

C120 VHF Hand-Held Transceiver

OWNER'S MANUAL



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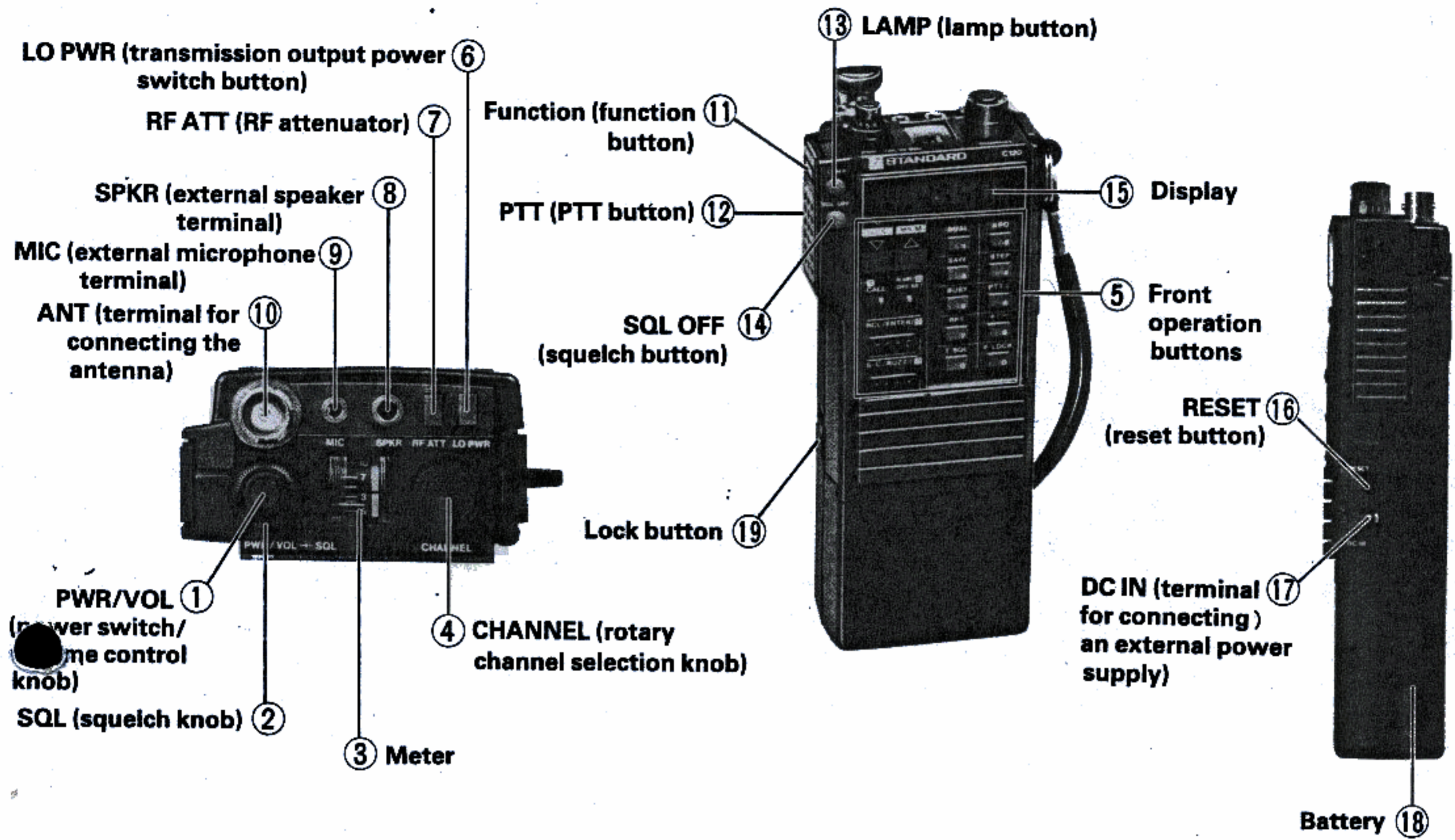
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Thank you for purchasing this 144-MHz band hand-held transceiver. We have produced and shipped this transceiver with stringent quality control and testing. If there is any problem with this unit, please bring it to the store where you purchased it or the nearest one of our stores or service centers as soon as possible.

So that you will be able to take full advantage of all the functions this transceiver has to offer and use it for a long time, please read through this entire user's manual before using your new transceiver.

PARTS NAMES



For an explanation of what each of these parts is for, see Page 37.

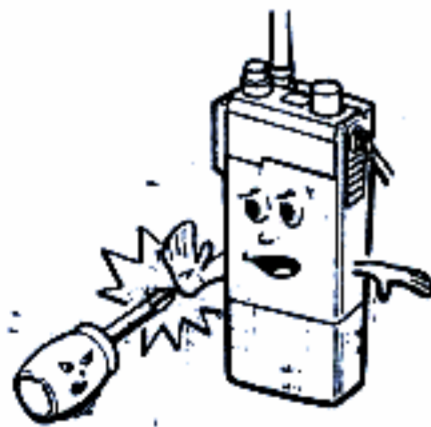
BEFORE USING YOUR NEW TRANSCEIVER

Here are a few things to avoid:

1 Do not reverse the + and - ends of the batteries.



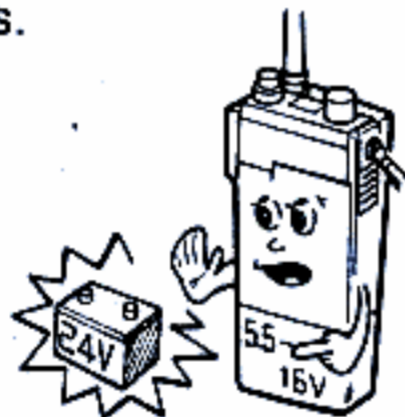
2 Do not touch the core or the trimmer. They have already been tuned to their optimum settings.



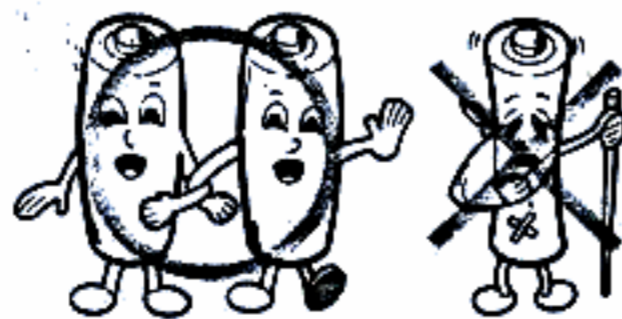
3 Avoid places that are too hot, too damp, or too dusty.



4 Do not use 24 volt batteries.



5 Do not mix old batteries and new batteries together. Use SUM-3 manganese batteries or nickel-cadmium batteries.

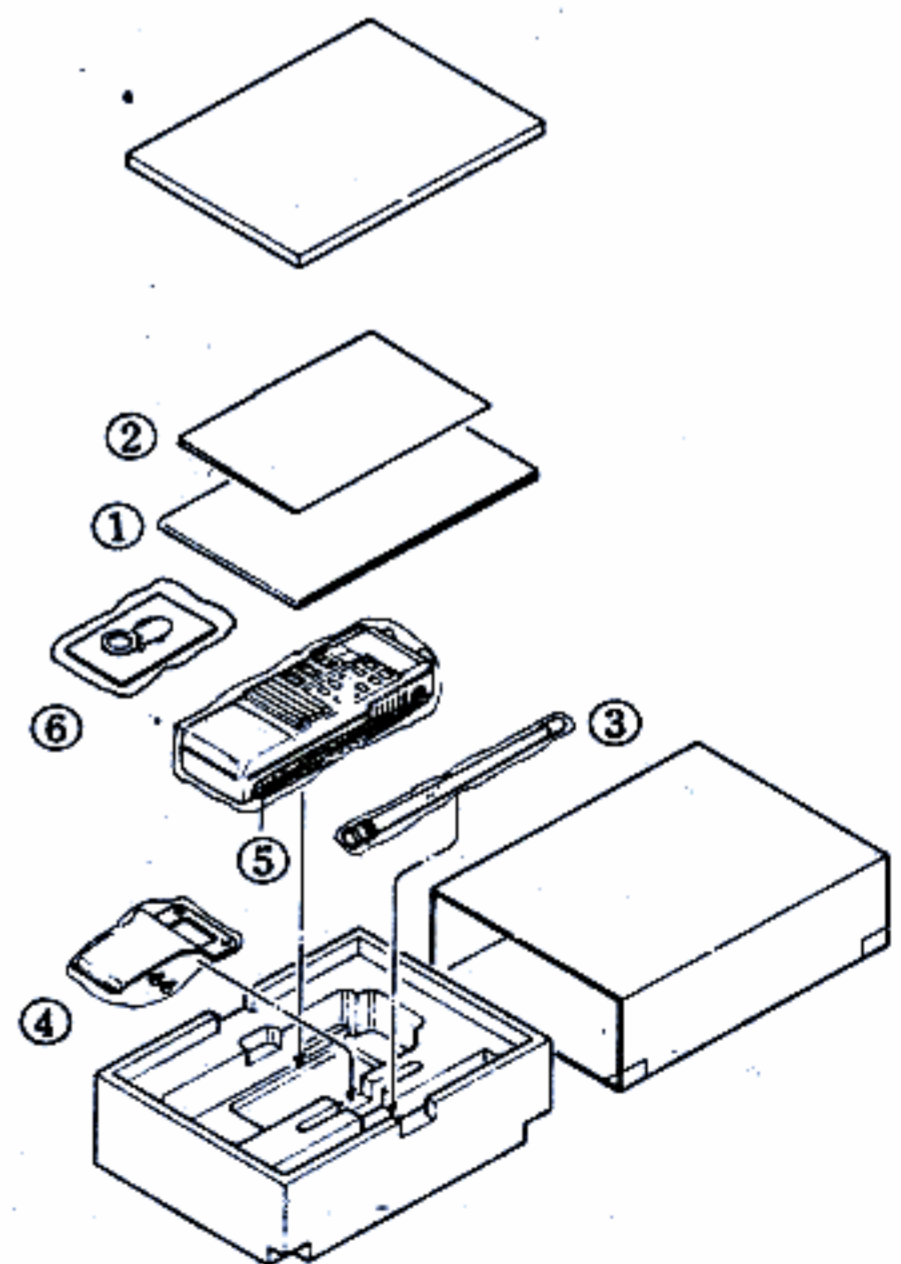


6 Do not throw old batteries into fires.



PACKING

Open up the box and make sure all the accessories are there.



ACCESSORIES

- ① User's manual
- ② Circuit diagram
- ③ Whip antenna
- ④ Belt clip (and 2 screws)
- ⑤ Hand strap (already attached to the transceiver)
- ⑥ Waterproof cover

ACCESSORIES

A complete range of accessories have been prepared to enhance your enjoyment of this transceiver. Be read the user's manuals for your accessories carefully and use those accessories as explained in those manuals.

- CSA111: Desk-top battery charger
- CNB111: Rechargeable battery pack
- CNB120: High-power rechargeable battery pack (for 5W output)
- CHP111: PTT headset
- CMB111: Mobile bracket
- CLC120: Soft case (for use with the CNB111)
- CLC121: Long-size soft case (for use with the CNB120)
- CAD111: Charge adaptor
- CWC120: AC charger (for use with the CNB120)
- C10/130-1: AC charger (for use with the CNB111)
- CMP111: Microphone & speaker
- CMC01: Mobile charger (for use with the CNB111)
- CAW120: Power cord for mobile
- CNB121: Long life rechargeable battery pack

FEATURES

- ★ The frequency can be selected with the keyboard, the up-down switches, and with the rotary channel selector.
- ★ Plenty of RF power for 5W output
RF Power increases to 5W with the high-power rechargeable battery pack (CNB120) or with 13.8V external power supplies.
- ★ Can be connected to automobile power supplies without an adaptor
The voltage range for the input power is from 5.5 to 16 volts, so this transceiver can be connected to automobile power supplies without an adaptor, which can be quite handy.
- ★ Even if you forget to turn off the power, the automatic power off function reduces the current drain (stand-by) to a mere 3 mA.
- ★ Battery save function to reduce battery consumption while you are in stand-by.
- ★ VCS functions that automatically find an vacant channel and can easily QSY this open channel to vacant.
- ★ Variety of built-in dual watch functions
This function watches the dial frequency and the next frequency at the same time.
(Frequency in Memory 1)
(Frequency in any other memory)
(Frequency in the repeater memory)

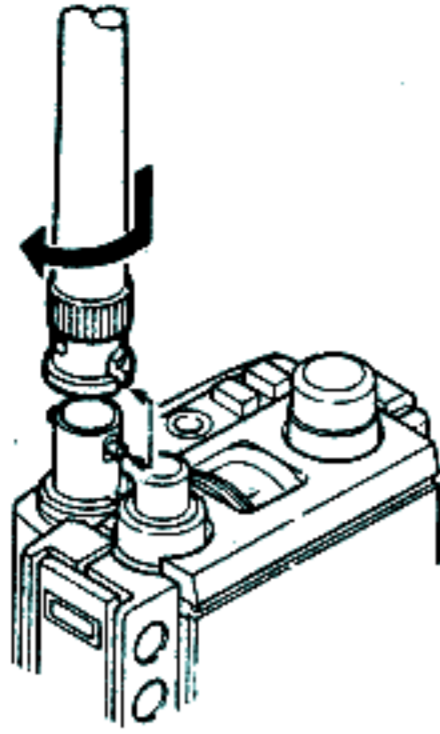
4

- ★ Memory for 20 channels
- ★ Additional MS.M (memory scan memory) function, resulting in full and varied scanning
- ★ Repeater memory functions for calling frequently used frequencies with a single action
- ★ One-touch squelch off function to switch off the squelch temporarily
- ★ The rotary channel selector can be combined with the function button for 100kHz steps, quite handy for quick QSYs.
- ★ Scanning can go from lower frequencies to higher or vice-versa.
- ★ An optional tone squelch unit of which frequencies can be selected with the rotary channel selector or the Up/Down buttons.
- ★ When the CALL button is pressed during transmission, a 1750 Hz tone signal is also transmitted simultaneously.
- ★ Frequency lock function to make sure that the frequency is not changed by mistake
- ★ PTT lock function to keep the transceiver from coming on by mistake while being carried
- ★ Smallest and lightest transceiver in its class:
Dimensions: 161mm (height) × 60mm (width) × 34mm (depth) (excluding protrusions)
Weight: 455g (including batteries and antenna)
- ★ High sensitivity
12dB SINAD -16dBμ -10dB (0.158 μV)
- ★ Built-in RF attenuator function
- ★ A full line-up of options

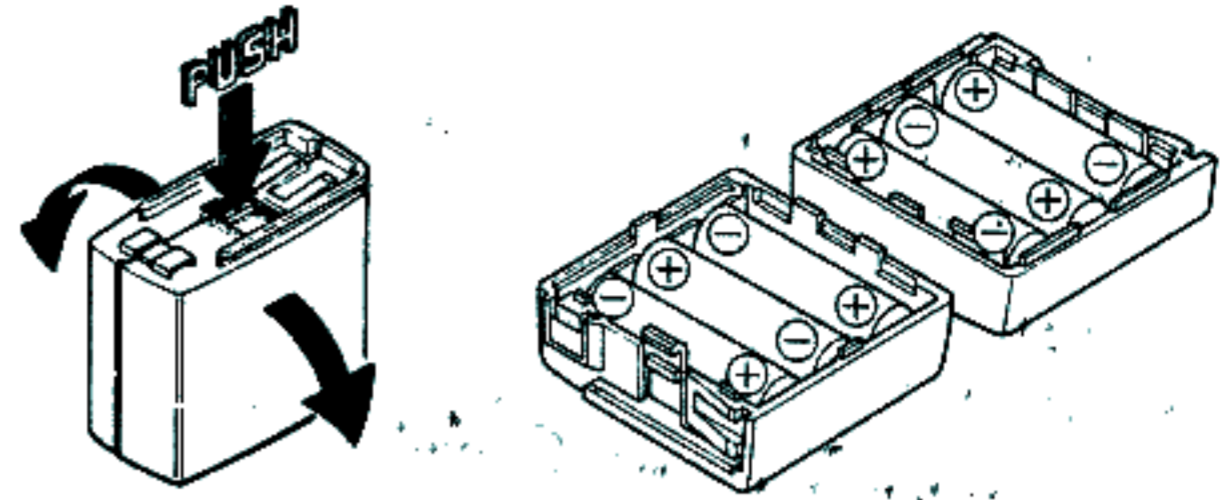
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OPERATIONS PROCEDURES

- 1** Install the antenna.

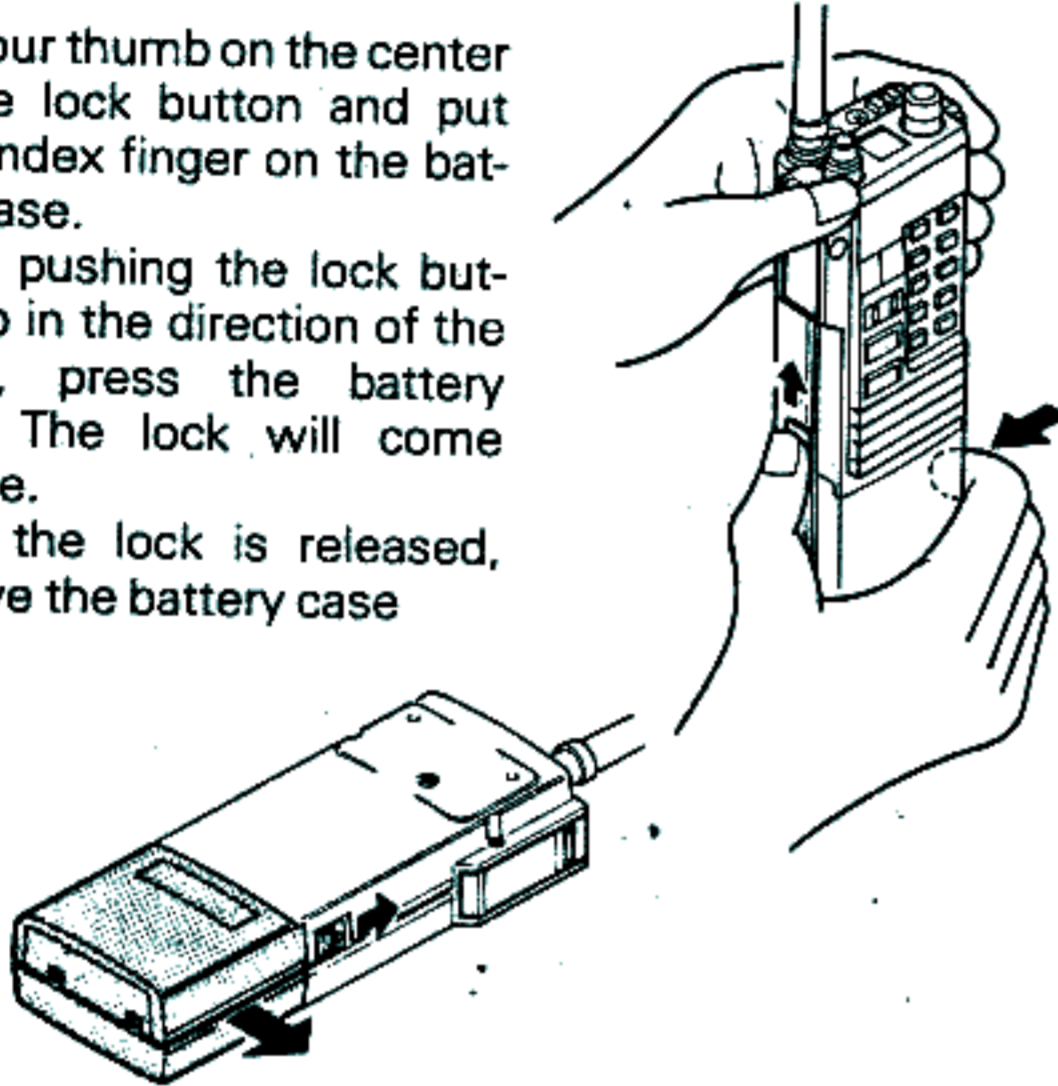


- 3** Put 6 AA batteries in the battery case. Make sure that the + and - ends are facing the correct direction.

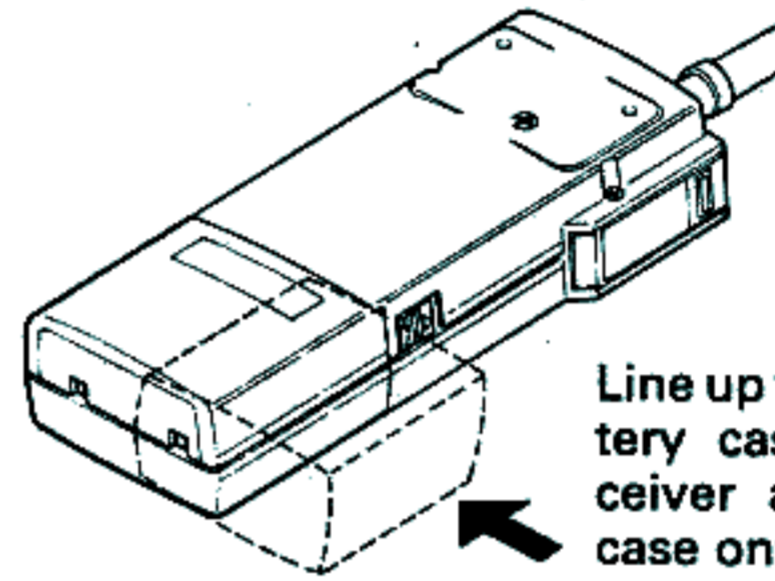


- 2** Remove the battery case from the transceiver.

- A** Put your thumb on the center of the lock button and put your index finger on the battery case.
- B** While pushing the lock button up in the direction of the arrow, press the battery case. The lock will come release.
- C** Once the lock is released, remove the battery case intact.



- 4** Connect the battery case to the transceiver.



