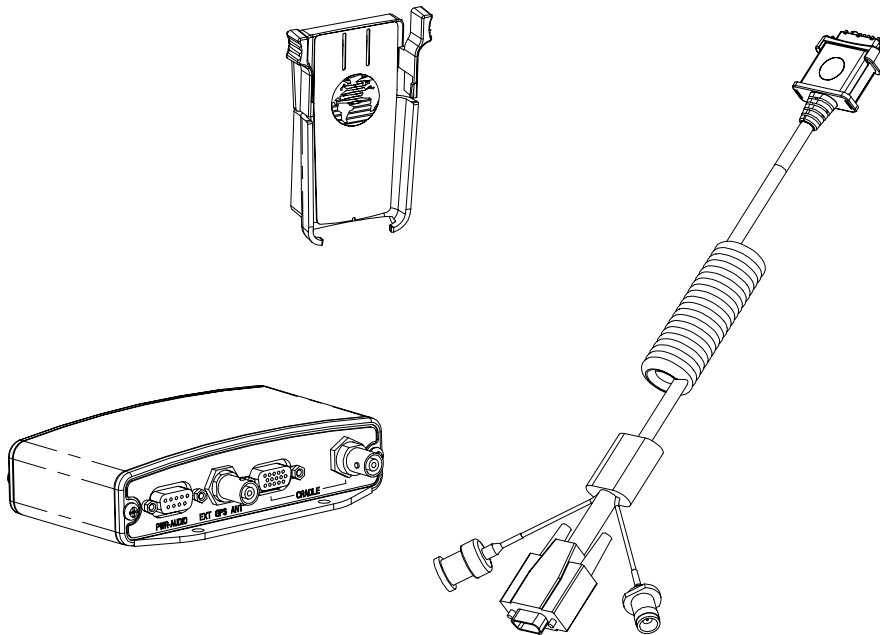




NavTalk™ Pilot AIRCRAFT PROVISIONS KIT INSTALLATION MANUAL



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1200 E. 151st Street
Olathe, KS 66062 USA

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REVISION RECORD

Revision	Revision Date	Description	ECO #
A	1/28/00	Initial Release	12616
B	5/11/00	Remove antenna installation data, add service activation and post-installation checkout procedures.	13303
C	6/18/01	Change J4 to J6.	16047

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1. GENERAL DESCRIPTION

1.1. INTRODUCTION

This manual describes the physical, mechanical, and electrical characteristics and the installation requirements for the NavTalk Pilot Aircraft Provisions Kit. After installation of the NavTalk Pilot Aircraft Provisions Kit, FAA Form 337 must be completed by an appropriately certificated agency to return the aircraft to service. The NavTalk Pilot cellular telephone handset is portable equipment and is not FAA approved. No FAA approval of the NavTalk Pilot cellular telephone is required when it is used with this provisions kit.

1.2. EQUIPMENT DESCRIPTION

The NavTalk Pilot Aircraft Provisions Kit provides the interfacing and antenna provisions necessary to permit the in-flight use of a GARMIN NavTalk Pilot AirCell compatible cellular telephone. Components include a handset cradle, a handset cable, an airborne cellular antenna, and an adapter box that may be remotely mounted. For improved GPS signal reception, GARMIN's low profile GA 56 antenna (P/N 010-10040-0X) may optionally be installed.

SOME OF THE AIRCELL SERVICE AND RELATED PHONE EQUIPMENT IS PROVIDED UNDER AN EXPERIMENTAL AUTHORIZATION FROM THE FEDERAL COMMUNICATIONS COMMISSION AND MAY BE TEMPORARY. ALL AIRBORNE SERVICE IS SECONDARY TO THE UNDERLYING GROUND CELLULAR SERVICE. THE SERVICE DOES NOT GUARANTEE 911 OR OTHER EMERGENCY RESPONSE CAPABILITIES, AND THE PHONE IS NOT INTENDED TO BE FLIGHT CRITICAL EQUIPMENT.

1.3. TECHNICAL SPECIFICATIONS

1.3.1. Adapter Box Specifications

Dimensions	5.21"W x 3.94"D x 1.33"H
Weight	0.61 lbs.
Operating Temperature Range	-20°C to +55°C. For more details see Environmental Qualification Form
Humidity	95% non-condensing
Altitude Range	-1,500 ft to 50,000 ft
Input Voltage Range	11 to 33 Vdc
Power Requirements (Maximum, Phone Operating)	390 mA @ 27.5 Vdc 720 mA @ 13.75 Vdc
Software	RTCA DO-178B level E
Environmental Testing	RTCA DO-160D. For more details see Environmental Qualification Forms

1.3.2. Handset Cradle Specifications

Dimensions	2.84"W x 1.10"D x 5.50"H
Height allowance for NavTalk Pilot unit	4.75" above the top of the handset cradle
Weight	1.5 ozs.

