CQ80 Series Vehicle PC

Product Overview

The new CQ80 series takes over from the CQ70 line-up as some of the most powerful PC's in our range. Powered by a 10-core Intel Core i9-10900TE CPU with an NVIDIA Quadro RTX 3000 GPU featuring 1920 CUDA cores and 240 Tensor cores, this PC is designed to handle the growing demands of AI GPU computing. All wrapped up in a discrete, rugged fanless form factor.

As with all our PCs, numerous built-in options are available, including cellular, GPS, Wi-Fi, video capture, CAN-bus and 8 channel PoE as standard. The fanless nature of the CQ80 series makes it suitable for extremely dusty environments and the device's ruggedness is demonstrated by multiple MIL-STD-810G tests. The CQ80 series is E-mark certified making it fully approved for in-vehicle use and also certified CE, FCC Class A and EN50155 compliant offering a wide range of operational use cases. All our CQ range includes a 2-year warranty as standard, which is extendable to 3 or 5 years.

Product Highlights

- Up to an **10th Gen Intel i9-10900TE processor (10 Cores, 20 threads, up to 4.5GHz)**
- Up to a **NVIDIA Quadro RTX 3000 GPU (1920 CUDA cores, 240 Tensor cores)**
- Up to **64 GB DDR4 RAM**
- **M.2 slot for Ultra-fast NVMe and MSATA storage**
- **Configurable Dual Removable 2.5" SSDs with RAID support**
- **3 x DisplayPort 1.2 powered by the Intel UHD 630 Graphics**
- (with GPU) **2 x HDMI powered by the NVIDIA RTX 3000**
- Optional internal **5/4G, GPS (DR), WLAN, Bluetooth, CAN & video capture modules**
- Supports up to **2 internal cellular (5/4G / LTE) modems**, with **2 easily accessible SIM card slots**
- **8 x Digital Inputs and 4 x Digital Outputs** (Supporting Relay Switching)
- Optional **Internal Backup Battery (UPS)** providing approx. 10 minutes of operation with no external power
- Up to **4 x USB 3.2 5Gbps Ports**
- Up to **4 x RS-232 Ports**
- **10 x RJ45 GbE LAN Ports** – with optional **Power over Ethernet (PoE) on 8 ports (Max 120W)**
- **Auto on/off with vehicle ignition, configurable shut down delays** via software, **low battery detection**
- **9-48V peak input voltage range**
- **E11 certified – fully approved for automotive use**
- Up to **-40°C to +70°C (with 0.6 m/S airflow) operating temperature range** at base specification
- **MIL-STD-810G tested for shock & vibration**
- **2-year RTB warranty (extendable to 3 or 5 years)**
- **Long-term availability**