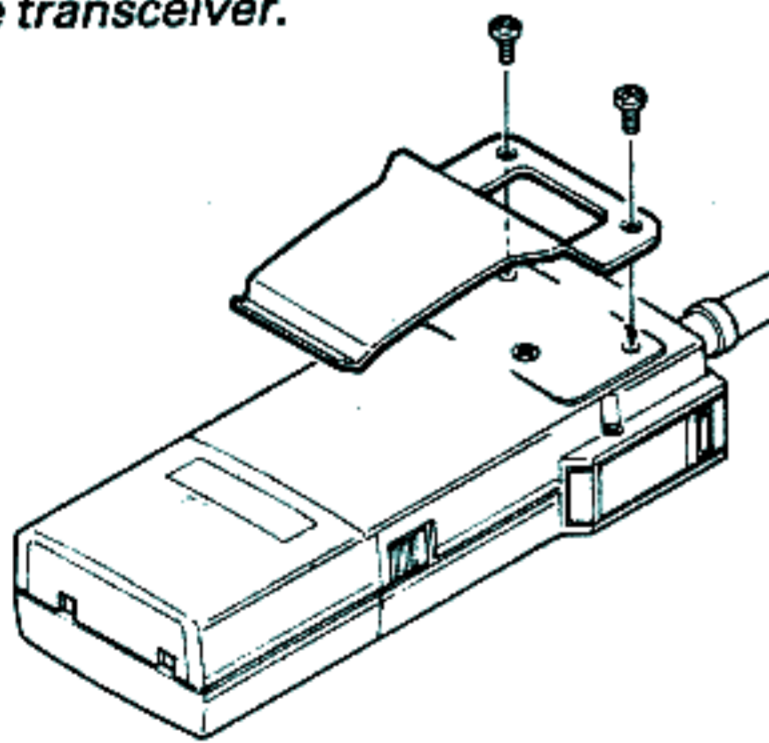
Line up the grooves on the battery case and on the transceiver and push the battery case onto the transceiver until you hear a click.

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- 5** Install the belt clip on the transceiver.

Precaution

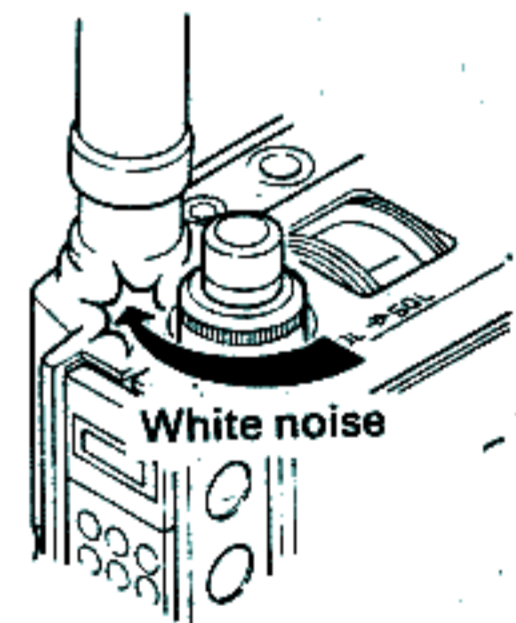
Do not use any screws other than those supplied with the transceiver.



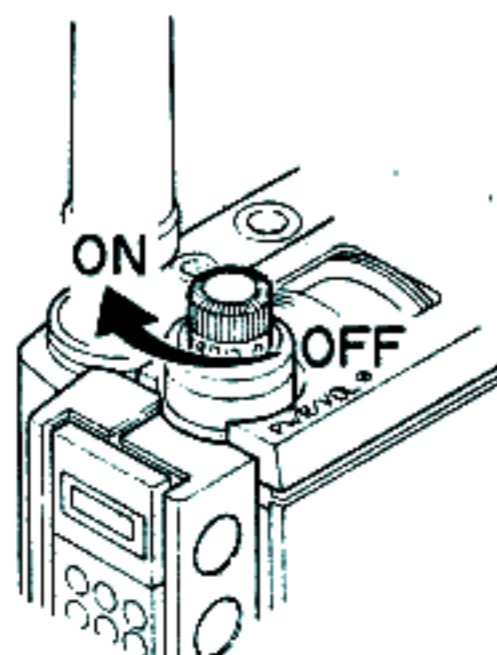
- 7** Slowly turn the SQL squelch knob clockwise until no white noise is heard from the internal speaker.

Precaution

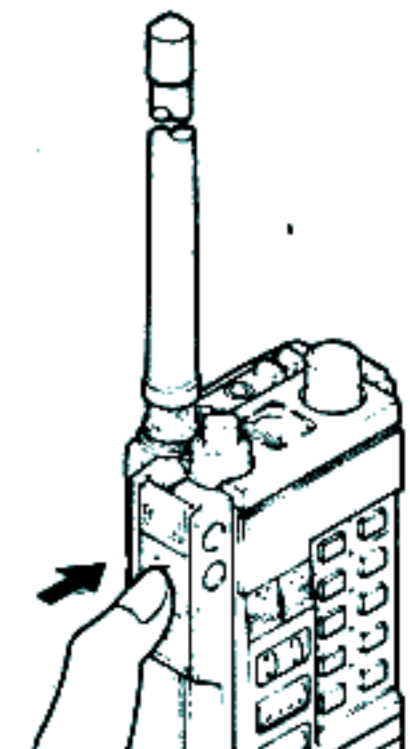
If you turn the squelch knob too far clockwise, you will not be able to pick up weak signals.



- 6** Switch on the power and turn the volume knob to about 5 on the scale.



- 8** Press the PTT button to obtain transmission mode and release it to obtain reception mode.



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OPERATION

Functions of the buttons on the front operation

Each of the buttons on the front operation section has its own function. Whenever one of them is operated correctly, a pip sound is made; whenever one of them is operated incorrectly, a buzz is made. The functions of each of the buttons is explained in greater detail later in this manual.

Button name	Function when the FUNCTION button is not pressed	Function when the FUNCTION button is pressed
*▽/VCS	Frequency down	VCS operation
#△/MS.M	Frequency UP	Sets the MS.M memory frequency: Sets MS.M scanning
[A] CALL	Makes the buzz	
R.MR/[B] OFF SET	R.MR call	Sets the offset frequency
RCL/ENTER/[C]	Calls the memory channel	Sets the memory frequency
S/C/BUZZ/[D]	Scan operation and clear	Buzzer on and off

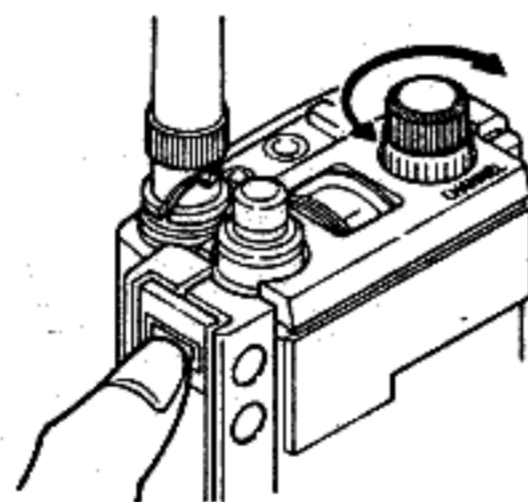
Button name	Function when the FUNCTION button is not pressed	Function when the FUNCTION button is pressed
1/DUAL	Enters a 1	Dual watch operation on and off
2/APO	Enters a 2	APO operation on and off
3/SAVE	Enters a 3	SAVE operations on and off
4/STEP	Enters a 4	Changes the frequency steps
5/BUSY	Enters a 5	Switches PAUSE and BUSY scan operation
6/PTT.L	Enters a 6	Transmission prohibition operation on and off
7/RPT	Enters a 7	Switches the RPT operation on and off
8/+/-	Enters an 8	Switches offset between + and -
9/T.SQL	Enters a 9	—
0/F.LOCK	Enters a 0	Switches the frequency lock on and off

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1 CHANGING THE TRANSMISSION AND RECEPTION FREQUENCY

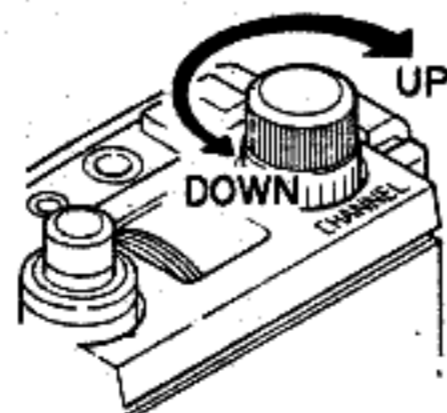
1 USING THE ROTARY CHANNEL SELECTOR KNOB

Set the frequency by turning the rotary channel selector knob. The frequency changes in 5 kHz steps. Turning the rotary channel selector knob while pressing the FUNCTION button changes the frequency in 100 kHz steps.



Procedure

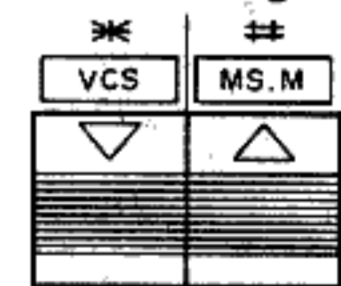
Turn the rotary channel selector knob clockwise to increase the frequency and turn it counter-clockwise to decrease the frequency.



2 USING THE △ AND ▽ BUTTONS

Procedure

- ◇ Pressing the △ button raises the frequency in a 5 kHz step; pressing the ▽ button lowers the frequency in 5 kHz steps.
- ◇ Pressing and holding either of these buttons for longer than half a second make a continuous frequency change.

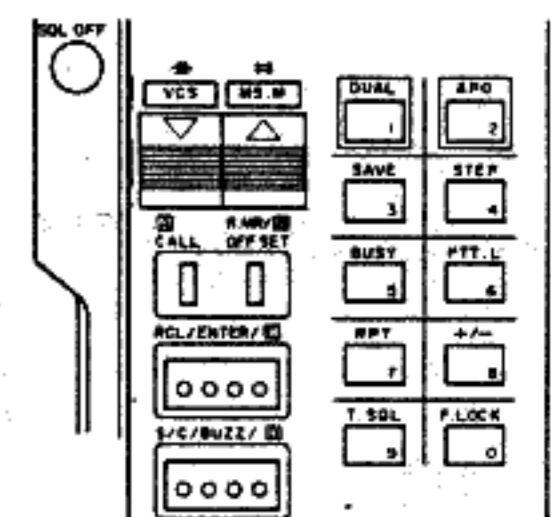


Advice

1. The amount that the frequency changes each time the ▽ or △ button is switched is called the channel step.
2. The channel step for this transceiver can be set to 5, 10, 20, or 25 kHz. It is shipped from the factory set to a channel step of 5 kHz. To change the channel step, see Page 29.

3 USING THE KEYBOARD

Set the desired frequency directly by pressing the desired buttons, "0 to 9".



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Precaution

Example: Setting the frequency to 144.80 MHz

- ① Set the MHz range. ... Press the 4 button. 144 is displayed.

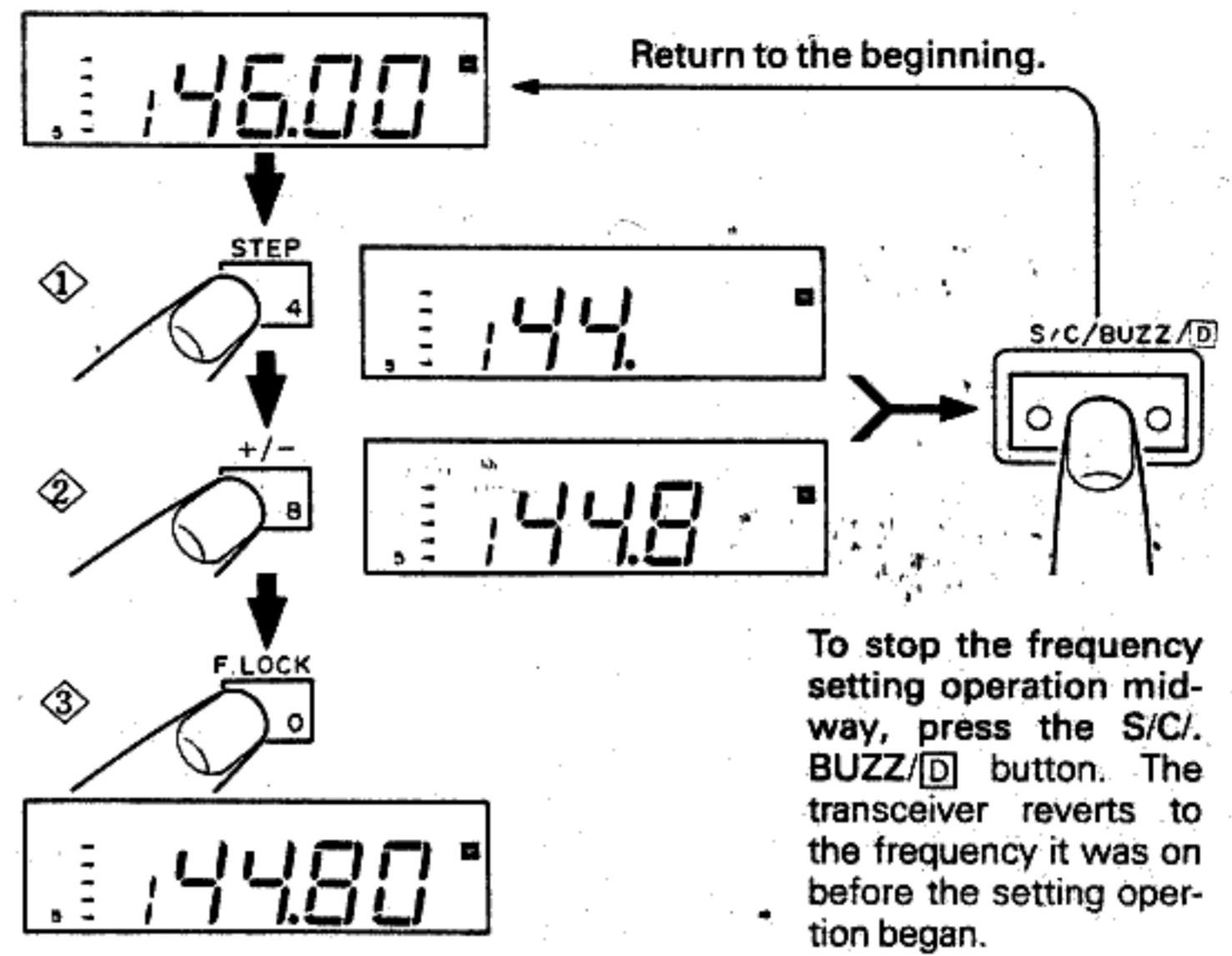
Procedure

If you press any button other than 4 or 7 as the MHz range, the error beep sounds and that MHz setting is not set.

- ② Set the 100 kHz range. ... Press the 8 button. 144.8 is displayed.
- ③ Set the 10 kHz range. Press the 0 button. 144.80 is displayed.

When these 3 numbers have been entered, the long buzz sounds to let you know that the frequency has been set.

This mode is called dial frequency mode. All the examples in this user's manual use a dial frequency of 144.80 MHz.



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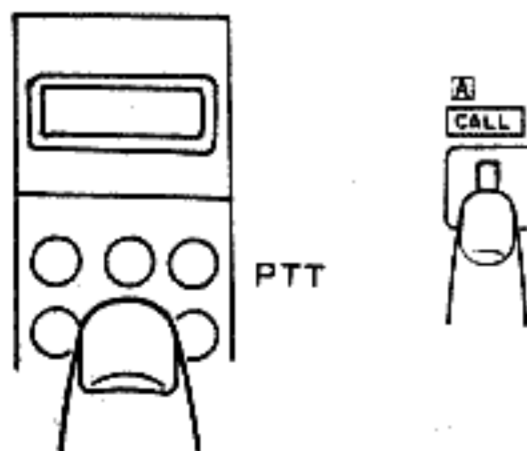
2

HOW TO CALL THE REPEATER [CALL/A BUTTON]

With PTT ON, pressing the CALL button transmits the tone signal (1750 Hz) as long as the button is held. With PTT OFF, the CALL button input is ignored and a beep sound is heard to indicate it.

Procedure

While pressing the PTT button, press the CALL button.



3

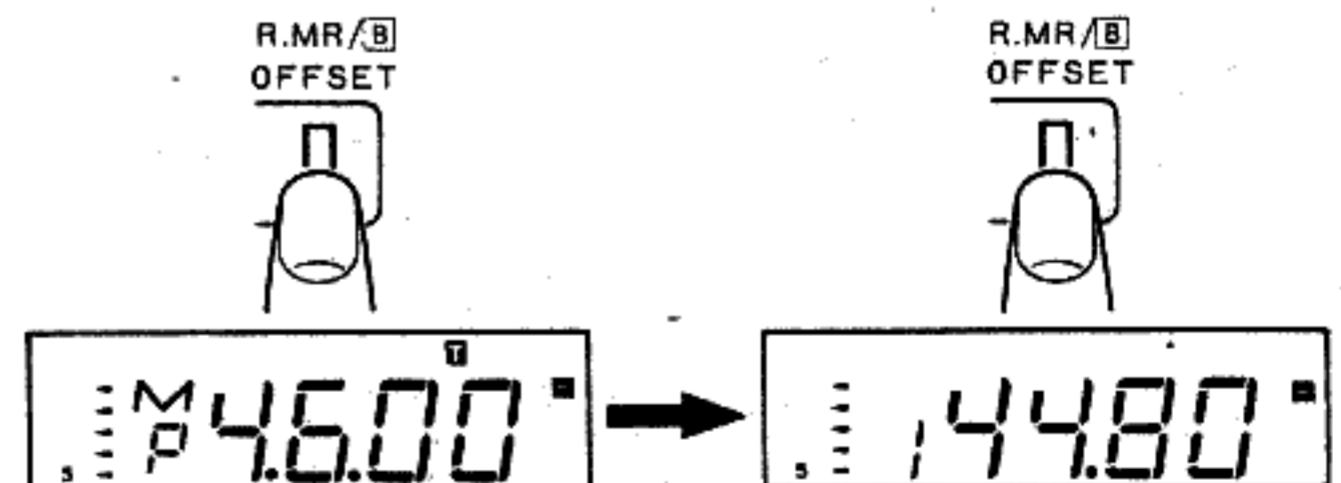
HOW TO CALL THE REPEATER (PRIORITY) FREQUENCIES WITH THE R.MR BUTTON

The most-frequently used repeater frequency can be called with one touch of the R.MR button. When the R.MR button is pressed, the transceiver always enters the repeater operation mode (RPT ON). (After calling, the repeater operation mode can be switched on/off by pressing the 7/RPT button while holding down the FUNCTION button.)

Procedure

Press the R.MR button, and the repeater memory (priority) frequency is called.

To return to the frequency in effect before the R.MR button was pressed, the R.MR button again.



Precaution

The transceiver is shipped from the factory with 146.000 MHz set as the initial state. The tone encoder setup state is 0.60 MHz offset (Pressing the RESET button on the side of the transceiver resets the transceiver's microprocessor. The state of the microprocessor then returns to is called the initial state.)

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★ HOW TO STORE THE REPEATER (PRIORITY) FREQUENCY (WITH THE R.MR BUTTON)

Procedure

Example: Setting the repeater (priority) frequency to 145.12 MHz

- 1 Press the R.MR button. The repeater (priority) frequency which has already been stored is displayed.
- 2 Using the Δ and ∇ buttons, the rotary channel selector knob, or the number buttons, set the priority frequency to 145.12. P45.12 is displayed with the "M" blinking.

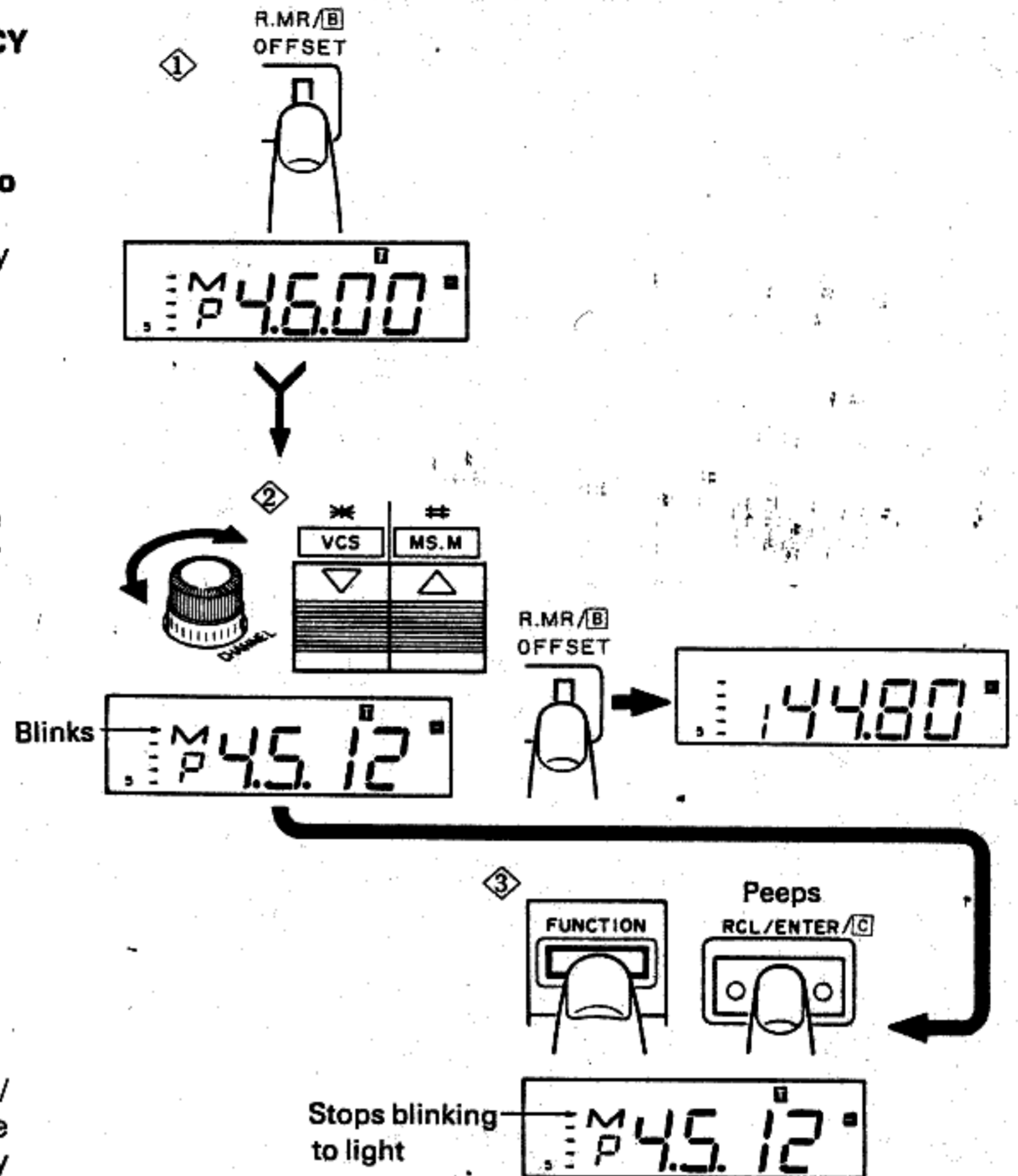
Pressing the R.MR button while the M is blinking ends the R.MR operation and leaves the priority frequency unchanged.