1.3.3. Handset Cable Specifications

Dimensions	28.5" long (retracted)
Weight	0.45 lbs.

1.4. LICENSE REQUIREMENTS

None.

1.5. CERTIFICATION

The NavTalk Pilot Aircraft Provisions Kit initial certification was accomplished via STC by GARMIN in a Mooney M20J. See Appendix B for a copy of the STC.

1.6. LIMITED WARRANTY

GARMIN Corporation warrants this product to be free from defects in materials and manufacture for one year from the date of purchase. GARMIN will, at its sole option, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts or labor. The customer is, however, responsible for any transportation costs. This warranty does not cover failures due to abuse, misuse, accident or unauthorized alteration or repairs.

THE WARRANTIES AND REMEDIES CONTAINED HEREIN ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED OR STATUTORY, INCLUDING ANY LIABILITY ARISING UNDER ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, STATUTORY OR OTHERWISE. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, WHICH MAY VARY FROM STATE TO STATE.

IN NO EVENT SHALL GARMIN BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM THE USE, MISUSE, OR INABILITY TO USE THIS PRODUCT OR FROM DEFECTS IN THE PRODUCT. SOME STATES DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU.

To obtain warranty service, call the GARMIN Customer Service department (913-397-8200) for a returned merchandise tracking number. The unit should be securely packaged with the tracking number clearly marked on the outside of the package and sent freight prepaid and insured to a GARMIN warranty service station. A copy of the original sales receipt is required as the proof of purchase for warranty repairs. GARMIN retains the exclusive right to repair or replace the unit or software or offer a full refund of the purchase price at its sole discretion. SUCH REMEDY SHALL BE YOUR SOLE AND EXCLUSIVE REMEDY FOR ANY BREACH OF WARRANTY.

2. INSTALLATION

2.1. INTRODUCTION

Careful planning and consideration of the suggestions in this section are required to achieve the desired performance and reliability from the installed equipment. Any deviations from the installation instructions prescribed in this document shall be accomplished in accordance with the requirements set forth in FAA AC 43.13-2A.

2.2. ANTENNA CONSIDERATIONS

2.2.1. OPTIONAL EXTERNAL GPS ANTENNA LOCATION

The GA 56 Antenna must be mounted on top of the aircraft. For best performance, select a location with an unobstructed view of the sky above the aircraft when in level flight. Figure 2-1 illustrates a typical GPS antenna installation. The antenna should be located at least three feet from transmitting antennas such as VHF COM, HF transmitter, DME, Transponder and Radar.

For rotorcraft, locate the GA 56 Antenna as far as possible from the main rotor hub. This reduces the percentage of time the blade blocks the antenna. Also mount it as far below the blade surface as possible if installing the antenna under the blade. This reduces signal distortion caused by the blades.

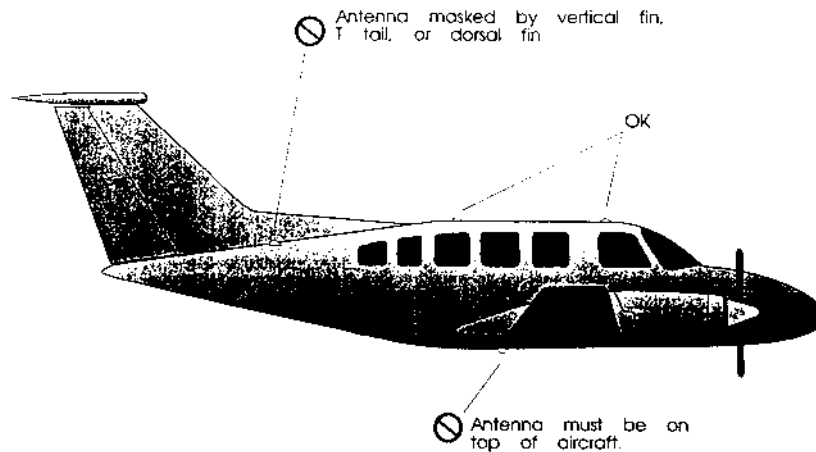


Figure 2-1. GPS Antenna Installation Considerations

2.2.2. CELLULAR ANTENNA LOCATION

Refer to the installation manual for the Cellular antenna.

2.2.3. ELECTRICAL BONDING

No special precautions need to be taken to provide a bonding path between the GPS antenna and the aircraft structure.

2.2.4. ANTENNA LIMITATIONS

GARMIN's GA 56 Antennas are recommended for installations where the airspeed of the aircraft will be subsonic. In such installations, GA 56—Mod 1 or later—must be used.

