



TimeTrac

Model 5500

HARDWARE INSTALLATION MANUAL

FAA
APPROVED
ACE-117C (1)
00002 2007

P/N: 5500-HIM

April 12, 2007

GENERAL AVIATION
DIVISION OFFICE
WASHINGTON, DC

**P2 Aviation Technology, Inc.
14839 Pioneer Trail
Eden Prairie, MN 55347 USA
(952) 472-2577**

Product Number: 5500

Revision Date: April 12, 2007

LEP



LIST OF EFFECTIVE PAGES

SEC. I Drawing List

DRAWING	DATE	REVISION
TT-1 Installation, Option 1, TimeTrac Computer	8/26/04	-
TT-1A Installation, Option 2, TimeTrac Computer	8/26/04	-
TT-2 Inst. Wiring Diagram, 232 connection	4/12/07	A
TT-2A Inst. Wiring Diagram, 232 connection + external switch	4/12/07	-
TT-4 Inst. Wiring Diagram, 422 connection	4/12/07	-
TT-4A Inst. Wiring Diagram, 422 connection + external switch	4/12/07	-
TT-5 Inst. Wiring Diagram, no nav + external switch	4/12/07	-
TT-5A Inst. Wiring Diagram, no nav + P2 Audio Advisory Sys.	4/12/07	-

SEC. II System Description

Page 1	April 12, 2007	
Page 2	April 12, 2007	
Page 3	April 12, 2007	

SEC. III Installation Procedure

Page 1	April 12, 2007	
--------	----------------	--

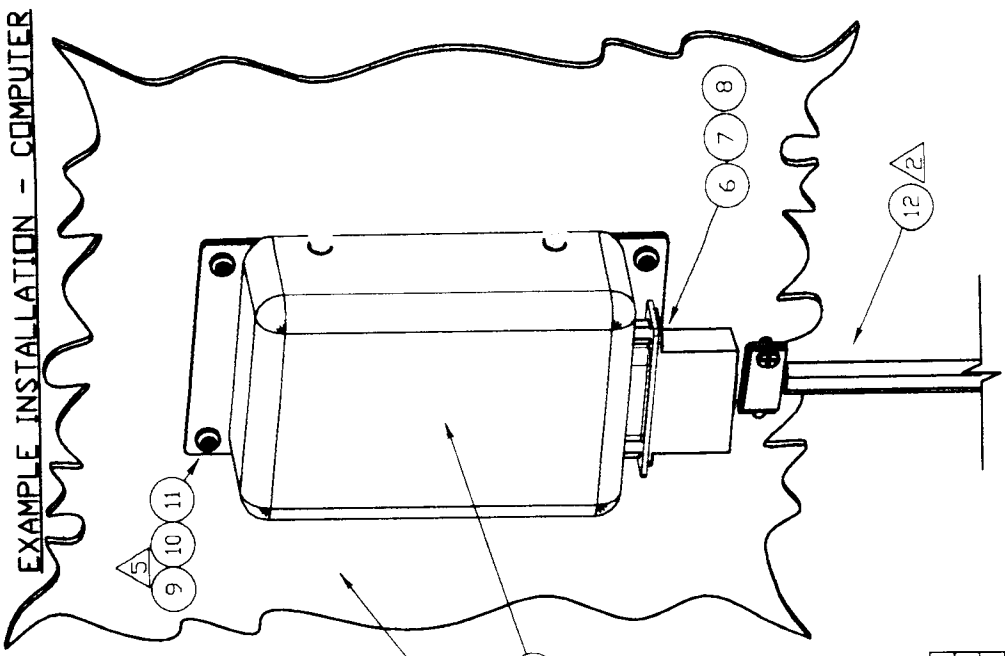
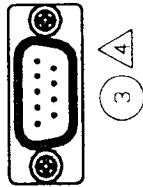
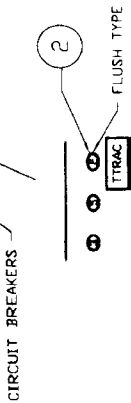
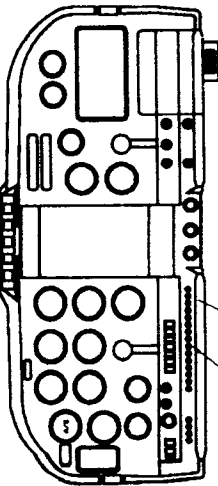
SEC. IV Technical Specifications

Page 1	April 12, 2007	
--------	----------------	--

SEC. V Reference

Page 1 List of Known Compatible Nav Units	April 12, 2007	
Page 2 Instructions for Testing the Aircraft Installation	April 12, 2007	

EXAMPLE INSTALLATION - SERIAL CONNECTOR



NOTES:

1. THIS DRAWING IS TO BE USED IN CONJUNCTION WITH THE INSTALLATION INSTRUCTIONS (FURNISHED) SECTION III.
2. SECURE ELECTRICAL HARNESS EVERY 8" -10" OR WHEREVER NECESSARY (REF AC 43.13-1A).
3. THE COMPUTER MAY BE INSTALLED IN ANY DRY, TEMPERATURE CONTROLLED LOCATION AND MOUNTED IN ANY ORIENTATION.
4. THE 9-PIN CONNECTOR SHALL BE MOUNTED IN A READILY ACCESSIBLE LOCATION.
5. FASTEN COMPUTER IN FOUR LOCATIONS USING HARDWARE LISTED OR OTHER SUITABLE MEANS.
6. ITEMS REQUIRED FOR APPROVAL:
 - A. COPY OF STC
 - B. LOG BOOK ENTRY
 - C. WEIGHT & BALANCE DATA REVISED
 - D. FORM 337 FILED

FN	DESCRIPTION	QTY	MFG	P/N	SCIP/N
1	TIMETRAC COMPUTER	1	P2 INC	5500 (PMA)	965300
2	CIRCUIT BKR, 2 AMP, FLUSH (NOT FURNISHED)	1	POTTER & BRUMFIELD	W58-XC4C12A-2	N/A
3	CONN, Socket Shell 9 Pin D-Sub	1	POSITRONIC	RD9F00000	230052-9
4	PIN, Crimp D-Sub, Female, 20-24 AWG	9	POSITRONIC	FC6020D	230055
5	HOOD, 9 Pin D-Sub Conn	1	POSITRONIC	9000JYLO	230020-1
6	CONN, 15Pin, D-Sub, F Crimp, w/Ccontacts	1	POSITRONIC	M24308/2-2	230050C
7	CONN, Hood 15 Pin D Sub	1	CINCH	DA-24658	230038
8	RETAINER CLIP, "Bow Tie" Style	2	KEYSTONE	2061K	512101
9	MOUNTING SCREWS (NOT FURNISHED)	4	VARIOUS	AN526-632-8	N/A
10	WASHER (NOT FURNISHED)	4	VARIOUS	AN936-A6	N/A
11	RIVNUT (NOT FURNISHED)	4	VARIOUS	MS27130-A7	N/A
12	WIRING HARNESS (NOT FURNISHED)	AR	VARIOUS	M22759/16-22-9	N/A

