

TK-981 MEMORY PROGRAM PROCEDURE

BY W7AIT

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NO WARRANTY OFFERED OR ASSUMED

USE AT YOUR OWN RISK

SCOPE:

DOCUMENT COVERS PROGRAMMING OF KENWOOD TK-981 TRANSCEIVER FOR AMATEUR RADIO USE IN THE AMATEUR 902- 928 AMATEUR BAND - NO HARDWARE MODIFICATIONS ARE REQUIRED.

CAVEAT - COOLING FANS:

1. IF EXTENDED "RAG CHEWING" OR "BUCKET MOUTH" OPERATIONS INTENDED, COOLING FANS MUST BE ADDED TO REAR HEAT SINK OF TK-981. CONTACT AUTHOR FOR DETAILS.

DEFINITIONS:

1. **PART 15 TRASH** – UNLICENSED PART 15 RADIATORS THAT MAY MEET PART 15 IN THE 902 -928 BAND BUT INTERFERE WITH HAM RADIO.
 - a. EXAMPLE – RESIDENTIAL TRANSCEIVER OR TRANSMITTER PART OF ELECTRIC METER, WATER METER, GAS METTER.
2. **ISM BAND** – 902 IS A "ISM BAND – INDUSTRIAL, SCIENTIFIC, MEDICAL" FCC BAND. AMATEURS SHARE WITH ISM USERS.
3. **SYSTEM** – A "CHANNEL".
4. **CONVENTIONAL** – RADIO SET FOR SIMPLEX OR REPEATERS.
5. **TRUNKED** – RADIO IN COMMERCIAL USE, TRUNKED SYSTEM.
6. **FCC CHANNEL** –RESULT OF PROGRAMMING. CREATES 7 DIGIT FCC NUMBER.
7. **INITIAL FCC CHANNEL** – A STARTING 2 DIGIT FCC ID. PROGRAM CONVERTS TO 7 DIGIT.
 - a. EXAMPLES: 01, 00, 49, 53, 77, 02.
 - b. FINAL 7 DIGIT: 3435346, 3435383, 3435342, CORRESPOND TO 927.1500, 927.6125, 927.1000 MHZ.
8. **TA** – TALK AROUND OR SIMPLEX.
9. **THE WILD WEST** – CONDITIONS ON 902 HAM BAND, FLUID, CHANGEABLE, SUDDEN INTERFERENCE.
10. **SECONDARY** – AMATEUR SECONDARY TO MILITARY/ FEDERAL OPERATIONS.
 - a. PART 15 USERS ARE SECONDARY TO AMATEUR. PART 15 USERS MUST YIELD TO ALL LICENSED AMATEUR USERS I.E. IF PART 15 USER INTERFERES WITH LICENSED AMATEUR, PART

15 OPERATOR REQUIRED TO SHUT DOWN, CEASE OPERATION /
MIDIGATE INTERFERENCE FOR THE AMATEUR.

11. **SIMPLEX PL** –PL GENERALLY REQUIRED FOR SIMPLEX.
12. **SPLITS** – EACH AREA HAS UNIQUE SPLITS.
 - a. MOST -25 MHZ SPLITS.
 - b. AMATEUR USUALLY AT BOTTOM & TOP 1 MHZ FOR TX/RX.
13. **PROGRAMMING DEFAULTS** – USER DETERMINES THESE. THIS
PROCEDURE DOESN'T COVER DEFAULTS.
14. **OPTIONAL FEATURES** – SETTINGS DETERMINED BY USER
PREFERENCE IN PROGRAM KGP-49D.
15. **KEY ASSIGNMENT** - SETTINGS DETERMINED BY USER PREFERENCE
IN PROGRAM KGP-49D.
16. **SCAN INFORMATION** - SETTINGS DETERMINED BY USER
PREFERENCE IN PROGRAM KGP-49D.
17. **DTMF** - SETTINGS DETERMINED BY USER PREFERENCE IN PROGRAM
KG-49D.
18. **FLEET SYNC** - SETTINGS DETERMINED BY USER PREFERENCE IN
PROGRAM KGP-49D.
19. **SYSTEM MERGE** - SETTINGS DETERMINED BY USER PREFERENCE IN
PROGRAM KGP-49D.
20. **EMERGENCY INFORMATION** - SETTINGS DETERMINED BY USER
PREFERENCE IN PROGRAM KGP-49D.
21. **TEST FREQUENCY** - SETTINGS DETERMINED BY USER PREFERENCE
IN PROGRAM KGP-49D.
22. **EMBEDDED MESSAGE** - SETTINGS DETERMINED BY USER
PREFERENCE IN PROGRAM KGP-49D.

