SIMREX Corporation

SIMSYNC

Instruction Manual

Traffic Controller Time Synchronization System
Firmware Release 1.7

SIMREX MAN.SIMSYNC, Rev 8.0
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SIMREX Corporation

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Traffic Control Synchronization System
SIMSYNC rev 8.0
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Introduction

The *SIMREX Corporation* SimSync is a device used for time synchronization of traffic control devices. It consists of the SimSync controller and a weatherproof/tamperproof GPS receiver. The SimSync controller receives GPS messages from the GPS receiver, reformats the information to your local time zone, automatically adjusting for Daylight Savings Time (DST) and leap years and then sends time information in UTC (or GMT) time to the Traffic Controller at an interval based on your custom settings.

There are six (6) connection points on the SimSync unit:

1. **POWER** (2-pin Phoenix) – positive (inside) and negative (outside) for 9-24VDC input. Optional wall mount or desk mount power adapter are available.
2. **RELAY** (3-pin Phoenix) – normally open, normally closed and common connection points.
3. **GPS** (6-pin RJ-12) – proprietary connection for SIMREX ***SIMGPS1-HD-RJ12-5V*** GPS antenna.
4. **CONTROLLER** (6-pin RJ-12) - connection to Traffic Controller for normal operation using proprietary controller cable (supplied).
5. **PROGRAM/MONITOR** (6-pin RJ-12) – multi function –
   a) programming of SimSync controller using proprietary DB9M to RJ-12 cable (See SimSync Commands below).
   b) monitoring of GPS message strings using proprietary DB9M to RJ-12 cable.
   .
6. **FLASH UPDATE** (6-pin RJ-12) – firmware upgrade using proprietary flash upgrade cable (optional).

A drilling template is provided for accurate installation of the GPS antenna enclosure to the top of the traffic control box or applicable enclosure. Apply RTV adhesive (provided) between antenna enclosure and traffic control box to prevent leakage. Mounting brackets for the SimSync are also available. After the mechanical installation is complete, make the following connections:

1. Plug the GPS receiver RJ-12 connector into the SimSync controller.
2. Make applicable relay connections, if needed
3. Install controller cable between SimSync RJ-12 and Traffic Controller (see connection list below)
4. Install power connection.

SimSync-to-Traffic Controller Interface

SimSync (RJ-12)	EAGLE PORT 2 (DB 25)		Standard (DB9)	Standard (DB25)
6	7 (GND)		5 (GND)	7 (GND)
4	3		2	3
5	2		3	2
	5 8 20	Tied Together		

LED Indicators

PWR LED	Indicates voltage at the output of the internal 5V regulator. This power is used for the GPS as well as the SimSync controller.
GPS LED	Indicates the presence of GPS data sent to the SimSync controller. A flash occurs every time there is a message. This should be once per second. A short flash of 100 ms indicates data that does not have a valid time and or date and is thus not used by the SimSync to synchronize its own Real Time Clock. A long flash of 500 ms (50% duty cycle on the LED as it is flashing once per sec) indicates that valid time and date are sent from GPS to SimSync.
SYNC LED	Indicates that data is sent from SimSync to Traffic Controller. If the unit has been just powered up, no message is sent to the Traffic Controller until valid data (time/date) is sent from the GPS to the SimSync Controller so that the SimSync real time clock may be initialized. Once the SimSync real time clock has been initialized, the SimSync will continue to send date and time to the Controller even if it loses contact with the GPS or if the GPS produces invalid data (signal blockage). During periods of lost GPS signal or invalid data, the SimSync will coast on its own internal clock and update the controller.

The relay on SimSync units can be heard to click when a message is sent to the Traffic Controller.

Update Rate

For testing purposes, any update rate may be used so that correction of a controller may be quickly seen. Five (5) to thirty (30) seconds is common for this. In a permanent installation, it is recommended that an update of only once per day is used. A common practice is to use 4:00 AM.

Startup

The SimSync controller will produce and send valid time/date messages to the Traffic Controller in less than 5 minutes if it is powered up in an area that has a good view of the sky AND if it has been powered up with valid GPS data in the last 1 to 2 weeks. If the SimSync controller has been powered down for more than 1 to 2 weeks, it can take as long as 12.5 minutes to produce valid GPS time and date. The 12.5 minute delay is not a limitation of the SimSync, but rather the GPS ALMANAC message structure that is broadcast by GPS satellites every 12.5 minutes.

