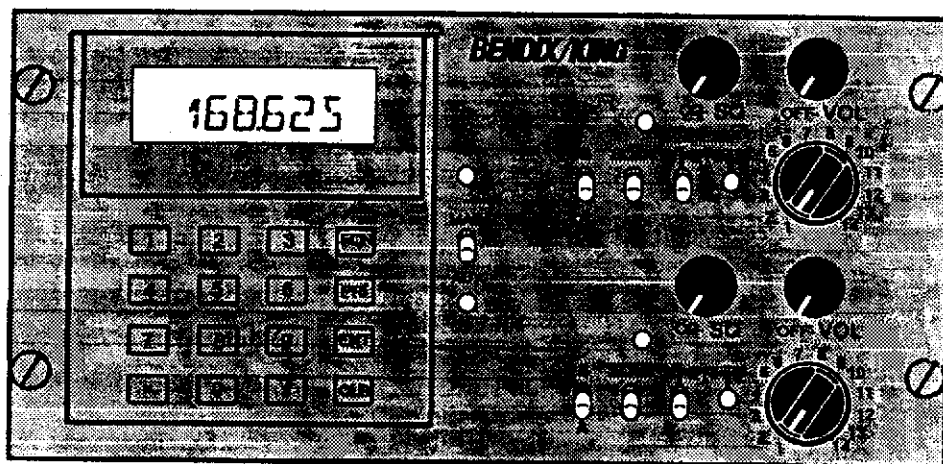


# KFM0985

## AIRBORNE FM TRANSCEIVER

### INSTALLATION MANUAL



 **BK RADIO**  
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Lawrence, Kansas 66049

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# SECTION I GENERAL INFORMATION

## 1.1 KFM0985 INSTALLATION KIT

The KFM0985 Airborne Transceiver Installation Kit, P/N 9406-2048-600, contains the following parts:

PART NUMBER	DESCRIPTION	QTY
2107-2057-511	Contact, Socket; Crimp	25
2109-2057-600	Connector Housing; Sub-miniature D, 25-Pin	1
2113-2055-300	Connector Hood; Sub-miniature D, 25-Pin	1
2113-2057-400	Latch Set; 2 pcs. w/mounting hardware	1

## 1.2 UNITS AND ACCESSORIES REQUIRED, BUT NOT SUPPLIED

Antennas covering the 136–160 MHz, 148–174 MHz, 403–457 MHz or 450–512 MHz bands will be determined by the configuration of VHF and/or UHF transceivers. Vertically polarized 50 Ohm antennas of the appropriate frequency range(s) are required.

## 1.3 OPTIONAL UNITS AND ACCESSORIES REQUIRED

If the avionics voltage supply bus is +28 VDC, a BK Radio KA0039 Voltage Converter is required.

