Cellocator™ CelloTrack 3G for North America Family Overview

Table of Contents

1   Introduction

1.1   About this Document

This document provides a brief overview of the CelloTrack 3G for North America family, and includes descriptions of the CelloTrack variants, battery life tables and technical specifications.

This document also describes the CelloTrack magnetic cradle and accessories.

1.2   Abbreviations

Abbreviation	Description
FB	Front Button
GMS	Global Mobile (Communication) System
GPS	Global Positioning System
OTA	Over the Air
SMS	Short Message Service (GSM)
IP	International Protection Rating
3Y	Three Years
8M	Eight Months
AH	Amper Hour
3D	3 Dimensions
LED	Light Emitted Diode

1.3   References

#	Reference	Description
1		
2		

1.4   Revision History

Version	Date	Description
1.0	1/05/2013	Initial release
1.1	11/05/2013	Modifying CelloTrack 3G Family Overview section Add CelloTrack 3G NA Family Overview section Modify CelloTrack 8M name

2 The CelloTrack Family

2.1 CelloTrack 3G Family Overview

The CelloTrack family is comprised of a small, standalone tracking device intended for mobile assets as well as assets having limited access to power or with no power supply at all.

The capabilities provided by the CelloTrack family can greatly reduce an enterprise's financial losses incurred as a result of the often difficult task of successfully tracking equipment such as trailers, containers, train wagons or any kind of valuable mobile asset such as generators, machinery, chemical toilets and waste containers.

The CelloTrack 3G supports 3G network standards in addition to the same features, Capabilities and variants of the existing family.

CelloTrack supports tracking, communication, GPS location-based features and maintenance capabilities similar to the Cello family, and also includes the following additional features:

- ◆ Stand-alone tracking device; can be installed without a power supply.
- ◆ Houses all components, including battery, Cellular modem and a SIRF III GPS, in the same enclosure.
- ◆ Highly durable IP67 weatherproof casing for outdoor long-life service.
- ◆ Durability and long life, rechargeable 13/2/4,25 Ah Lithium Polymer battery, making it ideal for tracking trailers, trains, containers, high-value assets, and more.
- ◆ Advanced power management algorithms preserving battery power and extending battery life period by switching off unused components (GPS, Modem).
- ◆ Two configurable general purpose I/O interfaces: Digital, Analog or Pulse Counter inputs or Open Collector outputs
- ◆ A 3D accelerometer that detects movement of assets and enables different transmission rates for a moving asset and a standing asset.
- ◆ A Real Time Clock (RTC) which is used for accurate peeking and glancing timing and reducing power consumption.
- ◆ A programmable (on/off/test/panic) push button.
- ◆ Two monitoring LED's
- ◆ A charging and communication connector.
- ◆ A tamper switch to detect tampering.
- ◆ Supports up to 2256 time-stamped events
- ◆ Almost instant assembly and removal.
- ◆ Minimal maintenance.

The CelloTrack family includes the main following types:

- ◆ CelloTrack (regular)

◆ CelloTrack Power

While the rest of the variants differ mainly by the embedded battery technology and life time.

2.2 CelloTrack 3G NA Family Overview

The CelloTrack 3G family for North America provides solutions for the asset market of North America including USA and Canada

It includes the following products:

Product Name	Catalog Number
CelloTrack 3Y (3G)	GT9740012-000
CelloTrack 8M (3G)	GT9740022-000
CelloTrack XT (3G)	GT9740025-000
CelloTrack3G Power	GT9740001-000
CelloTrack Power 8M (3G)	GT9740021-000
CelloTrack Power XT (3G)	GT9740026-000

The CelloTrack 3G NA family supports the required network standards: HSPA 5.76[UL]/7.2[DL] Mbps, 800/850, AWS 1700, 1900 and GSM/GPRS/EDGS, 850, 900, 1800, 1900 (Quad band)

The CelloTrack 3G NA family supports the appropriate service providers such as: AT&T, T-Mobile, Telus and Rogers

It also supports the following Certifications / homologations: FCC, CE Safety, PTCRB, AT&T, IC and Rogers.

2.3 CelloTrack 3G family feature list

The following table lists features and capabilities of the CelloTrack family which are a merge of Fleet management capabilities derived from Cellocator's Cello product line and specific asset management capabilities designed for the CelloTrack family solely.