Pressing the S/C/BUZZ/D button sets the transceiver to the dial frequency mode.

Advice

While the "M" is blinking the transceiver can operate at the displayed frequency, but the frequency 146,000 MHz in memory is unchanged.

- 3 While holding down the FUNCTION button, press the RCL/ENTER/C button. The "M" stops blinking (lights) and the transceiver peeps to tell you that the frequency in memory has been changed.



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4 HOW TO ENTER FREQUENCIES INTO MEMORY [RCL/ENTER/C BUTTON]

The memory has a capacity for storing up to 20 frequencies. These memorized frequencies can be freely called, changed, scanned, etc.

The area in which a frequency is memorized is called a memory address. The memory addresses are from M0 to M19.

Precaution

Note that there is a slight difference in the method used for storing frequencies into memory addresses M0-M9 and that used for storing frequencies into memory addresses M10-M19.

① STORING FREQUENCIES INTO MEMORY ADDRESSES M0-M9 (WHEN NOTHING IS STORED IN THE MEMORY ADDRESSES)

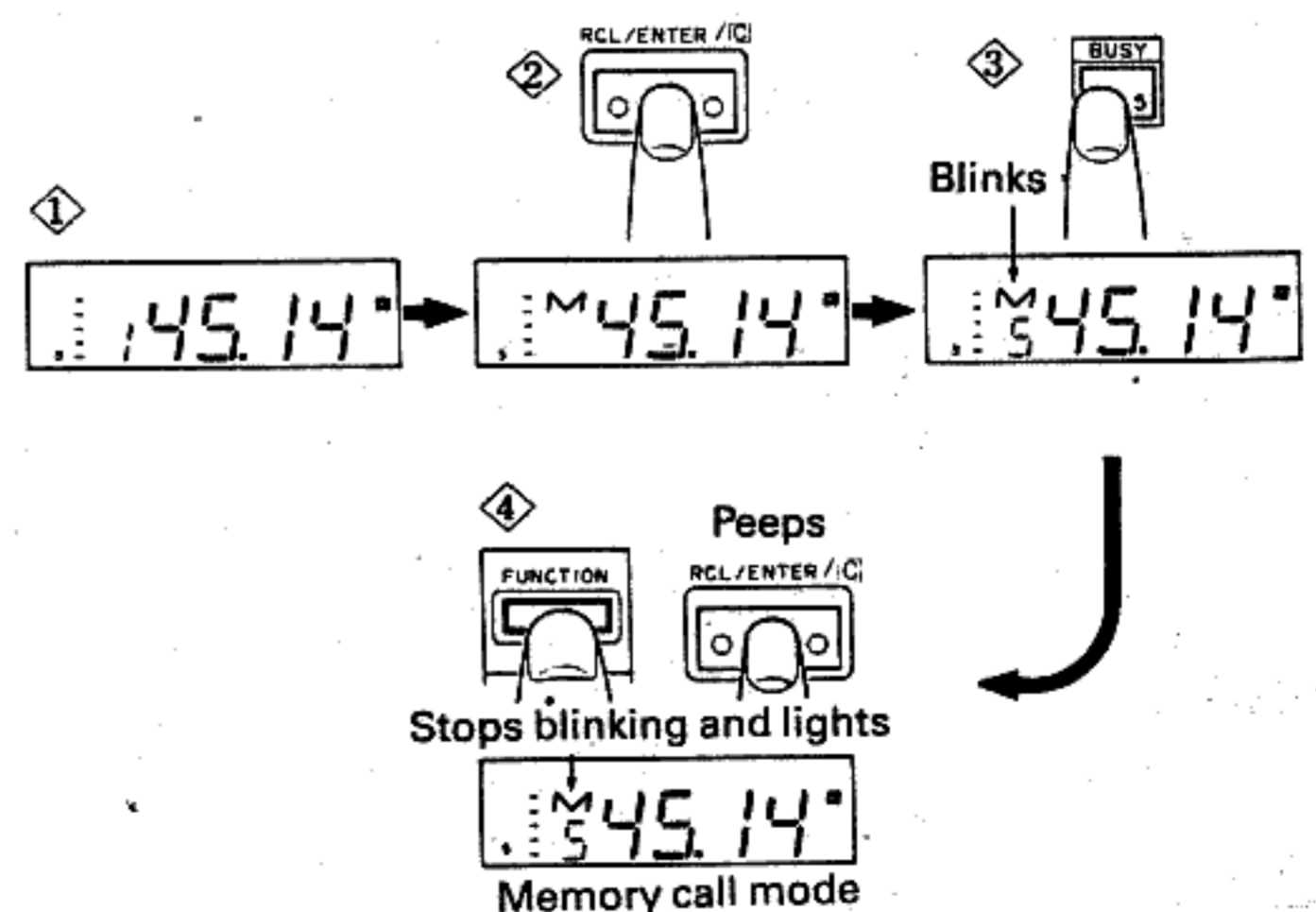
Procedure

Example: Storing 145.14 MHz into memory address M5

- 1 Display the memory to be stored, 145.14, in the display section.

- 2 Press the RCL/ENTER/C button. M lights in the display section. At this time, even if you turn the rotary channel selector knob, the frequency does not change.
- 3 Call memory address "M5" by pressing the button Number 5. The "M" in the display section blinks and the memory address number is displayed.
- 4 While pressing the FUNCTION button, press the RCL/ENTER/C button. The transceiver peeps to let you know that the frequency has been stored into memory and the M stops blinking, and lights.

This state is known as memory call mode.



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② STORING FREQUENCIES INTO MEMORY ADDRESSES NUMBER M10-M19

The 10s digit of the memory address is specified by pressing the *▽ button and the 1s digit with the number buttons.

Procedure

Example: Storing 145.20 MHz into memory address number M12

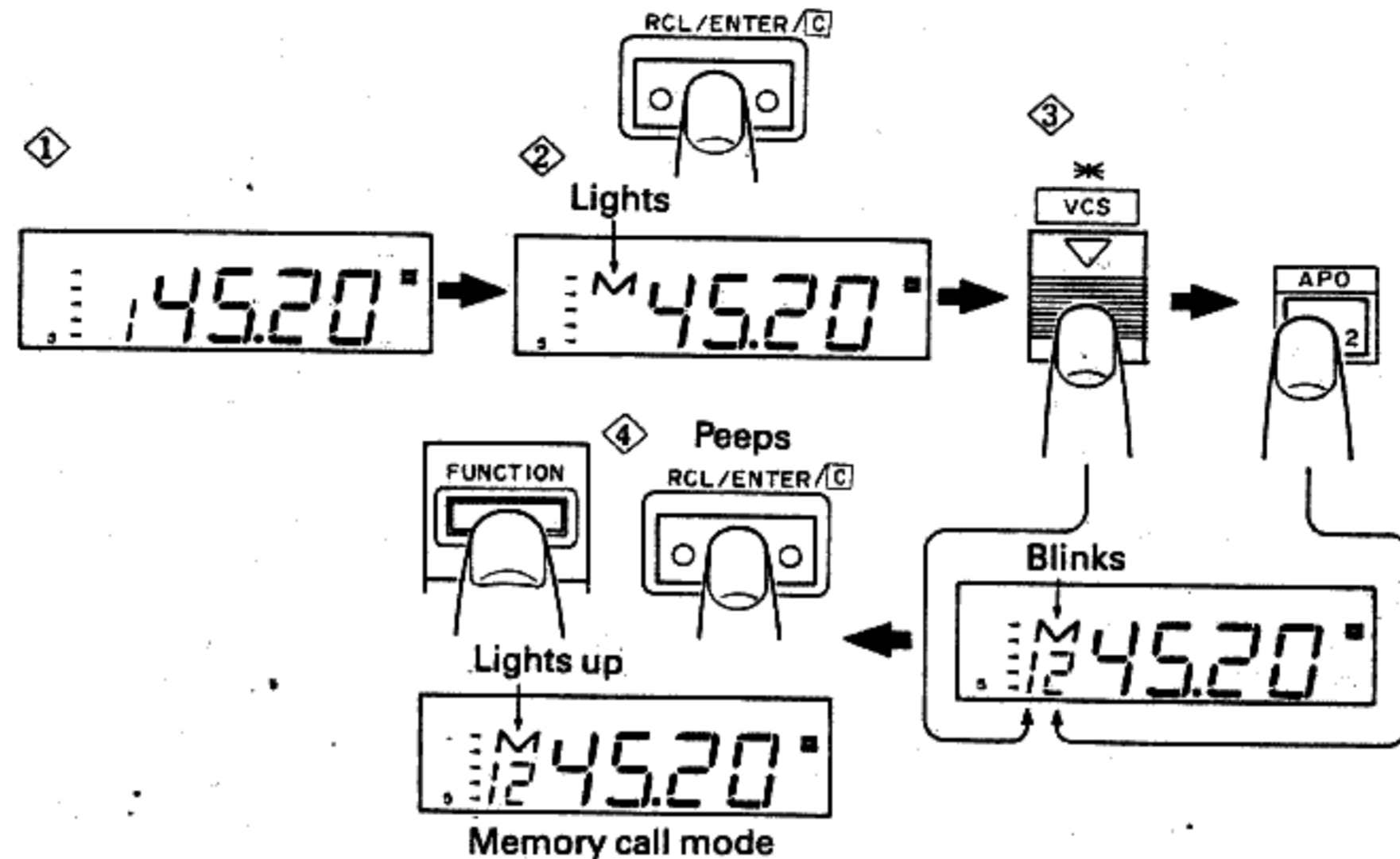
① Display the memory to be stored, 145.20, in the display section.

② Press the RCL/ENTER/[C] button. "M" lights in the display section.

At this time, even if you turn the rotary channel selector knob, the frequency does not change.

Press the *▽ button. 1 is displayed as the tens position of the memory address number. Next press the 2 button. The M blinks.

④ While pressing the FUNCTION button, press the RCL/ENTER/[C] button. The transceiver peeps to let you know that the frequency has been stored into memory and the "M" lights.



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5 CALLING A FREQUENCY IN MEMORY WITH THE [RCL/ENTER/[C]] BUTTON

The method for calling frequencies from memory is the same as the method for storing them into memory.

Procedure

① Press the RCL/ENTER/[C] button and "M" lights up in the display section.

② Press the number button "5" to call the frequency stored in memory address "M5". The called memory address "M5" is displayed in the display section along with the frequency 145.14 MHz.

To call another address from memory, press the RCL/ENTER/[C] button again and enter the desired memory address with the appropriate number button.

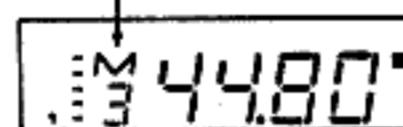
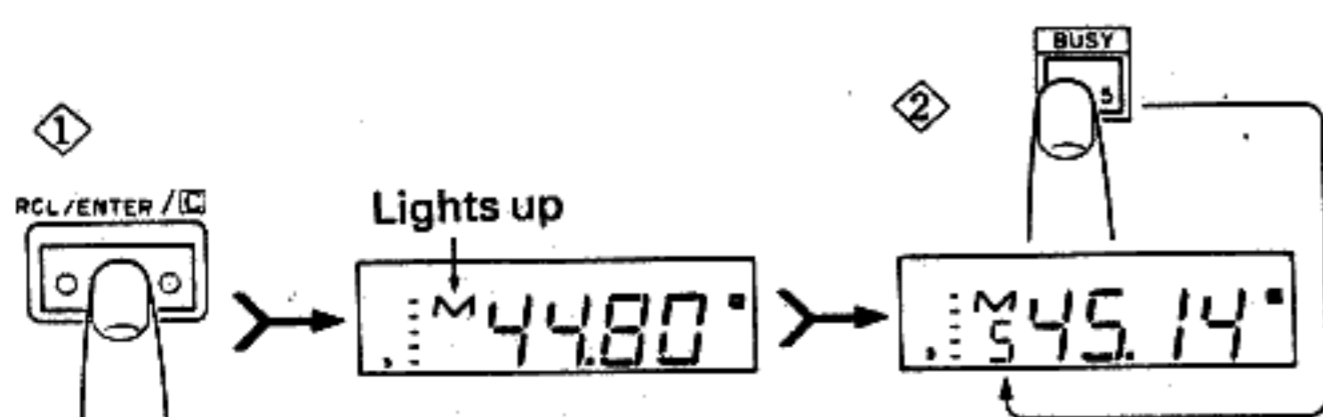
Precaution

To specify a memory address from M10 to M19, press the *▽ button, then press the number button.

Advice

1. When there is no frequency stored for the specified memory address, the "M" in the display section blinks to show that there is no frequency stored in that memory address.

Blinks when there is no frequency stored in the memory address.



6

CHANGING THE STORED FREQUENCY

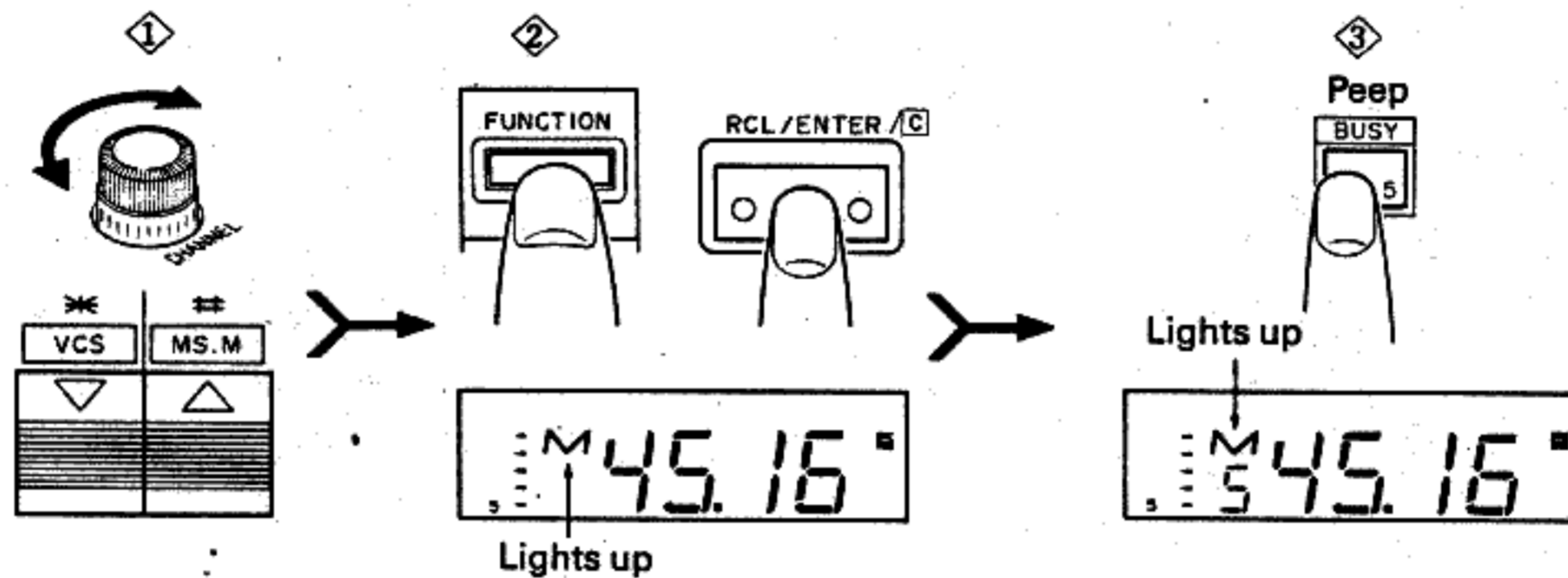
There are two methods for changing the frequency stored for a memory address.

METHOD 1

Procedure

Example: Changing the frequency stored in memory address "M5" from 145.14 MHz to 145.16 MHz without calling the old frequency (with the transceiver in the dial frequency mode)

- Use the Δ button, the ∇ button, the rotary channel selector knob, or the number buttons to set the new frequency of 145.16 MHz.



- While pressing the FUNCTION button, press the RCL/ENTER/C button. The display changes to M45.16 (lights up).
- Press the "5" button to specify memory address "M5". The transceiver makes a long peep, the memory frequency has been changed, and the transceiver is in memory call mode.

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METHOD 2

Procedure

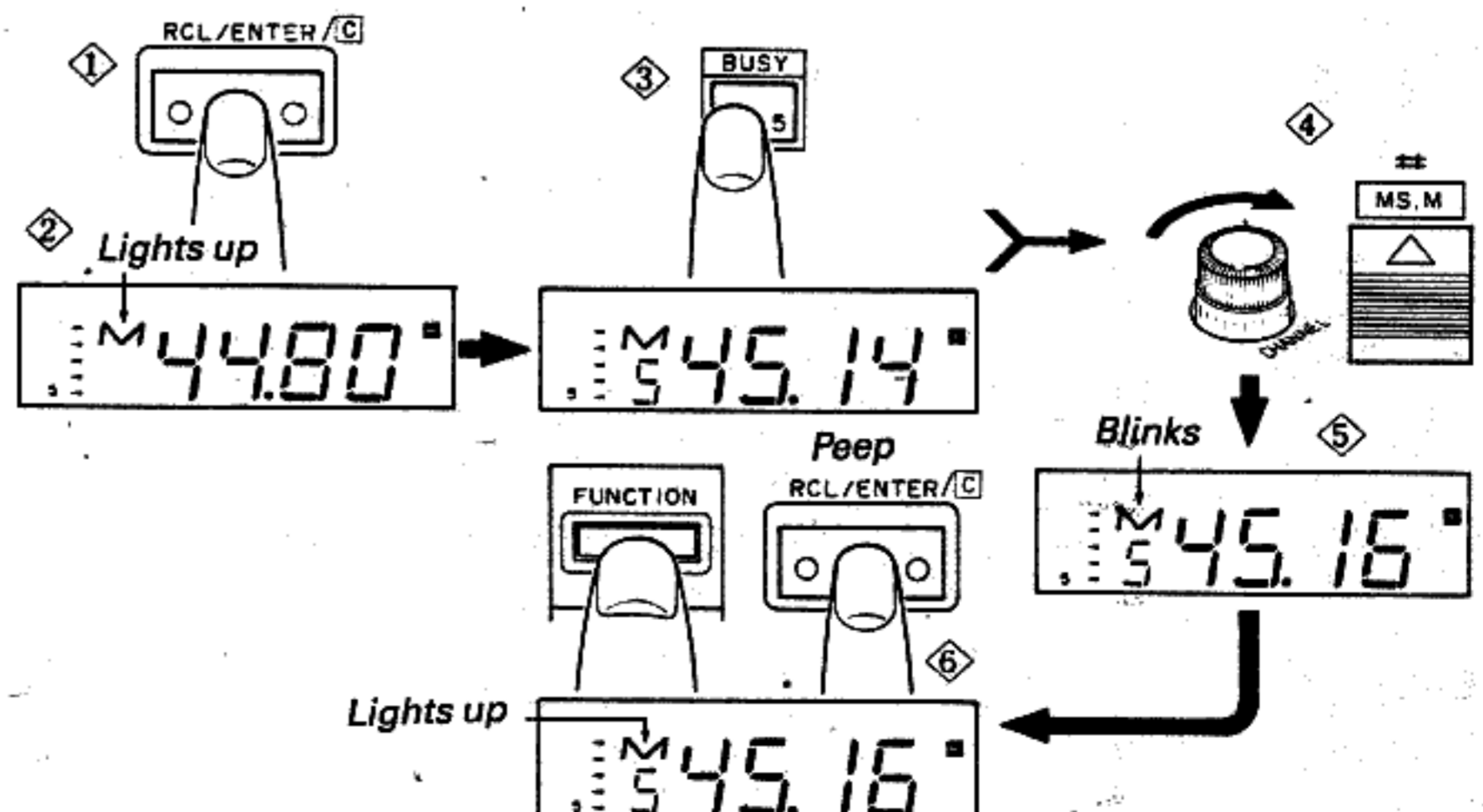
Example: To change the frequency stored in memory address "M5"

- Press the RCL/ENTER/C button.
- M lights up in the display section. At this time, even if you turn the rotary channel selector, the frequency does not change.
- Press the "5" button. The memory address number "M5" and its frequency 145.14 are displayed.
- Use the Δ button, the ∇ button, the rotary channel selector knob, or the number buttons to set the new frequency of 145.16 MHz.

- The "M" in the display starts blinking to show that the frequency can be changed.
- While pressing the FUNCTION button, press the RCL/ENTER/C button. The transceiver makes a long peep to show that the memory frequency has been changed, and the transceiver is in memory call.

Advice

Pressing the S/C/BUZZ/D at any point during this procedure returns the transceiver to the dial frequency mode, leaving the memory frequency unchanged.



