

## CHAPTER 34

## AVIONICS

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## CHAPTER 34

## AVIONICS

34-10 Avionics Switch Description

R22 Helicopters S/N 4591, 4650, 4651, 4656 & subsequent have a dedicated avionics switch located on the main switch panel on top of the avionics stack. Earlier R22s have an avionics bus, but the master radio relay interrupts power to the avionics bus during start-up, eliminating the need for a switch. The avionics switch controls a relay which interrupts power to the avionics bus (system is fail-safe ON).

34-20 Transponder Installations34-21 A804-12 Transponder (Garmin GTX 330 ES) Installation

## NOTE

Refer to Garmin GTX 330 ES Maintenance Manual and Instructions for Continued Airworthiness.

**A. Description**

Automatic Dependent Surveillance-Broadcast (ADS-B) “Out” equipment transmits aircraft specific-data and position information to air traffic control via GPS-based surveillance (rather than radar-based surveillance). ADS-B Out equipment will be required for R22 operation in certain airspace in the United States after January 1, 2020.

ADS-B Out system operates mostly automatically. ADS-B Out equipment is programmed with aircraft-specific data at installation. ADS-B Out system uses the primary installed GPS for position information. Additional flight-specific data is entered by the pilot using transponder controls. ADS-B data is transmitted via the transponder’s Extended Squitter (ES) on frequency 1090 MHz.

ADS-B Out equipment (transponder and primary GPS) must have power and must be in normal operating modes for systems to function properly. ADS-B Out system faults are annunciated on the transponder and primary GPS screens.

Change of aircraft registration may require ADS-B equipment programming by qualified maintenance personnel.

Refer to R22 Pilot’s Operating Handbook Section 9 for additional information.

**B. Schematic**

Refer to Figure 14-41 for A804-12 transponder & blind encoder electrical schematic.

**34-21 A804-12 Transponder (Garmin GTX 330 ES) Installation (continued)****C. Removal**

1. Turn battery switch off and pull out XPDR circuit breaker (5 amp) at panel.
2. Loosen radio key securing A804-12 transponder to avionics tray.
3. Carefully unplug/remove transponder from tray.

**D. Installation**

1. Turn battery switch off and pull out XPDR circuit breaker (5 amp) at panel.
2. Carefully plug-in/install A804-12 transponder in appropriate location in avionics tray.
3. Tighten radio key securing transponder to tray. Verify equipment security.
4. Push in XPDR circuit breaker (5 amp) at panel. Turn battery & avionics switches on.
5. Perform appropriate functional checks per Garmin GTX 330 ES Pilot's Guide. Turn battery and avionics switches off.

**E. Antenna**

Refer to § 16-70 for antenna locations and R22 Illustrated Parts Catalog (IPC) Chapter 6.

**NOTE**

Antenna installation depends on optional equipment installed.

**Removal**

1. Turn battery switch off and pull out XPDR circuit breaker (5 amp) at panel.
2. Using plastic scraper, remove B270-1 sealant from around transponder antenna at corners where it attaches to A794-2 panel.
3. Remove screws securing panel to cabin skin and disconnect antenna cable from antenna. Remove hardware securing antenna and ground wire to panel and remove antenna.

34-21 A804-12 Transponder (Garmin GTX 330 ES) Installation (continued)**E. Antenna (continued)**Installation

1. Turn battery switch off and pull out XPDR circuit breaker (5 amp) at panel.
2. Remove paint and primer from A794-2 panel where ground wire attaches to ensure electrical ground.
3. Install hardware securing transponder antenna and ground wire to panel. Verify security. Connect antenna cable to antenna and install screws securing panel to cabin skin. Verify security.
4. Apply small bead B270-1 sealant (0.1 inch max in height) around antenna at corners where it attaches to panel and allow to dry.
5. Perform ground checks per Part D steps 4 and 5.

**F. Scheduled Maintenance and Inspections****NOTE**

All factory-installed Garmin units are "on condition" and do not require scheduled periodic maintenance. Units feature a BIT (Built-In Test) function during each initial power-up that will detect internal failure(s) and alert pilot.

