

Altitude Encoder

Model 8800-TTM

Altitude Encoder with Trimble
Loran/GPS Serial Interface



OPERATING MANUAL

Shadin Avionics

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Overview

Before using this information and the product it supports, be sure to read the section covering the product warranty.

While every precaution has been taken in the preparation of this manual, Shadin assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained herein.

Although it is not required by the FAA, it is recommended that this manual be attached to the FAA-approved flight manual or always be kept on board for reference.

Operation

Place the aircraft transponder in altitude reporting mode (MODE C).

Place the aircraft transponder in the standby mode, unless power to the encoder is supplied directly from the aircraft bus. In this case, follow the power-up procedure recommended by the transponder manufacturer.

A warm-up time of approximately 10 minutes is necessary after power is applied to the encoder. If power to the encoder is interrupted momentarily after the unit has warmed up, a period of approximately one minute after power is restored is required for the unit to stabilize.

Installation Instructions

Mounting: The encoder may be mounted in any position on a rigid surface. Avoid locations where hot air, cold air, or water could come in contact with the unit. The selected location should have an ambient temperature above -4°F. The unit should be mounted such that the correspondence adjustment controls are accessible.

Fasten the mounting tray to the aircraft using either #6-32 screws or 1/8" pop rivets. Use locking-type washers or nuts to secure against vibration. The installation should be performed according to RTCA/DO-160B, Section 7.

Static Connection: Connect the encoder to the primary altimeter static source line using procedures listed in FAR 23.1325.

Cut the static line at a point that is as close to the encoder as possible. Use appropriate tools and procedure so as not to contaminate the static line.

Use a "T" fitting and 1/4" I.D. hose to supply static pressure to the encoder. The encoder accepts a 1/8" NPT fitting at the static pressure inlet. Use a suitable thread sealant to prevent leaks. Avoid turning the hex fitting on the encoder.

Electrical Connections: Use the 15 pin socket provided with the unit to make a wiring harness. The harness should have 14 wires: 10 for altitude data and one each for strobe, serial data, power, and ground. Refer to drawing number 4088-161 for the connector pin out.

Most transponders have available switched power (A+) or a direct connection to the aircraft avionics bus may be made. When a connection to the avionics bus is made, a 2-Ampere circuit breaker should be installed.

Connect pin 6 to ground if the transponder does not have a strobe connection. Connect pin 7 to the RS-232 input of the Trimble Loran or GPS receiver. Consult the Trimble installation manual for proper connection.

Calibration and Correspondence

Refer to FAR 91.36, 91.172, FAA Advisory Circular 43-6A

Note: When power is first applied to the encoder, all of the output data lines will pulse high/low. Each data line will then go high and low individually until all of the lines have been pulsed. This action is normal and serves as a diagnostic tool for the installer to use in verifying the encoder output and the harness on a line-by-line basis.

1. Leave the encoder powered for a minimum of 30 minutes warm-up time before calibration. If power is momentarily interrupted, allow a minimum of five minutes for the unit to stabilize.
2. Set the altimeter barometric pressure to 29.92 In Hg.
3. Increase pressure until the aircraft altimeter shows -950 feet.
4. If necessary, adjust the LOW altitude trim on the side of the unit until the transition point (or altitude, as indicated on the Loran or GPS receiver) is within 10 feet of the altimeter reading.
5. Decrease static pressure until the altimeter shows 100 feet less than the maximum calibrating altitude. Verify the altitude out of the encoder is within ± 50 feet.
6. Repeat steps 3-5 until the transition accuracy is within ± 50 feet at both the maximum calibrating altitude and -950 feet.
7. Perform a correspondence check, as required by FAR 91.36 and AC 43-6A.
8. Placard the aircraft altimeter with the maximum calibrating altitude.

