SatMate/CsSync
Command Guide

Locus P/N 005-001104

SatMate / CsSync
Command Guide

P/N 005-001104

Locus, Inc.
Madison, Wisconsin USA

Copyrights and trademarks

SatMate, Cs Sync, LAD-Loran, LRSIIID, and Locus are trademarks of Locus, Inc.

Windows is a registered trademark of Microsoft Corporation. Other product and company names mentioned herein may be the trademarks of their respective owners.

Locus, Inc., 5540 Research Park Drive, Fitchburg Center, Madison, WI 53711.

For technical support, call 608-270-0500 or
you can also visit our website: *www.locusinc.com*

Revision June 2005.

The most current manual revision or latest Addendum is also available on the technical support page of Locus' Web site: *www.locusinc.com*.

Disclaimer of warranties and limitation of liabilities

Contents

CHAPTER 1 INTRODUCTION

This manual lists and explains all the commands you can use with the Locus Loran receiver software.

- Chapter 2 lists all commands in alphabetical order.
- To find a particular timing command or navigation command, see the special indexes after Chapter 2. You can also use the general index to quickly find any command.

Tips for entering commands

- After you type most commands, you must enter a “newline” character. For typical PC terminal programs, this character is the Enter key. Three commands—$, /, and ?—are exceptions to this rule; you can type these three commands without pressing Enter.
- When the command requires entry of a numerical value or other variable value, this manual indicates the value with an *f*. When the command requires entry of multiple values, the manual indicates the values with *f1*, *f2*, and so on.
- Most commands are case-insensitive. In other words, you can use lowercase and uppercase letters interchangeably to enter commands.
- To change most command settings, you type the command name and then specify a value. To view a current setting without changing it, you usually type the command without specifying a value afterward.
- The software may round certain settings, especially time values, to match its internal operations. In such cases, the value reported by the software may differ slightly from the value you entered.
- If you enter a numerical value beyond the acceptable range for the particular command, the software usually substitutes the minimum or maximum value in the range. In some cases, substitution is impractical; an error message appears and the setting is left unchanged.

CHAPTER 2 LIST OF COMMANDS

This section provides an alphabetical list of each command you can use with the receiver. Characters such as $, ?, and / are listed first.

$ ("dollar" sign) command

Function	Clear tracing functions and stop certain lengthy dumps of internal data if they are in progress.
Command Syntax	$
Example 1	$
System Response 1	None.
Notes	This substitute for the `clear` command is useful for recovery when too many such functions have been turned on simultaneously and the echo from typing is lost in all the text going by.

? ("question mark") command

Function	Show the standard TD/status display in the selected format.
Command Syntax	?
Example 1	?
System Response 1	See below. Format type 2 with precise TOA format is shown.

```
Status: 34U  +0.0dBR 34147CV   426B +81.37C  60A      87268T
02: 8970M: P 9  90/ 95dB  30S/N  -338nS +0.08 1.00   10    697038025
06: 8970W: S 9  65/ 70dB   2S/N   -51nS -0.27 0.97   38    873997256
05: 8970X: S 9  77/ 82dB  16S/N  +439nS -0.05 0.96   10    133164614
03: 8970Y: S 9  82/ 86dB  22S/N   +56nS +0.02 1.00   10    289417042
04: 8970Z: S 9  69/ 76dB   8S/N  -118nS -0.27 0.96   16    469242108
end data
```

Notes	This is the same display that is controlled by the `update` command. All reports are controlled by the UPDATE command.

/ (forward “slash” sign) command

Function	Display notch filter data.
Command Syntax	/
Example 1	/
System Response 1	notches: 79093 62 22 92 78972 49 21 82 96593 48 21 99 79212 47 20 94 78877 45 24 79 91651 44 19 93 118519 43 28 67 113935 41 14 98 94432 41 21 86 96808 41 21 90 120063 40 18 99 88528 39 17 94 83775 38 20 94 124604 37 16 99 118758 36 18 95 73560 35 22 51 122201 33 17 85 48405 28 8 99 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 end notches
Notes	From left to right, these columns display the frequency (in Hertz) of the filtered interfering signal; the signal amplitude before filtering (in dB); the signal amplitude after filtering (in dB); and a relative value (0 – 100) representing the coherence of the interferer signal after accounting for the effects of the notch filtering.

ANTENNA CHANNEL *SatMate 1020 or 1030 only*

Function	Selects operation mode of receiver given type of antenna being used.
Command Syntax	*antenna channel f*

Parameter	Description
none	Indicates the current antenna's operation mode.
f	auto - Used when the type of antenna in us is unknown, the receiver will determine the type of antenna that is in use.
f	e - Used with an E-field antenna (or to see only the first channel of the two channel H-field signal).
f	h - Used to see only the second the second channel of the H-field signal. This is for diagnostic purposes only and should not be used for normal H-field antenna operation.
f	e/h - Used for normal H-field antenna operation.

Example 1	`antenna channel auto`
System Response 1	`antenna mode set to 0, channel auto` `anstat=0x3, current=0.053`
Example 2	`antenna channel e`
System Response 2	`antenna mode set to 0, channel E` `anstat=0x3, current=0.053`
Notes	The default is auto and should be used when the type of antenna is unknown. It may be used for H-field antenna operation. The "current" in the output response is antenna power supply current.

ANTENNA COUPLING *SatMate 1020 or 1030 only*

Function	Partially couples H-field magnetic antenna rotation angles so that strong stations can assist weak ones when the rotation is rapid.
Command Syntax	*antenna coupling f*

Parameter	Description
none	Indicates current antenna's coupling status
	on – Turns antenna coupling on
	off – Turns antenna coupling off

Example 1	`antenna coupling`

System Response 1	`antenna mode is 0, channel auto`
	`antenna rotation coupling 2`
	`anstat=0x3, current=0.053`

Example 2	`antenna coupling on`

System Response 2	`antenna mode is 0, channel auto`
	`antenna rotation coupling 2`
	`anstat=0x3, current=0.053`

Example 3	`antenna coupling off`

System Response 3	`antenna mode is 0, channel auto`
	`antenna rotation coupling 0`
	`anstat=0x3, current=0.052`

Notes	The default setting is 2, which will be set by "antenna coupling on".

ANTENNA GEO *SatMate 1020 or 1030 only*

Function	Uses the navigation solution to assist in H-field antenna orientation.
Command Syntax	*antenna geo f* Parameter — Description *none* — Indicates current antenna geographic mode status on – Turns antenna geo on off – Turns antenna geo off
Example 1	`antenna geo off`

System Response 1	`antenna mode is 0, channel auto`
	`antenna geographic mode off`
	`anstat=0x3, current=0.052`

Example 2	`antenna geo 1`

System Response 2	`antenna mode is 0, channel auto`
	`antenna geographic mode on`
	`anstat=0x3, current=0.052`

Notes	The H-field antenna inherently has front-to-back ambiguity. To resolve this ambiguity the ECD must be determined to within 1/2 cycle, which is difficult on weaker stations. This command takes information about the strong stations and applies it to the weaker ones using the current position generated by the navigation solution.

ANTENNA UPSIDE DOWN

Function	Compensates for reversed antenna polarity.
Command Syntax	*antenna upside down f*

Parameter	Description
none	Indicates current antenna orientation selection
	on – Used when antenna is mounted in an inverted position other than how it was labeled or intended to be mounted.
	off – Used when antenna is mounted according to labeling or instructions.

Example 1	`antenna upside down on`

System Response 1	`antenna mode is 0, channel auto`
	`antenna upside down on`
	`anstat=0x3, current=0.052`

Example 2	`antenna upside down off`

System Response 2	`antenna mode is 0, channel auto`
	`antenna upside down off`
	`anstat=0x3, current=0.053`

Notes	When using an H-field antenna, upside-down means that the rotational sense as between the channels is reversed. With an E-field antenna it means the antenna is mounted or wired in some way that yields signals of opposite polarity.

