GREAT WEST EQUIPMENT
"SERVICE FIRST"

ST 9100

NEXT-GENERATION DUAL MODE
SATELLITE-CELLULAR TERMINAL
FOR DIVERSE IOT APPLICATIONS

COST EFFECTIVELY TRACK, MONITOR, AND CONTROL REMOTE ASSETS WITH MULTI-NETWORK CONNECTIVITY.

The ST 9100 is a flexible, robust, and programmable dual mode satellite-cellular terminal. It is ideal for remotely monitoring and controlling fixed and portable assets in industries as diverse as transportation, oil and gas, utilities, maritime and more. The versatile, environmentally sealed ST 9100 is ideal for rugged environments in the world's most remote areas.

Satellite-cellular connectivity | Feature-rich and versatile | Rugged
Flexible programming environment | Supports market-specific terminal apps
Comprehensive integration resources for quick deployment

EASY INTEGRATION

The ST 9100 offers a flexible programming environment that supports the development of custom solutions, as well as support for ORBCOMM® configurable terminal apps. In fact, you can combine terminal apps with your own code to create a custom solution to speed time to market.

FEATURE-RICH

Standard features include multiple I/Os, including analog/digital, 2 RS232, 1 RS-485/J1708, 1-Wire and 2 CANbus. 3-Axis accelerometer, Bluetooth connectivity and multiple SIMs are also supported.

AIRTIME SAVINGS

Use cellular or automatically switch between cellular and satellite connectivity for significant cost savings. In addition, the ST 9100 can be programmed to process data and send only important updates over the air, reducing connectivity costs.

CONTINUOUS OPERATION

The ST 9100 features a backup battery that enables reporting for more than 48 hours with 1-minute cellular reporting or 60-minute satellite reporting when power is interrupted.

DEVELOPMENT KIT

The ST 9100 development kit includes all the hardware, software development tools, documentation, accessories and support that you need to write and test your IoT solution for quicker time to market.

Although we strive to ensure accuracy in all of our published specifications, actual field performance can vary depending on a variety of environmental, installation and usage factors, as well as third-party factors such as cellular providers. The specifications listed are approximations, and do not constitute binding statements or modify the terms and conditions of purchase or lease including, but not limited to, product operational limitations and warranties. All specifications are subject to change without notice. Please check www.orbcomm.com to ensure you have the latest version of these specifications.

Satellite Communications

Satellite service: Two-way, Global, IsatData Pro
From-mobile message: 6,400 bytes
To-mobile message: 10,000 bytes
Typical latency: <15 sec, 100 bytes
Elevation angle: +20° to +90° (remote antenna); -15° to +90° (low elevation antenna)
Frequency:
» Rx: 1525.0 to 1559.0 MHz;
» Tx: 1626.5 to 1660.5 MHz
EIRP: <7.0 dBW

Cellular Communication

Global: Cat 4 LTE (B1, B3, B5, B7, B8, B28), UMTS (850, 900, 1900, 2100), Quad-band GSM
Americas: Cat 1 LTE (B2, B4, B5, B12), UMTS (850, 900, 1900, 2100), Quad-band GSM
Saudi Arabia: Cat 1 LTE (B1, B3, B8, B20, B28), UMTS (2100)
SIM: 3.3V/1.8V SIM

GPS/Glonass/Beidou/Galileo

Acquisition time: hot: 1 second; cold: 26/30/34/26 seconds
Accuracy: 2.0 m CEP-horizontal
Sensitivity:
» Acquisition: -148 dBm
» Tracking: -167 dBm
Security: signal jamming detection

Certification

CE (R&TTE, RoHS 2), FCC/IC, FFA, PTCRB, Inmarsat type approval, ACMA, ICASA, Anatel, ITF, IEC 60945

Electrical

Input voltage: 9 to 32V; load dump protection: +150V; SAE J1455 (Sec. 4.13)

Battery

Lithium ion: 2,000 mAh
Discharge temperature range: -20°C to +75°C
Battery backup: >48 hours operation with 1-minute cellular reporting or 60-minute satellite reporting

