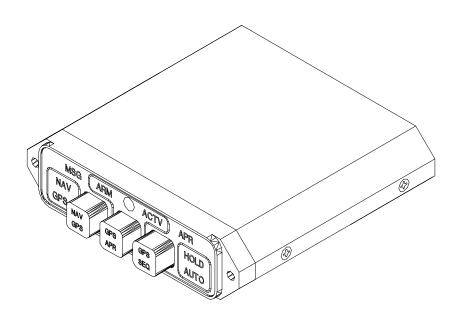


INSTALLATION MANUAL AND OPERATING INSTRUCTIONS

MD41-() Series GPS ANNUNCIATION CONTROL UNIT FOR GARMIN GPS 155XL / GNC 300 / GNC 300XL

MFG. P/N: MD41-1448	28VDC	Horizontal Mount
MFG. P/N: MD41-1444	14VDC	Horizontal Mount
MFG. P/N: MD41-1458	28VDC	Vert. Mount (shown on page 11)
MFG. P/N: MD41-1454	14VDC	Vert. Mount (shown on page 11)



Mid-Continent Instruments and Avionics 9400 E. 34th Street N., Wichita, KS 67226 USA Phone 316-630-0101 • Fax 316-630-0723 Manual Number 7019813 REV. 2 Feb. 24, 1998

MANUAL REVISION AND HISTORY

MANUAL: MD41-1444, -1448, -1454, -1458, -1448(5v), -1458(5v) REVISION: 1Oct. 18, 1997 MANUAL NUMBER: 7019813

This revision level of this manual consist of the following changes:

Added AlliedSignal KI 208A/209A Navigation Indicators to be used with the MD41-144X/145X series ACU in place of the MD41-244/248 series Relay Units.

REVISION: 2 Feb 24, 1998 Added GPS 155XL and GNC 300XL GPS receivers.

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	-

APPENDIX

ENVIRONMENTAL QUALIFICATION FORM

SECTION 1 GENERAL DESCRIPTION

1.1 INTRODUCTION

The MD41-() is a compact, self -contained GPS Annunciation and Control unit. It combines all the necessary functions required to interface the Garmin GPS 155XL, GNC 300 and GNC 300XL approach certified GPS receivers with the MD41-244/248 remote mounted relay transfer system. In addition, the MD41-() contains several GPS status annunciations used to indicate modes selected by the front panel switches and various inputs from the GPS receiver.

A special ILS override feature has been incorporated to cause the MD41-() to automatically switch to the NAV mode when the NAV (VOR) receiver is tuned to an ILS frequency. Other features include dual 20,000 hour lamps used for all annunciations, internally lighted selection switches and automatic photocell dimming. A external annunciation dimming adjustment is provided for balancing low level light conditions.

The MD41-144X/145X series annunciation control unit must be installed with the companion MD41-244/248 series Relay Unit or the AlliedSignal KI 208A/209A course deviation indicator to be approved as a complete TSO'd system.

1.2 SPECIFICATIONS, TECHNICAL

1.2.1 PHYSICAL CHARACTERISTICS

Mounting:	Panel
Width:	3.25 Inches
Height:	0.80 Inches
Depth:	3.20 Inches
Weight:	0.50 lbs.

1.2.2 ENVIRONMENTAL CHARACTERISTICS

TSO Compliance:	TSO C129
Applicable Documents:	RTCA DO-160C, DO-208
Operating Temperature Range:	-55°C to +70°C
Humidity:	95% Non-Condensing
Altitude Range:	0 to 55,000 ft.
Vibration:	Cat. M and N
Operational Shock:	Rigid Mounting, 6 G Operational 15 G Crash Safety

1.2.3 SPECIFICATIONS, ELECTRICAL

Design	All Solid State
MD41-1444/1454 (14VDC)	0.40 Amps
MD41-1448/1458 (28VDC)	0.30 Amps
MD41-1448(5V)/1458(5V) (28DC)	0.30 Amps

1.2.4 FRONT PANEL CONTROLS AND ANNUNCIATIONS

1.2.4.1 CONTROLS

NAV/GPS	Alternate action switch, when pressed, will select NAV (VOR) GPS presentation on HSI/CDI.
GPS/APR	Momentary switch, when pressed, will arm GPS Approach Mode.
GPS/SEQ	Alternate action switch, when pressed, will select between AUTO and HOLD modes.

1.2.4.2 ANNUNCIATIONS

NAV	NAV (VOR) information presented on the HSI or CDI.
GPS	GPS information presented on the HSI or CDI.
ARM	GPS is armed for automatic transition to approach mode.
ACTV	GPS is actively engaged in the approach mode.
HOLD	This will activate the course selector and also disable
	the automatic GPS waypoint sequencing.
AUTO	This will disable the course selector input to the GPS
	and will enable automatic GPS waypoint sequencing.
MSG	GPS message alert, from the GPS receiver.
WPT	GPS waypoint alert, from the GPS receiver.

1.2.5 INTERFACE

NAV annunciation	Receives ground from transfer relay
J1 Pin 2	when relays are in NAV mode.
GPS annunciation J1 Pin 1	Receives ground from transfer relay when relays are in GPS mode.

connection)	Lamp Test J1 Pin 7	Receives ground from remote test switch to light all annunciations.(optional
	APR ARM Select J1 Pin 6	Provides a momentary logic low to the GPS receiver when approach arm is selected.
	APR ARM J1 Pin 4	Receives a logic low from the GPS receiver to annunciate ARM.
	GPS/SEQ select J1 Pin 10	Provides a logic low to the GPS receiver when HOLD is selected.
	GPS APR ACTV J1 Pin 8	Receives a logic low from the GPS receiver when a transition is made from arm to active.
	MSG and WPT annunciation	A logic low will cause the appropriate annunciation to illuminate. GPS receiver must be able to accept 100ma.
	ILS Override JI Pin 15	Receives a logic low from the NAV (VOR) receiver when tuned to an ILS frequency. This will force the MD41-() into NAV mode regardless of the NAV/GPS selection. This connection is optional.
	FCS LOC ENGAGE J1 pin 11	Logic low when GPS is in ACTIVE mode. Used to provide a ILS ground to the flight control system when the GPS is approach active.

