

PROGRAM/TEST SET

KPT-20

INSTRUCTION MANUAL

KENWOOD

© PRINTED IN JAPAN B50-8168-20(K,M)(G)
88/12 11 10 9 8 7 6 5 1 3 2 1 87/12 11 10 9 8 7 6 5

The three types of data which can be written with this Program/Test Set are:

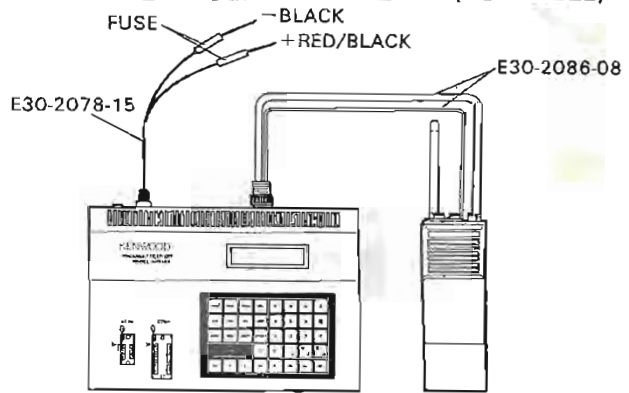
- 1) Frequencies (TK-310)
- 2) Control codes (TK-310)
- 3) Signaling (KMS-3)

WARNING: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of the FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

CONTENTS

1. CONNECTION	2
2. NOMENCLATURE	2
3. OPERATION	3
■ Function keys	3
■ Rewrite and ENT keys	5
■ FREQUENCY SELECTION	6
■ CONTROL DATA INPUT	8
1 Tone Frequency selection	
2 SW1, SW2, and Power Control condition	
3 Carrier and Tone Detect Time selection	
4 Power Save condition	
5 Scan Stop condition	
6 Priority Look Back Time selection	
7 Connect ANI and Terminate ANI selection	
8 Resume Delay Time selection	
■ SIGNALING	14
4. SERVICE	17
Error message	
Before requesting assistance	
5. UNPACKING AND CHECKING EQUIPMENT	17
6. FLOW CHART	32

1. CONNECTION (PORTABLE)



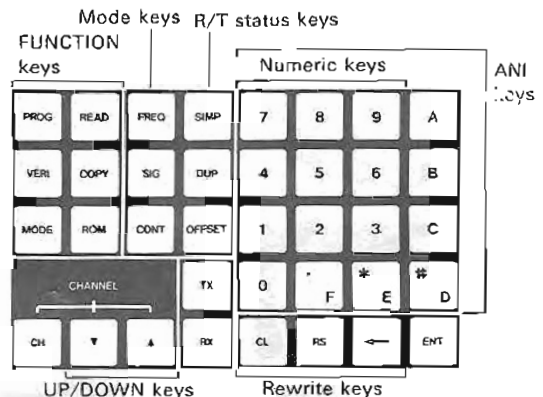
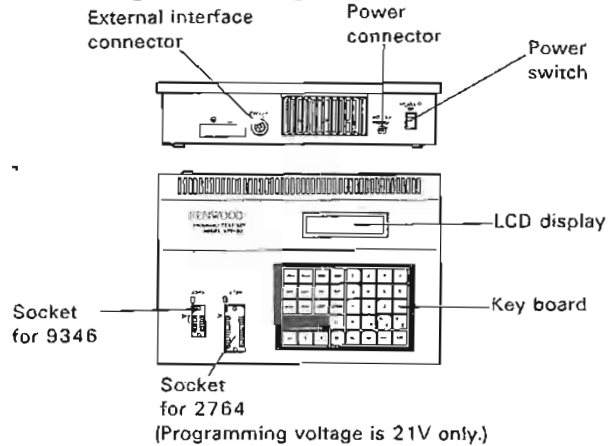
Power cable: connect to a source of 13.8VDC capable of supplying 2A.

Red/black is positive, black is negative.

CAUTION:

Observe polarity. Power cable fuse is 2A. If the fuse blows, there is usually some cause. Try to determine the cause before replacing the fuse. Use another 2A fast blow fuse. Under no circumstance use a fuse of higher rating. This will cause extensive equipment damage.

2. NOMENCLATURE



3. OPERATION (PORTABLE)

Turn the power switch on or press the **RS** key twice, the LCD display shows;

READY

The all function rewrite operation must be started in this state.

Select one of the 6 Function keys.

■ FUNCTION keys

The 6 types of Function keys are;

PROG PROGRAM

This key is used to enter data previously stored in the Test Set's internal memory (RAM) into a set of PROMs.

COPY COPY

This key is used to copy data previously stored in the Test Set's internal socketed PROMs into the Test Set's internal memory (RAM) and a set of PROMs.

READ READ

This key is used to transfer data previously stored in a set of PROMs into the Test Set's internal memory (RAM).

VERI VERIFY

This key is used to verify the specified data (before writing into the PROMs).

ROM ROM

This key is usually not used.

MODE MODE

Please refer to page 5.

CAUTION:

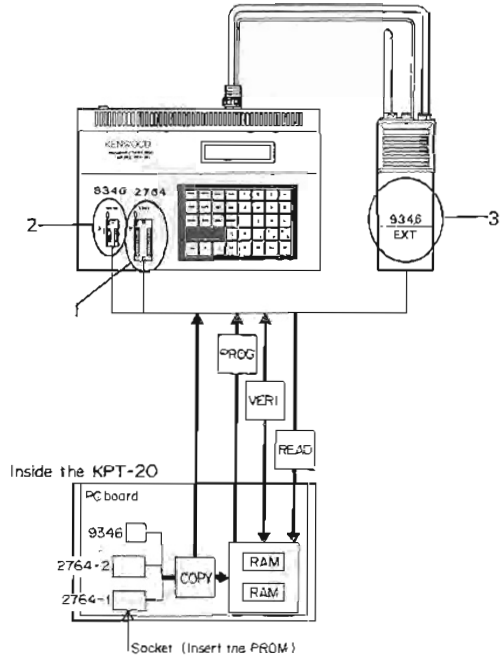
It is important not to press the **COPY**, **READ**, or **ROM** key after new data have been programmed, as damage to the data may result.

PROG OPERATION

When the **PROG** key is pressed, the LCD display shows;

1=2764 2=9346
3=9346EXT 4=MODIFY

ROM selection



For example the **3** key is pressed.

(Usually the **4** key, modify, is not used.)

The LCD display shows;

PROGRAM 9346EXT

Press the **ENT** key.

PROGRAM 9346EXT
BUSY

After several minutes the display shows;

PROGRAM 9346EXT
DONE

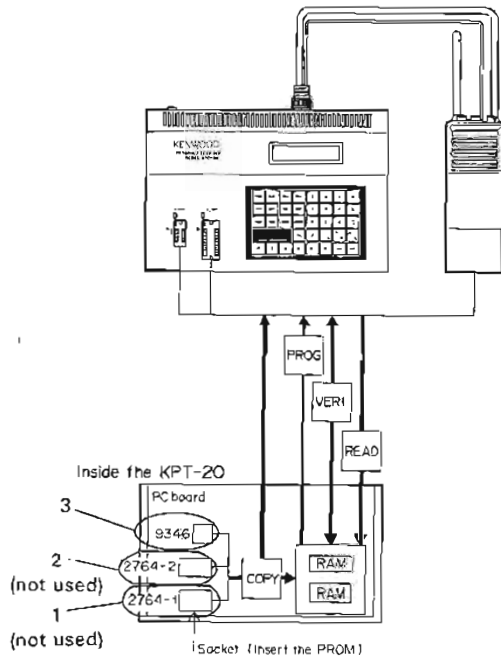
Then the display shows the function to be complete.

READY

COPY OPERATION

When the **COPY** key is pressed, the LCD display shows:

1=2764-1 2=2764-2
3=9346



For example, the **3** key is pressed.

COPY 9346

Press the **ENT** key.

COPY 9346 BUSY

After several minutes, the display shows;

COPY 9346 DONE

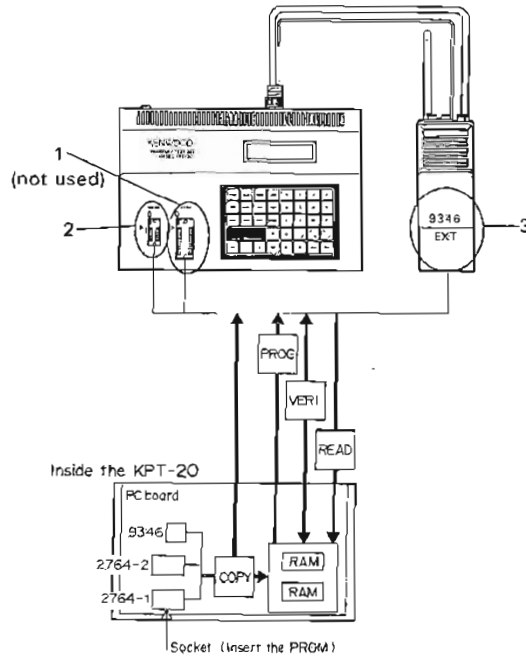
Then the display shows the function to be complete.

READY

READ, VERI OPERATION

When the **READ** key, or **VERI** key is pressed, the LCD display shows;

1=2764 2=9346
3=9346EXT



For example, enter the **READ** key, and then the **2** key.

READ 9346

Press the **ENT** key.

READ 9346 BUSY

After several minutes, the display shows:

READ 9346 DONE

Then the display shows the function to be complete.

READY

MODE OPERATION

Press the **MODE** key, and the LCD display shows;

MODE ENTRY

Press the **2** key.

2 PORTABLE MODE

Press the **ENT** key.

DEPRESS FREQ, CONT OR
SIG key

Select one of the 3 mode keys.

MODE key

The 3 types of mode keys are the **FREQ** key, the **CONT** key, and the **SIG** key.

If selecting the **FREQ** key, refer to page 6.

If selecting the **CONT** key, refer to page 8.

Or selecting the **SIG** key, refer to page 14.

Note:

After **FREQ** (Frequency Selection) or **CONT** (Control Data) input entry, you cannot proceed continuously to **SIG** (Signaling mode).

Do not turn the power switch off during programming, as damage to the data will result.

REWRITE and ENT keys

←

The **←** key is used to delete the data displayed on the LCD.

Depressing the key once deletes the right hand digit.

CL

The **CL** key is used to delete displayed data.

CL + ENT

The **CL** key and then **ENT** keys are used to delete displayed, and internal memory data.

RS

Depress the **RS** key **once** and then any other key, and the LCD display shows "Reset?".

Depressing the **RS** key **twice** restores the entire Test Set system (but not the PROMs) to the initial setup status.

