

Product Description

For the

Arrow Vehicle Tracking Device

By

Connected Holdings LLC

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Description

The ARROW GPS Tracker is a self contained, integrated commercial grade vehicle tracking device that uses GPS satellite location in combination with a quad band GSM/GPRS cellular radio connection to report that location.

All antennas including the GPS patch and GSM antenna are internal to the device. Data reporting can be initiated by a server or by the tracker itself via GSM/GPRS SMS or UDP pathways or over a physical USB connection.

The ARROW is comprised of a simple two piece plastic enclosure that is snapped together for reliability, durability and low cost assembly. Interface signals and power are ported through a connector socket at one end with 8pin wire connector.

The ARROW is based on chip level design as opposed to the traditional approach of using a third party communications module with an external processor. The application software executes on the base level Central Processing Unit (CPU) under direct real-time Operating System (OS) control. This approach provides a much more reliable, lower power and faster response time than module/processor architectures. Unlike common module/processor based designs; the ARROW design allows direct operating system access by the application, thus mitigating the need and for a redundant external processor and the associated power and cost.

For added redundancy against system lockup, a physically separate, dedicated watchdog circuit oversees the ARROW system operation. If the system does not maintain the watchdog circuit through programmed reporting, the system power is cycled and a new GPS satellite and cellular connection is established.

The ARROW can be provisioned for UDP and SMS data services for application command and/or data transactions within the 850, 900, 1800 and 1900 MHz GSM bands. Network provisioning is done using embedded SIM technology for reliability and cost savings. For added safeguard against network connection loss, a hardware ARROW endpoint reset and reboot can be initiated by simply calling the provisioned phone number and allowing it to ring three times.

Flexible I/O includes 2 bidirectional General Purpose Input Output (GPIO) ports. A separate dedicated USB port is provided for general use as well as development and programming support. A high current relay drive is provided for starter motor solenoid control or general purpose drive (current sink only).

Over The Air (OTA) application firmware updates are supported through at TFTP connection to a server. The entire application image can be updated using one specialized SMS or USB command.

All inputs are electrically hardened against overvoltage and over current conditions present in automotive environments. This includes transient electrical noise and Electrostatic Discharge (ESD). The power input is further protected against over current with an internal self-resetting fuse.

The ARROW is physically disguised to appear to be a nondescript part of the cabling system. It is a small black box with unremarkable features. Two LED status indicators are provided to verify correct installation and initial operation. A unique power

management feature allows these LEDs to be extinguished once installation is verified to be correct. This feature reduces power and further conceals the ION Tracker from untrained parties wishing to defeat its operation.

As with all GPS location devices, the ARROW should be installed in a vehicle such that it has an unobstructed view of the sky during normal operation. Double sided foam tape can be used to secure the surface not facing the sky if needed.

A factory populate option is provided to add a backup battery and motion detector to the main board. Under software control, this motion detector can be used to wake the ARROW from a very low power state.

Bullet Specifications

Cellular: 850/900/1800/1900 MHz Quad band
GSM/GPRS Protocol CS-1, CS-2, CS-3 and CS-4
Output power:
 Class 4 (2W) @ 850/900MHz
 > 24dB @ 850/900MHz (OTA TRP)
 Class 1 (1W) @ 1800/1900MHz
 > 26.5dB @ 1800/1900MHz (OTA TRP)
Sensitivity:
 < -107dBm @ 850/900MHz (Conducted)
 < -101dBm @ 850/900MHz (OTA TIS)
 < -106dBm @ 1800/1900MHz (Conducted)
 < -103.5dBm @ 1800/1900MHz (OTA TIS)
Antenna:
 Integrated onto PCB
 Meets minimum AT&T TRP/TIS requirements

Services: GPRS Multi slot class 12
SMS (Text):
UDP data
DNS address resolution
GSM circuit switched hard reboot