BATCH MAX

Function	Set the global batch averaging time limit to n seconds, as a constraint on weak stations.
Command Syntax	batch max *f*

Parameter	Description
none	Indicates the current batch values.
f	A decimal value in the range of 0 to 1000. For stationary operation, a setting of 60 is usually adequate. Lower values may be necessary for mobile applications. This setting must be higher than the `batch min` setting. 0 = Sets `batch max` to its minimum value.

Example 1	`batch max`

System Response 1	`global batch minimum is 1.0 seconds`
	`global batch maximum is 45 seconds`
	`global batch sync is 1.5 seconds`
	
	(Without optional parameter, `batch max` indicates the current batch settings.)

Example 2	`batch limit 60`

System Response 2	`global batch minimum is 1.0 seconds`
	`global batch maximum is 60 seconds`
	`global batch sync is 1.5 seconds`

Notes	This setting is stored.

BATCH MIN

Function	Set global batch averaging minimum time to *f* seconds.
Command Syntax	batch min *f* Parameter: *none* — Indicates the current batch values. Parameter: *f* — A decimal value in the range of 1 to 1000. This setting must be lower than the `batch limit` or `batch max` setting.
Example 1	`batch min`

System Response 1	`global batch minimum is 1.0 seconds`
	`global batch maximum is 60 seconds`
	`global batch sync is 1.5 seconds`
	
	[Without optional parameter, `batch min` indicates the current batch settings.]

Example 2	`batch min 10`

System Response 2	`global batch minimum is 10 seconds`
	`global batch maximum is 60 seconds`
	`global batch sync is 1.5 seconds`

Notes	This setting is stored. Shorter averaging times than the minimum are used when the clock coherence value suggests they are appropriate. Otherwise, use the default setting. To obtain the default setting for the software version, usually about 3 or 4 seconds, enter a value of 0. In some versions it may be possible to enter lower values than this default, down to about 1 second. The maximum setting is 30 seconds.

BAUD

<table>
<tr><td>Function</td><td colspan="2">Set the receiver's serial port settings.</td></tr>
<tr><td rowspan="8">Command Syntax</td><td colspan="2">baud f1 f2 f3 f4 f5</td></tr>
<tr><td>Parameter</td><td>Description</td></tr>
<tr><td>none</td><td>Indicates current serial port settings</td></tr>
<tr><td>f1</td><td>Selects Serial Port A or B.
Defaults to A if not specified</td></tr>
<tr><td>f2</td><td>This parameter is the baud rate. Baud rates include 300, 600, 1200, 4800, 9600, 38400, 57600, and 115,200.
Note: If you change any of the following parameters, you must include the entire list of parameters with the command.</td></tr>
<tr><td>f3</td><td>Word length of the ASCII character:
7 = Seven-bit ASCII word length
8 = Eight-bit ASCII word length
Defaults to 8 if not specified.</td></tr>
<tr><td>f4</td><td>Parity bit: n = No parity;
e = Even parity; o = Odd parity
Defaults to n if not specified.</td></tr>
<tr><td>f5</td><td>Number of stop bits: 1 = One stop bit;
2 = Two stop bits
Defaults to 2 if not specified.</td></tr>
<tr><td>Example 1</td><td colspan="2"><code>baud 9600</code></td></tr>
<tr><td>System Response 1</td><td colspan="2"><code>baud about to be set to 9600 8 n 2
(stored setting)
baud setting is 9600 8 n 2</code></td></tr>
<tr><td>Example 2</td><td colspan="2"><code>baud 9600 8 n 1</code></td></tr>
<tr><td>System Response 2</td><td colspan="2"><code>baud about to be set to 9600 8 n 1 (stored setting)
baud A and B setting is 9600 8 n 1</code></td></tr>
<tr><td>Notes</td><td colspan="2">The default baud rate is 9600.</td></tr>
</table>

CLEAR

Function	Clear tracing functions.
Command Syntax	clear
Example 1	`clear`
System Response 1	None
Notes	For more information, see the "$ command" section.

CLOCK

Function	Turn the clock control loop on or off.	
Command Syntax	clock *f*	
	Parameter	Description
	f	These parameters can be included with the `clock` command: off = Clock control loop is disabled. The `clock DAC` setting remains frozen at its current value. on = Clock control loop is enabled as set by `clock order` command.
Example 1	`clock off`	
System Response 1	`clock order 0`	
Example 2	`clock on`	
System Response 2	`clock order 2`	
Example 3	`clock`	
System Response 3	clock dac 32585 (+77.94C) clock order 2 clock averaging time 10	
Notes	The `clock off` command has the same effect as `clock order 0`.	

CLOCK DAC

Function	Set the clock correction DAC to the given value, or read it if *f* is not given.
Command Syntax	clock dac *f* Parameter: *none* — Description: Indicates the current clock value. Parameter: *f* — Description: An integer value in the range of 0 to 65535.
Example 1	`clock dac`
System Response 1	`clock dac is 34143` [Without optional parameter, `clock dac` indicates the current clock settings.]
Example 2	`clock dac 32768`
System Response 2	`clock dac is 32768`
Notes	It can be useful to know the approximate setting in case the setting gets lost, especially in lab applications. If the unit is operating normally, this command may disrupt its operation, possibly to the point of dropping all stations. If the unit is running and stable with real Loran stations, the `clock dac` function will give a reasonable value. CAUTION: This function is meant for diagnostic and maintenance purposes only, and not for sending repetitive or continuous adjustments to the clock DAC. It temporarily disables storage of the clock value into non-volatile RAM.

CLOCK ORDER

Function	Set the clock feedback loop to the given order.
Command Syntax	clock order *f*

Parameter	Description
none	Indicates the current clock value.
f	This parameter sets the type of clock control: 0 = Clock control is disabled; the `clock dac` setting remains frozen at its current value. 1 = Clock control occurs using a simple first-order exponential filter. 2 = Clock control occurs using a more complex second-order filter.

Example 1	`clock order`
System Response 1	`clock order 1` [Without optional parameter, `clock order` indicates the current clock order setting.]
Example 2	`clock order 2`
System Response 2	`clock order 2`
Notes	While a PLL setting is active, the order is always effectively 1.

CLOCK STARTUP

Function	This command sets the clock control loop for “startup” conditions by providing a wider bandwidth and capture range.
Command Syntax	`clock startup`
Example 1	`clock startup`
System Response 1	`set clock for startup`

DATE

Function	Set the date. The preferred format for date entry is dd-mm-yyyy, but you can use other formats.
Command Syntax	date *dd-mm-yyyy* Other acceptable formats are: date *dd-MMM-yyyy* date *dd/mm/yyyy* date *dd/MMM/yyyy*
Example 1	`date 22-06-2001`
System Response 1	`22-Jun-2001  19:15:25`
Notes	You can use MMM as a convenience. It is the three-letter English language abbreviation (Example: JAN is January). ***However***, the number form is strongly suggested for computer control, since it is not language-dependent. Note that the DAY comes FIRST, which is contrary to U.S. usage, but is the international and ISO standard. If the time is not set, it will start at 00:00:00, but will be treated as invalid for TAI purposes until it has been set. The TAI-setting algorithm requires both the time and the date.

DEFAULT

Function	Return most settings to their default values.
Command Syntax	default
Example 1	`default`
System Response 1	`default settings restored` [After the above response, the default settings and values will scroll down the screen.]
Notes	Clock and crystal tables, operating mode (mobile/monitor), Search List, baud rate, and echo are not affected by this command.

ECAVG

Function	You can use this command to set the ECD averaging to a higher or lower setting than the default (60).
Command Syntax	ecavg *f* Parameter: *none* — Description: Indicates the current ECD averaging-time value. Parameter: *f* — Description: This parameter sets the ECD averaging-time for reports, in seconds. The range is 0 to 3600 seconds. Also, off = 0
Example 1	`ecavg 60`
System Response 1	`Global supplementary ECD averaging set to 60 seconds`
Example 2	`ecavg off`
System Response 2	`Global supplementary ECD averaging is off`
Notes	[Use caution when working with any command that affects the ECD.] The value set *only* affects reports, not tracking. The ECD flags the reports reflecting tracking status. The flags may be set when the averaged value suggests they should not be, or vice versa. The averaged value may be incorrect after a cycle slip, until the time set has elapsed. Default is “off”. This averaging is in addition to automatic averaging for tracking. See also ECAVG SCALE.

