

NORTHSTAR 2006 ALTITUDE SERIALIZER

INSTALLATION MANUAL

Revision A
May 12, 1992

Northstar Technologies
a division of CMC Electronics, Inc.
30 Sudbury Road
Acton, Massachusetts 01720
Sales: (978) 897-6600
Service: (978) 897-7251

Current Product Line is now being
maintained by

CMC Electronics Inc.
600 Dr. Frederik Philips Boulevard
Ville Saint-Laurent, Quebec, Canada
H4M 2S9

Tel : 1-888-827-2881 or 514-748-3050

All Manual references to
Northstar should read
CMC Electronics Inc.

REVISION HISTORY

Date	Page	Revision
4/24/92		Initial release

TABLE OF CONTENTS

1.	TECHNICAL INFORMATION	1
1.1	EQUIPMENT DESCRIPTION	2
1.2	TECHNICAL SPECIFICATIONS	2
2.	INSTALLATION INSTRUCTIONS	3
2.1	GENERAL INFORMATION	3
2.1.1	Special installation requirements	3
2.2	UNPACKING AND INSPECTION	3
2.3	INSTALLING THE ALTITUDE SERIALIZER	5
2.3.1	Wiring the serializer	5
2.3.2	System checkout	6
3.	APPROVAL OF THE SERIALIZER	9
4.	FACTORY SERVICE POLICIES	10
4.1	LIMITED WARRANTY POLICY	10
4.2	FACTORY ASSISTANCE BY TELEPHONE	10
4.3	GENERAL SERVICE PROCEDURES	11
4.4	RETURNING THE GPS SENSOR FOR FACTORY SERVICE	11

FIGURES

Figure 1 - Northstar 2006 altitude serializer	4
Figure 2 - M2 mounting tray (rear view)	4
Figure 3 - Wiring diagram	8

TABLES

Table 1 - Altitude Serializer pinout - P1 and P2	5
Table 2 - Altitude Serializer pinout - P3	5
Table 3 - M2 Rear connector pinout	7

SECTION 1

TECHNICAL INFORMATION

This manual explains installation and use of the Northstar 2006 Altitude Serializer. The Serializer is for use with the Northstar M2 or M2V, and provides altitude information from a encoding altimeter or remote encoder. Altitude information provides expanded availability of GPS coverage with reduced pilot workload.

It is recommended that the Northstar 2006 Altitude Serializer be installed as a part of the GPS installation procedure. The serializer connects between the existing encoding altimeter or remote encoder and the transponder.

Note: The serializer will not work with transponders using a pulsed strobe line. Most modern transponders do not use a pulsed strobe. The Serializer must "see" Mode C data at all times. The Serializer will not work with the King KXP-750 transponder. Consult the original manufacturer if the transponder is a Narco AT-50 or AT-50A.

A GPS receiver requires a source of altitude information whenever only three satellites are being received. The pilot may input his altitude manually into the M2, but it must be kept up to date as altitude is changed in order to provide accurate navigation. The serializer provides this altitude information automatically.

Note that reception from satellites can be lost when the aircraft banks for a turn. It is not unusual to receive only 3 satellites when 5 or 6 are overhead. The serializer will continue to provide navigation benefits even after all satellites are launched and the GPS system has been declared operational.

Information for operating this unit is contained in the Northstar M2 Reference Manual, which is supplied with the navigator unit.

The Northstar M2V is a VFR-only version of the Northstar M2. In the remainder of this manual, the term "M2" is used to refer to both the M2 and the M2V.

1.1 EQUIPMENT DESCRIPTION

The Northstar 2006 Altitude Serializer converts the gray-coded parallel data from an encoding altimeter or remote encoder into a serial data format for transmission to the Northstar M2. The serializer is designed with high-impedance input circuits, to have no effect on the output of the encoder to which it is connected.

1.2 TECHNICAL SPECIFICATIONS

Physical Characteristics

- | | |
|----------------|------------------------|
| 1. Weight: | 5 oz |
| 2. Dimensions: | 4.2" by 3.00" by 1.00" |

Electrical Requirements

- | | |
|-------------|----------------|
| 1. Voltage: | 14 or 28 volts |
| 2. Current: | 0.020 A |
| 3. Power: | 0.5 Watts |

SECTION 2

INSTALLATION INSTRUCTIONS

2.1 GENERAL INFORMATION

This section contains information for installing and wiring the Northstar 2006 Altitude Serializer. All installation procedures should follow approved aviation practices, methods and techniques as described in Advisory Circulars 43.13-1A and 43.13-2A.

