OUTLINE

The KPT-50 Field Programmer is a convenient tool that allows programming of the following equipment with operating frequencies and signaling information:

- TKR-820
- TKR-820A
- TKR-820N
- TKR-720
- TKR-720A
- TKR-720N
- TKB-720
- TKB-620

Note:

▶ *Data is stored in volatile memory in the KPT-50. All data will be erased if the modular plug is removed from or the power is turned off on the unit being programmed.*

▶ *The KPT-50 is designed specifically for the above equipment. Do not use the KPT-50 with other models.*

ACCESSORIES

Instruction manual (B62-0385-XX) 1

ORIENTATION

Modular plug cable for power
- Connect to the microphone jack to power the KPT-50. Power is controlled by turning the power ON or OFF on the unit being programmed.

8-pin connector cable
- Connect inside the unit being programmed to program transmit and receive frequencies {p. 4}.

EEPROM socket
- Remove the signaling EEPROM from the unit being programmed and insert it in this socket {p. 5}.

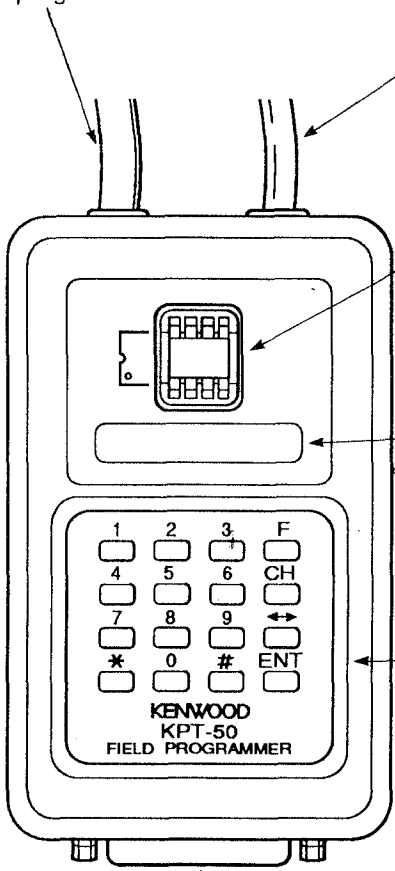**8-digit, 13-segment LCD** (Liquid Crystal Display)
- Displays information during the programming process. Refer to the Programming Map.

Keypad
- Use to input commands and data. Refer to the Programming Map.

25-pin connector
- If using KPG-21D Programming Software, connect the interface cable from a computer to this connector. Refer to the KPG-21D Instruction Manual.
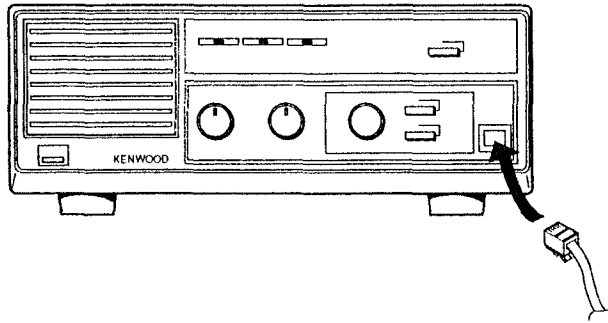
PREPARATION

This section explains the preliminary set-ups required for programming.
Do not turn on power until all connections are made.

Programming Receive and Transmit Frequencies

1 Remove the unit's upper cover (10 screws).

2 Connect the KPT-50 cable with the modular plug to the microphone jack on the front panel.

3 Connect the KPT-50 cable with the 8-pin connector to the matching connector facing upward inside the unit immediately behind the front panel.
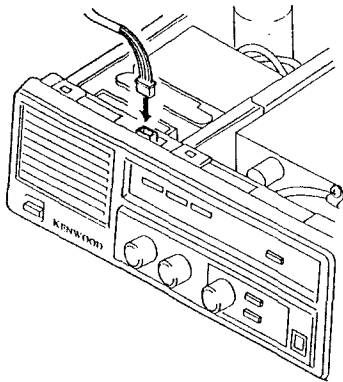
4 Turn on the unit.

  ● "PROGRAM" appears on the KPT-50 display.

This completes PREPARATION.