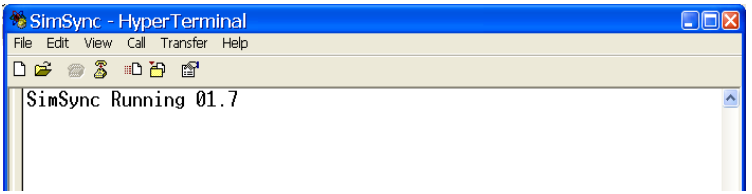
Configuration

Any terminal program can be used to configure the SimSync controller. Windows HyperTerminal, for example, is a common choice.

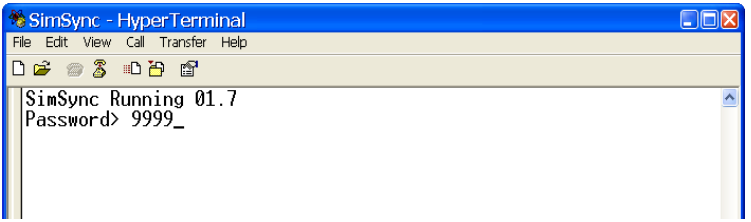
The configuration port settings on the SimSync default to 9,600 baud, 8 data bits, no parity, 1 stop bit, or more commonly seen as 9600,8,N,1. After setting up the terminal program, apply power to the SimSync. The LED on the front panel labeled PWR indicates that DC power is successfully making it to the controller. There is an LED marked GPS that flashes every time a GPS string is received from the GPS receiver, so you should see this flashing at a 1 second interval. The LED called out as SYNC turn's on when a time update is being sent to the Traffic Controller.

Version 1.7 of the SimSync firmware replaces the bare terminal screen configuration with a menu.

With a terminal program running and the CONFIG port connected, power up the unit. If the terminal program is set up correctly, you will see the screen below.

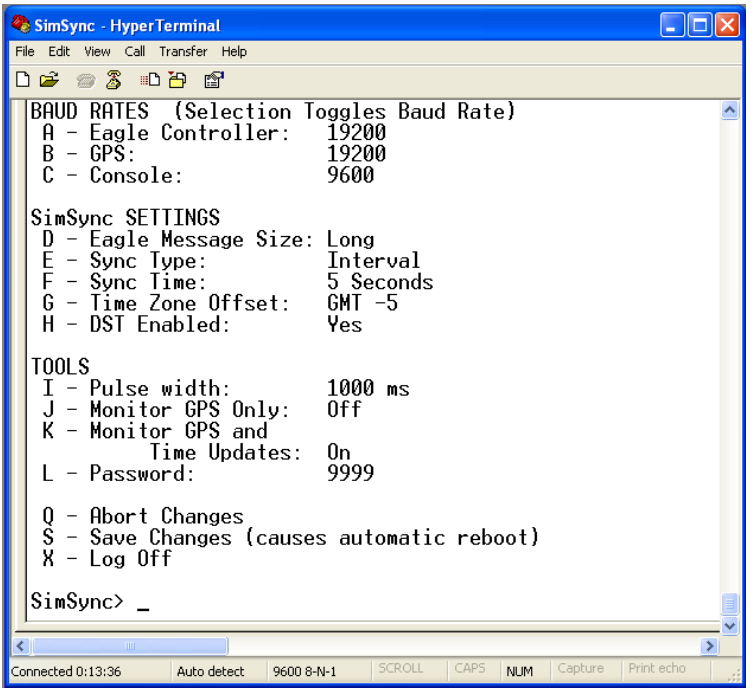


The configuration is now password protected. Press 'Enter' to stop data from being displayed on the screen and the "Password>" prompt will appear. If an incorrect password or no password is entered and "Enter" is hit, the screen will revert back to the data display mode.



The default password is 9999, press 'Enter'. It is recommended that the password is changed from the default to a custom password of your choice. When setting a new password, it must be between 5 and 20, and only alpha-numeric characters are accepted, 0 through 9 and a through z. Additionally, the password is case sensitive.