2.1.1 Special Installation Requirements

Turn off power to the M2 mounting tray (using the avionics master switch or circuit breaker) before inserting or removing the M2 from the tray (even if the unit's power switch is turned off). This will prevent inrush current from arcing across the power connector.

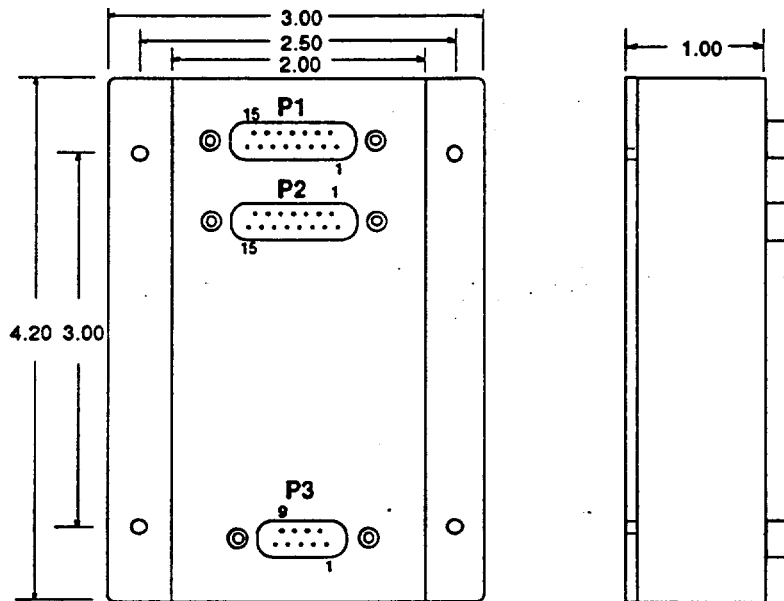
2.2 UNPACKING AND INSPECTION

The shipping carton contains the following components and parts:

1. 2006 Altitude Serializer
2. 2006 Installation Manual (GM435)
3. Parts Kit containing connectors

Be sure all parts are present and have sustained no shipping damage. If there is evidence of shipping damage, save the shipping carton and packing material to help substantiate your claim to the shipping company.

Keep a Northstar GPS shipping carton on hand in case it becomes necessary to return the GPS to the factory for service.



