

DESIGN SPECIFICATION  
MODEL, CDI-500, P/N 50-0010-XX  
COURSE DEVIATION INDICATOR  
Document # 97040005

SKYLIGHT AVIONICS  
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### **Index**

Section	Title	Page
(i)	Operating Instructions	1
(ii)	Equipment Limitations	2
(iii)	Installation Procedures	3
(iv)	Install Specification: Physical	4
(v)	Install Specification: Electrical	4
(vi)	Specifications	5,6,7
(vii)	System Equipment - Major Components	8
(viii)	Environmental Qualification Form	9, 10

### **Illustrations**

Section	Title	Page
(i-1)	Operation P/N 50-0010-XX	1
(iv-1)	Mechanical Installation Drawing	4
(v-1)	Electrical Installation Drawing	4
(vii-1)	Interconnect Block Diagram	8

(i) Operating Instructions

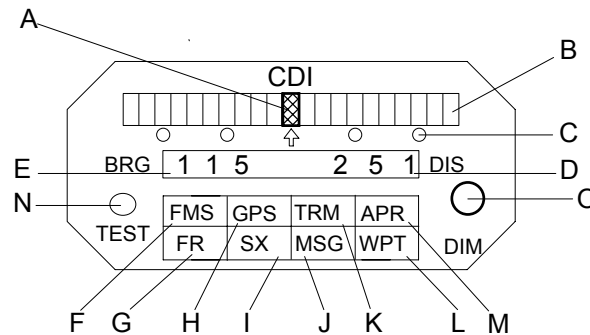
1. General

The CDI-500 indicator only displays information received from the Flight Management System and has no control over it. The indicator has no "OFF/ON" switch and becomes operational upon application of Aircraft Avionics Bus Power.

2. Warning Flags

1. Alphanumeric Display reads " FLAG " HSI status input is missing or invalid.
2. GPS warn lit, GPS status is missing or invalid.

3. Navigation Mode



P/N 50-0010-(XX), Illustration (i-1)

Course Deviation Bar Graph and Numeric Display

- A. On Course / Center Line (Green LED, OFF Course Intensity Decreases).
- B. Right / Left Course Deviation (Yellow LED Bar graph, 10 Segments ea.).
- C. Center Line / Course Deviation Dots (Engraved in Plastic).
- D. Distance to WPT (Yellow Alpha Numerical Led Display, "DIS" Engraved).
- E. Bearing to WPT (Yellow Alpha Numerical Led Display, "BRG" Engraved).

Status Displays

- F. FMS - FMS CONTROLLED HDG SUB-Mode (Green LED).
- G. FR - From Waypoint (Yellow LED, No "Next Waypoint").
- H. GPS - Illuminates when "GPS" Failure is detected (Yellow LED).
- I. SX - Selected Cross Track Warning (Yellow LED).
- J. MSG - Message Alert (Flashing Yellow LED).
- K. TRM - Terminal Mode (Green LED).
- L. WPT - Way Point Alert (Flashing Yellow LED.)
- M. APR - Approach Mode (Yellow LED).

Controls

- N. TEST: Verifies LED's and Bus Activity.
- O. DIM: Varies Display Intensity

(ii) Equipment Limitations

The CDI-500, Digital Course Deviation Indicator, is only a display of ARINC 429 digital data received from other on-board flight or navigation system outputs. The update speed, accuracy, and data available for display is directly limited to the output of the system to which it is interfaced. In effect, it is a display component of that navigation system and therefore subject to all inherent limitations of that system.

A hardware design assurance of "Level D" per RTCA DO-254 "Design Assurance Guidance for Airborne Electronic Hardware" will be applied to design verification, documentation and manufacturing.

Failure Condition Classification "Minor"

Failure Condition Description "Failure conditions that would not significantly reduce aircraft safety, and which would involve flight crew actions that are well within their capabilities. Minor failure conditions may include: a slight reduction in safety margins or functional capabilities, a slight increase in flight crew workload, such routine flight plan changes, or inconvenience to occupants."

Hardware Design Assurance Level Definition "D Hardware functions whose failure or anomalous behavior, as shown by the hardware safety assessment, would cause a failure of system function resulting in a minor failure condition for the aircraft"

The conditions and test 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. If not 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 CDI-500 is classified as "ON CONDITION" with no preventative maintenance required. No overhaul time limitations apply. No scheduled inspections to determine operational status are required. In the event of a failure the operator or cognizant maintenance facility shall remove the appliance and return it to Skylight Avionics for the repair or replacement.