Note:

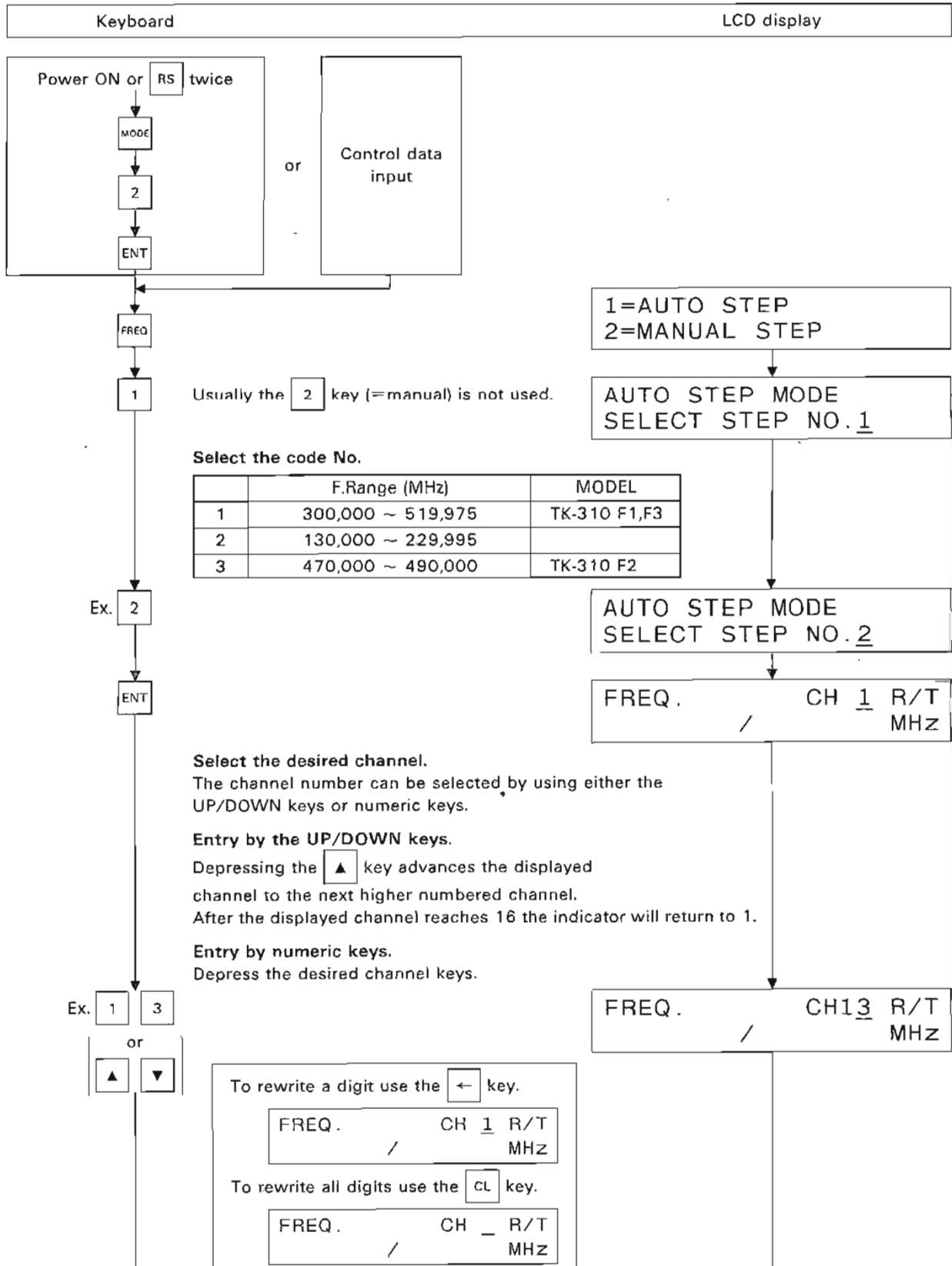
However, that all internally stored data is cleared (except PROM).

ENT

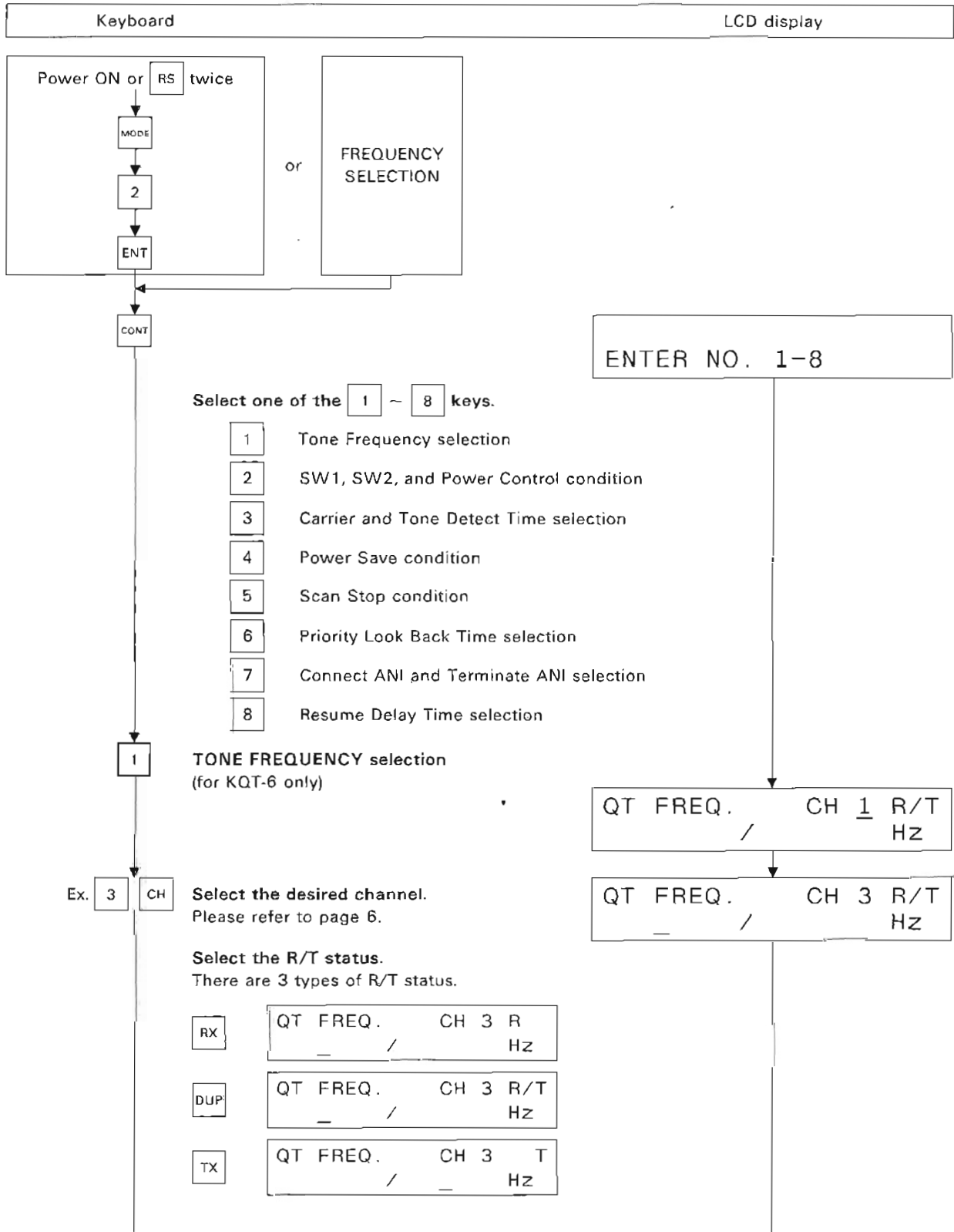
The **ENT** key is used to enter data into the Test Set internal memory.

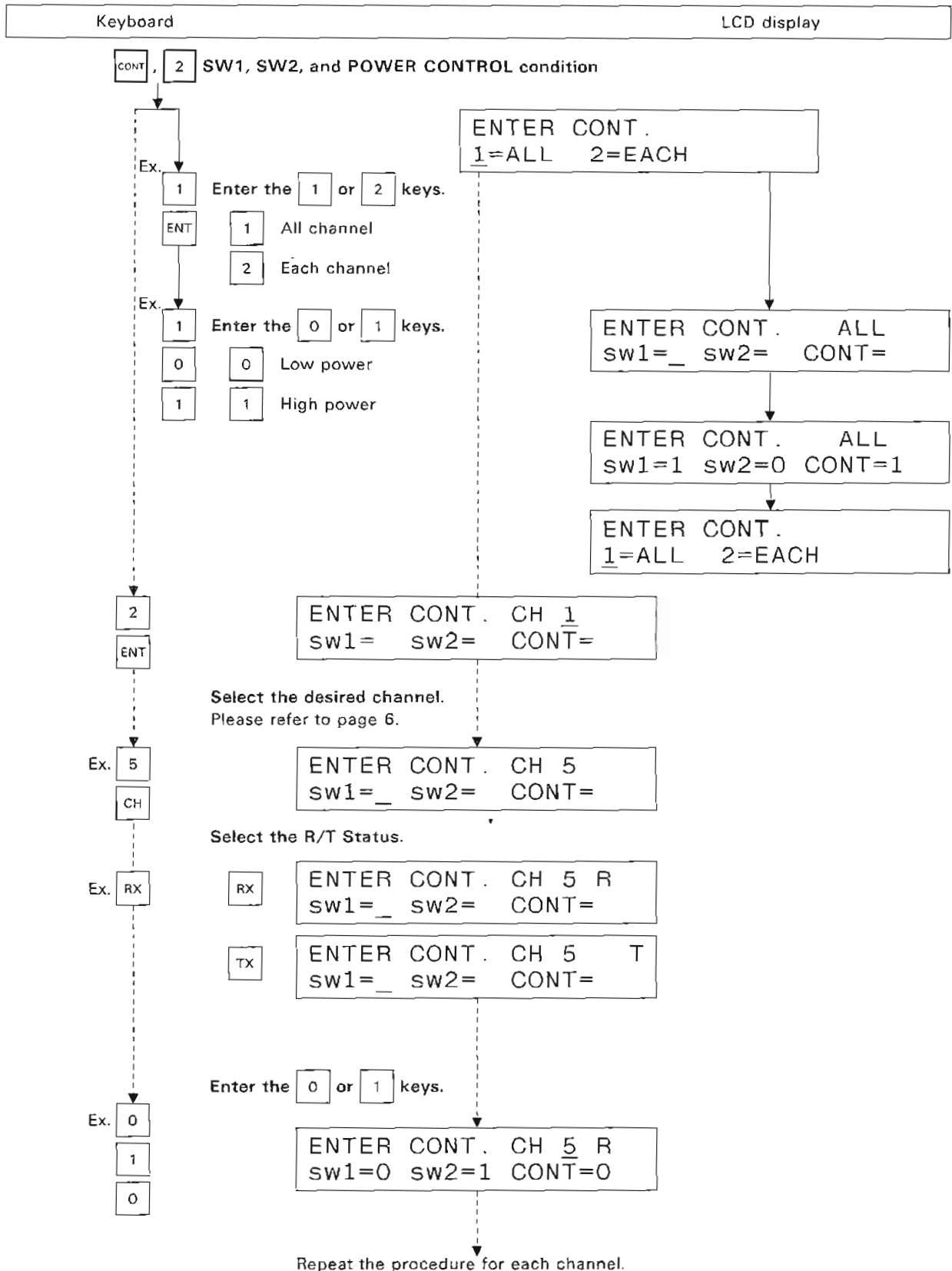
This key must be depressed after data is entered into the display.

■ FREQUENCY SELECTION (PORTABLE)

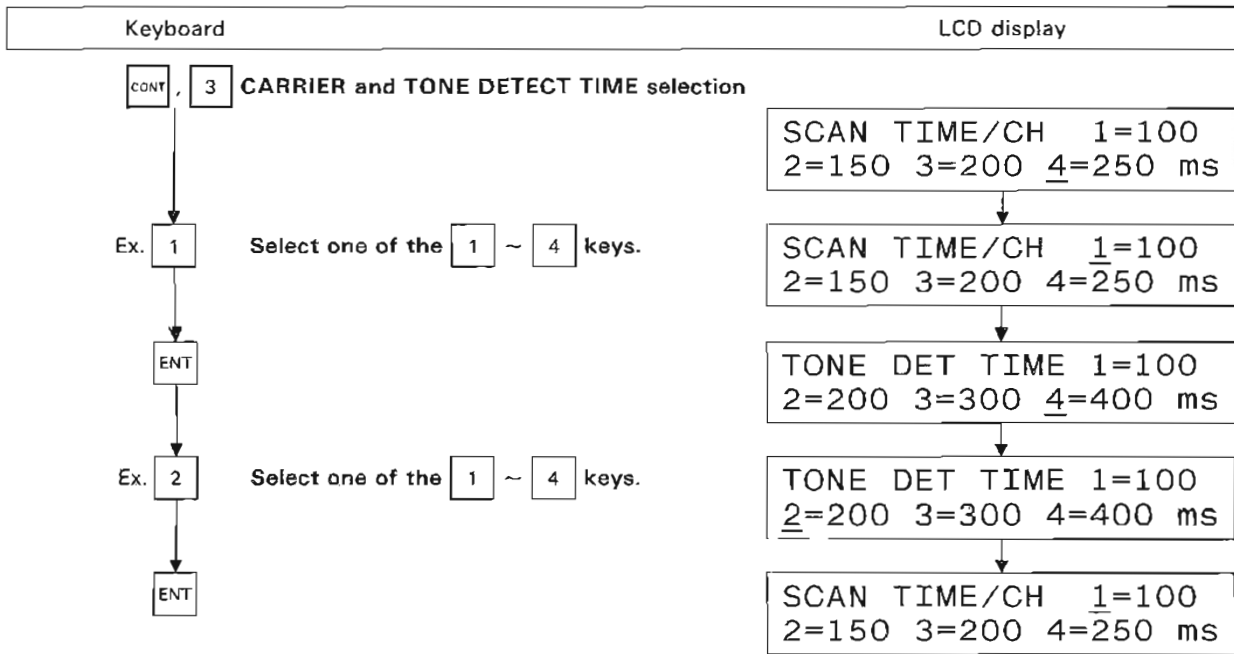


CONTROL DATA INPUT (PORTABLE)