Dimensions

148 × 113 × 47 mm
181 × 113 × 47 mm including mounting feet

External Interfaces

4 configurable inputs/outputs: Analog/digital /input/output
2 dedicated outputs (sink-ground)
4 Digital/analog inputs (2×4-20mA)
Serial: 2 RS-232; 1 RS-485/J1708; 2 CAN bus; 1-Wire

Other Interfaces

Bluetooth v5.0 low energy module
Two embedded SIMs plus additional user accessible SIM

Environmental

Operating temperature: transceiver and antenna: -40°C to +85°C; back-up battery: -20°C to +75°C;
Dust and water ingress: transceiver: IP67; Satellite/GPS antenna: IP67;
Vibration: SAE J1455 (Sec 4.9.4.2 fig 6-8); MIL-STD-810G
Shock: MIL-STD-810G (Sec 516.6)

Programming

Lua scripting engine with core services. SDK with GUI development tools available. Lua software application and firmware upgradable over the air (SOTA, FOTA).
Geofencing: 128 Polygons
Data Logger: 50,000 position reports;

Optional, configurable terminal apps:

» AVL app enables location tracking, status monitoring and driver behavior monitoring.

» J1939 app extracts engine data such as engine hours, fuel consumption from heavy-duty vehicles.

» Garmin Dispatch app enables text messaging, custom forms, stops, and HOS through a Garmin device.

» Sensors app extracts data from connected sensors or devices and generates reports, alarms and histograms.

» Modbus app interprets data from Modbus devices and allows data processing and alarms.

» Vessel Monitoring System (VMS) app provides location tracking, status monitoring and behavior monitoring.

Accelerometer

3-axis accelerometer

Memory

Lua Code: PSRAM 8MB, NVM 16MB

Order Codes

ST9100-C01 Terminal *
ST9100-D01 Americas Terminal *
ST9100-E01 Saudi Arabia Terminal *
ST901065-APA IDP Remote Antenna
ST901066-APA IDP Low Elevation Remote Antenna
ST101014-001 White Shroud
ST101062-002 Blunt cut cable, 5 meters
ST101096 Mating connector kit
ST101356-001 Dev Kit Americas
ST101356-002 Dev Kit Global
ST101356-003 Dev Kit Saudi
** Cellular antenna included*

ORBCOMM is a global leader and innovator in the industrial Internet of Things, providing solutions that connect businesses to their assets to deliver increased visibility and operational efficiency. The company offers a broad set of asset monitoring and control solutions, including seamless satellite and cellular connectivity, unique hardware and powerful applications, all backed by end-to-end customer support, from installation to deployment to customer care. ORBCOMM has a diverse customer base including premier OEMs, solutions customers and channel partners spanning transportation, supply chain, warehousing and inventory, heavy equipment, maritime, natural resources, and government. For more information, visit www.orbcomm.com.

GREAT WEST EQUIPMENT
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AT2

SOLAR-POWERED
LOCATION & RUNTIME
DATA WHEN YOU NEED IT

AT2: SATELLITE ASSET TRACKER - SOLAR. INNOVATIVE. GLOBAL.

Introducing the AT2, Geoforce's enhanced solar-powered successor to our SmartOne asset tracker. Operating on one of the world's leading satellite networks, the AT2 provides remote location monitoring and engine runtime tracking (ERT) on Geoforce's cloud-based Track and Trace field asset management software platform.

The AT2's rechargeable batteries can deliver up to eight years of service life, drastically reducing maintenance time and costs for labor and parts. The AT2 also boasts several leading safety certifications, because field operations don't have to be unsafe or chaotic.

TRACK AND TRACE

- LIGHT TOWERS
- GENERATORS
- CARGO UNITS
- TOTE TANKS
- CONTAINERS
- ROLL-OFFS
- TRAILER CHASSIS
- TRAILERS
- WASTE DISPOSAL BINS
- AND MORE...

