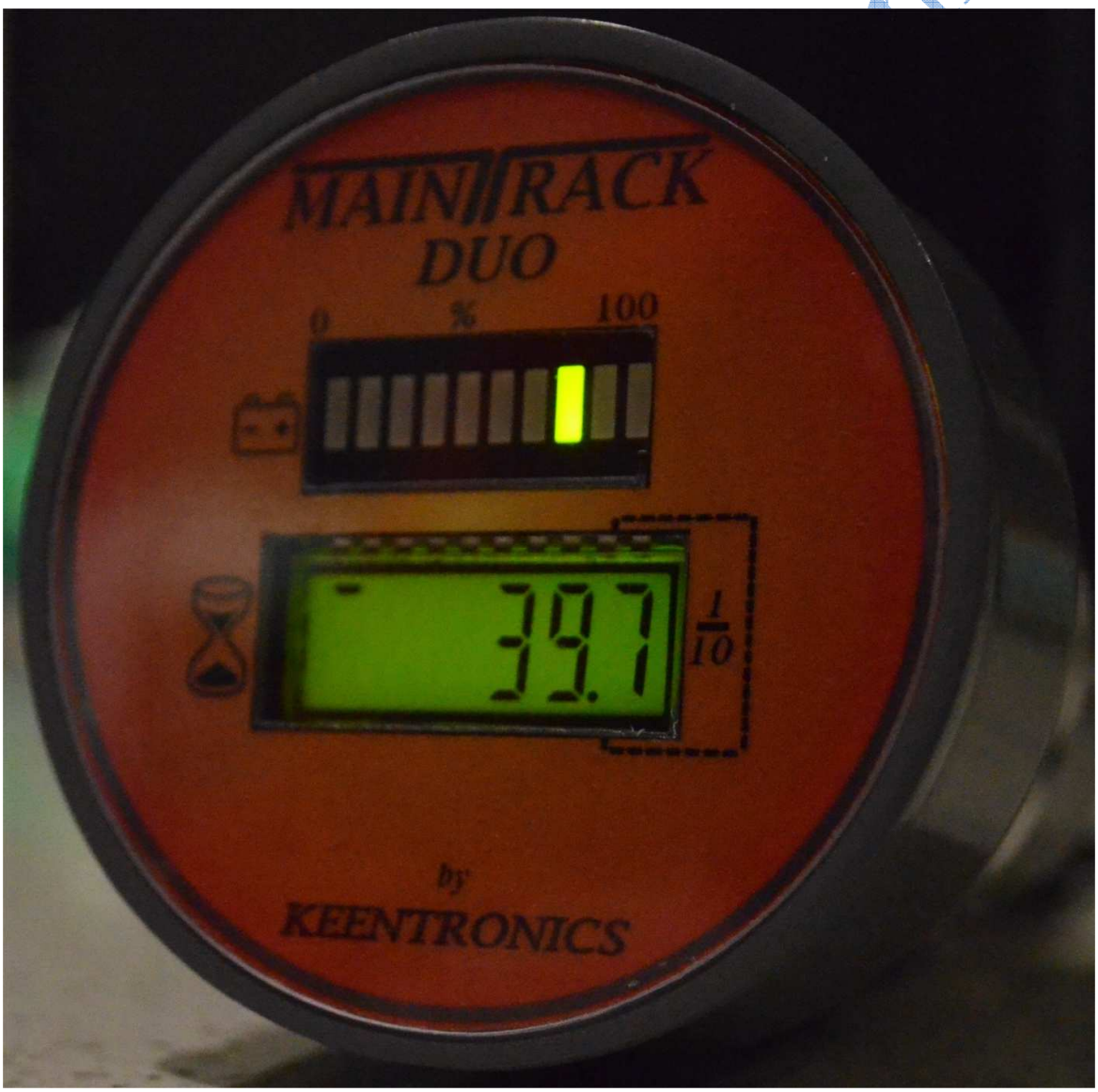
# MAINTRACK DUO

**MAINT**ENANCE METER and GSM/GPRS/GPS **TRACK**ER

# User Manual

**Revision: 1.02**

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|---|---|
| Document Title | MT- II User Manual |
| Version | 1.02 |
| Date | 15-11-2013 |
| Status | Release |
| Document Control ID | TRACMT-II-001 |



## Preface

Thank you for purchasing the MT-II service meter tracker. This manual shows how to operate the device smoothly and correctly. Make sure to read this manual carefully before using this product. Please note that specifications and information are subject to changes without prior notice in this manual. Any change will be integrated in the latest release. The manufacturer assumes no responsibility for any errors or omissions in this document.

