

# ***Stormscope***<sup>®</sup>

*Series II* Weather Mapping Sensor

## **WX-950 Installation Manual**

This manual contains installation and operating instructions and recommended flightline maintenance information for the WX-950 *Stormscope*<sup>®</sup>. This information is supplemented and kept current by Change Notices and Service Bulletins published by Goodrich Avionics Systems.



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**Goodrich Avionics Systems, Inc.**  
5353 52<sup>nd</sup> Street, S.E.  
Grand Rapids, MI USA 49512

009-10950-001 (Rev. C)

11 October 2001

## ABOUT THIS MANUAL

### **Chapter 1 – General Information**

This chapter includes equipment specifications and a functional description. It describes the various hardware configurations and includes a list of items furnished and items required but not supplied with the equipment.

### **Chapter 2 – Installation**

This chapter contains instructions for unpacking the equipment and inspection for in-shipment damage. It also includes information required to locate, assemble and install the equipment.

### **Chapter 3 – Installation Checkout**

This chapter contains instructions for doing post-installation and return to service checkout of the WX-950 using the Goodrich Avionics Systems WX-PA Portable Analyzer Kit.

### **Chapter 4 – Maintenance**

This chapter contains general flightline maintenance procedures. It includes periodic maintenance and troubleshooting; and instructions for the return of defective components.

### **Appendix A – Signal and Cable Characteristics**

This appendix defines the electrical characteristics of all input and output signals.

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**WX-950**  
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**FOREWORD**

This manual provides information intended for use by persons who, pursuant to current regulatory requirements, are qualified to install this equipment. Because installations vary depending on a particular aircraft, this manual is intended as a guideline. If further information is required, contact:

**Goodrich Avionics Systems**  
Attn: Customer Service  
5353 52nd Street, S.E.  
Grand Rapids, MI USA 49512  
Tel. (800) 453-0288 or (616) 949-6600

We welcome your comments concerning this manual. Although every effort has been made to keep it free of errors, some may occur. When reporting a specific problem, please describe it briefly and include the manual part number, the paragraph/figure/table number, and the page number. Send your comments to:

**Goodrich Avionics Systems**  
Attn: Technical Publications  
5353 52nd Street, S.E.  
Grand Rapids, MI USA 49512

**REVISION C HIGHLIGHTS**

Revision "C" is a republication. This republication completely replaces the existing book. It incorporates the basic manual and all previous changes. New and revised material has been added. Discard previous editions of the old publication.

This revision will be kept current by change notices. As you receive change notices, replace changed pages with the corresponding numbered page. A new list of effective pages will be issued with each change. The list shall reflect the current changes in addition to the tabulation of all previous changes, thus providing a complete history of the manual.

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**WX-950  
Installation Manual**

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**TABLE OF CONTENTS**

Paragraph	Page
<b>Chapter 1</b>	
<b>GENERAL INFORMATION</b>	
1.1	INTRODUCTION.....1-1
1.2	FUNCTIONAL DESCRIPTION.....1-2
1.3	PHYSICAL DESCRIPTION.....1-3
1.3.1	Display/Processor.....1-3
1.3.2	Antenna.....1-4
1.4	SPECIFICATIONS.....1-5
1.5	INTERFACE.....1-6
1.6	EQUIPMENT REQUIRED NOT SUPPLIED.....1-6
1.7	INSTALLATION APPROVAL.....1-6
1.8	WARRANTY INFORMATION.....1-6
1.8.1	Warranty Statement.....1-6
1.8.2	Related Policies and Procedures.....1-7
<b>Chapter 2</b>	
<b>INSTALLATION</b>	
2.1	INTRODUCTION.....2-1
2.2	UNPACKING AND INSPECTING.....2-1
2.3	PRE-INSTALLATION TEST PROCEDURE.....2-1
2.3.1	Equipment Required.....2-1
2.3.2	Test Procedure.....2-2
2.4	ANTENNA LOCATION.....2-3
2.4.1	Interference Sources.....2-4
2.4.2	Skin Current.....2-4
2.4.3	Skinmapping.....2-4
2.4.4	Ground Plane.....2-4
2.4.5	Alignment.....2-5
2.4.6	Slipstream.....2-5
2.4.7	Site Selection.....2-5
2.5	ANTENNA AND DOUBLER INSTALLATION.....2-6
2.6	DISPLAY/PROCESSOR LOCATION.....2-8
2.7	CABLE REQUIREMENTS AND FABRICATION.....2-8
2.7.1	Antenna Cable.....2-11
2.7.2	Power Cable.....2-12
2.7.3	Heading Input Cable.....2-12
2.7.4	Inhibit Line.....2-15
2.7.5	Remote Clear Line.....2-15
2.8	MATING CONNECTOR ASSEMBLY.....2-16
2.9	DISPLAY/PROCESSOR INSTALLATION.....2-20
2.10	PERFORMANCE TEST.....2-21

---

---

**WX-950  
Installation Manual**

**TABLE OF CONTENTS**

Paragraph	Page
<b>Chapter 3 INSTALLATION CHECKOUT</b>	
3.1 INTRODUCTION .....	3-1
3.2 CONTROLS .....	3-1
3.3 POST-INSTALLATION CHECKOUT .....	3-2
<b>Chapter 4 MAINTENANCE</b>	
4.1 INTRODUCTION .....	4-1
4.2 CONTINUED AIRWORTHINESS.....	4-1
4.3 PERIODIC MAINTENANCE.....	4-1
4.3.1 Display/Processor .....	4-1
4.3.2 Antenna .....	4-1
4.4 SERVICE MENU .....	4-2
4.4.1 System Data .....	4-2
4.4.2 Fault Log .....	4-4
4.4.3 CRT Test Pattern .....	4-5
4.4.4 Noise Monitor .....	4-6
4.5 FAULT ISOLATION.....	4-8
4.6 TROUBLESHOOTING ELECTRICAL NOISE .....	4-12
4.7 FUSE REPLACEMENT .....	4-13
4.8 RETURN TO SERVICE CHECK .....	4-14
4.9 DISPOSITION OF FAILED ITEMS.....	4-14
<b>Appendix A WX-950 INTERFACE SIGNAL &amp; CABLE CHARACTERISTICS</b>	
INTRODUCTION .....	A-1
SIGNAL CHARACTERISTICS .....	A-1

---

---

**WX-950**  
**Installation Manual**

---

---

**LIST OF ILLUSTRATIONS**

Figure	Page
1-1	System Functional Diagram.....1-2
1-2	Display/Processor Unit (P/N 805-10950-001/002) .....1-3
1-3	NY-163 Antenna (P/N 805-10930-001/002) .....1-4
1-4	Antenna Doubler Plate (P/N 78-8060-5959-2).....1-4
2-1	Test Cable.....2-2
2-2	Test Setup.....2-2
2-3	Antenna Mounting Holes.....2-6
2-4	Antenna and Doubler Installation .....2-7
2-5	Interconnect Wiring.....2-9
2-6	Antenna Cable.....2-11
2-7	Antenna Cable Preparation.....2-11
2-8	Heading Input Cable.....2-13
2-9	Heading Input Cable Preparation.....2-14
2-10	Mating Connector.....2-16
2-11	Heading Flag (KCS55) Connection .....2-29
2-12	Instrument Panel Cutout and Mounting Holes .....2-20
2-13	Display/Processor Installation .....2-21
3-1	Controls .....3-1
3-2	Self-Test in Progress .....3-2
3-3	Self-Test Passed .....3-2
3-4	Recoverable Error Message .....3-3
3-5	Fatal Error Message .....3-3
3-6	360° Weather View at 200 nmi Range .....3-4
3-7	Aircraft Test Setup.....3-5
3-8	WX-PA Antenna Alignment .....3-6
4-1	Service Menu.....4-2
4-2	System Data, Page 1 .....4-3
4-3	System Data, Page 2 .....4-4
4-4	System Data, Page 3 .....4-4
4-5	Fault Log .....4-5
4-6	CRT Test Pattern.....4-6
4-7	Noise Monitor .....4-6
4-8	Test Strikes .....4-7
4-9	Replacing the Fuse.....4-13

---

---

**WX-950**  
**Installation Manual**

---

---

**List of Tables**

Table	Page
1-1	WX-950 System Part Numbers ..... 1-1
1-2	Antenna Cable Part Numbers..... 1-1
1-3	WX-950 Installation Kit P/N 817-10950-001 ..... 1-1
1-4	Hardware Package P/N 817-10951-001..... 1-1
2-1	Heading Input Cable Vendors ..... 2-13
2-2	Stepper Input Connections (KI-525 Indicator) ..... 2-14
2-3	Synchro Connections to Mating Connectors ..... 2-15
2-4	Antenna Cable Connections..... 2-16
2-5	Heading Input Connections ..... 2-17
2-6	Configuration Jumpers ..... 2-17
2-7	Jumper Configuration Resistance ..... 2-18
4-1	Error Messages ..... 4-9



# CHAPTER 1

## GENERAL INFORMATION

### 1.1 INTRODUCTION

This section contains a functional description of the Stormscope® model WX-950 Series II weather mapping system, outlines the main features of the system, and provides a functional block diagram. The basic WX-950 System (see table 1-1) consists of the following equipment:

- Display/Processor P/N 805-10950-001 (Black Bezel) or P/N 805-10950-002 (Gray Bezel)
- NY-163 Antenna P/N 805-10930-001 (White) or P/N 805-10930-002 (Black)
- Installation Kit P/N 817-10950-001
- Antenna Cable (ordered separately). Antenna cables, with the antenna connector pre-wired to one end, are available in 6, 12, 25, 50 and 75 ft. lengths (see table 1-2). To meet different space requirements the antenna connector can be ordered with either a straight or right-angle backshell. Most installations will require the right-angle backshell.

Components supplied with the installation kit are identified in tables 1-3 and 1-4.

**Table 1-1. WX-950 System Part Numbers**

SYSTEM P/N	BEZEL		ANTENNA	
	BLACK	GRAY	WHITE	BLACK
830-10950-001	X		X	
830-10950-002		X	X	
830-10950-003	X			X
830-10950-004		X		X

**Table 1-2. Antenna Cable Part Numbers**

LENGTH (ft.)	PART NUMBER	
	RIGHT-ANGLE BACKSHELL	STRAIGHT BACKSHELL
6	803-10950-004	803-10952-004
12	803-10950-005	803-10952-005
25	803-10950-001	803-10952-001
50	803-10950-002	803-10952-002
75	803-10950-003	803-10952-003

**Table 1-3. WX-950 Installation Kit P/N 817-10950-001**

QUANTITY	PART NUMBER	DESCRIPTION
1	78-8060-5979-2	Antenna Doubler Plate
1	78-8060-5977-6	Antenna Gasket
1	817-10951-001	Hardware Package (see table 1-4)

**Table 1-4. Hardware Package P/N 817-10951-001**

QUANTITY	PART NUMBER	DESCRIPTION
1	814-10956-001	Rear Cable Connector Assembly
1	814-10959-001	Connector Shell Assembly
1	78-8060-5733-3	Circuit Breaker Label
1	606-10010-001	Cable Clamp, 7/16"
1	606-10009-001	Cable Clamp, 3/8"
2	606-10012-001	Cable Tie, 5-5/8"
2	101-10091-001	Brass Locking Terminal
4	100-10075-001	Screw, 6-32 x 1/2 PP SS Black Oxide UNC-2A
3	101-10098-001	Stop Nut, Elastic 10-32 S.S.
2	26-1004-1394-2	Washer, .2 ID x .325 OD S.S.
3	26-1004-9316-7	Stop Nut, Elastic 4-40
2	26-1004-9152-6	Screw, 10-32 x 1 1/2 PPH S.S.
2	26-1010-0057-3	Screw, 10-32 x 3/8 TRUS PH S.S.



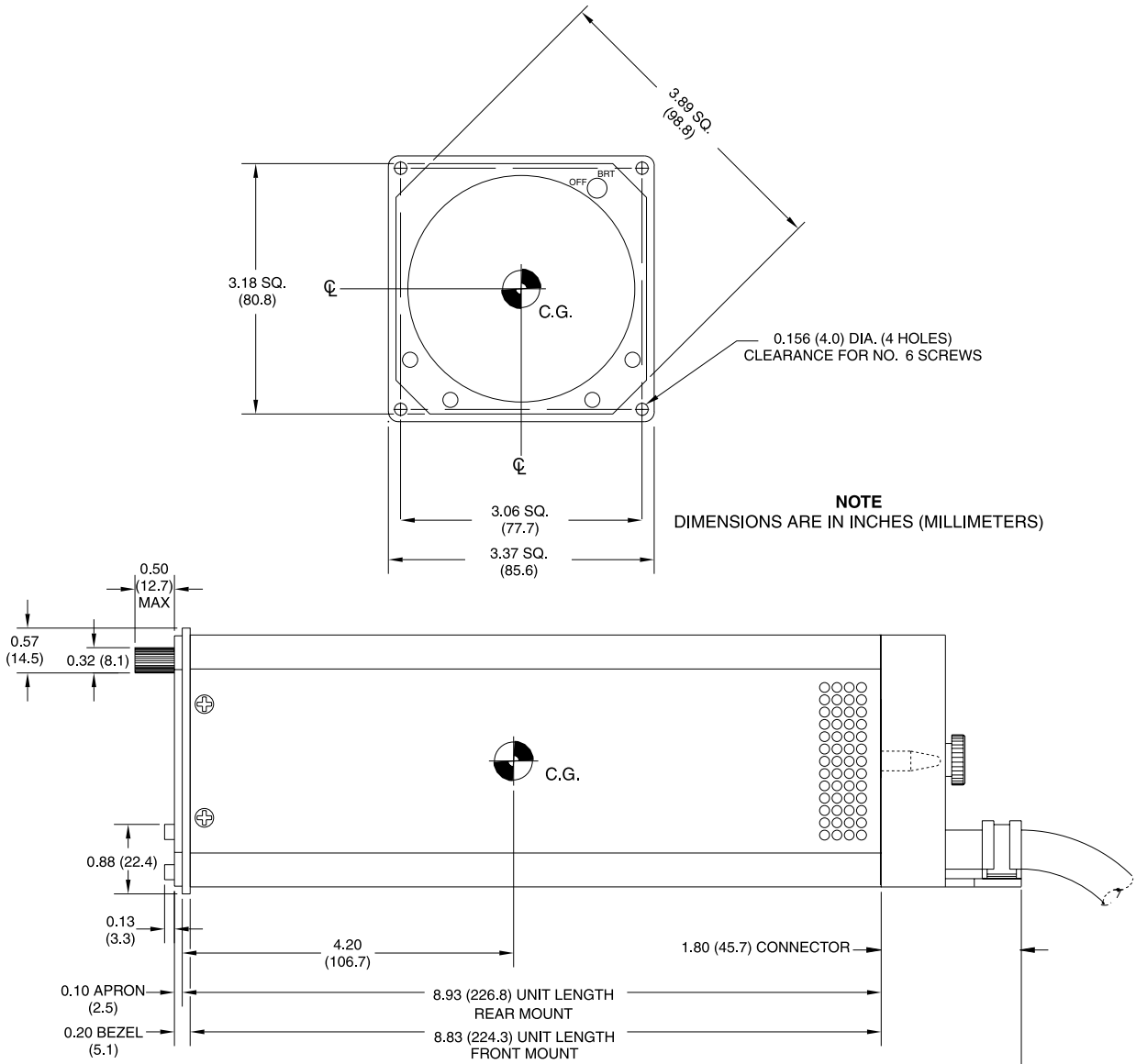
# WX-950 Installation Manual

## 1.3 PHYSICAL DESCRIPTION

The WX-950 System consists of two main components; Display/Processor (P/N 805-10950-001/002) and NY-163 Antenna (P/N 805-10930-001/002).

### 1.3.1 Display/Processor

The display/processor (see figure 1-2) houses the processing circuitry as well as the CRT display panel and the pilot's operating controls. The Display/processor can mount in a 3ATI panel cutout from the front or rear. No mounting tray is required, although a mooring plate may be purchased for increased stability in high-vibration environments. Refer to paragraphs 2.6 and 2.9 for guidelines relating to mounting location and installation. Connection is made through a mating connector assembly (refer to paragraph 2.8) that attaches to a single 25 pin D-subminiature connector on the back panel.

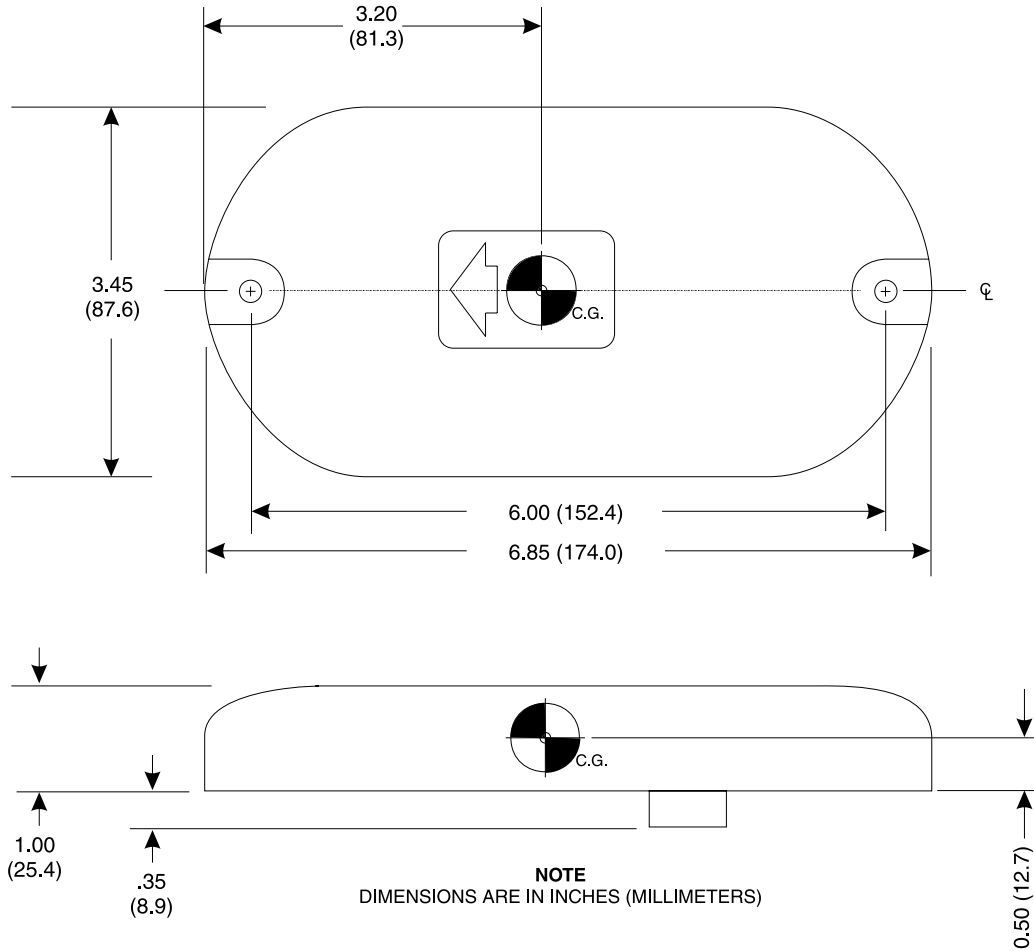


**Figure 1-2. Display/Processor Unit (P/N 805-10950-001/002)**

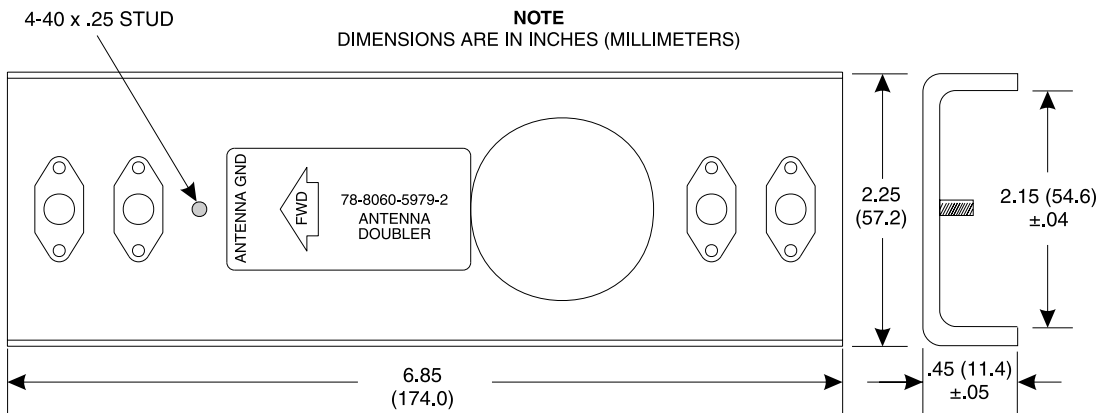
**WX-950**  
**Installation Manual**

**1.3.2 Antenna**

The antenna (see figure 1-3) is a combined cross-loop and sense antenna. Connection is made through a single 10-pin connector (refer to paragraph 2.7.1). It is mounted to the aircraft using a doubler plate (see figure 1-4) supplied with the installation kit (see table 1-1). The antenna is sealed against environmental extremes and is non-repairable. To inhibit the build-up of precipitation-static the antenna is coated with conductive paint and should not be repainted. Refer to paragraphs 2.4 and 2.5 for guidelines relating to mounting location and installation.