1.2.6 EQUIPMENT LIMITATIONS

The MD41-() series control units contain specific dash numbers to be used with various GPS receivers. The installer must match the correct controller part number with the GPS receiver being installed.

The conditions and tests required for TSO approval of this article are minimum performance standards. It is the responsibility of those desiring to install this article either on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within the TSO standards. The article may be installed only if further evaluation by the applicant documents an acceptable installation and is approved by the Administrator.

The MD41-1444/1454/1448/1458/1448(5V)/1458(5V) ACU **MUST** be installed with the Mid-Continent Instruments and Avionics MD41-244/248 remote transfer relay or the AlliedSignal KI 208A/209A course deviation indicator in order to be approved as a complete TSO system. These items will not be TSO'd if one is installed without the other.

The MD41-1444/1454/1448/1458/1448(5V)/1458(5V) is TSO'D and certified for use with the Garmin GPS 155XL, GNC 300 and GNC 300XL GPS systems. Any attempts to install the listed units in an installation other than the listed GPS receivers is prohibited. **This will void the TSO.**

<u>NOTE</u>: Anytime the MD41-() is disconnected or removed from the aircraft, the HSI/CDI will default to NAV (VOR) mode.

1.2.7 MAJOR COMPONENTS

This system is comprised of two major components, the MD41-144X/145X series GPS Annunciation Control Unit and the MD41-244/248 Remote Relay or the AlliedSignal KI 208A/209A course deviation indicator.

SECTION 2 INSTALLATION CONSIDERATIONS

2.1 COOLING

No direct cooling is required. As with any electronic equipment, overall reliability may be increased if the MD41-() is not located near any high heat source or crowded next to other equipment. Means of providing a gentle air flow will be a plus.

2.2 EQUIPMENT LOCATION

The MD41-() must be mounted as close to the pilot's field of view as possible. The preferable location is near the HSI/CDI that will be displaying the GPS information. The unit depth, with connector attached, must also be taken into consideration. Note: Unlike previous versions of the MD41 Annunciation Control Units (ACU), the transfer relays have been removed and are now remotely mounted in a separate package designated as the MD41-244/248 Relay Unit. This has allowed a for a smaller size ACU which now provides more options for panel mounting. For systems that utilize the AlliedSignal KI208A/209A, the transfer relays are internal to the indicator.

2.3 ROUTING OF CABLES

Care must be taken not to bundle the MD41-() logic and low level signal lines with any high energy sources. Examples of these sources include 400 HZ AC, Comm, DME, HF and transponder transmitter coax. Always use shielded wire when shown on the installation print. Avoid sharp bends in cabling and routing near aircraft control cables.

SECTION 3 INSTALLATION PROCEDURES

3.1 GENERAL INFORMATION

This section contains interconnect diagrams, mounting dimensions and other information pertaining to the installation of the MD41-(). After installation of cabling and before installation of the equipment, ensure that power is applied only to the pins specified in the interconnect diagram.

3.2 UNPACKING AND INSPECTING EQUIPMENT

When unpacking equipment, make a visual inspection for evidence of damage incurred during shipment. The following parts should be included:

- 1. MD41-1444 (14volt) or MD41-1448 (28 volt) Horiz. Mount MD41-1454 (14volt) or MD41-1458 (28volt) Vert. Mount MD41-1448(5V) (28volt) 5 volt button lighting Horiz. Mount MD41-1458(5V) (28volt) 5 volt button lighting Vert. Mount
- 2. J1 Connector Kit (25 pin). MCI PN 7014517
- 3. Installation Manual. MCI PN 7019813

3.3 MOUNTING THE MD41-()

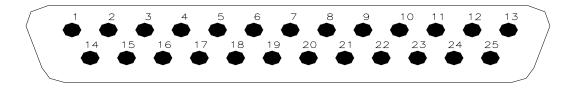
Plan a location in the aircraft for the MD41-() to be mounted as close to the pilot's field of view as possible. The preferable location is near the HSI/CDI that will be displaying the GPS information. Avoid mounting close to heater vents or other high heat sources. Allow a clearance of at least 3 inches from back of unit for plug removal.

The indicator is secured in place behind the panel since it is designed for rear mount only. Make a panel cutout as shown in Figure 3-2 Secure the indicator in place with two 4-40 x 3/8 flat head phillips screws.

3.4 INSTALLATION LIMITATIONS

Wire the aircraft harness according to figure 3-3 or 3-4. Use at least 24 AWG wire for all connections. Avoid sharp bends and routing cable near high energy sources. Care must be taken to tie the harness away from aircraft controls and cables. Normal installation techniques should be applied. Also see equipment limitations, section 1.2.6.

J1 CONNECTOR

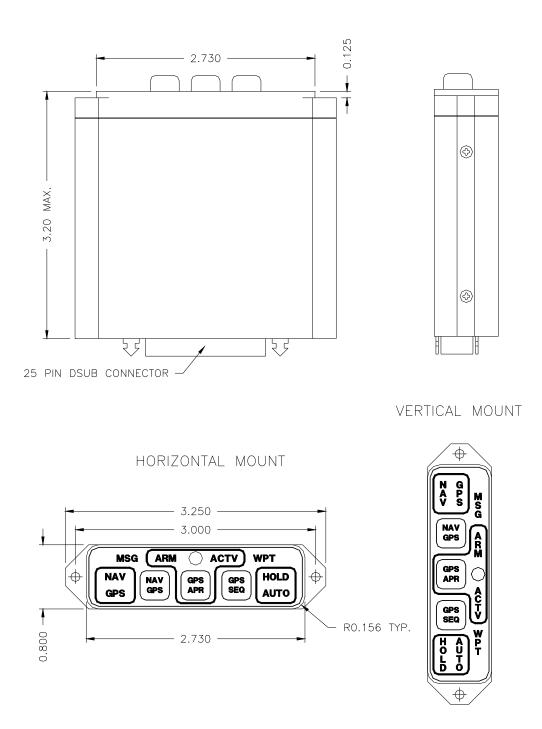


REAR VIEW OF J1 (bottom) CONNECTOR

J1 PIN NO.

