SERVICE MANUAL

RF DATA LINK RADIOS

70-101BD
70-201BD

MIDLAND®
RADIO CORPORATION

Important Information

This manual is designed to facilitate the set-up and service of the Midland 70-101BD and 70-201BD RF Data Link Radio series. As necessary, service manual supplements will be published and distributed on the following forms:

Manual Addition (MA)……For supplemental information useful in product service or improvement. Printed on BLUE paper.

Change Notice (CN)……For details about changes made during production by model and serial number. Printed on YELLOW paper.

Manual Correction (MC).....For correcting literature errors not related to production changes. Printed on GREEN paper.

Technical Bulletin (TB).....For solutions to field problems and tips for performance improvement. Printed on PINK paper.

Comments or suggestions concerning areas of manual improvement are welcome.

TABLE OF CONTENTS

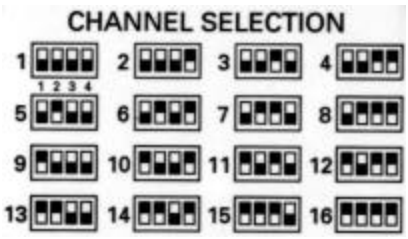
ACRONYMS AND ABBREVIATIONS

Below is a list of common electrical abbreviations used in documentation.

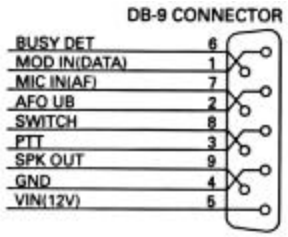
CTCSS----------	Continuous Tone-Controlled Squelch System
DCS(or CDCSS) ----------	Continuous Digital-Controlled Squelch System
EEPROM ----------	Electrically Erasable Programmable Read Only Memory
MIL SPEC ----------	Military Specification
RX ----------	Receive
TX ----------	Transmit
SINAD ----------	The ratio in decibels of signal + noise + distortion to noise + distortion
VCO ----------	Voltage Controlled Oscillator
TCXO ----------	Temperature Controlled Crystal Oscillator
PLL ----------	Phase Locked Loop

Installation and Setup Information for 70-101BD and 70-201BD Data Link Radios.

Transmit/Receive channels are chosen from the frequencies programmed by switches inside the cover. Refer to the channel data list and set DIP switches for the desired frequency.



All connections to the unit are made through the DB9 connector. Connect wiring according to the diagram below.



Connections to DB-9 connector:

1. Mod in (data). Audio sensitivity is 100mV RMS @ 60% Peak deviation.
2. AF out (data) (0.25 volt rms)
3. PTT . Ground to transmit.
4. GND
5. V in . 9-18 VDC
6. Busy Detector 0 volts DC = busy, 5 volts DC = open
7. Audio/Mic in. Sensitivity 5 mV. Typ.
8. Switch
9. Spkr out. 1 V. rms. typ. to 8 ohm load.

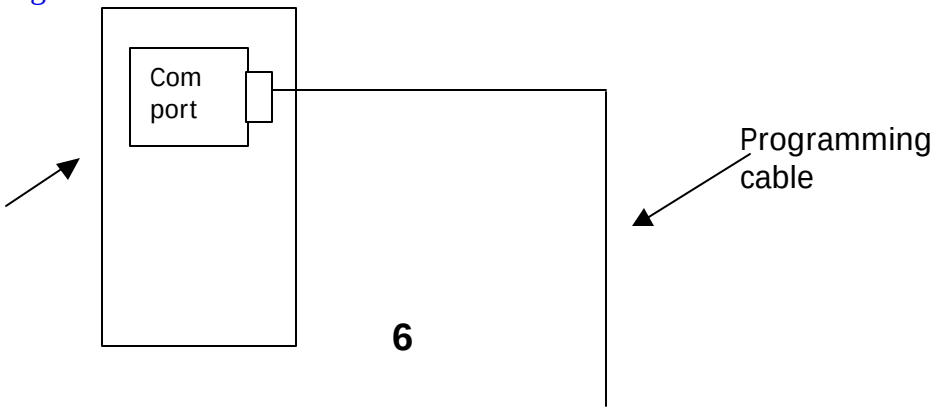
PS current:

Power save	15-30 mA. typ.
Standby	30-50 mA. typ.
Receive	35-60 mA. typ.
Transmit Low power	400-650 mA. typ.
Transmit High power	1100-1800 mA. typ.