**ICAO Standard Code for
S.S.R. Pressure Altitude Transmission**

<i>Altitude Feet</i>	<i>D2</i>	<i>D4</i>	<i>A1</i>	<i>A2</i>	<i>A4</i>	<i>B1</i>	<i>B2</i>	<i>B4</i>	<i>C1</i>	<i>C2</i>	<i>C4</i>
-1000 to -950	0	0	0	0	0	0	0	0	0	1	0
-50 to +50	0	0	0	0	0	0	1	1	0	1	0
450 to 550	0	0	0	0	0	0	1	0	0	1	0
950 to 1050	0	0	0	0	0	1	1	0	0	1	0
1950 to 2050	0	0	0	0	0	1	0	1	0	1	0
2950 to 3050	0	0	0	0	1	1	0	0	0	1	0
4950 to 5050	0	0	0	0	1	0	1	0	0	1	0
6950 to 7050	0	0	0	1	1	0	0	0	0	1	0
9950 to 10050	0	0	0	1	1	1	0	1	0	1	0
11950 to 12050	0	0	0	1	0	1	1	1	0	1	0
14950 to 15050	0	0	1	1	0	0	0	0	0	1	0
17950 to 18050	0	0	1	1	0	1	0	1	0	1	0
19950 to 20050	0	0	1	1	1	1	1	1	0	1	0
21950 to 22050	0	0	1	1	1	0	0	1	0	1	0
24950 to 25050	0	0	1	0	1	1	1	0	0	1	0
29950 to 30050	0	0	1	0	0	0	0	1	0	1	0
32950 to 33050	0	1	1	0	0	1	1	0	0	1	0
34950 to 35050	0	1	1	0	1	1	0	0	0	1	0

Transponder Connection

To the best of our knowledge the 8800-T encoder is compatible with all late-model transponders that are in current production.

Consult the transponder manufacturer’s installation manual when making the harness connection. Pin 6 of the encoder connector is the strobe line. Logic low (less than 1.2 volts) on this pin enables encoder output. Connect pin 6 to ground if the transponder does not have a strobe connection.

Specifications

Certification:	TSO-C88a
Environmental Categories:	RTCA/DO-160B C1CANMOXXXXXXZBABZZZ
Altitude Range:	-1,000 ft. to 35,000 ft.
Operating Temperature:	-20° to +55° C
Warm-up Time:	6 minutes from 75° F 12 minutes from -4° F
Serial Interface:	RS-232 – from pin 7, 9,600 bps, eight bits, no parity, one stop bit. One message per second. Serial data format is compatible with Trimble Loran and GPS receivers.
Power Input:	+14 to +28 VDC, 300mA (average)
Weight:	11 oz. or 312 grams (without mounting tray)
Dimensions:	6 1/8”L x 3”W x 2 1/8”H (without mounting tray)
Mounting:	Avionics; no orientation specified

Warranty Information



**6831 Oxford Street
St. Louis Park, MN 55426**

Limited Warranty

Shadin Avionics warrants this instrument and system components to be free from defects in materials and workmanship for a period of one year from the user invoice date. Shadin Avionics will repair or replace any item under the terms of this Warranty, provided the item is returned to the factory prepaid.

This obligation assumed by Shadin Avionics under this Warranty is limited to repair, replacement or refund of the product at the sole discretion of Shadin Avionics.

This Warranty shall not apply to any product that has been repaired or altered by any person other than Shadin Avionics or that has been subjected to misuse, accident, incorrect wiring, negligence, improper or unprofessional assembly or improper installation by any person. ***This Warranty does not cover any reimbursement for any person's time for installation, removal, assembly or repair.*** Shadin Avionics retains the right to determine the reason or cause for warranty repair or replacement.

This Warranty does not extend to any aircraft, vehicle, boat, machine or any other device to which this Shadin Avionics product may be installed, connected, attached, interconnected or used in conjunction with in any way.

Shadin Avionics is not responsible for any shipping charges or damages incurred under this Warranty.

No representative is authorized to assume any other liability for Shadin Avionics in connection with the sale or resale of Shadin Avionics' products.