KEY FEATURES

- Solar-powered to eliminate need for battery replacements
- Reports into Geoforce Track and Trace
- Provides location only or location + engine runtime reporting
- *(optional)* Engine Shutdown / Turn-on notifications
- Mounts via VHB adhesive, Geoforce ERT baseplate with screws / bolts, or mounting bracket
- Certified IECEX/ATEX Zone 0 / Class I, Division 1 (when not using ERT connection)

INNOVATIVE TECHNOLOGY

- Leverages the Globalstar satellite constellation to deliver reliable location reporting for assets deployed worldwide
- Wide range of reporting rates available
- Geoforce ERT baseplate for more robust mounting and cable strain relief for engine runtime installations

STANDARDS

IP68 / IP69K (Ingress Protection)

MIL-STD-810G for:

- Immersion
- Impact resistance
- Salt fog
- Acidic atmosphere
- Humidity
- Vibration

SATELITTE COVERAGE

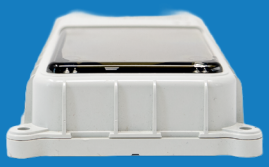
Globalstar Simplex Data Network

DIMENSIONS

SIDE VIEW

FRONT VIEW

BACK VIEW



OPERATING SPECIFICATIONS

DIMENSIONS:
3.25 IN (D) x 7.00 IN (W) x 1.13 IN (H)
8.26 CM (D) x 17.78 CM (W) x 2.86 CM (H)

WEIGHT:
13.5 oz (385 g)
With optional mounting bracket 40.6 oz (1150 g)

OPERATING TEMPERATURE:
-40°C to +85°C. Using the AT2 above +60°C may cause RF signal degradation and decreased battery lifetime of the unit.

INPUT VOLTAGE:
10 to 48 VDC (not for use in hazardous locations)

BATTERY TYPE:
Built-in rechargeable batteries (non-replaceable)

CERTIFICATIONS:
FCC, ISED, CE, ANATEL (PENDING)
AS/NZS CISPR 22 (PENDING)
IFT (PENDING)

INTRINSIC SAFETY CERTIFICATIONS:
-- DEVICE ONLY (NON-ERT) --
ATEX: CE 0359 EX II 1G ia IIC T4 Ga
IECEX: EX ia IIC T4 Ga
North America: AEx ia IIC T4 Ga
Class I, Division 1
Class I, Zone 0
-40°C <Tamb<+65°C

Geoforce ERT Kit

GREAT WEST EQUIPMENT
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AT4

AT4-ATK-3W-LTEM-ATT

LOCATION AND ENGINE RUNTIME DATA

WHEN YOU NEED IT

STANDARD EQUIPMENT TRACKER

The AT4 Standard Equipment Tracker enables equipment managers to view engine runtime and location for portable powered equipment. By providing higher reporting frequency when the asset is powered on and scaling back reporting when powered down, the AT4 allows companies to more effectively manage portable powered equipment in locations where cellular service is available, and the AT4 will store and forward data created when assets travel out of cellular coverage.

REPORTING RATES

Powered by equipment (ignition on)

- Reports every 15 minutes whether stationary or moving.
- Provides frequent location and engine runtime data during operation.

While stationary (ignition off)

- Reports every 12 hours.
- Provides location and engine runtime at a lower rate reducing data and power usage.

Powered by backup battery

- Reports every 5 minutes when moving and every 12 hours when stationary.
- Provides high data granularity as equipment is being moved or transported.

Improved Powered Equipment Reliability

- Timely asset maintenance detects and corrects small issues before they become big, costly problems.
- Conditional maintenance based on actual engine runtime will help you catch problems while they are still manageable while minimizing wasted service calls.
- Collect readings from remote assets instead of relying on calendar-based schedules, you'll easily stay ahead of your equipment and asset maintenance needs.

LOWER MAINTENANCE COST FOR YOUR POWERED ASSETS

Frustrated with **analyzing stale equipment data** and **high maintenance costs**? Often find yourself in "break/fix" mode repairing an asset after failure occurs?

Receiving **critical operational data** from your mobile powered assets is vital to running your business, but often quite the technical challenge. In addition to **location data**, imagine if you were able to receive **engine runtime** throughout the day from your mobile device or laptop.

Geoforce's new **AT4 Cellular Asset Tracker** with Engine Run Time (ERT) enables you to do just that, and in a small compact footprint that works in **harsh industrial environments.**

MANAGE YOUR ASSETS

Geoforce designed and built its web-based and mobile software with field operations in mind, enabling us to provide innovative software for all your field asset tracking needs. By combining this cloud-based software with rugged GPS tracking devices and cellular network integration, Geoforce facilitates asset location and retrieval, rental invoice auditing, service delivery verification, inspection compliance, and equipment maintenance alerts. Because field operations don't have to be chaotic.

