



A-429 HS/LS TO SERIAL CONVERTER

PRODUCT P/N: 933620-00

INSTALLATION MANUAL

REV A

**Shadin Avionics
6831 Oxford Street
St. Louis Park, MN 55426
USA**

**Sales: (800)-328-0584
Technical Support: (800)-388-2849
WWW.SHADIN.COM**

MANUAL P/N: IM3620-00

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| <u>DWG No.</u> | <u>Description</u> | <u>DATE</u> | <u>REV</u> |
| 4036-402 | Installation, P/N 933620-00 A-429 HS/LS to Serial Converter | 12/17/08 | - |
| N/A | Parts List, Install Kit for 15 Pin D-Sub, IK9337 | 01/11/06 | F |

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REVISION LOG

| REV. | DATE | APP'D | CHANGE |
|-------------|-------------|--------------|-------------------|
| - | 12-17-08 | ZK | Baseline Release |
| A | 03-23-15 | ZK | Updated Sec. 1.5. |
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The information in this manual is subject to change without notification. To ensure complete and current updates, note the Revision Log above and call Technical Assistance for updated information.

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1. OVERVIEW

1.1 THE MANUAL

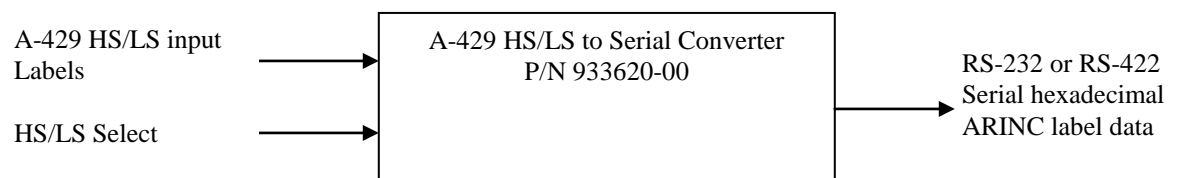
This manual is intended to facilitate the proper installation of the A-429 HS/LS to Serial Converter. Installation instructions should be read and followed.

1.2 PRODUCT DESCRIPTION

The purpose of this converter is to take the ARINC 429 high or low speed input data. The serial output (RS-232 or RS-422) will provide the information contained on selected ARINC 429 input labels. The serial output will be a hexadecimal dump of each desired label, one per line.

The block diagram below depicts the intended use of the converter in the aircraft installation.

Figure 1. Block Diagram of Aircraft Installation



The converter accepts A-429 labels from a typical Flight Management System and has specifically been tested using the following:

Rockwell Collins; BUS NAME: L-FMC-1; BUS TYPE: A-429 HS
 Rockwell Collins; BUS NAME: LB-GPBUS-3; BUS TYPE: A-429 LS
 Honeywell; BUS NAME: IFEHS429TX; BUS TYPE: A-429 HS

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1.3 SPECIFICATIONS

Physical

Dimensions: 3.230H x 3.175L x 3.175W (inches)

Weight: 0.6 lbs.

Electrical

Input Voltage: +28VDC

Input Current: 100mA

Input Data

ARINC 429 Input Labels:

High/Low Select: Open = High Speed, GND = Low Speed

Outputs

RS-232 or RS-422 Serial Data

Environmental

RTCA/DO-160D (By similarity to P/N 933612-00)

Categories: F1XCAB[H(B,R)]XXXXXXXXZBABA[VVX]LXXXX

Operating Temperature: -20°C to +55°C

Storage Temperature: -55°C to +85°C

Altitude: Up to 55,000 ft.

In-Flight loss of Cooling: Equipment can run indefinitely with no cooling.

