



## **DC50 Datalink Coupler**

# **Installation Manual**

**P/N 600-00082-000**  
Rev 03

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## REVISION RECORD

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# 1 General Information

## 1.1 Introduction

This manual contains information about the physical, mechanical and electrical characteristics of the Avidyne DC50 Datalink Coupler, and provides installation instructions for this unit. Follow the installation instructions carefully to obtain maximum performance from the Antenna Coupler.

The installation manual applies to Avidyne 700-00015-XXX-().

The conditions and tests required for TSO approval of this article are minimum performance standards. It is the responsibility of those installing this article either on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within the TSO standards. TSO articles must have separate approval for installation in aircraft. The article may be installed only if performed under 14 CFR Part 43 or the applicable airworthiness requirements.

## 1.2 Equipment Description

The Datalink Coupler is a Radio Frequency (RF) device that allows two transceivers (a VHF communications radio and a datalink radio) to share a single wide-band VHF antenna. The coupler contains filters that allow the signals intended for the comm to reach the VHF comm port, while routing the ORBCOMM datalink frequencies to the ORBCOMM datalink port.

# 1.3 Technical Specification

DC50 Datalink Coupler 700-00015-XXX-()

Specifications	Description/Requirement
<b>Physical Characteristics</b>	
Weight	.65 pounds
Height	1.1 +/- 0.1 inches
Width	5.6 +/- 0.1 inches
Depth	5.1 +/- 0.1 inches
<b>Electrical Requirements</b>	
Voltage	28 VDC Nominal
Current	110 A intermittent at 28VDC, 0.055A continuous at 28 VDC
<b>Cooling Requirements</b> No cooling is necessary.	
<b>Operating Limits</b> See Appendix B – Environmental Qualification Forms	
<b>TSO's</b>	TSO-C37d, TSO-C38d
<b>Environmental</b>	DO-160D

## 2 Installation Instructions

### 2.1 General Information

This section contains information for installing and wiring the datalink coupler. All installation procedures should follow the acceptable practices, methods, and techniques of avionics installations as described in FAA Advisory Circulars.

### 2.2 Unpacking and Inspection

The shipping carton of the DC50 contains the following components and parts

Part Number	Description
700-00015-000	Datalink Coupler
600-00082-000	Datalink Coupler Installation Manual
850-00017-000	Installation Kit, Datalink Coupler

Make sure that all the parts listed above were received and sustained no shipping damage. If there is evidence of shipping damage, save the shipping carton and packaging material to help substantiate your claim to the shipping company. Retain the original shipping carton and packing material in case you need to ship the unit for service.

### 2.3 Coupler Installation Requirements

For the antenna coupler to function correctly when connected to an ORBCOMM datalink transceiver and a comm transceiver it **must** be connected to a top mounted antenna capable of transmitting and receiving both communications frequencies and datalink frequencies. The VHF comm operates from 118 MHz to 136.975 MHz, and the ORBCOMM transceiver transmits from 148 MHz to 150.05 MHz and receives at 137 MHz to 138 MHz. This installation manual does not contain approved data for antenna installations on specific aircraft types.

Low loss coaxial cable (RG400 or equivalent) must be used for all RF connections. Coax cable is to be double shielded, have a loss of less

than 4.5 dB per 100 ft at 100 MHz and have a center-stranded conductor.

The datalink function cannot operate when the VHF communications radio is transmitting. Therefore, if there are two comms installed, the coupler should be connected to the secondary comm. This configuration will allow for best datalink operation.

The Coupler **must** be powered from the same circuit breaker as the VHF comm that is connected to it. This ensures that the coupler will never be powered off while the comm transmits. If this were to happen it could damage the Coupler.

The Coupler **must** be connected to the same PTT discrete as the comm connected to it (usually the PTT switch is connected to an audio control panel that in turn routes PTT to the selected VHF comm). Transmitting into the coupler with the PTT discrete ungrounded could damage the coupler.

