



PROGRAMMING MANUAL

CLONING SOFTWARE

CS-F500

FOREWORD

This manual explains in detail how to program each of the functions in the IC-F510, IC-F520, IC-F521, IC-F610, IC-F620 and IC-F621 VHF AND UHF TRANSCEIVERS with the CS-F500 CLONING SOFTWARE, Revision 2.0. The CS-F500 can be set up to meet any number of requirements of your customers, such as system conditions, channels, frequencies, tones, etc.

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■ EQUIPMENT REQUIRED

To use this program, the following hardware and software is required:

- Microsoft® Windows® 95/98/Me
- RS-232C serial port
- OPC-1122 CLONING CABLE (Cable adapter + DB9 Female /DB25 Male serial cable)

■ SOFTWARE INSTALLATION

/// **NOTE:** Depending on your Windows® system files, the PC may require rebooting. In this case, repeat the installation from the beginning.

◇ Installation

- ① Boot up Windows®. (Quit all applications when Windows is running.)
- ② Insert the CS-F500 disk into the appropriate CD drive.
- ③ Select 'Run' from the [Start] menu.
- ④ Type the setup program name with full path name, then press the [Enter] key.
(e.g. D:\csf500\disk1\setup [Enter])
- ⑤ Follow the prompts.
- ⑥ Enter the product ID number in the following manner.
 - ID number: 254301-(6 digit Serial number)
 - e.g. if the Serial number on the CD is 000001, enter "254301-000001" as the ID number.
- ⑦ Program group 'CS-F500' appears in the 'Programs' folder of the start menu.

■ CONNECTION

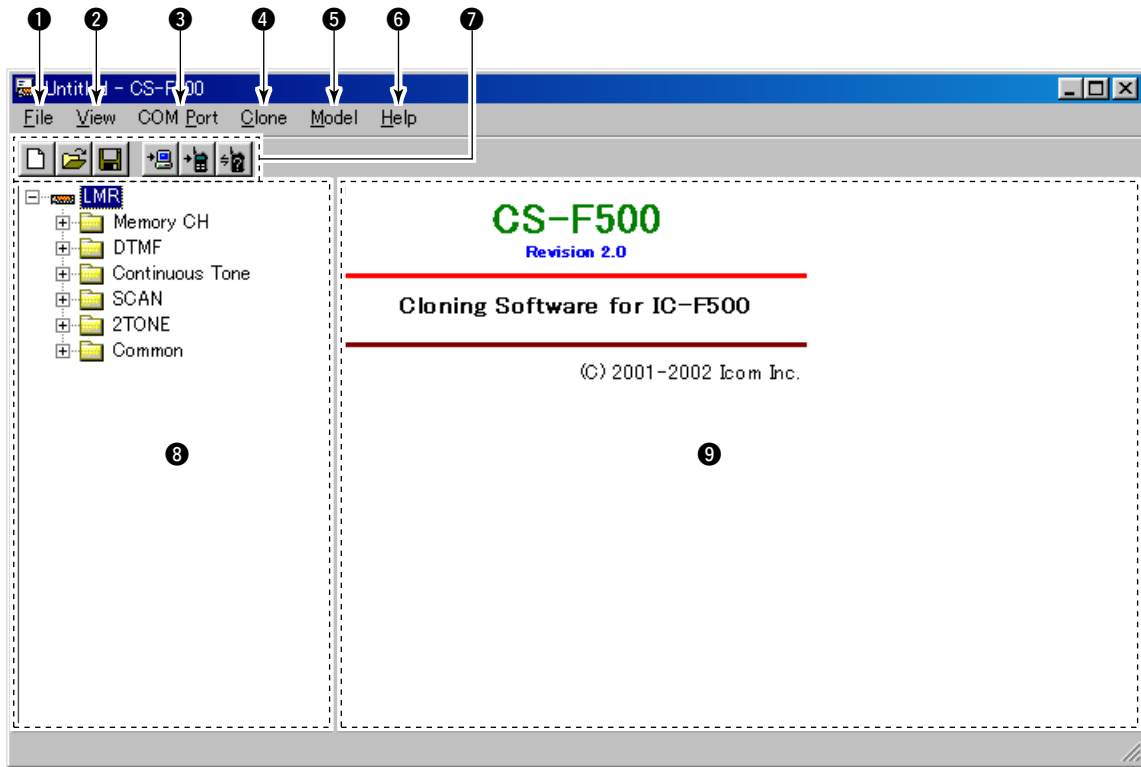
Connect each item as in the following diagram.

/// **CAUTION:** Do not connect an antenna to the transceiver during cloning operation. Received signals may cause cloning errors.

/// All cloning operations are performed from the computer— the operation required on the transceiver side is; Turn the transceiver's power ON.



2-1 MAIN SCREEN DESCRIPTION



1 FILE MENU— [File]



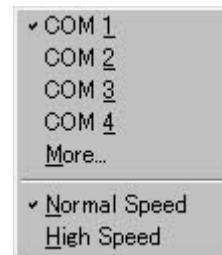
Used for making new files, opening available saved files, saving memory channel contents or quitting the program, etc. Up to 4 recently used files are indicated in the sub menu for simple, quick file selection.

2 VIEW MENU— [View]



- The independent Common Setting Screen is selectable. (pgs. 6–22)
- Turn the tool bar or status bar ON/OFF.

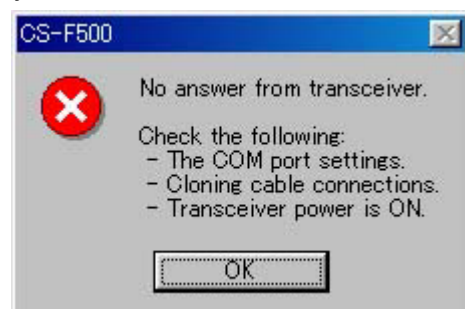
3 COM PORT MENU— [COM Port]



Click to display the COM port setting sub menu.

- Set the COM port number properly.
- When “More...” is selected, enter the desired COM port number in the COM port dialog box’s text box that appears.
- Select data transfer rate from Normal Speed and High Speed.

NOTE: ‘Check the following’ dialog box as follows, appears when the COM port is not set correctly.



4 CLONE MENU— [Clone]



Starts to read the programmed data from the connected transceiver, programs setup data to the connected transceiver, or displays detailed information screen to check Model type, CPU revision number, clone comment and the optional unit installation condition of the connected transceiver.

The clone comment is programmed in **Clone Comment— (1), (2)** in **COMMON** (p. 67).

Go to Clone Comment— (1), (2)

5 MODEL MENU— [Model]



Select the model type from LMR (2Tone), PMR (5Tone/DTMF) or BIIS PMR.

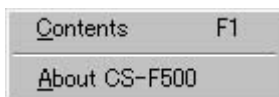
-“✓” mark appears for the selected model.

The Tree View Screen content will be changed when switched between BIIS PMR, PMR and LMR. See page 4 for details.

Go to 2-2 TREE VIEW SCREEN DESCRIPTION

IMPORTANT! : The model type must be selected first, otherwise the edited contents will be lost. Select **PMR (5Tone/DTMF)** to enable the DTMF decode operation, or select **BIIS PMR** to enable the SDM operation.

6 HELP MENU— [Help]



Click to display help contents and cloning software revision information.

7 TOOL BAR



Short cut keys appear in the tool bar when the tool bar is checked (“✓” mark appears) in the [View] menu as above.

Short cut keys for New (Ctrl+N), Open (Ctrl+O), Save (Ctrl+S) as in [File], and Read <- TR, Write -> TR, Information as in [Clone] menu, are available.

8 TREE VIEW SCREEN (p. 4)

Double click the folder icon or click the “+” beside the folder which you want to edit. Then double click the desired item name to display the item on the ‘Memory channel screen’.

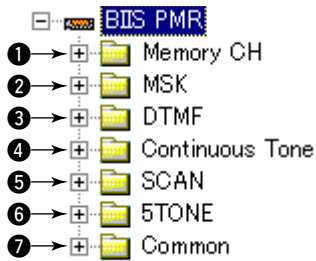
9 MEMORY CHANNEL SCREEN

Displays the Memory Channel or item information to be edited. Double click, right click on the desired channel number, or press [Enter] key after desired channel selection, to edit the item.

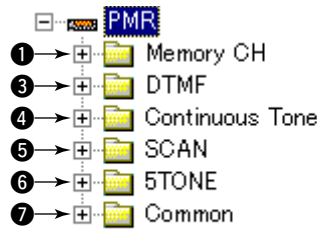
2 SCREEN DESCRIPTIONS

2-2 TREE VIEW SCREEN DESCRIPTION

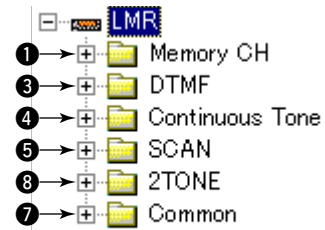
• BIIS PMR Tree View



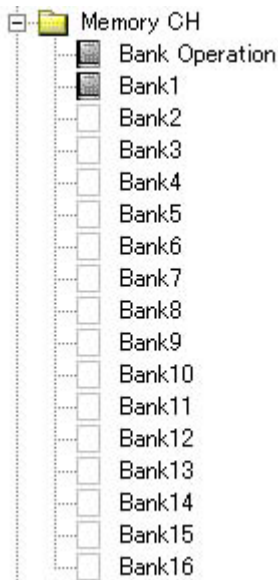
• PMR Tree View



• LMR Tree View



1 Memory CH (BIIS PMR; pgs. 6–13, PMR; pgs. 14–21, LMR; pgs. 22–27)



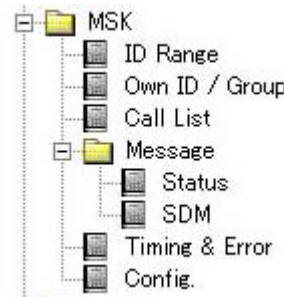
Sets the number of channels and the bank usage for each bank, and channel attribute, operating frequency, CTCSS encoder/decoder frequency, transmit output power, voice scrambling code, etc.

A total of 256 memory channels are available and are separated into 16 banks. The bank condition setting screen appears in the Memory Channel Screen by clicking the Bank Operation icon.

The only programmable bank icons appear and the memory channels condition in the bank is displayed in the Memory Channel Screen.

- Go to Bank Operation (BIIS PMR)**
- Go to Bank Operation (PMR)**
- Go to Bank Operation (LMR)**
- Go to Bank (BIIS PMR)**
- Go to Bank (PMR)**
- Go to Bank (LMR)**

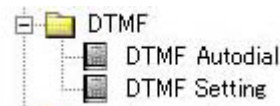
2 MSK (BIIS PMR only; pgs. 28–38)



Sets ID range, IDs, messages for status and SDM, MSK operating condition, etc.

- Go to ID Range**
- Go to Own ID/Group**
- Go to Call List**
- Go to Message— Status**
- Go to Message— SDM**
- Go to Timing & Error**
- Go to Config.**

3 DTMF (pgs. 39–40)

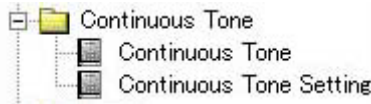


Program DTMF codes for the DTMF auto dialling function and timers for each digit, 1st digit, [*] and [#] code.

By clicking the DTMF Autodial or the DTMF Setting icon, the DTMF channels or the DTMF setting for editing appear in the Memory Channel Screen, respectively.

- Go to DTMF Autodial**
- Go to DTMF Setting**

4 Continuous Tone (pgs. 41–42)



Set the continuous tone frequency. The programmed continuous tone is used for encoder and/or decoder. By clicking the Continuous Tone or the Continuous Tone Setting icon, the continuous tone channels or the continuous tone setting for editing appear in the Memory Channel Screen, respectively.

- Go to Continuous Tone**
- Go to Continuous Tone Setting**

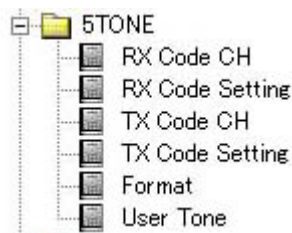
5 SCAN (pgs. 43–44)



Sets scan mode, text for each scan group, power save function scan stop/resume timers, etc. By clicking the Scan List icon, the scan group channels for editing appear in the Memory Channel Screen, and the Scan Setting Screen appears when the Scan Setting icon is clicked.

- Go to Scan List**
- Go to Scan Setting**

6 5TONE (BIIS PMR, PMR only; pgs. 45–53)



Sets RX/TX code, text, 5-tone format, beep, bell, stun, group call, answer back functions, etc. By clicking the RX/TX Code CH, RX/TX Code Setting, Format or User Tone icon, the RX/TX code channels for editing, RX/TX code setting, 5-tone format or user tone appear in the Memory Channel Screen.

- Go to RX Code CH (5TONE)**
- Go to RX Code Setting (5TONE)**
- Go to TX Code CH (5TONE)**
- Go to TX Code Setting (5TONE)**
- Go to Format (5TONE)**
- Go to User Tone (5TONE)**

7 Common (pgs. 57–72)



Sets programmable key, function display assign, and several commonly used timers, etc., are programmable. By clicking an item in the Common Setting folder, the desired screen appears.

- Go to Key & Display**
- Go to Set Mode**
- Go to Common**
- Go to Character Editor**

8 2TONE (LMR only; pgs. 54–56)



Sets RX code, text, beep, bell, stun, group call, ANS functions, etc. By clicking the RX Code Channel, RX Code Setting or TX Code icon, the RX code channels, RX code Setting or TX code Channel screen for editing appear in the Memory Channel Screen.

- Go to RX Code CH (2TONE)**
- Go to RX Code Setting (2TONE)**
- Go to TX Code (2TONE)**

3-1 Bank Operation

Bank Operation			
Bank	Smar-Trunk	Capa	Use
1		16	0
2	①	②	③
3		0	0
4		0	0
5		0	0
6		0	0
7		0	0
8		0	0
9		0	0
10		0	0
11		0	0
12		0	0
13		0	0
14		0	0
15		0	0
16		0	0
④ Total		16	0
⑤ Left		240	256

① SmarTrunk

Turn the SmarTrunk usage ON and OFF.

The bank icon for SmarTrunk specified bank/s, displayed in the Tree View screen, changes from regular to SmarTrunk type as follows, for easy recognition.



: Regular type



: SmarTrunk type

② Capa

Set an available number of memory channels in the bank.

A memory channel can also be added or deleted during bank contents indication.

③ Use

Shows the number of memory channels actually programmed.

④ Total

Shows the total number of memory channels that have been assigned into banks below “Capa,” and “Use” columns, respectively.

⑤ Left

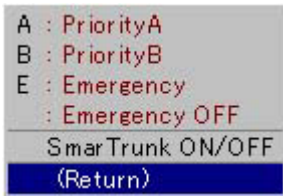
Shows the total number of memory channels that are assignable into banks below “Capa” and “Use” columns, respectively.

3-2 Bank

CH	Frequency (MHz)				
	Atr	Inh	RX	TX	TX Inh
1- 1	AB				
1- 2	①	②	③		④
1- 3					
1- 4					
1- 5					
1- 6					
1- 7					
1- 8					
1- 9					
1- 10					
1- 11					
1- 12					
1- 13					
1- 14					

① Atr

Selects the channel attribution from Prio A, Prio B, Emergency, Emergency OFF and SmarTrunk ON/OFF.



Right click or double click on the desired channel to open the sub-menu window as at left, then select the channel attribution.

A: PriorityA— “A” tagged channel becomes the priority channel A, simply recalled by pushing [Priority A] or [Priority A (Rewrite)] key, and also is automatically monitored during the priority scan. When [Priority A (Rewrite)] key is assigned, priority channel A can be re-assigned by pushing [Priority A (Rewrite)] key for 1 sec.

B: PriorityB— “B” tagged channel becomes the priority channel B, simply recalled by pushing [Priority B] key.

E: Emergency— “E” tagged channel becomes an emergency channel, immediately recalled and sends an emergency signal by pushing [Emergency Single] or [Emergency Repeat] key. Only 1 channel can be set.

Emergency OFF— Regular channel.

SmarTrunk ON/OFF— Specifies the selected bank for SmarTrunk operation.

The bank icon for SmarTrunk specified bank/s displayed in the Tree View Screen, changes from regular to SmarTrunk type as described in **Bank Operation** (① SmarTrunk).

Go to SmarTrunk

[Priority A], [Priority B], [Priority A (Rewrite)], [Emergency Single] and [Emergency Repeat] keys are assigned in **Key & Display** (pgs. 58, 60).

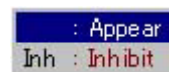
Go to Prio A, Prio B

Go to Prio A (Rewrite)

Go to Emergency Single, Emergency Repeat

② Inh

Select “Inh:Inhibit” when the channel is to be inhibited.



The channel never appears on the transceiver, even if all the other items are programmed when the channel is inhibited.

③ Frequency (MHz)— RX, TX

Enter receive and transmit frequencies within the following frequency ranges in either 5, 6.25 or 7.5 kHz steps* for the RX and TX boxes, respectively.

IC-F500 series : 136–174 MHz

IC-F600 series : 400–430, 440–490, 480–520 MHz

*depending on version

When no receive frequency is entered, other items cannot be programmed in the channel.

When the editing bank is set as the SmarTrunk operation in **SmarTrunk** (Bank Operation; p. 6) or

Atr as described at left, operating frequencies must be programmed from channel 1 without a blank.

Go to SmarTrunk

④ Frequency— TX Inh

Select “Inh:Inhibit” when transmission inhibit is necessary.

NEVER select “TX Inhibit” in an MSK channel.

When “TX Inhibit” is set in an MSK channel, the acknowledgement call (answer back) is also inhibited (MSK operation cannot be performed).

⑧ **Compander**

Selects the compander function ON and OFF.

The compander function reduces back ground noise and increases the voice audio components in the receiving signal for clear communications.

When communicating with an other station that doesn't use or have the compander function, it is recommended to turn the compander function OFF via [Compander] key or select "OFF" in this cell, otherwise the received audio will distort.

The function can be switched ON or OFF for temporary operation with the [Compander] key.

The [Compander] key is assigned in **Key & Display** (p. 61).

Go to Compander

⑨ **TOT**

Toggle the time-out timer function ON and OFF.

Continuously transmittable time is limited by the timer during activation. The time-out timer must be activated due to local regulations in some countries.

Deactivating (select "OFF") the time-out timer is recommended for an MSK channel.

The time-out timer can be used in an MSK channel, however, the Clear Down transmission won't be performed while the TOT penalty timer is activated.

The time period is programmed in **TOT/Lockout—TOT Timer** in **Common** (p. 68).

When the editing bank is set for SmarTrunk operation in **SmarTrunk** (Bank operation; p. 6) or **Atr** (p. 7), "OFF" must be selected.

Go to TOT/Lockout—TOT timer

Go to SmarTrunk

Go to Atr

⑩ **RF Pwr**

Selects the transmit output power for initial setting from High, Low1 and Low2.

The selected output power setting for each channel can be switched to either temporary or permanent operation, according to the setting in **Selection—RF Power Selection** in **Key & Display** (p. 64) via [High/Low] key.

The [High/Low] key is assigned in **Key & Display** (p. 59).

Go to Selection—RF Power Selection

Go to High/Low

⑪ **Lockout**

Selects the transmission lock out (temporary transmission inhibit) capability from OFF, Busy, Rpt 1 and Rpt 2.

OFF : No restriction for receiving a signal.