## 1. INTRODUCTION

This section contains information relative to the installation of the, CDI-500 indicator to assure satisfactory performance of the unit. (See Sections "iv" and "v" for detailed mechanical and wiring diagrams.)

## 2. UNPACKING AND INSPECTING EQUIPMENT

After unpacking the unit, make a visual inspection of the unit for evidence of damage incurred during shipment. If a claim for damage is to be made, save the shipping container to substantiate the claim.

## 3. PRE-INSTALLATION CHECK

Perform a continuity and power check on the wiring harness before connecting equipment.

## 4. POWER REQUIREMENTS

The CDI-500 has been designed to accept from 14 to 32 VDC power with no special modification or wiring considerations. The CDI-500 operates from a standard +28 VDC aircraft power source. Circuit protection should be provided with an in-line 1 Amp breaker. Panel lighting for the unit can be either +5 or +28 VDC, depending on aircraft requirements.

## 5. POST INSTALLATION CHECK

Apply power to the indicator (28VDC avionics bus) Press and hold the TEST button. Verify that all of the display lights function.

Systems Check: After the system to which the CDI-500 has been interfaced has been verified and is operating, verify that each data format function is operational. Input a flight plan to the FMS/GPS System, including a Waypoint. The CDI-500 will display cross track deviation and waypoint position information which reflect the FMS/GPS CDU, deviation and message data displays.

SKYLIGHT AVIONICS  
 DESIGN SPECIFICATION  
 MODEL CDI-500, P/N 50-0010-XX  
 DOC # 97040005, REV: New, Date 03/20/02

(iv) Install Specification: Physical

1. Mechanical

Mounting is by a Standard (1/2 3 ATI) rear mounting clamp.

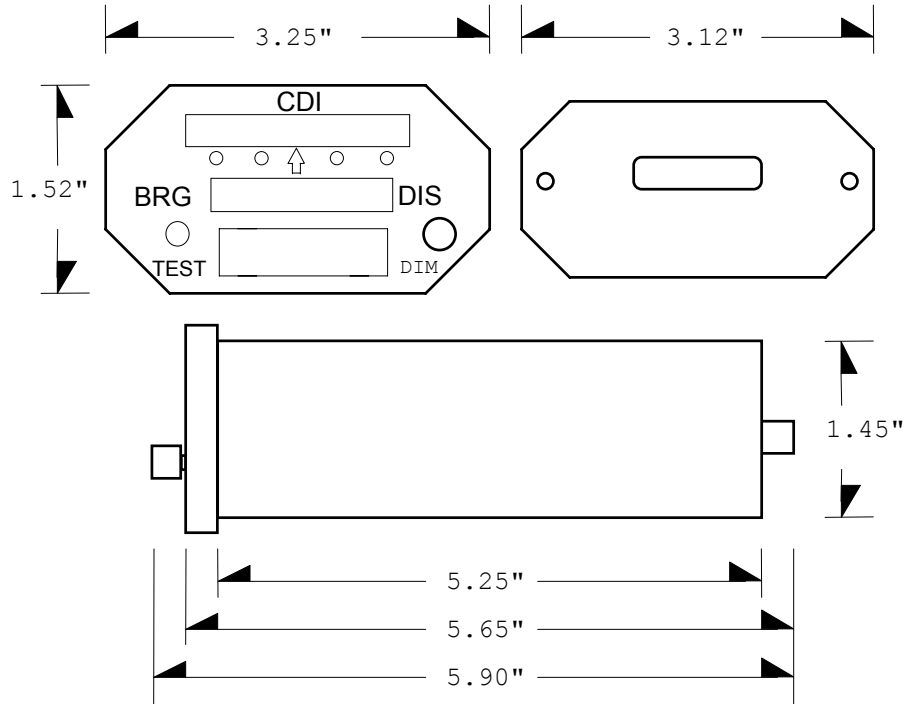
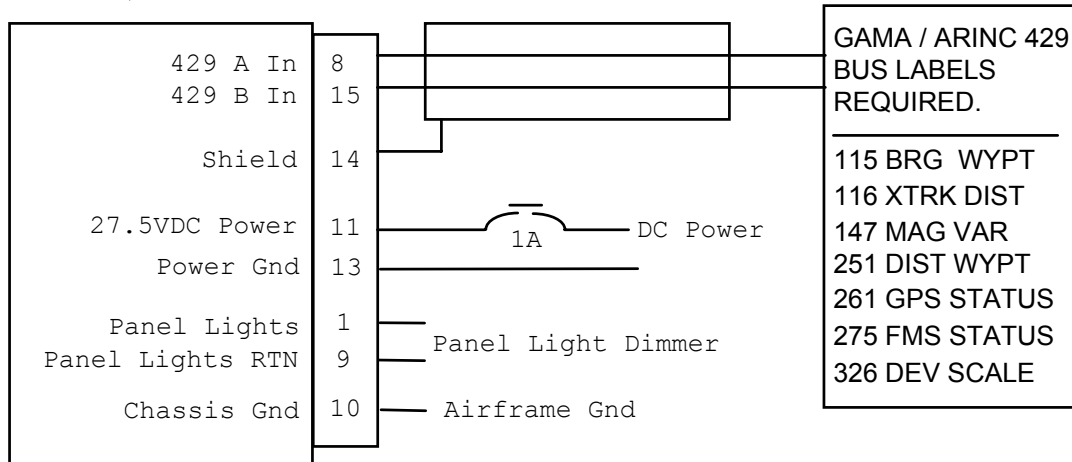


