



User Manual

Arrow QG™ • Arrow VI™

- ⊕ 4-6340-17-12V
- ⊕ 4-6340-10
- ⊕ 4-6341-17
- ⊕ 4-6341-10
- ⊕ 4-6201-10



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The Arrow QG™ (Arrow VI™) from Phillips Connect Technologies is a vehicle tracking device that combines GPS location with LTE and Bluetooth. Arrow products monitor vehicle functions and collect data for tracking and analysis.

- GPS location engine
- General Purpose Bidirectional I/O (GPIO) pins
- Relay drive pin output
- Serial UART port
- CAN Communication (optional)
- BLE 5.0

The diagram illustrates the architecture of a location-based service (LBS) system. It shows a central **NETWORK** tower. A **GPS** satellite provides data to a **Mobile Phone**. The **Mobile Phone** communicates with the **NETWORK** tower via **OTA** (Over-the-Air) technology. The **NETWORK** tower connects to an **IP**-based **SERVER** (Internet) and an **SMS**-based **SERVER**. The **Mobile Phone** also communicates with a **Vehicle**, which is also connected to the **NETWORK** tower.



2. DESIGN

2.1 BASIC HARDWARE

Items	Requirement
Baseband Chipset	Qualcomm Cat.M1
RF Receiver	Qualcomm SDR
Memory	Internal
Air Interface	Support for LTE Cat.M1
Frequency	4G band support Band 2/4/5/12/13/25/26 BLE 5.0: 2.4 GHz
Antenna	Internal Antenna/ Chip Antenna
GPS Antenna	Dedicated high performance ceramic antenna
Interface	UART Tx UART Rx 12V DC Input (1A current) Relay Drive GPIO CAN (option)
Voltage Monitor	Supported
Watchdog	Supported
Motion Detect	Supported
LED	2 LED Supported
Battery	Built-in battery for backup (<90mAH)
Power Cable Connector Type	8-pin
Power Consumption	<5 Watts

Arrow QG (Arrow VI) provides support for specialized hardware features through extended AT commands. The features supported include the following:

GPS

The major functionality of the GPS system is to compute the correlation results between the incoming signal and the selected PRN code based on certain Carrier Doppler Frequency, code phase, carrier phase, and the particular satellite the system is tracking or acquiring.

GPIO

The GPIO pins are presented to the external environment on the main connector. They are general purpose bidirectional lines capable of providing system interrupts to generate a report or drive logic levels to external devices. These lines are 2.8V logic level and are 16V tolerant.

LEDs

Two LED status indicators are provided to verify correct installation and operation.



UART

A UART port is provided for AT command and data interaction and optionally for application specific control.

Relay Driver

A 500mA sink capable output pin is provided. This pin is meant to drive a relay coil intended to interrupt the starter solenoid relay for the ignition circuit to a car, tractor, or other vehicle.

Voltage Monitor

The battery monitor is internal analog input scaled such that the DC value of the power input pin to the power input pin to the Arrow QG (Arrow VI) system is measured.

Watchdog

MDM9207-1 chipset provides internal software and hardware Watchdog.

Motion Detect

This function will work with firmware power down options to keep the Arrow QG (Arrow VI) in a very low power down state until motion is detected. Upon waking, a report can then be generated.

CAN

This function is an option for watching the information of vehicle.

2.2 BASIC RF PERFORMANCE

Items	Requirements	Remark
TRP free space	CTIA	TRP free space
TIS free space	CTIA	TIS free space

Board RF Specifications	
4G LTE Cat 1	
Band	Band 2/4/5/12/25/26
Rx Spec	Follow TS 36.521. Ch. 7
Tx Spec	Follow TS 36.521. Ch. 6
BLE 5.0	
ISM Band	2.4 GHz
Rx Spec	Follow Chipset
Tx Spec	Follow Chipset
GPS	
Frequency Support	L1-band (1.57542GHz)



2.3 CERTIFICATION AND SAFETY

Items	Requirement
Drop Design	0.8 meter 6-direction standard drop test
Temperature Range	0 to +60°C Operation –40 to +85°C Storage
Humidity	20% to 90% Operation 10% to 95% Storage
Altitude	–500 to +18,000 meters
FCC Certification	FCC Part 15/22/24/27/90
IC Certification	RSS-130/132/133/139/247
ESD Requirement	8kV non-Conductive