Busy : [PTT] cannot be activated while the operating channel/repeater is in use.

Rpt1 : [PTT] can be activated while receiving a signal with a matched CTCSS (or DTCS) tone or no signals.

Rpt2 : [PTT] can be activated while receiving a signal with a matched CTCSS (or DTCS) tone or no signals while 5-tone mute is released, or receiving an unmatched CTCSS (or DTCS) tone while 5-tone mute is activated.

In addition, [PTT] is not activated for an extra time period in the case of when the lockout penalty timer, programmed in **TOT/Lockout—Penalty Timer** in **Common** (p. 68), is activated even if the transceiver is in a transmittable condition.

Go to TOT/Lockout—Penalty Timer

⑫ **Scan List—List**

Selects the channel included into the desired scan list (scan group) 0–9.

-The selected scan list number appears in the column.

Only the selected channels in the same scan list are scanned when [Scan A Start/Stop] or [Scan B Start/Stop] key is pushed.

2 ways of selection are available— one is using the PC keyboard (numeral keys), another one is using the independent selection screen.

Select the desired channel's 'List' cell, then press the numeral keys on the keyboard to set the selected memory channel and include it into the scan list.

Double click the desired channel's 'List' cell to display the selection screen (see below), then double click the desired scan list number check-box to set the selected memory channel and include it into the scan list.

-The "✓" mark appears in the check-box when checked.



The scan list (scanning group) is selectable via [CH Up] or [CH Down] keys, after [Scan A Start/Stop] or [Scan B Start/Stop] key is pushed for 1 sec.

The scanning conditions for each scan list are specified in **Scan List** (pgs. 43–44).

NEVER include an MSK channel into the scan list. The MSK call signal may not be received due to the call signal being too short to be received during scanning.

⑩ **CH Mute**

Selects 5-tone mute initial activity from CONT and SGL.

CONT : 5-tone mute is released.

SGL : 5-tone mute is activated. In this case, [PTT] action is inhibited while the 5-tone mute is activated.

⑪ **Log IN/OFF**

Selects the automatic ID transmission condition in relation to [PTT] from OFF, L-IN, L-INA, L-INI, L-OFF, L-OFFA, Both, BothA1 and BothA2.

OFF : No ID is transmitted with [PTT].

L-IN : ID is transmitted when [PTT] is pushed.

L-INA : ID is transmitted when [PTT] is pushed while the 5-tone mute is released.

L-INI : ID is transmitted when [PTT] is pushed while the 5-tone mute is activated. Voice transmission is impossible while the 5-tone mute is activated, and 'SGL' is selected in **CH Mute** (as above) in this screen.

L-OFF : ID is transmitted when [PTT] is released.

L-OFFA : ID is transmitted when [PTT] is released while the 5-tone mute is released.

Both : ID is transmitted when both [PTT] is pushed and released.

BothA1 : ID is transmitted when both [PTT] is pushed and released while the 5-tone mute is released.

BothA2 : ID is transmitted when both [PTT] is pushed and released while the 5-tone mute is released. ID is transmitted when [PTT] is pushed while the 5-tone mute is activated. Voice transmission is impossible while the 5-tone mute is activated, and when 'SGL' is selected in **CH Mute** (as above) in this screen.

When SmarTrunk ON/OFF is selected for the editing bank in **Atr** (p. 7), "OFF" must be selected.

The ID code is assigned in the **5Tone Signaling—ID** column in this screen for 5-tone operation (p. 12), and the 5-tone code is programmed in **TX Code** in **TX Code CH** (p. 49).

Go to Atr

Go to 5Tone Signaling— ID

Go to Tx Code

⑫ **Send Status**

Select the desired station for status call operation. Select "Base" to transmit the status call to the specified station (fixed ID; programmed in **Status Setting—Fixed Base ID** in **MSK— Config**: p. 37) only. Select "Mobile" to transmit the status call to the currently selected station (ID).

Go to Fixed Base ID

⑬ **SW Action— Moni**

Selects [Moni(Audi)] key action from OFF, Aud, In A, In A+R1, In A+R2, Both, Both+R1 and Both+R2.

OFF : Releases both noise and CTCSS/DTCS squelch mute while pushing and holding [Moni(Audi)] key. There is no audio output when the 5-tone mute is activated on the channel.

Aud : Releases the 5-tone mute only when 'SGL' is selected in **CH Mute** in this screen, by pushing [Moni(Audi)] key for 1 sec. Both CTCSS/DTCS and noise squelch mutes are released (audio is emitted) while pushing and holding [Moni(Audi)] key when the 5-tone mute is released or 'CONT' is selected in **CH Mute** in this screen.

In A : Mutes the 5-tone when 'SGL' is selected in **CH Mute** in this screen by pushing [Moni(Audi)] key. Both CTCSS/DTCS and noise squelch mutes are released (audio is emitted) while pushing and holding [Moni(Audi)] key while the 5-tone mute is activated.

In A+R1, In A+R2: In addition to the 'In_A' condition above, a reset code 1 or 2 is automatically transmitted when call transmission is performed or the 5-tone mute is activated by pushing [Moni(Audi)] key.

Both : Mutes the 5-tone when 'SGL' is selected in **CH Mute** (as above left) in this screen by pushing [Moni(Audi)] key. Releases the 5-tone mute when 'SGL' is selected in **CH Mute** in this screen by pushing [Moni(Audi)] key for 1 sec. Releases all mute controls and emits audio while pushing and holding [Moni(Audi)] key.

Both+R1, Both+R2: In addition to the 'Both' condition above, a reset code 1 or 2 is automatically transmitted when call transmission is performed via [Call] key or the 5-tone mute is activated by pushing [Moni(Audi)] key.

The [Moni(Audi)] and [Call] keys are assigned in **Key & Display** (pgs. 58, 59).

3-2 Bank (continued)

Switch Action				MSK Signaling			5Tone Signaling							Scrambler				
Moni	Sel	Call	PTT	RPT ID	STN ID	Receive ID	Form	RPT	L	STN	L	ID	L	Pos	RX C.No	ON/OFF	Code	
19	20	21		22	23		24	25							26	27	28	29

19 SW Action— Moni (continued)

The reset code 1 and 2 are programmed in **TX Code CH** (p. 49), and channels 32 (reset code 1) and 31 (reset code 2) are used, respectively.

The mute condition will be returned to initial condition when the Auto Reset timer is specified in **Auto Reset** in this screen (p. 10).

- Go to CH Mute
- Go to Moni(Audi)
- Go to Call
- Go to Tx Code CH
- Go to Auto Reset

20 SW Action— Sel

Selects the mute condition after memory or TX code channel selection from OFF, Aud and In A.

- OFF : Does not change even when selecting memory or TX code channel.
- Aud : Releases the 5-tone mute when 'SGL' is selected in **CH Mute** (p. 11) in this screen.
- In A : Mutes the 5-tone when 'SGL' is selected in **CH Mute** (p. 11) in this screen.

The mute condition will be returned to initial condition when the Auto Reset timer is activated in **Auto Reset** in this screen (p. 10).

- Go to CH Mute
- Go to Auto Reset

21 SW Action— Call, PTT

Selects the mute condition from Aud and OFF after [Call] and [PTT] action.

- OFF : Does not change when transmitting with [Call]/[PTT] transmission.
- Aud : Releases the 5-tone mute when 'SGL' is selected in **CH Mute** (p. 11) in this screen after any [Call]/[PTT] transmission.

Select OFF for both the SW Action— Call and PTT, when **ABC— Aud** in **TX Code CH** (p. 50) is activated, and select OFF for the SW Action— PTT, when **PTT Call at Inaudible** in **TX Code Setting** (p. 51) is activated.

The [Call] key is assigned in **Key & Display** (p. 59).

The mute condition will be returned to initial condition when the Auto Reset timer is specified in **Auto Reset** in this screen (p. 10).

- Go to CH Mute
- Go to ABC— Aud
- Go to PTT Call at Inaudible
- Go to Call
- Go to Auto Reset

22 MSK Signaling— RPT ID

Select the repeater type to use in the MSK channel. When using the CTCSS repeater, select OFF. Select or enter the desired ID channel number programmed in **ID** in **MSK— Call List** (p. 30), directly.

- Go to ID

23 MSK Signaling— STN ID, Receive ID

Select the desired station and group ID for STN ID and Receive ID column, respectively.

The same ID list as used in the repeater ID above, is used for the STN ID selection.

24 5Tone Signaling— Form

Selects the 5-tone system format from USER, CCIR, ZVEI1, ZVEI2, DZVEI, EEA, EEA2, DAPL, EIA and DTMF.

When the DTMF decoder operation is required, select DTMF in this item.

②⑤ **5Tone Signaling— RPT, STN, ID, L**

Selects the 5-tone code channel for repeater (RPT), individual station/group (STN) access and own identity (ID), respectively.

Double-click the “L” column then select the desired long tone condition for each 5-tone code, RPT, STN and ID, respectively.

- “L” appears when long tone is activated.

These 5-tone codes are programmed in **TX Code** in **TX Code CH** (p. 49).

The time period for the long tone is programmed in **Timer— Long Tone** in **TX Code Setting** (p. 51).

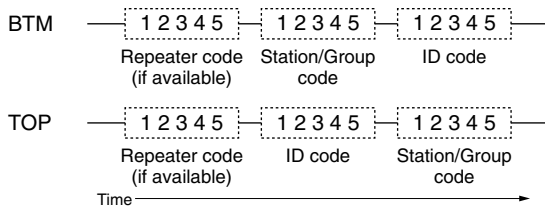
- Go to TX Code**
- Go to Timer— Long Tone**

②⑥ **5Tone Signaling— Pos**

Selects the own ID code sending sequence from OFF, BTM and TOP.

- OFF : Does not send the ID code.
- BTM : Sends the ID code after sending the station or group code.
- TOP : Sends the ID code before sending the station or group code.

• ID code sending sequence diagram



②⑦ **RX C.No**

Select the receive 5-tone code channel to be decoded.

Up to 8 codes/channels can be selected for decode in each operating channel.

The 5-tone code is programmed in **RX Code** in **RX Code CH** (p. 45).

Double click the desired channel’s ‘RX C.No’ cell to display the selection screen (see below), then double click the desired code channel number check-box to set the selected code channel to be decoded.

-The “✓” mark appears in the check-box when checked.



- Go to RX Code**

②⑧ **Scrambler— ON/OFF**

Double click to select the voice scrambling function initial setting from OFF, ON and Inhibit.

When OFF or ON is selected, the voice scrambling function can be manually switched with the [Scrambler] key, however, the function cannot be manually switched ON when Inhibit is selected.

An optional UT-109 or UT-110 VOICE SCRAMBLER UNIT is required.

The [Scrambler] key is assigned in **Key & Display** (p. 61).

- Go to Scrambler**

②⑨ **Scrambler— Code**

Enter the voice scrambling code within 1–32 using UT-109 or UT-110 with ‘Non-Rolling’ selection or within 1–255 using UT-110 with ‘Rolling’ selection installed.

In addition, **Scrambler— Group Code** in **Common** (p. 70) must be programmed when UT-110 is installed and ‘Rolling’ is selected in **Scrambler— Type** in **Common** (p. 70).

- Go to Scrambler— Group Code**
- Go to Scrambler— Type**

4-1 Bank Operation

Bank Operation			
Bank	Smar-Trunk	Capa	Use
1		16	0
2	①	②	③
3		0	0
4		0	0
5		0	0
6		0	0
7		0	0
8		0	0
9		0	0
10		0	0
11		0	0
12		0	0
13		0	0
14		0	0
15		0	0
16		0	0
④ Total		16	0
⑤ Left		240	256

① **SmarTrunk**

Turn the SmarTrunk usage ON and OFF.

The bank icon for SmarTrunk specified bank/s, displayed in the Tree View screen, changes from regular to SmarTrunk type as follows, for easy recognition.



: Regular type



: SmarTrunk type

② **Capa**

Set an available number of memory channels in the bank.

A memory channel can also be added or deleted during bank contents indication.

③ **Use**

Shows the number of memory channels actually programmed.

④ **Total**

Shows the total number of memory channels that have been assigned into banks below “Capa,” and “Use” columns, respectively.

⑤ **Left**

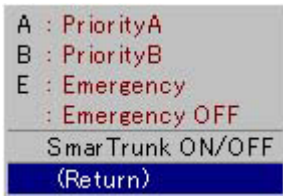
Shows the total number of memory channels that are assignable into banks below “Capa” and “Use” columns, respectively.

4-2 Bank

CH	Frequency (MHz)		RX	TX	TX Inh	W/I
	Atr	Inh				
1- 1	AB					
1- 2	①	②	③		④	
1- 3						
1- 4						
1- 5						
1- 6						
1- 7						
1- 8						
1- 9						
1- 10						
1- 11						
1- 12						
1- 13						
1- 14						

① Atr

Selects the channel attribution from Prio A, Prio B, Emergency, Emergency OFF and SmarTrunk ON/OFF.



Right click or double click on the desired channel to open the sub-menu window as at left, then select the channel attribution.

A: PriorityA— “A” tagged channel becomes the priority channel A, simply recalled by pushing [Priority A] or [Priority A (Rewrite)] key, and also is automatically monitored during the priority scan. When [Priority A (Rewrite)] key is assigned, priority channel A can be re-assigned by pushing [Priority A (Rewrite)] key for 1 sec.

B: PriorityB— “B” tagged channel becomes the priority channel B, simply recalled by pushing [Priority B] key.

E: Emergency— “E” tagged channel becomes an emergency channel, immediately recalled and sends an emergency signal by pushing [Emergency Single] or [Emergency Repeat] key. Only 1 channel can be set.

Emergency OFF— Regular channel.

SmarTrunk ON/OFF— Specifies the selected bank for SmarTrunk operation.

The bank icon for SmarTrunk specified bank/s displayed in the Tree View Screen, changes from regular to SmarTrunk type as described in **Bank operation** (① SmarTrunk).

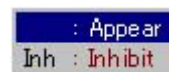
Go to SmarTrunk

[Priority A], [Priority B], [Priority A (Rewrite)], [Emergency Single] and [Emergency Repeat] keys are assigned in **Key & Display** (pgs. 58, 60).

- Go to Prio A, Prio B**
- Go to Prio A (Rewrite)**
- Go to Emergency Single, Emergency Repeat**

② Inh

Select “Inh:Inhibit” when the channel is to be inhibited.



The channel never appears on the transceiver, even if all the other items are programmed when the channel is inhibited.

③ Frequency (MHz)— RX, TX

Enter receive and transmit frequencies within the following frequency ranges in either 5, 6.25 or 7.5 kHz steps* for the RX and TX boxes, respectively.

IC-F500 series : 136–174 MHz

IC-F600 series : 400–430, 440–490, 480–520 MHz

*depending on version

When no receive frequency is entered, other items cannot be programmed in the channel.

When the editing bank is set as the SmarTrunk operation in **SmarTrunk** (Bank Operation; p. 14) or **Atr** as described at left, operating frequencies must be programmed from channel 1 without a blank.

Go to SmarTrunk

④ Frequency— TX Inh

Select “Inh:Inhibit” when transmission inhibit is necessary.

⑧ Compander

Selects the compander function ON and OFF.

The compander function reduces back ground noise and increases the voice audio components in the receiving signal for clear communications.

When communicating with an other station that doesn't use or have the compander function, it is recommended to turn the compander function OFF via [Compander] key or select "OFF" in this cell, otherwise the received audio will distort.

The function can be switched ON or OFF for temporary operation with the [Compander] key.

The [Compander] key is assigned in **Key & Display** (p. 61).

Go to Compander

⑨ TOT

Toggle the time-out timer function ON and OFF.

Continuously transmittable time is limited by the timer during activation. The time-out timer must be activated due to local regulations in some countries.

The time period is programmed in **TOT/Lockout—TOT Timer** in **Common** (p. 68).

When the editing bank is set for SmarTrunk operation in **SmarTrunk** (Bank operation; p. 14) or **Atr** (p. 15), "OFF" must be selected.

Go to TOT/Lockout—TOT timer

Go to SmarTrunk

Go to Atr

⑩ RF Pwr

Selects the transmit output power for initial setting from High, Low1 and Low2.

The selected output power setting for each channel can be switched to either temporary or permanent operation, according to the setting in **Selection—RF Power Selection** in **Key & Display** (p. 64) via [High/Low] key.

The [High/Low] key is assigned in **Key & Display** (p. 59).

Go to Selection—RF Power Selection

Go to High/Low

⑪ Lockout

Selects the transmission lock out (temporary transmission inhibit) capability from OFF, Busy, Rpt 1 and Rpt 2.

OFF : No restriction for receiving a signal.

Busy : [PTT] cannot be activated while the operating channel/repeater is in use.

Rpt1 : [PTT] can be activated while receiving a signal with a matched CTCSS (or DTCS) tone or no signals.

Rpt2 : [PTT] can be activated while receiving a signal with a matched CTCSS (or DTCS) tone or no signals while 5-tone mute is released, or receiving an unmatched CTCSS (or DTCS) tone while 5-tone mute is activated.

In addition, [PTT] is not activated for an extra time period in the case of when the lockout penalty timer, programmed in **TOT/Lockout—Penalty Timer** in **Common** (p. 68), is activated even if the transceiver is in a transmittable condition.

Go to TOT/Lockout—Penalty Timer

⑫ Scan List—List

Selects the channel included into the desired scan list (scan group) 0–9.

-The selected scan list number appears in the column.

Only the selected channels in the same scan list are scanned when [Scan A Start/Stop] or [Scan B Start/Stop] key is pushed.

2 ways of selection are available— one is using the PC keyboard (numeral keys), another one is using the independent selection screen.

Select the desired channel's 'List' cell, then press the numeral keys on the keyboard to set the selected memory channel and include it into the scan list.

Double click the desired channel's 'List' cell to display the selection screen (see below), then double click the desired scan list number check-box to set the selected memory channel and include it into the scan list.

-The "✓" mark appears in the check-box when checked.



The scan list (scanning group) is selectable via [CH Up] or [CH Down] keys, after [Scan A Start/Stop] or [Scan B Start/Stop] key is pushed for 1 sec.

The scanning conditions for each scan list are specified in **Scan List** (pgs. 43–44).

Continue to the next page—

- L-INA : ID is transmitted when [PTT] is pushed while the 5-tone mute is released.
- L-INI : ID is transmitted when [PTT] is pushed while the 5-tone mute is activated. Voice transmission is impossible while the 5-tone mute is activated and 'SGL' is selected in **CH Mute** (p. 18) in this screen.
- L-OFF : ID is transmitted when [PTT] is released.
- L-OFFA : ID is transmitted when [PTT] is released while the 5-tone mute is released.
- Both : ID is transmitted when both [PTT] is pushed and released.
- BothA1 : ID is transmitted when both [PTT] is pushed and released while the 5-tone mute is released.
- BothA2 : ID is transmitted when both [PTT] is pushed and released while the 5-tone mute is released. ID is transmitted when [PTT] is pushed while the 5-tone mute is activated. Voice transmission is impossible while the 5-tone mute is activated, and when 'SGL' is selected in **CH Mute** (p. 18) in this screen.

When SmarTrunk ON/OFF is selected for the editing bank in **Atr** (p. 16), "OFF" must be selected.

The ID code is assigned in the **5Tone Signaling—ID** column in this screen (p. 20), and the 5-tone code is programmed in **TX Code** in **TX Code CH** (p. 49).

