Shock: 25G
Vibration: Sinusoidal/random

Hardware Architecture

Figure 1 shows a high level block diagram of the TRAXIT X 2G GPS TRACKER 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 strain relieved 7 lead pigtail harness. Fewer wires may be populated as a cost reduction option at the factory at assembly time.

Figure 1
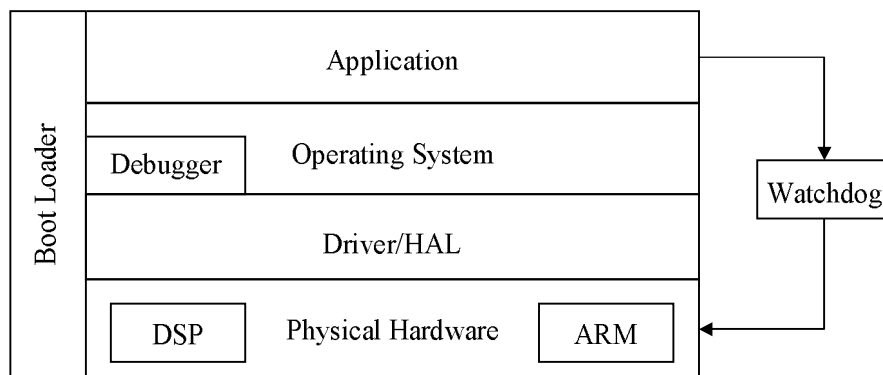**TRAXIT X 2G GPS TRACKER Hardware**
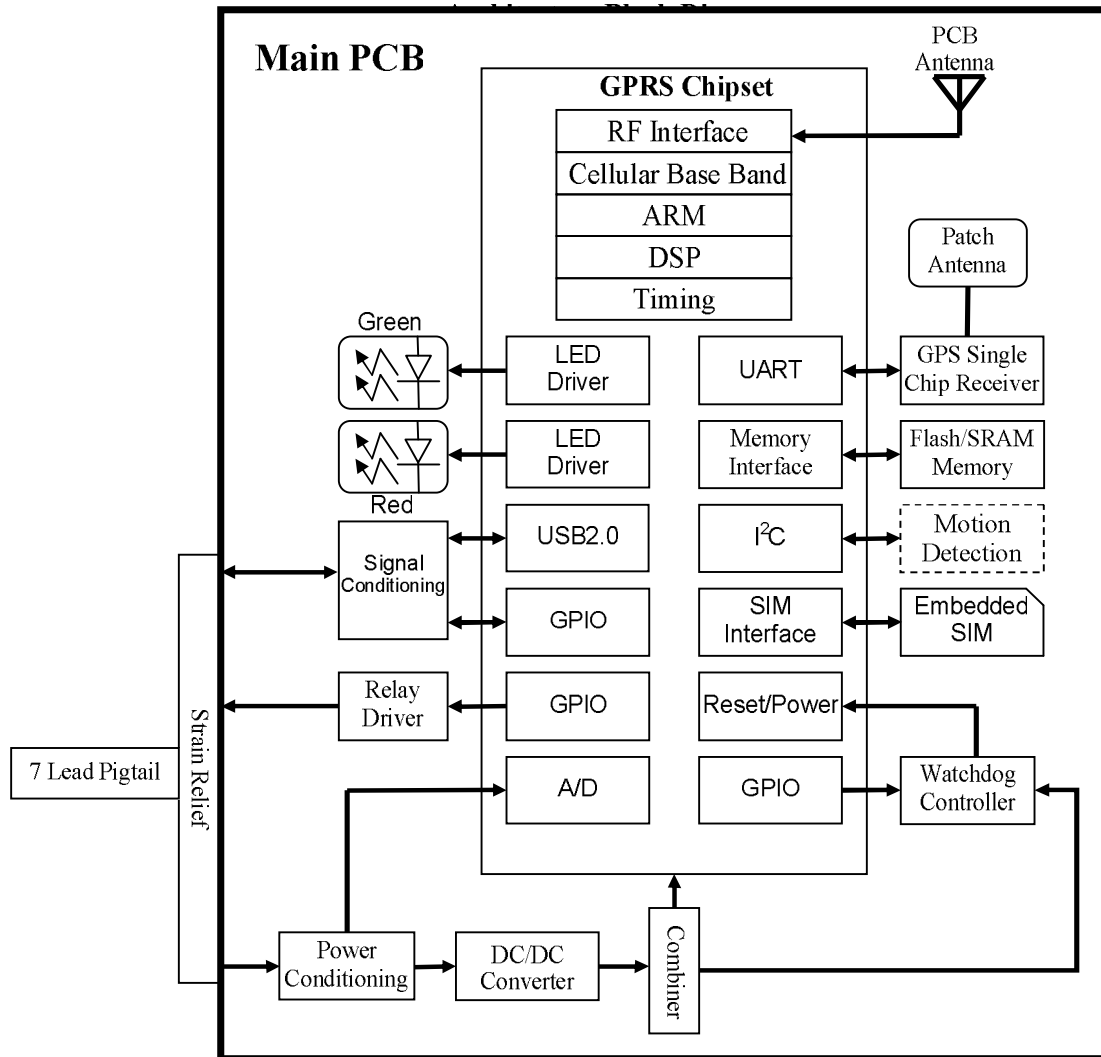
Software Architecture

