LANDING GEAR UP WARNING AND ALT. ENCODER

PRODUCT P/N: 8800-02

INSTALLATION MANUAL

REV C

Shadin Avionics
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St. Louis Park, MN 55426
USA

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Technical Support: (800)-388-2849
WWW.SHADIN.COM

MANUAL P/N: IM8800-02
# PAGE CONTROL CHART

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<th>DESCRIPTION</th>
<th>PAGE</th>
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<td>1-1</td>
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<td>2-2</td>
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<table>
<thead>
<tr>
<th>Drawing No.</th>
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<th>REV</th>
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<td>N/A</td>
<td>Installation Drawing, P/N 8800-02</td>
<td>07-10-14</td>
<td>–</td>
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<td>4038-055</td>
<td>Installation, Remote Mounting Tray P/N 613253-6</td>
<td>04-15-03</td>
<td>B</td>
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<td>N/A</td>
<td>Parts List, Install Kit, P/N 9B1411</td>
<td>11-18-05</td>
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REVISION LOG

<table>
<thead>
<tr>
<th>REV.</th>
<th>DATE</th>
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<td>–</td>
<td>05-02-02</td>
<td>Baseline Release</td>
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<td>A</td>
<td>03-08-05</td>
<td>Changed Company Name</td>
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<tr>
<td>B</td>
<td>12-01-05</td>
<td>Updated Company Logo, 9B1411 Assy, PL, Section 2.1</td>
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<tr>
<td>C</td>
<td>07-10-14</td>
<td>Updated Installation Dwg to new format (ERN#1407/002)</td>
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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.
1. OVERVIEW

1.1 THE MANUAL

This manual is intended to ensure the proper installation of the Landing Up Gear Warning and Altitude Encoder, P/N 8800-02. Installation instructions should be read and followed.

1.2 PRODUCT DESCRIPTION

The Landing Gear Up Warning and Altitude Encoder is made up of two identical subsystems, each of which is entirely independent from the other except that they share a single enclosure. Each subsystem has an ARINC 429 low speed input, on which it receives the pressure altitude and the computed airspeed. The ARINC altitude data is converted to Gray Code and sent to the TDR.

There are five discrete status inputs that are processed to control the three discrete warning outputs. The Weight On Wheels (WOW) I4 discrete is active low when the aircraft weight is fully resting on the wheels. When Discrete Inputs (I2, I3, or I5) indicate that landing gear is up and the craft is below 250 feet or the decision altitude setting, the Discrete Outputs (WARN1, 2, and 3) are set to their active state. When the Cancel/Test Switch discrete I1 is active low, the unit enters the self-test mode.

Figure 1. Subsystem Functional Block Diagram (2 Identical Subsystems)
1.3 SPECIFICATIONS

Physical Specifications

Dimensions: 8.56L x 3.30W x 3.68H (inches)
Weight: 2.0lbs with mounting tray

Electrical and Functional

Power Supply Voltage: +11 to +28VDC
Supply Current: 200mA at 28VDC (each section)
Protection: Not internally fused

Inputs: Discretes
Cancel / Test (Active Low)
W.O.W (Weight On Wheels – Active Low)
Gear Down (Active High, 28VDC)
Radio Alt. DH [Active High or Low, Selectable Voltage
Low (3-5VDC), High (14-28VDC)]

Data / Communication
RS-232 RX (9600 baud) Test purposes only.
ARINC 429 Low Speed (Label 206 Computed Airspeed)
( bowls 203 Pressure Altitude)

Outputs: Discretes
Warning 1 (+28VDC Active) Lamp
Warning 2 (Gnd Active) Tone
Warning 3 (Gnd Active) AFCGS System

Data / Communication
Gray Code (10 bits, 35,000 feet maximum value)
RS-232 TX (9600 baud) Test purposes only
RS-422 TX Test purposes only

Environmental

RTCA / DO-160A

Categories: F2BAMNOBBBBBBB

Operating Temperature: -55° to +70°C
Operating Altitude: Up to 55,000 ft
Storage Temperature: -55° to +85°C
In-Flight loss of Cooling: Equipment can run indefinitely without cooling
Certification: TSO-C88a
2. INSTALLATION PROCEDURE

2.1 APPROVAL FOR INSTALLATION

The conditions and tests required for TSO approval of this article are minimum performance standards. It is the responsibility of those installing 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. TSO articles must have separate approval for installation in an aircraft. The article may be installed only if performed under 14 CFR part 43 or the applicable airworthiness requirements.

