

DESIGN SPECIFICATION  
LRN-500, P/N 500-5608  
DISTANCE DISPLAY CONVERTER

Skylight Avionics  
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Palmdale, California  
(661) 265-0497

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#### i. OPERATING INSTRUCTIONS

The LRN-500, P/N 500-5608 by it's design has no independent operating instructions. Being a distance format change only, operating instructions for the systems interfaced will need to be followed.

##### Converter Operation

###### Received Label.

- 035 with SM = 01 (NCD), SM = 11 (Unused) or with parity error will be ignored.
- 035 with SM = 00 (Normal) and valid parity will set an internal node (Displayed channel) equal to bit 16 of this word.
- 035 with SM = 10 (Self Test) and valid parity will set an internal node (Displayed channel) regardless to bit 16 of this word.
- 201 with internal node (Displayed channel) set low or with parity error will be ignored.
- 201 with internal node (Displayed channel) set hi and valid parity will be transmitted as ARINC-568 and reset the displayed channel node.

The 28VDC Flag relay will be open if the unit fails to transmit ARINC-568 within 1.5 Sec.

## ii. EQUIPMENT LIMITATIONS

The LRN-500, P/N 500-5608 is limited to being a format adapter of the ARINC-429 Input (Labels 035 and 201) into ARINC-568 (Label 201). The LRN-500, P/N 500-5608, is limited by the on board DME and the ARINC-568 data bus. The design of the LRN-500 is such as to cause minimal degradation of the input signal and to convert the data in the fastest and most accurate means possible.

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

Failure Condition Classification "Major"

Failure Condition Description "Failure conditions that would reduce the capability of the aircraft or the ability of the flight crew to cope with adverse operating conditions to the extent that there would be: a significant reduction in safety margins or functional capabilities, a significant increase in flight crew workload or in conditions impairing flight crew efficiency, or discomfort to occupants, possibly including injuries".

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

The conditions and test required for TSO C66, 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 LRN-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.

### iii. INSTALLATION PROCEDURES

#### 1. INTRODUCTION

This section contains information relative to the installation of the Adapter to assure satisfactory performance of the unit. (See Sections "6" and "7" 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 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 unit can be operated from the 27.5 VDC aircraft essential bus.. See specifications for current requirements.

#### 5. POST INSTALLATION CHECK

There are no adjustments required for the unit. Follow the manufactures check out procedures of the on board system, to determine if indications being driven by the unit are accurate.

#### 6. PREFLIGHT CHECK

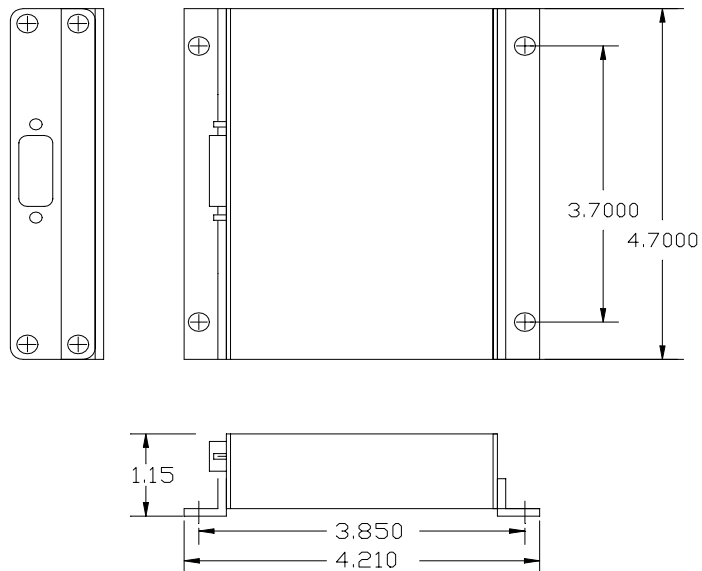
Follow the manufactures check out procedures of the on board systems, to determine indications being driven by the unit are accurate.