ECAVG SCALE

<table>
<tr><td>Function</td><td>You can use this command to set the ECD averaging to a higher or lower setting than the default.</td></tr>
<tr><td>Command Syntax</td><td>ecavg scale f
<table><tr><th>Parameter</th><th>Description</th></tr><tr><td>none</td><td>Indicates the current ECD averaging-time scale value.</td></tr><tr><td>f</td><td>This parameter sets the ECD averaging-time scale value, which is an integer in the range of 0.5 to 5.0.</td></tr></table></td></tr>
<tr><td>Example 1</td><td><code>ecavg scale</code></td></tr>
<tr><td>System Response 1</td><td><code>ECD averaging-time scale factor is 1.0</code></td></tr>
<tr><td>Example 2</td><td><code>ecavg scale 2</code></td></tr>
<tr><td>System Response 2</td><td><code>ECD averaging-time scale factor is 2.0</code></td></tr>
<tr><td>Example 3</td><td><code>ecavg scale 0</code></td></tr>
<tr><td>System Response 3</td><td><code>ECD averaging-time scale factor is 0.5</code></td></tr>
<tr><td>Notes</td><td>[Use caution when working with any command that affects the ECD.]
This command alters the automatic setting. For example, <code>ecavg scale 2</code> causes ECDs to be averaged for twice as long as normal. This command does affect signal tracking. See also ECAVG.</td></tr>
</table>

ECDBIAS

Note: This command is for advanced users only. It is generally only needed for installation and maintenance.

Function	Enter a bias that is added to all ECD measurements, in *f* nanoseconds.
Command Syntax	ecdbias *f*
Example 1	`ecdbias 500`
System Response 1	`ECD bias 500ns`
Notes	[Use caution when working with any command that affects the ECD.] The ECD for stations at normal distances of a few hundred miles will typically range from -500 to +500 ns. *This bias will affect tracking, so a decision to add it should not be made lightly.* The bias setting is intended to correct moderate ECD deviations, such as those due to adverse antenna mounting conditions like nearby metallic structures. Generally speaking, magnitudes exceeding a microsecond or so mean that you should consider a better antenna location, one that is further from nearby conductive objects. Note that as the required bias becomes larger, the ability to reject skywaves tends to deteriorate. Because this setting is applied directly to the ECD measurement process, changes will show up in the data only after the characteristic averaging times have elapsed. The setting range is -2500 to +2500 for the nanoseconds desired, and the setting is stored.

ECHO

Function	Use this command to enable or disable the display of text characters you type them.
Command Syntax	echo *f* Parameter: *f* Description: This parameter MUST be included with the `echo` command: off = Characters typed are NOT repeated by the receiver. on = Characters typed are repeated back by the receiver.
Example 1	`echo on`
System Response 1	`echo setting is on`
Example 2	`echo off`
System Response 2	`echo setting is off`
Notes	The default setting for `echo` is `off`.

ERROR

Function	Show logged errors and error statistics.
Command Syntax	error *f* Parameter: *none* — Show (i.e., report) recent errors that have been logged. Parameter: *f* — An integer value. Setting a value for `error` is an advanced function, and is generally not needed for normal operation.
Example 1	`error`

System Response 1	`No new errors logged`
	`Total logged errors: 0`
	(Without optional parameter, `error` indicates the current errors logged.)

Example 2	`error 10`
System Response 2	`No new errors logged` `Total logged errors: 0`
Notes	This command may not be necessary since errors are automatically shown and removed on an automatic update. This command is useful if automatic updates are off.

EUROFIX

Function	Display settings for Eurofix.
Command Syntax	eurofix *f* Parameter: *none* — Indicates the current Eurofix status. Parameter: *off* — Turns all Eurofix decoding off.
Example 1	`eurofix`
System Response 1	`EuroFix off` `EuroFix format is 0 A`
Example 2	`eurofix off`
System Response 2	`EuroFix is off`

EUROFIX ADD

Function	Add Eurofix decoding to a station.
Command Syntax	eurofix add *f* Parameter: *f* — Valid station-tag number, or station GRI number and alpha designator.
Example 1	`eurofix add 10`
System Response 1	`eurofix request on 10` (Example is using a station process (tag) number.)
Example 2	`eurofix add 8970Y`
System Response 2	`eurofix request on 20` (Example showing a station GRI number with alpha designator.)

Notes	After issuing the `eurofix` command, the following line might appear in the data file when format is equal or greater than 3:
	
	`EUF10: EF6731Z: 0.2362 127110  0  0`
	`Info: Eurofix re-synchronization: param=2,PC=0x414eea`

EUROFIX DROP

Function	Drop Eurofix decoding from a station.
Command Syntax	eurofix drop *f*

Parameter	Description
f	Valid station-tag number, or station GRI number with alpha-indicator.

Example 1	`eurofix drop 10`
System Response 1	`eurofix drop on 10` (Shows the use with a station-tag number.)
Example 2	`eurofix drop 8970Y`
System Response 2	`eurofix drop on 20` (Shows the use with a station GRI number and its alpha-identifier. The Process ID for 8970Y was 20.)

EUROFIX FORMAT

Function	Sets the Eurofix display format.
Command Syntax	eurofix format *f1 f2*

Parameter	Description
f1	0 = Turn off all Eurofix messages. 1 = Turn on RTCM Type 9 DGPS messages. 2 = Turn on DGPS text messages.
f2	a = Serial port A for RTCM output. b = Serial port B for RTCM output.

Example 1	`eurofix format 1`
System Response 1	`Eurofix format set to 1`
Notes	Only RTCM Type 9 messages will be sent to Serial Port B. Text messages (format 2) can only be sent to Serial Port A.

FLASH LOAD (optional)

Function	Loads ASF data from Flashcard and applies them to the navigation solution. (For SatMate/CsSync 1030 with FLASH card reader only.)
Command Syntax	flash load

Parameter	Description
none	Loads ASF data from Flashcard and applies them to the navigation solution.

Example 1	`flash load`
System Response 1	Loading ASF data.....Done

FORMAT

Function	Formats the display of the automatic TD update data.
Command Syntax	format *f*

Parameter	Description
none	Indicates the current display format setting.
f	0 = Displays the station process update only. 1 = Displays notch status data before station process update data. 2 = Displays parameter data for diagnostic use. 3 = Displays Eurofix decoding data. Enter higher values to display additional data for diagnostic use.

Example 1	`format`
System Response 1	`format is 1`
Example 2	`format 2`
System Response 2	`format set to 2`

FORMAT ANTENNA

Function	Formats how the data in the automatic antenna update is displayed.
Command Syntax	format antenna *f*

Parameter	Description
none	Indicates the current antenna display format.
f	0 = Disable automatic antenna update. 1 = Set antenna update to display basic antenna information only. 2 = Set antenna update to display more detailed information.

Example 1	`format antenna`
System Response 1	`antenna format is 1`
Example 2	`format antenna 2`
System Response 2	`antenna format is 2`

FORMAT NAV

Function	Format of navigation display.
Command Syntax	format nav *f*

Parameter	Description
none	Indicates the current navigation display format setting.
f	0 = Turns off the display, but navigation (lat/lon) computation continues. 1 = Displays navigation solutions after station process update information. Enter higher values for *f* to display additional data.

Example 1	`format nav`
System Response 1	`nav format is 0`
Example 2	`format nav 1`
System Response 2	`nav format is 1`

FORMAT NMEA

Function	Control the output of NMEA reports and the serial port that they are sent to.
Command Syntax	format nmea *f1 f2*

Parameter	Description
none	Indicates the current NMEA format status.
f1	0 = Disable NMEA messages. 1 = Enable NMEA messages and station process update. 2 = Enable NMEA messages only.
f2	a = Serial Port A b = Serial Port B

Example 1	`format nmea`
System Response 1	`NMEA format is 0 B`
Example 2	`format nmea 1`
System Response 2	`NMEA format is 1 B`
Notes	The update rate is set by the `update` command. The station process update is always output to Port A.