## **CAUTION:**

**IF ANY OF THE REQUIREMENTS ABOVE ARE NOT ADHERED TO, THE COUPLER MAY NOT FUNCTION CORRECTLY AND MAY BE DAMAGED.**

## **2.4 Other Installation Considerations**

Prior to installing the antenna coupler, you should carefully assess the location where the coupler will be mounted, specifically considering the external connections to the coupler.

Prior to starting the installation, you should develop an installation strategy by carefully reviewing all installation instructions, including mechanical and electrical instructions.

Use appropriate appendices for guidance with antenna coupler dimensions.

Installations not identified in applicable STC's may require additional substantiation.

The antenna coupler is held in place by four screws. Refer to Appendix C.



A positive ground path must be established between the datalink coupler chassis and airframe ground less than 0.5 ohms.

## 2.5 Electrical Interfaces

Power to the datalink coupler is derived directly from the aircraft. The coupler must be connected to the same circuit breaker as the comm it is connected to. The coupler does not have an on/off switch. Refer to Appendix A, Datalink Coupler Interconnect. Power, Ground and PTT are all connected through the 9-pin male D shell connector available at the front of the coupler.

## 2.6 Electrical Load Worksheet

### 2.6.1 Coupler Electrical Load

The Avidyne Coupler has the following power consumption:

<b>Operating Mode</b>	<b>Electrical Load</b>	<b>Duty Cycle</b>
Transmit	0.110 amps at 28V DC	Intermittent
Receive	0.055 amps at 28 VDC	Continuous

### 2.6.2 Electrical Load Considerations

The Avidyne coupler will be connected to the airplane electrical power system on the same circuit breaker as the associated VHF comm transceiver and should be wired to carry the full load of the circuit breaker. The coupler may be damaged if the VHF comm system attempts to transmit without power applied to the coupler. Connecting the coupler to the VHF comm circuit breaker ensures that the two units will be powered at the same time.

## 2.6.3 Electrical Load Worksheet

Both the VHF comm transceiver and the coupler consume more power in transmit mode than in receive mode. For the airplane installation, identify the VHF comm equipment to which the coupler will be connected.

- 1) Review the specifications for the VHF comm transceiver to determine the power consumption in both transmit mode (intermittent operation) and receive mode (continuous operation).
- 2) Add the power consumption for the coupler in each mode.
- 3) Review the circuit breaker and electrical wiring ratings for the combined electrical load to ensure that the installation complies with the guidance of Advisory Circular 43.13-1B, Chapter 11.

<b>Operating Mode</b>	<b>Transmit Mode (Intermittent)</b>	<b>Receive Mode (Continuous)</b>
VHF comm		
Coupler	0.110 amps at 28V DC	0.055 amps at 28 VDC
Total		

## 2.7 RF Interfaces

The coupler has three Female BNC connectors mounted on the front face. These connectors allow the VHF comm radio and the datalink radio to connect to the top mounted aircraft antenna. For connector locations, refer to Appendix C.

## 2.8 Positioning and Mounting the Coupler

The coupler should be mounted close to the rear of the VHF comm radio it will be connected to, and close to the datalink transceiver. The cable used to connect the VHF comm and the datalink transceiver should be as short as practical, to minimize the loss found in long cable lengths, and must be constructed of RG-400 or equivalent cable.

## **2.9 Weight and Balance**

Weight and balance computation is required after the installation of the DC50 Datalink Coupler. Follow the guidelines as established in AC43.13-1B, Chapter 10, Section 2. Make appropriate entries in the equipment list indicating items added, removed or relocated along with the date accomplished. Include your name and certificate number in the aircraft records. DC50 Datalink Coupler weight is identified in the technical specification section as 0.65 lbs.

# 3 Installation Procedure

## 3.1 Coupler Wiring and Installation

This installation procedure assumes the datalink transceiver has been installed. If the datalink transceiver has not been installed, and the coupler is being installed for datalink provisions, install the 50 Ohm Termination, Minicircuits BTRM-50, shipped in the install kit as described in step 8.

The following hardware is recommended to complete the installation.