**NOTE**

Refer to § 34-60 for avionics software information.

**G. Special Maintenance and Inspections**

1. Turn battery and avionics switches off. Open circuit breaker panel and upper console.
2. Inspect condition of and verify no obvious damage to transponder, radio tray, copper bus bars, circuit breaker, and wiring. Verify no loose, chafed, or broken wires or terminals. Verify no evidence of arcing. Verify equipment security.
3. Secure circuit breaker panel and upper console. Perform ground checks per Part D steps 4 and 5.

### 34-30 COM Radio Installations

#### 34-31 C802-2 COM Radio (Garmin GTR 225B) Installation

##### **A. Description**

The C802-2 COM radio (Garmin GTR 225B) includes similar communication features available in the earlier King KY197A COM radio, but includes an airport frequency database, ability to monitor the standby frequency, and improved user memory channel functionality. The Garmin GTR 225B is a dual voltage unit, suitable for use in 14V and 28V systems.

##### **B. Schematic**

Refer to Figure 14-43 for C802-2 COM Radio Installation electrical schematic.

##### **C. Removal**

1. Turn battery switch off and pull-out COM radio circuit breaker (10 amp) at panel.
2. Loosen radio key securing C802-2 COM radio to avionics tray.
3. Carefully unplug/remove radio from tray.

##### **D. Installation**

1. Turn battery switch off and pull-out COM radio circuit breaker (10 amp) at panel.
2. Carefully plug-in/install C802-2 COM radio in appropriate location in avionics tray.
3. Tighten radio key securing radio to tray. Verify equipment security.
4. Push-in COM radio circuit breaker (10 amp) at panel. Turn battery and avionics switches on.
5. Perform appropriate functional checks per Garmin GTR 225B Pilot's Guide. Turn battery and avionics switches off.

##### **E. Antenna**

Refer to § 16-70 for antenna locations and R22 Illustrated Parts Catalog (IPC) Chapter 6.

##### **NOTE**

Antenna installation depends on number of COM installations and additional equipment installed.

34-31 C802-2 COM Radio (Garmin GTR 225B) Installation (continued)**E. Antenna (continued)**Removal

1. Turn battery switch off and pull out COM radio circuit breaker (10 amp) at panel.
2. Using plastic scraper, remove B270-1 sealant from around COM antenna at corners where it attaches to tailcone.
3. Disconnect antenna cable from antenna. As required, remove B270-13 sealant from fastener holes. Remove screws securing antenna to tailcone and remove antenna.

Installation

1. Turn battery switch off and pull out COM radio circuit breaker (10 amp) at panel.
2. Remove paint & primer from antenna mating surfaces to ensure electrical ground.
3. As required, apply light coat B270-13 sealant to screw threads and install screws securing antenna to tailcone. As required, seal around screw heads and fill fastener holes using B270-13 sealant and allow to dry. Verify security.
4. Apply small bead B270-1 sealant (0.1 inch max in height) around antenna at corners where it attaches to tailcone and allow to dry.
5. Connect antenna cable to antenna. Verify security.
6. Perform ground checks per Part D steps 4 and 5.

**F. Scheduled Maintenance and Inspections****NOTE**

All factory-installed Garmin units are "on condition" and do not require scheduled periodic maintenance. Units feature a BIT (Built-In Test) function during each initial power-up that will detect internal failure(s) and alert pilot.

**NOTE**

Refer to § 34-60 for avionics software information.

**G. Special Maintenance and Inspections**

1. Turn battery and avionics switches off. Open circuit breaker panel and upper console.
2. Inspect condition of and verify no obvious damage to COM radio, radio tray, copper bus bars, circuit breaker, and wiring. Verify no loose, chafed, or broken wires or terminals. Verify no evidence of arcing. Verify equipment security.
3. Secure circuit breaker panel and upper console. Perform ground checks per Part D steps 4 and 5.

## 34-40 Audio Control Installations

### 34-41 C822-1 Audio Control (Garmin GMA 350H) Installation

#### NOTE

Refer to Garmin GMA 350H series Maintenance Manual and Instructions for Continued Airworthiness.