3. TESTING

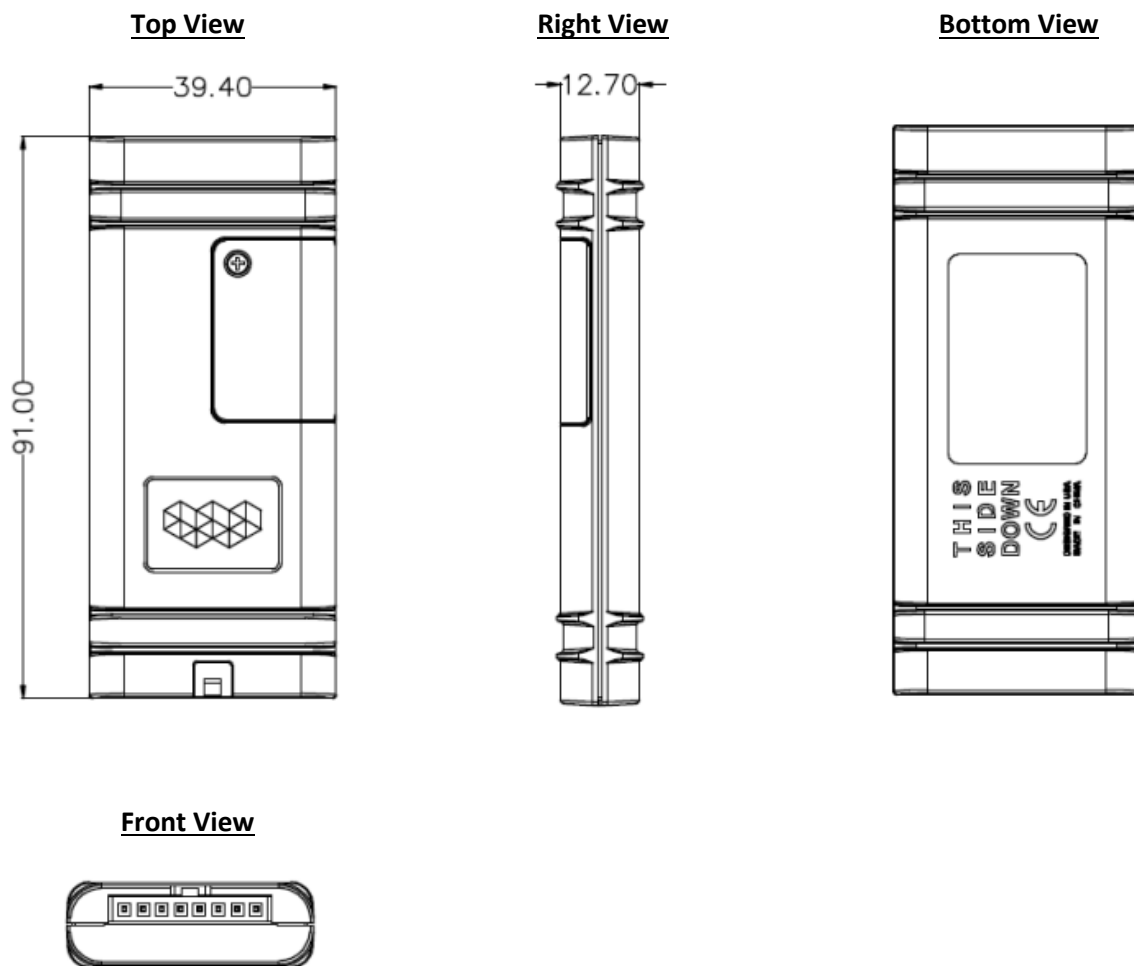
Test Item	Description
Baseband Function Test	Power Input Test Power Consumption and Current Test Heat Dissipation Test UART Stability Test GPIO Level Test LED Stability Test (4-6201-10) Drop Down Test ESD Test High/Low Temperature Test
RF Test	LTE Performance Test GPS Performance Test BLE Performance Test Antenna Performance Test



4. MECHANICAL STRUCTURE A

Applies to the following part numbers:

- 4-6340-17-12V
- 4-6340-10
- 4-6341-17
- 4-6341-10





5. MECHANICAL STRUCTURE B

Applies to the part number below. Dimensions: 103 x 16 x 43 mm (cable not included).

- 4-6201-10

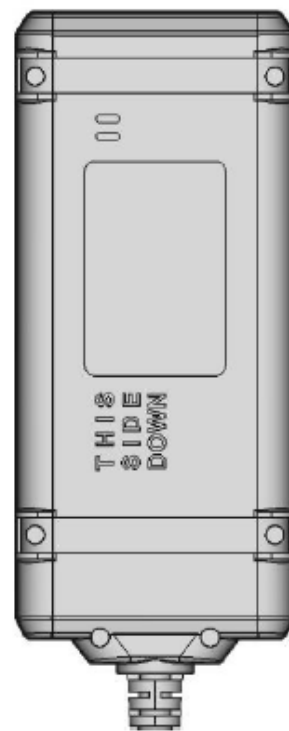
Top View



Right View



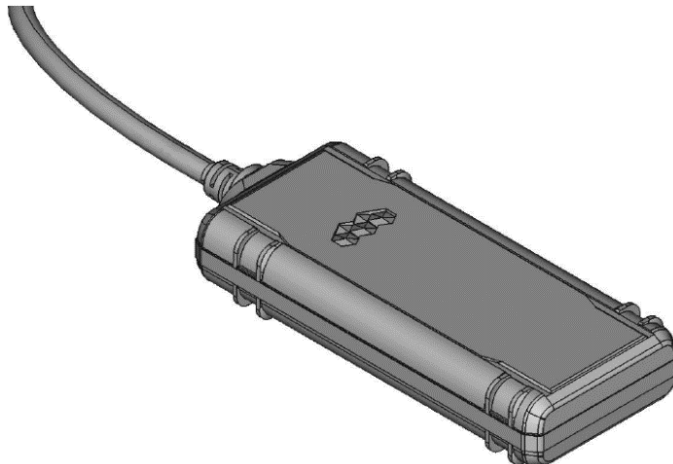
Bottom View



Front View



3D View





6. COMPANY INFORMATION

**Technology that
moves us forward**



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FEDERAL COMMUNICATION COMMISSION INTERFERENCE STATEMENT

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IMPORTANT NOTE: FCC Radiation Exposure Statement

This equipment complies with the FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance **20** cm between the radiator and your body.

The transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.



INDUSTRY CANADA STATEMENT

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). operation is subject to the following two conditions:

- (1) This device may not cause interference
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicable aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

- (1) L'appareil ne doit pas produire de brouillage;
- (2) L'appareil doit accepter tout brouillage radioélectrique sub, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Radiation Exposure Statement:

This equipment complies with Canada radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance **20** cm between the radiator and your body.

Déclaration d'exposition aux radiations:

Cet équipement est conforme Canada limites d'exposition aux radiations dans un environnement non contrôlé. Cet équipement doit être installé et utilisé à distance minimum de **20** cm entre le radiateur et votre corps.