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## *Installation and Operation Manual*



### **Time Sync Plus**

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## INTRODUCTION

Thank you for your purchase of the tiny TOOLS™ Time Sync Plus, which we will refer to through out the manual as the Time Sync Plus. We're confident this product will give you many years of dependable service. This manual is intended to give you all the information needed to install and operate the product.

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### NOTE:

This manual should be read thoroughly before installation and operation.

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## INTRODUCTION

## Product Description

The tiny TOOLS Time Sync Plus provides four separate GPS time referenced outputs. The first is a SPST relay, which pulses at 12:00, 22:00, 42:00, 54:30 each hour and is user programmable in each of four locations for any minute and second each hour. The second output is an active high driver with a 100 ms pulse each second, while the third output is a 4800-baud, RS-232 serial port providing a time zone adjustable hours, minute and seconds time code. The fourth output provides an active high driver in the ESE TC89 or TC90 serial time code format. Indicator LED's are provided to display power/valid GPS data, programming mode and time sync relay operation. The Time Sync Plus is powered by a surge protected internal power supply. The Time Sync Plus may be rack mounted on the optional RA-1 mounting shelf. Each Time Sync Plus is supplied in a small profile plastic enclosure, while the Garmin 12 Channel GPS receiver with embedded antenna is housed in a water-resistant case and designed to withstand the riggers of outdoor conditions. The GPS receiver is supplied with an approximate 10-foot cable, longer CAT-5 cable lengths of up to 100 feet may be used.

## Installation

Please examine your Time Sync Plus carefully for any damage that may have been sustained during shipping. If any is noted, please notify the shipper immediately and retain the packaging for inspection by the shipper. The package contains the Time Sync Plus, 9 VDC @ 1 amp wall power transformer, straight-through serial cable and this manual.

Installation of the Time Sync Plus in **high RF environments** should be performed with care. Shielded cable is suggested for all I/O connections. All shields and the station ground should be connected to either of the screws on the DB-9 connector. It is recommended that all cables connected to the Time Sync Plus be looped through ferrite cores to suppress RF. Surge protection with RF filtering such as the Tripp-Lite "ISOBAR 4 or 6" is also suggested for the wall transformer.

Enclosure rack mounting: The Time Sync Plus plastic enclosure may be rack mounted using the optional RA-1, 1-RU rack shelf. Apply a short strip of user-supplied Velcro to the bottom of the Time Sync Plus and attach the other mating strip to the surface of the RA-1.

**GPS Receiver/Antenna mounting:** *The receiver must be mounted in an area that has a clear, unobstructed view of the sky.* If the attached 10-foot cable isn't an adequate length, you may attach an additional 100 feet of CAT 5 cable. The receiver is equipped with a **Metric M3 x 4mm treaded magnetic base**, use this to secure the receiver to a user provided mounting bracket. The receiver may also be secured with a small strip of Velcro. **Do not allow the receiver to sit in water.**

**Time Sync Relay connections:** One SPST relay with Normally Open dry contacts. Make your connections as noted on the top cover label. T.S. N.O. & T.S. COM. The yellow led will illuminate when the relay is activated.

**1 PPS logic output:** The 1 PPS output provides an active high 100ms pulse. This output may be used to drive clock systems.

**STC (Serial Time Code) active high logic output:** Format compatible with the ESE TC89 or TC90 time code.

**GND:** Use this terminal for all the logic grounds.

### GPS Receiver RJ-45 pin-out:

- Pin 1 = Unreg +12 vdc to power the older model Garmin GPS-16 receiver.
- Pin 2 = Ground
- Pin 3 = Ground
- Pin 4 = GPS Receiver, receive data.
- Pin 5 = GPS Receiver transmit data.
- Pin 6 = GPS Receiver 1 PPS output.
- Pin 7 = No connection
- Pin 8 = Regulated +5 Vdc used to power the Garmin GPS-18 receiver (100 ma max).

**Test:** After the receiver has been connected to the receiver, locate the power receptacle **“Power 9VAC”** and insert the power plug of the supplied 9VDC wall transformer (*We are now supplying a DC power supply for this unit*). The power led should be lit. Allow at least 10 minutes for the receiver to acquire the required satellites. When the Time Sync Plus is receiving valid GPS time data, the power LED will flash at a one pulse per second rate.

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## Setup

The Time Sync Plus has four contact closures available each hour. The unit comes from the factory with preprogrammed closures at 12:00, 22:00, 42:00, and 54:30, and any or the user if desired can change all of these defaults to other times. As few as one or as many as four closures each hour can be employed depending on the user requirements. To enter the program mode, follow the steps below:

Connect the supplied serial cable between the PC's COM port and the Time Syncs "RS-232 GPS & PGM PORT" female DB-9 connector.

Start HyperTerminal and configure for 4800 baud, 1 stop bit, no parity, flow control to none, emulation to ANSI and ASCII setup check to the box "echo typed characters locally".

If HyperTerminal has been configured correctly, you should see the time displayed each second.

Engage the PGM pushbutton on the Time Syncs case using a small non-metallic device.

Verify that the PGM led is illuminated.

The Time Sync menu should be present, along with the factory configured values.

Make your selection, 1,2,3, or 4 followed by the two-digit minute and two-digit second value. NOTE: NO colon is required (example, 5930).

Enter a 5 to program the time zone offset, followed by 12 or 24 for the output format. NOTE: The offset is a positive number 00 to 23. It is the value added to local time that equals the GMT hour. For example, enter 07 if you are in California and your local time is PDT. Enter 04 if your local time is EDT. If you are in Germany and your local time is one hour ahead of GMT, enter 23 (example for California using the 24 hour format: 0724). If you make a mistake, press the ESC key and start over.

To reload all factory defaults, enter a 6.

When finished, disengage the PGM push button. The time display should restart, while the red PGM led should extinguish. NOTE: If one minute elapses with no data entry, the Time Sync will time out and exit the program mode. You will need to disengage and then engage the PGM push button to reenter the PGM mode.

There are two data outputs: RS-232 with HH:MM:SS and the ESE TC89 or TC90 format. TC89 is the default time code (Dipswitch S2-1 = OFF). To change the time code to TC90, remove power and the cover. Locate Dipswitch S2-1 and turn switch 1 ON. Reinstall the cover and reapply power.

Your Time Sync Plus is ready.

## Specifications

Relay	1 - SPST, 30Vdc/1 amp. 300ms pulse.
Logic Outputs	1 PPS - Active high, 100ms Serial Time Code - ESE TC89 or TC-90 active high logic format.
Logic	Flash Microprocessor with non-volatile memory
RS-232	RS-232, 8N1. 4800 baud. Handshaking disabled.
Connectors	Logic outputs/Relay - Plug-in euroblock screw terminals. Serial - Female DB-9. GPS Receiver – RJ-45 Power - 2.1mm coax connector.
Power Requirement	9 VDC/AC, 1 Amp, wall transformer, supplied. Internal power supply surge protected.
Size	2.60" x 4.25" x 1.12", Plastic enclosure with aluminum end panels.
Weight	2.0 lb.
Options	RA-1, Rack Shelf. 1 RU. USB-RS-232 cable adapter 230 VAC CE transformer

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