- Go to CH Atr
- Go to 5Tone Signaling— ID
- Go to Tx Code

⑰ **SW Action— Moni**

Selects [Moni(Audi)] key action from OFF, Aud, In A, In A+R1, In A+R2, Both, Both+R1 and Both+R2.

- OFF : Releases both noise and CTCSS/DTCS squelch mute while pushing and holding [Moni(Audi)] key. There is no audio output when the 5-tone mute is activated on the channel.
- Aud : Releases the 5-tone mute only when 'SGL' is selected in **CH Mute** (p. 18) in this screen, by pushing [Moni(Audi)] key for 1 sec. Both CTCSS/DTCS and noise squelch mutes are released (audio is emitted) while pushing and holding [Moni(Audi)] key when the 5-tone mute is released or 'CONT' is selected in **CH Mute** in this screen.
- In A : Mutes the 5-tone when 'SGL' is selected in **CH Mute** in this screen by pushing [Moni(Audi)] key. Both CTCSS/DTCS and noise squelch mutes are released (audio is emitted) while pushing and holding [Moni(Audi)] key while the 5-tone mute is activated.

In A+R1, In A+R2:

In addition to the 'In_A' condition as below left, a reset code 1 or 2 is automatically transmitted when call transmission is performed or the 5-tone mute is activated by pushing [Moni(Audi)] key.

Both : Mutes the 5-tone when 'SGL' is selected in **CH Mute** in this screen by pushing [Moni(Audi)] key.

Releases the 5-tone mute when 'SGL' is selected in **CH Mute** in this screen by pushing [Moni(Audi)] key for 1 sec.

Releases all mute controls and emits audio while pushing and holding [Moni(Audi)] key.

Both+R1, Both+R2:

In addition to the 'Both' condition above, a reset code 1 or 2 is automatically transmitted when call transmission is performed via [Call] key or the 5-tone mute is activated by pushing [Moni(Audi)] key.

The [Moni(Audi)] and [Call] keys are assigned in **Key & Display** (pgs. 58, 59).

The reset code 1 and 2 are programmed in **TX Code CH** (p. 49), and channels 32 (reset code 1) and 31 (reset code 2) are used, respectively.

The mute condition will be returned to initial condition when the Auto Reset timer is specified in **Auto Reset** in this screen (p. 18).

- Go to CH Mute
- Go to Moni(Aud)
- Go to Call
- Go to Tx Code
- Go to Auto Reset

⑱ **SW Action— Sel**

Selects the mute condition after memory or TX code channel selection from OFF, Aud and In A.

- OFF : Does not change even when selecting memory or TX code channel.
- Aud : Releases the 5-tone mute when 'SGL' is selected in **CH Mute** (p. 18) in this screen.
- In A : Mutes the 5-tone when 'SGL' is selected in **CH Mute** (p. 18) in this screen.

The mute condition will be returned to initial condition when the Auto Reset timer is specified in **Auto Reset** in this screen (p. 18).

- Go to CH Mute
- Go to Auto Reset

4-2 Bank (continued)

Action			5Tone Signaling									Scrambler	
Sel	Call	PTT	Form	RPT	L	STN	L	ID	L	Pos	RX C.No	ON/OFF	Code
			⑲	⑳					㉑				㉒

⑲ **SW Action— Call, PTT**
 Selects the mute condition from Aud and OFF after [Call] and [PTT] action.

- OFF : Does not change when transmitting with [Call]/[PTT] transmission.
- Aud : Releases the 5-tone mute when 'SGL' is selected in **CH Mute** (p. 18) in this screen after any [Call]/[PTT] transmission.

Select OFF for both the SW Action— Call and PTT, when **ABC— Aud** in **TX Code CH** (p. 50) is activated, and select OFF for the SW Action— PTT, when **PTT Call at Inaudible** in **TX Code Setting** (p. 51) is activated.

The [Call] key is assigned in **Key & Display** (p. 59).

The mute condition will be returned to initial condition when the Auto Reset timer is specified in **Auto Reset** in this screen (p. 18).

- Go to CH Mute
- Go to ABC— Aud
- Go to PTT Call at Inaudible
- Go to Call
- Go to Auto Reset

⑳ **5Tone Signaling— Form**
 Selects the 5-tone system format from USER, CCIR, ZVEI1, ZVEI2, DZVEI, EEA, EEA2, DAPL, EIA and DTMF.

When the DTMF decoder operation is required, select DTMF in this item.

㉑ **5Tone Signaling— RPT, STN, ID, L**
 Selects the 5-tone code channel for repeater (RPT), individual station/group (STN) access and own identity (ID), respectively.

Double-click the “L” column then select the desired long tone condition for each 5-tone code, RPT, STN and ID, respectively.
 - “L” appears when long tone is activated.

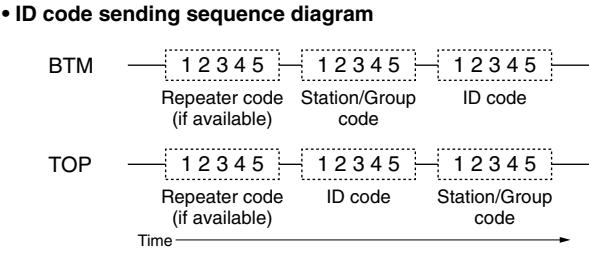
These 5-tone codes are programmed in **TX Code** in **TX Code CH** (p. 49).

The time period for the long tone is programmed in **Timer— Long Tone** in **TX Code Setting** (p. 51).

- Go to TX Code
- Go to Timer— Long Tone

㉒ **5Tone Signaling— Pos**
 Selects the own ID code sending sequence from OFF, BTM and TOP.

- OFF : Does not send the ID code.
- BTM : Sends the ID code after sending the station or group code.
- TOP : Sends the ID code before sending the station or group code.



②③ RX C-No

Select the receive 5-tone code channel to be decoded.

Up to 8 codes/channels can be selected for decode in each operating channel.

The 5-tone code is programmed in **RX Code** in **RX Code CH** (p. 45).

Double click the desired channel's 'RX C-No' cell to display the selection screen (see below), then double click the desired code channel number check-box to set the selected code channel to be decoded.

-The "✓" mark appears in the check-box when checked.



Go to RX Code

②④ Scrambler— ON/OFF

Double click to select the voice scrambling function initial setting from OFF, ON and Inhibit.

When OFF or ON is selected, the voice scrambling function can be manually switched with the [Scrambler] key, however, the function cannot be manually switched ON when Inhibit is selected.

An optional UT-109 or UT-110 VOICE SCRAMBLER UNIT is required.

The [Scrambler] key is assigned in **Key & Display** (p. 61).

Go to Scrambler

②⑤ Scrambler— Code

Enter the voice scrambling code within 1–32 using UT-109 or UT-110 with 'Non-Rolling' selection or within 1–255 using UT-110 with 'Rolling' selection installed.

In addition, **Scrambler— Group Code** in **Common** (p. 70) must be programmed when UT-110 is installed and 'Rolling' is selected in **Scrambler— Type** in **Common** (p. 70).

Go to Scrambler— Group Code

Go to Scrambler— Type

5-1 Bank Operation

Bank Operation			
Bank	Smar-Trunk	Capa	Use
1		16	0
2	①	②	③
3		0	0
4		0	0
5		0	0
6		0	0
7		0	0
8		0	0
9		0	0
10		0	0
11		0	0
12		0	0
13		0	0
14		0	0
15		0	0
16		0	0
④ Total		16	0
⑤ Left		240	256

① **SmarTrunk**

Turn the SmarTrunk usage ON and OFF.

The bank icon for SmarTrunk specified bank/s, displayed in the Tree View screen, changes from regular to SmarTrunk type as follows, for easy recognition.



: Regular type



: SmarTrunk type

② **Capa**

Set an available number of memory channels in the bank.

A memory channel can also be added or deleted during bank contents indication.

③ **Use**

Shows the number of memory channels actually programmed.

④ **Total**

Shows the total number of memory channels that have been assigned into banks below “Capa,” and “Use” columns, respectively.

⑤ **Left**

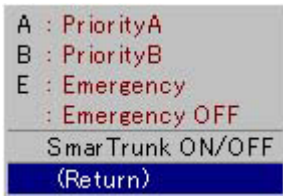
Shows the total number of memory channels that are assignable into banks below “Capa” and “Use” columns, respectively.

5-2 Bank

CH	Atr	Inh	Frequency (MHz)			W/
			RX	TX	TX Inh	
1- 1	AB					
1- 2						
1- 3	①	②	③		④	
1- 4						
1- 5						
1- 6						
1- 7						
1- 8						
1- 9						
1- 10						
1- 11						
1- 12						
1- 13						
1- 14						

① Atr

Selects the channel attribution from Prio A, Prio B, Emergency, Emergency OFF and SmarTrunk ON/OFF.



Right click or double click on the desired channel to open the sub-menu window as at left, then select the channel attribution.

A: PriorityA— “A” tagged channel becomes the priority channel A, simply recalled by pushing [Priority A] or [Priority A (Rewrite)] key, and also is automatically monitored during the priority scan. When [Priority A (Rewrite)] key is assigned, priority channel A can be re-assigned by pushing [Priority A (Rewrite)] key for 1 sec.

B: PriorityB— “B” tagged channel becomes the priority channel B, simply recalled by pushing [Priority B] key.

E: Emergency— “E” tagged channel becomes an emergency channel, immediately recalled and sends an emergency signal by pushing [Emergency Single] or [Emergency Repeat] key. Only 1 channel can be set.

Emergency OFF— Regular channel.

SmarTrunk ON/OFF— Specifies the selected bank for SmarTrunk operation.

The bank icon for SmarTrunk specified bank/s displayed in the Tree View Screen, changes from regular to SmarTrunk type as described in **Bank Operation** (① SmarTrunk).

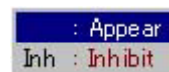
Go to SmarTrunk

[Priority A], [Priority B], [Priority A (Rewrite)], [Emergency Single] and [Emergency Repeat] keys are assigned in **Key & Display** (pgs. 58, 60).

- Go to Prio A, Prio B**
- Go to Prio A (Rewrite)**
- Go to Emergency Single, Emergency Repeat**

② Inh

Select “Inh:Inhibit” when the channel is to be inhibited.



The channel never appears on the transceiver, even if all the other items are programmed when the channel is inhibited.

③ Frequency (MHz)— RX, TX

Enter receive and transmit frequencies within the following frequency ranges in either 5, 6.25 or 7.5 kHz steps* for the RX and TX boxes, respectively.

IC-F500 series : 136–174 MHz

IC-F600 series : 400–430, 440–490, 480–512 MHz

*depending on version

When no receive frequency is entered, other items cannot be programmed in the channel.

When the editing bank is set as the SmarTrunk operation in **SmarTrunk** (Bank operation; p. 23) or **Atr** as described at left, operating frequencies must be programmed from channel 1 without a blank.

Go to SmarTrunk

④ Frequency— TX Inh

Select “Inh:Inhibit” when transmission inhibit is necessary.

5-2 Bank (continued)

X th	C. Tone			Text	Com- pander	TOT	RF Pwr	Lock -out	Scan List	
	W/N	RX	TX						List	In
	⑤			⑦	⑧	⑨	⑩	⑪	⑫	
		⑥								

⑤ W/N

Selects the passband width for each operating channel from Wide and Narrow.

The selection can be manually switched with the [Wide/Narrow] key for temporary operation.

The [Wide/Narrow] key is assigned in **Key & Display** (p. 59).

Go to Wide/Narrow

⑥ C.Tone— RX, TX

Selects a desired CTCSS frequency from the list. The list appears by double clicking the cell, or enter a 3-digit DTCS code with polarity, N (Normal) or I (Inverse), for receive and transmit in the RX and TX boxes, respectively.

RECOMMENDATION

When programming a CTCSS/DTCS code, choosing a frequency/code, listed in the following tables is recommended. In case a CTCSS frequency/DTCS code other than below is used, sometimes the squelch system may not function correctly.

• Recommended CTCSS frequencies

67.0	77.0	88.5	100.0	114.8	131.8	151.4	173.8	203.5	233.6
69.3	79.7	91.5	103.5	118.8	136.5	156.7	179.9	210.7	241.8
71.9	82.5	94.8	107.2	123.0	141.3	162.2	186.2	218.1	250.3
74.4	85.4	97.4	110.9	127.3	146.2	167.9	192.8	225.7	

• Recommended DTCS codes

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

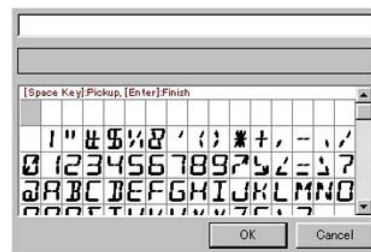
⑦ Frequency— Text

Enter up to a 10-character text in the Text cell for memory name, channel usage indication, etc.

The usable characters are as follows;

Characters	
0	() , (.) ! (!) ? (?) ' (') " (") , (,) ; (;) : (:)
_	(_) ; (()) ; (()) ' (<) ' (>) [([])] (])
!	(!) (Space) # (#) * (*) / (/) + (+) - (-) = (=) \ (\)
&	(&) % (%) \$ (\$) @ (@) ^ (^)
2	(2) A(A) B(B) C(C) a(a) b(b) c(c)
3	(3) D(D) E(E) F(F) d(d) e(e) f(f)
4	(4) G(G) H(H) I(I) g(g) h(h) i(i)
5	(5) J(J) K(K) L(L) j(j) k(k) l(l)
6	(6) M(M) N(N) O(O) m(m) n(n) o(o)
7	(7) P(P) Q(Q) R(R) S(S) p(p) q(q) r(r) s(s)
8	(8) T(T) U(U) V(V) t(t) u(u) v(v)
9	(9) W(W) X(X) Y(Y) Z(Z) w(w) x(x) y(y) z(z)

The independent text edit screen appears automatically during editing.



When no text is entered, the channel number is indicated.

When entering user original characters, enter '%' and the desired thumbnail number 10 to 19 and 1A to 1F (capital letters only).

Programming example:

When entering the original character thumbnail number 12, enter as '%12.'

User original characters are programmed in **Character Editor** (p. 72).

Go to Character Editor

⑧ **Compander**

Selects the compander function ON and OFF.

The compander function reduces back ground noise and increases the voice audio components in the receiving signal for clear communications.

When communicating with an other station that doesn't use or have the compander function, it is recommended to turn the compander function OFF via [Compander] key or select "OFF" in this cell, otherwise the received audio will distort.

The function can be switched ON or OFF for temporary operation with the [Compander] key.

The [Compander] key is assigned in **Key & Display** (p. 61).

Go to Compander

⑨ **TOT**

Toggle the time-out timer function ON and OFF.

Continuously transmittable time is limited by the timer during activation. The time-out timer must be activated due to local regulations in some countries.

The time period is programmed in **TOT/Lockout—TOT Timer** in **Common** (p. 68).

When the editing bank is set for SmarTrunk operation in **SmarTrunk** (Bank operation; p. 23) or **Atr** (p. 24), "OFF" must be selected.

Go to TOT/Lockout—TOT timer

Go to SmarTrunk

Go to Atr

⑩ **RF Pwr**

Selects the transmit output power for initial setting from High, Low1 and Low2.

The selected output power setting for each channel can be switched to either temporary or permanent operation, according to the setting in **Selection—RF Power Selection** in **Key & Display** (p. 64) via [High/Low] key.

The [High/Low] key is assigned in **Key & Display** (p. 59).

Go to Selection—RF Power

Go to High/Low

⑪ **Lockout**

Selects the transmission lock out (temporary transmission inhibit) capability from OFF, Busy, Rpt 1 and Rpt 2.

OFF : No restriction for receiving a signal.

Busy : [PTT] cannot be activated while the operating channel/repeater is in use.

Rpt1 : [PTT] can be activated while receiving a signal with matched CTCSS (or DTCS) tone or no signals.

Rpt2 : [PTT] can be activated while receiving a signal with matched CTCSS (or DTCS) tone or no signals while 5-tone mute is released, or receiving an unmatched CTCSS (or DTCS) tone while 5-tone mute is activated.

In addition, [PTT] is not activated for an extra time period in the case of when the lockout penalty timer, programmed in **TOT/Lockout—Penalty Timer** in **Common** (p. 68), is activated even if the transceiver is in a transmittable condition.

Go to TOT/Lockout—Penalty Timer

⑫ **Scan List—List**

Selects the channel included into the desired scan list (scan group) 0–9.

-The selected scan list number appears in the column.

Only the selected channels in the same scan list are scanned when [Scan A Start/Stop] or [Scan B Start/Stop] key is pushed.

2 ways of selection are available— one is using the PC keyboard (numeral keys), another one is using the independent selection screen.

Select the desired channel's 'List' cell, then press the numeral keys on the keyboard to set the selected memory channel and include it into the scan list.

Double click the desired channel's 'List' cell to display the selection screen (see below), then double click the desired scan list number check-box to set the selected memory channel and include it into the scan list.

-The "✓" mark appears in the check-box when checked.



The scan list (scanning group) is selectable via [CH Up] or [CH Down] keys, after [Scan A Start/Stop] or [Scan B Start/Stop] key is pushed for 1 sec.

The scanning conditions for each scan list are specified in **Scan List** (pgs. 43–44).

Continue to the next page—

⑰ Scrambler— ON/OFF

Double click to select the voice scrambling function initial setting from OFF, ON and Inhibit.

When OFF or ON is selected, the voice scrambling function can be manually switched with the [Scrambler] key, however, the function cannot be manually switched ON when Inhibit is selected.

An optional UT-109 or UT-110 VOICE SCRAMBLER UNIT is required.

The [Scrambler] key is assigned in *Key & Display* (p. 61).

Go to Scrambler

⑱ Scrambler— Code

Enter the voice scrambling code within 1–32 using UT-109 or UT-110 with 'Non-Rolling' selection or within 1–255 using UT-110 with 'Rolling' selection installed.

In addition, **Scrambler— Group Code** in *Common* (p. 70) must be programmed when UT-110 is installed and 'Rolling' is selected in **Scrambler— Type** in *Common* (p. 70).

Go to Scrambler— Group Code

Go to Scrambler— Type

6-1 MSK— ID Range

MSK - ID Range			
ID	Start	End	
Individual	0000 (No Edit)	3999 (No Edit)	①
Group	4000	4095 (No Edit)	②
Common	0001		③
Country Code	F		④
Killer ID	3456		⑤

① ID— Individual

Shows the Individual ID range.

The same ID range should be set to the all transceivers in the same system.

② ID— Group

Sets the Group ID range by entering a number into the 'Start' column within 0001 to 4095 for group calls. (Start: 4000 is default)

When the Group ID is set, the Individual ID range as above is set automatically.

The same ID range should be set to the all transceivers in the same system.

③ ID— Common

Set the Common ID within 0001 to 4095 range.

The same ID must be set for all transceivers that are going to communicate in the group.

The base station can communicate to all stations when changing the Common ID setting when used with the PC control command.

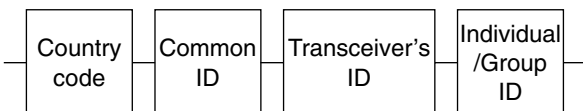
④ Country Code

Select the appropriate country code, specified by ETS 300 230, from the list.

The same country code must be set to all transceivers in that country.

Select 'Others' when no appropriate country code is listed.

Each ID and code are transmitted in the sequence that follows, when making a call.



