High-performance, Powerful, Programmable

InVehicle G710 Series

Automotive Grade Cellular Gateway

The InVehicle G710 4G LTE 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 automotive-grade hardware platform, high-speed Wi-Fi and LTE CAT6 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. 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:

- 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
- Public transportation: buses, long-distance buses

Application Case
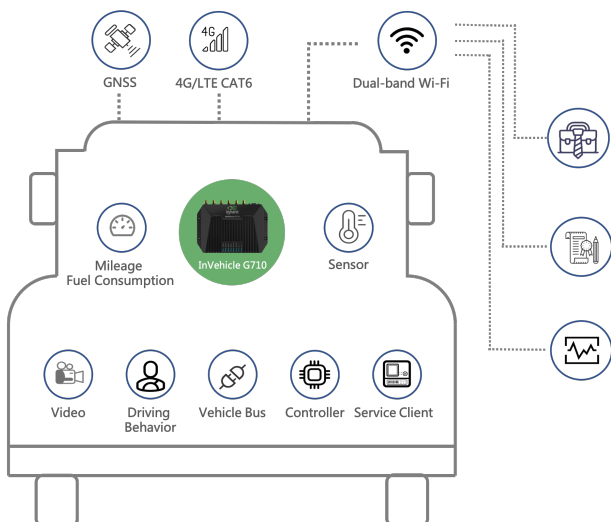
Features and Advantages

- + Supports 4G LTE CAT6
- + 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/diagnostic interface
- + Industrial-grade chip, communication module and electronic components
- + Supports Python and Docker for secondary development

● **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 management, reducing the complexity of device management and service deployment.

● **Developer features**

The comprehensive secondary development platform opens key system resources to users, facilitating fast development and deployment of custom applications. Integrating cloud-end IoT SDK, enables quick building of AWS, Azure and other mainstream clouds based applications.
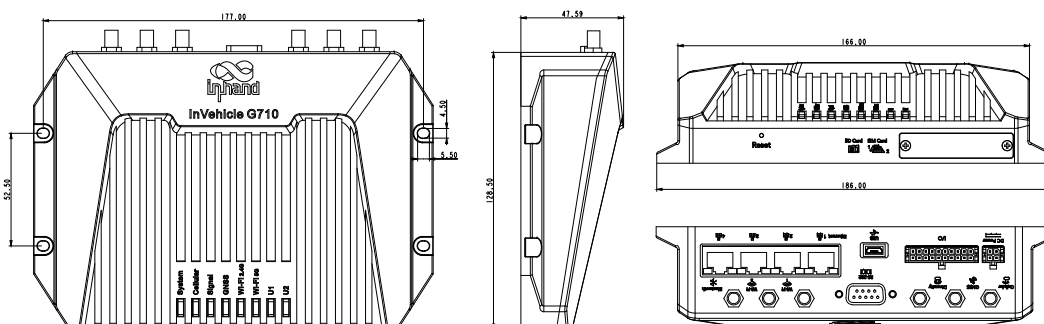
20PIN Definition

PIN	Definition	PIN	Definition
1	-485	11	485
2	CANL	12	CANH
3	1-Wire	13	GND
4	DO4	14	DO3
5	DO2	15	DO1
6	GND	16	GND
7*	AI6/DI6	17*	AI5/DI5
8	AI4/DI4	18	AI3/DI3
9	AI2/DI2	19	AI1/DI1
10	GND	20	GND

7* ： AI6/DI6/FWD
17* ： AI5/DI5/WHEELTICK

InHand Networks

Product Specifications

InVehicle G710 Hardware Specifications

Hardware Platform

CPU	ARM Cortex A7	RAM	1GB/512MB 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)		
Tracking Sensitivity	-160dBm	Location Update Rate	MAX 10Hz

Interfaces

Cellular	LTE CAT6/CAT4	Ethernet	4*10/100/1000 Mbps RJ45 interface
Serial Port	RS232 serial (DB-9)	USB Port	USB2.0 Micro-B (Read-write: Max 480Mbps)
MicroSD	Micro SD Card (up to 32GB, 20MB/s)	Bluetooth	Bluetooth 4.1
Antenna	SMA-K: Cellular, GNSS, Diversity; RPSMA-K: 2*Wi-Fi, Bluetooth		
Indicator	System, LTE, 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	CanBus	DI	6 * digitali input
DO	4 * digital output	AI	6 * analog input
RS485	RS485 serial (A+, B-, GND)	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 (mm)	186 x 128.5 x 48	Real Time Clock	Supported
Weight	775g		
SIM Card Slot	Dual SIM	SIM Card Spec	2FF

Environment

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		

Vehicle

Automotive Standard	ECE-R118, IEC60068-2-31	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, FCC, IC, PTCRB, AT&T, E-Mark, RoHS		

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 HTPP, 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
Edge Computing Engine	Python & 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

Fleet Management Cloud	InHand SmartFleet cloud platform: task allocation, route planning, vehicle tracking, real-time messaging, geofencing, batch firmware upgrade, batch configuration backup, application upgrade
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

