



# **LANDING GEAR UP WARNING AND ALT. ENCODER**

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**PRODUCT P/N: 8800-02**

**INSTALLATION MANUAL**

**REV C**

**Shadin Avionics  
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**MANUAL P/N: IM8800-02**

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**PAGE CONTROL CHART**

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<b><u>Drawing No.</u></b>	<b><u>Description/ Part Number</u></b>		<b><u>DATE</u></b>	<b><u>REV</u></b>
N/A	Installation Drawing, P/N 8800-02		07-10-14	–
4038-055	Installation, Remote Mounting Tray P/N 613253-6		04-15-03	B
N/A	Parts List, Install Kit, P/N 9B1411		11-18-05	A

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**REVISION LOG**

REV.	DATE	CHANGE
-	05-02-02	Baseline Release
A	03-08-05	Changed Company Name
B	12-01-05	Updated Company Logo, 9B1411 Assy, PL, Section 2.1
C	07-10-14	Updated Installation Dwg to new format (ERN#1407/002)

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 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)**

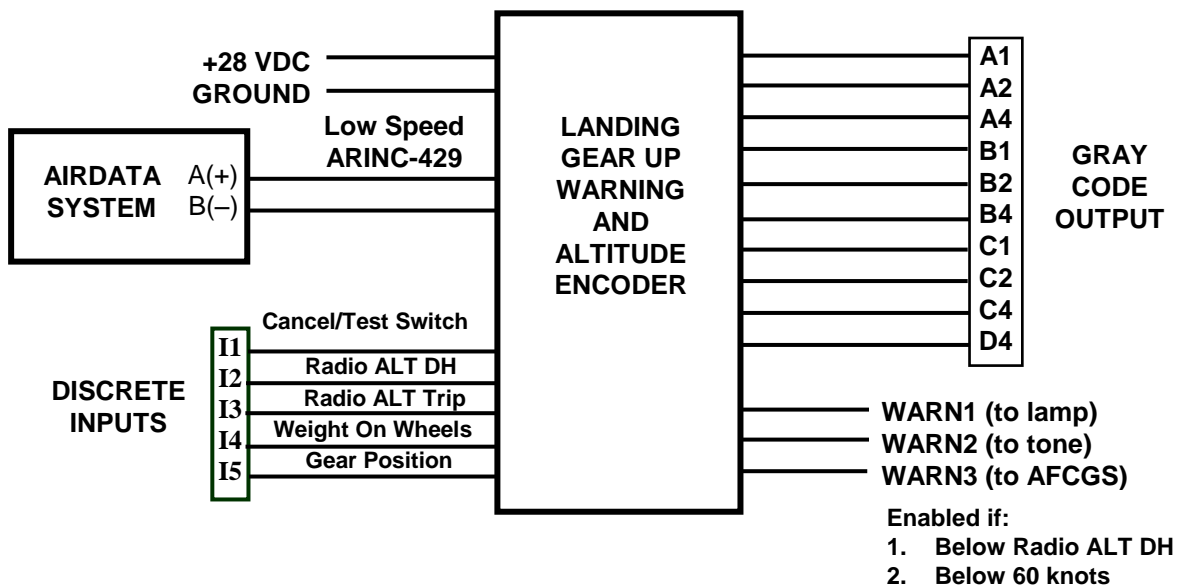


Figure 1

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**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: *Discrettes*  
 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)  
 (Label 203 Pressure Altitude)

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

*Data / Communicaton*

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

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## **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.

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**2.3 ELECTRICAL CONNECTIONS**

Connection to Power Supply +28 VDC

8800-02		Description
J1:1, 2	To	+28 VDC Power IN
J1:20, 21	To	Power GND

Inputs

8800-02		Description	
J1:3	To	Cancel / Test	
J1:4	To	+14 to 28V Input	Radio Altitude DH
J1:5	To	+3 to 5V Input	
J1:6	To	- Input	
J1:7	To	+14 to 28V Input	Radio Altitude Trip
J1:8	To	+3 to 5V Input	
J1:9	To	- Input	
J1:10	To	B (-) ARINC 429 Input	
J1:11	To	A (+) ARINC 429 Input	
J1:23	To	W.O.W (Weight On Wheels)	
J1:24	To	(+) Gear Down Input	
J1:26	To	+ Spare Flag Input	
J1:27	To	- Spare Flag Input	
J1:30	To	RS-232 RX (Future Use)	

