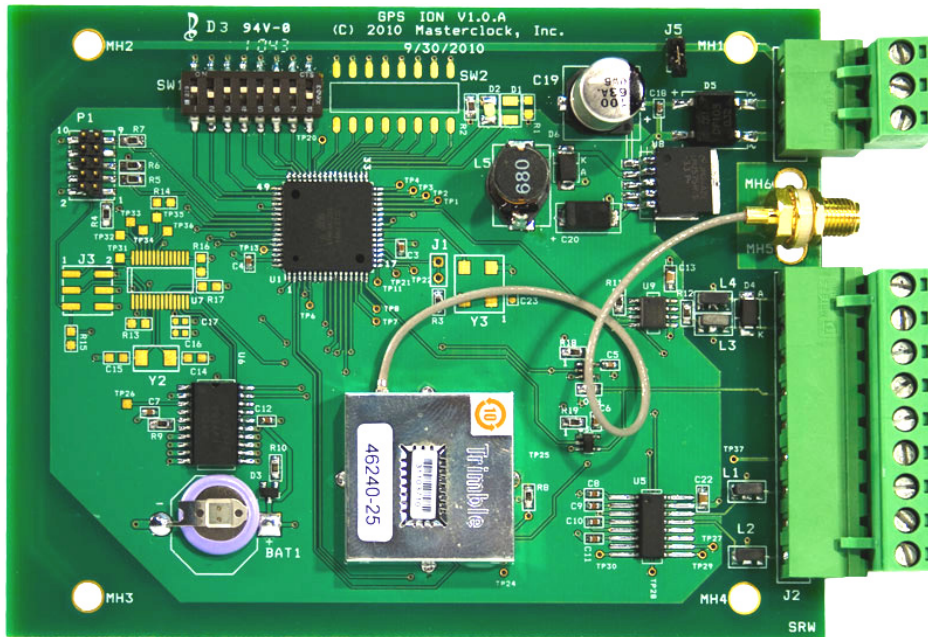


# GPS-ION

## ION METER SERIAL TIME GENERATOR



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## **DISCLAIMER**

The information contained in this document is subject to change without notice.

Masterclock, Inc. (hereinafter MC) makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

MC shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

MC is not responsible for legislative changes to the Daylight Saving Time (DST) rules, nor to the systems relying on accurate time, which may be affected by such changes. Issues related to legislative changes to the DST rules are not covered under the Masterclock, Inc. limited warranty.

See important *limited warranty* information.

## **ADVISORY NOTICE**

### **CONCERNING GPS SATELLITE SYSTEM AND THE GPS-ION SERIAL TIME GENERATOR**

Depending on many factors beyond the control of MC, the signals that are received from the GPS Satellites **are subject to interference, fading, satellite failure and other influences that could cause** the GPS-ION to generate erroneous time and/or date information and, under some conditions, **could prevent** it from generating a time code signal and or cause it to generate an erroneous time code signal.

It is the responsibility of the user to determine the adequacy and suitability of this device for the intended use.

**INITIAL OPERATION**

The GPS-ION was thoroughly tested with its antenna prior to shipment. There are four steps to the GPS-ION installation.

- 1. Configure the J5 ground jumper and switches.** By default the J5 ground jumper is off. In this state the GPS-ION’s system ground is floating or a virtual ground. Connecting the J5 ground jumper connects the system ground to the Earth Ground (J4).

1	<b>GPS Lock Quality Flag.</b> Determines what GPS lock status is sent with Truetime/Kinematics timestamp. On - Sends GPS lock status (locked/not locked) with timestamp Off - Always sends GPS locked status with timestamp			
2	<b>Interval Blanking.</b> Some devices require a span of time where it is not receiving a time stamp (interval blanking). This switch controls whether the blanking is enabled. See <a href="#">chart</a> for further explanation. On - Enabled    Off - Disabled			
3	Output Truetime/Kinematics and NMEA if GPS isn’t locked. On - Enabled    Off - Disabled			
4	Output Truetime/Kinematics. On - Enabled    Off - Disabled			
5	NMEA output. On - Enabled    Off - Disabled With this switch enabled the following switches become available.			
	6	7	8	NMEA Output Packets
	Off	Off	Off	ZDA
	On	Off	Off	ZDA, GGA
	Off	On	Off	ZDA, GLL
	On	On	Off	ZDA, GSA
	Off	Off	On	ZDA, GSV
	On	Off	On	ZDA, RMC
	Off	On	On	ZDA, VTG
	On	On	On	ZDA, GGA, GLL, GSA, GSV, RMC, VTG