**Figure 1-3. NY-163 Antenna (P/N 805-10930-001/002)**



**Figure 1-4. Antenna Doubler Plate (P/N 78-8060-5979-2)**

## 1.4 SPECIFICATIONS

### SIZE:

Display/Processor (including mating connector assembly)  
3.37 inches (8.56 centimeters) high  
3.37 inches (8.56 centimeters) wide  
11.33 inches (28.78 centimeters) deep

### Antenna

1.00 inches (2.54 centimeters) high  
3.45 inches (8.76 centimeters) wide  
6.85 inches (17.40 centimeters) deep

### WEIGHT:

Display/Processor  
2.9 lb (1.3 kg)  
Antenna (without doubler)  
0.84 lb (0.38 kg)

### TEMPERATURE:

Display/Processor  
-20 to +55 degrees Celsius (-4 to +131 degrees Fahrenheit)  
Antenna  
-55 to +70 degrees Celsius (-67 to +158 degrees Fahrenheit)

### ALTITUDE:

Display/Processor  
35,000 feet (Maximum)  
Antenna  
55,000 feet (Maximum)

### COOLING:

Conduction and Forced Air (Internal Fan) Convection

### DISPLAY RANGE:

25, 50, 100, & 200 nmi

### TSO COMPLIANCE:

TSO-C110a

### RTCA COMPLIANCE:

Display/Processor Environmental  
DO-160C Category C1-BA(NBM)XXXXXXXXZ(AB)ABZTZAZE3XX  
Display/Processor Software  
DO-178B Level D  
Antenna  
DO-160C Category F2-AC(YCLM)XSFXXXXXXXXXZXXXE3XX

### POWER REQUIREMENTS:

Input voltage: 11 to 32 VDC  
Current: 2.0 A ± 0.5 A @ 12 VDC  
0.8 A ± 0.25 A @ 28 VDC

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## WX-950 Installation Manual

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### 1.5 INTERFACE

The electrical characteristics of all input and output signals are detailed in Appendix A.

### 1.6 EQUIPMENT REQUIRED NOT SUPPLIED

Circuit Breaker	The WX-950 is protected via an internal fuse (see para 4.6). For external circuit breaker protection, a 5 A circuit breaker is recommended for 14 V aircraft systems and a 3 A circuit breaker for 28 V systems.
12 to 28 VDC Power Supply	Power supply capable of providing 12 to 28 VDC at 30 Watts is required to do the pre-installation test procedure.
WX-950 Test Cable	This cable is required to do the pre-installation test procedure. The cable can be purchased from Goodrich Avionics Systems (P/N 803-10950-001) or fabricated from the details provided in figure 2-1.
WX-SM Skinmapper	WX-SM Skinmapper (P/N 78-8060-5859-6 with Mod. 2 (P/N 816-10012-001) installed) is required to verify the suitability of a selected WX-950 antenna location.
WX-PA Portable Analyzer	WX-PA Portable Analyzer Kit (P/N 78-8060-5791-1) is required to do the post installation checkout.
Surface Preparation	Alodine 1001, required for installation of the <i>Stormscope</i> <sup>®</sup> antenna.
Antenna Sealant	For pressurized aircraft, use a sealant meeting the requirements of SAE AMS-S-8802 such as Flamemaster CS3204 Class B. For non-pressurized aircraft, use a non-corrosive sealant that meets the physical requirements of MIL-A-46146 such as General Electric RTV162.
Heading Input Cable	This cable provides aircraft heading information to the WX-950. See paragraph 2.7.3. for cable specification and requirement.
Synchro Inverter	If 400Hz synchro drive is not available.

### 1.7 INSTALLATION APPROVAL

The installation of *Stormscope*<sup>®</sup> systems, if not installed under a type certificate or supplemental type certificate, must be treated as a major alteration on F.A.A. form 337. Application for approval may be made at any F.A.A. Air Carrier, General Aviation, or Flight Standards district Office.

### 1.8 WARRANTY INFORMATION

The *Stormscope*<sup>®</sup> WX-950 Weather Mapping System is warranted for two years from the date of installation (not to exceed 30 months from the date of shipment from Goodrich Avionics Systems) subject to the following limitations.

#### 1.8.1 Warranty Statement

Goodrich Avionics Systems, (hereinafter called Goodrich Avionics Systems), warrants each item of new equipment manufactured or sold by Goodrich Avionics Systems to be free from defects in material and workmanship, under normal use as intended, for a period of 30 months from date of shipment by Goodrich Avionics Systems to an authorized facility, or 24 months from date of installation by an authorized facility, whichever occurs first. No claim for breach of warranties will be allowed unless Goodrich Avionics Systems is notified thereof, in writing, within thirty (30) days after the material or workmanship defect is found.

The obligation of Goodrich Avionics Systems shall be limited to replacing or repairing at its factory the equipment found defective under terms of this warranty certificate; providing that such equipment is returned in an approved shipping container, transportation charges prepaid, to Goodrich Avionics Systems, Grand Rapids, Michigan, or such other location as Goodrich Avionics Systems may authorize. Goodrich Avionics Systems reserves the right to have necessary repairs performed by an authorized agency.

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**WX-950**  
**Installation Manual**

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This warranty shall not apply to any unit or part thereof which has not been installed or maintained in accordance with Goodrich Avionics Systems instructions, or has been repaired or altered in any way so as to adversely affect its performance or reliability, or which has been subjected to misuse, negligence or accident.

This warranty is exclusive and is accepted by buyer in lieu of all other guaranties or warranties express or implied, including without limitation the implied warranties of merchantability and fitness for a particular purpose. Buyer agrees that in no event will Goodrich Avionics Systems liability for all losses from any cause, whether based in contract, negligence, strict liability, other tort or otherwise, exceed buyer's net purchase price, nor will Goodrich Avionics Systems be liable for any special, incidental, consequential, or exemplary damages.

Goodrich Avionics Systems reserves the right to make changes in design or additions to or improvements in its equipment without the obligation to install such additions or improvement in equipment theretofore manufactured.

### **1.8.2 Related Policies and Procedures**

1. If the original registered owner of a WX-950 system sells the aircraft in which the system is installed during the warranty period, the remaining warranty may be transferred. Written notification of the transaction must be submitted by the initial recipient of the warranty to:

ATTENTION: WARRANTY ADMINISTRATOR  
Goodrich Avionics Systems  
5353 52nd Street, S.E.  
Grand Rapids, MI 49512  
U.S.A.

2. Equipment must be installed by a Goodrich Avionics Systems authorized dealer or installer. Installation of equipment by facilities not specifically authorized will void the equipment warranty.
3. Notice of a claimed product defect must be given to Goodrich Avionics Systems or a designated Goodrich Avionics Systems Service Agency within the specified warranty period.
4. A product which is defective in workmanship and/or material shall be returned to Goodrich Avionics Systems via any Authorized Dealer with transportation charges prepaid. After correction of such defects, the equipment will be returned to the Dealer, transportation prepaid by Goodrich Avionics Systems via surface transportation. Any other means of transportation must be paid by the customer.  
The risk of loss or damage to all products in transit shall be assumed by the party initiating the transportation of such products. All items repaired or replace hereunder shall be warranted for the unexpired portion of the original warranty.
5. Goodrich Avionics Systems is in no way obligated or responsible for supporting or participating in the costs of the installation warranty. The entire responsibility lies with the Goodrich Avionics Systems Authorized Dealer making the installation. Goodrich Avionics Systems is only responsible for the product warranties outlined in paragraph 1.8.1.
6. Goodrich Avionics Systems cannot authorize warranty credit for troubleshooting of other systems in the aircraft in order to reduce noise interference with the WX-950 system.

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**WX-950**  
**Installation Manual**

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## CHAPTER 2

# INSTALLATION

### 2.1 INTRODUCTION

Installation must be made by qualified personnel, in conformance with applicable government regulations. The information furnished is for convenience only.

#### NOTE

*Tolerances* (unless otherwise indicated):

ANGLES ARE	$\pm 1^\circ$
.00 TWO PLACE DECIMALS ARE	$\pm .02$
.000 THREE PLACE DECIMALS ARE	$\pm .010$

This section describes the installation of *Stormscope* Series II Model WX-950, in a step by step procedure. The installation activities in this section will be performed in the following order:

- Determine component locations.
- Install the cables.
- Install the system components.

### 2.2 UNPACKING AND INSPECTING

**CAUTION**

The display/processor and antenna are sensitive to electrostatic discharge (ESD) and may be damaged if not handled correctly. Do not remove protective covers from electrical connectors during unpacking. Touching an exposed connector may cause electrostatic damage to equipment.

Carefully unpack the system and note any damage to shipping containers or equipment. Visually inspect each component for evidence of damage. Compare the equipment received with that noted on the packing list. Immediately report any missing items or evidence of damage to the carrier making the delivery. To justify a claim, retain the original shipping container and all packing materials.

Every effort should be made to retain the original shipping containers for storage. If the original containers are not available, a separate cardboard container should be prepared that is large enough to accommodate sufficient packing material to prevent movement. The ambient temperature of the storage area should not fall below  $-55^\circ\text{C}$  ( $-65^\circ\text{F}$ ) or rise above  $70^\circ$  ( $158^\circ\text{F}$ ).

### 2.3 PRE-INSTALLATION TEST PROCEDURE

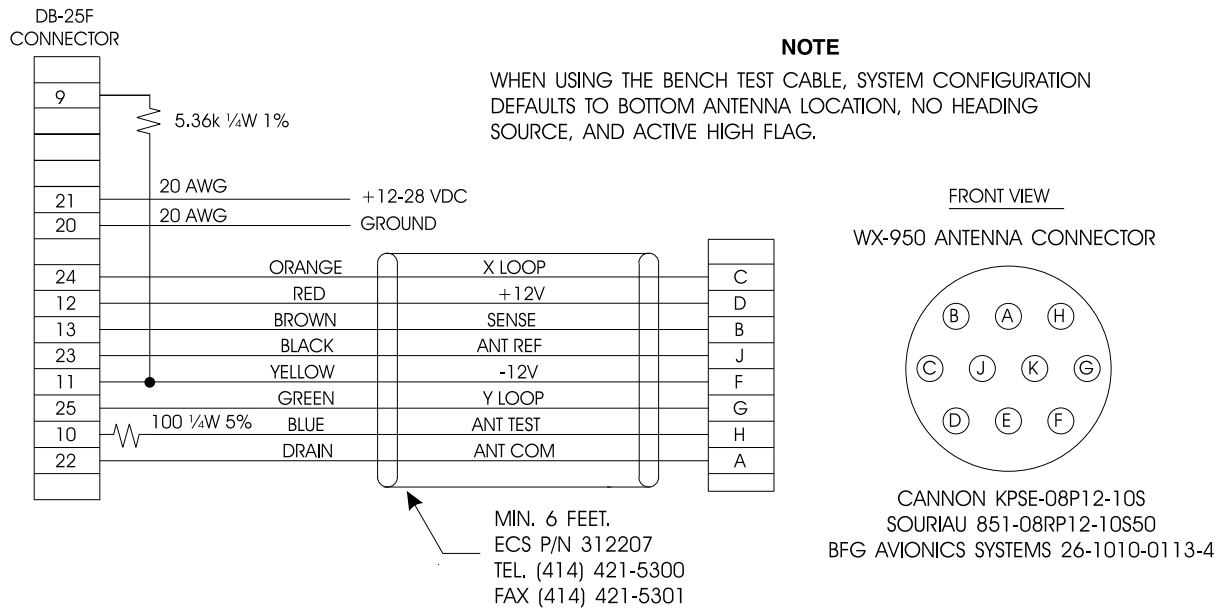
Goodrich Avionics Systems recommends testing each display/processor and antenna immediately upon receipt. The pre-installation test procedure verifies operation of the system and may save valuable installation time by detecting hidden damage that may have occurred during shipment.

#### 2.3.1 Equipment Required

- a. System components to be tested.
  - 1). WX-950 Display/Processor
  - 2). NY-163 Antenna
- b. DC Power Supply: 12 to 28 VDC, 30W, or equivalent (not supplied).

# WX-950 Installation Manual

- c. WX-950 Test Cable P/N 803-10951-001. The bench test cable may be purchased directly from Goodrich Avionics System, or one may be fabricated (unterminated cable may be purchased from Electronic Cable Specialists - ECS P/N 312207) from the details provided in figure 2-1.



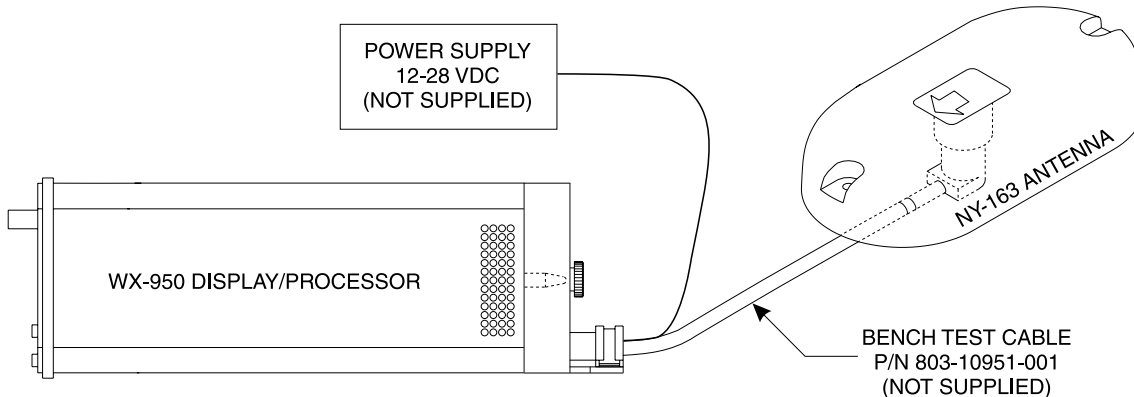
**Figure 2-1 Test Cable**

### 2.3.2 Test Procedure

**CAUTION**

Before connecting/disconnecting cables, ensure that all power is removed.

1. Connect the equipment as shown in figure 2-2.



**Figure 2-2 Test Setup**

2. Rotate the OFF/BRT knob clockwise about 180 degrees. After approximately 15 seconds, the initialization screen will be displayed. During initialization, the system runs a series of self-tests to ensure that all functions are operating properly. These tests are designed to check the antenna, processor, and associated hardware.
3. If no faults are detected, at completion of the self-test an "ALL TESTS PASSED" message will be displayed.

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**WX-950**  
**Installation Manual**

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4. After completion of the self-test, verify that the WX-950 is in the weather mapping mode; 200 nmi, 360° view.
5. Verify that clockwise rotation of the OFF/BRT knob increases display brightness and counter-clockwise rotation decreases brightness. The screen should be completely dark with the control fully counter-clockwise. Adjust to a comfortable viewing level.

**NOTE**

Paragraph 3.2 contains a description of all operating controls.

6. Verify operation of the pushbuttons:
  - a. Press softkey (A), i.e., MENU. This should cause the system menu to be displayed with “Weather View” menu item highlighted.
  - b. Press softkey (B), i.e., 360°. The display should return to the weather mapping mode, 360° Weather View at the 200 nmi range.
  - c. Press softkey (C), i.e., down-arrow. The weather view range should change to 100 nmi.
  - d. Press softkey (D), i.e., up-arrow. The weather view range should return to 200 nmi.
7. If correct results are obtained, the system is operating properly. Immediately report any problems to our Customer Service Department at 1-800-453-0288 or 1-616-949-6600.

## **2.4 ANTENNA LOCATION**

Because *Stormscope*® weather mapping systems detect electrical discharge activity, antenna placement relative to other active electrical components is critical. The antenna must be placed at a location that is free from excessive electrical interference. The ideal location varies from aircraft to aircraft. To ensure an interference-free antenna location, every aircraft must be skimapped prior to installation of the *Stormscope*® antenna. The skinmap must be done with the engines and all electrical systems operating. Refer to the WX-SM Skinmapper Instruction Manual (P/N 78-8060-5874-5).

**NOTE**

The *Stormscope*® requirement for an antenna ground plane and a noise free environment complicates installation in aircraft with wood, fabric or composite construction. Each aircraft needs to be analyzed individually for the best antenna location. Before starting an installation in one of these types of aircraft, contact Goodrich Avionics Systems Field Service Engineering at (800) 453-0288 or (616) 949-6600.

