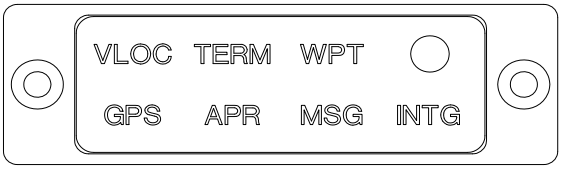
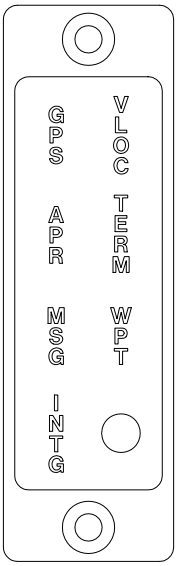
INSTALLATION MANUAL AND OPERATING INSTRUCTIONS

MD41-( ) Series GPS Annunciation Unit

MD41-1484W	14VDC	Horizontal Mount
MD41-1488W	28VDC	Horizontal Mount
MD41-1494W	14VDC	Vertical Mount
MD41-1498W	28VDC	Vertical Mount





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Manual Number 9016478
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Revision History

ECO	Rev.	Date	Detail
	N/R	01/19/07	Initial release.
	A	02/15/07	J1 connector was 9016475, now 9016479.
	B	03/12/07	Corrected section 4.1 to show proper pins, corrected mating connector rear view.
4828	C	4/24/07	Correct connector schematic pinout in section 1.2.5. Add –1494W and –1498W versions.
6051	D	10/28/13	Updated Technical Specifications to include compatible Garmin GTN Systems
6338	E	01/26/15	Updated Technical Specifications to include compatible Avidyne system.

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SECTION 1 GENERAL DESCRIPTION

1.1 INTRODUCTION

The MD41-( ) is a compact, self-contained GPS Annunciation unit. This unit displays status annunciation received from the compatible GPS systems listed in Table 1.

Features include dual 20,000 hour lamps used for all annunciations along with automatic photocell dimming. An external annunciation dimming adjustment is provided for balancing low-level light conditions.

1.2 TECHNICAL SPECIFICATIONS

Mid-Continent Instruments Co., Inc. certifies that the model MD41-( ) series, Annunciation Control Unit has been tested to and meets or exceeds the functional and environmental requirements of the following FAA Technical Standard Order (TSO):

- FAA/TSO-C151a: TERRAIN AWARENESS AND WARNING SYSTEM

We also certify we meet the requirements of Part 21, Subpart 0 of the Code of Federal Regulations.

The MD41-( ) series, Annunciation Control Unit conforms to all pertinent documented design and internal manufacturing standards. This includes, but is not limited to: component drawings, specifications, testing criteria, inspection requirements, quality processes, manufacturing instructions, and handling procedures. It shall be manufactured in accordance with Mid-Continent Instruments FAA-approved Production Approval Holder-Quality System Manual, Revision M, dated April 14, 2011 or later.

The MD41-10XX series complies with the manufacturers' specifications and has been verified and approved for use with the following systems:

Mid-Continent Instruments and Avionics Model Number(s):	**Designed for use with TAWS System:**
MD41-1484W MD41-1488W MD41-1494W MD41-1498W	Manufacturer: Garmin International Model: GTN 650/750
MD41-1484W	Manufacturer: Avidyne

MD41-1488W	Model: IFD540

TABLE 1

1.2.1 PHYSICAL CHARACTERISTICS

Mounting:	Front mount, panel
Width:	2.45 inches
Height:	0.75 inches
Depth:	2.60 inches (max)
Weight:	0.2 pounds

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:	RTCA DO-160C, Cat. M and N
Operational Shock:	Rigid Mounting, 6G Operational 15 G Crash Safety

1.2.3 ELECTRICAL SPECIFICATIONS

Design	All Solid State
MD41-1484W (14VDC)	0.30 Amps
MD41-1488W (28VDC)	0.25 Amps
MD41-1494W (14VDC)	0.30 Amps
MD41-1498W (28VDC)	0.25 Amps