Technical Specifications

Processor	**CQ87N**: • Intel Core i7-10700TE • Base Frequency of 2.0 GHz • Turbo Frequency up to 4.4 GHz • 8 Cores • 16 Threads (Hyper-Threading) • TDP of 35W **CQ89G**: • Intel Core i9-10900TE • Base Frequency of 1.8 GHz • Turbo Frequency up to 4.5 GHz • 10 Cores • 20 Threads (Hyper-Threading) • TDP of 35W
RAM	Up to 64GB DDR4 2933 MHz (8GB as standard) Optional extended temperature memory, allowing PC operating temperature of -40°C to +70°C.
SSD (internal NVMe)	1 x NVMe slot supporting the following variants: **NVMe – Standard Temperature**: • 250, 500 GB, 1 & 2 TB capacities • High performance variant also available for all capacities **NVMe - Extended Temperature**: • 256, 512 GB & 1 TB capacities • Industrial-grade memory • Allows PC operating temperature of -40 to +70°C.
SSD (removable 2.5")	Dual removable Solid-State Drive (SSD) bays with RAID 0, 1 & 5 support including the caddy head attachments. **Standard Temperature:** • 120, 240, 256, 512 GB, 1 & 2 TB capacities • For 256 GB & above models: Ultra-high performance & excellent endurance **Extended Temperature:** • 128, 256, 512 GB & 1 TB capacities • Industrial-grade memory • Allows PC operating temperature of -40 to +70°C
LAN	10 x RJ45 Gigabit Ethernet Ports Optionally 8 ports can support PoE as standard (IEEE802.3AF, subject to up to 120W across all ports).
Audio	Realtek HD Audio with external: • Line-Out • Line-In • Mic-In
Graphics	**CQ87N:** • Intel UHD Graphics 630 Total of 3 independent outputs: • 3 DisplayPort from Intel GPU Max Resolution (DP 1.2) : 4096 x 2340 @ 60Hz **CQ89G:** • NVIDIA Quadro RTX 3000 GPU • Intel HD Graphics 630 Total of 5 independent outputs: • 2 HDMI from NVIDIA GPU • 3 DisplayPort from Intel GPU HDMI Max Resolution Output: 1920 x 1080 @ 60Hz without HDMI Audio DisplayPort 1.2 Max Resolution: 4096 x 2340 @ 60Hz
Graphics (GPU Computing)	**CQ89G:** NVIDIA Quadro RTX 3000 GPU features 1920 CUDA cores, 240 Tensor cores and 30 Ray Tracing cores
USB	**CQ87N:** 4 x USB 3.2 5Gbps ports **CQ89G:** 4 x USB 3.0 ports
DIO Interface	8 x Digital Inputs (high => 5VDC, max input 48VDC 4 x Digital Outputs (0V/5VDC, 100 mA) Status of inputs/outputs is monitored/controlled via software.
Serial	Up to 4 x serial ports (3 as standard), supporting RS-232/422/485

TPM	Trusted Platform Module (TPM) version 2.0
Expansion	• 3 x Mini PCI Express slots • 1 x M.2 slot (2230 A-E Key) • 1 x M.2 slot (3042 B key) *See below for available expansion card options*
GPS (DR)	Optional built-in GPS module: • Ublox6 chipset • 1 x SMA connector for GPS antenna (supports active & passive antennas, available separately) • Occupies 1 x Mini PCIe slot • Model code: G5 Optional built-in GPS DR (Dead Reckoning) module: • As above, but with internal gyroscope and external inputs for speed pulse & forward/reverse signal lines • Occupies 1 x Mini PCIe slot • Model code: G7 *See below for 4G modules that include GPS*
Cellular (4G / 5G)	Optional up to 2 built-in 4G (with GPS) module(s): • 2 x externally accessible SIM card slots (supporting either single-modem/dual-SIM or dual-modem) • Occupies 1 x M.2 slot and 1 x Mini PCIe slot • SIM switching (single-modem/dual-SIM only supported on M.2 slot) • SIM card provisioning available • 4G specifications detailed below **4G (with GPS) Module Specifications** • Supports LTE/HSPA+/UMTS/EDGE/GPRS/GSM network technologies (4G with fall back to 3G) • Supports frequency bands 700/800/900/1800/2100/2600 MHz (4G) and 850/900/2100 MHz (3G) • Maximum downlink: 300 Mbps (42 Mbps when falling back to HSPA+) • Maximum uplink: 150 Mbps (5.76 Mbps when falling back to HSPA+) • GPS & GLONASS receiver supporting Standalone & Assisted Modes • 2 x SMA connectors for 3G/4G diversity/MIMO antennas (available separately) • 1 x SMA connector for active or passive GPS antenna (available separately) • Model code: U11 (Mini PCIe) /U12 (M.2 2230)
WLAN & Bluetooth	Optional built-in M.2 WLAN (Wi-Fi) & Bluetooth modules: **Updated May 2025** **Support for Wi-Fi 7** • 802.11a/b/g/n/ac/ax/be • 2.4, 5 & 6 Ghz operation • Up to 5.8 Gbps (WLAN) • Bluetooth v5.4 • 2 x SMA connectors for concurrent WLAN diversity & Bluetooth antennas (available separately) • Occupies 1 x M.2 2230 slot **Standard Temperature:** Operating Range: 0 °C to 80 °C Model code: **W21** **Extended Temperature:** Operating Range: -40 °C to 85 °C Model code: **W22**
CAN-bus	Optional 2-channel CAN interface (Standard): • CAN 2.0B & 2.0A compliant • USB signalling • Complies with EN61000-4-5 2.5 kV surge protection, IEC 60950-1:2005 +A1:2009 + A2:2013 2.5 kV HiPot protection, EN61000-4-2 (ESD) Air-15kV, Contact-8kV • Supports 50, 125, 250, 500 & 1000 kbit/s baud rates • Supports Linux SocketCAN • API supplied • Optional CAN bus termination (disabled by default, please specify at order time) • Allows PC operating temperature range of -40°C to +70°C • Model code: P21 Optional 1- or 2-channel CAN interface (Advanced): • CAN 2.0B & CAN 2.0A compliant • PCI Express signalling • 300V galvanic isolation between CAN-bus and PC • Supports baud rates from 5 kbit/s to 1 Mbit/s