REFERENCE DOCUMENTS:

1. BROCHURE: <http://www.repeater-builder.com/kenwood/pdfs/TK-980-981-spec-sheet.pdf>
2. MANUAL SUPPLEMENT: <http://www.repeater-builder.com/kenwood/pdfs/TK-980-981-sm-supplement-1.pdf>
3. MANUAL: TK-980-981 INSTRUCTION MANUAL AND OTHER INFO,
AVAILABLE AS PDF ON LINE.

GENERAL – KEY ASSIGNMENTS:

1. TK-981 – ALL FRONT PANEL BUTTONS FULLY PROGRAMMABLE
FOR ANY FUNCTION. YOU AS USER DETERMINE WHAT AND HOW
YOUR RADIO'S BUTTONS ARE AND HOW TO BE LAID OUT
2. RECOMMENDED:
 - a. LEFT UP DOWN – VOLUME CONTROL LOUDER SOFTER.
 - b. RIGHT UP DOWN – CHANGE CHANNEL UP OR DOWN.
 - c. A - SKIP DURING SCAN.
 - d. B – TA OR TALK AROUND OR SIMPLEX FOR THAT CHANNEL.

- e. C – DECREMENT PREPROGRAMMED PL SELECTION.
- f. D – INCREMENT PREPROGRAMMED PL SELECTION.
- g. DISPLAY – GEOGRAPHICAL LOCATION OR FREQUENCY, YOUR CHOICE.

REQUIRED PARTS, SOFTWARE, EQUIPMENT OR EQUIVALENT:

1. KENWOOD PROGRAMMING CABLE, KPG-4, DB9 FEMALE TO 6 PIN RJ45 CONNECTOR. HAS LEVEL SHIFTER CIRCUIT INSIDE THE DB9. AVAILABLE ON LINE FOR ABOUT \$25.
2. KENWOOD, TK-981, TRANSCEIVER TO BE PROGRAMMED. AVAILABLE USED FOR ABOUT \$200, NEW \$460 TO \$520.
3. DESKTOP PC, WINDOWS XP, WITH RS 232 SERIAL PORT.
4. KWID SOFTWARE, FREE ON LINE.
5. KPG-49D SOFTWARE FREE ON LINE.
6. KW900EZP CONVERTER PROGRAM, FREE ON LINE AT <http://home.roadrunner.com/~n2mci/KW900EZP.html>
7. MS-DOS (RUN COMMAND, PART OF WINDOWS XP).

PROGRAMMING

PROGRAMMING ABSTRACT:

DESPITE COMPLEXITY OF THE PROCEDURE BELOW, PROGRAMMING IS SIMPLE IF THE FOLLOWING CONCEPTS ARE UNDERSTOOD:

1. GET DATA & CONVERT FCC NUMBERS.
2. LOAD INTO MAIN PROGRAM, PROCESS & SAVE UNIQUE FILE NAME.
3. WITHIN SAME DIRECTORY, MAIN PROGRAM COMPLETES CONVERSION AND YOU SAVE RESULTS.
4. LOAD SAVED FILE INTO RADIO, TEST, RUN RADIO. FINISHED.