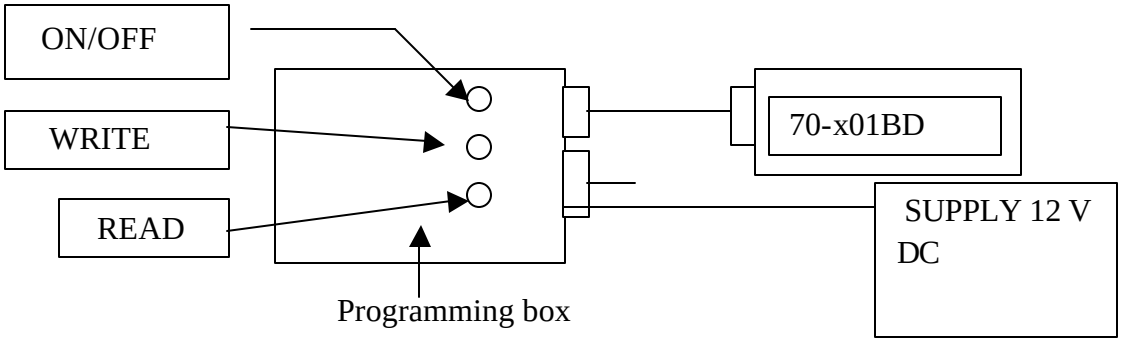
How to Program 70-x01BD.

Requirement : PC running DOS or Windows 95/98, 70-1410K kit including:
Programing box, Programming Cable, and Software on one 3.5 disc.
(Optional: dot matrix printer)

Connection Diagram



PC



1. Install ACC900 by copying ACC900.exe to your PC or running it from the floppy disk.
2. Connect the 70-x01 Unit through the Programming box and cable to the PC .(See Connection Diagram)
3. Run Acc900.exe and select Band, 70-101BD VHF or 70-201BD UHF.

Radio Model
70-101BD VHF
70-201BD UHF

4. After selecting Band, Press Enter. The screen will show

Setup & Select Data Source
1. Select Comunication Port
2. Read Radio
3. Set Path to Data Files
4. Read Existing File
5. Restore Last File
6. Create New File
7. Delete a File
8. Exit

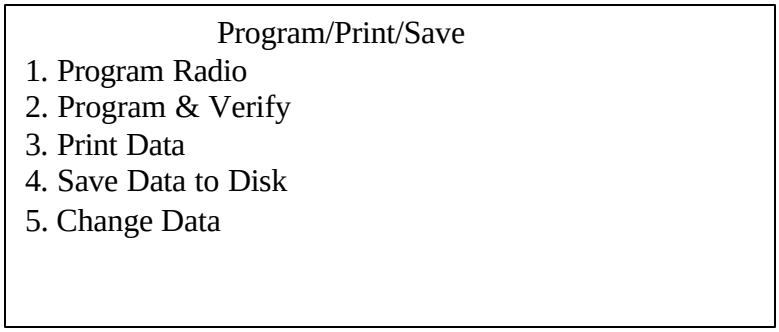
5. On first operation you will need to set the Com Port and path to data files before beginning to program radios.

