1. BATTERY POWERED GPS ASSET TRACKING ON 2G AND 3G

The Oyster is a compact, rugged GPS tracking device that has been designed for tracking containers, trailers, skip bins, and other assets where super-long battery life is required without sacrificing the frequency of updates and performance.

The IP-67 rated housing is rugged and UV stable, so the Oyster can be mounted on assets that are exposed to rain, dust and marine conditions.

By utilising the latest technology, the Oyster can operate in ultra-low power modes, and with an incredible battery life of up to 5 years the Oyster Cellular can be attached to assets and tracked without needing to change batteries. The Oyster has built-in antennas for GPS reception and for cellular communication, a 3D accelerometer, a high-performance GPS that can track both GPS and GLONASS satellites simultaneously and flash memory for storing non-volatile information.

The Oyster Cellular device is available in different versions to cater for different networks around the globe. Enquire with Digital Matter as to availability in your country.

The Oyster Cellular uses 3 x AA 1.5V “off the shelf” Lithium batteries. These are generally available at retail outlets from manufacturers like Duracell and Energizer. Industrial 1.5V Lithium AA batteries are also available at bulk pricing.

The Lithium batteries have excellent performance and capacity, and allow the Oyster Cellular to be used in extreme temperatures and climatic conditions that other tracking devices simply cannot operate in.

1.1. Hardware Features

Hardware Features	
Low-profile IP67 rugged housing	The IP67 rated housing is made of sturdy ABS/Polycarbonate plastic to survive bumps and knocks and to survive many years in the sun and weather.

	It is low-profile making it easier to mount in the corrugation on containers or concealed on the underside of a trailer, for example. The housing screws together for easy assembly, and has 2 convenient mounting tabs. It also has 'strap slots' allowing the Oyster to be cable tied or metal strapped to an asset. Dimensions: 100 mm x 65 mm x 19 mm Weight: 160 grams with batteries
Batteries	**AA size**: The Oyster uses 3 x "AA" size 1.5V Lithium batteries which provide a balance between size and capacity **Off-the-shelf Lithium**: The Oyster Cellular must be fitted with off-the-shelf 1.5V Lithium batteries. These are readily available from retail outlets, for example Duracell and Energizer. **Sleep Current**: 10uA (micro amps)
Battery Life with Adaptive-Tracking	The Oyster can be set to use Adaptive-Tracking technology where the accelerometer and GPS data are used to intelligently work out if it is moving and to send frequent updates, and to scale the update rate down to once per day if the asset is stationary - to preserve battery life. 5 years @ one position per day (at 25°C)
Operating Temperature	-20°C to +65°C [1] For operation in extreme temperatures, the Oyster must be fitted with Lithium batteries. Batteries are affected by temperature extremes and typical performance is dependent on temperature
High sensitivity GPS	UBLOX MAX-M8Q GPS module Supports concurrent GPS and GLONASS 72 channel high sensitivity receiver -167dBm industry leading tracking performance Optimal hot-start performance AssistNow Offline aiding data for fast time-to-first-fix and performance in urban canyon environments
GLONASS	The Oyster uses both the GPS and GLONASS positioning systems simultaneously. This allows the device to use **twice the number of satellites** to get a position fix – making it faster and more accurate.
Low noise GPS amplifier	GPS signals are boosted by a special low-noise amplifier (LNA) This allows the Oyster to operate where normal units will fail to receive GPS signal – like in a container stack!
Cellular Communications	The Oyster Cellular can be manufactured for specific markets around the world depending on their modem requirements: **2G Modem**: Quad Band GSM/GPRS Class 10 850 / 900 / 1800 / 1900 MHz **3G Modem – EU**: 850 / 900 / 2100 EMEA / APAC / Latin America

	3G Modem - NA 850 / 1900 / AWS North America (AT&T) LTE-CAT1, CATM and NB-IOT currently in development Enquire for other bands and LTE / 4G options
Certifications	In progress
Internal Antennas	Internal GPS and Cellular RF antennas tuned by the RF laboratories to ensure optimal performance
3 axis accelerometer	The 3-axis accelerometer allows the Oyster to 'sleep' in an ultra-low power state yet still wakeup when movement occurs. Future firmware versions will allow for harsh G-force detection (like assets being dropped or involved in accidents)
Flash memory	The Oyster has enough flash to store over 50,000 data records, and will record information even when out of cellular coverage. The flash memory is also used to store firmware updates, GPS aiding data, parameters and other important information. A future firmware version will allow for geo-fences to be loaded into the flash memory of the device and used for geo-fence alerting on the device.

1.2. Firmware Features

Firmware Smarts	
OTA Configuration	The Oyster can be remotely configured and updated OTA (over the air). Device management is performed from Digital Matter's OEM Server device management platform.
Recovery Mode	The Oyster can be remotely switched into Recovery Mode which switches the device to do live tracking and reporting – so that you can get your asset back!
Auto-APN	Auto-APN allows the Oyster to analyse the SIM card and select the correct APN details from a list that is pre-loaded in the device's firmware. This means that the Oyster can be shipped world-wide without requiring specialist setup for SIMs.
Text Message Setup	The Oyster can also be sent text messages to setup the APN, and other details
AssistNow Offline	The Oyster will track successfully where other devices just give up. This fantastic technology allows the GPS to predict which satellites are in orbit above it and to dramatically reduce the time-to-first-fix of the GPS, and the overall performance of the GPS, especially in 'urban canyon' or forested environments.
G-Force Events	A future firmware version will allow for harsh G-force detection (like assets being dropped or involved in accidents) and report these to the server.
Geo-Fences	The Oyster has the capacity to hold hundreds of geo-fences that can be downloaded to it from the server and updated Over-The-Air. A future firmware version will allow the Oyster to use this geo-fence information to implement geo-fence based alerting on the device.

1.3. Device Management – OEM Server

All Digital Matter cellular devices are fully managed Over-The-Air (OTA) via our OEM Server web interface. The OEM Server seamlessly manages:

- Device firmware – firmware updates can be done remotely
- Network (administrator) parameters relating to critical communications
- System parameters, including GPS parameters, IO configuration, logging options and general device behaviour settings
- GPS and GLONASS AssistNow Offline aiding data files
- Remote debugging of devices, including being able to trace data, view detailed debug message logs, and view a live trace of the server debug messages
- Remote disconnect and reboot of devices
- Provides a command and message queueing platform to the devices and is incorporated into the remote management and debugging applications

Data Connectors

The OEM Server provides Data Connectors that forward data records on to the software platform of your choice, including Digital Matter's own Telematics Guru and GPS Log Book platforms.

More information on the OEM Server can be found at http://www.digitalmatter.com

If you would like to integrate the Remora into a software system, then please contact Digital Matter for more information on our integration protocols.

1.4. Committed to Quality

We take pride in designing each of our products with the goal of providing the best performance and reliability possible in the price range of that product. "Engineered to outperform".

Not all GPS tracking devices operate with the same level of performance or reliability, especially when exposed to extreme conditions in the field. In addition, we only use the highest quality parts and the latest assembly and quality control techniques to ensure the reliability and long life of our products.

Every device is individually tested at production.

All Digital Matter devices are covered by a one-year manufacturer's warranty.

1.5. Contact Information

For the latest version of this document plus other product information please visit our website at www.digitalmatter.com/support

Email: info@digitalmatter.com