Time →

Individual ID must be within the range of the Individual ID range, specified by the Group ID range setting as above.

Code 0001 to 3999 are assignable as the individual ID by default— 3999 codes are available. (Code 0000 is the fixed code for Clear Down transmission.)

Code 4000 to 4095 are assignable as the group ID by default— 96 codes are available.

And there are 32 country codes and 4095 common IDs.

$$32 \times 4,095 \times 3,999 = 524,028,960$$

$$32 \times 4,095 \times 96 = 12,579,840$$

So the BIIS system provides 524,028,960 ways for individual, and 12,579,840 ways for group selective calling in the entire system.

⑤ Killer ID

Set the desired killer ID (up to 4 digits) which disables the transceiver's operation.

When receiving a call with the killer ID, the stun function will be activated. In this case, password input is necessary, and the transceiver cannot be operated until entering the correct password.

The password is programmed in **Security— User Password** in **Common** (p. 67).

Go to Security— User Password

6-2 MSK— Own ID/Group

MSK - Own ID / Group				
No.	ID Code		Decode Action	
	ID	Display Text	Alert	Bell Icon
0	1234		PiRo	ON
1	4001		PiPi	Blink
2	4002		PiPi	Blink
3	4003		PiPi	Blink
4	4095			OFF
5	4095			OFF
6	4095			OFF
7	4095			OFF

① ID code— ID

Enter the Own ID for the transceiver into No. 0 within the Individual ID range.

Enter the Group ID into No.1 to No.7 within the Group ID range.

The transceiver is always standing-by with the own ID during MSK operation. The group ID for stand-by can be selected for each independent operating channel.

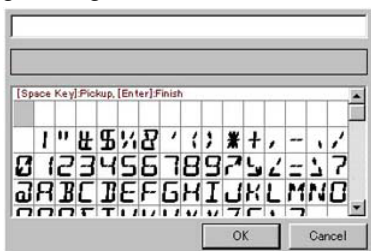
② ID code— Display Text

Enter the desired text message to display on the function display when the corresponding ID code is received.

The usable characters are as follows;

Characters
0 () , (.) ! (!) ? (?) ' (') " (") , (,) ; (;) : (:)
_ (_) ; (;) > (>) < (<) > (>) [([)] (])
! (!) (Space) # (#) * (*) / (/) + (+) - (-) = (=) \ (\)
& (&) % (%) \$ (\$) @ (@) ^ (^)
2 (2) A (A) B (B) C (C) a (a) b (b) c (c)
3 (3) D (D) E (E) F (F) d (d) e (e) f (f)
4 (4) G (G) H (H) I (I) g (g) h (h) i (i)
5 (5) J (J) K (K) L (L) j (j) k (k) l (l)
6 (6) M (M) N (N) O (O) m (m) n (n) o (o)
7 (7) P (P) Q (Q) R (R) S (S) p (p) q (q) r (r) s (s)
8 (8) T (T) U (U) V (V) t (t) u (u) v (v)
9 (9) W (W) X (X) Y (Y) Z (Z) w (w) x (x) y (y) z (z)

The independent text edit screen appears automatically during editing.



When no text is entered, the channel number is indicated.

When entering user original characters, enter ‘%’ and the desired thumbnail number 10 to 19 and 1A to 1F (capital letters only).

Programming example:

When entering the original character thumbnail number 12, enter as ‘%12.’

User original characters are programmed in **Character Editor** (p. 72).

Go to Character Editor

③ Decode Action— Alert

Select the desired alert beep type when receiving a signal with a matched ID (own or group).

Null: (Retain Beep)

Beep emission (or non emission) is retained.

OFF: (Turn off Beep)

No beeps are emitted.

Pi: (Single)

Emits 1 high beep once.

PiPi: (Single)

Emits 2 high beeps once.

PiRo: (Single)

Emits 1 high and 1 low beeps 3 times.

Pi/R: (Repeat)

Emits 1 high beep repeatedly for the set period.

PiPi/R: (Repeat)

Emits 2 high beeps repeatedly for the set period.

PiRo/R: (Repeat)

Emits 1 high, 1 low beep 3 times, repeatedly for the set period.

When selecting a repeat type alert, set the desired time period for repeat in **Decode Setting— Beep/Alert Timer** in **MSK— Config**. (p. 36).

Go to Beep/Alert Timer

④ Decode Action— Bell Icon

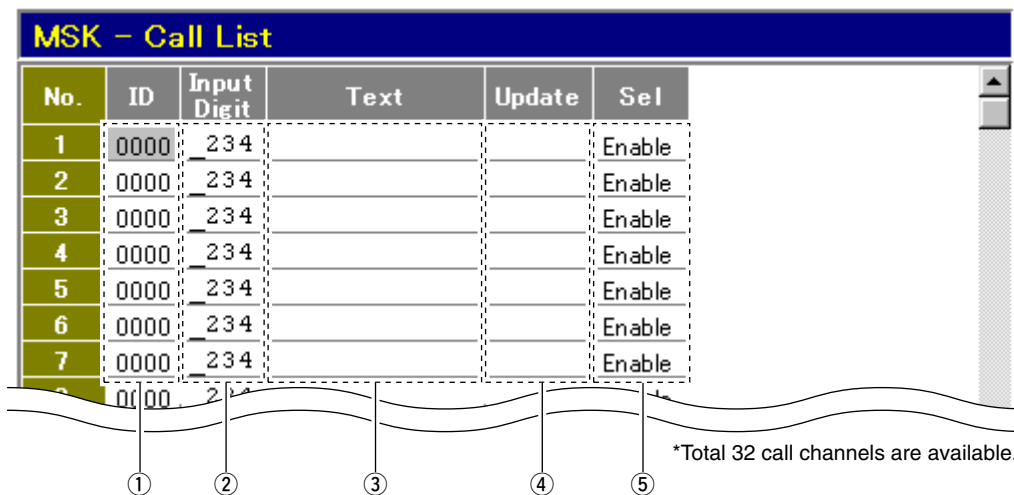
Select the desired bell indicator condition when receiving a signal with a matched ID (own or group).

OFF : The bell indicator goes off.

ON : The bell indicator appears until operating a key.

Blink : The bell indicator blinks until operating a key.

6-3 MSK— Call List



① ID

Enter the other transceiver’s (mobile or base) own (individual) ID and group ID.

The IDs can be selected when pushing [Digital] or [TX Code CH Up]/[TX Code CH Down].

[Digital], [TX Code CH Up] and [TX Code CH Down] keys are assigned in the **Key & Display** (pgs. 61, 62).

- Go to Digital**
- Go to TX Code CH Up, TX Code CH Down**

② Input Digit

Set the editable digit for direct ID input by pushing [TX Code Enter].

Press the appropriate number key on the PC keyboard (1–4), or display the edit window as below, then double click the number of the digit you want to edit ON and OFF.

The edit window is displayed when double clicking the column, or right click then select [Edit...Enter] in the desired column.

When inhibiting the code edit, hide all of the digit numbers or remove all of the “✓” mark from the edit window.

Double click the desired channel’s ‘Input Digit’ cell to display the selection screen (see below), then double click the desired scan list number check-box.

-The “✓” mark appears in the check-box when checked.



[TX Code Enter] key is assigned in **Key & Display** (p. 61).

- Go to TX Code Enter**

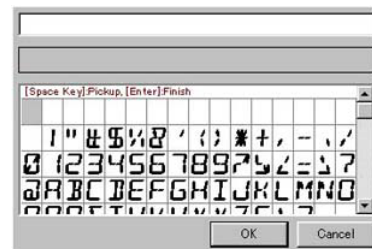
③ Text

Enter the desired text to display the text message instead of the ID number indication.

The usable characters are as follows;

Characters	
0	() , (.) ! (!) ? (?) ' (') " ("), (,) ; (;) : (:)
_	_ () : (:) ; (:) ' (<) > [([)] (])
1	! (1) (Space) # (#) * (*) / (/) + (+) - (-) = (=) \ (\)
&	& (&) % (%) \$ (\$) @ (@) ^ (^)
2	2 (2) A (A) B (B) C (C) a (a) b (b) c (c)
3	3 (3) D (D) E (E) F (F) d (d) e (e) f (f)
4	4 (4) G (G) H (H) I (I) g (g) h (h) i (i)
5	5 (5) J (J) K (K) L (L) j (j) k (k) l (l)
6	6 (6) M (M) N (N) O (O) m (m) n (n) o (o)
7	7 (7) P (P) Q (Q) R (R) p (p) q (q) r (r) s (s)
8	8 (8) T (T) U (U) V (V) t (t) u (u) v (v)
9	9 (9) W (W) X (X) Y (Y) Z (Z) w (w) x (x) y (y) z (z)

The independent text edit screen appears automatically during editing.



When no text is entered, the channel number is indicated.

When entering user original characters, enter ‘%’ and the desired thumbnail number 10 to 19 and 1A to 1F (capital letters only).

Programming example:

When entering the original character thumbnail number 12, enter as ‘%12.’

User original characters are programmed in **Character Editor** (p. 72).

- Go to Character Editor**

④ Update

Select the ID code overwrite capability.

The directly entered ID can be overwritten via [TX Code Enter] when “Enable” is selected. Select “Disable” when it is necessary to leave the contents as is.

[TX Code Enter] key is assigned in **Key & Display** (p. 61).

Go to TX Code Enter

⑤ Sel

Set the list selection from Disable or Enable.

Select “Disable” to prevent the desired ID from appearing on the function display when selecting the status via [Digital], [Status Up], [Status Down] or 10 keypad (on the optional HM-100TN).

[Digital], [Status Up] [Status Down] keys are assigned in **Key & Display** (p. 62).

Go to Digital

Go to Status Up/Down

6-4 MSK— Message— Status

MSK - Message - Status							
RX Status				TX Status			
No.	Display Text	Beep	Horn	Auto TX	Display Text	Priority	Sel
1	RX STAT 1	PiPi			TX STAT 1	Normal	ON
2	RX STAT 2	PiPi			TX STAT 2	Normal	ON
3	RX STAT 3	PiPi			TX STAT 3	Normal	ON
4	RX STAT 4	PiPi			TX STAT 4	Normal	ON
5	RX STAT 5	PiPi			TX STAT 5	Normal	ON
6	RX STAT 6	PiPi			TX STAT 6	Normal	ON
7	RX STAT 7	PiPi			TX STAT 7	Normal	ON
8	RX STAT 8	PiPi			TX STAT 8	Normal	ON
9	RX STAT 9	PiPi			TX STAT 9	Normal	ON
10	RX STAT 10	PiPi			TX STAT 10	Normal	ON
11	RX STAT 11	PiPi			TX STAT 11	Normal	ON
12	RX STAT 12	PiPi			TX STAT 12	Normal	ON
13	RX STAT 13	PiPi			TX STAT 13	Normal	ON
14	RX STAT 14				TX STAT 14		

① RX Status— Display Text

Enter the desired text to display on the function display instead of the status channel number.

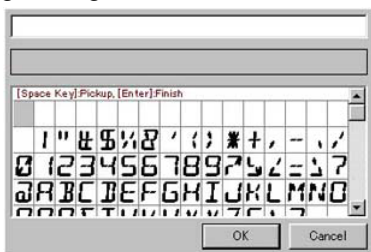
The programmed text appears when receiving the status.

No text message is displayed when receiving the Status 24, and the text edit is restricted in this screen because the Status 24 is a fixed function for the position request.

The usable characters are as follows;

Characters	
0	() , () ! (!) ? (?) ' (') " (") , (,) ; (;) : (:)
1	_ (_) < (<) > (>) [([)] (])
2	/ (/) (Space) # (#) * (*) / (/) + (+) - (-) = (=) \ (\)
3	& (&) % (%) \$ (\$) @ (@) ^ (^)
4	A (A) B (B) C (C) a (a) b (b) c (c)
5	D (D) E (E) F (F) d (d) e (e) f (f)
6	G (G) H (H) I (I) g (g) h (h) i (i)
7	J (J) K (K) L (L) j (j) k (k) l (l)
8	M (M) N (N) O (O) m (m) n (n) o (o)
9	P (P) Q (Q) R (R) S (S) p (p) q (q) r (r) s (s)
10	T (T) U (U) V (V) t (t) u (u) v (v)
11	W (W) X (X) Y (Y) Z (Z) w (w) x (x) y (y) z (z)

The independent text edit screen appears automatically during editing.



When no text is entered, the channel number is indicated.

When entering user original characters, enter '%' and the desired thumbnail number 10 to 19 and 1A to 1F (capital letters only).

Programming example:

When entering the original character thumbnail number 12, enter as '%12.'

User original characters are programmed in **Character Editor** (p. 72).

Go to Character Editor

② RX Status— Beep

Select the desired alert beep type for a Status call reception.

Null: (Retain Beep)

Beep emission (or non emission) is retained.

OFF: (Turn off Beep)

No beeps are emitted.

Pi: (Single)

Emits 1 high beep once.

PiPi: (Single)

Emits 2 high beeps once.

PiRo: (Single)

Emits 1 high and 1 low beeps 3 times.

Pi/R: (Repeat)

Emits 1 high beep repeatedly for the set period.

PiPi/R: (Repeat)

Emits 2 high beeps repeatedly for the set period.

PiRo/R: (Repeat)

Emits 1 high, 1 low beep 3 times, repeatedly for the set period.

When selecting a repeat type alert, set the desired time period for repeat in **Decode Setting—Beep/Alert Timer** in *MSK— Config.* (p. 36).

Go to Beep/Alert Timer

③ **RX Status— Horn**

Select the horn sounding capability from ON and OFF when receiving the Status call.

The optional OPC-617 (Pin 6: EXO is used for control) is necessary to use this function.

Use an external drive transistor for the horn sounding function because the transceiver outputs the control signal as the open collector that has only 12 V/500 mA driving capability.

④ **RX Status— Auto TX**

Select the auto transmit function from ON and OFF when receiving the Status call.

This function automatically transmits the microphone audio for the set period.

*Use the HM-100N only. This function cannot be used when the HM-100TN DTMF MICROPHONE is connected.

The transmission time period is set in **5Tone/MSK— Auto TX Timer** in *Common* (p. 69).

/// 'Inaudible' mode may be selected by the station that requests the Auto TX because it is transmitting a status call— audio cannot be heard. Therefore, use the PC control command to turn the MSK mute OFF (base station), or use an extra transceiver for monitoring.

Go to 5Tone/MSK— Auto TX Timer

⑤ **TX Status— Display Text**

Enter the desired text to display on the function display instead of the status channel number.

The programmed text appears when the TX status is selected via [Digital], [Status Up/Down] or 10 keypad on the optional HM-100TN.

See **RX Status— Display Text** (p. 32) for the usable characters details.

[Digital], [TX Code CH Up] and [TX Code CH Down] keys are assigned in *Key & Display* (pgs. 61, 62).

Go to RX Status— Display Text

Go to Digital

Go to TX Code CH Up, TX Code CH Down

⑥ **TX Status— Priority**

Select the desired transmission priority for the status call when the operating channel is busy.

Normal : Status call will be cancelled.

High : Status call is made even if the channel is busy. However, the calling success is not guaranteed.

Select "High" for the Status 22 (emergency call), because the status call is repeated until receiving an acknowledgement call.

Even if "Normal" is selected, the status call can be made when used with the Busy Check Timer.

When the timer is set, the transceiver watches for a signal, and transmits the status after the signal disappears. When the signal is still available for the set time period, the status call is cancelled.

The timer is set in the Busy Check Timer in the MSK Timing & Error screen.

⑦ **TX Status— Sel**

Select "Disable" to prevent the desired status message from appearing on the function display when selecting the status via [Digital], [Status Up], [Status Down] or optional HM-100TN's 10 keypad.

[Digital], [Status Up] [Status Down] keys are assigned in *Key & Display* (p. 62).

Go to Digital

Go to Status Up/Down

6 MSK (BIIS PMR ONLY)

6-5 MSK— Message— SDM

MSK - Message - SDM	
No.	SDM
1	
2	
3	
4	
5	
6	
7	
8	

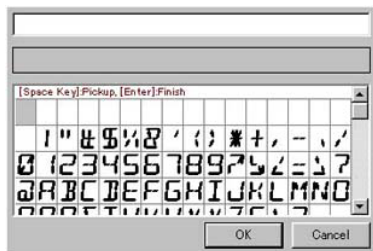
Enter up to a 10-character text message for short data message operation.

The usable characters are as follows;

Characters	
0	␣ () ' () ? () " () , () ; () : ()
1	␣ () ␣ () ␣ () ␣ () ␣ () ␣ () ␣ () ␣ ()
2	␣ () ␣ () ␣ () ␣ () ␣ () ␣ () ␣ () ␣ ()
3	␣ () ␣ () ␣ () ␣ () ␣ () ␣ () ␣ () ␣ ()
4	␣ () ␣ () ␣ () ␣ () ␣ () ␣ () ␣ () ␣ ()
5	␣ () ␣ () ␣ () ␣ () ␣ () ␣ () ␣ () ␣ ()
6	␣ () ␣ () ␣ () ␣ () ␣ () ␣ () ␣ () ␣ ()
7	␣ () ␣ () ␣ () ␣ () ␣ () ␣ () ␣ () ␣ ()
8	␣ () ␣ () ␣ () ␣ () ␣ () ␣ () ␣ () ␣ ()
9	␣ () ␣ () ␣ () ␣ () ␣ () ␣ () ␣ () ␣ ()

The message edit screen as below appears while editing a message.

Set the message directory from the PC keyboard or using the message edit screen.



In addition, up to 16 user original characters can also be used for the message.

The user original characters are created in **Character Editor** (p. 72)

Go to Character Editor

6-6 MSK— Timing & Error

MSK – Timing & Error		
Call Parameter		
NA	1	①
NM	1	②
NR	3	③
TAC(TAD)	0.50	④
Call LET Timer	0.05	⑤
Ack LET Timer	0.05	⑥
Busy Check Timer	0	⑦

① Call Parameter— NA

Set the desired number of repeating acknowledgement calls in a calling sequence from 1 to 8.

(default: 1)

② Call Parameter— NM

Set the desired number of repeating messages in a calling sequence from 1 to 8.

(default: 1)

NOTE: NA and NM

When setting 2 or a larger number, the calling success rate becomes higher even in bad signal conditions. Also, a TAC timer setting longer than the default must be set to receive all the acknowledgement calls or messages according to this setting.

All of the transceivers must be set with the same value for NA, NM and TAC Timer for all of the transceivers to be able to communicate.

The total calling time becomes longer in this case.

③ Call Parameter— NR

Set the desired number of repeating transmission calls when no acknowledgement call is received, from 1 to 8.

(default: 3)

This setting is different from the NA and NM settings. The desired number can be set for each transceiver independently.

④ Call Parameter— TAC(TAD)

Set the waiting time period for receiving an acknowledgement during a call within 0.01 to 2.55 sec.

When no acknowledgement is received in this set period, the transceiver repeats the call transmission the number of times set in NR.

The default setting is 0.5 sec., however, set a longer time period when communicating through a repeater using CTCSS.

Set 0.8 sec. (approx.) for CTCSS operation.

⑤ Call Parameter— Call LET Timer

Set the time period for transmission delay for the transmit signal and MSK modulation when transmitting a call.

⑥ Call Parameter— Ack LET Timer

Set the time period for transmission delay for the transmit signal and MSK modulation when transmitting an acknowledgement call.