6. To read radio channel data from a unit, first push box switch ON (DOWN). Second you must select read radio from the software then Push Switch READ and wait for the download to complete. If everything is OK Red LED will show while reading. The screen will show:

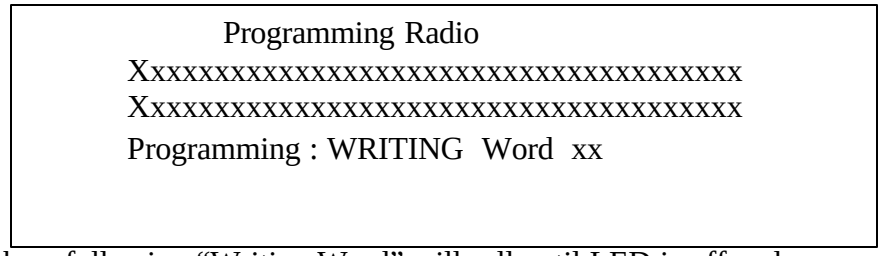
Programming Radio
Xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Programming : Reading Word xx

Numbers following "Reading Word" will roll until the read is complete. The LED will turn off, the screen will prompt that programming is complete, and the channel list will display. (In some cases * this box will be blank.)

7. You can change the channel data two ways. You can create a new frequency file by selecting Create New file from Setup & Select Data source menu or by reading from the unit and modifying the frequency that you want. To upload the changes verify that power switch is still Down (ON). Press Right Arrow Key to select Features Window and select 4. Program/Print/Save. The next Window is as below



Select Program Radio and push Write Switch. The Red LED will light followed by the display of the screen as below



The numbers following "Writing Word" will roll until LED is off and programming is complete. (In some cases * this box will be blank.)

Notes:
* in Windows 95/98 use ALT+ENTER to change to full screen display from window display. Box contents will show.

Maintenance and Repair

GENERAL

When removing or fitting, use the Exploded View and Parts List, located on page 33 in conjunction with the following procedures:

- WARNING: Disconnect the 70-x01 from all external equipment at the D-Sub connector prior to disassembly.

REMOVING & REPLACING THE UPPER COVER

Removing the Upper Cover:

1. Unscrew the four upper cover mounting screws located on the upper cover of the radio.

To replace the Upper Cover:

1. Reverse the steps taken to remove the Upper Cover.

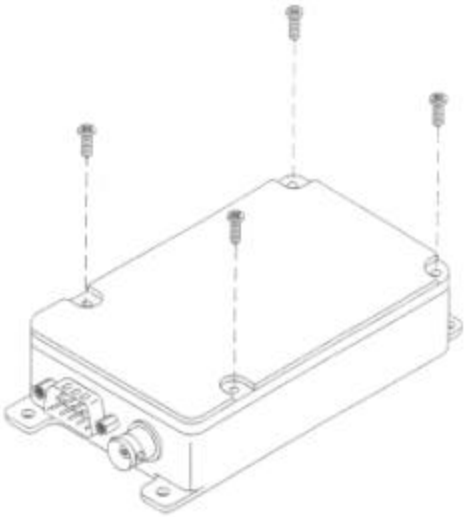


Figure 1-Upper Cover Removal

REMOVING & REPLACING THE DIGITAL BOARD & SHIELD PLATE

Removing the Digital Board Assembly & Shield Plate:

1. Remove the Upper Cover (refer to Removing & Replacing the Upper Cover).
2. Disconnect the DB9 pin connector on CON401.
3. Unscrew the 4 mounting screws.
4. Remove the Digital Board Assembly.
5. Remove the Shield Plate.

To replace the Digital Board Assembly:

1. Reverse the steps taken to remove the Digital Board Assembly & Shield Plate.

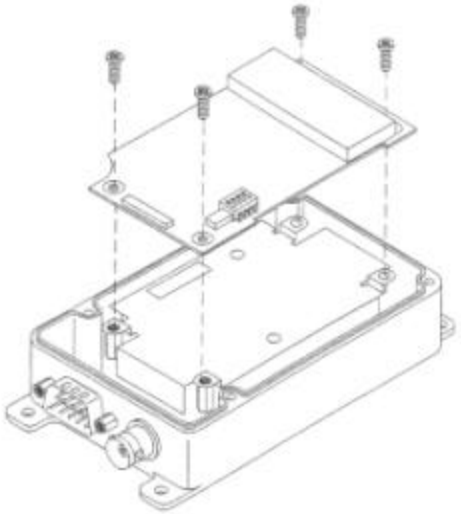


Figure 2-Digital Board Assembly Removal

Maintenance and Repair (continued)