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#### iv. INSTALLATION MECHANICAL DIAGRAMS

The LRN-500 is designed for flat mounting anywhere on board the aircraft, pressurized or unpressurized compartments. The unit has four (4) mounting holes for number (6) size screws. (NOTE: Screws and other miscellaneous mounting hardware are NOT included with the LRN-500.

#### MECHANICAL DRAWING

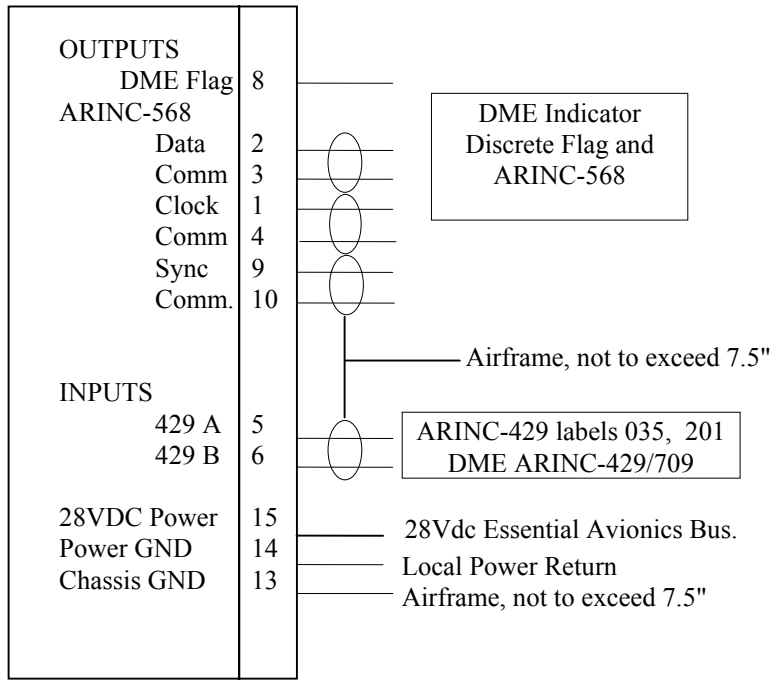


Unit Connector - DA15P, AMP P/N: 748872-1, Mate - DA15S  
Mechanical Drawing of LRN-500 (Illustration iv-1)

Note: To be mounted in electronic bay on shelf.

v. INSTALLATION ELECTRICAL

LRN-500 P/N 500-5608



Notes: 28VDC Power, Power return and Chassis Ground are 20 Ga. All else 24 Ga.  
 Installation shall be in accordance with A/C 43.13

(Illustration v-1)  
 LRN-500, P/N 500-5608 Pin out

vi. SPECIFICATIONS

SPECIFICATION

CHARACTERISTICS

Physical Dimensions:

Height	1.15"
Length	4.21"
Width	4.70"
Weight	0.75 lb.

Temperature Range

Operation	-55 C to +70 C
Storage	-55 C to +85 C

Altitude 50,000 ft.

Power Requirements 28 VDC @ .3A Nominal

Digital Inputs ARINC 429 / 709  
Optic-Isolated 1000V  
Input Impedance 10,000 Ohm  
Label 035 bit 16 set as displayed channel  
Label 201 BCD

Outputs ARINC-568  
Max. Load 600 Ohms  
Label 201 BCD  
  
Discrete Flag, 28VDC = Valid

Resolution .01 NM

Limitations: Limited to the Manufactures specifications of the units making up the interface.



vi. SPECIFICATIONS cont.

**Digital Data Specifications**

Input ARINC-429, Label 035: Frequency.

Rate: Minimum 140 mSec .

Bit

3	33	2222222222	1111111111	10	00000000
2	10	9876543210	9876543210	9	87654321
P	SM	XXXXXXXXXXXX	DXXXXXXX		10111000

X = Ignored

SM 00 = Normal, 10 = Self Test, 01 = NCD, 11 = Unused.