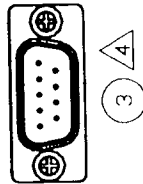
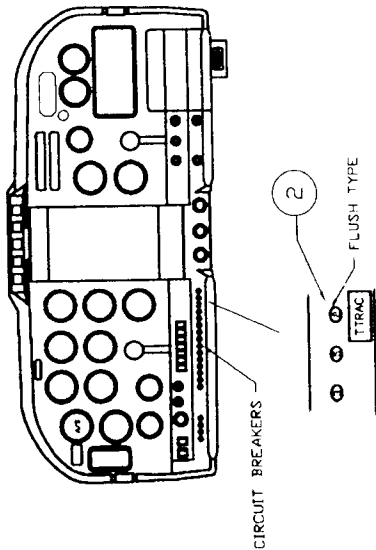
P2 INC. 10000 POTOSI, MI 49864

INSTALLATION, OPTION 1, TIMETRAC COMPUTER

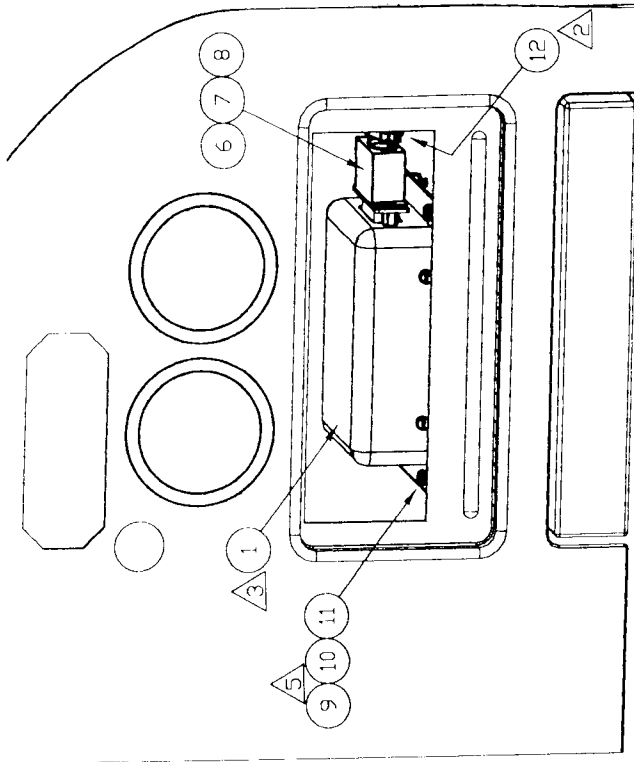
REV. DATE: 11/25/73
 DRAWN BY: PAB
 APPROVED BY: SP
 FILE NAME: TT-1-10V
 DIRECTOR: J. J. WOOD
 PROJECT NO: 5500

CODE IDENT. NO. TT-1
 SIZE A
 P/N 5500
 REV -

EXAMPLE INSTALLATION - SERIAL CONNECTOR



EXAMPLE INSTALLATION - COMPUTER



- NOTES:**
- THIS DRAWING IS TO BE USED IN CONJUNCTION WITH THE INSTALLATION INSTRUCTIONS (FURNISHED) SECTION III.
 - SECURE ELECTRICAL HARNESS EVERY 8" -10" OR WHEREVER NECESSARY (REF AC 43.13-1A).
 - THE COMPUTER MAY BE INSTALLED IN ANY DRY, TEMPERATURE CONTROLLED LOCATION AND MOUNTED IN ANY ORIENTATION.
 - THE 9-PIN CONNECTOR SHALL BE MOUNTED IN A READILY ACCESSIBLE LOCATION.
 - FASTEN COMPUTER IN FOUR LOCATIONS USING HARDWARE LISTED OR OTHER SUITABLE MEANS.
 - ITEMS REQUIRED FOR APPROVAL:
 - A. COPY OF STC
 - B. LOG BOOK ENTRY
 - C. WEIGHT & BALANCE DATA REVISED
 - D. FORM 337 FILED

REV	DESCRIPTION	QTY	MEG	P/N	SC/P/N
1	TIMETRAC COMPUTER	1	P2 INC	3500 (PMA)	965300
2	CIRCUIT BKR 2 AMP, FLUSH (NOT FURNISHED)	1	POTTLER & BRUMFIELD	WSK-XC4C12A-2	N/A
3	CONN, Socket Shell, 9 Pin D-Sub	1	POSTRONIC	RD2F00000	230052-9
4	PIN, Crimp D-Sub, Female, 20-24 AWG	9	POSTRONIC	FC60207	230055
5	HOOD, 9 Pin D-Sub Conn.	1	POSTRONIC	90800VLO	230020-1
6	CONN, 15 Pin D-Sub, F Crimp, w/Contacts	1	POSTRONIC	M243082-2	230030C
7	CONN, Hood 15 Pin D-Sub	1	GENCO	DA-24658	230038
8	RETAINER CLIP, Bow Tie Style	2	KEYSTONE	296IK	512101
9	MOUNTING SCREWS (NOT FURNISHED)	4	VARIOUS	AS526-632-8	N/A
10	WASHER (NOT FURNISHED)	4	VARIOUS	AS936-A5	N/A
11	RIVNUT (NOT FURNISHED)	4	VARIOUS	MS27130-A7	N/A
12	WIRING HARNESS (NOT FURNISHED)	AR	VARIOUS	M2275916-22-0	N/A

