** Power On

Power on the radio by turning the power/volume control clockwise out of detent. You will hear a confirmation tone on power-up. When Power-on, all character and icon are displayed for around 0.7 sec. And it beeps to enter normal opeation mode.

* When Power-On, it checks the last Memory and if data is wrong, it display as under and beeps a error tone and then, the radio goes initial value and re-writes the memory. The radio goes to normal operation with two beep sounds.

```
EEP Err
```
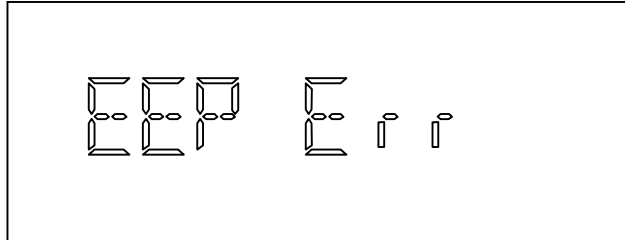
** Channel change

Rotate Channel Knob to select the channel among 16 channels.

** Transmit

- Press PTT button to transmit. If PTT button is released, the radio returns to receive mode.
  When VOX option is set and voice is input, the radio transmits the signal. If voice input stops, the radio maintains TX for around 2 set and if there is no voice input, it returns to receive mode.

** Channel Option view

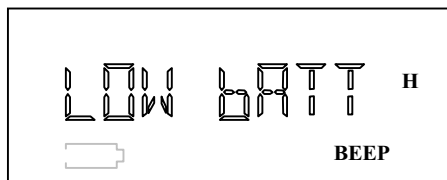- In receiving mode, if Monitor key is pressed for more than 2 sec., RX option and TX option each of the channel displays for one sec.

```
RCTC 01        H

(IIII)      BEEP
```
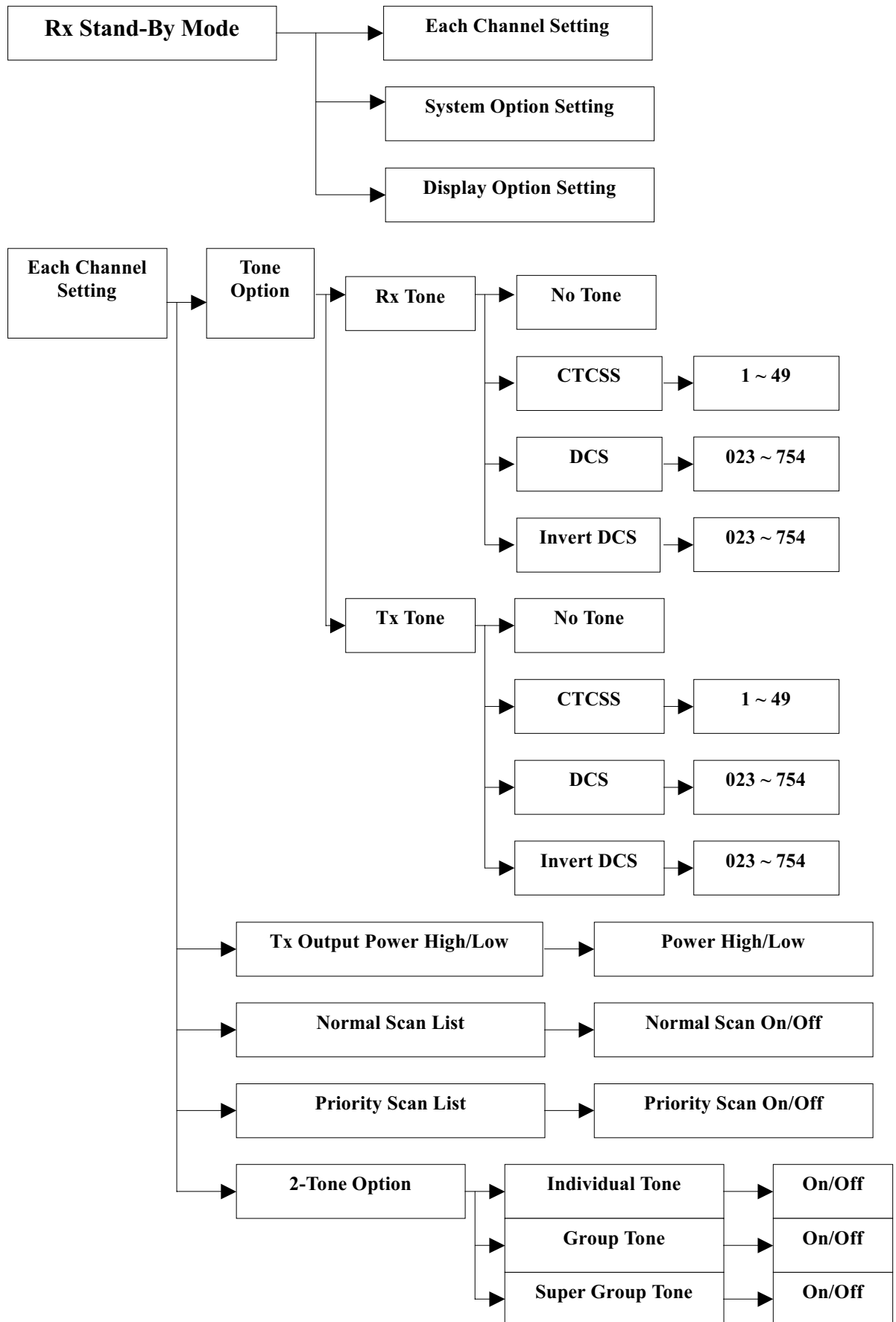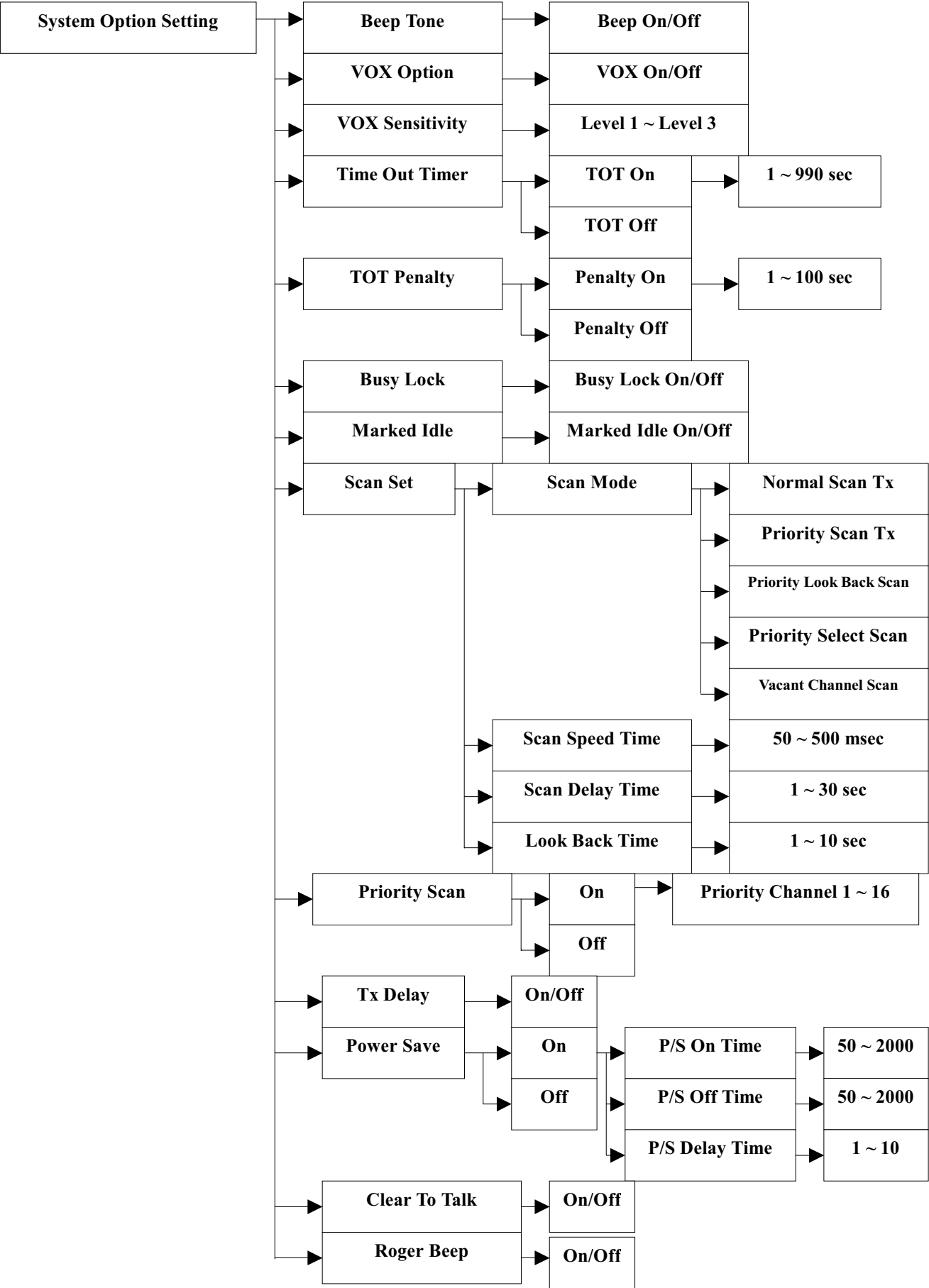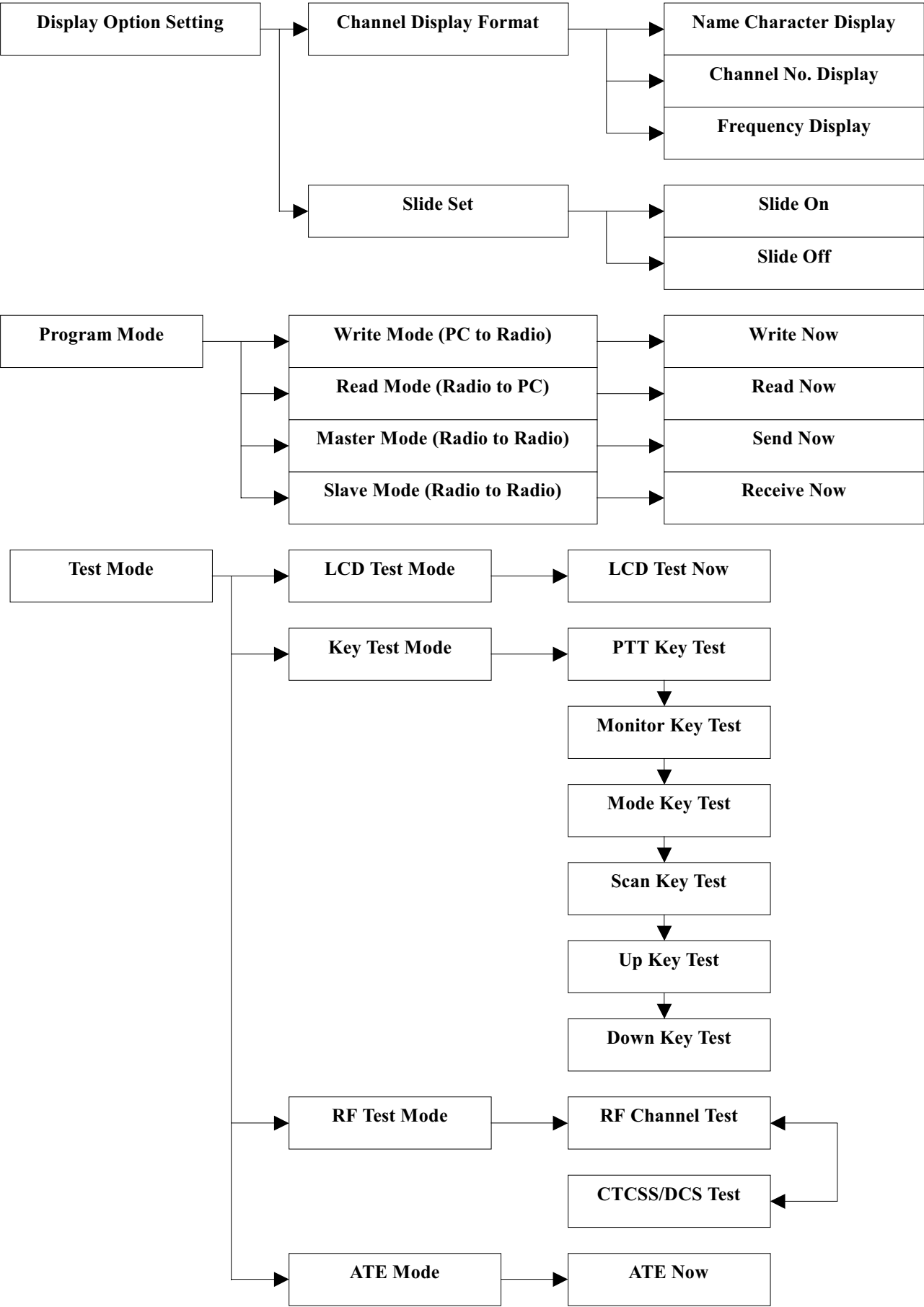
```
TCTC 01        H

(IIII)      BEEP
```
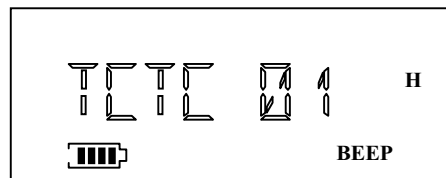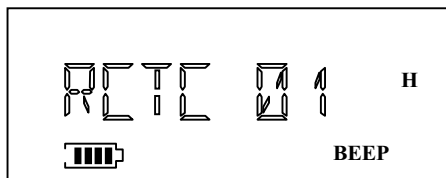
** Low Battery

- If Battery voltage went under certain value, Low Cell error message is shown for two sec. And batt. Icon is flashing.

```
LOW bATT   H

[    ]      BEEP
```

● Menu Tree

```
┌──────────────────────┐          ┌──────────────────────────┐
│   Rx Stand-By Mode   │─────────▶│   Each Channel Setting   │
└──────────────────────┘          └──────────────────────────┘

                                  ┌──────────────────────────┐
                                ─▶│  System Option Setting   │
                                  └──────────────────────────┘

                                  ┌──────────────────────────┐
                                ─▶│  Display Option Setting  │
                                  └──────────────────────────┘
```

```
┌──────────────┐   ┌──────────┐   ┌────────────┐   ┌────────────┐
│ Each Channel │──▶│  Tone    │──▶│  Rx Tone   │──▶│  No Tone   │
│   Setting    │   │  Option  │   └────────────┘   └────────────┘
└──────────────┘   └──────────┘
                                   ┌────────────┐   ┌────────────┐
                                 ─▶│   CTCSS    │──▶│   1 ~ 49   │
                                   └────────────┘   └────────────┘

                                   ┌────────────┐   ┌────────────┐
                                 ─▶│    DCS     │──▶│ 023 ~ 754  │
                                   └────────────┘   └────────────┘

                                   ┌────────────┐   ┌────────────┐
                                 ─▶│ Invert DCS │──▶│ 023 ~ 754  │
                                   └────────────┘   └────────────┘

                   ┌────────────┐   ┌────────────┐
                 ─▶│  Tx Tone   │──▶│  No Tone   │
                   └────────────┘   └────────────┘

                                   ┌────────────┐   ┌────────────┐
                                 ─▶│   CTCSS    │──▶│   1 ~ 49   │
                                   └────────────┘   └────────────┘

                                   ┌────────────┐   ┌────────────┐
                                 ─▶│    DCS     │──▶│ 023 ~ 754  │
                                   └────────────┘   └────────────┘

                                   ┌────────────┐   ┌────────────┐
                                 ─▶│ Invert DCS │──▶│ 023 ~ 754  │
                                   └────────────┘   └────────────┘
```

```
┌──────────────────────────┐   ┌──────────────────────┐
│ Tx Output Power High/Low │──▶│   Power High/Low     │
└──────────────────────────┘   └──────────────────────┘

┌──────────────────────────┐   ┌──────────────────────┐
│     Normal Scan List     │──▶│  Normal Scan On/Off  │
└──────────────────────────┘   └──────────────────────┘

┌──────────────────────────┐   ┌──────────────────────┐
│    Priority Scan List    │──▶│ Priority Scan On/Off │
└──────────────────────────┘   └──────────────────────┘

┌──────────────────────────┐   ┌──────────────────────┐   ┌────────┐
│      2-Tone Option       │──▶│   Individual Tone    │──▶│ On/Off │
└──────────────────────────┘   ├──────────────────────┤   ├────────┤
                             ─▶│     Group Tone       │──▶│ On/Off │
                               ├──────────────────────┤   ├────────┤
                             ─▶│  Super Group Tone    │──▶│ On/Off │
                               └──────────────────────┘   └────────┘
```

