



AIS-450 HEADING SYNCHRO OUTPUT

P/N: 834511-00

INSTALLATION MANUAL

REV –

**Shadin Avionics
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MANUAL P/N: IM834511-00

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<u>Part No.</u>	<u>Description</u>	<u>REV</u>
ID834511-00	Installation Dwg, AIS 834511-00	–
IK834510	Install Kit, P/N 834510	–

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REVISION LOG

REV.	DATE	APP'D	CHANGE	CVS Version
–	04-19-2011	ZK	Baseline Release	1.4

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 guide the proper installation of the AIS-450 Heading Synchro Output. Installation instructions should be read and followed.

1.2 PRODUCT DESCRIPTION

The AIS-450 Heading Synchro Output is a digital to synchro based converter that receives angular data (Heading) on two ARINC 429 inputs and converts it to one ARINC 407 synchro output (3-wire). The two ARINC 429 inputs are high speed (H/S) and accept only angular ARINC 429 labels for Heading, Pitch, and Roll (ARINC Labels 314, 320, 324, and 325). The ARINC 429 outputs are high speed (H/S) and pass through only the valid angular ARINC 429 labels received on the inputs. The AIS-450 single channel has one ARINC 407 output that is configured as 3-wire synchro. The output is mapped to the True or Magnetic Heading ARINC 429 label (314 or 320) depending on the state of the Heading Select Discrete Input. A High/Open state maps the output to Magnetic Heading and a Low/Ground state maps the output to True Heading. The Synchro Validity Discrete Output indicates whether the ARINC 407 output is valid. The ARINC 429 Input 1 takes priority over the ARINC 429 Input 2.

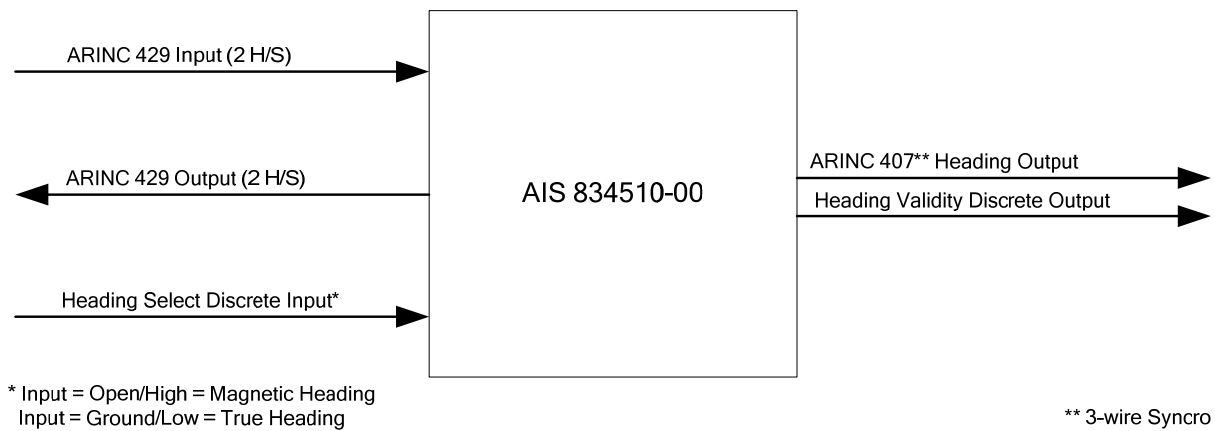


Figure 1 - System Overview

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1.3 SPECIFICATIONS**Physical Specifications**

Dimensions:	8.5”L x 4.0”W x 2.5”H
Weight:	1.42 lbs
Mounting:	Screw size #8
Mounting Locations:	8.00”L x 2.00”W

Electrical and Functional

Power Supply Voltage:	+18VDC to +33 VDC
Supply Current:	520 mA Max (745 mA Max including external loads)
Protection:	Active current limiting to 2.0 Amps

Inputs:

ARINC 429	High Speed, 100 Kbps \pm 1%
26 VAC Reference CH1 and CH3	24.7 VAC to 27.3 VAC ¹
Discrete Input (ARINC 763-3)	Active: Low / Ground Signal $V < 3.5$ VDC with $I < 20$ mA sink or $R < 10 \Omega$
	Inactive: High / Open Signal 18.5 VDC $< V < 36.0$ VDC or $R > 100$ K Ω

Outputs:

ARINC 429	High Speed, 100 Kbps \pm 1%
Synchro-X, Y, and Z (ARINC 407)	0 to 11.8 VAC Typical, 12.4 VAC Max 0.209 VA into 500 Ω each channel
Synchro Angle Accuracy	Input Angle $\pm 0.5^\circ$
Synchro-Valid-CH1	+28VDC(Valid) / Open(Invalid) Discrete, 75mA Max Short Circuit Protected