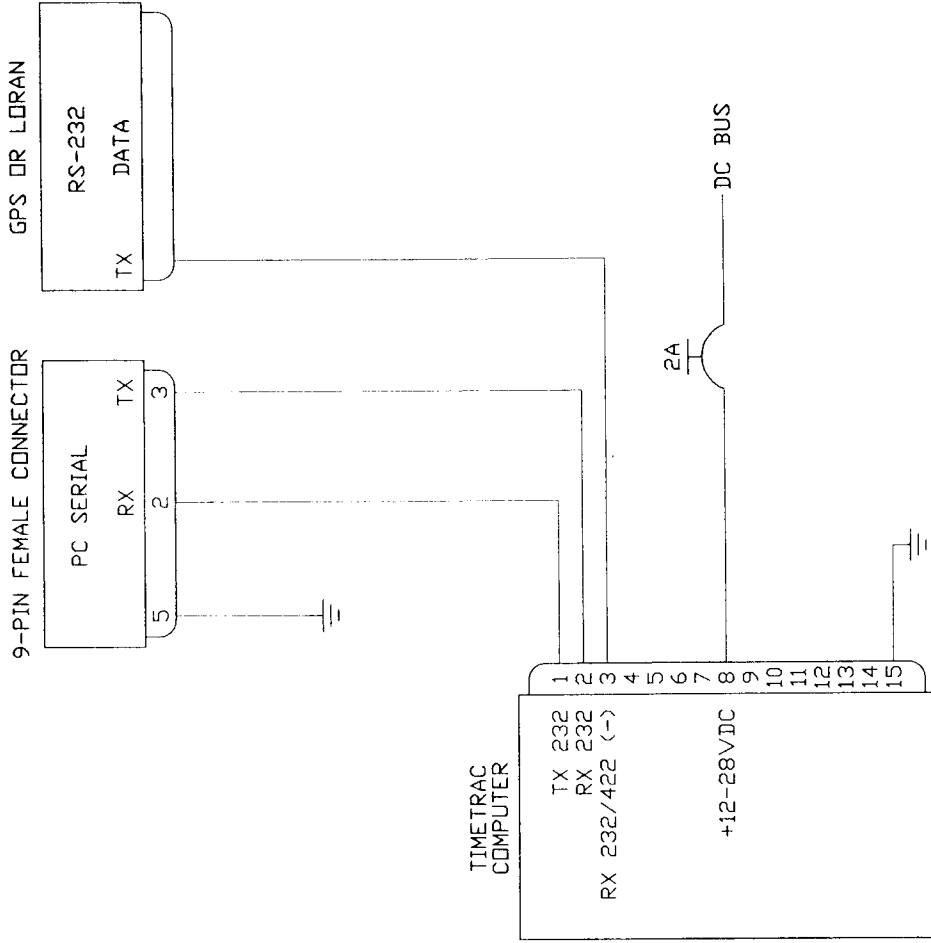
P2, Inc. KOWEAP013, PH 55364

INSTALLATION, OPTION 2, TIMETRAC COMPUTER

DRAWING DATE: 8/17/04
 DRAFTER: PAB
 APPROVED SP:
 FILE NAME: TTRAC-1A-110V
 DIRECTORY: 965300-00
 SHEET 1 OF 1

CODE IDENT. NO. TT-1A
 SIZE A
 P/N 5500
 REV 1

RS-232 GPS/LORAN CONNECTIONS



DRAWING DATE	11/24/03
DRAFTER	PAB
APPROVED SP	
FILE NAME	TT-2A.DWG
DIRECTORY	255500-00
SHEET	1 OF 1

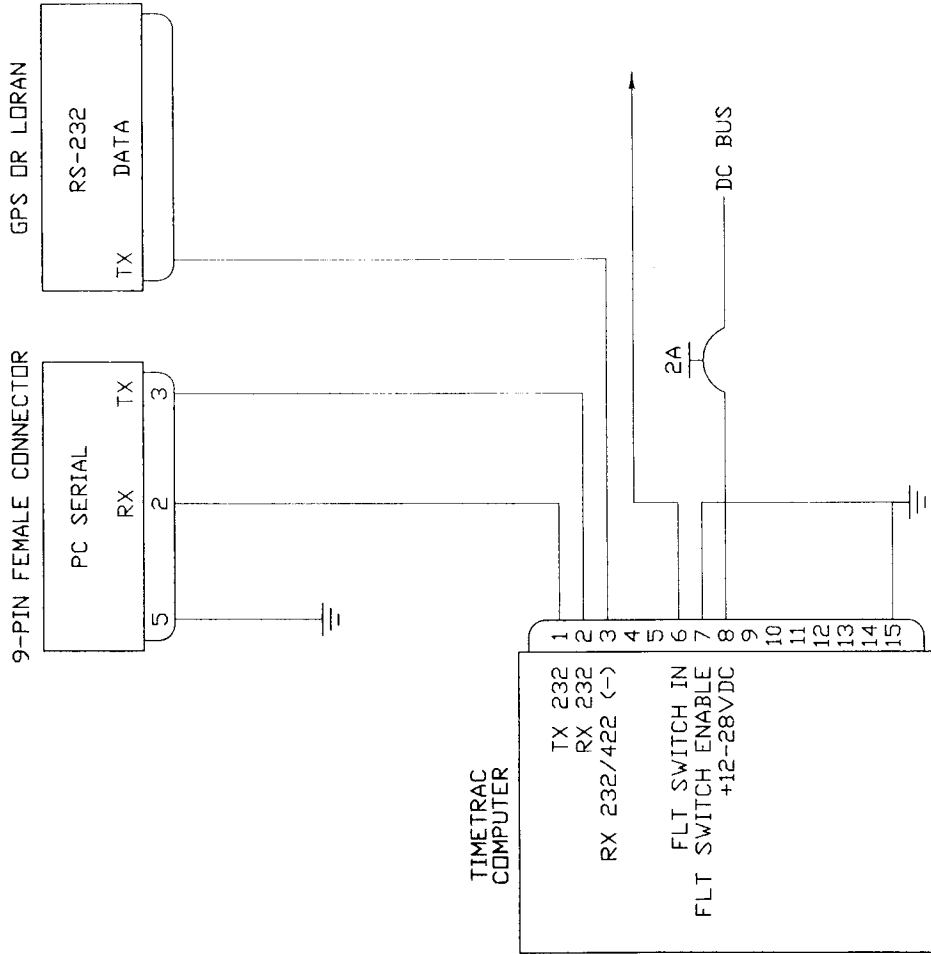
P2, Inc. MINNEAPOLIS, MN 55264

INSTALLATION WIRING DIAGRAM, TIMETRAC
COMPUTER FOR 232 CONNECTION

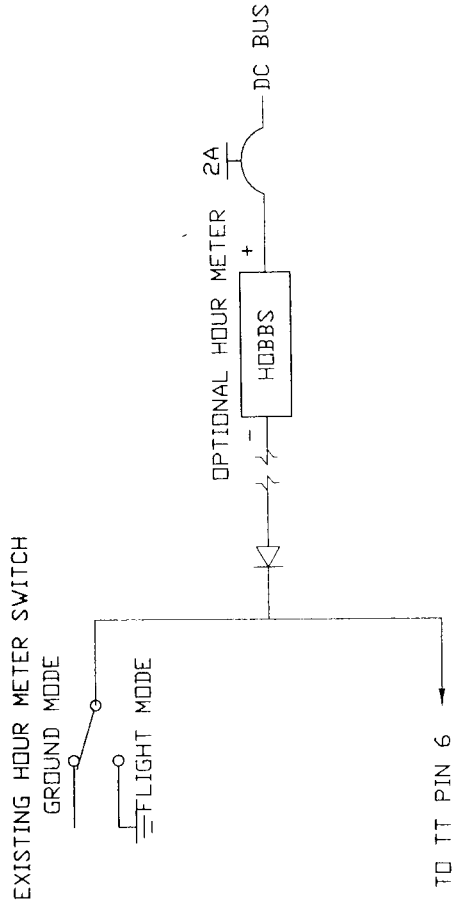
CODE IDENT. NO.	TT-2	SIZE	A	P/N	5500	REV	A
-----------------	------	------	---	-----	------	-----	---

NO.	REV.	DATE	BY	APP'D	DESCRIPTION	SCALE
A	-	11/24/03	PAB	SP	REMOVED 422 CONNECTIONS	
NA/	-	8/26/04	PAB	SP	BASELINE RELEASE	
ECD #						