## 1.4 TYPICAL SYSTEM CONFIGURATION

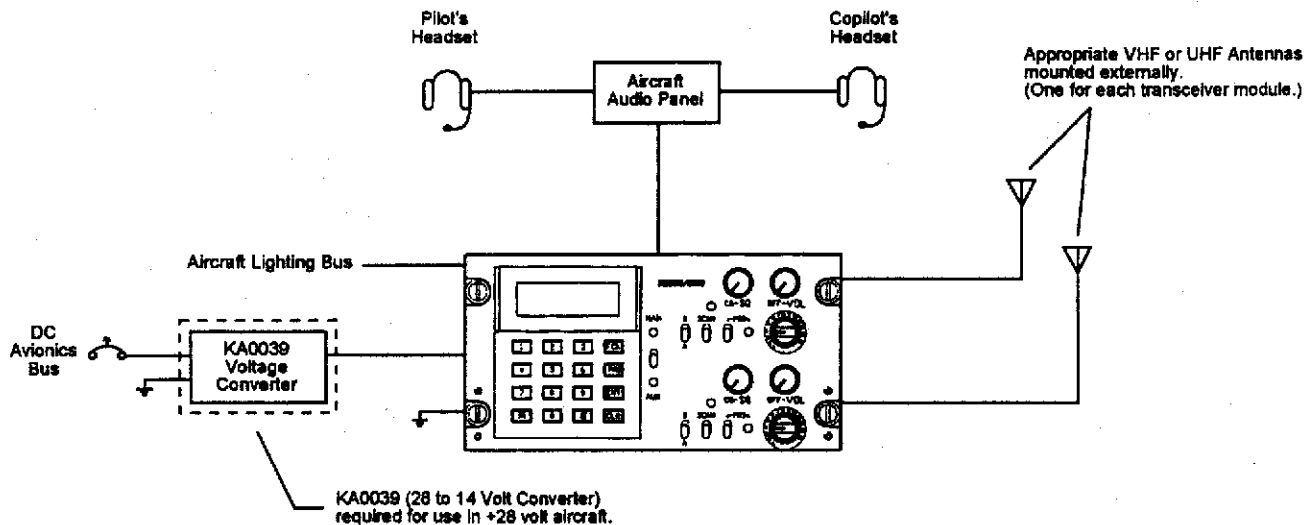


Figure 1-1. Typical System Configuration.

## SECTION II INSTALLATION

### 2.1 GENERAL INFORMATION

The purpose of this section is to provide service personnel with installation information pertaining to the KFM0985 Airborne FM Transceiver. Close adherence to these suggestions will help assure a more satisfactory performance from the equipment.

Installation instructions are supported by mechanical outline drawings and electrical interconnection drawings. These drawings, located in this section, should be reviewed by the installing agency and requirements peculiar to the particular airframe established before installation is begun.

### 2.2 EQUIPMENT INSTALLATION

#### 2.2.1 GENERAL

The following paragraphs contain information pertaining to the initial installation of the KFM0985 Airborne FM Transceiver, including instructions concerning the location and mounting of any supporting equipment.

The equipment should be installed in the aircraft in a manner consistent with acceptable workmanship and engineering practices and in accordance with the instructions set forth in this publication. To ensure that the equipment has been properly and safely installed in the aircraft, the installer should make a thorough visual inspection and conduct an overall operational check of the system on the ground prior to flight.

#### CAUTION

AFTER INSTALLATION OF THE CABLING AND BEFORE INSTALLATION OF THE EQUIPMENT, A CHECK SHOULD BE MADE WITH AIRCRAFT PRIMARY POWER SUPPLIED TO THE MOUNT CONNECTOR TO ENSURE THAT POWER IS APPLIED ONLY TO THE PINS SPECIFIED IN THE INTERCONNECT DIAGRAM, FIGURE 2-2 ON PAGE 2-4.

The KFM0985 installation will conform to standards designated by the customer, installing agency and existing conditions as to the unit location and type of installation. However, the following suggestions should be considered before installing your KFM0985.

#### 2.2.2 AVIONICS COOLING REQUIREMENTS FOR PANEL MOUNTED EQUIPMENT

The greatest single contributor to increased reliability of all modern day avionics is to limit the maximum operating temperature of the individual units, whether panel or remote mounted. While modern day individual circuit designs consume much less electrical energy, the watts per cubic inch dissipated within avionics units remains much the same because of the high density packaging techniques utilized. Consequently, the importance of providing avionics stack cooling is essential to the life span of the equipment.

While each individual unit may not require forced air cooling, the combined heat load of several units operating in a typical avionics stack will significantly degrade the reliability of the avionics if provisions for stack cooling are not incorporated in the initial installation. Failure to provide stack cooling may lead to increased avionics maintenance costs and may void the warranty.

#### 2.2.3 LOCATION OF EQUIPMENT

##### A. Antenna Locations

The configuration will define parameters of antenna(s) installation. The antenna(s) should cover the desired frequency range. The dimensions and footprint pattern for the antenna should be provided by the manufacturer. The location will vary with different aircraft types.

The antenna should be well removed from any projections, the engine(s), and propeller(s). It should also be well removed from landing gear doors, access doors, or other openings which will

break the ground plane for the antenna, as the surface directly beneath the antenna should be a flat plane over as large an area as possible.

A back-up plate should be used for added strength on thin-skinned aircraft.

To prevent RF interference, the antenna must be physically mounted a minimum distance of three feet from the KFM0985 and the wiring harness.

The unit's antenna should be mounted a minimum of six feet away from the DME antenna and four feet from the ADF sense antenna.

Where practical, plan the antenna location to keep cable lengths as short as possible and avoid sharp bends in the cable to minimize the VSWR.

Avoid running other cables or wires near the antenna cable.