## Declaration

**jTrack** technology is based on experience since 1994, being the first tracking system manufacturer in the world market, post era of GPS, GSM and Google Maps. **jTrack** always leads in the market by new ideas, innovations and out of the box solutions in the tracking field. Many Far East companies are inspired from our products, and they try to copy most of our products, enclosure appearance, colors and taking many other ideas. But no one can achieve 100% as original source. Quality of the product is not only purchasing top quality components, but also worldwide warranty, technical support, customize for each individual user and long term service capability. We are also distributing only quality proven, third party manufactured hardware which has all approvals **only** with our 100% own developed firmware, in order to increase the performance and add more features that the original hardware did not support by original manufacturer. In some products you may notice that our enclosure appearance seems very similar to other Far East products. In order to remove all doubts from your heart and for further information, please contact to info@jtrack.ca in order to have explanations on relevant product.

**General Notes**

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## Table Index

## Figure Index

**Table 1** Revision History

| Revision | Date | Author | Description of change |
|---|---|---|---|
| 1.02 | 15-11-2013 | Bill Keenan | Initial |
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# 1. Introduction

The MT-II is a powerful vehicle maintenance system including GPS locator designed for vehicle or asset servicing and tracking. It includes an output for ignition control (external relay output).and an input for controlled counting of service hours. It has superior receiver sensitivity, fast TTFF (Time to First Fix) and supports Dual-Band GSM frequencies 850/900/1800/1900, its location can be monitored in real time or be periodically tracked, by a backend server with a WEB based user interface. Based on the integrated RVCL protocol, the MT-II can communicate with a backend server through the GPRS/GSM network to transfer service hours, total hours or voltage, geo-fence boundary crossings, low vehicle battery or scheduled GPS position as well as many other useful functions.

## 1.1. Reference

**Table 2 MT-II Protocol Reference**

| SN | Document name | Remark |
|---|---|---|
| [1] | **RVCL Protocol** ©1999 | The RVCL protocol interface between MT-II and backend server. |

## 1.2. Terms and Abbreviations

**Table 3 Terms and Abbreviations**

| Abbreviation | Description |
|---|---|
| DIN | Digital Input |
| DOUT | Digital Output |
| GND | Ground |
| PWR | Battery Supply Voltage with Ignition 8 - 60 Volts |
| | |

# 2. Product Overview

## 2.1. **Check Part List**

Before starting, check all the following items have been included with your MT-II. If anything is missing, please contact your supplier.


**Figure 1 Appearance of MT-II Kit**

## 2.2. **Parts List**

**Table 4 Part List**

| Name | Picture |
|---|---|
| MT-II Meter | 66mm*100mm  |
| Mounting Nut |  |
| Power Cable |  |
| GSM Antenna |  |
| GPS Antennna |  |

## 2.3. **Interface Definition**

The MT-II has a 5 PIN interface connector. It contains the connections for power and input and output. The sequence and definition of the 5PIN connector are shown in following figure:

**Figure 2 The 5 PIN connector on the MT-II**

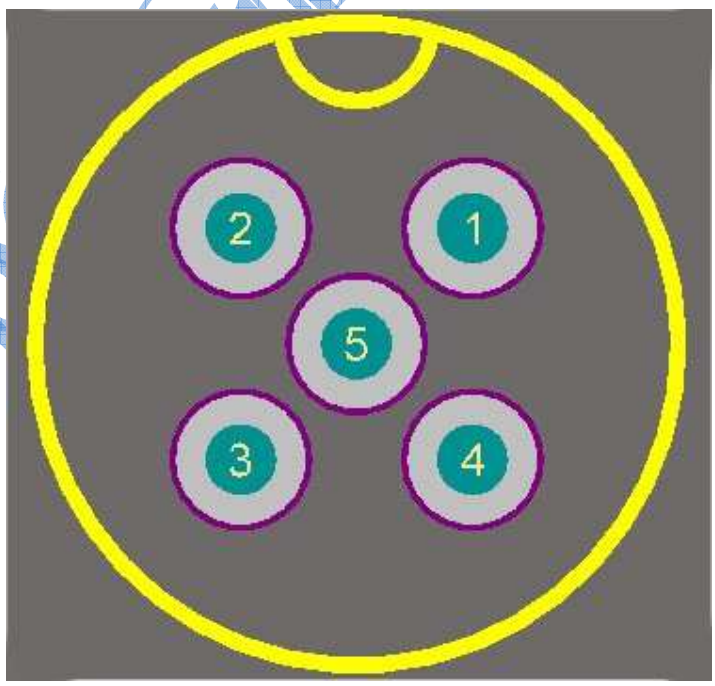



**Figure 3 Pinout viewed looking into the rear of the MT-II**

**Table 5 Description of 5 PIN Connections**

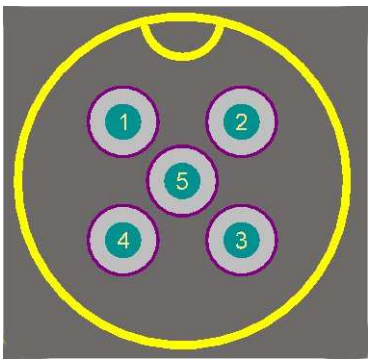
| Index | Description | Comment |
|---|---|---|
| 1 | +VIN | External DC power input, 8-60V @ 2Amax |
| 2 | DOUT | Open collector 2A max |
| 3 | PC-TX | Used for testing purposes only |
| 4 | GND | Battery Negative |
| 5 | DIN | Digital Input, active low |

## 2.4. MT-II Voltage supply

The voltage supply to the MT-II device is preset to be either 12V, 24V or 48V, and is not interchangeable. The correct device must be purchased for the vehicle it is to be installed on. **WARNING: An MT-II device installed on a vehicle with a higher voltage supply than specified on the MT-II will damage the MT-II device.** Ensure that you have the correct MT-II before connecting to the vehicle. Check the vehicle voltage before making connection.

## 2.5. MT-II User Cable Colour

**Table 6 MT-II User Cable Colour definition**

| Definition | Color | PIN No. | Looking into the cable plug |
|---|---|---|---|
| +VIN | Brown | 1 |  |
| DOUT | White | 2 | |
| PC-TX | Blue | 3 | |
| GND | Black | 4 | |
| DIN | Grey | 5 | |

# 3 . Features

- Compact dashboard design
- Easy installation
- Waterproof (IP65)
- Backlit LCD hour display
- Total hours of run time
- Hours until next service due
- Battery Voltage display
- WEB based user interface for fleet management
- Remote vehicle disable function using external relay
- Hour count control using seat switch (optional)
- Geofence to inform if vehicle is outside it's normal operating area
- Individual service interval setting
- Resetting service hours from vehicle or from WEB site

# 4 . Understanding the MT-II

## 4.1. **Installation**


**Figure 4 View of installed meter**

Drill a 40mm hole in the dash panel using a hole saw, and insert the meter then screw on the large nut from behind until tight. Ensure that there is sufficient space around the hole underneath the panel to install the nut and to fit the rear of the meter and cables before drilling. The panel surface should have a flat area of at least 70mm diameter on both sides

## 4.2. Installing GSM and GPS Antennae

The rear of the MT-II unit has markings GPS and GSM near the 2 antenna input connectors. The left one is for the GSM antenna. It can be screwed on and swiveled to any position that will not interfere with other things under the dash. Do not tighten the 8mm nut too tight or you may damage the circuit board inside.