Programming Signaling Information

1 Remove the unit's upper cover (10 screws).

2 Connect the KPT-50 cable with the modular plug to the microphone jack on the front panel.

3 Remove the cover as shown (11 screws).
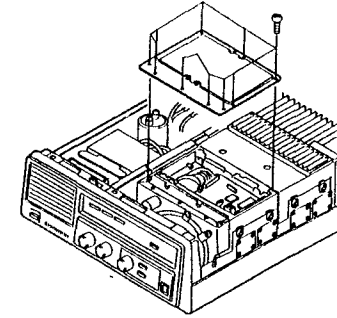
4 Remove the 8-pin EEPROM IC as shown and insert it in the KPT-50 EEPROM socket.

  ● Be careful when inserting the EEPROM into the KPT-50. Orient the IC so the printing on the EEPROM is not upside down.
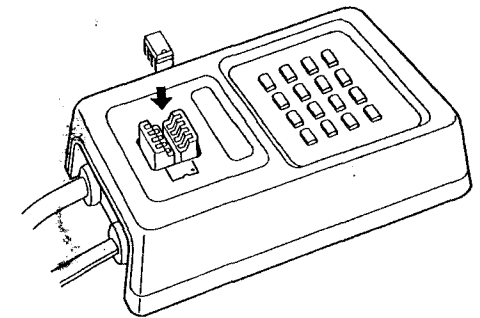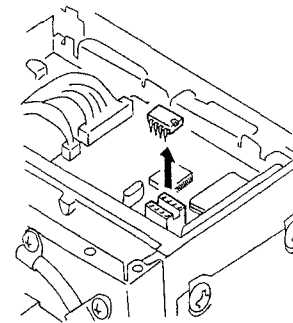
5 Turn on the unit.

  ● "PROGRAM" appears on the KPT-50 display.

This completes PREPARATION.

PROGRAMMING

Programmable Data

The KPT-50 permits the following data to be programmed:

- Receive and transmit frequencies
- Signaling information
- Frequency step
- Model number

The programmable ranges of the items identified above are as follows:

- **Receive and transmit frequencies**

MODEL	FREQUENCY RANGE
TKB-620	25 MHz to 54 MHz
TKR-720 TKR-720A TKR-720N TKB-720	130 MHz to 230 MHz
TKR-820 TKR-820A TKR-820N	300 MHz to 520 MHz

- **Signaling information**

SIGNALING TYPE	FREQUENCY / CODE RANGE
QT	60.0 to 288.5 Hz (in 0.1 Hz steps)
DQT (Normal)	000 Normal to 777 Normal [1]
DQT (Inverted)	000 Inverted to 777 Inverted [1]

[1] Only digits "0" to "7" can be entered for a DQT code.

Kenwood recommends that you select QT and DQT from the standard frequencies and codes listed below:

Standard QT Frequencies

FREQUENCY (Hertz)			
EIA Code Group A	EIA Code Group B	EIA Code Group C	Special Non-EIA
67.0	71.9	74.4	97.4
77.0	82.5	79.7	
88.5	94.8	85.4	
100.0	103.5	91.5	
107.2	110.9		
114.8	118.8		
123.0	127.3		
131.8	136.5		
141.3	146.2		
151.4	156.7		
162.2	167.9		
173.8	179.9		
186.2	192.8		
203.5	210.7		
218.1	225.7		
233.6	241.8		
250.3			

Standard DQT Codes

Low Series	100 Series	200 Series	300 Series	400 Series	500 Series	600 Series	700 Series
023	114	205	306	411	503	606	703
025	115	223	311	412	506	612	712
026	116	226	315	413	516	624	723
031	125	243	331	423	532	627	731
032	131	244	343	431	546	631	732
043	132	245	346	432	565	632	734
047	134	251	351	445		654	743
051	143	261	364	464		662	754
054	152	263	365	465		664	
065	155	265	371	466			
071	156	271					
072	162						
073	165						
074	172						
	174						

● Frequency step

MODEL	STEP 1 (Normal)	STEP 2 (Special)
TKB-620	5	6.25
TKR-720 TKR-720A ¹ TKR-720N TKB-720	5	6.25
TKR-820 TKR-820A TKR-820N	12.5	10

¹ Use only Step 2 when programming a TKR-720N.

Frequency/Signaling Combinations

The combinations of transmit/receive frequency pairs and signaling differ between the TKR series and TKB series.

■ TKR-820/820A/820N/720/720A/720N Repeater Stations

Each frequency channel can correspond to a maximum of 8 signaling frequencies or codes. The transmit and receive signaling can be set independently.