FORMAT PRECISE

Function	Cause TD/TOA information to be displayed in units of 1nS (off) or 100 pS (on).
Command Syntax	format precise *f*

Parameter	Description
none	Indicates the current `format precise` status.
f	off = Turn off precise TD format. on = Turn on precise TD format.

Example 1	`format precise`
System Response 1	`precise (100pS) td format is off`
Example 2	`format precise on`
System Response 2	`precise (100pS) td format is on`

FORMAT TD

Function	Control display of TD data.
Command Syntax	format td *f* Parameter: *none* — Indicates the current TD display format setting. Parameter: *f* — 0 = Turns station process update off. 1 = Displays station process update. 2 = Displays station process update including tentative stations. GRI = Displays station process update for the specified chain.
Example 1	`format td`
System Response 1	`td format is 1`
Example 2	`format td 2`
System Response 2	`td format is 2`
Example 3	`format td 8970`
System Response 3	`td format is 8970`

FOUT

Function	Set each frequency output port on the receiver to a preferred frequency.
Command Syntax	fout *f1 f2*

Parameter	Description
none	Indicates current status of the two Frequency Output ports.
f1	a = Frequency Output Port A b = Frequency Output Port B
f2	Set the frequency from the following options: 1000000 = 1 MHz 1544000 = 1.544 MHz 2048000 = 2.048 MHz 5000000 = 5 MHz 10000000 = 10 MHz

Example 1	`fout`
System Response 1	`freq A is 10M` `freq B is 10M`
Example 2	`fout a 1000000`
System Response 2	`freq A set to 1M`

GCD

Function	Determines the greatest common divisor between two numbers.
Command Syntax	gcd *f1 f2* Parameter: *f1, f2* — Description: Any integer value.
Example 1	`gcd 8970 9960`
System Response 1	`30`
Example 2	`gcd 7980 9960`
System Response 2	`60`
Notes	To smooth out crossrate interference, the GCD is ideally 15 or less for all pairs of published GRIs, since 15 is roughly the effective number of cycles in a transmitted Loran pulse. If the GCD is large (as with 7980 and 9960), then at least at some locations, crossrate interference between the two chains will be anomalously severe. For TAI analysis, a GCD of 10 rather than 1 as in Europe, is preferred in order to accommodate some cycle tracking ambiguity on distant stations.

HELP

Function	Show summary help information for commands. If you specify a GRI number, you can view station information for the specified GRI, provided that it is in the receiver's Loran chain database.
Command Syntax	help *f*

Parameter	Description
none	Display help for system commands.
chains	Display all Loran-C chain names.
f	A valid GRI number. Provides station information for the specified chain.

Example 1	`help`
System Response 1	See below

```
$: stop traces (no <enter> key required)
baud <n>: set baud rate to n <stored>
format <n>: set update format to n <stored>
help chains: show chains known to system
search stop/start: stop/restart auto search process
search <g>,<n>: search GRI g for n gri time intervals
search add/drop <n>: add/drop GRI n from auto search (takes time)
<stored>
slip-/slip+ <p>: force slip on process p
slipf/slipr <p>: slip freeze/release on process p
stop <p>: stop station process
tdavg <c>: set global TD averaging to c seconds <stored>
tdavg <p>,<c>: set TD averaging on process p to c seconds
update <n>: set update interval n seconds (may be rounded)
```

Example 2	`help 8970`

System Response 2	`8970 MWXYZ  Great Lakes`
	`8970M:  400KW: 39 51 07.658N   87 29 11.586W  Dana`
	`8970W:  800KW: 30 59 38.870N   85 10 08.751W  Malone`
	`8970X:  800KW: 42 42 50.716N   76 49 33.308W  Seneca`
	`8970Y:  800KW: 48 36 49.947N   94 33 17.915W  Baudette`
	`8970Z:  900KW: 36 30 20.783N  102 53 59.487W  Boise City`

Example 3	`help chains`

System Response 3	`5543 MXY Calcutta`
	`5930 MXYZ East Coast Canada`
	`5980 MXY Russian/American (Bering Sea)`
	`5990 MXYZ West Coast Canada`
	`6042 MWX Bombay`
	`6731 MXYZ Lessay`
	`6780 MXY China South Sea`
	`7001 MXY Bo`
	`7030 MWXYZ Saudia Arabia South`
	`7270 MWX Newfoundland East Coast`
	`7430 MXY China North Sea`
	`7499 MXY Sylt`
	`7950 M12 Eastern Russia`
	`7960 MXYZ Gulf of Alaska`
	`7980 MWXYZ Southeast USA`
	`8000 M1234 Western Russia`
	`8290 MWXY North Central USA`
	`8390 MXY China East Sea`
	`8830 MWXYZ Saudia Arabia North`
	`8930 MWXYZ Northwest Pacific`
	`8970 MWXYZ Great Lakes`
	`9007 MWXYZ Ejde`
	`9610 MVWXYZ South Central USA`
	`9930 MWXYZ East Asia`
	`9940 MWXY West coast USA`
	`9960 MWXYZT Northeast USA`
	`9990 MXYZ North Pacific`

INUSE

Function	Show the number of station channels that are in use by the receiver and “verified”.
Command Syntax	inuse
Example 1	`inuse`
System Response 1	`35 total in use, 35 verified`
Notes	The probability that a displayed station is “real” and thus verified is never exactly 100%. However, this probability is higher if the channel has been tracked for some time, and if the station is a secondary and shows a valid designator (V, W, X, Y, or Z), and TD value.

INVERT

<table>
<tr><td>Function</td><td colspan="2">Invert the effective electrical sense of the data on station or chain f.</td></tr>
<tr><td>Command Syntax</td><td colspan="2">invert f1 f2</td></tr>
<tr><td></td><td>Parameter</td><td>Description</td></tr>
<tr><td></td><td>none</td><td>Indicates the current <code>invert</code> status.</td></tr>
<tr><td></td><td>f1</td><td>A valid station GRI number and alpha-identifier; or, a valid chain number.</td></tr>
<tr><td></td><td>f2</td><td>off = Turn off <code>invert</code>
on = Turn on <code>invert</code></td></tr>
<tr><td>Example 1</td><td colspan="2"><code>Invert</code></td></tr>
<tr><td>Response 1</td><td colspan="2"><code>none set</code></td></tr>
<tr><td>Example 2</td><td colspan="2"><code>invert 8970M on</code></td></tr>
<tr><td>Response 2</td><td colspan="2"><code>10 (8970M): set to invert</code></td></tr>
<tr><td>Example 3</td><td colspan="2"><code>invert 8970M off</code></td></tr>
<tr><td>Response 3</td><td colspan="2"><code>10 (8970M): set non-inverting</code></td></tr>
<tr><td>Example 4</td><td colspan="2"><code>invert 8970 on</code></td></tr>
<tr><td>Response 4</td><td colspan="2"><code>05 (8970X): set to invert
08 (8970Z): set to invert
10 (8970M): set to invert
19 (8970W): set to invert
20 (8970Y): set to invert</code></td></tr>
<tr><td>Example 5</td><td colspan="2"><code>invert 8970M off</code></td></tr>
<tr><td>Response 5</td><td colspan="2"><code>none set</code></td></tr>
<tr><td>Notes</td><td colspan="2">This setting is for experimental purposes; usually it is associated with very odd antenna mountings, and applies to either magnetic or electric field antennas.</td></tr>
</table>

MODE

Function	Select Mobile or Monitor mode for dynamic or static applications.
Command Syntax	mode *f1 f2*

Parameter	Description
none	Indicates the current `mode` status.
f1	monitor = Configures receiver for static operation. mobile = Configures receiver for land mobile operation. aero = configures receiver for aviation operator. default = restores default settings for mode specified.
f2	

Example 1	`mode`
Response 1	`operating mode is mobile`
Example 2	`mode mobile`
Response 2	reminder: global batch minimum is 1.0 seconds global batch maximum is 60 seconds global batch sync is 1.5 seconds global TD averaging is 60 seconds td averaging filter mode is 0 operating mode is mobile
Example 3	`Mode mobile default`

Response 3	`operating mode set to mobile`
	`global batch minimum is 1.0 seconds`
	`global batch maximum is 10.0 seconds`
	`global batch sync is 1.5 seconds`
	`batch scale is 0.5`
	`clock nav adjust is solution 1`
	`global TD averaging is 10 seconds`
	`td averaging filter mode is 0`

Notes	In mobile mode some alarms are adjusted to account for rapid motion or rapidly changing conditions.

