InHand Networks

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, 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.
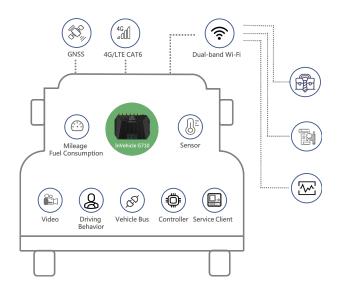
The InVehicle G710 has automotive-grade hardware platform, high-speed Wi-Fi and LTE CAT6 WAN to provide fast, reliable and secure network access for vehicles and vehicle-mounted devices. It supports CAN bus for real-time collection of vehicle data; built-in advanced satellite navigation system for continuous 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:

- Public safety: law enforcement vehicles, fire engines, waste collection vehicles
- Defense forces: combat vehicles, emergency communication vehicles
- Public transportation: buses, long-distance buses
- First Aid: ambulances, telemedical vehicles
- Logistics transport: express logistics
- Special goods transport: hazardous goods, vaccines, cold chain

Application Case

Features and Advantages

+ Supports 4G LTE CAT6
+ 5G compatible
+ Built-in link redundancy, dual SIM, link backup
+ Dual-band Gigabit Wi-Fi and Ethernet
+ Integrated OBD-II/J1939/J1708 diagnostic interface
+ Easy to manage and deploy in large scale
+ Vehicle-mounted OTA upgrade service
+ Supports Python development, for fast deployment of service applications
+ Automotive-grade chip, communication module and electronic components

Designed for vehicles

Designed for challenging operating environments in vehicles. Automotive-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 diagnostics of vehicles, and API interface to upload the data to the application platform in real time. By analyzing the diagnostic information, the online application platform can timely detect health status 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

Edge computing capability extends analytic computing to network edge, i.e. in vehicles, providing much faster response, greatly improving data processing efficiency while reducing the load of cloud. This can meet the basic needs of real-time services and smart applications of the Internet of Vehicles.
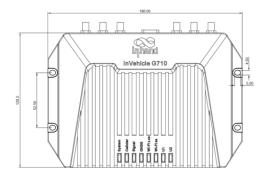
Fleet management platform

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.
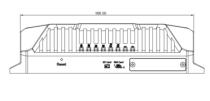
Developer features

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, Ali Cloud and other mainstream clouds based applications.

Dimensions(mm)

20 Pin I/O

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

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Product Specifications

InVehicle G710 Hardware Specifications

Hardware Platform

CPU	ARM Cortex A CPU	RAM	512MB DDR3
FLASH	8GB eMMC	Main Frequency	717MHz

Satellite Navigation

GNSS Receiver	GPS, GLONASS, Galileo, Beidou and other regional system		
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 30Hz

Interface

Cellular	LTE CAT6	Ethernet	4*10/100/1000 Mbps RJ45 interface
Serial Port	RS232 serial (DB-9) Packet loss: 0% hardware	USB Port	USB2.0 Micro-B (Read-write: Max 480Mbps)
MicroSD	Micro SD Card (up to 32GB, 20MB/s)	Bluetooth	Bluetooth 4.1
Antenna	6 SMA-J connectors: LTE*2, Wi-Fi*2, GNSS, Bluetooth		
Indicator	System, LTE, Signal, GNSS, Wi-Fi 2.4G, Wi-Fi 5G, U1, U2		

Wi-Fi

Frequency	2.4G / 5GHz dual-band	Protocol	802.11ac/a/b/g/n Wave2
Maximum Output	2.4G: 17dBm 5G: 17dBm	Working Mode	AP / Client

Automotive Interface

DI	6 * digitali input	6 channels multiplexing, configurable (AI: 0.5-36V, DI: 0-36V)	
AI	6 * analog input		
DO	4 * digital output (U: 0-36V, Low Side Current Sink Output I:0.5A)		
Dignostic Interface	CanBus		
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

Installation	Wall-mounting	Protection Rating	IP64
Cooling	Radiation cooling	Housing	Die-cast aluminum
Dimensions(mm)	186 x 128.5 x 48	Real Time Clock	Supports

Environment

Operating Temperature	-30 °C to +70 °C / -22 °F to +158 °F	Storage Temperature	-40 °C to +85 °C / -40 °F to +185 °F
Humidity	95% RH @ 60°C		

Automotive

Automotive Standard	MIL-STD-810GB, E-Mark, ISO 7637-2 (EMC), ISO11452 (EMI) SAEJ1455
EMC	EN 61000-6-2 (Static)