Feature	CelloTrack	CelloTrack Power
Geo-Fences	√	√
Way Points	√	√
Roaming List	√	√
Usage counters (PTO)	√	√
Server authentication	√	√

Feature	CelloTrack	CelloTrack Power
Automatic SIM PIN lock	√	√
DNS support	√	√
Virtual odometer	√	√
Jamming detection	√	√
Road curve smoothing	√	√
Cell-ID report	√	√
Offline Tracking	√	√
Wake up event	√	√
Movement detection	√	√
Time based events (adaptive to movement status)	√	√
Specific time (in day) reporting	√	√
Distance based events	√	√
Velocity Adaptive message rate	√	√
Home/Roam adaptive message rate	√	√
Distress reporting mode (higher priority)	√	√
Over speeding alerts	√	√
Go/Halt reports	√	√
External Power monitoring		√
Internal excessive temp	√	√
A/D threshold events	√	√
Frequency threshold events	√	√
GPS status events	√	√
Watchdog	√	√
Temp dependent Backup Battery charging		√
Battery level reporting	√	√
Network dependent traffic Opt.	√	√
Cellocator+ (Maintenance) server support	√	√
OTA/Serial Firmware upgrade	√	√
OTA/Serial configuration update	√	√
Nested Output activation	√	√
Gradual Output activation	√	√
Programmed Output activation	√	√

NOTES:

- Jamming detection is not supported due to Modem limitation.

- Cell-ID features is operable only if 2G communication is used and when the APS power mode is disable,

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2.4   CelloTrack

The regular CelloTrack unit is designed for assets without power sources. It is ideal for trailers, containers, trains and other high value mobile assets.

The unit includes a 6-pin connector for battery charging, programming, and two general purpose I/Os which can function as dry contact inputs, threshold based input, analog input, frequency counter or open collector output (relay driver). The connector is covered by a rubber cover for dust and water protection (IP67).

The unit is charged via a dedicated charger from a standard electric wall outlet (110 / 230 V).

2.5   The CelloTrack Power

The CelloTrack Power unit is designed specifically for assets which have a temporary power connection, such as trailers. The unit charges its battery when the power is connected and uses its battery and the advanced power management algorithm to maintain tracking when the power is disconnected.

The unit includes a pigtail harness for battery charging, programming and two general purpose I/Os which can function as dry contact inputs, threshold based input, analog input, frequency counter or open collector output (relay driver). The unit is charged via the asset (trailer) power supply (12 / 24 V).

2.6   The CelloTrack Lighter

The CelloTrack Lighter unit is designed especially for applications where power is connected only on "ignition on" and minimum installation and maintenance is required.

The CelloTrack Lighter is shipped as a kit comprised from CelloTrack Power and Lighter Harness. The Lighter

Harness is terminated with a connector which fits a vehicle's standard cigarette lighter socket.

This arrangement allows the unit to be installed in the driver's cabin with a fast and simple connection to the vehicle power. The unit charges its battery when the power is connected and uses its battery and the advanced power management algorithms to maintain tracking when vehicle power is disconnected.

2.7 The CelloTrack 8M Family

The CelloTrack 8M family provides a cost effective solution that supports eight months of single GPS reading and Cellular transmissions per day, or three months of four readings and transmissions per day, utilizing a 2AH rechargeable battery.

The CelloTrack 8M family supports the same set of capabilities - including the same Firmware and Programming Library (PL) - as the regular CelloTrack family, apart from the following:

◆ The CelloTrack 8M family utilizes a 2AH rechargeable battery.

◆ The CelloTrack 8M family is visually different from the regular CelloTrack family with the use of a white label.

The 8M family includes all CelloTrack types:

◆ CelloTrack 8M
◆ CelloTrack Power 8M

2.8 The CelloTrack XT Family

The CelloTrack XT family provides an asset tracking solution for environments that require a wide operational temperature range (-30℃ to +70℃） and a wide charging temperature range (-10℃ to +60℃）. The CelloTrack XT family supports up to 15 months of single GPS reading and GPRS transmissions per day, utilizing a 4.25AH rechargeable Li-Poly battery.

The CelloTrack XT family supports the same set of capabilities - including the same Firmware and almost the same Programming Library (PL) - as the regular CelloTrack family. It is visually different from the standard CelloTrack family with the use of a yellow label.