ALL DIMENSIONS IN INCHES

FIGURE 1
2006 ALTITUDE SERIALIZER

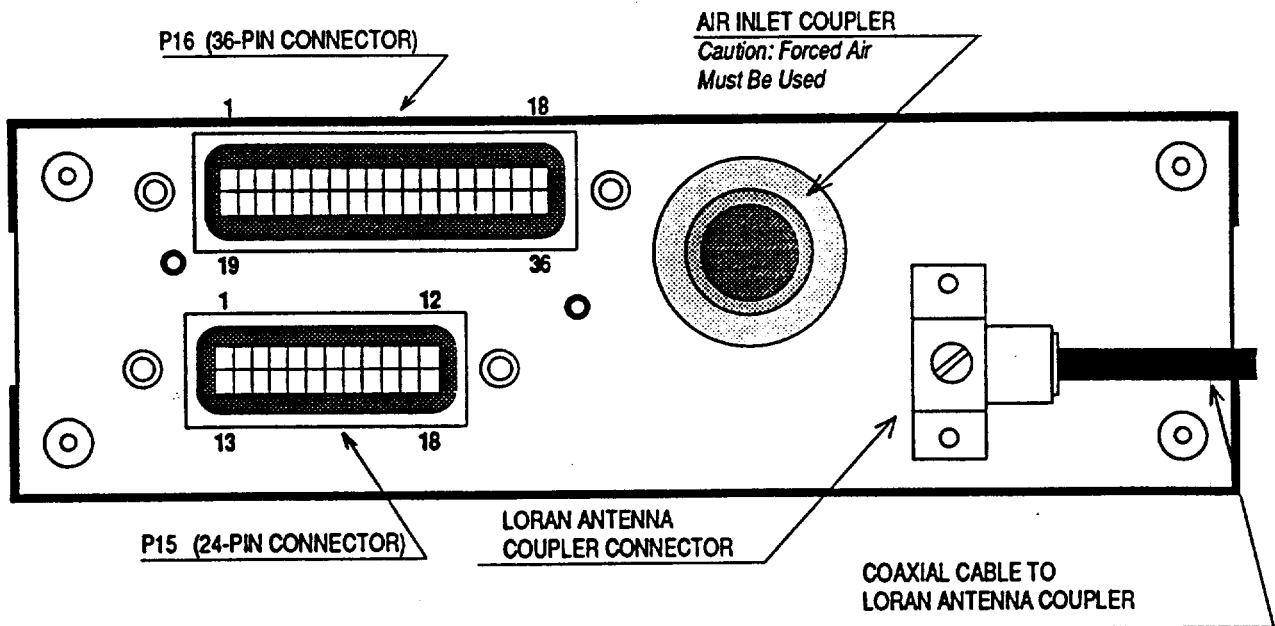


FIGURE 2
M2 NAVIGATOR MOUNTING TRAY (REAR VIEW)

2.3 INSTALLING THE ALTITUDE SERIALIZER

2.3.1 Wiring the serializer

An installer-fabricated cable is connected between connector P3 of the serializer and pins 9, 10 and 36 of the M2's 36-pin connector (P16), as shown on the wiring diagram on page 8. An additional cable is connected between the remaining serializer connector and the transponder. The cable from the altitude encoder is plugged in to either P1 or P2 of the serializer. The pinout of connectors P1 and P2 is shown below:

Pin	Function	Pin	Function
1	D4	9	B2
2	A1	10	B4
3	A2	11	C1
4	A4	12	C4
5	B1	13	C2
6	AUX 2	14	+ 14v
7	AUX 1	15	GND
8	+ 28v		SHELL GND

**TABLE 1
ALTITUDE SERIALIZER PINOUT - P1 AND P2**

The serializer pinout listed above matches that of most popular encoders. (Note that connections for C2 and C4 may appear to be reversed from what might be expected, but they are correct as listed above.)

Some encoders do not provide internal pullup voltage to their outputs. Refer to the manufacturer's specifications to determine whether pullup resistors are needed. If required, pullup resistors must be provided on all code lines from the encoder (pins 1, 2, 3, 4, 5, 9, 10, 11, 12 and 13). Connect a 10K 1/4 Watt resistor from each of these pins to either pin 8 (for a 28-volt system) or pin 14 (for a 14-volt system). These resistors may be mounted in the empty connector shell which would normally lead to the transponder.

Power for the serializer is supplied on either Pin 8 (for 24 volt systems) or Pin 14 (for 14 volt systems). Power should be supplied through the cable connected to P1, and should be derived from a breaker separate from that feeding the transponder.

Pin	Function	Pin	Function
1	N/C	6	N/C
2	RS-422 out B (to M2 P16, pin 10)	7	RS-422 out A (to M2 P16, pin 9)
3	N/C	8	jumper to P3 pin 9
4	N/C	9	jumper to P3 pin 8
5	N/C		SHELL GND

**TABLE 2
ALTITUDE SERIALIZER PINOUT - P3**

Pins 8 and 9 of connector P3 must be jumpered together to set the serializer's baud rate to match the M2's requirement.

The M2's serial input port is always active; no setup initialization is required for operation with the serializer.

2.3.2 System checkout

Software version 01.03 and earlier:

The serializer output can be tested by using the M2 to display the output from the serializer. The M2 will display the encoder's altitude if a GPS sensor is connected to the M2, provided it is not receiving four or more satellites. To be sure the GPS sensor is not receiving four or more satellites, use one of the following techniques:

1. Disconnect the GPS antenna, or
2. Run the test inside the hanger (this may or may not block the signals), or
3. Cover the GPS antenna with aluminum foil or other signal blocker, or
4. Run the test during the first minute after power-on, before the sensor acquires signals.

The encoder altitude is displayed as one of the **SETUP** functions. The transponder must be turned on to supply "pull-up" voltage to the serializer inputs.

Software version 01.04 and later:

To display the serializer output, turn the *large secondary* knob to **SETUP**, and turn the *small secondary* knob to display **RAW ENCODER ALTITUDE**. The secondary readout will show the altitude information as it is received from the serializer.