1.2.4 FRONT PANEL CONTROLS AND ANNUNCIATIONS

1.2.4.1 ANNUNCIATIONS

VLOC	NAV or ILS information presented on the HSI or CDI
GPS	GPS information presented on the HSI or CDI
MSG	ON indicates message(s) active.
WPT	ON indicates reaching the arrival waypoint.
TERM	ON indicates aircraft is within 30 miles of departure or arrival airport
APR	ON indicates the approach is active.
INTG	ON indicates GPS receiver detected a position error or is unable to calculate the integrity of the position

1.2.5 INTERFACE

INTG annunciation J1 Pin 1	Requires a logic low to annunciate
WPT annunciation J1 Pin 2	Requires a logic low to annunciate
MSG annunciation J1 Pin 3	Requires a logic low to annunciate
TERM annunciation J1 Pin 4	Requires a logic low to annunciate
APR annunciation J1 Pin 6	Requires a logic low to annunciate
VLOC annunciation J1 Pin 7	Receives ground from GNS 430/530 when in VOR/ILS mode
GPS annunciation J1 Pin 8	Receives ground from GNS 430/530 when in GPS mode.
Lamp Test J1 Pin 10	Receives ground from remote test switch to light all annunciations (optional connection)
J1 Pin 15	Ground

1.2.6 EQUIPMENT LIMITATIONS

The MD41-( ) series control units contain specific dash numbers to be used with various GPS receivers or Navigation Management Systems. The installer must match the correct controller part number with the system 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 MD41-1484W/1488W/1494W/1498W are approved for use with the manufacturers listed in Table 1 of this document.

NOTE: If the MD41-( ) is disconnected or removed from the aircraft, it will not affect the operation of the installed GPS system.

1.2.7 MAJOR COMPONENTS

This system is comprised of one major component, the MD41-1484W/1488W/1494W/1498W GPS Annunciation Control Units.

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 airflow 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/VLOC 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 are not required since the GNS 430/530 handles all switching between GPS, VOR and ILS. This has allowed for a smaller size ACU that now provides more options for panel mounting.

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. MD41-1484W (14VDC) or MD41-1488W (28VDC) Horiz. Mount
   MD41-1494W (14VDC) or MD41-1498W (28VDC) Vertical Mount

2. Installation kit P/N 9016480 consisting of the following items:

A.	J1 Connector Kit (15 pin)	MCI P/N 9016479
B.	2 ea mounting brackets	MCI P/N 8018483
C.	4 ea 4-40x ½ pan Phillips screws	MCI P/N 90-416-00011
D.	2 ea 4-40x $^{9}/_{16}$ flat Phillips screws	MCI P/N 90-418-10011
E.	1 ea panel cutout template	MCI P/N 8018954

3. Installation Manual — MCI P/N 9016478

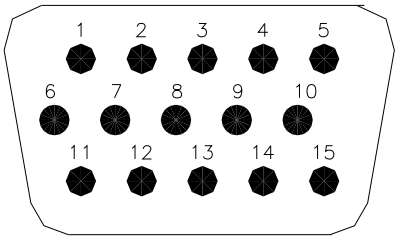
3.3 MOUNTING THE MD41-( )

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.

Use the dimensions shown in figure 3-3 to prepare opening and screw holes for the ACU. A file template has been provided to use for these measurements and hole cutout Carefully measure the locations for the screw holes and mark the drill locations with a center punch. Drill all six holes. A steel template (P/N 8018954) is supplied to aid in locating holes and cutting out the panel. The template may be mounted to the instrument panel to allow a file to be used to complete the cutout area. The front plate of the ACU has a recessed area on the back so a flat head screw is not absolutely necessary. Attach the mounting brackets to the rear side of the instrument panel with four 4-40x1/2 pan-head screws. Insert the ACU through the front of instrument panel and fasten with two 4-40 x 9/16 flat-head screws.

