



InHand Networks



High-performance, Powerful, Programmable, Compact

InVehicle G710 Series

On-board 5G Cellular Gateway

The InVehicle G710 5G gateway provides high-speed and secure network access for vehicles and transportation services, including special-purpose, heavy equipment, law enforcement, emergency, engineering and ambulance vehicles. The cloud-based fleet management platform provides continuous supervision for logistics management, asset tracking, mobile offices and government security works.

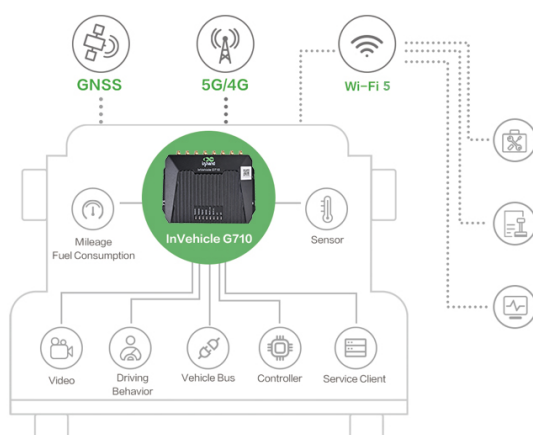
The InVehicle G710 has industrial grade hardware platform, high-speed Wi-Fi and 5G WAN to provide fast, reliable and secure network access for vehicles and vehicle-mounted devices. It supports CAN bus for real-time collection of vehicle data; built-in advanced satellite navigation system for continuous accurate positioning; combining with remote analysis software, it supports monitoring of dangerous driving behaviors.

The gateway is embedded with powerful edge computing capability and supports fast custom development by Python and C/C++. It also supports MS Azure and AWS IoT clouds.

The InVG710 vehicle gateway is suitable for fleet management as well as vehicle operation process control. Applications include:

- Public transportation: buses, long-distance buses
- Heavy equipment: trucks, excavators, cranes, loaders, bulldozers
- Public safety: law enforcement vehicles, fire engines, waste collection vehicles
- Defense forces: combat vehicles, emergency communication vehicles
- Logistics transport: express logistics
- Special goods transport: hazardous goods, vaccines, cold chain
- First Aid: ambulances, tele-medical vehicles

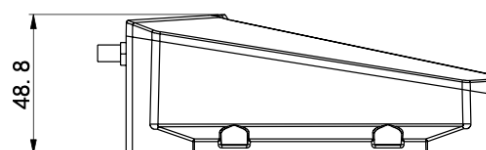
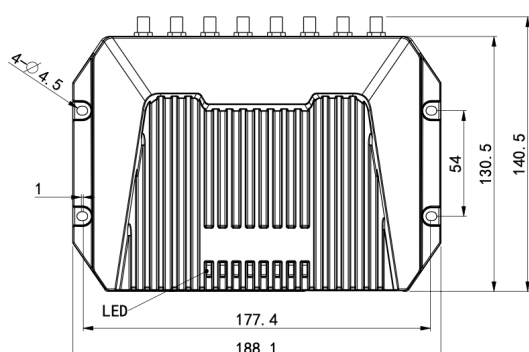
Application Case