PROCEDURE

1. OBTAIN VALID FREQUENCY / PL INFORMATION

- 1.1. ****EXTREMELY IMPORTANT**** - VALID REPEATER FREQUENCIES THAT YOU CAN HIT AND BE LOUD ENOUGH TO WORK THROUGH REQUIRED.
- 1.2. DO NOT PICK REPEATERS THAT:
 - 1.2.1. HAVE HIGH ELEVATIONS BUT YOU KNOW ARE TOO FAR AWAY OR ARE BLOCKED BY MOUNTAINS.
 - 1.2.2. LOCATIONS FURTHER THAN 75 MILES.
 - 1.2.3. ANY FREQUENCIES LISTED IN ARRL REPEATER DIRECTORY. CURRENT ARRL REPEATER DIRECTORY IS OUT OF DATE BECAUSE NO ONE IS KEEPING TRACK OF FREQUENT CHANGES (SEE THE WILD WEST).

- 1.2.4. NARCC WEBSITE, OUTDATED INFO BECAUSE THINGS CHANGE TOO FAST ON 902 BAND.
- 1.3. PICK REPEATER FREQUENCIES FROM:
 - 1.3.1. KNOWN REPEATER USERS BY WORD OF MOUTH.
 - 1.3.2. TRUSTED WEBSITES - KJ6KO'S "NC9RS" SYSTEM WEBSITE.
2. **INITIAL SET UP TK-981 AND SOFTWARE ON PC**
 - 2.1. DISCONNECT MICROPHONE AT RJ-45 JACK AND POWER UP TK-981. DO NOTHING FURTHER WITH RADIO UNTIL INSTRUCTED TO DO SO.
 - 2.2. LOAD SOFTWARE PROGRAM KWID ON PC DESKTOP, PUT ICON ON DESKTOP.
 - 2.3. LOAD SOFTWARE PROGRAM KPG-49D ON PC DESKTOP, PUT ICON ON DESKTOP.
 - 2.4. LOAD SOFTWARE PROGRAM KW900Ezp ON PC. IT SHOULD SHOW UP IN A DIRECTORY VIEWABLE BY RUN COMMAND. IT MUST EVENTUALLY BE IN THE SAME DIRECTORY AS LATEST PROGRAMMING FILE, AND PROGRAM KGP-49D.
 - 2.5. NOTE: YOU WILL DO THE FOLLOWING PARAGRAPHS FOR EACH NEW FREQUENCY YOU WANT TO LOAD INTO THE RADIO (DETERMINE INITIAL 2 DIGIT FCC ID NUMBER). AT STEP 2.6.8, YOU MAY WRITE DOWN A LIST OF CONVERTED 2 DIGIT STARTING FCC NUMBERS IF YOU WISH OR DO EACH ONE INDIVIDUALLY, ONE AT A TIME, YOUR CHOICE.
 - 2.6. OPEN, RUN KWID. I WILL USE 927.175 MHZ IN THIS EXAMPLE.
 - 2.6.1. CONVERTER BOX OPENS.
 - 2.6.2. USE LEFT SIDE OF PROGRAM BOX.
 - 2.6.3. FREQUENCIES ARE FOR RECEIVE, THE PROGRAM KPG-49D WILL AUTOMATICALLY GENERATE THE CORRECT TRANSMIT FREQUENCY AND CORRECT OFFSET DURING THE PROCESS.
 - 2.6.4. SELECT FIRST OF YOUR DESIRED FREQUENCIES FROM KWID PULL DOWN.
 - 2.6.5. EXAMPLE, PULL DOWN AND SCROLL UNTIL 927.1750 IS DISPLAYED (DISPLAYS 4 DIGITS AFTER DECIMAL POINT, OK).
 - 2.6.6. PRESS/ CLICK MOUSE CONVERT BOX BUTTON.
 - 2.6.7. FCC ID # APPEARS IN BOX ABOVE BUTTON. THIS EXAMPLE THE FCC NUMBER IS 14.