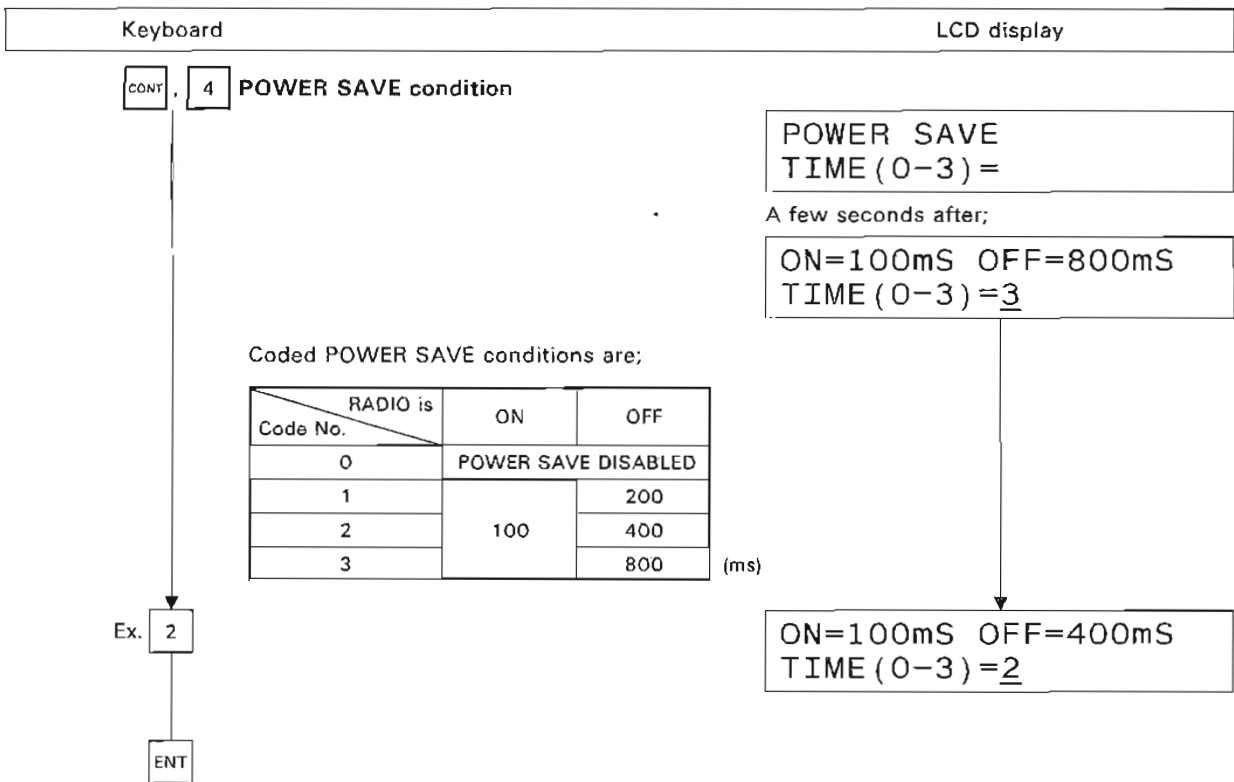




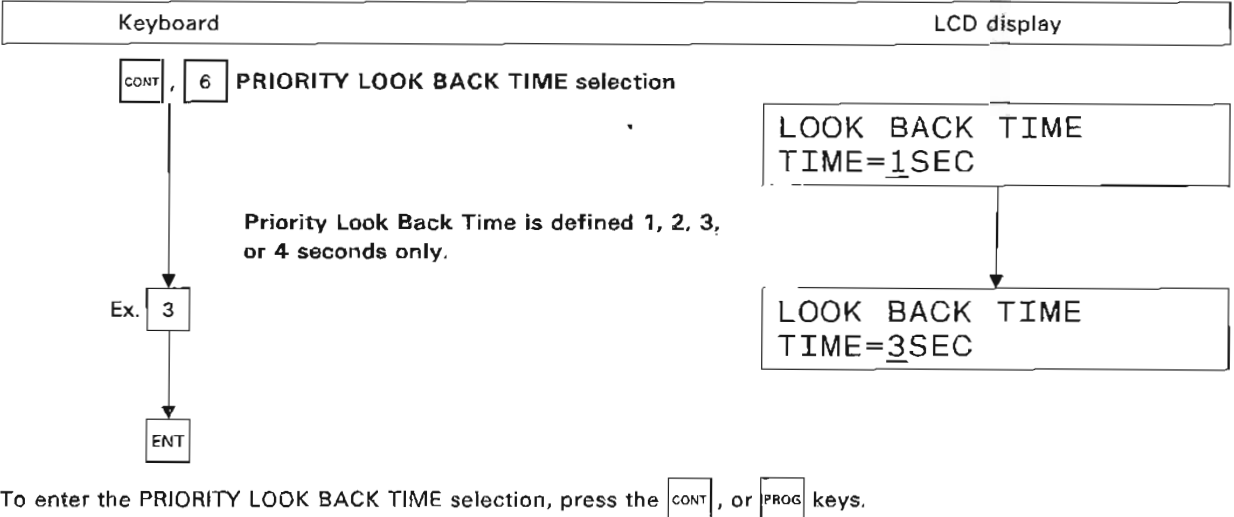
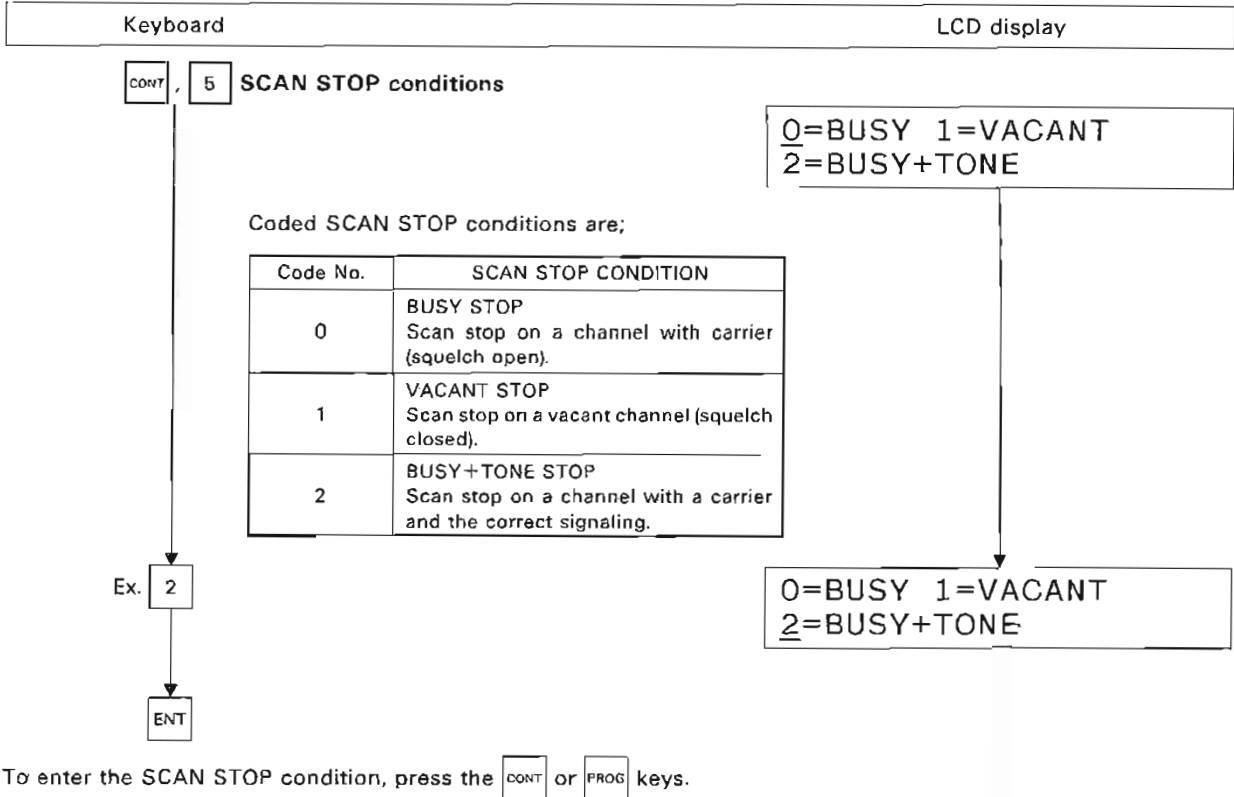
To complete the SW1, SW2, and POWER CONTROL conditions, press the CONT or PROG keys.

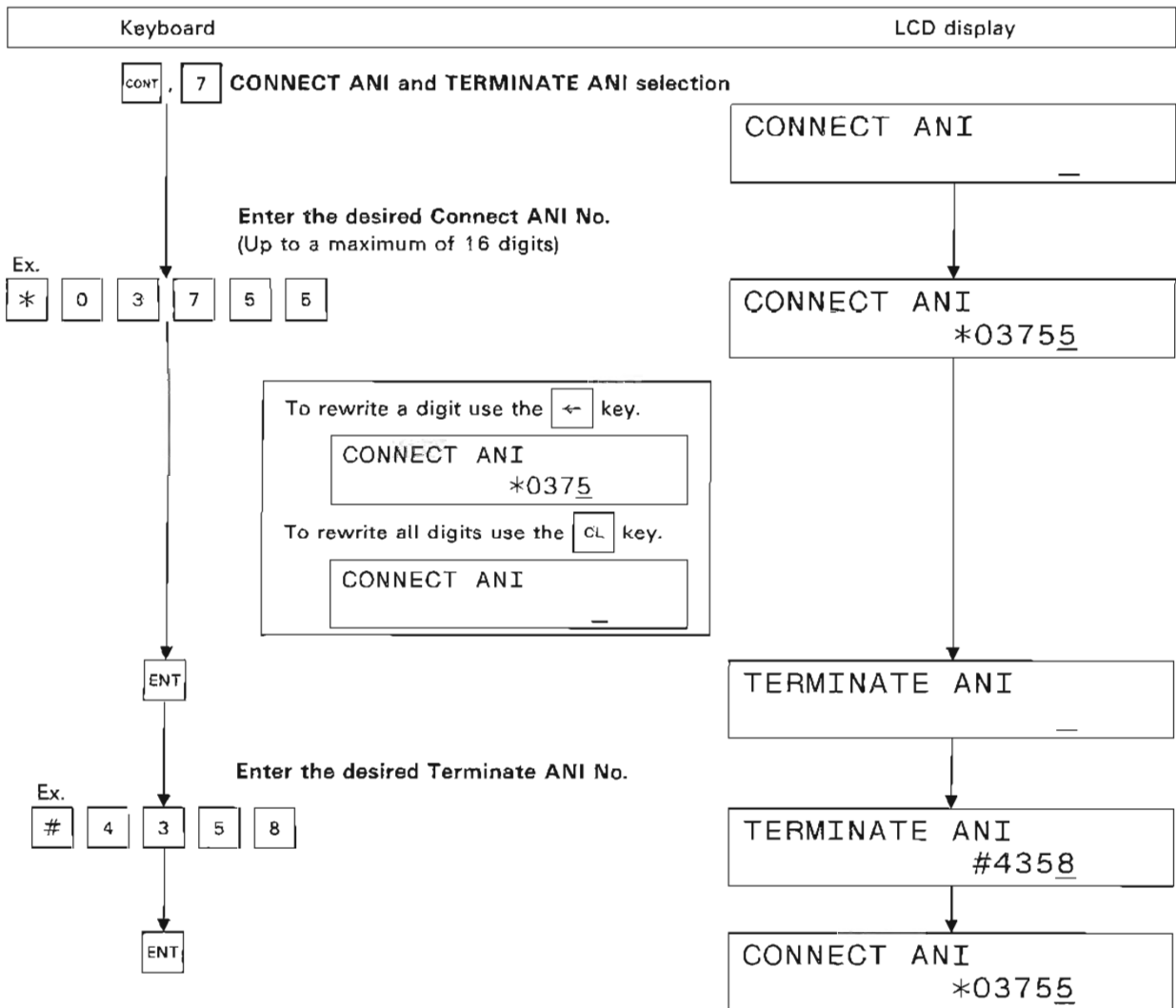


To complete the CARRIER and TONE DETECT TIME selection, press the **CONT** or **PROG** keys.