The XT family includes two CelloTrack types:

◆ CelloTrack XT
◆ CelloTrack Power XT

NOTES:

- The SIM card must also support the declared temperature range to provide overall unit support.

- For proper operation the parameter "Enable Extended Charging Temperature Range" in the PL should be set to 1.

- Programming an extended temperature for standard CelloTrack or CelloTrack 8M units may decrease the battery life due to it not being charged within the recommended temperature range.

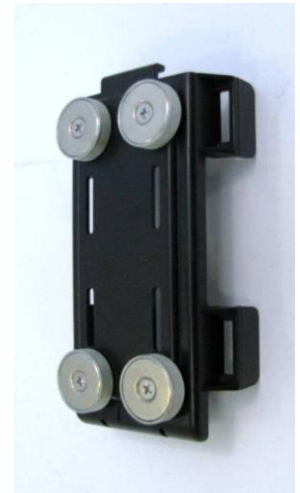
2.9 The CelloTrack Magnetic Cradle

The CelloTrack Magnetic Cradle is a standard CelloTrack cradle with four powerful POT magnets. This configuration allows instant attachment to a vehicle or an asset with metal surface, on a per-trip basis, in order to provide covert CelloTrack installation. It is especially useful for monitoring rented trucks or containers for a specific trip or time period.

The POT magnet technology annuls the influence of the magnetic field on the CelloTrack GSM modem, GPS antenna, and the electronic circuit while providing a concentrated magnetic force to attach the cradle to the vehicle's surface.
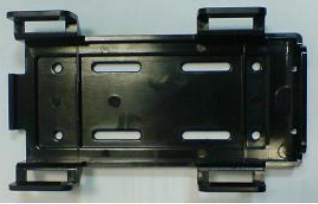
The CelloTrack Magnetic Cradle is designed to contend with rapid acceleration or braking, and serious vibration caused by journeys over rough roads, and it can even remain effective where layers of dirt separate between the magnets and the vehicle surface or in cases where the vehicle's body material is not 100% iron. Each of the magnets supports up to 16 Kg, i.e, 64 Kg per cradle, while the CelloTrack weight is approximately only 0.55 Kg.

The CelloTrack Magnetic Cradle has been successfully tested while driving in difficult conditions on rough roads.

2.10 CelloTrack Accessories

The CelloTrack accessories are described in the following table:

Part	Description	
Cradle PN:705-60068	A cradle designed to be mounted on the surface of a container, wagon or track and to hold the CelloTrack unit.	
Magnetic Cradle PN:712-00100	Allows CelloTrack Family units to be fixed on steel (iron) surfaces by means of very strong permanent magnets.	
Lighter Harness PN: 711-00316	Allows the availability of CelloTrack Lighter In conjunction with CelloTrack Power.	
Communication	Allows configuration and FW	

Part	Description	
Harness PN: 711-00251	upgrades.	
CelloTrack Charger – EU PN: 711-00168	CelloTrack external charger to be used in Europe.	
CelloTrack Charger – US PN: 711-00170	CelloTrack external charger to be used in the USA.	
CelloTrack Charger – UK PN: 711-00171	CelloTrack external charger to be used in the UK.	
CelloTrack Power 3G NA Evaluation Kit PN: K080-001	Evaluation kit for the CelloTrack Power 3G NA	
CelloTrack 3G NA Evaluation Kit PN: K080-002	Evaluation kit for the CelloTrack 3G NA	

Attention: The Communication Harness used for the CelloTrack 3G family (PN 711-00251) is different from the one used for the legacy CelloTrack (PN 711-00278). Using the wrong Communication Harness can damage the electrical circuit of the CelloTrack 3G, and require repair at Cellocator premises (RMA). Therefore only the correct Communication Harness, easily differentiated by its red label, should be used.

2.11   CelloTrack 3G Battery Life

The life expectancy of the CelloTrack battery types is described in the following tables.