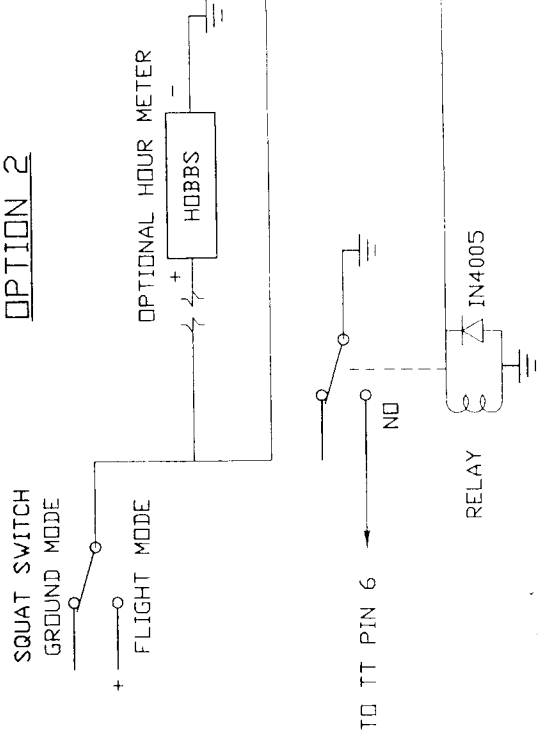
RS-232 GPS/LORAN CONNECTIONS



OPTION 1



OPTION 2



DRAWING DATE	2/19/07
DRAFTER	PAB
APPROVED	SP
FILE NAME	TT-2A-JDWG
DIRECTORY	965300-00
SHEET	1 OF 1

SCALE	NONE
-------	------

BASELINE RELEASE	SP			
APP'D				
REV.	DATE	BY	APP'D	DESCRIPTION

N/A				
ECD #				

REV.	DATE	BY	APP'D	DESCRIPTION
------	------	----	-------	-------------

TT-2A				
-------	--	--	--	--

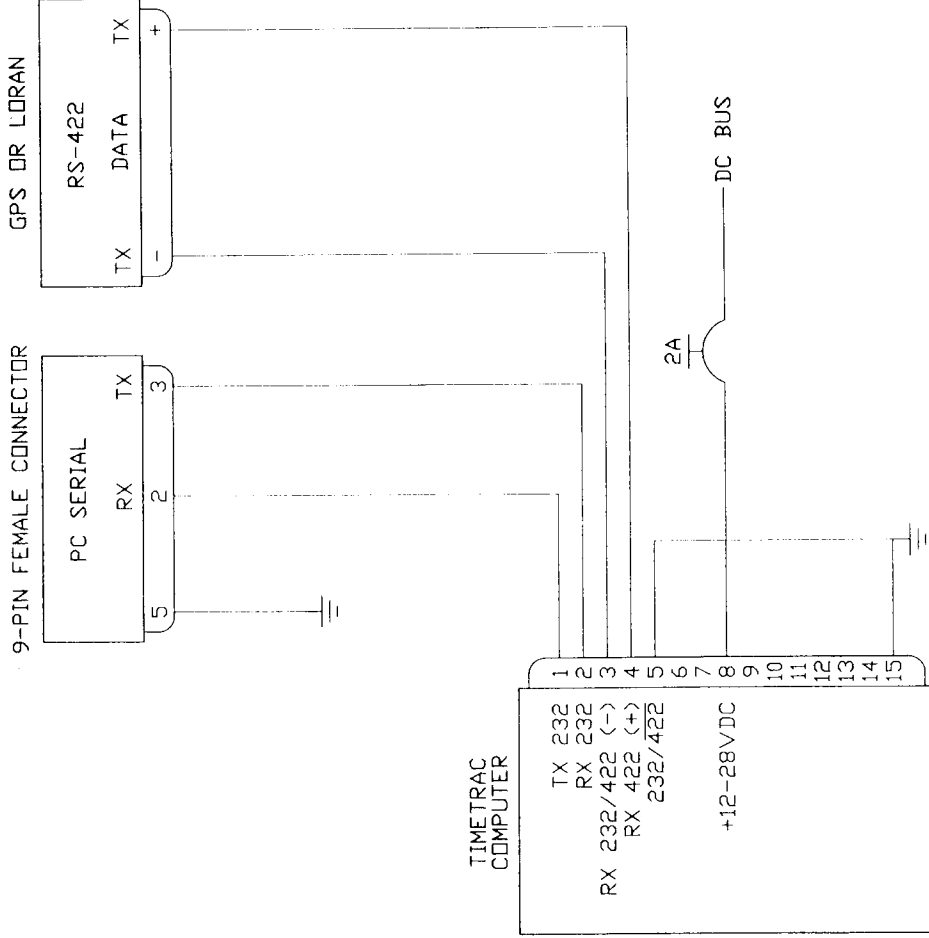
CODE IDENT. NO.	TT-2A	SIZE	A	P/N	5500
-----------------	-------	------	---	-----	------