1. Input Voltage in excess of 27.3 VAC may result in Synchro output voltage greater than 12.5 VAC.

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Environmental**(By similarity to P/N 834510-00)**

RTCA/DO-160F Categories: F1-BAB[R(B, B1)]XXXXXXXXZ[AXX]AR[CC][WW]M[XXXXXX]XXAX

Operating Temperature: -40°C to +70°C

Storage Temperature: -55°C to +85°C

Operating Altitude: Up to 55,000ft

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

Certification: TSO-C5f, TSO-C6e “Incomplete System”

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2. INSTALLATION PROCEDURE

2.1 INSTALLATION LIMITATION

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.

2.2 MOUNTING

The AIS-450 Heading Synchro Output (P/N 834511-00) should be mounted in a partially temperature controlled location. Non-pressurized or pressurized locations are acceptable.

The converter should be mounted according to the AIS 834511-00 Installation Dwg, P/N ID834511-00.

2.3 ELECTRICAL CONNECTIONS

The electrical connections are defined in the AIS 834511-00 Installation Dwg, P/N ID834511-00. The mating connectors are standard female 25 and 37 pin D-Sub connectors (Included in installation kit are shell P/Ns Amphenol 205165-1 and 205167-1 and contacts P/N Positronic M39029/63-368). All interface wires should be 20 AWG. All wire shielding for STP (Shielded Twisted Pair) and STT (Shielded Twisted Triple) wires should be tied to the mating connector backshell.

2.4 MAINTENANCE

There is no periodic maintenance or calibration required for the AIS-450. All product repairs will be completed at Shadin Avionics.

2.5 EXAMPLE INSTALLATION DIAGRAM

The following diagram shows an example of a system installation.

The installation drawing shows ARINC 429 Input 2 connections as optional. The ARINC 429 Input 1 takes priority over the ARINC 429 Input 2.

The installation drawing shows the Discrete Input tied to Low/Ground which maps Synchro Output 1 to True Heading (ARINC 429 label 314). The Discrete Input can also be left in a High/Open state which maps the output to Magnetic Heading (ARINC 429 label 320).

External Synchro Z to C signal connection for the synchro output is required if it does not already exist within the interface LRU. All AIS-450 pins not shown on the installation diagram should be left unconnected.

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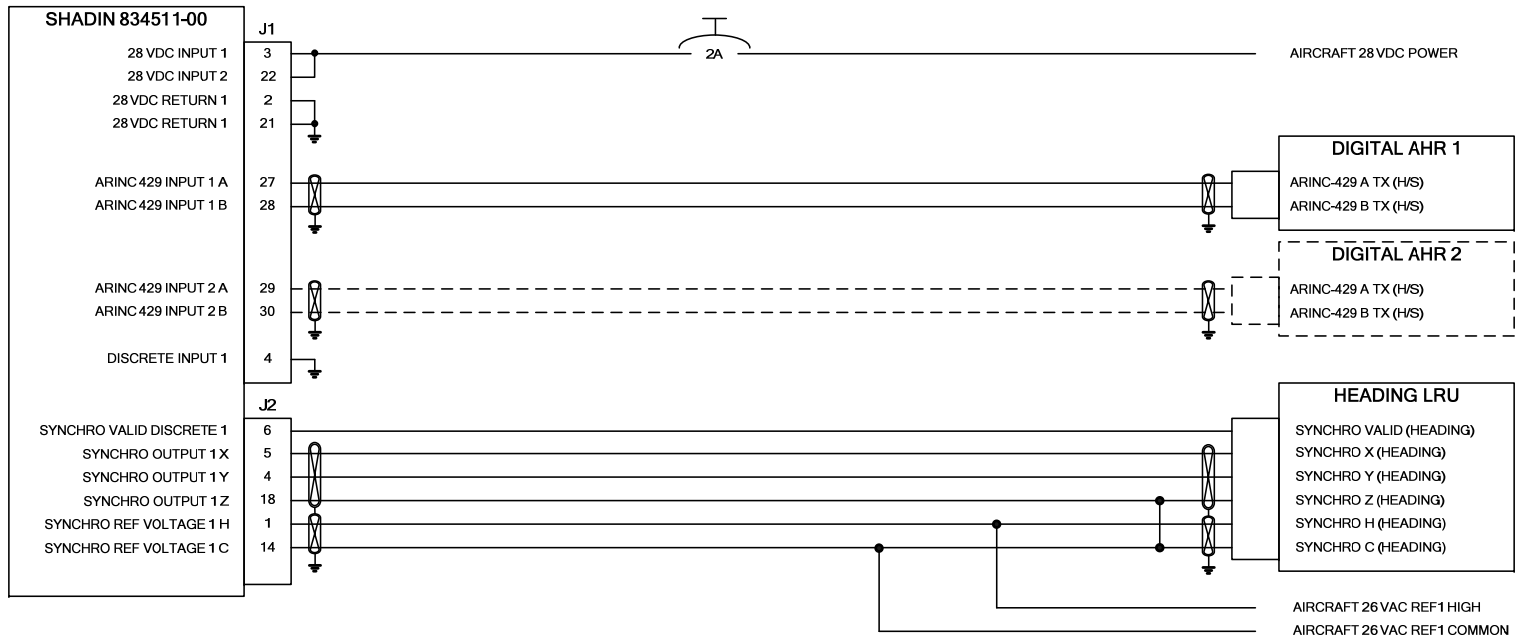