1	GPS ANNUNCIATION (receives ground from remote transfer relays)
2	NAV ANNUNCIATION(receives ground from remote transfer relays)
3	MSG ANNUNCIATION (receives logic low from GPS receiver)
4	ARM ANNUNCIATION (receives logic low from GPS receiver)
5	DIMMER IN (from aircraft dimming bus)
6	GPS APR ARM SELECT (logic low sent to GPS)
7	LAMP TEST (receives ground from remote test switch)(optional conn.)
8	ACTV ANNUNCIATION (receives logic low from GPS receiver)
9	WPT ANNUNCIATION (receives logic low from GPS receiver)
10	GPS SEQ HOLD LOW (logic low to the GPS)
11	FCS LOC ENGAGE (provides ground when GPS is in active mode)(for
	autopilot)
12	TO NAV CIRCUIT BREAKER (for fault monitoring)
13	14 or 28 VDC UNIT POWER (depends on dash number)
14	EXTERNAL RELAY ENERGIZE (provides ground to energize remote
	transfer relays when GPS is selected)
15	ILS FROM NAV (VOR) REC. (for ILS override) (optional)
16	SPARE
17	SPARE
18	SPARE
19	SPARE
20	SPARE
21	SPARE
22	SPARE
23	SPARE
24	SPARE
25	POWER GROUND