System Option Setting

- **Beep Tone** → **Beep On/Off**
- **VOX Option** → **VOX On/Off**
- **VOX Sensitivity** → **Level 1 ~ Level 3**
- **Time Out Timer**
  - **TOT On** → **1 ~ 990 sec**
  - **TOT Off**
- **TOT Penalty**
  - **Penalty On** → **1 ~ 100 sec**
  - **Penalty Off**
- **Busy Lock** → **Busy Lock On/Off**
- **Marked Idle** → **Marked Idle On/Off**
- **Scan Set**
  - **Scan Mode**
    - **Normal Scan Tx**
    - **Priority Scan Tx**
    - **Priority Look Back Scan**
    - **Priority Select Scan**
    - **Vacant Channel Scan**
  - **Scan Speed Time** → **50 ~ 500 msec**
  - **Scan Delay Time** → **1 ~ 30 sec**
  - **Look Back Time** → **1 ~ 10 sec**
- **Priority Scan**
  - **On** → **Priority Channel 1 ~ 16**
  - **Off**
- **Tx Delay** → **On/Off**
- **Power Save**
  - **On**
    - **P/S On Time** → **50 ~ 2000**
    - **P/S Off Time** → **50 ~ 2000**
    - **P/S Delay Time** → **1 ~ 10**
  - **Off**
- **Clear To Talk** → **On/Off**
- **Roger Beep** → **On/Off**

```
┌─────────────────────────┐         ┌─────────────────────────┐         ┌─────────────────────────┐
│ Display Option Setting  │────────▶│ Channel Display Format  │────────▶│ Name Character Display  │
└─────────────────────────┘    │    └─────────────────────────┘    │    ├─────────────────────────┤
                               │                                    ├───▶│   Channel No. Display   │
                               │                                    │    ├─────────────────────────┤
                               │                                    └───▶│    Frequency Display    │
                               │                                         └─────────────────────────┘
                               │    ┌─────────────────────────┐         ┌─────────────────────────┐
                               └───▶│        Slide Set        │────────▶│        Slide On         │
                                    └─────────────────────────┘    │    ├─────────────────────────┤
                                                                    └───▶│        Slide Off        │
                                                                         └─────────────────────────┘
```

```
┌─────────────────────────┐         ┌─────────────────────────┐         ┌─────────────────────────┐
│      Program Mode       │────┬───▶│ Write Mode (PC to Radio)│────────▶│       Write Now         │
└─────────────────────────┘    │    ├─────────────────────────┤         ├─────────────────────────┤
                               ├───▶│ Read Mode (Radio to PC) │────────▶│        Read Now         │
                               │    ├─────────────────────────┤         ├─────────────────────────┤
                               ├───▶│Master Mode (Radio to Radio)│─────▶│        Send Now         │
                               │    ├─────────────────────────┤         ├─────────────────────────┤
                               └───▶│Slave Mode (Radio to Radio)│──────▶│      Receive Now        │
                                    └─────────────────────────┘         └─────────────────────────┘
```

```
┌─────────────────────────┐         ┌─────────────────────────┐         ┌─────────────────────────┐
│       Test Mode         │────┬───▶│     LCD Test Mode       │────────▶│      LCD Test Now       │
└─────────────────────────┘    │    └─────────────────────────┘         └─────────────────────────┘
                               │    ┌─────────────────────────┐         ┌─────────────────────────┐
                               ├───▶│     Key Test Mode       │────────▶│      PTT Key Test       │
                               │    └─────────────────────────┘         └─────────────────────────┘
                               │                                                    │
                               │                                                    ▼
                               │                                        ┌─────────────────────────┐
                               │                                        │    Monitor Key Test     │
                               │                                        └─────────────────────────┘
                               │                                                    │
                               │                                                    ▼
                               │                                        ┌─────────────────────────┐
                               │                                        │      Mode Key Test      │
                               │                                        └─────────────────────────┘
                               │                                                    │
                               │                                                    ▼
                               │                                        ┌─────────────────────────┐
                               │                                        │      Scan Key Test      │
                               │                                        └─────────────────────────┘
                               │                                                    │
                               │                                                    ▼
                               │                                        ┌─────────────────────────┐
                               │                                        │       Up Key Test       │
                               │                                        └─────────────────────────┘
                               │                                                    │
                               │                                                    ▼
                               │                                        ┌─────────────────────────┐
                               │                                        │      Down Key Test      │
                               │                                        └─────────────────────────┘
                               │    ┌─────────────────────────┐         ┌─────────────────────────┐
                               ├───▶│      RF Test Mode       │────────▶│     RF Channel Test     │◀─┐
                               │    └─────────────────────────┘         └─────────────────────────┘  │
                               │                                        ┌─────────────────────────┐  │
                               │                                        │     CTCSS/DCS Test      │◀─┘
                               │                                        └─────────────────────────┘
                               │    ┌─────────────────────────┐         ┌─────────────────────────┐
                               └───▶│        ATE Mode         │────────▶│        ATE Now          │
                                    └─────────────────────────┘         └─────────────────────────┘
```

* Channel option & System Option & display Option Setting.

- To enter Setting Menu, press and release Mode key shortly in receive mode or stand-by mode.
- In Setting Menu, press Up/Down Key to move up direction or down direction of the current setting menu item.
- To enter Sub-menu of Setting Menu, press mode key. If the menu is the last selective one, it saves and exits.
- If PTT key is pressed, it exits to receiving standby mode.
- If Monitor key is pressed, it returns to previous Menu.

*. Channel Option Setting

** Each Channel Menu display format
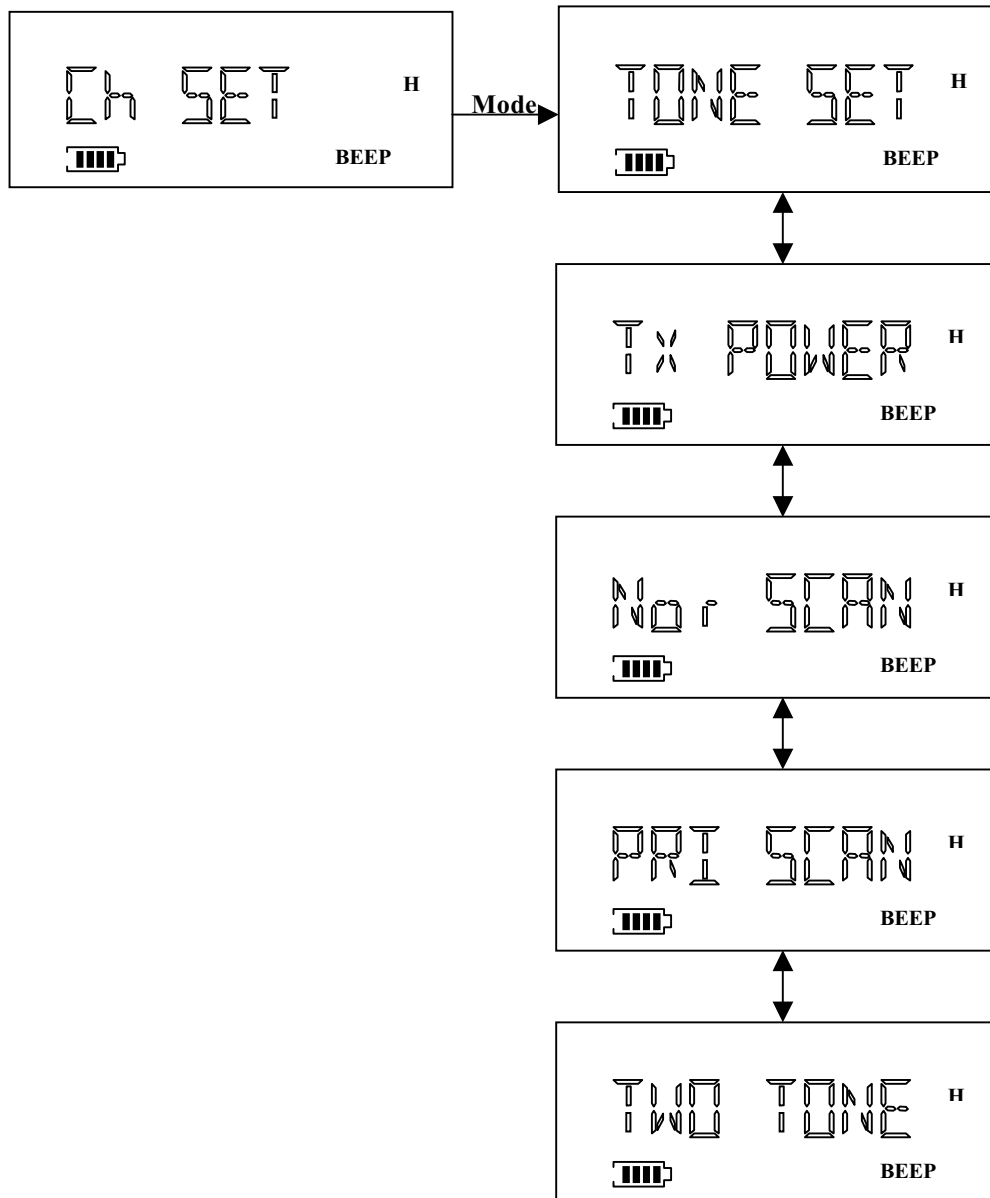
** Rx/Tx Tone Option Setting

Each Channel Option Setting Menu

```
Ch SET          H        ──Mode──▶    TONE SET        H        ──Mode──┐
▮▮▮▮       BEEP                        ▮▮▮▮       BEEP                  │
```

Rx Tone Setting Menu

```
RX TONE         H        ──Mode──▶    No TONE         H
▮▮▮▮       BEEP                        ▮▮▮▮       BEEP
     │  ▲                                    │  ▲
  Up/Down                                   Up  Down
     ▼  │                                    ▼  │
TX TONE         H        ────────▶    CTCSS          H
▮▮▮▮       BEEP                        ▮▮▮▮       BEEP
```

Tx Tone Setting Menu

```
                                           │  ▲
                                          Up  Down
                                           ▼  │
                                      dCS            H
                                       ▮▮▮▮       BEEP
                                           │  ▲
                                          Up  Down
                                           ▼  │
                                      IdCS           H
                                       ▮▮▮▮       BEEP
```

** No Tone Select

```
············· ──Mode──▶    No TONE         H
                           ▮▮▮▮       BEEP
```
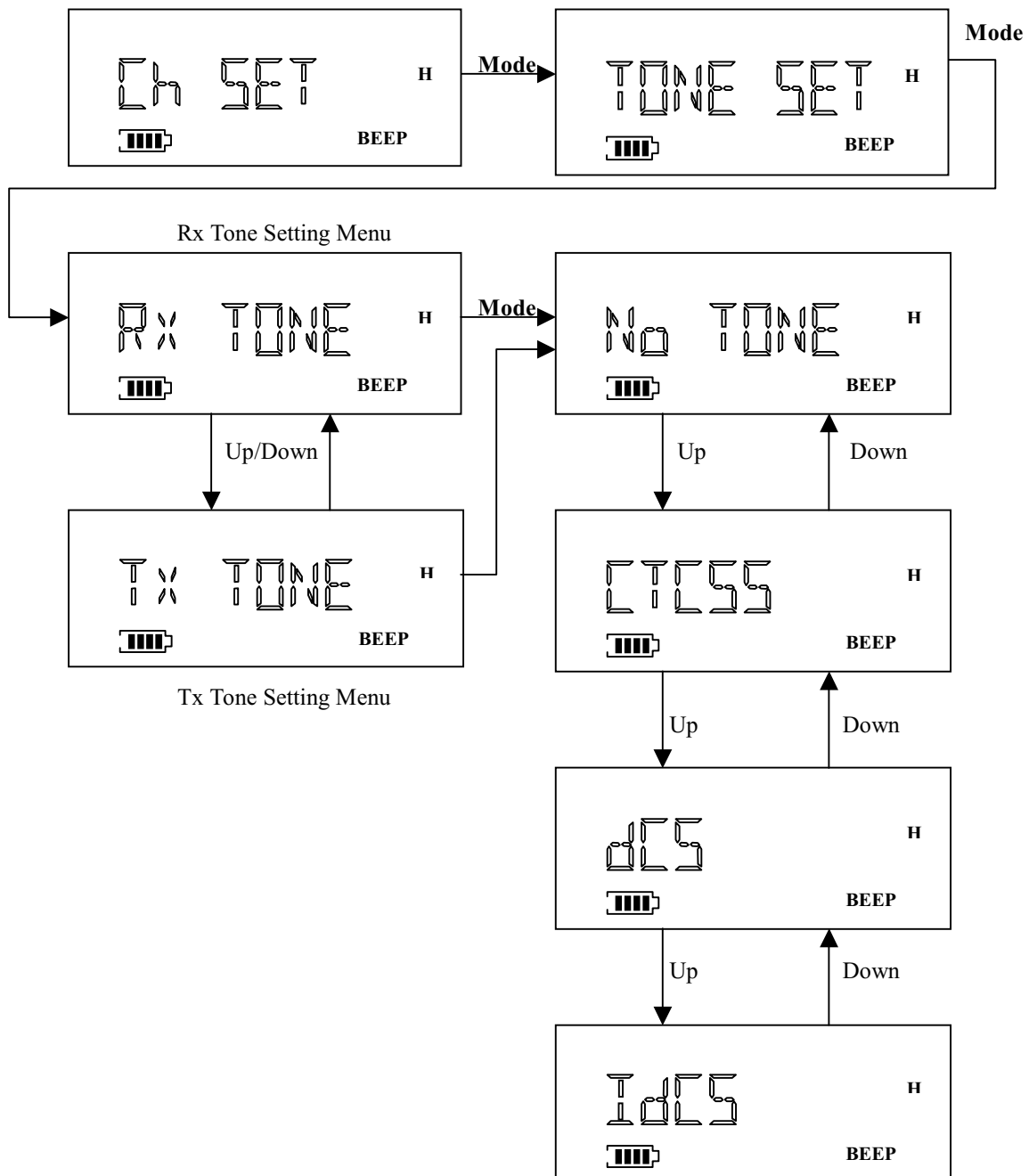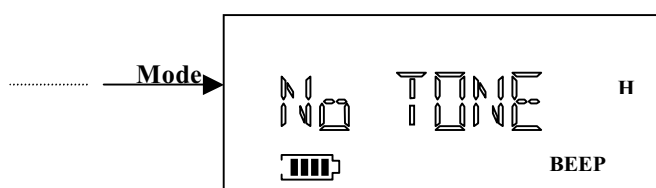
Under the above, if MODE Key or PTT Button is pressed, it sets No tone for RX or TX Tone option and then goes to receiving stand-by mode.