Figure 2 - Example Installation Diagram

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3.0 ENVIRONMENTAL QUALIFICATION FORM (EQF)

This Environmental Qualification Form describes qualification testing performed on the P/N 834510-00. The P/N 834511-00 AIS-450 Heading Synchro Output is qualified by similarity to the P/N 834510-00 AIS-450 Synchro Converter. The P/N 834511-00 is therefore qualified to RTCA/DO-160F standards.

NOMENCLATURE: AIS-450 SYNCHRO CONVERTER

TYPE/MODEL/PART NO: 834510-00 **TSO NUMBER:** TSO-C4c, -C5f, -C6e “Incomplete System”

MANUFACTURER'S SPECIFICATION AND/OR OTHER APPLICABLE SPECIFICATION:

RTCA/DO-160F

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		-40°C
High Temperature		+70°C
Altitude		55,000ft
Decompression		55,000ft
Overpressure		-15,000ft
Temperature Variation	5.0	Tested to Category B.
Humidity	6.0	Tested to Category A.
Operational Shock and Crash Safety	7.0	Tested to Category B.
Vibration	8.0	Tested to Category R (B, B1).
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 AXX and Engine Starting Undervoltage.
Voltage Spike	17.0	Tested to Category A.
Audio Frequency Susceptibility	18.0	Tested to Category R.
Induced Signal Susceptibility	19.0	Tested to Category CC.
Radio Frequency Susceptibility	20.0	Tested to Category WW.
Radio Frequency Emission	21.0	Tested to Category M.
Lightning Induced Transient Susceptibility	22.0	Identified as Category XXXXX. 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	Tested to Category A.
Fire, Flammability	26.0	Identified as Category X. Not tested.

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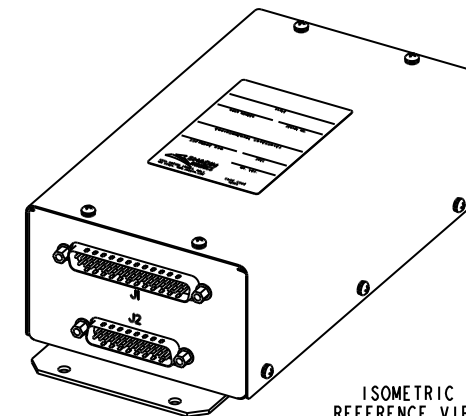
SECTION 4.0