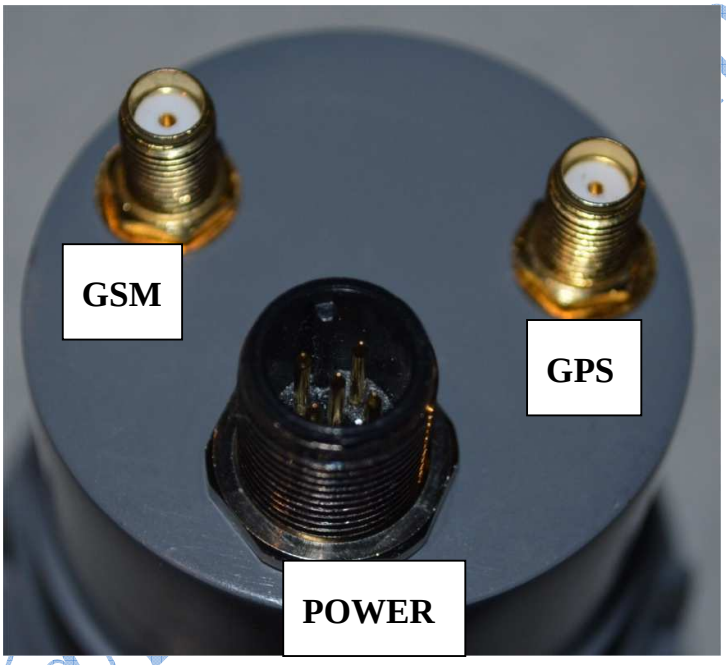



**Figure 5 Rear Panel Connectors**

The right connector is for the GPS antenna. It must first be mounted on the roof of the vehicle to ensure that there is no metal between the antenna and the sky. The cable should be routed down the roof pillar, preferably inside the pillar. It can then be screwed on to the right connector. Do not tighten the 8mm nut too tight or you may damage the circuit board inside. Cable tie any excess wire in a loop onto some other non-moving parts under the dash.

## 4.3. Power Connection

PWR (PIN1) / GND (PIN4) are the power input pins. The input voltage range for this device is from 8V to 60V. The device is designed to be installed in vehicles that operate on 12V, 24V or 48V systems without the need for external transformers. **WARNING: An**

**MT-II device installed on a vehicle with a higher voltage supply than specified on the MT-II will damage the MT-II device.** Refer to section 2.4 Voltage Supply before making connection. Connect the BROWN wire (PIN 1) to the vehicle ignition output. It is recommended to connect this pin to ignition key "RUN" position as shown above. An alternative to connecting to the ignition switch is to find a non permanent power source that is only available when the vehicle is running. MT-III can be configured to start counting hours when ignition is on; or when ignition is on AND the digital input is connect to GND. This is configurable from the WEB site. Refer to the commands section for more information.

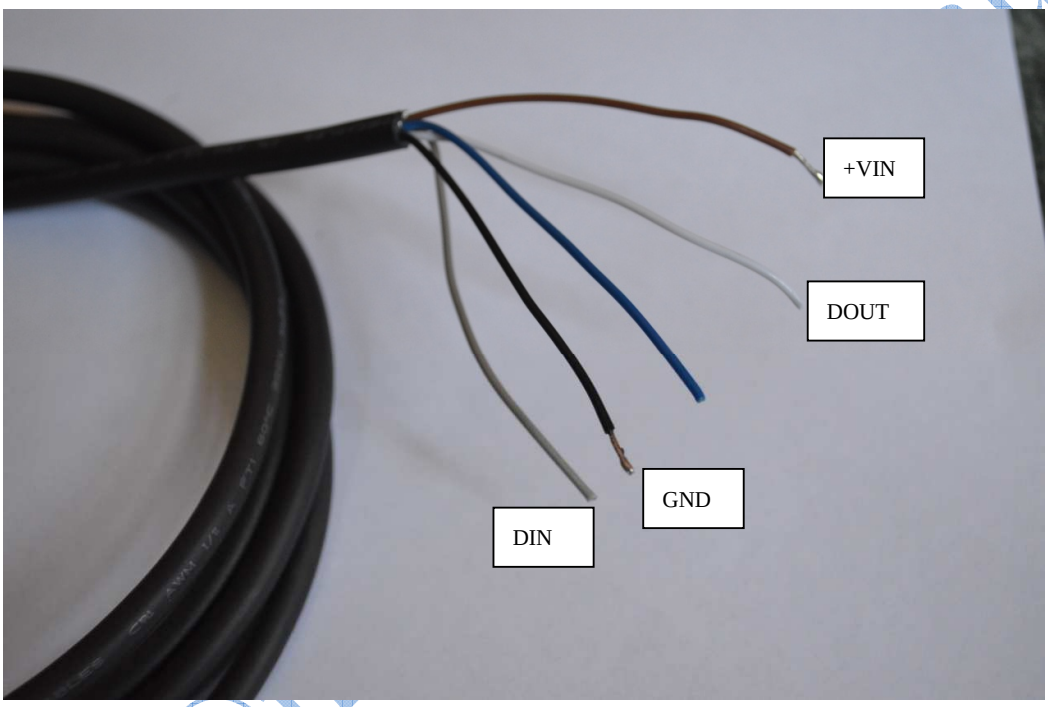



**Figure 6 Typical Power Connection**

## 4.4. Digital Input

There is one digital input on MT-II. It is a negative trigger. Connect the GREY wire to GND via a seat switch or any other control switch to use this input. This input is used to control the hour counting. If it is connected to GND and the device has been configured from the WEB site to count when CONTROL is active then the hour counting will only occur when this input is connected to GND. This input will be ignored if the WEB site has not been set to use CONTROL input.