<b>Ref. Des.</b>	<b>Vendor</b>	<b>Part Number</b>	<b>Description</b>
P1	Positronic	SD9F10G00	9 Pin Female D Shell Connector
J1	Pasternack	PE4044	Right Angle BNC Dual Crimp Connector (RG400)
J3	Pasternack	PE4044	Right Angle BNC Dual Crimp Connector (RG400)
J5	Pasternack	PE4044	Right Angle BNC Dual Crimp Connector (RG400)

All installation and modifications accomplished should be compliant with AC 43.13-1B and -2A.

1. Ensure power is removed from all applicable avionics. (Turn off avionics master and aircraft master switches.)
2. Remove the VHF radio that will be connected to the coupler, and disconnect the antenna cable and the connector supplying power and Push-to-Talk (PTT).
3. Connect Pin 1 on connector P1 of the coupler to the circuit breaker for the comm, or spliced into the comm power circuit connected to that breaker. The wire gauge should be sized to carry the full load of the circuit breaker.
4. Connect Pin 8 on connector P1 of the coupler to suitable aircraft ground.
5. Connect Pin 5 on Connector P1 of the coupler to the PTT discrete of the interfacing comm, which may be connected

through an audio panel. (This discrete must be grounded only when that comm is to transmit.)

6. Complete the connections to the 9-pin D shell connector that connects to P1, installing the backshell and the hardware to fasten the 9-pin D shell connector to the coupler.
7. Connect the comm antenna coax to the BNC connection on the coupler labeled J5 VHF comm in Appendix A.
8. Connect the datalink transceivers antenna coax to the BNC connector on the coupler labeled J3 Datalink. See Appendix A. If the datalink transceiver will be installed later, connect the 50 ohm termination to the datalink BNC J3 on the coupler.
9. Connect the Antenna port of the coupler labeled J1 Antenna (see Appendix A) to the coax from the top mounted VHF/Datalink antenna.
10. Reinstall the VHF comm.

# 4 Post Installation System Checkout

## 4.1 EMI Check

Verify that no interference is noted through the use of comm and the datalink on other systems in the aircraft. The operation of these systems, with the coupler installed, should not result in erroneous data displayed by navigation systems.

1. Turn off power to comm control head.
2. Power on the avionics master.
3. If applicable, turn power on to audio control panel and make sure the comm is selected.
4. Check the coupler pins P1-1 for +28V and P1-8 for Airframe ground with volt meter.
5. Check for correct operation of PTT of the comm connected to the coupler, with an ohm meter at the coupler connector P1-5.
6. Power on comm.
7. Verify operation of the datalink, according to the datalink installation manual.
8. Conduct a radio check by transmitting and receiving via the comm.
9. Re-verify operation of the datalink according to the datalink installation manual.

## 5 Factory Service Policies

### 5.1 Technical Support

Avidyne's web site contains information that may assist the operator and installer with questions or problems with their DC50 Datalink Coupler.

**[www.avidyne.com](http://www.avidyne.com)**

Technical support questions may be submitted, 24 hours a day, via the following:

**Email: [techsupport@avidyne.com](mailto:techsupport@avidyne.com)**

**Fax: 781-402-7599**

**Voice: 888-723-7592**

An Avidyne Technical Support Representative will respond as soon as possible. Avidyne business hours are 8:00 AM to 5:00 PM Eastern Standard Time, Monday through Friday.

Please include the part number, revision number and serial number of the unit in all correspondences. For problem reporting, please provide as many details associated with the problem as possible.