- CAN monitoring software supplied
- API supplied comprising DLL, examples and header files for all common programming languages, plus documentation
- Numerous additional optional software and development tools available, including LabVIEW driver
- Allows PC operating temperature range of -40°C to +70°C
- Model code: P12 (1-channel), P13 (2-channel)

Optional 1-, 2- or 4-channel CAN FD interface (Advanced):

- CAN FD, 2.0B & 2.0A compliant
- Supports ISO and non-ISO CAN FD standards (switchable)
- PCI Express signalling
- 300V galvanic isolation between CAN-bus and PC
- Supports baud rates from 25 kbit/s to 12 Mbit/s (CAN FD)
- Supports baud rates from 25 kbit/s to 1 Mbit/s (CAN)
- CAN monitoring software supplied
- API supplied comprising DLL, examples and header files for all common programming languages, plus documentation
- Numerous additional optional software and development tools available, including LabVIEW driver
- Allows PC operating temperature range of -40°C to +70°C
- Model code: P25 (1-channel), P26 (2-channel), P27 (4-channel)

CAN options occupy 1 x Mini PCIe slot and may reduce the number of available serial ports.

Video Capture	Optional 8-channel video capture card: • 8-channel video (4-channel video + 4-channel audio available on request) • H.264/MPEG4 software compression • 240/200 fps (NTSC/PAL) at up to D1 resolution shared across all channels • SDK available • Occupies 1 x Mini PCIe slot • Model code: N7
UPS / Backup Battery	Optional internal backup battery (UPS): • Provides operating power for up to approx. 10 minutes with no external power • Controlled shutdown if external power is not restored • Unless specified at order time PC initiates shut down procedure immediately upon power loss - Model code: P19
Power Supply	Internal intelligent automotive power supply: • PC automatically turns on and off with vehicle ignition • Input voltage: 9V to 48V • High efficiency for extended battery life • Protection against transients and load dumps • Automatic shutdown with low battery (only for 12V vehicles, or for 24V vehicles using voltage dropper) • Ignition status detectable via software • Command Line Interface (CLI) tool provided to allow programmatic detection of ignition status, UPS status and other parameters (CLI tool runs on Windows OS only) • Configurable shut-down delay. The time between the ignition being turned off and the PC powering down can be changed via software. • Hard Power Off. In the event of a software crash during shut down the power will be cut to prevent draining of the vehicle battery. • OS loading guard timer. If the ignition is turned off having only just been turned on, a delay will be applied before issuing the shutdown command, in order to allow the PC to fully boot before attempting to shut down • External power switch on front of PC. • LED indicates PC power status. • 5-pin terminal block supplied for power/ignition input connector (screw lockable) • Modified PSU firmware can be loaded for customers with special requirements - please contact us for more information.
Watchdog	Optional watchdog timer generates automatic system reset in the event of a software crash
Operating System	Microsoft Windows 11 Pro 64-bit Other operating systems, including Windows Embedded/IoT options, are available upon request.
Mounting	Mountable via fixed mounting flanges.

