

# CQ40N Series Vehicle PC

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## Product Overview



In-CarPC's CQ40N series will take over from our highly popular CQ40 series as our main fleet services solution, with our signature compact and fanless design allowing for the system to be placed discreetly in the vehicle. Featuring a range of 6th generation Intel processor options from Intel Celeron 3955U, up to the high-performance Intel Core i7-6600U making the CQ40N series a big upgrade on its predecessor.

As with all our PCs, numerous built-in options are available, including cellular, GPS, Wi-Fi, video capture and CAN-bus. With its multiple independent display outputs, the CQ40N series can be combined with our range of touchscreen options to offer increased flexibility. The compact, fanless nature of the CQ40N series makes it suitable for the enclosed spaces of a vehicle and extremely dusty environments. The CQ40N's ruggedness is demonstrated by multiple MIL-STD-810G tests and E-mark certification making it fully approved for in-vehicle use. Also certified CE, FCC Class A and EN50155 compliant offering a wide range of operational use cases. The CQ40N comes with a 2-year warranty as standard, which is extendable to 3 or 5 years.

## Product Highlights

- Intel Celeron 3955U 2.0GHz, Intel Core i3-6100U 2.3GHz, Intel Core i7-6600U 2.6GHz up to 3.4GHz
- Up to 16 GB DDR4 RAM
- Single SSD only
- VGA and dual HDMI outputs powered by the Intel Graphics
- Optional internal 4G, GPS (DR), WLAN, Bluetooth, CAN & video capture modules
- Dual SIM card slots for built-in cellular modem
- 2 x digital inputs and 2 x digital outputs (supporting relay switching)
- Optional internal backup battery (UPS) providing approx. 10 minutes of operation with no external power
- 2 x USB 3.0 and 1 x USB 2.0 ports
- Up to 3 x RS-232 ports
- 2 x GbE LAN ports
- Auto on/off with vehicle ignition, configurable shut down delays via software, low battery detection
- 9-36V peak input voltage range
- Regulated 12V switched output for powering accessories (2A)
- E11 certified – fully approved for automotive use
- -40°C to +70°C (with 0.6 m/S airflow) operating temperature range at base specification
- MIL-STD-810G tests for shock & vibration
- 2-year RTB warranty (extendable to 3 or 5 years)
- Long-term availability

## Technical Specifications

- Processor**
- PC Model CQ41N:
- Intel Celeron 3955U
  - 2.0 GHz
  - 2 Cores
- PC Model CQ43N:
- Intel Core i3-6100U
  - 2.3 GHz
  - 2 Cores
  - 4 Threads (Hyper-Threading)
- PC Model CQ47N:
- Intel Core i7-6600U
  - 2.6 GHz (3.4GHz with Intel Turbo boost)
  - 2 Cores
  - 4 Threads (Hyper-Threading)

**RAM** Up to 16GB DDR4 (8GB as standard)

Optional extended temperature memory, allowing PC operating temperature of -40°C to +70°C.

**SSD (removable 2.5")** Single SSD supporting any of the following drives.

Solid State Drive (SSD) - Standard Temperature:

- 120, 240, 256, 512 GB, 1 & 2 TB capacities
- For 256 GB & above models: Ultra-high performance & excellent endurance

Solid State Drive (SSD) - Extended Temperature:

- 128, 256, 512 GB & 1 TB capacities
- Industrial-grade memory
- Allows PC operating temperature of -40 to +70°C

**LAN** 2 x Gigabit Ethernet Ports

**Audio** Realtek HD audio with line-out, line-in and mic-in external audio ports.

**Graphics** Intel HD Graphics (HD Graphics 510 for the CQ41N, HD Graphics 520 for the CQ43N and CQ47N) with VGA and HDMI outputs

**USB** 2 x USB 3.0 ports & 1 x USB 2.0 Port

**DIO Interface** 2 x Digital Inputs (high => 3.3V, max input 36V)

2 x Digital Outputs (12V, 100 mA)

Status of inputs/outputs is monitored/controlled via software

**Serial** Up to 4 x serial ports (3 as standard for the CQ41N and CQ43N, 4 as standard for the CQ47N), supporting RS-232/422/485

**TPM** Trusted Platform Module (TPM) version 2.0

**Expansion**

- 2 x Mini PCI Express slots
- 1 x M.2 slot (2230 A-E 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 (3G / 4G)** 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 Mini PCIe WLAN (Wi-Fi) & Bluetooth modules:

- 802.11 a/b/g/n/ac
- 2.4 & 5 GHz operation
- Up to 867 Mbps (WLAN)
- Bluetooth v4.0
- 2 x SMA connectors for concurrent WLAN diversity & Bluetooth antennas (available separately)
- Occupies 1 x Mini PCIe slot
- Model code: W10

Optional built-in M.2 WLAN (Wi-Fi) & Bluetooth modules:

- 802.11 a/b/g/n/ac
- 2.4 & 5 GHz operation
- Up to 867 Mbps (WLAN)
- Bluetooth v4.2
- 2 x SMA connectors for concurrent WLAN diversity & Bluetooth antennas (available separately)
- Occupies 1 x M.2 2230 slot
- Model code: W16

**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 36V
- 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.
- 3-pin terminal block supplied for power/ignition input connector (screw lockable)
- 8-pin terminal block supplied for combined DIO, 12V output and remote power switch 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 10 Pro 64-bit

Other operating systems, including Windows Embedded 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** CQ41N & CQ43N

- Width: 210 mm
- Depth: 168 mm
- Height: 54 mm

CQ47N

- Width: 278 mm
- Depth: 168 mm
- Height: 54 mm

**Weight** CQ41N & CQ43N

- 1400g (Base Specification)

CQ47N

- 2400g (Base Specification)

**Environmental** Operating Temperature: -40°C to +70°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** Whilst idling at the Windows 10 desktop:

- average over 60 seconds: 10.26W

Whilst loading the Windows 10 operating system (from completion of POST to appearance of desktop):

- average over period: 10.64W
- peak observed: 21.16W

Whilst under stress-test conditions:

- average over test: 26.02W
- peak observed: 33.66W

The above figures were measured with a base-spec CQ43N PC (i.e. CQ43N series with Core i3 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** 2029  
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 CE

**Certifications**  
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 CQ40N series follow this format:

*CQ4[CPU code]N-[RAM code]-[Drive code]-[Optional model codes]*

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

### CPU Code

- 1 (CQ41N) = Intel Celeron 3955U  
2.0GHz
- 3 (CQ43N) = Intel Core i3-6100U  
2.3GHz
- 7 (CQ47N) = Intel Core i7-6600U  
2.6GHz (upto 3.4 GHz)

### 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)

### 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 **CQ47N-16-256SMN-U11** denotes the CQ47N series, with an i7 processor, 16 GB RAM, 256 GB normal-temperature SSD and built-in 4G/GPS.

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