FIGURE 3-1 SCHEMATIC PINOUT, 25 PIN DSUB



Note 1: Use two 4-40 X 3/8" Flat Head Phillips Screws for Mounting

FIGURE 3-2 OUTLINE DRAWING

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335 CPS TROW+ 4 THIS DRAWING. 386 CPS TROW+ 2 1 387 CPS D-BAR RICHT+ 1 1 42 CPS D-BAR RICHT+ 1 14 43 CPS STATOR F 37 37 44 CPS STATOR C 37 37 45 CPS STATOR C 35 HSI/CDI 48 CPS STATOR C 35 HSI/CDI 18 FLAC+ 1 14 20 FROM+ 1 1 21 TO+ 35 HSI/CDI 22 D-BAR RIGHT+ 1 1 23 NAV FROM 1 1 24 CRTOR C 1 1 23 D-BAR RIGHT+ 1 1 24 STATOR C 1 1 25 STATOR C 1 1 26 ROTOR C 1 1 27 ROTOR C 1 1 28 STATOR E 1 1 310 STATOR E 1<			GPS 155XL
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38 CPS T0-4 2 39 CPS D-BAR LEFT+ 1 42 CPS ROTOR C 14 44 CPS STATOR F 37 45 CPS STATOR C 35 46 CPS STATOR C 35 47 CPS STATOR C 37 48 CPS STATOR C 35 48 CPS STATOR C 35 19 FLAC+ 14 19 FLAC+ 14 20 FROM+ 14 21 10+ 14 22 D-BAR RCHT+ 14 23 D-BAR RCHT+ 14 24 STATOR C 14 25 STATOR C 14 26 ROTOR C 14 27 ROTOR H 14 28 STATOR D 14 31 STATOR C 14 31 NAV FROM+ 14 3 NAV FROM+ 14 3 NAV FROM 14 3 NAV FROM + 14 3	J1 T	OP GPS FLAG+	JI NOTE: THIS IS A 24 POLE REL
33 GPS D -BAR LEFT+ 1 40 GPS D -BAR RIGHT+ 14 43 GPS ROTOR C 14 44 GPS STATOR F 37 45 GPS STATOR C 14 46 GPS STATOR C 14 46 GPS STATOR C 15 19 FLAG- 1 20 FROM+ 1 21 TO+ 1 22 D-BAR RIGHT+ 1 23 D-BAR RIGHT+ 1 24 ROTOR C 1 27 ROTOR C 1 28 STATOR C 1 29 STATOR C 1 21 TO+ 1 28 STATOR C 1 30 STATOR C 1 31 NAV FLAG- 1 35 NAV FLAG- 1 36 NAV FLAG- 1 37 NAV FLAG- 1 37 NAV FLAG- 1 37 NAV FLAG- 1 38 NAV FLAG-	J1 T 34 35	OP GPS FLAG+ GPS FLAG	JI NOTE: THIS IS A 24 POLE REL
GP GPS D-BAR RICHT+ 14 42 GPS ROTOR C 14 44 GPS STATOR F 37 46 GPS STATOR D 35 46 GPS STATOR C 14 47 GPS STATOR D 35 48 GPS STATOR D 14 48 GPS STATOR C 14 19 FLAG- 14 20 FROM+ 12 21 TO+ 12 22 D-BAR RIGHT+ 12 23 D-BAR RIGHT+ 14 24 ROTOR C 12 27 ROTOR C 12 28 STATOR F 14 29 STATOR C 14 21 NAV FLAG+ 14 21 NAV FROM + 14 23 D-BAR RIGHT+ 14 24 NAV FLAG- 14 31 NAV FROM + 14 32 NAV FROM + 14 33 NAV FROM + 14 34 NAV O-BAR RIGHT+ 14 <tr< td=""><td>J1 T 34 35 36</td><td>OP</td><td>NOTE: THIS IS A 24 POLE REL NOT ALL POLES ARE SHOWN C</td></tr<>	J1 T 34 35 36	OP	NOTE: THIS IS A 24 POLE REL NOT ALL POLES ARE SHOWN C
42 GPS ROTOR C 14 43 GPS STATOR F 37 45 GPS STATOR F 37 46 GPS STATOR C 35 47 GPS STATOR F 10 48 GPS STATOR E 11 18 FLAG+ 12 19 FLAG+ 12 20 FROM+ 12 21 TO+ 12 22 D-BAR RIGHT+ 12 23 O-BAR RIGHT+ 12 24 ROTOR C 12 25 STATOR C 12 29 STATOR C 12 30 STATOR C 14 21 NAV FLAG+ 14 28 STATOR C 14 29 STATOR C 14 10 NAV FLAG+ 14 11 NAV FLAG+ 14 12 NAV D-BAR RIGHT+ 14 13 NAV FLAG- 14 14 NAV D-BAR RIGHT+ 14 15 NAV D-BAR RIGHT+ 14	J1 T 34 35 36 38	OP GPS FLAG+ GPS FLAG+ GPS FROM+ GPS TO+ GPS TO+	J1 NOTE: THIS IS A 24 POLE REL 3 NOT ALL POLES ARE SHOWN C 4 THIS DRAWING.
43 GPS ROTOR H 37 44 GPS STATOR C 37 45 GPS STATOR C 35 46 GPS STATOR E 10 18 FLAG+ 12 20 FROM+ 12 21 TO+ 12 22 D-BAR RIGHT+ 12 23 D-BAR RIGHT+ 12 24 STATOR F 12 25 STATOR C 12 26 ROTOR C 12 27 ROTOR C 12 28 STATOR D 12 310 STATOR E 12 311 STATOR E 12 31 NAV FLAC+ 14 21 NAV FLAC+ 14 23 NAV FROM+ 15 31 NAV FLAC+ 14 31 NAV FLAC+ 14 32 NAV FLAC+ 14 33 NAV FLAC+ 14 34 NAV STATOR C 14 36 NAV STATOR C 14 37	J1 T 34 35 36 38 39	OP GPS FLAG+ GPS FLAG GPS FROM+ GPS TO+ GPS D-BAR LEFT+	J1 NOTE: THIS IS A 24 POLE REL 3 NOT ALL POLES ARE SHOWN C 4 THIS DRAWING.
44 GPS STATOR F 37 45 GPS STATOR D 35 46 GPS STATOR E HSI/CDI 18 FLAG+ 1 19 FLAG- 1 20 FROM+ 1 21 TO+ 1 23 D-BAR LEFT+ 1 24 FROM+ 1 25 ROTOR C 1 28 STATOR F 1 29 STATOR F 1 20 STATOR C 1 28 STATOR C 1 30 STATOR R C 1 31 STATOR R C 1 2 NAV FLAG- 1 3 NAV FLAG- 1 3 NAV FROM+ 1 4 NAV D-BAR RIGHT+ 1 3 NAV ROTOR C 1 4 NAV STATOR C	J1 T 34 35 36 38 39 40	OP GPS FLAG+ GPS FLAG GPS FROM+ GPS T0+ GPS T0-BAR LEFT+ GPS D-BAR RIGHT+	J1 NOTE: THIS IS A 24 POLE REL 3 NOT ALL POLES ARE SHOWN C 4 THIS DRAWING.
45 GPS STATOR G	J1 T 34 35 36 38 39 40 42	OP GPS FLAG+ GPS FLAG+	J1 NOTE: THIS IS A 24 POLE REL 3 NOT ALL POLES ARE SHOWN C 4 THIS DRAWING.
46 GPS STATOR D 35 HSI/CDI 48 GPS STATOR E HSI/CDI 19 FLAG- Image: Stator Constraints Image: Stator Constraints 20 FROM+ Image: Stator Constraints Image: Stator Constraints Image: Stator Constraints 21 TO+ Image: Stator Constraints Image: Stator Constraints Image: Stator Constraints Image: Stator Constraints 22 OBAR RIGHT + Image: Stator Constraints Image: Stator Constraints Image: Stator Constraints Image: Stator Constraints 23 OBAR LEFT + Image: Stator Constraints Image: Stator Constraints Image: Stator Constraints Image: Stator Constraints 31 STATOR Constraints Image: Stator Constraints Image: Stator Constraints Image: Stator Constraints 31 STATOR Constraints Image: Stator Constraints Image: Stator Constraints Image: Stator Constraints 31 NAV FLAG- Image: Stator Constraints Image: Stator Constraints Image: Stator Constraints 31 NAV FLAG- Image: Stator Constraints Image: Stator Constraints Image: Stator Constraints Image: Stator Constator Constator Constator Constraints Image: Stator	J1 T 34 35 36 38 39 40 42 43	OP GPS FLAG+ GPS FLAG+	J1 NOTE: THIS IS A 24 POLE REL 3 NOT ALL POLES ARE SHOWN C 4 THIS DRAWING.