2.2.5. HANDSET CRADLE MOUNTING CONSIDERATIONS

Plan a location for the handset cradle which gives the pilot convenient access while in flight.

2.3. CABLING AND WIRING

2.3.1. GENERAL

Check that there is ample space for the cabling and mating connectors. Avoid sharp bends in cabling, particularly the antenna cables, and routing near aircraft control cables. Cabling should not be routed near components or cabling which are sources of electrical noise. Do not route the antenna cables near any ADF antenna cables. Route the GPS antenna cable as far as possible away from all COM transceivers and antenna cables.

2.3.2. GPS ANTENNA CABLING REQUIREMENTS

Coaxial cable with 50 Ω nominal impedance and meeting applicable aviation regulations should be used for the installation. A typical maximum cable length for the GPS antenna is 40 feet. The installer should insure that the attenuation does not exceed 10 dB at 1.5 GHz for the specific installation.

2.3.3. CELLULAR ANTENNA CABLING REQUIREMENTS

Refer to the antenna installation manual.

3. INSTALLATION PROCEDURE

3.1. UNIT AND ACCESSORIES

The NavTalk Pilot Aircraft Provisions Kit is available as part of GARMIN part number 010-00141-01, and includes the following items:

ITEM	GARMIN P/N
NavTalk Pilot Adapter	011-00388-01
NavTalk Pilot Handset Cable	011-00518-01
NavTalk Pilot Adapter Installation Kit	010-10244-01

The following installation accessories are available:

1. Cellular Antenna:

- The Dual-polarization AirCell Antenna is available under GARMIN P/N 010-10278-00. This kit contains the following items:

ITEM	GARMIN P/N
Cellular Antenna, Dual Polarization	700-00013-00
AirCell Antenna Installation Kit	013-00059-00

2. GPS Antenna Options:

- GA 56 Antenna Kit, without cable (Mod 1 or later, GARMIN P/N 010-10040-01). This kit contains the following items:

ITEM	GARMIN P/N	QTY
GA 56 ANTENNA	011-00134-00	1
BACKING PLATE	115-00031-00	1
NUT, SELF-LOCKING, #8-32	210-10004-09	4
ANTENNA GASKET	253-00002-00	1

- GA 56 Flange Mount Antenna Kit (Mod 1 or later, GARMIN P/N 010-10040-02). This kit contains the following items:

ITEM	GARMIN P/N	QTY
FLANGE MOUNT GA 56 ANTENNA	011-00147-00	1
NUT PLATE	115-00080-00	1
SCREW, #10-32 x 5/8"	211-62212-14	4
ANTENNA GASKET	253-00011-00	1

3.2. MISCELLANEOUS OPTIONS

ITEM	GARMIN P/N
CONNECTOR, BNC, MALE, CLAMP	330-00087-00
LOW-LOSS AVIATION ANTENNA EXTENSION CABLE WITH RIGHT ANGLE BNC CONNECTOR, 15 FT.	320-00003-00
LOW-LOSS AVIATION ANTENNA EXTENSION CABLE WITH RIGHT ANGLE BNC CONNECTOR, 30 FT.	320-00003-02
NAVTALK PILOT AIRCRAFT PROVISIONS KIT IN MOONEY M20J DOCUMENTED INSTALLATION	190-00189-06

3.3. INSTALLATION ACCESSORIES REQUIRED BUT NOT PROVIDED

The following installation accessories are required but not provided:

The following hardware is required for installation of the adapter box and handset cradle, but is not provided--#6-32 Pan Head Screw (8 ea.), #6-32 Self-locking Nut (8 ea.).

A locally-fabricated backing bracket may be required to properly fasten the handset adapter to the aircraft.

3.4. ANTENNA INSTALLATION

3.4.1. Cellular Antenna Installation

Refer to the antenna installation manual.

3.4.2. Optional External GPS Antenna Installation

The GA 56 antenna outline and footprint dimensions are shown in Figure 3-4, page 3-5.

1. Using the backing plate as a template, mark the location of the mounting holes and the through hole for coaxial cable. Drill or punch the holes.
2. The antenna installation must provide adequate support for the antenna considering a maximum drag load of 5 lbs. For the GA 56 antennas (at subsonic speed). Install a doubler plate to reinforce thin-skinned aircraft. Observe guidelines for acceptable installation practices as outlined in AC 43.13-2A.
3. Seal the antenna and gasket to the fuselage using a good quality electrical grade sealant. Use caution to insure that the antenna connector is not contaminated with sealant. Insure that the mounting screws are fully tightened and that the antenna base is well seated against the gasket.