**Table 7 Electrical Characteristics of the digital input**

| Logical State | Electrical Characteristics |
|---|---|
| Active | 0V to 0.8V |
| Inactive | Open |

The following diagram shows the recommended connection of a digital input.

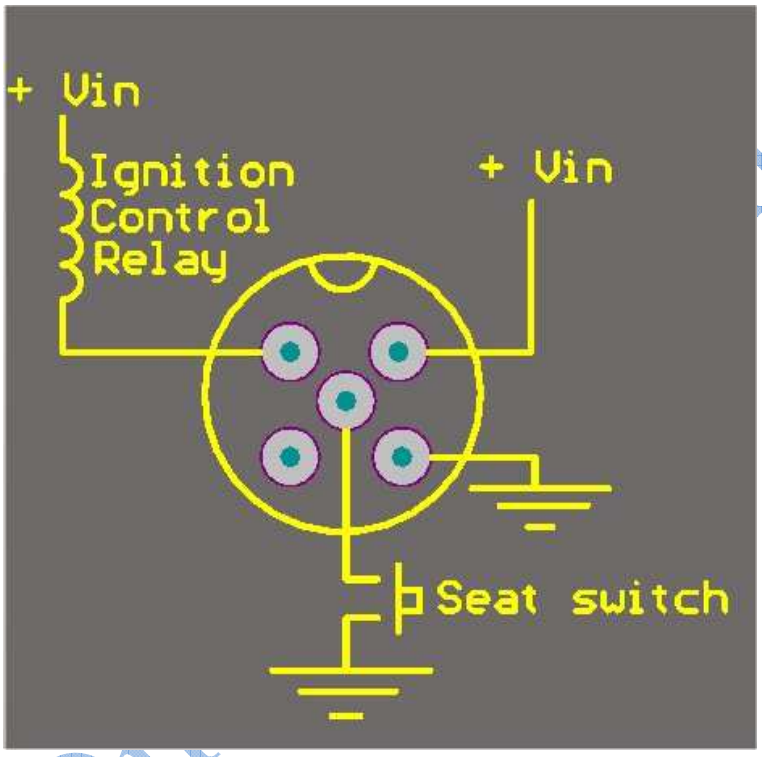



**Figure 7 Typical Digital Input Connection**

## 4.5. Digital Output

There is a digital output on MT-II. It is of open drain type and the maximum drain current is 2000mA. This output has a built in flyback diode for protection from inductive loads like relays. To use this output to disable the vehicle connect a 12V relay between the WHITE wire and 12V from the vehicle.

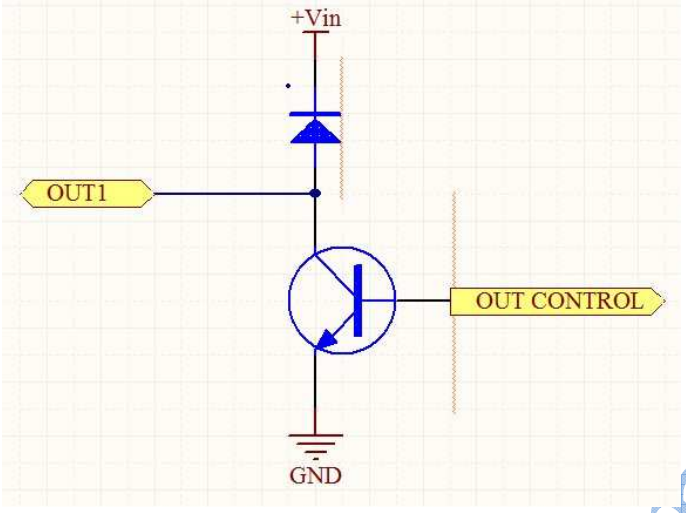



**Figure 8 Digital Output Internal Drive Circuit**

**Table 8 Electrical Characteristics of Digital Outputs**

| Logical State | Electrical Characteristics |
|---|---|
| Enable | <1.5V @1000mA |
| Disable | Open Collector |