** CTCSS Tone Select
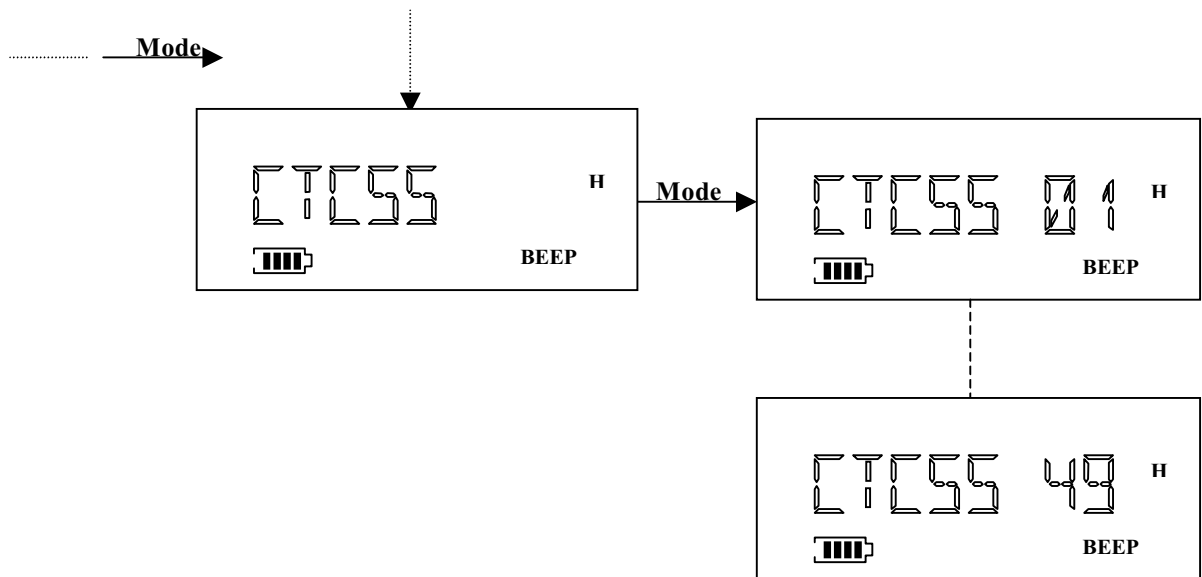
Under the above mode, press Up/Down Key to select desired CTCSS Tone and then press Mode key or PTT button to set RX or TX tone option. Then it saves and exits to receiving stand-by mode.
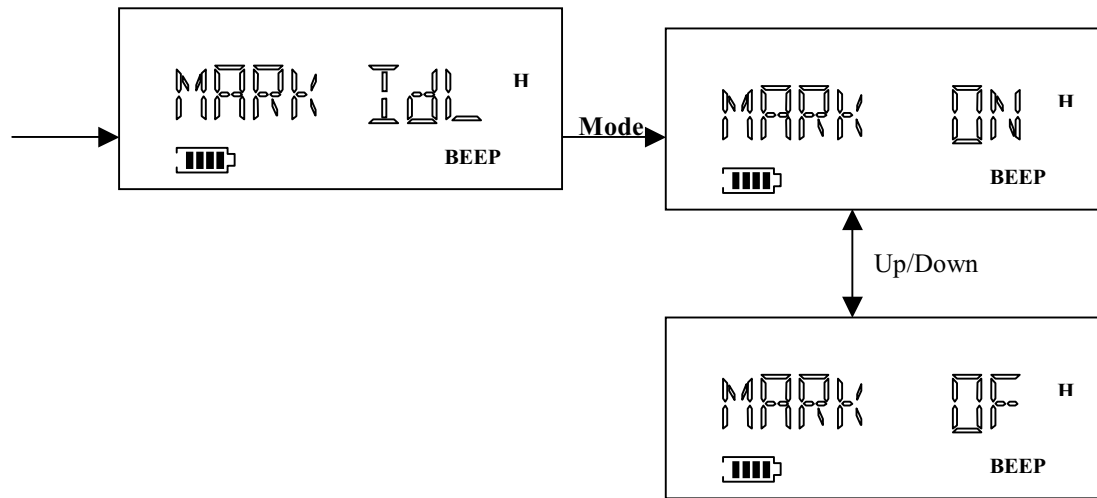
** DCS Tone Select
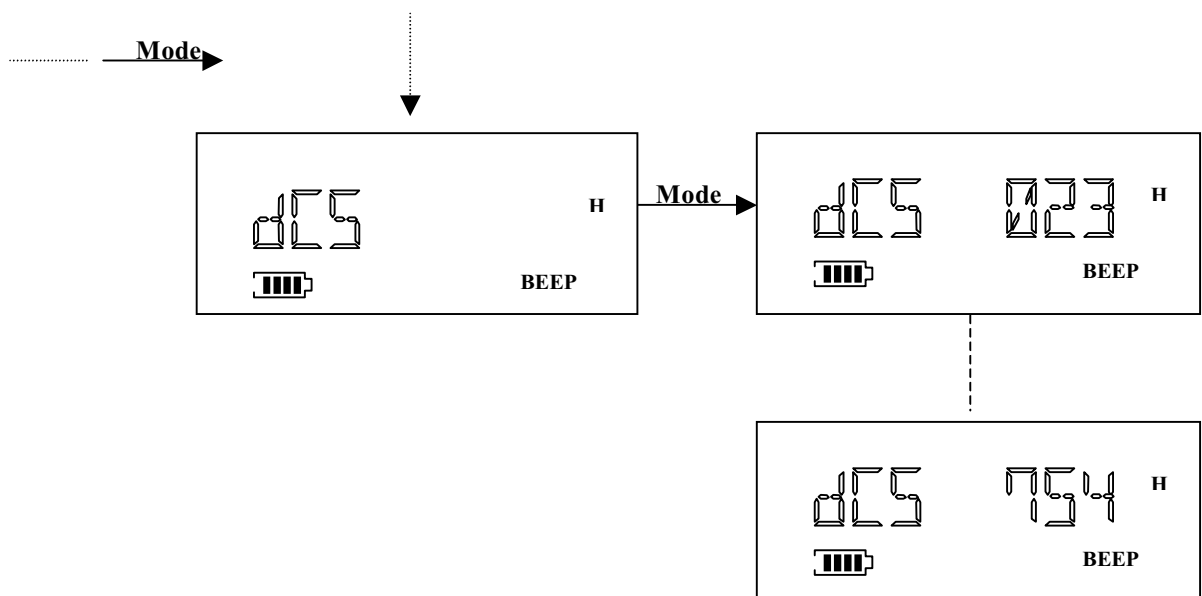
Under the above mode, press Up/Down Key to select desired DCS Tone and then press Mode key or PTT button to set RX or TX tone option. Then it saves and exits to receiving stand-by mode. .

** Invert DCS Tone Select

Mode

IdCS H BEEP

Mode →

IdCS 023 H BEEP

IdCS 754 H BEEP
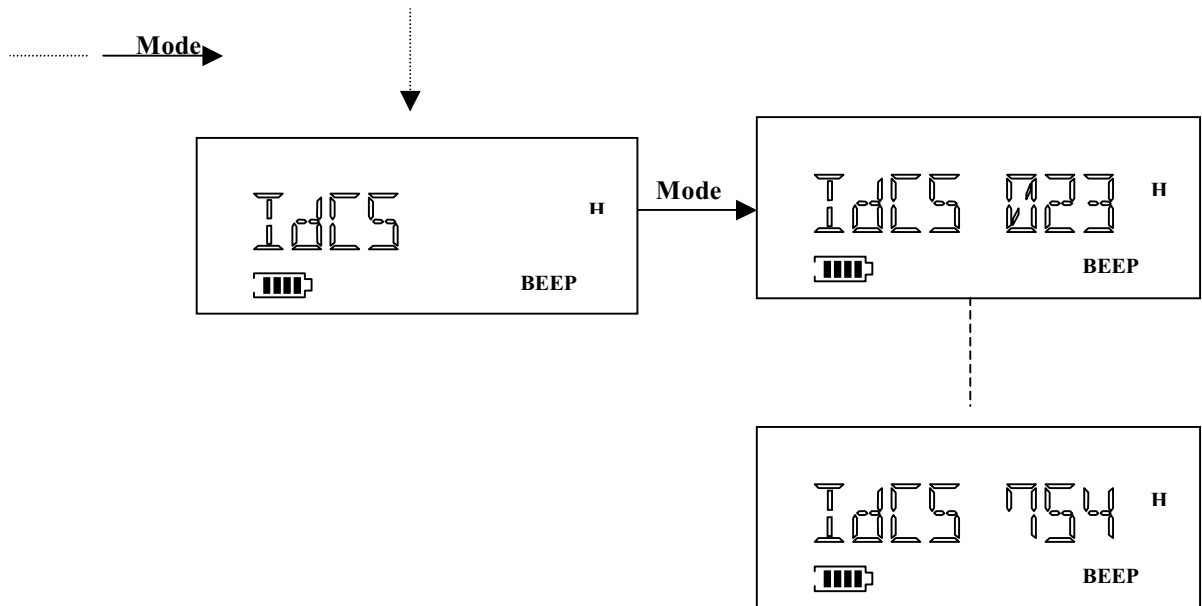
Under the above mode, press Up/Down Key to select desired Invert DCS Tone and then press Mode key or PTT button to set RX or TX tone option. Then it saves and exits to receiving stand-by mode. .

** Tx Output Power High/Low Setting

TX POWER H BEEP

Mode →

PWR Lo H BEEP

Up/Down

PWR Hi H BEEP
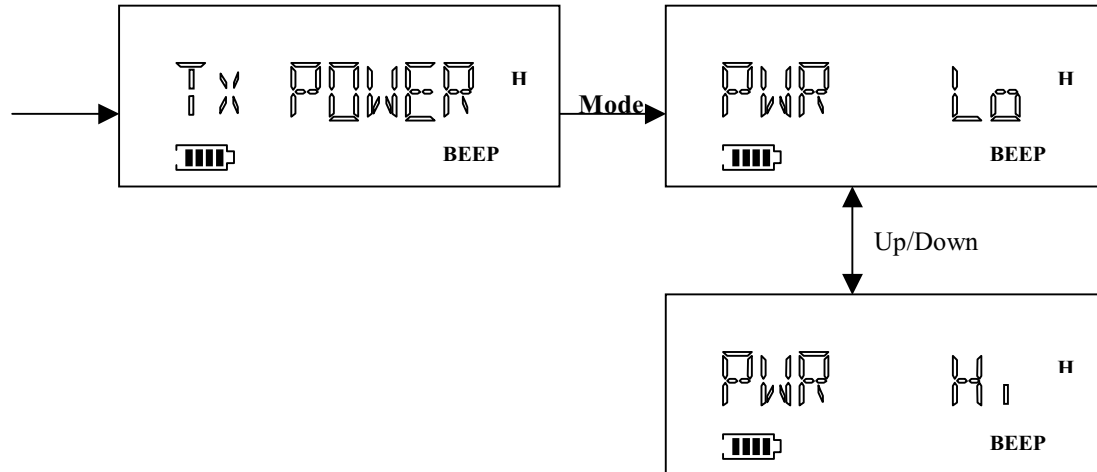
Under the above mode, press Up/Down Key to select desired Output Power and then press Mode key or PTT button to set the output power 1W or 5W for the current channel. Then it saves and exits to receiving stand-by mode. ..

** Normal Scan List On/Off Setting
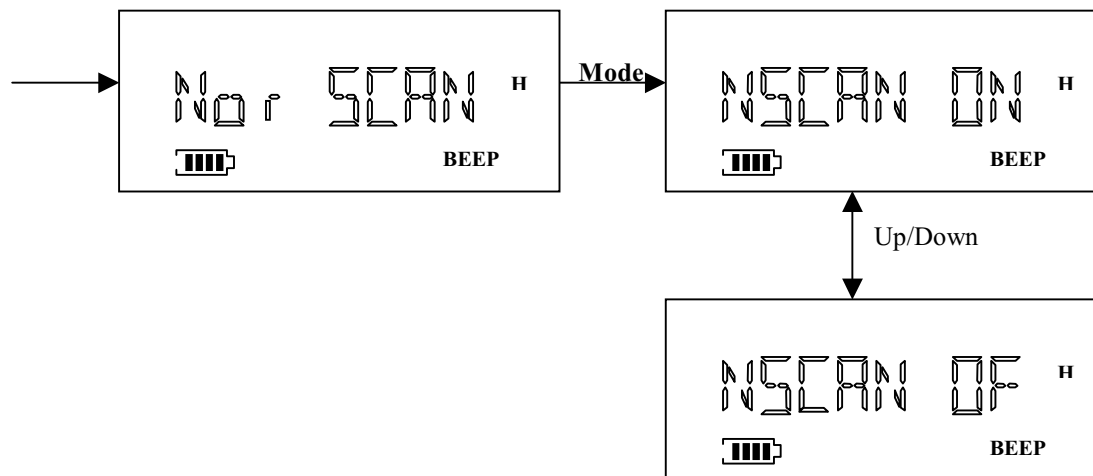
```
Nor SCAN  H        Mode        NSCAN ON  H
[IIII]      BEEP                [IIII]      BEEP

                                    Up/Down

                                NSCAN OF  H
                                [IIII]      BEEP
```

Under the above mode, press Up/Down Key to select On or Off and then press Mode key or
PTT button to set the scan option as On or Off for the current channel. Then it saves and exits to receiving
stand-by mode.
    ** In scanning by SCAN Key, the radio scans only channels which are set "On".

** Priority Scan List On/Off Setting
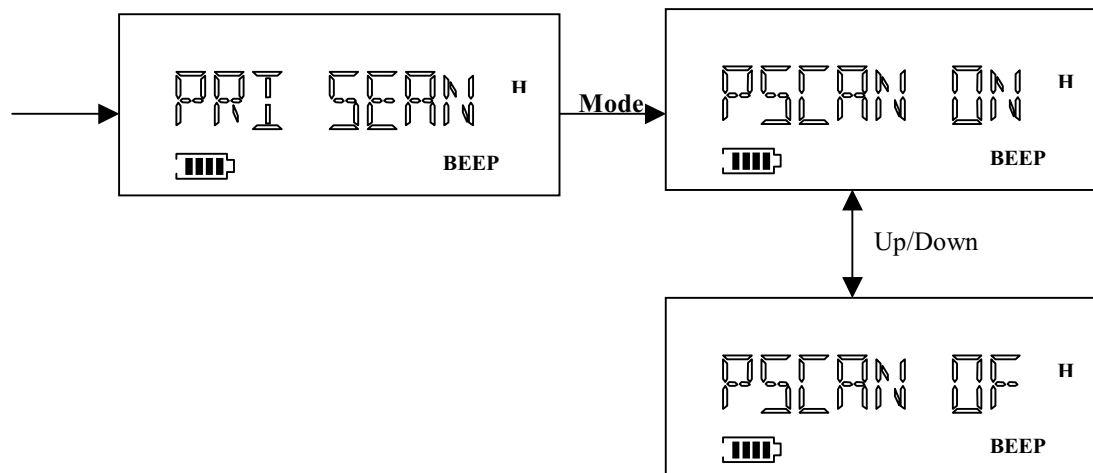
```
PRI SCAN  H        Mode        PSCAN ON  H
[IIII]      BEEP                [IIII]      BEEP

                                    Up/Down

                                PSCAN OF  H
                                [IIII]      BEEP
```

Under the above mode, press Up/Down Key to select On or Off and then press Mode key or
PTT button to set the priority scan option as On or Off for the current channel.
Then it saves and exits to receiving stand-by mode.
** If Priority Scan option of "System Option" menu" is on, Priority scan works only when the channel position
is located to the channel with "PSCAN ON".

** 2-Tone Option Setting
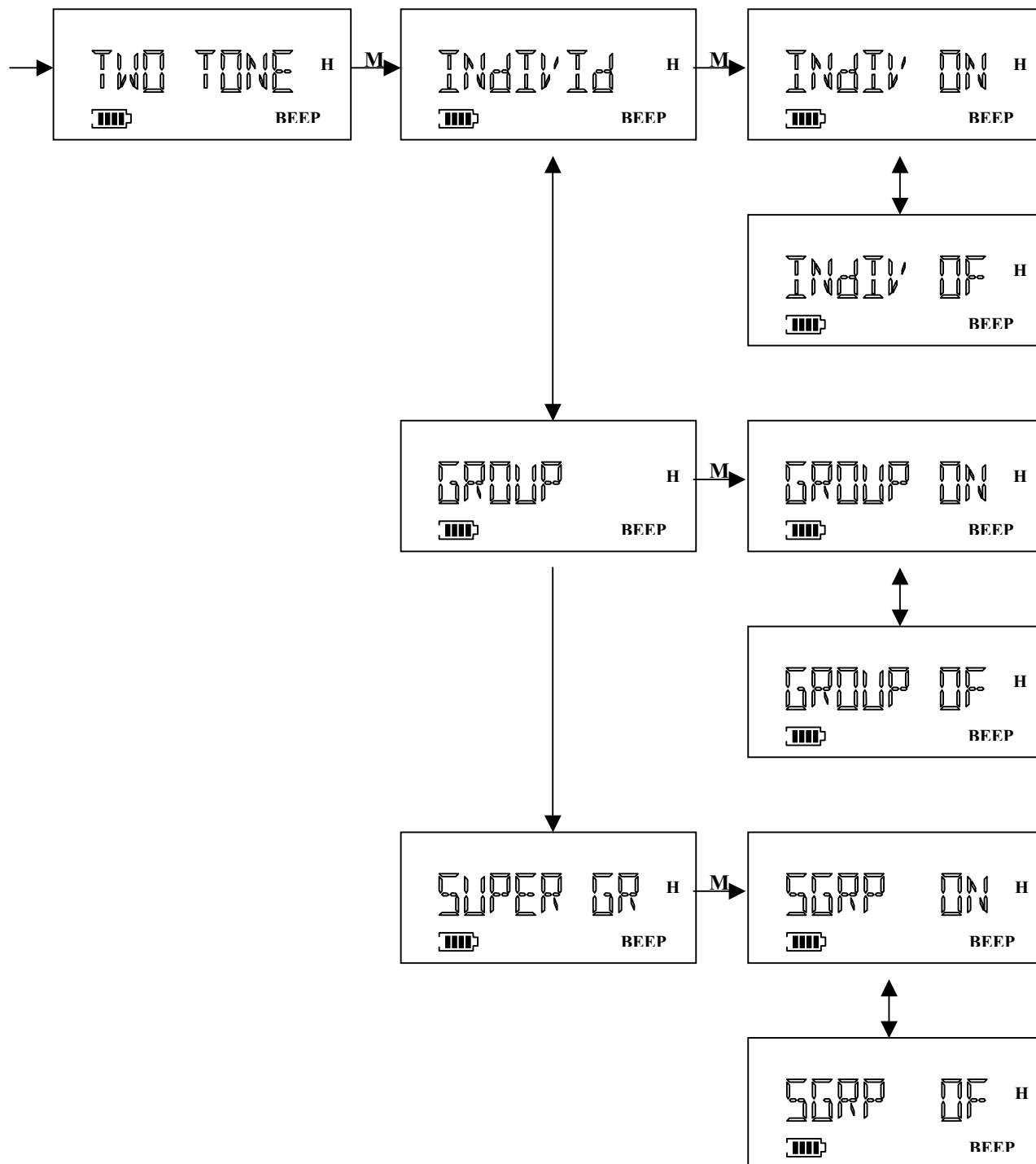
```
┌─────────────────┐      ┌─────────────────┐      ┌─────────────────┐
│  TWO TONE   H   │  M   │  INdIVId    H   │  M   │  INdIV ON   H   │
│  ▣▣▣      BEEP  │ ───► │  ▣▣▣      BEEP  │ ───► │  ▣▣▣      BEEP  │
└─────────────────┘      └─────────────────┘      └─────────────────┘
                                  ▲                        ▲
                                  │                        ▼
                                  │               ┌─────────────────┐
                                  │               │  INdIV OF   H   │
                                  │               │  ▣▣▣      BEEP  │
                                  │               └─────────────────┘
                                  ▼
                         ┌─────────────────┐      ┌─────────────────┐
                         │  GROUP      H   │  M   │  GROUP ON   H   │
                         │  ▣▣▣      BEEP  │ ───► │  ▣▣▣      BEEP  │
                         └─────────────────┘      └─────────────────┘
                                  │                        ▲
                                  │                        ▼
                                  │               ┌─────────────────┐
                                  │               │  GROUP OF   H   │
                                  │               │  ▣▣▣      BEEP  │
                                  │               └─────────────────┘
                                  ▼
                         ┌─────────────────┐      ┌─────────────────┐
                         │  SUPER GR   H   │  M   │  SGRP   ON  H   │
                         │  ▣▣▣      BEEP  │ ───► │  ▣▣▣      BEEP  │
                         └─────────────────┘      └─────────────────┘
                                                           ▲
                                                           ▼
                                                  ┌─────────────────┐
                                                  │  SGRP   OF  H   │
                                                  │  ▣▣▣      BEEP  │
                                                  └─────────────────┘
```

Under the above mode, press Up/Down Key to select On or Off and then press Mode key or
PTT button to set 2-Tone Option (Individual, Group, Super-Group) as On or Off for the current channel.
Then it saves and exits to receiving stand-by mode.
** Set Individual, Group, Super-Group and each Tone A, Tone B frequency and Time by PC programmer.