CAUTION

Do not use construction grade RTV sealant or sealants containing acetic acid. These sealants may damage the electrical connections to the antenna. Use of these type sealants may void the antenna warranty.

3.5. CABLE INSTALLATION

1. Route the coaxial cable to the NavTalk Pilot Adapter mounting location keeping in mind the recommendations of Section 2. Secure the cable in accordance with good aviation practice.
2. Trim the coaxial cable to the desired length and install the appropriate BNC or TNC (see table on Figure 3-4, page 3-6) connector per the cabling instructions on Figure 3-1. If the connector is provided by the installer, follow the connector manufacturer's instructions for cable preparation.

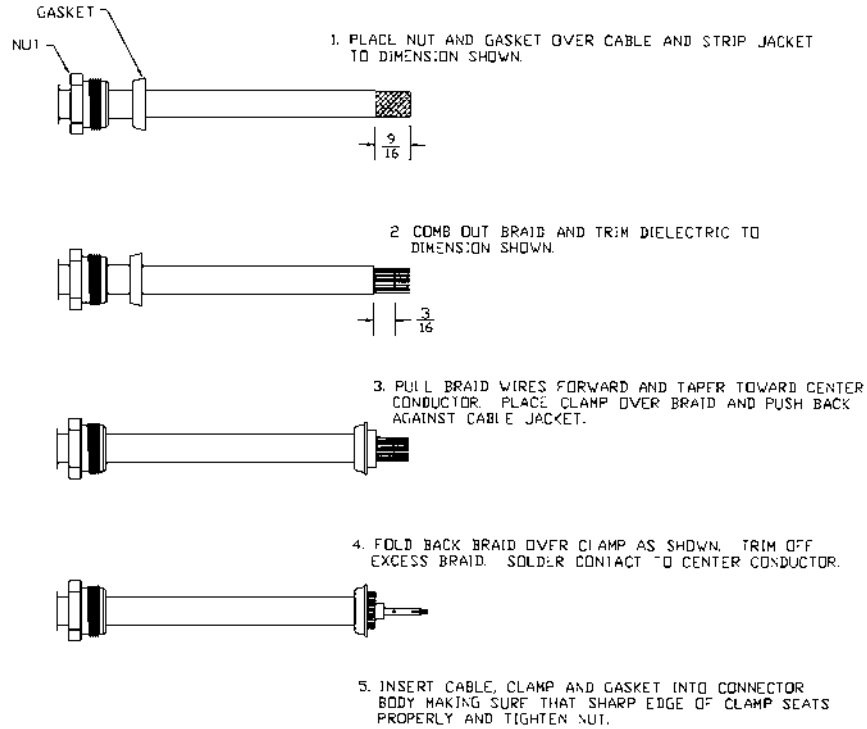


Figure 3-1. Coaxial Cable Installation

- Contacts for the 9 pin “D” connector must be crimped onto the individual wires of the aircraft wiring harness. The following tables list contact part numbers (for reference) and recommended crimp tools:

Table 3-1. Pin Contact Part Numbers

9 pin connector (P7)	
Connector Type	Standard Density Socket Contact (20-24 AWG)
GARMIN P/N	336-00022-00
Military P/N	M39029/63-368
AMP	205090-1
Positronic	M39029/63-368
ITT Cannon	031-1007-042

Table 3-2. Recommended Crimp Tools

Connector Type	Hand Crimping Tool	Standard Density, 20-24 AWG	
		Positioner	Insertion/Extraction Tool
Military P/N	M22520/2-01	M22520/2-08	M81969/1-02
Positronic	9507	9502-5	M81969/1-02
ITT Cannon	995-0001-584	995-0001-604	980-2000-426
AMP	601966-1	601966-5	91067-2
Daniels	AFM8	K13-1	M24308/1-02
Astro	615717	615724	M81969/1-02

NOTES

- Insertion/extraction tools from ITT Cannon are all plastic; others are plastic with metal tip.
- Non-GARMIN part numbers shown are not maintained by GARMIN and consequently are subject to change without notice.

3.6. NAVTALK PILOT ADAPTER INSTALLATION

If the adapter box or handset cradle is mounted using thru-holes, self-locking nuts should be used. If threading into tapped holes, use Loctite, being sure not to allow Loctite to contact the plastic surfaces. If using self-threading screws, no locking device or adhesive is required.

3.6.1. Adapter Box Installation

- Figure 3-5, page 3-6, shows outline dimensions for the adapter box.
- Install the adapter box to the aircraft structure using four #6-32 pan head screws and four self-locking nuts. See section 3.3 for additional mounting information.

3.6.2. Handset Cradle Installation

1. Figure 3-6, page 3-7, shows outline dimensions for the handset cradle.

NOTE

A locally-fabricated backing bracket may be required to properly fasten the handset adapter to the aircraft.