### 5.2 General Service Procedures

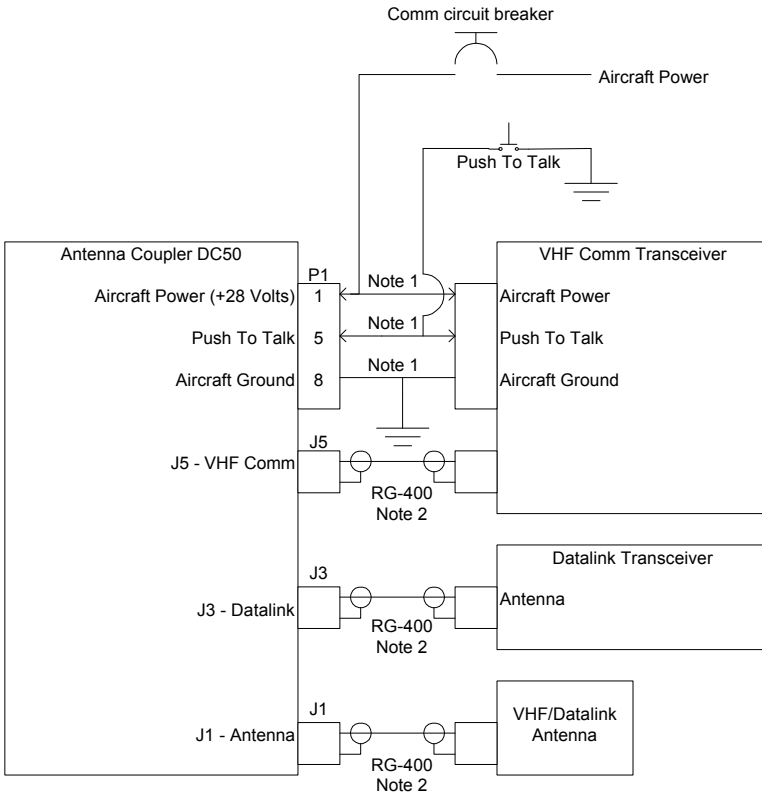
Repair of the DC50 Datalink Coupler is performed at the factory, and includes a complete checkout.

Prior to returning a unit for service, contact Avidyne at 1-888-723-7592 to obtain a Return Merchandise Authorization (RMA) number.

Securely pack the unit, write the RMA number on the outside of the shipping box, and return it to the address provided by the Avidyne Customer Service Representative.

Include your name, complete shipping address, daytime telephone number, a complete description of the problem, the desired return date, and shipping method.

# 6 Antenna Coupler Interconnect



Note 1: Wiring interconnects should match comm wiring (power and ground AWG should carry the full load supplied by the circuit breaker 5 amp 20 AWG, 10 amp 18 AWG).

Note 2: Coaxial Cable: Use M17/128-RG400, (Thermax/CDT P/N RGS-400) high temperature, 50 ohm, stranded core with 0.038 OD, or equivalent.

**Figure 1. Installation Wiring**



# 7 Environmental Qualification Form

Nomenclature: DC50 VHF/Datalink Coupler

Type /Model/Part Number: 700-00015-XXX-()

TSO Compliance: C37d and C38d

Manufacturer: Avidyne Corporation

Address: 55 Old Bedford Rd. Lincoln, Ma, 01773

<b>Environmental Tests</b>	<b>RTCA/DO-160D Section</b>	<b>Conducted Test Category</b>
Temperature and Altitude		
Low Temp	4.5.1	Equipment tested to Category A1
High Temp	4.5.2 & 4.5.3	Equipment tested to Category A1
In-Flight Loss of Cooling	4.5.4	Equipment tested to Category Y
Altitude	4.6.1	Equipment tested to Category D1
Decompression	4.6.2	Equipment tested to Category A1
Overpressure	4.6.3	Equipment tested to Category A1
Temperature Variation	5	Equipment tested to Category C
Humidity	6	Equipment tested to Category A
Operational Shocks & Crash Safety	7	Equipment tested to Category B
Vibration	8	Equipment tested to Category S, Curve B & M

<b>Environmental Tests</b>	<b>RTCA/DO-160D Section</b>	<b>Conducted Test Category</b>
Explosive Proofness	9	Category X, no test performed
Waterproofness	10	Category X, no test performed
Fluids Susceptibility	11	Category X, no test performed
Sand and Dust	12	Category X, no test performed
Fungus Resistance	13	Category X, no test performed
Salt Spray	14	Category X, no test performed
Magnetic Effects	15	Equipment tested to Class Z
Power Input	16	Equipment tested to Category B
Voltage Spike	17	Equipment tested to Category A
Audio Frequency Conducted Susceptibility	18	Equipment tested to Category B
Induced Signal Susceptibility	19	Equipment tested to Category A
Radio Frequency Susceptibility	20	Equipment tested to Category TTX
Emission of Radio Frequency Energy	21	Equipment tested to Category M
Lightning Induced Transient Susceptibility	22	Equipment tested to Category A2E2
Lightning Direct Effects	23	Category X, no test performed