INSTALLATION WIRING DIAGRAM, TIMETRAC COMPUTER FOR 232 CONNECTION AND EXTERNAL SWITCH

P2, Inc. MINNEAPOLIS, MN 55364

REV.	
------	--

RS-422 GPS/LORAN CONNECTIONS



DRAWING DATE: 2/19/07
 DRAFTER: PAB
 APPROVED: SP
 FILE NAME: TT-4-JDWG
 DIRECTORY: 965300-00
 SHEET: 1 OF 1

P2, Inc. MINNEAPOLIS, MN 55364

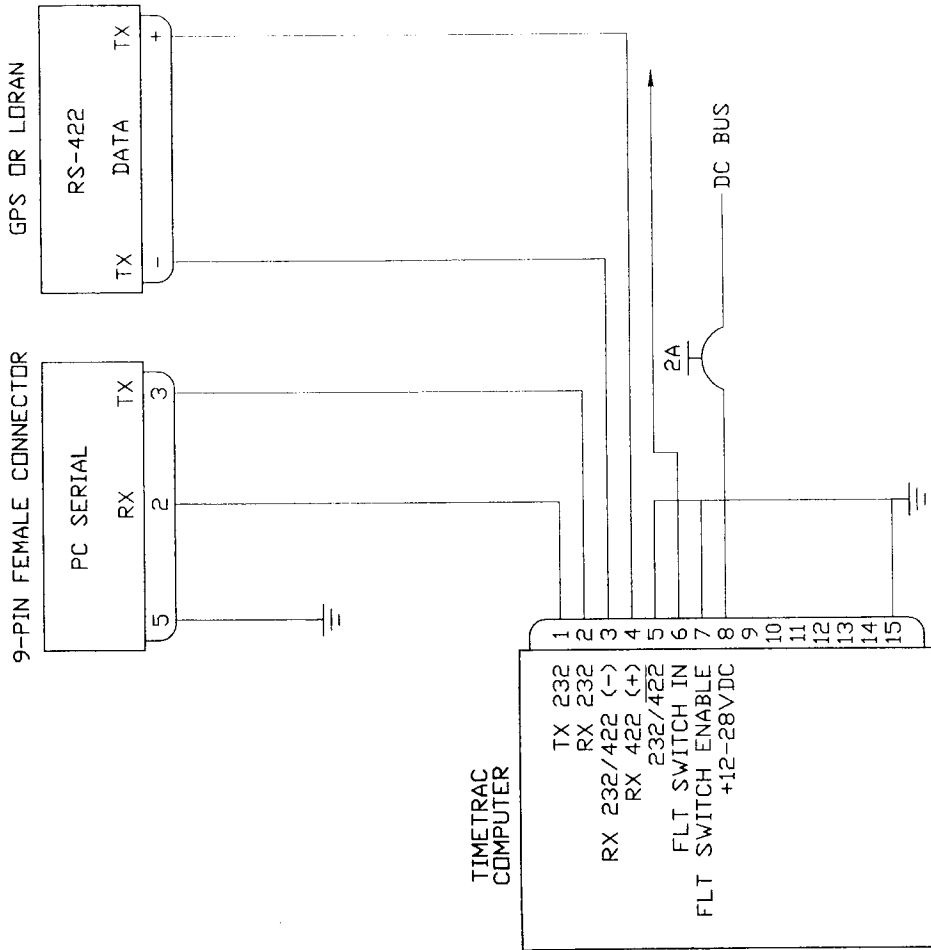
INSTALLATION WIRING DIAGRAM, TIMETRAC
 COMPUTER FOR 422 CONNECTION

CODE IDENT. NO. TT-4
 SIZE A
 P/N 5500
 REV 1

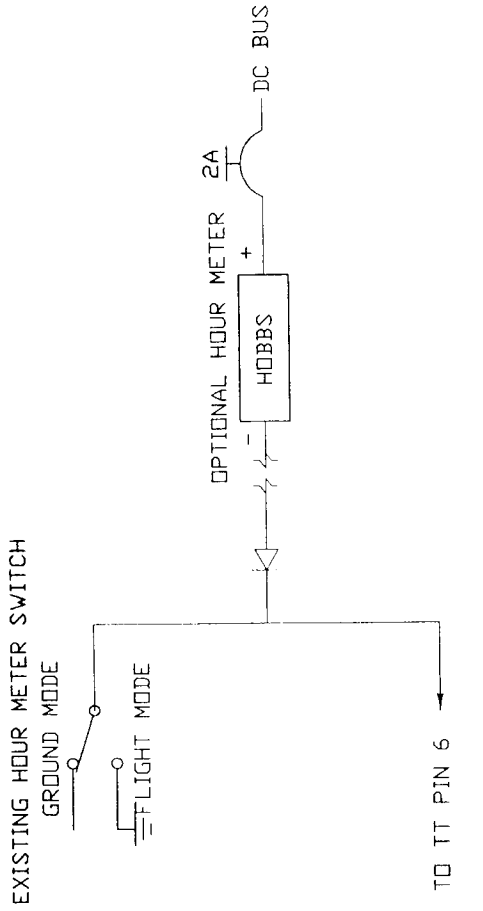
SCALE: NONE

ECO #	REV.	DATE	BY	APP'D	DESCRIPTION
N/A	-	4/16/07	PAB	SP	BASELINE RELEASE

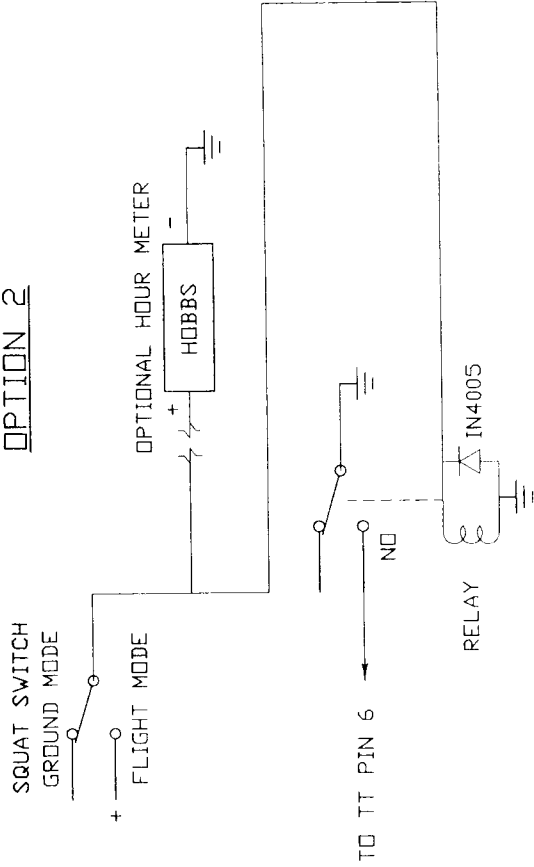
RS-422 GPS/LORAN CONNECTIONS



OPTION 1



OPTION 2

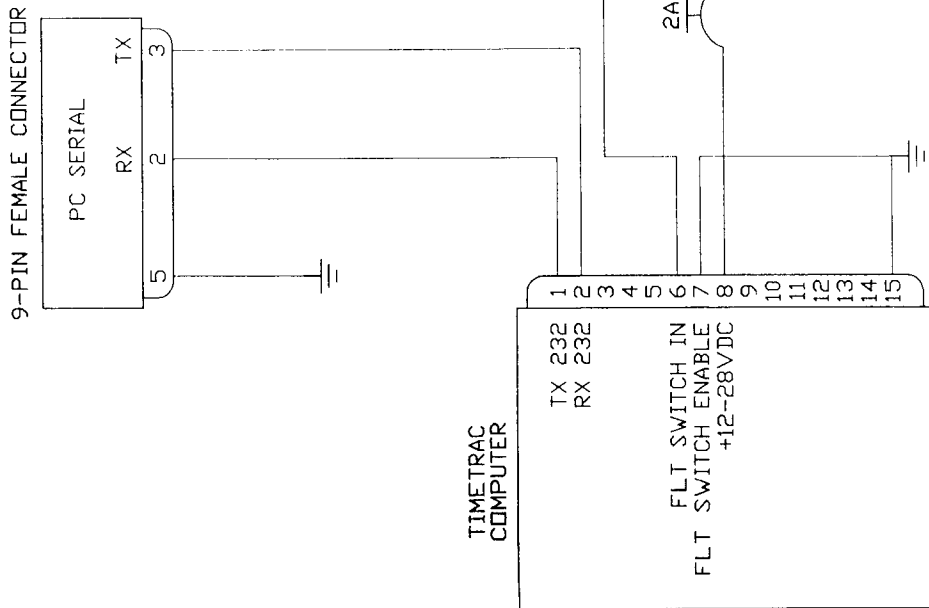


DRAWING DATE	2/19/07
DRAFTER	PAB
APPROVED	SP
FILE NAME	TT-4A-JDWG
DIRECTORY	965300-00
SHEET	1 OF 1

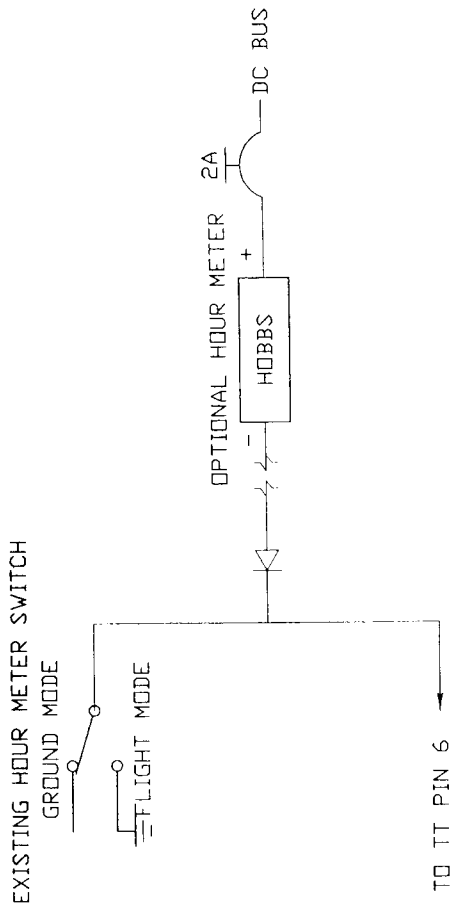
P2, Inc. MINNEAPOLIS, MN 55364	
INSTALLATION WIRING DIAGRAM, TIMETRAC COMPUTER FOR 422 CONNECTION AND EXTERNAL SWITCH	
CODE IDENT. NO.	TT-4A
SIZE	A
P/N	5500
REV	-

N/A	4-12-07	PAB	SP	BASELINE RELEASE
ECD #	REV.	DATE	BY	APP'D
				DESCRIPTION