GPS: L1-band (1.57542GHz)
Channels:
210 PRN
66 Search
22 Simultaneous tracking
Sensitivity (UHIS):
Tracking: -165dBm
Reacquisition: -158dBm
Acquisition: -149dBm
Acquisition time:
Hot: <1.5s
Warm: <34s
Cold: <90s
Reacquisition: <1.0s
WAAS:
Position: <3m
Velocity: >0.1m/s
Acceleration: >0.1m/s²
Altitude: 18,000m (max)
Velocity: 515m/s (max)
Acceleration: 4G (max)
32 Geo fences
Coil antenna

I/O: One main port and one internal expansion port
 All pins are 16V tolerant and ESD protected

Pigtail:

- 2-Leads 2.8V GPIO
- 2-Leads USB2.0
 - Data+
 - Data-
- 1-Pin relay drive
 - 500mA drive
 - TVS overvoltage protection
- 1-Pin power input:
 - 1.0A resetting fuse
 - TVS overvoltage protection
- 1-Pin ground

SIM: Internal embedded

LED: Red GSM status
 Green GPS status

Battery voltage measurement

Power: Vin:

- 6.0 – 15.0VDC
- Full Shutdown: < 50 μ A
- Standby: < 800 μ A (GSM Idle)
- GPS acquisition: < 40.0mA (GSM Idle)
- GPS tracking: < 36 mA (GSM Idle)
- GSM dedicated: < 36.0mA (GPS Off)
- GPRS max power: < 90.0mA (GPS Off)
- Peak instantaneous < 600mA

Software: Native ARM processor execution
Proprietary application
Extended AT command interface
Easily configured reports to minimize data transport costs
Based on proven GSM/GPRS modem stack

Lockup protection:
Independent watchdog with power cycle reset and reboot
GSM circuit switched reset

Flash memory:
8MB for application and data storage
Report buffer
USB port update
Over the air update

Options: Backup Battery
Motion sensor

Physical: Design: Nondescript design
Color: Black
Material: UL Lanxess PA6 Durethan BKV15+
Size: L91mm x W39.4mm x D13.7mm
SIM: Keyed retainer socket