*. System Option Setting
** System Option Menu display format
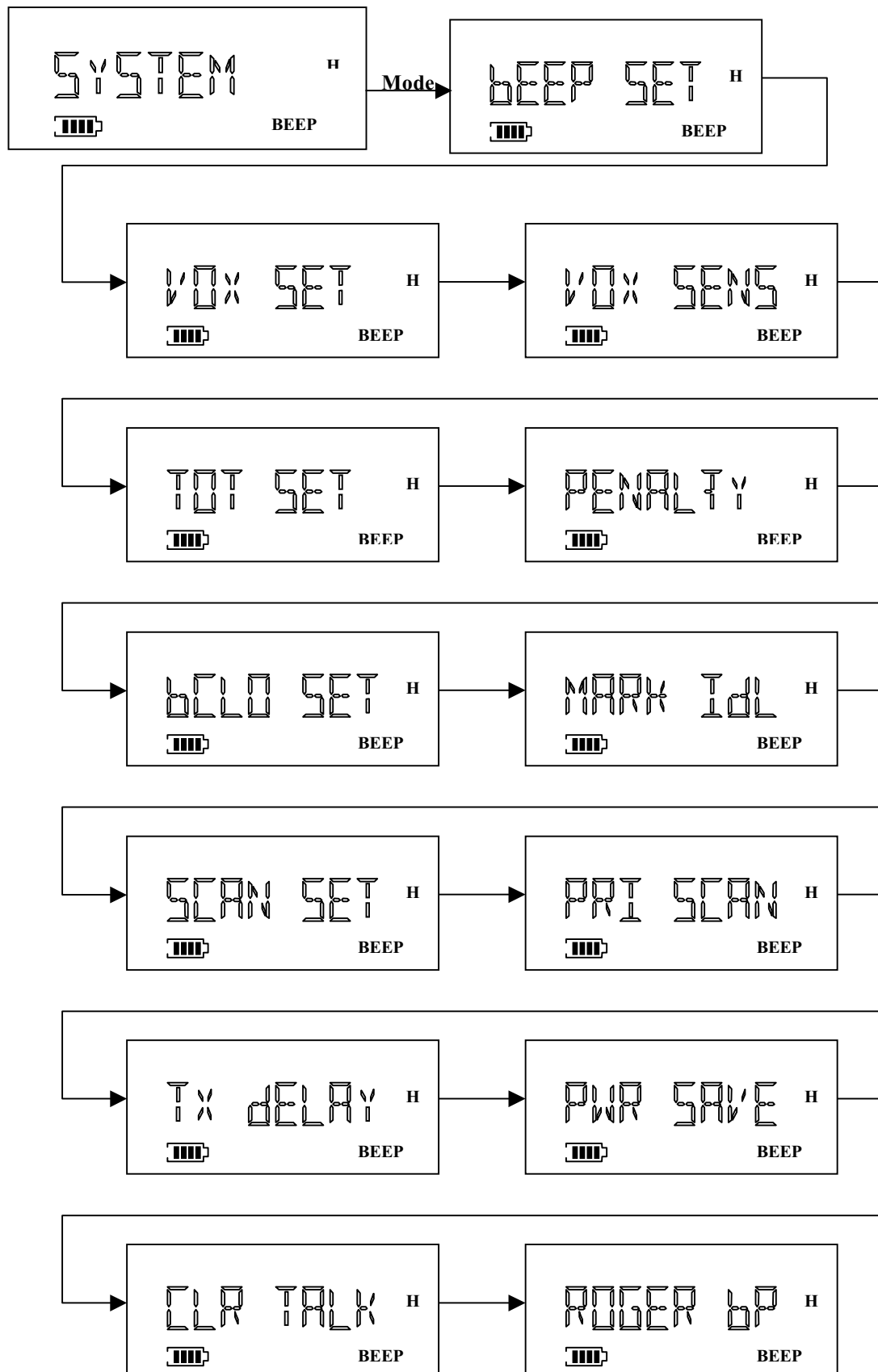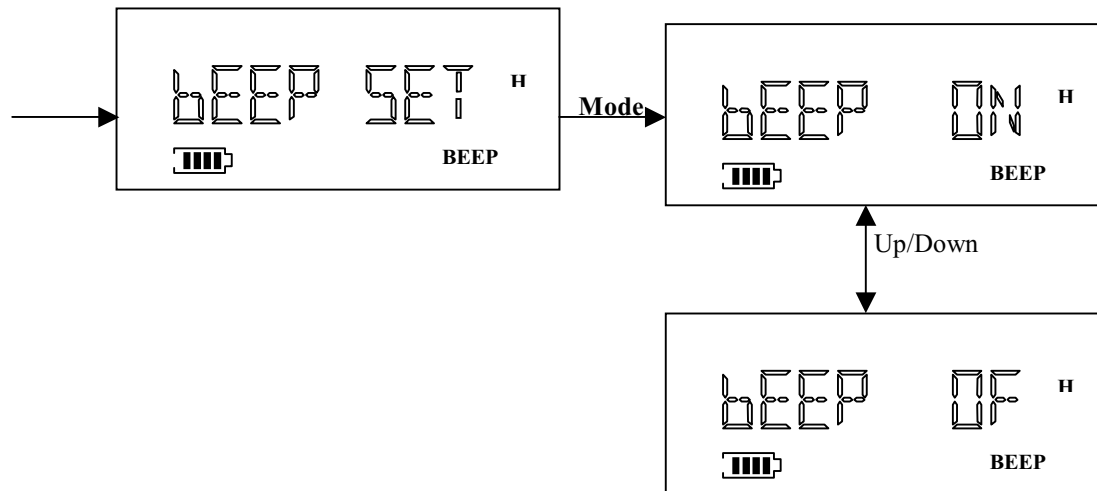
SYSTEM H BEEP → **Mode** → bEEP SET H BEEP

VOX SET H BEEP → VOX SENS H BEEP

TOT SET H BEEP → PENALTY H BEEP

bCLO SET H BEEP → MARK IdL H BEEP

SCAN SET H BEEP → PRI SCAN H BEEP

TX dELAY H BEEP → PWR SAVE H BEEP

CLR TALK H BEEP → ROGER bP H BEEP

** Beep Tone On/Off Setting

```
            bEEP SEt  H          Mode          bEEP    ON  H
            ▐IIII▌         BEEP                 ▐IIII▌        BEEP
```

Up/Down

```
                                               bEEP    OF  H
                                               ▐IIII▌        BEEP
```

Under the above mode, press Up/Down Key to select On or Off and then press Mode key or PTT button to set Beep Tone as On or Off.
Then it saves and exits to receiving stand-by mode.

** VOX Option On/Off Setting
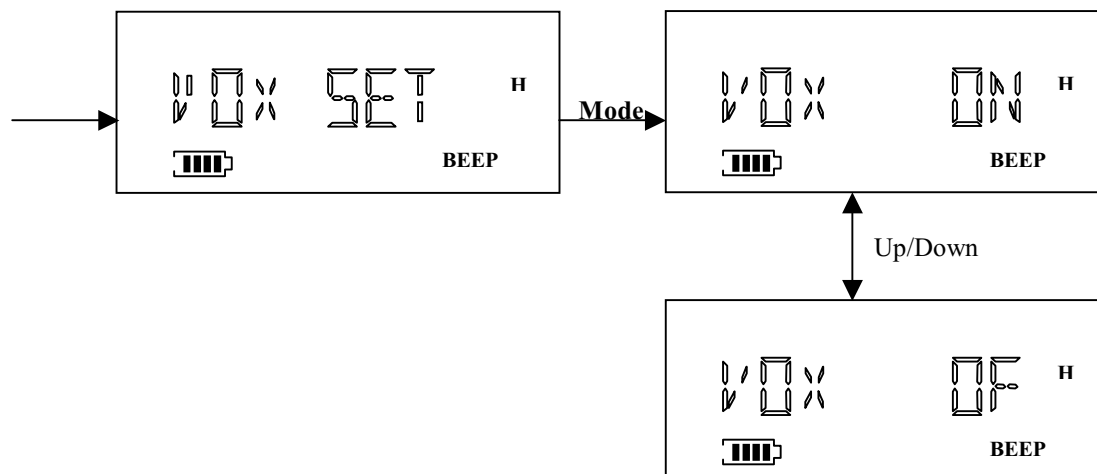
```
            VOX SEt  H          Mode          VOX    ON  H
            ▐IIII▌        BEEP                 ▐IIII▌        BEEP
```

Up/Down

```
                                              VOX    OF  H
                                              ▐IIII▌        BEEP
```
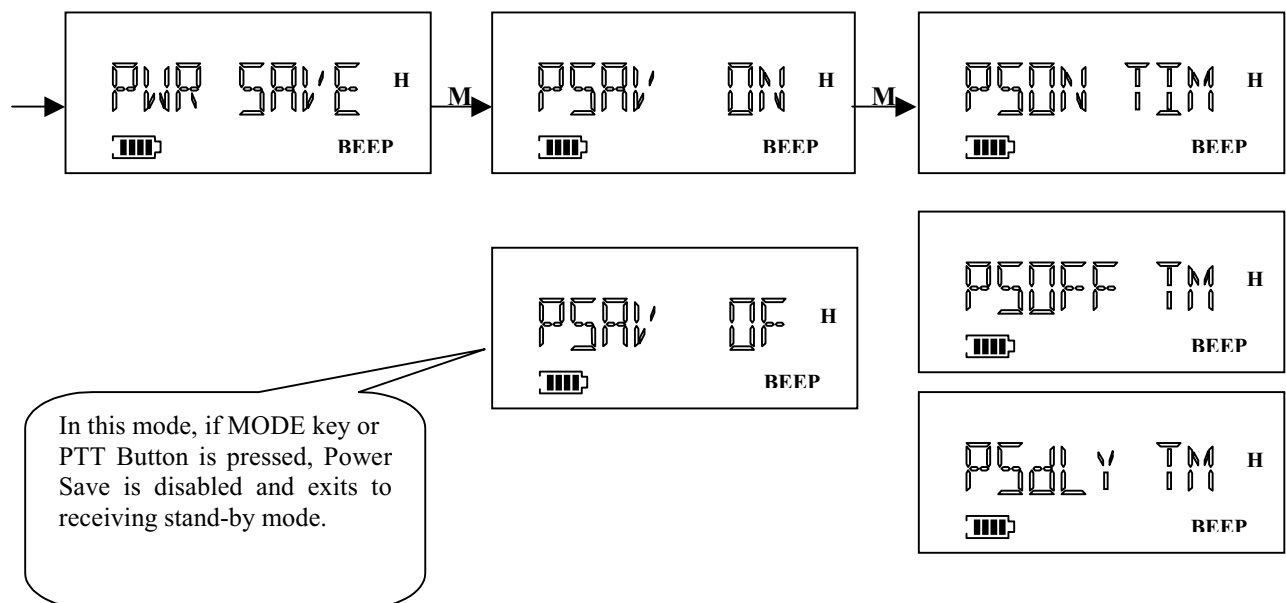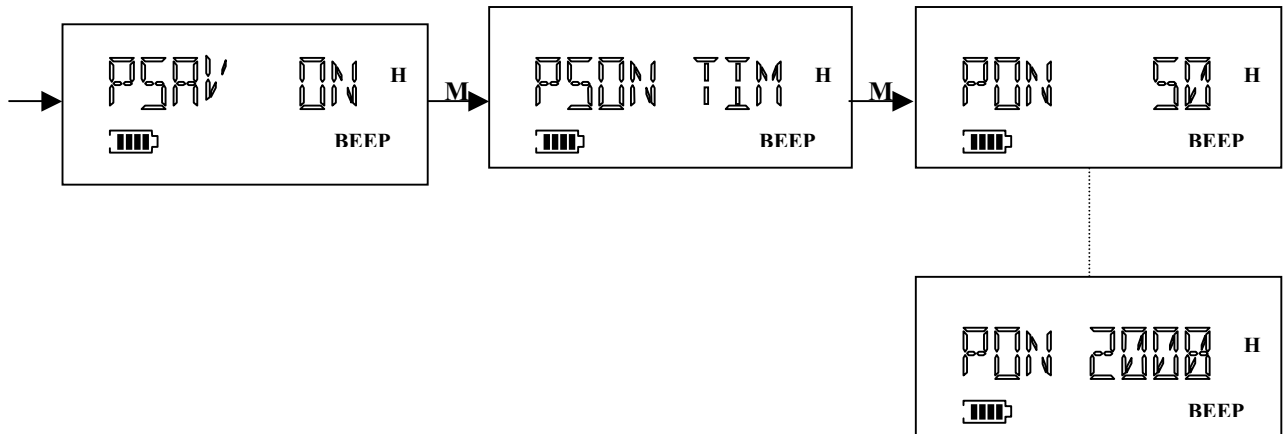
Under the above mode, press Up/Down Key to select On or Off and then press Mode key or PTT button to set Vox Option as On or Off.
Then it saves and exits to receiving stand-by mode.

** VOX Sensitivity Setting
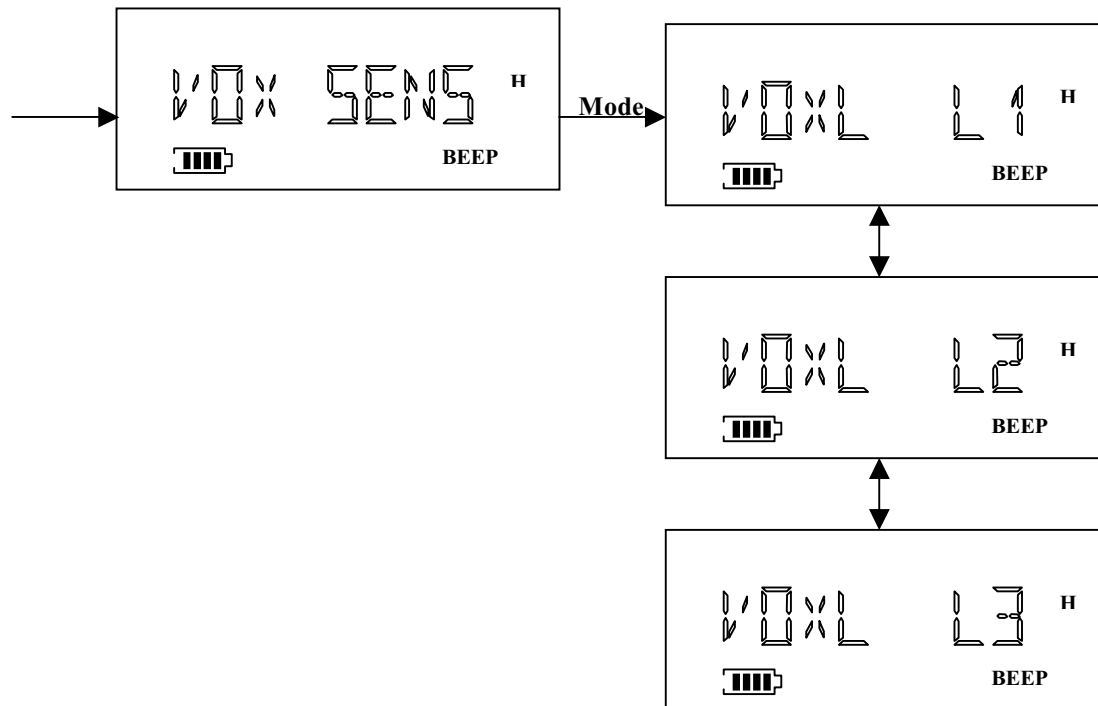
Under the above mode, press Up/Down Key to select desired level and then press Mode key or PTT button to set Vox sensitivity level.
Then it saves and exits to receiving stand-by mode.