NAV

Function	Add or remove a chain from a navigation solution.
Command Syntax	nav *f1 f2 f3*

Parameter	Description
none	Indicates the current nav status
f1	The solution number, from 1 to 4
f2	A valid chain (GRI) number
f3	off = Remove chain from solution You can also specify particular stations within a chain for *f3* (e.g., M, X, and Y) to add them to the navigation solution.

Example 1	`nav`

Response 1	`nav solutions:`
	`none`
	`nav format is 1`
	`nav conductivity is 0.005`

Example 2	`nav 1 8970`

Response 2	`set gri 8970 in solution 1`
	`nav solutions:`
	`01 - 8970`
	`*C 8970 M.WXYZ`
	`*[00]  - 01 - 43 0.0879 N  89 25.5608 W 61.4  7/`
	`2M F=0000 0.005`

Example 3	`nav`

Response 3	`nav solutions:`
	`01 - 8970`
	`01 - ASF modes off`
	`01 - skywave-include mode is off`
	`nav format is  1`
	`nav conductivity is 0.005`

Example 4	`nav 1 9960 mz`

Response 4	`set gri 9960 in solution 1`
	`nav solutions:`
	`01 - 8970 9960MZ`

Example 5	`nav`

Response 5	`nav solutions:`
	`01 - 8970 9960MZ`
	`01 - ASF modes off`
	`01 - skywave-include mode is off`
	`nav format is  1`
	`nav conductivity is 0.005`

Example 6	`nav 1 9960 off`

Response 6	`clear gri 9960 in solution 1`
	`nav solutions:`
	`01 - 8970`

Notes	You can use up to 4 different navigation solutions with up to 8 chains per solution.

NAV ASF *for use with SatMate/CsSync 1030 or newer models only*

Function	Perform ASF data operations
Command Syntax	nav asf, nav asf sta f, nav asf on/off, nav asf clear

Parameter	Description
none	Displays any ASF data that has been loaded into internal memory from the Flashcard.

Example 1	nav asf
System Response 1	ASF 8970M d -1.13us ASF 8970W d +2.91us ASF 8970X d +0.69us ASF 8970Y d +0.94us ASF 8970Z d +0.12us ASF 9960M d +0.18us ASF 9960X d +2.78us ASF 9960Y d +2.73us ASF 9960Z d -1.04us ASF 8290M d +0.41us ASF 8290W d +0.90us ASF 8290X d +0.33us ASF 7980M d -0.96us ASF 7980W d -1.75us ASF 7980X d -0.73us ASF 7980Y d +0.66us ASF 7980Z d -0.38us ASF 9610M d -1.73us ASF 9610V d -0.97us ASF 9610X d +0.34us ASF 9610Y d +0.69us ASF 9610Z d +0.20us
Example 2	nav asf 8970M –1.22 [To manually enter known ASF values into the SatMate receiver.]
System Response 2	nav asf off
Example 3	apply ASF data set to 0
System Response 3	nav asf clear
Example 4	ASF data cleared
System Response 4	
Notes	Use the above command and its operands to output a list of current ASF values for Loran stations, enter ASF values for Loran stations that apply to a current receiver location or local area, turn the receiver ASF function on or off, or clear all ASF values from the receiver.

NAV ASF CLEAR note! If you use the `nav asf clear` command, you will clear the ASF function and will need to reenter the local area conductivity setting for the Loran reception area. The ASF function automatically resets the navigation conductivity model to the baseline seawater setting of "5.0". See the NAV CONDUCTIVITY command in the SatMate Command Guide for further information. The SatMate manual is available at http://www.locusinc.com/satmatemanuals.html.

NAV ASF CLEAR *for use with SatMate/CsSync 1030 or newer models only*

Function	Clears any resident ASF data from the SatMate receiver's internal memory.	
Command Syntax	`nav asf clear`	
	Parameter	Description
	none	Clears any resident ASF data from internal memory.
Example 1	`nav asf clear`	
System Response 1	ASF data cleared	

NAV AUTOASF

Function	Control position jumps resulting from ASF.	
Command Syntax	nav autoasf *f*	
	Parameter	Description
	none	Indicates the current `nav autoasf` status.
	f	Controls how position jumps will occur if a tracked station is lost. off = Position jumps will occur immediately. on = Position jumps will not occur immediately.
Example 1	`nav autoasf`	
System Response 1	`01 - ASF modes off`	
Example 2	`nav autoasf on`	
System Response 2	`01 - auto ASF on`	
Notes	When this setting is on and a station ceases to be tracked, the solution is biased as if the station were still there, for a period	

of time. Therefore, the position does not immediately jump when a station is lost.

When this setting is off, the position is derived according to the stations that are selected, and will jump if the selection changes. The jumping effect is due to ASF.

NAV CONDUCTIVITY

<table>
<tr><td>Function</td><td colspan="2">Set an approximation of the earth's conductivity over which the Loran signal has passed. This value is used in the mathematical model that converts TDs to latitude and longitude.</td></tr>
<tr><td>Command Syntax</td><td colspan="2">nav conductivity f

<table><tr><td>Parameter</td><td>Description</td></tr><tr><td>none</td><td>Indicates the current <code>nav conductivity</code> status.</td></tr><tr><td>f</td><td>A decimal value selected from an internal table. The valid values are shown below in the Notes section.</td></tr></table></td></tr>
<tr><td>Example 1</td><td colspan="2"><code>nav conductivity</code></td></tr>
<tr><td>System Response 1</td><td colspan="2"><code>nav conductivity is 5</code></td></tr>
<tr><td>Example 2</td><td colspan="2"><code>nav conductivity 0.03</code></td></tr>
<tr><td>System Response 2</td><td colspan="2"><code>nav conductivity set to 0.03</code></td></tr>
<tr><td>Notes</td><td colspan="2">Values are 0.0001, 0.001, 0.005, 0.03, and 5. Use 5 when the paths to the stations are primarily over water, or a smaller value if the paths are primarily over land.</td></tr>
</table>

NAV FORCE APPLY

Function	Cause the receiver to (not) apply any currently existing ASF values to the navigation solution.
Command Syntax	`nav force apply` *on/off* Parameter | Description
Example 1	`nav force apply on`
System Response 1	`nav force apply set to 1`
Notes	When this command is given, it has the effect of setting the SatMate navigation solution equal to the datum (in the case of *nav force datum*), or the GPS solution (in the case of *nav force stream*).

NAV FORCE STREAM

Function	Use a NMEA $GPGGA message stream to generate ASF values
Command Syntax	`nav force stream` Parameter | Description |
Example 1	`nav force stream`
System Response 1	`nav stream enabled`
Notes	If a GPS receiver is available to the user and it generates NMEA 0183 serial output messages of the type $GPGGA, then that GPS receiver can provide those RS-232 serial messages to the SatMate 1030's auxiliary "Serial Port B" and the SatMate 1030 will calculate up to date corrected Loran positions. Note 1: Type the command first, then plug GPS serial cable into "Serial Port B" on the SatMate receiver. Note 2: The calculated ASF values for the last GPS $GPGGA location will be retained and reused until the location is updated by the reception of another NMEA 0183 Message by the SatMate 1030.

NAV FORCE DATUM

Function	Enter datum for generating ASF values.
Command Syntax	`nav force datum` *`latd latm`* `N/S` *`lond lonm`* `E/W`

Parameter	Description
latd, latm, lond, lonm, N, S, E, W	Latitude, longitude, and direction

Example 1	`nav force datum 43 0.191N 89 25.5581W`
System Response 1	`datum 43 0.1910 N 89 25.5581 W`
Notes	The above command causes the receiver to calculate quasi-ASF correction values at a current Loran receiver system location. The SatMate receiver assumes the user-entered latitude and longitude values are for those of the SatMate receiver's antenna. **Note:** Use only in `'mode monitor'`. ASF values will only be generated for those stations that are included in the navigation solution.