After successfully entering the password, the main menu screen is shown on the terminal screen.



BAUD RATES

Valid baud rates are 1200, 2400, 4800, 19200, 38400, and 57600. Use A, B &C for setting the baud rate for each serial port. The terminal screen above shows the default baud rate settings. To modify them, simply enter the corresponding letter choice, the press ‘enter’. Each time A, B, or C is entered, that baud rate will increase to the next speed until it rolls over back to 1200 from 57600.

SimSync SETTINGS

The next section deals with configuration of the time update message.

```
SimSync SETTINGS
 D - Eagle Message Size: Long
 E - Sync Type:          Interval
 F - Sync Time:          5 Seconds
 G - Time Zone Offset:   GMT -5
 H - DST Enabled:        Yes
```

D – Eagle Message Size

The Eagle controller accepts two different message formats for the time/date update. Enter 'D', then press 'return' to toggle the message format sent.

E & F – Sync Type and Sync Time

The SimSync supports two different update types, either one update per day, or an interval update which will send the time/date updates every 'F' seconds. 'Sync Type' is another toggle setting. Enter 'E' and press 'Enter' to switch back and forth between them.

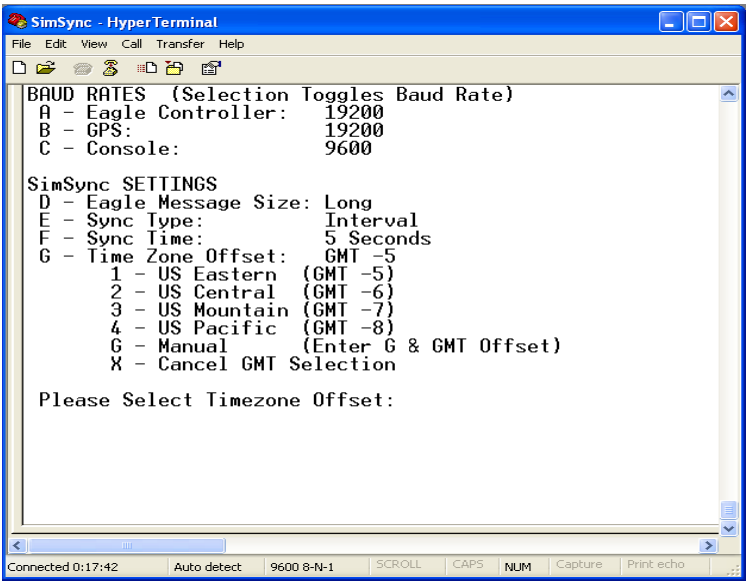
The Sync Time is a value, in seconds. To update the time/date once an hour, set the Sync Type to Interval and Sync Time to 3600 (3600 seconds in one hour). If the Sync Type is set to 'Once a Day', the Sync Time refers to the number of seconds past midnight to do the time/date sync. For example, to update at 4AM each morning, set the Sync Type to 'Once a Day' and set the Sync Time to 14400 (the number of seconds between 12 midnight and 4 AM).

G – Time Zone

The time zone is displayed as an offset from GMT. In the US, the Eastern Time Zone is GMT -5 hours.

The Time Zone setting is now done through a sub-menu. At the prompt, enter ‘g’ and press return.

You should now see the menu below.



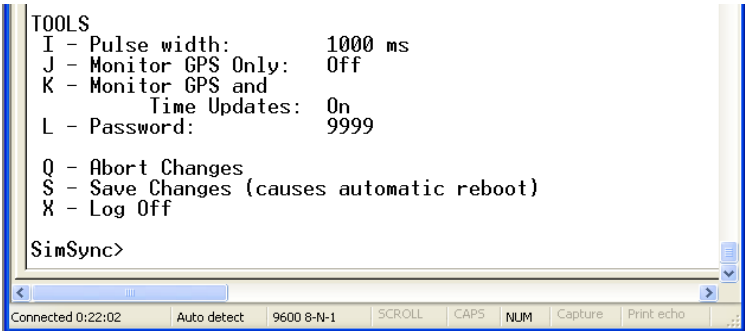
Select one of the pre-defined Time Zones by entering its corresponding choice and pressing ‘Enter’. You could also select ‘G’ in the sub menu, directly followed by the desired offset. For example, enter ‘g-8’ then pressing ‘Enter’ will manually set the time zone to US Pacific time.