3.4 INSTALLATION LIMITATIONS

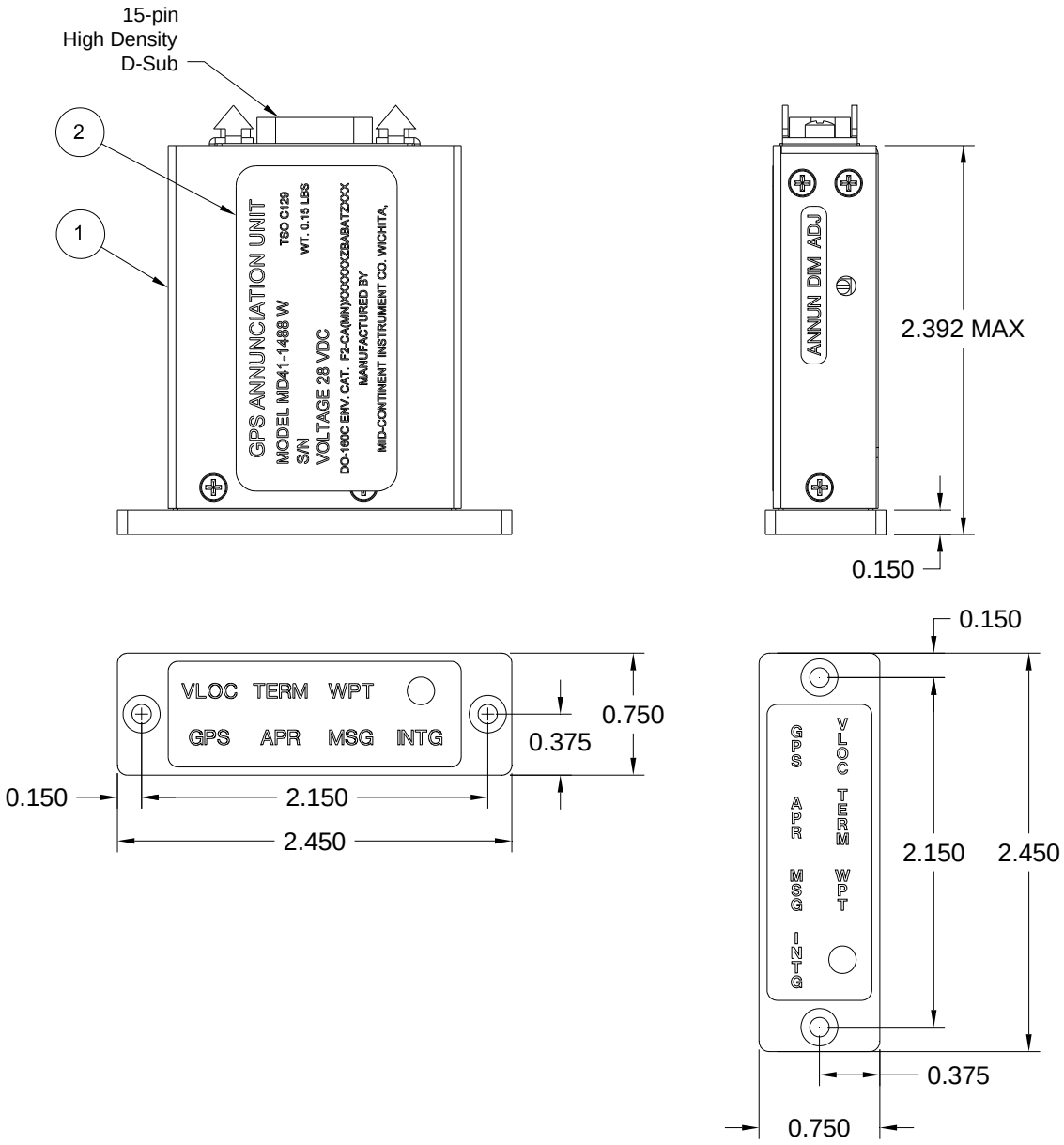
Wire the aircraft harness according to figure 3-3. Use at least 24 AWG wire for all connections. Avoid sharp bends and routing cable near high-energy sources. Care must be taken to tie the harness away from aircraft controls and cables. Normal installation techniques should be applied. Also see equipment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



REAR VIEW OF MATING CONNECTOR

Connector Pinout				
Pin #			Pin #	
1	INTG Annun.		9	Reserved
2	WPT Annun.		10	Lamp Test
3	MSG Annun.		11	Reserved
4	TERM Annun.		12	Reserved
5	28 VDC Power		13	Reserved
6	APR Annun.		14	Reserved
7	VLOC Annun.		15	Ground
8	GPS Annun.			