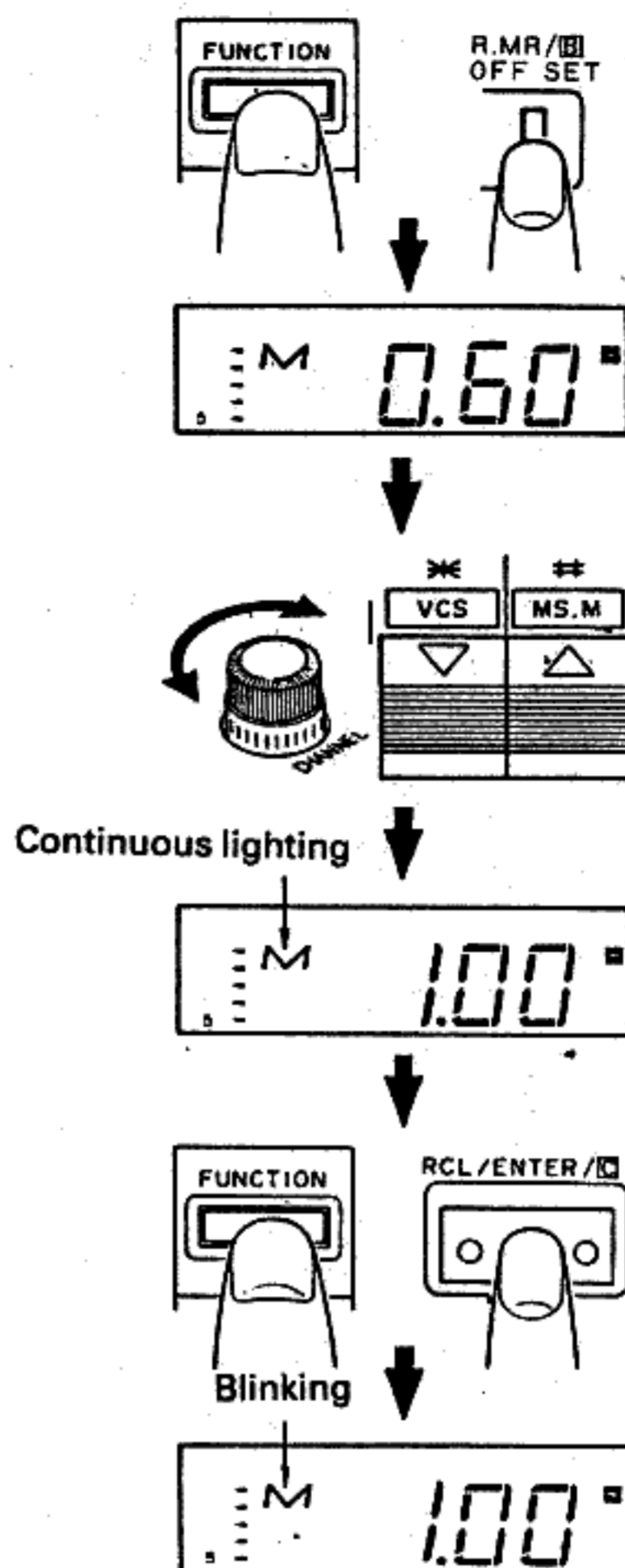
17

7 SETTING AN OFFSET FREQUENCY

With the C120 transceiver, the offset frequency can be freely varied for repeater operations. However, one offset frequency is applied commonly to all repeater modes.

Procedure

- ① Press the R.MR/OFF SET button while pressing the FUNCTION button. The offset frequency has been factory preset to 600 kHz.
- ② When the new offset frequency is input using the Δ and ∇ buttons, rotary channel selector or digit keys, "M" blinks on the display.
- ③ Press the RCL/ENTER/[C] button while holding down the FUNCTION button. The blinking of "M" changes to continuous display and a beep buzzer sound is heard, indicating that the new offset frequency has been set.



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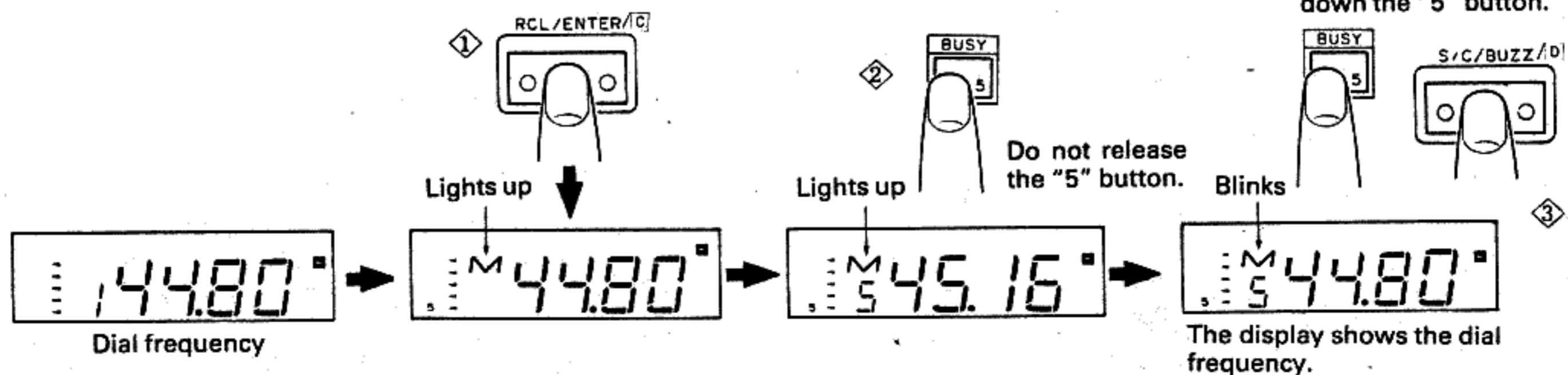
8 ERASING A FREQUENCY FROM MEMORY

It is possible to erase a frequency from memory.

Procedure

Example: Erasing the frequency stored in memory address "M5"

- ① Press the RCL/ENTER/[C] button. "M" lights up in the display section.
- ② While pressing the "5" button, press the S/C/BUZZ/[D] button. This erases the frequency stored in "M5" and starts the "M" blinking.
- ③ The frequency shown in the display at this point is the dial frequency that was being displayed before the RCL/ENTER/[C] button was pressed.



19



MULTI-FUNCTION SCAN OPERATIONS [S/C/BUZZ/D] BUTTON

Pressing the S/C/BUZZ/D button with the transceiver in the dial frequency mode starts scanning operations.

This transceiver has two types of scanning: busy scanning in which the transceiver scans until it receives a signal, then starts scanning again after the signal disappears; and pause scanning in which even when the transceiver receives a signal, it only stops scanning for about 5 seconds before resuming scanning. This transceiver scans continuously from the frequency stored in memory address "M18" to the frequency stored in memory address "M19", returning to the "M18" frequency whenever it reaches the "M19" frequency.

This transceiver has the following scan operations:

1. All scanning of 4 MHz band
2. Program scanning within a specified frequency range or outside of a specified frequency range
3. 1 MHz scanning of any specific 1 MHz range
4. Memory scanning of the frequencies stored in memory
5. MS.M scanning of the MS.M in the frequencies stored in memory

Busy scan operations

Scanning stops when a signal is found and resumes 1.5 seconds after that signal disappears.

Pause scanning

Scanning stops when a signal is found and resumes 5 seconds later, even if the transceiver is still receiving the signal. If the signal disappears, the scanning resumes at any time.

Advice

- ❖ During scanning or while the scanning is stopped, pressing the Δ or ∇ button moves the frequency up or down, respectively, one step.
- ❖ Pressing the ∇ button during scanning makes the transceiver scan down to the lower frequencies in a continuous operation; pressing Δ the button during scanning makes the transceiver scan up to the higher frequencies. (Press the Δ or ∇ button again if the scanning has stopped.)
- ❖ Pressing the Δ or ∇ button and holding it for more than 0.5 seconds makes the scanning move at a very high speed.

20

❖ Pressing the S/C/BUZZ/D button during scanning operations releases the scanning and stops the transceiver to the frequency it was on or the S/C/BUZZ/D button was pressed to start the scanning.

❖ If you have just stored a frequency into memory or erased one from memory, put the transceiver into dial frequency mode before starting scanning.

❖ Pressing the Δ button during memory scanning moves the frequency up one step, but pressing the ∇ button does not move it down.

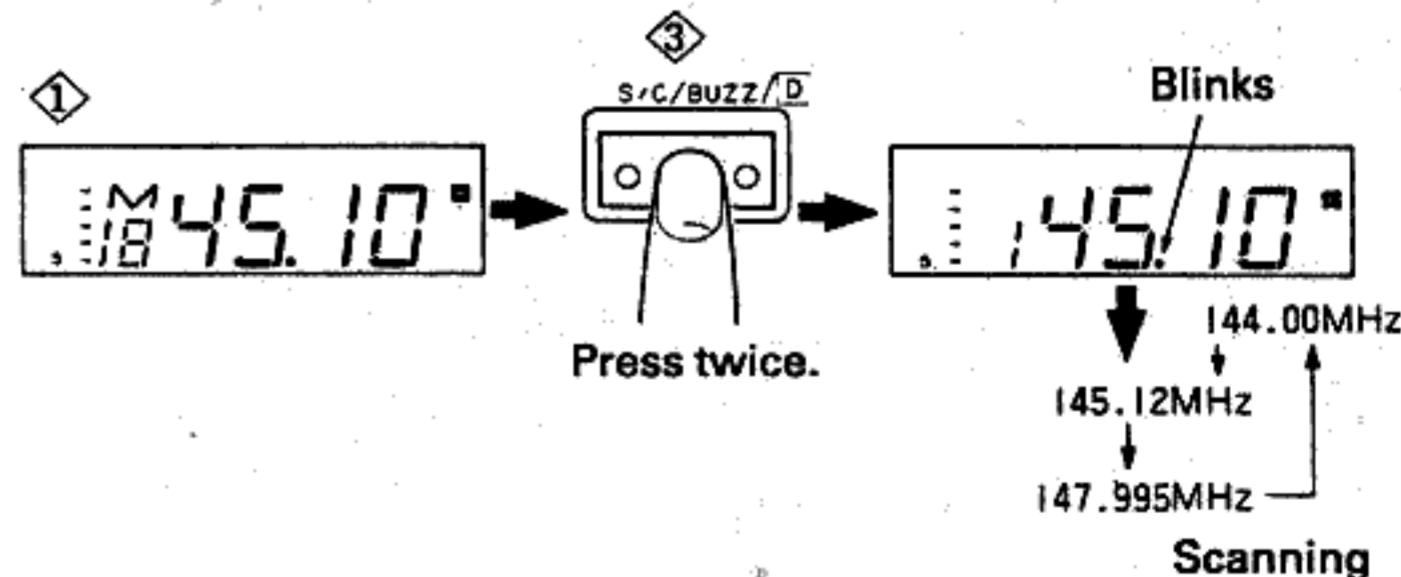
① NORMAL SCANNING OPERATIONS

How to scan all the frequencies in 4 MHz band

This function is for scanning the entire amateur band. This type of scanning requires that a frequency be stored in "M18" but that "M19" be empty. When there is a frequency stored in "M18" but "M19" is empty, the entire amateur band is scanned.

Procedure

- ① Store a frequency into memory address "M18".
- ② Do not store any frequency into memory address "M19". If one is already stored into "M19", erase it.
- ③ Pressing the S/C/BUZZ/D button starts the transceiver scanning the entire 4 MHz band. During scanning the decimal point for the MHz-order frequency display blinks.



② Programmed scanning inside or outside of a specified frequency range

Programmed scanning begins from the first frequency after the frequency stored in memory address "M18", scans until the frequency stored in memory address "M19", then returns to the frequency in memory address "M18".

21

★ SCANNING WITHIN THE SPECIFIED FREQUENCY RANGE

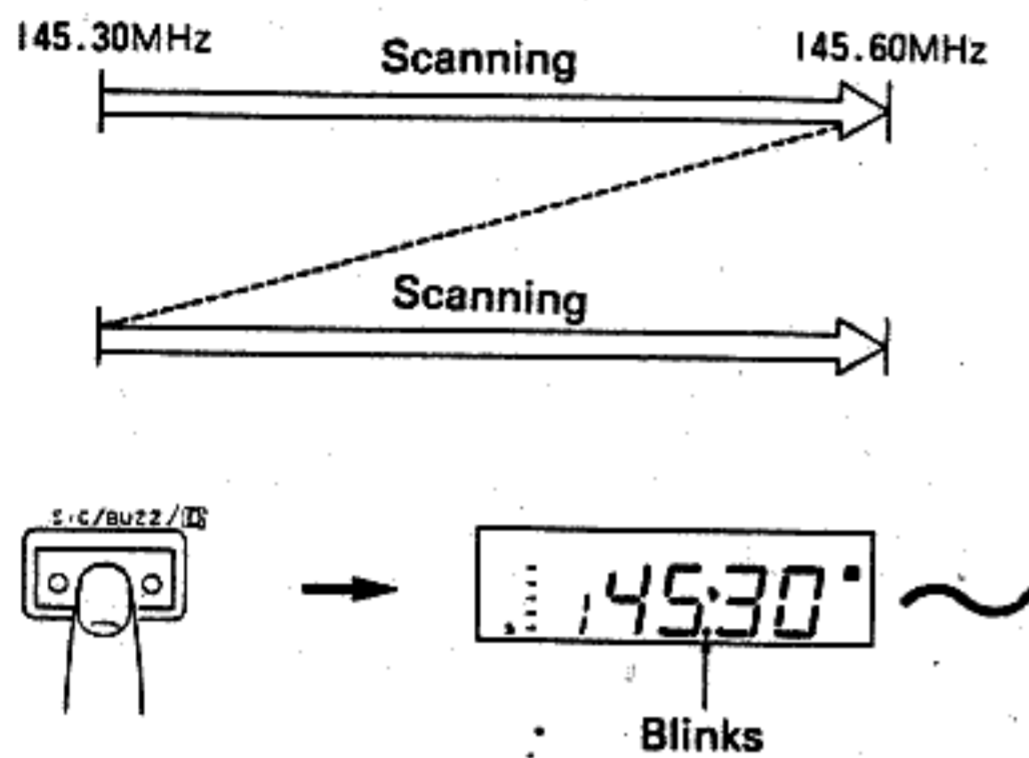
Procedure

Store the start frequency (the lower frequency) in memory address "M18" and the end frequency (the higher frequency) in memory address "M19".

Here is an example in which 145.30 MHz is stored in memory address M18 and 145.60 MHz is stored in memory address M19.

- ① Store 145.30 MHz in "M18".
- ② Store 145.60 MHz in "M19".

With the transceiver in the dial frequency mode, press the S/C/BUZZ/[D] button. The transceiver scans repeatedly between 145.30 MHz and 145.60 MHz.



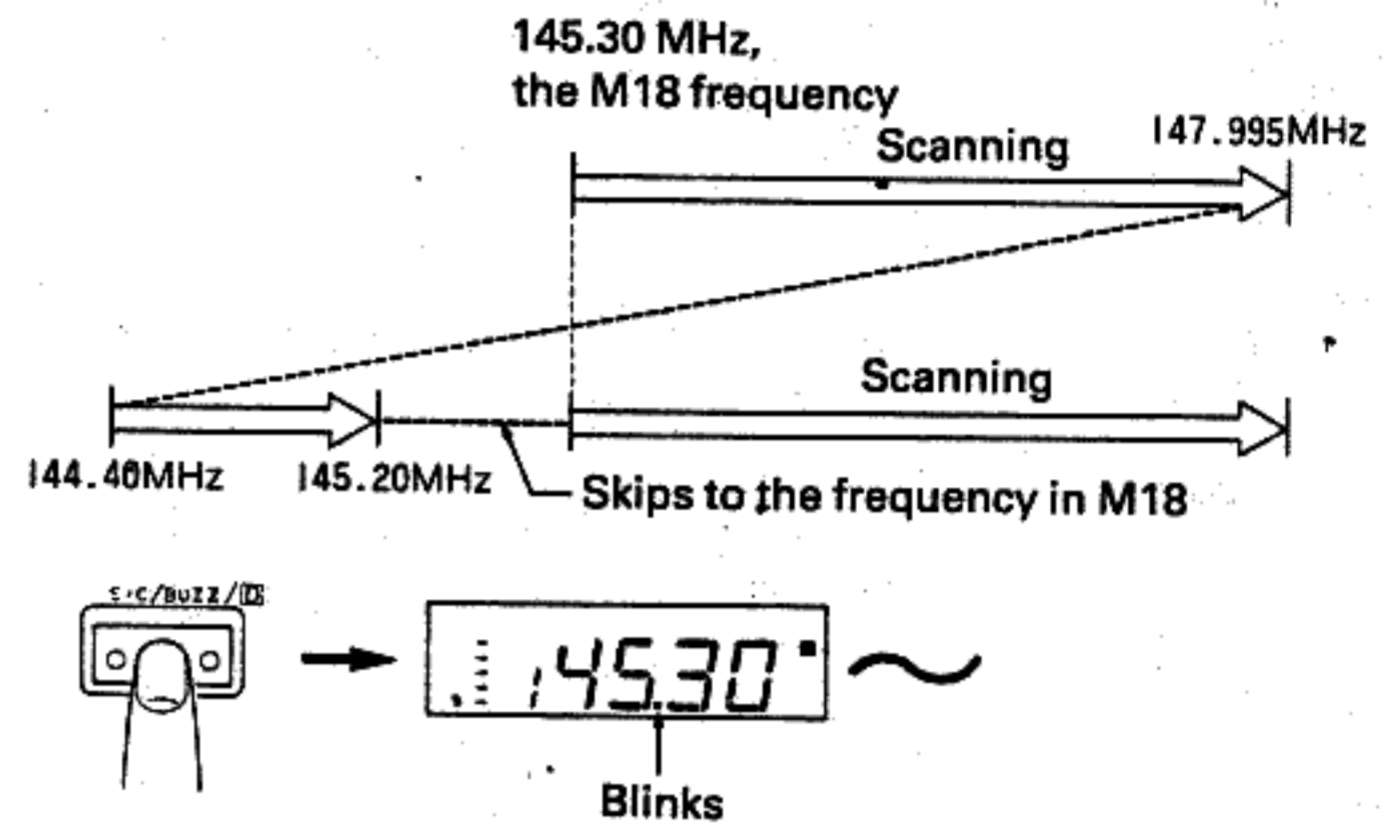
★ SCANNING OUTSIDE THE SPECIFIED FREQUENCY RANGE

Store the start frequency (the higher frequency) in memory address "M18" and the end frequency (the lower frequency) in memory address "M19".

Procedure

Here is an example in which 145.30 MHz is stored in memory address "M18" and 145.20 MHz is stored in memory address "M19".

- ① Store 145.30 MHz in "M18".
- ② Store 145.20 MHz in "M19".
- ③ With the transceiver in the dial frequency mode, press the S/C/BUZZ/[D] button. The transceiver scans frequencies except for the band from 145.20 MHz to 145.30 MHz.



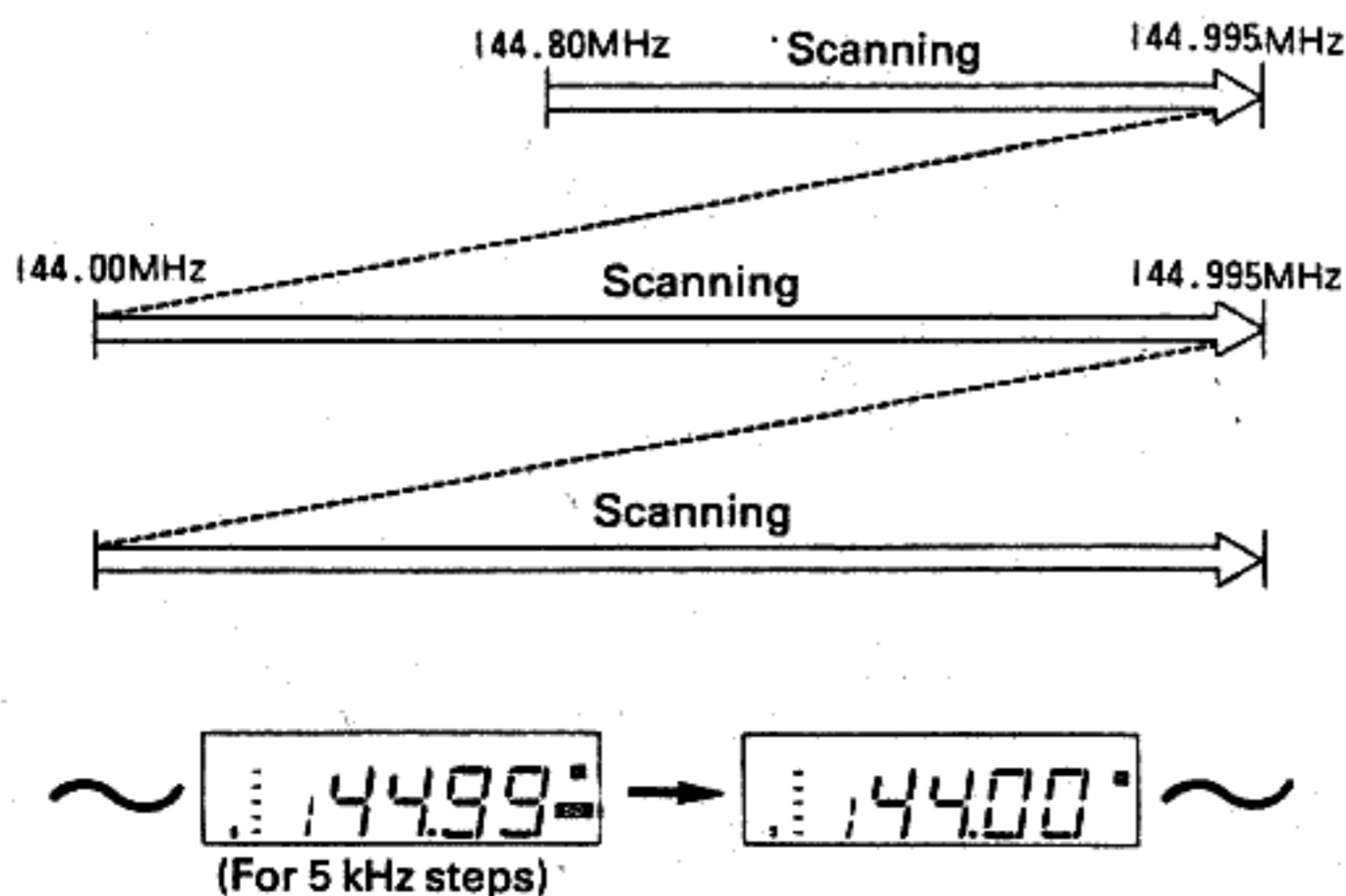
22

③ SCANNING ANY 1 MHz RANGE

Erase the frequencies stored in memory addresses "M18" and "M19" and the transceiver scans a 1 MHz range.