If you do not agree and accept the terms of this Warranty, you may return the product in new condition, with receipt, within thirty (30) days for a refund.

This Warranty is made only to the original user. **THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES OR OBLIGATIONS: EXPRESSED OR IMPLIED. SHADIN AVIONICS EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. PURCHASER AGREES THAT IN NO EVENT SHALL SHADIN BE LIABLE FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGE, INCLUDING LOST PROFITS OR LOSS OF USE OR OTHER ECONOMIC LOSS. EXCEPT AS EXPRESSLY PROVIDED HEREIN, SHADIN AVIONICS DISCLAIMS ALL OTHER LIABILITY TO PURCHASER OR ANY OTHER PERSON IN CONNECTION WITH THE USE OR PERFORMANCE OF SHADIN AVIONICS' PRODUCTS, INCLUDING SPECIFICALLY LIABILITY IN TORT.**

Record of Revisions

Revision Letter	Date	Description
- thru D		Shown for record keeping purposes only. Revisions prior to D were tracked by part number
E	21 Oct 2008	Changed Shadin Logo and Nameplate
F	3 Oct 2011	Altitude Encoder cover paint black. Added Record of Revisions



**6831 Oxford Street
St. Louis Park, MN 55426-4412
U.S.A.**

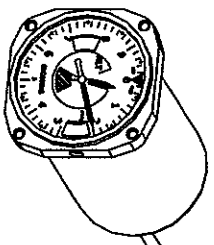
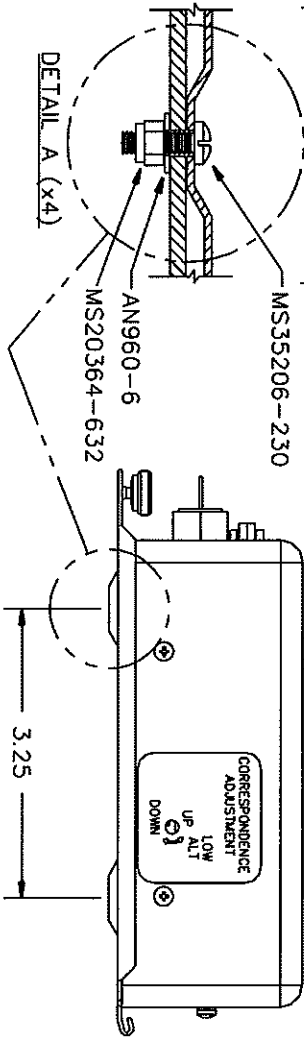
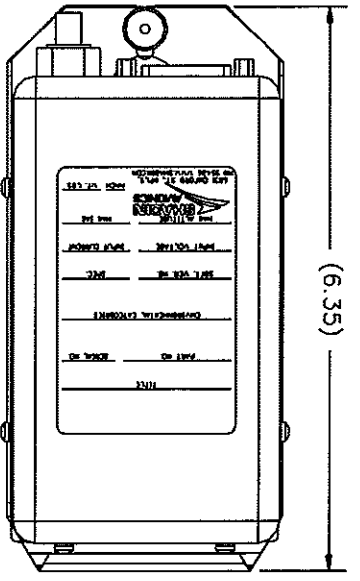
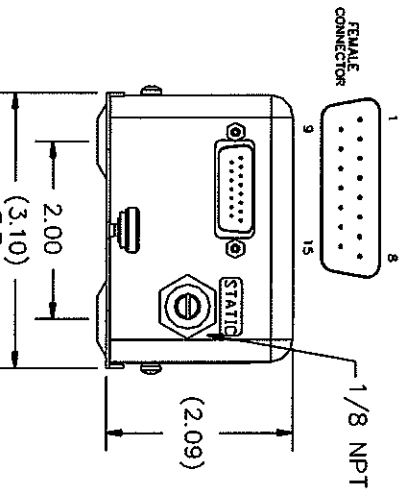
Sales Tel: (800) 328-0584
Tech Support Tel: (800) 388-2849
International Tel: (952) 927-6500
Main/Sales Fax: (952) 924-1111
Tech Support Fax: (952) 924-1122
Sales E-Mail: sales@shadin.com
Tech Support E-Mail: service@shadin.com
Web Site: www.shadin.com