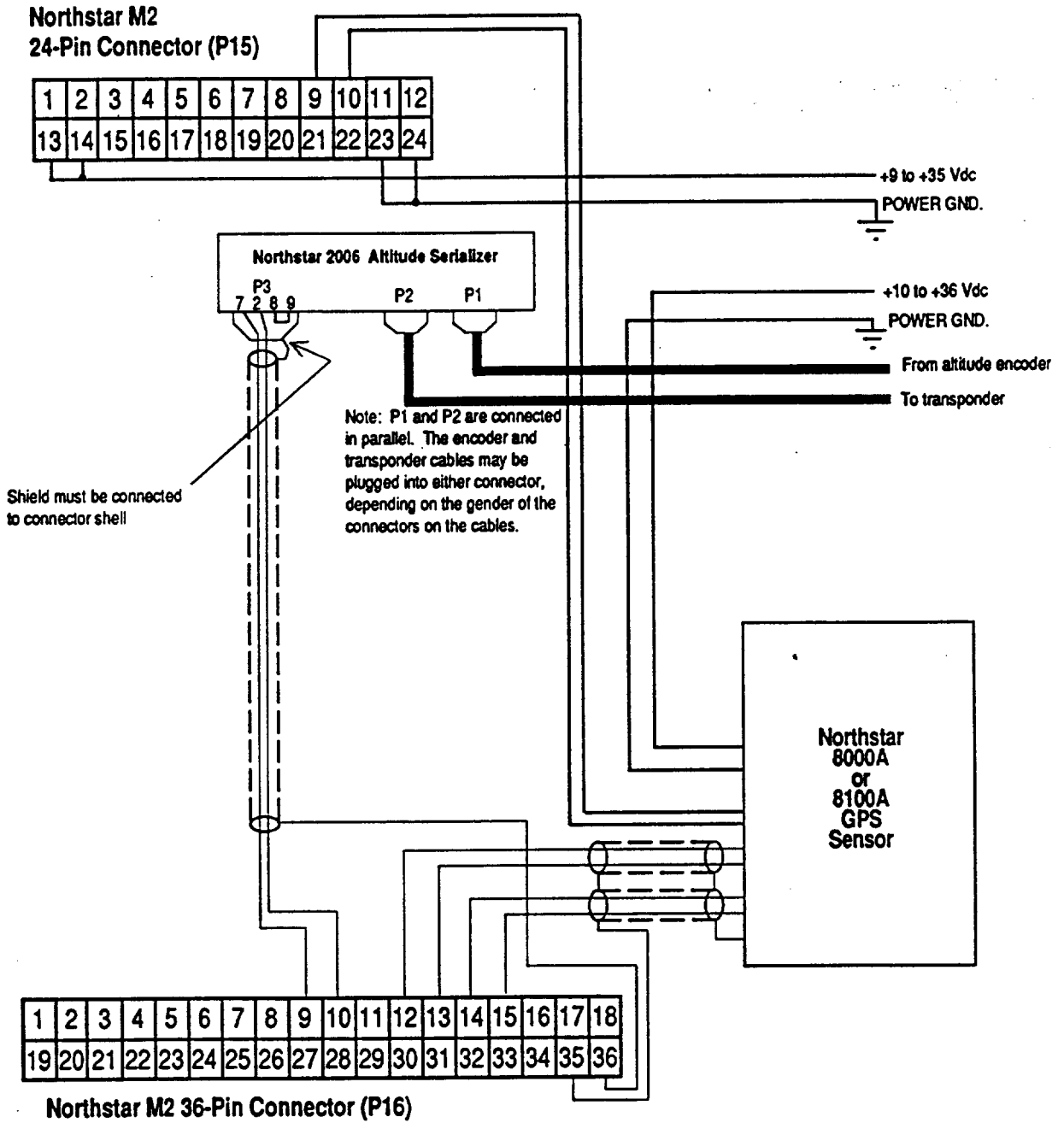
24-PIN CONNECTOR (P15)
Pin Function

1	Nav Flag +
2	CDI + Right deviation
3	CDI + Left deviation
4	Nav Flag -
5	Ground
6	RS-485 serial A out
7	N/C
8	N/C
9	Ground
10	+5 volt out
11	RS-485 serial B out
12	WAYPOINT ALERT annunciator out
13	9-35 VDC power input
14	9-35 VDC power input
15	N/C
16	Ground
17	Ground
18	N/C
19	N/C
20	WARN annunciator out
21	PARALLEL OFFSET annunciator out
22	Ground
23	Power Ground
24	Power Ground