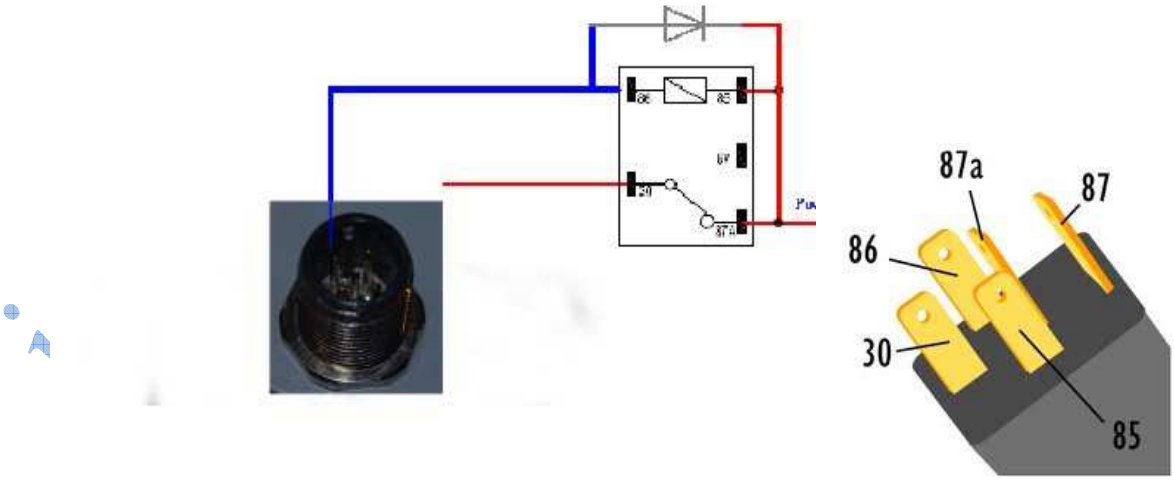
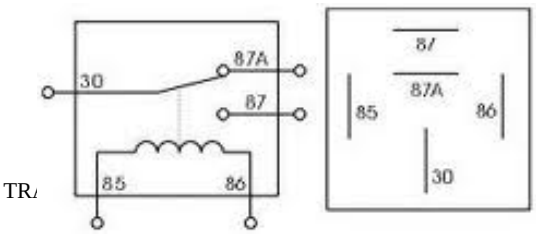



**Figure 9 Typical Connection with Relay**




## 4.6. **Dimensions**

MT-II is compact for easy integration into the dashboard.

Diameter: 70 mm (2.75 Inch)

Length: 100 mm (4.0 Inch)

**Figure 10** MT-II Dimensions

## 4.7. Commands

The unit responds to the following text commands sent by the website via the GSM network.

**Table 9 Command Set**

| Command | Description | Format | Response |
|---|---|---|---|
| **SET_TOTAL** | Used to set the total run time hours for the vehicle. Normally only used on an initial installation to set the unit to match the hours that the vehicle has already been used. | SET_TOTAL=12345 | OK |
| **SET_HTS** | Used to set the hours to the next service | SET_HTS=1234 | OK |
| **SET_INTERVAL** | Used to set the service interval hours. This is used when a local HTS reset or RESET_HTS command is activated | SET_INTERVAL=1234 | OK |
| **RESET_HTS** | Set the HTS to the current set interval | RESET_HTS | OK |
| **GET_TOTAL** | Retrieve the total run time hours of the vehicle | GET_TOTAL | TOTAL=12345 |
| **GET_HTS** | Retrieve the hours before next service is due. A negative value represents overdue for service | GET_HTS | HTS=+1234<br>Also sent automatically when a local reset is made. (See 4.10) |
| **GET_VOLTAGE** | Retrieve the vehicle battery voltage | VOLTS=087% | |
| **INIT_EEPROM** | Initialise the MT-II | INIT_EEPRM<br>Only used in manufacture | OK |
| **DANGER_ON** | Switched on a buzzer in the MT-II | DANGER_ON | OK |
| **DANGER_OFF** | Switched off a buzzer in the MT-II | DANGER_OFF | OK |

| | | | |
|---|---|---|---|
| **IGNITION_ON** | Allows ignition to be enabled | IGNITION_ON | OK |
| **IGNITION_OFF** | Disables the vehicle ignition | IGNITION_OFF | OK |
| **USE_CONTROL** | Allows minute counting only if control line is low | USE_CONTROL | OK |
| **USE_IGNITION** | Allows minute counting anytime ignition is on | USE_IGNITION | OK |

## 4.8. Normal operation

When first powered up the MT-II will normally show “Good CAL” then show “SoFt 1.1A” for the software version. It will then start to alternatively show the hours to service and the total hours.
Hours to service is displayed by showing “SErv” for one second then “123.4” for 4 seconds, and on the left the bars will be moving down to indicate counting down. If the HTS goes into the negative this represents overdue for service and the display will show “-12.3” or something similar.
Total hours is displayed by showing “HOUrS” for one second then “1234.5” and on the left the bars will be moving up to indicate counting up.