Environment: Temperature:
-40 to 85 °C Operation
-50 to +100 °C Storage

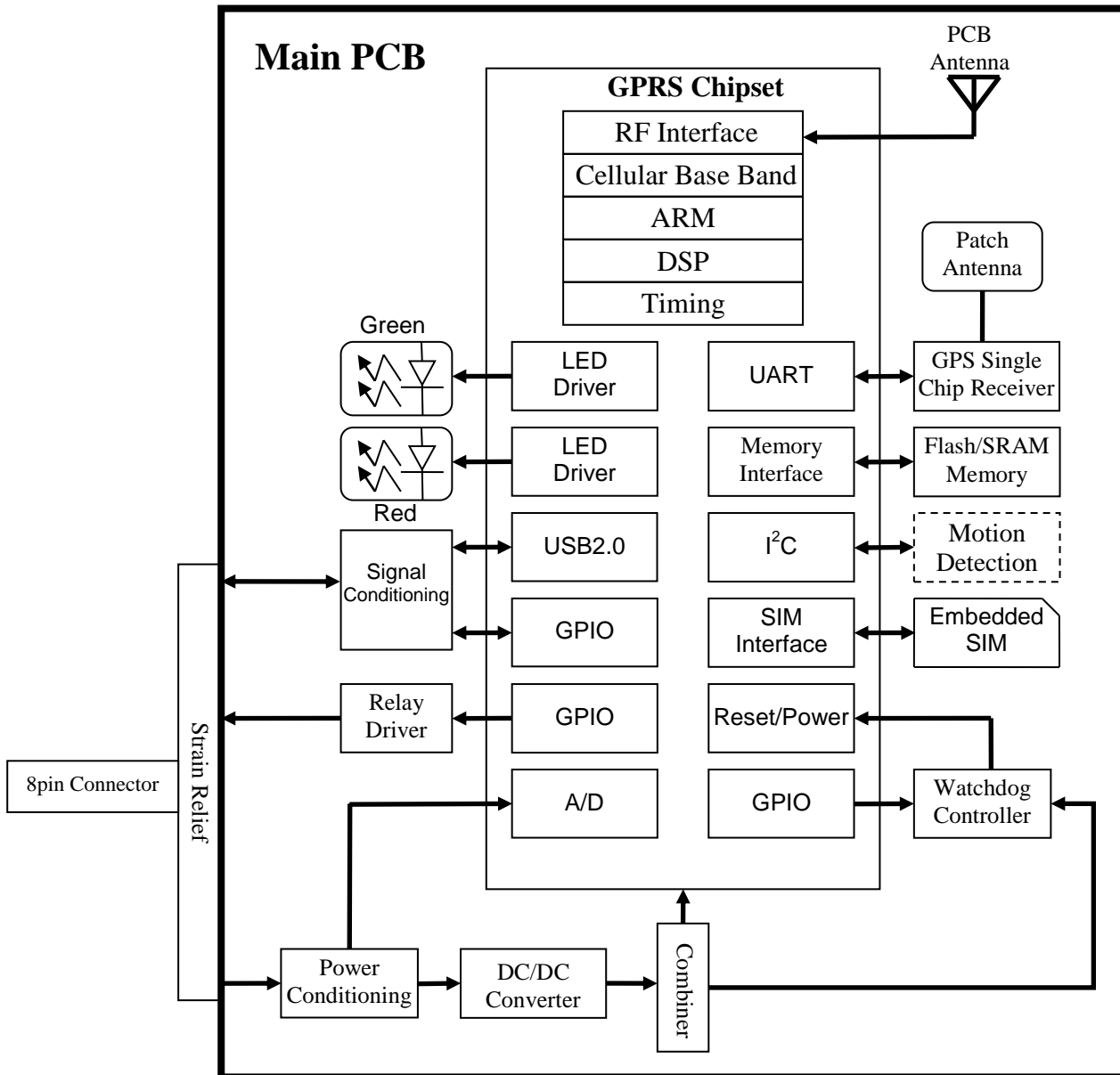
Humidity:
20% to 90% Operation
10% to 95% Storage

ESD: 15KV immune on all user accessible surfaces and ports
Altitude: -500 to +18,000m
Shock: 25G
Vibration: Sinusoidal/random

Hardware Architecture

Figure 1 shows a high level block diagram of the ARROW system hardware. The core architecture is defined a highly integrated GPRS chipset and single chip GPS receiver. The motion detector is optionally populated at assembly time. Signal and power interface to the PCB is through a 8pin connector harness.

Figure 1
ION-X Hardware Architecture Block Diagram



Physical Attributes

Figures 2 show various exterior views and dimensions of the ARROW Tracker and some critical physical features.

Figures 2



Variants

Model	Description	Remarks
Arrow-G	GPRS GPS Tracker – Standard	
Arrow-G-BA	GPRS GPS Tracker with Built-in Backup Battery	
Arrow-G-BG	GPRS GPS Tracker with Built-in Backup Battery & Motion Sensor	

FCC Statement

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.

The grantee is not responsible for any changes or modifications not expressly approved by the party responsible for compliance. Such modifications could void the user's authority to operate the equipment.

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 or more 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 RF Radiation Exposure Statement:

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

IC Statement

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

CAN ICES-3(B)/NMB-3(B)

Le présent appareil est conforme aux CNR d'Industrie Canada applicables 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'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

CAN ICES-3(B)/NMB-3(B)

IC RF Radiation Exposure Statement:

This equipment complies with IC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

Déclaration de rayonnement RF exposé IC:

Ce dispositif conforme aux valeurs limites d'exposition pour les rayonnements RF présente un environnement non contrôlé. Le dispositif dissipateur de chaleur et le corps entre l'installation et la distance minimale de 20 cm de fonctionner.