



**Eye-In-The-Sky <-> Cell-To-Cell
Global Telematics Security Monitoring
On Land - On Air - On Seas**

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TEXEL™ ruggedised Box-in-a-Box consisting of TRAXAT™ Tri-Band 900-1800-1900 GSM-GPRS-GPS-RFID Transceiver with additional Battery Back-up and configured with RFID Active Intelligent Container Door Seal Transponder,.



The following proposed format is for the development and prototyping of an industrial GPRS + GPS + RFID black box with a battery life that can sustain 60 to 90 days of operations limited to a maximum of two transmissions per day, as part of the overall solution for the CSI Project which you are directing.

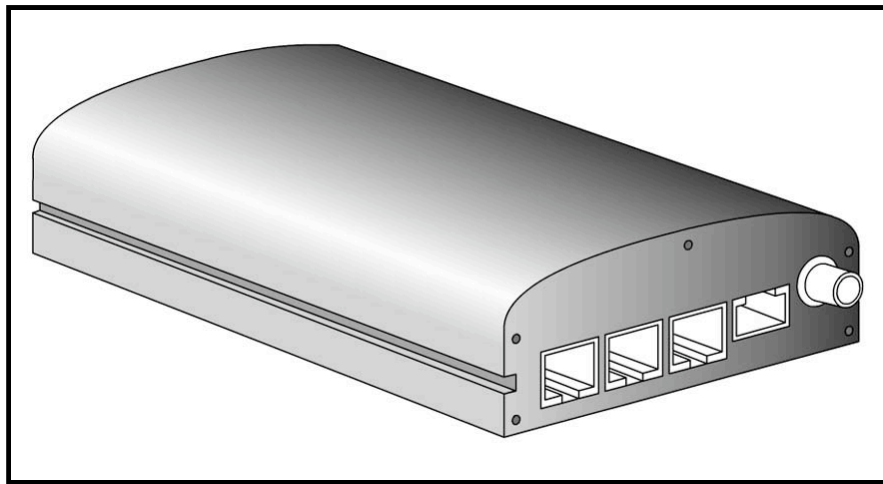
The product which GlobalTrax Pte Ltd is developing for this project is called the TEXEL™ product with an enclosed telematics device called TRAXAT™. It comprises four main components:

- 1. The telematics device known as TRAXAT with the GPRS + GPS modules, processor and operating system.**
- 2. The RFID active reader and tag to be interfaced with the TRAXAT™.**
- 3. The ruggedized enclosure to meet the environmental specifications.**
- 4. The external extended battery for 60 to 90 days of continuous operations.**

This proposal is by no means exhaustive. If there are any areas which need to be fine tuned, we will appreciate your feedback. Should you have any queries or clarifications, please send an email or call me directly.

Chapter 1 - TRAXAT™ – Technical Specifications

1.1 Introduction



The **TRAXAT™ GSM/GPRS**, **TRAXAT™ TDMA** and **TRAXAT™ CDMA/X1** integrate a Global Positioning System (GPS) receiver, a cellular network modem: GSM/GPRS or TDMA or CDMA/1X module, and an on-board processor.

The system is linked, monitors various vehicle sensors, and provides the customer with a wide variety of real-time activities and information about the vehicle.

The **TRAXAT™** is a complete vehicle protection/security and fleet management product, which allows for data transfer and full duplex voice applications, all in a single unit. All components, including antennas, are hidden and undetectable.

1.2 General Specifications

- β Supporting both GSM/GPRS, CDMA/1X and TDMA networks.
- β Encrypted messages protocol.
- β Complies with the Automotives Industry standard.
- β Shock resistant according to the European and US vehicle security systems standards.
- β OTA (Over the Air) unit software programming for various parameters, such as SMS destination, SMSC number, etc.
- β 4K static RAM.
- β 8K Nonvolatile parameters memory.
- β 56K Flash memory.
- β External device connector:
 - * Serial data interface (RS232) for connecting external intelligent devices such as terminals, vehicle computers, Palm-Pilot, i-PAQ etc.
 - * External “Blue-Tooth”, plug-in to the RS232 connector.
- β 2 immobilizing output/methods:
 - * Internal immobilizing with 30 Amp relays, for starter immobilizing, automatically active in Passive Arming mode
 - * External immobilizing, connecting to ignition and/or fuel pump and remotely controlled.
- β 16 Channels GPS receiver.
- β Unit disarmed by several options: Dallas e-button, Key Pad (6 keys), or a finger print sensor.
- β Smart power management.
- β Small unit (140 x 100 x 29 mm, 250 grams) with all the components on one board.
- β Power supply: 8 – 28V with surge capabilities of +/- 60V. For both 12V and 24V vehicles.
- β Internal back-up battery.