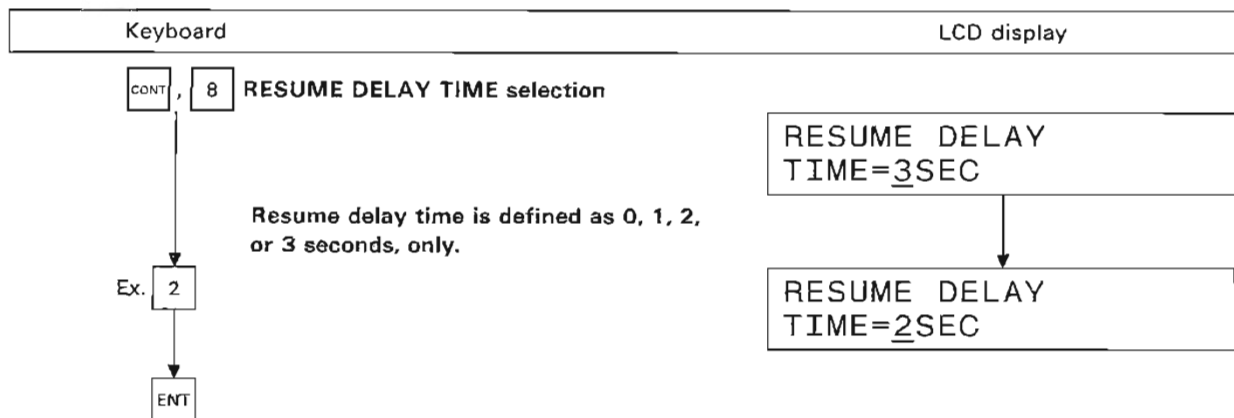


To enter the POWER SAVE condition, press the **CONT**, or **PROG** keys.



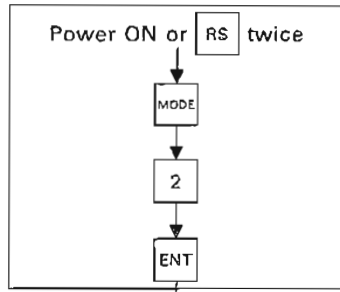


To enter the CONNECT ANI and TERMINATE ANI selection, press the CONT, or PROG keys.



To enter the RESUME DELAY TIME selection, press the CONT, or PROG keys.

■ SIGNALING (PORTABLE)



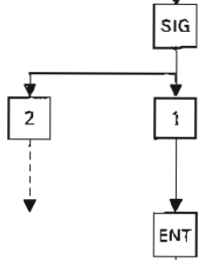
1=QT 2=DQT

After a few seconds (or Press the **1** key, or **ENT** key);

QT - / CH Hz

QT - / CH 1 R/T Hz

QT - / CH 8 R/T Hz



QT

Ex. **8** CH

Select the desired channel.
Please refer to page 6.
(Up to a maximum of 32 channels)

Select the R/T status.

RX

QT - / CH 8 R Hz

DUP

QT - / CH 8 R/T Hz

TX

QT - / CH 8 T Hz

Ex. **DUP**

QT - / CH 8 R/T Hz

Enter the desired QT Frequency.

RT QT Frequency is defined as the following.

(Hz)

frequency	above	below	frequency	above	below	frequency	above	below
67.0	67.0	67.8	90.0	89.2	90.7	118.8	118.2	119.8
68.6	67.8	69.4	91.5	90.7	92.3	120.9	119.8	121.9
70.2	69.4	71.0	93.1	92.3	93.9	123.0	121.9	123.6
71.9	71.0	72.5	94.8	93.9	96.1	124.3	123.6	126.8
73.1	72.5	73.7	97.4	96.1	98.7	127.3	125.8	127.5
74.4	73.7	75.0	100.0	98.7	101.3	127.7	127.5	128.4
75.7	75.0	76.3	102.8	101.3	103.0	131.2	128.4	131.5
77.0	76.3	77.6	103.5	103.0	104.5	131.8	131.5	133.3
78.3	77.6	79.0	105.6	104.5	106.4	134.8	133.3	135.6
79.7	79.0	80.4	107.2	106.4	107.8	136.5	135.6	137.5
81.1	80.4	81.8	108.5	107.8	109.7	138.5	137.5	139.9
82.5	81.8	83.2	110.9	109.7	111.2	141.3	139.9	141.8
83.9	83.2	84.6	111.5	111.2	113.0	142.4	141.8	144.3
85.4	84.6	86.1	114.6	113.0	114.7	146.2	144.3	146.2
86.9	86.1	87.7	114.8	114.7	116.2	146.3	146.2	148.3
88.5	87.7	89.2	117.7	116.2	118.2	150.3	148.3	150.8

frequency	above	below	frequency	above	below	frequency	above	below
151.4	150.8	152.9	186.8	186.5	189.4	232.2	230.6	232.9
154.5	152.9	156.6	192.0	189.4	192.4	233.6	232.9	236.1
156.7	155.6	156.7	192.8	192.4	195.0	238.6	236.1	240.2
156.8	156.7	157.7	197.2	195.0	199.9	241.8	240.2	243.4
158.7	157.7	160.4	202.7	199.9	203.1	245.1	243.4	247.7
162.2	160.4	162.6	203.5	203.1	206.0	250.3	247.7	251.1
163.1	162.6	165.3	206.5	205.0	207.4	251.9	251.1	253.0
167.6	165.3	167.7	208.3	207.4	208.5	254.1	253.0	256.4
167.9	167.7	170.0	210.7	209.5	212.3	258.8	256.4	262.3
172.2	170.0	173.0	214.0	212.3	216.0	266.0	262.3	269.6
173.8	173.0	175.3	218.1	216.0	219.0	273.3	269.6	277.0
176.9	175.3	178.4	219.9	219.0	222.8	280.8	277.0	281.3
179.9	178.4	180.8	225.7	222.8	225.8	281.8	281.3	285.1
181.8	180.8	184.0	225.9	225.8	227.5	288.5	285.1	288.6
180.2	184.0	186.5	229.1	227.5	230.6			

Ex.

ENT

TX QT Frequency is not defined.

Ex.

ENT

After a TX QT Frequency is entered, the Reverse/Burst code No. must be entered.
The , , or key is usually entered.

To rewrite a digit, use the key.

QT _ CH 8 R/T
 R/B.=1_

To rewrite all digits, use the key.

QT _ CH 8 R/T
 R/B.=_

Press the key.

QT _ CH 8 R/T
102.6 /120.0 Hz

QT _ CH 8 R/T
102.6 / Hz

QT _ CH 8 R/T
102.6 /_ Hz

QT _ CH 8 R/T
102.6 /120_ Hz

QT _ CH 8 R/T
 R/B.=_

QT _ CH 8 R/T
 R/B.=1F

QT QT CH 8 R/T
 R/B.=1F

QT QT CH 8 R/T
102.6 /120.0 Hz

ENT

ENT

Repeat the procedure for each channel.

To enter the QT Frequency, press the , or keys.

Reverse Burst Time T_R	Code	Cycle	Code	Cycle	Code	Cycle	Code	Cycle
$T_R = \frac{\text{CYCLE}}{\text{CTCSS TONE CODE}}$	00	10.0000	08	11.3333	10	12.6667	18	14.0000
	01	10.1667	09	11.5000	11	12.8333	19	14.1667
Ex. CTCSS TONE CODE = 123.0 Reverse Burst Code = 0C (12 cycles)	02	10.3333	0A	11.6667	12	13.0000	1A	14.3333
	03	10.5000	0B	11.8333	13	13.1667	1B	14.5000
$T_R = \frac{12}{123.0} = 97.6 \text{ (ms)}$	04	10.6667	0C	12.0000	14	13.3333	1C	14.6667
	05	10.8333	0D	12.1667	15	13.5000	1D	14.8333
	06	11.0000	0E	12.3333	16	13.6667	1E	15.0000
	07	11.1667	0F	12.5000	17	13.8333	1F	default time



SIG, 2 DQT

ENT

Select the desired channel.
Please refer to page 6.

Ex. 1 0 CH

Select the R/T status.

- RX DQT _ / CH10 R
- DUP DQT _ / CH10 R/T
- TX DQT _ / CH10 T

Ex. RX

Ex. 1 5 6

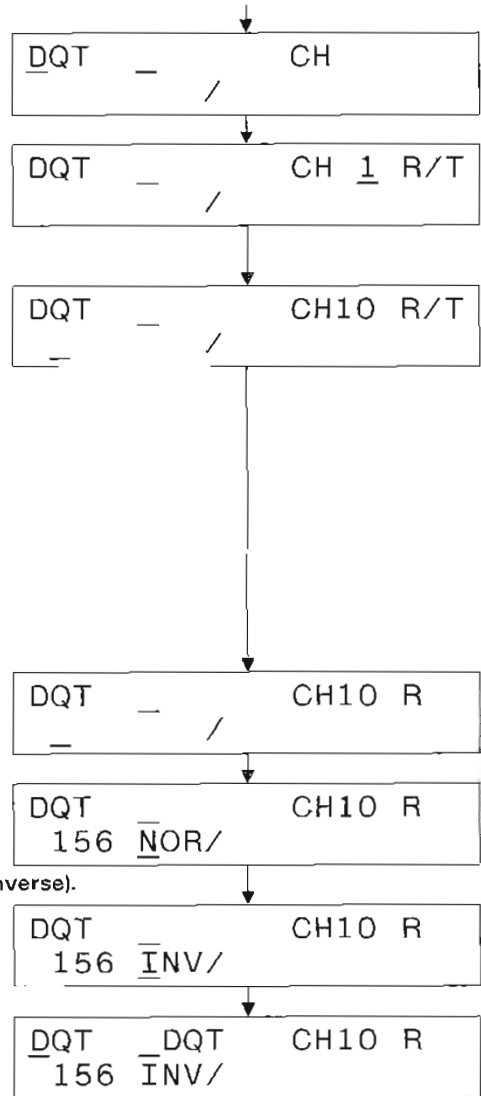
Select the 1 key (=Normal), or 2 (=Inverse).

Ex. 2

ENT

Repeat the procedure for each channel.

To enter the DQT Frequency, press the MODE, or PROG keys.



4. SERVICE

■ ERROR MESSAGE

The following messages are to alert an error.

ILLEGAL INPUT

ILLEGAL ROM TYPE

ROM SET ERROR

Confirm whether a PROM is installed backwards.

VERIFY ERROR

■ BEFORE REQUESTING ASSISTANCE.

When all else fails, read the instructions.

Before requesting assistance or return authorization, be sure:

1. The power supply is ON and capable of delivering approximately 3A peak.
2. The 2A fuse is good.
3. The KPT-20 power switch is ON and you have depressed RESET twice.
4. PROMs are new and unused (or additional channel frequencies are to be programmed).
5. PROMs are correctly installed in their sockets.
6. If all steps check OK, call Land Mobile Technical Service for assistance or return authorization.

Note:

A separate Service Manual is available for this product.

5. UNPACKING AND CHECKING EQUIPMENT

Carefully unpack the equipment. It is recommended that you identify the items listed and check them off before storing the packing material. If any damage has occurred to the equipment during shipment, file a claim with the carrier immediately.

EQUIPMENT

KPT-20 1 pc.
Cord with MIC connector
and Earphone plug..... E30-2086-08.... 1 pc.
DC power cord..... E30-2078-15.... 1 pc.
Instruction manual..... B50-8168-XX... 1 copy
Warranty card B46-0409-10 ... 1 each
(U.S.A only)

For MOBILE use

Cord with connector..... E30-2087-08.... 1 pc.