2. Position the lock assembly (P/N 145-00417-00) on the back of the cradle assembly so it slides up to lock the levers on the sides of the cradle, and down to release them (Figure 3-2).

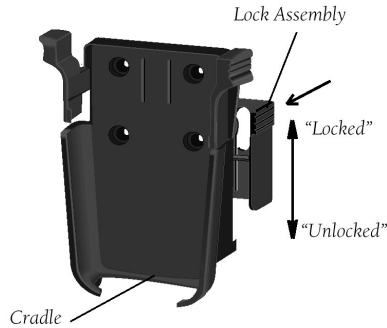


Figure 3-2. Positioning the Lock Assembly

3. Install the handset cradle to the aircraft structure using four #6-32 pan head screws. See section 3.3 for additional mounting information.
4. After the mounting screws have been installed, place the NavTalk Pilot unit in the cradle to check for proper fit. Guide the unit onto the two hooks at the base of the cradle. Pivot the unit on the hooks (while pushing down), until it clicks into place. The lock assembly should then slide up smoothly and click into place holding the NavTalk pilot securely in the cradle. If the lock assembly does not move freely, the mounting screws may be too tight. Loosen the screws slightly until the lock moves freely. Remove the NavTalk Pilot unit from the handset cradle.
5. Cover the screwheads with Appearance Plate 161-00267-00 (Figure 3-3). Remove the protective liner from the adhesive coated side. Carefully align the two vertical slots in the plate over the two matching ribs on the cradle and press in place.



Figure 3-3. Applying the Appearance Plate

6. Attach a placard to the aircraft near the handset cradle, reading:
 - 1) GPS not for in-flight navigation.
 - 2) Handset must be in the cradle for in-flight use.
 - 3) Telephone connected to COM # [for example, "Telephone connected to COM 3"].

3.7. OUTLINE DRAWINGS

REF DES	DESCRIPTION	CABLE REQUIRED (MADE BY INSTALLER)	SUPPLIED GARMIN PARTS
P2/J2*	UNIT	15 PIN HIGH DENSITY "D" - MALE TO FEMALE	330-00185-15 (PLUG, QTY 1) 330-00273-15 (RECEPTACLE, QTY 1) 336-00021-00 (CRIMP PIN, QTY 15) 336-00036-00 (CRIMP SOCKET, QTY 15) 330-00113-09 (BACKSHELL, QTY 2)
J3/J4	GPS ANTENNA	BNC - MALE TO MALE	NONE
J6/J5	CELLULAR ANTENNA	TNC - MALE TO MALE	NONE
P1/J1*	GPS UNIT	BNC - MALE TO FEMALE	NONE
P7/ AUDIO PANEL	POWER/AUDIO	9 PIN "D" - FEMALE TO AIRCRAFT AUDIO PANEL	330-00051-09 (RECEPTACLE, QTY 1) 336-00001-00 (CRIMP SOCKET, QTY 9) 330-00113-09 (BACKSHELL, QTY 1)

* CABLE NOT REQUIRED IF ADAPTER BOX IS WITHIN 4 FT OF CRADLE.