Official Approvals to be Obtained



TUV Certification

E24 10R-020086



Part 15



Declaration



60950



CB Certification



Environment Specification

- β Storage Temperature -40°C to $+85^{\circ}\text{C}$ (Commercial Grade).
- β Operation Temperature -40°C to $+55^{\circ}\text{C}$ (Industrial Grade).
- β Operating Humidity 50% to 80%.

Inputs and Outputs

- β 12 digital Inputs.
- β 12 digital Outputs.
- β 5 analog inputs

Power consumption

- β Nominal (relays off) – 30mA.
- β Transmission Mode – 130mA

Motorola g18 GSM/GPRS Module Specification

- β GPRS packet switching with speeds up to 57.6K - Brings Internet Protocol capability to GSM.
- β Tri Band - 2 Watt 900 MHz and 1 Watt 1800 & 1900 MHz for GSM global performance.
- β Supports voice, data, fax, SMS and WAP.
- β GSM Phase 2+ Feature Set.
- β 3.0 to 6.0 Volt operations
- β 3 and 5 Volt SIM supports.
- β Operational Temperature: -35°C to $+60^{\circ}\text{C}$.
- β Storage Temperature: -40°C to $+85^{\circ}\text{C}$.

Sony Ericsson DM15 TDMA/AMPS Module Specification

- β Dual Mode (TDMA/AMPS-800 MHz).
- β Digital PCM and Analog Audio.
- β SMS (MO/MT).
- β OTA Activation and Provisioning.
- β AT Command Set: ITU V.24.
- β Standards and supported classes: TDMA Class IV and AMPS Class IV.
- β Operational Temperature: -40°C to $+85^{\circ}\text{C}$.
- β Shock Resistance 20G Half Sine, 11ms.

Motorola c18 1XCDMA Module Specification

- β Includes Emergency & Location aGPS/AFTL capabilities and complies with the FCC E911 Phase II Location Mandate.
- β Dual band Tri mode: CDMA 1X 800/1900 and 800 MHz AMPS range.
- β Supports voice (Differential Audio), data, fax and SMS.
- β 3.6 to 4.5 Volt operations.
- β Operational Temperature: -25°C to $+70^{\circ}\text{C}$.
- β Storage Temperature: -40°C to $+85^{\circ}\text{C}$.

GPS Receiver Module

- β 16 parallel satellite-chasing device.
- β Channels for fast acquisition and reacquisition.
- β Built-in Antenna.
- β Power consumption (GPS Engine 60mA).
- β NMEA /CIROCOMM protocol (Binary format).
- β Multi-path migration.
- β Small size (67x53mm).
- β Light weight.



- β Receiving Frequency: L1 band, C/A.1575.42MHz.
- β Sensitivity: -133 dB
- β Update Rate: 1 sec.
- β Accuracy:
Position: 30m 2DRMS.
Velocity: 0.3m/sec.
- β Acquisition:
Cold start: 60 sec Typical.
Warm Start: 35 sec Typical.
Hot Start: 7 sec Typical.
- β Active Antenna: >22dB.

1.3 Applications

General

- β Setting to a Garage state in which it stops its active transmissions and security system, therefore allowing the installer to work with the vehicle.
- β Stopping the active transmissions from unit (without de-arming the security system and losing its functionality).

Security system application:

β TRAXAT is responsible for vehicle alarm, used Keypad, Dallas e-button or Remote Control with Code or without to disarm the unit.

β When the siren is active or the system transmits a theft transmission, the unit automatically immobilizing the vehicle.

β Active windowpane engine.

β Transmission triggers:

When any of the following events, the unit will start transmitting:

1 Protection on all vehicle entries in real time identification: Doors and Hood.

1 Passive alarm arming after predefined period (in case that the door was left opened, or the vehicle was forgotten unarmed).

1 Real time breaks in identification.

1 Alarm bypass: real time alarm system bypass attempting identification Ignition.

1 Towing alert: real time identification of a change in the vehicle's location when the engine is off.

1 Main power battery disconnection or low input voltage.

1 Once every 36 hours (or other predefined number of hours) – for verifying that the unit hasn't been tampered with and is fully function.

1 Protection against communication frequencies jamming.

β Remote control channel:

The unit can receive and execute remote various commands from the control center or from the owner's cellular phone including:

1 Arming/disarming the system.

1 Remote gradual shut down.

1 Activate/deactivate the siren and lights.

1 Lock/Unlock doors.

Driver Protection:

β When any of the following events occur, the unit will start transmitting:

1 Distress button: used in real time for "Life threatening".

1 Report vehicle accidents by Accident Detector: The sensor is designed to detect impact with acceleration above 8G, forward backward and 3g from right and left sides.