Outputs

8800-02		Description	
J1:12	To	B1	Gray Code Altitude Output
J1:13	To	B2	
J1:14	To	B4	
J1:15	To	C1	
J1:16	To	C2	
J1:17	To	C4	
J1:18	To	D4	
J1:19	To	Code Gnd	
J1:28	To	+ SDA RS-422 TX	Future Use
J1:29	To	- SDB RS-422 TX	
J1:31	To	RS-232 TX	
J1:32	To	A1	Gray Code Altitude Output
J1:33	To	A2	
J1:34	To	A4	
J1:35	To	Warning 1 Output (+28V)	
J1:36	To	Warning 2 Output (Gnd)	
J1:37	To	Warning 3 Output (Gnd)	

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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

<u>CONDITIONS</u>	<u>SECTION</u>	<u>DESCRIPTION OF TESTS CONDUCTED</u>
Temperature and Altitude	4.0	Tested to Category F2.
Low Temperature		
High Temperature		
Altitude		
Decompression		
Overpressure		
Temperature Variation	5.0	Tested to Category B.
Humidity	6.0	Tested to Category A.
Operational Shock and Crash Safety	7.0	Standard
Vibration	8.0	Tested to Category MNO.
Explosion	9.0	Not tested.
Waterproofness	10.0	Not tested.
Fluids Susceptibility	11.0	Not tested.
Sand and Dust	12.0	Not tested.
Fungus	13.0	Not tested.
Salt Spray	14.0	Not tested.



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**ENVIRONMENTAL QUALIFICATION FORM (Cont.)**

<b><u>CONDITIONS</u></b>	<b><u>SECTION</u></b>	<b><u>DESCRIPTION OF TESTS CONDUCTED</u></b>
Magnetic Effect	15.0	Tested to Category B.
Power Input	16.0	Tested to Category B.
Voltage Spike	17.0	Tested to Category B.
Audio Frequency Susceptibility	18.0	Tested to Category B.
Induced Signal Susceptibility	19.0	Tested to Category B.
Radio Frequency Susceptibility	20.0	Tested to Category B.
Radio Frequency Emission	21.0	Tested to Category B.

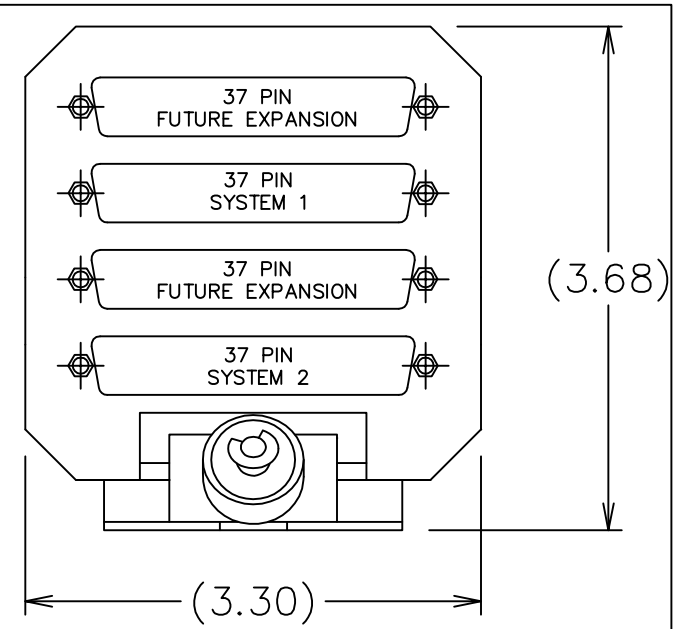
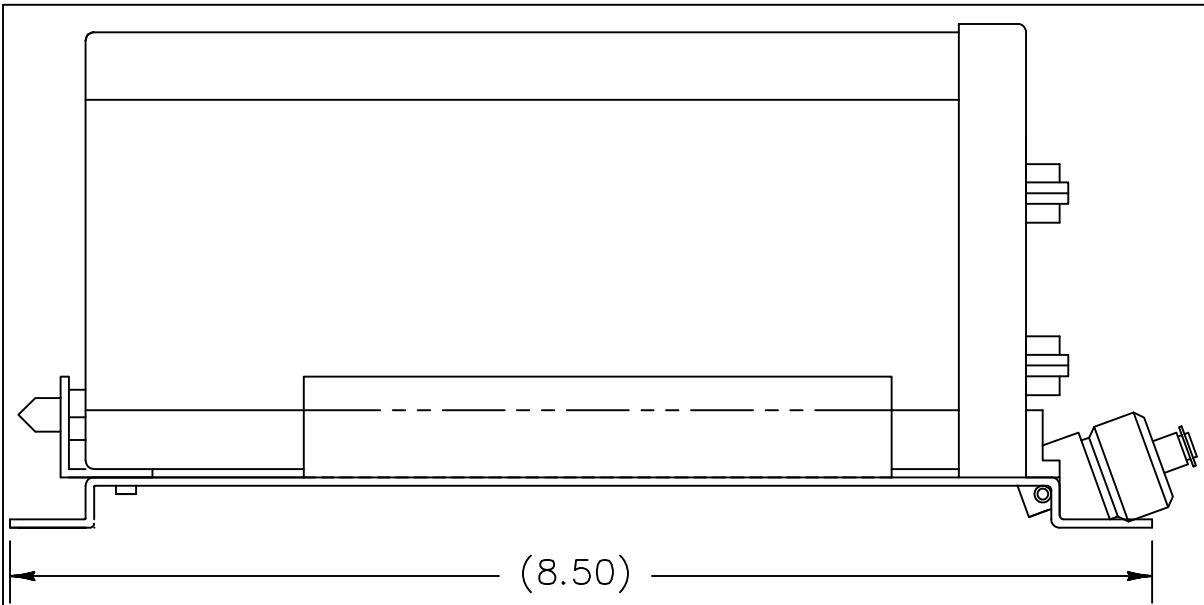
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**SECTION 4.0**