TECHNICAL SPECIFICATIONS

GENERAL

Network Technologies 4G LTE CAT 1 / CAT M1
Equipped with rechargeable battery making it an ideal solution for asset management.
IP68 rated casing, designed to operate under extreme environment against water and dust.

GPS

Receiver Type: 99 channel engine
Location Technology: GPS & GLONASS
SBAS Support: WAAS, EGNOS, GAGAN, MSAS
Tracking Sensitivity: -167dBm
Acquisition Sensitivity: -149dBm
Location Accuracy: 2.5m CEP 50%

PHYSICAL

Dimension: 4.72" x 3.15" x 1.42" (120mm x 80mm x 36mm)
Weight: 250g (0.56 lb)

LINE POWER

Powered Asset 12V/24V system

STANDARDS

SAE J1455 MIL STD 810
NEMA 4X / IP68
RoHS Compliant

CERTIFICATIONS

Standards: FCC, IC, PTCRB, TELEC
Carriers: AT&T
Carriers (Module Certified): NTT docomo, KDDI, Telstra

CELLULAR BANDS

AS11 (AT&T): LTE FDD Cat.M1, B2, B4, B12
Antenna: Embedded cellular antenna

ENVIRONMENTAL

Operating Temperature: −40 to +70 °C (connected to primary power) −20 to +60 °C (operating on internal battery)
Humidity: 95%RH @ 50° C non-condensing
Vibration/Shock: MIL-STD-810G, SAE J1455, SAE
Ingress Protection Rating IP 68

BATTERY TYPE

Backup Battery: 3.7V 6400mAh
Lithium-Ion Charging Temperature 0° to +45°

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G09

RUGGEDIZED TELEMATICS DEVICE

G09: RUGGED® TELEMATICS DEVICE - THE MOST POWERFUL YET.

Geotab's G09 RUGGED® telematics device is the most powerful yet. The G09 RUGGED offers a 32-bit processor, 4x more memory and 5x more RAM than the GO8 RUGGED®. Similar to the GO8 RUGGED, the G09 RUGGED offers state-of-the-art GPS technology, G-force monitoring, GEOTAB IOX® expandability, engine and battery health assessments, and communication on the LTE network*.

Vehicle Tracking

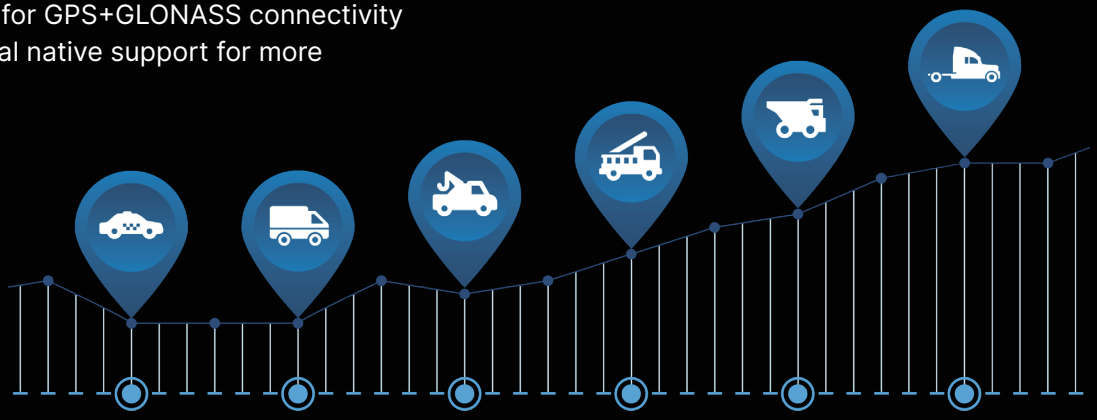
Using Geotab's patented tracking algorithm, the GO9 RUGGED accurately recreates vehicle trips and analyzes incidents. The GO9 RUGGED also offers in-vehicle alerts to instantly notify drivers of infractions and — with hardware Add-Ons — provides live coaching for driver's on-road performance. The GO9 RUGGED does not require a dash-mounted antenna or any wire splicing.