P is = Parity Odd.

D = Displayed distance, Enable / Disable Label 201 detect.

Input ARINC-429, Label 201: Distance.

Rate: Minimum 140 mSec.

Range: 0-399.9 NM., Resolution: 0.01 NM.

Bit

3	33	2	22	2222	2221	1111	1111	10	00000000
2	10	9	87	6543	2109	8765	4321	09	87654321
P	SM	X	100	10	1.0	0.1	0.01	XX	10000001

X = Ignored

SM 00 = Normal, 10 = Self Test, 01 = NCD, 11 = Unused.

P is = Parity Odd.

Output ARINC-568, Label 201: Distance.

Rate: As received.

Range: 0-399.9 NM., Resolution: 0.01 NM.

Bit

33	32	2222	2222	2111	1111	1110	00000000
21	09	8765	4321	0987	6543	2109	87654321
SM	100	10	1.0	0.1	0.01	PPPP	10000001

P = 0, Pad Bit

SM: 00 = Normal, 01 = Self Test, 10 = NCD, 11 = Unused

**Discrete Flag**

28VDC = Valid. Relay Contact to 28VDC Power. 0.5 Amp Max. load.

1.5 Sec Discrete timeout of the ARINC-568 Transmitter.

If the transmitter fails to complete a cycle within 1.5 Sec the discrete flag output will be open circuit.

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vii. MAJOR COMPONENT

Equipment Supplied

1. Model LRN-500, Part Number 500-5608

Equipment Required But Not Supplied

- 4 Standard #6 Mounting Screws
- 1 Connector Standard DA 15S, TRI STAR, P/N: CQARE15S or equivalent.
- 1 Back Shell with screw locks

Interconnect Block Diagram



(Illustration vii-1)

Note 1: Collins DME-900, P/N 822-0329-001 or equivalent with ARINC 429/709 Output.  
Interconnect varies by Manufacturer.

Note 2: Litton Clifton Precision, Dual Distance Indicator, P/N 59500000-1 or equivalent requiring a ARINC-568 input with discrete flag.

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viii. ENVIRONMENTAL QUALIFICATION FORM

NOMENCLATURE: DISTANCE DISPLAY CONVERTER

MODEL / PART NO: LRN-500, P/N 500-5608

MANUFACTURE'S: SPECIFICATION; NONE

MANUFACTURE: SKYLIGHT AVIONICS

ADDRESS: 38629 6<sup>th</sup> STREET EAST, PALMDALE, CA. 93550-3717

RTCA/DO-160D, Change No. 2, Dated, June 12, 2001

DATE TESTED:

Conditions	Section	Description of Conducted Tests
Temperature and Altitude	4.0	Equipment tested to Category D2 Auxiliary air cooling not required.
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 operational and crash safety
Vibration	8.0	Equipment tested Category T, Zone 2, Curves [BB1R]
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 Z
Voltage Spike	17.0	Equipment tested to Category A
Audio Frequency Susceptibility	18.0	Equipment tested to Category Z
Induced Signal Susceptibility	19.0	Equipment tested to Category Z
Radio Frequency Susceptibility	20.0	Equipment tested to Category RR
Radio Frequency Emission	21.0	Equipment tested to Category M
Lighting Induced Transient Susceptibility	22.0	Equipment tested Category XXE3 (M.S. 1MHZ) (M.B. 10MHZ)
Lighting 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

Remarks:

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

Environmental tests were conducted at:

ENVIRONMENT ASSOCIATES, INC

9604 VARIEL AVE.

CHATSWORTH, CA. 91311

(Sections 4 - 8) Report #

ENVIRONMENT ASSOCIATES, INC

9604 VARIEL AVE.

CHATSWORTH, CA. 91311

(Sections 15 - 25) Report #