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1.4 INPUTS

| ARINC 429 LABELS DESCRIPTION | Octal | Rate | Format |
|------------------------------------|-------|-------|--------|
| Origin Airport Ident Char # 1 | 40 | 1Hz | DISC |
| Origin Airport Ident Char # 4 | 41 | 1Hz | DISC |
| Destination Airport Char # 2 | 42 | 1Hz | DISC |
| GPS Altitude | 76 | 20Hz | BNR |
| Selected Altitude | 77 | 10Hz | DISC |
| GPS Ground Speed | 112 | 20hz | BNR |
| Park Brake Set | 113 | 10Hz | DISC |
| BNR Greenwich Mean Time 429 | 150 | 4Hz | BNR |
| Destination ETA | 152 | 5Hz | DISC |
| Validity Status | 153 | 10Hz | DISC |
| A/C Serial # | 154 | 1Hz | BNR |
| A/C Type | 167 | 1Hz | BNR |
| BNR Pressure Altitude | 203 | 19Hz | BNR |
| BNR Baro Altitude 429 | 204 | 20Hz | |
| Mach | 205 | 20Hz | BNR |
| BNR True Airspeed 429 | 210 | 9.5Hz | BNR |
| True Airspeed | 211 | 20z | BNR |
| BNR Static Air Temperature 429 | 213 | 20Hz | BNR |
| Flight Ident Word #1 | 233 | 5Hz | DISC |
| Flight Ident Word #2 | 234 | 5Hz | DISC |
| Flight Ident Word #3 | 235 | 5Hz | DISC |
| Flight Ident Word #4 | 236 | 5Hz | DISC |
| BNR Distance to Waypoint 429 | 251 | 2Hz | BNR |
| BNR Time to Waypoint 429 | 252 | 2Hz | BCD |
| BCD Date 429 | 260 | 1Hz | BCD |
| Active Waypoint Ident Char # 3 | 263 | 1Hz | DISC |
| Active Waypoint Ident Char # 4 | 264 | 1Hz | DISC |
| Active Waypoint Ident Char # 7 | 265 | 1Hz | DISC |
| A/C Registration Char # 1 | 301 | 1Hz | |
| A/C Registration Char #6 | 302 | 1Hz | |
| A/C Registration Char # 7 | 303 | 1Hz | |
| Destination Airport ID Word # 1 | 304 | 1Hz | ASCII |
| Destination Airport ID Word # 2 | 305 | 1Hz | ASCII |
| BNR Waypoint Latitude GAMA | 306 | 10Hz | BNR |
| BNR Waypoint Longitude GAMA | 307 | 10Hz | BNR |
| BNR Present Position Latitude 429 | 310 | 10Hz | BNR |
| BNR Present Position Longitude 429 | 311 | 10Hz | BNR |
| BNR Ground Speed 429 | 312 | 20Hz | BNR |
| BNR True Track Angle 429 | 313 | 80Hz | BNR |
| BNR True Heading 429 | 314 | 80Hz | BNR |
| BNR Wind Speed 429 | 315 | 20Hz | BNR |
| BNR Wind Angle 429 | 316 | 2Hz | BNR |
| BNR Magnetic Heading 429 | 320 | 80Hz | BNR |
| Drift Angle | 321 | 10Hz | BNR |
| Pitch Angle | 324 | 80Hz | BNR |
| Roll Angle | 325 | 80Hz | BNR |
| BNR Distance to Destination GAMA | 351 | 10Hz | BNR |
| Time to Destination | 352 | 10Hz | BNR |
| Origin Airport Word # 1 | 361 | 1Hz | ASCII |
| Origin Airport Word # 2 | 362 | 1Hz | ASCII |

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| | | | |
|---------------------------------|-----|-----|-------|
| Destination Airport ID Word # 1 | 365 | 1Hz | ASCII |
| Destination Airport ID Word # 2 | 366 | 1Hz | ASCII |
| Vendor/Unit ID GAMA | 371 | 1Hz | DISC |
| Flight Number Word # 1 | 373 | 1Hz | DISC |
| Flight Number Word # 2 | 374 | 1Hz | DISC |
| Flight Number Word # 3 | 375 | 1Hz | DISC |

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1.5 OUTPUTS

Serial Data Output in either RS-232 or RS-422 format.

Transmission Rate: once per second.

Format:

38400 baud, 8 data bits, no parity, one stop bit.

Each output packet starts with a diagnostic / header line. A header is presented first, than a list of filtered labels, and finally terminated with footer.

Example:

```
hexdump-A429 933620 403620-00 csE8 i0350 b1401 r0000 s0000 k0350 o00 p08 pf000 idle70
68D8F76B
C8000072
C9000064
CA007BE0
CB0000E8
CC000068
D4000061
D50080E0
sinif
```

Each line of the output ends with a carriage character return, so that each data item (header, filtered label, footer) can be read line by line.

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2. INSTALLATION PROCEDURE

2.1 MOUNTING

The Converter (P/N 933620-00) should be mounted in a dry location and the equipment may be installed in a temperature controlled, and non-pressurized location.

Use installation drawing, Drawing No.: 4036-402, to connect the A-429 HS/LS to Serial Converter to the system. Use # 6-32 screws for mounting.

2.2 ELECTRICAL CONNECTIONS

Connection to Power Supply +28 VDC

| 933620-00 | | Description |
|-----------|----|-------------------------|
| J1:8 | To | +14 to +28 VDC Power IN |
| J1:15 | To | Power GND |

Inputs

| 933620-00 | | Description |
|-----------|----|-------------------|
| J1:5 | To | RX+, ARINC 429 IN |
| J1:13 | To | RX-, ARINC 429 IN |
| J1:9 | To | High/Low Select |

Pin 9 strapped to GND for ARINC Low Speed applications, otherwise left open for high speed.