Features and Advantages

- + Supports 5G SA/NSA and LTE-A
 - + Built-in link redundancy, dual SIM, link backup
 - + Dual-band Gigabit Wi-Fi and Ethernet
 - + Easy to manage and deploy in large scale
 - + Vehicle-mounted OTA upgrade service
 - + Integrated OBD-II/J1939/LIN diagnostic interface
 - + Industrial-grade chip, communication module and electronic components
 - + Supports Python and Docker for secondary development
- **Robust network access capability**
Supports 5G both standalone (SA) and non-standalone (NSA) modes. Download speed up to 2.1Gbps and upload speed up to 450 Mbps. Support TDD and FDD two modes, backward compatible with 4G/3G.
 - **Designed for vehicles**
Designed for challenging operating environments in vehicles. Industrial-grade processor chip ensures continuous operation on-board vehicles. IP64 protection, resistant to challenging conditions like water splash, dust, shock, vibration, damp heat and high and low temperatures.
 - **Global satellite positioning**
72-channel high-precision high-sensitivity global satellite positioning system, tracks vehicle locations precisely at any time anywhere.
 - **Inertial navigation**
Integrates inertial navigation system. When GNSS positioning becomes inaccurate due to weak signal, no signal or multi-path effect, the gateway will still provide excellent positioning accuracy, enabling continuous accurate tracking of the vehicle.
 - **Driving behavior monitoring**
Integrated 3D accelerometer and gyroscope can help to monitor in real time dangerous driving behaviors like rapid acceleration, sudden braking and sharp turns, as well as collision events. This will help to reduce accidents, protect personnels and cargoes safe with preventive measures, and finally reduce operation losses and improve customer satisfaction.
 - **Vehicle diagnostics collection**
Integrates multiple interfaces including OBD-II and J1939 to collect vehicles diagnostics, and API interface to upload the data to the application platform in real time. By analyzing the diagnostic data, the application platform can timely detect health issues of vehicles, shorten response duration.
 - **Rich vehicle-mounted I/O**
Integrates multiple channels of I/O inputs, outputs, and analog inputs, can connect a wide range of sensors. Integrates Bluetooth 4.1 to connect vehicle-mounted Bluetooth electronic devices. Supports RS232/RS485 serial port, can connect field service devices to implement asset management or service workflow.
 - **Edge computing**
Outstanding edge computing capabilities extend analytical calculation to the network edge within the vehicle, improving the efficiency of data processing, which meets the basic need for real-time business and application intelligence in the Internet of Vehicles (IoV) industry. Supports Node-RED Low-code edge computing solutions.
 - **Fleet management platform**
Supports access to InHand or a 3rd-party fleet management platform to perform: task assignment, route planning, vehicle tracking, real-time messaging, geofencing, etc. Supports network

Dimensions (mm)



Product Specifications

InVehicle G710 Hardware Specifications			
Hardware Platform			
CPU	ARM Cortex A7	RAM	1GB DDR3
FLASH	8GB eMMC	Main Frequency	717MHz
Satellite Navigation			
GNSS Receiver	GPS, GLONASS, Galileo, Beidou		
Built-in Sensor	Inertial navigation sensor (accelerometer and gyroscope)		
Positioning Deviation	1.5m (With SBAS), 2.5m (Autonomous), ADR (Optional)		
Tracking Sensitivity	-160dBm	Location Update Rate	MAX 10Hz
Interfaces			
Cellular	5G SA/NAS Sub-6 or 4G CAT 6		
Ethernet	4*10/100/1000 Mbps RJ45 interface		
MicroSD	Micro SD Card (up to 32GB, 20MB/s)	Bluetooth	Bluetooth 4.1
Antenna	SMA-K: Cellular, GNSS; RPSMA-K: 2*Wi-Fi, Bluetooth		
Indicator	System, Cellular, Signal, GNSS, Wi-Fi 2.4G, Wi-Fi 5G, U1, U2		
Wi-Fi			
Frequency	2.4G / 5GHz dual-band	Protocol	Wi-Fi 5
Maximum Output	2.4G: 17dBm 5G: 17dBm	Working Mode	AP / Client
Automotive Interfaces			
Diagnostic Interface	CAN bus *2, J1708*1, LIN Bus*1		
DO/DI/AI	DO*2 DI/AI *4 or DI/AI *2	Audio/Voice	R, L, Mic
Serial Port	RS485*1, RS232*1	Other	1 WIRE (driver ID / temperature sense)
Power Supply			
Pin Definition	V+, V-, ignition signal, NC (4 pins)		
Input Voltage	9-36VDC [configurable to 7-36VDC]		
Protection	Built-in voltage transient protection, with delayed ignition induction		
Standby Power	0.006W - monitors ignition signal only; system starts on ignition		
Operating Power	12.00W - average when RF module not running at full load		
Peak Power	18.20W - peak value when RF module running at full load		
Mechanical Features			
Installation	Wall-mounting	Protection Rating	IP64
Cooling	Radiation cooling	Housing	Die-cast aluminum
Dimensions(W x D x H)	188.1 x 104.5 x 48.8 (mm)	Weight	775g
SIM Card Slot	Dual SIM	SIM Card Spec.	2FF
Environmental			
Operating Temperature	-30 °C ~ +70 °C -22 °F ~ +158 °F	Storage Temperature	-40 °C ~ +85 °C -40 °F ~ +185 °F
Humidity	95% RH @ 60°C	Start-up	-35 °C / -35 °F
Vehicle			
Vehicle Standard	ECE-R10, R118	Rail Standard	EN50155, EN50121 EN61373, EN45545
EMC	Level 3 (EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-18)		
Physical			
Shock	IEC60068-2-27	Vibration	IEC60068-2-6
Fall	IEC60068-2-32		
Certificate	CE, E-Mark, ITxPT, FCC, IC, PTCRB, RoHS, AT&T		