## 4.9. Battery Voltage display

The MT-II includes a battery voltage display which displays the battery voltage as a percentage of full charge. The LEDs are coloured to indicate desired battery level. The 3 left LEDs are red to indicate low battery, then 4 orange LEDs to indicate a safe level of charge, and then the 3 LEDs on the right are green indicating good or fully charged condition. If the voltage is below minimum the three left red LEDs will flash toward the left. Similarly if charge level is above maximum the 3 green LEDs on the right will flash toward the right to indicate voltage above maximum. The voltage represented by the LEDs is shown in the following chart.

**Table 10 Voltage Display LED representation**

| LEDs Displayed | 12V System | 24V System | 48V System | % Charge |
|---|---|---|---|---|
| RED Flashing | <12.0V | <24V | <48V | <0% |
| LED 1 (red) | 12.0 – 12.2 | 24.0 – 24.4 | 48.0 – 48.8 | 0-10% |
| LED 2 (red) | 12.2 – 12.4 | 24.4 – 24.8 | 48.8 – 49.6 | 10-20% |
| LED 2 (red) | 12.4 – 12.6 | 24.8 – 25.2 | 49.6 – 50.4 | 20-30% |
| LED 4 (orange) | 12.6 – 12.8 | 25.2 – 25.6 | 50.4 – 51.2 | 30-40% |
| LED 5 (orange) | 12.8 – 13.0 | 25.6 – 26.0 | 51.2 – 52.0 | 40-50% |
| LED 6 (orange) | 13.0 – 13.2 | 26.0 – 26.4 | 52.0 – 52.8 | 50-60% |

| | | | | |
|---|---|---|---|---|
| LED 7 (orange) | 13.2 – 13.4 | 26.4 – 26.8 | 52.8 – 53.6 | 60-705 |
| LED 8 (green) | 13.4 – 13.6 | 26.8 – 27.2 | 53.6 – 54.4 | 70-80% |
| LED 9 (green) | 13.6 – 13.8 | 27.2 – 27.6 | 54.4 – 55.2 | 80-90% |
| LED 10 (green) | 13.8 – 14.0 | 27.6 – 28.0 | 55.2 – 56.0 | 90-100% |
| GREEN Flashing | >14.0 | >28.0 | >56.0 | >100% |

## 4.10. **Local Reset**

A local reset of the hours to next service back to the currently set interval can be made using a magnet. This will do the same job as sending a RESET_HTS command from the website. A **HTS=+500** (or similar) command will be sent to the website when complete.
Apply a magnet to the device just above the voltage display.
Sequence :

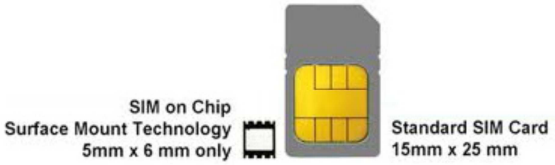
1: Magnet ON, Count up to 2 Remove magnet
2: Count up to 3, Add magnet
3: Count up to 2, Remove magnet
4: Count up to 3, Add magnet
5: Count up to 2, System resets HTS to Interval
6: Display shows “rESEt” then goes back to normal operation
7: System sends HTS=+500 command to WEB site
8: Return to normal operation

## 4.11. **Global SIM Card**


**Figure 1. One SIM Card for worldwide coverage.**

jTrack provides global SIM cards for generic AVL/M2M applications. The Java applet can be uploaded on Java SIM . The applet may be customized. The units communicate via jSIM server via XML files. The advantage is that the units can travel in any country in the world, the communication via XML files handles the communication between the device, user interface (GUI) and HLR. The plans are fixed price for data. Those plans also give international free boundless traveling and low cost charges.

Next generation of our devices supported on-chip SIM cards, which reduce cost and size of devices.




Volume use customers will be able to manage their jSIM cards via www.globalsimcard.ca