For example, assume that a signal is received at 462.0250 MHz with a 210.7 Hz signaling tone. The TKR-XXX is set for a receive frequency of 462.0250 MHz. In this case, the squelch opens when 210.7 Hz is programmed as 1 of the 8 signaling possibilities.

■ TKB-720/620 Base Stations

Each frequency channel can function with only 1 corresponding signaling frequency or code. The transmit and receive signaling can be set independently.

KPT-50 Programming Map

The Programming Map shows all programming commands available on the KPT-50. The map also shows all associated displays that appear on the LCD when commands are entered. The map uses a flow diagram format whereby all options available are shown. The style of boxes on the map representing keypad entries is different from boxes representing displayed information to help the user distinguish input from output. The input boxes indicate which keys the user must input. The output boxes indicate what the user sees on the display.

The Programming Map is divided into basically two sections:

- Function commands ("FUNC")
- Channel Data commands ("CH")

```
                    ┌─────────────┐
                    │ "PROGRAM"   │
                    └─────────────┘
                   ┌──────┴──────┐
              ┌─────────┐   ┌─────────┐
              │ "FUNC"  │   │  "CH"   │
              └─────────┘   └─────────┘
```

■ Function Commands

```
                    ┌─────────┐
                    │ "FUNC"  │
                    └─────────┘
    ┌───────────┬───────────┼───────────┬───────────┐
┌────────┐ ┌─────────┐ ┌─────────┐ ┌────────┐ ┌────────────┐
│ "READ" │ │ "WRITE" │ │ "MODEL" │ │ "STEP" │ │ "BUFF CLR" │
└────────┘ └─────────┘ └─────────┘ └────────┘ └────────────┘
```
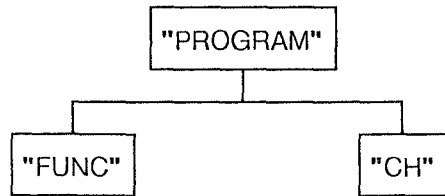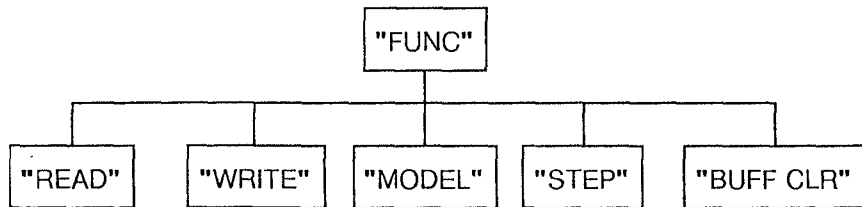
- Use Read commands to read frequency data from the repeater and signaling data from the signaling EEPROM in the repeater. This data is stored in the KPT-50 memory.

- Use Write commands to write frequency data to the repeater and signaling data to the EEPROM from the KPT-50 memory.

- Use Model commands to enter a model number identification label for the unit being programmed.

- Use Step commands to enter the frequency step size required if necessary.

- Use the Buffer Clear command to erase all data from the KPT-50 memory.

■ Channel Data Commands

Channel Data commands allow repeater frequencies and signaling data to be entered into the KPT-50 memory from the keypad. This data may be transferred from memory to the unit being programmed using Write commands. The Channel Data commands can also be used to edit data that has been read into the KPT-50 memory via Read commands.