SPECIFICATIONS

Operating voltage : 13.8 VDC ± 15%
Current drain : Less than 2A
Operating temperature : +0°C ~ +40°C
(41°F ~ 104°F)

The two types of data which can be written with this Program/Test Set are:

- 1) Frequencies (TK-710, TK-810)
- 2) Signaling (KMS-1, KMS-4)

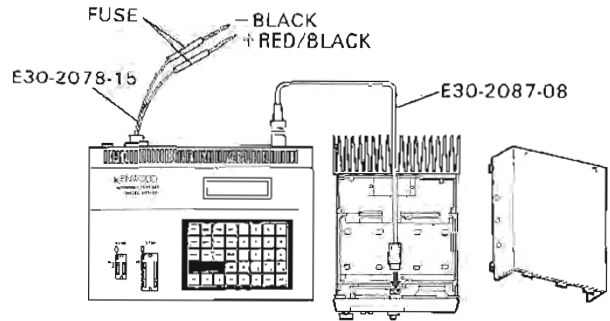
WARNING: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of the FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

CONTENTS (MOBILE)

1. CONNECTION	18
2. NOMENCLATURE	18
3. OPERATION	19
■ Function keys	19
■ Rewrite and ENT keys	21
■ FREQUENCY SELECTION	22
■ SIGNALING	25
1 QT	
2 DQT	
3 2TONE	
4 2805	
5 DTMF	
4. SERVICE	31
Error message	
Before requesting assistance	
5. UNPACKING AND CHECKING EQUIPMENT	31
6. FLOW CHART	35

1. CONNECTION (MOBILE)

Remove the front panel by loosening the screws.



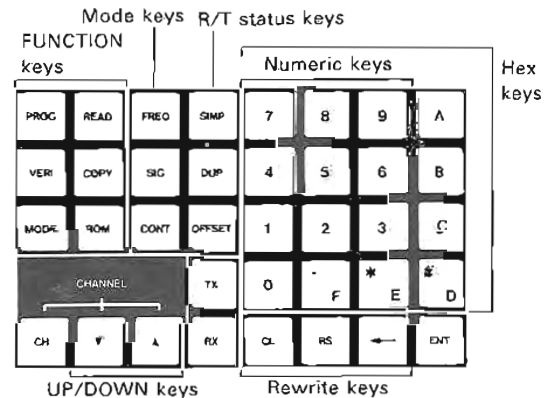
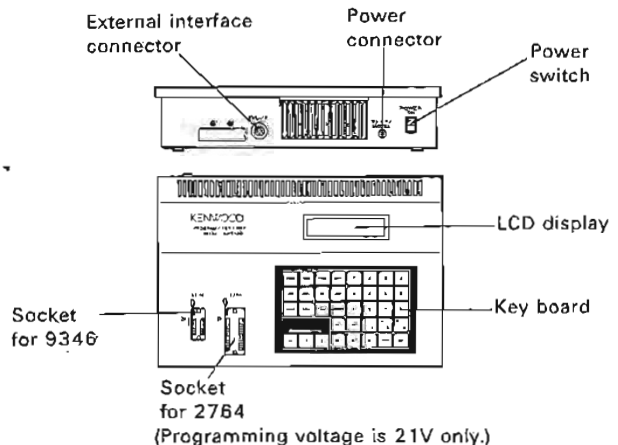
Power cable: connect to a source of 13.8VDC capable of supplying 2A.

Red/black is positive, black is negative.

CAUTION:

Observe polarity. Power cable fuse is 2A. If the fuse blows, there is usually some cause. Try to determine the cause before replacing the fuse. Use another 2A fast blow fuse. Under no circumstance use a fuse of higher rating. This will cause extensive equipment damage.

2. NOMENCLATURE



3. OPERATION (MOBILE)

Turn the power switch on or press the **RS** key twice, the LCD display shows;

READY

The all function rewrite operation must be started in this state.

Select one of the 6 Function keys.

■ FUNCTION keys

The 6 types of Function keys are;

PROG PROGRAM

This key is used to enter data previously stored in the Test Set's internal memory (RAM) into a set of PROMs.

COPY COPY

This key is used to copy data previously stored in the Test Set's internal socketed PROMs into the Test Set's internal memory (RAM) and a set of PROMs.

READ READ

This key is used to transfer data previously stored in a set of PROMs into the Test Set's internal memory (RAM).

VERI VERIFY

This key is used to verify the specified data (before writing into the PROMs).

ROM ROM

This key is used to select a ROM.

MODE MODE

Please refer to page 21.

CAUTION:

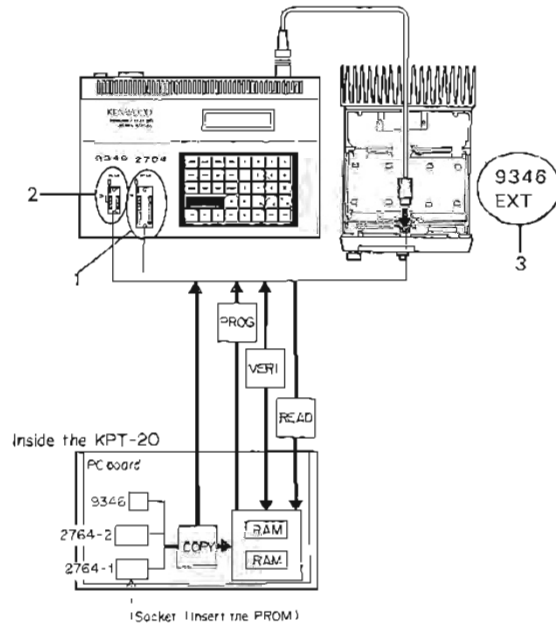
It is important not to press the **COPY**, **READ**, or **ROM** key after new data have been programmed, as damage to the data may result.

PROG OPERATION

When the **PROG** key is pressed, the LCD display shows:

1=2764 2=9346
3=9346EXT 4=MODIFY

ROM selection



For example the **3** key is pressed.

The LCD display shows;

PROGRAM 9346EXT

Press the **ENT** key.

PROGRAM 9346EXT
BUSY

After several minutes the display shows;

PROGRAM 9346EXT
DONE

Then the display shows the function to be complete.

READY

The **4** key (modify):

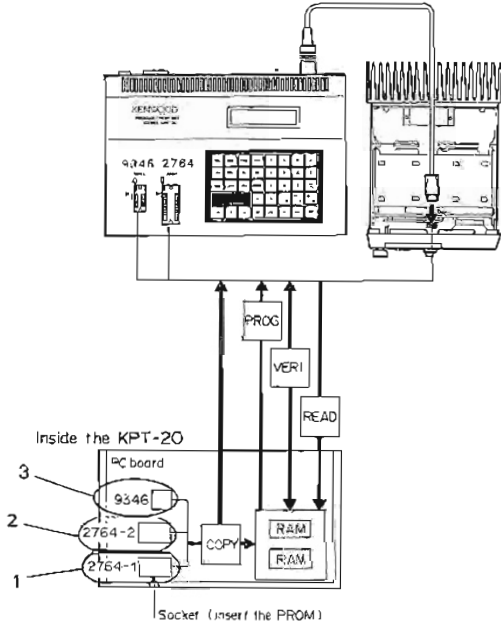
No program presently installed.

Reserved for future use.

COPY OPERATION

When the **COPY** key is pressed, the LCD display shows;

1=2764-1 2=2764-2
3=9346



For example, the **1** key is pressed.

COPY 2764-1

Press the **ENT** key.

COPY 2764-1 BUSY

After several minutes, the display shows;

COPY 2764-1 DONE

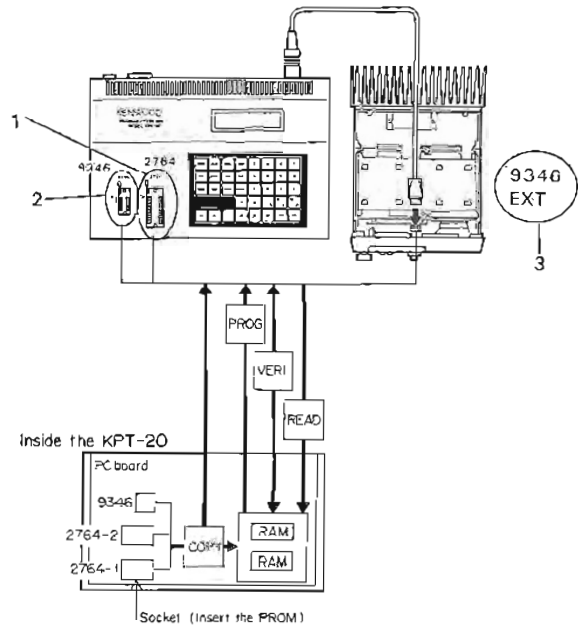
Then the display shows the function to be complete.

READY

READ, VERI OPERATION

When the **READ** key, or **VERI** key is pressed, the LCD display shows;

1=2764 2=9346
3=9346EXT



For example, enter the **READ** key, and then the **2** key.

READ 9346

Press the **ENT** key.

READ 9346 BUSY

After several minutes, the display shows;

READ 9346 DONE

Then the display shows the function to be complete.

READY

MODE OPERATION

Press the **MODE** key, and the LCD display shows;

MODE ENTRY

Press the **1** key.

1 MOBILE MODE

Press the **ENT** key.

**DEPRESS FREQ. OR SIG
KEY**

Select one of the 2 mode keys.

MODE key

The 2 types of mode keys are the **FREQ** key and the **SIG** key.

If selecting the **FREQ** key, refer to page 22.

Or selecting the **SIG** key, refer to page 25.

Note:

After **FREQ** (Frequency Selection) input entry, you cannot proceed continuously to **SIG** (Signaling mode).

Do not turn the power switch off during programming, as damage to the data will result.

■ **REWRITE** and **ENT** keys

←

The **←** key is used to delete the data displayed on the LCD.

Depressing the key once deletes the right hand digit.

CL

The **CL** key is used to delete displayed data.

CL + **ENT**

The **CL** key and then **ENT** keys are used to delete displayed, and internal memory data.

RS

Depress the **RS** key once and then any other key, and the LCD display shows "Reset?".

Depressing the **RS** key twice restores the entire Test Set system (but not the PROMs) to the initial setup status.

Note:

However, that all internally stored data is cleared (except PROM).

ENT

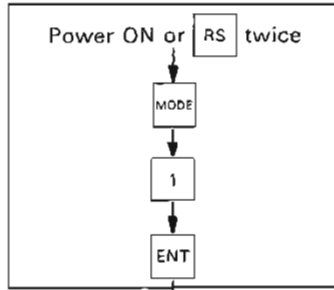
The **ENT** key is used to enter data into the Test Set internal memory.

This key must be depressed after data is entered into the display.

FREQUENCY SELECTION (MOBILE)

Keyboard

LCD display



FREQ Select 1 or 2

1=AUTO STEP
2=MANUAL STEP

AUTO STEP MODE
SELECT STEP NO. 1

Select the code No.

	F.Range (MHz)	Model
1	300 ~ 520	TK-810
2	130 ~ 230	TK-710
3	RX439,TX424 ~ 470	
4	0 ~ 306.27	
5	10.7 ~ 420.2875	
6	54 ~ 88	
7	0 ~ 398.8875	
8	25 ~ 53.995	

AUTO STEP MODE
SELECT STEP NO. 2

MANUAL STEP MODE
IF FREQ.=21.4MHz

Select the IF frequency, 21.4 or 10.7 MHz.

MANUAL STEP MODE
IF FREQ.=21.4MHz

MANUAL STEP MODE
CH SPACING=12.5kHz

Select the CH Spacing, 12.5, 6.25, 5.0 or 2.5 kHz.

MANUAL STEP MODE
CH SPACING=5.0_kHz

Ex. 1

Ex. 2

Ex. 2

Ex. (2 1 . 4)

Ex. 5 . 0

MOBILE

Select the R/T Status.

Before frequency input, select the R/T status.
If the same as a preset, go to the frequency input.
To change R/T status, select the following.

<input type="checkbox"/> TX	FREQ. CH50 T /_ MHz
<input type="checkbox"/> RX	FREQ. CH50 R _ / MHz
<input type="checkbox"/> SIMP	FREQ. CH50 S _ / MHz
<input type="checkbox"/> OFFSET	FREQ. CH50 + _ / MHz
twice	alternative
<input type="checkbox"/> OFFSET	FREQ. CH50 _ / MHz
<input type="checkbox"/> DUP	FREQ. CH50 R/T _ / MHz

Ex. SIMP

Enter the desired frequency.

ENT

To rewrite a digit use the key.

FREQ. CH50 S
152. _ / MHz

To rewrite all digits use the key.

