

Halo QUBE 2

V1.0

Installation Manual



NAVMAN

Important Notice

It is the Owner's sole responsibility to install and use the Halo QUBE system (the Products) in a manner that will not cause accidents, personal injury or property damage. For the purposes of this notice, "Owner", "you" and "your" means the party (including any person authorized by that party to use and/or install the Product) that has either: (a) purchased the Product; or (b) leased the Product from Navman NZ Limited or its related companies (Navman). The Operator of this Product is solely responsible for observing safe driving practices. The choice, location, and installation of all components of the Product is critical. If installation is not correct, the Product may not perform at its designed potential or specifications. If in doubt, consult your Navman dealer. Ensure that any mounting holes that are cut in the vehicle are in a safe position and will not weaken the vehicle's structure or compromise the safety of the vehicle or its occupants. If in doubt, consult your vehicle's manufacturer.

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Introduction

The Navman Halo Qube 2 is an Automatic Vehicle Location unit (AVL) that is installed into fleet vehicles. It communicates with a server, allowing vehicle information to be stored and monitored.

It is a combined GPS (Global Positioning System) and communications product that contains:

- A GPS receiver, providing accurate location data.
- A cellular modem, enabling data to be efficiently transferred.
- An on-board microprocessor for intelligent processing and storage of data, and external communication.

What comes with the Halo QUBE 2

1. Halo Qube 2 – Navman vehicle tracking unit.
2. Tax disk antenna. Combination GPS / GPRS. (Optional).
3. Vehicle connection cable. Either configuration A or configuration B (B shown).
4. Mounting rails for the Halo Qube 2.
5. Mounting Hardware for Halo Qube 2.
6. This installation manual.



Quick Install - 3-Wire Basic Tracking

Power Connection

Wire Colour	Function	Description
Red	+12/24 V	Main Power Connection - Connect to fused supply
Pink	Ignition	Positive input from vehicle when the key is in the IGNITION position (not the accessory position). This signal must remain on DURING starting of the vehicle - Connect to a fused supply.
Black	GND	Vehicle ground / chassis connection

Note: Please individually insulate any bare ends that are not connected.



Recommended Mounting

- Under the driver or passenger's seat.
- In or under the dash.
- In the boot / trunk area.
- Where it is not excessively hot.
- Where it is dry.
- Where there is not excessive vibration.
- Should allow MDT/ PDT connection.
- Should allow the diagnostics LED's to be seen
- Should allow sufficient clearance to plug and unplug the connectors while mounted.

Status LED Indicators

LED	Display State	Normal Operation	Description
Power	On	✓	Power ON, Unit awake
	Slow Flash		Sleep mode
	Off		No Power - <i>Note: The Qube 2 should always be powered.</i>
GPS	On	✓	GPS fix
	Off		No GPS fix
GPRS	On	✓	Data connection to cellular network
	Off		No data connection

Installation

Location / Mounting

Install the Qube 2:

- Under the driver or passenger's seat
- In or under the dash
- In the boot / trunk area

The chosen location should:

- Allow for later connection of the MDT or PDT.
- Be dry
- Not have excessive vibration.
- Not be excessively hot.
- Allow the antennas and cabling to easily connect to the Qube 2.
- Allow the diagnostics LED's can be seen
- Allow sufficient clearance to plug and unplug Qube 2, while mounted.

Mount the unit using the supplied self-tapping screws and washers, placed through the slots in the side rails. The side mounting rails are supplied fitted to the Qube 2 ready for installation. If a different side mounting format is required, the mounting rails may be turned over or removed completely. There are two types of mounting rails. Type A will clip and unclip from the side of the Qube 2 by applying pressure on the foot of the mounting rail. Type B requires the end cap to be removed, and the rails slid out to change their orientation. Only one type will be supplied with the unit.

Connect the antenna cables to the correct connector. Both the Cellular connector (TNC) and the GPS (SMA) are screw on connectors, which should be hand tightened only. Connect the DB15 connector to the socket and hand tighten the two locking screws.

Ensure all cables are secured out of the way, so they will not be damaged, walked on, or have other articles placed on them.

Important Notice

- Before you begin ensure that drilling will not damage the vehicles structure, wiring or equipment.
- Ensure the Qube 2 cables, mounting screws etc will pose no hazard to the occupants of the vehicle.

Antenna

Position the antennas so that:

- The GPS antenna has a clear view of as much of the sky as possible.
- They are mounted as far away as practical from any other antenna, to minimize the risk of interference.
- The cables can be easily routed to the Qube 2

Important Notice

The cellular antenna must be placed at least 20 cm (8") away from any person to meet FCC RF exposure requirements.

Windscreen Combination (Tax Disk) Antenna

This is an internal combination GPS/Cellular antenna. The ideal mounting angle is 45°. This antenna is not suitable for mounting on vertical windows (e.g. side windows or near vertical windscreens.)