On pressurized aircraft, the antenna should be sealed using RTV No. 3145, or equivalent, around the connector and mounting hardware.

All antenna mounts should be sealed around from the outside for moisture protection using RTV or equivalent.

Mount the antenna in as clean an environment as possible, away from exhaust gases and oils. The antenna should be kept clean. If left dirty (oil covered), the range of the unit may be affected.

#### B. Unit Mounting Location

The panel mounted KFM0985 can be mounted in any convenient location that is free of excessive heat and vibration and which provides reasonable access for inspection and maintenance. To achieve maximum performance, the KFM0985 should be installed adjacent to other units with similar functions. Except for antenna cables, the length of cables from the KFM0985 connectors is not critical because the unit interfaces are designed with high impedance inputs, low impedance outputs, and low noise characteristics. Forced-air cooling can be provided but is not a requirement. Outline and mounting drawing Figure 2-1 on page 2-3 shows the unit's various dimensions.

Care should be exercised to avoid mounting the equipment near equipment operating with high pulse current or high power outputs such as radar and satellite communication equipment. In general, the equipment should be installed in a location convenient for operation, inspection, and maintenance, and in an area free from excessive vibration, heat and noise generating sources.

### 2.2.4 KFM0985 INTERWIRING AND CABLE HARNESS FABRICATION

#### A. General

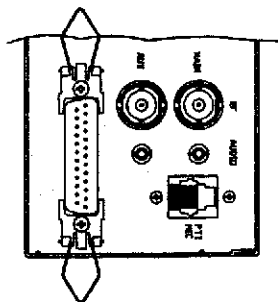
Figure 2-2 on page 2-4 is a detailed interwiring diagram for installations. The interwiring diagram requires thorough study before installation of the aircraft wiring.

Cabling must be fabricated in accordance with Figure 2-2. The length of the wires to parallel pins should be approximately the same length, so that the best distribution of current can be effected. BK Radio recommends that all wires, including spares as shown on the interwiring diagram, be included in the fabricated harness. However, if full wiring is not desired, the installer should ensure that the minimum wiring requirements for the features and functions to be used are incorporated.

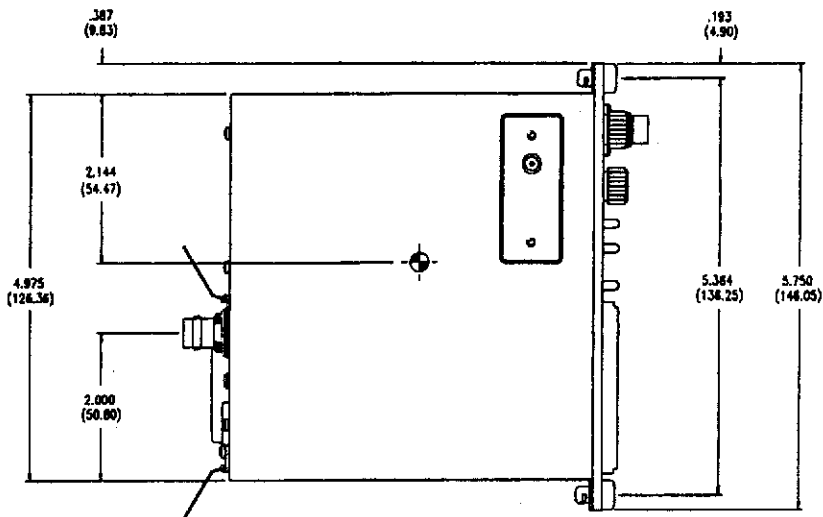
When the cables are installed in the aircraft, they must be supported firmly enough to prevent movement and should be carefully protected against chafing. Additional protection should also be provided in all locations where the cables may be subject to abuse.

In wire bundles, the cabling should not be tied tightly together as this tends to increase the possibility of noise pickup and similar interference. When routing cables through the airframe, the cables should cross high-level lines at a right angle.

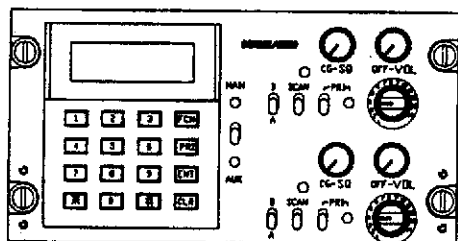
⊙ = Center of Gravity  
 Unit Weight = 2 lbs., 3 oz.