Enter ‘x’ then press ‘Enter’ to exit the sub-menu.

H – DST Enabled

DST stands for Daylight Saving Time. If you are in an area that observes DST, this should be set to 'Yes'. Once again, toggle between 'Yes' and 'No' by typing 'h' and pressing 'Enter'.

TOOLS



I – Pulse Width

The Pulse Width setting indicates how long the internal relay contacts should be energized when an update is sent to the Eagle Traffic Controller.

The SimSync unit features a set of relay contacts that trigger at each update. On the rear of the unit, there is a 3 pin terminal block for this that connects directly to the contacts of an internal relay. From left to right, the connections are labeled N.O., COM., and N.C., which stand for 'normally open', 'normally closed', and 'common'. At the time the update is triggered, the relay fires also and the N.O. and COM. contacts are connected, and the N.C. to COM. Connection is opened.

If the Pulse Width is set to 500 ms, when an update occurs, the relay will be energized for 500 ms.

J & K – Verbose Output and Monitor Output

These are toggled settings also, turned off and on by entering its respective choice at the prompt.

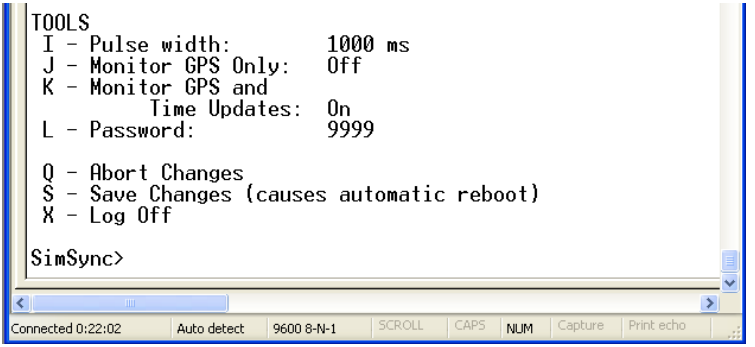
These refer to output sent out the configuration serial port while in operational mode. The messages sent include the raw GPS string received form the GPS receiver and the date/time update message sent to the Eagle controller.

Both outputs can be in an OFF state, but only one of them can be on at any given time.

If both are OFF, no messages are sent out the configuration serial port during operational mode. (This is equivalent to sending the 'quiet' command in the earlier versions of firmware.)

When 'Verbose Output' is turned on, each GPS string received from the GPS receiver will be sent to the configuration port as well as the date/time update message sent to the Eagle controller.

If 'Monitor Output' is turned on, only the time/date update message will be shown on that port.



L - Password

To change the password to access the unit, enter 'l', followed immediately by the new password. An acceptable password must be between 5 and 20 characters, and only accepts alpha-numeric characters. ('0-9' and 'a-z' and 'A-Z')

Passwords ARE case sensitize.

Example, lqwerty will change the password to 'qwerty'.

Q – Abort Changes

Entering this command will cause all settings changes that haven't been saved back to the value they were at the time the configuration menu was entered. This does not exit the menu.

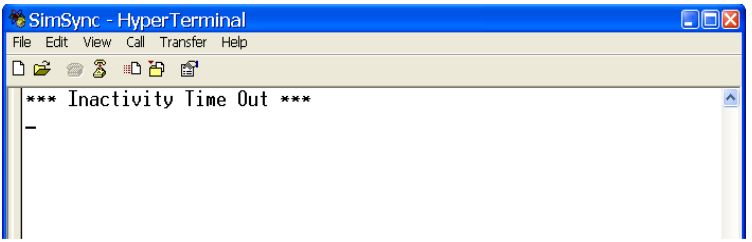
S – Save Changes

This will save all of the new configuration data and re-boot the unit.

X – Logoff

This command simply closes the configuration menu and returns the unit into operational mode. Any settings changes made that were not saved will be lost.

Finally, after 5 minutes without a keystroke, the unit will log itself out and display the screen below.



When this 'Inactivity Time Out' occurs, ANY changes made that were NOT saved are lost.

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