All work must conform to AC 43.13-1B.

2.2 MOUNTING

The Landing Gear Up Warning and Alt. Encoder (P/N 8800-02) may be mounted in a dry location and the equipment may be installed in non-pressurized and non-controlled temperature locations.

Use installation drawing D8800-02 and Install Kit (P/N 9B1411) to connect to the Landing Gear Warning and Alt. Encoder to the aircraft system. Install the tray to mounting location using four #6-32 machine screws.
2.3 ELECTRICAL CONNECTIONS

Connection to Power Supply +28 VDC

<table>
<thead>
<tr>
<th>8800-02</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>J1:1, 2</td>
<td>To +28 VDC Power IN</td>
</tr>
<tr>
<td>J1:20, 21</td>
<td>To Power GND</td>
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Inputs

<table>
<thead>
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<th>8800-02</th>
<th>Description</th>
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<tbody>
<tr>
<td>J1:3</td>
<td>To Cancel / Test</td>
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<tr>
<td>J1:4</td>
<td>To +14 to 28V Input</td>
</tr>
<tr>
<td>J1:5</td>
<td>To +3 to 5V Input</td>
</tr>
<tr>
<td>J1:6</td>
<td>To - Input</td>
</tr>
<tr>
<td>J1:7</td>
<td>To +14 to 28V Input</td>
</tr>
<tr>
<td>J1:8</td>
<td>To +3 to 5V Input</td>
</tr>
<tr>
<td>J1:9</td>
<td>To - Input</td>
</tr>
<tr>
<td>J1:10</td>
<td>To B (-) ARINC 429 Input</td>
</tr>
<tr>
<td>J1:11</td>
<td>To A (+) ARINC 429 Input</td>
</tr>
<tr>
<td>J1:23</td>
<td>To W.O.W (Weight On Wheels)</td>
</tr>
<tr>
<td>J1:24</td>
<td>To (+) Gear Down Input</td>
</tr>
<tr>
<td>J1:26</td>
<td>To + Spare Flag Input</td>
</tr>
<tr>
<td>J1:27</td>
<td>To - Spare Flag Input</td>
</tr>
<tr>
<td>J1:30</td>
<td>To RS-232 RX (Future Use)</td>
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Outputs

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<th>Description</th>
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</thead>
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<tr>
<td>J1:12</td>
<td>To B1</td>
</tr>
<tr>
<td>J1:13</td>
<td>To B2</td>
</tr>
<tr>
<td>J1:14</td>
<td>To B4</td>
</tr>
<tr>
<td>J1:15</td>
<td>To C1</td>
</tr>
<tr>
<td>J1:16</td>
<td>To C2</td>
</tr>
<tr>
<td>J1:17</td>
<td>To C4</td>
</tr>
<tr>
<td>J1:18</td>
<td>To D4</td>
</tr>
<tr>
<td>J1:19</td>
<td>To Code Gnd</td>
</tr>
<tr>
<td>J1:28</td>
<td>To + SDA RS-422 TX</td>
</tr>
<tr>
<td>J1:29</td>
<td>To - SDB RS-422 TX</td>
</tr>
<tr>
<td>J1:31</td>
<td>To RS-232 RX</td>
</tr>
<tr>
<td>J1:32</td>
<td>To A1</td>
</tr>
<tr>
<td>J1:33</td>
<td>To A2</td>
</tr>
<tr>
<td>J1:34</td>
<td>To A4</td>
</tr>
<tr>
<td>J1:35</td>
<td>To Warning 1 Output (+28V)</td>
</tr>
<tr>
<td>J1:36</td>
<td>To Warning 2 Output (Gnd)</td>
</tr>
<tr>
<td>J1:37</td>
<td>To Warning 3 Output (Gnd)</td>
</tr>
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3.0 ENVIRONMENTAL QUALIFICATION FORM