The TRAXIT X 2G GPS TRACKER does not use an external applications processor.

Structure

Figure 2 shows a high level block diagram of the basic architecture. The OS is closely knit with a debugger allowing for code development, maintenance and updates over the USB port. The boot loader provides control over all code and configuration memory. The watchdog is a dedicated hardware device that will issue a hardware reset to the unit in conjunction with a power cycle operation if it is not maintained by a periodic ping from the application program.

Figure 2
TRAXIT X 2G GPS TRACKER Software Architecture

Features

TRAXIT X 2G GPS TRACKERs to AT commands issued to it from either a physical USB port connection or to AT commands issued to it through an SMS or a UDP/IP connection. With regard to text messages, TRAXIT X 2G GPS TRACKER "reads" all of its own text messages and tries to interpret each message as an AT command. SMS text may be sent to an ION through any CSD SMS connection.

Key superset functions outside that of typical GPRS modems support intrinsic TRAXIT X 2G GPS TRACKER Features. These functions include:

- Automatic field lockup recovery
  - o Dedicated hardware watchdog with power and reset cycle
- Specialized GPS functions including
  - o GPS data reporting
  - o GPS status reporting

- o GPS power control

- o Setup and monitor geographic fences

- Device initiated UDP reporting

  - o Recurring schedule event

  - o Low battery condition

  - o Change in GPIO state

  - o Report record queue

  - o User defined IP addresses

  - o Geographic fence violation

- Virtual AT command processor over SMS or a UDP/IP connection

- OTA code update using TFTP

  - o 100% buffered

  - o Established standard protocol

- Application specific I/O

  - o Read/write digital

  - o Read battery voltage

- APN support with optional credential verification

Further details on the TRAXIT X 2G GPS TRACKER software features are available in the document titled: "AT Command Specification for the TRAXIT X 2G GPS TRACKER GPRS/GPS Tracking Device" and available from the author of this document.