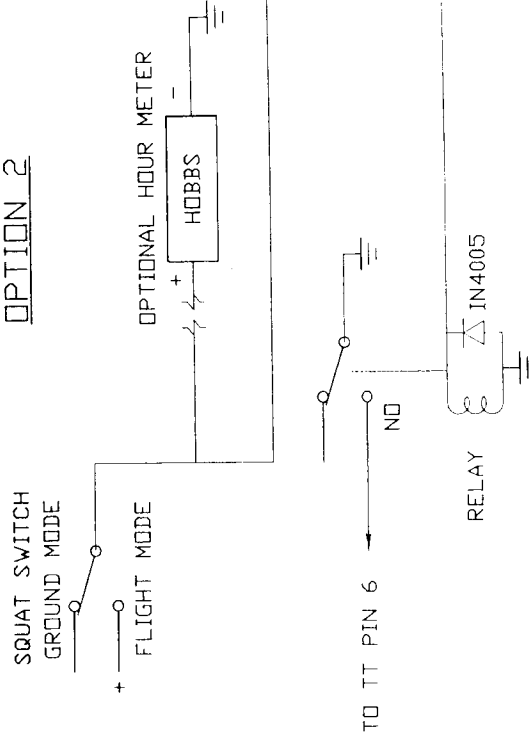
SCALE: NONE



OPTION 1



OPTION 2



DRAWING DATE	2/19/07
DRAFTER	PAB
APPROVED SP	
FILE NAME	TT-5-UDVG
DIRECTORY	965300-00
SHEET	1 OF 1

SCALE	NONE
BASELINE RELEASE	SP
DESCRIPTION	

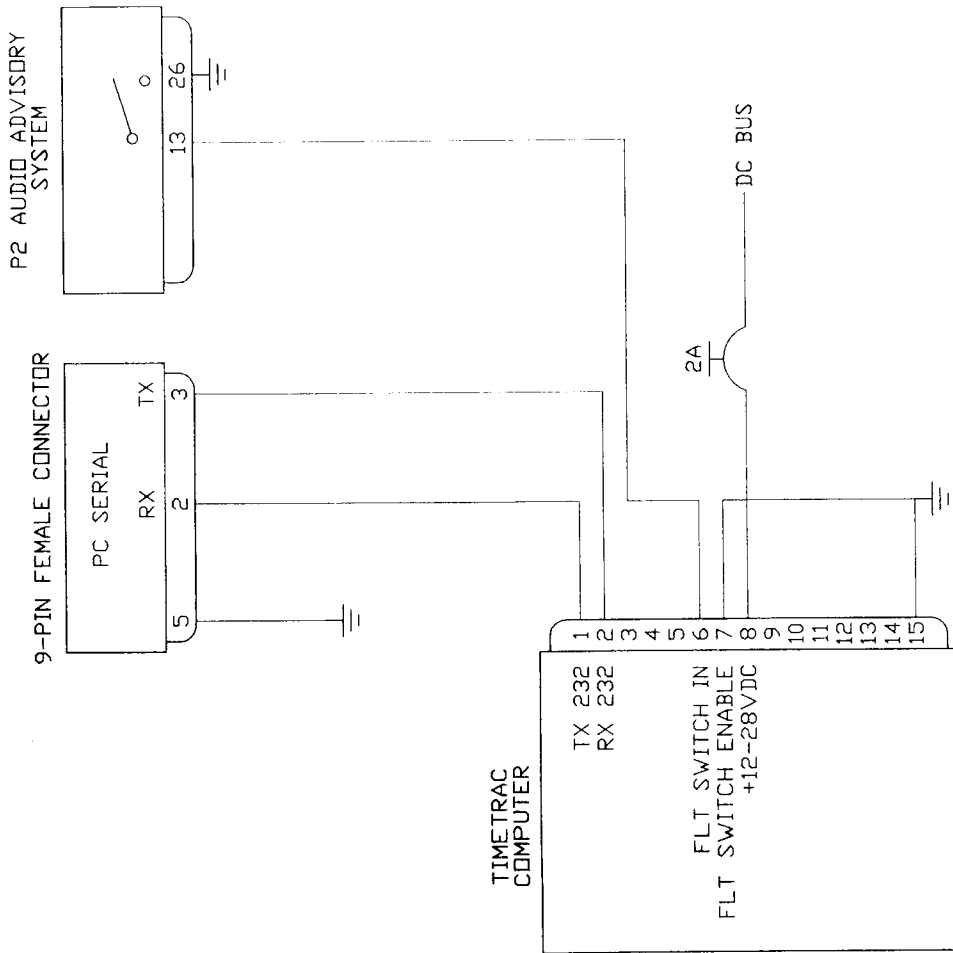
ECD #	REV.	DATE	BY	APP'D
N/A	-	4-2-07	PAB	SP

CODE IDENT. NO.	TT-5
SIZE	A
P/N	5500

P2, Inc. MINNEAPOLIS, MN 55364

INSTALLATION WIRING DIAGRAM, TIMETRAC
COMPUTER WITH NO NAV AND EXTERNAL
SWITCH ONLY

REV	
-----	--



DRAWING DATE 2/19/07		P2, Inc. MINNEAPOLIS, MN 55364		REV
DRAWN BY PAB	APPROVED BY SP	INSTALLATION WIRING DIAGRAM, TIME TRAC COMPUTER WITH P2 AUDIO ADVISORY ONLY		REV
FILE NAME TT-5A-JDWG	DIRECTORY 965300-00	SIZE A	P/N 5500	REV
SHEET 1 OF 1		CODE IDENT. NO. TT-5A		REV

N/A	-	472-07	PAB	SP	SCALE: NONE
ECD #	REV.	DATE	BY	APP'D	DESCRIPTION
					BASELINE RELEASE

Product Number: 5500

Revision Date: April 12, 2007

SECTION II.1



- IMPORTANT NOTICE -

TimeTrac is a tool intended to assist in the management of aircraft flight records. It is not intended to replace aircraft logs, pilot logs or any other documentation required by FAA or other Federal Regulations.