InVehicle G710 Software Specifications			
Network Connection			
Network Access	APN, VPDN	LAN Protocol	ARP, Ethernet
Access Authentication	CHAP/PAP/MS-CHAP/MS-CHAP V2		
Network Protocols			
IP Application	IPv6,Ping, Traceroute, DHCP server/relay/client, DNS relay, DDNS, Telnet, SSH, HTTP, HTTPS, TFTP, FTP, SFTP, Portal		
IP Routing	Static routing, RIP, OSPF, BGP, IGMP Proxy		
Network Security			
Firewall	SPI, DoS attack defense, multicast/Ping probe filter, ACLs Supports NAT, PAT, DMZ, port mapping, virtual server		
User Level	2 levels: administrator; read-only user		
AAA	Local authentication, Radius, Tacacs+, LDAP		
CA Certificate	PEM, PKCS12, SCEP		
VPN	IPsec VPN, L2TP, PPTP, GRE, OPENVPN, CA		
Reliability			
Backup	Floating routing, VRRP, interface backup		
Link Detection	Sends heartbeat packet to detect, auto redial when disconnected		
Watchdog	Runs self-detection and auto-repairing of device faults		
Offline Storage	Built-in cache, records key data when network unavailable		
Ports			
VLAN Partition	Supported	Port Mirroring	Supported
WLAN			
Protocol	IEEE802.11 b/g/n/a/ac		
Security	Shared key, WPA/WPA2 authentication, WEP/TKIP/AES encryption		
Network Management			
Configuration	Local or remote HTTP, HTTPS, Telnet, SSH		
Upgrade	Local or remote WEB, DM, TFTP, FTP, SFTP server		
AAA	Local / Radius / TACACS +		
Network Diagnostic	Ping, Traceroute, Sniffer (network packet capturing tool)		
Edge Computing Framework			
Edge Computing Platform	An edge computing platform integrating network, computing, storage and applications		
Programmable	Python, C/C++ & Docker		
SDK	Python 3 SDK, Docker SDK and Azure IoT Edge SDK		
IDE	Visual Studio Code		
IoT Architecture	Supports MQTT, DDS, AMQP, XMPP, JMS, REST, CoAP		
3rd Party Cloud	MS Azure, SmartFleet and development APIs for other third-party platforms		
Docker images	Node-RED, Ubuntu, Docker for ARM 32, etc.		
Application Services			
Cloud Services	Device Manager platform enable to manage and monitor VG710 online . InConnect Service can help customer quickly build a private network, user can access the devices connected to VG710 at any time.		
Vehicle Telemetry	Rich interfaces for vehicle telemetry and asset tracking devices		
Event Alarm	Customizable event alarms: digital input, network, service status, power supply, temperature, voltage, etc.		
Message Push	SMS, Email, App, device digital output		