Physical Attributes

Figures 3A and 3B show various exterior views and dimensions of the TRAXIT X 2G GPS TRACKER Tracker and some critical physical features.   The top and bottom half shells are sonically welded together to provide a water resistant seal around the case perimeter. Through pressure engagement around the cable strain relief the welded enclosure also provides water resistance around the cable harness. This seal is also potted with a slow set adhesive when the case is welded together. The label is made of waterproof plastic and adhered the to the case bottom as shown using 3M waterproof adhesive. The label covers test points used in final manufacturing test and also provides a watertight lens over the LED ports. The label also provides media for silk-screening and printing barcode and other information onto.
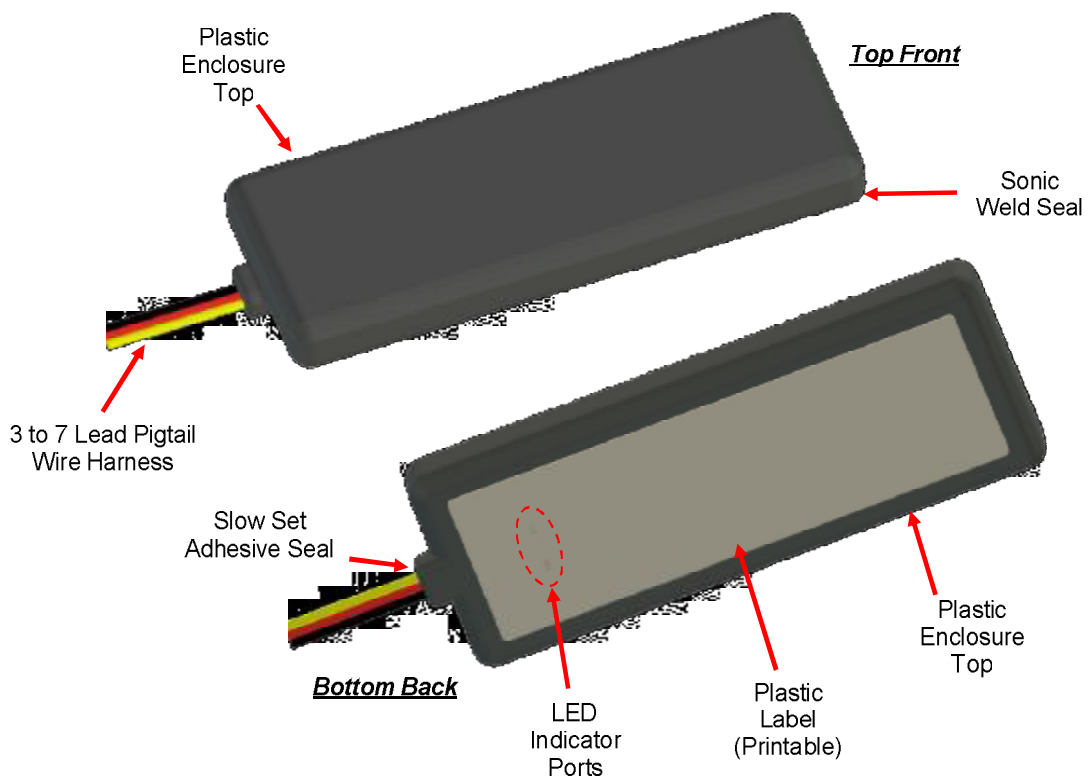
Figure 3A
TRAXIT X 2G GPS TRACKER Exterior

