



INSTALLATION AND OPERATION
MANUAL

for the

Broadcast Tools® TIME SYNC II

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**BROADCAST TOOLS® TIME SYNC II
TIME SYNCHRONIZER WITH GPS**


TABLE OF CONTENTS

Introduction	3
Safety Information	3
Who to Contact for Help	3
Product Description	4
Installation	4
Specifications	7
Warranty	8
Schematic and Component Layout	Appendix

BROADCAST TOOLS® TIME SYNC II TIME SYNCHRONIZER WITH GPS


INTRODUCTION

Thank you for your purchase of a Broadcast Tools® Time Sync II (referred to as the Time Sync II in this manual). 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 unit.

 **NOTE:** *This manual should be read thoroughly before installation and operation.*

SAFETY INFORMATION

Only qualified personnel should install Broadcast Tools® products. Incorrect or inappropriate use and/or installation could result in a hazardous condition.

 **CAUTION!** *Broadcast Tools® Products, as with any electronic device, can fail without warning. Do not use this product in applications where a life threatening condition could result due to failure.*

WHO TO CONTACT FOR HELP

If you have any questions regarding your product or you need assistance, please contact your distributor from whom you purchased this equipment.

If you would like more information about Broadcast Tools® products, you may reach us at:

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THANK YOU FOR CHOOSING BROADCAST TOOLS® BRAND PRODUCTS!

BROADCAST TOOLS® TIME SYNC II TIME SYNCHRONIZER WITH GPS

PRODUCT DESCRIPTION

The Time Sync II provides four separate GPS time referenced outputs. The first is a SPDT relay, which pulses once every 15 minutes. These times are programmed for 13:00, 28:00, 43:00 and 58:00 after each hour. The second SPDT relay pulses at the "Top of the Hour" (00:00) or may be user programmed for any minute and second within the hour. The third output is an open collector with a 100 ms pulse every second while the fourth output is an 4800-baud, RS-232 serial port providing UTC time in HH:MM:SS format. The final feature is the "SIG" led and SPDT relay, furnished as fail-safe for either loss of satellite, power or invalid time. The Time Sync II is supplied in a small profile chassis, along with a Garmin 12 – Channel GPS receiver with embedded antenna. The receiver is housed in a water-resistant case and designed to withstand rugged outdoor operating conditions. The Time Sync II chassis furnishes power to the receiver. The receiver is supplied with an approximate 15-foot cable; longer cable lengths up to 100 feet may be used. The Time Sync II is equipped with an optional RS-485 receiver input, allowing 1000 plus feet of separation from the receiver.

FEATURES

* Time Sync of automation systems and clock systems

APPLICATIONS

* Automation system time synchronization * Clock system synchronization

* Computer time base

REAR PANEL DESCRIPTION

The rear panel contains a power connector, screw terminals for all outputs, Power, Loss of signal, Top of hour, Time Sync, 1PPS status led's, UTC serial time port and the GPS receivers 9-Pin D-sub connector.

POWER

Connect the 2.1mm barrel type power connector into the unit and the 9 Vac, 500 ma wall transformer into a 120 Vac 50-60 Hz power source. The rear panel green power LED indicates when power is applied to the unit. (220 Vac 50-60 Hz wall transformer OPTIONAL)

INSTALLATION

Installation of the Time Sync II in **high RF environments** should be performed with care. Shielded cable is suggested for all connections. All shields should be tied to the EGND terminal. The station ground should be connected to the chassis ground screw located on the far right side of the Time Sync II as viewed from the rear. It is recommended that all cables connected to the Time Sync II be looped through ferrite cores to suppress RF. Surge protection with RF filtering is also suggested for the wall transformer. The purchase of an inexpensive UPS will provide back up power in case of a power outage.

BROADCAST TOOLS® TIME SYNC II TIME SYNCHRONIZER WITH GPS

INSTALLATION

The Time Sync II is very simple to install. The majority of the connections are via screw terminals. Installation of the Time Sync II consists of five steps:

1. Inspection
2. Jumper selection, if applicable
3. Bench test
4. Mount the unit on a rack shelf (RM-3) if needed.
5. Connect your equipment to the unit

STEP 1: INSPECTION

Please examine your Time Sync II 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 should contain the Time Sync II, Garmin GPS Receiver with embedded antenna, 9vac, 500 ma wall power transformer and this manual.

STEP 2: JUMPERS

See page 5, if applicable.

STEP 3: BENCH TEST

Place the unit on a workspace and install the receiver in an area that has a clear, unobstructed view of the sky. Do not allow the receiver to sit in water. Connect the 9 pin D-Sub from the receiver to the "GPS Receiver" connector J2 on the Time Sync II. Connect the wall transformers power connector to the Time Sync II's power connector. Check to see if the green power LED is lit. It may take as much as 15 minutes for the receiver to acquire the needed satellites on the first power up. During this time, the "SIG" led will be extinguished and the "SIG" relay will be relaxed. If after 15 minutes you still haven't acquired a lit "SIG" led, try realigning your receiver.

When the "**SIG**" led is lit, you should see the following actions:

1. The "**1PPS**" led should flash (100 ms) every second.
2. The "**TS**" led will flash and K1 should pulse (500 ms) at the following minutes: 13:00, 28:00, 43:00 and 58:00
3. The "**TOH**" led should flash and K3 will pulse (500 ms) at the **Top Of the Hour** (00:00)
4. Valid UTC time at 4800 baud (8,N,1) out of the J3 ("Computer").