OVEN (If hardware option is installed)

Function	Report oven temperature setting.
Command Syntax	oven
Example 1	`oven`
System Response 1	`oven trim 35166, auto (+81.38C)`

PLL

Function	References the receiver clock to a specific transmitter clock.
Command Syntax	pll *f1 f2*

Parameter	Description
none	Returns current PLL status.
f1	Loran-C station as identified by GRI number and alpha designator or station tag number. 0 or OFF = cancel a phase lock.
f2	Filter modes. Enter 1, 2, or 3 to specify the filtering mode. (3 is the default.) The three modes are described in the Notes section below.

Example 1	`pll 8970M`

System Response 1	`pll request on 7`
	`07 (8970M): pll set, mode 3`
	`pll deviation +002nS`
	`end pll`

Example 2	`pll 0` or `pll off`
System Response 2	`pll is off`
Example 3	`Pll`

System Response 3	`07 (8970M): pll set, mode 3`
	`pll deviation +028nS`
	`end pll`

Notes	Locus recommends that the closest Master station be the specified station. The following filtering modes are designed to lessen the frequency fluctuation noise that is intrinsic to phase locking. Choosing a filtering mode requires some consideration because trade-offs are associated with each mode. • Mode #1: Correction of phase shifts can be considered as continuous (critically damped). This mode keeps the receiver's clock closest to the phase of the reference station. The overshoot of the correction approaches 0%. The trade-off for the close tracking and "continuous" correction is the relatively high level of frequency fluctuation noise associated with the phase "catch up" adjustment. This mode may be preferred in some applications where the SNR is very good to begin with. • Mode #2: The Loran receiver's clock is generally based on an oscillating quartz crystal. The frequency of an oscillating crystal fluctuates during the first few hours of operation after a long idle period and with ambient temperature changes. Mode 2 provides compensation for a receiver's clock that

slowly drifts by a large amount. This mode is designed to be used when the receiver's ambient thermal environment varies (such as from day to night), or during the first few hours after receiver power-up. This drift compensation is a source of frequency fluctuation noise, though not as much as with mode #1.

- Mode #3: This mode provides slower feedback compensation to the internal clock's drift and is the result of an extra filter stage. This mode is classified as "low noise" because the phase drift compensation is slower (less frequency shift noise) than with the other modes. The trade-off is that the slower feedback control results in approximately a 30% phase correction overshoot. This filter mode is the receiver's default.

PROCESS TOA

Function	Controls format of station process update TD/TOA data.
Command Syntax	process toa *f* Parameter: *none* — Indicates the current status. Parameter: *f* — 0 or OFF = TD reported. 1 or ON = TOA reported.
Example 1	`process toa on`
System Response 1	`process TOA is 1`
Example 2	`process toa off`
System Response 2	`Process TOA is 0`
Notes	The Time Difference (TD) is the difference between time of arrival for a secondary and time of arrival for a master. Master time delay is shown as 0. The Time of arrival (TOA) is referenced to the receiver's internal clock and contains an arbitrary constant that is the same for all stations in the same GRI. Powering down and up the receiver will produce a different arbitrary constant, as will issuing the "RESET" command.

RESET

Function	Resets the receiver software without power cycle.
Command Syntax	reset
Example 1	`reset`

System Response 1	`user reset requested, resetting`
	`Locus DSP Loran  May 29 2001 10:36:44`
	`ASIC Version 00071`

Notes	All averaging of the station signal data is cleared. All tracking starts again as directed by the Search List. If a reset has occurred that is not a result of this command, such as a power outage or a hardware failure, the following message is sent: `"Caution: startup without full hardware reset"` The output strings will vary in length. The ASIC version, board number, and revision number are subject to change. Additional information may be added to the response to distinguish between models or for other purposes.

RETURN

Function	Output ASCII carriage returns in addition to line feeds when you press the Enter key.
Command Syntax	return *f* **Parameter** / **Description** *none* — Indicates the current `return` status. *f* — Controls how the Enter key responds. off = No carriage return is issued when you press Enter; newline only. on = Carriage return and newline are issued when you press Enter.
Example 1	`return`
System Response 1	`carriage return setting is on`
Example 2	`return off`
System Response 2	`carriage return setting is off`
Notes	Typically, this setting should be “on” for applications running under Microsoft DOS and Windows, and “off” for Unix. When `return` is on, lines coming from the receiver have newlines preceded by carriage returns (CRLF). Otherwise, they have newlines only (LF).

SEARCH

<table>
<tr><td>Function</td><td colspan="2">Adds or deletes a chain to the automatic search.</td></tr>
<tr><td>Command Syntax</td><td colspan="2">search f1 f2
<table><tr><td>Parameter</td><td>Description</td></tr><tr><td>none</td><td>Indicates the chains currently in the search list.</td></tr><tr><td>f1</td><td>add or drop – Add or drop a chain to the search list</td></tr><tr><td>f2</td><td>A search list chain</td></tr></table></td></tr>
<tr><td>Example 1</td><td colspan="2"><code>search add 8970</code></td></tr>
<tr><td>System Response 1</td><td colspan="2"><code>8970 added to search list</code></td></tr>
<tr><td>Notes</td><td colspan="2">If chain 8970 was already part of the Search List, the system response would be:
<code>8970 is a duplicate gri</code></td></tr>
<tr><td>Example 2</td><td colspan="2"><code>search drop 8970</code></td></tr>
<tr><td>System Response 2</td><td colspan="2"><code>8970 dropped from search list</code></td></tr>
<tr><td>Example 3</td><td colspan="2"><code>search drop all</code></td></tr>
<tr><td>System Response 3</td><td colspan="2"><code>search list cleared</code></td></tr>
<tr><td>Notes</td><td colspan="2">The removal of a chain from the Search List may be delayed by up to 30 seconds if the system is busy or a search is in progress when the command is issued. If the receiver is already tracking stations associated with the chains dropped from the Search List, it will continue to track those stations, and data from those stations will continue to be displayed in the automatic updates.

To stop the tracking and display of previously tracked stations, use the STOP NONSEARCH command.</td></tr>
</table>

SLIP

Function	Slip a selected station process one cycle. A '+' advances further into the pulse. A '-' retreats from the pulse.
Command Syntax	slip+ *f*, slip- *f* Parameter: *f* — Description: Loran-C station as identified by GRI number and alpha designator or station tag (process) number.
Example 1	`slip+ 8970M`
System Response 1	`slip 8970M: + pending, auto` `02: 8970M 741150045: slip (+1m)`
Notes	Operation may be tricky on weak stations or where large skywaves are present, and a TD transient may occur. Allow sufficient settling time. The slip request is held until the next data processing interval on the affected station; a diagnostic message is displayed at that time.

SLIPF, SLIPR

Function	Freeze or release the automatic slip function on a particular station process.
Command Syntax	slipf *f*, slipr *f* Parameter: *f* — Description: Loran-C station as identified by GRI number and alpha designator or station tag number.
Example 1	`Slipr 8970M`
System Response 1	`Slip 8970m: auto`
Example 2	`Slipf 15`
System Response 2	`Slip 15: frozen`
Notes	Expect strange readout values if you freeze on a cycle other than the correct one for tracking. The E and S flags do not work while the automatic slip function is frozen. If some other flag is not set, an 'f' flag will be displayed in the station process update line to indicate that the station's `slip` setting is frozen.