Outputs

| 933620-00 | | Description |
|-----------|----|---------------|
| J1:3 | To | TX, RS-422(-) |
| J1:4 | To | TX, RS-422(+) |
| J1:10 | To | SIGNAL GND |
| J1:14 | To | TX, RS-232 |

Use RS-232 or RS-422, but not both.

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3. ENVIRONMENTAL QUALIFICATION FORM

This EQF pertains to P/N 933612-00 which is a different Shadin P/N. It is a superset of the hardware used in P/N 933620-00. This data can be used to qualify P/N 933620-00 to RTCA/DO-160D standards by similarity.

NOMENCLATURE: ARINC 429 HS/LS to Serial CONVERTER

TYPE/MODEL/PART NO: 933612-00 **TSO NUMBER:** C129a Class A1

MANUFACTURER'S SPECIFICATION AND/OR OTHER APPLICABLE SPECIFICATION:
 Report 4036-12, RTCA/DO-160D

MANUFACTURER: Shadin Avionics

ADDRESS: 6831 Oxford Street, St. Louis Park, Minnesota 55426-4412

| <u>CONDITIONS</u> | <u>SECTION</u> | <u>DESCRIPTION OF TESTS CONDUCTED</u> |
|------------------------------------|----------------|--|
| Temperature and Altitude | 4.0 | Tested to Category F1. |
| Low Temperature | | |
| High Temperature | | |
| Altitude | | |
| Decompression | | |
| Overpressure | | |
| Temperature Variation | 5.0 | Tested to Category C. |
| Humidity | 6.0 | Tested to Category A. |
| Operational Shock and Crash Safety | 7.0 | Tested to Category B. |
| Vibration | 8.0 | Tested to Category H (B, R). |
| Explosion | 9.0 | Identified as Category X. Not tested. |
| Waterproofness | 10.0 | Identified as Category X. Not tested. |
| Fluids Susceptibility | 11.0 | Identified as Category X. Not tested. |

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ENVIRONMENTAL QUALIFICATION FORM (Cont.)

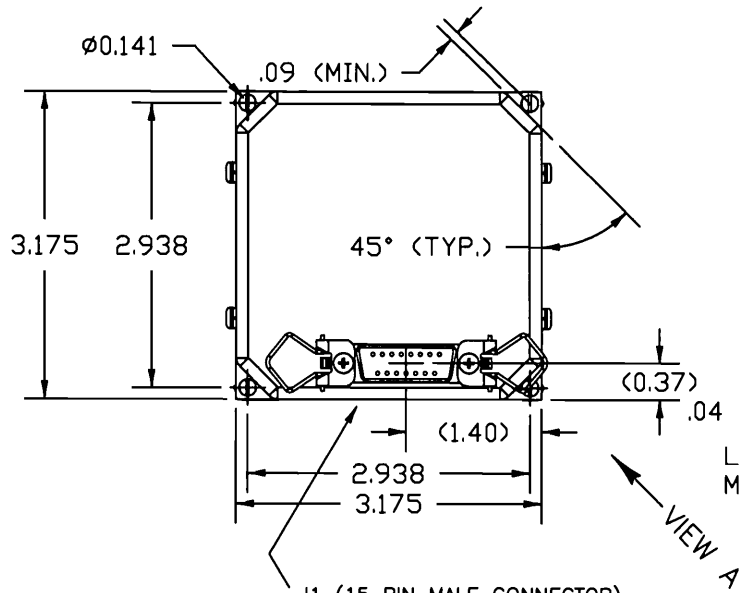
| <u>CONDITIONS</u> | <u>SECTION</u> | <u>DESCRIPTION OF TESTS CONDUCTED</u> |
|--|-----------------------|--|
| Sand and Dust | 12.0 | Identified as Category X. Not tested. |
| Fungus | 13.0 | Identified as Category X. Not tested. |
| Salt Spray | 14.0 | Identified as Category X. Not tested. |
| Magnetic Effect | 15.0 | Tested to Category Z. |
| Power Input | 16.0 | Tested to Category B. |
| Voltage Spike | 17.0 | Tested to Category A. |
| Audio Frequency Susceptibility | 18.0 | Tested to Category B. |
| Induced Signal Susceptibility | 19.0 | Tested to Category A. |
| Radio Frequency Susceptibility | 20.0 | Tested to Category VVX. |
| Radio Frequency Emission | 21.0 | Tested to Category L. |
| Lightning Induced Transient Susceptibility | 22.0 | Identified as Category X. Not tested. |
| Lightning Direct Effects | 23.0 | Identified as Category X. Not tested. |
| Icing | 24.0 | Identified as Category X. Not tested. |
| Electrostatic Discharge | 25.0 | Identified as Category X. Not tested. |