NOMENCLATURE: LANDING GEAR UP WARNING and ALT. ENCODER
TYPE/MODEL/PART NO: 8800-02 TSO NUMBER: C88a
MANUFACTURER'S SPECIFICATION AND/OR OTHER APPLICABLE SPECIFICATION:
Report 4088-02, RTCA/DO-160A
MANUFACTURER: Shadin Avionics
ADDRESS: 6831 Oxford Street, St. Louis Park, Minnesota 55426-4412

<table>
<thead>
<tr>
<th>CONDITIONS</th>
<th>SECTION</th>
<th>DESCRIPTION OF TESTS CONDUCTED</th>
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</thead>
<tbody>
<tr>
<td>Temperature and Altitude</td>
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<td>Tested to Category F2.</td>
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<tr>
<td>Low Temperature</td>
<td></td>
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</tr>
<tr>
<td>High Temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decompression</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overpressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature Variation</td>
<td>5.0</td>
<td>Tested to Category B.</td>
</tr>
<tr>
<td>Humidity</td>
<td>6.0</td>
<td>Tested to Category A.</td>
</tr>
<tr>
<td>Operational Shock and Crash Safety</td>
<td>7.0</td>
<td>Standard</td>
</tr>
<tr>
<td>Vibration</td>
<td>8.0</td>
<td>Tested to Category MNO.</td>
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<td>Explosion</td>
<td>9.0</td>
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<tr>
<td>Waterproofness</td>
<td>10.0</td>
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<tr>
<td>Fluids Susceptibility</td>
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<tr>
<td>Sand and Dust</td>
<td>12.0</td>
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<tr>
<td>Fungus</td>
<td>13.0</td>
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<tr>
<td>Salt Spray</td>
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## ENVIRONMENTAL QUALIFICATION FORM (Cont.)

<table>
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<th>SECTION</th>
<th>DESCRIPTION OF TESTS CONDUCTED</th>
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<tbody>
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<td>Magnetic Effect</td>
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<tr>
<td>Power Input</td>
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<td>Tested to Category B.</td>
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<tr>
<td>Voltage Spike</td>
<td>17.0</td>
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</tr>
<tr>
<td>Audio Frequency Susceptibility</td>
<td>18.0</td>
<td>Tested to Category B.</td>
</tr>
<tr>
<td>Induced Signal Susceptibility</td>
<td>19.0</td>
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<tr>
<td>Radio Frequency Susceptibility</td>
<td>20.0</td>
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<tr>
<td>Radio Frequency Emission</td>
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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.
### 37 PIN CONNECTOR DEFINITION (X2)