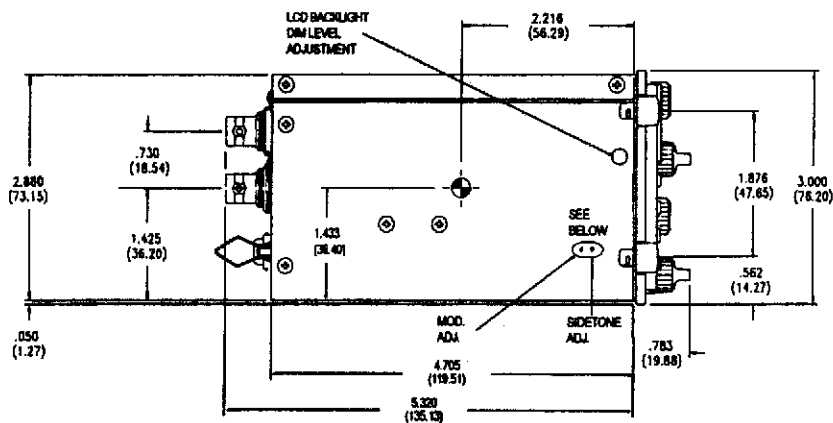
**REAR VIEW  
 (Partial)**



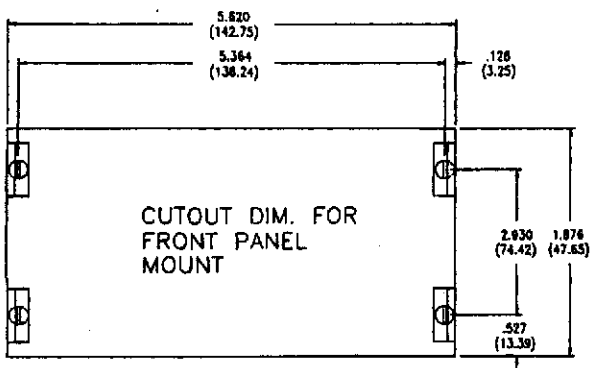
**TOP VIEW**



**FRONT VIEW**

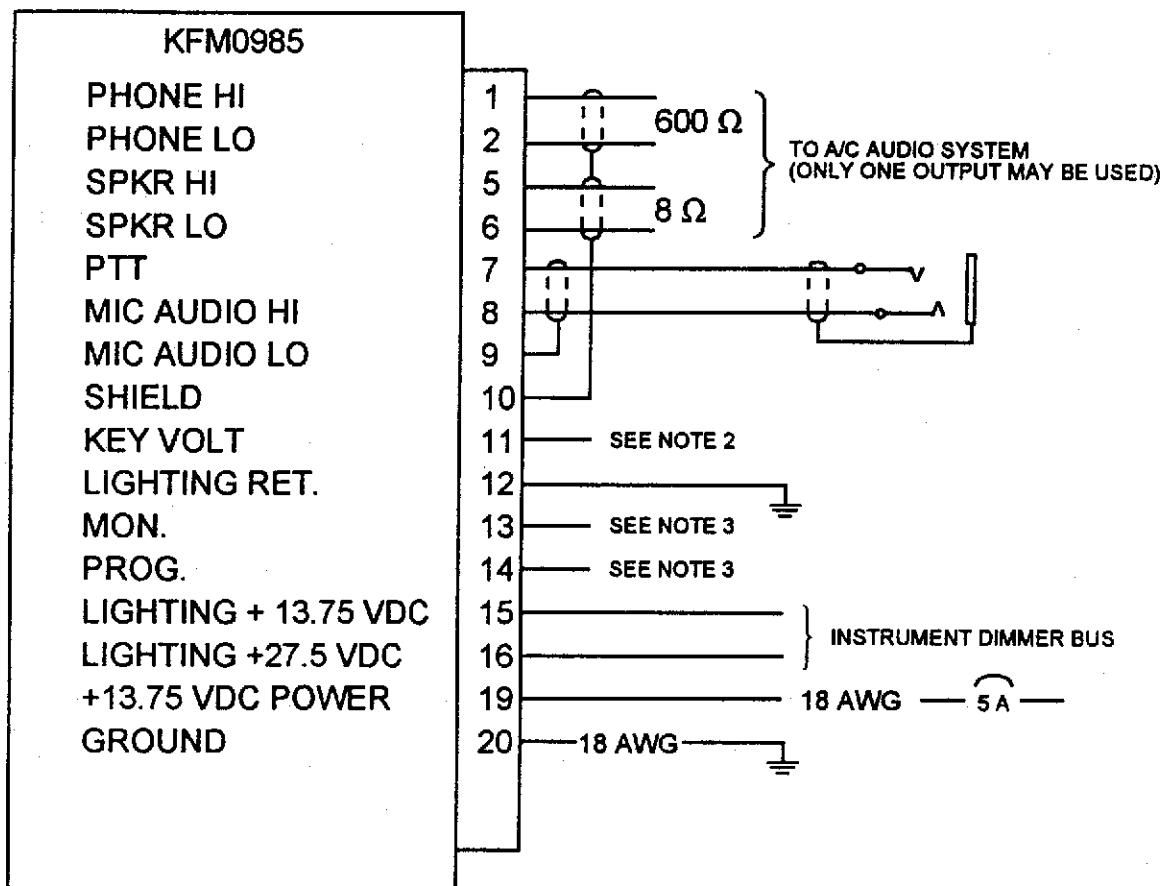


**SIDE VIEW**



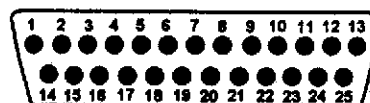
NOTE: DIMENSIONS IN ( ) ARE IN MILLIMETERS.

**Figure 2-1. Outline and Mounting Drawing.**



**NOTES:**

1. ALL WIRING #24 AWG UNLESS OTHERWISE NOTED.
2. ENCRYPTION MODULE SUPPLY PIN.
3. FOR UNIT PROGRAMMING.
4. ANTENNA CONNECTIONS NOT SHOWN.



CONNECTOR VIEWED FROM WIRING SIDE

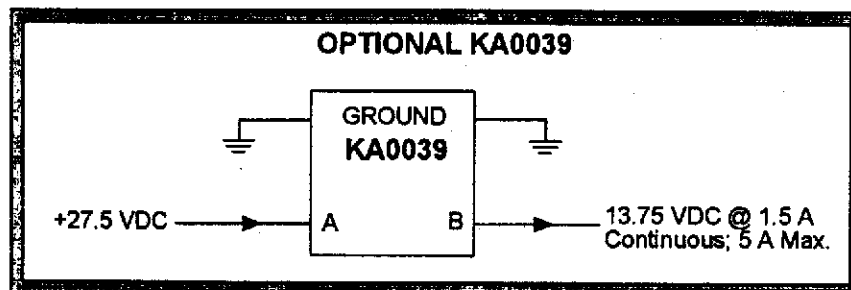


Figure 2-2. Interconnect and Wiring Diagram.

## 2.2.4 A. Continued

The installer must be knowledgeable of any system variations peculiar to the installation.

Notes on the interwiring diagram, Figure 2-2, describe wire sizes and other particulars related to the system interwiring.

The following guidelines are recommended:

- (1) The installing facility will supply and fabricate all external cables following the instructions provided as per Figure 2-2. The required connectors are supplied as part of the Installation Kit.
- (2) The KFM0985 and the associated wiring harness must be kept a minimum of three feet from the transceiver/receiver antenna coax and the termination connector of the antenna to prevent RF interference from the antenna.
- (3) Do not route the transceiver/receiver antenna coax near ADF sense or loop antenna cables.

### B. Primary Power and Circuit Breaker Requirements and Wiring

The KFM0985 unit receives primary power from an aircraft +14 VDC power source via an aircraft circuit breaker or if +28 VDC, a KA0039 voltage converter is required. The unit receives its lighting signal from the aircraft dimmer bus.

Power connection requirements are shown on interwiring diagram Figure 2-2.

### C. Connectors

All connections and mating connectors for the KFM0985 units are identified on the appropriate outline drawing, Figure 2-2.

#### (1) Main Connector

The transceiver main connector is mounted on the rear panel. The connector is a D-subminiature 25 pin. With the exception of the antenna coax connections, all of the necessary electrical connections are delivered through the main connector.