PIN ASSIGNMENT	
#	FUNCTION
1	D4
2	A1
3	A2
4	A4
5	B1
6	STROBE
7	TX 65-232
8	+28VDC
9	B2
10	B4
11	G1
12	C4
13	C2
14	+14VDC
15	AIRFRAME GROUND

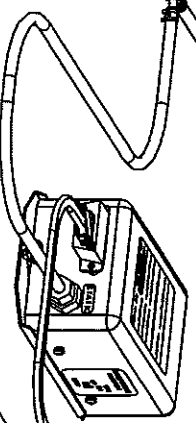
ALTIITUDE ENCODER
 TYPICAL INSTALLATION
 FOR ENCODERS WITH
 S/N E-447 AND UP

MAXIMUM ALTIITUDE TABLE	
MODEL	ALTIITUDE
RMS-200	20,000 FT
RMS-350	35,000 FT

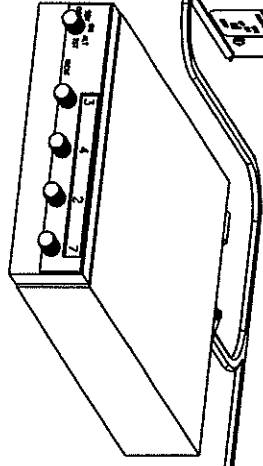
8800-X MODEL TABLE	
MODEL	NAV. RCVR
8800-G	MAGELLAN
8800-M	II MORROW
8800-R	ARNAV
8800-T	TRIMBLE/GARMIN



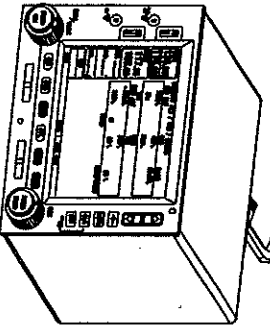
AIRCRAFT ALTIIMETER



ALTIITUDE ENCODER P/NL 8800-X
 MINN. TRAY P/NL 542801A



ATC TRANSPONDER



ENABLE APPROACH MODE
 AND VERTICAL NAV

- NOTES:**
- 1 "X" IS A VARIABLE THAT WHEN REPLACED BY EITHER "G", "M", "R", OR "T", INDICATES WHICH NAVIGATIONAL RECEIVER THE SERIAL DATA OUTPUT IS PROGRAMMED FOR.
 - 2 GROUND THIS PIN IF THE ATC TRANSPONDER DOES NOT HAVE A STROBE LINE.

REV	BY	DATE	APPD	DESCRIPTION
0808/010	F	10/06/08	DRG	UPDATED SHADIN AVONICS LABEL
0303/015	E	3/20/03	PAB	REMOVED HIGH ALT ADJUST. DRG # WAS "8800-021", REDRAWN
N/A	-	3/2/89	RR	BASELINE RELEASE
EOD	REV	DATE	BY	APPD

SCALE: NONE

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES TOLERANCES: XX - ±0.01 X/X ± 1/64 XXX - ±0.01 X,XXX - ±0.005	
FINISH:	N/A
MATERIAL:	N/A

DRAWING DATE 02/02/89	
DRG. P. ICHMAN	APPROVED
RR	RR
FILE NAME: 8800-X/LOW DIRECTORY: 8800-X	SHEET 1 OF 1

MINNEAPOLIS, MN 55426	SHADIN AVONICS
DRAWING NO. 4088-161	SIZE A

INSTALLATION, ALTIITUDE ENCODER	REV F
P/N 8800-X	