The accompanying diagram shows the order that information should be entered when using Channel Data commands.

```
            ┌──────────────┐
            │   Select     │
            │   Channel    │
            └──────────────┘
                   │
                   ▼
            ┌──────────────┐
            │   Enter      │
            │ RX Frequency │
            └──────────────┘
                   │
                   ▼
            ┌──────────────┐
            │   Enter      │
            │ RX Signaling │
            │ (QT or DQT)  │
            └──────────────┘
                   │
                   ▼
            ┌──────────────┐
            │   Enter      │
            │ TX Frequency │
            └──────────────┘
                   │
                   ▼
            ┌──────────────┐
            │   Enter      │
            │ TX Signaling │
            │ (QT or DQT)  │
            └──────────────┘
                   │
                   ▼
            ┌──────────────┐
            │ Select Next  │
            │   Channel    │
            └──────────────┘
```

```
                                          │
                                          ▼
                                    ┌───────────┐
                                    │   [ 1 ]   │
                                    └───────────┘
                                          │
                                          ▼
                                    ┌───────────┐
                                    │   READ    │
                                    └───────────┘
                                          │
           ┌──────────────────────────────┼──────────────────────────────
           ▼                              ▼
    ┌───────────┐                  ┌───────────┐                  ┌──────
    │   [ 1 ]   │                  │   [ 2 ]   │                  │
    └───────────┘                  └───────────┘                  └──────