The mating D-subminiature 25 pin connector for the main connector is supplied with the KFM0985 Installation Kit. The two latches supplied must be installed on the connector so that the spring locks on the Unit's connector can be used to properly secure the two together.

#### (2) Antenna Connectors

The two discrete coaxial cable connectors on the transceiver rear plate (see Figure 2-1) connects to the specific-band antenna by a coaxial cable and BNC connector.

#### (3) Headset Connections

The connections are accessed from the rear connector. (Refer to Figure 2-1 and 2-2)

#### (4) Programming Cable

This cable allows the unit to be externally programmed by a computer, using a special RS232 interface cable (LAA0725).

### D. Equipment Mounting

All mechanical installation drawings, connector assembly diagrams, interwiring diagrams, and connector pin assignment tables referenced in this section are located in this section of the manual. Determine the mounting location for system components per Paragraph 2.2.3.

Prior to installing any equipment, make a continuity check of all wires and cables associated with the system. After the continuity check, apply power and check for proper voltages at system connectors, and then remove power before continuing installation.

(1) Transceiver

The mounting for the transceiver should be panel mounted, using dimensions specified in the manufacturer's applicable outline drawing. The unit should be wired according to the system interwiring diagram, Figure 2-2.

To allow for inspection or repair of the wiring of the connector assembly itself, sufficient lead length should be left so that when the mounting hardware for the rear connector assembly is removed, the rear connector assembly may be pulled forward several inches. Also a bend should be made in the harness (at the rear connectors) to allow water droplets that might form on the harness due to condensation, to drip off at the bend and not collect in the connector.

The unit mounting hole location and dimensions are aircraft-type-dependent and must be determined prior to installation. Clean all surfaces prior to placing the mount in place.

The unit uses Dzus fasteners to secure them to the instrument panel. Use the applicable outline drawings, Figure 2-1 on page 2-3, as a guide to position the unit and to cut and drill the instrument panel. Attach the Dzus fastener brackets behind the instrument panel in the proper locations shown on the outline drawing. The unit has four Dzus fasteners, one at each of the four corners. After connecting the cable assemblies to the rear connectors, insert the control panel into the instrument panel. Make certain the cable assembly is not pinched or severely twisted before tightening the Dzus fasteners.

(2) Antennas

For frequency-specific antenna outline drawings, installation procedures, and mounting dimensions, refer to the manufacturer's instructions.

## 2.3 INSPECTION, SYSTEM CHECKOUT, AND FLIGHT TEST PROCEDURE

### 2.3.1 INSPECTION

Figure 2-3 is a visual inspection/check procedure that should be performed after system installation as part of a system checkout. In addition, the procedure should be used as a periodic maintenance inspection check.

EQUIPMENT	INSPECTION/CHECK PROCEDURE
KFM0985 Airborne FM Transceiver	<ul style="list-style-type: none"> <li>(1) Inspect external surface for damage.</li> <li>(2) Check that the unit is properly installed and that retaining mechanism is securely tightened.</li> <li>(3) Ensure that all connections into the unit are properly mounted and secure.</li> </ul>
Antennas	<ul style="list-style-type: none"> <li>(1) Inspect external surfaces for damage.</li> <li>(2) Check that antenna is properly mounted and mounting screws are tight.</li> <li>(3) Ensure that antenna coaxial cable connector is properly mated and secure.</li> </ul>

Figure 2-3. Inspection/Check Procedure.

## 2.3.2 TRANSCEIVER CHECKOUT

A. Installation of the transceiver system requires three stages of testing to ensure the proper operation of the transceivers. Initially, prior to installation of the transceiver, a system interwiring check is performed. This check verifies that the aircraft and all transceiver system interconnections are correct, before power is applied. After the unit is installed a visual inspection of the equipment and connections is made. The post-installation test is used to apply power and functionally check out the system. Successful completion of the post-installation test verifies the proper operation of the KFM0985 Airborne FM Transceiver.

### B. Interwiring Check

To check the aircraft and transceiver system interconnections proceed as follows:

- (1) Check that all cables and interwiring are installed in accordance with the Interwiring and Cable Fabrication instructions (paragraph 2.2.4).
- (2) Check wiring for proper destinations, opens, and shorts, per interconnect diagrams Figure 2-2.