Fleet Management:

β **Tracking mode:** Ability to set the unit to transmit at intervals of between 10 seconds to unlimited time with the ability to set the network channel priority. The vehicle can be tracked in one of the available channels according to the pre-selected priority.

The unit will switch channels according to availability.

β **Compress Mode:** Ability to send up to 15 positions and transmission reason in one SMS transmission.

β **On board analysis** and real time alerts from the vehicle according to a planned schedule: In order to minimize communication expenses, the system has the capability to save unlimited Work Plan Records in the unit memory, to perform real-time analysis to identify any deviation from the defined Work Plan, and to transmit the deviation as an emergency broadcast. The TRAXAT has the capability, with onboard intelligence, to choose between channels (TCP, Data and SMS), in order to speed up the transmissions and to minimize the communication costs, according to the cellular network capability and site coverage. The work plan application includes:

1 **Way Point:** Monitoring and verifying of drivers arrival and departure from a Way Point at predefined desired times.

1 **Geo Fencing:** Set-operating areas for the unit. When the unit is leaving or entering these areas, the system will alert.

1 **Status Alert:** Receipt of alert upon execution of an abnormal operation on the vehicle by Enable/disable specific input(s), which cause a transmission in case of input state changing. Used for such inputs as container doors, activate engine, alarm bypass etc'.

1 **High/Law Value Alert:** Monitoring high or low vehicle velocity and the unit analog inputs: i.e.: main and backup battery, trunk temperature etc'. The alert is according to values and time definition.

β **150 - 850 positions/Statuses storage:** When programmed to "Tracking mode", the unit can record and store up to **150 messages** includes Date and time, Transmission Reason, Position and Vehicle Statuses or **850 messages** includes Date and Time, Transmission Reason and Vehicle Positioning locations only. The storage is used in case the unit is located in an area not covered by the cellular operator. When the unit reenters a covered area, it starts transmitting the stored positions via the TCP/IP or the SMS channel.

β **Speed information:** Ability to store the speed in the unit memory and to download it via the GPRS channel and/or via the RS232 connection.

β **Real time over speed alert:** Ability to define the required speed for a specific vehicle. Over speeding will send an alert to the Control Center.

β **Real time harsh breaking alert:** Ability to identify vehicle abuse by the driver in real time. When the driver over used the vehicle brakes and/or stops abruptly. The application is using an external acceleration measure.

β **Vehicle operating status and Ignition Diagnostics** at each transmission:

1 Ignition.

1 Accurate odometer reading.

1 **Engine & other vital statistics**, including:

o **"Overheat":** high engine temperature (connecting to the vehicle original alert).

o **Oil pressure:** Connecting to the vehicle original alert.

β **Driver identification:**

β **External hands free kit** – (Optional) for Voice communications. Allows the control center to communicate with vehicle driver and the driver with external dialer (Terminal with dialing program) to dial out.

β **Palm Pilot/IPAQ/Data Terminal unit connection.** Allowing text messages to be sent to and from the driver to the control center, uses voice channel by dialing via special program etc'.

Environmental Qualification Tests

S/No	Environmental Test	Reference Standard
1	High Temperature - Storage	Mil-Std-810E, Method 501.3, Procedure I Storage: 30°C to 70°C (7 cycles X 24hrs)
2	High Temperature - Operation	Mil-Std-810E, Method 501.3, Procedure II Operating: 30°C to 65°C (3 cycles X 24hrs)
3	Low Temperature - Storage	Mil-Std-810E, Method 502.3, Procedure I Storage: -30°C to 5°C (3 cycles X 24hrs)
4	Low Temperature - Operation	Mil-Std-810E, Method 502.3, Procedure II Operating: 0°C to 5°C (1 cycle X 24hrs)
5	Humidity	Mil-Std-810E, Method 507.3, Procedure III 60°C, RH 95%±5% (10 cycles X 24 hrs)
6	Salt Fog	Mil-Std-810E, Method 509.3, Procedure I Continuous 48hrs exposure, 48hrs drying
7	Rain	Mil-Std-810E, Method 506.3, Procedure I
8	Vibration	Mil-Std-167-1, Type 1 Exploratory: 12min/axis, 3 axes Variable Frequency: 4hr/axis, 3 axes Endurance: 2hrs/axis, 3 axes
9	Shock GAM-T13	Half sine, 4 shocks/axis, 3 axes Z-axis 50G, 6ms; X- and Y-axis 30G, 11ms
10	Drop	Mil-Std-810E, Method 516.4, Procedure IV 6 face drops from 1m

Chapter 3 : RFID READER and TAG

Reader : Product Code: L-RX300

Description: Reader RS232

The Reader connects directly to an available serial port on the computer. The Reader detects the presence of all Wavetrend™ L-series compatible Active Tags within its read range and continuously streams the data to the serial port.