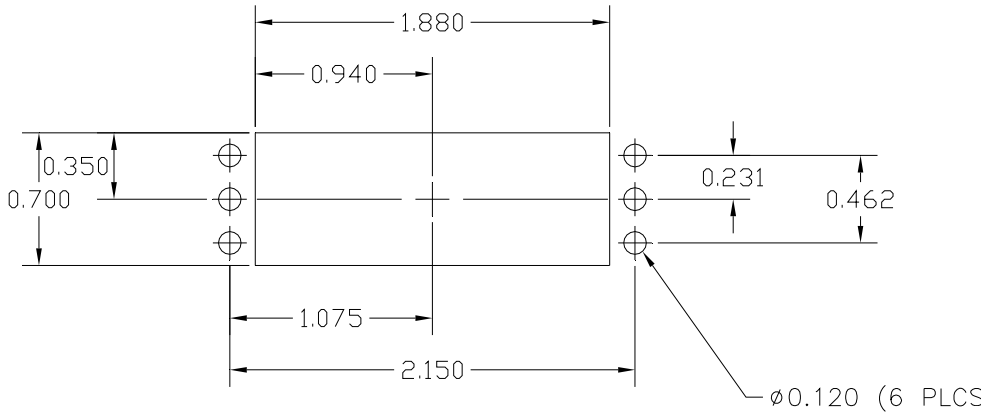
FIGURE 3-1 SCHEMATIC PINOUT, 15 PIN HIGH DENSITY D-SUB



MD41-1484W, MD41-1488W

MD41-1494W, MD41-1498W

FIGURE 3-2 OUTLINE DRAWING



PANEL CUTOUT

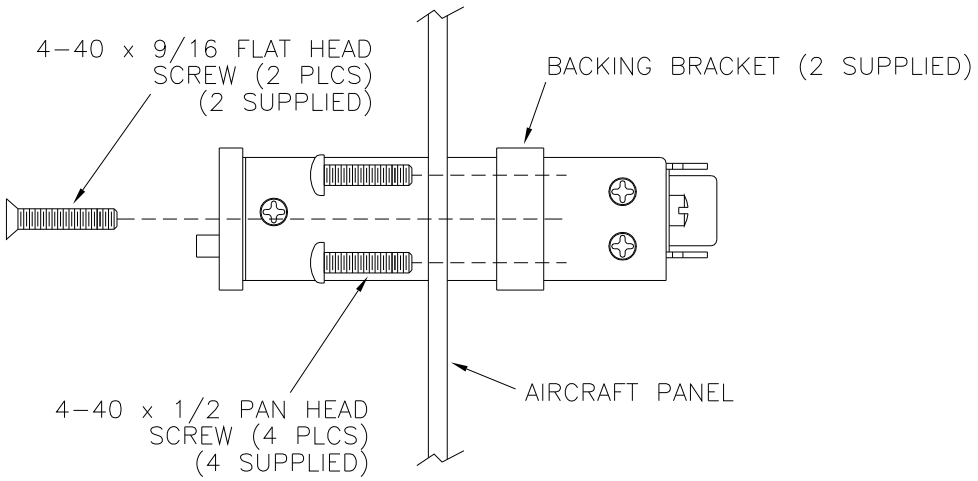
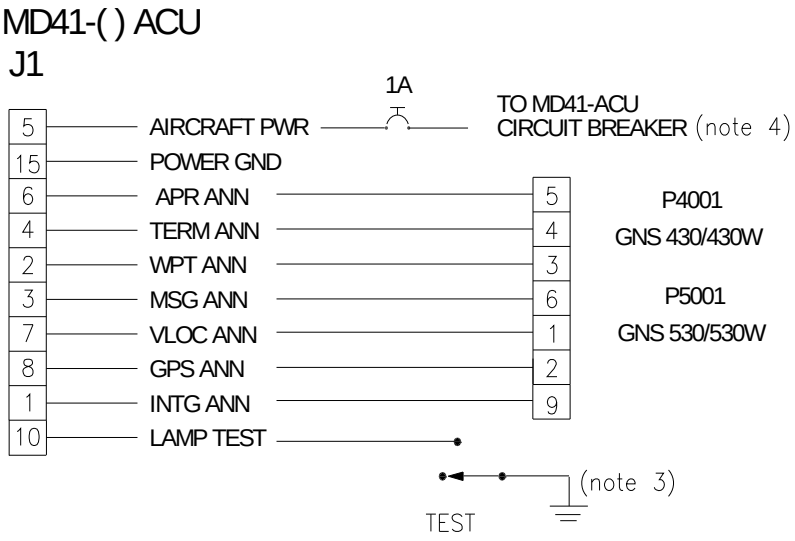