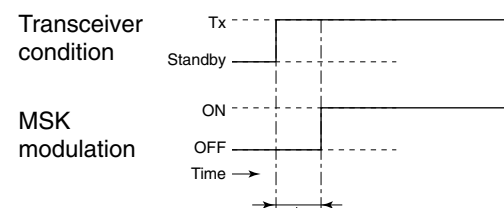
⑦ Call Parameter— Busy Check Timer

Set the stand by time period for the status call transmission (with the status priority set to “Normal”) when the operating channel is busy.

When the signal disappears within the set period, a status call will be made. However, the status call will be cancelled when the channel is busy for the duration of the set period.

- Max. 255 sec. can be set.

- Enter 0 sec. to cancel the call immediately when the channel is busy.



Call/Ack LET timers specifying the delay time for the MSK modulation from signal transmission for call transmission and acknowledgement call, respectively.

NOTE: Call LET Timer and Ack LET Timer

The default setting is 50 msec., however, set a longer time period when communicating through a repeater using CTCSS.

The communication may not be successful when the setting is shorter than the default time period because the time periods may be different between each transceiver.

Set 350 msec. (approx.) for CTCSS operation.

6-7 MSK— Config

MSK - Config		
Encode Setting		
PTT Call	Enable	①
Pre-Emphasis	FM	②
SYNC Word	B433	③
ANI		
PTT Side Tone	ON	④
Decode Setting		
Beep/Alert Timer	1.000	⑤
Mute MSK Tone	ON	⑥
Status Setting		
Fixed Base ID	0001	⑦
Send Status to PrioA CH	Disable	⑧
Power ON Status23	Disable	⑨
Power OFF Status19	Disable	⑩
GPS Setting		
Fixed Base ID	0001	⑪
Send GPS fix to Base	Disable	⑫
Auto	Disable	⑬
Time Marker [mm:ss]	10:00	⑭
Interval Timer [mm:ss]	5:00	⑮
Send with Logoff	Disable	⑯
Send with Status	Disable	⑰
Send with SDM	Disable	⑱
Send with Emergency	Disable	⑲
Sentence	\$GPRMC	⑳

① Encode Setting— PTT Call

Select the call operation capability with the microphone PTT.

When “Enable” is selected, the PTT functions as [Call] on an MSK channel during “Inaudible” mode.

② Encode Setting— Pre-emphasis

Select the MSK signal modulation type from “PM” and “FM.”

③ Encode Setting— SYNC Word

Set the synchronous signal word in the system with a 4 digit hexadecimal word.

The same word must be set for all transceivers to be communicated to.

For example, “B433” is mainly used in France.

Do not set “C4D7”. This word is used in the MPT trunking system.

④ ANI— PTT Side Tone

Select the beep emission capability to announce the communication timing during digital ANI operation with log-in setting.

A short beep sounds after the digital ANI signal is transmitted when set to ON.

⑤ Decode Setting— Beep/Alert Timer

Set the Beep/Alert repeat timer within 0 to 60 sec. range.

This timer is used for the alert beep emission and functions when receiving the MSK or status call with one of the ‘Repeat’ items set in **Decode Action— Alert** in *Own ID/Group* (p. 29) and in **RX Status— Beep** in *Message— Status* (p. 32).

Go to Decode Action— Alert

Go to RX Status— Beep

⑥ Decode Setting— Mute MSK Tone

Select the MSK signal mute function ON and OFF.

This function mutes the MSK audio coming from the other stations while the transceiver is in the 'Audible' mode (after the connection is successful, while monitoring, etc.).

The MSK signal mute function mutes only when the signal includes the same SYNC Word. The MSK signal can be heard when the signal includes an unmatched SYNC Word.

⑦ Status Setting— Fixed Base ID

Enter the desired station ID.

A status message is transmitted to this station all the time on the channel with "Base" as the setting for **Send Status** in **Bank** (p. 11).

Go to Send Status

⑧ Status Setting— Send Status to PrioA Ch

When "Enable" is set, the status message is always transmitted on the Priority A channel.

Specifying Priority A to the desired MSK channel is necessary.

The priority channel is specified in **Atr** in **Bank** (p. 7)

Go to Atr

⑨ Status Setting— Power ON Status 23

Set "Enable" to transmit the Status 23 when turning the power ON.

⑩ Status Setting— Power OFF Status 19

Set "Enable" to transmit the Status 19 when turning the power OFF.

⑪ GPS Setting— Fixed Base ID

Enter the desired station ID.

The position data is transmitted to this station all the time when the Send GPS fix to Base, as below, is set to "Enable" also.

This ID is independent from the ID programmed in **Status Setting— Fixed Base ID** as above.

⑫ GPS Setting— Send GPS fix to Base

Turn the sending position data to fixed station capability ON and OFF.

Select "Enable" to send the position data to the specified station (**GPS Setting— Fixed Base ID** as above).

⑬ GPS Setting— Auto

Turn the automatic position data transmission capability ON and OFF.

The position data is automatically transmitted at the specified time and interval when "Enable" is selected.

The time and interval are specified in **GPS Setting— Timer Marker [mm:ss]** and **Interval Timer [mm:ss]** as follows.

The transceiver reads the UTC time data from the GPS receiver after 10 minutes from turning the transceiver power ON, then specifies the time marker. Therefore, the GPS receiver must receive the time data signals properly before the UTC time is read into the transceiver.

Check the GPS data is received properly by sending the Status 24 (GPS Request) to ensure the GPS Auto TX activates.

⑭ GPS Setting— Time Marker [mm:ss]

Set the desired Marker time for the automatic position transmission capability.

The Marker time is specified by the set value and based on each second of a UTC hour.

Set a different Marker time for each transceiver to avoid interference caused by the simultaneous transmission of position data.

⑮ GPS Setting— Interval Timer [mm:ss]

Set the desired interval time.

NOTE: Time Marker and Interval Timer

For example:

- Time Marker : 40 minutes
- Interval Timer : 90 minutes
- Transceiver powered ON : at 8:50 UTC time

The first position data is transmitted at 9:40 UTC time.

The second position data is transmitted at 11:10 UTC time, then both types of position data are transmitted in 90 minute intervals.

⑯ GPS Setting— Send with Logoff

Turn the automatic position data transmission capability at log-off (each time [PTT] is released) ON and OFF.

This function activates only when "L-OFF" is selected in **Log IN/OFF** in **Bank** (p. 11).

The position data is transmitted to the station that is specified in **GPS Setting— Fixed Base ID** when "ON" is selected in **GPS Setting— Send GPS fix to Base** described at left.

Transmit the data to the communicating station/party when no ID is specified in **GPS Setting— Fixed Base ID** or "OFF" is selected in **GPS Setting— Send GPS fix to Base**.

6 MSK (BIIS PMR ONLY)

6-7 MSK— Config (continued)

MSK – Config		
Encode Setting		
PTT Call	Enable	①
Pre-Emphasis	FM	②
SYNC Word	B433	③
ANI		
PTT Side Tone	ON	④
Decode Setting		
Beep/Alert Timer	1.000	⑤
Mute MSK Tone	ON	⑥
Status Setting		
Fixed Base ID	0001	⑦
Send Status to PrioA CH	Disable	⑧
Power ON Status23	Disable	⑨
Power OFF Status19	Disable	⑩
GPS Setting		
Fixed Base ID	0001	⑪
Send GPS fix to Base	Disable	⑫
Auto	Disable	⑬
Time Marker [mm:ss]	10:00	⑭
Interval Timer [mm:ss]	5:00	⑮
Send with Logoff	Disable	⑯
Send with Status	Disable	⑰
Send with SDM	Disable	⑱
Send with Emergency	Disable	⑲
Sentence	\$GPRMC	⑳

⑰ GPS Setting— Send with Status

The position data is transmitted after making a Status call when “Enable” is selected.

The position data is transmitted to the same station that the Status call was made to.

⑱ GPS Setting— Send with SDM

The position data is transmitted after an SDM transmission when “Enable” is selected.

The position data is transmitted to the selected station for the SDM transmission in this case.

⑲ GPS Setting— Send with Emergency

The position data is transmitted after an emergency call via [Emergency Single], [Emergency Repeat] key or DIM input, when “Enable” is selected.

The position data is transmitted to the station that is specified in the emergency status setting in this case.

[Emergency Single] or [Emergency Repeat] key is assigned in **Key & Display** (p. 60).

⑳ GPS Setting— Sentence

Select the desired position data sentence format to be transmitted from \$GPRMC, \$GPGLL and \$GPGLL.

Go to Emergency Single, Emergency Repeat

7-1 DTMF Autodial

• DTMF Autodial screen for BIIS PMR/PMR selection

DTMF Autodial		
No.	Code	Text
1		DTMF 1
2		DTMF 2
3		DTMF 3
4		DTMF 4
5		DTMF 5
6		DTMF 6
7		DTMF 7
8		DTMF 8

• DTMF Autodial screen for LMR selection

DTMF Autodial		
No.	Code	Text
1		DTMF 1
2		DTMF 2
3		DTMF 3
4		DTMF 4
5		DTMF 5
6		DTMF 6
Emergency		DTMF 7
Log/ID		DTMF 8

① Code

Enter up to a 24-digit DTMF code for simple and quick DTMF code transmission.

The usable characters are 0–9, A–F (#/* used as F/E).

The programmed DTMF codes are selected via [CH Up] or [CH Down] key after pushing [DTMF Autodial] key.

The [CH Up], [CH Down] and [DTMF Autodial] keys are assigned in **Key & Display** (pgs. 57, 59).

Go to CH Up, CH Down

Go to DTMF Autodial

② Text

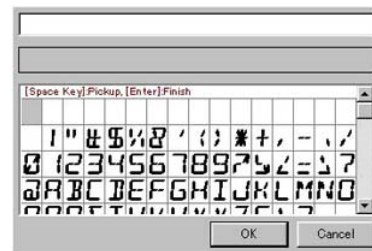
Enter up to a 10-character text for easy recognition of DTMF code usage, etc.

When no text is programmed, the programmed DTMF code is scrolled.

The usable characters are as follows;

Characters
0 (0) . (.) ! (!) ? (?) ' (') " (") , (,) ; (;) : (:) (()
_ (_) { ({) } (}) ^ (^) < (<) > (>) [([)] (])
() (1) (Space) # (#) * (*) / (/) + (+) - (-) = (=) \ (\)
& (&) % (%) \$ (\$) @ (@) ^ (^)
2 (2) A (A) B (B) C (C) a (a) b (b) c (c)
3 (3) D (D) E (E) F (F) d (d) e (e) f (f)
4 (4) G (G) H (H) I (I) g (g) h (h) i (i)
5 (5) J (J) K (K) L (L) j (j) k (k) l (l)
6 (6) M (M) N (N) O (O) m (m) n (n) o (o)
7 (7) P (P) Q (Q) R (R) S (S) p (p) q (q) r (r) s (s)
8 (8) T (T) U (U) V (V) t (t) u (u) v (v)
9 (9) W (W) X (X) Y (Y) Z (Z) w (w) x (x) y (y) z (z)

The independent text edit screen appears automatically during editing.



When no text is entered, the channel number is indicated.

When entering user original characters, enter ‘%’ and the desired thumbnail number 10 to 19 and 1A to 1F (capital letters only).

Programming example:

When entering the original character thumbnail number 12, enter as ‘%12.’

User original characters are programmed in **Character Editor** (p. 72).

Go to Character Editor

7-2 DTMF Setting

DTMF Setting		
DTMF Timer	0.100	①
First Timer	0.100	②
* # Timer	0.100	③

① DTMF Timer

Enter the time period/signal length for each DTMF code emission and interval.

② First Timer

Enter the time period/signal length for 1st DTMF code emission and interval corresponding to the scanning or power saving of the transceiver.

③ * # Timer

Enter the time period/signal length for [*] and [#] DTMF code signal emission and interval.

These codes may be used for control codes depending on the signaling system.

When these special codes are used for the 1st digit code, the **1st Timer** as above has priority over this setting.

8-1 Continuous Tone

Continuous Tone		
No.	RX	TX
1		
2		
3		
4		
5		
6		
7		
8		
9		

The IC-F500 series transceiver has a total of 9 continuous tone memory channels, in addition to the channel (operating channel) independent continuous tone operation. Separate continuous tone, CTCSS or DTCS for encoder and decoder, can be programmed for each channel, and can be operated temporarily or permanently.

• RX, TX

Selects the desired CTCSS frequency from the list or enter a 3-digit DTCS code with polarity, N (Normal) or I (Inverse), for receive and transmit in the RX and TX boxes, respectively.

The programmed continuous tone combinations can be used for temporary encoder and/or decoder operation.

To use the programmed continuous tone;

Push [C. Tone CH Ent] key, then select a continuous tone memory channel via [CH Up] or [CH Down] key.

[C. Tone CH Ent], [CH Up] and [CH Down] keys are assigned in **Key & Display** (pgs. 57, 59).

Go to C.Tone CH Ent

Go to CH Up, CH Down

RECOMMENDATION

When programming a CTCSS/DTCS code, choosing a frequency/code listed in the following tables is recommended. In case a CTCSS frequency/DTCS code other than below is used, sometimes the squelch system may not function correctly.

• Recommended CTCSS frequencies

67.0	77.0	88.5	100.0	114.8	131.8	151.4	173.8	203.5	233.6
69.3	79.7	91.5	103.5	118.8	136.5	156.7	179.9	210.7	241.8
71.9	82.5	94.8	107.2	123.0	141.3	162.2	186.2	218.1	250.3
74.4	85.4	97.4	110.9	127.3	146.2	167.9	192.8	225.7	

• Recommended DTCS codes

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

8-2 Continuous Tone Setting

Continuous Tone – Setting		
Tone Burst	Notone	①
CTCSS Reverse Burst Timer	0.300	②
User CTCSS Freq (Hz)	88.5	③
TX DTCS Inverse	Normal	④
RX DTCS Inverse	Normal	⑤
RX AF Filter	Normal	⑥

① Tone Burst

Selects the tone burst system from Notone and Phase.

Notone: Unmodulates the CTCSS encoder signal for the specified time period programmed in **CTCSS Reverse Burst** in this screen, as follows. (This system is currently used.)

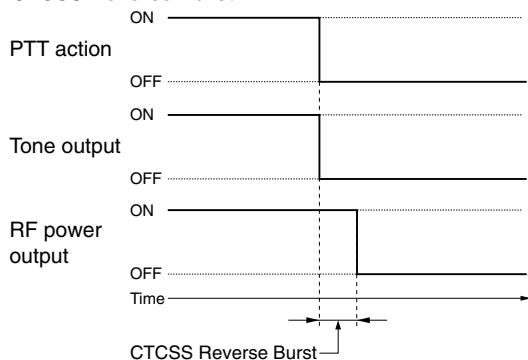
Phase : Reverses the phase of the CTCSS encoder signal for the specified time period programmed in **CTCSS Reverse Burst** in this screen, as follows.

② CTCSS Reverse Burst Timer

Enters the time period for transmission delay with [PTT] operation and CTCSS signal.

The transceiver still transmits for the programmed period without the CTCSS encoder, or with the phase reversed CTCSS encoder signal, after [PTT] is released. This removes the transceiver's 'Squelch delay'.

• CTCSS Reverse Burst



③ User CTCSS Freq (Hz)

Programs an additional customer/system own CTCSS frequency to the existing 51 CTCSS frequencies within 60 to 300 Hz range.

The programmed CTCSS frequency can be selected in **C.Tone— RX, TX** in **Bank** (BIIS PMR; p. 8, PMR; p. 16, LMR; p. 24), and **RX, TX** in **Continuous Tone** (p. 41) by selecting 'USER'.

Go to C.Tone— RX, TX (BIIS PMR)

Go to C.Tone— RX, TX (PMR)

Go to C.Tone— RX, TX (LMR)

Go to RX, TX

④ TX DTCS Inverse

Selects the transmit DTCS code polarity.

In order for the transceiver to communicate using a DTCS code, the polarity of the transmitting transceiver's transmit code must be the same as the polarity of the receiving transceiver's receive code.

⑤ RX DTCS Inverse

Selects the receive DTCS code polarity.

In order for transceivers to communicate using DTCS codes, the polarity of the receiving transceiver's receive code must be the same as the polarity of the transmitting transceiver's transmit code.

⑥ RX AF Filter

Turns the high-pass filter in the AF circuit ON and OFF.

Select "Low Cut" when the continuous tone is in use to reduce the CTCSS tone output from the speaker.

9-1 Scan List

Scan List			
List	Scan Mode	Text	Text ON
1	M1 (Normal)	SCAN 1	ON
2	M1 (Normal)	SCAN 2	ON
3	M1 (Normal)	SCAN 3	ON
4	M1 (Normal)	SCAN 4	ON
5	M1 (Normal)	SCAN 5	ON
6	M1 (Normal)	SCAN 6	ON
7	M1 (Normal)	SCAN 7	ON
8	M1 (Normal)	SCAN 8	ON
9	M1 (Normal)	SCAN 9	ON
10	M1 (Normal)	SCAN 10	ON

①
②
③

A total of 10 scanning lists/groups are available for a wide variety of scanning operation. In this screen, program scanning conditions for each list/group.

① Scan Mode

Selects the scanning mode from Scan OFF, MODE 1, MODE 2 and MODE 3.

Scan OFF: Scan function cannot be controlled from the transceiver keypad.

MODE 1 : Normal scan. Scans all checked channels. The scan proceeds in sequence from lower to higher channel number.

MODE 2 : Priority scan. The priority A channel is monitored every fixed time period during scan (depending on version), or every specified time period programmed in **Timer— Stop** in **Scan Setting** (p. 44), during pause. The busy or paused channel is retained when scan is cancelled.

MODE 3 : Priority scan. Same scanning sequence as MODE 2 above. The priority channel is retained when scan is cancelled.

The scanning channels are selected in **Scan List— List** in **Bank** (BIIS PMR; p. 9, PMR; p. 17, LMR; p. 25).

The priority A channel is selected in **Atr** in **Bank** (BIIS PMR; p. 7, PMR; p. 15, LMR; p. 23).

- Go to Timer— Stop**
- Go to Scan List— List (BIIS PMR)**
- Go to Scan List— List (PMR)**
- Go to Scan List— List (LMR)**
- Go to Atr (BIIS PMR)**
- Go to Atr (PMR)**
- Go to Atr (LMR)**

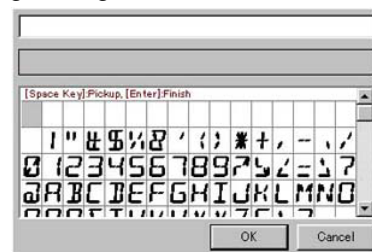
② Text

Enter up to a 10-character text to indicate messages, etc. during scanning.

The usable characters are as follows;

Characters
0 (0) \ (.) ! (!) ? (?) ' (') " (") , (,) ; (;) : (:) ; (;) ; (;) ; (;)
_ (_) : (:) ; (:) < (<) > (>) [([)] (])
! (1) (Space) # (#) * (*) / (/) + (+) - (-) = (=) \ (\)
& (&) % (%) \$ (\$) @ (@) ^ (^)
2 (2) A (A) B (B) C (C) a (a) b (b) c (c)
3 (3) D (D) E (E) F (F) d (d) e (e) f (f)
4 (4) G (G) H (H) I (I) G (g) h (h) i (i)
5 (5) J (J) K (K) L (L) j (j) k (k) l (l)
6 (6) M (M) N (N) O (O) m (m) n (n) o (o)
7 (7) P (P) Q (Q) R (R) S (S) P (p) q (q) r (r) s (s)
8 (8) T (T) U (U) V (V) t (t) u (u) v (v)
9 (9) W (W) X (X) Y (Y) Z (Z) w (w) x (x) y (y) z (z)

The independent text edit screen appears automatically during editing.