** Time-Out-Timer Setting
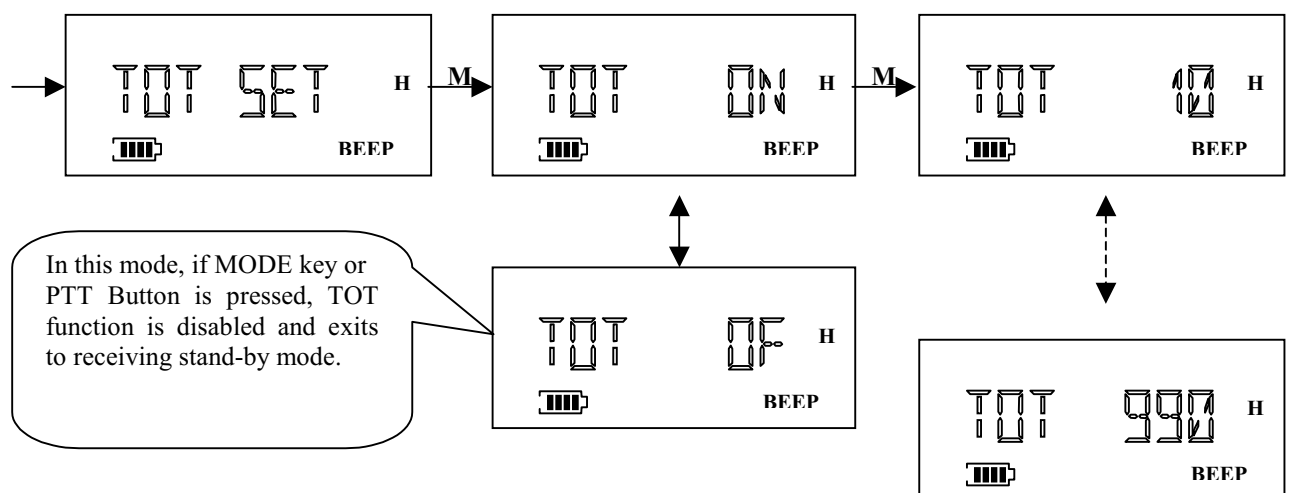
In this mode, if MODE key or PTT Button is pressed, TOT function is disabled and exits to receiving stand-by mode.
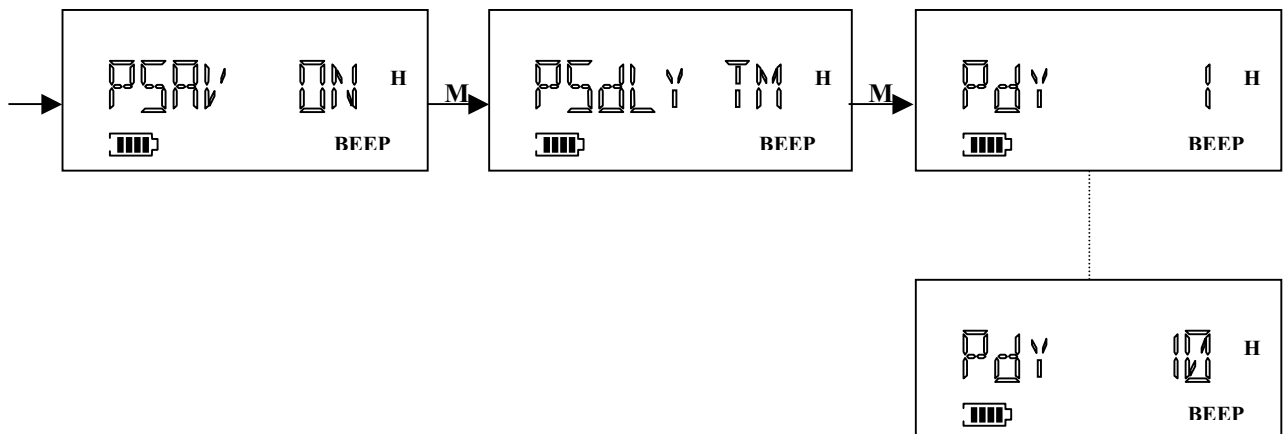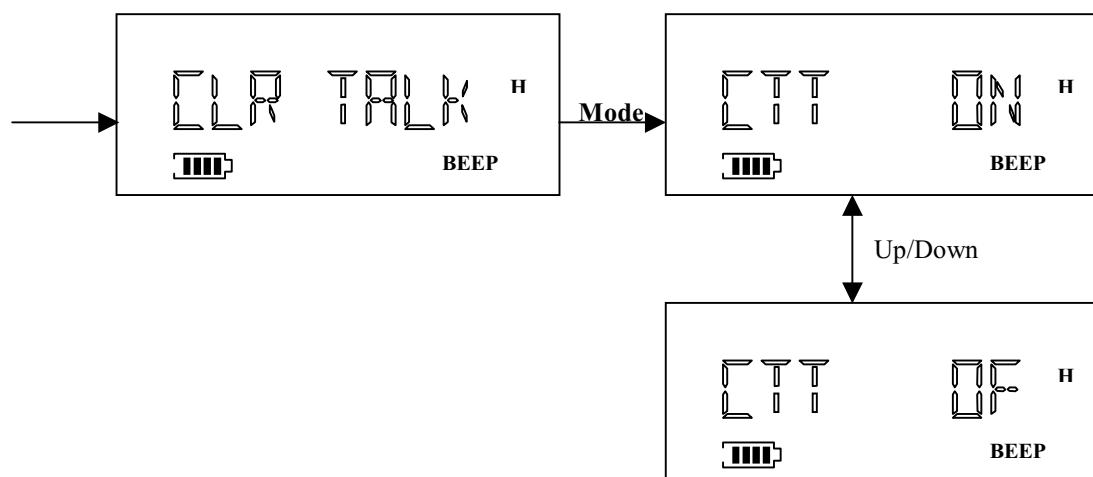
Under the above mode, press Up/Down Key to select desired time and then press Mode key or PTT button to set T-O-T time. Then it saves and exits to receiving stand-by mode.

.
** T-O-T : This function inhibits TX after certain set time..

** TOT Penalty Setting
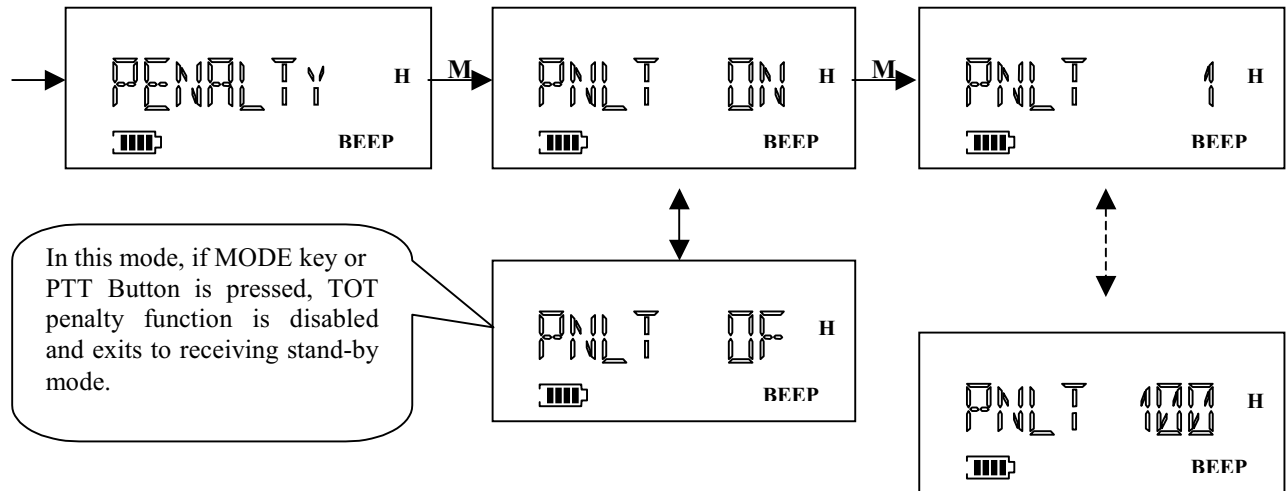
```
PENALTY      H      M    PNLT    ON    H    M    PNLT     1    H
[III]        BEEP            [III]      BEEP            [III]       BEEP
```

In this mode, if MODE key or PTT Button is pressed, TOT penalty function is disabled and exits to receiving stand-by mode.

```
PNLT    OF    H
[III]      BEEP
```

```
PNLT   100    H
[III]       BEEP
```

Under the above mode, press Up/Down Key to select desired time and then press Mode key or PTT button to set T-O-T penalty time. Then it saves and exits to receiving stand-by mode.

.

    **   TOT Penalty : If the radio transmits over the certain set time, it beeps T-O-T error tone and the radio only receives the signal for penalty time. (TX inhibited for this time.)

** Busy Channel Lock Out On/Off Setting

```
bCLO SET    H    Mode    bCLO    ON    H
[III]       BEEP                [III]        BEEP
```

Up/Down

```
bCLO    OF    H
[III]        BEEP
```

Under the above mode, press Up/Down Key to select On or Off and then press Mode key or PTT button to set Busy Channel Lock Out. Then it saves and exits to receiving stand-by mode.

.
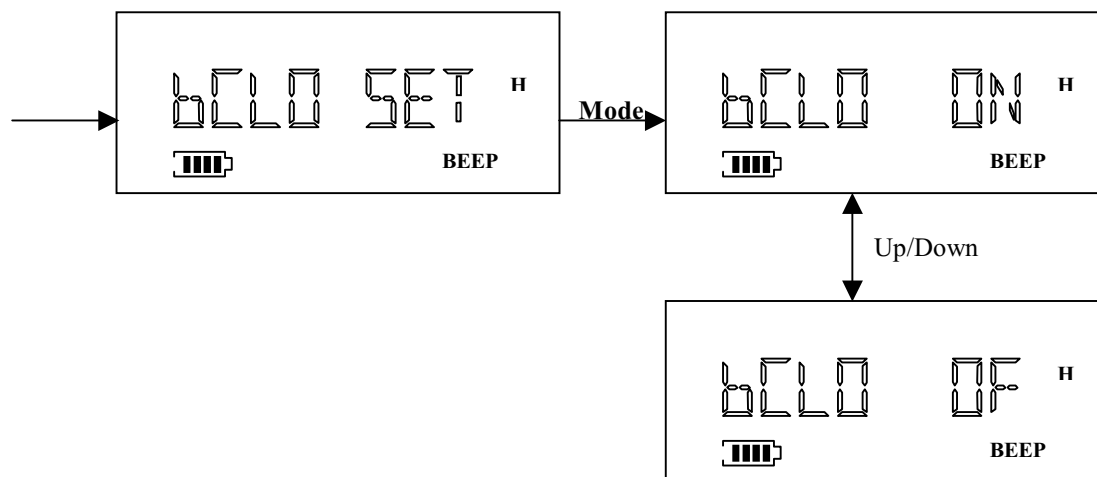
    ** Busy Channel Lock Out : If the channel is busy, it inhibits transmission.

** Marked Idle Out On/Off Setting

```
MARK IdL ᴴ          Mode    MARK ON ᴴ
[IIII>      BEEP             [IIII>       BEEP
```

Up/Down

```
                            MARK OF ᴴ
                            [IIII>       BEEP
```

Under the above mode, press Up/Down Key to select On or Off and then press Mode key or
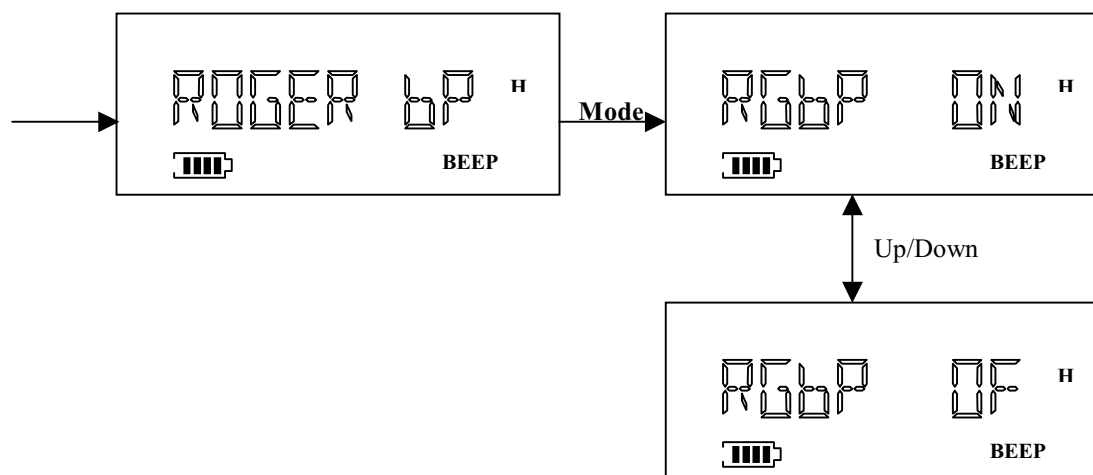PTT button to set Marked Idle Out. Then it saves and exits to receiving stand-by mode.

** Marked Idle : If the channel is set by Busy Lock and TX is inhibited during in RX, this function allows
TX when it is CTCSS or DCS correct call.

** SCAN Setting

** Scan Setting Menu

```
SCAN SET          Mode►    SCAN MOd  H
[IIII▸]    BEEP             [IIII▸]    BEEP
```

```
SC SPEEd
[IIII▸]    BEEP
```

```
SC dELAY  H
[IIII▸]    BEEP
```

```
LOOKbACK  H
[IIII▸]    BEEP
```

** Scan Mode Setting

```
SCAN SET  H   ►M  SCAN MOd  H   ►M  NSCAN TX  H
[IIII▸]  BEEP     [IIII▸]  BEEP     [IIII▸]  BEEP
```

```
PSCAN TX  H
[IIII▸]  BEEP
```
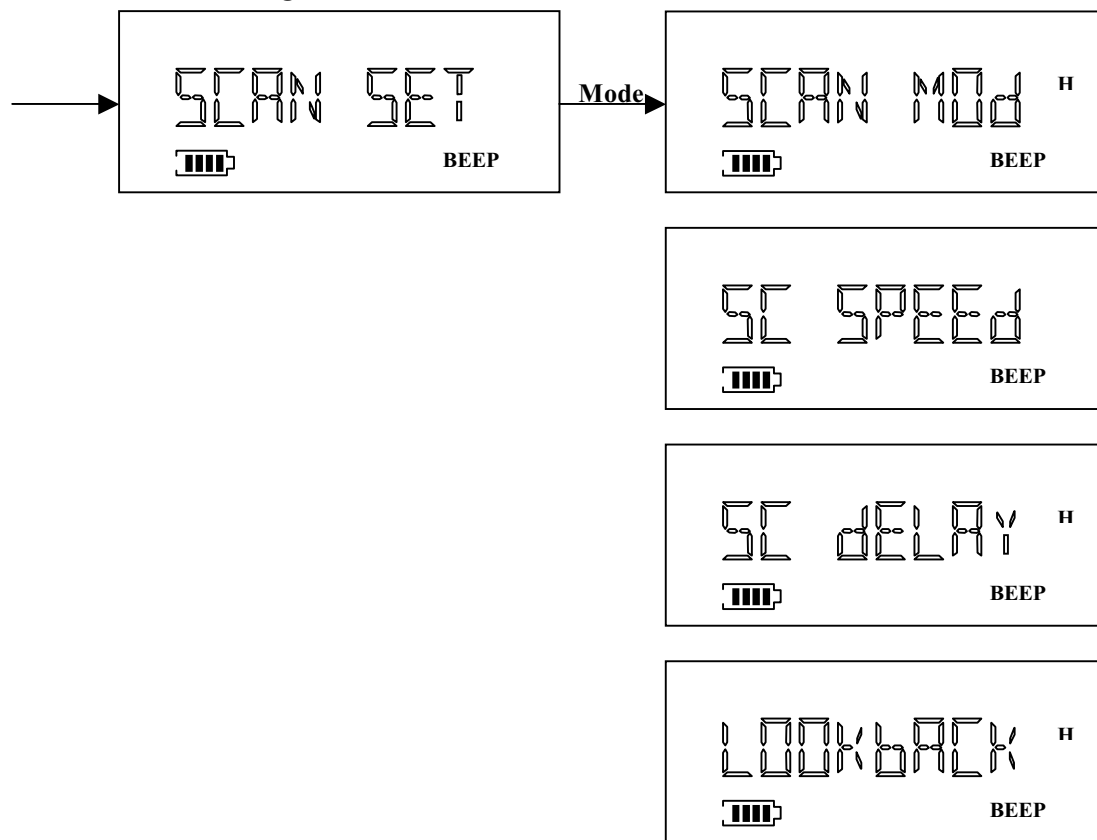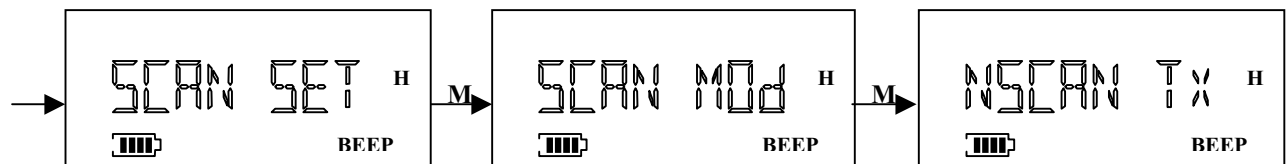
Under the above mode, press Up/Down Key to select the desired
Scan operation mode. then press Mode key or
 PTT button to set a scan mode. Then it saves and exits to receiving
 stand-by mode.

```
PLb SCAN  H
[IIII▸]  BEEP
```