IB CPS STATOR E HSI/CDI IB FLAG+ HSI/CDI 20 FROM+ Image: Stator F 21 TO+ Image: Stator F 23 D-BAR RIGHT+ Image: Stator F 26 ROTOR C Image: Stator F 28 STATOR F Image: Stator F 29 STATOR G Image: Stator F 21 NAV FLAG+ Image: Stator F 2 NAV FLAG+ Image: Stator F 1 NAV FLAG+ Image: Stator F 2 NAV FLAG+ Image: Stator F 3 NAV FLAG+ Image: Stator F 1 NAV D-BAR LEFT+ Image: Stator F 3 NAV TOLGH Image: Stator F 3 NAV TOLGH Image: Stator F 1 NAV STATOR C Image: Stator F 3 NAV STATOR C Image: Stator F 10 NAV STATOR F Image: Stator F 11 NAV STATOR C Image: Stator F 12 NAV STATOR F Image: Stator F 13 NAV STATOR F Image: Stator F	J1 T 34 35 36 38 39 40 42 43 44	OP GPS FLAG+ GPS FLAG+	J1 NOTE: THIS IS A 24 POLE REL 3 NOT ALL POLES ARE SHOWN C 4 THIS DRAWING.
18 FLAG+ 19 FLAG- 20 FROM+ 21 TO+ 22 D-BAR RICHT+ 23 D-BAR RICHT+ 26 ROTOR C 27 ROTOR C 28 STATOR F 29 STATOR C 29 STATOR C 21 TO+ 1 NAV FLAG+ 2 NAV FROM+ 3 NAV FROM+ 5 NAV TO+ 6 NAV ROTOR C 9 NAV STATOR F 10 NAV STATOR C 11 NAV STATOR C 12 NAV STATOR C 13 NAV STATOR C 10 NAV STATOR C 11 NAV STATOR C 12 NAV STATOR C 13 NAV STATOR C 13 NAV STATOR C 13 NAV STATOR C 14 NAV STATOR C 15 NAV STATOR C 16 SPARE	J1 T 34 35 36 38 39 40 42 43 44 45	OP GPS FLAG+ GPS FLAG+	J1 NOTE: THIS IS A 24 POLE REL 3 NOT ALL POLES ARE SHOWN C 4 THIS DRAWING.
19 FLAG- 20 FROM+ 21 TO+ 22 D-BAR LEFT+ 23 D-BAR RIGHT+ 26 ROTOR C 27 ROTOR C 28 STATOR F 29 STATOR C 310 STATOR C 1 NAV FLAG+ 2 NAV FLAG+ 3 NAV FLAG+ 3 NAV FLAG+ 1 NAV STATOR C 3 NAV FLAG- 3 NAV FLAG- 1 NAV STATOR C 1 NAV STATOR C 1 NAV STATOR C 10 NAV STATOR C 11 NAV STATOR C 12 NAV STATOR C 13 NAV STATOR C 14 NAV STATOR C 15 NAV STATOR C 16 SPARE	J1 T 34 35 36 38 39 40 42 43 44 45 46	OP GPS FLAG+ CPS FLAG+	J1 NOTE: THIS IS A 24 POLE REL 3 NOT ALL POLES ARE SHOWN C 4 THIS DRAWING.
21 TO+ 22 D-BAR RICHT+ 23 D-BAR RICHT+ 26 ROTOR C 27 ROTOR F 28 STATOR F 29 STATOR F 29 STATOR F 29 STATOR F 29 STATOR F 21 NAV FLAG+ 1 NAV FLAG+ 2 NAV FROM+ 5 NAV TO+ 6 NAV D-BAR LEFT+ 7 NAV BOTOR C 9 NAV ROTOR C 10 NAV STATOR F 11 NAV STATOR C 12 NAV STATOR C 13 NAV STATOR C 11 NAV STATOR C 12 NAV STATOR C 13 NAV STATOR C 13 NAV STATOR C 13 NAV STATOR C 13 NAV STATOR C 14 NAV STATOR C 15 NAV STATOR C 16 SPARE	J1 T 34 35 36 38 39 40 42 43 44 45 46 48	OP GPS FLAC+	J1 NOTE: THIS IS A 24 POLE REL 3 NOT ALL POLES ARE SHOWN C 4 THIS DRAWING.
22 O - BAR LEFT+	J1 T ⁻ 34 35 36 38 39 40 42 43 44 45 46 48 18 19	OP GPS FLAG+ CPS FLAG+	J1 NOTE: THIS IS A 24 POLE REL 3 NOT ALL POLES ARE SHOWN C 4 THIS DRAWING.
23 O BAR RIGHT+ Image: constraint of the system of th	J1 T 34 35 36 38 39 40 42 43 44 445 46 48 18 19 20	OP GPS FLAG+ GPS FLAG+	J1 NOTE: THIS IS A 24 POLE REL 3 NOT ALL POLES ARE SHOWN C 4 THIS DRAWING.
26 ROTOR C	J1 Tr 34 35 36 38 39 40 42 43 44 45 46 48 18 19 20 21	OP GPS FLAC+	J1 NOTE: THIS IS A 24 POLE REL 3 NOT ALL POLES ARE SHOWN C 4 THIS DRAWING.
27 ROTOR H V 28 STATOR F V 29 STATOR G V 30 STATOR C V 31 STATOR E V 2 NAV FLAG+ V 2 NAV FLAG+ V 3 NAV FLAG+ V 4 NAV D-BAR LEFT+ V 6 NAV D-BAR RIGHT+ V 9 NAV ROTOR C V 10 NAV STATOR F V 11 NAV STATOR C V 12 NAV STATOR C V 13 NAV STATOR C V 15 NAV STATOR C V 16 SPARE V	J1 Tr 34 35 36 38 39 40 42 43 44 45 46 48 18 19 20 21 22	OP GPS FLAG+ GPS FLAG+	J1 NOTE: THIS IS A 24 POLE REL 3 NOT ALL POLES ARE SHOWN C 4 THIS DRAWING.
28 STATOR F 29 STATOR G 30 STATOR D 31 STATOR E 1 NAV FLAG+ 2 NAV FLAG+ 3 NAV FROM+ 5 NAV D-BAR RIGHT+ 6 NAV D-BAR RIGHT+ 9 NAV STATOR F 11 NAV STATOR C 12 NAV STATOR F 13 NAV STATOR F 14 NAV STATOR F 15 NAV STATOR F 16 SPARE	J1 T 34 35 36 38 39 40 42 43 44 45 46 48 18 19 20 21 22 23	OP GPS FLAG+ GPS FLAG+	J1 NOTE: THIS IS A 24 POLE REL 3 NOT ALL POLES ARE SHOWN C 4 THIS DRAWING.
29 V STATOR G V 30 STATOR D NAV CONVERTER 11 NAV FLAG+ NAV CONVERTER 2 NAV FROM+ Image: Convertige of the state of	J1 T 34 35 36 38 39 40 42 43 44 45 46 48 19 20 21 22 23 26	OP GPS FLAC+	J1 NOTE: THIS IS A 24 POLE REL 3 NOT ALL POLES ARE SHOWN C 4 THIS DRAWING.
30 STATOR D NAV CONVERTER 31 STATOR E NAV CONVERTER 2 NAV FLAG- Image: Converter Converter 3 NAV FLAG- Image: Converter Converter 3 NAV FLAG- Image: Converter Converter 3 NAV FROM+ Image: Converter Converter 6 NAV D-BAR LEFT+ Image: Converter Converter 7 NAV D-BAR RIGHT+ Image: Converter Converter 9 NAV ROTOR C Image: Converter Converter 10 NAV STATOR C Image: Converter Converter 11 NAV STATOR C Image: Converter Converter 12 NAV STATOR C Image: Converter Converter 13 NAV STATOR C Image: Converter Converter 15 NAV STATOR C Image: Converter Converter 16 SPARE Image: Converter Converter Image: Converter Converter	J1 T 34 35 36 38 39 40 42 43 44 45 46 48 19 20 21 22 23 27	OP GPS FLAG+ GPS FLAG+	J1 NOTE: THIS IS A 24 POLE REL 3 NOT ALL POLES ARE SHOWN C 4 THIS DRAWING.
31 STATOR E NAV CONVERTER 1 NAV FLAG- Image: Converting the second	J1 T 34 35 36 38 39 40 42 43 44 45 46 48 19 21 22 23 26 27 28	OP GPS FLAG+ GPS FLAG+	J1 NOTE: THIS IS A 24 POLE REL 3 NOT ALL POLES ARE SHOWN C 4 THIS DRAWING.
1 NAV FLAG+ 2 NAV FLAG+ 3 NAV FROM+ 5 NAV TO+ 6 NAV D-BAR LEFT+ 7 V NAV D-BAR RIGHT+ 9 NAV ROTOR C 10 NAV STATOR F 12 NAV STATOR C 13 NAV STATOR F 15 NAV STATOR C 16 SPARE	J1 T 34 35 36 38 39 40 42 43 43 44 45 46 48 19 20 21 22 23 26 27 27 29	OP GPS FLAC+	J1 NOTE: THIS IS A 24 POLE REL 3 NOT ALL POLES ARE SHOWN C 4 THIS DRAWING.
2 NAV FLAG- 3 NAV FLAG- 3 NAV FROM+ 5 NAV TO+ 6 NAV D-BAR LEFT+ 7 NAV D-BAR RIGHT+ 9 NAV ROTOR C 10 NAV STATOR F 12 NAV STATOR C 13 NAV STATOR C 16 SPARE	J1 T 34 35 36 38 379 40 42 4 445 46 48 19 20 21 223 226 227 22 230 30	OP GPS FLAG+ GPS FLAG+	J1 NOTE: THIS IS A 24 POLE REL NOT ALL POLES ARE SHOWN C THIS DRAWING.
