Bivocom®

TG465 Series

Programmable Intelligent 5G IoT Gateways

Key Features

- ✓ Quad-core 64-bit ARM Cortex-A55 up to 2GHz
- ✓ NPU up to 1 TOPS, ARM G52 2EE GPU
- ✓ Up to 2GB RAM (DDR4, 8GB Option) and 16GB Flash(eMMC, 128GB Option), NVMe SSD(Option, up to 2TB)
- ✓ Openwrt Linux OS with Python/C/C++ programmable, or Unbuntu Linux OS, docker container, flexible for secondary development[1]
- ✓ 5G NR or 4G LTE to choose[2]
- ✓ 4-RJ45(GbE),1-RS232, up to 6-RS485, up to 4-DI, up to 4-DO, 1-USB3.0,
  1-TF, WIFI6(Option), HDMI(Option), Super capacitor(Option)
- ✓ MQTT broker/client, Modbus RTU/TCP, JSON, TCP/UDP, OPC UA, IEC101/104 and VPN[3]

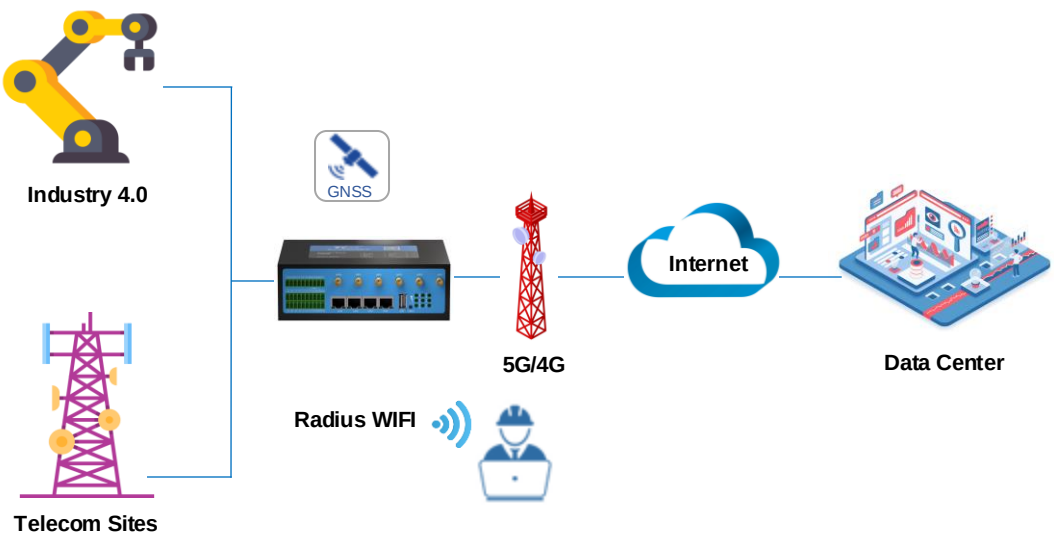
Introduction

The TG465 is a powerful and intelligent next generation IoT Gateway built-in with ARM CPU, GPU and NPU. It's designed for mission-critical IoT applications that demands advanced connectivity, edge computing, enhanced security, AI and machine learning, improved energy efficiency. It finds great utility in sectors such as industry 4.0, telecom sites, smart city, smart grid, renewable energy, transportation, etc.

The TG465 offers an embedded environment with OpenWRT-based Linux OS, enabling IoT developers to program and install their own applications using Python, C/C++ directly on the hardware via SDK. Additionally, it provides a flexible secondary development option through the Ubuntu programming environment.

The TG465 has wide range of interfaces and I/Os, allowing seamless connectivity with various equipment, controllers, and sensors. It facilitates data transfer to the cloud server via a 5G/4G LTE cellular network. It also supports crucial industrial protocols like MQTT broker/client, Modbus RTU/TCP, JSON, TCP/UDP, OPC UA, IEC101/104, and VPN, ensuring efficient and secure IoT data connectivity between field devices and the cloud server.