**2.6.8. WRITE DOWN 14 ON A PIECE OF PAPER, OR
OTHERWISE REMEMBER IT.**

3. BUILD UP THE PROGRAMMING DATA & SAVE

3.1. OPEN PROGRAM KPG-49D BY DOUBLE CLICKING ICON.

3.2. PROGRAM OPENS.

3.3. NOTE: I WILL NOT GO INTO ALL THE DETAILS OF THE KPG-49D PROGRAM, NOR ITS DEFAULT VALUES, AS ITS A COMPLEX PROGRAM. IT IS UP TO YOU TO READ THE HELP FILE, RADIO MANUALS, PLAY WITH THE PROGRAM, AND FIGURE IT OUT. I WILL ONLY DEAL WITH HIGHLIGHTS TO DO SIMPLE PROGRAMMING IN THIS PROCEDURE.

3.3.1. IT IS RECOMMENDED THAT YOU CONNECT

COMPUTER TO YOUR RADIO AND READ ITS INITIAL MEMORY AND DEFAULT CONTENTS PRIOR TO REPROGRAMMING. IT IS A GOOD IDEA TO PRINT A HARD COPY, BEFORE REPROGRAMMING. BY DOING THIS, YOU WILL HAVE A BASELINE STARTING POINT FOR PROGRAMMING PARAMETERS. I HIGHLY RECOMMEND READING THE RADIO AND CREATING A BASELINE AS THERE MANY PARAMETERS AND THEY CAN BE RATHER COMPLEX.

CAUTION

3.3.2. DO NOT EXPERIMENT OR CHANGE THINGS YOU DON'T UNDERSTAND WITHOUT ASKING QUESTIONS AND READING THE HELP FILES FIRST. OTHERWISE YOU CAN MAKE YOUR RADIO NOT WORK.

3.4. INSIDE MAIN PROGRAM WINDOW SYSTEM INFORMATION BOX APPEARS. TOP COMMAND LINE: FILE, MODEL, EDIT, PROGRAM, SETUP, VIEW, WINDOW AND HELP APPEAR. EACH OF THESE COMMANDS MAKE OTHER BOXES APPEAR AS IN 3.4.1 BELOW:

3.4.1. OTHER BOXES CAN APPEAR AS YOU USE THEM SUCH AS:

3.4.1.1. FILE.

3.4.1.1.1. NEW.

3.4.1.1.2. OPEN – ALLOWS OPENING OF AN EXISTING SET OF PROGRAMMING FOR THE RADIO IF ANY.

3.4.1.1.3. SAVE.

3.4.1.1.4. SAVE AS.

3.4.1.1.5. PRINT.

3.4.1.1.6. PRINT PREVIEW.

3.4.1.1.7. EXIT.

3.4.1.2. MODEL.

3.4.1.2.1. MODEL INFORMATION.

3.4.1.2.2. **YOU MUST SELECT CORRECT MODEL OF YOUR RADIO HERE BEFORE PROGRAMMING.**

3.4.1.2.2.1. USE PULL DOWNS.

3.4.1.3. EDIT.

3.4.1.3.1. OPTIONAL FEATURES BOX.

3.4.1.3.2. KEY ASSIGNMENTS.

3.4.1.3.3. SCAN INFORMATION.

3.4.1.3.4. DTMF.

3.4.1.3.5. FLEET SYNC.

3.4.1.3.6. SYSTEM INFORMATION (DEFAULT).

3.4.1.3.7. SYSTEM MERGE.

3.4.1.3.8. EMERGENCY INFORMATION.

3.4.1.3.9. TEST FREQUENCY.

3.4.1.3.10. EMBEDDED MESSAGE.

3.4.1.4. PROGRAM.

3.4.1.4.1. READ DATA FROM RADIO.

3.4.1.4.2. WRITE DATA TO RADIO.

3.4.1.4.3. READ DTMF FROM RADIO.

3.4.1.4.4. WRITE DTMF TO RADIO.

3.4.1.4.5. TEST MODE.

3.4.1.5. SETUP.

3.4.1.5.1. COMMUNICATIONS PORT.

3.4.1.5.1.1. RADIO AND COMPUTER AUTO
SELECT CORRECT BAUD RATES.

3.4.1.6. VIEW.

3.4.1.6.1. TREE VIEW.

3.4.1.6.2. TOOL BAR.

3.4.1.6.3. STATUS BAR.

3.4.1.7. WINDOW.

3.4.1.7.1. CASCADE.

3.4.1.7.2. HORIZONTAL TILE.

3.4.1.7.3. VERTICAL TILE.

3.4.1.7.4. ARRANGE ICONS.

3.4.1.7.5. CLOSE ALL WINDOW .

3.4.1.7.6. DISPLAYED WINDOW.

3.4.1.8. HELP.

3.4.1.8.1. HELP TOPICS.

3.4.1.8.2. ABOUT KPG-49D.

3.5. AT SYSTEM INFORMATION BOX:

3.5.1. FAR LEFT NO COLUMN #1.

3.5.1.1. CLICK MODE.

3.5.1.1.1. PULL DOWN.

3.5.1.1.2. SELECT CONVENTIONAL.

3.5.1.1.2.1. CONVENTIONAL - FOR HAM RADIO.

3.5.1.1.2.2. TRUNKING – DO NOT USE.

**3.5.1.1.2.3. NOT USED – ONLY USE THIS IF YOU
DO NOT WANT TO USE THIS SYSTEM
(CHANNEL).**

**3.5.1.1.2.3.1. SYSTEM NAME (A SEQUENTIAL
NUMBER) WILL APPEAR ON RADIO LCD
DISPLAY TOP LEFT LCD DISPLAY AFTER
PROGRAMMING COMPLETED.**

**3.5.1.2. DOUBLE CLICK #1 FAR LEFT COLUMN, LARGE
WINDOW BOX OPENS.**

**3.5.1.2.1. MAY BE NAMED CONVENTIONAL MODE
[SYSTEM – 1 GROUP – 1]. THIS NAME MAY
CHANGE DEPENDING ON WHAT YOU ARE
DOING.**

3.5.1.3. UNDER GRP, AT ROW 1:

**3.5.1.3.1. FCC CHANNEL: ENTER 14 FROM STEP 2.6.7
ABOVE. CLICK FCC CHANNEL BOX.**

**3.5.1.3.2. AFTER CLICK, THINGS APPEAR IN BOXES
TO RIGHT.**

3.5.1.3.3. SHIFT: *****

**3.5.1.3.4. QT/DQT ENC: AT QT/DQT ENC ENTER PL
ENCODE (THE PL TONE FOR MAKING REPEATER
COME ON) – YOU MAY USE PULL DOWN
FEATURE.**

**3.5.1.3.5. QT/DQT DEC: AT QT/DQT DEC, PL
OPTIONAL, LEAVE BLANK OR IF
INTERFERENCE PERSISTS ON RADIO RECEIVE,
ENTER SAME PL CODE AS ENCODE IN STEP
3.5.1.3.4 ABOVE.**

3.5.1.3.5.1. THIS TURNS ON PL DECODE
FUNCTION THAT HELPS BLOCK
INTERFERENCE.

3.5.1.3.6. GROUP NAME – ENTER WHAT YOU WANT
RADIO TO DISPLAY ON FRONT PANEL LCD
DISPLAY FOR THIS CHANNEL. IT CAN BE:

- 3.5.1.3.6.1.** CALL OF REPEATER.
- 3.5.1.3.6.2.** A GEOGRAPHICAL NAME.
- 3.5.1.3.6.3.** A FREQUENCY.
- 3.5.1.3.6.4.** ANYTHING ELSE YOU DESIRE.