InHand Networks

Ordering Guide

Model	Cellular Type	UE Category	RAM	CANBUS	GNSS	Wi-Fi	Bluetooth	Region
VG710-L-FS39	LTE-FDD Band2/4/5/12/13/17/29 UMTS/HSPA+Band2/4/5 GSM/GPRS/EDGE 850/900/1800/1900MHz	LTE CAT6	1GB	√	√	√	√	NorthAmerica LatinAmerica CaribbeanCoast
VG710-L-FS59	L T E – F D D Band1/3/5/7/8/1819/20/26/28A/28B LTE-TDD Band38/39/40/41 UMTS/HSPA+Band1/3/5/6/8 TD-SCDMA Band34/39 GSM/GPRS/EDGE900/1800MHz	LTE CAT6	1GB	√	√	√	√	Europe Africa Asia Oceania
VG710-L-FQ78	LTE-FDD Band1/2/3/4/5/7/8/28 LTE-TDD Band40 WCDMA Band1/2/5/8 GSM/EDGE Band2/3/5/8	LTE CAT4	1GB	√	√	√	√	LatinAmerica Australia NewZealand
VG710-L-LQ20	LTE-FDD Band1/3/5/8 LTE-TDD Band38/39/40/41 TD-SCDMABand34/39 UMTS（DC-HSPA+）Band1/8 EVDO800MHzCDMA-1x800MHz E D G E / G P R S / GSM850/900/1800/1900MHz	LTE CAT4	1GB	√	√	√	√	China
VG710-FS39	LTE-FDD Band2/4/5/12/13/17/29 UMTS/HSPA+Band2/4/5 GSM/GPRS/EDGE 850/900/1800/1900MHz	LTE CAT6	512MB	√	√	√	√	NorthAmerica LatinAmerica CaribbeanCoast
VG710-FS59	L T E – F D D Band1/3/5/7/8/18/19/20/26/28A/28B LTE-TDD Band38/39/40/41 UMTS/HSPA+Band1/3/5/6/8 TD-SCDMA Band34/39 GSM/GPRS/EDGE900/1800MHz	LTE CAT6	512MB	√	√	√	√	Europe Africa Asia Oceania China
VG710-LQ20	LTE-FDD Band1/3/5/8 LTE-TDD Band38/39/40/41 TD-SCDMABand34/39 UMTS（DC-HSPA+）Band1/8 EVDO800MHzCDMA-1x800MHz E D G E / G P R S / GSM850/900/1800/1900MHz	LTE CAT4	512MB	√	√	√	√	China
VG710-FQ78	LTE-FDD Band1/2/3/4/5/7/8/28 LTE-TDD Band40 WCDMA Band1/2/5/8 GSM/EDGE Band2/3/5/8	LTE CAT4	512MB	√	√	√	√	LatinAmerica Australia NewZealand
Example：	VG710-FS59 vehicle-mounted gateway, 4 Ethernet interfaces, one DB-9 RS232 serial port, RS485 serial port, MicroUSB2.0 serial port, supports DC-HSPA+ networks, supports CANBUS, GNNS global satellite positioning, WLAN dual-band Gigabit wireless LAN, and bluetooth, can be used in Europe, Asia Pacific, and China.							

Accessories

Antenna	Order Code	Specifications
LTE 4G Antenna	AANT090025	LTE/GSM/CDMA/DCS/PCS/WCDMA/UMTS/HSDPA/GPRS/EDGE 824−960MHz, 1710−2700Mhz 1M RG−174 cable with SMA−J1.5 connector, dimensions: 2000±20mm
GNSS Antenna	AANT040005	GPS/GALILEO: 27±2 dB@1575.42MHz GLONASS: 27±2 dB@1602MHz, dimensions: 55.6x50.5mm
GNSS Antenna	AANT040006	GPS/GALILEO: 27±2 dB@1575.42MHz GLONASS: 27±2 dB@1602MHz, dimensions: 50x38.5mm
Wi−Fi Antenna (Rubber Ducky)	AANT060016	2400~2500MHz / 4900~5850MHz, peak gain 5±0.5dBi,
Wi−Fi Antenna (Antenna Adhesive)	AANT060018	2400~2500MHz / 4900~5850MHz, peak gain ≤ 3dBi, dimensions: 2000±20mm
Bluetooth Antenna (Rubber Ducky)	AANT060017	2.4GHz, peak gain ≤ 2dBi

Cable	Order Code	Specifications
Power Cable	SCAB000216	The cable has A and B ends: A is 4PIN end to connect to VG710; B is open end, suitable for field engineering projects. To perform indoor testing, a power adapter needs to be prepared separately.
20 PIN Extension Cord	SCAB000219	The cable has A and B ends: A is 20PIN end to connect to VG710; B is open end, suitable for field engineering projects and testing.
OBD−II Power Cable	SCAB000235	P1 is 20PIN; P2 is 4PIN power terminal; P3 is OBD−II male; P4 is I/O open end, suitable for engineering projects; P5 is ignition signal cable, please connect to the ignition signal of the vehicle before use. Suitable for field engineering projects.
J1939 9PIN Power Cable	SCAB000234	P1 is 20PIN; P2 is 4PIN power terminal; P3 is J1939 9PIN female; P4 is I/O open end, suitable for engineering projects; P5 is ignition signal cable, please connect to the ignition signal of the vehicle before use. Suitable for field engineering projects.
J1939 6PIN Power Cable	SCAB000233	P1 is 20PIN; P2 is 4PIN power terminal; P3 is J1939 6PIN female; P4 is I/O open end, suitable for engineering projects; P5 is ignition signal cable, please connect to the ignition signal of the vehicle before use. Suitable for field engineering projects.
20 PIN to OBD−II	SCAB000215	This cable has A, B, C and D ends: A is 20PIN female; B is OBD female; C is A duplicate but male; D is OBD male, suitable for field engineering projects and testing.

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.

InHand Networks

43671 Trade Center Place, Suite 100, Dulles, VA 20166, USA
T: +1 (703) 348-2988
E: info@inhandnetworks.com
www.inhandnetworks.com