#### **A. Description**

The Garmin GMA 350H audio control includes improved squelch and background noise suppression, 3D audio (if stereo headsets are used) which allows inputs from separate radios to sound as if they are coming from separate locations around the listener, and some control functions via voice command when a momentary push-button switch is depressed on the pilot's cyclic grip.

#### **B. Schematic**

Refer to Figure 14-44 for C822-1 Audio Control Installation electrical schematic.

#### **C. Removal**

1. Turn battery switch off and pull out AUDIO PANEL circuit breaker (5 amp) at panel.
2. Loosen radio key securing Garmin GMA 350H audio control to avionics tray.
3. Carefully unplug/remove audio control from tray.

#### **D. Installation**

1. Turn battery switch off and pull out AUDIO PANEL circuit breaker (5 amp) at panel.
2. Carefully plug-in/install Garmin GMA 350H audio control in appropriate location in avionics tray.
3. Tighten radio key securing audio control to tray. Verify equipment security.
4. Push in AUDIO PANEL circuit breaker (5 amp) at panel. Turn battery & avionics switches on.
5. Perform appropriate functional checks per Garmin GMA 350H series Pilot's Guide. Turn battery & avionics switches off.

#### **E. Antenna**

Refer to § 16-70 for antenna locations and R22 Illustrated Parts Catalog (IPC) Chapter 6.



34-41 C822-1 Audio Control (Garmin GMA 350H) Installation (continued)**E. Antenna (continued)**Removal

1. Turn battery switch off & pull out AUDIO PANEL circuit breaker (5 amp) at panel.
2. Using plastic scraper, remove B270-1 sealant from around CI 102 marker beacon antenna at corners where it attaches to A794-2 panel.
3. Remove hardware securing panel to belly and disconnect A850-210 antenna cable from antenna. Carefully remove screws (they are installed with threadlocker) securing antenna to panel and remove antenna.

Installation

1. Turn battery switch off & pull out AUDIO PANEL circuit breaker (5 amp) at panel.
2. Remove paint & primer from antenna mating surfaces to ensure electrical ground.
3. Apply light coat B270-11 adhesive to new screw threads and install screws securing CI 102 marker beacon antenna to A794-2 panel. Verify security.
4. Connect A850-210 antenna cable to antenna. Install screws securing forward belly panel to belly. Verify security.
5. Apply small bead B270-1 sealant (0.1 inch max in height) around antenna at corners where it attaches to belly panel and allow to dry.
6. Perform ground checks per Part D steps 4 and 5.

**F. Scheduled Maintenance and Inspections****NOTE**

All factory-installed Garmin units are "on condition" and do not require scheduled periodic maintenance. Units feature a BIT (Built-In Test) function during each initial power-up that will detect internal failure(s) and alert pilot.

**NOTE**

Refer to § 34-60 for avionics software information.

**G. Special Maintenance and Inspections**

1. Turn battery & avionics switches off. Open circuit breaker panel and upper console.
2. Inspect condition of and verify no obvious damage to audio control, radio tray, copper bus bars, circuit breaker, and wiring. Verify no loose, chafed, or broken wires or terminals. Verify no evidence of arcing. Verify equipment security.
3. Secure circuit breaker panel and upper console. Perform ground checks per Part D steps 4 and 5.

## 34-50 GPS Installations

### 34-51 C831 GPS (Garmin GTN 600 series) Installation

#### NOTE

Refer to Garmin GTN 600 series Maintenance Manual and Instructions for Continued Airworthiness.

#### **A. Description**

The C831 GPS (Garmin GTN 600 series) includes similar navigation features available in the earlier Garmin GNS 400 series GPS, but the interface offers a combination of touch screen technology with traditional buttons and knobs.

One GTN 600 series GPS may be installed in the pilot-side console location only.

Note: R22 ADS-B Out system requires Garmin GTN 600-series GPS. Refer to § 14.1230.

#### **B. Schematic**

Refer to Figure 14-45 for C831 GPS (Garmin GTN 600 series) installation electrical schematic.