### C. Visual Inspection

In conjunction with system installation, perform the visual inspection/check procedure (Figure 2-3 on page 2-6 in this section).

### D. Post-Installation Test

This test verifies the proper operation of the KFM0985 Transceiver System. The following tests are performed on the ground.

- (1) Check KFM0985 system source power as follows:
  - (a) Confirm that aircraft +14 VDC/+ 28 VDC power source is operational (i.e., check aircraft power bus meter).
  - (b) Confirm that the aircraft panel background lighting power source is operational by adjusting the cockpit dimmer switch for proper cockpit panel illumination.
  - (c) Confirm that the LCD display's backlighting is properly adjusted for this installation. The backlight adjustment is a future production change. If the access hole is present, then the following Steps 1) through 3) apply.
    - 1) Dim the backlight by depressing the CLR button for approximately 3 seconds.
    - 2) If necessary, the Dim level can be adjusted brighter or dimmer. See the Side View in Figure 2-1 on page 2-3 for the adjustment's access hole location.
    - 3) Toggle the backlight back to Bright by again depressing the CLR button for approximately 3 seconds.

#### NOTE

Steps (b) through (e) below provide control settings for the KFM0985. The instructions are relevant to both the MAIN and AUX radios and, unless otherwise noted, will not be repeated for different version of radios. Any exceptions will be addressed.

- (2) To receive, set the controls as follows:
  - (a) Set the ON/OFF switch to ON.
  - (b) Set MAIN/AUX toggle switch to MAIN (selects transceiver #1).
  - (c) Set the Squelch switch to "threshold squelch setting".
  - (d) Set the rotary channel selector switch to desired channel.
  - (e) Check for proper indications on the LCD display and an audible signal indicating the radio is operational.

- (3) To transmit, set the controls as follows:
  - (a) Select the channel (not a receive only channel).
  - (b) Key the microphone and check for illumination of the TX indicator lamp on the MAIN (selected) transceiver.
  - (c) Check for proper microphone modulation and sidetone levels. See the Side View in Figure 2-1 on page 2-3 for their adjustment location. Remove the cover tag for access.

#### E. Taxi-Run and Flight Test

#### NOTE

Perform the following test after the post-installation and preflight checks indicate that normal operation is possible.

#### CAUTION

DURING ENGINE START-UP PROCEDURES, KEEP ALL NAVIGATION – COMMUNICATION – RADAR EQUIPMENT TURNED OFF. LARGE VOLTAGE SPIKES MAY BE GENERATED WHICH COULD DAMAGE TRANSISTOR AND INTEGRATED CIRCUIT EQUIPMENT.

Once airborne, check for proper transceiver operation by communicating with another aircraft, or a handheld or a base station on the ground to verify that the unit will both transmit and receive.

## 2.4 REMOVAL AND REPLACEMENT

### A. Transceiver

#### (1) Removal

- (a) Loosen the four 1/4-turn Dzus fasteners (located on control unit front panel) that secure the control unit to mounting surface.
- (b) Gently pull the control unit forward to expose the rear panel connectors.
- (c) Disconnect the control unit connectors.

#### (2) Reinstallation

- (a) Reconnect the connectors to the rear panel of the control unit.
- (b) Carefully slide the control unit into position and tighten the four 1/4-turn Dzus fasteners to hold unit firmly in place.