3 NAV FROM+ 5 NAV TO+ 6 NAV D-BAR LEFT+ 7 NAV D-BAR RIGHT+ 9 NAV ROTOR C 10 NAV STATOR C 11 NAV STATOR F 12 NAV STATOR C 13 NAV STATOR C 16 SPARE	J1 T 34 35 36 38 39 40 42 44 45 46 46 48 18 19 20 221 222 23 27 28 27 28 29 30 31	OP GPS FLAG+ GPS FLAG+	J1 NOTE: THIS IS A 24 POLE REL NOT ALL POLES ARE SHOWN C THIS DRAWING.
5 NAV D-BAR LEFT+ 6 NAV D-BAR RIGHT+ 9 NAV ROTOR C 10 NAV ROTOR H 11 NAV STATOR F 12 NAV STATOR C 13 NAV STATOR E 16 SPARE	J1 T 34	OP GPS FLAC+	J1 NOTE: THIS IS A 24 POLE REL NOT ALL POLES ARE SHOWN C THIS DRAWING.
6 NAV D-BAR LEFT+ 7 NAV D-BAR RIGHT+ 9 NAV ROTOR C 10 NAV STATOR F 11 NAV STATOR F 13 NAV STATOR C 15 NAV STATOR E	J1 T 34 35 36 37 38 39 40 42 44 44 45 19 20 21 22 22 22 22 23 30 31 1 22 22 30 31 22 22 23 31 31 22 22 30 31 31 31 32 32 32 33 33 33 33 33 33 33	OP GPS FLAG+ GPS FLAG+	J1 NOTE: THIS IS A 24 POLE REL NOT ALL POLES ARE SHOWN C THIS DRAWING.
7 V NAV D-BAR RIGHT+ V 9 NAV ROTOR C V 10 V NAV ROTOR C V 11 NAV STATOR F V V 12 V NAV STATOR G V 13 NAV STATOR C V V 16 SPARE V V	J1 1 34 35 36 38 37 40 40 42 43 44 44 44 46 48 19 20 21 22 23 26 27 28 29 31 1 2 2 3	OP GPS FLAG+ GPS FLAG+	J1 NOTE: THIS IS A 24 POLE REL NOT ALL POLES ARE SHOWN C THIS DRAWING.
9 NAV ROTOR C 10 NAV ROTOR H 11 NAV STATOR F 12 NAV STATOR G 13 NAV STATOR D 16 SPARE	$\begin{array}{c c} J1 & 1 & 1 \\ \hline 34 & 35 \\ \hline 336 & 38 \\ \hline 338 & 38 \\ \hline 338 & 39 \\ \hline 40 & 42 \\ \hline 44 & 42 \\ \hline 44 & 42 \\ \hline 44 & 44 \\ \hline 22 & 22 \\ \hline 23 & 31 \\ \hline 1 \\ \hline 1 \\ 2 \\ \hline 3 \\ 5 \\ \hline \end{array}$	OP GPS FLAC+	J1 NOTE: THIS IS A 24 POLE REL NOT ALL POLES ARE SHOWN C THIS DRAWING.
10 V NAV ROTOR H V 11 NAV STATOR F V V 12 V NAV STATOR G V 13 NAV STATOR D V V 15 V NAV STATOR E V 16 SPARE V V	$\begin{array}{c} J1 & T \\ \hline 34 \\ \hline 35 \\ \hline 36 \\ \hline 38 \\ \hline 39 \\ \hline 40 \\ \hline 42 \\ \hline 44 \\ \hline 46 \\ \hline 48 \\ \hline 19 \\ \hline 20 \\ \hline 21 \\ \hline 22 \\ \hline 23 \\ \hline 22 \\ \hline 23 \\ \hline 30 \\ \hline 31 \\ \hline 1 \\ \hline 22 \\ \hline 26 \\ \hline 27 \\ \hline 28 \\ \hline 30 \\ \hline 31 \\ \hline 1 \\ \hline 22 \\ \hline 27 \\ \hline 28 \\ \hline 30 \\ \hline 31 \\ \hline 1 \\ \hline 22 \\ \hline 27 \\ \hline 28 \\ \hline 30 \\ \hline 31 \\ \hline 1 \\ \hline 22 \\ \hline 27 \\ \hline 28 \\ \hline 30 \\ \hline 31 \\ \hline 5 \\ \hline 6 \\ \hline 6 \\ \hline \end{array}$	OP GPS FLAG+ GPS FLAG+	J1 NOTE: THIS IS A 24 POLE REL NOT ALL POLES ARE SHOWN C THIS DRAWING.
11 NAV STATOR F 12 NAV STATOR G 13 NAV STATOR D 15 NAV STATOR E 16 SPARE	$\begin{array}{c c} J & J & J \\ \hline 3 & J \\ \hline 4 & J \\ \hline 5 & J \\ \hline 5 & J \\ \hline 7 & J \\ \hline 5 & J \\ \hline 7 & J \\ 7 & J \\ \hline 7 & J \\ 7 &$	OP GPS FLAG+ GPS FLAG+	J1 NOTE: THIS IS A 24 POLE REL NOT ALL POLES ARE SHOWN C THIS DRAWING.
12 NAV STATOR G	$\begin{array}{c} J \\ 3 \\ 3 \\ 3 \\ 3 \\ 3 \\ 3 \\ 3 \\ 3 \\ 3 \\$	OP GPS FLAC+ GPS FLAC-	J1 NOTE: THIS IS A 24 POLE REL NOT ALL POLES ARE SHOWN C THIS DRAWING.
13 NAV STATOR D 15 NAV STATOR E 16 SPARE	$\begin{array}{c c} J1 & T & \\ \hline 34 & \\ \hline 35 & \\ \hline 38 & \\ \hline 39 & \\ \hline 30 & \\ \hline 30 & \\ \hline 42 & \\ \hline 40 & \\ 40 & \\ 40 & \\ \hline 40 & \\ 40$	OP GPS FLAG+ GPS FLAG+	J1 NOTE: THIS IS A 24 POLE REL NOT ALL POLES ARE SHOWN C THIS DRAWING.
15 V NAV STATOR E V 16 SPARE –	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	OP GPS FLAG+ GPS FLAG-	J1 NOTE: THIS IS A 24 POLE REL NOT ALL POLES ARE SHOWN C THIS DRAWING.
16 SPARE	$\begin{array}{c c} J & J & J & J \\ \hline 3 & J & J & J \\ \hline 3 & J & J & J \\ \hline 3 & J & J & J \\ \hline 3 & J & J & J \\ \hline 3 & J & J & J \\ \hline 3 & J & J & J \\ \hline 4 & J & J & J \\ \hline 4 & J & J & J \\ \hline 4 & J & J & J \\ \hline 4 & J & J & J \\ \hline 4 & J & J & J \\ \hline 4 & J & J & J \\ \hline 4 & J & J & J \\ \hline 4 & J & J & J \\ \hline 4 & J & J & J \\ \hline 4 & J & J & J \\ \hline 4 & J & J & J \\ \hline 4 & J & J & J \\ \hline 4 & J & J & J \\ \hline 4 & J & J & J \\ \hline 5 & J \\ \hline$	OP GPS FLAC+	J1 NOTE: THIS IS A 24 POLE REL NOT ALL POLES ARE SHOWN C THIS DRAWING.
	$\begin{array}{c c} J & J & J \\ \hline 3 & J \\ \hline 4 & J \\ \hline 5 & J \\ \hline 5 & J \\ \hline 7 & J \\ 7 & J \\ \hline 7 & J$	OP GPS FLAG+ GPS FLAG+ GPS FLAG+ GPS FLAG- GPS FCOM+ GPS TO+ GPS STATOR C GPS STATOR C GPS STATOR C FLAG+ FLAG+ FLAG- FROM+ TO+ D=BAR RIGHT+ D=BAR RIGHT+ D=BAR RIGHT+ D=BAR RIGHT+ NAV FLAG+ NAV STATOR C NAV STATOR C NAV STATOR C NAV STATOR G NAV STATOR C NAV STATOR C NAV STATOR C	J1 NOTE: THIS IS A 24 POLE REL NOT ALL POLES ARE SHOWN C THIS DRAWING.
33 14/28VDC AIRCRAFT PWR TO MD41-ACU/RFLAY CIRCUIT BRFAKFR	J1 T. 34	OP GPS FLAG+ GPS FLAG+ GPS FLAG- GPS FCAM+ GPS TO+ GPS TO+ GPS TO+ GPS TOTOR C GPS STATOR C GPS	J1 NOTE: THIS IS A 24 POLE REL NOT ALL POLES ARE SHOWN C THIS DRAWING.
(note 7) (note 8)	J1 T. 34	OP GPS FLAG+ GPS FLAG+ GPS FLAG- GPS FCAM+ GPS TO+ GPS TO+ GPS TO+ GPS TOTOR C GPS STATOR C GPS	J1 NOTE: THIS IS A 24 POLE REL NOT ALL POLES ARE SHOWN C THIS DRAWING.