Figure 3B
TRAXIT X 2G GPS TRACKER Exterior
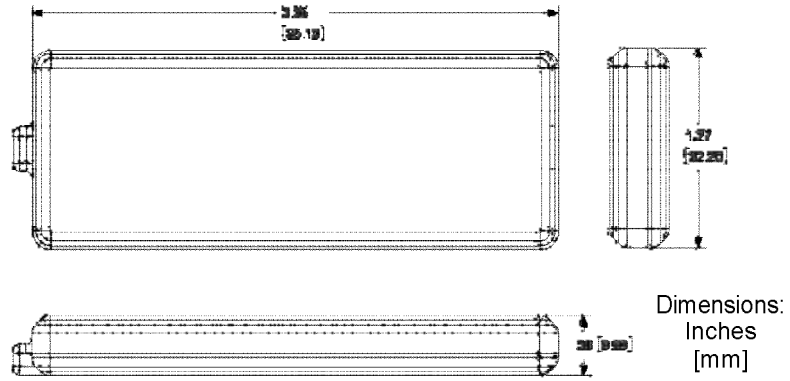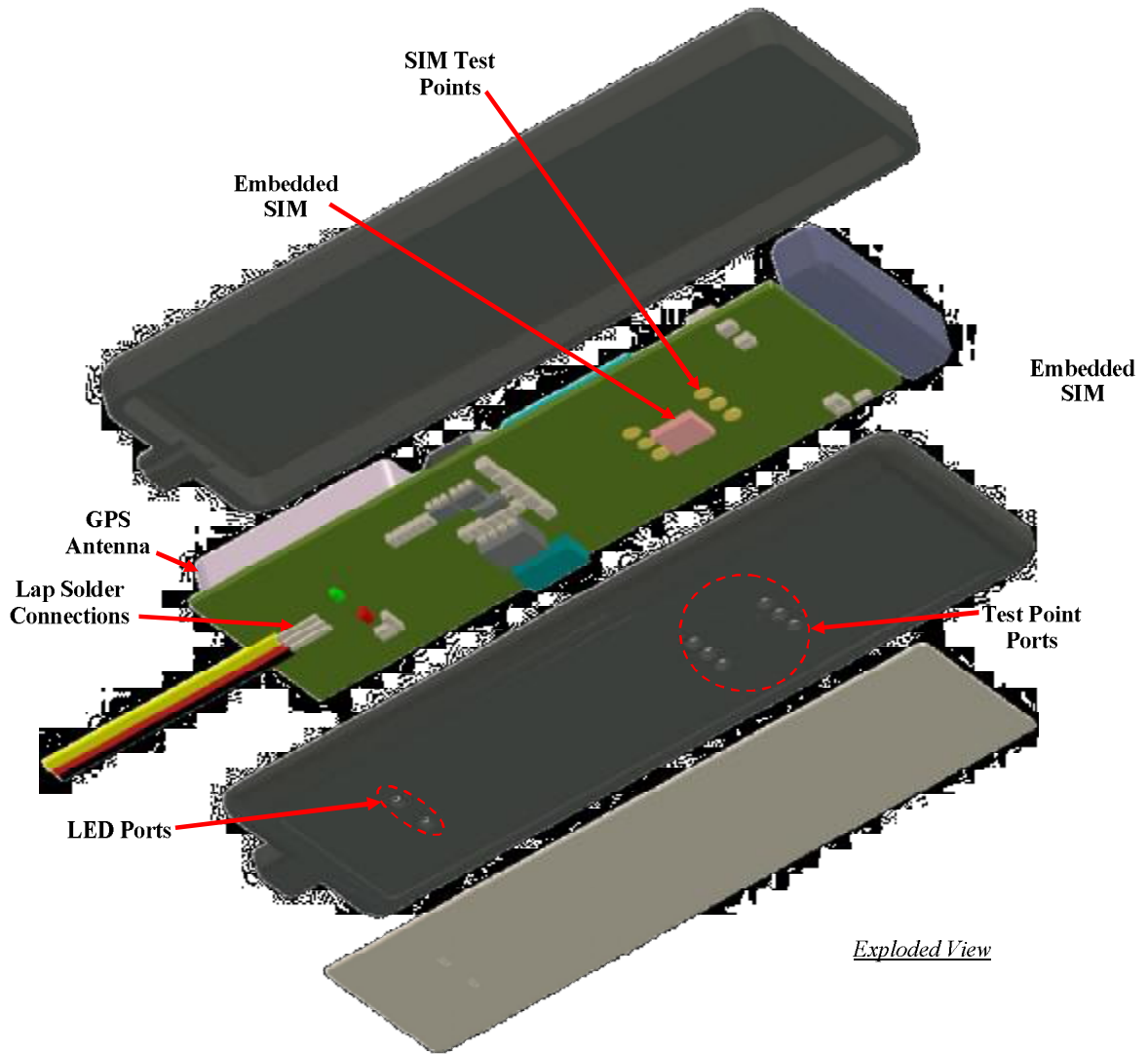

Dimensions:
Inches
[mm]

Figure 4 shows a various internal attributes of the TRAXIT X 2G GPS TRACKER. The SIM is an embedded QFN package that is mounted during board assembly. Test is accomplished using special carrier provisioning and through probe holes that bypass the SIM and are later covered by the water resistant label.

Figure 4
TRAXIT X 2G GPS TRACKER Interior

SIM Test
Points

Embedded
SIM

Embedded
SIM

GPS
Antenna

Lap Solder
Connections

Test Point
Ports

LED Ports

Exploded View

Interfaces

Electrical interface to the outside world is accomplished through a 7-lead pigtail wire harness that is retained directly by the sonically welded enclosure. Test points required for final test and provisioning are provided by port holes that are covered by the water resistant plastic label when applied. Dual LEDs provide status and are viewed through this label through clear ports where printing or silk-screening is omitted.