FREQ. CH50 S
_ / MHz

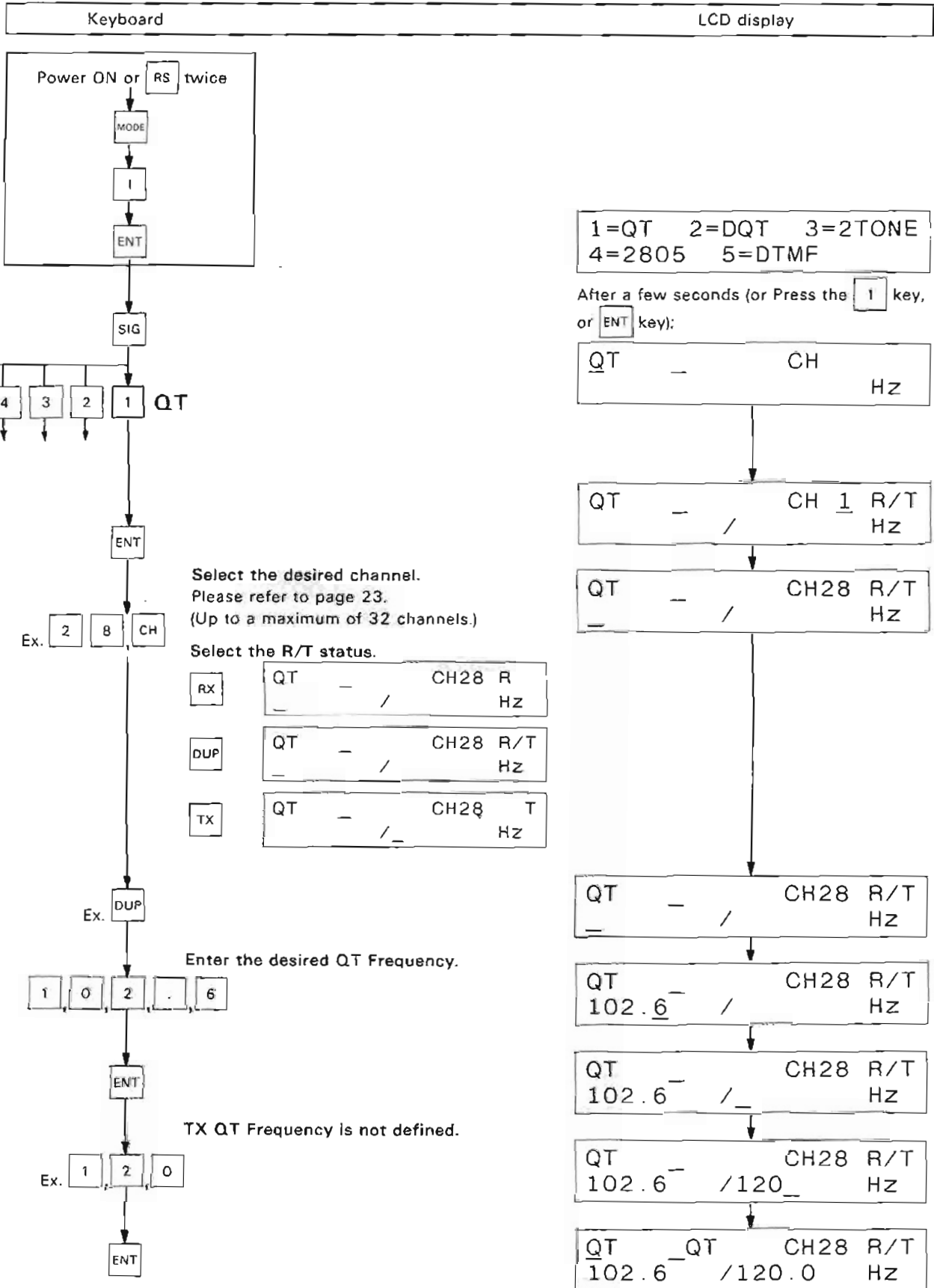
FREQ. CH50 S
_ / MHz

FREQ. CH50 S
152.5_ / MHz

FREQ. CH50 S
152.5000/152.5000MHz

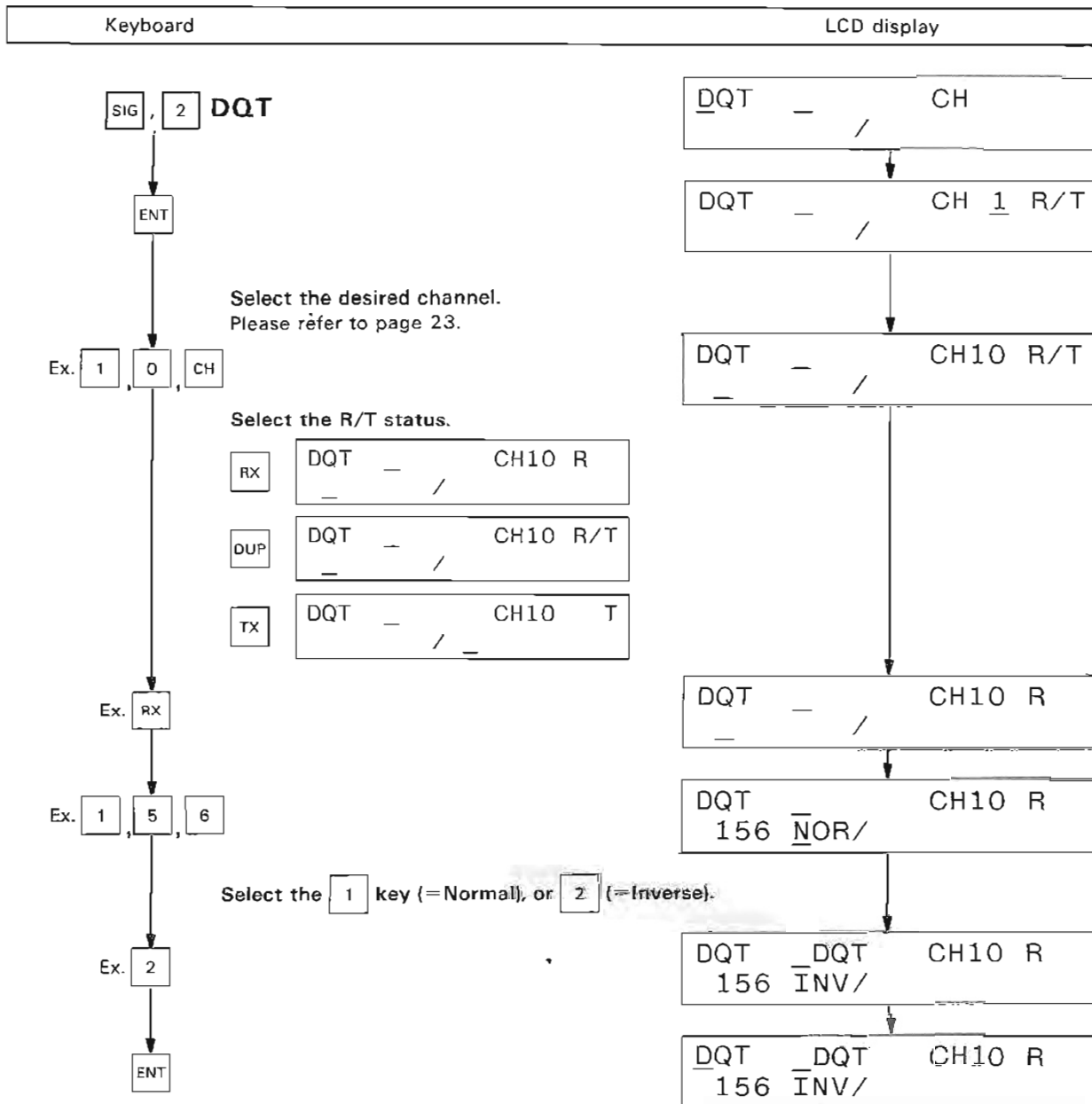
Repeat the procedure for each channel.
To enter the FREQUENCY SELECTION, press the keys.

■ SIGNALING (MOBILE)



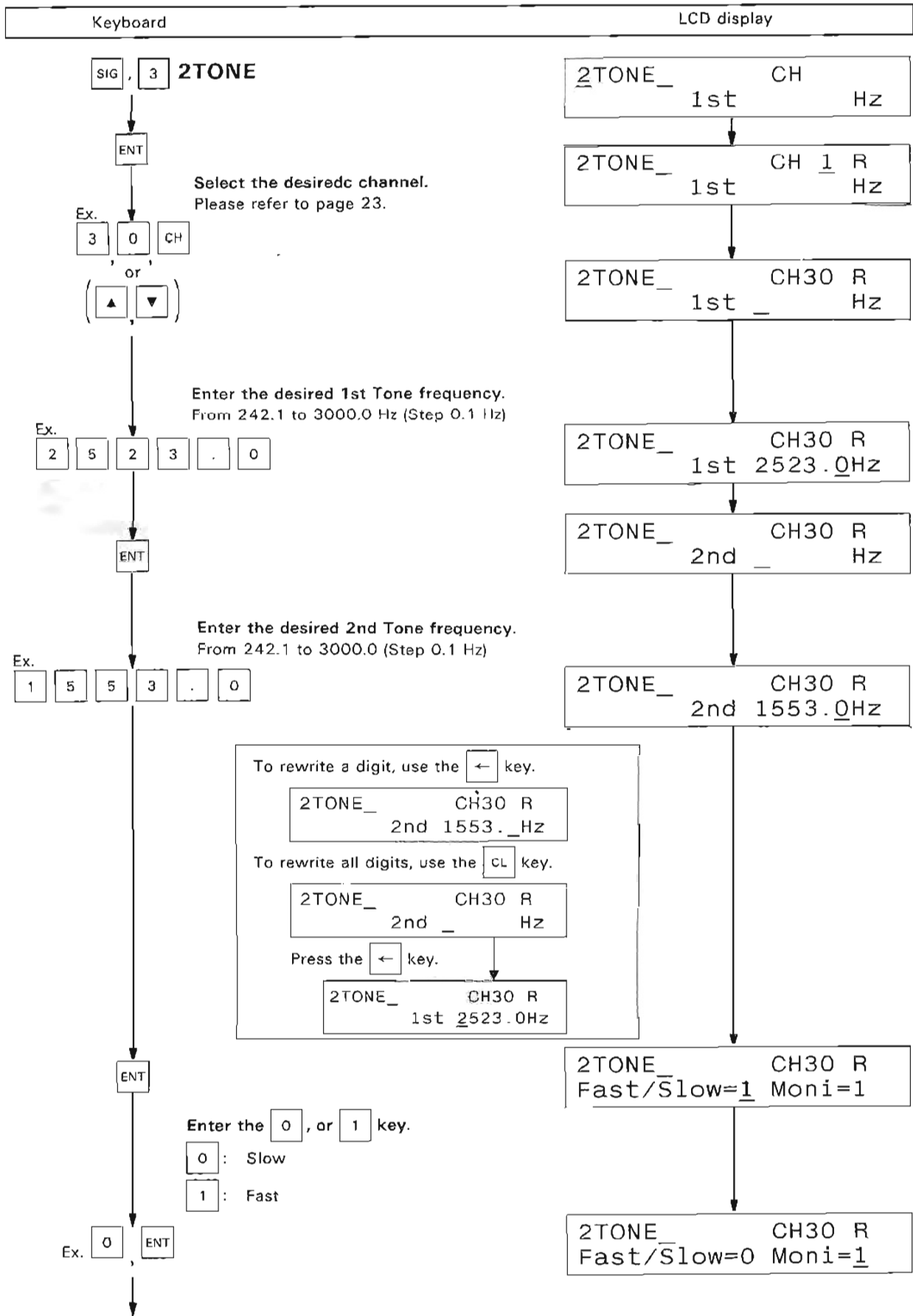
Repeat the procedure for each channel.

To enter the QT Frequency, press the SIG, MODE, or PROG keys.



Repeat the procedure for each channel.

To enter the DQT Frequency, press the , , or keys.



To rewrite a digit, use the key.

2TONE_ CH30 R
2nd 1553. _ Hz

To rewrite all digits, use the key.

2TONE_ CH30 R
2nd _ Hz

Press the key.

2TONE_ CH30 R
1st 2523.0 Hz

, 2805

Select the desired channel.
Please refer to page 23.

CH

Enter 2805 data.
4 digits or 7 digits.

, , , and key only.

Enter the A code: use the , or keys.

: Not monitored.

: Automatically monitored.