           │                              │
           ▼                              ▼
    ┌───────────┐                  ┌───────────┐                  ┌──────
    │  RD FREQ  │                  │  RD SIG   │                  │
    └───────────┘                  └───────────┘                  └──────
           │                              │
           ▼                              ▼
    ┌───────────┐                  ┌───────────┐                  ┌──────
    │   [ENT]   │                  │   [ENT]   │                  │
    └───────────┘                  └───────────┘                  └──────
           │                              │                              │
     ┌─────┴─────┐                  ┌─────┴─────┐                  ┌─────
     ▼           ▼                  ▼           ▼                  ▼
┌─────────┐ ┌─────────┐        ┌─────────┐ ┌─────────┐        ┌─────────┐
│ READ OK │ │ NO FREQ │        │ READ OK │ │ NO SIG  │        │ READ OK │
└─────────┘ └─────────┘        └─────────┘ └─────────┘        └─────────┘
     │           │                  │           │                  │
     ▼           ▼                  ▼           ▼                  ▼
┌─────────┐ ┌─────────┐        ┌─────────┐ ┌─────────┐        ┌─────────┐
│[ * ]{1} │ │[ * ]{1} │        │[ * ]{1} │ │[ * ]{1} │        │[ * ]{1} │
└─────────┘ └─────────┘        └─────────┘ └─────────┘        └─────────┘
     │           │                  │           │                  │
     ▼           ▼                  ▼           ▼                  ▼
┌─────────┐ ┌─────────┐        ┌─────────┐ ┌─────────┐        ┌─────────┐
│ PROGRAM │ │ PROGRAM │        │ PROGRAM │ │ PROGRAM │        │ PROGRAM │
└─────────┘ └─────────┘        └─────────┘ └─────────┘        └─────────┘
```
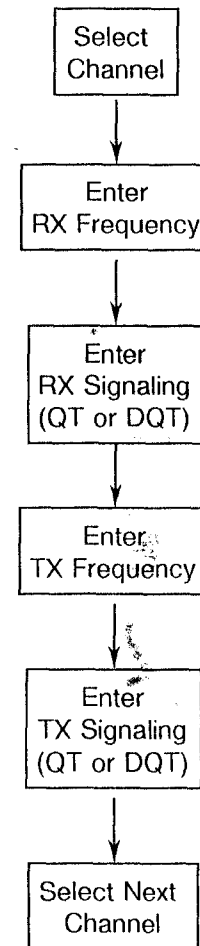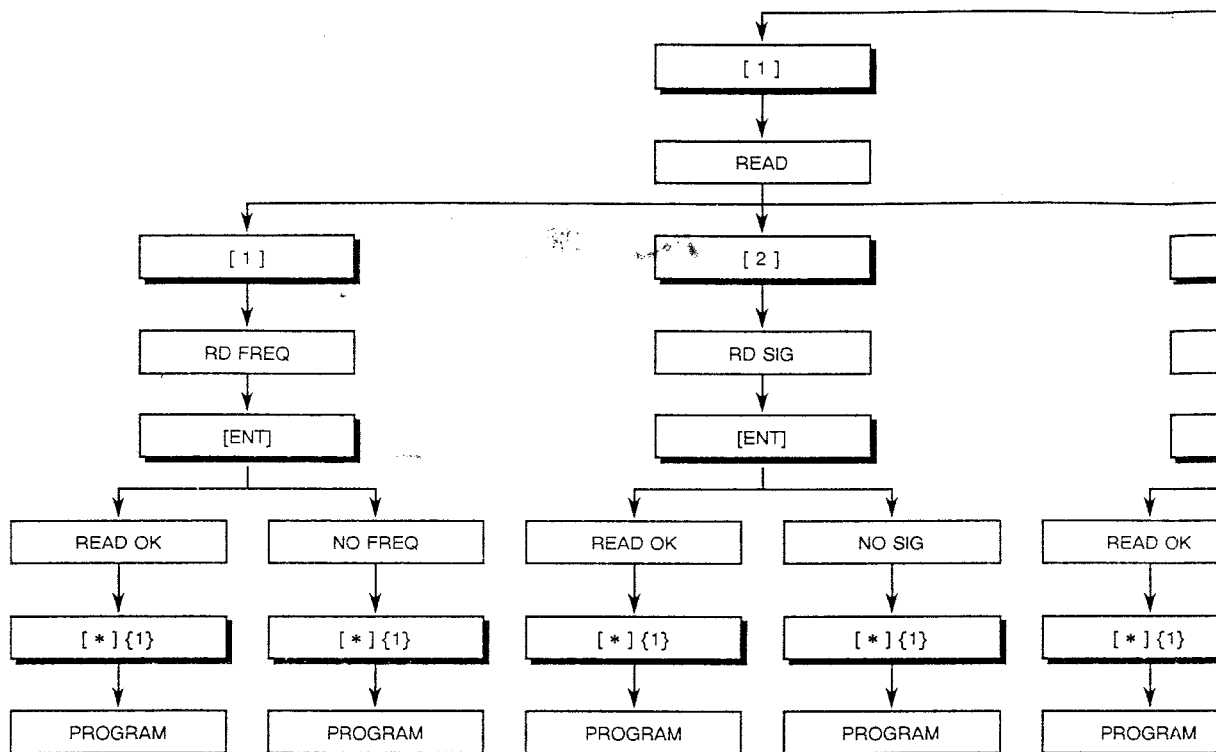
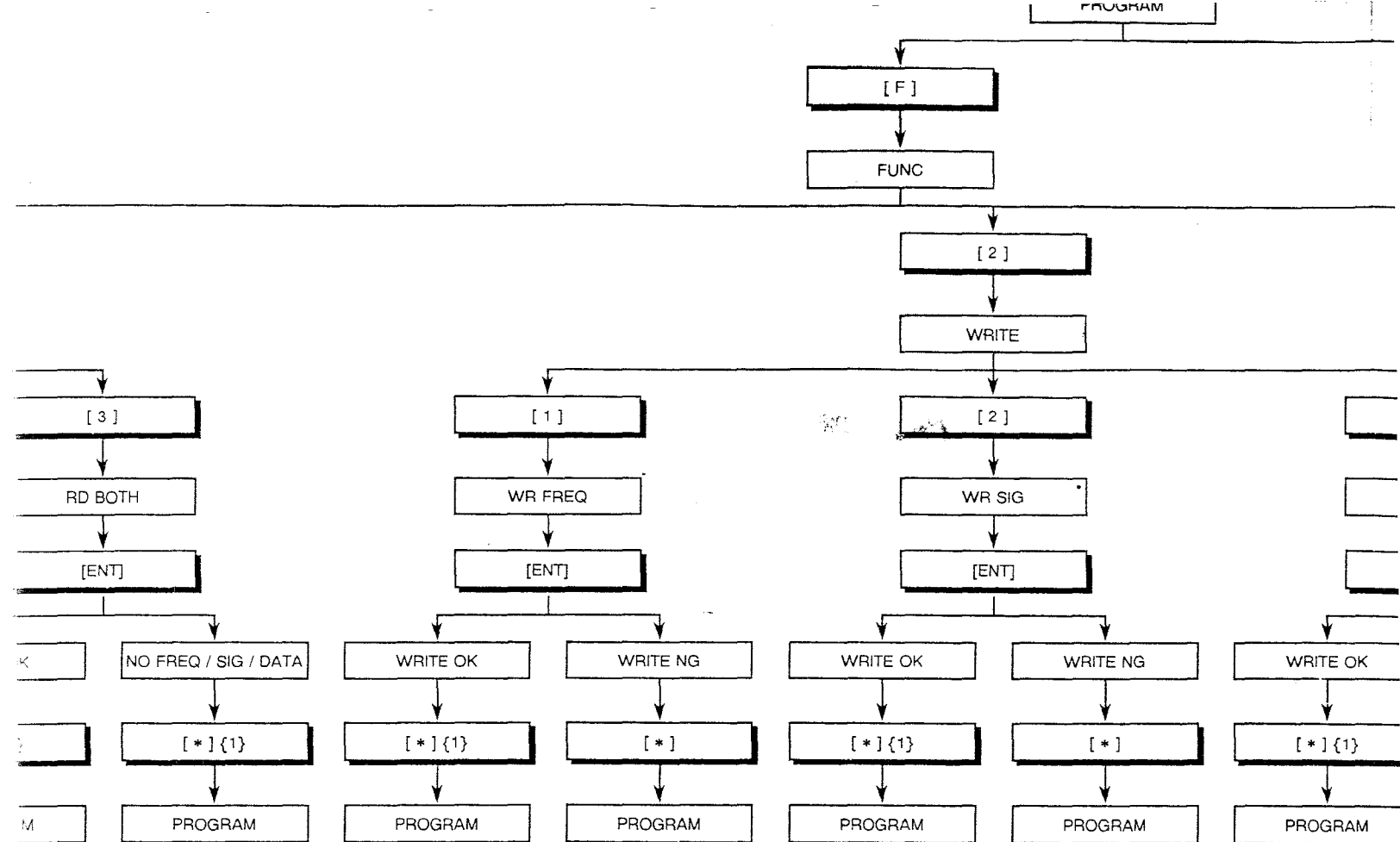{1}   Alternatively, wait 5 seconds.