Position the Tax Disk antenna so that the antenna:

- The Flat side is facing outside.
- Mounts directly on the windscreen, at least 13 mm (½") from window frame.
- Does not obstruct driver vision (normally placed on the passenger side).
- Allows mounting with notch to the top, so that a tax disk may be inserted.



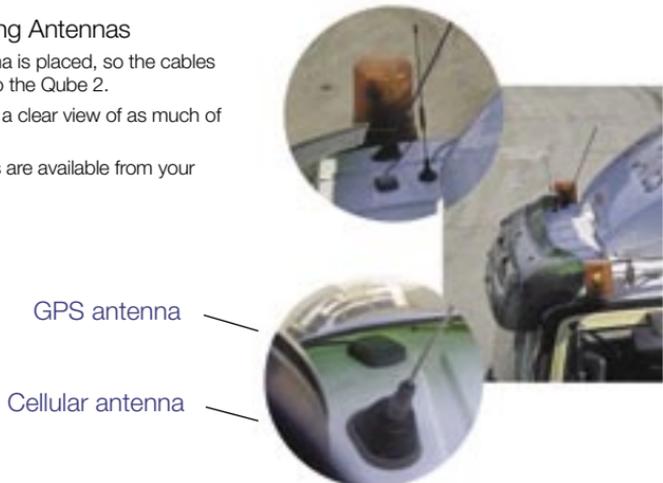
Note: This antenna is suitable for internal mounting only. Some tinted, heated or other windscreens may not be suitable for use with this antenna. If unsure, test the antenna through the windscreen before mounting.

Magnetic Mounting Antennas

Ensure that the antenna is placed, so the cables can easily be routed to the Qube 2.

The GPS antenna has a clear view of as much of the sky as possible.

Other antenna options are available from your installer.



Wiring

Cable A

Has a long cable with a RJ45 Plug, a short cable with a DB9 plug, and a single cable with bare ends for all other connections.

Cable B

Has an RJ45 socket very close to the main plug (DB15), and a single long cable with bare ends for all other connections.

Power Connection - Bare wires

Cable A	Cable B	Function	Description
Red	Red	+12/24 V	Main Power Connection - Connect to a fused supply
Pink	Pink	Ignition	Positive input from vehicle when the key is in the IGNITION position (not the accessory position). This signal must remain on DURING starting of the vehicle - Connect to a fused supply.
Black	Black	GND	Vehicle ground / chassis connection

Important Notice

If fitting a **MDT-800** (Mobile Data Terminal) the main power connection (red wire) must be connected to +12 V DC only. The Qube 2 ignition and Multi IO lines may still be connected to 24 V DC.

MDT or PDT Connection

RJ45 Connector - Cable A (Male plug), Cable B (Female socket)

Cable A	Cable B	Function	Description
Pin - 1	Pin - 1	GND	Ground
Pin - 2	Pin - 2	+12/24 V	Power
Pin - 4	Pin - 4	Serial RxD	Serial data Input
Pin - 5	Pin - 5	Serial TxD	Serial data Output

Connecting the Auxiliary Devices

The Qube 2 is equipped with additional IO that can be connected to auxiliary devices in the vehicle. These Allow the Qube to generate events based on inputs from these devices.

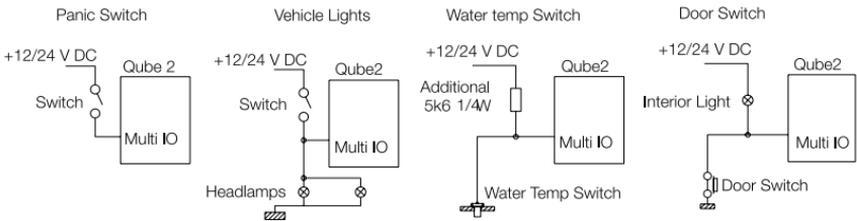
Multi-IO. Each multi IO can be configured as digital input, analogue input or digital output.

Serial. There are two RS232 serial ports that can be configured as serial capture ports, MDT or External ConEX ports etc. For serial Capture, a configuration string is sent via the server.

Cable A	Cable B	Function	Description
Yellow	Yellow	Multi IO-1	Digital IN, analogue IN, digital OUT
Green	Green	Multi IO-2	Digital IN, analogue IN, digital OUT
Blue	Blue	Multi IO-3	Digital IN, analogue IN, digital OUT
Grey	Grey	A - GND	Analogue GND reference
White	White	+3V7 OUT	Reference voltage if required
DB9 – Pin 3	Purple	Serial TxD	Serial data OUT
DB9 – Pin 2	Brown	Serial RxD	Serial data IN
DB9 – Pin 7	Light Green	Serial RTS	Serial data flow control OUT
DB9 – Pin 8	Black/White	Serial CTS	Serial data flow control IN
DB9 – Pin 5	-	Serial GND	Serial GND

Digital Inputs

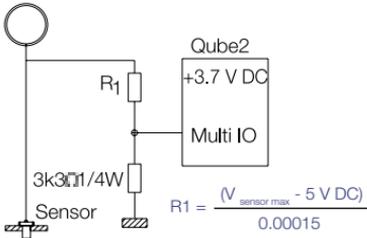
These are inputs that are either on or off. The polarity is not important but must be noted for the correct configuration to be sent to the vehicle. All digital inputs must be sourcing inputs.