- 2. Connect the SMA antenna cable and 9-pin output connector.** Connect the GPS pre-amplified antenna to the GPS-ION’s SMA input (between MH5 and MH6) with Belden 8219 coaxial cable. *RG-58 cable will not work.* **Warning:** *Attaching a passive (non pre-amplified) antenna to the GPS-ION could destroy the GPS receiver module. This is a major repair cost which is not covered by warranty.* Load the 9-pin terminal block (J2) according to your application’s specifications and the [inputs/outputs and switches diagram](#).
- 3. Connect the power.** *Important. Ensure J5 ground jumper is configured to your specifications before connecting power.* Connect power to the 3-pin terminal block according to the [inputs/outputs and switches diagram](#).
- 4. Secure the board.** Using the four mounting holes (MH1-MH4) secure the board to a reliable surface.

## OPERATING THE GPS-ION FOR THE FIRST TIME

When the GPS-ION is initially powered up, after having been shipped to a new location, the time to first fix (time the unit takes to acquire satellites and extract correct local time) could be up to 25 minutes, although it is typically 2 - 5 minutes. Factors such as atmospheric conditions, type of antenna, antenna location, and antenna cable length will affect the time to first fix.

The GPS-ION uses UTC time while GPS satellites use GPS time. Since the rotation of the earth isn't exactly 24 hours every 2-3 years a "leap second" must be made so that UTC time can stay in sync with the earth's rotation. As of September 2008 UTC is -14 seconds GPS time.

Upon initially powering on the device and getting GPS lock or after an extended period of the device being without power (over two weeks) the GPS-ION will output GPS time. After a few minutes the device will receive the leap second information (automatic) and then adjust itself to the UTC time.

The GPS-ION's GPS navigation module has a backup battery that maintains startup data when the unit is powered down. If, when starting up, the location, time and number of satellites that the unit can receive has not changed significantly since last power down then the unit will startup much faster.

The GPS-ION's GPS lock status and power is indicated by a LED on the board.

**One blink per second** - GPS is locked. Power is on.

**Two blinks per second** - GPS is not locked (freewheeling). Power is on. The time reference is the internal real time clock.