### 2.4.1 Interference Sources

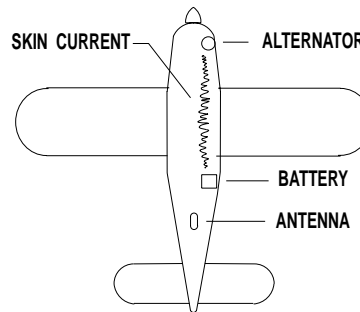
Avoid mounting the antenna near active electrical components whenever possible. General clearance guidelines are:

- Strobe lamps and power supplies - 5 ft. (1.5 meters)
- Pitch trim servos and amplifiers - 3 ft. (1 meter)
- Fluorescent lamps and ballasts - 5 ft. (1.5 meters)
- Heater ignitors - 5 ft. (1.5 meters)
- Air conditioner and heater blowers - 5 ft. (1.5 meters)
- DME/Transponder/TCAS antennas - 4 ft., Minimum (1.2 meters)
- Inflight telephone antennas - 4 ft. (1.2 meters)
- VHF comm. antennas - 1 ft. (.3 meters)
- ADF antennas - 1 ft. (.3 meters)
- Any current-carrying cable - 2 ft. (0.6 meters)

*Stormscope*<sup>®</sup> sensors are adversely affected by the build up of static charges. Do not mount the antenna near any composite materials (e.g., plastic covers, radomes, fiberglass housings, windows, etc.) as these devices can build up objectionable static charges.

### 2.4.2 Skin Current

Avoid mounting the antenna in the ground return current path between the battery and alternator, and the battery and blower motors or other heavy current carrying equipment. Aircraft skin currents may cause antenna interference.

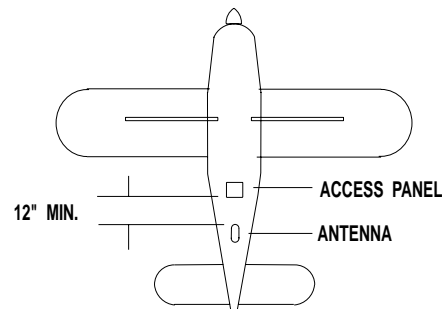


### 2.4.3 Skinmapping

In order to reduce potential interference problems, some of which are evident only during flight, a skinmap of the aircraft must be performed (with engines and all electrical systems operating) prior to every installation. This procedure will save installation time by avoiding the necessity for such things as antenna relocation. A WX-SM Skinmapper (Goodrich Avionics Systems P/N 78-8060-5859-6, with Mod 2 installed) must be used to verify the suitability of a selected antenna location before proceeding with the installation. This must be done even if all the other placement criteria are met.

### 2.4.4 Ground Plane

The antenna must mount in a location with a minimum of 12 inches (30 cm) continuous aluminum ground plane in all directions. Avoid hinge lines, gear doors, and access panels by at least 12 inches (30 cm). Do not mount the antenna on an access panel.



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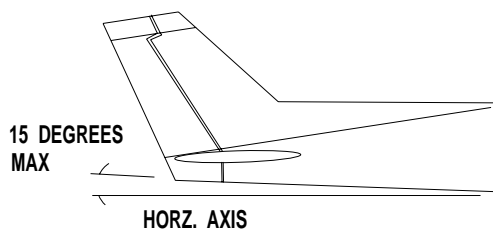
## WX-950 Installation Manual

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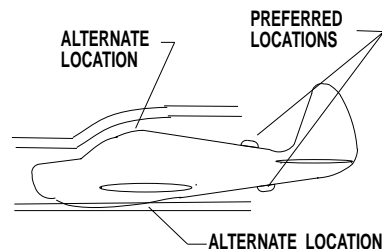
### 2.4.5 Alignment

The antenna need not be centered on the fuselage as long as its longitudinal axis is within 2 degrees of parallel with the aircraft longitudinal axis. The antenna should be mounted within 15 degrees of horizontal and may be mounted within 6 inches (15 cm) of a ventral fin. The antenna may mount on an upslope not to exceed 15 degrees of horizontal.



### 2.4.6 Slipstream

In general, the antenna should mount aft, where the slipstream boundary layer is thick, to reduce the effects of P-static. Do not mount the antenna near any composite materials (e.g., plastic covers, domes) as they can build up static charges. Top or bottom mounts provide equal performance.



### 2.4.7 Site Selection

Select an antenna location that satisfies the criteria outlined in the preceding paragraphs.

The ideal guidelines, of course, cannot always be met. If the installation criteria cannot be met, contact the Goodrich Avionics Systems Customer Service Department at 1-800-253-9525 or 1-616-949-6600, for location assistance.

#### NOTE

Since Goodrich Avionics Systems has no control over airframe integrity or aircraft configuration, the authorized installer is responsible for insuring a noise free installation. If additional labor is required to correct an interference problem caused by another aircraft system or component, Goodrich Avionics Systems will not reimburse the installer for this labor under warranty. For this reason, the installer should anticipate extra labor when quoting the installation to the customer, depending upon aircraft type and specific configuration.

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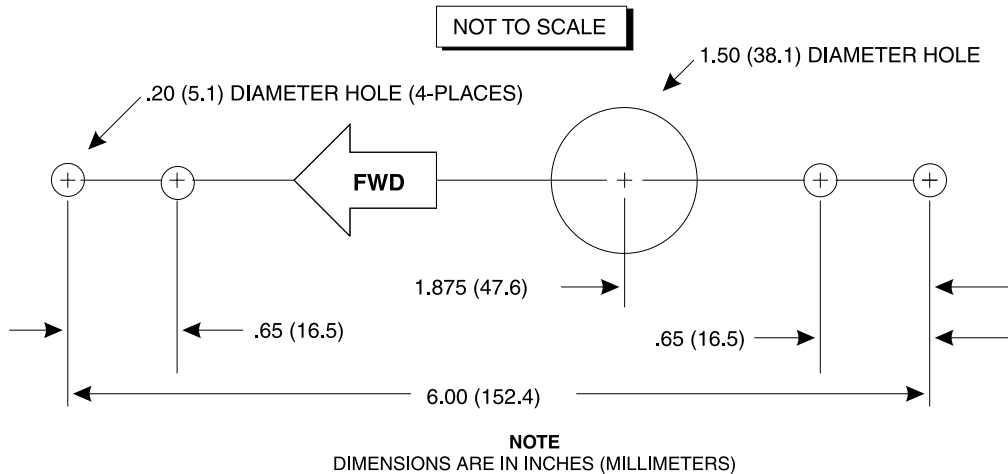
**WX-950**  
**Installation Manual**

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## 2.5 ANTENNA AND DOUBLER INSTALLATION

Figure 2-3 shows the mounting holes and dimensions for the antenna and doubler plate.



**Figure 2-3. Antenna Mounting Holes**

1. Use the antenna doubler plate as a template to mark hole locations on the aircraft skin.

**NOTE**

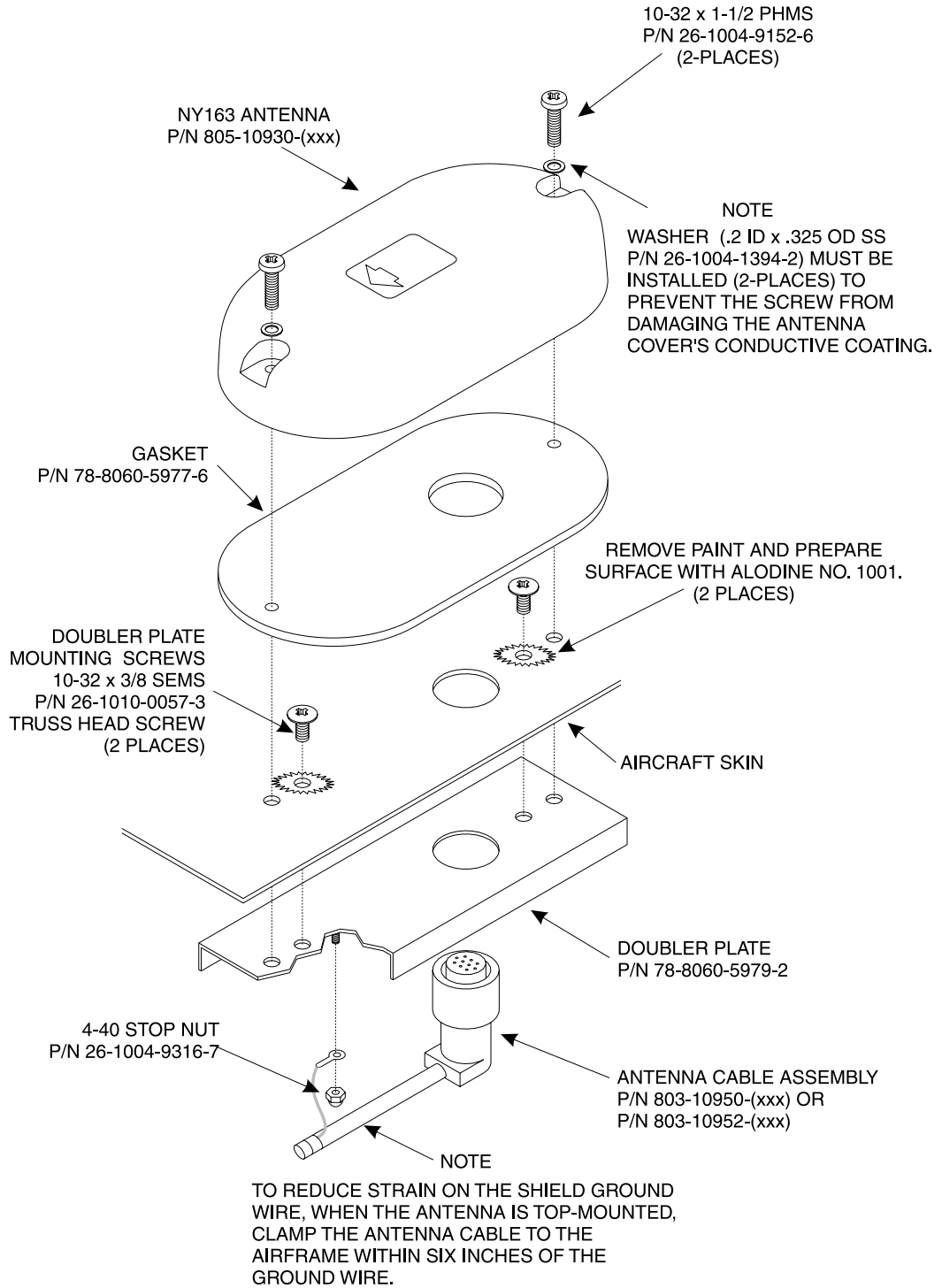
Ensure that the location selected allows adequate space inside the fuselage for the doubler plate to clear ribs and aircraft structure. (It may be necessary to cut the doubler plate to ensure proper fit.)

2. Attach the doubler plate to the inside of the fuselage as shown in figure 2-4.
3. Mount the antenna to the aircraft as shown in figure 2-4.

**CAUTION**

1. Do not paint the antenna. It has been coated with a special conductive paint to inhibit the build-up of precipitation-static.
2. Do not over-tighten the antenna mounting screws during installation on convex surfaces. Doing so may cause stress cracks and shorten the life of the antenna.
3. To ensure a good electrical ground connection (metal-to-metal contact) remove the paint from the aircraft skin under the double plate mounting screws and prepare the surface with Alodine® No. 1001. Failure to provide a good ground connection may affect system performance.

**WX-950  
Installation Manual**



**Figure 2-4. Antenna and Doubler Installation**

4. Seal around the entire perimeter of the antenna.

**NOTE**

The antenna should not be sealed until the sensor performance tests are complete.

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**WX-950**  
**Installation Manual**

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- a. For non-pressurized aircraft, use a non-corrosive sealant that meets the physical requirements of MIL-A-446146 such as General Electric RTV162
- b. For pressurized aircraft, use a sealant that meets the requirements of SAE AMS-S-8802 such as Flamemaster® CS3204 class B.

## **2.6 DISPLAY/PROCESSOR LOCATION**

The display/processor should be mounted in a location easily accessible and clearly visible to the pilot. In selecting a location, consider the following:

Panel Depth	Adequate depth must be available behind the instrument panel to allow for the display, the mating connector assembly, and excess display cable. Remember, a service loop is necessary to allow access to the display connector when removing or inserting it into the instrument panel.
Cooling	While the display has no special cooling requirements, it should be mounted to permit adequate air circulation. Allow at least ¼ inch of clearance above and below the instrument for air circulation.
Viewing Angle	The viewing angle for the display is not a critical factor. The most favorable mounting position would be near eye level and no more than arms length from the principal user of the instrument.
Readability	The display is designed to provide sufficient luminance to be readable in environments exposed to direct sunlight.

## **2.7 CABLE REQUIREMENTS AND FABRICATION**

### **NOTES**

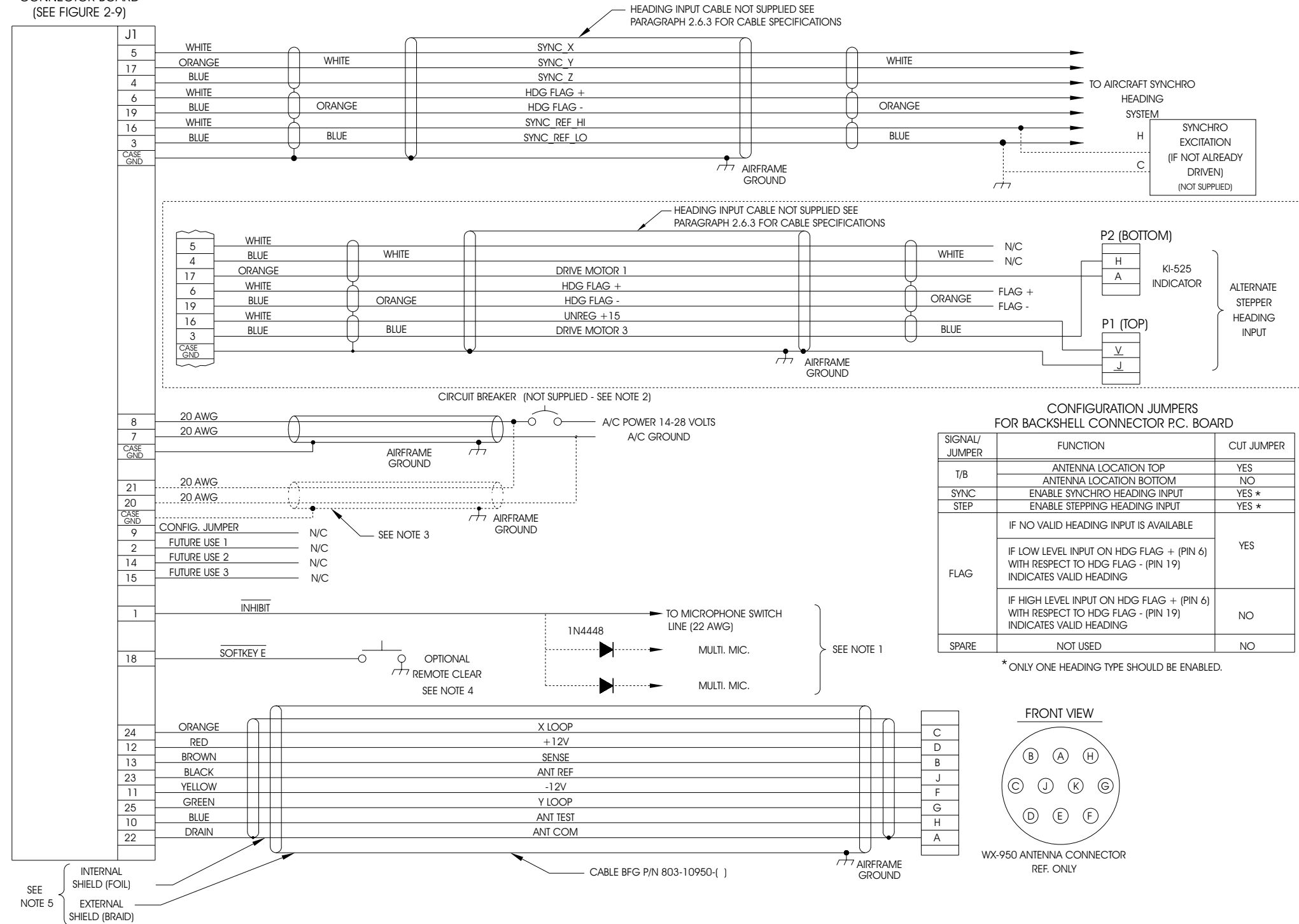
1. All wiring must be in accordance with industry accepted methods, techniques and practices.
2. The length and routing of the external cables must be carefully studied and planned before attempting installation of the equipment.
3. Use of any cable not meeting Goodrich Avionics Systems specifications voids all warranties.
4. All system cables are terminated at the mating connector assembly (see paragraph 2.8).

Appendix A defines the electrical characteristics of all input and output signals and identifies the cable requirements for each signal. Refer to figure 2-5 for interconnect wiring information. Wire-marking identification is at the discretion of the installer. The following paragraphs detail specific cable requirements.



# WX-950 Installation Manual

WX-950 BACKSHELL  
CONNECTOR BOARD  
(SEE FIGURE 2-9)



### NOTES

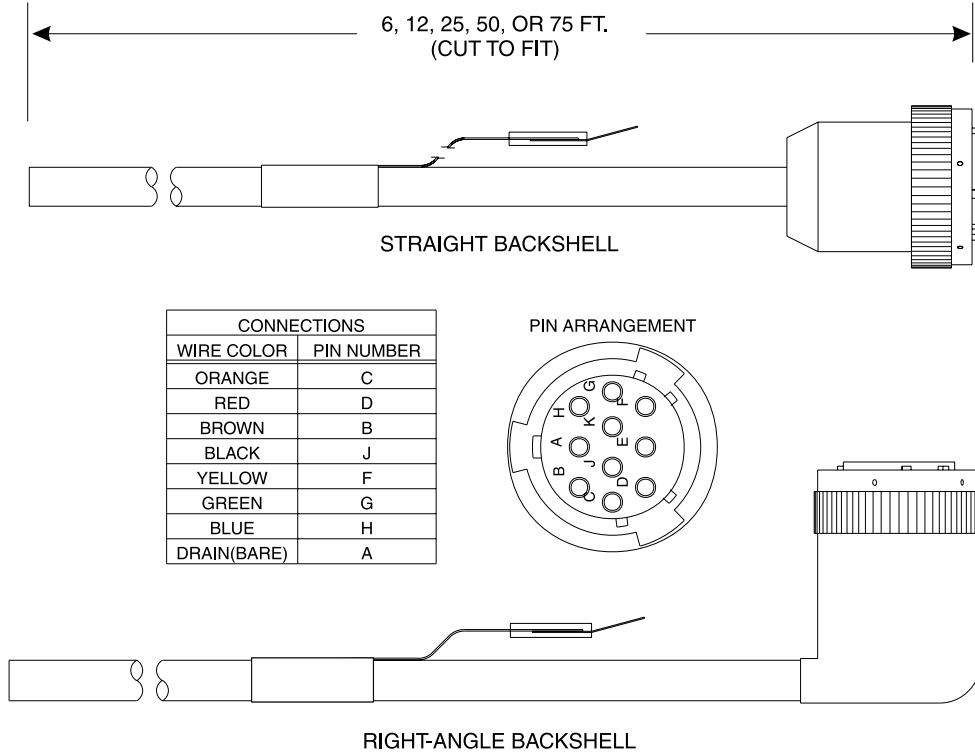
1. NORMALLY THE INHIBIT LINE IS NOT NEEDED IF THE STORMSCOPE ANTENNA AND THE COMMUNICATIONS ANTENNAS ARE ON OPPOSITE SIDES OF THE AIRCRAFT FUSELAGE. IF THE INHIBIT LINE IS CONNECTED TO MULTIPLE MICROPHONE SWITCH LINES, EXTERNAL ISOLATION DIODES MUST BE INSTALLED BETWEEN THE SWITCH LINES AS SHOWN.
2. THE WX-950 IS PROTECTED VIA AN INTERNAL FUSE (SEE PARA 4.7). FOR EXTERNAL CIRCUIT BREAKER PROTECTION, A 5 A CIRCUIT BREAKER IS RECOMMENDED FOR 14 V AIRCRAFT SYSTEMS AND A 3 A CIRCUIT BREAKER FOR 28 V SYSTEMS.
3. THE SECOND SHIELDED PAIR CABLE (CONNECTED TO PINS 20 AND 21) IS NECESSARY ONLY IF POWER CABLE LENGTH IS GREATER THAN 15 FEET.
4. OPTIONAL REMOTE CLEAR SWITCH PROVIDES THE SAME FUNCTION AS SOFTKEY B.
5. INTERNAL AND EXTERNAL SHIELDS ARE ISOLATED FROM EACH OTHER. DO NOT CONNECT THESE SHIELDS TOGETHER.