SOFT FAULT

Function	If this command is on, the LED blinks when coherence is less than about 100.
Command Syntax	Soft fault *f* Parameter: *f* Description: ON = Turns soft fault on OFF = Turns soft fault off
Example 1	`soft fault on`
System Response 1	`soft fault LED mode on`
Example 2	`soft fault off`
System Response 2	`soft fault LED mode off`

STATUS

Function	Displays current system settings.
Command Syntax	status *or* status v (recommended)
Example 1	`status`

System Response 1	`Locus DSP Loran  May 29 2001 10:36:44`
	`ASIC version 00071`
	`Board #25`
	`autoloop mode is 0`
	`global batch minimum is 1.0 seconds`
	`global batch maximum is 60 seconds`
	`global batch sync is 1.5 seconds`
	`baud A setting is 115200 8 n 2`
	`baud B setting is 115200 8 n 2`
	`clock dac 37328 (+83.88C)`
	`clock order 2`
	`clock averaging time 10`
	`operating mode is monitor`
	`nav solutions:`
	`01 - 8970 9960MZ`
	`01 - ASF modes off`
	`01 - skywave -include mode off`
	`nav format is 0`
	`nav conductivity is 5 (sea water)`
	`oven trim 48871, auto  (+83.88C)`
	`auto search on, sequence:`
	`Chain  Rank`
	`9960     97`
	`8290     82`
	`8970     101`
	`7980     66`
	`9610     68`
	`end list`
	`search mode is 2`
	`update interval is 60.0 seconds`
	`end status`

Notes	The above response is only an example and the number of lines and line lengths will vary depending on the Loran user's applications. It is recommended when setting up and testing a Loran receiver, or when diagnosing a problem, that a *status* command be submitted to the receiver near the beginning of each stored file of data that is being collected, since this will archive a copy of the parameters that were used during the data collection process. The information that is output by using the *status* command will be embedded within the data log. This is very useful when performing a post analysis on the data and especially so for data that were collected at an offsite location. Also, issuing a *format notch 1* command will cause a list of noise interferers to be recorded into a diagnostic file as well. This can be helpful during a post analysis of data as well.

Also, issuing a *format antenna 2* command as data are being collected will cause the detailed status of the antenna to be included with the diagnostic data file.

The *status* v command is a more verbose version of status reporting and will provide the user with additional information.

STOP

<table>
<tr><td>Function</td><td colspan="2">Stops the tracking of some or all stations.</td></tr>
<tr><td>Command Syntax</td><td colspan="2">stop f</td></tr>
<tr><td></td><td>Parameter</td><td>Description</td></tr>
<tr><td></td><td>f</td><td>A valid station GRI and alpha designator, a station process number, or a chain.
all = Stops tracking on all stations.
nonsearch = Stops tracking of all stations that are not currently in the Search List.</td></tr>
<tr><td>Example 1</td><td colspan="2"><code>stop all</code></td></tr>
<tr><td>System Response 1</td><td colspan="2">There is no response to the command.</td></tr>
<tr><td>Example 2</td><td colspan="2"><code>stop 8970M</code></td></tr>
<tr><td>System Response 2</td><td colspan="2"><code>stop request now set on 2</code></td></tr>
<tr><td>Notes</td><td colspan="2">The <code>stop all</code> command can be used to reset the tracking of stations in the Search List. Note that the search function will reinitiate the tracking for chains that remain in the Search List.
The <code>stop nonsearch</code> command removes from tracking only those stations that were selected for removal by the <code>search drop</code> command.</td></tr>
</table>

STP

Function	Synchronous timing pulse. Causes the rear panel output timing pulse to be synchronous to GRI times of a Loran station. The pulse may be set on the “A” phase of the PCI or to output at the station’s GRI rate.
Command Syntax	stp gri|pci *f*

Parameter	Description
none	Indicates the current stp status.
gri|pci	Selects the pulse to output at the GRI rate or the PCI rate.
f	A Loran station.

Example 1	`stp`
System Response 1	`stp output 1PPS unphased`
Example 2	`stp pci 8970m`
System Response 2	`stp output 02`

STP DELAY

Function	This adjusts the STP Pulse output relative to a default value by a user entered “n” number of nanoseconds. The adjustment range is +/- 100 microseconds. This is a fixed offset for the STP mode of output only. (TAI DELAY is used to set a delay when the pulse is in the 1PPS mode instead of gri|pci mode.) The command can be used to compensate for cable delays, ASFs, or phase shifts due to poor antenna location.
Command Syntax	stp gri|pci delay *f* Parameter: *f* — Description: -100,000 to 100,000 nanoseconds
Example 1	`stp gri delay -5690`
System Response 1	`stp pci|gri delay set to -5690`
Notes	The operation of this command is not the same as the TAI DELAY command, which is for the 1PPS mode. This command is stored and then recalled when the STP operation is active.

STP OFF

Function	Stop the synchronous timing pulse output mode and revert to the receiver’s default 1PPS output mode. The phase of the 1PPS pulse relative to the receiver system clock will be as it was before the GRI/PCI synchronous timing pulse mode was invoked (using STP). Also see the TAI commands for reference.
Command Syntax	stp gri|pci off *none* — Indicates the current stp status. *gri|pci* — Selects STP mode.
Example 1	`stp pci off`
System Response 1	`stp output 1PPS unphased`
Example 2	`stp pci off`
System Response 2	`stp output 1PPS TAI`

SUBTRACTION

Function	Turn crossrate-compensatory pulse subtraction on or off.
Command Syntax	sub *f* Parameter: *f* — Description: On or off.
Example 1	`subtraction on`
System Response 1	`subtraction mode set to 1`
Example 2	`subtraction off`
System Response 2	`subtraction mode set to 0`
Notes	This setting should normally be “on” since it will improve the signal-to-noise ratio (S/N) of the Loran signals.

TAI

Function	Display the current TAI solution.
	Warning flags may appear in two columns, as noted. The "^" up arrows indicate a column position:
	
	`tai:  06-Jul-2001 21:45:25`
	`(^  Column position is to the left)`
	
	`?: Solution date unreasonable.`
	`E: Solution epoch too short, may be ambiguous.`
	`T: "time" has been set, and solution differs from it excessively.`
	`*: The solution is not unique, but depends in part on the "time" setting.`
	
	`(  ^  Column position is to the right)`
	`P: The position is not set up (the "tai pos"), and navigation solution 1 has been used. The timing result will contain extra jitter due to the normal statistical and other variations of the position solution.`

Command Syntax	`tai`
Example 1	`tai`
System Response 1	`TAI: TP 06-Jul-2001 21:45:25`
Notes	CAUTION: If the solution year has more than four digits or does not make sense, the solution is probably not valid.

TAI ADD

Function	Add one or more group repetition intervals (GRIs) to the list of GRIs used to determine TAI. If the list is empty, all tracked GRIs that are marked as valid in the internal database will be used.
Command Syntax	tai add *f1 f2 f3 ... fn* Parameter: *f1 f2 f3...fn* — Description: A Loran-C GRI number.
Example 1	`tai add 8970 9960`

System Response 1	`8970 added to tai list`
	`9960 added to tai list`
	`TAI chains`
	`8970`
	`9960`
	`end list`

Notes	*n* is limited to a maximum of 10.

TAI DELAY

Function	This is a fixed offset for the 1PPS output. It can serve as an allowance for cable delay, ASF, or phase shift due to poor antenna location.
Command Syntax	tai delay *f* Parameter: *f* — Description: -100,000 to 100,000 nanoseconds
Example 1	`tai delay -5690`
System Response 1	`TAI delay set to -5690`

TAI DROP

Function	Clear GRIs from the TAI list, meaning that any available valid GRI will be used.
Command Syntax	tai delay *f1 f2 f3 ... fn* Parameter: *f1 f2 f3...fn* Description: A Loran-C GRI number. ALL = All stations.
Example 1	`tai drop 8970 8290`

System Response 1	`8970 dropped from tai list`
	`TAI chains`
	`7980`
	`9960`
	`9610`
	`end list`

Example 2	`tai drop all`

System Response 1	`tai list cleared`
	`TAI chains`
	`none`
	`end list`

TAI EPOCH

Function	TAI is computed in terms of a periodic duration. The duration is a function of the number of GRIs involved in the computation. If you need to know this duration to estimate the reliability of the TAI computation, use the TAI EPOCH command.
Command Syntax	tai epoch *f1 f2 f3 ... fn* Parameter: *f1 f2 f3...fn* Description: A Loran-C GRI number.
Example 1	`tai epoch 8970 8290 9610 7980`
System Response 1	`0.60235 years`
Notes	Keep in mind that the TAI algorithm can be very brittle; in other words, when it errs, the error can be quite large.