FIGURE 3-3 WIRING DIAGRAM, MD41-1444/1454/1448/1458, 1448(5V)/1458(5V), MD41-244/248 for the GPS 155XL, GNC 300 and GNC 300XL GPS SYSTEMS

20 SPARE 13 14 OR 28VDC AIRCRAFT PWR -3A TO MD41-ACU/ 25 POWER GND J1J2 15 ILS ENERGIZE (note 1) J1J2 10 GPS SEQ SELECT SW 13 3 MSG ANN 20 9 WPT ANN 13 6 APR ARM SELECT 9 4 GPS APR ARM ANN 28 16 SPARE 28 16 SPARE 28 17 GPS ANNUNCIATION 28 19 SPARE active mode) 22 SPARE TEST 7 LAMP TEST TEST 7 LAMP TEST TEST 7 SPARE 21 23 SPARE 21 23 SPARE 21 24 EXPARE 23 25 SPARE 21 24 SPARE 21 25 SPARE 21 26 SPARE 21 27 SPARE 21 23	 NOTES: GNC 300 NOTES: 1) CONNECT ONLY IF SYSTEM IS TO BE FORCED TO NAV MODE WHEN ILS IS SELECTED. 2) RELAYS IN NORMALLY CLOSED POSITION WITH NAV SELECTED 3) REFER TO GARMIN INSTALLATION MANUAL FOR ACTUAL INSTALLATION. 4) ALL WIRING SHALL BE 24 AWG UNLESS OTHERWISE NOTED. 5) MOMENTARY SWITCH FOR TEST. (optional connection) 6) 5 VOLT FOR MD41–1448(5V)/1458(5V), 14 VOLT FOR MD41–1444/1454, AND 28 VOLT FOR MD41–1448/1458. 7) POWER FOR ACU AND RELAY UNIT MUST BE TIED TO SAME CIRCUIT BREAKER.
P208A/209A 28 VOLT	KI208A/209A 28 VOLT
P208A/209A 14 VOLT	KI208A/209A 14 VOLT

