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## Technical Bulletin # 201

### SatMate 1020 Quick Reference Setup Guide

#### **System Overview**

The SatMate 1020 is a 1U high, 19" rack mount receiver that can be used for both precise timing/frequency and navigation applications. The SatMate 1020 can be used with the Locus LRSII E-field antenna or Locus H-field antenna.

#### **Antenna Mounting**

##### *E-field Antenna*

When mounting the E-field antenna these guidelines must be followed to optimize receiver performance. In general, the antenna must be free of obstructions in all directions at an angle of 30° above a horizontal line from the top of the antenna. No metal objects or power lines can be located above the antenna. Also, the antenna should be located away from large, conductive objects. The antenna ground wire must be attached to a dependable earth ground and be less than 3 meters in length if possible.

##### *H-field Antenna*

When mounting the H-field antenna it must not be located near strong magnetic fields such as electronic fluorescent light ballasts or computer monitors/CRTs. It should not be mounted near power lines (above or below ground) or to elongated metal objects. It is not necessary to ground the H-field antenna.

If an E-field or an H-field antenna is used in an application that causes it to be inverted (e.g. on the bottom of an aircraft) then the antenna upside-down command must be set to "on". If power is cycled on the receiver, this command will revert to its default value of "off".

As a general test, if you are using the receiver in the continental United States you should be able to receive at least 3 or 4 stations (not counting dual-rated stations) with signal-to-noise ratios between 10dB and 20dB.

#### **Current Software**

"Jul 10 2003" is the current version of SatMate 1020 software. Please note that only software specifically labeled for use with a SatMate 1020 should be loaded into the receiver. LRSIIID, SatMate 1000, and SatMate 1030 software is not compatible and should not be used with a SatMate 1020.

New versions of software are released periodically. You can check the Locus website for the latest version. [www.locusinc.com](http://www.locusinc.com)

#### **Basic Operation**

At a minimum the eight closest Loran chains need to be entered in the Search List regardless of whether they are being used in the navigation solution or PLL. This allows the receiver to "anticipate" cross-rate interference and lock it out.

Set the data update/output rate of the receiver using the update command. Typing store after the update command saves the setting. If power is cycled to the receiver the update rate will revert back to the last stored value.

Use the status v command to verify the receiver is set up correctly. This command displays the status of most receiver settings. Any time a data file is logged this command should be issued and recorded in the file.

If an H-field antenna is being used the antenna channel command must be set to "auto". If an E-field antenna is being used the antenna channel command must be set to "e". The "h" setting is for diagnostic purposes only and should not be used. If power is cycled to the receiver the antenna channel command will revert back to the default value of "auto".

The H-field antenna uses the position generated by navigation solution # 1 to aid in acquiring and tracking stations so it is very important that all usable stations be included in this navigation solution.



### **Navigation Applications**

The following is the recommended receiver setup for land, air, and marine applications. The \$LCGLL NMEA output uses the position generated by navigation solution # 1 so all usable GRIs should be included in this solution.

Note the pll command should not be used for navigation applications.

mode mobile default	}	(land and marine applications)
or		
mode aero default	}	(aircraft applications)
antenna channel auto	}	(H-field antenna)
or		
antenna channel e	}	(E-field antenna)
process toa on		(displays TOAs relative to internal oscillator modulo the GRI)
format precise on		(displays TOAs in 100 picosecond format)
format 2		(displays notch filter and station process information)
format nav 1		(turns navigation solution calculation on)
nav 1 <GRI>		(repeat for each GRI to be added to the navigation solution)
format nmea 1 b		(outputs NMEA messages to port B of the receiver)
update <seconds> store		(enter desired data output rate in seconds)
status v		(display current receiver settings for verification)

### **Timing Applications**

The following is the recommended receiver setup for timing applications requiring a 1PPS output. Note that the absolute phase of the 1PPS is random. See the TAI section of the SatMate Reference Manual for other options.

The receiver should be phase-locked to the nearest Loran Master transmitter for best results. The pll command can be issued only after the desired station has been acquired and is being tracked by the receiver. If power is cycled or the receiver stops tracking the desired station, the pll command will need to be issued again once the receiver has resumed tracking the desired station.

antenna channel auto	}	(H-field antenna)
or		
antenna channel e	}	(E-field antenna)
process toa on		(displays TOAs relative to internal oscillator modulo the GRI)
format precise on		(displays TOAs in 100 picosecond format)
format 2		(displays notch filter and station process information)
mode monitor default		(used for timing and monitoring applications)
pll <station>		(enter GRI and letter designator of closest Master transmitter)
status v		(display current receiver settings for verification)

### **Frequency Applications**

The following is the recommended receiver setup for frequency applications requiring a 10MHz output. The pll command should not be used for frequency applications.

antenna channel auto	}	(H-field antenna)
or		
antenna channel e	}	(E-field antenna)
process toa on		(displays TOAs relative to internal oscillator modulo the GRI)
format precise on		(displays TOAs in 100 picosecond format)
format 2		(displays notch filter and station process information)
mode monitor default		(used for timing and monitoring applications)
fout a 10000000		(sets output frequency to 10MHz)
status v		(display current receiver settings for verification)