FIGURE 3-3 INSTRUMENT PANEL MOUNTING



NOTES:

1) REFER TO APPROPRIATE MANUFACTURER INSTALLATION MANUAL FOR ACTUAL INSTALLATION.

2) ALL WIRING SHALL BE 24 AWG UNLESS OTHERWISE NOTED.

3) MOMENTARY SWITCH FOR TEST. (optional connection)

4) 14 VDC FOR MD41-1484W/1494W. 28 VDC FOR MD41-1488W/1498W.

FIGURE 3-4: WIRING DIAGRAM, MD41-1484W/1488W/1494W-1498W

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 5. Using an ohmmeter, verify pin 15 is aircraft ground.

4.2 OPERATING INSTRUCTIONS

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

1. VLOC or GPS
2. MSG may be flashing depending on the status of the GPS receiver.

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

Please refer to the GPS manufacturers' installation manual for directions regarding the testing of annunciations.

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

DO-160C Environmental Qualification Form

NOMENCLATURE: Annunciation Control Unit (ACU)
MODEL NUMBER: MD41-( ) Series **TSO NUMBER:** C129, Class A1
MANUFACTURERS SPECIFICATIONS:
Minimum Performance Specification 7015613
Test Data Specification (TDS) 161, dated 2/12/07

MANUFACTURER: Mid-Continent Instruments and Avionics
ADDRESS: 9400 E. 34th St. North, Wichita, KS 67226, USA

CONDITIONS	SECTION	DESCRIPTION OF TEST
Temperature and Altitude Survival Low Temperature Operating Low Temperature	4.0 4.5.2 4.5.2	Equipment tested to Category A1F2
Temperature Variation	5.0	Equipment tested to Category B
Humidity	6.0	Equipment tested to Category A
Operational Shocks and Crash Safety	7.0	Equipment tested to Paragraph 7.2.1
Vibration	8.0	Equipment tested to Category M and N
Explosive Atmosphere	9.0	Equipment identified as category X, no test performed.
Waterproofness	10.0	Equipment identified as category X, no test performed.
Fluids Susceptibility	11.0	Equipment identified as category X, no test performed.
Sand and Dust	12.0	Equipment identified as category X, no test performed.
Fungus	13.0	Equipment identified as category X, no test performed.
Salt Fog	14.0	Equipment identified as category X, no test performed.
Magnetic Effect	15.0	Equipment tested to Category Z
Power Input	16.0	Equipment tested to Category B
Voltage Spike	17.0	Equipment tested to Category A
Audio Frequency Conducted Susceptibility	18.0	Equipment tested to Category B
Induced Signal Susceptibility	19.0	Equipment tested to Category A
Radio Frequency Susceptibility (Radiated and Conducted)	20.4 20.5	Equipment tested to Category T
Emission of Radio Frequency Energy	21.0	Equipment tested to Category Z
Lightning Induced Transient Susceptibility	22.0	Equipment identified as category X, no test performed.
Lightning Direct Effects	23.0	Equipment identified as category X, no test performed.
Icing	24.0	Equipment identified as category X, no test performed.