**Figure 2-5. Interconnect Wiring**

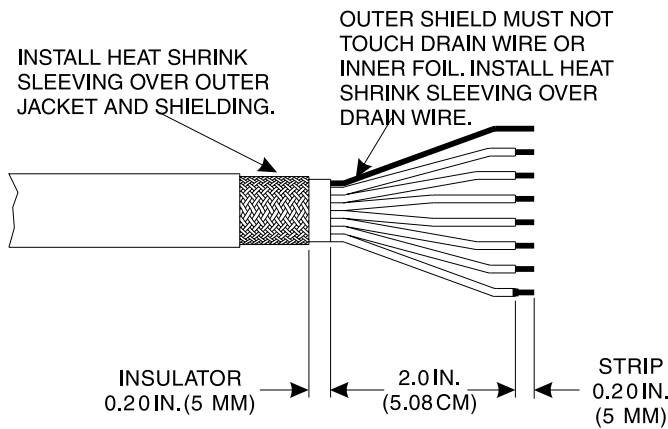
**WX-950**  
**Installation Manual**

**2.7.1 Antenna Cable**

Antenna cables, with the antenna connector pre-wired to one end, are available in 6, 12, 25, 50 and 75 ft. lengths (see table 1-2). To meet different space requirements the antenna connector can be ordered with either a straight or right-angle backshell (see figure 2-6). Most installations will require the right-angle backshell. Cut cable to the desired length and prepare in accordance with the guidelines shown in figure 2-7.



**Figure 2-6. Antenna Cable**



**Figure 2-7. Antenna Cable Preparation**

The antenna cable may be susceptible to interference from outside sources and routing is subject to the following guidelines.

- Cable routing should be kept as short and direct as practical.
- The cable should not be bundled with any other aircraft cable except for short distances, and then only when absolutely necessary.

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**WX-950**  
**Installation Manual**

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- To prevent undo strain on the shield ground wire, when the antenna is top-mounted, clamp the antenna cable to the airframe no further than one foot (1 ft.) from the antenna connector.
- If the antenna cable routes through a bulkhead connector, a dedicated connector must be used. (The antenna cable must not share a bulkhead connector with any other conductors).
- The antenna cable may tie to other electrical cables at right angles.
- The antenna cable overall shield is terminated at the antenna end only

Refer to paragraph 2.5 for antenna and doubler installation.

### 2.7.2 Power Cable

The power cable (not supplied) runs from the mating connector to the aircraft circuit breaker panel. For the power cable, use twisted shielded pair, #20 AWG. The positive wire connects to the avionics circuit breaker. The negative wire connects to airframe ground. If airframe ground is not available, run a separate wire to power ground at the battery.

<b>CAUTION</b>
----------------

Reversing the power leads will cause an internal fuse to blow. Fuse replacement procedures are detailed in chapter 4.

Power cable routing is generally not critical to system operation. Cable lengths greater than 15 feet require a second shielded twisted pair (to reduce the voltage drop) connected to pins 20 and 21 (refer to figure 2-5). Affix a circuit breaker label (P/N 78-8060-5733-3, provided with the hardware package) to the circuit breaker panel.

### 2.7.3 Heading Input Cable

The heading input cable connects the WX-950 processor to the aircraft heading system. This cable provides XYZ and HC aircraft heading information (or King KCS55 stepper signals) to the WX-950 processor. FLAG lines are also included in the heading input cable to provide the WX-950 processor with flag status (or heading valid) information.

### NOTE

Use of any cable not meeting Goodrich Avionics Systems specifications voids all warranties, and may be cause for termination of Authorized Installer status.

Table 2-1 lists some U.S. vendors who sell the required cable by the foot.

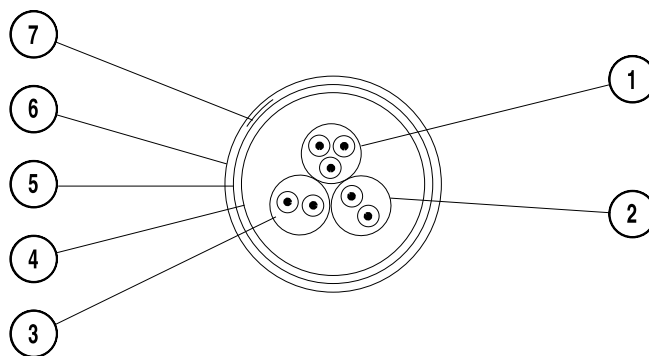
The synchro cable consists of the following (refer to figure 2-8):

1. Twisted, Shielded, Jacketed Triad #24 AWG  
Colors: White, Blue, Orange  
Shield: Tin Plated Copper Braid, 90% min.  
Jacket: FEP .007 in. min., White
2. Twisted, Shielded, Jacketed Pair #24 AWG  
Colors: White, Blue  
Shield: Tin Plated Copper Braid, 90% min.  
Jacket: FEP .007 in. min., Blue
3. Same as Item 2, except Orange jacket.
4. Aluminized Mylar<sup>®</sup> Wrap.
5. #34 AWG braided shield.
6. FEP Teflon<sup>®</sup> jacket .013 in. - .023 in., clear (translucent).
7. Marker tape with vendor P/N.

## WX-950 Installation Manual

**Table 2-1. Heading Input Cable Vendors**

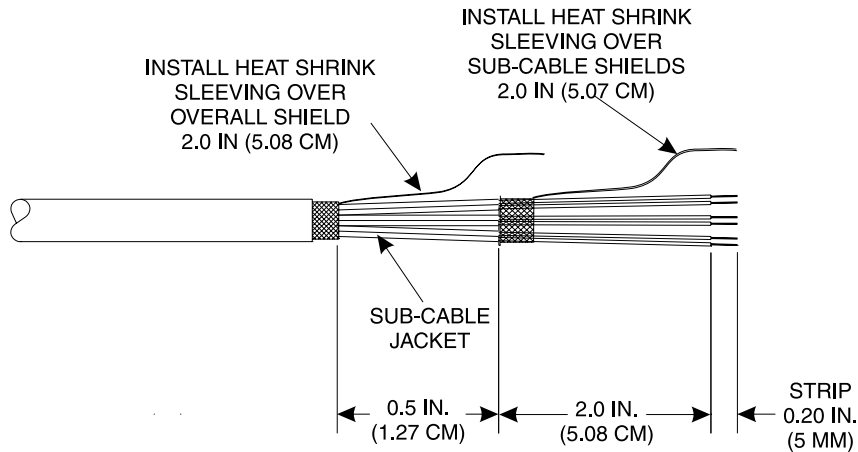
US COMPANY	CABLE P/N
Dallas Avionics 1-800-527-2581 214-320-9776 FAX 214-320-1057	WX-5 (6.84 lbs/ 100 ft)
Electronic Cable Specialists 414-421-5300 FAX 414-421-5301	3N6607 (7.5 lbs/ 100 ft)
A.E. Petsche 1-800-777-9280 817-461-9473 FAX 817-277-2887	TZGYR (6.84 lbs/ 100 ft)
EDMO Distributors 1-800-235-3300 509-535-8280 FAX 1-800-828-0623 FAX 509-535-8266	WX-1000 SYNCHRO
PIC Wire and Cable 1-800-742-3191 414-246-0500 FAX 414-246-0450	WM25807 (7.2 lbs/ 100 ft)



**Figure 2-8. Heading Input Cable**

## WX-950 Installation Manual

The sub-cable color-coded jackets and shields should be left on the sub-cables as close to the connector as practical to provide the required shielding and to identify the sub-cables. Guidelines for preparing the cable for connection to the WX-950 mating connector (see paragraph 2-8) are shown in figure 2-9. Ground the overall shield at both ends. The WX-950 End should be grounded within the mating connector assembly. Ground the sub-cable shields only at the mating connector subassembly. Cable routing and length are not critical to system operation.



**Figure 2-9. Heading Input Cable Preparation**

Tables 2-2 and 2-3 provide heading source interconnect information. Refer to the applicable manufacturers publication for specific interconnect guidelines to be followed.

### NOTE

Every effort has been made to correctly identify the pin numbers and signal names used by the various manufacturers. However, Goodrich Avionics Systems cannot be responsible for changes made by others. Please consult the appropriate manufacturers documentation for the latest information.

**Table 2-2. Stepper Input Connections  
(KI-525 Indicator)**

SIGNAL	WIRE COLOR		BACKSHELL PIN NUMBER	KI-525 INDICATOR
	SUB-CABLE	WIRE		
	WHITE	WHITE	5	N/C
	WHITE	BLUE	4	N/C
DRIVE MOTOR 1	WHITE	ORANGE	17	P2-A (BOTTOM)
HDG FLAG +	ORANGE	WHITE	6	FLAG +
HDG FLAG -	ORANGE	BLUE	19	FLAG -
UNREG +15	BLUE	WHITE	16	P1- <u>y</u> (TOP)
DRIVE MOTOR 3	BLUE	BLUE	3	P2-H (BOTTOM)
SIGNAL GND*			GROUND	P1- <u>j</u> (TOP)

\*Connect outer shield at KI-525, P1-j (TOP)

**WX-950**  
**Installation Manual**

**Table 2-3 Synchro Connections to Mating Connector**

SYNCHRO CONNECTION TO WX-950 MATING CONNECTOR BACKSHELL							
SIGNAL PIN SUB-CABLE WIRE COLOR	HDG FLAG + 6 ORANGE WHITE	HDG FLAG - 19 ORANGE BLUE	SYNC X 5 WHITE WHITE	SYNC Y 17 WHITE ORANGE	SYNC Z 4 WHITE BLUE	SYNC REF HI 16 BLUE WHITE	SYNC REF LO 3 BLUE BLUE
Cessna ARC 200-9BC	N/A	N/A	A	E	D	C	B
Cessna ARC 40840-0204	N/A	N/A	N	M	L	B	L
Cessna Slaved DG	N/A	N/A	E	D	A	C	B
AIM Type 289-1-2	N/A	N/A	E	D	A	H	C
AIM Type 2892D	N/A	N/A	M	N	K	L	K
AIM Type 2892ED	N/A	N/A	M	N	K	L	K
Collins Type 331P-1V	N/A	N/A	N	M	D	B	L
Collins Type 331P-1	N/A	N/A	N	M	D	B	L
Century NSD360 DG & 722/755	N/A	N/A	1*	2*	3*	7*	5*
Century NSD360A DG & 722/755	36	1	1*	2*	3*	7*	5*
Century Slaved DG	N/A	N/A	N	M	L	B	L
King KCS-55 w/KI-525A-01	N/A	N/A	P2- <u>s</u>	P2- <u>v</u>	P2- <u>t</u>	P2- <u>r</u>	P2- <u>u</u>
King KCS-55A w/KI-525A-01	P1- <u>v</u>	P2-P	P2- <u>s</u>	P2- <u>v</u>	P2- <u>t</u>	P2- <u>r</u>	P2- <u>u</u>
Sperry C6E, C6J	N/A	N/A	39	38	40	37	36
Sperry C6, C6A, C6C	N/A	N/A	18	19	20	21	41
Sperry C-14d	e	GND	a	b	Z	X	Y

\*Connections to 722/755.

#### 2.7.4 Inhibit Line

**NOTE**

Normally the inhibit line is not needed if the *Stormscope* antenna and communications antennas are mounted on opposite sides of the fuselage.

The inhibit line is #22 AWG unshielded, and need be connected only if communication transmitters interfere with the WX-950 when in the weather mapping mode. This line can be included in the installation, but need be connected only if the testing of the final installation indicates transmitter interference. Inhibit line routing and length is not critical to system operation.

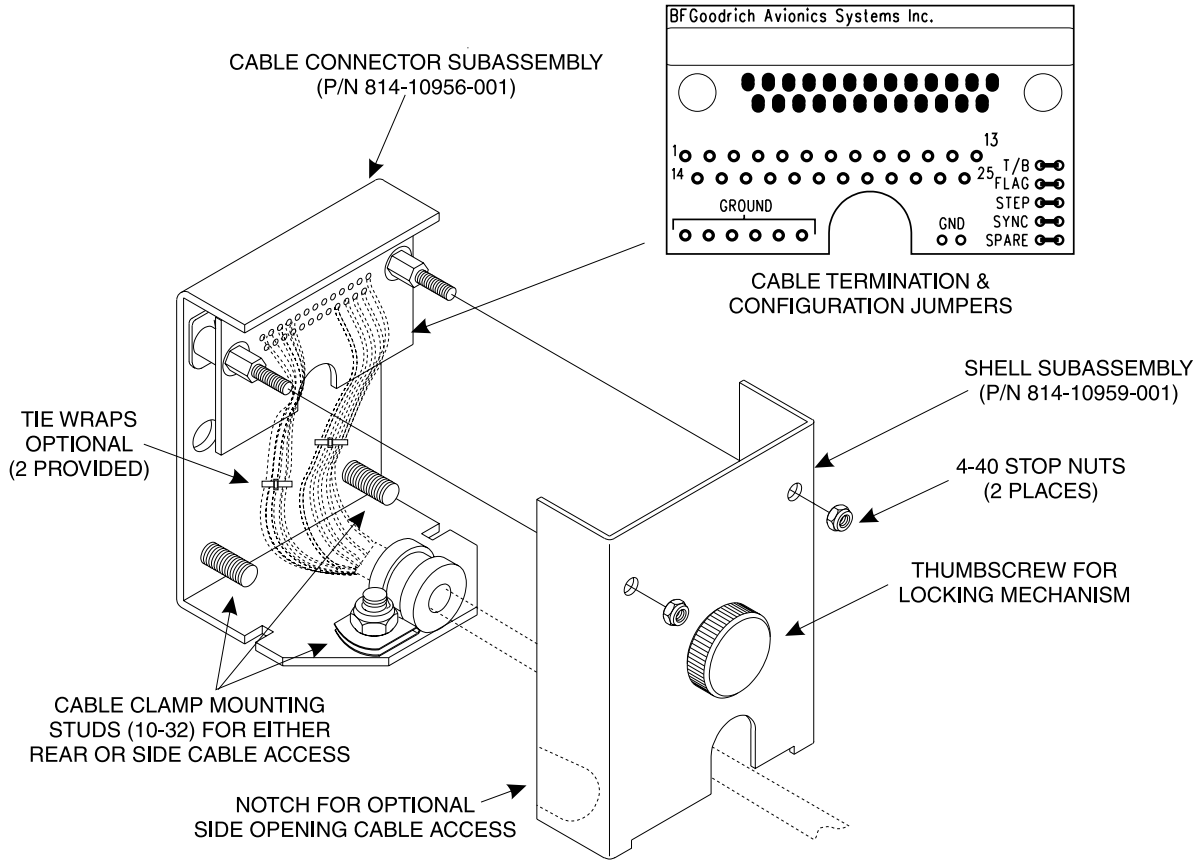
#### 2.7.5 Remote Clear Line

When activated, the remote clear switch performs the same function as the lower left softkey. The remote clear line is #22 AWG unshielded. Remote clear line routing and length are not critical to system operation, nor is the location of the airframe ground point at which the remote clear switch terminates.

**WX-950**  
**Installation Manual**

**2.8 MATING CONNECTOR ASSEMBLY**

All system cables are terminated at the mating connector assembly (see figure 2-10). This connector assembly also contains jumpers to select system configuration. The locking mechanism has been designed to allow blind mating to the 25-pin D-sub-miniature connector on the back panel of the display/processor.



**Figure 2-10 Mating Connector**

When terminating wires observe specified color designations. Tie points are identified on the cable termination PCB. If necessary, this PCB can be removed to simply making the solder connections. After the wiring connections have been completed, use the interconnect diagram to verify continuity between each pin and its opposite end termination. Tables 2-4 and 2-5 provides this information for the antenna and heading inputs.

**Table 2-4. Antenna Cable Connections**

SIGNAL	WIRE COLOR	CONNECTOR PIN NUMBER	
		BACKSHELL	ANTENNA
XLOOP	ORANGE	24	C
+12V	RED	12	D
SENSE	BROWN	13	B
ANTREF	BLACK	23	J
-12	YELLOW	11	F
YLOOP	GREEN	25	G
ANTTEST	BLUE	10	H
ANTCOM	DRAIN	22	A

**WX-950**  
**Installation Manual**

**Table 2-5. Heading Input Connections**

SYNCHRO INPUT	STEPPER INPUT	WIRE COLOR		BACKSHELL PIN NUMBER
		SUB-CABLE	WIRE	
SYNC-X		WHITE	WHITE	5
SYNC-Z		WHITE	BLUE	4
SYNC-Y	DRIVE MOTOR 1	WHITE	ORANGE	17
HDG FLAG +	HDG FLAG +	ORANGE	WHITE	6
HDG FLAG -	HDG FLAG -	ORANGE	BLUE	19
SYNC REF HI	UNREG +15	BLUE	WHITE	16
SYNC REF LO	DRIVE MOTOR 3	BLUE	BLUE	3

Cables terminating at mating connector must be secured with a cable clamp attached to one of the mounting studs (see figure 2-10). Shields terminating at the mating connector can be attached to one of the unused mounting studs with a locking terminal. Secure the cable clamp and locking terminals with 10-32 stop nuts. Tie wraps, cable clamps, locking terminals, and stop nuts are supplied with the hardware package (see table 1-2).