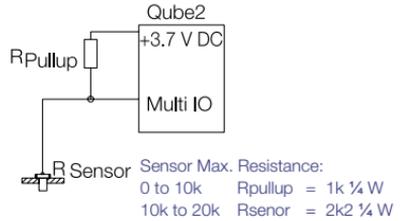
Analogue Inputs

These connect to devices that have a variable voltage output. As the input voltage range (0 to 5 V DC) may not match the sensors range, the input may have to be scaled. In order to scale the voltages correctly, you should calculate the maximum sensor voltage to scale to 5 V DC at the ConEX input.

Example using existing wiring

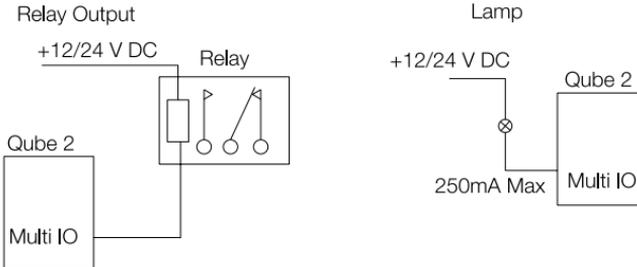


Example with resistive temp./ pressure sensor (water, oil etc.)



Digital Outputs

These outputs are an "open collector" transistor type arrangement. The outputs will pull low when activated. The outputs have an over current trip. If tripped the output must be changed to the off state, or have a power cycle to reset the current trip.



Battery Backup connections

The Qube 2 has the facility to connect an external battery to allow for a battery backup operation. This allows the Qube 2 to normally run off the main supply, and also trickle-charge the backup battery. When the main power fails or is disconnected, the Qube 2 will continue to run by drawing power from the backup battery. (e.g. A gel cell type battery).

Connect the orange wire directly to the positive of the backup battery, and ground the negative side of the battery at the same point where the Qube 2's black wire is grounded. If the Qube 2 is powered off 24 V DC, then the backup battery must also be 24 V DC. If powered from 12 V DC the battery must be 12 V DC.

Note: As the charging circuit is simplistic, the backup battery will only fully charge when the vehicle is operating (ie. the vehicle's alternator is supplying the higher charging voltage.)

Connecting an External ConEX

Note: Please check with your distributor, to see if this feature is available yet.

An external ConEX would be connected if: The user requires additional IO lines, additional serial capture port, or has custom ConEX code that needs to be used with their system.

The Qube 2 will connect into the connector marked "HALO - QUBE". The wire colours do not directly match. Please connect the Qube 2 using the table below.

Please refer to the ConEX installation manual for all other ConEX connections.

RJ45 Connector - Cable A Male plug, Cable B Female socket

ConEX Connections	Cable A	Cable B	Qube 2 Function	Description
RD	Red	Red	+12/24 V	Power
OR	Pink	Pink	Ignition	Ignition
GR	-	-	-	Do not connect
WH	-	-	-	Do not connect
YE	-	-	-	Do not connect
BL	DB9 - Pin 3	Purple	TxD	Serial data output
BR	DB9 - Pin 2	Brown	RxD	Serial data input
BK	Black	Black	GND	Ground

Note: The MDT port on the ConEX box will no longer function. Please use the RJ45 connector on the Qube 2 cable to attach an MDT / PDT etc.



Testing

Check Correct Ignition connection

Use a multi-meter to measure the voltage at the ignition line connected to the Qube 2.

1. Turn the key to the accessories position. Check that there is no voltage on the ignition line.
2. Turn the key to the IGNITION position. Ensure that +12 / 24 V DC is present at ignition line.
3. Watching the meter, start the vehicle and ensure that the voltage does remain ON during starting.