Ordering Guide

Model	Cellular Type	CAN bus	GNSS	Wi-Fi 5	Bluetooth	Region
VG710-H-NRQ0	5G NR NSA:n38*/n41/n71/n77/n78/n79 5G NR SA:n1/n2/n3/n5/n7/n8/n12/n20/n25/n28*/n38/n40/n41/n48/n66/n71/n77/n78/n79 LTE-FDD:B1/B2/B3/B4/B5/B7/B8/B12/B13/B14/B17/B18/B19/B20/B25/B26/B28/B29/B30/B32/B66/B71 LTE-TDD:B34/B38/B39/B40/B41/B42/B43/B48 WCDMA:B1/B2/B3/B4/B5/B8/B19	2	√ / UDR	√	√	Global (except for North America)
VG710-H-NRQ3	5G NR NSA: n1/n2/n3/n5/n7/n8/n12/n20/n25/n28/n38/n40/n41/n48*/n66/n71/n77/n78/n79 5G NR SA: n1/n2/n3/n5/n7/n8/n12/n20/n25/n28/n38/n40/n41/n48*/n66/n71/n77/n78/n79 LTE-FDD:B1/B2/B3/B4/B5/B7/B8/B9/B12(B17)/B13/B14/B18/B19/B20/B25/B26/B28/B29/B30/B32/B66/B71 LTE-TDD:B34/B38/B39/B40/B41/B42/B43/B48 LTE Category: DL CAT20/UL CAT18 LAA:B46 WCDMA Bands:B1/B2/B3/B4/B5/B6/B8/B19	2	√ / UDR	√	√	Global (except for China)
VG710-H-NRQ3-Ga	5G NR NSA: n1/n2/n3/n5/n7/n8/n12/n20/n25/n28/n38/n40/n41/n48*/n66/n71/n77/n78/n79 5G NR SA: n1/n2/n3/n5/n7/n8/n12/n20/n25/n28/n38/n40/n41/n48*/n66/n71/n77/n78/n79 LTE-FDD:B1/B2/B3/B4/B5/B7/B8/B9/B12(B17)/B13/B14/B18/B19/B20/B25/B26/B28/B29/B30/B32/B66/B71 LTE-TDD:B34/B38/B39/B40/B41/B42/B43/B48 LTE Category: DL CAT20/UL CAT18 LAA:B46 WCDMA Bands:B1/B2/B3/B4/B5/B6/B8/B19	2	√ / ADR	√	√	Global (except for China)
VG710-H-FQ59-Ga	LTE CAT6 LTE-FDD B1/B3/B5/B7/B8/B20/B28/B32 LTE-TDD B38/B40/B41 WCDMA B1/B3/B5/B8	2	√ / ADR	√	√	EMEA/APAC/Brazil

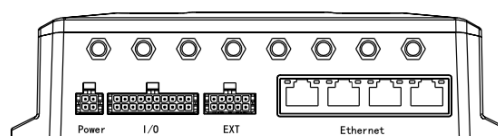
Connector Pin

I/O 20PIN Definition

PIN	1	2	3	4	5	6	7	8	9	10
Def.	L_Channel	Mic IN	RS_485A	GND	RS232_TX	1Wire	DO1	GND	AI1/DI1	AI3/DI3/FWD*
PIN	11	12	13	14	15	16	17	18	19	20
Def.	R_Channel	GND	RS_485B	GND	RS232_RX	GNSS_1PPS	DO2	GND	AI2/DI2	AI4/DI4/WHEEL TICK*

EXT 10PIN Definition

PIN	1	2	3	4	5
Def.	K_LINE	CAN0_H	GND	CAN1_H	J1708_A
PIN	6	7	8	9	10
Def.	L_LINE	CAN0_L	GND	CAN1_L	J1708_B



* FWD and WHEEL TICK is GNSS ADR function PIN, UDR mode is AI3/DI4 and AI4/DI4.

About Us

InHand Networks is a global leader of Industrial IoT, with a record of tremendous success following groundbreaking innovation since our inception in 2001.

InHand serves world-class partners and customers with industrial M2M routers, gateways, industrial Ethernet switches, rugged computers and IoT management platforms. We provide IoT solutions for various vertical markets including Smart Grid, Industrial Automation, Remote Machine Monitoring, Smart Vending, Smart City, Retail and more.

Proudly bearing the marks of both Rockwell Automation Technology Partner in Asia-Pacific and Schneider Electric Technology Partner, InHand Networks defines industrial innovation and reliability.



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