Procedure

- ① Erase the frequency stored in memory address "M18".
- ② Press the S/C/BUZZ/[D] button to start the scanning from the frequency being displayed. The transceiver repeatedly scans the MHz range, within which the scanning started.



④ SCANNING THE FREQUENCIES STORED INTO MEMORY

Memory scan in which the transceiver can scan all the frequencies stored into memory, and MS.M scan in which the transceiver can scan priority frequencies stored into memory.

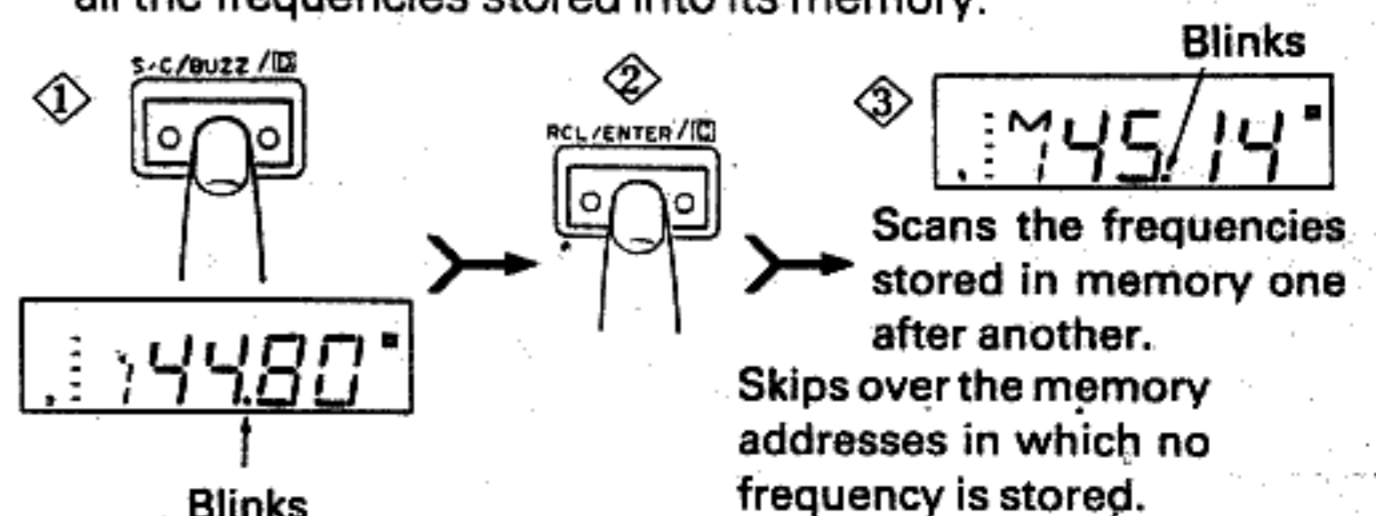
★ MEMORY SCAN; SCANNING ALL THE FREQUENCIES IN THE MEMORY

Pressing the RCL/ENTER/[C] button during regular scanning operations starts memory scanning.

- The transceiver scans only those memory addresses in which a frequency is stored and skips any memory addresses that are empty.

Procedure

- ① Press the S/C/BUZZ/[D] button to start regular scanning. During scanning operations, the decimal point for the MHz order frequency display blinks.
- ② During these regular scanning operations, press the RCL/ENTER/[C] button.
- ③ The transceiver begins memory scanning, in which it scans all the frequencies stored into its memory.

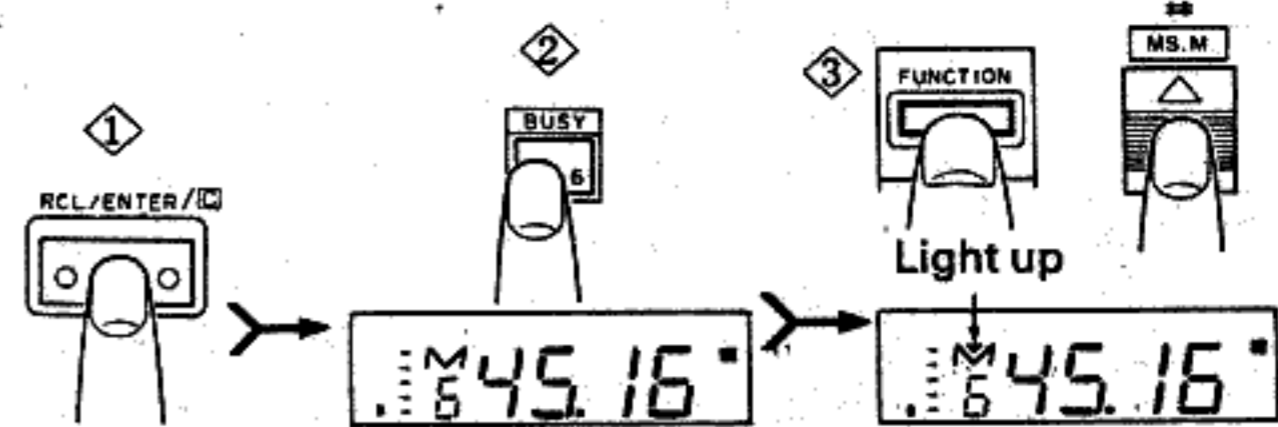


23

⑤ MS.M (MEMORY SCAN MEMORY) SCANNING: SCANNING ONLY PRIORITY FREQUENCIES

Any of the frequencies stored in memory can be designated as priority frequencies. MS.M scanning scans just these frequencies.

- When the memory is called, ▼ is displayed over the M to indicate priority frequencies.
- When the memory is not called, just the ▼ is displayed to indicate MS.M scanning operations memory ahead of time. The address No. subject to the MS.M scanning should be stored in memory before this operation.



ERASING

Call the MS.M frequency to be erased. While pressing the FUNCTION button, press the #MS.M button. The ▼ over the M disappears.

STORING PRIORITY FREQUENCIES INTO MEMORY

Procedure

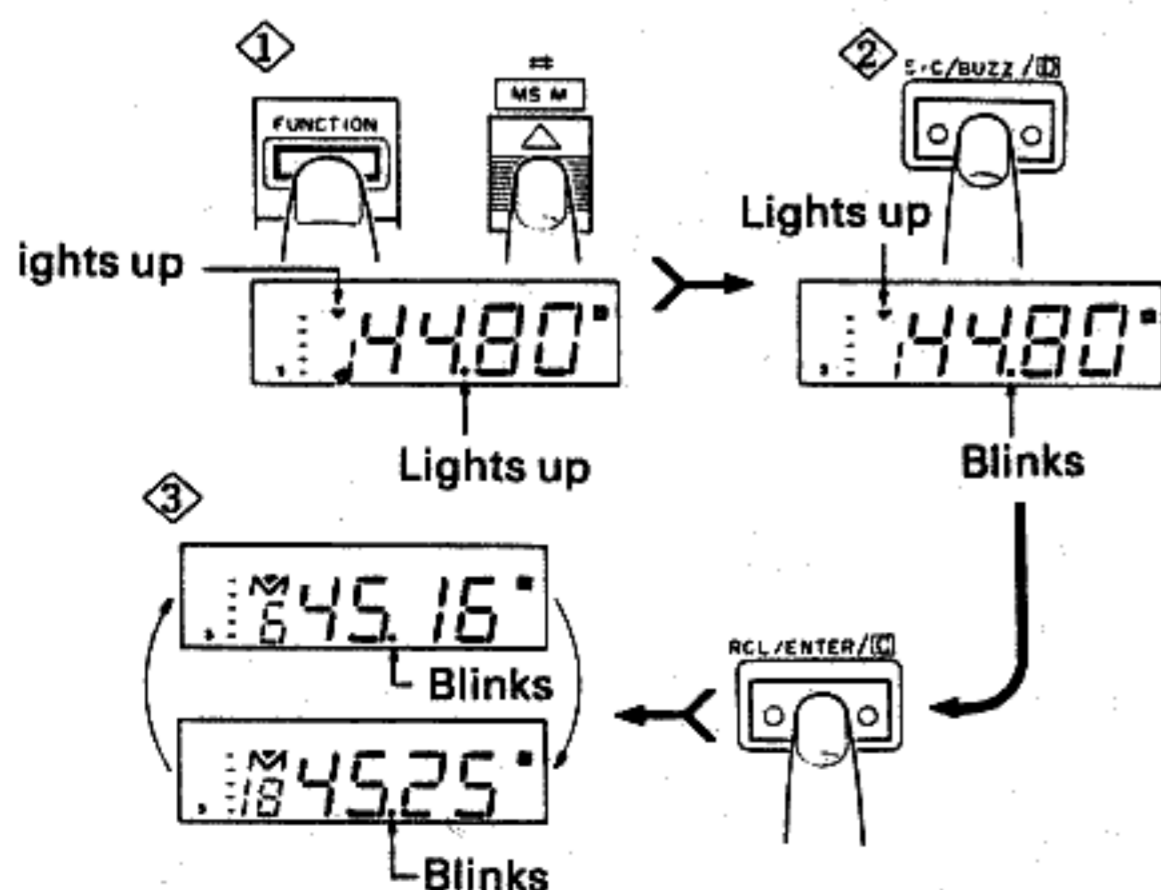
- ① Press the RCL/ENTER/C button.
- ② Press the appropriate number button to call the desired memory frequency.
- ③ While pressing the FUNCTION button, press the #MS.M button.
- ④ ▼ is displayed over the M to show that an MS.M frequency has been stored.
- ⑤ Call the next frequency and store it with the same method.

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MS.M SCANNING METHOD I

Procedure

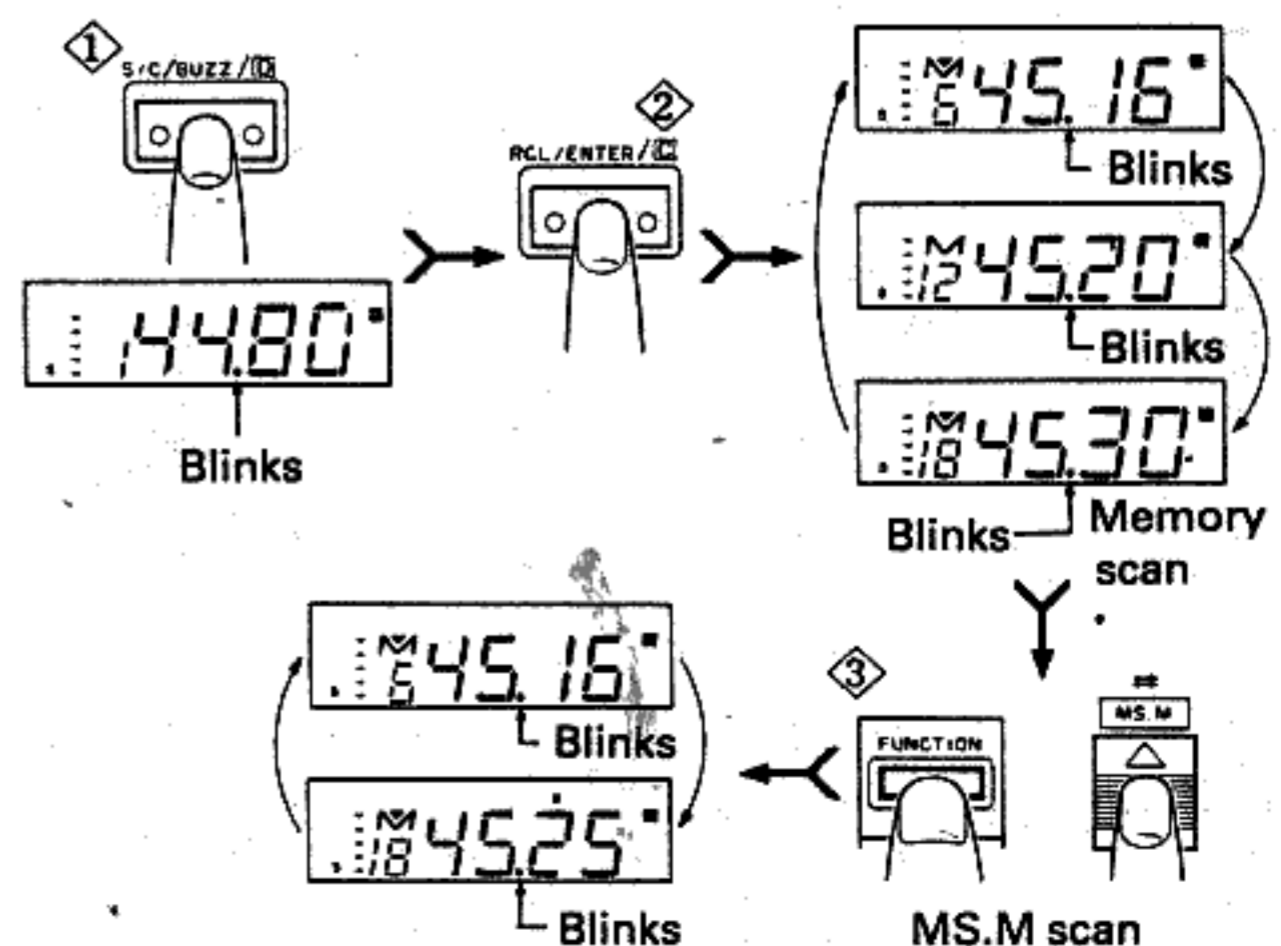
- ① While pressing the FUNCTION button, press the #MS.M button. This puts the transceiver into the MS.M scanning reservation mode and the ▼ lights up.
- ② Press the S/C/BUZZ/D button. Pressing the RCL/ENTER/C button with the transceiver in MS.M scanning reservation mode starts memory scanning, resulting MS.M scanning.
- ③ Pressing the #MS.M button again while holding the FUNCTION button ends the MS.M scanning reservation.



MS.M SCANNING METHOD II

Procedure

- ① With the transceiver in dial frequency mode, press the S/C/BUZZ/D button to start regular scanning.
- ② Press the RCL/ENTER/C button to make the regular scanning a memory scan.
- ③ While pressing the FUNCTION button, press the #MS.M button to make the memory scan an MS.M scan.



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10 DUAL-WATCH FUNCTION [1/DUAL] BUTTON

This transceiver has a dual-watch function:

1. For the frequency stored in "M1" and the dial frequency
2. For any one of the frequencies stored in memory from memory address "M0" to "M19" and the dial frequency
3. For the repeater (priority) memory frequency (R.MR) and the dial frequency

Advice

- ❖ During dual-watch operations, "DUAL" is shown in the display section.
- ❖ During dual-watch operations, only the dial frequency can be changed.
- ❖ During a dual-watch, the transceiver receives and displays (momentarily) the memory frequency about once every 3 seconds.
- ❖ When there is a call on the memory frequency, end the dual-watch operations and call the frequency up from memory in order to communicate.
- ❖ When a signal is received on the memory frequency, the dual-watch operations stop temporarily only while receiving it.

- ❖ An "F.LOCK" operation during a dual-watch ends the dual-watch.
- ❖ If a signal is received during dual-watch operations, the reception signal can be heard only intermittently. This is normal.
- ❖ Fully turning the SQL knob counter-clockwise during dual-watch operations stops the dual-watch operation for the memory frequency.

Precaution

If you transmit during dual-watch operations, you transmit at the dial frequency. Pressing the PTT button when receiving on the memory frequency switches the transceiver to the dial frequency. When you release the PTT button, the transceiver returns to the dual-watch.

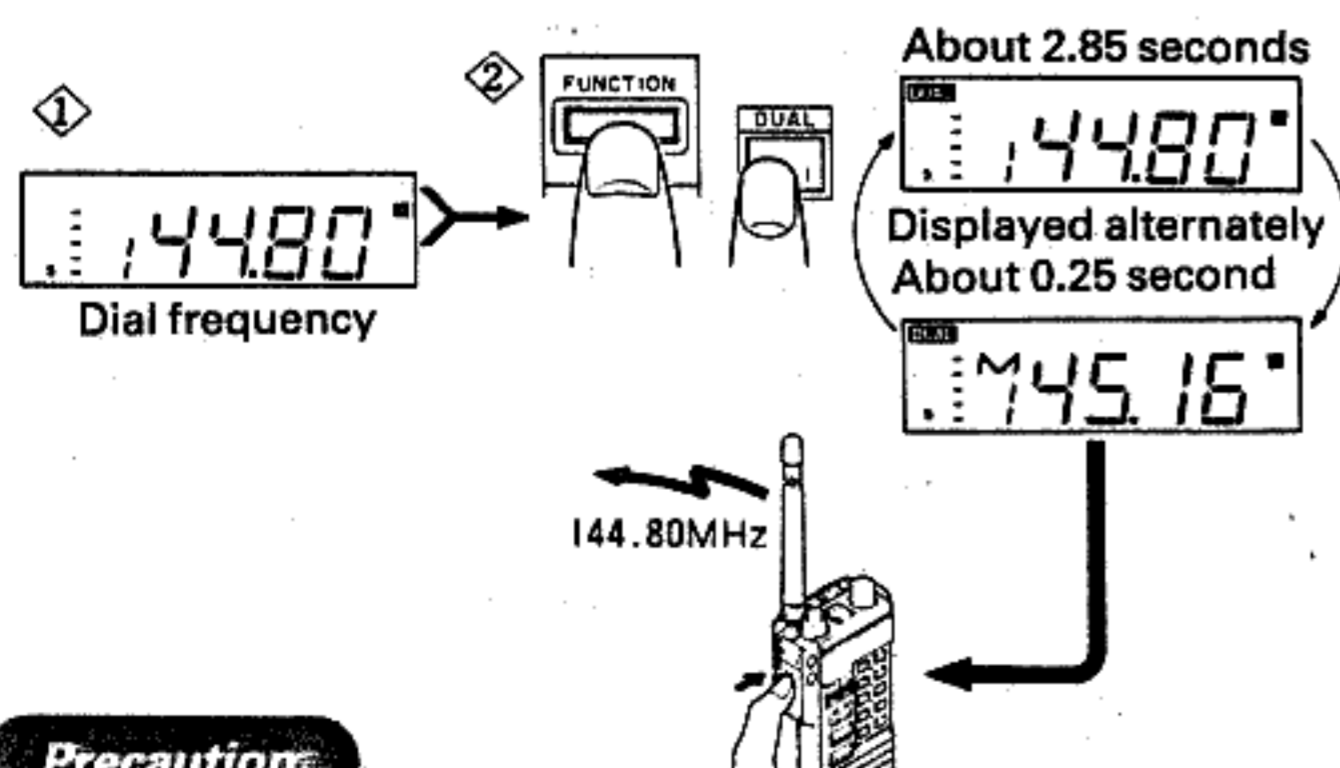
26

① DUAL-WATCH OPERATIONS WITH THE FREQUENCY STORED IN MEMORY ADDRESS "M1"

This procedure watches the dial frequency and the frequency stored in memory address "M1"

Procedure

- ① Put the transceiver into the dial frequency state.
- ② While pressing the FUNCTION button, press the 1/DUAL button. "DUAL" is displayed (lit) on the display section and the transceiver begins the dual-watch.



Precaution

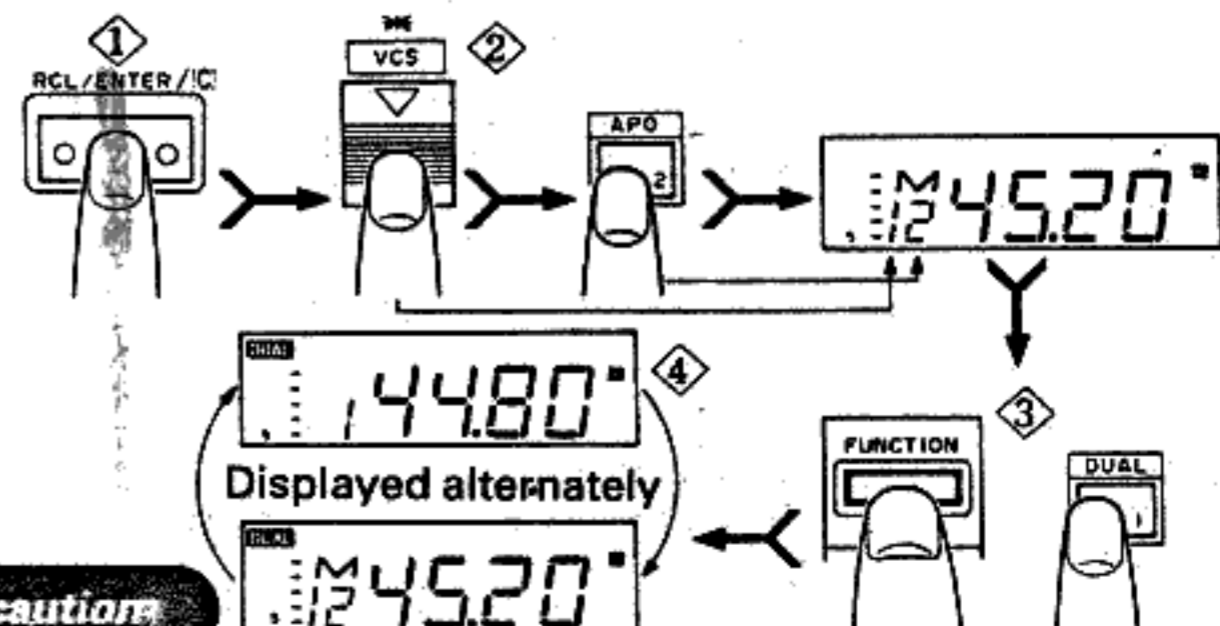
If there is no frequency stored in memory address "M1", then the error buzz sounds and the transceiver does not start dual-watch operations.