When entering user original characters, enter ‘%’ and the desired thumbnail number 10 to 19 and 1A to 1F (capital letters only).

Programming example:

When entering the original character thumbnail number 12, enter as ‘%12.’

User original characters are programmed in **Character Editor** (p. 72).

- Go to Character Editor**

③ Text ON

Turn the text (programmed in **Text** as above) indication during scan ON and OFF.

9-2 Scan Setting

Scan Setting		
Timer		
Stop	5.000	①
Resume	3.000	②
Fast Scan	0.030	③
Slow Scan	0.300	④
Power ON Scan	OFF	⑤
Auto CH Call	OFF	⑥

① Timer— Stop

Enters the time period for scan pausing on a busy channel (watching interval) when receiving a signal in scan mode 2 or 3 (priority scan), specified in **Scan Mode** in **Scan List** (p. 43).

Go to Scan Mode

② Timer— Resume

Enters the time period for resuming scanning after the signal disappears.

③ Timer— Fast Scan

Enters the time period for scanning of each channel without CTCSS/DTCS programming.

An appropriate time is set by default. The scan may not stop when setting a value less than the default.

④ Timer— Slow Scan

Enters the time period for scanning of each channel with CTCSS/DTCS programming.

An appropriate time is set by default. The scan may not stop when setting a value less than the default.

⑤ Power ON Scan

Select the automatic scan start capability at power ON.

Also, automatically restarts scanning even when scanning has been cancelled once by call transmission, reception, or manually, etc., after a specified time has passed when the signal disappears, or key operation is finished when the power ON scan function is activated.

When SmarTrunk ON/OFF is selected for the editing bank in **Atr** in **Bank** (BIIS PMR; p. 7, PMR; p. 15, LMR; p. 23), the Power ON scan setting must be OFF.

The scanning restart condition is selected in **Auto Reset** in **Bank** (BIIS PMR; p. 10, PMR; p. 18, LMR; p. 26), and the time period is programmed in **Auto Reset— Timer A, Timer B** and **Auto Reset— Inactive Timer** (BIIS PMR/PMR only) in **Common** (pgs. 67, 68).

Go to Atr (BIIS PMR)

Go to Atr (PMR)

Go to Atr (LMR)

Go to Auto Reset (BIIS PMR)

Go to Auto Reset (PMR)

Go to Auto Reset (LMR)

Go to Auto Reset— Timer A, Timer B

Go to Auto Reset— Inactive Timer

⑥ Auto CH Call (BIIS PMR/PMR only)

Select "ON" to activate the automatic clear channel searching capability when [Call] key is pushed (call transmission).

When [Call] key is pushed while the channel without BIIS/5-tone is busy, the transceiver starts scanning, then transmits the previously transmitted BIIS/5-tone code after a clear channel is found.

The [Call] key is assigned in **Key & Display** (p. 59).

Go to Call

10-1 RX Code CH

5Tone RX Code CH												
CH	RX Code	Text	ID Dec	Bell	Emer Cancel	ABC	EXO	Beep	Auto TX	Aud	Stun	Scan
1	111①	CALL 1	③	C④	⑤	⑥	⑦	Pi⑧	⑨	f⑩	⑪	⑫
2	22222	CALL 2		ON				PiRo		Aud		
3	33333	CALL 3		ON				PiRo		Aud		
4	44444	CALL 4		ON				PiRo		Aud		
5	55555	CALL 5		ON				PiRo		Aud		
6	66666	CALL 6		ON				PiRo		Aud		
7	77777	CALL 7		ON				PiRo		Aud		
8	88888	CALL 8		ON				PiRo		Aud		
G	----	GROUP		Blink		----		PiPi	----	Aud		

① RX Code

Enter up to a 7-digit code for receiving a 5-tone code.

When entering “+” instead of number(s), the digit(s) are used for the status function, which indicates a number message. Any number is accepted for decoding and is indicated on the display instead of text or a decoded ID as programmed in **Text** or **ID-Dec** as follows, when receiving the call.

Up to a 7-digit DTMF code for receive can be programmed. In this case, DTMF must be selected in **5TONE Signaling— Form** in **Bank** (BIIS PMR; p. 12, PMR; p. 20).

Go to 5Tone Signaling— Form (BIIS PMR)

Go to 5Tone Signaling— Form (PMR)

② Text

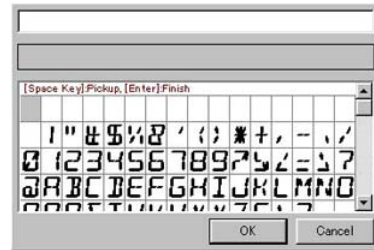
Enter up to a 10-character text for indication when a matched 5-tone/DTMF code is received.

To display the text when a matched 5-tone code is received, the **ID Dec** in this screen must be blank.

The usable characters are as follows;

Characters	
0	() , (.) ! (!) ? (?) ' (') " (") , (,) ; (;) : (:)
-	(-) { ({) } (}) < (<) > (>) [([)] (])
1	(1) (Space) # (#) * (*) / (/) + (+) - (-) = (=) \ (\)
2	(2) & (&) % (%) \$ (\$) @ (@) ^ (^)
3	(3) A (A) B (B) C (C) a (a) b (b) c (c)
4	(4) D (D) E (E) F (F) d (d) e (e) f (f)
5	(5) G (G) H (H) I (I) g (g) h (h) i (i)
6	(6) J (J) K (K) L (L) j (j) k (k) l (l)
7	(7) M (M) N (N) O (O) m (m) n (n) o (o)
8	(8) P (P) Q (Q) R (R) S (S) p (p) q (q) r (r) s (s)
9	(9) T (T) U (U) V (V) t (t) u (u) v (v)
	(0) W (W) X (X) Y (Y) Z (Z) w (w) x (x) y (y) z (z)

The independent text edit screen appears automatically during editing.



When entering user original characters, enter “%” and the desired thumbnail number 10 to 19 and 1A to 1F (capital letters only).

Programming example:

When entering the original character thumbnail number 12, enter as ‘%12.’

User original characters are programmed in **Character Editor** (p. 72).

Go to Character editor

③ ID Dec

Select “ON” to activate the ID decode capability to indicate the received ID code on the LCD, instead of the text programmed in **Text**, when a matched 5-tone/DTMF code is received.

④ Bell

Selects the bell indicator condition when a matched 5-tone/DTMF code is received from Null, OFF, ON and Blink.

- Null : The bell indicator condition is not changed, even when a matched 5-tone code is received.
- OFF : The bell indicator goes off.
- ON : The bell indicator appears until operation of a key.
- Blink : The bell indicator blinks until operation of a key.

10 5TONE (BIIS PMR/PMR ONLY)

10-1 RX Code CH (continued)

5Tone RX Code CH												
CH	RX Code	Text	ID Dec	Bell	Emer Cancel	ABC	EXO	Beep	Auto TX	Aud	Stun	Scan
1	111①	CALL 1	③	C④	⑤	⑥	⑦	Pi⑧	⑨	f⑩	⑪	⑫
2	22222	CALL 2		ON				PiRo		Aud		
3	33333	CALL 3		ON				PiRo		Aud		
4	44444	CALL 4		ON				PiRo		Aud		
5	55555	CALL 5		ON				PiRo		Aud		
6	66666	CALL 6		ON				PiRo		Aud		
7	77777	CALL 7		ON				PiRo		Aud		
8	88888	CALL 8		ON				PiRo		Aud		
G	----	GROUP		Blink		----		PiPi	----	Aud		

⑤ Emer Cancel

Select to enable the emergency repeat call cancel when a matched RX code is received.

Once the Emergency Repeat Call is performed, the transceiver repeatedly transmits the emergency call at specified intervals until the selected cancelling condition is performed.

⑥ ABC

Selects the answer back call capability from OFF, STN, SGL and 1–32.

- OFF : No answer back operation.
- STN : Transmits the station code which is selected with the channel assigned code.
- SGL : Transmits a 1 kHz single tone for 2 sec.
- 1–32 : Transmits the selected channel's 5-tone/DTMF code, programmed in **TX code** in **TX Code CH** (p. 49), regardless of the operating channel.

Go to TX Code

⑥ EXO

Selects the external unit, such as a buzzer, horn honk, control signal (EXO; pin 6) output capability when receiving the matched 5-tone from ON and OFF.

The optional ACC cable, OPC-617, must be installed and external unit connection is necessary.

The activation time can be set in **EXO/Horn Timer** in **Common** (p. 69).

Go to EXO/Horn Timer

⑧ Beep

Select the beep type when a matched 5-tone/DTMF code is received from Null, OFF, Pi(single), PiPi(single), PiRo(single), Pi(repeat), PiPi(repeat), and PiRo(repeat).

- Null : Beep emission (or non emission) is retained even when a matched 5-tone code is received.
- OFF : Beep emission is turned OFF.
- Pi(single) : 1 high beep once.
- PiPi(single) : 2 high beeps once.
- PiRo(single) : 1 high and 1 low beep 3 times.
- Pi(repeat) : 1 high beep repeated at the specified time period.
- PiPi(repeat) : 2 high beeps repeated at the specified time period.
- PiRo(repeat) : 1 high, 1 low beep 3 times, repeated at the specified time period.

The repeating interval is programmed in **Timer—Beep Repeat** in **RX Code Setting** (p. 48).

Go to Timer—Beep Repeat

⑨ Auto TX

Select automatic transmit capability when a matched 5-tone code is received.

The transmitting time period is programmed in **Timer—Auto TX** in **RX Code Setting** (p. 48).

Go to Timer—Auto TX

⑩ Aud

Selects the transceiver's receiving condition when a matched 5-tone/DTMF code is received from Null, IN_A and Aud.

- Null : Retains audible status
- IN_A : Inaudible mode is selected.
- Aud : Audible mode is selected.

When the DTMF decoder is used as a pager function, Aud selection is recommended.

⑪ Stun

Selects the transceiver's basic condition when a matched 5-tone code is received from OFF, Kill, and Stun.

- OFF : The transceiver can be used continuously.
- Kill : The transceiver cannot be used. Cloning is necessary to activate the transceiver.
- Stun : A message, "SORRY", appears and the transceiver cannot be used. To use the transceiver, turn power OFF and ON again. At this time, password input is necessary.

The password is programmed in **Security— User Password** in *Common* (p. 67).

Go to Security— User Password

⑫ Scan

Selects the scanning condition when a matched 5-tone/DTMF code is received from Null, Cancel and Start.

- Null : Scan condition is unaffected.
- Cancel : Cancels the scan.
- Start : Starts the scan.

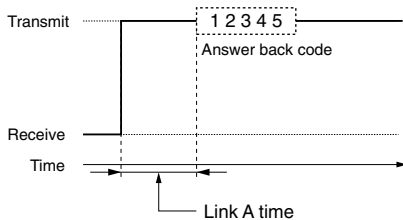
10-2 RX Code Setting

5Tone RX Code Setting		
Timer		
Link A	0.800	①
ID Decode	1.600	②
Beep Repeat	10.000	③
Auto TX	60.000	④
Compare Digit	12345	⑤

① Timer— Link A

Enter the non-modulated time period before transmitting an answer back call.

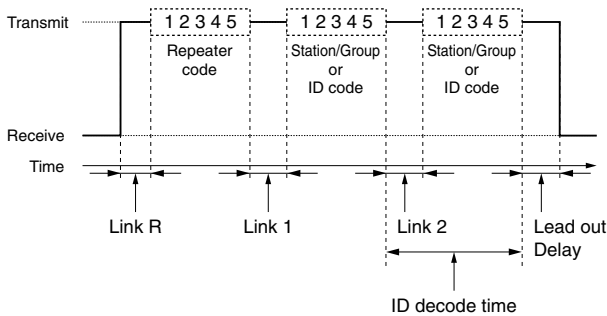
• Link A Timer Timing diagram



② Timer— ID Decode

Enter the time period for decoding an ID code completely when the ID decode capability is activated, specified in **ID Dec** in *RX Code CH* (p. 45).

• ID decode Timer



Go to ID Dec

③ Timer— Beep Repeat

Enter the time period for the repeated beep interval for Pi(repeat), PiPi(repeat), and PiRo(repeat) beep type selection in **Beep** in *RX Code CH* (p. 46).

Go to Beep

④ Timer— Auto TX

Enters the time period for the automatic transmit function when a matched 5-tone code is received. The automatic transmit function is programmed in **Auto TX** in *RX Code CH* (p. 46).

Go to Auto TX

⑤ Compare Digit

Click the check-box to select comparative digits for decoding (ignores blanked digit/s for the decode actions)

When a "+" (status code) is programmed in **RX Code** in *RX Code CH* (p. 45), the digit is not compared even if selected.

Go to Rx Code

10-3 TX Code CH

5Tone TX Code CH							
CH	TX Code	Input Digit	Text	Update	ABC		
					Dec	Aud	Sel
1	1111①	4②	③	④	⑤	⑥	⑦
2	22222	45		ON			ON
3	33333	45		ON			ON
4	44444	45		ON			ON
5	55555	45		ON			ON

① TX Code

Enter up to a 7-digit code for transmitting the 5-tone/DTMF station, ID or repeater codes. Up to 32 channels are available.

Usable codes are [0]–[9], [A]–[E] (or [#]) and group code ([G] or [*]).

The programmed TX code in CH No. 32 and 31 are normally used for the reset code 1 and 2, respectively. It is automatically transmitted when In A+R1, In A+R2, Both+R1 or Both+R2 is selected for the mute condition selection after [Moni(Audi)] key action in **Switch Action— Moni** in **Bank** (BIIS PMR; p. 11, PMR; p. 19).

The programmed TX codes in CH No. 30 (Call A) and 29 (Call B), are normally used for the call transmission A and B via [Call A (Code 30)] or [Call B (Code 29)] key operation, respectively.

[Call A (Code 30)] or [Call B (Code 29)] key is assigned in **Key & Display** (p. 59).

- Go to Switch Action— Moni (BIIS PMR)**
- Go to Switch Action— Moni (PMR)**
- Go to Call A (Code 29), Call B (Code 30)**

② Input digit

Set the editable digit for direct 5-tone code input by pushing [TX Code Enter].

Press the appropriate number key on the PC keyboard (1–7), or display the edit window as below, then double click the number of the digit you want to edit ON and OFF.

The edit window is displayed when double clicking the column, or right click then select [Edit...Enter] in the desired column.

When inhibiting the code edit, hide all of the digit numbers or remove all of the “✓” marks from the edit window.

Double click the desired channel’s ‘Input Digit’ cell to display the selection screen (see above right), then double click the desired scan list number check-box.

The checked digits only can be entered.

-The “✓” mark appears in the check-box when checked.



[TX Code Enter] key is assigned in **Key & Display** (p. 61).

Go to TX Code Enter

③ Text

Enter up to a 10-character text channel name, usage indication, etc.

The programmed text appears instead of the TX code channel number during TX code selection when ‘MR CH+TX CODE CH’ is selected in **Display— MR/Code Display** in **Key & Display** (p. 63).

Go to Display— MR/Code Display

The usable characters are as follows;

Characters	
0	[0] \ (.) ! (!) ? (?) ' (') " (") , (,) ; (;) : (:)
-	[_] ' (') > (>) < (<) > (>) [([] (]
1	[1] (Space) # (#) * (*) / (/) + (+) - (-) = (=) \ (\)
2	[2] & (&) % (%) \$ (\$) @ (@) ^ (^)
3	[3] A (A) B (B) C (C) a (a) b (b) c (c)
4	[4] D (D) E (E) F (F) d (d) e (e) f (f)
5	[5] G (G) H (H) I (I) g (g) h (h) i (i)
6	[6] J (J) K (K) L (L) j (j) k (k) l (l)
7	[7] M (M) N (N) O (O) m (m) n (n) o (o)
8	[8] P (P) Q (Q) R (R) S (S) p (p) q (q) r (r) s (s)
9	[9] T (T) U (U) V (V) t (t) u (u) v (v)
	W (W) X (X) Y (Y) Z (Z) w (w) x (x) y (y) z (z)

continue to the next page.

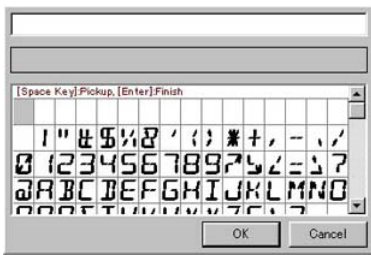
10 5TONE (BIIS PMR/PMR ONLY)

10-3 TX Code CH (continued)

5Tone TX Code CH							
CH	TX Code	Input Digit	Text	Update	ABC		
					Dec	Aud	Sel
1	1111①	4②	③	④	⑤	⑥	⑦
2	22222	45		ON			ON
3	33333	45		ON			ON
4	44444	45		ON			ON
5	55555	45		ON			ON

③ Text (continued)

The independent text edit screen appears automatically during editing.



When entering user original characters, enter '%' and the desired thumbnail number 10 to 19 and 1A to 1F (capital letters only).

Programming example:

When entering the original character thumbnail number 12, enter as '%12.'

User original characters are programmed in **Character Editor** (p. 72).

Go to Character Editor

④ Update

Select "ON" to enable the TX code overwrite capability after manual code input.

Original transmit 5-tone codes are overwritten when checked, however, the input TX code is used for temporary operation only when blank.

⑤ ABC— Dec

Select "ON" to activate the answer back code decode/indication capability.

The decoded answer back code is indicated when the specified TX code is used as the station code.

⑥ ABC— Aud

Select "ON" to activate the automatic 5-tone/DTMF mute release capability.

When the function is activated, the transceiver releases the 5-tone/DTMF mute after an answer back code is received, when the TX code channel is used.

Both **SW Action— Call** and **SW Action— PTT** in **Bank** (BIIS PMR; p. 12, PMR; p. 20) must be turned OFF when this function is activated.

Go to SW Action— Call, PTT (BIIS PMR)

Go to SW Action— Call, PTT (PMR)

⑦ Sel

Select "ON" to enable the TX code channel selection capability from the transceiver's keypad for flexible call operation.

Channels for which "ON" is selected can only be selected/accessed via [CH Up], [CH Down] with [TX Code CH Select], or, [TX Code CH Up] or [TX Code CH Down] key operation.

[CH Up], [CH Down], [TX Code CH Select], [TX Code CH Up] or [TX Code CH Down] keys are assigned in **Key & Display** (pgs. 57, 60, 61).

Go to CH Up, CH Down

Go to TX Code CH Select

Go to TX Code CH Up, TX Code CH Down

10-4 TX Code Setting

5Tone TX Code Setting		
Timer		
Long Tone	0.700	①
Link R	0.800	②
Link 1	0.800	
Link 2	0.800	
Lead out Delay	0.100	
ABC Decode	1.600	③
Displayed Digit	12345	④
PTT Call at Inaudible	OFF	⑤
Special Tone		
Group	A	⑥
Repeat	E	
Link2	F	

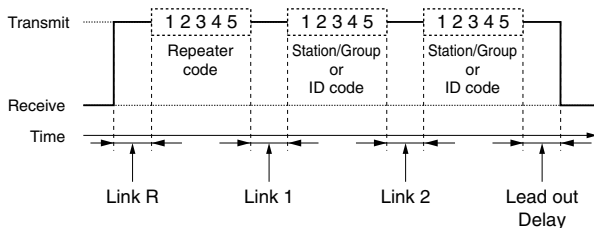
① Timer— Long Tone

Enters the time period for the 1st digit code emission length when the long tone function is specified in **5Tone Signaling— L** in **Bank** (BIIS PMR; p. 13, PMR; p. 20).