Option Jumpers, as shown in figure 2-10, are installed on the mating connector assembly. The jumpers, (22 AWG bus wire) are cut, as detailed in table 2-6, to enable/disable the different configurations. Jumper configuration can be verified with a resistance check between pins 9 (CONFIG JUMPER) and 11 (-12V). Simply compare the resistance measured between pins 9 and 11 with that shown in table 2-7. Table 2-7 lists the resistance value identified with each jumper configuration.

**Table 2-6. Configuration Jumpers**

JUMPER	FUNCTION	CUT JUMPER
T/B	ANTENNA LOCATION TOP	YES
	ANTENNA LOCATION BOTTOM	NO
SYNC	ENABLE SYNCHRO HEADING INPUT	YES <sup>1</sup>
STEP	ENABLE STEPPING HEADING INPUT	YES <sup>1</sup>
FLAG <sup>2</sup>	IF NO VALID HEADING INPUT IS AVAILABLE	YES
	IF LOW LEVEL INPUT ON HDG FLAG+ (PIN 6) WITH RESPECT TO HDG FLAG - (PIN 19) INDICATES VALID HEADING	
	IF HIGH LEVEL INPUT ON HDG FLAG+ (PIN 6) WITH RESPECT TO HDG FLAG - (PIN 19) INDICATES VALID HEADING	NO
SPARE	NOT USED	NO

<sup>1</sup> Only one heading input should be enabled (unless NO HEADING is connected, then cut neither).

<sup>2</sup> Figure 2-11 shows the WX-950 heading validation circuit along with a typical connection of a navigational system (such as the King KCS55) that provides a heading valid signal to the WX-950.

The shell and cable connector subassemblies are joined with two 4-40 stop nuts (provided with the hardware package, see table 1-2).



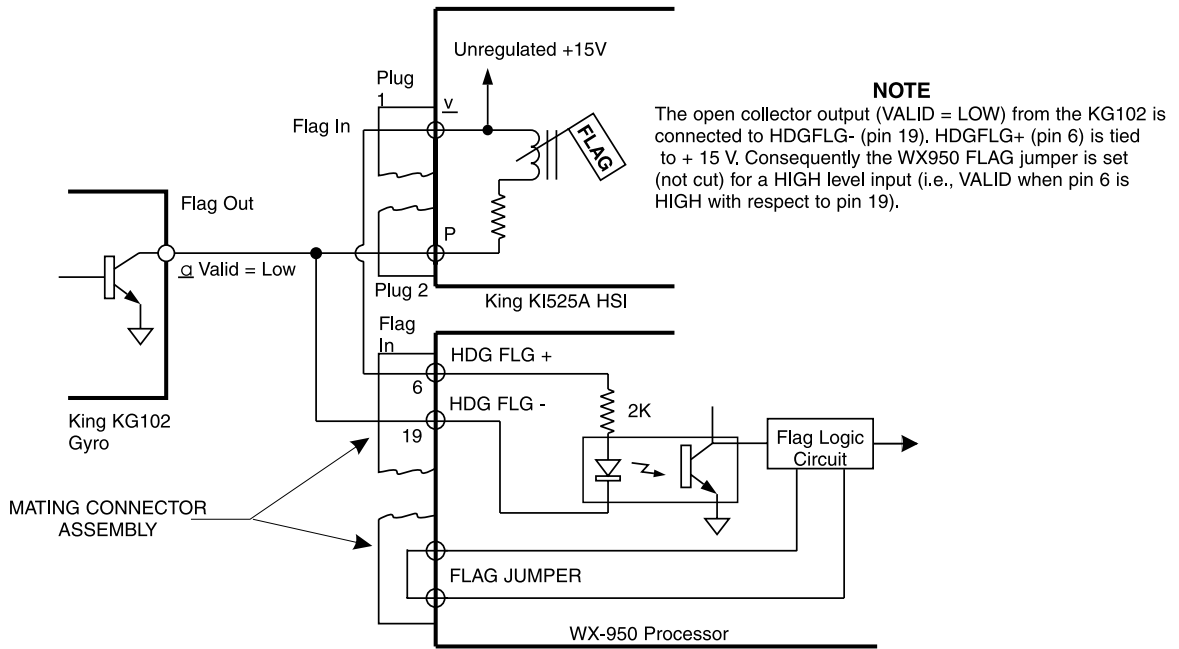
**WX-950**  
**Installation Manual**

**Table 2-7. Jumper Configuration Resistance Check**

RESISTANCE (k-OHM ± 1%)	JUMPER - CUT (C) or NOT CUT (NC)				
	T/B	SYNC	STEP	FLAG	SPARE
5.17	NC	NC	NC	NC	NC
5.34	NC	NC	NC	NC	C
5.52	NC	C	NC	NC	NC
5.72	NC	C	NC	NC	C
5.93	NC	NC	C	NC	NC
6.16	NC	NC	C	NC	C
6.97	NC	NC	NC	C	NC
7.28	NC	NC	NC	C	C
7.63	NC	C	NC	C	NC
8.01	NC	C	NC	C	C
8.43	NC	NC	C	C	NC
8.90	NC	NC	C	C	C
10.7	C	NC	NC	NC	NC
11.5	C	NC	NC	NC	C
12.3	C	C	NC	NC	NC
13.4	C	C	NC	NC	C
14.6	C	NC	C	NC	NC
16.0	C	NC	C	NC	C
23.0	C	NC	NC	C	NC
26.8	C	NC	NC	C	C
32.2	C	C	NC	C	NC
40.2	C	C	NC	C	C
53.8	C	NC	C	C	NC
80.6	C	NC	C	C	C

**NOTE**  
RESISTANCE MEASURED BETWEEN PINS 9 AND 11 WITH MATING CONNECTOR REMOVED FROM DISPLAY/PROCESSOR.

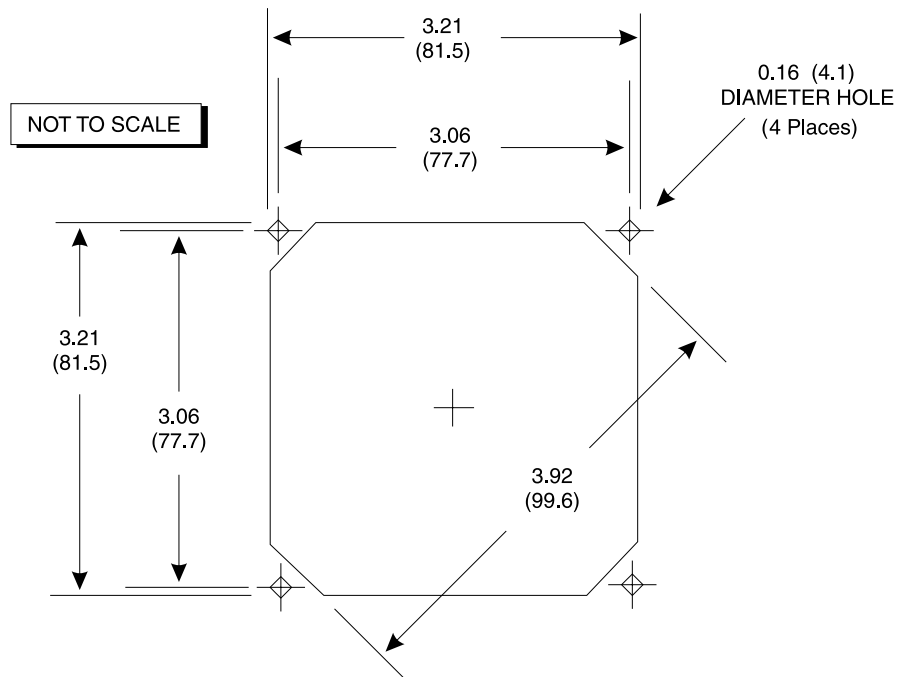
**WX-950  
Installation Manual**



**Figure 2-11. Heading Flag (KCS55) Connection**

## 2.9 DISPLAY/PROCESSOR INSTALLATION

The display/processor is designed to mount into a standard 3 ATI instrument panel cutout. The instrument panel cutout and mounting holes are shown in figure 2-12.



**NOTE**  
DIMENSIONS ARE IN INCHES (MILLIMETERS)

**Figure 2-12. Instrument Panel Cutout and Mounting Holes**

Goodrich Avionics Systems recommends front-mounting the display/processor using 6-32 rivet-nuts to secure the unit to the instrument panel. For increased stability, in high-vibration environments, the display/processor can be secured to the instrument panel with a mooring plate (see figure 2-13). A mooring plate will accommodate mounting to the instrument panel from the front or from the rear.

A mooring plate can be ordered from Goodrich Avionics Systems.

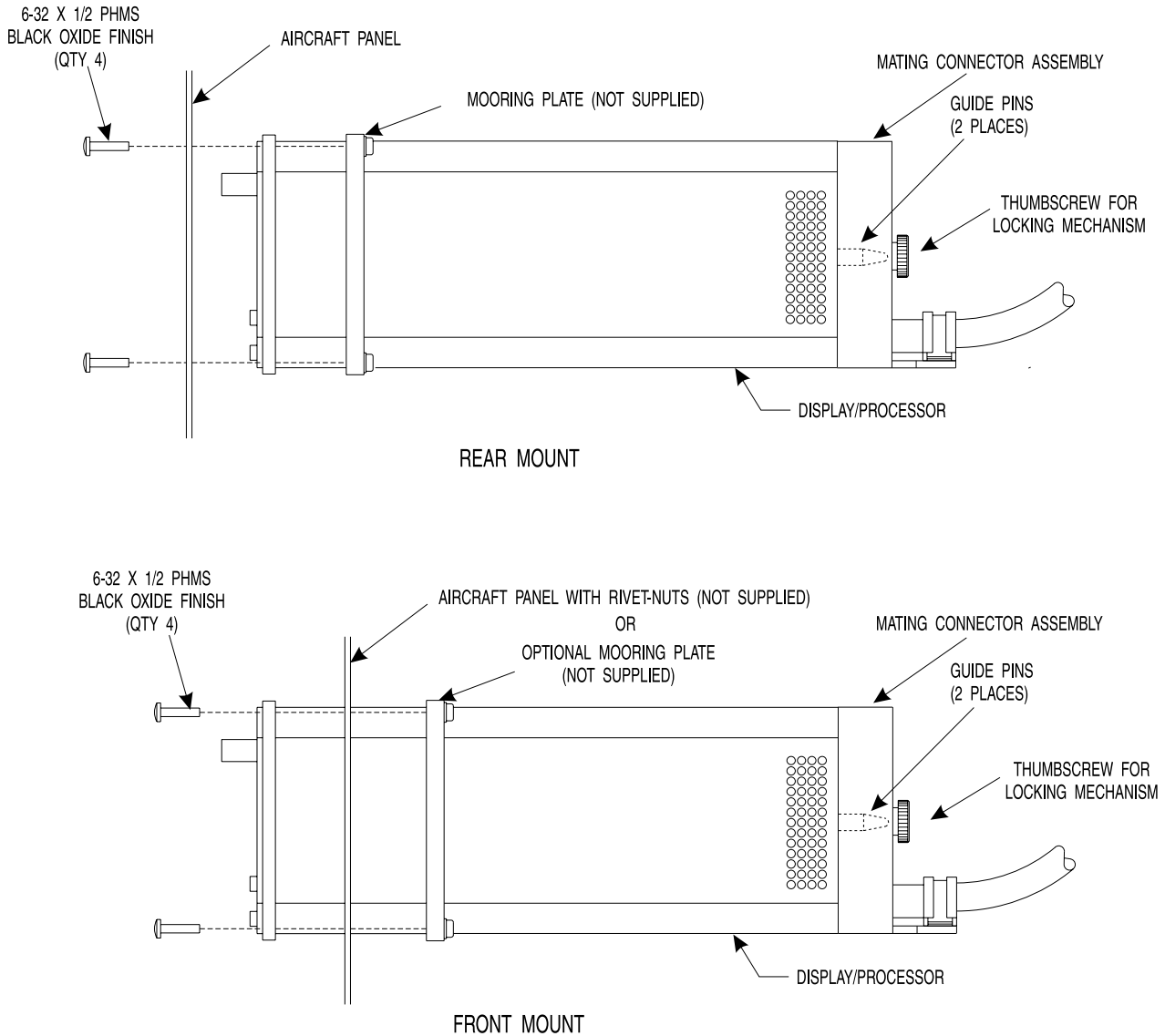
P/N 78-8060-5856-2

3ATI mooring plates are also available from:

MSP, Incorporated  
P.O. Box 1196  
R.R. 4, Box 383A  
Nashville, Indiana 47448

(812) 988-6623 FAX (812) 988-6181

**WX-950**  
**Installation Manual**



**Figure 2-13. Display/Processor Installation**

The mating connector assembly has been designed for easy blind mating. Simply align the connector assembly with the guide pins at the rear of the display/processor and slide it in place. Lock by turning the thumbscrew in a clockwise direction.

**2.10 PERFORMANCE TEST**

After the installation is completed do the installation checkout procedures detailed in chapter 3.

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**WX-950**  
**Installation Manual**

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## CHAPTER 3

# INSTALLATION CHECKOUT

### 3.1 INTRODUCTION

This section contains instructions for post-installation checkout of the WX-950. Complete operating instructions for the WX-950 are provided in the Pilot's Guide supplied with each system.

#### NOTE

The post-installation check procedures in this chapter assume familiarity with the set-up and operation of the WX-PA Portable Analyzer Kit (P/N 78-8060-5791-1).

### 3.2 CONTROLS

All operating controls are located on the front of the indicator. Figure 3-1 shows the location of the controls.

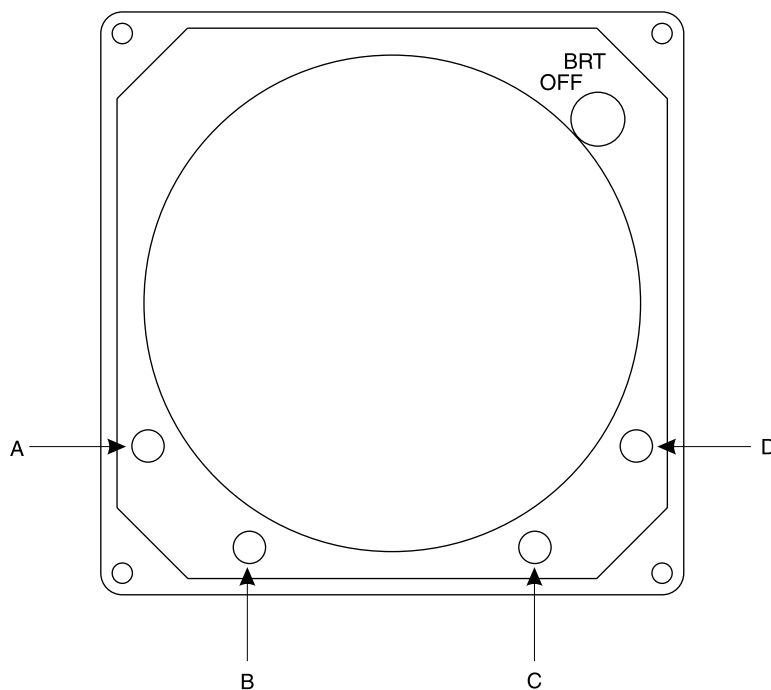


Figure 3-1. Controls

OFF/BRT  
Switch

Power is applied by rotating the knob clockwise past the detent. Continued clockwise rotation increases display brightness.

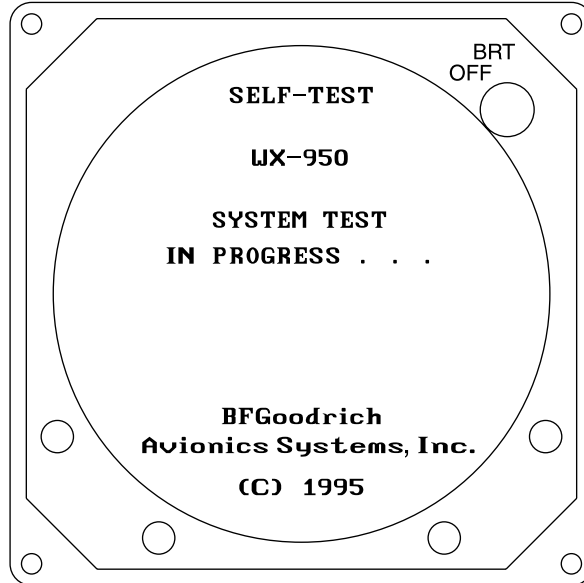
A, B, C, & D  
Pushbuttons

Also referred to as softkeys (A), (B), (C), and (D). In every operating mode a label identifying the button function will be displayed next to the button.

### 3.3 POST INSTALLATION CHECKOUT

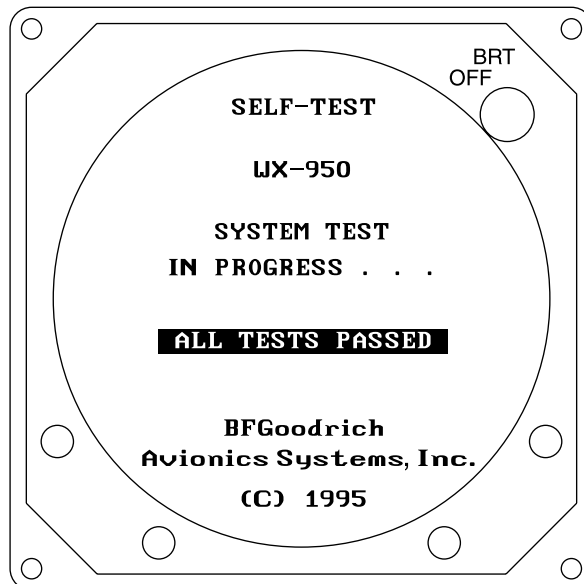
This procedure will validate the installation and return to service of the WX-950.

1. Rotate the OFF/BRT knob clockwise about 180 degrees. After approximately 15 seconds, the initialization screen (see figure 3-2) will be displayed. During initialization, the system runs a series of self-tests to ensure that all functions are operating properly. These tests are designed to check the antenna, processor, and associated hardware.



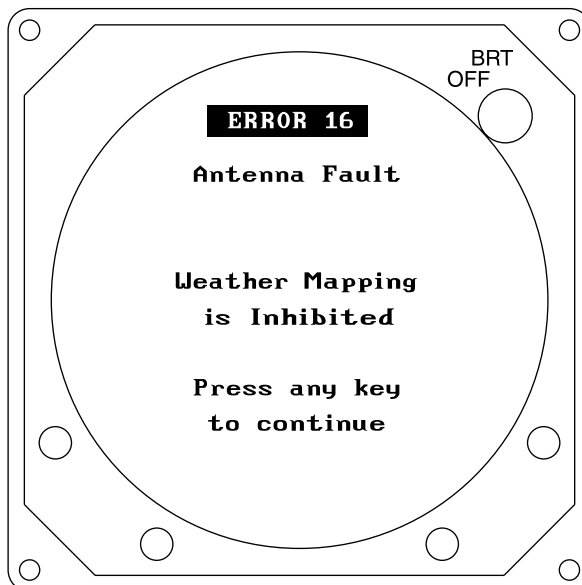
**Figure 3-2. Self-Test in Progress**

2. If no faults are detected, at completion of the self-test an “ALL TESTS PASSED” message will be displayed (see figure 3-3). Proceed to step 4.