Illustration (iv-1) Mechanical Installation Drawing

(v) Install Specification: Electrical

1. PINOUT

CDI-500, P/N 50-0010-XX



Connector: DA15P (AMP P/N 748872-1)

Mate: DA15S (Standard 15 pin with male screw retainer)

Illustration (v-1) P/N 50-0010-XX Pin out

SKYLIGHT AVIONICS  
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 DOC # 97040005, REV: New, Date 03/20/02

(vi) Specifications: General

SPECIFICATION

CHARACTERISTICS

Compliance; TSO C115

Physical Dimensions:

Height	1.52"
Length	5.90"
Width	3.25"
Weight	13oz.

Temperature Range:

Operational	-15° C to +55° C
Storage	-55° C to +85° C

Maximum Altitude

Non pressurized	15,000'
Pressurized	55,000'

Power Requirements

28 VDC @ .5 Amps Peak, .3 Amps Normal

Digital Inputs

GAMMA 429 Hi or Low Speed. (Details next page.)

Deviation Scale

Dependent on input Label 326.

Deviation Range

120% of Deviation Scale.

Deviation Accuracy

+/- 1%

Bearing Display

0 to 359 Degrees, +/- 1 Deg.  
 True Mode = Label 115 (Label 275, Bit 28 Hi)  
 Mag Mode = Label 115 - Label 147 (Label 275, Bit 28 Lo)

Distance Display

0.0 to 99.9 N.M., +/- 0.1 N.M.  
 100 to 1023 N.M., +/- 1.0 N.M.

Data Update

< 750mS.

(vi) Specifications: General (cont)

Label 116: Cross Track Distance.

Range: +/- 128 NM., Resolution: 0.004 NM.

Bit

3	332	222222222111111	11110	00000000
2	109	876543210987654	32109	87654321
P	SSM	Binary NM.	00000	01110010

SSM 110 = (Fly Left), 111 = (Fly Right), 10X = Self Test, Else = Invalid

P is = Parity.

Label 326: Scale Factor.

Range: 128 NM., Resolution: 0.004 NM.

Bit

3	332	222222222111111	11110	00000000
2	109	876543210987654	32109	87654321
P	SSM	Binary NM.	00000	01110010

SSM 110 = valid, 100 = Self Test, Else = Invalid

P is = Parity.

Label 115: BEARING TO WAYPOINT.

Range: +/- 180°, Resolution: 0.05°.

Bit

3	332	222222222111111	11110	00000000
2	109	876543210987654	32109	87654321
P	SSM	Binary Angle	00000	01110010

SSM, 110= Neg., 111 = Pos., 10X = Self Test, Else = Invalid

P = Parity

Label 147: Magnetic Variation.

Range: +/- 180°, Resolution: 0.05°.

Bit

3	332	222222222111111	11110	00000000
2	109	876543210987654	32109	87654321
P	SSM	Binary Angle	00000	01110010

SSM 110 = East, 111 = West, 10X = Self Test, Else = Invalid

P is = Parity

Label 251: Distance To Go

Range: 0.0 To 1023 N.M., Resolution: 0.125 N.M.

Bit

3	332	222222222111111	11110	00000000
2	109	876543210987654	32109	87654321
P	SSM	Binary NM.	00000	01110010

SSM 110 = valid, 100 = Self Test, Else = Invalid

P is = Parity.