** Normal Scan Tx :

** Priority Scan Tx :

```
PSL SCAN  H
[IIII▸]  BEEP
```

** Priority Look Back Scan :

** Priority Select Scan :

** Vacant Channel Scan :

```
VC SCAN  H
[IIII▸]  BEEP
```

** Scan Speed Time Setting

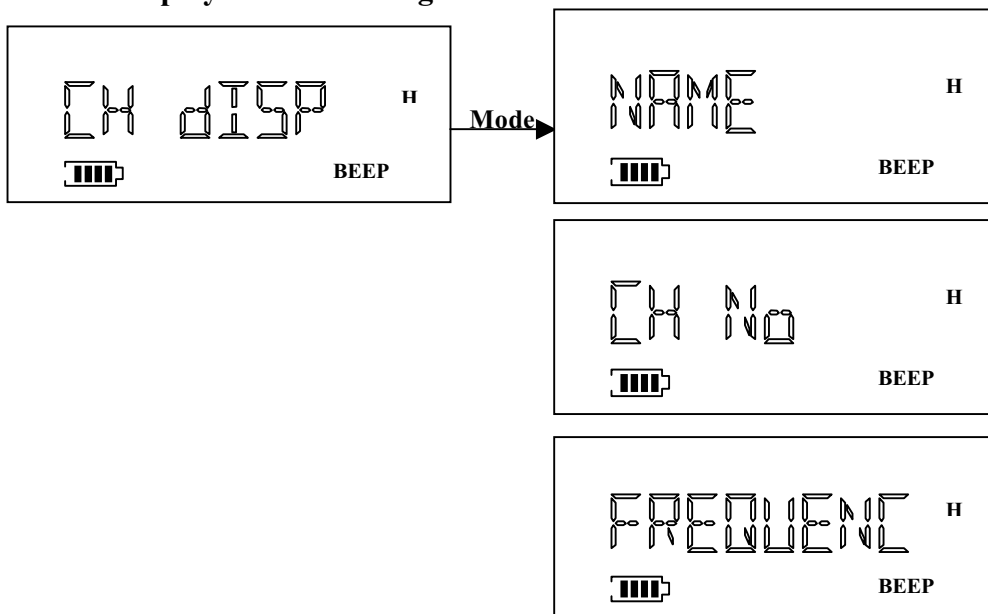|		
SCAN SET H ▥ BEEP	**M▸**	SC SPEEd H ▥ BEEP	**M▸**	SCP 50 H ▥ BEEP

SCP 500 H
 ▥ BEEP
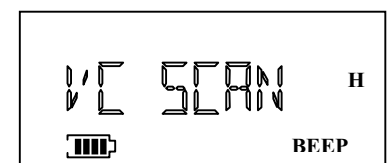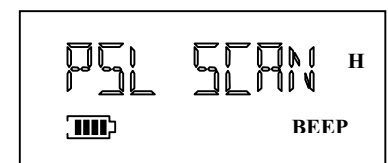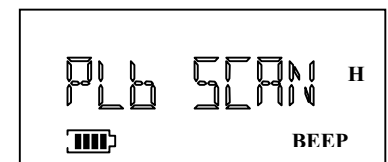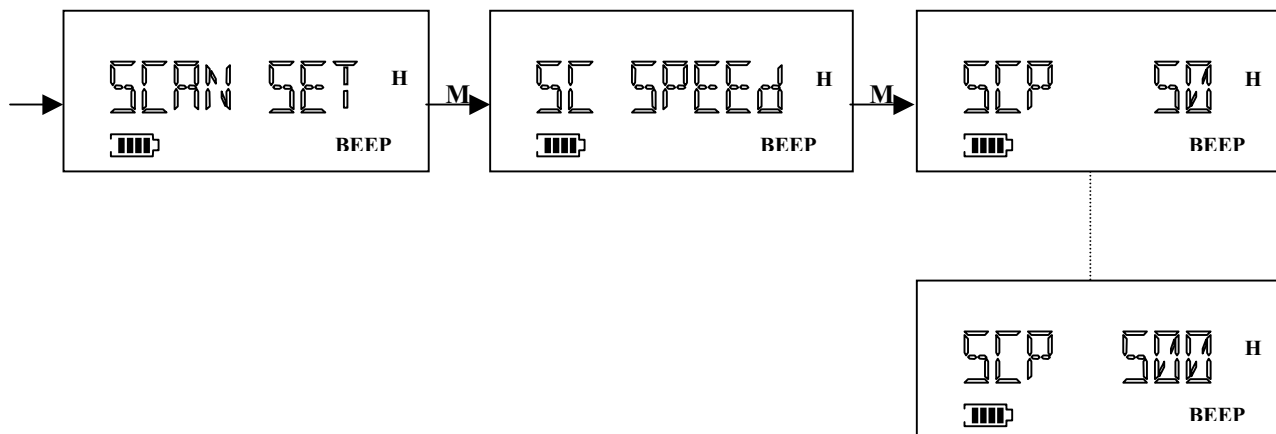
Under the above mode, press Up/Down Key to select desired time and then press Mode key or
PTT button to set. Then it saves and exits to receiving stand-by mode.

** Scan Speed Time : In SCAN, this is the time to stay the channel before moving to another when there is
no signal.

** Scan Delay Time Setting
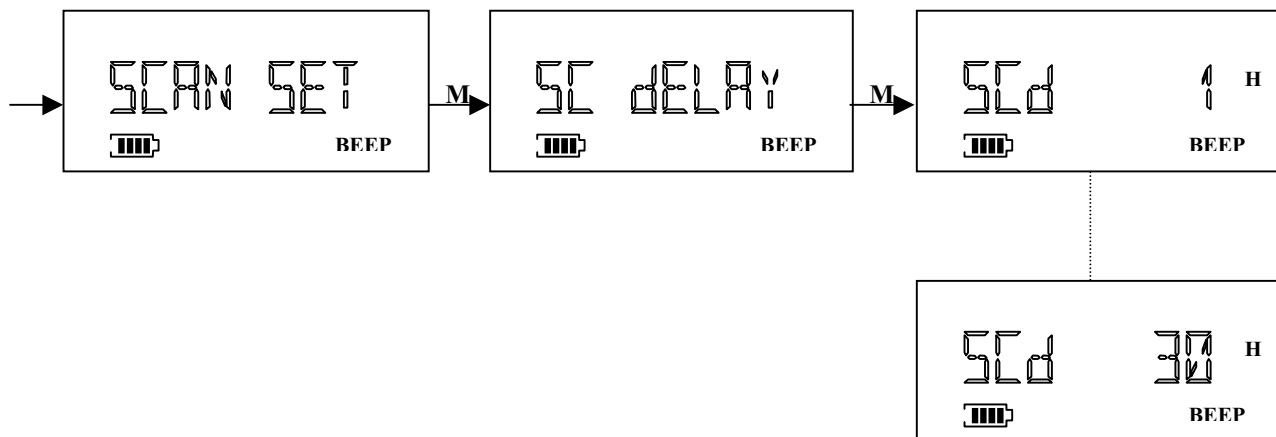
SCAN SET
 ▥ BEEP **M▸** SC dELAY
 ▥ BEEP **M▸** SCd 1 H
 ▥ BEEP

SCd 30 H
 ▥ BEEP

Under the above mode, press Up/Down Key to select desired time and then press Mode key or
PTT button to set. Then it saves and exits to receiving stand-by mode.

** Scan Delay Time : In SCAN, this is the stand-by time to stay the channel after the receiving signal stops or
after the transmitting, it returns to receiving mode, or after transmitting.

** Look Back Time Setting
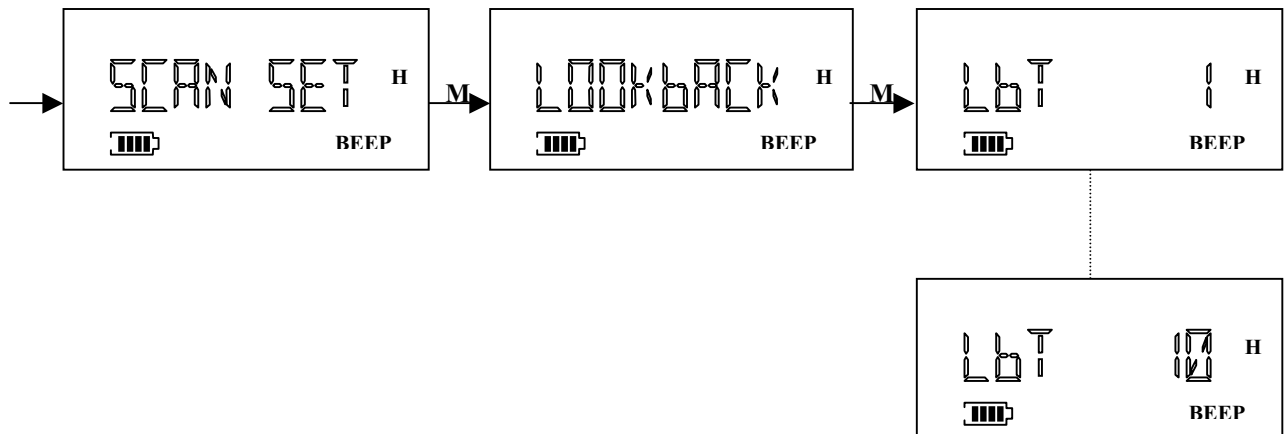
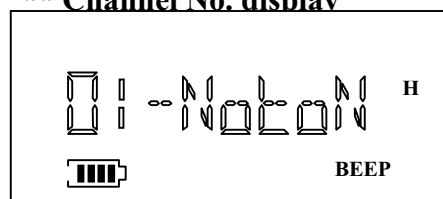| SCAN SET H	**M**	LOOKbACK H	**M**	LbT 1 H
BEEP		BEEP		BEEP

LbT 10 H
BEEP

Under the above mode, press Up/Down Key to select desired time and then press Mode key or PTT button to set. Then it saves and exits to receiving stand-by mode.

** Look Back Time : In Priority SCAN mode, this is the interval time to check priority channel when the radio receives signal in non- priority channel.

** Priority Scan Setting

PRI SCAN H	**M**	PSCN ON H	**M**	PRICH-01 H
BEEP		BEEP		BEEP

In this mode, if MODE key or PTT Button is pressed, Priority Scan is disabled and exits to receiving stand-by mode.

PSCN OF H
BEEP

PRICH- 16 H
BEEP
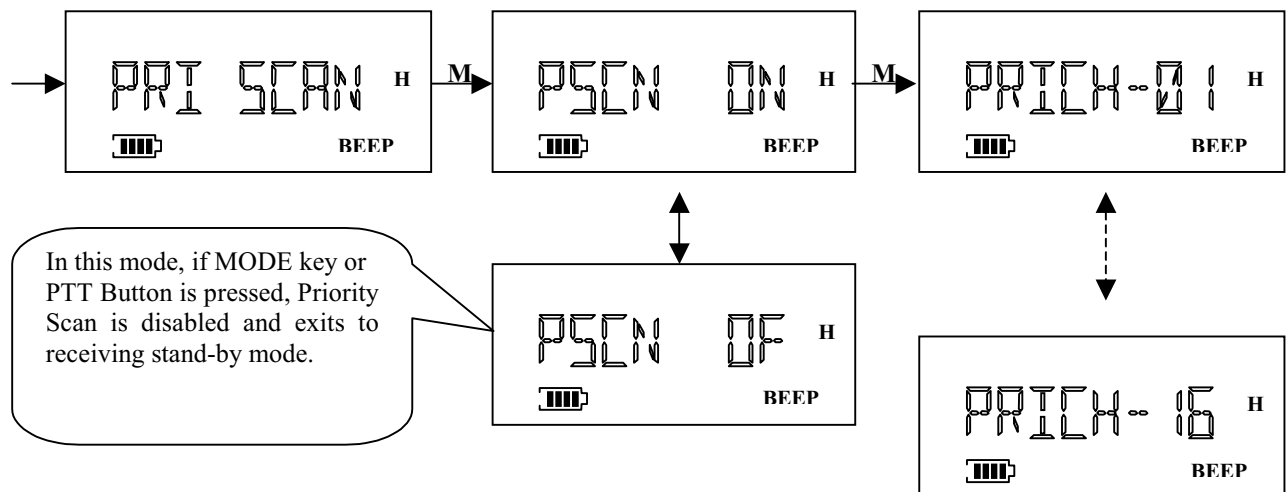
Under the above mode, press Up/Down Key to select desired priority channel and then press Mode key or PTT button to set. Then it saves and exits to receiving stand-by mode.