Go to 5Tone Signaling— L (BIIS PMR)
Go to 5Tone Signaling— L (PMR)

② Timer— Link R, Link 1, Link 2, Lead out Delay
 Enters the time period for the unmodulated signal length before emitting the 1st 5-tone code prior to returning to receive mode, as well as between each code.

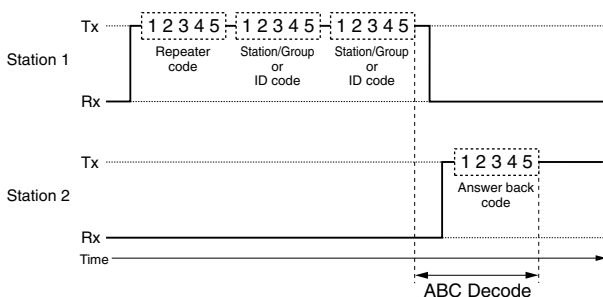
• Link R, 1, 2 and Lead out Delay Timer



③ Timer— ABC Decode

Enters the time period for answer back decode. The timer count is shown in the following diagram.

• ABC Decode Timer



④ Display Digit

Select viewable 5-tone code digits on the display.

The selected viewable digits condition is also applied to transmit (station/group), received ID and answer back code indications programmed in **TX Code** in **TX Code CH** (p. 49), **ID Dec** in **RX Code CH** (p. 45) and **ABC— Dec** in **TX Code CH** (p. 50), respectively.

Go to TX Code
Go to ID Dec
Go to ABC— Dec

⑤ PTT Call at Inaudible

Select “ON” to enable the call operation with [PTT] while the 5-tone mute is activated.

OFF must be selected with **Switch Action— PTT** in **Bank** (BIIS PMR; p. 12, PMR; p. 20) when checked.

Go to Switch Action— PTT (BIIS PMR)
Go to Switch Action— PTT (PMR)

⑥ Special Tone— Group, Repeat, Link 2

Select a special tone code instead of Group, Repeat code and Link 2 timer.

Group : The decoder accepts this code regardless of the programmed code.

Repeat : Used when the same codes are repeated. (e.g. 11111 → 1E1E1)

Link 2 : Emits the code instead of no modulation between station and ID codes (for link 2 timer).

Normally, from [A]–[F] code is assigned for each special tone.

10 5TONE (BIIS PMR/PMR ONLY)

10-5 Format

5Tone Format			
Format	Tone Period	Notone Timer	Tone Length
USER	0.100	0.160	0.164
CCIR	0.100	0.160	0.164
ZVEI1	0.070	0.100	0.109
ZVEI2	0.070	0.100	0.109
DZVEI	0.070	0.100	0.109
EEA	0.040	0.060	0.066
EEA2	0.040	0.060	0.066
DAPL	0.100	0.160	0.164
EIA	0.033	0.060	0.066
DTMF	0.050	0.080	----
	①	②	③

① Tone Period

Enters the time period for each digit tone signal emission length within 0–0.255 sec. in 0.001 sec. steps.

A longer period/emission length programmed in **Timer— Long Tone** in *TX Code Setting* (p. 51) has priority for the 1st digit when long tone is activated.

The long tone is selected in **5Tone Signaling— L** in **Bank** (BIIS PMR; p. 13, PMR; p. 20).

Go to Timer— Long Tone

Go to 5Tone Signaling— L (BIIS PMR)

Go to 5Tone Signaling— L (PMR)

② Notone Timer

Enters the time period with the maximum acceptable tone interval between each code detection within 0.02–0.30 sec. in 0.01 sec. steps.

The following code is received as a different code when the receiving tone is interrupted for more than the programmed time period.

Approx 1.5 times the tone period time, programmed as above, is recommended.

When too short a time period is programmed, the decode success ratio may be decreased according to weather conditions, operating environment, etc.

③ Tone Length

Enters the time period with the maximum acceptable tone period for each code detection within 0–2.327 sec. in 0.001 sec steps.

The following code is received as a different code when the receiving tone period is longer than the programmed time period.

Approx 1.5 times the tone period time, programmed as above, is recommended.

10-6 User Tone

5TONE – User Tone			
Tone No.	Encode	Decode Low	Decode High
0	1981.0	1921.6	2040.4
1	1124.0	1090.3	1157.7
2	1197.0	1161.1	1232.9
3	1275.0	1236.8	1313.3
4	1358.0	1317.3	1398.7
5	1446.0	1402.6	1489.4
6	1540.0	1493.8	1586.2
7	1640.0	1590.8	1689.2
8	1747.0	1694.6	1799.4
9	1860.0	1804.2	1915.8
A	2400.0	2328.0	2472.0
B	930.0	902.1	957.9
C	2247.0	2179.6	2314.4
D	991.0	961.3	1020.7
E	2110.0	2046.7	2173.3

 ① ②

① **Encode**

Enters the specialized tone frequency, relative to the tone number, for transmission within 400–2998 Hz range.

The nearest available frequency is automatically selected.

② **Decode Low, Decode High**

Enter the desired tone frequency for each Low and High columns to specify the decodable frequency range as the tone code, programmed in **Encode** as as above.

11 2TONE (LMR ONLY)

11-1 RX Code CH

2Tone RX Code CH											
CH	Freq (Hz)		Group Call	Text	Bell	ANS	EXO	Beep	Auto TX	Stun	Scan
	1st	2nd									
1	250.0	3300.0	2nd	CALL 1	ON			PiRo			
2	250.0	3300.0	2nd	CALL 2	ON			PiRo			
3	250.0	3300.0	2nd	CALL 3	ON			PiRo			
G	----	----	----	GROUP	Blink			PiPi	----		

①
②
③
④
⑤
⑥
⑦
⑧
⑨
⑩

A 2-tone code frequency can be programmed as the operating frequency, etc. And up to 3 different 2-tone codes are programmable for flexible selective calling.

① Freq (Hz)— 1st, 2nd

Enter the tone code frequency within 250 to 3300 Hz range for each 1st and 2nd frequency.

The nearest available frequency is selected automatically.

② Group Call

Selects which tone frequency, 1st or 2nd, is used for the group code.

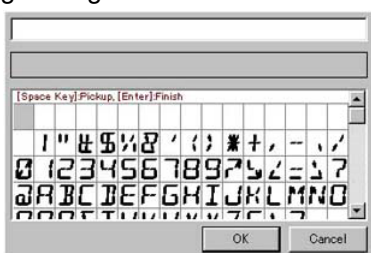
③ Text

Enter up to a 10-character text to indicate messages, etc., when a matched 2-tone code signal is received.

The usable characters are as follows;

Characters	
0	0) \ (.) ! (!) ? (?) ' (') " (") , (,) \ (:) / (/)
1	1) () < (<) > (>) [([)] (])
2	2) () () () * (*) / (/) + (+) - (-) = (=) \ (\)
3	3) (&) % (%) \$ (\$) @ (@) ^ (^)
4	4) (2) A(A) B(B) C(C) a(a) b(b) c(c)
5	5) (3) D(D) E(E) F(F) d(d) e(e) f(f)
6	6) (4) G(G) H(H) I(I) g(g) h(h) i(i)
7	7) (5) J(J) K(K) L(L) j(j) k(k) l(l)
8	8) (6) M(M) N(N) O(O) m(m) n(n) o(o)
9	9) (7) P(P) Q(Q) R(R) S(S) p(p) q(q) r(r) s(s)
0	0) (8) T(T) U(U) V(V) t(t) u(u) v(v)
1	1) (9) W(W) X(X) Y(Y) Z(Z) w(w) x(x) y(y) z(z)

The independent text edit screen appears automatically during editing.



When entering user original characters, enter '%' and the desired thumbnail number 10 to 19 and 1A to 1F (capital letters only).

Programming example:

When entering the original character thumbnail number 12, enter as '%12.'

User original characters are programmed in **Character Editor** (p. 72).

Go to Character editor

④ Bell

Selects the bell indicator condition when receiving a matched 2-tone from Null, OFF, ON and Blink.

- Null : The bell indicator condition is not changed even when a matched 2-tone code is received.
- OFF : The bell indicator goes off.
- ON : The bell indicator appears until operation of a key.
- Blink : The bell indicator blinks until operation of a key.

⑤ ANS

Turns the answer back function ON and OFF.

The function transmits a 1 kHz single tone for 2 sec. when receiving a matched 2-tone.

⑥ EXO

Selects the external unit, such as a buzzer, horn honk, control signal (EXO; pin 6) output capability when receiving the matched 2-tone from ON and OFF.

The optional ACC cable, OPC-617, must be installed and external unit connection is necessary.

The activation time can be set in **EXO/Horn—EXO/Horn Timer** in **Common** (p. 69).

Go to EXO/Horn Timer

⑦ Beep

Selects the beep type when matched 2-tone code is received from Null, OFF, Pi(single), PiPi(single), PiRo(single), Pi(repeat), PiPi(repeat), and PiRo(repeat).

- Null : Beep emission (or non emission) is retained even when matched 2-tone code is received.
- OFF : Beep emission is turned OFF.
- Pi(single) : 1 high beep once.
- PiPi(single) : 2 high beeps once.
- PiRo(single) : 1 high and 1 low beep 3 times.
- Pi(repeat) : 1 high beep repeated at the specified time period.
- PiPi(repeat) : 2 high beeps repeated at the specified time period.
- PiRo(repeat) : 1 high, 1 low beep 3 times, repeated at the specified time period.

The repeating time period is programmed in **Timer—Beep Repeat** in **RX Code Setting** (p. 56).

Go to Timer— Beep Repeat

⑧ Auto TX

Selects the automatic transmit capability when a matched 2-tone code is received.

The transmitting time period is programmed in **Timer— Auto TX** in **RX Code Setting** (p. 56).

Go to Timer— Auto TX

⑨ Stun

Selects the transceiver's basic condition when a matched 2-tone code is received from OFF, Kill and Stun.

- OFF : The transceiver can be used continuously.
- Kill : The transceiver cannot be used. Cloning is necessary to activate the transceiver.
- Stun : A message, "SORRY", appears and the transceiver cannot be used. To use the transceiver, turn power OFF and ON again. At this time, password input is necessary if the power ON password is programmed in **Security— User Password** in **Common** (p. 67).

Go to Security— User Password

⑩ Scan

Selects the scanning condition when a matched 2-tone code is received from Null, Cancel and Start.

- Null : Scan condition is unaffected.
- Cancel : Cancels the scan.
- Start : Starts the scan.

The cancelled or started scan type and conditions are specified in **Scan Mode** in **Scan List** (p. 43), and **Scan Setting** (p. 44), respectively.

The scanning can be restarted or cancelled via [Scan A Start/Stop] or [Scan B Start/Stop] keys, assigned in **Key & Display** (p. 57).

Go to Scan Mode

Go to Scan Setting

Go to Scan A Start/Stop, Scan B Start/Stop

11 2TONE (LMR ONLY)

11-2 RX Code Setting

2Tone RX Code Setting		
Timer		
Notone	0.100	①
Group	3.000	②
Beep Repeat	10.000	③
Auto TX	60.000	④

① Timer— Notone

Enters the time period with the maximum acceptable tone interval between 1st and 2nd code detection.

② Timer— Group

Enters the time period for group tone decoding. The transceiver reads the tone as a group code in the case that the received tone is longer than the programmed time period.

③ Timer— Beep Repeat

Enters the beep emission repeating time period. When 'Pi(repeat)', 'PiPi(repeat)' or 'PiRo(repeat)' is selected in **Beep** in *RX Code CH* (p. 55), beeps are repeated at this period.

Go to Beep

④ Timer— Auto TX

Enters the time period for the automatic transmit function when a matched 2-tone code is received. The automatic transmit function is programmed in **Auto TX** in *RX Code CH* (p. 55).

Go to Auto TX

11-3 TX Code

2Tone TX Code		
Code Type	Individual	①
1st Tone		
Frequency	250.0	②
Period	1.0	③
2nd Tone		
Frequency	3300.0	②
Period	2.0	③

① Code Type

Selects the transmit 2-tone code type from Individual and Group.

Individual: Transmits both 1st and 2nd tone codes.
Group : Transmits 1st tone code only.

② 1st Tone/2nd Tone— Frequency

Enter the tone code frequency within 250 to 3300 Hz range each for 1st and 2nd frequency.

The nearest available frequency is selected automatically.

③ 1st Tone/2nd Tone— Period

Enters the time period for each digit tone signal emission length.

12-1 Key & Display

Key	Conventional	SmarTrunk
L-Up	Status Up	Null
L-Down	Status Down	Null
R-Up	CH Up	Null
R-Down	CH Down	Null
P0	Call	Null
P1	Digital Button	Null
P2	Null	Null
P3	Null	Null
P4	Moni(Audi)	Null
OPF0	Null	Null
OPF1	Null	Null
OPF2	Null	Null
Beep		

① **Key**— [▲] (L-Up), [▼] (L-Down), [^] (R-Up), [v] (R-Down), [P0], [P1], [P2], [P3], [P4], OPF0,* OPF1,* OPF2*

Assign a function for each programmable key and operating mode (Conventional and SmarTrunk). Assignable functions and actions are as follows.

The following functions can be assigned in the Conventional column.

Null No function is assigned.

CH Up, CH Down

- Changes the memory channel up or down.
- Select a transmit code channel after pushing the [TX CODE CH] key.
- Select a DTMF channel after pushing the [DTMF] key.
- Select a scan group after pushing and holding the [Scan A/B] key.

Bank Select and determine a bank number.

- When the optional UT-105 is installed, push [BANK] then push [CH UP]/[CH Down] to select an operating bank number, and then push [BANK] to determine the bank number.

Scan A Start/Stop, Scan B Start/Stop

- ➔ Push this key to start scanning; and push again to stop.

NOTE: Place the microphone on hook to start scanning.
Take the microphone off hook to stop scanning.

- ➔ Push and hold this key for 1 sec. to indicate the scan group, then push to select the desired group.

When the power ON scan function is turned OFF; Push to start and cancel scanning operation. In case of transmission during scan, cancels scanning when in Scan A, and pauses scanning, then resumes scanning after passing the time period specified in **Auto Reset** in **Bank** (BIIS PMR; p. 10, PMR; p. 18, LMR; p. 26) when Scan B is selected.

When the power ON scan function is turned ON; Push to pause scanning when in Scan A, and push to cancel scanning when Scan B is selected. In case of transmission during scan, pauses scanning, then resumes scanning after passing the time period specified in **Auto Reset** in **Bank** (BIIS PMR; p. 10, PMR; p. 18, LMR; p. 26) when in Scan A. Cancels scanning when Scan B is selected.

The power ON scan function is specified in **Power ON Scan** in **Scan Setting** (p. 44).

NOTE: Scan A and Scan B cannot be assigned at the same time because the transceiver cannot have two different scans.

Go to Auto Reset (BIIS PMR)

Go to Auto Reset (PMR)

Go to Auto Reset (LMR)

Go to Power ON Scan

Scan Add/Del(Tag)

Push to add or delete the channel to/from the selected scanning list

12-1 Key & Display (continued)

Key	Conventional	SmArTrunk
L-Up	Status Up	Null
L-Down	Status Down	Null
R-Up	CH Up	Null
R-Down	CH Down	Null
P0	Call	Null
P1	Digital Button	Null
P2	Null	Null
P3	Null	Null
P4	Moni(Audi)	Null
OPF0	Null	Null
OPF1	Null	Null
OPF2	Null	Null
Beep		

Prio A, Prio B

Selects the priority channel A or B programmed in **Atr** in **Bank** respectively (BIIS PMR; p. 7, PMR: p. 15, LMR; p. 23) by pushing this key.

Go to Atr (BIIS PMR)

Go to Atr (PMR)

Go to Atr (LMR)

Prio A (Rewrite)

Selects the priority channel A programmed in **Atr** in **Bank** (BIIS PMR; p. 7, PMR: p. 15, LMR; p. 23) by pushing this key. Also the operating channel is re-assigned for priority channel A by pushing this key for 1 sec.

Go to Atr (BIIS PMR)

Go to Atr— LMR

Go to Atr— PMR

MR-CH 1-4

Immediately selects memory channel 1-4 in the operating bank, respectively.

Moni/Moni(Audi)

For LMR model use— Moni

Push to mute and release the CTCSS (DTCS) or 2-tone squelch mute. Opens any squelches/deactivates any mutes while pushing this key.

For PMR, BIIS PMR model use— Moni (Audi)

Activates a monitor function specified in **Switch Action— Moni** in **Bank** (BIIS PMR; p. 11, PMR; p. 19).

Go to Switch Action— Moni (BIIS PMR)

Go to Switch Action— Moni (PMR)

Public Address

When an optional OPC-617 ACC CABLE is installed, the audio output via the cable can be controlled from the transceiver separately from the volume control.

- This audio output can be used as a 'public address' function when an external audio amplifier and speaker are connected additionally.
- Push this key, then speak into the microphone while pushing the microphone's PTT.
- The [CH Up]/[CH Down] keys allow you to set the audio output level from minimum to maximum.

RX Speaker

When external connections are made for the 'public address' function, the external speaker drive function is also available simultaneously. The received audio can be heard via the external speaker when this key is pushed.

- This function is useful when you are out of the vehicle.
- The audio output level is linked to the transceiver's volume control.

Lock

Electronically locks all programmable keys except the following:

- [Call], [Call A], [Call B], [Moni/Moni(Audi)], [Emergency Single] and [Emergency Repeat] keys.

High/Low

Switches the transmit output power level from the independent settings of each channel.

It is impossible to select “High” when “Low” is selected for the initial setting in **RF Pwr** in **Bank** (BIIS PMR; p. 9, PMR; p. 17, LMR; p. 25) as well as when “MR CH Individual” is selected in **Selection— RF Power Selection** (p. 64) in this screen.

Go to RF Pwr (BIIS PMR)

Go to RF Pwr (PMR)

Go to RF Pwr (LMR)

Go to Selection— RF Power Selection

C. Tone CH Ent

Selects the continuous tone channel via [CH Up] or [CH Down] keys to change the tone frequency/code setting after pushing this key for temporary operation.

The [CH Up] or [CH Down] keys are assigned in this screen (p. 57) and the continuous tone channel is programmed in **Continuous Tone** (p. 41).

Go to CH Up, CH Down

Go to Continuous Tone

Talk Around

Turns the talk around function ON and OFF.

- The talk around function equalizes the transmit frequency to the receive frequency for mobile-to-mobile communication.

Wide/Narrow

Switches both transmission and reception IF passband width for temporary wide or narrow channel spacing operation.

After channel or bank selection, the passband width returns to the original selection. The original passband width is programmed in **W/N** in **Bank** (BIIS PMR; p. 8, PMR; p. 16, LMR; p. 24).

Go to W/N (BIIS PMR)

Go to W/N (PMR)

Go to W/N (LMR)

DTMF Autodial

Push to enter the DTMF autodial mode and then select the stored DTMF code via [CH Up] or [CH Down] keys.

Transmits the selected DTMF code by pushing this key for 1 sec.