**INSTALLATION DRAWINGS AND
INSTALL KIT PARTS LISTS**

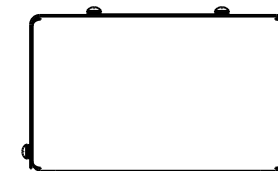
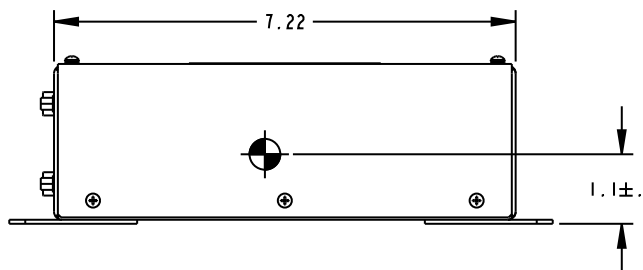
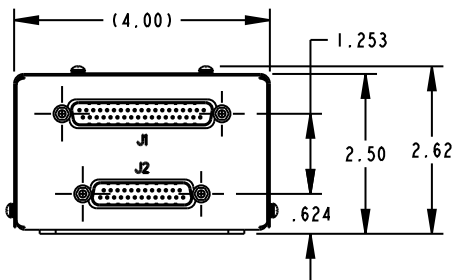
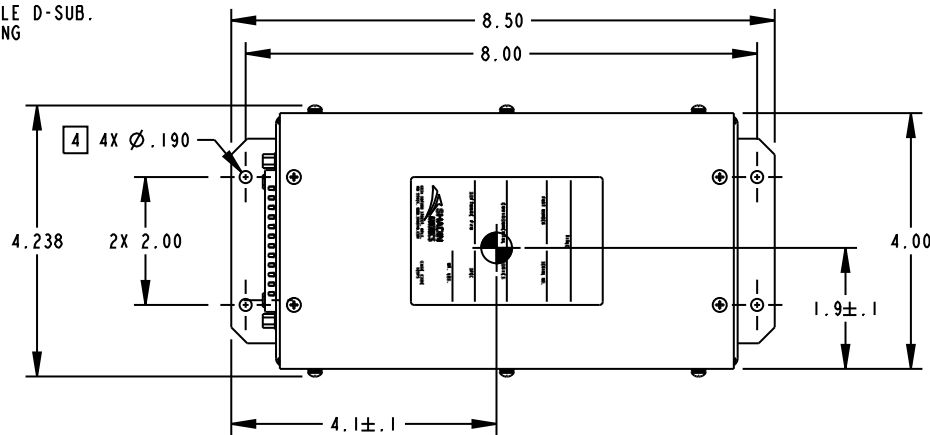
The following drawings are arranged in the sequence specified on page i of the Page Control Chart.

NOTES:

1. DIMENSIONS ARE FOR REFERENCE ONLY.
2. PHYSICAL SIZE, EXCLUDING SCREW HEADS:
- 8.5" (L) X 4.0" (W) X 2.50" (H).
3. WEIGHT = 1.42 LBS
- 4 MOUNTING SCREW SIZE IS NO. 8.
- 5 J1 CONNECTOR
- 37 PIN D-SUB, MALE
- WIRE TYPE "STP" IS SHIELDED TWISTED PAIR
- 6 J2 CONNECTOR
- 25 PIN D-SUB, MALE
- WIRE TYPE "STP" IS SHIELDED TWISTED PAIR
- WIRE TYPE "STT" IS SHIELDED TWISTED TRIPLE PAIR
7. MATING CONNECTORS ARE STANDARD 25 & 37 PIN FEMALE D-SUB.
- STP & STT WIRE SHIELDS SHOULD BE TIED TO MATING CONNECTOR SHELL.



ISOMETRIC
REFERENCE VIEW



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DRAWING DATE 2011-04-01
DRAFTER HWL
APPROVED DSE
FILE NAME ID834511-00-.PDF DIRECTORY 834511-00
SHEET 1 OF 2

MINNEAPOLIS, MN 55426

CAGE CODE
OZ5P5

SIZE
A

INSTALLATION DWG, AIS 834511-00	
P/N ID834511-00	REV —

1104/001	—	04/18/11	HWL	DSE	BASELINE RELEASE
ECO #	REV.	DATE	BY	APP'D	DESCRIPTION

5 J1 CONNECTOR PIN OUT

PIN	SIGNAL NAME	DESCRIPTION	TYPE (REF)	PAIR (REF)
1	RESERVED	N/A	N/A	N/A
2	POWER-GND-IN	POWER RETURN	SINGLE	N/A
3	+28V-IN	28 VDC POWER POSITIVE	SINGLE	N/A
4	DISCRETE-INPUT-1	DISCRETE INPUT #1 (ACTIVE LOW)	SINGLE	N/A
5	RESERVED	N/A	N/A	N/A
6	RESERVED	N/A	N/A	N/A
7	RESERVED	N/A	N/A	N/A
8	ARINC-429-TXA-1	ARINC 429 OUTPUT #1 (LINE A)	STP	PIN 9
9	ARINC-429-TXB-1	ARINC 429 OUTPUT #1 (LINE B)	STP	PIN 8
10	ARINC-429-TXA-2	ARINC 429 OUTPUT #2 (LINE A)	STP	PIN 11
11	ARINC-429-TXB-2	ARINC 429 OUTPUT #2 (LINE B)	STP	PIN 10
12	RESERVED	N/A	N/A	N/A
13	RESERVED	N/A	N/A	N/A
14	RESERVED	N/A	N/A	N/A
15	RESERVED	N/A	N/A	N/A
16	RESERVED	N/A	N/A	N/A
17	RESERVED	N/A	N/A	N/A
18	RESERVED	N/A	N/A	N/A
19	RESERVED	N/A	N/A	N/A
20	SPARE1	UNUSED PIN	NA	N/A
21	POWER-GND-IN	POWER RETURN	SINGLE	N/A
22	+28V-IN	28 VDC POWER POSITIVE	SINGLE	N/A
23	RESERVED	N/A	N/A	N/A
24	RESERVED	N/A	N/A	N/A
25	RESERVED	N/A	N/A	N/A
26	RESERVED	N/A	N/A	N/A
27	ARINC-429-RXA-1	ARINC 429 INPUT #1 (LINE A)	STP	PIN 28
28	ARINC-429-RXB-1	ARINC 429 INPUT #1 (LINE B)	STP	PIN 27
29	ARINC-429-RXA-2	ARINC 429 INPUT #2 (LINE A)	STP	PIN 30
30	ARINC-429-RXB-2	ARINC 429 INPUT #2 (LINE B)	STP	PIN 29
31	RESERVED	N/A	N/A	N/A
32	RESERVED	N/A	N/A	N/A
33	RESERVED	N/A	N/A	N/A
34	RESERVED	N/A	N/A	N/A
35	RESERVED	N/A	N/A	N/A
36	RESERVED	N/A	N/A	N/A
37	RESERVED	N/A	N/A	N/A