2805 _ CH
DATA=_ A=

2805 _ CH 1 R
DATA=_ A=

2805 _ CH32 R
DATA=_ A=

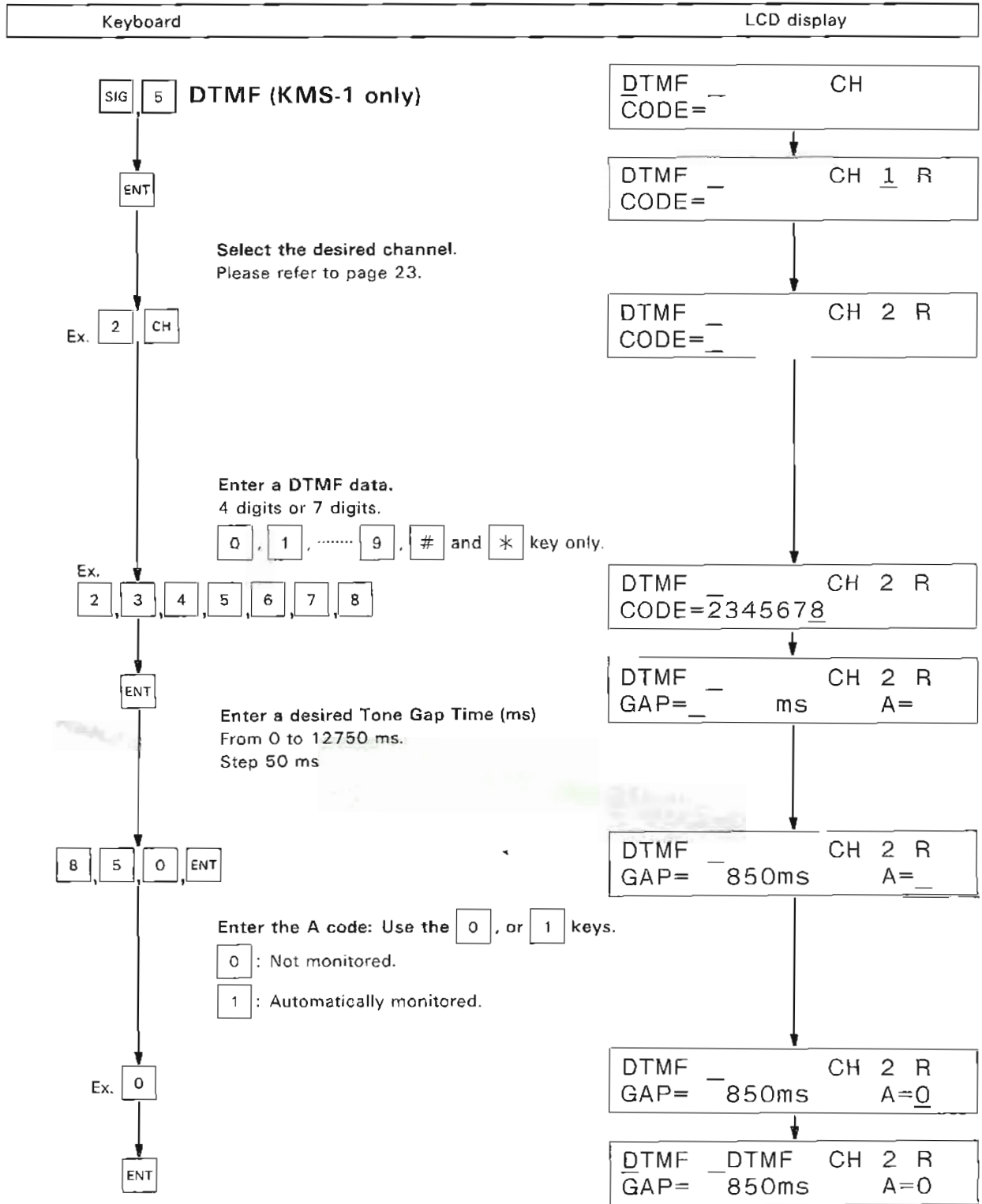
2805 _ CH32 R
DATA=4444 A=_

2805 _ 2805 CH32 R
DATA=4444 A=0

2805 _ 2805 CH32 R
DATA=4444 A=0

Repeat the procedure for each channel.

To enter the 2805 data input, press the , , or keys.



Repeat the procedure for each channel.

To enter the DTMF data input, press the **SIG**, **MODE**, or **PROG** keys.

4. SERVICE

■ ERROR MESSAGE

The following messages are to alert an error.

ILLEGAL INPUT

ILLEGAL ROM TYPE

ROM SET ERROR

Confirm whether a PROM is installed backwards.

VERIFY ERROR

■ BEFORE REQUESTING ASSISTANCE.

When all else fails, read the instructions.

Before requesting assistance or return authorization, be sure;

1. The power supply is ON and capable of delivering approximately 3A peak.
2. The 2A fuse is good.
3. The KPT-20 power switch is ON and you have depressed RESET twice.
4. PROMs are new and unused (or additional channel frequencies are to be programmed).
5. PROMs are correctly installed in their sockets.
6. If all steps check OK, call Land Mobile Technical Service for assistance or return authorization.

Note:

A separate Service Manual is available for this product.

5. UNPACKING AND CHECKING EQUIPMENT

Carefully unpack the equipment. It is recommended that you identify the items listed and check them off before storing the packing material. If any damage has occurred to the equipment during shipment, file a claim with the carrier immediately.

EQUIPMENT

KPT-20 1 pc.
Cord with connector E30-2087-08 ... 1 pc.
DC power cord E30-2078-15 ... 1 pc.
Instruction manual B50-8168-XX ... 1 copy
Warranty card B46-0409-10 ... 1 each
(U.S.A. only)

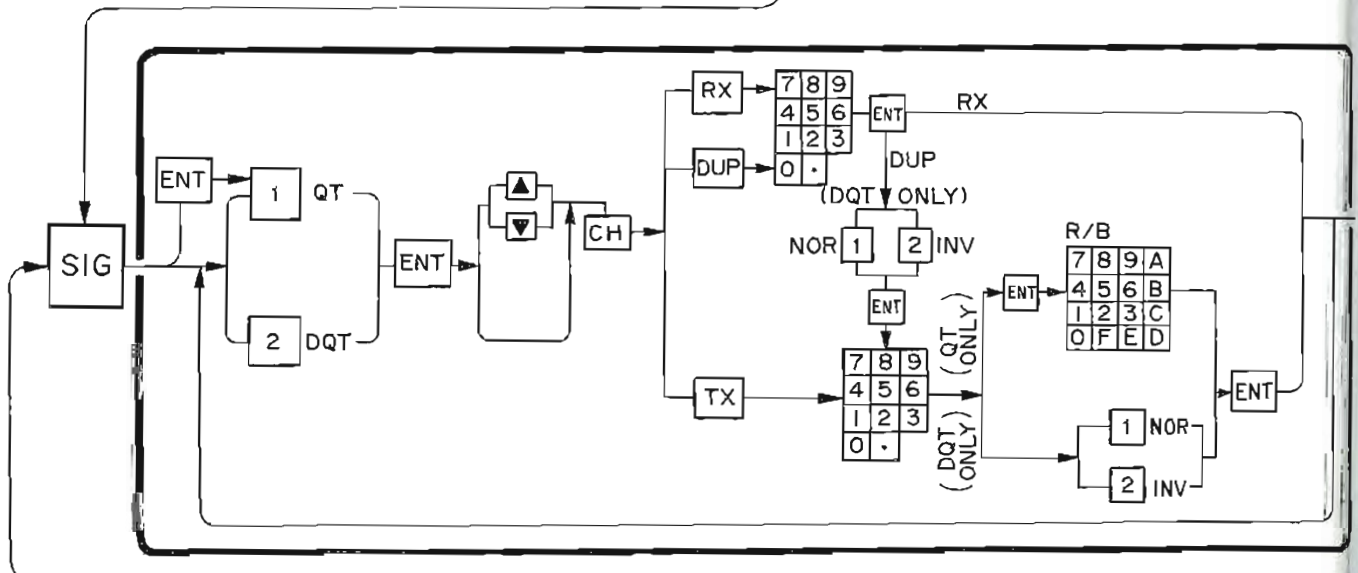
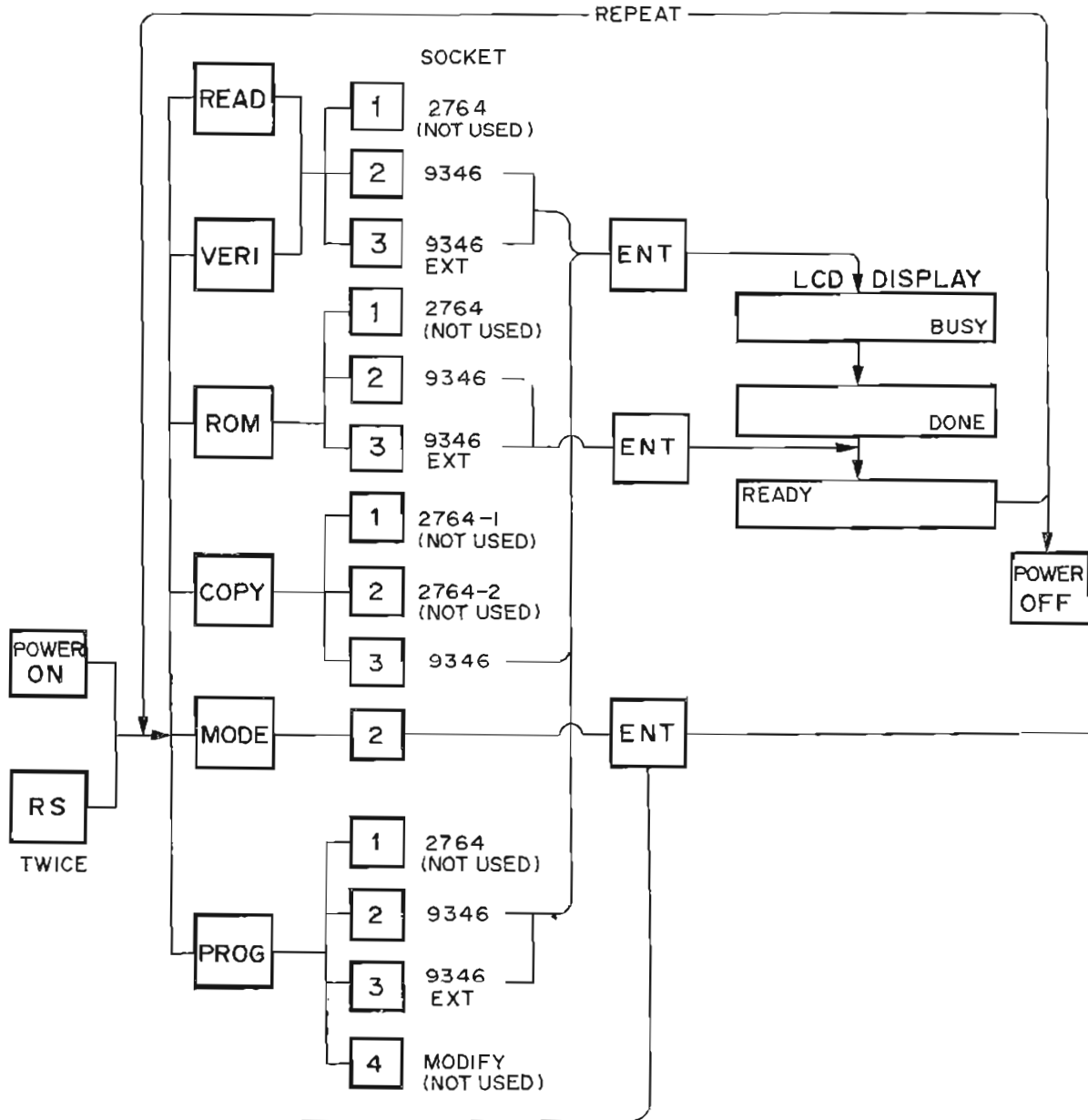
For PORTABLE use

Cord with MIC connector
and Earphone plug E30-2086-08 ... 1 pc.