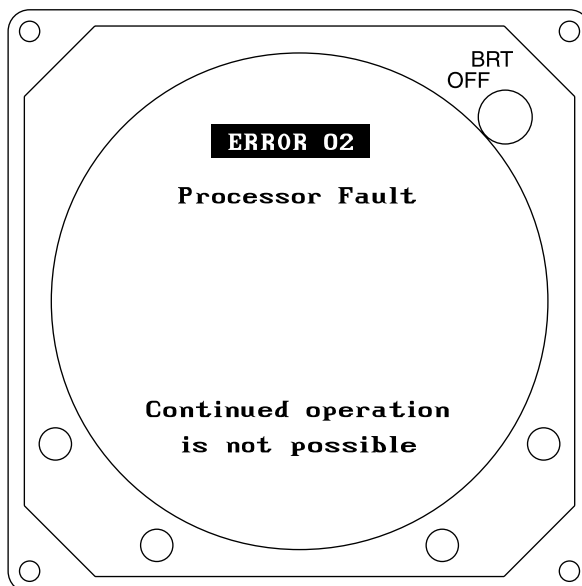
**Figure 3-3. Self-Test Passed**

3. If a fault is detected, an error message will be displayed indicating which test failed and which functions may be inoperative.
  - a. If continued operation is possible, the message “**Press any key to continue**” will appear (see figure 3-4). To continue operation, press any key.



**Figure 3-4. Recoverable Error Message**

- b. If a fatal (i.e., non-recoverable) error is detected, the message “**Continued operation is not possible**” will appear (see figure 3-5). In this circumstance, turn the system OFF and refer to the maintenance procedures detailed in chapter 4.



**Figure 3-5. Fatal Error Message**

Table 4-1 lists all the possible error messages, the probable causes, and the recommended actions.



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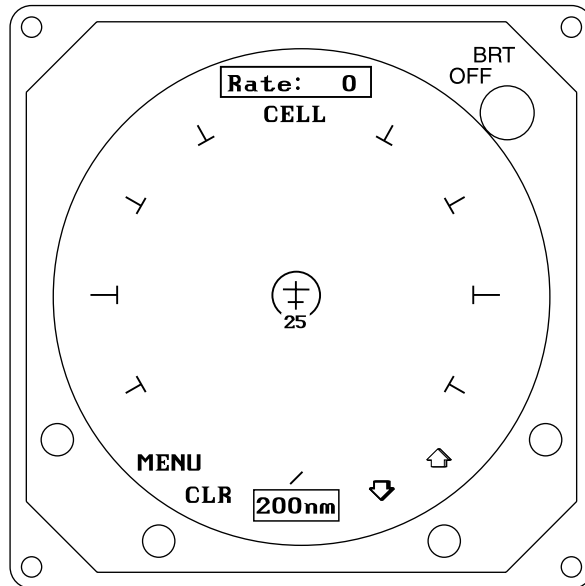
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**WX-950**  
**Installation Manual**

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4. After completion of the self-test, verify that the WX-950 is in the weather mapping mode (i.e., 360° Weather View at the 200 nmi range, see figure 3-6).



**Figure 3-6. 360° Weather View at 200 nmi Range**

5. Verify that clockwise rotation of the OFF/BRT knob increases display brightness and counter-clockwise rotation decreases brightness. The screen should be completely dark with the control fully counter-clockwise. Adjust to a comfortable viewing level.
6. Verify operation of the pushbuttons (figure 3-1 shows location of softkeys):
  - a. Press softkey (A), i.e., MENU. This should cause the system menu to be displayed with "Weather View" menu item highlighted.
  - b. Press softkey (B), i.e., 360°. The display should return to the weather mapping mode, 360° Weather View at the 200 nmi range.
  - c. Press softkey (C), i.e., down-arrow. The weather view range should change to 100 nmi.
  - d. Press softkey (D), i.e., up-arrow. The weather view range should return to 200 nmi.
7. Access the Service Menu (refer to paragraph 4.4) and verify the information (i.e., heading source, heading flag, jumper sense, heading, inhibit line and antenna mounting location) identified on System Data Page 2 of 3).

**NOTE**

If stepper heading is used, the heading will not agree with the HSI. Stepper heading is relative to aircraft heading.

8. From the Service Menu, enter the noise monitor mode.
9. Repeatedly key the aircraft communications radio microphone:
  - a. If keying the transmitter does not cause strike data to appear on the CRT, proceed to step 13.
  - b. If strike data appears on the CRT when the transmitter is keyed, wire the inhibit line to the microphone key switch (see figure 2-5).
10. From the Service Menu, access System Data Page 2 of 3 and verify that when the transmitter is keyed the state of the Inhibit Line transitions from off to on.
11. From the Service Menu, enter the noise monitor mode.

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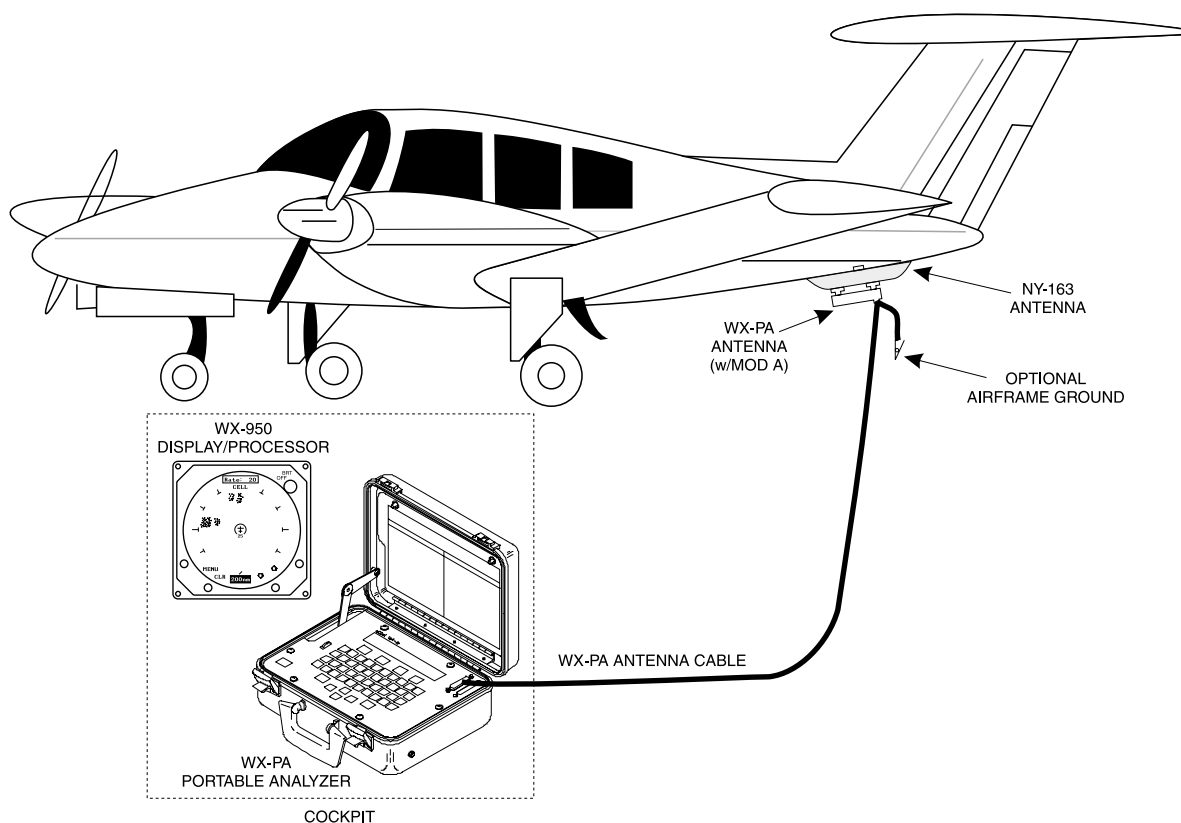
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**WX-950  
Installation Manual**

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12. Repeatedly key the aircraft communications radio microphone:
  - a. If keying the transmitter does not cause strike data to appear on the CRT, proceed to step 13.
  - b. If strike data appears on the CRT when the transmitter is keyed:
    - Verify separation of the NY-163 and aircraft communication system antennas.
    - Check the routing of the stormscope antenna cable with respect to the aircraft communication system antenna cables.
    - Contact customer service for advice and assistance.
13. To verify antenna orientation and the integrity of the antenna wiring, a antenna phase check must be performed using at least the four cardinal headings (000, 090, 180, and 270) and using the following WX-PA ranges: 120, 75, and 30 nmi. Refer to figure 3-7 for the test setup.



**Figure 3-7. Aircraft Test Setup**

- a. Connect the WX-PA cable to the WX-PA antenna.
- b. Refer to figure 3-8 and position the WX-PA antenna on the system antenna. Make sure the connection is tight. If necessary, use tape to secure the WX-PA antenna.

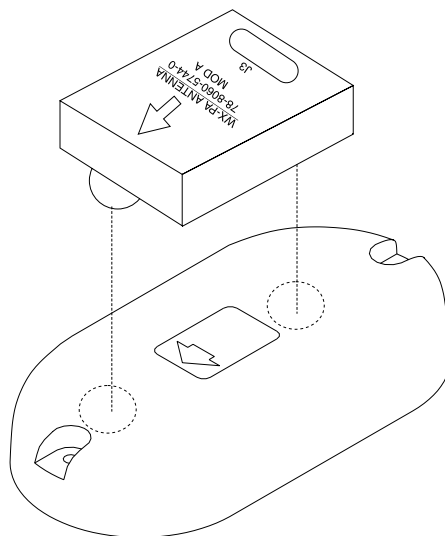
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**WX-950  
Installation Manual**

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**NOTE**

ENSURE THE 'FORWARD' ARROWS ARE ALIGNED AND THE WX-PA ANTENNA SUCTION CUPS ARE POSITIONED AS SHOWN (FORWARD OF CENTER ALONG LONGITUDINAL AXIS).

**Figure 3-8. WX-PA Antenna Alignment**

- c. Secure the WX-PA cable to the aircraft with the attached suction cup and route the cable to the cockpit.
- d. Connect the remaining end of the WX-PA antenna cable to the WX-PA.
- e. Power up the WX-PA.
- f. Power up the WX-950. After completion of the self-test, verify that the WX-950 is in the weather mapping mode (i.e., 360° Weather View at the 200 nmi range, see figure 3-6).
- g. Set the WX-950 to the STRIKE display mode; 100 nmi range. To toggle between the cell and strike modes, press the button labeled CELL or STRIKE. Press the arrow keys to step through the operating ranges.
- h. Select the Continuous Out mode displayed on the WX-PA menu and press MENU/ENTR.

**NOTE**

During continuous output mode, the strike counter should read between 560 and 600.

- i. Select a top mount or a bottom mount antenna configuration on the WX-PA keyboard ("A" key), as appropriate.
- j. Select a cardinal bearing and a range of 120 nmi.
- k. Use the F1 and F2 keys to adjust range and the F3 and F4 keys to adjust bearing.

**NOTE**

The WX-950 will plot data at one-half the range selected on the WX-PA.

- l. Press MENU/ENTER to start the test.

**NOTE**

Adjustments to range and bearing can be made while the test is in progress.

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**WX-950**  
**Installation Manual**

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- m. Observe the display to ensure the proper positioning of the test strikes, based on range and azimuth settings on the WX-PA. The strikes should be within 10 degrees of the selected azimuth and should plot at 60 nmi ( $\frac{1}{2}$  120 nmi).

**NOTE**

THE WX-PA IS USED ONLY TO CHECK SYSTEM FUNCTIONS. IT IS NOT CONSIDERED A CALIBRATION STANDARD.

- n. After testing for all ranges and bearings indicated, press 2ND, then MENU/ENTER to return to the Main Menu.
14. To check range and azimuth plotting accuracy set up the WX-PA to simulate a series of strikes at 30 degree increments at WX-PA ranges of 120, 55, and 15 nmi:
- a. Select Circular Pattern mode on the WX-PA Mode Menu and press MENU/ENTR.
  - b. Select a top mount or a bottom mount antenna configuration on the WX-PA keyboard ("A" key), as appropriate.

**NOTE**

The WX-950 display should be set at 100 nmi on the 360 degree weather screen and in strike display mode.

- c. Use the F1 and F2 keys to select a 120 nmi range and press "MENU/ENTR" to start the test. The system should plot discharge points at approximately 60 nmi.
- d. Observe the display to ensure the proper positioning of the test strikes. The strikes should be within 10 degrees of the 30 degree azimuth increment and within 12 nautical miles (20%) of 60 nmi.

**NOTE**

THE WX-PA IS USED ONLY TO CHECK SYSTEM FUNCTIONS. IT IS NOT CONSIDERED A CALIBRATION STANDARD.

- e. When complete, set the WX-PA for 55 nmi, set the WX-950 display for 50 nmi and repeat the test.
    - 1) The System should plot points just outside of the 25 nmi ring.
    - 2) The strikes should be within 10 degrees of the 30 degree azimuth increment and within 5 nmi of 27.5 nmi.
  - f. Repeat, setting the WX-950 display for 25 nmi and the WX-PA for 15 nmi.
  - g. Again, observe the display to ensure the proper positioning of the test strikes within 10 degrees of azimuth and within 2 nmi of 7.5 nmi.
15. To test the synchro functions:
- a. Set the WX-950 range to 200 nmi, and use the WX-PA (at any desired range and bearing) to plot continuous discharge points on the CRT.

**NOTE**

During continuous output mode, the strike counter should read between 560 and 600.

- b. With the compass system turned on, physically turn the aircraft 45° to the right (or manually slew the compass clockwise), and verify that the previously plotted discharge points move 45° counterclockwise.
16. Test for electrical noise and interference by running the noise monitor and strike test as detailed in paragraph 4.4.4. The noise monitor is accessed from the SERVICE MENU (refer to paragraph 4.4).

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**WX-950**  
**Installation Manual**

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**NOTE**

This test may be performed with the aircraft in flight or on the ground, as long as it is running at high RPM with all systems powered.

An offending interference source can be isolated by shutting down one system at a time, then clearing the display and observing the noise monitor screen. Refer to troubleshooting electrical noise, paragraph, 4.6.

17. This completes the post installation checkout procedure.

# CHAPTER 4

## MAINTENANCE

### 4.1 INTRODUCTION

This chapter contains general flightline maintenance procedures. These procedures are intended to aid in testing a complete, interwired WX-950 system and to isolate a fault to the display/processor, antenna, or cable.

### 4.2 CONTINUED AIRWORTHINESS

No scheduled maintenance is required to ensure continued airworthiness.

### 4.3 PERIODIC MAINTENANCE

#### NOTE

Upon delivery to a customer, the dealer should recommend an annual checkout of the system, especially prior to the thunderstorm season.

#### 4.3.1 Display/Processor

1. Check that cable is properly mated and secured.
2. Check to ensure unit is properly placed and secured to the instrument panel.

**CAUTION**

Do not use cleaning solvents on the viewing face.

3. Check faceplate for cleanliness. Wipe the viewing face with a damp lint-free, static-free cloth. If necessary, clean with a soft cloth moistened with a mild solution of soap and water. Take care to prevent cleaning solution from running down inside the case.

#### 4.3.2 Antenna

1. Check for dents, cracks, and punctures.

**CAUTION**

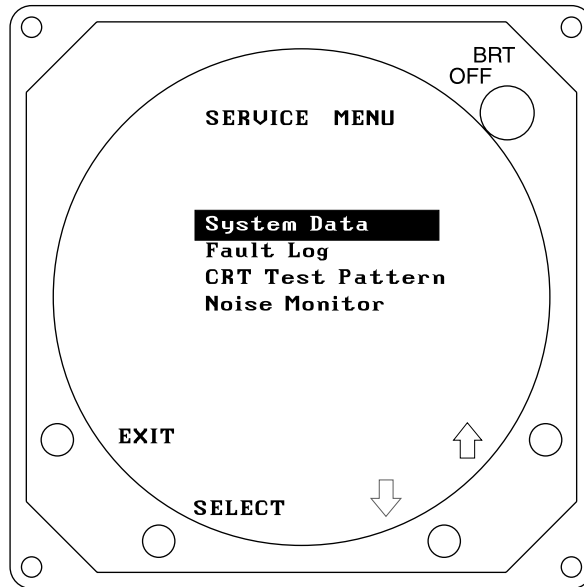
Do not paint the antenna.  
Do not use cleaning solvents on the antenna.

2. Remove all dirt and grease from surface areas. Clean with a soft cloth moistened with mild soap and water.
3. Visually inspect sealant around the antenna base. Reapply sealant if required.

#### 4.4 SERVICE MENU

The Service Menu is intended as an aid in installing, testing and troubleshooting the WX-950. Service Menu items are to be used only for testing and troubleshooting an installation. They are not intended to be used by the pilot during normal system operation. While in the Service Menu, the internal self-test and run-time counter are not operational; therefore, any system errors will not be detected or displayed.

The Service Menu is accessed by holding softkeys (A) and (B) (the left two buttons) depressed as the system is turned on. Hold the buttons until the Service Menu is displayed. The Service Menu is shown in figure 4-1.



**Figure 4-1. Service Menu**

The buttons perform the following operations in this mode:

- **EXIT** - causes the system to exit the Service Menu and run the power on self-test.
- **SELECT** - selects the highlighted item.
- ↑ steps to the previous item.
- ↓ steps to the next item.

The Service Menu provides the following choices:

- System Data
- Fault Log
- CRT Test Pattern
- Noise Monitor

The individual menu items are explained in the following paragraphs.

##### 4.4.1 System Data

System Data screens (see figures 4-2 through 4-4) contain a record of setup information. If you have problems with the WX-950, have this information available when contacting Goodrich Avionics Systems Customer Service. The Customer Service specialist must have adequate information to diagnose a problem. System Data screens are accessed by selecting that option from the Service Menu (i.e., press **SELECT** with **System Data** high-lighted). The data is updated once per second.

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## WX-950 Installation Manual

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The buttons perform the following operations in this mode:

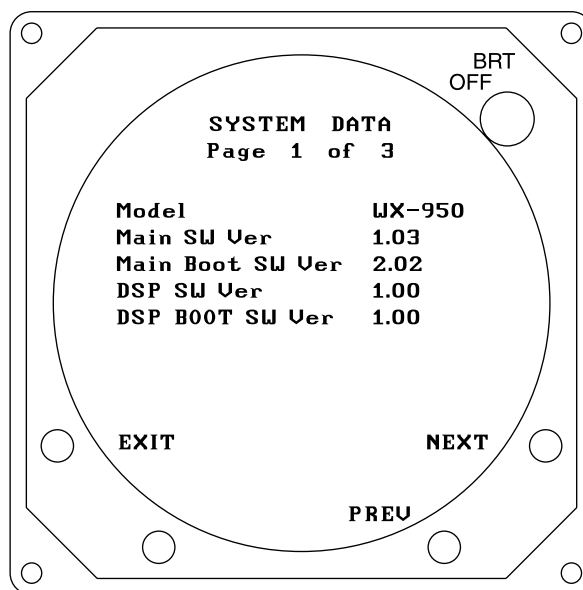
- **EXIT** - returns to the Service Menu (figure 4-1).
- **NEXT** steps to the next page.
- **PREV** steps to the previous page.
- Softkey (**B**) is not used.