** Tx Delay On/Off Setting
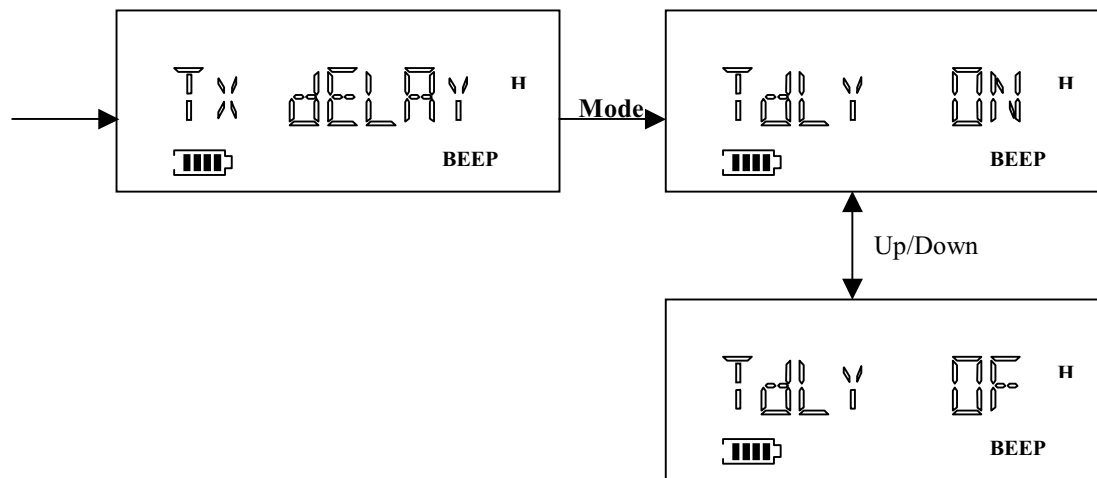
TX dELAY `H` BEEP → **Mode** → TdLY ON `H` BEEP

Up/Down

TdLY OF `H` BEEP

Under the above mode, press Up/Down Key to select On or Off and then press Mode key or PTT button to set. Then it saves and exits to receiving stand-by mode.
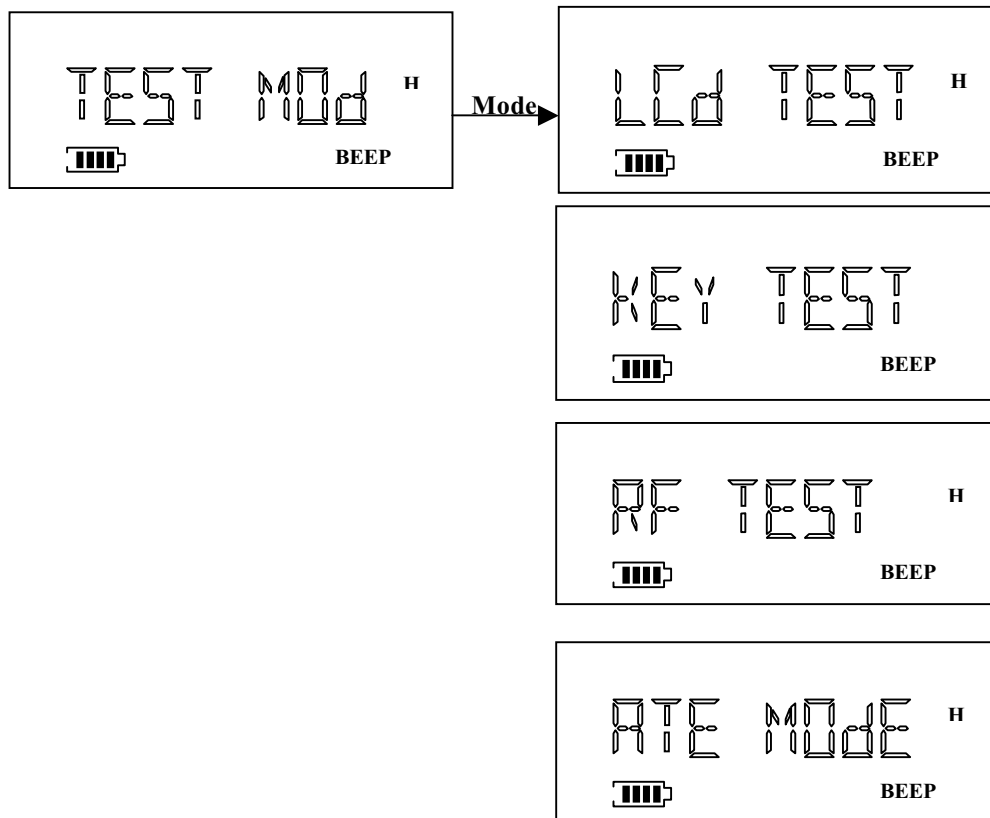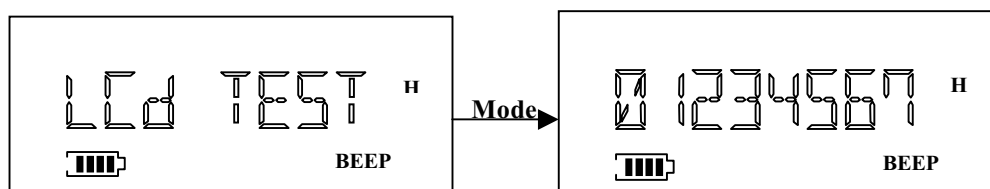** Tx Delay : This function is to remove Squelch tail of Receiving Radio by creating CTCSS Turn-Off (No Tone) during 180msec after TX is completed if TX tone option is set by CTCSS Option.

** Power Save Setting

PWR SAVE `H` BEEP → **M** → PSAV ON `H` BEEP → **M** → PSON TIM `H` BEEP

PSAV OF `H` BEEP

PSOFF TM `H` BEEP

PSdLY TM `H` BEEP

In this mode, if MODE key or PTT Button is pressed, Power Save is disabled and exits to receiving stand-by mode.

** Power Save On Time Setting

PSAV ON	PSON TIM	PON 50
BEEP	**BEEP**	**BEEP**

M → M →

PON 2000
BEEP

Under the above mode, press Up/Down Key to select the desired time and then press Mode key or PTT button to set. Then it saves and exits to receiving stand-by mode.

** Power Save Off Time Setting
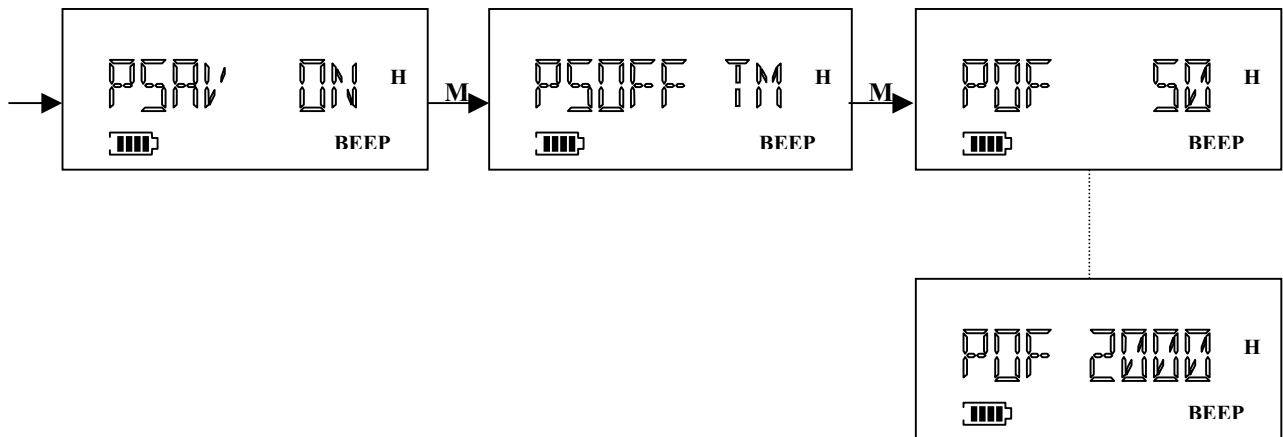
PSAV ON	PSOFF TM	POF 50
BEEP	**BEEP**	**BEEP**

M → M →

POF 2000
BEEP

Under the above mode, press Up/Down Key to select the desired time and then press Mode key or PTT button to set. Then it saves and exits to receiving stand-by mode.

** Power Save Delay Time Setting

PSAV ON	PSdLY TM	Pdy 1
BEEP	**BEEP**	**BEEP**

M → M →

Pdy 10
BEEP

Under the above mode, press Up/Down Key to select the desired time and then press Mode key or PTT button to set. Then it saves and exits to receiving stand-by mode.

** Clear To Talk On/Off Setting

```
CLR TALK  H          Mode          CTT  ON  H
[IIII]    BEEP                      [IIII]   BEEP
```

Up/Down

```
CTT  OF  H
[IIII]   BEEP
```

Under the above mode, press Up/Down Key to select On or Off and then press Mode key or
PTT button to set. Then it saves and exits to receiving stand-by mode.
    ** Clear To Talk : This function is to make TX Start Beep tone when it starts TX by pressing PTT Button.

** Roger Beep On/Off Setting

```
ROGER bP  H          Mode          RGbP  ON  H
[IIII]    BEEP                      [IIII]   BEEP
```

Up/Down

```
RGbP  OF  H
[IIII]   BEEP
```

Under the above mode, press Up/Down Key to select On or Off and then press Mode key or
PTT button to set. Then it saves and exits to receiving stand-by mode.
    ** Roger Beep : This function is to make beep tone after TX is completed to confirm transmission
        is finished.

*. Display Option Setting

dISPLAY ⊞ H / BEEP	**Mode** →	CH dISP ⊞ H / BEEP
		SLIdE ST ⊞ H / BEEP
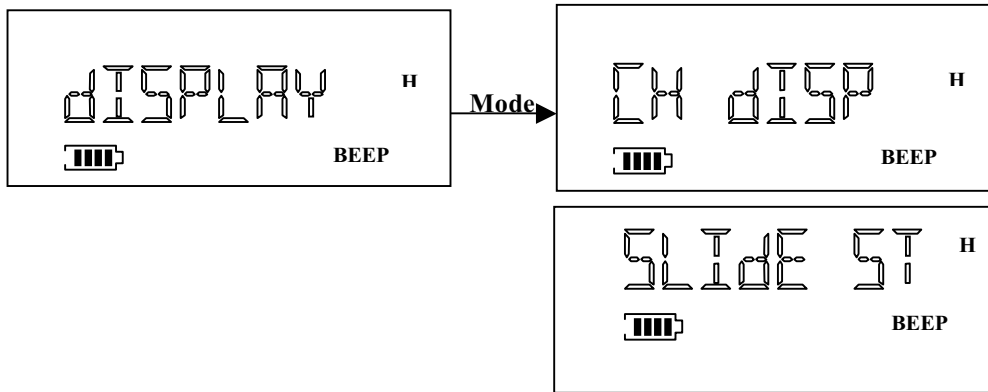
*. Channel Display Format Setting

CH dISP ⊞ H / BEEP	**Mode** →	NAME ⊞ H / BEEP
		CH No ⊞ H / BEEP
		FREQUENC ⊞ H / BEEP

Under the above mode, press Up/Down Key to select Display Format and then press Mode key or PTT button to set. Then it saves and exits to receiving stand-by mode.

** Name display

TOPAZ3 ⊞ H / BEEP

** Channel No. display

01-NotoN ⊞ H / BEEP

** Frequency Display

148_0000 ⊞ H / BEEP
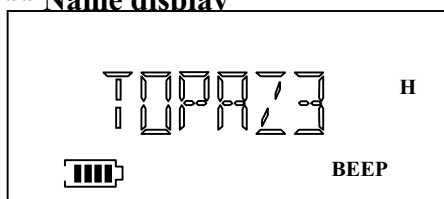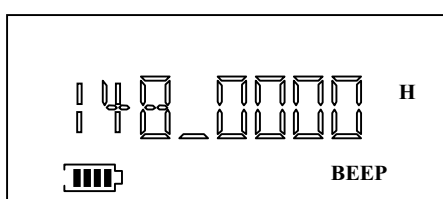
** Display Slide On/Off Setting
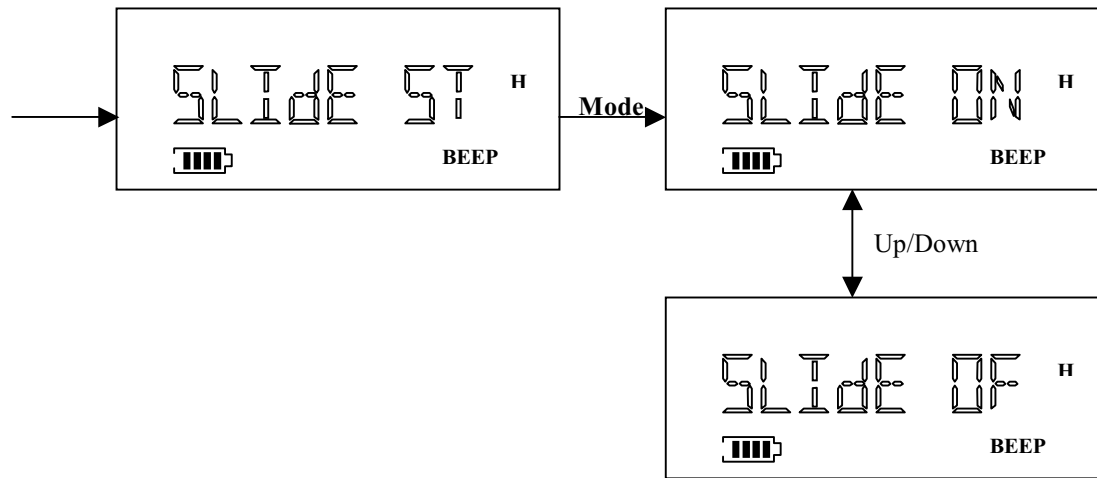
Under the above mode, press Up/Down Key to select On or Off and then press Mode key or
PTT button to set. Then it saves and exits to receiving stand-by mode.
   ** Display Slide :   If the radio is not in TX or RX and no key is pressed and then time passes over 20 sec,
       Slide message programmed by PC programmer scrolls.

**. Test Mode

```
TEST MOd ᴴ        →Mode    LCd TEST ᴴ
[III]      BEEP            [III]      BEEP

                          KEY TEST
                          [III]      BEEP

                          RF TEST  ᴴ
                          [III]      BEEP

                          ATE MOdE ᴴ
                          [III]      BEEP
```

To enter test mode, power on while pressing and holding SCAN Key & MODE Key.

**. LCD Test Mode

```
LCd TEST ᴴ       →Mode    0 1234567 ᴴ
[III]      BEEP            [III]      BEEP
```

LCD test mode continues until Power Off/On.

**. KEY Test Mode

```
KEY TEST
[IIII]              BEEP
```

Mode →

```
PUSH PTT   H
[IIII]              BEEP
```

You can test the keys following
the direction of LCD display.

```
PUSH MON   H
[IIII]              BEEP
```

```
PUSH MOd   H
[IIII]              BEEP
```

```
PUSH SCN   H
[IIII]              BEEP
```

```
PUSH UP    H
[IIII]              BEEP
```

```
PUSH dWN
[IIII]              BEEP
```
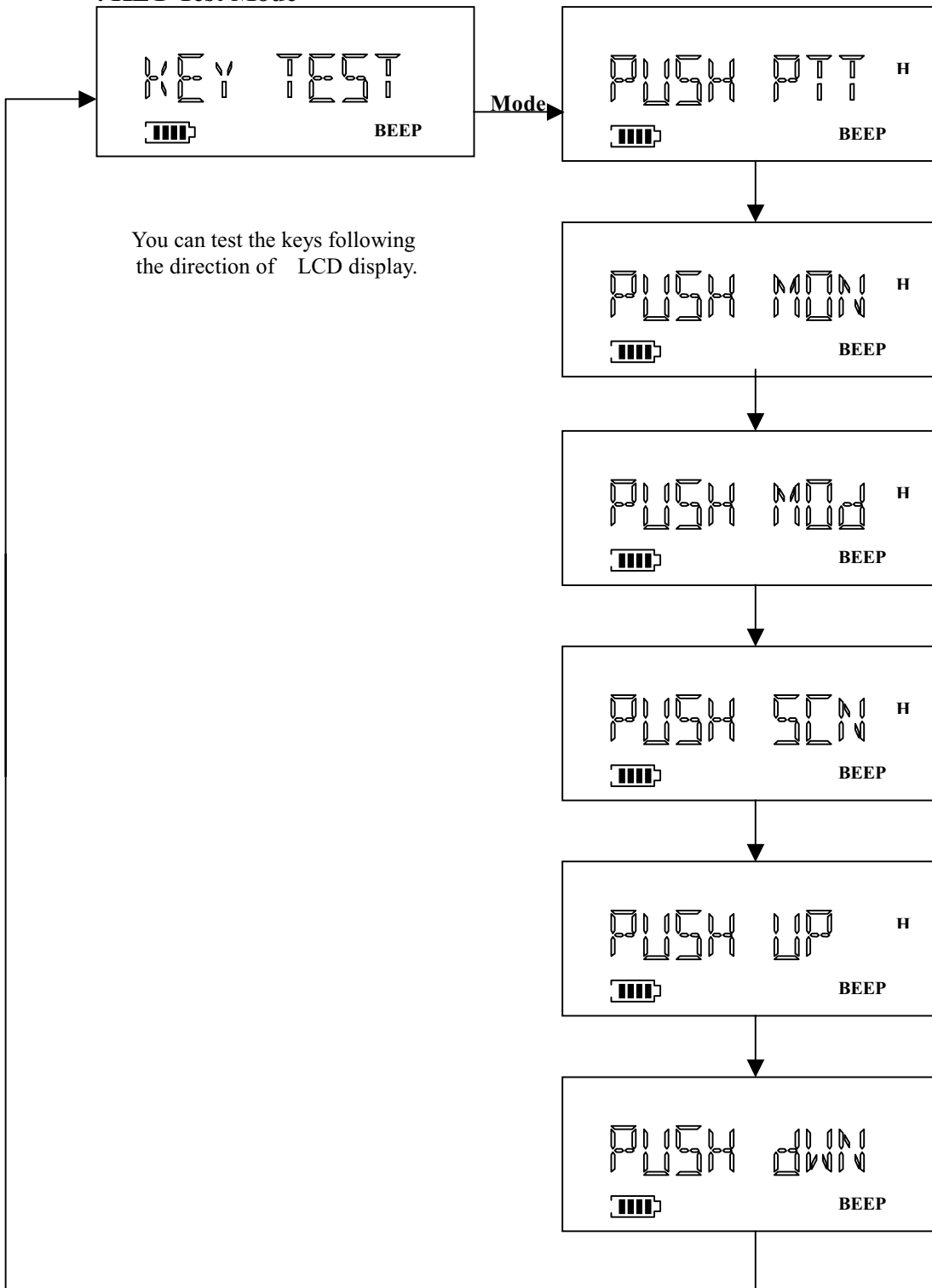
**. RF Test Mode
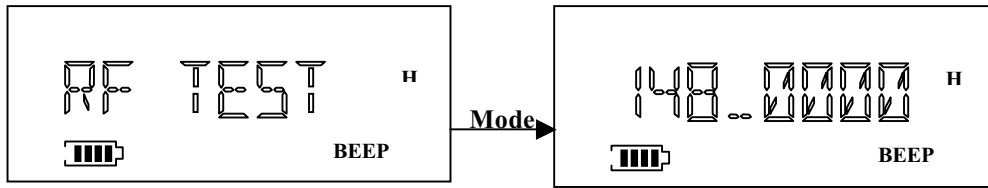
** RF Test Display
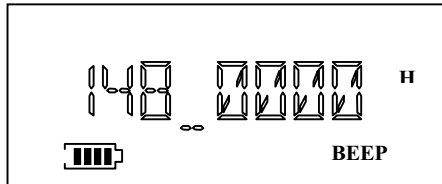
Under the above mode, press Up/Down Key to select the desired freq. Step
(freq. Step : 5 KHz, 10 KHz, 100 KHz, 1 MHz, 10 MHz) .