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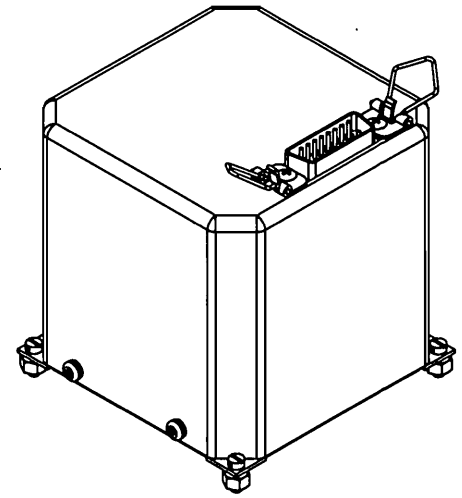
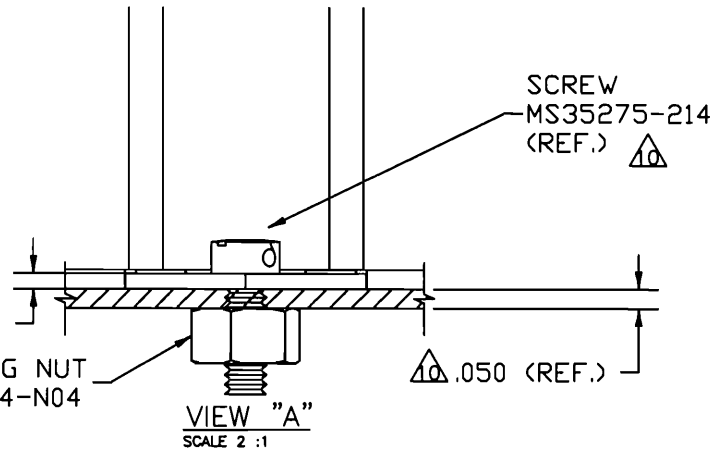
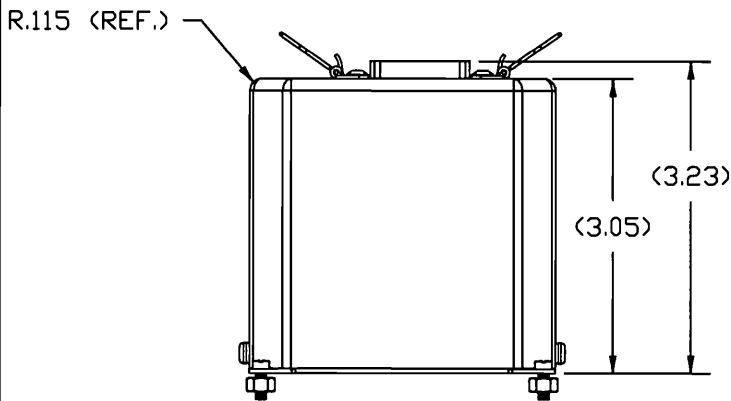
SECTION 4.0

INSTALLATION DRAWINGS AND INSTALL KIT PARTS LISTS

The following drawings are arranged in the sequence specified on page i of the Page Control Chart.



J1 (15 PIN MALE CONNECTOR)
 MATING CONNECTOR:
 AMPHENOL 17-DA15S OR EQUIVALENT
 HOOD: CINCH # DA-24658
 AMPHENOL 17-529 CLIPS (2)



SCREW TABLE (MS35275)

| LENGTH | SIZE | FULL P/N |
|----------------|------|-------------|
| 1/4" (.250) | #4 | MS35275-213 |
| 5/16" (.312) | #4 | MS35275-214 |
| 3/8" (.375) | #4 | MS35275-215 |
| 7/16" (.438) | #4 | MS35275-216 |
| 1/2" (.500) | #4 | MS35275-217 |
| 5/8" (.625) | #4 | MS35275-218 |
| 3/4" (.750) | #4 | MS35275-219 |
| 7/8" (.875) | #4 | MS35275-220 |
| 1" (1.000) | #4 | MS35275-221 |
| 1-1/4" (1.250) | #4 | MS35275-222 |
| 1-1/2" (1.500) | #4 | MS35275-223 |