Page 1 identifies (see figure 4-2):

- System Model (Model)
- Main Software Version (Main SW Ver)
- Main Boot Software Version (Main Boot SW Ver)
- DSP Software Version (DSP SW Ver)
- DSP Boot Software Version (DSP Boot SW Ver)

### NOTE

The software version identified on the bottom of the processor represents the system software configuration (i.e., a collective designator for all software/firmware installed within the unit).



**Figure 4-2. System Data, Page 1**

Page 2 displays (see figure 4-3):

- Heading Type (XYZ, Step or None)\*
- Heading Valid Flag (Flag, No Flag or N/A)
- Flag Sense Jumper (Open, Closed or N/A)\*
- Heading Value (XYZ synchro/ stepper relative in degrees, or N/A)
- State of the Inhibit Line (On or Off)
- Antenna Mounting (Top or Bottom)\*

\* As read from the configuration jumpers in the mating connector.



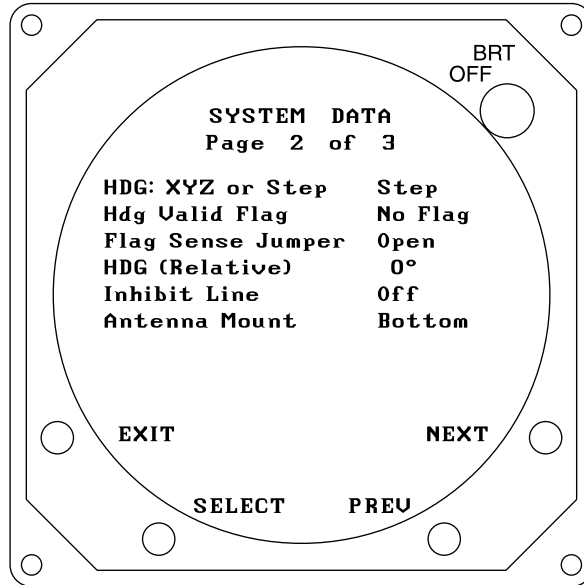
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**WX-950**  
**Installation Manual**

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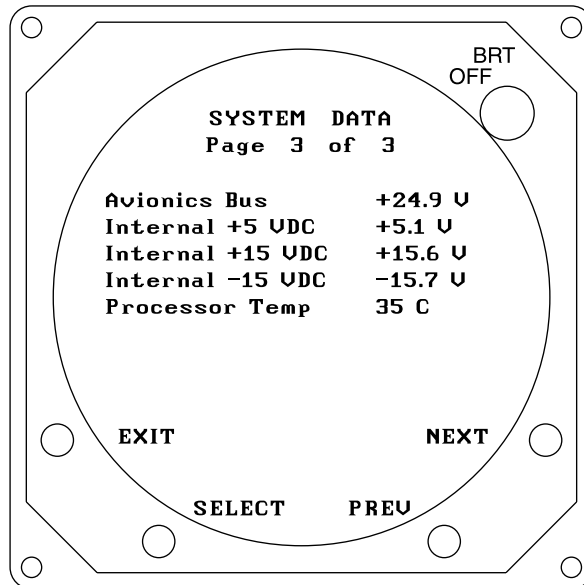
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**Figure 4-3. System Data, Page 2**

Page 3 displays (see figure 4-4):

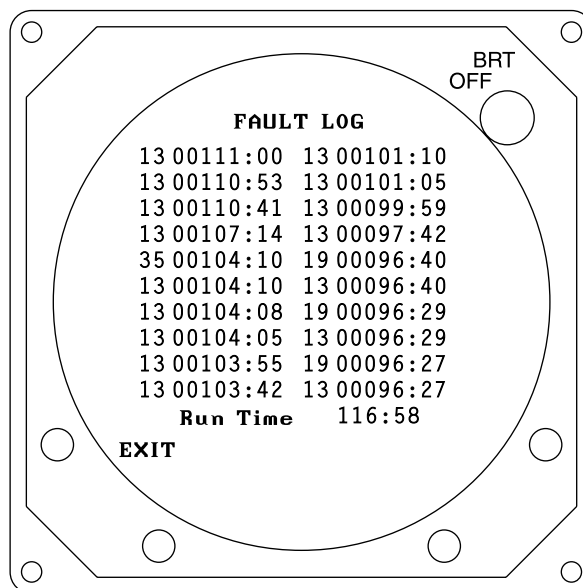
- Avionics Bus Voltage
- Internal Voltage Values (+5.0 VDC, +15.0 VDC, and -15.0 VDC)
- Processor Temperature (degrees C)



**Figure 4-4. System Data, Page 3**

#### **4.4.2 Fault Log**

The 20 most recent errors detected by the system self-test are saved in the Fault Log. For each error, the corresponding error code and run-time of occurrence are saved. The fault log, as shown in figure 4-5, is displayed by selecting that option from the Service Menu (i.e., press **SELECT** with **Fault Log** highlighted). Note that heading errors (i.e., error 22 (Invalid XYZ Input) and error 23 (Invalid Heading Ref.)) are not logged.



**Figure 4-5. Fault Log**

Fault Log displays the results in the following format:

**## HHHHH:MM**

where:

**##** = Fault identifier code.  
**HHHHH:MM** = Run-time (in hours and minutes) at which fault occurred.

The total elapsed run-time is displayed in the lower middle portion of the screen (**Run Time HHHHH:MM**).

**NOTE**

The run-time clock does not increment when the Service Menu is active.

If fewer than 20 faults have been recorded, the portion of the screen used to display the fault data will be partially blank.

If the fault log is empty, the following message is displayed:

**NO FAULTS DETECTED**

If, due to a failure of non-volatile memory, the fault log cannot be displayed, the following message is displayed:

**DATA NOT AVAILABLE**

Press the **EXIT** key to return to the Service Menu. Softkeys **(B)**, **(C)**, and **(D)** are not used.

#### **4.4.3 CRT Test Pattern**

The CRT test pattern screen will display an 8 x 8 grid of squares. The test pattern is used by factory technicians to verify that the CRT is aligned. The test pattern, as shown in figure 4-6, is displayed by selecting that option from the Service Menu (i.e., press **SELECT** with **CRT Test Pattern** high-lighted).

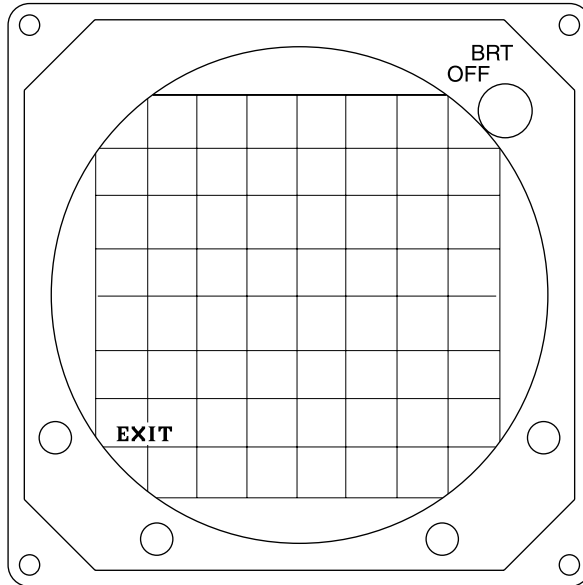


Figure 4-6. CRT Test Pattern

Press the **EXIT** key to return to the Service Menu. Softkeys **(B)**, **(C)**, and **(D)** are not used.

#### 4.4.4 Noise Monitor

The noise monitor screen (see figure 4-7) displays indications of electrical noise as well as lightning/ atmospheric electrical discharge activity that occurs within electrical range of the system. It is checked to see if electrical noise, that will interfere with normal system operation, is present. No compression is

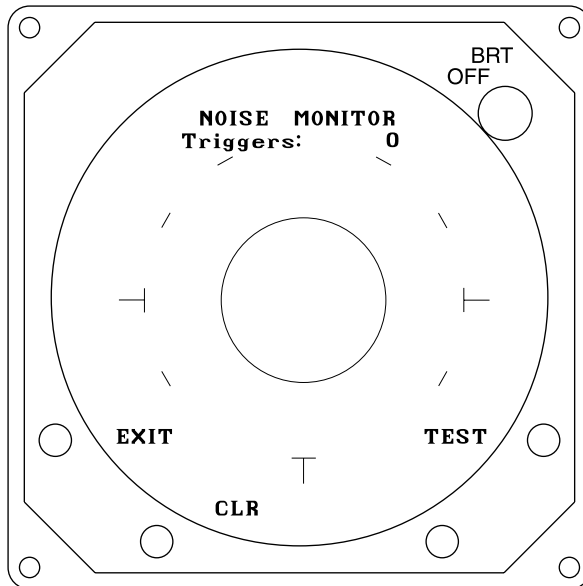


Figure 4-7. Noise Monitor

applied to the strikes. Also displayed is a circle (solid ring) that provides a reference for an acceptable noise level. No range markings are displayed. Old data is removed (bumped off) after 3 minutes, or when the **CLR** button is pressed. A five digit counter that indicates the number of triggers detected (i.e, electrical discharges including noise and/or strikes) is displayed at the top of the screen. The counter rolls over at

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**WX-950**  
**Installation Manual**

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99999, and is reset using the clear button. It should be noted that noise can cause triggers but not result in a strike symbol.

The noise monitor is displayed by selecting that option from the Service Menu (i.e., press **SELECT** with **Noise Monitor** high-lighted).

The buttons perform the following operations in this mode:

- **EXIT** - returns to the Service Menu (figure 4-1).
- **CLR** - clears all received data from the screen.
- **TEST** - Selects the **Test Strikes** display.
- Softkey (C) is not used.

**NOTE**

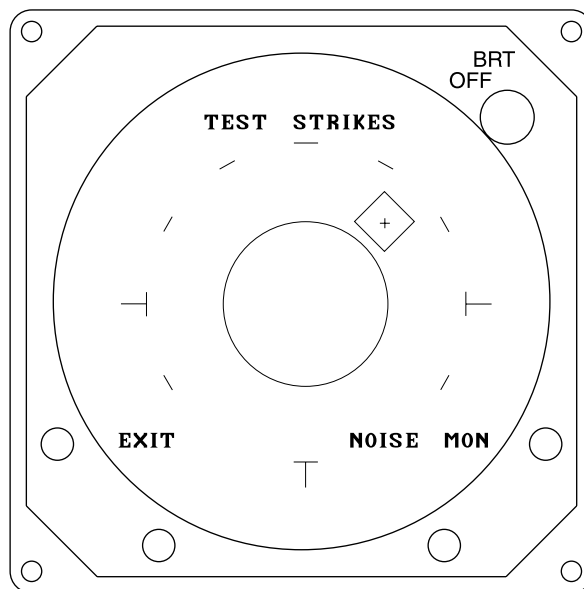
Thunderstorm activity within 200 nmi will register on the noise monitor and may affect the test strike display by causing the test strike to fall outside the box.

Press **CLR** to erase the screen and then check for electrical noise indications.

**PASS** There should normally be no noise indications inside the solid ring on the display. (A small number of triggers and/or random noise points inside the displayed ring is acceptable.)

**FAIL** Significant activity (triggers and/or strike clusters) or persistent indications of electrical noise inside the solid ring are unacceptable. (Trouble-shooting electrical noise is discussed in paragraph 4.6.)

If the noise monitor test is satisfactory, press the **TEST** button to switch to the Test Strike display, see figure 4-8.



**Figure 4-8. Test Strikes**

The Test Strikes display is used by installers to visually verify the operation of the internal strike test signal. No range indication is displayed. The rectangular shaped box is displayed on the screen to enclose the area in which the test strikes should appear. Test strikes are generated and sent to the antenna at a rate of one pulse per second (1 Hz rate). The resulting test strike received by the system is displayed on the screen, and is indicated by a single strike symbol (+). The last strike is erased before the next strike is generated.

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**WX-950**  
**Installation Manual**

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The buttons perform the following operations in this mode:

- **EXIT** - returns to the Service Menu (figure 4-1).
- **NOISE MON** - returns to the Noise Monitor display (figure 4-7).
- Softkeys **(B)** and **(C)** are not used.

The test strike screen verifies the processing and plotting of electrical discharge data. A strike indication ("+") should appear inside the displayed box each second.

**PASS** - A strike indication is displayed and cleared each second (1 Hz rate), so that it appears to flash. The strike symbol should appear inside the box.

**FAIL** - If the generated strike indications appear outside of the box, or do not appear at all.

**NOTE**

OCCASIONAL strikes appearing outside the box or, that do not appear at all, should not be interpreted as failing the test.

Switch back and forth between the Test Strikes and Noise Monitor displays to check for accurate plotting of the internally generated test strikes and for electrical noise that could interfere with weather mapping. (Trouble-shooting electrical noise is discussed in paragraph 4.5.)

**NOTE**

The system must pass both the Noise Monitor and Test Strike criteria to ensure proper operation.

#### **4.5 FAULT ISOLATION**

Most problems associated with the WX-950 will cause the unit to display error messages. Table 4-1 lists the WX-950 error messages. Refer to this table to help diagnose systems problems. Do the corrective action steps in the order listed.

Guidelines for troubleshooting electrical noise are provided in paragraph 4.6.

A total power failure is indicated if the display remains dark after the system is powered ON. If no signs of power are present:

1. Reset circuit breaker.
2. Check aircraft power source.
3. Check power input at mating connector.
  - a. J1-8 (14-28V PWR)
  - b. J1-7 GND (AIRCRAFT PWR GND)
4. Check internal fuse, replace if defective (refer to para 4.7).
5. Contact Customer Service.

If there is power, but the display is distorted:

1. Check for interference from near-by instruments.
2. Contact Customer Service.

Use the Service Menu (refer to paragraph 4.4) as an aid in fault isolation. Information available from the service menu can help identify conditions that need to be resolved.

**WX-950  
Installation Manual**

**Table 4-1. Error Messages**

<b>ERROR</b>	<b>PROBABLE CAUSE</b>	<b>CORRECTIVE ACTION</b>
ERROR 01. Processor Fault.	Main processor	Continued operation is not possible. Contact Customer Service.
ERROR 02. Processor Fault.	Video controller	Continued operation is not possible. Contact Customer Service.
ERROR 03. Processor Fault.	Video controller	Continued operation is not possible. Contact Customer Service.
ERROR 04. Processor Fault.	Video memory	Continued operation is not possible. Contact Customer Service.
ERROR 05. Processor Fault.	Main processor memory	Continued operation is not possible. Contact Customer Service.
ERROR 06. Processor Fault.	Main processor memory	Continued operation is not possible. Contact Customer Service.
ERROR 07. Processor Fault.	Main processor memory	Continued operation is not possible. Contact Customer Service.
ERROR 08. Processor Fault.	Main processor memory	Continued operation is not possible. Contact Customer Service.
ERROR 09. Processor Fault.	DSP processor memory	Continued operation is not possible. Contact Customer Service.
ERROR 10. Processor Fault.	DSP processor memory	Continued operation is not possible. Contact Customer Service.
ERROR 11. Processor Fault.	DSP processor memory	Continued operation is not possible. Contact Customer Service.
ERROR 12. Processor Fault.	DSP processor memory	Continued operation is not possible. Contact Customer Service.
ERROR 13. Processor Fault.	DSP processor memory	Continued operation is not possible. Contact Customer Service.
ERROR 14. Processor Fault.	DSP processor	Continued operation is not possible. Contact Customer Service.
ERROR 15. Processor Fault.	DSP processor	Continued operation is not possible. Contact Customer Service.
ERROR 16. Antenna Fault.	Antenna or Antenna wiring	Weather mapping is inhibited. a. Press any key to continue. b. Check antenna wiring for opens and shorts. c. Use test cable to isolate between antenna and aircraft wiring. d. Contact Customer Service.
ERROR 17. Processor Fault.	Antenna in noisy location or faulty antenna.	Weather mapping is inhibited. a. Press any key to continue. b. Check antenna wiring for opens and shorts. c. Check for presence of noise using built-in Noise Monitor or a WX-SM skinmapper. d. If airborne near Annapolis, may be ground transmitter. e. Fault will clear automatically if interference subsides. f. Contact Customer Service.

**WX-950**  
**Installation Manual**

**Table 4-1. Error Messages (Continued)**

ERROR	PROBABLE CAUSE	CORRECTIVE ACTION
ERROR 18. Processor Fault.	Antenna in noisy location or faulty antenna.	Weather mapping is inhibited. a. Press any key to continue. b. Check antenna wiring for opens and shorts. c. Check for presence of noise using built-in Noise Monitor or a WX-SM skinmapper. d. Fault will clear automatically if interference subsides. e. Contact Customer Service.
ERROR 19. Processor Fault.	Main Processor or Antenna in noisy location.	Weather mapping is inhibited. a. Press any key to continue. b. Check for presence of noise using built-in Noise Monitor or a WX-SM skinmapper. c. If airborne near Annapolis, may be ground transmitter. d. Fault will clear automatically if interference subsides. e. Contact Customer Service.
ERROR 20. Configuration Changed.	Antenna location (top/bottom, determined by processor wiring) changed since system was last powered up.  This may occur the first time the system is powered on in a new installation or after the configuration wiring is changed.	Select Antenna Location a. Press button, TOP or BOTTOM, that corresponds to Stormscope system antenna location. b. If jumper does not agree with user selection, "Configuration Fault" and "Continued operation is not possible" are displayed. c. Check jumper selection in mating connector assembly (refer to paragraph 2.8, table 2-6). d. Contact Customer Service
ERROR 21. Processor Fault.	Main processor	Continued operation is not possible. Contact Customer Service.
ERROR 22. Invalid XYZ Input.	The system is configured for synchro heading but the XYZ synchro signals are not present or are out of specification. Possible processor fault.	Heading stabilization is not available. a. Press any key to continue. b. Check wiring between heading system and WX-950 processor. c. Check configuration wiring to make sure system is set up for proper heading type (stepper or synchro). d. If heading signals become valid, the system will recover automatically. e. Contact Customer Service.
ERROR 23. Invalid Heading Ref.	The system is configured for synchro heading but the heading reference (400 Hz) is not present or out of specification. Possible processor fault.	Heading stabilization is not available. a. Press any key to continue. b. Check wiring between heading system and WX-950 processor. c. Check configuration wiring to make sure system is set up for proper heading type (stepper or synchro). d. If the reference signal become valid, the system will recover automatically. e. Contact Customer Service.