TOP FEATURES

- IP68 & IP69K rated for water, dust ingress and pressure spray protection
- LTE connectivity
- Simple device design for covert installations
- Intelligent in-vehicle driver coaching
- Breakthrough collision detection and notification
- External device expandability via IOX Technology
- Built-in auto-calibrating accelerometer and gyrometer
- Near-real-time vehicle data
- Fast GPS acquisition time using Almanac OTA support
- Support for GPS+GLONASS connectivity
- Additional native support for more

SECURITY

- GO device and network interfaces use authentication, encryption, and message integrity verification.
- GO devices are individualized. Each device uses a unique ID and non-static security key, making it difficult to fake a device's identity.
- Over-the-air updates use digitally-signed firmware to verify that updates come from a trusted source.
- Geotab uses independent third-party experts to validate the platform from end-to-end.
- Multiple harness options available.



TECHNICAL SPECIFICATIONS AND FEATURES

INTERFACES

Engine Management:
Legacy OBD (SAE J1850 PWM/VPW, ISO 9141-2, and ISO 14230 (KWP2000))

ISO 15765 CAN (including WWH-OBD, GMLAN, VW TP2.0) @ 125/250/500 kbps

J1708/1587, J1939 500/250 kps

2- or 3-wire installation support
(for older vehicles/asset tracking)

Modbus and secondary CAN

Input/Output:
LEDs — Ignition, GPS, Cellular
IOX (more details below)
Internal GPS/Cellular antennas

CELLULAR

Availability varying on certification full list of supported countries here.

GO9 RUGGED LTE ATT/TELUS/ROGERS
LTE (CAT-1): Bands 2/4/5/12
3G: Bands 2/5

GO9 RUGGED LTE Verizon
Single mode LTE (CAT-1): Bands 4/13

GO9 RUGGED LTE CATM1 Oceania
LTE (CAT-M1): Bands 3, 28

GO9 RUGGED LTE CATM1 EMEA
LTE (CAT-M1): Bands 1, 3, 5, 8, 20, 28
2G: 850/900/1800/1900 MHz

GO9 RUGGED 3G/2G Global
3G: 800/850/900/1900/2100 MHz
2G: 850/900/1800/1900 MHz

3GPP Compliant

GPS RECEIVER

72-channel engine (GPS/GLONASS)
Under 1 second Time-To-First Fix for hot and aided starts
Cold start: 26s
Concurrent GPS & GLONASS system
A-GNSS
Accuracy: ~2.0 m CEP
OTA FW updates supported

ENVIRONMENTAL & EMC

Operating Temperature: –40 to +85 °C

SAE J1455:
Temperature Cycle (Section 4.1.3.1)
Thermal Shock (Section 4.1.3.2)
Humidity Cycle (Section 4.2)
Salt Spray Fog (4.3.3.1)
Swept Sine Vibration (4.10.4.1)
Random Vibration (4.10.4.2)
Mechanical Shock (4.11.2.3)
Inductive Switching,
Burst Transients, Starter Motor
Engagement (Section 4.13.2.2.1)
Coupled Transients
(Section 4.13.2.2.2)
Electrostatic Discharge Handling,
Operation and non-operational
(Section 4.13.2.2.3)
Radiated Immunity
Radiated and Conducted Emissions

IEC 60529:
IP6X (Section 13.4 & 13.6)
IPX8 (Section 14.2.8)
IPX9K (Section 14.2.9)

ACCELEROMETER & GYROSCOPE

3D accelerometer and 3D gyroscope. Full-scale acceleration range of ±8g and an angular rate range of ±250 dps.

Acceleration and angular rate output data rate of 1.66 kHz.

MECHANICAL

Weight: 396 g (0.87 lbs)
Casing Dimensions: 159 mm L × 122 mm W × 31 mm H
Cable Length: 1000 mm
Housing: Polycarbonate (PC) thermoplastic two-piece housing (Flammability rating: UL 94 V-0)