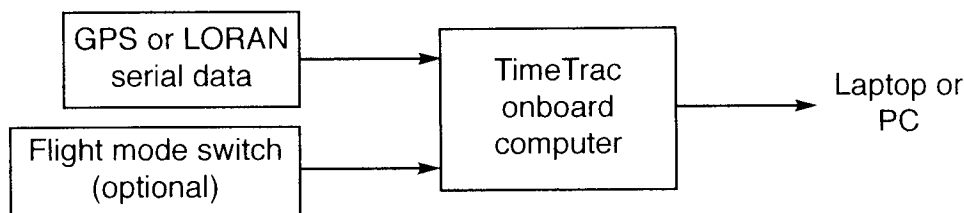
SYSTEM DESCRIPTION

INTRODUCTION

TimeTrac is a system that collects, stores and sorts flight records. The system consists of a small, electronic data recording device that is installed on the aircraft and a software program that resides on a PC to sort out the stored records and presents them in a useful manner to the end user.

It records flight data from the aircraft and takes the corresponding flight times (block-to-block or time-in-service) and sorts them into the categories such as component life, flight legs, etc. Its job is to automate and enhance flight record keeping for aircraft owners, maintenance personnel and pilots.

Aircraft installation and the flow of data:



COMPONENTS

The system consists of three major components, (1) the TimeTrac hardware, (2) the TimeTrac software and (3) the TimeTrac Utility software.

(1) The TimeTrac hardware, or onboard computer, is installed in the aircraft. It is powered by normal electrical power (hot buss or avionics buss) and does not need to be turned on or off by the operator. It receives data through a serial connection from the aircraft GPS or Loran. At the user's discretion, the stored data is downloaded through a serial download port to a PC for sorting and record management.

(2) The TimeTrac software program resides on the user's computer. This is where the data is

Product Number: 5500

Revision Date: April 12, 2007

SECTION II.2



collected, sorted and stored. The software program is compatible with both Windows and Macintosh operating systems.

(3) In addition, a separate TimeTrac Utility Software disk is provided for the avionics installer so that proper installation and functioning of the aircraft hardware can be verified.

HOW IT WORKS

The TimeTrac onboard computer receives serial data from a navigation receiver (GPS or LORAN) and has the primary function of recording flight “events”. When an event is recorded, the time, date, latitude and longitude information is stored until downloaded later. This data is recorded in a loop; when the memory is full, the first record will be written over and so on. The hardware has the capacity to record thousands of individual events.

In simple terms, these basic “events” are defined as follows:

Power-up. The time at which the aircraft is electrically powered.

Takeoff. The time and point at which the aircraft is in flight.

Landing. The time and point at which the aircraft is no longer in flight.

Power-down. The time at which the aircraft is no longer electrically powered.

The TimeTrac firmware reads the serial data and uses its own formula to determine whether the aircraft is on the ground or in flight. An external switching device can be used as well. See Options.

Each TimeTrac onboard computer gets its own identity—the serial number of the aircraft in which it was installed. This unique identity is entered during the first software to hardware communication. This initialization assures that the downloaded data is always applied to the correct aircraft. Since no two aircraft should have the same exact serial numbers, there should never be a data mix-up.

The TimeTrac hardware has an internal clock. It has been preset at the factory with the correct date and time (GMT). The clock is backed up by an internal battery, which has a life of four years.

SYNCH WITH A HOUR (Hobbs) METER

If an hour meter that records time-in-service is used on the aircraft, it is recommended that the TimeTrac computer is in synch with this device so both components start and stop counting flight time simultaneously. In order to do this, Pin 6 on the TimeTrac Computer needs to be connected to the same switched ground (-) as the hour meter. Each Installation Wiring Diagram has Option 1 and Option 2, showing the proper connections for low-side and high-side switching respectively.