**WX-950**  
**Installation Manual**

**Table 4-1. Error Messages (Continued)**

ERROR	PROBABLE CAUSE	CORRECTIVE ACTION
ERROR 24. MIC KEY STUCK.	Mic key (inhibit line) has been asserted for at least 60 seconds.	Weather mapping is inhibited. a. Press any key to continue. b. Check inhibit line wiring. c. If inhibit line not used, leave it unconnected. d. Check power to comms radio; if off, the radio may be asserting the inhibit line. e. Contact Customer Service.
ERROR 25. SW VER ERROR	Incompatible software versions	Continued operation is not possible. Contact Customer Service.
ERROR 26 - 34. Processor Fault.	Main processor	Continued operation is not possible. Contact Customer Service.
ERROR 35. Processor Fault.	Main or DSP processor	Weather mapping is inhibited. a. Press any key to continue. b. Contact Customer Service.
ERROR 36. Processor Fault.	Main or DSP processor	Weather mapping is inhibited. a. Press any key to continue. b. Contact Customer Service.
ERROR 38. Invalid Configuration.	The system configuration is set up for synchro <u>and</u> stepper heading signals instead of synchro or stepper.	Stepper & XYZ Selected. Heading Stabilization is not available. a. Press any key to continue. b. Check jumper selections in mating connector assembly (refer to paragraph 2.8, table 2-6). Make sure only one heading type is selected (jumper open). c. Contact Customer Service.
ERROR 39. High Temperature.	Processor temperature is outside of specifications (i.e., >80°C for approximately five minutes).	a. Press any key to continue. b. Make sure WX-950 internal fan is operating. c. Check for adequate ventilation. d. Perform user initiated self-test from Menu to determine if condition still present. May occur briefly under very hot conditions. e. Contact Customer Service.
ERROR 40. Processor Fault.	Main processor	Press any key to continue. Contact Customer Service.
ERROR 41. Processor Fault.	Main or DSP processor	Continued operation is not possible. Contact Customer Service.
ERROR 42. Processor Fault.	Main processor	Continued operation is not possible. Contact Customer Service.
Heading flag indicator (FLG) appears in weather screens.	Heading Flag	a. It is normal for the heading flag indicator to be present if the heading flag line is asserted b. The heading flag indicator will also be present if a heading related fault is present (Error 22,23).



#### **4.6 TROUBLESHOOTING ELECTRICAL NOISE**

The noise (interference) source can be isolated in two ways: by switching off one system at a time (preferably at the circuit breaker); or by running a system which cannot be switched off through all its operational modes. When the proper WX-PA response or system self-test response is restored, the offending system has been identified.

Systems that are common noise sources include:

- Alternators or generators
- Autopilot systems (especially trim servos and amplifiers)
- Pulse systems (DME, transponder)
- Strobe lights or beacons
- Air conditioners or heater blowers
- Fluorescent light systems
- Windshield heat

Electrical noise can be coupled into the WX-950 system by several avenues:

- Radiation into the Antenna.
- Grounding problems due to poor airframe bonding.
- Faulty component interference source.
- Excessive ripple on the A+ line to the Processor.

The following procedures are intended to facilitate the resolution of suspected noise problems.

1. Access the service menu (refer to paragraph 4.4) and run the noise monitor (refer to paragraph 4.4.4) to reproduce the problem on the ground.

If a problem cannot be reproduced on the ground, schedule a flight test for further troubleshooting.

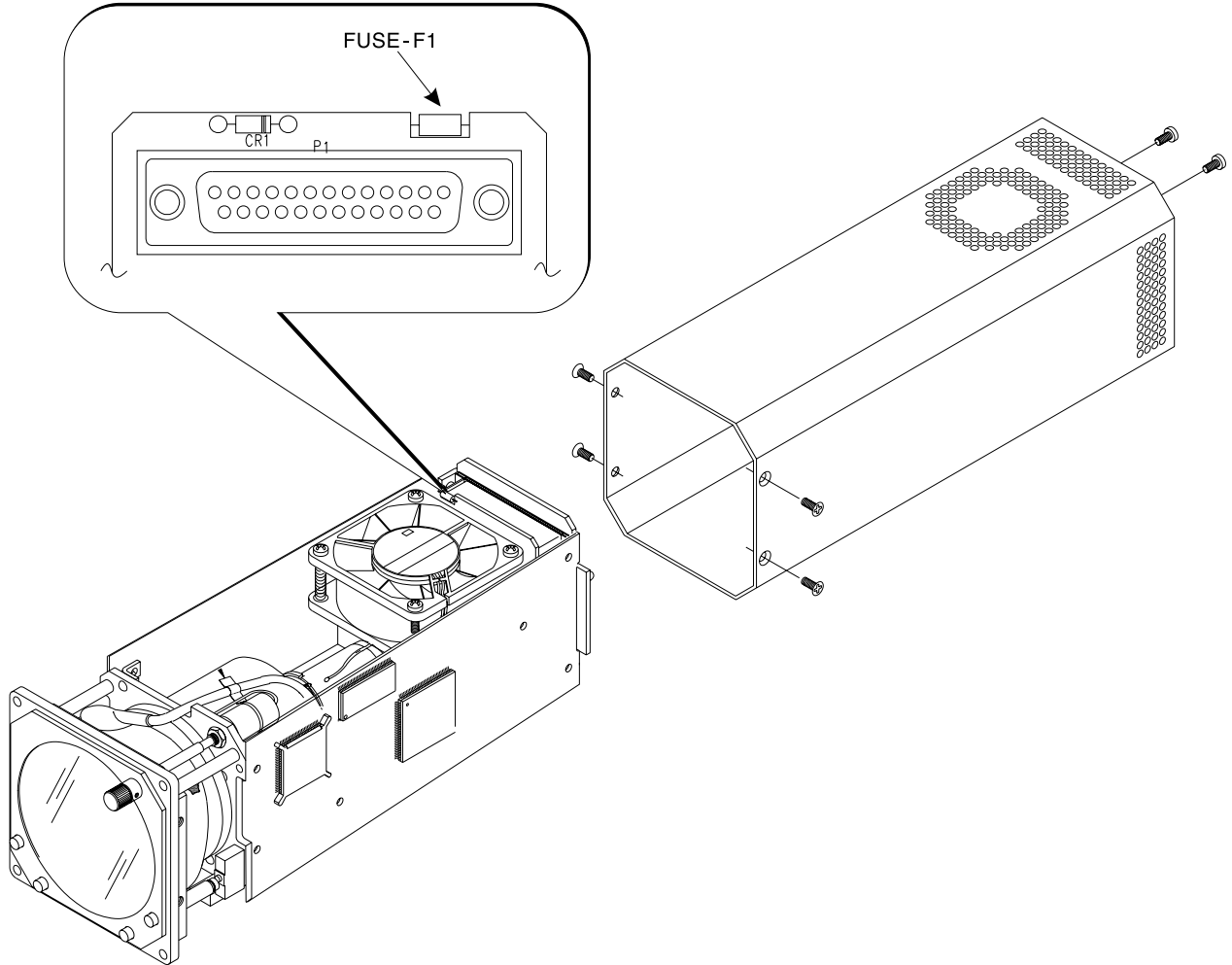
2. To check for interference radiated into the antenna or cable:
  - a. Use a WX-SM Skinmapper. The Skinmapper checks for radiated noise only.
  - b. To isolate noise to antenna or cable, replace the antenna with the WX-900 connector pod (P/N 78-8060-6001-4). Repeat noise check. If the noise goes away, the problem is noise radiated into the antenna.
3. Isolate the aircraft system that generates the noise.
4. Repair, replace, or relocate the offending source, or relocate the *Stormscope* antenna or cable, if necessary.
5. Check potential noise sources close to the system (cables, boxes, components).
6. It may be necessary to relocate the antenna or offending device (e.g., cables, communications antenna).
7. All grounds must conform to cabling procedures detailed in chapter 2 (Installation - refer to paragraphs 2.7 and 2.8). The interference source must be properly grounded. It may be necessary to relocate the WX-950 system airframe grounds, or airframe grounds on the interference source.
8. Powering the processor from an isolated DC power source may identify excessive ripple on the A+ line as an interference source. It may be necessary to install an in-line filter on the processor, or on the interference source.

If the noise cannot be isolated to an aircraft system, contact our Customer Service Department at 1-800-453-0288 or 1-616-949-6600 for advice and assistance.

#### 4.7 FUSE REPLACEMENT

To replace the internal fuse (P/N 204-10021-001, Little Fuse Type 473,005):

1. Place the unit on a workbench with an antistatic pad.
2. Remove six screws that secure the housing to the chassis (see figure 4-9).



**Figure 4-9. Replacing the Fuse**

3. While holding the bezel with one hand, carefully pull the housing away from the rear of the chassis.
4. Locate fuse F1. Unsolder and remove the fuse. Use a de-soldering tool to remove excess solder.
5. Replace fuse and re-solder.
6. While holding the unit in one hand, carefully slide the housing onto the chassis. Orient the housing so that the external connector and alignment pins fit through the openings.
7. Secure the housing with the six screws removed in step 1.

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**WX-950**  
**Installation Manual**

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#### **4.8 RETURN TO SERVICE CHECK**

After any repair has been made and after reinstallation of the equipment in the aircraft, do the post-installation checkout procedure detailed in Chapter 3. The post-installation checkout procedure is intended to verify that the system components are properly connected and that the installed system is operating correctly.

#### **4.9 DISPOSITION OF FAILED ITEMS**

Return defective components to your authorized Goodrich Avionics Systems dealer or to::

Goodrich Avionics Systems  
Attn: Customer Service  
5353 52nd Street, S.E.  
Grand Rapids, MI USA 49512

If available, pack components in their original shipping container. If the original container is not available, pack them as follows:

<b>CAUTION</b>
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Do not use desiccant crystals when packaging electronic assemblies. Since the assembly must be packed tightly, crystals in bag form cannot be used. The use of loose crystals may cause unnecessary damage resulting in a cleaning problem.

1. Ensure that conductive covers/caps are installed on the exposed terminals of cable connectors on the WX-950 display/indicator, and NY-163 antenna.
2. The WX-950 and NY-163 contain electrostatic discharge sensitive (ESDS) parts and must be wrapped in static protective materials.
3. Wrap with bubble pack. Secure bubble pack with reinforced tape.
4. Place assembly in a cardboard box.
5. Wrap any accessories in tissue and place in the box. Fill spaces with bubble pack.
6. Attach a letter to the unit. The letter must contain:
  - Your name, address, and telephone number.
  - Purchase order number.
  - Description of component including, when applicable, model and serial number.
  - A brief description of the difficulty.
7. Shut box and seal with reinforced tape.
8. Attach packing list to outside of box.

# APPENDIX A

## WX-950 INTERFACE

### SIGNAL & CABLE CHARACTERISTICS

#### INTRODUCTION

This appendix defines the electrical characteristics of all input and output signals to the WX-950 System. Sufficient data is included to perform an electrical load analysis for the aircraft. The interface characteristics contained in this appendix are fully compatible with ARINC specifications where noted. Connection information identifies the unit, connector-pin and signal names as they appear on the interconnect wiring diagram.

#### SIGNAL

#### CHARACTERISTICS

Antenna I/O

Antenna cables are shipped from the factory with the antenna connector pre-wired to one end.

SENSE

Signal provided by the sense channel within the antenna. Bipolar signal voltage,  $\pm 11$  V Peak Max., .05 to .1 V Peak @ 200nmi WX-PA Simulation Standard  $\pm 20\%$ , 20 Ohm output impedance, single ended. Charge sensed against GND from plate, less than  $60\mu\text{A}$ .

CONNECTION J1-13 (SENSE) to NY163, Pin B  
(Brown Wire)

ANTENNA COM.

Antenna power return.

CONNECTION J1-22 (ANT COM) to NY163, Pin A  
(Drain Wire)

ANTENNA REF.

20 Ohm output impedance. Common (ground) reference level from the antenna.

CONNECTION J1-23 (ANT REF) to NY163, Pin J  
(Black Wire)

ANTENNA TEST

A 1mA, or higher, positive current output signal from the display/processor that causes the antenna to generate a test strike.

CONNECTION J1-10 (ANT TEST) to NY163, Pin H  
(Blue Wire)

**WX-950**  
**Installation Manual**

**SIGNAL**

**CHARACTERISTICS**

Antenna I/O (Continued)

POWER	<p><math>\pm 12\text{VDC} \pm 5\%</math> regulated, less than 100mA. Power output from the display/processor to the antenna. It is used to power the active circuitry inside the antenna.</p> <p>CONNECTION J1-11 (-12V) to NY163, Pin F (Yellow Wire) J1-12 (+12V) to NY163, Pin D (Red Wire)</p>
X-LOOP	<p>Signal provided by the X-Loop winding within the antenna. Bipolar signal voltage, <math>\pm 11\text{ V Peak Max.}</math>, .1 V Peak @ 200nmi WX-PA Simulation Standard <math>\pm 20\%</math>, 20 Ohm output impedance, single ended. Loop current to GND, less than <math>60\mu\text{A}</math>.</p> <p>CONNECTION J1-24 (X LOOP) to NY163, Pin C (Orange Wire)</p>
Y-LOOP	<p>Signal provided by the Y-Loop winding within the antenna. Bipolar signal voltage, <math>\pm 11\text{ V Peak Max.}</math>, .1 V Peak @ 200nmi WX-PA Simulation Standard <math>\pm 20\%</math>, 20 Ohm output impedance, single ended. Loop current to GND, less than <math>60\mu\text{A}</math>.</p> <p>CONNECTION J1-25 (Y LOOP) to NY163, Pin G (Green Wire)</p>

XYZ Synchro Input

These connections from the aircraft heading source (ARINC Synchro Signal Practices) allow the unit to rotate the displayed storm data as the aircraft turns.

**NOTE**

Synchro heading input is selected via the SYNC jumper located in the connector back-shell.

X(S1), Y(S3), Z(S2)	
FREQUENCY	Min: 50 Hz Max: 1500 Hz
VOLTAGE	Min: 5.0 Vrms (w/reduced angular resolution.) Max: 14.0 Vrms (external padding required for higher levels.)
INPUT IMPEDANCE	>50k Ohm
CONNECTION	J1-5 (SYNC_X) J1-17 (SYNC_Y) J1-4 (SYNC_Z)
CABLE	See paragraph 2.7.3.

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**WX-950**  
**Installation Manual**

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**SIGNAL**

**CHARACTERISTICS**

XYZ Synchro Input (Continued)

H and C (high and low reference)

FREQUENCY           Min: 50 Hz  
                              Max: 1500 Hz

VOLTAGE  
                              Min: 3.5  
                              Max: 35 Vrms

INPUT IMPEDANCE >50k Ohm  
CONNECTION        J1-16 (SYNC\_REF\_HI)  
                          J1-3 (SYNC\_REF\_LO)

CABLE                See paragraph 2.7.3.

Stepper Heading Input  
(King KCS55)

These connections will accept heading information from a King KCS55 stepper drive unit.

**NOTE**

Stepper heading input is selected via the STEP jumper located in the connector back-shell.

Stepper Drive Motor 1 & 3

FREQUENCY           Min: 0 Hz  
                              Max: Turn Rate Dependent (.25 degree  
  increments per edge transition)

VOLTAGE            Low Level:   Min: 0 V  
  Max: 2 V  
                          High Level:   Min: 13 V  
  Max: 17 V  
                              Max: 35 Vrms

INPUT IMPEDANCE >50k Ohm  
CONNECTION        J1-17 (DRIVE MOTOR 1) to KI-525 P2-A  
                          J1-3 (DRIVE MOTOR 3) to KI-525 P2-H

CABLE                See paragraph 2.7.3.

Stepper Drive Motor Unregulated +15V

VOLTAGE            Min: 13 V  
                              Max: 17 V  
INPUT IMPEDANCE >50k Ohm  
CONNECTION        J1-16 (UNREG +15) to KI-525 P1-V  
                          CASE GND (AIRFRAME GROUND) to  
  KI-525 P1-J)

CABLE                See paragraph 2.7.3.

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**WX-950**  
**Installation Manual**

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**SIGNAL**

**CHARACTERISTICS**

Heading Valid

Indicates that the heading source is providing valid heading information.

**NOTE**

The active polarity (i.e., HEADING FLAG (+) or HEADING FLAG (-)) is selected via the FLAG jumper located in the connector back-shell. The line is debounced via software.

CONNECTION	J1-6 (HDG FLAG+) J1-19 (HDG FLAG-)
CABLE	See paragraph 2.7.3.
VOLTAGE	High Sense (FLAGHI - FLAGLO): Min: 5.0V Max: 30.0V Low Sense (FLAGHI - FLAGLO): Min: -30.0V Max: 1.0V
INPUT IMPEDANCE	>2k Ohm
INPUT CURRENT	Active: Min: 1mA Max: 15mA

Remote Clear

This input may be connected to an external switch (normally a yoke mounted switch). When activated, this switch performs the same function as the lower left softkey. When activated in weather mode, the strike buffers are cleared and all displayed lightning strikes are erased. This input is diode isolated and debounced. This input will perform any function indicated for the same lower left softkey in other modes.

CONNECTION	J1-18 ( <u>SOFTKEY E</u> )
CABLE	Minimum 22 AWG wire.
VOLTAGE	Active: Min: 0.0V Max: 1.5V Inactive: Min: 3.5V or Open (Internal 4.7K pull-up) Max: 5.0V

Inhibit

This input may be connected to the switch on the microphone of the aircraft's communications transmitter. When it is active, strike processing is disabled to prevent transmitted signals from corrupting the storm data. This input is diode isolated.

**NOTE**

The inhibit line is not needed if the Stormscope antenna and communications antennas are on opposite sides of the fuselage.

CONNECTION	J1-1 ( <u>INHIBIT</u> )
CABLE	Minimum 22 AWG wire.
VOLTAGE	Active: Min: 0.0V Max: 0.7V Inactive: Min: 2.4V Max: 28.4V

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**WX-950**  
**Installation Manual**

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**SIGNAL**

**CHARACTERISTICS**

**Power Input**

11-32 VDC. The WX-950 is protected via an internal fuse (see para 4.6). For external circuit breaker protection, a 5 A circuit breaker is recommended for 14 V aircraft systems and a 3 A circuit breaker for 28 V systems.

<b>CONNECTION</b>	J1-8, & J1-21 (A/C POWER 14-28 VOLTS) J1-7 & J1-20 (A/C GROUND)
<b>CABLE</b>	Use twisted shielded pair cable, minimum 20 AWG.
<b>VOLTAGE</b>	11 - 32 VDC
<b>CURRENT</b>	2.0 A ± 0.5 A @ 12 VDC 0.8 A ± 0.25 A @ 28 VDC

**Configuration Jumper**

The configuration jumper connection is available to support factory testing and analysis and SHOULD BE LEFT UNCONNECTED.

<b>CONNECTION</b>	J1-9 (CONFIG_JUMPER)
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**WX-950**  
**Installation Manual**

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