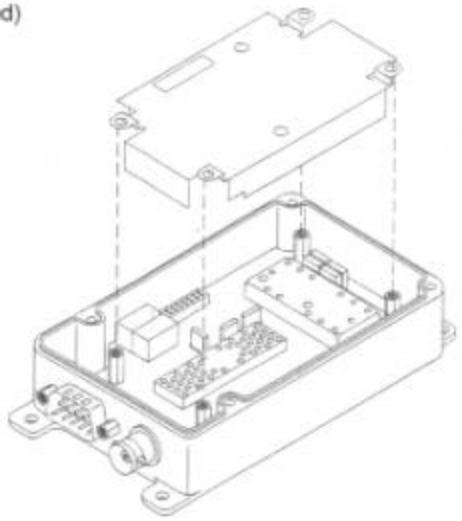


Figure 3-Shield Plate Removal

REMOVING & REPLACING THE RF BOARD

Removing the RF Board Assembly:

1. Remove the Upper Cover (refer to Removing & Replacing the Upper Cover).
2. Remove the Digital Board Assembly and Shield Plate (refer to Removing & Replacing the Digital Board Assembly & Shield Plate).
3. Unscrew the 4 mounting standoffs.
4. Unsolder the antenna connector cable.
5. Remove the RF Board Assembly.

To replace the RF Board Assembly:

1. Reverse the steps taken to remove the RF Board Assembly.

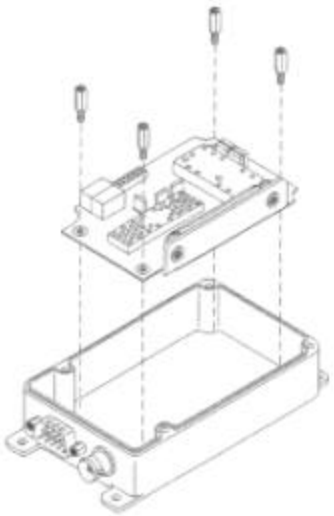


Figure 4-RF Board Removal

Troubleshooting Guide

SYMPTOMS	CAUSES	COUNTERMEASURES
Unit does not work	1. Incomplete connection 2. Defective DC/DC VCC 3. 5v voltage source 4. PLL error 5. Filtering error 6. EEPROM fail	1. Check CON401 connection 2. Check U801 3. IC1 (5v –0.2v) 4. Check TCXO/VCO/PLL IC 5. Check LPF (IC407) 6. Re-programming
Bad RX Sensitivity (-10 to -60dB)	1. Defective ANT Switch 2. Defective Front-End 3. Defective dBm 4. IF IC 5. VCO level drop 6. Change of 1st local frequency	1. Check D5, D6 2. Check Q601 3. Check D9, T2, T3 4. Replace IC5 5. RX VCO level .2dBm 6. Re-Tune TCXO
Defective RX	1. VCO frequency change or level drop 2. Defective voltage source	1. Repair RX VCO 2. Defective IF IC (IC5) 3. IC1, Q1, Q3
PLL Error	1. Defective 12.8 MHz TCXO 2. Voltage source for RX VCP/TX VCO 3. Defective PLL IC	1. Replace TCXO 2. Check RX VCO/TX VCO 3. Replace IC2
Low TX Power	1. APC	1. Re-adjust RV1
No TX Power	1. TX Buffer 2. Power Module 3. APC control	1. Check Q16, 17 2. Check Q501, 502, 503 3. Check Q22, D4
No Modulation	1. SW IC & Mic Amp IC	1. Check U404, 405, 406
No Programming	1. Short protector VCC	1. Defective programming lead

- An Extender Board, P/N: **70-075845** is required in order to separate the Digital and RF PCB s for troubleshooting purposes.