Product Number: 5500

Revision Date: April 12, 2007

SECTION II.3

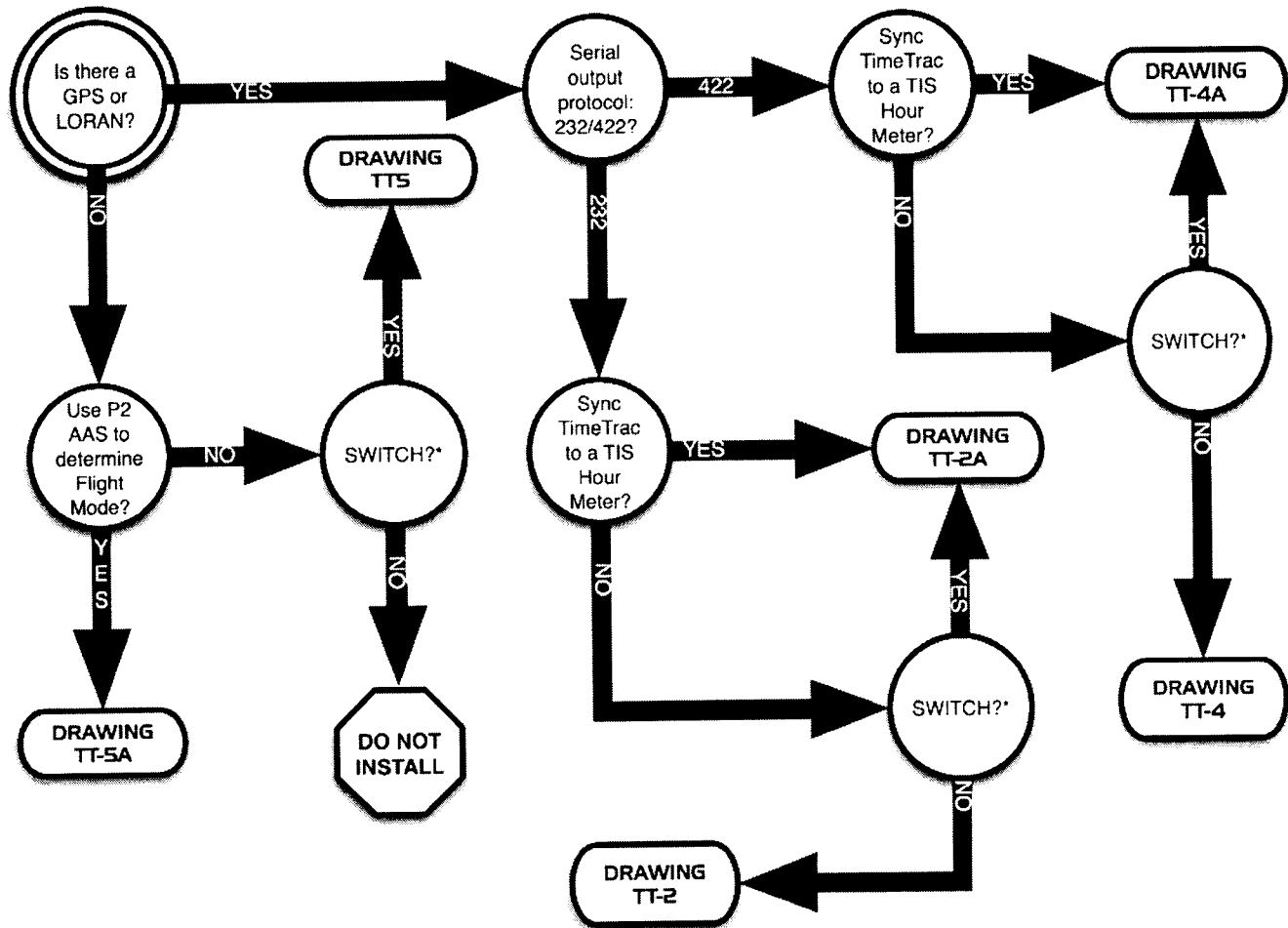


NO NAVIGATION DEVICE INSTALLED

In the rare situation where there is no navigation device available, TimeTrac will need to determine ground or flight status by using a connection to an external switching device such as a P2 Audio Advisory System, squat switch, pitot pressure switch, etc. NOTE: Without serial data available from a navigation source, the Lat/Lon recording and automatic airport identification feature of the TimeTrac software will not be available.

To help select the correct Installation Wiring Diagram, refer to the flow chart below:

START HERE



*Is a switching device present (squat switch, etc.) that can determine the "flight mode" of the aircraft?

Product Number: 5500

Revision Date: April 12, 2007

SECTION V.2



Reference II

Instructions for Testing the Aircraft Installation

STEP 1. Make sure that the aircraft is powered down (no power to the buss providing current to the TimeTrac unit itself).

STEP 2. Insert the CD labeled "TimeTrac Utility Disk" into your disk drive and follow the on-screen instructions.

STEP 3. After installing the Utility software, open the application and click on the button labeled CHECK FOR UPDATES. This will assure that you have the most current software version.

STEP 4. Click on the BEGIN TEST button and follow the instructions.

STEP 5. Upon successful completion of the test, a verification code will be generated by the TimeTrac Utility software. Enter this code on the TimeTrac Red Card. Fill in the remaining data on the card and return it, along with all software, serial cable, etc. to the end user.

Product Number: 5500

Revision Date: April 12, 2007

SECTION III.1



INSTALLATION

PREPARATION

Before starting the installation, be sure that the serial output from navigation receiver in the aircraft has a format that is recognized by TimeTrac (see Section V.1). Next, refer to Drawing TT-1 and TT-1A for directions on mounting the hardware. Then use the Flow Chart found in Section II to assist you in finding the correct Installation Wiring Diagram for the configuration you wish to perform.

The aircraft-mounted system consists of the TimeTrac onboard computer and a serial connection from the navigation receiver. The onboard computer may be mounted behind the instrument panel or in any dry, temperature-controlled area.

Mount the data download serial port in a location that provides easy access to the connection for the person downloading the data. All connections to the electronics package are made with a single 9-pin high-density connector (supplied). Consult the appropriate Installation Drawing for correct configuration connections.

WIRING THE SYSTEM

Before beginning the installation, it is very important to select the correct location for the TimeTrac computer. The computer itself will be wired to the following areas: (1) Aircraft power (+12 to 28 volts DC), Aircraft ground, Serial port and External flight mode switch (optional).

A.) Aircraft Power: Connect pin 8 through a 2 amp circuit breaker to the A+ buss. It must be fused externally, as the unit does not have an internal fuse. The circuit breaker should be labeled "TTRAC" using engraving, painting or any other approved method. TimeTrac will operate on either 12 or 24 VDC electrical systems without any external modifications.

B.) Aircraft Ground. Connect pin 15 to a suitable aircraft grounding location.

C.) Serial Port (data download) Installation: Select a convenient and appropriate position for the serial port. Remember, a location should be selected that allows easy access for the downloading process. Refer to Drawings TT-2 series for RS 232 or TT-4 series for RS 422 connections.

TESTING THE INSTALLATION

The installer must verify the aircraft installation by using the CD labeled "TimeTrac Utility Disk". Refer to Section V for complete instructions on how to perform the test.

Product Number: 5500

Revision Date: April 12, 2007

SECTION IV.1



HARDWARE TECHNICAL SPECIFICATIONS

Dimensions:	1.15"H x 4.30"L x 2.40H
Weight:	0.4 lbs.
Electrical:	Input voltage +10 to +32VDC Input current 50mA @ 28VDC Protection: Not internally fused
Input Data:	Serial Data (RS-422 Trimble CUGR AN/ASN-175) Discrete inputs: 232/422 Select; Open or +5V (RS-232)/GND (RS-422) Flight Mode Select; Open (takeoff)/ GND (land) Flight Mode Enable; Open (GPS input)/ GND (Hobbs input)
Output Data:	Serial Data (TimeTrac interface)
Environmental:	Operating Temperature: -50C to +70C Operating Altitude: Up to 55,000 ft. Storage Temperature: -60C to +85C Inflight cooling: Indefinitely with no cooling

SOFTWARE REQUIREMENTS for PC

Hardware	CD drive
Operating system	Windows 98 or later/ Mac OS 10.2.6 or later
Free Hard Drive Space	45 MB
RAM	256 MB RAM or greater
Misc	Windows users: Acrobat Reader or similar application

Product Number: 5500

Revision Date: April 12, 2007

SECTION V.1



Reference I

IMPORTANT! The protocols that TimeTrac recognizes are NMEA, IIMorrow, ARNAV, ONI, Foster and AIRINC. If the serial output from the navigation unit is one of these formats, it will work with TimeTrac.

List of Known Compatible Nav Units*

ARNAV:	R15, R20, R21, R30, R40, R50, R50v, R50i, R5000, FMS5000, Star5000, FMS5000
Bendix/King	KLN-35, KLN-89B, KLN-90, KLN-90A, KLN-90B, KLN-94, KLX-135, KLN-900
BF Goodrich/Foster	F-4, F-14, 500, 501, 616, LNS-6000
Garmin	100, 150, 150XL, 155XL, 165, 250, 250XL, 300, 300XL, 430, 430W, 530, 530W
Magellan	5000
Northstar	M1 (above s/n 14800), M1A, M2, M3, 60, 6000
Skyforce	AIM, KMD-150, Skymap II, Skymap IIIC
Trimble	1000DC, 2000, 3000, 2100, 3100
II Morrow/UPS	Apollo 612B, 618, 618TCA, 820, GX-50, GX-55, GX-55R, GX-60, GX-65, GY 50/60/65, 360, SL-50, SL-60, 360 GPS, NMS 2001, NMC 2001.

List of Known Compatible Handheld Nav Units*

Garmin	GPS III Pilot, GPS MAP195, GPSMAP 196, GPSMAP 295, GPSMAP 296, GPSMAP 396, GPSMAP 496
Lowrance	GlobalMap 3000

*This list is up to date as of the time of printing.