{2}   Press **[ENT]** to store and return
      to PROGRAM.

• Shaded boxes are default selections.

• "n" indicates any numerical digit or
  any numerical key.

• ┌─────────────────┐   Key input
  │   [   ]   │
  └─────────────────┘

• ┌─────────────────┐   Display output
  │   │
  └─────────────────┘

```
                                    [ F ]
                                     │
                                    FUNC
                                     │
                                    [ 2 ]
                                     │
                                   WRITE
         ┌──────────────┬───────────┼────────────────────────────┐
       [ 3 ]          [ 1 ]                    [ 2 ]
         │              │                        │
      RD BOTH        WR FREQ                   WR SIG
         │              │                        │
       [ENT]          [ENT]                    [ENT]
   ┌─────┴──────┐  ┌────┴─────┐         ┌───────┴──────┐         ┌──────
 K  NO FREQ/   WRITE OK   WRITE NG    WRITE OK    WRITE NG      WRITE OK
    SIG/DATA      │          │           │           │            │
   [*]{1}      [*]{1}      [*]        [*]{1}       [*]         [*]{1}
      │           │          │           │           │            │
   PROGRAM     PROGRAM    PROGRAM    PROGRAM     PROGRAM      PROGRAM
M
```

KPT-50 PROGRAMMING MAP

Frequency and Signaling Data (QT and DQT) Entry

Each time [CH] is pressed, the currently selected channel number is incremented. Each time [#] is pressed, the currently selected channel number is decremented.

Each time [#] is pressed while entering a frequency or signaling data, the digit entered last clears. Pressing [*] clears all digits entered. When [#] is pressed after all digits are cleared, the frequency or signaling data read previously, if any, from the unit being programmed is restored; pressing [ENT] saves this entry.

If an error occurs during entry of frequency or signaling information, check the allowed range for the parameter being entered, and enter appropriate data within that range.

Setting Frequency Step

When frequencies of a specified channel are displayed after the frequency step has been changed, the frequencies are corrected according to the newly selected step.

When [*] is pressed anytime while setting the frequency step, the previous setting is restored.