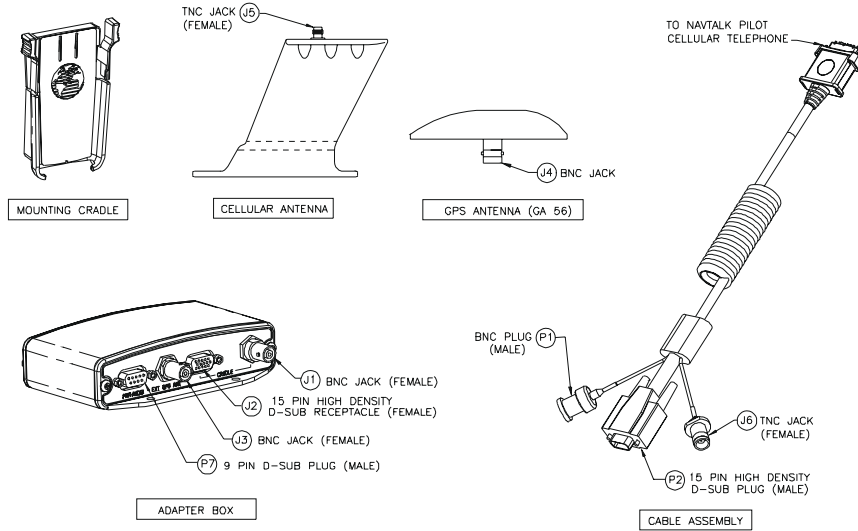


Figure 3-4. System Components

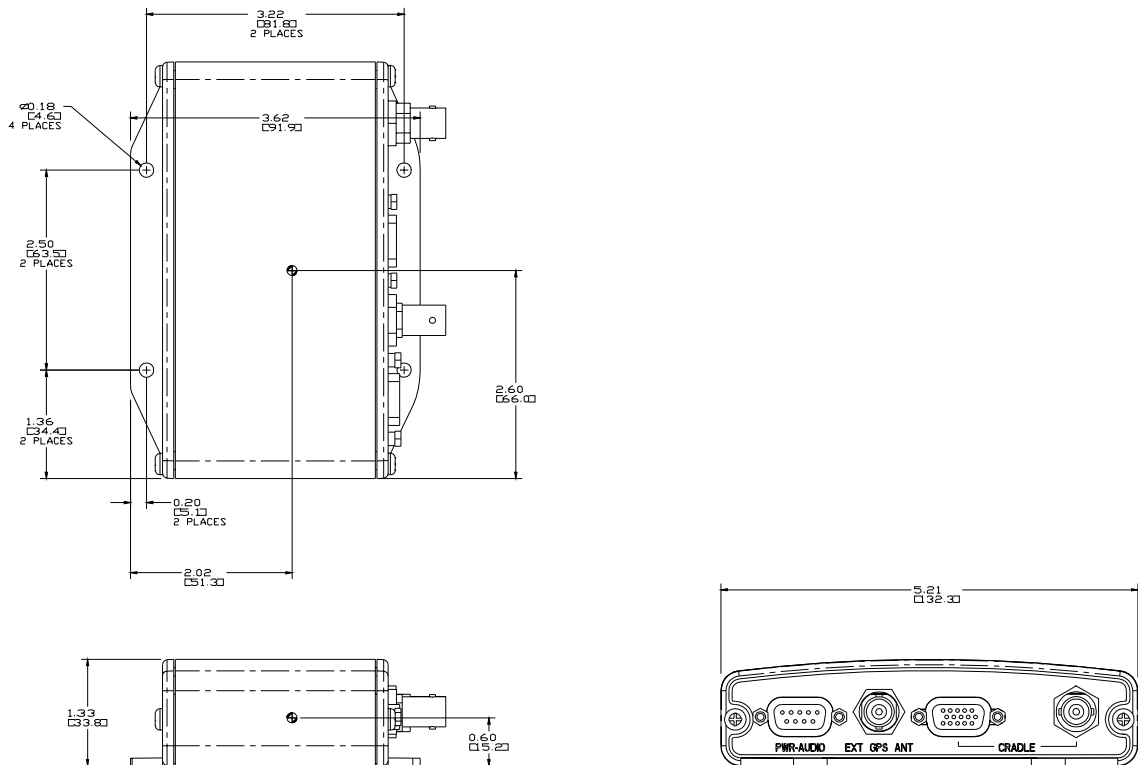


Figure 3-5. Adapter Box Outline Drawing

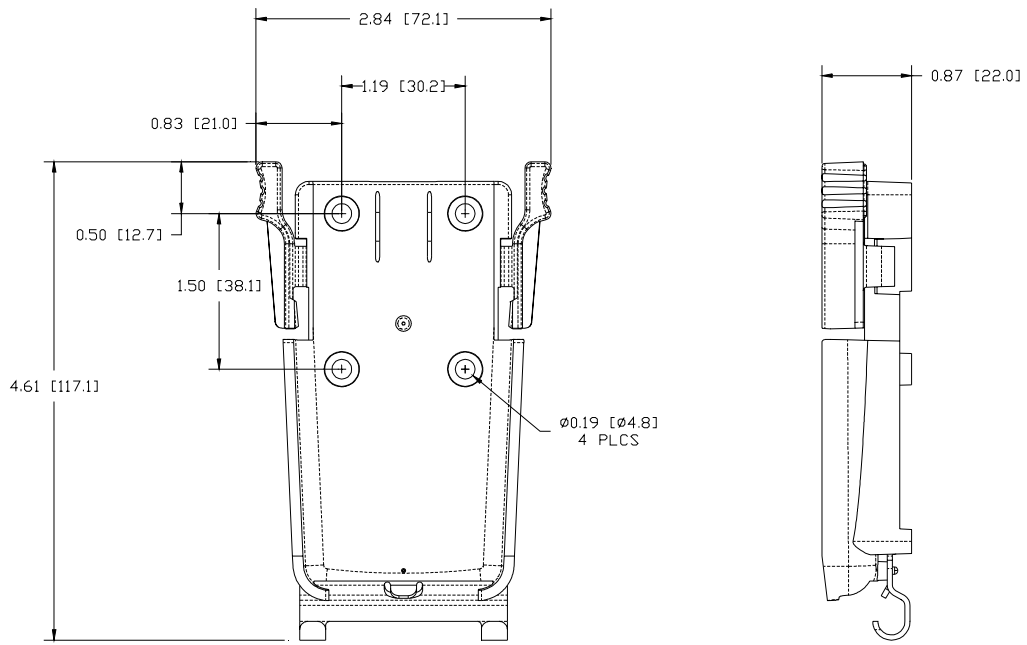


Figure 3-6. Handset Cradle Outline Drawing

4. SYSTEM INTERCONNECTION

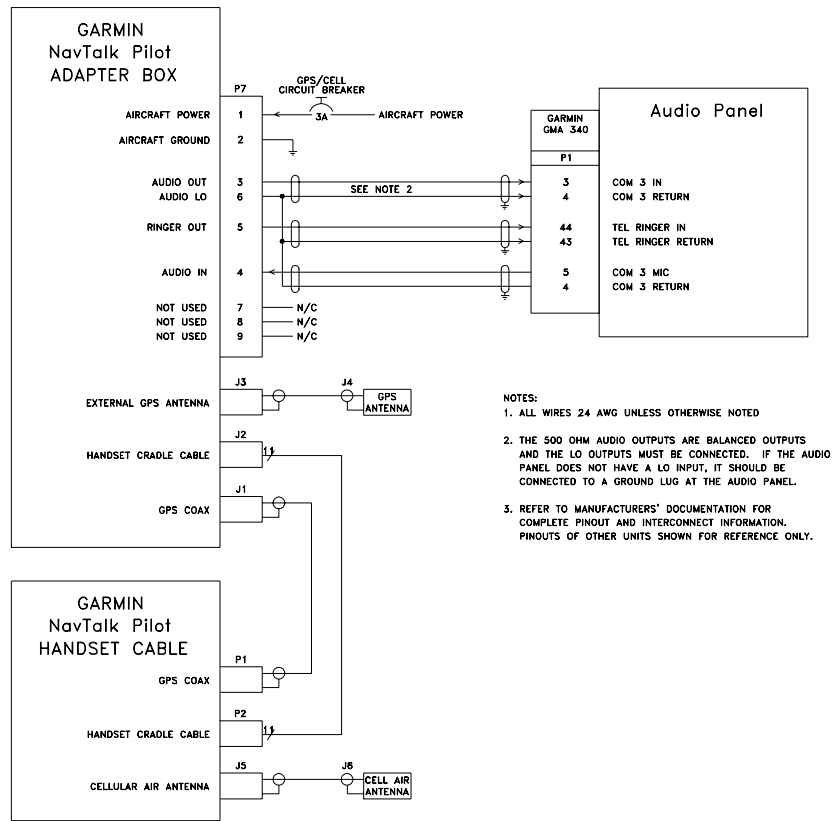


Figure 4-1. NavTalk Pilot Aircraft Provisions Kit Interconnect Drawing

5. ACTIVATION AND POST-INSTALLATION CHECKOUT PROCEDURE

5.1. INSTALLATION POWER CHECK

Before connecting the Adapter Box, a power check should be performed to verify proper connection of aircraft power and ground. Failure to verify power connection may result in damage to the equipment. After verifying proper power connections, pull/open the circuit breaker and then install the Adapter Box.

5.2. CELLULAR SERVICE ACTIVATION

5.2.1 AIRCELL SERVICE ACTIVATION

The consumer and/or dealer must complete the AirCell, Inc. Subscriber Service Agreement (SSA) and submit it to AirCell Customer Service before proceeding with the post-installation checkout. This form can be found in an envelope with the NavTalk Pilot equipment. Please FAX the completed SSA form to 1-888-398-1800, allowing 24 to 48 hours for activation.

5.2.2 GROUND SERVICE ACTIVATION

The NavTalk Pilot ground phone number is pre-programmed at the factory to (123) 456-7890, and is not active. For ground cellular service, the consumer and/or dealer should contact the cellular service provider of their own choosing. If it is desired for the ground and air phone numbers to be the same, contact AirCell Customer Service at 1-888-286-9876.

5.3. EXTERNAL GPS ANTENNA CHECKOUT

This checkout is only necessary if an optional external GPS antenna has been installed.

1. Engage the NavTalk Pilot unit in the handset cradle, press the PWR key, and select the GPS mode by pressing the PHONE/GPS key if necessary.
2. Select the Satellite Status page.
3. If the unit is unable to acquire satellites, relocate the aircraft away from obstructions that might be shading GPS reception. If the situation does not improve, check the GPS antenna installation.

5.4. TELEPHONE CHECKOUT

5.4.1 AIR PHONE CHECKOUT

The AIR telephone function of the NavTalk Pilot is best tested in-flight.