#### **C. Removal**

1. Turn battery switch off and pull out COM circuit breakers(s) (10 amp) and GPS circuit breaker(s) (7.5 amp) as required at panel.
2. Loosen radio key securing C831 GPS to tray in pilot's side console.
3. Carefully unplug/remove GPS from tray.

#### **D. Installation**

1. Turn battery switch off and pull out COM circuit breakers(s) (10 amp) and GPS circuit breaker(s) (7.5 amp) as required at panel.
2. Carefully plug-in/install C831 GPS in tray in pilot's side console.
3. Tighten radio key securing GPS to tray. Verify equipment security.
4. Push in COM circuit breaker(s) (10 amp) and GPS circuit breaker(s) (7.5 amp) as required at panel. Turn battery and avionics switches on.
5. Perform appropriate functional checks per Garmin GTN 600 series Pilot's Guide. Turn battery and avionics switches off.

34-51 C831 GPS (Garmin GTN 600 series) Installation (continued)**E. Antenna**

Refer to § 16-70 for antenna locations and R22 Illustrated Parts Catalog (IPC) Chapter 6.

**NOTE**

Antenna installation depends on number COM installations and additional equipment installed.

Removal

1. Turn battery switch off and pull out COM circuit breaker(s) (10 amp) and GPS circuit breaker(s) (7.5 amp) as required at panel.
2. Using plastic scraper, remove B270-1 sealant from around GPS antenna at corners where it attaches to tailcone.
3. Disconnect antenna cable from antenna. As required, remove B270-13 sealant from fastener holes. Remove screws securing antenna to tailcone and remove antenna.

Installation

1. Turn battery switch off and pull out COM circuit breaker(s) (10 amp) and GPS circuit breaker(s) (7.5 amp) as required at panel.
2. Remove paint & primer from antenna mating surfaces to ensure electrical ground.
3. As required, apply light coat B270-13 sealant to screw threads and install screws securing antenna to tailcone. As required, seal around screw heads and fill fastener holes using B270-13 sealant and allow to dry. Verify security.
4. Apply small bead B270-1 sealant (0.1 inch max in height) around antenna at corners where it attaches to tailcone and allow to dry.
5. Connect antenna cable to antenna. Verify security.
6. Perform ground checks per Part D steps 4 and 5.

**F. Scheduled Maintenance and Inspections****NOTE**

All factory-installed Garmin units are "on condition" and do not require scheduled periodic maintenance. Units feature a BIT (Built-In Test) function during each initial power-up that will detect internal failure(s) and alert pilot.

**NOTE**

Refer to § 34-60 for avionics software information.

34-51 C831 GPS (Garmin GTN 600 series) Installation (continued)**G. Special Maintenance and Inspections**

1. Turn battery and avionics switches off. Open circuit breaker panel. Remove hardware securing pilot's side console shell assembly to tray and carefully pivot shell assembly upward (GPS and faceplate may be also be removed).
2. Inspect condition of and verify no obvious damage to GPS, tray, copper bus bars, circuit breaker, and wiring. Verify no loose, chafed, or broken wires or terminals. Verify no evidence of arcing. Verify equipment security.
3. Secure circuit breaker panel and pilot's side console. Perform ground checks per Part D steps 4 and 5.

34-60 Avionics Software

Modern avionics software is complex and subject to rigorous testing by RHC to assure proper function and integration in the aircraft. Only specified software versions and software configurations have been FAA-approved for installation in Robinson helicopters. Software updates should not be attempted without a thorough understanding of approval status and compatibility. Technical support from either RHC or the avionics manufacturer will likely be required. In some cases, updating software for one item of avionics may require additional avionics to be updated to assure compatibility.

As long as RHC-installed equipment is functioning properly, there is no continuing airworthiness requirement to check or update software levels in Robinson helicopters; RHC will issue an SB (or FAA will issue an AD) for any mandatory updates.

Consult [www.robinsonheli.com](http://www.robinsonheli.com) > Customer Support > Avionics Support > Avionics Software page for approved software configurations.

**NOTE**

The above statements apply to avionics operating software. Databases (e.g. charts, terrain, etc.) may be updated regularly using avionics manufacturer's recommended procedures.