2.11.1 CelloTrack 3y - 13 AH Battery Life

TX / 24Hrs	Life time [months]
96	1
48	2
24	4
12	7
8	10
6	12
4	16
2	23
1	30

2.11.2 CelloTrack 8M - 2 AH Battery Life

TX / 24Hrs	Life time [months]
96	5 Days
48	10 Days
24	20 Days
12	40 Days
8	50 Days
6	2 Months
4	3 Months
2	6 Months
1	8 Months

2.11.3 CelloTrack XT - 4.25 AH Battery Life

TX / 24Hrs	Life time
96	10 Days
48	20 Days
24	40 Days
12	2 Months
8	4 Months
6	5 Months
4	6 Months
2	10 Months
1	15 Months

2.11.4 Battery Life Calculation Assumptions

The calculations are based on the following assumptions and setup:

- ◆ Battery self discharge rate: 3% of available capacity per month @ 25°C.
- ◆ Battery is fully charged optimally before first use.
- ◆ Operation mode: periodic peeking. Number of messages per day as specified in the table.
- ◆ Up to 2.5 minutes total on-time on peeking.
- ◆ Up to 1.5 minutes GPS on-time on peeking.
- ◆ Values may vary according to operational conditions.

3   CelloTrack 3G Specifications

Communication	
Cellular communication	HSPA 5.76[UL]/7.2[DL] Mbps, 800/850, AWS 1700,1900 GSM/GPRS/EDGS, 850, 900, 1800, 1900 (Quad band)
SIM	Internal, replaceable, 1.8/3V Remote PIN code management
Antenna	Internal, multi band GSM antenna
GPS	
Technology	Internal module, SiRFIII GSC3F/LP single chipset.
Sensitivity (tracking)	-159dBm
Acquisition (normal)	Cold <42Sec, Warm<35Sec, Hot<1Sec
Inputs & Outputs	
I/O	Two configurable ports supporting true GPIO (General Purpose Input Output). Each I/O port supports: ✓ Discrete Dry Input ✓ Discrete Wet Input ✓ Analog 0-2.5V Input ✓ Analog 0-30V Input ✓ Frequency Counter Input ✓ Output **Discrete Dry** – Ground sensing. Configurable ground threshold. **Discrete wet** – Logic 1 and 0 Configurable thresholds. **Analog inputs with variable resolution** - 8bit - 0-2.5V: 20mV resolution, accuracy ±30mV; 8bits - 0-30V: 100mV resolution, accuracy ±100mV 12bit - 0-2.5V: 3mV resolution, worst case accuracy <10mV; max 20mV. 12bits : 0-30V: 8mV resolution, worst case accuracy <40mV **Frequency counters –** Up to 5kHz input signal; Signal level (3V < Vin ≤ 30V); Accuracy ±2% **Output** - Open collector
Interfaces	
COM port	Cellocator Serial Protocol

	Debug, Configuration, FW upgrade RS232, CMOS levels
3D Accelerometer	Movement detection
MMI	2 LED status indication Activation / Distress button Tamper switch

Connectors	CelloTrack	CelloTrack Power
	6 pin Molex, Automotive	Pigtail

Power		

Input voltage:	CelloTrack	CelloTrack Power
	4.2V 1A CCCV Charger	9-32V DC

Internal Battery	CelloTrack 3Y family: Li-Polymer, 3.7V, 13Ah, rechargeable CelloTrack 8M family: Li-Polymer, 3.7V, 2Ah, rechargeable CelloTrack XT family: Li-Polymer, 3.7V, 4.25Ah, rechargeable

Environment	
Temp, operating	**CelloTrack and CelloTrack 8M:** Discharging: -20^0C – 60^0C. Charging: $0-45^0$C. **CelloTrack XT:** Discharging: -30^0C – 70^0C. Charging: -10^0C – 60^0C
Temp, storage	**CelloTrack and CelloTrack 8M:** -20^0C – 35^0C **CelloTrack XT:** -20^0C – 60^0C
Ingress Protection	IP67
Vibration, Impact, Humidity, chemical	ISO 16750
Mounting	Magnetic or screw mounted cradle Tampering detection

Certifications	
CE	CE EMC & R&TTE according to 89/336/EEC or 1999/5/EC CE Safety EN60950-1:2001+A11:2004
FCC	Part 15 Subpart B, part 22/24 compliant
IC	ICES-003, Issue4:2004 Class B CAN/CSA- CEI/IEC CISPR 22:02

PTCRB	TRP, TIS, Spurious and harmonics emission
AT&T	Yes
Dimensions & Weight	
Dimensions	~155mm x 81mm x 45mm
Weight	CelloTrack 3Y ~ 490gr CelloTrack Power 3Y ~ 530gr CelloTrack 8M ~ 280gr CelloTrack Power 8M ~ 320gr CelloTrack XT ~ 330gr CelloTrack Power XT ~ 370gr