The [<-->] key switches the step between Step 1 and Step 2.

```
                              [ 3 ]                    [ 4 ]

                              MODEL                    STEP

      [ 3 ]                   [ENT]                    [ENT]

      WR BOTH                 - - - - . .     STEP 1  ◄──► [ < - - > ] ◄──► STEP 2

      [ENT]                   [ < - - > ]     [ENT]                        [ENT]

  WRITE OK    WRITE NG        TKR-820 {2} ◄   PROGRAM                      PROGRAM

  [ * ] {1}    [ * ]          [ < - - > ]

  PROGRAM     PROGRAM         TKR-720 {2}                          ┌──────► R QT ◄──
                                                                   │
                              [ < - - > ]                          │        [n] [n] [n] [n]
                                                                   │
                              TKB-720 {2}               ERROR      │        R QTnnnn
                                                                   │
                              [ < - - > ]                      nnnn│        [ENT]
                                                          out of range
                              TKB-620 {2}                                   T  ◄──

                              [ < - - > ] ──┐                               [n] [n] [n] [n] [n] [n] [n]

                                                                            Tnnnnnnn

                                                                            [ENT]            nn
                                                                                             ou

              ┌──────► T QT ◄──► [ < - - > ] ◄──
              │
              │        [n] [n] [n] [n]
              │
    ERROR     │        T QTnnnn                        TDQTnnnN ◄──►
              │
          nnnn│        [ENT]                           [ENT]
     out of range
```
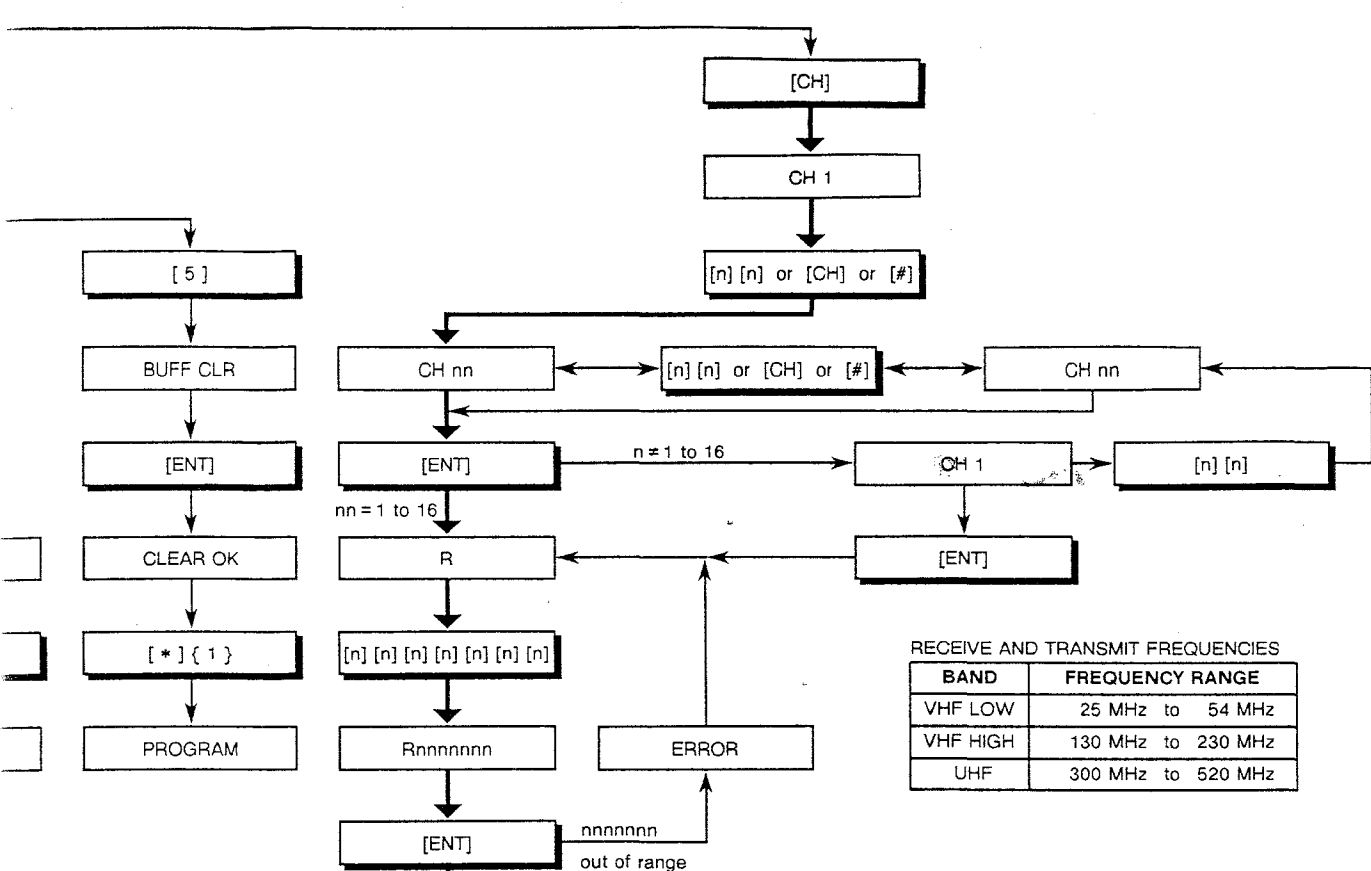
```
                                              ┌──────────┐
                                              │   [CH]   │
                                              └──────────┘
                                                   │
                                              ┌──────────┐
                                              │   CH 1   │
                                              └──────────┘
                                                   │
                                       ┌───────────────────────────┐
                                       │ [n] [n]  or  [CH]  or  [#] │
                                       └───────────────────────────┘
```