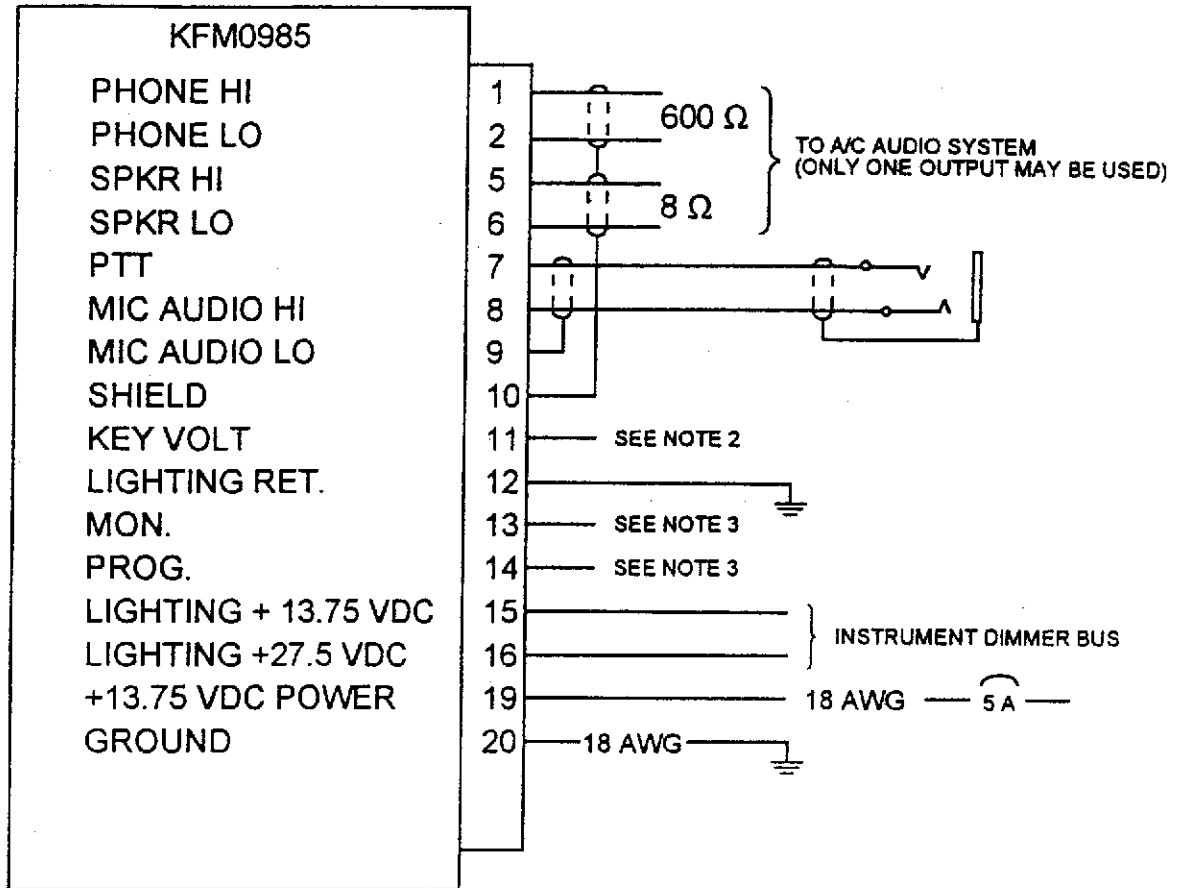
### B. Antennas

For antenna removal and reinstallation procedures, refer to manufacturer's documentation.

## 2.5 INFORMATION OR SERVICE

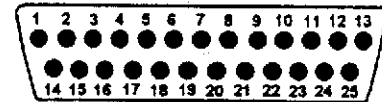
If you need service or more information, please contact your local BK Radio dealer or the factory at the address below:

BK Radio, Inc.  
ATTN: Technical Services Dept.  
2901 Lakeview Road, Suite 100  
Lawrence, Kansas 66049  
Telephone: (913) 842-0402  
Fax: (913) 841-0287



**NOTES:**

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3. FOR UNIT PROGRAMMING.
4. ANTENNA CONNECTIONS NOT SHOWN.



CONNECTOR VIEWED FROM WIRING SIDE

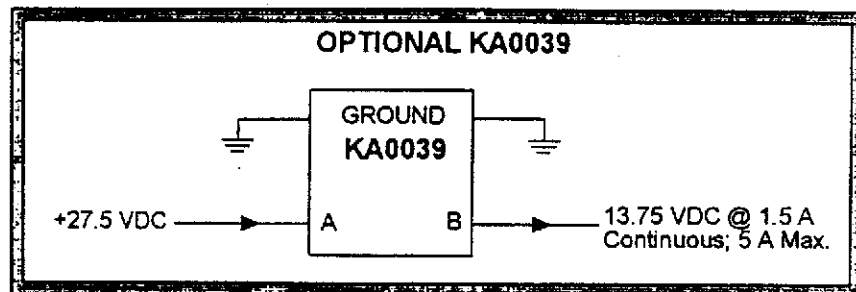


Figure 2-2. Interconnect and Wiring Diagram.