If any of these tests fail, the Qube 2 is not connected to the correct signal. Please find the correct wire

Check Data and GPS

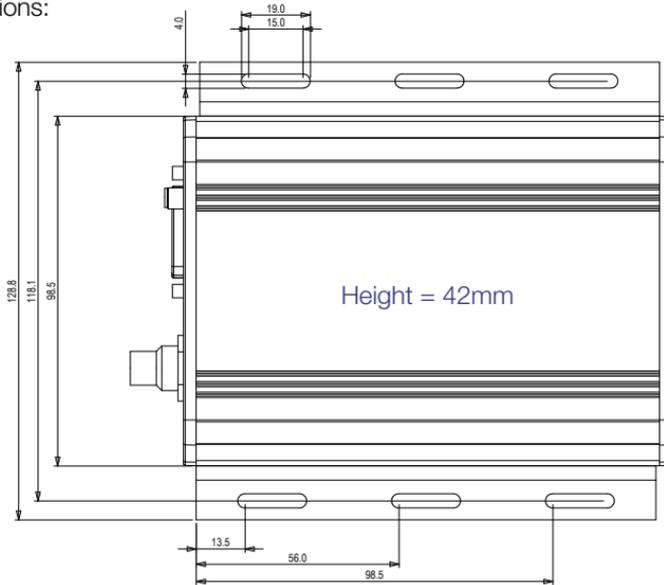
1. Ensure the vehicle is outside, so the GPS antenna has a clear view of the sky, and there is good cellular coverage.
2. Turn the Ignition Key on to the ignition position.
3. Check that all 3 LED's come ON. This may take up to 15 minutes, but is normally less than 2 minutes.

Fault Finding

Power LED fails to light	Check that the +12 / 24 V wire has permanent power connected to it.
	Check the DB15 I/O connector is correctly connected, and the securing screws are hand tightened onto the Qube 2.
GPS LED fails to light	Ensure that the antenna is up the correct way, and has a clear view of as much of the sky as possible.
	Check the antenna connectors are correctly connected, and hand tightened onto the Qube 2 connectors.
	It may take up to 15 minutes for a first GPS fix after the unit has been shipped un-powered to a new location.
GPRS LED fails to light	Check the antenna connectors are correctly connected, and hand tightened onto the Qube 2 connectors.
	Check if the area has GPRS coverage.

Specifications

Dimensions:



Physical

- Weight: 370g
- Case Material: Aluminium Extrusion.
- End Caps: Bayblend FR110. Fire retardant ABS/Polycarb blend.
- Feet: Unplasticised PVC. Fire retardant

Power Supply

- Supply voltage range: 8 to 30 V DC
- Typical Current consumption:
12 V DC Tracking 75 mA sleep 25 mA
24 V DC Tracking 45 mA sleep 20 mA

Temperature

- Storage: -40 to +85°C
(-40°F to +185°F)
- Operation: -20 to +60°C
(-4°F to +140°F)

Ignition Input

- Absolute Maximum Voltage: 30 V
(Independent of supply)

Serial Interface

- RS232 x2

Digital Inputs

- Input Voltage LOW: < 1.0 V
- Input Voltage HIGH: > 4.0 V
- Absolute Maximum Voltage: 30 V
(Independent of supply)

Analogue Inputs

- Voltage Range: 0 to 5 V DC
- ADC Resolution: 10 bit (4.88 mV/step)
- Absolute Maximum Voltage: 30 V
(Independent of supply)

Digital Outputs

- Maximum sink current 250 mA
(Current limited)

EMC Compliance

- USA (FCC): Part 15 class B
- NZ & Australia (C-Tick): AS / NZS CISPR 22:2002
- Europe (e11 and CE)

Conditions of Sale & Warranty

Important Notice

Some of the following terms and conditions vary from country to country. Please check with your Navman dealer from whom you purchased your product.

A. Conditions of Sale

Except to the extent otherwise required by the laws of the country in which the accompanying product ("the product") is sold the manufacturer of the product Navman NZ Limited ("Navman") - has no liability in respect of the product beyond the warranty hereunder provided. Where liability may not be excluded but may be limited to repair or replacement or the supply of equivalent goods or for the payment of the cost of replacing the goods or of acquiring equivalent goods, liability is so limited.

B. Manufacturers warranty

Warranty Period - 1 year from the date of purchase.

Extent of warranty - Subject to the following conditions Navman will rectify any defect occurring in the product of which notice in writing is received by Navman or its approved distributor within the Warranty Period.

Conditions:

1. Repairs may only be carried out by a Service Centre approved by Navman.
2. Repairs as above will be carried out at no cost to the owner subject to these conditions.
3. The cost of returning the goods to an approved dealer shall be met by the owner.
4. Warranty does not extend to accessories or defects or injuries caused or resulting from causes not attributable to faulty parts or the manufacturer of the product including, but not limited to, defect or injuries caused by or resulting from misuse, abuse, neglect, accidental damage, incorrect installation, water damage, use of consumables other than those approved by Navman or any alterations to the product not approved by Navman.
5. No warranty claim accepted without sales documentation.
6. Navman may, at its discretion, replace the product instead of repairing it.

C. Acceptance of Conditions of Sale

In consideration of this warranty the purchaser accepts the limitations of liability as set out in the conditions of sale.

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