[5]

BUFF CLR

[ENT]

CLEAR OK

[*] { 1 }

PROGRAM

CH nn   ←→   [n] [n] or [CH] or [#]   CH nn

[ENT]   n ≠ 1 to 16   CH 1   [n] [n]

nn = 1 to 16

R   ←   [ENT]

[n] [n] [n] [n] [n] [n] [n]

Rnnnnnnn   ERROR

[ENT]   nnnnnnn
              out of range

RECEIVE AND TRANSMIT FREQUENCIES

BAND	FREQUENCY RANGE
VHF LOW	25 MHz to 54 MHz
VHF HIGH	130 MHz to 230 MHz
UHF	300 MHz to 520 MHz

[< - - >]   ←   RDQT N

[n] [n] [n]

SIGNALING INFORMATION

SIGNALING TYPE	FREQUENCY / CODE RANGE
QT	60.0 to 288.5 Hz (in 0.1 Hz steps)
DQT (Normal)	000 Normal to 777 Normal [1]
DQT (Inverted)	000 Inverted to 777 Inverted [1]

[1] Only digits "0" to "7" can be entered for a DQT code.

RDQTnnnN   ←→   [< - - >]   ←→   RDQTnnnI

[ENT]   [ENT]

[n]

ERROR

nnnnnnn
out of range

TDQT N

[n] [n] [n]

[< - - >]   ←   TDQTnnnI

[ENT]
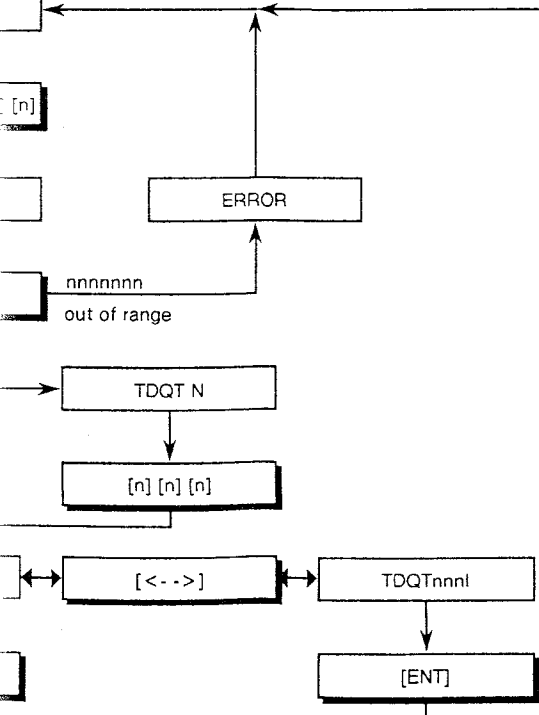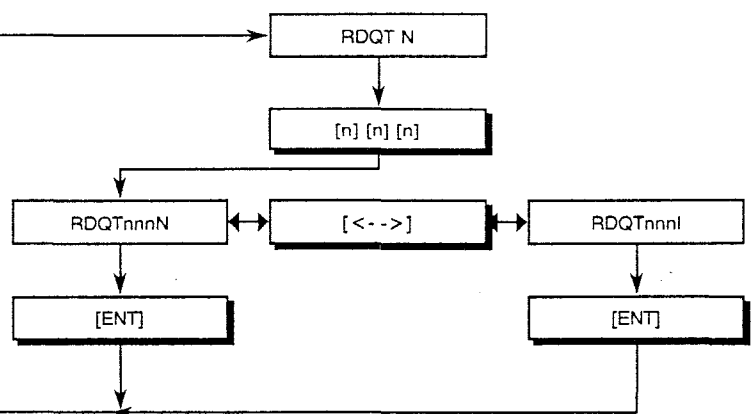
ABBREVIATION	MEANING
BOTH	Frequency and signaling data
BUFF CLR	Buffer clear
CH	Channel
DQT	Digital Quiet Talk (digital signaling)
ENT	Enter
F, FUNC	Function
FREQ	Frequency
I	Inverted
N	Normal
NG	No good (action was not completed)
QT	Quiet Talk (analog signaling)
R	Receive
RD	Read
SIG	Signaling data
T	Transmit
WR	Write