**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)

PIN #	FUNCTION	COMMENT	PIN #	FUNCTION	COMMENT
1	+28V DC INPUT		20	GND (POWER)	
2	+28V DC INPUT		21	GND (POWER)	
3	CANCEL/TEST INPUT		22	NC	
4	+14V - 28V INPUT		23	W.O.W. GND IN	
5	+3V - 5V INPUT	RAD. ALT DH	24	(+) GEAR DOWN INPUT	
6	- INPUT		25	NC	
7	+14V - 28V INPUT		26	+ SPARE FLAG INPUT	
8	+3V - 5V INPUT	RAD. ALT TRIP	27	- SPARE FLAG INPUT	
9	- INPUT		28	+ SDA RS-422 TX	
10	B (-) ARINC 429 INPUT		29	- SDB RS-422 TX	FUTURE USE
11	A (+) ARINC 429 INPUT		30	RS-232 RX	
12	B1		31	RS-232 TX	
13	B2		32	A1	GILLHAM (GRAY) CODE ALTITUDE OUTPUT
14	B4		33	A2	
15	C1	GILLHAM (GRAY) CODE ALTITUDE OUTPUT	34	A4	
16	C2		35	WARN 1 OUTPUT (+28v)	
17	C4		36	WARN 2 OUTPUT (GND)	
18	D4		37	WARN 3 OUTPUT (GND)	
19	GND (CODE COMMON)				

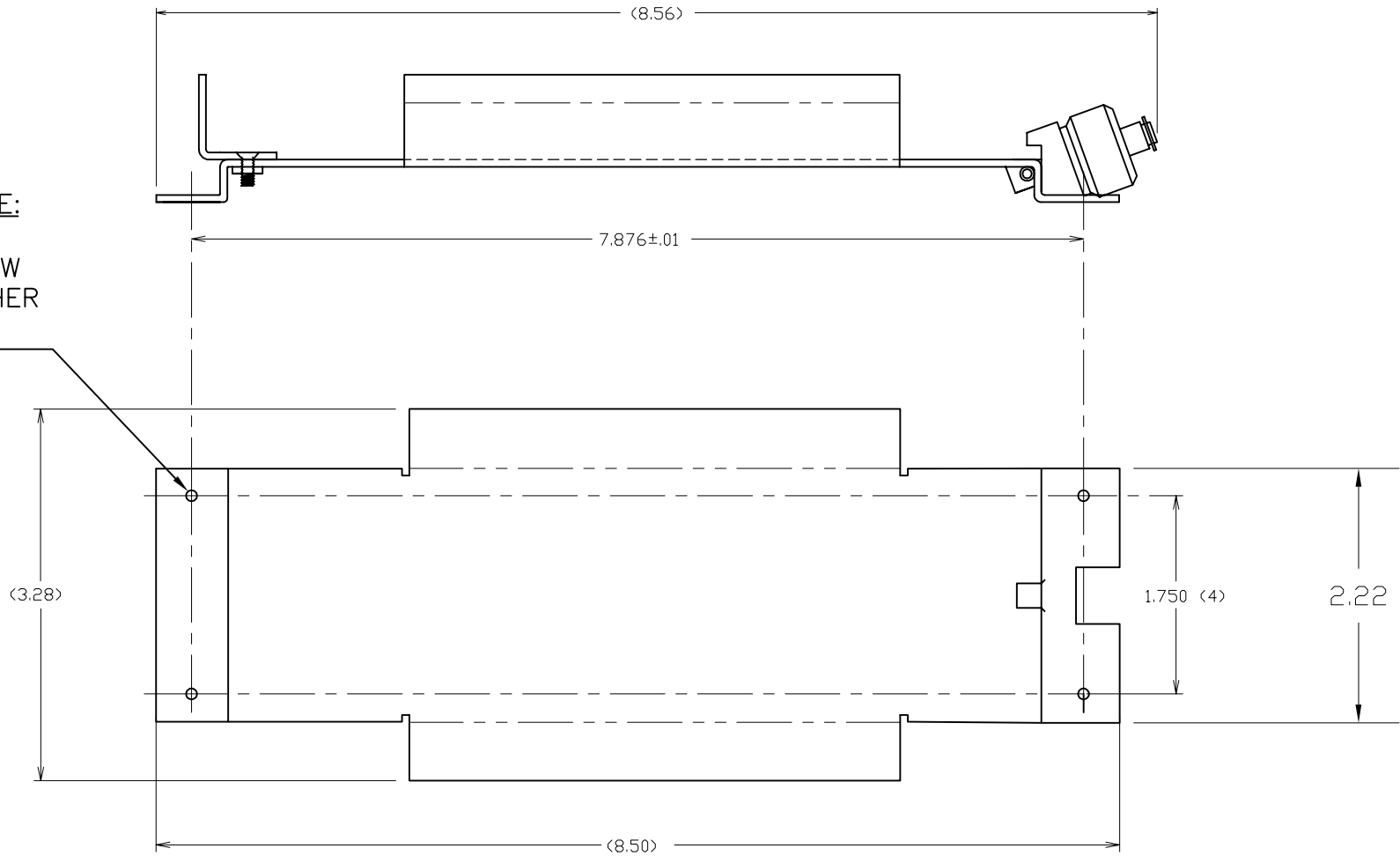
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DRAWING DATE  
7/10/2014  
 DRAFTER EG  
 APPROVED BVM  
 FILE NAME  
D8800-02-.DWG  
 DIRECTORY  
N/A  
 SHEET 1 OF 1