FIGURE 3-4 WIRING DIAGRAM, md41-144X/1445X SERIES ACU WITH AlliedSignal KI 208A/209A COURSE DEVIATION INDICATOR FOR THE GPS 155XL, GNC 300 and GNC 300XL GPS SYSTEMS

SECTION 4 POST INSTALLATION CHECKOUT

4.1 PRE INSTALLATION TESTS

With the MD41-() disconnected, turn on the avionics master switch and verify that aircraft power is on pin 13. Using an ohm meter, verify pin 25 is aircraft ground.

4.2 OPERATING INSTRUCTIONS

Turn off the avionics master switch and connect the mating connector to the MD41-(). Turn on the avionics master switch and the MD41-() should come on with the following annunciations.

- 1. NAV or GPS
- 2. HOLD or AUTO
- 3. MSG and/or WPT may be flashing depending on the status of the GPS receiver.

Press the lamp test button, (if installed) all annunciations should light. Continue pressing the lamp test button and cover the photocell window located in the center of the front panel. All annunciations should dim.

Annunciation brightness at the minimum dimming level may be adjusted by rotation of the dimmer control located on the bottom of the MD41-() case. CW rotation lowers the dimming level.

Select NAV using the NAV/GPS button. The presentation on the HSI/CDI will now be information from the VOR receiver. Using a VOR test generator or equivalent VOR signal, verify that the presentation and operation of the HSI/CDI is correct. This will include course resolver, left-right meter, to-from meter and nav warn flag. Now select GPS on the MD41-() and tune the VOR receiver to an ILS frequency. The MD41-() will be forced to NAV mode and ILS information will be displayed on the HSI/CDI. **NOTE**, this feature will not work if "ILS Energize" (J1 pin 14) was not connected at the time of installation.

Next, verify that HOLD and AUTO annunciations will cycle alternately when pressing the GPS/SEQ button two times. Press the GPS/APR button and the ARM annunciation will illuminate. ARM can be canceled by pressing the GPS/APR button a second time, or by ACTV input from the GPS receiver. GPS/APR test will not work without a valid GPS signal. Please refer to Section 4 of the Garmin GPS 155XL, GNC 300 and GNC 300XL installation manual for the remaining system tests.

No periodic maintenance or calibration is necessary for continued airworthiness of the MD41-().

ENVIRONMENTAL QUALIFICATION FORM

RTCA / DO160C

NOMENCLATURE: MD41-() GPS ANNUNCIATION CONTROL UNIT

MODEL NO: MD41-()

TSO NO: C129

CLASS A1

MPS 7015613

MANUFACTURER TEST SPECIFICATION:

MANUFACTURER: Mid-Continent Instruments and Avionics 9400 E. 34th Street N. Wichita, KS 67226 Phone (316) 630-0101

Conditions	Section	Description of Conducted Tests
Temperature and Altitude	4.0	Equipment tested to Categories A1 & F2 except as noted
Low Temperature	4.5.1	
High Temperature	4.5.2 & 4.5.3	
In-Flight Loss of Cooling	4.5.4	Cooling air not required
Altitude	4.6.1	
Decompression	4.6.2	
Overpressure	4.6.3	Not Tested
Temperature Variation	5.0	Equipment tested to Category B
Humidity	6.0	Equipment tested to Category A
Shock	7.0	Equipment tested per DO-160C
Operational	7.2	Par. 7.2.1
Crash Safety	7.3	
Vibration	8.0	Equipment tested without shockmounts to Categories M and N (Table 8-1)
Explosion	9.0	Equipment identified as Category X, no test required
Waterproofness	10.0	Equipment identified as Category X, no test required
Fluids Susceptibility	11.0	Equipment identified as Category X, no test required

Environmental Qualification (cont.)

Conditions	Section	Description of Conducted Tests
Sand and Dust	12.0	Equipment identified as Category X, no test required
Fungus	13.0	Equipment identified as Category X, no test required
Salt Spray	14.0	Equipment identified as Category X, no test required
Magnetic Effect	15.0	Equipment tested to Class Z
Power Input	16.0	Equipment tested to Category B
Voltage Spike	17.0	Equipment tested to Category A
Audio Frequency Susceptibility	18.0	Equipment tested to Category B
Induced Signal Susceptibility	19.0	Equipment tested to Category A
Radio Frequency Susceptibility	20.0	Equipment tested to Category T
Radio Frequency Emissions	21.0	Equipment tested to Category Z
Lightning Induced Transient Susceptibility	22.0	Equipment identified as Category X, no tests required
Lightning Direct Effects	23.0	Equipment identified as Category X, no tests required
Icing	24.0	Equipment identified as Category X, no test required