Test Points

Information on test point location and function can be obtained from the author of this document. This information is provided only to authorized contract manufacturers of the TRAXIT X 2G GPS TRACKER.

Harness Signals

The signals present on the pigtail harness are described in the table below.

| Main Signals			
Lead Color	**Name**	**Description**	**Properties**
BLACK	GND	System ground, connect to negative of battery power	Power and signal ground point
RED	VIN	Power input, connect to positive side of battery power	750mA PTC inline self resetting fuse, also clamped to GND through 16V
GRAY	USB+	Positive USB data	Can be directly connected to the + data pin on a standard USB2.0 data port
GREEN	USB-	Negative USB data	Can be directly connected to the - data pin on a standard USB2.0 data port
YELLOW	GP1	Configurable as general input or output	2.8V logic level, 16V tolerant, equivalent circuit in NOTE
BLUE	GP2	Configurable as general input or output	2.8V logic level, 16V tolerance, equivalent circuit in NOTE
ORANGE	RLY	Relay drive, connect relay coil between VIN (RED lead) and this pin	500mA, 16V tolerant open drain MOSFEET, TVS overvoltage protected

NOTE
Equivalent Circuit for GP1 and GP2
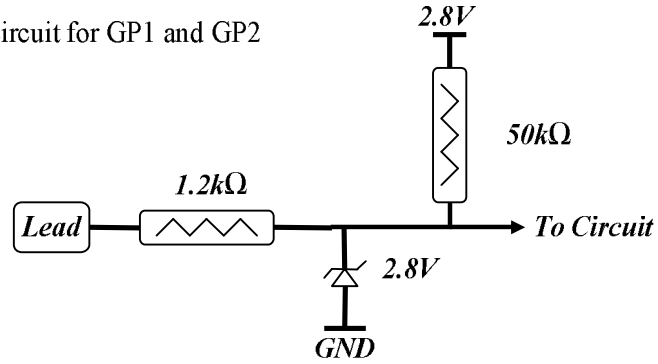
Harness Preparation

The length of the harness is a manufacturing option. The harness is comprised of 28AWG stranded automotive grade wires with solid colors as specified in the table above. Unless otherwise specified, the harness ends are stripped as shown in Figure 5.

Figure 5
Wire End Preparation
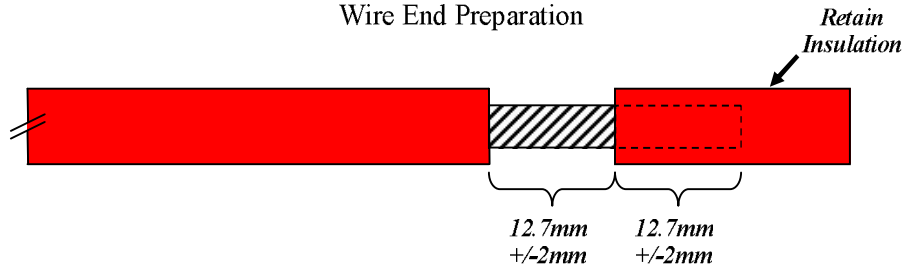
LEDs

The two status LEDs directly convey the status of the GPS subsystems as described in the table below. Indirectly, through their absence of a valid indication, they also provide power and operational status. These LEDs are color coded and located as shown in Figure 6.

Figure 6
LED Orientation

LED	Status
Green	**On**: GPS satellites acquired **Flash**: 250ms/250ms duty cycle indicates GPS satellite search is in progress **Off**: GPS subsystem fault
Red	**On**: Indicates GPRS connection is made **Flash**: 250ms/250ms duty cycle indicates subsystem initialization

Installation information

The Tracker uses a simple cabling arrangement and supports splicing into an OBDII exten-sion for power. Connection to the vehicle is made through a 3mm pitch rectangular header con-nection common to the automotive market.
As any GPS location device, the TXXL1G2 should be installed in a vehicle, so that it has an unob-structed view of the sky during normal operation. Double sided foam tape can be used to secure the surface not facing the sky, if needed.