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<th>COMMENT</th>
<th>PIN #</th>
<th>FUNCTION</th>
<th>COMMENT</th>
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<tbody>
<tr>
<td>1</td>
<td>+28V DC INPUT</td>
<td></td>
<td>20</td>
<td>GND (POWER)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>+28V DC INPUT</td>
<td></td>
<td>21</td>
<td>GND (POWER)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>CANCEL/TEST INPUT</td>
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<td>22</td>
<td>NC</td>
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<tr>
<td>4</td>
<td>+14V – 28V INPUT</td>
<td>RAD. ALT DH</td>
<td>23</td>
<td>W.O.W. GND IN</td>
<td></td>
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<tr>
<td>5</td>
<td>+3V – 5V INPUT</td>
<td>RAD. ALT TRIP</td>
<td>24</td>
<td>(+) GEAR DOWN INPUT</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>– INPUT</td>
<td></td>
<td>25</td>
<td>NC</td>
<td></td>
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<tr>
<td>7</td>
<td>+14V – 28V INPUT</td>
<td></td>
<td>26</td>
<td>+ SPARE FLAG INPUT</td>
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</tr>
<tr>
<td>8</td>
<td>+3V – 5V INPUT</td>
<td></td>
<td>27</td>
<td>– SPARE FLAG INPUT</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>– INPUT</td>
<td></td>
<td>28</td>
<td>+ SDA RS–422 TX</td>
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</tr>
<tr>
<td>10</td>
<td>B (–) ARINC 429 INPUT</td>
<td>GILLHAM (GRAY) CODE ALTITUDE OUTPUT</td>
<td>29</td>
<td>– SDB RS–422 TX</td>
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<tr>
<td>11</td>
<td>A (+) ARINC 429 INPUT</td>
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<td>30</td>
<td>RS–232 RX</td>
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<td>12</td>
<td>B1</td>
<td></td>
<td>31</td>
<td>RS–232 TX</td>
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</tr>
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<td>13</td>
<td>B2</td>
<td>GILLHAM (GRAY) CODE ALTITUDE OUTPUT</td>
<td>32</td>
<td>A1</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>B4</td>
<td></td>
<td>33</td>
<td>A2</td>
<td></td>
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<tr>
<td>15</td>
<td>C1</td>
<td></td>
<td>34</td>
<td>A4</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>C2</td>
<td></td>
<td>35</td>
<td>WARN 1 OUTPUT (+28v)</td>
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</tr>
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<td>17</td>
<td>C4</td>
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<td>36</td>
<td>WARN 2 OUTPUT (GND)</td>
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<td>18</td>
<td>D4</td>
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<td>37</td>
<td>WARN 3 OUTPUT (GND)</td>
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<td>19</td>
<td>GND (CODE COMMON)</td>
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INSTALLATION HARDWARE:
(TYP. 4 PLACES)
- AN 526-632R8 SCREW
- AN 960-6 WASHER
- AN 364-632 NUT
## Parts List

**Description:** INSTALL KIT, ENCODER/GEAR WARNING UP SYSTEM

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<thead>
<tr>
<th>FN</th>
<th>P/N</th>
<th>QTY</th>
<th>DESCRIPTION</th>
<th>MFG.</th>
<th>MFG.#</th>
<th>DESIGNATION</th>
<th>COMMENTS</th>
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<td>230019H-1</td>
<td>4</td>
<td>SPRING LATCH CLIP</td>
<td>SHA</td>
<td>4028-074</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>230052</td>
<td>2</td>
<td>CONN, 37Pin, D-Sub, Female, w/o Contacts</td>
<td>POS</td>
<td>M24308/2-284 (RD37F00000)</td>
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<td></td>
</tr>
<tr>
<td>15</td>
<td>230055</td>
<td>74</td>
<td>CONTACT, Crimp D-Sub, Fem, 20-24, M39029/63-368</td>
<td>POS</td>
<td>M39029/63-368 (FC6020D)</td>
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<tr>
<td>20</td>
<td>230082</td>
<td>2</td>
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<td>CIN</td>
<td>DC-24660</td>
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<td>25</td>
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<td>4</td>
<td>SCREW, 4-40 x ¼&quot;L, Phil Pan HD SS</td>
<td>MCM</td>
<td>91772A106</td>
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<td>512007</td>
<td>4</td>
<td>NUT, 4-40 3/16 x 1/16 SS</td>
<td>AFT</td>
<td>HNSP188 04C000</td>
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<td>35</td>
<td>541001</td>
<td>4</td>
<td>WASHER, #4 Split Lock SS</td>
<td>MCM</td>
<td>92147A005</td>
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<td>40</td>
<td>613253-6</td>
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<td>MOUNTING TRAY ASSEMBLY</td>
<td>SHA</td>
<td>4036-039</td>
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<td>AVR</td>
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<td>50</td>
<td>PK1002</td>
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<td>BAG, 3 x 4, 4 MIL Zip Lock</td>
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<tr>
<td>55</td>
<td>PK1010</td>
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<td>BAG, 10 x 12, 4 MIL</td>
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85 items