Applications



Specifications

System

- **CPU** ARM Cortex-A55, 64-bit, quad-core
- **RAM** DDR4, 2GB(8GB, Option)
- **Flash** eMMC, 16GB(128GB, Option)
- **NPU** 512MAC , up to 1 TOPS
- **GPU** Mali-G52, OpenGL ES 1.1/2.0/3.2, OpenCL 2.0, Vulkan 1.1

Cellular Interfaces

- **Antenna Connector** 4×50 Ω SMA Female(5G Version TG465-NR)
2×50 Ω SMA Female(4G Version TG465-LF)
- **SIM Slot** 1 x Micro SIM(Dual SIM, Option)[4]
- **ESD Protection** 15KV

Ethernet Interface

- **Ports** 4-RJ45 (1-WAN, 3-LAN or 4-LAN configurable)
- **Data Rates** 10/100/1000 Mbps (Auto-Sensing), Auto MDI/MDIX
- **ESD Protection** 1.5KV

Serial Interfaces

- **Connector** Terminal block, 3.5 mm female socket
- **Ports** 2-RS232(1-Debug, 1-Shared via RS485), 6-RS485(or 5-RS485, 1-Shared by RS232)
- **Baud Rate** 300bps to 230400bps
- **ESD protection** 8KV for RS232, 15KV for RS485

I/O

- **Connector** Terminal block, 3.5 mm female socket with lock
- **Digital Input** 3-DI (0-30V Input), up to 4-DI
Status "0": 0-3V, status "1": 5-30V
- **Relay Output** 2-DO (5A and 30VDC/250VAC switch) up to 4-DO
- **Power Output** 2(5-60VDC, controlled via device power input)

Wi-Fi 6(Option)

- **Antenna Connector** 2 × 50 Ω RP-SMA Female
- **Standard** 2T2R 802.11 a/b/g/n/ac/ax, AP and Client modes
- **Security** Open, WPA, WPA2, WPA/WPA2 Enterprise, Radius

GNSS (Option)

- **Module** GNSS from cellular module
- **Antenna Connector** 1 × 50 Ω SMA Female

External Storage & Display(Option)

- **TF Card Slot** 1x Micro SD interface, Up to 32G
- **SSD** 1x M2.0 NVMe SSD(Option, up to 2TB)
- **USB** 1x USB3.0
- **Usage** User Program, Data Storage and Firmware Upgrade
- **HDMI** 1 HDMI 2.0 (Option, up to 4K display)
- **Others(Option)** AI computing card, Audio

Power Supply and Consumption

- **Connector** Terminal block, 3.5 mm female socket
- **Standard Power** DC 12V/1.5A
- **Input Voltage** 5-60 VDC
- **Super Capacitor(Option)** Power-off alarm, data&log storage

Software

- **Network Protocols** PPP, PPPoE, SNMP v1/v2c/v3, TCP, UDP, DHCP, RIPv1/v2, OSPF, BGP, DNS, DDNS, HTTP, HTTPs, ARP, QoS, SNTP, Telnet, SSH
- **Industrial Protocols** MQTT client/broker, Transparent (TCP/UDP Client/Server), Modbus RTU/TCP, OPC UA, IEC101/104, DL/T645-2007, PLC(S7, FP) [5]
- **VPN Tunnel** IPsec/PPTP/L2TP/GRE/OpenVPN
- **Firewall** ACL/DMZ/Port Mapping/MAC Binding
- **Management** Web, CLI, SMS, Cloud DMP (Device Management Platform)[6]
- **Reliability** Dual SIM, WWAN and WAN Failover, Hardware & Software Watchdog
- **Secondary Development** OpenWrt based Linux OS, C/C++, Python SDK; or Ubuntu, Docker container

Physical Characteristics

- **Ingress Protection** IP30
- **Housing & Weight** Metal, 799g(1.76lbs), without accessories
- **Dimensions** 162x125x55mm (6.38 x 4.92 x 2.16in)
- **Mounting** Desktop, DIN-Rail

Environmental

- **Operating Temperature** -35°C to +75°C (-31°F to +167°F)
- **Storage Temperature** -40°C to +80°C (-40°F to +176°F)
- **Relative Humidity** 5% to 95% (non-condensing)

Others

- **Reset Button** 1
- **LED Indicators** Signal strength, Alarm, GPS, WIFI, SSD, System, 5G/4G
- **Built-in** Watchdog, RTC, Timer
- **EMC Index** EMC level 3
- **Approvals**[7] CE*, RCM*, FCC*
- **Warranty Period**[8] Standard: 12 Months; Extended: 2-5 Years