TOH user programming:

- 1 - Remove the GPS receiver from the Time Sync II and connect a NULL modem cable between the Time Sync II and your computer.
- 2 - Start HyperTerminal and set the baud rate for 4800 baud, 8,N,1 with flow control set to NONE. Emulation should be changed to ANSI.
- 3 - In the blind, type the following characters: **\$%** if things are working you should hear a relay "click".
- 4 - The Time Sync II will now wait for you to enter the minutes and seconds in the format **mmss**, if it's accepted, you will hear a double relay "click".

**BROADCAST TOOLS® TIME SYNC II
TIME SYNCHRONIZER WITH GPS**

INSTALLATION

- 5 – Remove the null modem cable from the Time Sync II and reinstall the GPS receiver connector.
- 6 – Verify proper operation.

STEP 4: MOUNTING

The Time Sync II's main chassis may be mounted just about anywhere. Number six screw holes are provided. **The receiver must be mounted in an area that has a clear, unobstructed view of the sky.** The receiver is supplied with "VELCRO" for mounting. Attach the receiver to a secure location. **Do not allow the receiver to sit in water.**

Main chassis mounting Options: Mount the unit on a rack shelf, such as the Broadcast Tools RM-3 (1-RU). Allow adequate airflow for cooling.


STEP 5: CONNECT YOUR EQUIPMENT

The Time Sync II interfaces to your equipment through rear panel screw terminals. Follow the silk-screened legends on the PCB for the desired connections. Use a small screwdriver to loosen each screw terminal, insert the stripped wire (18 to 26 gauge wire) and tighten the screw. The Receiver is supplied with a 15 foot data/power cable. Additional cable (**4 conductor with shield**) may be added, up to a total of 125 feet. The grid below gives you the pin-out if you plan on constructing an extension cable.

NOTE: Some customers have run over 400 feet of cable with good results.

J2, Pin # 1	J2, Pin # 2	J2, Pin # 4	J2, Pin # 5	J2, Pin # 6	J2, Pin # 7	J2, Pin # 8	J2, Pin # 9
Shield or ground	RS-232 data from the GPS Receiver	Regulated 5 vdc for the GPS-18 receiver	Power & Data ground	1 PPS data from the receiver	RS-485 Minus NOTE: Only used with the TS-RS485 option	RS-485 Plus NOTE: Only used with the TS-RS485 option	Unregulated 12Vdc to the receiver

Pin 1 must be utilized.

 **NOTE:** Order the RS485 option for cable runs over 125 feet. Customer provided CAT 5 cable. 2 to 4 wires are required for this option if CAT 5 cable is not used. Please consult factory for more information.

**BROADCAST TOOLS® TIME SYNC II
TIME SYNCHRONIZER WITH GPS**

SPECIFICATIONS

LOGIC:	Microprocessor
SERIAL UTC TIME:	Female DB-9, RS-232, 4800, 8N1 / HH:MM:SS UTC format. Updated each second.
TIMING:	Accuracy within 350ms.
GPS RECEIVER PORT:	Male DB-9, RS-232C or RS-485. 4800, 8N1 6 to 40 VDC power and ground. NOTE: User provided cable requires a 4 conductor shielded cable.
SUPPLIED RECEIVER:	Garmin GPS Receiver with embedded antenna.
RELAYS:	“TS”, 1 – SPDT, 500 ma @ 24Vdc / 500 ms “SIG”, 1 - SPDT, 500 ma @ 24Vdc / Latched “TOH”, 1 - SPDT, 500 ma @ 24Vdc / 500 ms
OPEN COLLECTOR:	“1PPS”, 24Vdc @ 200 ma / 100 ms
CONNECTORS:	Screw terminals & DB-9's.
POWER REQUIREMENTS:	9 Vac, 500 ma. 120 Vac wall transformer. Supplied
PHYSICAL DIMENSIONS:	7.75 “ x 4.00” x 1.25” (WDH)
WEIGHT:	3.0 lb.
MOUNTING OPTIONS:	RM-3 Rack shelf. 1– RU
OPTIONS:	RS485 option for cable runs over 125 feet. Customer provided CAT 5 cable. NOTE: 2 to 4 wires are required for this option if CAT 5 cable is not used. Please consult factory.

BROADCAST TOOLS® TIME SYNC II TIME SYNCHRONIZER WITH GPS

Broadcast Tools, INC.
LIMITED WARRANTY AND REMEDIES

LIMITED WARRANTY

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EXCLUSIVE REMEDIES

If Broadcast Tools is notified of in writing of a failure of any item manufactured by Broadcast Tools to conform to the foregoing Limited Warranty within one (1) year following the date of the Buyer's acquisition of the item, and if the item is returned in to Broadcast Tools in accordance with Broadcast Tools' instructions for confirmation by inspection of the defect (which at Broadcast Tools' election may include, without limitation, a requirement that the Buyer first obtain a Return Authorization number from Broadcast Tools, that the Buyer furnish proof of purchase in the form of an invoice and/or receipt, and that the Buyer prepay all freight charges associated with any return of the item to Broadcast Tools using such freight service as Broadcast Tools reasonably may specify), Broadcast Tools will repair or replace the defective item, or will refund the purchase price paid by the Buyer for the item. Broadcast Tools shall have the exclusive right to choose between these alternative remedies.

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