MINNEAPOLIS, MN 55426  
 CAGE CODE  
0Z5P5  
 SIZE  
A

INSTALLATION DWG,  
 P/N 8800-02  
 P/N D8800-02  
 REV -

INSTALLATION HARDWARE:  
 (TYP. 4 PLACES)  
 AN 526-632R8 SCREW  
 AN 960-6 WASHER  
 AN 364-632 NUT



DRAWING DATE 10/31/94	<b>SHADIN</b> MINNEAPOLIS, MN 55426		
DRAFTER WMP	INSTALLATION, REMOTE MOUNTING TRAY		
APPROVED SES			
FILE NAME 613253-6B.J.DWG	DRAWING NO. 4038-055	SIZE A	P/N 613253-6
DIRECTORY 613253-6	SHEET 1 OF 1		REV B

ECD #	REV.	DATE	BY	APP'D	DESCRIPTION
0303/041	B	4/15/03	PAB	ZK	ADJUSTED DIMENSIONS
9912/005	A	12/10/99	LJM	AR	CONVERT FROM DESIGN CAD TO ACAD, ADD TEXT
9410/026	-	10/31/94	WMP	SES	BASELINE RELEASE

SCALE: NONE

Report: 4088-02  
 ECO Date: November 14, 2005  
 Rev: A  
 Sec.: IX  
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ECO #: 0511/009  
 Release Date: 11/18/05  
 Approved: EDJ

**PARTS LIST**

Part #: **9B1411**

Drawing #: 4088-025 Rev A

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

<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	4	SPRING LATCH CLIP	SHA	4028-074		
10	230052	2	CONN, 37Pin, D-Sub, Female, w/o Contacts	POS	M24308/2-284 (RD37F00000)		
15	230055	74	CONTACT, Crimp D-Sub, Fem, 20-24, M39029/63-368	POS	M39029/63-368 (FC6020D)		
20	230082	2	CONN HOOD, 37 Pin D-Sub ST	CIN	DC-24660		
25	511002	4	SCREW, 4-40 x 1/4"L, Phil Pan HD SS	MCM	91772A106		
30	512007	4	NUT, 4-40 3/16 x 1/16 SS	AFT	HNSP188 04C000		
35	541001	4	WASHER, #4 Split Lock SS	MCM	92147A005		
40	613253-6	1	MOUNTING TRAY ASSEMBLY	SHA	4036-039		
45	753217	1	COMPUTER LABEL, 3.5x15/16"	AVR	4013		
50	PK1002	2	BAG, 3 x 4, 4 MIL Zip Lock				
55	PK1010	1	BAG, 10 x 12, 4 MIL				

85 items