Standard Package Content

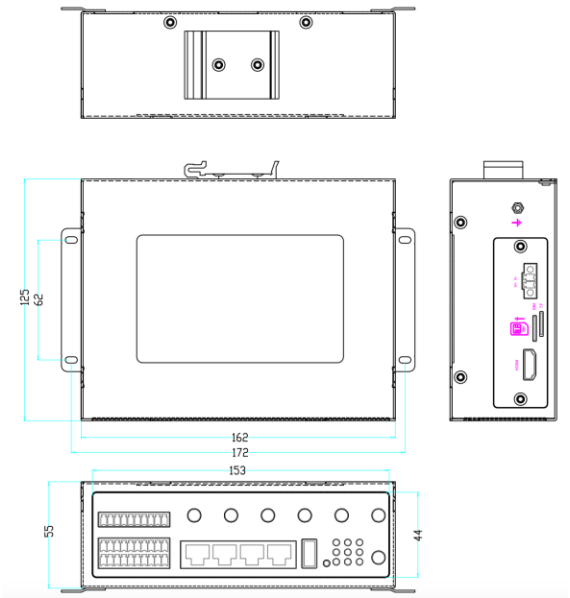
1.	TG465 Gateway	1 PCS
2.	Power Adapter(DC 12V/1.5A, EU/US/UK/AU plug optional)	1 PCS
3.	Mag-mount Cellular Antenna (SMA Male, 1 meter, 5dBi)	5G Version: 4 PCS 4G Version: 2 PCS
4.	RS232 Cable (DB9 Female, 1 meter)	1 PCS
5.	Ethernet Cable(1 meter)	1 PCS
6.	10-Pin Terminal Block	3 PCS
7.	2-Pin Terminal Block	1 PCS
8.	DIN-Rail Mount Kits	1 PCS

Order Information

Model	Part Number	Description	Frequency Band[9]
TG465-NR	TG465 - N<1><2> - <3>	5G IoT Gateway, 4-GbE, 1-RS232, 6-RS485, 3-DI, 2-Relay, 1-USB, 1-TF	5G NR Sub-6 • n1/n2/n3/n5/n7/n8/n12/n20/n28/n41/n66/n71/n77/n78/n79 • LTE FDD: B1/B2/B3/B4/B5/B7/B8/B9/B12/B13/B14/B17/B18/B19/B20/B21(TBD)/B25/B26/B28/B29/B30/B32/B66/B71 • LTE TDD: B34/B38/39/B40/B41/B42/B43/B48
TG465-LF	TG465 - L<1><2> - <3>	4G IoT Gateway, 4-GbE, 1-RS232, 3-RS485, 4-DI, 4-Relay, 1-USB, 1-TF	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

Option features:
<1>: 5G or 4G module for different countries and regions
<2>: DS=dual SIM on single module, failover only
<3>: W6=2WIFI 6
GN=GNSS from cellular module
HDMI=HM
SSD=SD
Super capacitor=SC

Dimensions



Interfaces

Terminal Block 1	K2+	K2-	K1+	K1-	NC	DI3	GND	DI2	GND	DI1
	Relay 2		Relay 1			DI 1-3				

Terminal Block 2	RS485-6 / DI4		RS485-5 / Relay 3		RS485-4 / Relay 4		Debug			Power Output 2
	A6	B6	A5	B5	A4	B4	TX2	RX2	GND	VCC2
Terminal Block 3	A3	B3	A2	B2	A1	B1	TX1	RX1	GND	VCC1
	RS485-3		RS485-2		RS485-1		RS232			Power Output 1

LED Indicators	Signal Strength	WIFI	5G/4G
		GPS	SYS
		ALARM	SSD

Ethernet Ports	LAN3	LAN2	LAN1	WAN

Antenna Ports	5G: ANT 1-4 4G: ANT 1-2			
	ANT4	ANT3	ANT2	ANT1

Related Products

5G NR IoT Gateway
TG463 Series

- ✓ 5G NR NA/NSA dual mode
- ✓ Rich I/O and customizable industrial protocols
- ✓ OpenWrt based Linux OS, C/C++, Python programmable

5G NR IoT Gateway
TG453 Series

- ✓ 5G NR NA/NSA dual mode
- ✓ Serial and Gigabit ethernet ports, with mainstream industrial protocols
- ✓ OpenWrt based Linux OS, C/C++, Python programmable

Note:
1. Customized firmware or SDK may be required.
2. There are different modules for different regions to choose.
3. Some protocols may require customized firmware.
4. DSSM=dual sim on single module, supports failover.
5. Customized firmware may be required.
6. There has a license fee for DMP.
7. * Under progress
8. Price of the extended warranty will be different.
9. If you couldn't find the frequency band for your regions or have any questions, please contact Bivocom sales representatives for more information.
10. To save the earth, Bivocom doesn't print the user guide, if you need it, please go to Bivocom website to download.

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