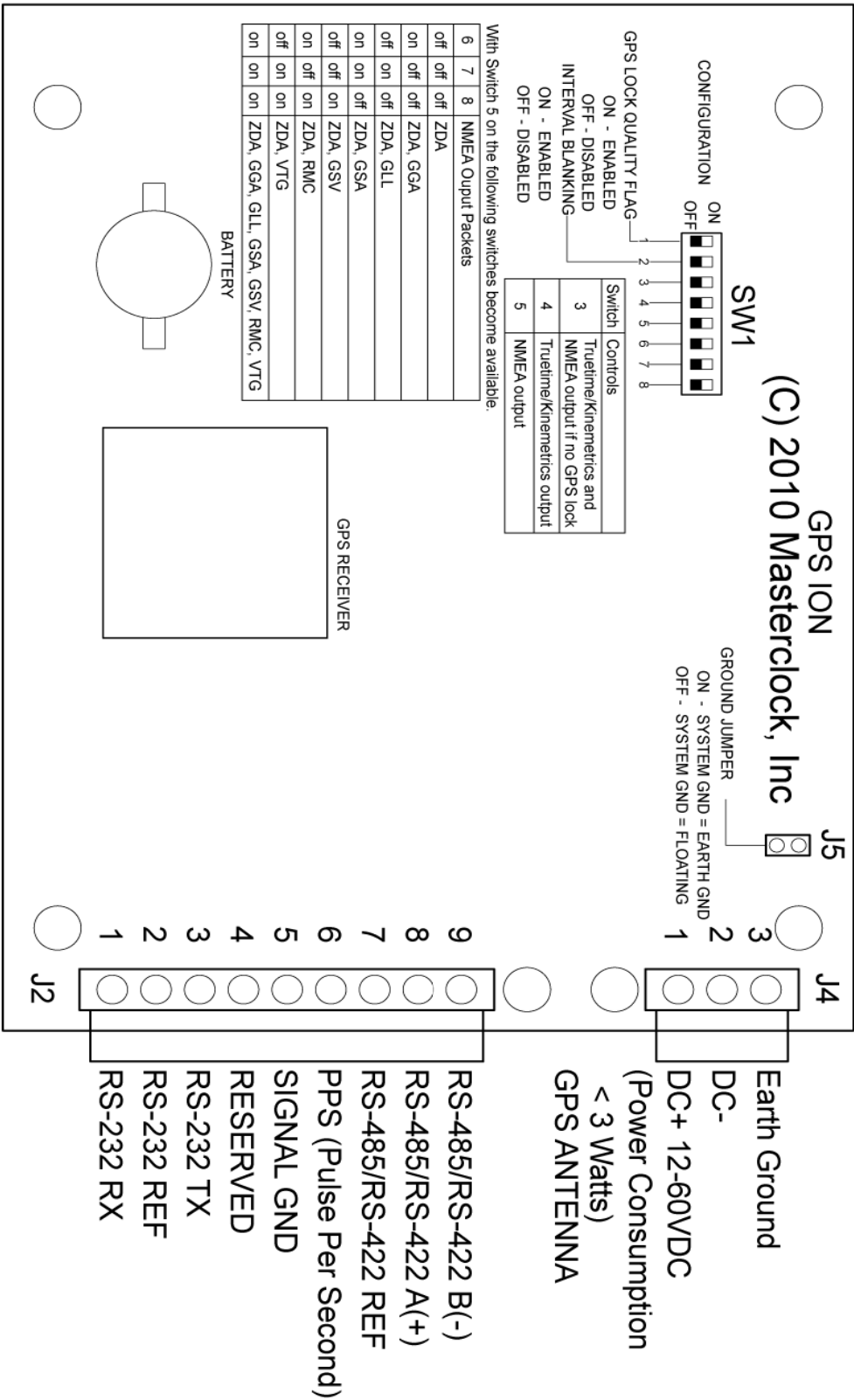
**No blinking** - No power.

## ANTENNA LOCATION

Depending on the location of the GPS-ION obstructions may block reception of signals from the GPS satellites, the antenna may have to be located where it has an unobstructed view of the sky. In some cases this can be accomplished by placing the antenna adjacent to a window. In most cases it will require mounting it outside of the building or on a roof. In the worse case, the basic requirement for assured system operation is that the antenna module has a clear and unobstructed view of the sky for initial satellite acquisition and lock (generation of time by the GPS-ION). It is possible that the system will operate indoors and under other obstructions however this can only be determined empirically; it is not guaranteed.

If a longer cable is required, cables of various lengths (up to 500 feet) with pre-amplified antennas are available from Masterclock. *Bringing the GPS-ION up for the first time with an indoor antenna may prevent or significantly increase the time to first fix.*