CONNECTOR KEY

| PIN | FUNCTION |
|-----|---------------------------|
| 1 | N.C. |
| 2 | N.C. |
| 3 | TX, RS-422 (-) |
| 4 | TX, RS-422 (+) |
| 5 | RX+, ARINC 429 IN |
| 6 | N.C. |
| 7 | N.C. |
| 8 | +12 TO 28 V DC POWER IN |
| 9 | HIGH/LOW SELECT |
| 10 | SIGNAL GND |
| 11 | N.C. |
| 12 | RX RS-232 (FOR TEST ONLY) |
| 13 | RX-, ARINC 429 IN |
| 14 | TX, RS-232 |
| 15 | POWER GND |

NOTES:

1. THE CONVERTER CAN BE MOUNTED IN ANY ORIENTATION
2. 4" SPACING IS REQUIRED ABOVE CONNECTOR
3. NO COOLING IS REQUIRED
4. THE CONVERTER CAN BE INSTALLED IN A NON-PRESSURIZED AREA, PROVIDING TEMPERATURE DOES NOT DROP BELOW -20°C.
5. 1 AMP CIRCUIT BREAKER IS REQUIRED
6. NO SHOCK MOUNT REQUIRED
7. USE RS-232 OR RS-422 BUT NOT BOTH
8. WEIGHT: .6 lbs.
POWER CONSUMPTION: 100 ma. @ 28VDC
9. PIN 9 STRAPPED TO GROUND FOR ARINC LOW SPEED OPERATION, LEFT OPEN FOR HIGH SPEED OPERATION.
10. MOUNTING SURFACE THICKNESS AND MS SCREW SHOWN ARE FOR REFERENCE ONLY. TO SELECT MOUNTING SCREW LENGTH NECESSARY FOR YOUR SPECIFIC INSTALLATION ADD .238" & THE THICKNESS OF YOUR DESIRED MOUNTING SURFACE. ROUND THIS SUM UP TO THE NEXT LONGEST SCREW SIZE (SEE TABLE).
11. CAN - SOLID ALUMINUM WITH CLEAR IRIDITE FINISH.

UNLESS OTHERWISE NOTED
 DIMENSIONS ARE IN INCHES
 TOLERANCES: X.X - ±0.1
 X/X ± 1/64 X.XX - ±0.01
 < - ±2' X.XXX - ±0.005

FINISH: N/A
 MATERIAL: N/A

DRAWING DATE: 12/18/08
 DRAFTER: DRG
 APPROVED: *JK*
 FILE NAME: 933620-00-J.DWG
 DIRECTORY: 933620-00
 SHEET 1 OF 1

SHADIN AVIONICS
 MINNEAPOLIS, MN 55426
 DRAWING NO. 4036-402
 SIZE A

INSTALLATION,
 A-429 HS/LS TO
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 REV -

Report: 4037
 ECO Date: January 11, 2006
 Rev: F
 Sec.: IX
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ECO # 0601/013
 Release date: 1/11/06
 Approved: CB

PARTS LIST

Part #: **IK9337**

Drawing #: N/A

Description: **INSTALL KIT FOR 15PIN D-SUB**

| <u>FN</u> | <u>P/N</u> | <u>QTY.</u> | <u>DESCRIPTION</u> | <u>MFG.</u> | <u>MFG.#</u> | <u>DESIGNATION</u> | <u>COMMENTS</u> |
|-----------|------------|-------------|---------------------------------------|-------------|----------------------------|--------------------|-----------------|
| 5 | 230019H-1 | 2 | SPRING LATCH CLIP | SHA | 4028-074 | | * |
| 10 | 230050C | 1 | CONN, 15 Pin D-Sub F Crimp w/contacts | POS | M24308/2-2 (RD15F10000-50) | | |
| 15 | 230038 | 1 | CONN HOOD, 15 Pin D-Sub | CIN | DA-24658 | | |
| 20 | 511002 | 2 | SCREW, 4-40 x 1/4 Phil Pan HD SS | MCM | 91772A106 | | |
| 25 | 512007 | 2 | NUT, 4-40 3/16 x 1/16 SS | AFT | HNSP188 04C000 | | |
| 27 | 512101 | 2 | RETAINER CLIP, "Bow Tie" Style | KEY | 2061K | | * |
| 30 | 541001 | 2 | WASHER, #4 Split Lock, SS | MCM | 92147A005 | | |
| 32 | 753217 | 1 | COMPUTER LABEL, 3.5"x 15/16" | AVR | 4013 | | |
| 35 | PK1001 | 1 | BAG, 2.5 x 3, 4 MIL Zip Lock | | | | |
| 45 | PK1007 | 1 | BAG, 6 x 8, 4 MIL | | | | |

15 items

* Use FN 5 Or FN 27, Not Both – Depending On D-Sub Connector Style Used.