Physical

Shock	IEC60068-2-27	Vibration	IEC60068-2-6
Fall	IEC60068-2-32		
Certificate	CE, FCC, IC, RCM, PTCRB, IMDA		

InVehicle G710 Software Specifications

Network Connection

Network Access	APN, VPDN	LAN Protocol	ARP, Ethernet
Access Authentication	CHAP/PAP/MS-CHAP/MS-CHAP V2		

Network Protocol

IP Application	Ping, Traceroute, DHCP server/relay/client, DNS relay, DDNS, Telnet, SSH, HTTP, HTTPS, TFTP, FTP, SFTP		
IP Routing	Static route, 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	IIPsec VPN, L2TP, PPTP, GRE, OPENVPN, CA

Reliability

Backup	Floating routing, VRRP, interface backup
Link Detection	Send 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

Port

VLAN Partition	Support	Port Mirroring	Support

WLAN

Protocol	IEEE 802.11b/g/n
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
Development Environment	Standard Python 3 development environment
Function Library	Supports Python official and custom function libraries
Dedicated Programmer	Provides debugging client tool for programming
IoT Architecture	Supports MQTT, DDS, AMQP, XMPP, JMS, REST, CoAP
3rd Party Cloud	MS Azure, AWS, Ali cloud, Huawei cloud, 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

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Ordering Guide

Model	Cellular Type	CANBUS	GNNS	Wi-Fi	Bluetooth	Region
VG710-FS39	GSM/GPRS/EDGE 850/900/1800/1900MHz UMTS/HSPA+ 850/1700/1900MHz, Band 2/4/5 LTE-FDD 700/850/1700/1900MHz, Band 2/4/5/12/13/17/29	√	√	√	√	North America, Latin America, Caribbean Coast
VG710-FS59	GSM/GPRS/EDGE 900/1800MHz UMTS/HSPA+ 850/900/1800/2100MHz, Band 1/3/5/6/8 LTE-FDD 700/800/850/900/1800/2100/2600MHz, Band 1/3/5/7/8/18/19/20/26/28A/28B LTE-TDD 1900/2300/2600MHz, Band 38/39/40/41 TD-SCDMA 1900/2000MHz, Band 34/39	√	√	√	√	Europe, Africa, Asia, Oceania
VG710-TL00	LTE-FDD Band 1/3/8 LTE-TDD Band 38/39/40/41 UMTS (DC-HSPA+) Band 1/5/8/9 TD-SCDMA Band 34/39 EDGE/GPRS/GSM 900/1800MHz	√	√	√	√	China
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 (The only difference between models is cellular network types and no other functional difference. The whole series can be referred to as VG710.)					

Antenna	Order Code	Specifications
LTE 4G Antenna	AANT090025	LTE/GSM/CDMA/DCS/PCS/WCDMA/UMTS/HSDPA/GPRS/EDGE/GPS/Wi-Fi 698-960MHz, 1575.42MHz, 1710-2700Mhz 1M RG-174 cable with SMA(M) connector
GNSS Antenna	AANT040005	GPS/GALILEO: 1575.42±1.023 MHz GLONASS: 1602±8 MHz Beidou: 1561.098±2.046 MHz Dimensions: 55.6x50.5mm
GNSS Antenna	AANT040006	GPS/GALILEO: 1575.42±1.023 MHz GLONASS: 1602±8 MHz Beidou: 1561.098±2.046 MHz Dimensions: 50x38.5mm
Wi-Fi Antenna - Rubber Ducky	AANT060016	2400~2500MHz / 4900~5850MHz
Wi-Fi Antenna	AANT060018	2400~2500MHz / 4900~5850MHz
Bluetooth Antenna	AANT060017	2.4GHz, peak gain 3dBI

Cable	Order Code	Specifications
Power Cable	SCAB000216	The cable has A and B ends: A end has 4 pins and connects to VG710; B end is bare wire ends. Suitable for field engineering projects. To perform indoor testing, a power adapter needs to be prepared separately.
20 PIN Extension Cord	SCAB000216	The cable has A and B ends: A end has 20 pins and connects to VG710; B end is bare wire ends. Suitable for field engineering projects and testing.
20 PIN to OBD-II	SCAB000219	This cable has A, B, C and D ends: A end is 20 pins female; B end is OBD female; C end replicates A but is male; D end 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 Encompass Product Partner in Asia-Pacific and Schneider Electric CAPP Technology Partner, while listed on NEEQ 430642 as of February 18, 2014, InHand Networks defines industrial innovation and reliability.

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