6 J2 CONNECTOR PIN OUT

PIN	SIGNAL NAME	DESCRIPTION	TYPE (REF)	PAIR (REF)
1	+26-VAC-REFERENCE-H-CHI	SYNCHRO REFERENCE VOLTAGE HIGH - CHANNEL 1	STP	PIN 14
2	UNUSED	UNUSED PIN	N/A	N/A
3	SPARE1	UNUSED PIN	N/A	N/A
4	SYNCHRO-Y-CHI	SYNCHRO OUTPUT Y - CHANNEL 1	STT	PINS 5 & 18
5	SYNCHRO-X-CHI	SYNCHRO OUTPUT X - CHANNEL 1	STT	PINS 4 & 18
6	SYNCHRO-VALID-CHI	SYNCHRO VALIDITY DISCRETE - CHANNEL 1	SINGLE	N/A
7	UNUSED	UNUSED PIN	N/A	N/A
8	UNUSED	UNUSED PIN	N/A	N/A
9	UNUSED	UNUSED PIN	N/A	N/A
10	UNUSED	UNUSED PIN	N/A	N/A
11	UNUSED	UNUSED PIN	N/A	N/A
12	UNUSED	UNUSED PIN	N/A	N/A
13	SPARE2	UNUSED PIN	N/A	N/A
14	+26-VAC-REFERENCE-C-CHI	SYNCHRO REFERENCE VOLTAGE COMMON - CHANNEL 1	STP	PIN 1
15	UNUSED	UNUSED PIN	N/A	N/A
16	SPARE3	UNUSED PIN	N/A	N/A
17	RESERVED	RESERVED PIN	N/A	N/A
18	SYNCHRO-Z-CHI	SYNCHRO OUTPUT Z - CHANNEL 1	STT	PINS 4 & 5
19	SPARE4	UNUSED PIN	N/A	N/A
20	RESERVED	RESERVED PIN	N/A	N/A
21	UNUSED	UNUSED PIN	N/A	N/A
22	SPARE5	UNUSED PIN	N/A	N/A
23	RESERVED	RESERVED PIN	N/A	N/A
24	UNUSED	UNUSED PIN	N/A	N/A
25	SPARE6	UNUSED PIN	N/A	N/A

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PARTS LIST

Part #: **IK834510**

Drawing #: NA

Description: **INSTALL KIT, P/N 834510**

<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	230055	36	CONTACT, Crimp D-Sub, Fem, 20-24, M39029/63-368	POS	M39029/63-368 (FC6020D)		29 pcs needed, 7 pcs are spares.
10	230082	1	CONN HOOD, 37 Pin D-Sub ST	CIN	DC-24660		
15	230088	1	CONN SHELL, 25 Pin D Sub Fem Crimp Type	AMP	205165-1		
20	230089	1	HOOD, 25 Pin D-Sub, ST	CIN	DB-24659		
25	232002	1	CONN SHELL, 37 Pin D-Sub, Fem Crimp	AMP	205167-1		
30	239001	1	TOOL, Insertion/Extraction	DAN	M81969/1-02		
35	512101	4	RETAINER CLIP, "Bow Tie" Style	KEY	2061K		
40	753217	1	Thermal Label, 4"x 1"	ULI	S-8601		
45	PK1001	2	BAG, 2.5 x 3, 4 MIL Zip Lock				
50	PK1007	1	BAG, 6 x 8, 4 MIL				

49 items