② DUAL-WATCH OPERATIONS WITH A FREQUENCY STORED IN ONE OF THE MEMORY ADDRESSES FROM M0 TO M19

This operation watches the dial frequency and the frequency stored in one of the memory addresses from M0 to M19.

Procedure

- ① Press the RCL/ENTER/[C] button.
- ② Press the appropriate number button to call the memory address in which the frequency to be watched is stored. (For details on how to call a memory address, see Page 15.)
- ③ While pressing the FUNCTION button, press the 1/DUAL button. "DUAL" is displayed (lit) on the display section to show that the transceiver is watching two frequencies.
- ④ You can doublecheck that the transceiver is actually carrying out the dual-watch operation by verifying that the display section shows the two frequencies alternately, the dial frequency or the memory frequency.



Precaution

If there is no frequency stored in memory address, then the error buzz sounds and the transceiver does not start dual-watch operations.

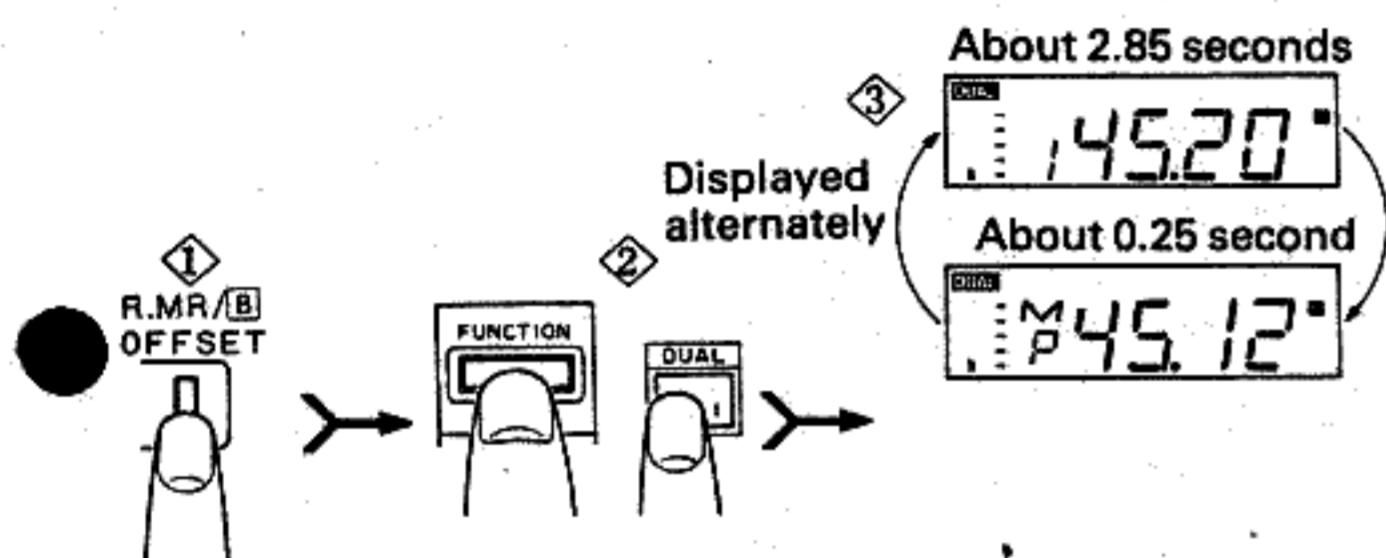
27

③ DUAL-WATCH OPERATIONS WITH A REPEATER (PRIORITY) MEMORY FREQUENCY (R.MR FREQUENCY)

This operation watches the dial frequency and a repeater (priority) memory frequency.

Procedure

- ① Press the R.MR button. The repeater memory frequency respectively, is displayed.
- ② While pressing the FUNCTION button, press the 1/DUAL button. "DUAL" is displayed (lit) on the display section to show that the transceiver is watching two frequencies.
- ③ You can doublecheck that the transceiver is actually carrying out the dual-watch operation by verifying that the display section shows the two frequencies alternately, the repeater memory frequency.



11 AUTOMATIC POWER OFF FUNCTION WITH THE [2/APO] BUTTON

The automatic power off function avoids having the batteries drained if you forget to switch off the power. The automatic power off function issues a series of warning pips if the squelch is left unopened for 30 minutes after keyboard button operation, either of PTT button or squelch ON-OFF button operations, or after the squelch has been turned on. If the transceiver is not operated for a minute after the warning pips are issued, the transceiver automatically puts itself in a state that is almost the same as if the power were switched off. In this state, only 3 mA of current flows. This battery-saving state is called sleep stand-by state.

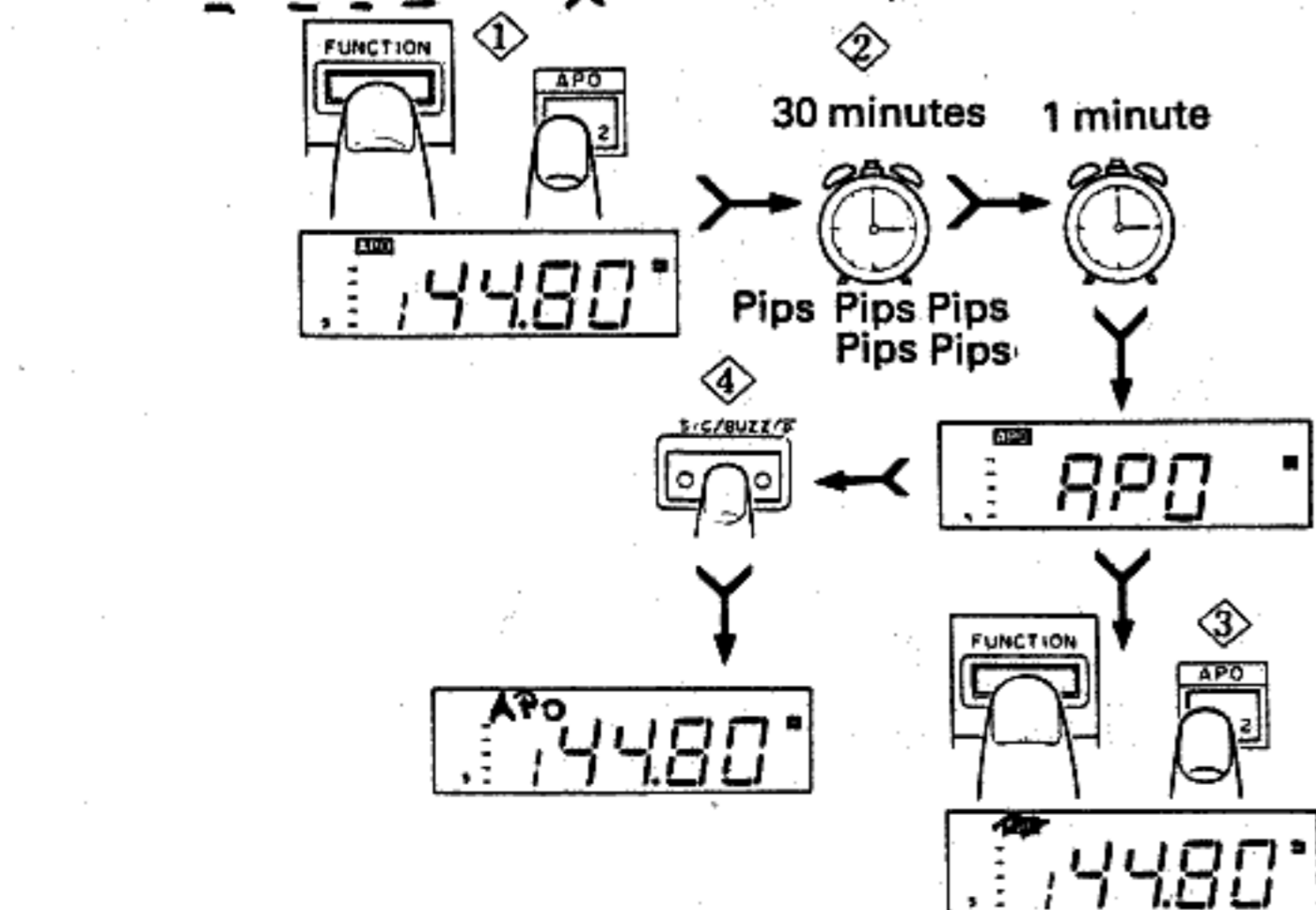
When the transceiver enters this state, the frequency display disappears and "APO" is displayed in its place.

Procedure

- ❖ Since the transmit and receive circuits do not operate while "APO" is displayed in the frequency display position, the transceiver can neither transmit nor receive.
- ❖ The automatic power off function can reduce battery consumption to a minimum, but please switch the power off with the power switch as soon as you are done.

Procedure

- ① While pressing the FUNCTION button, press the 2/APO button. The display section displays "APO" to show that the automatic power off function is working.
- ② After 30 minutes, the transceiver pips over and over again and after another minute, "APO" is displayed instead of the frequency.
- ③ While pressing the FUNCTION button, press the 2/APO button. This releases the transceiver from the sleep stand-by state. (However, the automatic power off function continues operating.)
- ④ Pressing the S/C/BUZZ/□ button while "APO" is displayed instead of the frequency releases the transceiver from sleep stand-by and ends the automatic power off function.



12 BATTERY SAVE FUNCTION WITH THE [3/SAVE] BUTTON

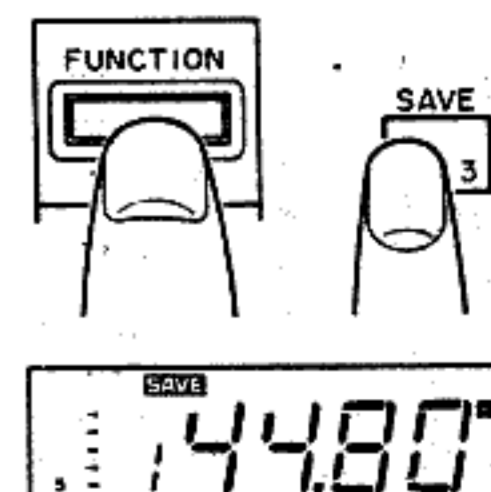
This function stops the reception for 1-second intervals while the transceiver is stand-by. This reduces the battery consumption to 1/4 of what it normally is.

Precaution

- ① While pressing the FUNCTION button, press the 3/SAVE button. SAVE is displayed and the transceiver starts battery save operations.
- ② Pressing the 3/SAVE button again while pressing the FUNCTION button ends the battery save operations.

Procedure

When a signal is received, the battery save function does not operate until 5 seconds pass after the signal disappears. The battery save function does not operate during dual-watch operations either.

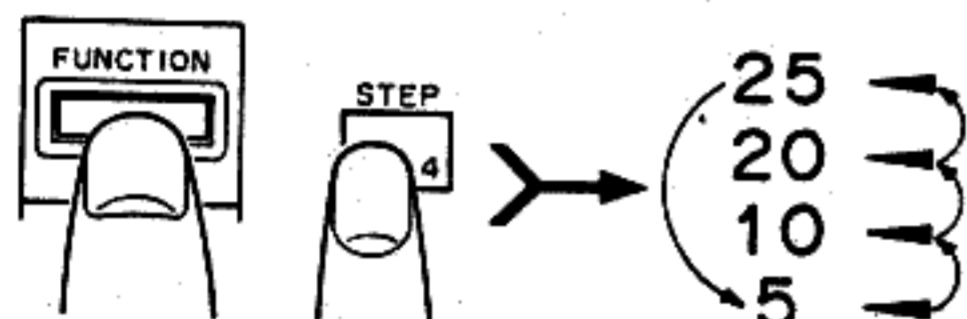


13 CHANNEL STEP SWITCH FUNCTIONS WITH THE [4/STEP] BUTTON

This function can switch the channel step to one of 4 settings: 5 kHz, 10 kHz, 20 kHz, or 25 kHz. Select the channel step most appropriate to the way you will be using the transceiver.

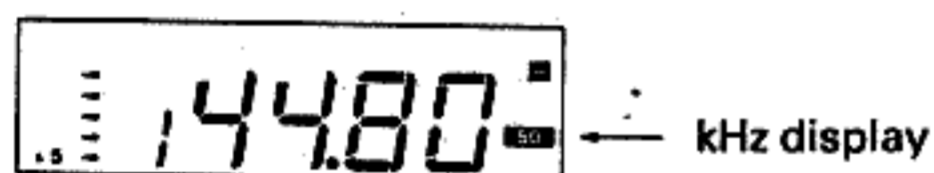
Procedure

- Every time the 4/STEP button is pressed while the FUNCTION button is being pressed, the channel step changes to the next setting: 5 kHz, 10 kHz, 20 kHz, or 25 kHz.



Advice

When the channel step is 5 kHz or 25 kHz, the 100 kHz and 10 kHz figures are shown in the frequency display, but the kHz figure is shown to the right of the frequency display.



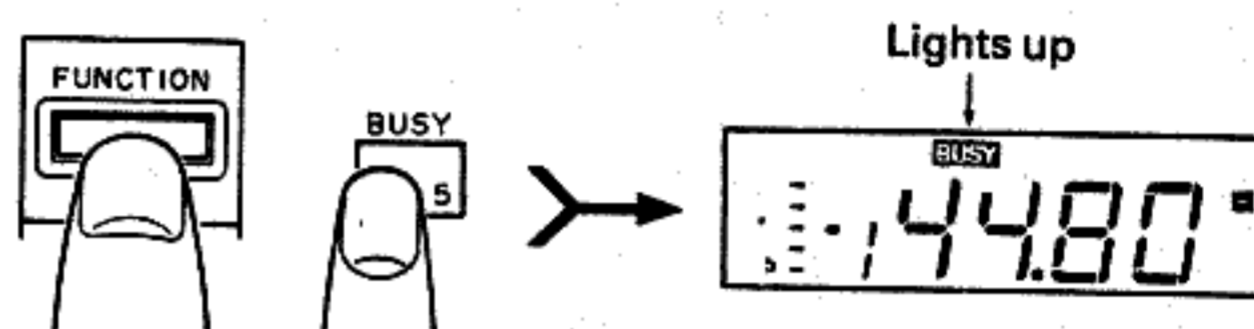
30

14 PAUSE SCAN/BUSY SCAN SWITCHING WITH THE [5/BUSY] BUTTON

This function switches the transceiver's scanning functions between pause scanning and busy scanning. The initial state (the one the transceiver is shipped with and the one set whenever the C120's reset button is pressed) is pause scanning.

Procedure

- While pressing the FUNCTION button, press the 5/BUSY button. BUSY is displayed on the display section and the scanning operations switch to busy scanning.
- Pressing the 5/BUSY button again while holding the FUNCTION button returns the transceiver to pause scanning.

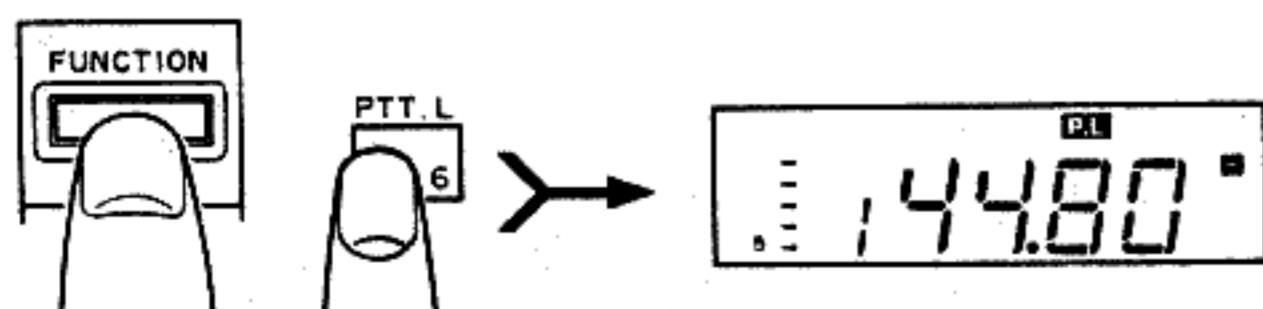


15 MAKING THE PTT BUTTON NONEFFECTIVE WITH THE [6/PTT.L] BUTTON

This function makes the PTT button operation noneffective: Pressing PTT button does not cause the transceiver into transmit mode.

Procedure

- While pressing the FUNCTION button, press the 6/PTT.L button. "P.L" is displayed on the display section and the PTT button is noneffective. In this state, even if the PTT button is pressed, transmit mode is not available.
- Pressing the 6/PTT.L button again while holding the FUNCTION button release the PTT lock. The PTT lock is valid for all operations.



16 REPEATER FUNCTION WITH THE [7/RPT] BUTTON

This function switches between the repeater operation and normal operation modes.

Precaution

- Tune the C120 transceiver in the frequency of a repeater station.
- While pressing the FUNCTION button, press the 7/RPT button. A dot is displayed on the below right of the 10 MHz digit on the display section, indicating the repeater operation.

Procedure

The C120's transmission frequency becomes the frequency added or subtracted by the shift width with respect to the reception frequency. Should the transmission frequency exceeds the limit of the amateur band, "OFF" is displayed in the frequency display section. In this case, set the frequency again so as not to deviate from the amateur band.

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17 SWITCHING +/- SHIFT DIRECTION WITH THE [8/ +/-] BUTTON

In normal repeater operations, when the offset frequency is 600 kHz and tone frequency is 1,750 Hz, the transmission frequency is shifted by 600 kHz in the negative direction. However, it is also possible to shift the transmission frequency by 600 kHz in the positive direction. This function switches the \oplus and \ominus shift directions.

Procedure

While pressing the FUNCTION button, press the 8/ +/- button repeatedly. " \oplus " and " \ominus " alternates on the display section.

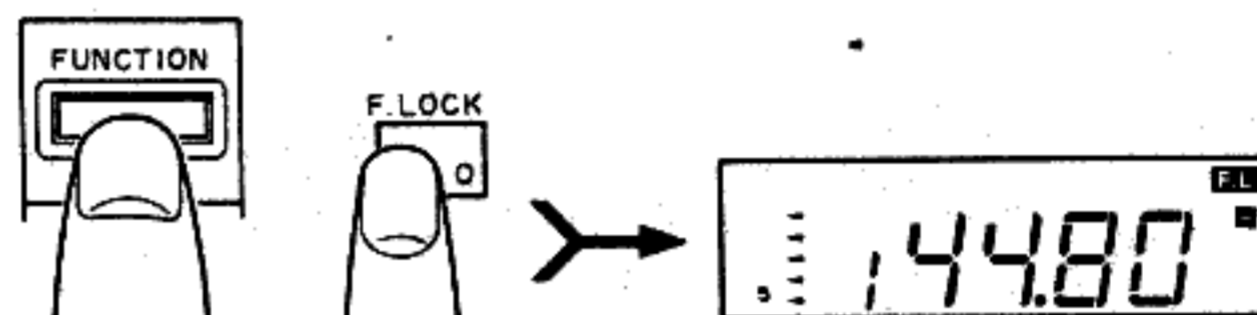
Normally set for the \ominus direction.

18 FREQUENCY LOCK FUNCTION WITH THE [O/F. LOCK] BUTTON

This function prevents the frequency from being changed by an operation mistake or by transceiver buttons being bumped against accidentally when the transceiver is being carried around. When the frequency is locked, the frequency does not change even if the Δ button, the ∇ button, or the rotary channel selector knob are used.

Procedure

- While pressing the FUNCTION button, press the O/F. LOCK button. F.L is displayed on the display section and the frequency is locked.
- Pressing the O/F. LOCK button again while holding the FUNCTION button unlocks the frequency.



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19 TURNING OFF THE BUZZER WITH THE [S/C/BUZZ/D] BUTTON

The transceiver has a set of sound for giving messages about operations:

- 1 pip Operations completed correctly
- Repeating pips Automatic power off alarm
- Buzz Incorrect operation
- Short Pip Each time one of the operation buttons pressed correctly

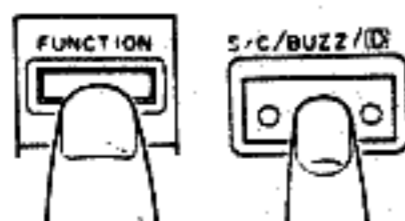
Procedure

- While pressing the FUNCTION button, press the S/C/BUZZ/D button. This turns off the buzzer. Pressing the S/C/BUZZ/D button again while holding the FUNCTION button turns the buzzer back on.

Precaution

- Nothing is displayed on the display section for either switching the buzzer on or switching it off. Check that the buzzer is in the state you want, on or off, by pressing operation keys and listening for whether or not the buzzer sounds.

- The repeating pips for the automatic power off (APO) alarm can not be cut off with this button.



20 VCS FUNCTION FOR AUTOMATICALLY FINDING AN VACANT CHANNEL WITH THE [*∇VCS] BUTTON

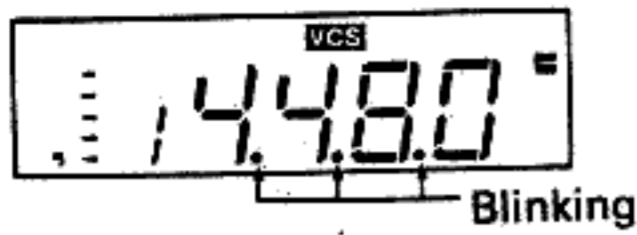
This is a new feature that makes it easy to find an vacant channel and to perform frequent QSY. When the transceiver is switched from dial frequency operation to VCS operations, it automatically searches for an unused frequency (i.e. an vacant channel) and when it finds one, it displays that frequency on the display section. It is also possible to use the frequency being displayed before the $\ast \nabla$ VCS button is pressed, or to use the frequency that is not being used. A frequency that is not being used by anyone is called an vacant channel later on.

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HERE IS WHAT THE DISPLAY DURING VCS OPERATION MEANS.