TAI POS

<table>
<tr><td>Function</td><td>Set reference latitude and longitude for TAI analysis to the current values for navigation solution, or set latitude and longitude directly.</td></tr>
<tr><td>Command Syntax</td><td>tai pos f OR tai pos f1 f2 f3 f4 f5 f6
<table>
<tr><th>Parameter</th><th>Description</th></tr>
<tr><td>f</td><td>A navigation solution number.</td></tr>
<tr><td>f1</td><td>Integer number of degrees latitude, dd</td></tr>
<tr><td>f2</td><td>Decimal number of minutes lat., mm.mm</td></tr>
<tr><td>f3</td><td>N or S</td></tr>
<tr><td>f4</td><td>Integer number of degrees longitude, ddd</td></tr>
<tr><td>f5</td><td>Decimal number of minutes long., mm.mm</td></tr>
<tr><td>f6</td><td>E or W</td></tr>
</table></td></tr>
<tr><td>Command Syntax</td><td>If you use the <code>tai pos f1</code> command, then:
f1 = navigation solution number.

If you use the <code>tai pos f1 f2 f3 f4 f5 f6</code> command, then:
f1 = integer number of degrees latitude, dd
f2 = decimal number of minutes latitude, mm.mm
f3 = N or S
f4 = integer number of degrees longitude, ddd
f5 = decimal number of minutes longitude, mm.mm
f6 = E or W</td></tr>
<tr><td>Example 1</td><td><code>tai pos 1</code></td></tr>
<tr><td>System Response 1</td><td><code>TAI reference location set to 43 01.40 N 089 24.39 W</code></td></tr>
<tr><td>Example 2</td><td><code>tai pos 43 01.40 N 089 24.39 W</code></td></tr>
<tr><td>System Response 2</td><td><code>TAI reference location set to 43 01.40 N 089 24.39 W</code></td></tr>
<tr><td>Example 3</td><td><code>tai pos 1</code></td></tr>
<tr><td>System Response 3</td><td><code>Error: not set, position unavailable</code></td></tr>
<tr><td>Notes</td><td>This setting is stored. Due to rounding errors that may be up to one meter, the value that is displayed as having been set may vary slightly from the value entered. The displayed value will be closer to the value that is actually used.</td></tr>
</table>

TAI RESTORE

Function	Restore the TIME setting as it was before the most recent TAI SET command. If the time or date had not been set, it reverts to the unset state.
Command Syntax	tai restore
Example 1	`tai restore`
System Response 1	`time base restored`
Example 2	`tai restore`
System Response 2	`nothing to restore`

TAI SET

Function	Use this command to display the current time according to the TAI solution and automatically set the time in the TIME command accordingly.
Command Syntax	tai set
Example 1	`tai set`
System Response 1	`time set to TAI` `TAI:    11-Jun-2001 20:48:10`
Example 2	`tai set`
System Response 2	`Error: time not set: insufficient epoch` `TAI:    01 Jan 1958 02:00:05`
Notes	Length and content of the error explanation may vary.

TDAVG

Note: This command is for advanced users only.

Function	Set global TD averaging to a specified number of seconds, or if *f1* is used, then set TD averaging time to be different than the global for a specific Loran station's process.
Command Syntax	tdavg *f1 f2*

Parameter	Description
f1	is a station process ID tag, or a GRI and Alpha Designator. (optional)
f2	is the number of whole seconds.

Example 1	`tdavg`
System Response 1	`global TD averaging is 60 seconds` `td averaging filter mode is 0`
Example 2	`Tdavg 8970W 30`

System Response 2	`Global TD averaging is 60 seconds`
	`05 (8970W): 30 seconds`
	`td averaging filter mode is 0`

Notes	Use 0 to get the minimum global averaging time. The initial default setting is 60 seconds. The setting is stored. The effective minimum is 1 second and is the smallest processing interval. You should not set this time constant much smaller than the UPDATE rate, because you will lose information. In mobile applications where positions are being taken or plotted, all TDs involved in the navigation process should have the same time constant. The use of *f2* sets the TD averaging time for a specific station, but it is uncommon to set TD averaging individually for a station.

TDAVG MODE

Note: This command is for advanced users only.

Function	Set the TD averaging filter mode.
Command Syntax	tdavg mode *f* where *f* is a filter. See the Notes section below for details on filters.
Example 1	`tdavg mode 0`
System Response 1	`global TD averaging is 60 seconds` `td averaging filter mode is 0`
Notes	A global or individual TD averaging time has been previously set for all stations. This command will modify the averaging process. For Loran monitoring applications, the use of "0" is suggested. This uses a simple first-order filter. For navigational applications, "3" is suggested. This is a second-order filter with some noise-dependent coefficient adaptation. Use "2" to remove the adaptation.

TIME

Function	Reports the time, as set by the TIME command itself, or by the TAI SET command. If a date has not been set, a date will not be shown. If you want to set the time, see the next command, TIME *hh:mm:ss*.
Command Syntax	time
Example 1	`time`
System Response 1	`time and date have not been sent`
Example 2	`time`
System Response 2	`06-Jul-2001 21:01:36`
Example 3	`time`
System Response 3	`12:00:00`
Notes	The time shown by this command is NOT necessarily the time that would be shown by the TAI command. Do not expect exact synchronization between the time string and the 1PPS output. It takes time for the string to be generated and to propagate out the serial port.

TIME *hh:mm:ss*

Function	Set the time (the software real-time clock), using the hh:mm:ss format.
Command Syntax	time *hh:mm:ss* where *hh* is the hour, *mm* are the minutes, and *ss* are the seconds. The range is from 00:00:00 to 23:59:59. To set the time and date simultaneously, use this format: time dd-mm-yyyy hh:mm:ss Other acceptable formats are: time dd-MMM-yyyy hh:mm:ss time dd/mm/yyyy hh:mm:ss time dd/MMM/yyyy hh:mm:ss
Example 1	`time 10:51:22`
System Response 1	`10:51:22`
Notes	If the time is to be used with the TAI commands, use TAI time, NOT local time. As of late 2004, TAI = UTC + 32 seconds. If the date is not set, there is no date. This time setting is somewhat imprecise, since the time is set approximately then the carriage return is received. The setting has an uncertainty of perhaps a few hundred milliseconds, depending on system loading.

UPDATE

Function	Sets the frequency of station related data updates.
Command Syntax	update *f*

Parameter	Description
none	Indicates the current update status.
f	The number of seconds. *OFF* - Turns updates off. *ON* - Turns updates on. Defaults to stored value.

Example 1	`update 15`
System Response 1	`update interval is 15.0 seconds` `stored update interval is 60.0 seconds`
Notes	If the current update interval is the same as the stored interval, the second line of the system response is not displayed. This setting is not stored in the monitoring receiver unless requested, see UPDATE STORE.

UPDATE STORE

Function	Set the update frequency to a specified number of seconds.
Command Syntax	update *f* store where *f* is the number of seconds.
Example 1	`Update 30 store`
System Response 1	`Update interval is 30.0 seconds`
Notes	This value is rounded off to a multiple of a time interval. Use the Update Store command to save a new update rate. The entered value becomes the receiver's new start up default value. See also UPDATE.

VERSION

Function	Displays the system's current revision.
Command Syntax	version
Example 1	`version`

System Response 1	`Locus DSP Loran  May 29 2001 10:36:44`
	`ASIC Version 00071`
	`Board #25`

Notes	The version number is also displayed after system reset and at power-up. The output strings will vary in length. The ASIC version, board number, and revision number are subject to change. Additional information may be added to the response to distinguish between models or for other purposes.

TIMING COMMANDS INDEX

Use the index below to quickly find a timing command.

NAVIGATION COMMANDS INDEX

Use the index below to quickly find a navigation command.

GENERAL INDEX