<b>Environmental Tests</b>	<b>RTCA/DO-160D Section</b>	<b>Conducted Test Category</b>
Icing	24	Category X, no test performed
Electrostatic Discharge	25	Equipment tested to Category A

# 8 DC50 STC

United States Of America  
Department of Transportation - Federal Aviation Administration  
**Supplemental Type Certificate**

*Number* SA00165BO

*This Certificate issued to* Avidyne Corporation  
55 Old Bedford Road  
Lincoln, Massachusetts 01773

*certifies that the change in the type design for the following product with the limitations and conditions therefor as specified herein meets the airworthiness requirements of Part 23 of the Federal Aviation Regulations.*

*Original Product Type Certificate Number:* See attached FAA-Approved Model List (AML), Document No. AVACP-020, Rev (-), dated February 20, 2003, or later FAA-approved revisions for the list of approved airplane models and applicable regulations.  
*Make:*  
*Model:*

*Description of Type Design Change:*

Installation of Avidyne Corporation Datalink Coupler, Part Number 700-00015-050, in accordance with Avidyne Corporation Master Document List, Document No. AVACP-006, Revision 00, dated January 2, 2003, or later FAA-approved revisions.

*Limitations and Conditions:*

1. Instructions for Continued Airworthiness (ICA), Avidyne Corporation Document AVACP-009, Revision 01, dated January 2, 2003, or later FAA accepted revision shall be made available to the operator at the time of installation.
2. Compatibility of this design change with previously approved modifications must be determined by the installer.

If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

*This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.*

*Date of application:* October 31, 2002

*Date reissued:*

*Date of issuance:* February 20, 2003

*Date amended:*



*By direction of the Administrator*

*Robert G. Marr*  
(Signature)

Robert G. Marr  
Manager  
Boston Aircraft Certification Office

(Title)

# 9 Coupler Dimensions

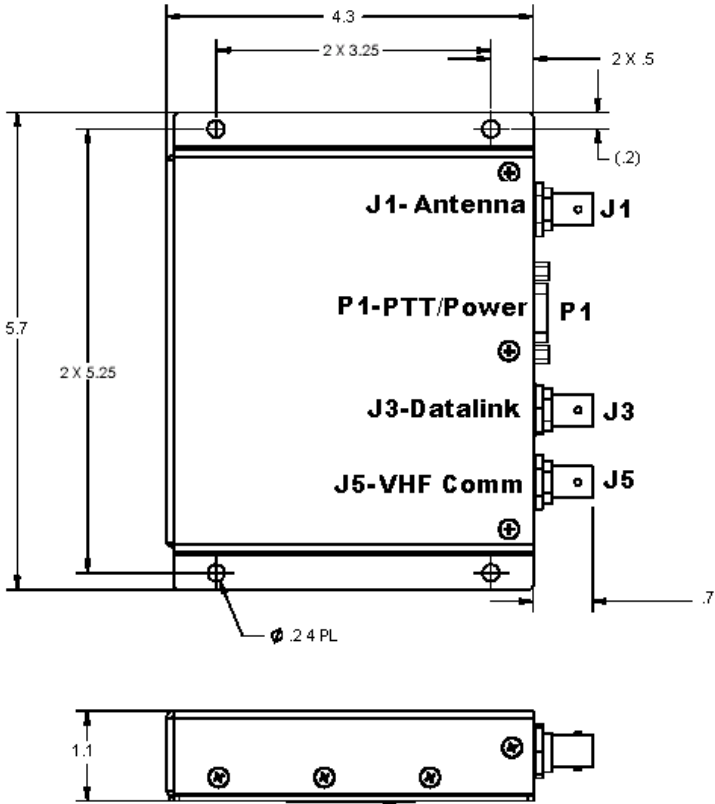


Figure 2. Top View and Side View