Engage the NavTalk Pilot unit in the handset cradle, press the PWR key, and select the PHONE mode by pressing the PHONE/GPS key if necessary. Observe the following:

1. An airplane icon is displayed at the bottom of the NavTalk Pilot screen. If not, the NavTalk Pilot is not receiving power from the aircraft power system. Installation troubleshooting is required.
2. "Roam", "No Service", or "Cellular Off" is displayed. The display should change from "Cellular Off" to "Roam" or "No Service" once the NavTalk pilot gets a GPS position fix and the aircraft is airborne.
3. The signal strength will be displayed with a number of bars. One or two bars are generally required for good communication.
4. The "Active Phone #" field will show your AIR telephone number.

NOTE

The NavTalk Pilot air phone number is pre-programmed at the factory. If the "Active Phone #" displayed is the ground number, the AIR mode has not been successfully activated. If some other number is displayed, write it down and contact AirCell Customer Service at 1-888-286-9876.

(Air phone checkout continued on next page)

5. If you have service, place a call. Enter a number to be called and press the SEND key. The area code must be used but the “1” preceding the area code is optional.
6. Turn the aircraft audio panel microphone selector to the correct setting for NavTalk Pilot. A “COM 3” or “TEL” position is frequently used on audio panels.
7. Verify good transmission and audio quality. Some aircraft audio panels may require you to press the push-to-talk key to transmit on the phone.
8. Terminate the call by pressing the END key. If you get a recorded message asking for a credit card, or the number is not valid or registered, dial AirCell Customer Service at 611 immediately for assistance.

5.4.2 GROUND PHONE CHECKOUT (AFTER GROUND SERVICE ACTIVATION)

With the NavTalk Pilot unit apart from the handset cradle, press the PWR key, and select the PHONE mode by pressing the PHONE/GPS key if necessary. Observe the following:

1. “Roam” is displayed.
2. The signal strength will be displayed with a number of bars. One or two bars are generally required for good communication.
3. The “Active Phone #” field will show your GROUND telephone number.
4. Place a call. Enter a number to be called and press the SEND key.
5. Verify good transmission. Terminate the call by pressing the END key.

APPENDIX A. CERTIFICATION DOCUMENTS

A.1 CONTINUED AIRWORTHINESS

Maintenance of the NavTalk Pilot Aircraft Provisions is “on condition” only. Periodic maintenance of the NavTalk Pilot Aircraft Provisions is not required.

A.2 ENVIRONMENTAL QUALIFICATION FORM (RTCA/DO-160D)

NOMENCLATURE: NavTalk Pilot Adapter Box
TYPE/MODEL/PART NO.: 010-00141-01, which includes 011-00388-01
TSO/JTSO COMPLIANCE: Not Applicable
MANUFACTURER’S SPECIFICATION AND/OR OTHER APPLICABLE SPECIFICATION: 004-00084-00
MANUFACTURER: GARMIN International, Inc.
ADDRESS: 1200 E. 151st Street, Olathe, Kansas 66062

NOTE: The following information provides examples only. It is not intended to be a comprehensive listing of all test conditions.

Conditions	Section	Description of Conducted Tests
Temperature and Altitude	4.0	Equipment tested to Category A2
Temperature Variation	5.0	Equipment tested to Category B
Humidity	6.0	Equipment tested to Category A
Shock	7.0	Equipment tested to Category B
Vibration	8.0	Equipment tested to Category S
Explosion	9.0	Equipment identified as Category X, no test required
Waterproofness	10.0	Equipment identified as Category X, no test required
Fluids Susceptibility	11.0	Equipment identified as Category X, no test required
Sand and Dust	12.0	Equipment identified as Category X, no test required
Fungus	13.0	Equipment identified as Category X, no test required
Salt Spray	14.0	Equipment identified as Category X, no test required
Magnetic Effect	15.0	Equipment tested to Class Z
Power Input	16.0	Equipment tested to Category B
Voltage Spike	17.0	Equipment tested to Category B
Audio Frequency Susceptibility	18.0	Equipment tested to Category B
Induced Signal Susceptibility	19.0	Equipment tested to Category A
Radio Frequency Susceptibility	20.0	Equipment identified as Category X, no test required
RF Emission—Conducted	21.3	Equipment tested to Category M
RF Emission—Radiated	21.4	Equipment tested to Category B
Lightning Induced Transient Susc.	22.0	Equipment identified as Category XXXX, no test required
Lightning Direct Effects	23.0	Equipment identified as Category X, no test required
Icing	24.0	Equipment identified as Category X, no test required

APPENDIX B. STC PERMISSION

Please contact GARMIN for STC information.