3.5.1.3.7. REMAINING COLUMNS: LEAVE COLUMNS
CALL, POWER, W/N, GRP-LOUT, OPT SIGNAL AS
IS, DO NOT CHANGE.

3.5.1.3.7.1.1. NOTE SYSTEM NAME IS THE
ACTIVE SYSTEM (CHANNEL) NUMBER
THAT IS DISPLAYED ON RADIO LCD
UPPER LEFT DISPLAY.

3.5.1.3.7.2. FREQUENCY: IMPORTANT -
VERIFY THAT THE CORRECT
FREQUENCY IS DISPLAYED IN
FREQUENCY BOX.

3.5.1.3.7.3. EITHER HIT CLOSE IF DONE OR
SYSTEM UP BUTTON FOR PROGRAMMING
NEXT CHANNEL (CHANNEL 2).

3.5.1.4. REPEAT STEPS 3.5.1 THROUGH 3.5.1.3.7.3 FOR
ALL FREQUENCIES AND PL'S YOU WANT TO
PROGRAM, VERIFYING THAT CORRECT
FREQUENCIES ARE LOADED CORRECTLY,
INCREMENTING SYSTEM NUMBER (CHANNEL
NUMBER) FOR EACH NEW SET OF FREQUENCY
DATA.

3.5.1.5. FILE: FILE SAVE AS – SAVE AS SAVE YOUR
WORK BY USING SAVE OR SAVE AS WITH UNIQUE
FILE NAME.

3.5.1.5.1. KEEP TRACK OF THE FILE NAME AND ITS
LOCATION AS YOU MUST PUT THIS FILE AND
FOLDER IN A COMMON FOLDER WITH
KW900EZR AND KGP-49D PROGRAMS LATER.

3.5.1.6. AT SAVE OR SAVE AS, BOX OPENS, SELECT
DATA FILE FOR TYPE OF FILE TO SAVE.

3.5.1.7. SAVE BOX OPENS, SAVE WITH UNIQUE FILE NAME, FOLDER NAME.

3.5.1.8. NOTE FILE NAME AND FOLDER.

3.5.2. LEAVE PROGRAM KPG-49D OPEN.

4. PROGRAM THE RADIO.

4.1. GOAL: THE PROGRAM FILE NAME CREATED IN 3.5.1.8 ABOVE AND KPG-49D, AND KW900EZP MUST ALL BE IN ONE SINGLE DIRECTORY TOGETHER. **IF NOT, NOTHING WILL WORK!**

4.1.1. EXAMPLE:

**4.1.1.1. KENWOOD_KPG-49D_V401.
KENWOOD_KW900EZP.
KENWOOD_KWID.
902REV19.DAT.**

4.2. USE DOS COMMANDS, COMMANDS “DIR” AND “CD” - ON PC OPEN COMMAND PROMPT WINDOW. PLACE NEAR KPG-49D PROGRAM WINDOW.

4.3. TYPE DIR AT PROMPT. FOR HELP WITH DOS COMMANDS TYPE HELP AT CARROT PROMPT “>HELP”.

4.3.1. USE COMMAND DIR TO DISPLAY DIRECTORY CONTENTS.

4.3.2. USE COMMAND CD TO CHANGE CURRENT DIRECTORY.

4.3.2.1. CONTINUE TO USE DIR AND CD COMMANDS TO CHANGE DIRECTORIES UNTIL YOU GET ALL THREE FILES SHOWN BELOW IN THE SAME DIRECTORY:

4.3.2.1.1. LATEST RADIO PROGRAMMING FILE CREATED IN 3.5.1.8 ABOVE, EXAMPLE “902REV19.DAT”.

4.3.2.1.2. PROGRAM KGP-49D.

4.3.2.1.3. PROGRAM KW900EZP.

**4.3.2.1.3.1. SAME AS EXAMPLE IN 4.1.1.1.
KENWOOD_KPG-49D_V401.
KENWOOD_KW900EZP.
KENWOOD_KWID.
902REV19.DAT.**

4.4. AFTER ALL THREE ARE TOGETHER IN ONE DIRECTORY, RUN KW900EZP BY:

**4.4.1. TYPE KW900EZP AT COMMAND PROMPT
“>KW900EZP”.**

4.4.2. PROGRAM RUNS.

4.4.3. FOLLOW INSTRUCTIONS.

4.4.3.1. VERIFY LATEST FILE NAME IN 3.5.1.8 IS SHOWN.

4.4.3.1.1. EXAMPLE “902REV19.DAT”.

4.4.3.2. IF CORRECT HIT ENTER OR ‘Y’ TO ACCEPT.

**4.4.3.3. TO EDIT, TYPE E AND FOLLOW INSTRUCTIONS,
ELSE HIT ENTER.**

4.4.3.4. IF RUN CORRECTLY IT SHOULD SHOW

‘PROCESSING COMPLETE. X CHANGES(S) MADE.’.

**4.4.3.4.1. IF NO CHANGES WERE MADE YOU WILL
SIMPLY RETURN TO “>” PROMPT.**

4.5. IN KPG-49D.

4.5.1. FILE: CLICK OPEN.

**4.5.2. SELECT THE LATEST VERSION OF FILE CREATED IN
3.5.1.8.**

**4.5.2.1. NOTE: THE PROGRAM HAS BEEN CHANGED BY
PROCESSING DONE IN STEPS 4.4.2 THROUGH
4.4.3.4.1.**

**4.5.2.2. IF CONVERSION(S) WAS DONE CORRECTLY
OPENING THIS FILE SHOULD SHOW 7 DIGIT FCC ID
NUMBER IN PLACE OF 2 DIGIT NUMBER YOU
ORIGINALLY STARTED WITH IN EACH SYSTEM
GROUP WINDOW, IN COLUMN “FCC CHANNEL”.**

**4.5.2.3. VERIFY BY OPENING EACH CHANNEL / SYSTEM
AND VERIFYING THAT INDEED A 7 DIGIT FCC
CHANNEL NUMBER EXISTS FOR ALL
PROGRAMMED / REPROGRAMMED CHANNELS.**

**4.5.2.4. IF NOT START OVER AND REPEAT ALL STEPS 2.5
THROUGH 4.5.5. IF OK, PROCEED TO NEXT STEP.**

4.5.3. IF 4.5.2.4 OK LET PROGRAM IDLE.

4.6. PROGRAM RADIO BY DOING THE FOLLOWING:

**4.6.1. ENSURE PROGRAMMING CABLE DB9 CONNECTOR
CONNECTED TO COMPUTER SERIAL PORT.**

**4.6.2. PLUG RJ45 6 PIN PROGRAMMING CABLE CONNECTOR
INTO TK-981 FRONT PANEL MICROPHONE CONNECTOR.**

4.6.3. AT PROGRAM KGP-49D SELECT .

**4.6.3.1. PROGRAM: PROGRAM, “WRITE DATA TO
RADIO”.**

4.6.3.2. HIT WRITE BUTTON.

- 4.6.3.3. IF CORRECT, PROGRESS BOX OPENS AND SHOWS, AND SHOWS PROGRESS BAR MOVING.
- 4.6.3.4. RADIO LCD DISPLAY SAYS 'PROGRAM'.
- 4.6.3.5. PROGRAM SHOWS 'WRITING COMPLETED'.
- 4.6.4. DISCONNECT PROGRAMMING CABLE, PLUG IN MICROPHONE.
- 4.6.5. TEST RADIO.
- 4.6.6. IF RADIO TESTS ALL OK, USE RADIO.

4.7. DONE, END OF PROCEDURE.

END OF PROCEDURE

Chip W7AIT