The reader is of a crystal stabilised Superheterodyne RF receiver design.

Features

- Σ Plugs into any Serial port with a DB9 (male) connector.
- Σ No external power supply is needed as this is supplied by the PC's communication port.
- Σ The Baud rate of outgoing data is 57600.
- Σ The Received Signal Strength indicator is appended to the Tag information, which is passed onto the serial port.
- Σ Small compact design.
- Σ The antennae is enclosed within the product housing.

Applications

PC access control (PCAC) applications when used in conjunction with Wavetrend PCAC software (product code: L-SY100). The PSION handheld computer reader also makes use of this reader (product code: L-SW600).

Specifications

Environmental

- Σ Operational temperature - 40° C to + 75° C
- Σ Storage temperature - 40° C to + 85° C
- Σ Humidity 5% to 90% (non condensing)

Electrical

- Σ Comm port Baudrate 57600 bps
- Σ Receive Frequency 433 MHz
- Σ Bandwidth ± 300KHz
- Σ Sensitivity - 85dB
- Σ Power supply + 7VDC
- Σ Current Consumption < 11mA

Physical

- Σ Size (Reader) 32 mm x 33 mm x 14 mm
- Σ Colour Dark Grey (Clariant 04-600 2%)
- Σ Type of material Fire resistant ABS
- Σ Colour Dark Grey (Clariant 04-600 2%)
- Σ Type of material Fire resistant ABS



Tag : Product Code: L-TG800-IH



Description: Tag Industrial Housed Asset

An internal battery powers The Link-it™ series of Active Asset Tags. The Industrial Housed Asset Tag will, for the duration of its life, transmit a Radio Frequency (RF) signal at a pre-set time-interval. The Tag life is estimated at 5 years at a transmission time interval of approximately 1.5 seconds. The life span of the Tag ends when the battery life is exhausted. Battery status can be inferred by interrogating the internal Tag Age Counter Value.

The transmitted Tag data includes Customer Site Code (CSC), Tag ID, Tag Age Counter Value, Movement Alarm and Tamper Alarm status. For protection against adverse environmental conditions, Link-it™ Asset Tags are encapsulated in a moulded plastic case, which is ultrasonically sealed during the manufacturing process.

The L-TG800-IH Tag is generally used for outdoor Asset tagging applications. The L-TG800-IH is ideally suited for **operating on metallic surfaces** (or plastics containing a high metal content). The mounting and affixing of a Tag depends on the type of application. The standard method is by VHB type double-sided adhesive tape.

The Tag can be configured to accommodate Wiegand interfacing.

Features

- Σ Configurable settings, including Site / Vendor ID, Tag ID, Transmission Repetition Interval and Alarm functions (these are programmed at order placement stage).
- Σ Low power consumption. Tag life is estimated at 5 years when transmitting at a 1.5-second interval.
- Σ A Collision avoidance algorithm is used to dispose the transmissions around the mean repetition interval.

Product Information Sheet

Specifications

Environmental :

- Σ Operational temperature - 10° C to + 60° C
- Σ Storage temperature : - 20° C to + 70° C
- Σ Humidity : 5% to 90% (non condensing)

Physical

- Σ Size 85 mm x 70mm x 9 mm
- Σ Weight < 25 grams
- Σ Colour Grey (Clariant 04-600 2%)
- Σ Type of material PVC (ultrasonically sealed) IP 65

RF Specifications

- Σ TX Frequency 433 Mhz
- Σ Typical Transmission Range 8 Meters (24 feet)
- Σ Field strength < 1600 μ V/m
- Σ Modulation ASK
- Σ Bandwidth < 1 MHz
- Σ Stability Saw Stabilised

Electrical Specifications

- Σ Power Internally powered Lithium Battery

Certification

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- Σ This device may not cause harmful interference and
- Σ This device must accept any interference received, including interference that may cause undesired operation.

The following standards applied in accordance with Article 5 of the directive, 1999/5/EC:

- EN 300 220-1 V1.2.1 (1997-11)
- ETS 300 683 (1997-03).

Summary of tests

- Σ Effective radiated power 25MHz - 4GHz
- Σ Range of modulation bandwidth for wideband equipment
- Σ Frequency stability under low voltage conditions
- Σ EN55022 Radiated emissions 30MHz – 1GHz
- Σ EN61000-4-3 Radiated immunity 80MHz – 1GHz, excl 434 MHz \pm 20MHz
- Σ EN61000-4-2 Electrostatic discharge

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“Discovery consists of looking at the same thing as everyone else and **thinking** something different.”

Albert Szent-Gyorgyi - Nobel Prize Winner

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