(vi) Specifications: General (cont)

Label 261: GPS STATUS (DSC)

Bit  

3	332	22222222221111111111	10	00000000
2	109	876543210987654321	09	87654321
P	SSM	DISCRETE BITS	00	10111101

Where: SSM is 00X = valid, Else invalid

P is odd parity.(Ignored)

The following bits are monitored and displayed.

- Bit 26 (1 = Approach )
- Bit 25 (1 = Terminal )
- Bit 24 (1 = GPS Integrity Invalid)

Label 275: LRN STATUS (DSC)

Bit  

3	332	22222222221111111111	10	00000000
2	109	876543210987654321	09	87654321
P	SSM	DISCRETE BITS	00	10111101

SSM is 00 = valid, Else invalid.

P is odd parity.(Ignored)

The following bits are monitored and displayed.

- Bit 29 (1 = HSI Valid)
- Bit 28 (1 = True Mode)
- Bit 27 (1 = MSG Alert)
- Bit 25 (1 = Selected Cross Track)
- Bit 24 (1 = From)
- Bit 17 (1 = FMS CONTROLLED HDG)
- Bit 11 (1 = WPT Alert)

SKYLIGHT AVIONICS  
DESIGN SPECIFICATION  
MODEL CDI-500, P/N 50-0010-XX  
DOC # 97040005, REV: New, Date 03/20/02

(vii) Major Components

1. Equipment Supplied:

Model CDI-500, Course Deviation Indicator, P/N 50-0010-XX

Panel Lights,	Faceplate	Part Number
5V	Black	50-0010-01
28V	Black	50-0010-02
5V	Gray	50-0010-11
28V	Gray	50-0010-12

2. Equipment Required But Not Supplied:

- 1 Standard 1/2 3ATI panel mounting clamp
- 1 Interconnect kit
- 1 Standard DA15S connector with male screw retainers

3. Interconnection



Illustration (vii-1)

Connect to FMS/GPS Navigation unit, which outputs the specified GAMMA 429 labels. Interconnect varies by manufacturer.

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MODEL CDI-500, P/N 50-0010-XX  
DOC # 97040005, REV: New, Date 03/20/02

(viii) Environmental Qualification

1. Nomenclature: MODEL CDI-500, COURSE DEVIATION INDICATOR
2. Part Number: 50-0010-XX
3. TSO Number: C115
4. Manufacturer's Specifications: None
5. Manufacturer: Skylight Avionics Company  
38629 6<sup>th</sup> Street East  
Palmdale, CA. 93550, USA

Tests:

iii. ENVIRONMENTAL QUALIFICATION FORM

RTCA/DO-160D, Dated July 29, 1997

Conditions	Section	Description of Conducted Tests
Temperature and Altitude	4.0	Equipment tested to Category A1
Temperature Variation	5.0	Equipment tested to Category B
Humidity	6.0	Equipment tested to Category A
Operational Shock and Crash Safety	7.0	Equipment tested to Category B
Vibration	8.0	Equipment tested to Category A
Explosion	9.0	Category X no test required
Waterproofness	10.0	Category X no test required
Fluids Susceptibility	11.0	Category X no test required
Sand and Dust	12.0	Category X no test required
Fungus	13.0	Category X no test required
Salt Spray	14.0	Category X no test required
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 Susceptibility	18.0	Equipment tested to Category A
Induced Signal Susceptibility	19.0	Equipment tested to Category A
Radio Frequency Susceptibility	20.0	Equipment tested to Category T
Radio Frequency Emission	21.0	Equipment tested to Category M
Lightning Induced Transient Susceptibility	22.0	Category X no test required
Lightning Direct Effects	23.0	Category X no test required
Icing	24.0	Category X no test required
Electrostatic Discharge	25.0	Equipment tested to Category A

(ix) Environmental Qualification (cont.)

SKYLIGHT AVIONICS  
DESIGN SPECIFICATION  
MODEL CDI-500, P/N 50-0010-XX  
DOC # 97040005, REV: New, Date 03/20/02

Remarks:

Tests 4.0, 5.0, 6.0, 7.0 and 8.0 were conducted at:  
ENVIROMENT ASSOCIATES, INC.

Tests 15.0, 16.0, 17.0, 18.0, 19.0, 20.0, 21.0 and 25.0 were conducted at:  
NEMKO-EESI

Compliance to FAR part 25 demonstrated by component parts and material analysis.