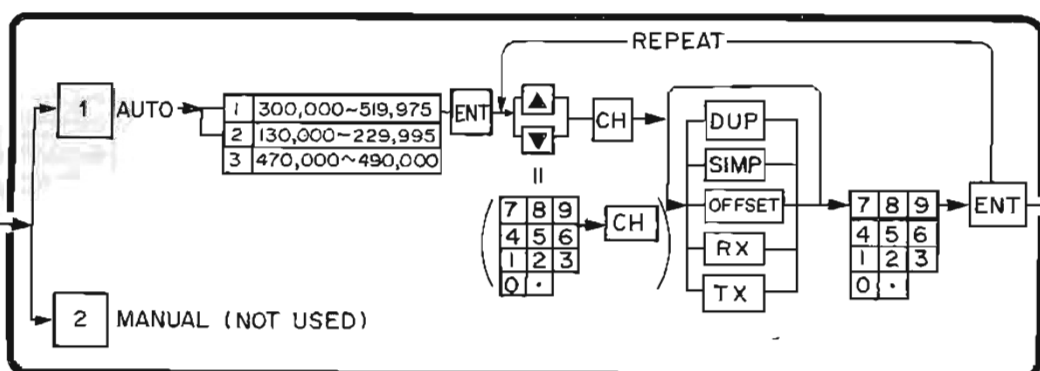
SPECIFICATIONS

Operating voltage : 13.8 VDC ± 15%
Current drain : Less than 2A
Operating temperature : +0°C ~ +40°C
(41°F ~ 104°F)

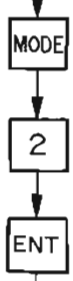
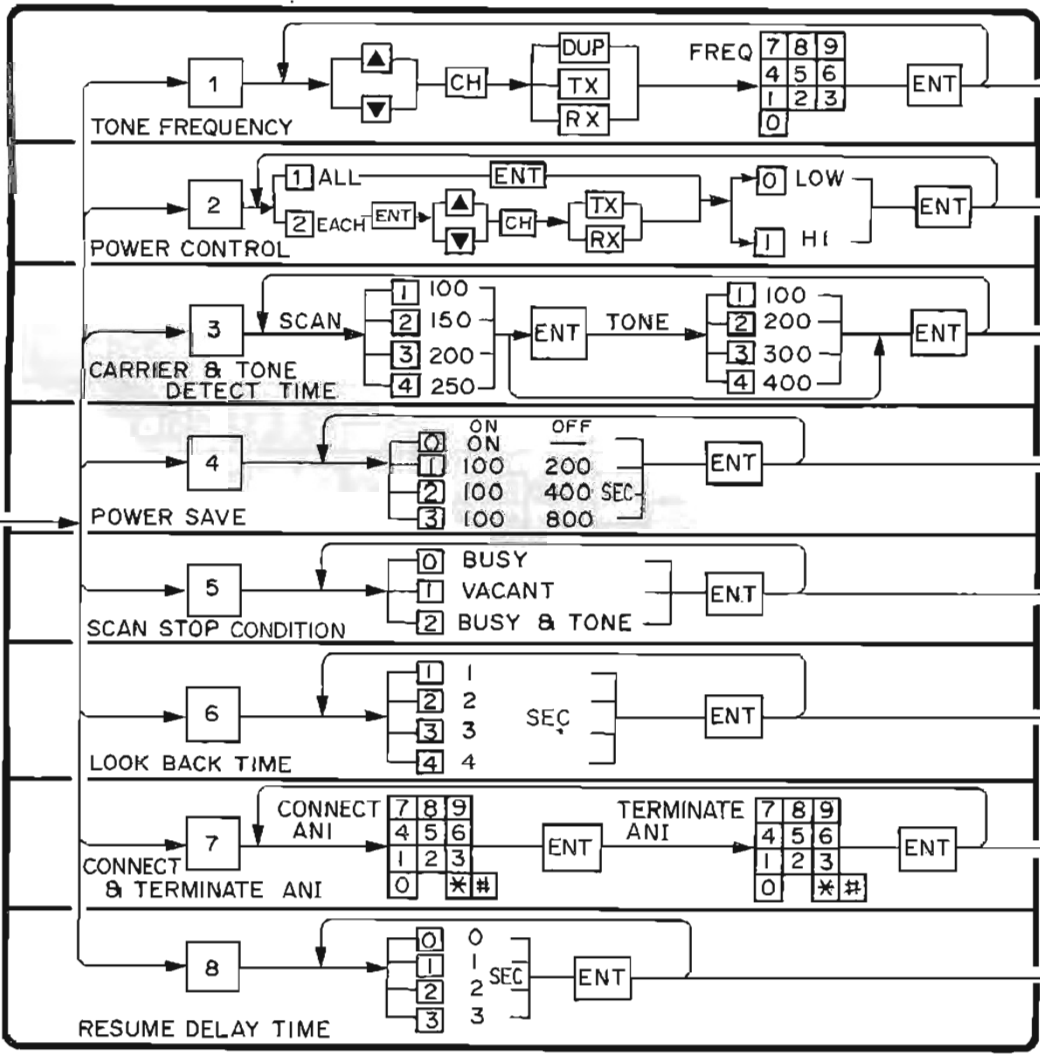
6. FLOW CHART (PORTABLE)



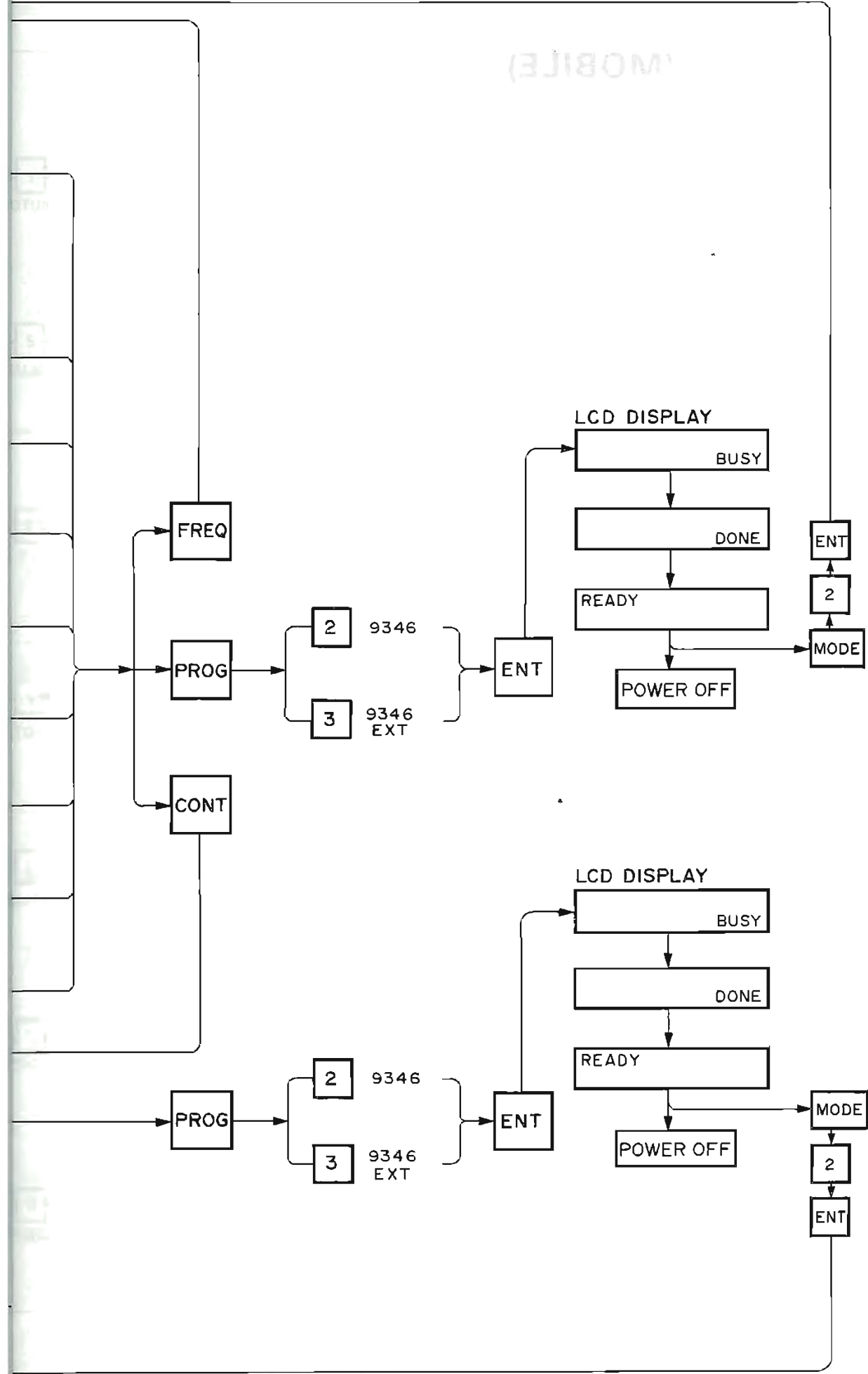
FREQ



CONT

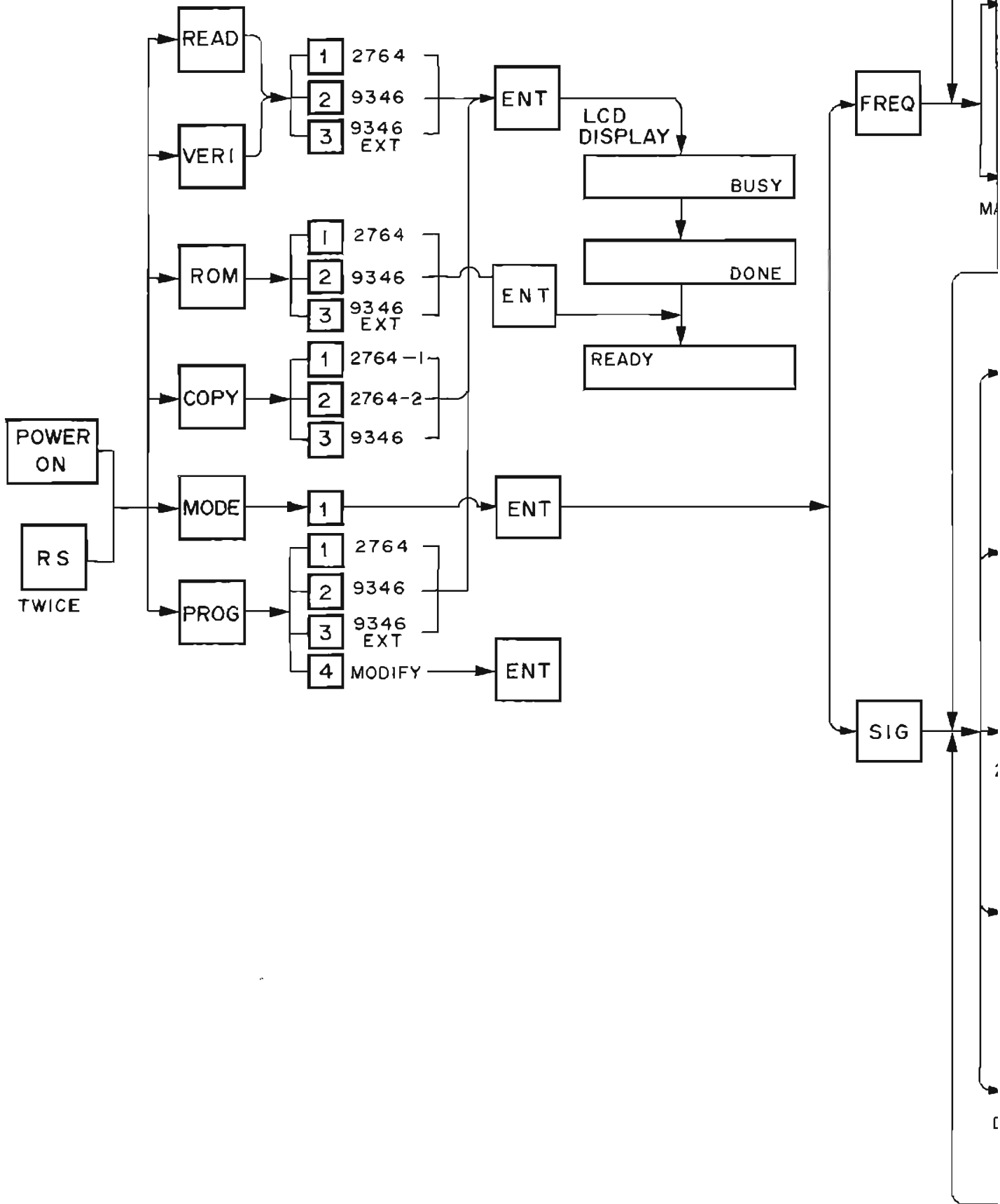


(MOBILE)



FLOW CHART (MOBILE)

MOBILE



1	300 ~ 520
2	130 ~ 230
3	RX439, TX424 ~ 470
4	0 ~ 306.27
5	10.7 ~ 420.2875
6	54 ~ 88
7	0 ~ 398.8875
8	25 ~ 53.995