Under the above mode, press Scan Key to scan all frequencies.
(PL5161 : 148 MHz ~ 174 MHz, PL5164 : 450 MHz ~ 490 MHz)

Under the above mode, press Mode key for over 1.5 sec, then it beeps once.
Release the key, then the frequency step varies as under;
(5 KHz → 10 KHz → 100 KHz → 1 MHz → 10 MHz → 5 KHz → …)

Under the above mode, press Mode key for over 3 sec, then it beeps twice (long and short one).
Release the key, then TX output power changes to high/low.

Under the above mode, press Mode key for over 5 sec, then it sounds long beep and N/S band is switched.
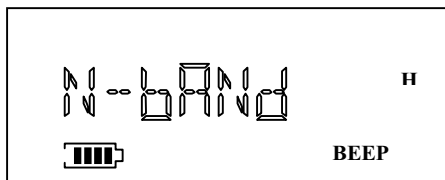
** N-Band display   ** S-Band display
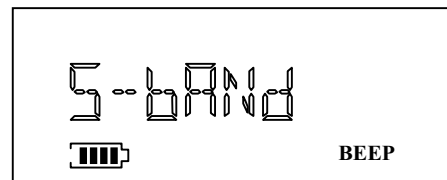
After showing changed N or S band display for around 2 sec, it returns to RF Channel frequency display.

Under above mode, press and release MODE Key shortly, then the radio goes to Tone Test mode.
** Tone Test mode display
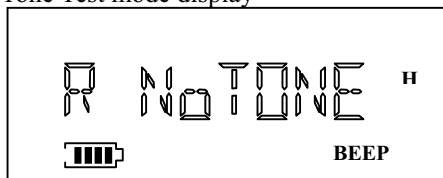
In Tone Test mode, Tone is changed by pressing Up/Down Key.
(Tone Off, CTCSS 1 ~ 49, DCS 023 ~ 754)
In Tone Test mode, Tone scan starts by pressing SCAN Key.
In Tone Test mode, the radio goes to RF Test mode by pressing MODE Key.

****** To get out of Test mode, Power off and on.

**. ATE Mode

```
 ATE MOdE  ᴴ
 [IIII]        BEEP
```
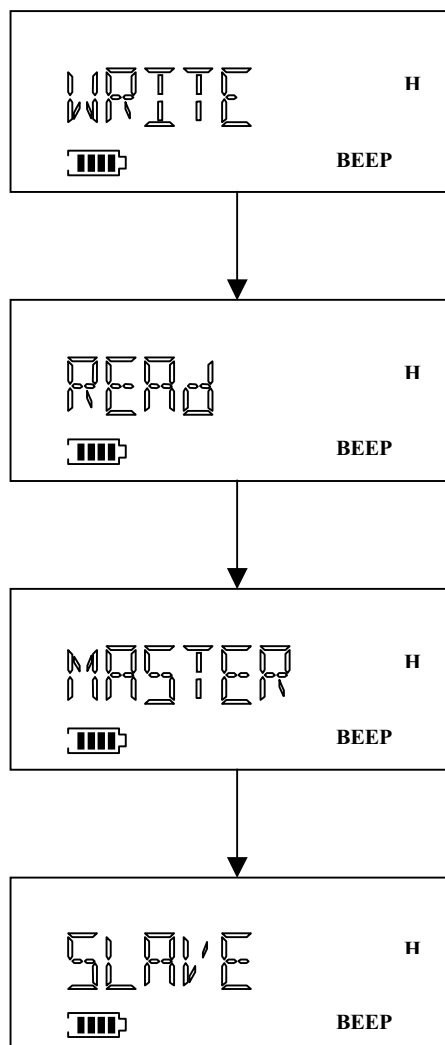→ **Mode** →
```
 ATE NOW   ᴴ
 [IIII]        BEEP
```
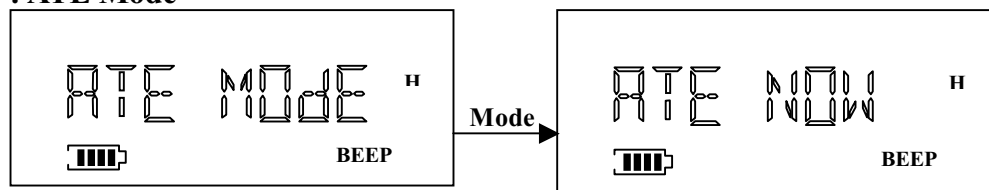
** ATE mode can be used when it is connected by PC ATE program.

**. Program Mode

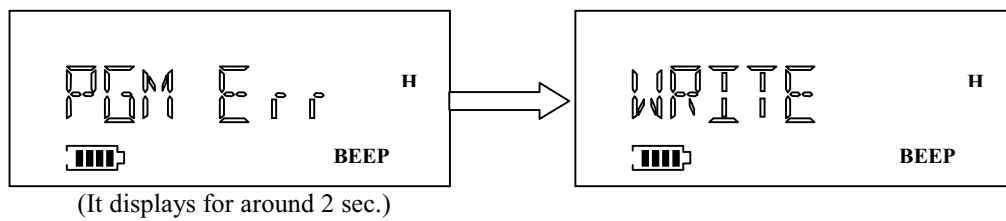To enter Program mode, press and hold Monitor Key and Power on.
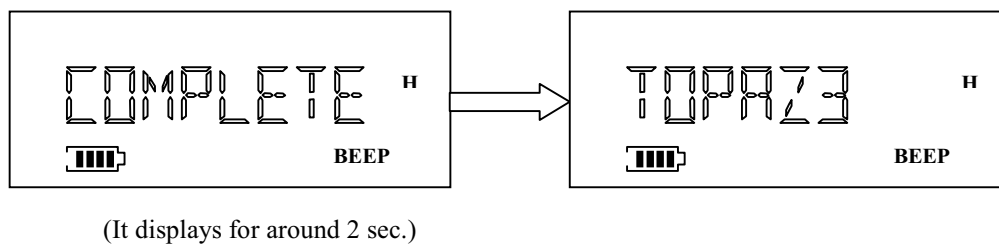
** Program mode display

```
 WRITE     ᴴ
 [IIII]        BEEP
```
↓
```
 REAd      ᴴ
 [IIII]        BEEP
```
↓
```
 MASTER    ᴴ
 [IIII]        BEEP
```
↓
```
 SLAVE     ᴴ
 [IIII]        BEEP
```

**. Program Write Mode

Make PC ready to write and press MODE Key, then write starts to transmit the data from PC to the radio.
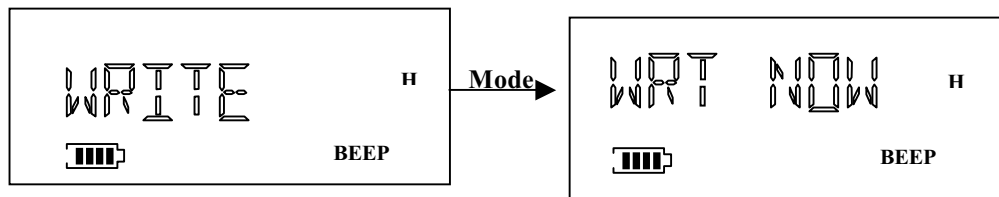
```
 _____              _____
| WRITE        H    |            | WRT NOW      H    |
|  ____             |  Mode      |  ____             |
| |IIII_|    BEEP   | ------->   | |IIII_|    BEEP   |
|_____|            |_____|
```

** If error is made during interface with PC, Error tone beeps and Program Error Message displays.
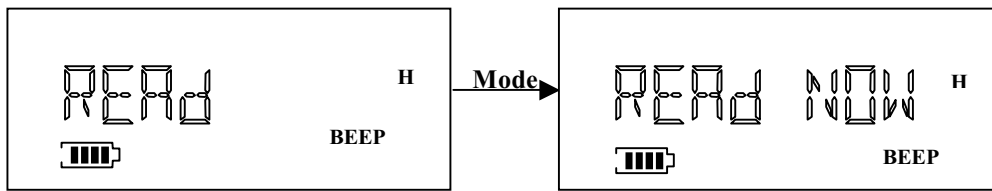 Then the radio goes to write stand by mode.

```
 _____              _____
| PGM Err      H    |            | WRITE        H    |
|  ____             |  =====>    |  ____             |
| |IIII_|    BEEP   |            | |IIII_|    BEEP   |
|_____|            |_____|
```
  (It displays for around 2 sec.)

** When WRITE is completed successfully, it displays OK Message and then return to RX
   Standby mode.

```
 _____              _____
| COMPLETE     H    |            | TOPAZ3       H    |
|  ____             |  =====>    |  ____             |
| |IIII_|    BEEP   |            | |IIII_|    BEEP   |
|_____|            |_____|
```

  (It displays for around 2 sec.)

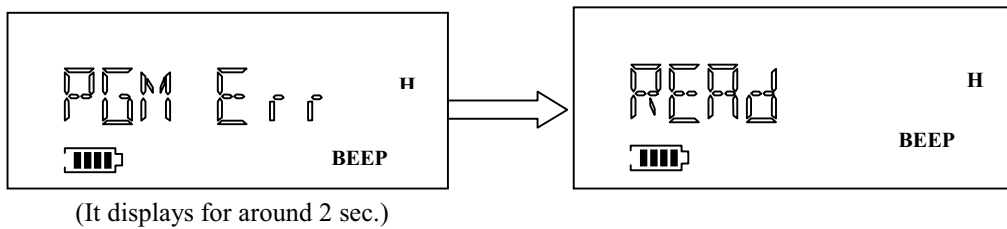## ****. Program Read Mode**

Make PC ready to read and press MODE Key, then read starts to receive the data from the radio to PC.

REAd H BEEP	**Mode** → READ NOW H BEEP

** If error is made during interface with PC, Error tone beeps and Program Error Message displays. Then the radio goes to read stand by mode.

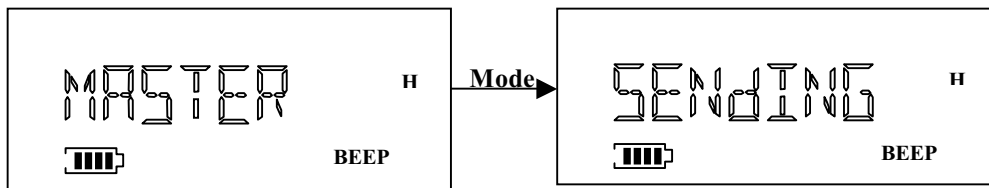|	
PGM Err H BEEP	⇒ REAd H BEEP

(It displays for around 2 sec.)

** When READ is completed successfully, it displays OK Message and then return to RX Standby mode.

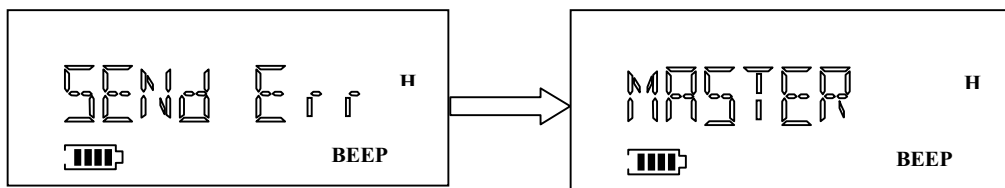|	
COMPLETE H BEEP	⇒ TOPAZ3 H BEEP

(It displays for around 2 sec.)
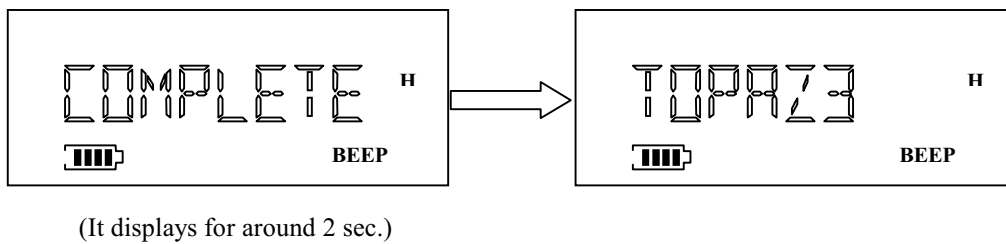
**. Program Master Mode (Transmit data to other(SLAVE) Radio)

Make the other radio connected by cloning cable, ready as slave mode, then press Mode key of the slave radio.Press mode key of master radio to start.
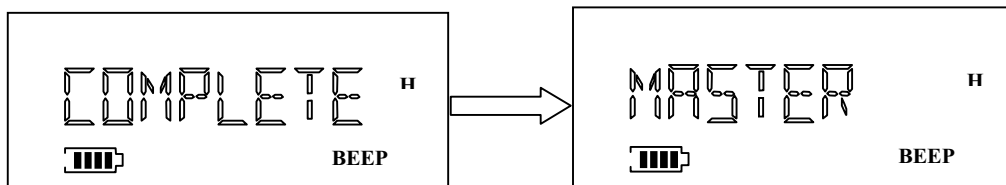
```
┌─────────────────────┐          ┌─────────────────────┐
│                     │          │                     │
│  MASTER         H   │  Mode►   │  SENdING        H   │
│                     │          │                     │
│  [IIII▷      BEEP   │          │  [IIII▷      BEEP   │
└─────────────────────┘          └─────────────────────┘
```

** If error is made during interface with slave radio, Error tone beeps and Error Message displays. Then the radio goes to the master stand by mode.

```
┌─────────────────────┐          ┌─────────────────────┐
│                     │          │                     │
│  SENd Err       H   │   ⟹     │  MASTER         H   │
│                     │          │                     │
│  [IIII▷      BEEP   │          │  [IIII▷      BEEP   │
└─────────────────────┘          └─────────────────────┘
```
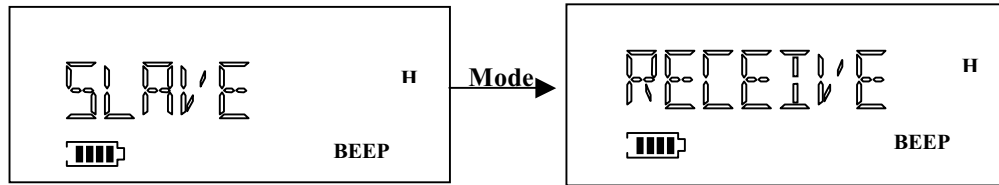(It displays for around 2 sec.)

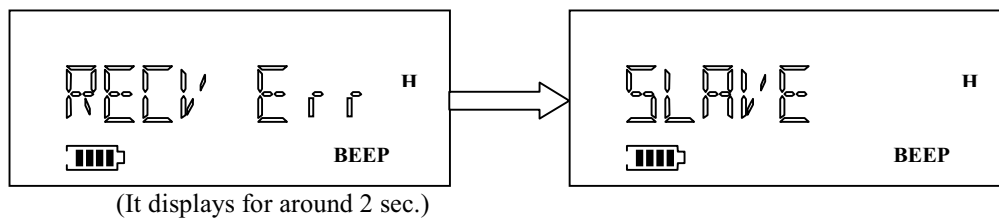** When Master operation is completed successfully, it displays OK Message and then return to Master Standby mode.

```
┌─────────────────────┐          ┌─────────────────────┐
│                     │          │                     │
│  COMPLETE       H   │   ⟹     │  MASTER         H   │
│                     │          │                     │
│  [IIII▷      BEEP   │          │  [IIII▷      BEEP   │
└─────────────────────┘          └─────────────────────┘
```
(It displays for around 2 sec.)

**. Program SLAVE Mode (Receive data from other(MASTER) Radio)

Make the other radio connected by cloning cable, ready as Master mode, then press Mode key of the slave radio.Press mode key of master radio to start the operation of slave.

SLAVE ᴴ	Mode ▶	RECEIVE ᴴ
🔋 BEEP		🔋 BEEP

** If error is made during interface with master radio, Error tone beeps and Error Message displays. Then the radio goes to the slave stand by mode.

RECV Err ᴴ	⟹	SLAVE ᴴ
🔋 BEEP		🔋 BEEP

(It displays for around 2 sec.)

** When Slave operation is completed successfully, it displays OK Message and then return to Slave Standby mode.

COMPLETE ᴴ	⟹	TOPAZ3 ᴴ
🔋 BEEP		🔋 BEEP

(It displays for around 2 sec.)