Vibration & Shock	MIL-STD-810G (base spec, with SSD)
Cooling	Passive cooling (fanless) with 0.6 m/S airflow
Dimensions	**CQ87N:** • Width: 260 mm • Depth: 250 mm • Height: 95 mm **CQ89G:** • Width: 290 mm • Depth: 250 mm • Height: 95 mm
Weight	5.3 KG (base specification)
Environmental	Operating Temperature: -40°C to +60°C with 0.6 m/S airflow Storage Temperature: -40°C to +80°C The above temperature ranges are at base specification and with extended temperature RAM & SSD. Using standard RAM results in an operating temperature range of 0°C to +70°C. Using a standard SSD results in an operating temperature range of 0°C to +55°C. Some optional features also restrict the unit's operating temperature range - for the operating temperature range of a specific configuration please contact us. **In common with all passively cooled (fanless) computers, the PC should be installed in a location that allows cooling air to flow freely over the chassis fins.**
Power Consumption	**CQ87N:** Whilst idling at the Windows 11 desktop: • average over 30 seconds: 20W Whilst loading the Windows 11 operating system (from completion of POST to appearance of desktop): • average over period: 20W • peak observed: 45W Whilst under fully loaded stress-test conditions (100% CPU usage): • average over test: 47W • peak observed: 56W The above figures were measured with a base-spec CQ87N PC (i.e. CQ87N series with Core i7 processor, 8 GB RAM and 120 GB NVMe SSD). **CQ89G:** Whilst idling at the Windows 10 desktop: • average over 30 seconds: 19.44W Whilst loading the Windows 10 operating system (from completion of POST to appearance of desktop): • average over period: 24.48W • peak observed: 56.40W Whilst under stress-test conditions (no CUDA workload): • average over test: 43.68W • peak observed: 70.56W Whilst under stress-test conditions (with CUDA workload on NVIDIA GPU): • average over test: 65.04W • peak observed: 95.88W The above figures were measured with a base-spec CQ89G PC (i.e. CQ89G series with Core i9 processor, 8 GB RAM and 120 GB SSD).
Warranty	2 years RTB Extendable to 3 or 5 years if required.
Estimated End of Life (EoL) Date	**CQ87N:** 2030 This is the earliest date at which we expect to stop producing new units of this PC model. However, the warranty for each PC will remain in place regardless of whether the EoL date has passed, and will continue for the duration of the original warranty period. **CQ89G:** 2025 (due to NVIDIA GPU) This is the earliest date at which we expect to stop producing new units of this PC model. However, the warranty for each PC will remain in place regardless of whether the EoL date has passed, and will continue for the duration of the original warranty period.
Certifications	CE E11 - ("E-mark" - fully approved for use in vehicles, including all optional configurations above. Approval number 10R-054687, certificate available upon request.)
RoHS / WEEE	RoHS Compliant In-CarPC is a registered member of a WEEE compliance scheme

Model Numbers

Model numbers for the CQ80 series follow this format:

CQ8[CPU code][Model identifier]-[RAM code]-[Drive code]-[Optional model codes]

Commonly ordered values for each section of the model number are as follows:

CPU Code

- 9 (CQ89…) = Intel Core i9-10900TE 1.8GHz (up to 4.5 GHz)

Model Identifier

- G (e.g. CQ89GN...) = Model with Nvidia (and Intel) graphics

RAM Code

Amount of RAM in GB

Drive Code

Value in GB of drive capacity with the following suffixes:

- SMN = MLC-type SSD (normal temperature range)
- SME = MLC-type SSD (extended temperature range)
- NVN = M.2 NVMe SSD (normal temperature range)
- NVE = M.2 NVMe SSD (extended temperature range)

Optional Model Codes

See Specifications section above for model codes. Where multiple optional codes are present they are simply listed one after the other without any spacing (e.g. "U11W10" in this section indicates the presence of both 4G (with GPS) and Wi-Fi/Bluetooth modules).

Example

Model code **CQ89G-32-250NVN-U11** denotes the CQ89G series (i.e. with NVIDIA graphics), with an i9 processor, 32 GB RAM, 250 GB normal-temperature SSD and built-in 4G/GPS.

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