The "VCS" in the display section
 VCS: Blinking: operation possible on the new frequency
 Lit up: operation possible on the original frequency

THE DISPLAY SECTION DOTS



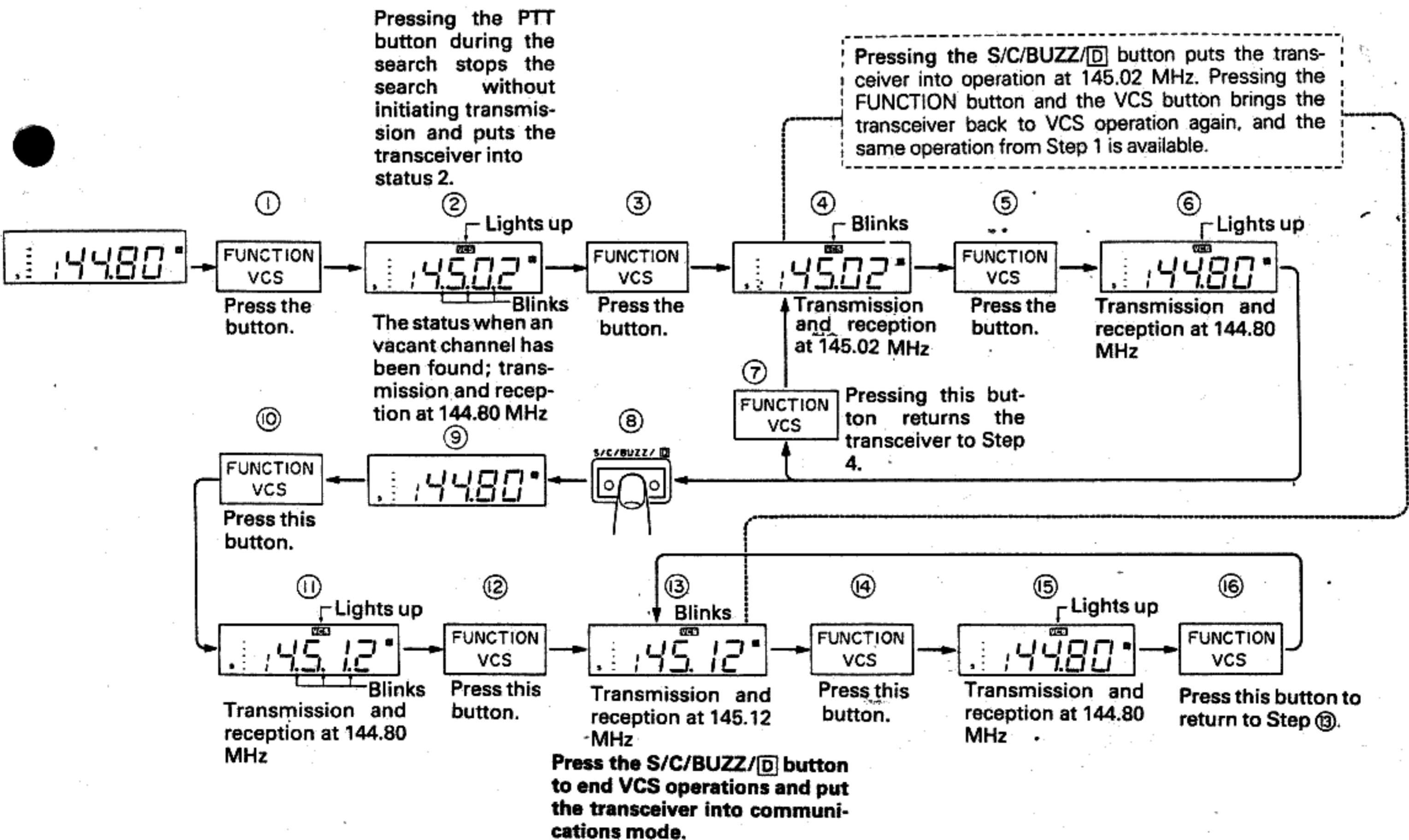
When all three of these dots are blinking at the same time, the frequency shown in the display section and the frequency being used are different.

Advice

The operation of the S/C/BUZZ/[D] button during VCS operations
 Pressing the S/C/BUZZ/[D] button while the transceiver is searching for an vacant channel returns the transceiver to dial frequency operation.

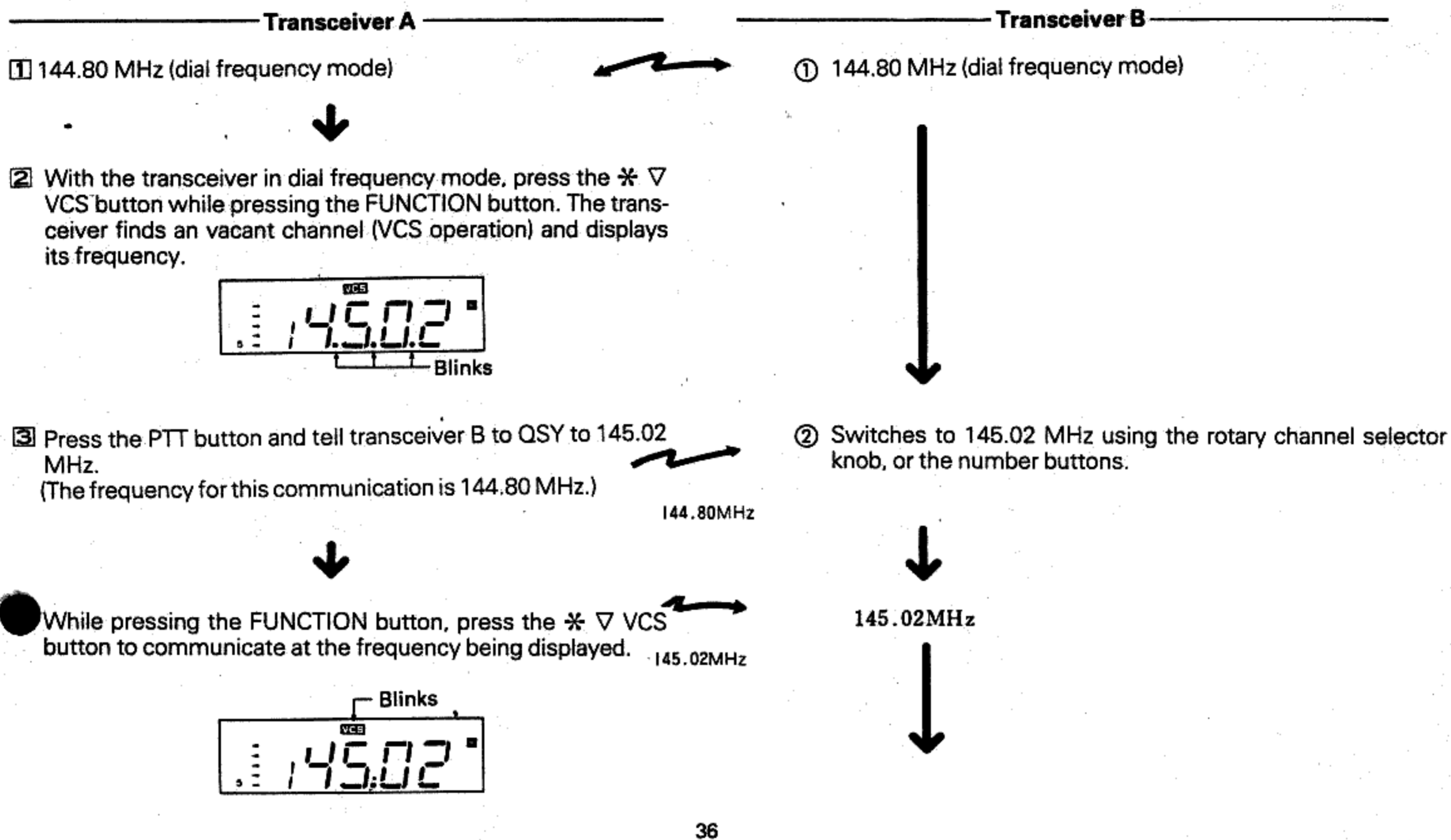
Pressing the S/C/BUZZ/[D] at any other time during VCS operations sets the transceiver to the operating frequency mode.

Here is a diagram of a sample operation.

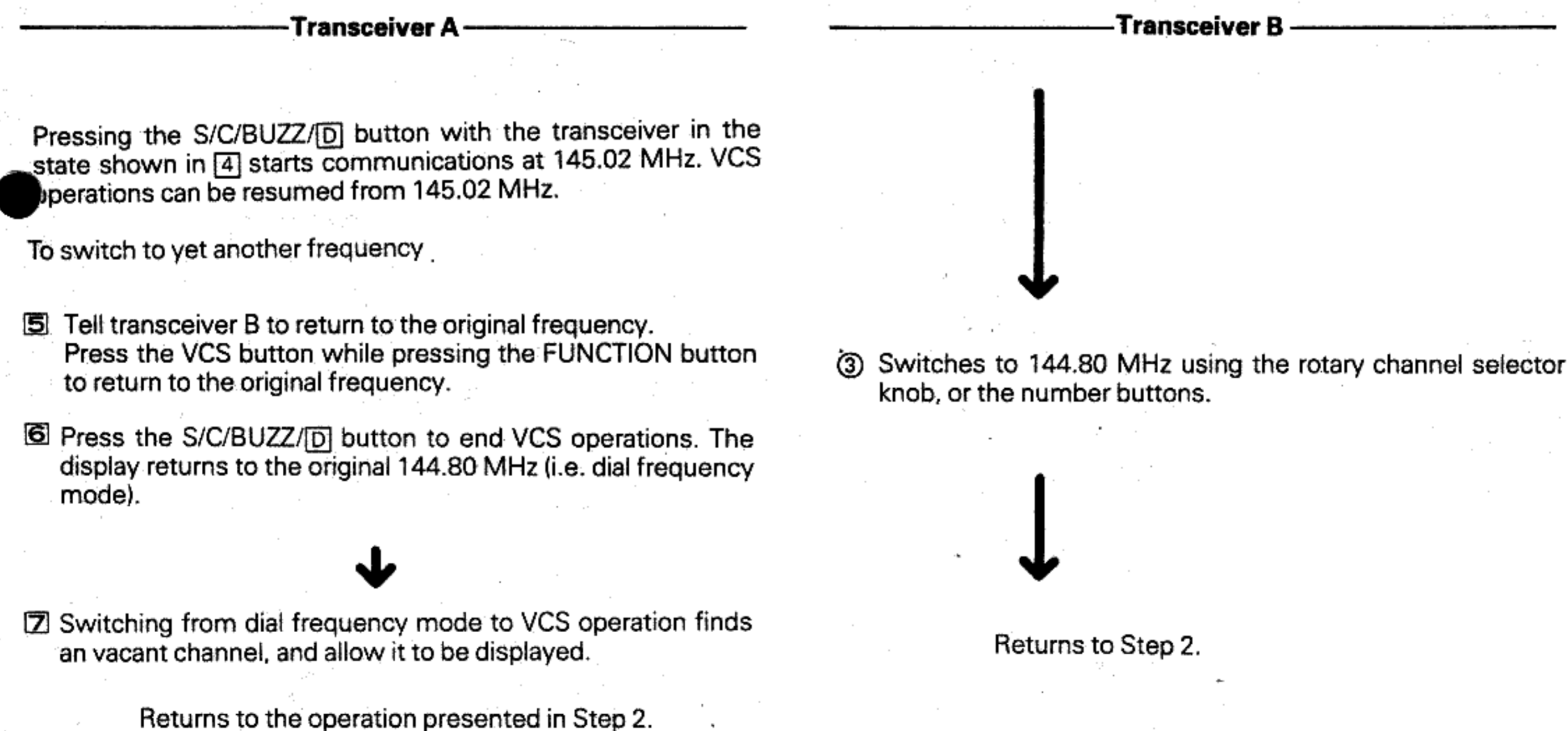


AN EXAMPLE OF CHANGING THE FREQUENCY DURING COMMUNICATION

CHANGING FROM 144.80 MHz TO SOME OTHER FREQUENCY



36



Advice

The function of the S/C/BUZZ/[D] button during VCS operations Pressing the S/C/BUZZ/[D] button while the transceiver is searching for an vacant channel returns the transceiver to dial frequency operation.

Pressing the S/C/BUZZ/[D] at any other time during VCS operations sets the transceiver to the operating frequency.

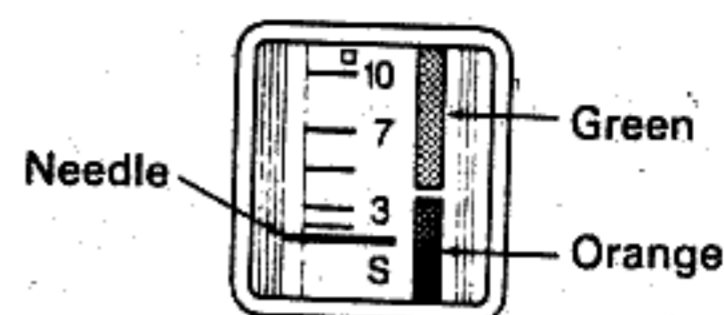
① **PWR/VOL (power switch/volume control knob)**
 This knob switches the power on and of and adjusts the volume. Turning the knob clockwise increases the volume. Adjust the volume while pressing the SQL OFF button or after turning the SQL knob counterclockwise to switch off the squelch.

② **SQL (squelch knob)**
 This knob cuts off the FM white noise. Turning the squelch knob counterclockwise allows the FM white noise to come out, but turning the squelch knob clockwise cuts off the FM white noise. Adjust the squelch control by starting from a point at which the white noise can be heard, then turn the knob slowly to the point at which the white noise just disappears, then stop.

Precaution

If you turn the SQL knob too far clockwise, the transceiver will not be able to pick up weak signals. Set the knob so that there is no FM white noise during scanning, dual watching, and battery save operations. Carry out the squelch adjustment on an unused frequency.

③ **Meter**
 This meter indicates the strength of the signal being received and of the battery charge. During reception it operates as an "S" meter and during transmission it shows the state of the battery. When the meter's needle points to the orange section, the batteries are running low and need to be replaced.



Precaution

When using one of the optional nickel-cadmium battery packs (CNB111 or CNB120), use the special charger.

④ **CHANNEL (rotary channel selector knob)**
 This is the knob for changing the communications frequency. Turning this knob clockwise raises the frequency; turning this knob counterclockwise lowers the frequency. The channel step can be 5 kHz, 10 kHz, 20 kHz, or 25 kHz.

⑤ **Front operation buttons**
 There are a variety of operation buttons on the front operation section. For more details, see "Functions of the buttons on the front operation section" on page 8.

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⑥ **LO PWR (transmission output level switch)**
 This button switches the transmission output between two levels. Pressing this button sets the transmission level to low power (0.4 W); pressing it again sets the transmission level to high power. We recommend the use of low power for short distance transmission.

⑦ **RF ATT (RF attenuator button)**
 This button decreases the reception sensitivity. To reduce the sensitivity, for example for fox hunting, press this button to reduce the reception sensitivity by about 20 dB.

Precaution

If this button is pressed, weak signals can not be received.

⑧ **SPKR (external speaker terminal)**
 This is the terminal for the optional microphone and speaker (CMP111) or PTT headset (CHP111). It can be used for connecting an 8-ohm load impedance speaker or earphone. Inserting a plug into this terminal cuts off the sound from the transceiver's built-in speaker.

⑨ **MIC (external microphone terminal)**
 This is the terminal for the optional microphone and speaker (CMP111) or PTT headset (CHP111).

⑩ **ANT (antenna terminal)**
 This is the BNC connector for connecting the helical antenna that comes with the transceiver. Connect the antenna securely and correctly, following the instructions in Operations Procedure 1.

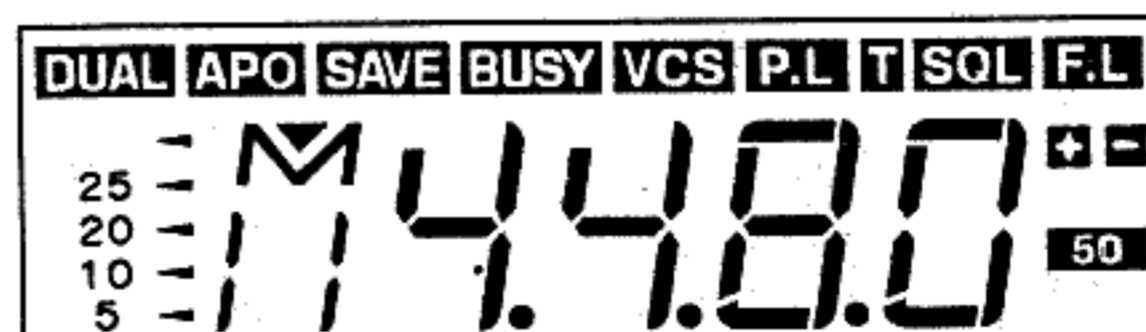
⑪ **FUNCTION (function button)**
 In a variety of special operations, the appropriate operation button or number button is pressed while pressing this FUNCTION button is held down.

⑫ **PTT (press to talk button)**
 This button switches the transceiver between transmission and reception. To transmit, hold down this button, face the microphone and talk. To receive, release this button. When using the optional PTT head set (CHP111), use the PTT button on that headset.

⑬ **LAMP (lamp button)**
 While this button is pressed, a light shines on the display section and the meter section.

⑭ **SQL OFF (squelch button)**
 The button to release the squelch operation. While this button is being pressed, it has the same effect as temporarily turning the squelch knob all the way counterclockwise to switch off the squelch.

⑮ **Display section**
 The display section shows the following:



⑩ **RESET (reset button)**

This button is used to initialize the microcomputer after a mistaken microcomputer operation or after replacing the lithium batteries. To reset the microcomputer, press the reset button lightly with the tip of a pointed non-metallic stick after turning power switch on. See Page 41.

⑪ **DC IN (external power supply terminal)**

When using the transceiver with an external power supply, the voltage is applied to this terminal. This transceiver can be used without batteries by using the STANDARD special external power supply connection cord. When this cord is plugged in, the transceiver automatically switches over from the battery case to the external power supply.

Precaution

Be sure to turn the PWR switch OFF before plugging or unplugging the connection cord.

This transceiver can use voltages from 5.5 VDC to 16 VDC. Never connect a power supply stronger than this.

Be absolutely sure that the polarity (+, -) of the power supply is correct.

Battery case

The battery case holds six AA batteries. These batteries can be SUM-3 manganese batteries (1.5V) or rechargeable nickel-cadmium batteries (1.2V).

Precaution:

Never mix new and old batteries. When replacing the batteries, always use the batteries with the same charge.

⑫ **Lock button**

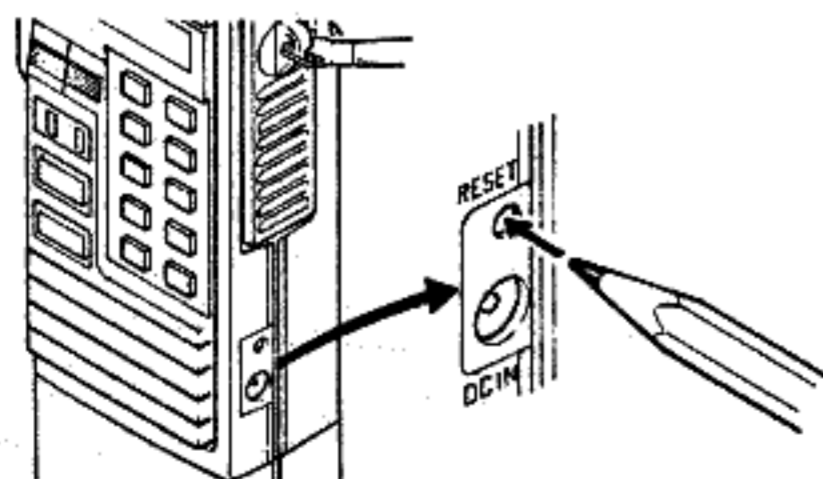
This button locks the battery case. To remove the battery case from the transceiver, pull the case from the transceiver while pushing this button up.

CONCERNING THE LITHIUM BATTERY

The C120 transceiver has a lithium battery to supply back-up power to the microcomputer and preserve the data stored into memory even when the main power is off. The life of this battery depends on how often the transceiver is used, but it ought to last about 5 years.

Advice

- ❖ *When the lithium battery is running low, the frequency is not displayed correctly in the display section when the power is switched on. When that happens, replace the lithium battery as soon as possible.*
- ❖ *After replacing the lithium battery, press the reset button lightly with the tip of a pointed non-metallic stick.*



Precaution

- ❖ *Always replace the lithium battery with the same type of special lithium battery. When replacing or checking the lithium battery, always have it done at the store where you bought the transceiver or the nearest STANDARD sales office or service center.*
- ❖ *Never dispose of the used battery by burning it.*

BEFORE BRINGING YOUR TRANSCEIVER IN FOR SERVICING

Before bringing your transceiver in for servicing, please check the following items. If none of these tips solves the problem with your transceiver, bring it to the store at which you purchased it or the nearest STANDARD Sales Office or Service Center.

❑ **The frequency display blinks**

When the PLL circuit is temporarily unlocked, the entire display blinks.

- ❑ **Either the main batteries or the back-up lithium battery is running low.** Replace the main batteries and if that does not solve the problem, replace the lithium battery.

❑ **The frequency is not displayed correctly.**

Sometimes after the lithium back-up battery has been replaced or there has been an erroneous microcomputer operation, the frequency may not be displayed correctly.

- ❑ **Press the reset button lightly with a pointed, non-metallic object.**

Have the transceiver's power on when you press the reset button.

❑ **The frequency display becomes strange every time the power is switched on or off.**

- ❑ **Replace the lithium back-up battery.**

❑ **No reception**

- ❑ **Press the SQL OFF button and see if any sound comes out of the speaker.**

Is the squelch knob turned all the way clockwise?

- ❑ **Turn the squelch knob counterclockwise.**

Is the VOL knob turned all the way counterclockwise?

- ❑ **Turn the VOL knob clockwise to the desired volume level.**

☐ Only strong signals are received.

Has the RF.ATT button on the top operating section been pressed?

☐ Press the RF.ATT button again to switch off the attenuation. Is the accessory antenna installed properly?

☐ Install the antenna properly.

If the squelch knob is turned too far clockwise, weak signals can not be received.

☐ Turn the squelch knob counterclockwise.