# INPUTS/OUTPUTS AND SWITCHES DIAGRAM



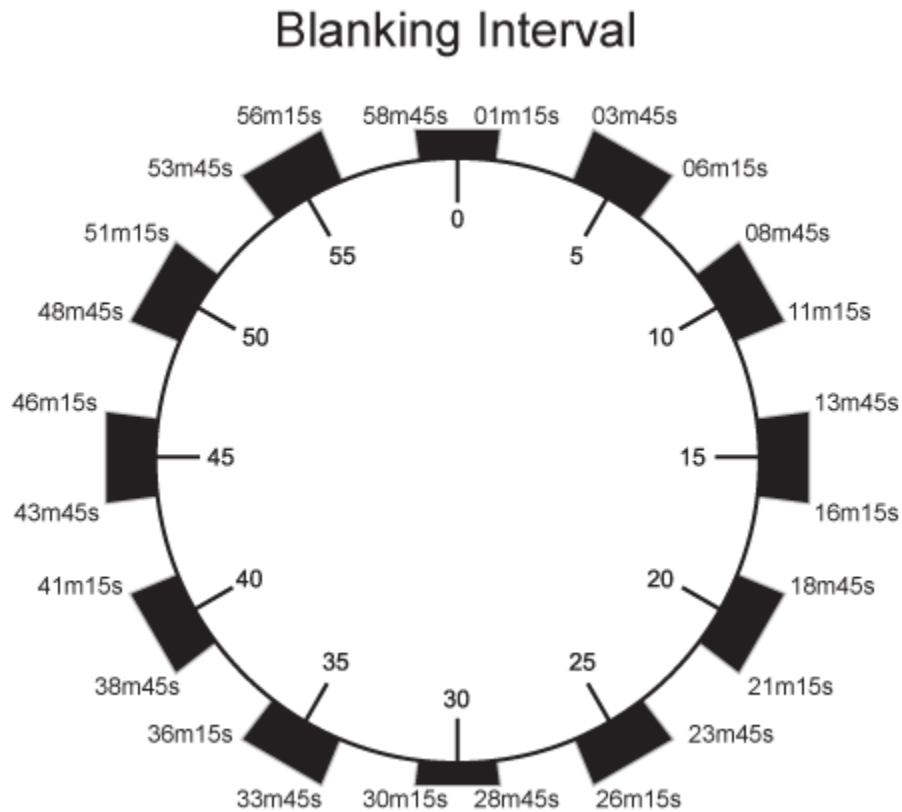
**Note:** ZDA is output at the top of the second. If switch 3 and 5 are ON, only the ZDA message is output when there is no GPS lock.

## Interval Blanking

During the noted periods the GPS-ION does not output a timestamp.

### Middle of Interval Interval

	mm:ss - mm:ss
xx:00:00	58:45 - 01:15
xx:05:00	03:45 - 06:15
xx:10:00	08:45 - 11:15
xx:15:00	13:45 - 16:15
xx:20:00	18:45 - 21:15
xx:25:00	23:45 - 26:15
xx:30:00	28:45 - 31:15
xx:35:00	33:45 - 36:15
xx:40:00	38:45 - 41:15
xx:45:00	43:45 - 46:15
xx:50:00	48:45 - 51:15
xx:55:00	53:45 - 56:15



## **LIMITED WARRANTY**

This Masterclock, Inc. (hereinafter MC) product warranty extends to the original purchaser.

MC warrants the GPS-ION against defects in materials and workmanship for a period of one year from date of sale. If MC receives notice of such defects during the warranty period, MC will, at its option, either repair or replace products which prove to be defective.

Should MC be unable to repair or replace the product within a reasonable amount of time, the customer's alternate remedy shall be a refund of the purchase price upon return of the product to MC. This warranty gives the customer specific legal rights. Other rights, which vary from state to state or province to province, may be available.

### ***Exclusions***

The above warranty shall not apply to defects resulting from improper or inadequate maintenance by the customer, customer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product or improper site preparation and maintenance (if applicable).

### ***Warranty Limitations***

MC MAKES NO OTHER WARRANTY, EITHER EXPRESSED OR IMPLIED, WITH RESPECT TO THIS PRODUCT. MC SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

In any state or province which does not allow the foregoing disclaimer, any implied warranty of merchantability or fitness for a particular purpose imposed by law in those states or provinces is limited to the one-year duration of the written warranty.

### ***Exclusive Remedies***

THE REMEDIES PROVIDED HEREIN ARE THE CUSTOMER'S SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL MC BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER BASED ON CONTRACT, TORT, OR ANY OTHER LEGAL THEORY.

In any state or province which does not allow the foregoing exclusion or limitation of incidental or consequential damages, the customer may have other remedies.

## **HARDWARE SERVICE**

You may return your GPS-ION to MC for repair service. Please contact the factory for return authorization before returning the unit. 1-636-724-3666