36-PIN CONNECTOR (P16)
Pin Function

1	RS-232 serial in (future use)
2	RS-232 serial out (future use)
3	To/From pointer (+ To)
4	Reserved - do not use
5	Reserved - do not use
6	Reserved - do not use
7	RS-422 serial B out (future use)
8	RS-422 serial A out (future use)
9	RS-422 serial B in (to 2006 P3, pin 7)
10	RS-422 serial A in (to 2006, P3, pin 2)
11	VFR annunciator out
12	GPS output B
13	GPS output A
14	GPS input B
15	GPS input A
16	Reserved - do not use
17	Reserved - do not use
18	Reserved - do not use
19	Reserved - do not use
20	Reserved - do not use
21	Reserved - do not use
22	Reserved - do not use
23	Reserved - do not use
24	Reserved - do not use
25	Reserved - do not use
26	Reserved - do not use
27	Reserved - do not use
28	Reserved - do not use
29	Reserved - do not use
30	Reserved - do not use
31	Reserved - do not use
32	Reserved - do not use
33	Reserved - do not use
34	To/From pointer (+ From)
35	Ground
36	Ground

TABLE 3
M2 REAR CONNECTOR PIN CONNECTIONS



**FIGURE 3
WIRING DIAGRAM**

SECTION 3

APPROVAL OF THE SERIALIZER

The serializer monitors the signals on the encoding altimeter output through high impedance circuits, and is designed to have no effect on the operation of the encoding altimeter. It is a (fail) passive element, and does not affect the technical integrity of the transponder. It is recommended that the details of any particular installation be reviewed in advance with the FAA General Aviation or Flight Standards District Office prior to installation.

SECTION 4

FACTORY SERVICE POLICIES

4.1 LIMITED WARRANTY POLICY

Northstar Avionics warrants the 2006 Altitude Serializer to be free from defects in materials and workmanship for a period of two (2) years from the date of shipment to an authorized dealer. This warranty applies to the original purchaser and/or subsequent owner.

This warranty covers repair and/or replacement, at our option, of any parts found to be defective, provided such defects in our opinion are due to faulty material or workmanship and are not caused by tampering, abuse, or normal wear.

ALL WARRANTIES ARE F.O.B.:

**Northstar Avionics
30 Sudbury Road
Acton, Massachusetts 01720**

Northstar Avionics will not accept or pay for any charges for warranty work performed outside of our plant.

This warranty applies only to products in normal use. It does not apply to units or circuit boards defective due to improper installation, physical damage, tampering, lightning or other electrical discharge, units with altered serial numbers, or units repaired by unauthorized persons or in violation of Northstar Avionics service procedures.

Northstar Avionics assumes no responsibility for any consequential losses of any nature with respect to any products or services sold, rendered, or delivered.

The foregoing are the only warranties expressed or implied. No other warranties exist.

4.2 FACTORY ASSISTANCE BY TELEPHONE

Please feel free to call on our technical staff at any time for assistance in service or installation. Call (508) 897-7251 between 9AM and 5PM Eastern Time, Monday through Friday. We do not accept collect calls. Please have the serial number of the unit available when you call, along with as many details of the problem as possible.

4.3 GENERAL SERVICE PROCEDURES

Repair of the Northstar 2006 Altitude Serializer is performed at the factory. The only costs for factory repair of a unit still under warranty are the shipping charges.

4.4 RETURNING THE ALTITUDE SERIALIZER FOR FACTORY SERVICE

Securely pack the unit in the original Northstar shipping carton and return it to the address shown in Section 3.1. Include your name and complete shipping address, telephone number, a complete description of the problem, and the desired return date and shipping method. If not specified, units will normally be returned in about one week, by UPS ground transportation. Use air express and specify your requirements if faster service is required. In emergencies, we can usually meet any reasonable request.

New units will not be supplied to replace those that have failed. Units returned for credit instead of repair will be charged a 15% restocking charge.

INDEX

altimeter 1
altitude serializer 1, 4
factory assistance 10
inspection 3
restocking charge 11
service procedures 11
specifications 2
transponder 1
unpacking 3
warranty policy 10
wiring diagram 8