☐ No transmission

Does the meter point to orange when the PTT button is pressed?

☐ Replace the batteries.

Does the display section show "P.L"?

☐ While pressing the FUNCTION button, press the 6/PTT.L button to unlock the PTT lock.

☐ Can not transmit at the displayed frequency.

Are three dots blinking in the display section?

☐ While pressing the FUNCTION button, press the * / ∇ VCS button and those dots will stop blinking (light).

☐ Can not change the frequency.

Does the display show "F.L"?

☐ While pressing the FUNCTION button, press the O/F.LOCK button to release the frequency lock.

Is "VCS" blinking in the display section?

☐ While pressing the FUNCTION button, press the * VCS button.

☐ No buzzer

Has the buzzer been switched off?

☐ While pressing the FUNCTION button, press the S/C/BUZZ / [D] button to release the mode the buzzer can not be operated.

☐ Even if the reset button on the side of the transceiver is pressed, the frequency is not displayed correctly.

The lithium back-up battery for the microcomputer is running low.

☐ Have the battery replaced at the store where you purchased your transceiver or at the nearest STANDARD Service Center.

RATINGS

1. General specifications

Transmission and reception frequencies ... 144-147.995 MHz

Type of emission F3

Mic input impedance 600 ohms

Speaker impedance 8 ohms

Operating voltage range 5.5-16V

Antenna impedance 50 ohms

Power supply 9V nominal (six nickel-cadmium or manganese (SUM-3) batteries)

Size (excluding protrusions) 161mm (height) × 60mm (width) × 34mm (depth)

Weight 455g (including the antenna and batteries)

2. Reception

Reception system double-superheterodyne

Intermediate frequencies 1st IF 21.8 MHz

2nd IF 455 KHz

Reception sensitivity 12dB SINAD-10dB (-0.158 μV) for 0.5 μV input with a S/N ratio of at least 30dB

Passband width ±7KHz (-6dB)

Selectivity -60dB

Squelch sensitivity -14dB

AF output 0.4W (10% distortion factor and load impedance 8 ohms)

Power consumption with no signal being received

..... About 38mA

(Closed' indication)

3. Transmission

Transmission output . High 2.5W (4W with the CNB111 and 5W or more with the CNB120) Low 0.4W

Spurious signal ratio Less than -60 dB

Maximum frequency deviation ±5 kHz

Modulation system Reactance modulation

AF characteristic 300-3000Hz

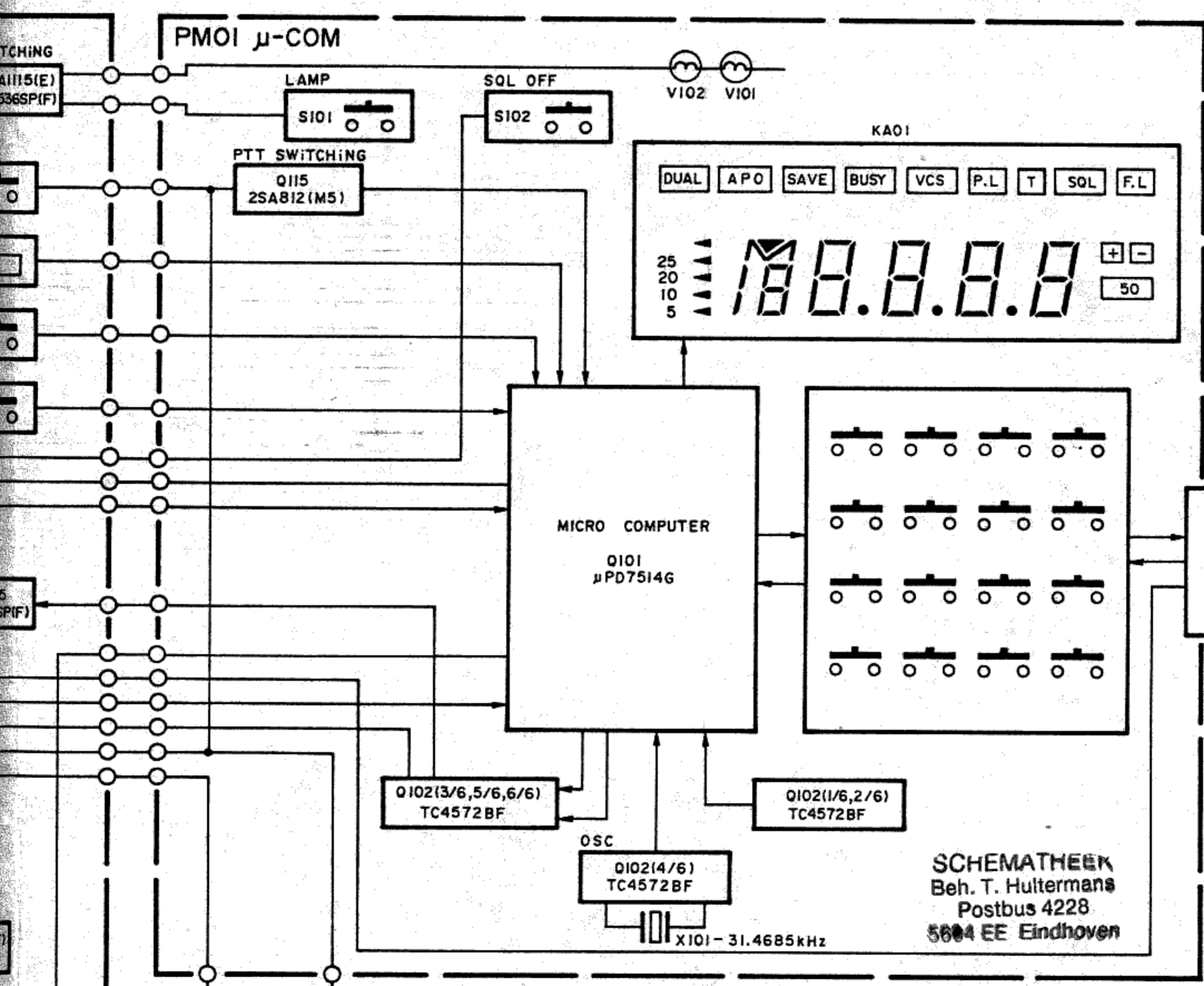
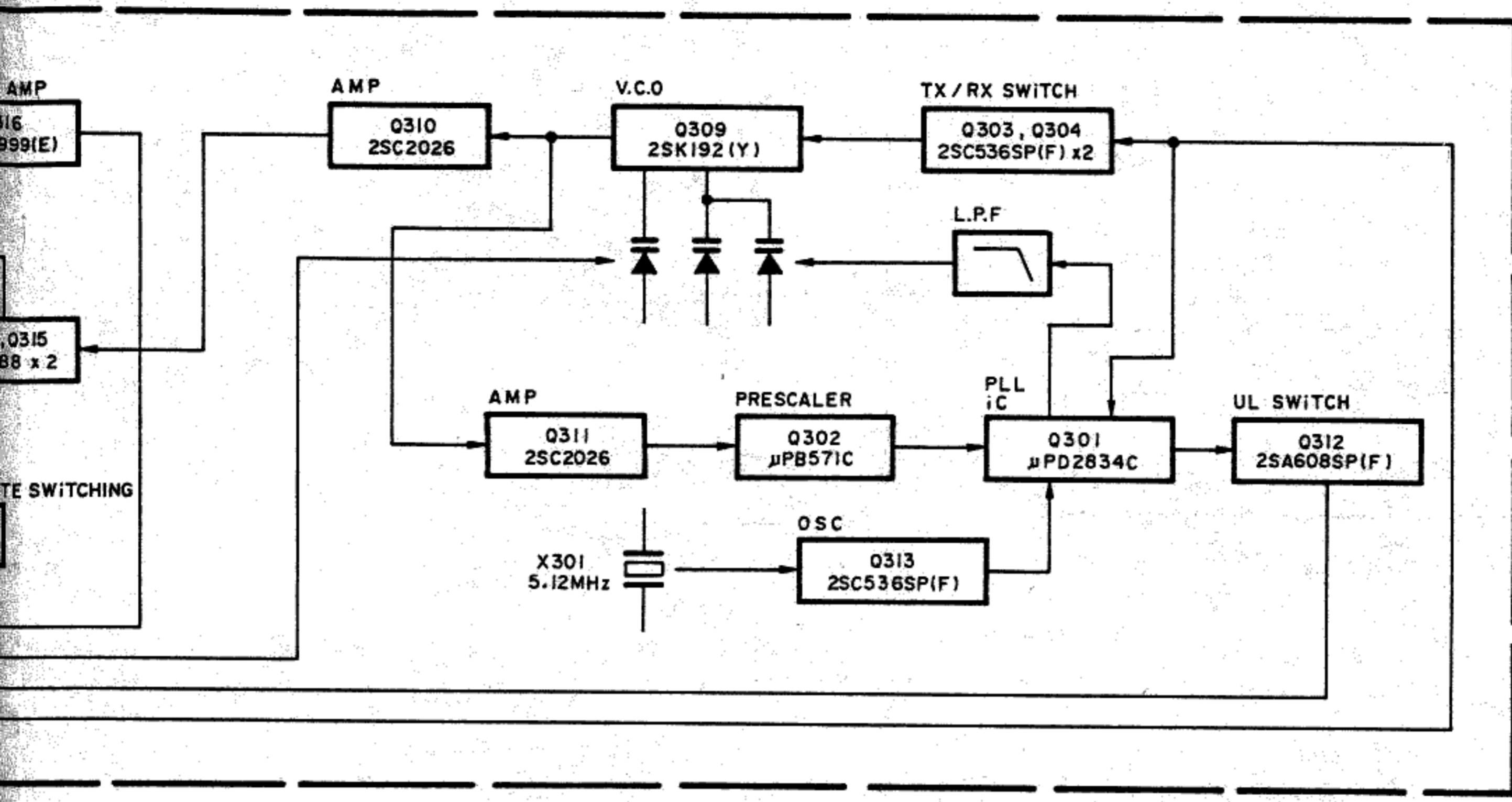
Power consumption during transmission

..... For Hi 2.5W output: about 750mA

transmission For 5W output : about 950 mA

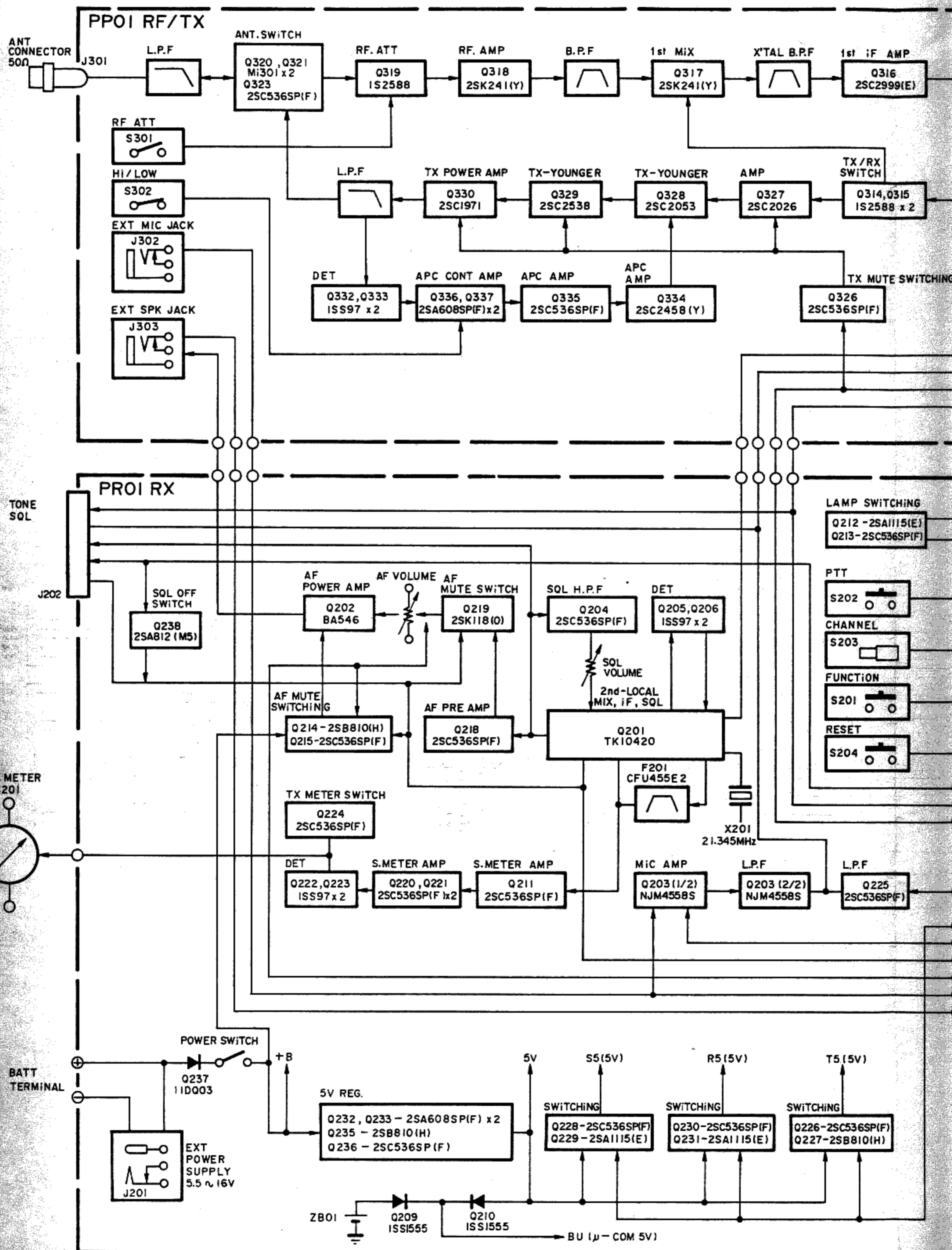
For low output: about 350 mA

The specifications or external appearance of this transceiver may be changed at any time for improvement.

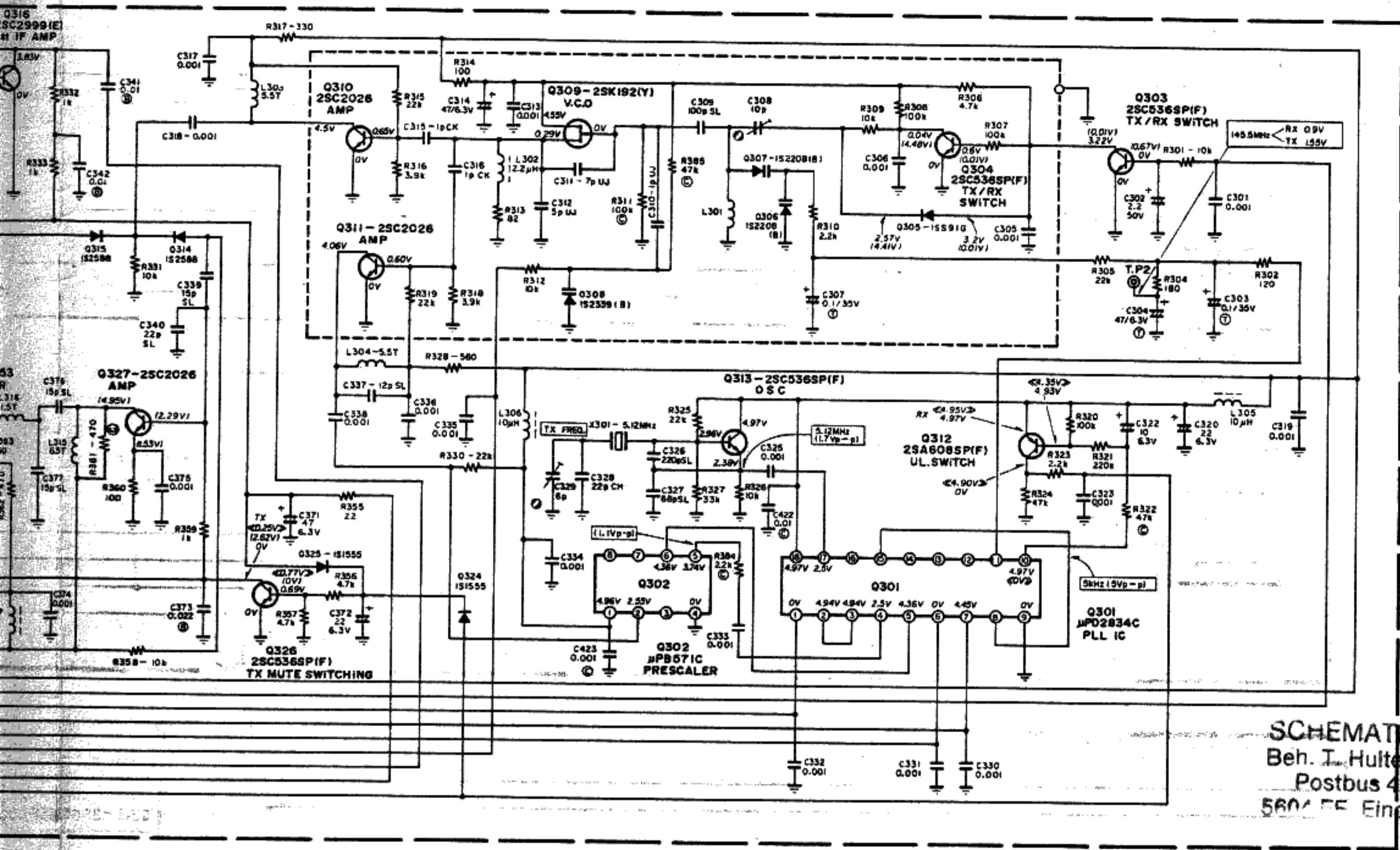


SCHEMATHEEK
Beh. T. Hultermans
Postbus 4228
5604 EE Eindhoven

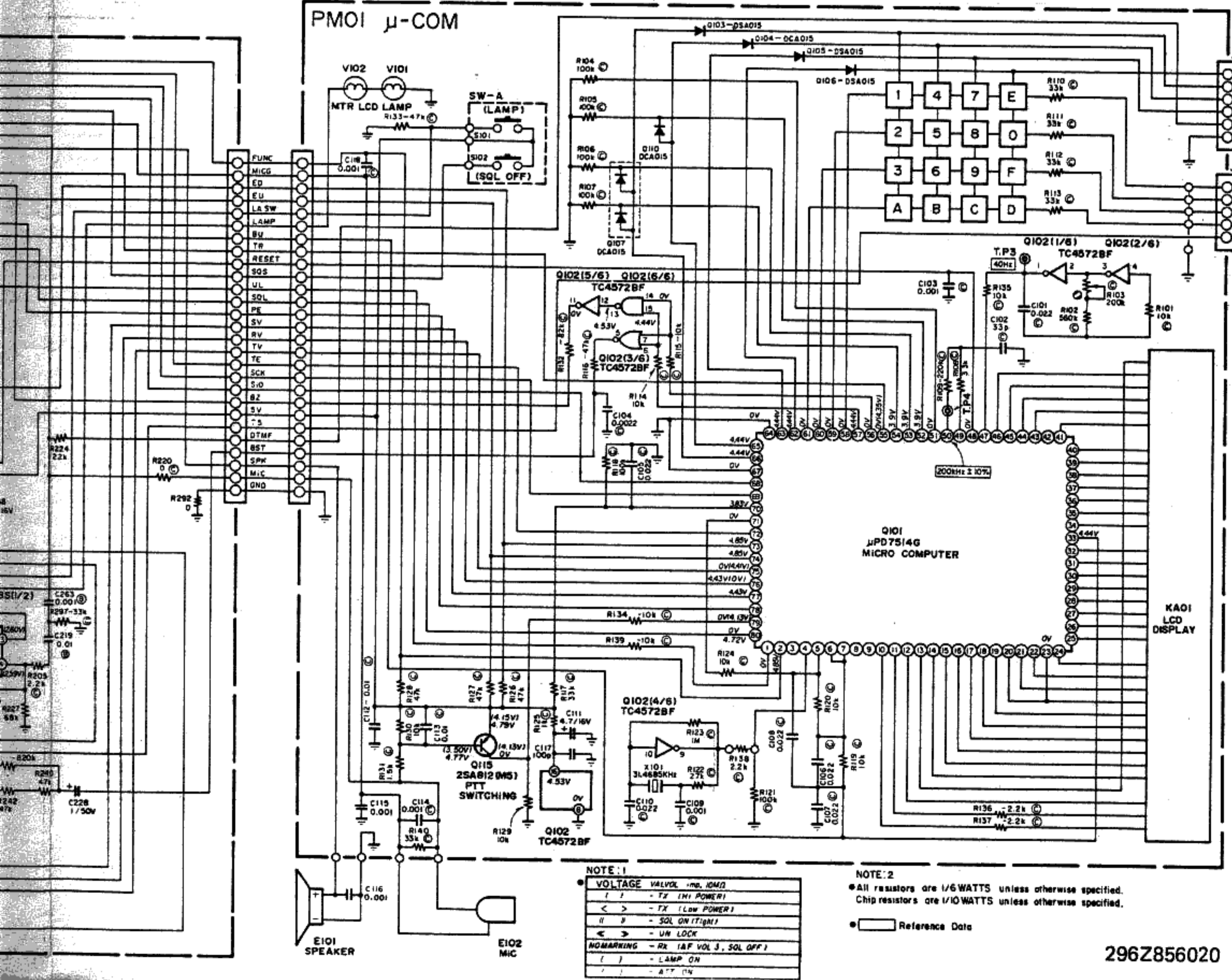
BLOCK DIAGRAM



SCHEMATIC DIAGRAM FOR MODEL C120



SCHEMATHEEK
Beh. J. Hultermans
Postbus 4228
5604 DE Eindhoven



NOTE 1

VOLTAGE	VALUE	IMP.	ICM2
()	TX	1M	POWER
< >	TX	LOW	POWER
	SQL	ON	(TIGHT)
←	UN	LOCK	
←	MARKING	- RX	18F VOL 3, SQL OFF
()	LAMP	ON	
()	ATT	ON	

NOTE 2
• All resistors are 1/6 WATTS unless otherwise specified.
Chip resistors are 1/10 WATTS unless otherwise specified.
• Reference Data