The DTMF code for auto dialling is programmed in **DTMF Autodial** (p. 39), and the [CH Up] or [CH Down] keys are assigned in this screen (p. 57).

Go to DTMF Autodial

Go to CH Up, CH Down

Re-dial Transmits the last-transmitted DTMF code again. Acts for both manual and autodial. Re-Dial will be cleared when the transceiver is turned OFF once.

Call Transmits the 5-tone/MSK or DTMF code (BIIS PMR, PMR) or 2-tone (LMR) code in the selected channel.

The MSK code channel is programmed in **MSK Signaling— RPT ID, STN ID** in **Bank** (p. 12).

The 5-tone code channel is programmed in **5Tone Signaling— RPT, STN, ID** in **Bank** (BIIS PMR; p. 13, PMR; p. 20).

The 2-tone code is programmed in **2Tone** in **Bank** (p. 26).

For BIIS PMR/PMR model use only

In case this key is pushed, and the 5-tone setting is an “OFF” channel, it transmits the previously transmitted 5-tone/BIIS code on a clear channel when the automatic clear channel searching function is activated, which is specified in **Auto CH Call** in **Scan Setting** (p. 44).

Go to MSK Signaling— RPT ID

Go to MSK Signaling— STN ID

Go to 5Tone Signaling— RPT, STN, ID (BIIS PMR)

Go to 5Tone Signaling— RPT, STN, ID (PMR)

Go to 2Tone

Go to Auto CH Call

Call A (Code 30), Call B (Code 29)

— *BIIS PMR, PMR only*

Transmits the 5-tone code programmed in channel 30 (Call A) or 29 (Call B) in **TX Code** in **TX Code CH** (p. 49) as the station code, when [Call A] or [Call B] key is pushed respectively.

Go to TX Code

12-1 Key & Display (continued)

Key	Conventional	SmartTrunk
L-Up	Status Up	Null
L-Down	Status Down	Null
R-Up	CH Up	Null
R-Down	CH Down	Null
P0	Call	Null
P1	Digital Button	Null
P2	Null	Null
P3	Null	Null
P4	Moni(Audi)	Null
OPF0	Null	Null
OPF1	Null	Null
OPF2	Null	Null
Beep		

Emergency Single, Emergency Single (Silent), Emergency Repeat, Emergency Repeat (Silent)

Immediately selects the emergency channel and automatically sends a repeated emergency signal at specified time intervals, or an emergency signal once, by pushing this key for the specified time period, programmed in **Emergency— Emer SW ON Timer** in *Common* (p. 70). Also, cancels the emergency call by pushing this key for the specified time period, programmed in **Emergency— Emer SW OFF Timer** in *Common* (p. 70), before an emergency signal is transmitted.

The emergency channel is specified in **Atr** in *Bank* (BIIS PMR; p. 7, PMR; p. 15, LMR; p. 23) and the time intervals are specified in **Emergency— Emer Start/Repeat** in *Common* (p. 71).

When [Emergency Single (Silent)] or [Emergency Repeat (Silent)] is pushed, an emergency call is transmitted without a beep emission and LCD indication change.

Go to Emergency— Emer SW ON Timer

Go to Emergency— Emer SW OFF Timer

Go to Atr (BIIS PMR)

Go to Atr (PMR)

Go to Atr (LMR)

Go to Emergency— Emer Start/Repeat

TX Code CH Select (BIIS PMR, PMR only)

Selects a TX code channel, instead of the specified 5-tone/MSK code channel programmed in **5Tone Signaling— STN**, or **MSK Signaling— STN** in *Bank* (BIIS PMR; pgs. 12, 13, PMR; p. 20), via [CH Up] or [CH Down] keys after pushing this key for temporary operation.

To enter an MSK code—

Selectable MSK code channels, acceptable input digits and updates can be specified in **Sel** (p. 31), **Input Digit** (p. 30) and **Update** (p. 31) in *MSK— Call List*.

To enter a 5-tone code—

Selectable 5-tone channels, acceptable input digits and updates can be specified in **Sel** (p. 50), **Input Digit** (p. 49) and **Update** (p. 50) in *TX Code CH*.

The [CH Up] and [CH Down] keys are assigned in this screen (p. 57).

Go to 5Tone Signaling— STN

Go to MSK Signaling— STN

Go to Sel— MSK— Call List

Go to Input Digit— MSK— Call List

Go to Update— MSK— Call List

Go to Sel— TX Code CH

Go to Input Digit— TX Code CH

Go to Update— TX Code CH

Go to CH Up, CH Down

TX Code Enter (*BIIS PMR, PMR only*)

Push to edit the selected 5-tone/MSK channel ID, 5-tone code or MSK code.

The ID is overwritten when the 5-tone/MSK channel ID “Update” setting is set to “Enable.”

Go to Update— MSK— Call List

Go to Update— TX Code CH

TX Code CH Up, TX Code CH Down

(*BIIS PMR/PMR only*)

Selects a TX code channel, instead of the specified 5-tone/MSK code channel programmed in **5Tone Signaling— STN**, or **MSK Signaling— STN** in **Bank** (BIIS PMR; pgs. 12, 13, PMR; p. 20) for temporary operation.

Selectable MSK code channels or 5-tone channels are specified in **Sel** in **MSK— Call List** (p. 31) or **TX Code CH** (p. 50), respectively.

Go to 5Tone signaling— STN

Go to MSK Signaling— STN

Go to Sel— MSK— Call List

Go to TX Code CH

ID-MR Select (*BIIS PMR/PMR only*)

For entering into the received ID code history indication mode. Up to 5 codes can be memorized, and searches the record with [CH Up] or [CH Down] keys.

All the records can be cleared by pushing this key for 1sec.

The selected/displayed 5-tone/MSK code can be transmitted as station/group code when [Call] key is pushed.

[CH Up], [CH Down] or [Call] keys are assigned in this screen (pgs. 57, 59).

Go to CH Up, CH Down

Go to Call

Scrambler

Push and hold to turn the voice scrambler function ON, and push to turn the voice scrambler function OFF.

When “Inhibit” is selected in **Scrambler— ON/OFF** in **Bank** (BIIS PMR; p. 13, PMR; p. 21, LMR; p. 27), the scrambler function cannot be switched on with this key operation.

Go to Scrambler— ON/OFF (BIIS PMR)

Go to Scrambler— ON/OFF (PMR)

Go to Scrambler— ON/OFF (LMR)

Compander

Switches the compander function ON and OFF.

The compander function reduces noise components from the transmitting audio to provide clear communication and is programmed in **Compander** in **Bank** (BIIS PMR; p. 9, PMR; p. 17, LMR; p. 25).

Go to Compander (BIIS PMR)

Go to Compander (PMR)

Go to Compander (LMR)

Hook Scan

When the hook on scan function is turned ON, push this key to stop scanning temporarily. Push this key again to resume scanning manually.

The hook on scan function is programmed in **Hanger Action— Hook on Scan** in this screen. (p. 65)

Go to Hanger Action— Hook on Scan

User Set Mode

Enter into the *User Set Mode* by pushing this key for 1 sec.

The *User Set Mode* is used for programming infrequently changed values or conditions of functions without PC programming.

Push this key momentarily to select the function, and push [CH Up] or [CH Down] to change the setting, after entering into the *User Set Mode*.

Programmable functions are selected in **Set Mode** (p. 66).

The *User Set Mode* can be accessed with the [^] and [v] key operation even if no [User Set Mode] key is assigned. See **User Set Mode** (p. 80) for details.

Go to Set Mode

OPT1 Out, OPT2 Out, OPT3 Out

Outputs a signal from the OPT1–3 ports in the optional unit connector (MAIN unit, J1; pins 9–11), respectively.

OPT1 Momentary, OPT2 Momentary, OPT3 Momentary

Outputs a pulse signal from the OPT1–3 ports in the optional unit connector (MAIN unit, J1; pins 9–11), respectively.

12-1 Key & Display (continued)

Key	Conventional	SmarTrunk
L-Up	Status Up	Null
L-Down	Status Down	Null
R-Up	CH Up	Null
R-Down	CH Down	Null
P0	Call	Null
P1	Digital Button	Null
P2	Null	Null
P3	Null	Null
P4	Moni(Audi)	Null
OPF0	Null	Null
OPF1	Null	Null
OPF2	Null	Null
Beep		

Sp. Func 1, Sp. Func 2

Reserved for future functions.

Digital (BIIS PMR only)

Push to select the call ID list, transmit message or standby condition. Toggles between queue channel and received message record indication after queue channel is selected.

Push for 1 sec. to select queue channel indication.

Status Up/Down (BIIS PMR only)

During the standby condition, push to display the transmit status indication and select a status number.

The following functions can be assigned in the SmarTrunk columns.

- Null** No function is assigned.
- Bank** Push this key then [CH Up] or [CH Down] to change the memory channel bank up or down.
- Lock** Switches the keyboard lock function ON and OFF.

High/Low

Switches the transmit output power level from the independent settings of each channel.

It is impossible to select "High" when "Low" is selected for the initial setting in **RF Pwr** in **Bank** (BIIS PMR; p. 9, PMR; p. 17, LMR; p. 25) as well as when "MR CH Individual" is selected in **Selection— RF Power Selection** (p. 64) in this screen.

Go to RF Pwr (BIIS PMR)

Go to RF Pwr (PMR)

Go to RF Pwr (LMR)

Go to RF Power Selection

Trunking Group SW

Push to select the Trunking group.

Turbo Speedial A, B, C, D

Immediately calls commonly used telephone or subscriber numbers during SmarTrunk II operation.

Programming memory Speed Dial

- ① Push and hold [*] until a high-pitch beep is heard.
- ② Enter the memory location (0–9), the telephone or subscriber number, then [1], [*] (or [3], [*] if for another system subscriber).
 - A high-pitch beep informs of successful programming.
 - Memories [A]–[D] are used for the Turbo Speedial.

Note: This function is available when the optional HM-100TN is used.

* (CH Up), # (CH Down)

Acts as [*] or [#] keys on the optional DTMF microphone, HM-100TN.

Convenient during SmarTrunk II operation. Assign these functions to the keys in which [CH Up] or [CH Down] is assigned in conventional operation.

- Push [*] for call, push [#] for clear-down.

Compander

Switches the compander function ON and OFF.

The compander function reduces noise components from the transmitted audio to provide clear communication.

Sp. Func 1, Sp. Func 2

Reserved for future functions.

12-1 Key & Display (continued)

Beep		
Low	500) ②
High	1000	
Display		
Opening Text		③
MR/Code Display	MR CH	④
Scroll Timer	OFF	⑤
Selection		

② **Beep— Low, High**

Enter the beep audio frequency for each Low (for error) and High (for regular) beep within 400 to 2998 Hz range, respectively. The nearest available frequency is selected automatically.

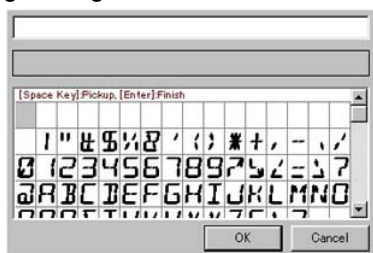
③ **Display— Opening Text**

Enter up to a 10-character transceiver opening message.

The usable characters are as follows;

Characters	
0	() , (.) ! (!) ? (?) ' (') " (") , (,) ; (;) : (:)
_	(_) ; (:) > (>) < (<) [([])] (])
1	(1) (Space) # (#) * (*) / (/) + (+) - (-) = (=) \ (\)
&	(&) % (%) \$ (\$) @ (@) ^ (^)
2	(2) A (A) B (B) C (C) a (a) b (b) c (c)
3	(3) D (D) E (E) F (F) d (d) e (e) f (f)
4	(4) G (G) H (H) I (I) g (g) h (h) i (i)
5	(5) J (J) K (K) L (L) j (j) k (k) l (l)
6	(6) M (M) N (N) O (O) m (m) n (n) o (o)
7	(7) P (P) Q (Q) R (R) S (S) p (p) q (q) r (r) s (s)
8	(8) T (T) U (U) V (V) t (t) u (u) v (v)
9	(9) W (W) X (X) Y (Y) Z (Z) w (w) x (x) y (y) z (z)

The independent text edit screen appears automatically during editing.



When entering user original characters, enter '%' and the desired thumbnail number 10 to 19 and 1A to 1F (capital letters only).

Programming example:

When entering the original character thumbnail number 12, enter as '%12.'

User original characters are programmed in **Character Editor** (p. 72).

Go to Character editor

④ **Display— MR/Code Display**

(BIIS PMR/PMR only)

Selects the display conditions from MR CH, TX Code CH and MR CH+TX Code CH.

MR CH: The selected operating channel number or programmed text only is displayed.

TX Code CH:

The selected transmit 5-tone/BIIS code channel number or programmed text are displayed.

MR CH+TX Code CH:

The selected operating channel and transmit 5-tone/BIIS code channel number or programmed text are displayed.

Text for each operating channel and transmit 5-tone/BIIS code channel are programmed in **Text** in **Bank** (BIIS PMR; p. 8, PMR; p. 16), and in **Text** in **TX Code CH** (5-tone code: p. 49) or **Call List** (MSK code: p. 30), respectively.

When no text is programmed, the selected channel number is displayed instead of the text.

Go to Text— Bank (BIIS PMR)

Go to Text— Bank (PMR)

Go to Text— TX Code CH

Go to Text— Call List

12-1 Key & Display (continued)

Display		
Opening Text		③
MR/Code Display	MR CH	④
Scroll Timer	OFF	⑤
Selection		
RF Power Selection	MR CH Individual	⑥
Power SW	Enable	⑦
Ignition SW		
Ignition SW	Inhibit	⑧
Delay Timer [mm:ss]	0:00	⑨
10Key		
Select	OFF	⑩
Move to Prio A CH		
Power SW ON	Disable	⑪
Clear Down	Disable	⑫
Hook off	Disable	⑬
Hanger Action		
Hook off Monitor	OFF	⑭
Hook on Scan	OFF	⑮

⑤ Display— Scroll Timer (BIIS PMR only)

Set the desired time interval for the SDM (Short Data Message) automatic scroll function.

Up to 25.5 sec. can be set.

The function is set as OFF when “0 sec.” is entered.

The function will also be activated during the received message record indication.

⑥ Selection— RF Power Selection

Selects the transmit output power setting condition from MR CH individual and Override.

Selected transmit output power level with the [High/Low] key is kept for all channels regardless of the individual power setting programmed in **RF Pwr** in **Bank** (BIIS PMR; p. 9, PMR; p. 17, LMR; p. 25) when “Override” is selected. However, outputs the selected transmit output power level temporarily with the [High/Low] key when “MR CH Individual” is selected. The [High/Low] key is assigned in this screen (p. 59).

Go to RF Pwr (BIIS PMR)

Go to RF Pwr (PMR)

Go to RF Pwr (LMR)

Go to High/Low

⑦ Selection— Power SW

Select the transceiver power OFF capability with the power switch ([⓪]) from Inhibit and Enable.

Inhibit : The transceiver power can be turned ON with [⓪], however, the power cannot be turned OFF.

Enable : The transceiver power can be turned ON and OFF with [⓪].

⑧ Ignition SW— Ignition SW

Select the transceiver power relation capability with the ignition switch from Inhibit and Enable.

The transceiver power is turned OFF automatically when the ignition switch is turned OFF when “Enable” is selected.

⑨ Ignition SW— Delay timer [mm:ss]

Enter the desired time period for the transceiver power relation capability with the ignition switch.

The transceiver power goes OFF automatically after the set period from when the ignition switch is turned OFF.

⑩ 10key— Select (BIIS PMR only)

Sets the keypad operation.

*Optional HM-100TN is required.

OFF : Turns the keypad operation OFF.

Status : Push the keypad to select the desired Status in an MSK channel. Push and hold the key to transmit the Status.
[0] is for 'Status 10', [1] to [9] are for 'Status 1' to 'Status 9' respectively.

ON : Turns the keypad operation ON.

The HM-100TN's [A], [B], [C] or [D] key act as the [P0], [P1], [P2] or [P3] key on the front panel respectively, when either "Status" or "ON" is selected.

⑪ Move to Prio A CH— Power SW ON

Select the automatic priority channel A selection capability at power ON from Enable and Disable.

The priority channel A is always selected when "Enable" is selected at power ON.

⑫ Clear Down (BIIS PMR only)

Select "Enable" to move to the priority channel A automatically after clear down transmission.

⑬ Move to Prio A CH— Hook off

Select "Enable" to move to the priority channel A automatically when taking the microphone from its hanger (hanger-off).

⑭ Hanger Action— Hook off Monitor

For BIIS PMR/PMR selection

Select "ON" to activate the function specified in **Switch Action— Moni** item in **Bank** at hanger-off.

For LMR selection

Select "ON" to release any mute (except noise squelch) at hanger-off.

Go to Switch Action— Moni (BIIS PMR)

Go to Switch Action— Moni (PMR)

⑮ Hanger Action— Hook on Scan

Select "ON" to start scanning automatically at hanger-on.

12-2 Set Mode

Set Mode		
	Value	Enable /Inhibit
Backlight	Auto	① Enable
Beep	ON	② Enable
Beep Level	3	③ Enable
SQL Level	0	④ Enable
AF Min Level	0	⑤ Enable
Audio Filter	300-3000†	⑥ Enable
Mic Gain	3	⑦ Enable
Horn	ON	⑧ Enable

Set the values or conditions of the following functions in the Value column, and select the conditions of User Set Mode from Enable and Inhibit in the Enable/Inhibit column.

These functions are for programming infrequently changed values or conditions without PC programming.

The function for which "Inhibit" is selected in the Enable/Inhibit column, does not appear and therefore cannot be set in the User Set Mode.

① Backlight

Selects the LCD backlight lighting conditions from ON, OFF and Auto.

ON : Lights continuously while the transceiver is powered ON.

OFF : Does not light with any operation.

Auto : Lights for 5 sec. when any key except [PTT] is pushed.

② Beep

Selects the key-touch beep output capability. (Not for lockout timer, TOT, etc.)

③ Beep Level

Selects the key-touch beep fixed output level from 1 to 5, or minimum output level from 1(Linked) to 5(Linked).

When either minimum output level is selected, the beep output level is adjustable with [VOL] control.

④ SQL Level

Enter a value within a 0–255 range for noise squelch threshold level adjustment.

⑤ AF Min Level

Enter a value within a 0–255 range for minimum audio output level.

⑥ Audio Filter

Selects the audio filter from 300–3000 Hz, 0–3000 Hz, 300–3400 Hz and 0–3400 Hz.

⑦ Mic Gain

Selects the internal microphone gain from 1–5.

⑧ Horn

When "OFF" is selected, the EXO and Horn functions are turned OFF temporarily.

The EXO function is programmed in **EXO** in **5Tone RX Code CH** (BIIS PMR/PMR; p. 46) or **2Tone RX Code CH** (LMR; p. 54), and the Horn function is programmed in **RX Status—Horn** in **MSK—Message—Status** (p. 33).

Go to EXO— 5Tone RX Code CH

Go to EXO— 2Tone RX Code CH

Go to RX Status— Horn

12-3 Common

Common		
Clone Comment		
(1)) ①
(2)		
Security		
User Password	1234	②
PWR ON Password	OFF	③
Transceiver Data Out	Enable	④
Auto Reset		
Timer A	30.000) ⑤
Timer B	OFF	
Inactive Timer	60.000	
TOT/Lockout		

① Clone Comment— (1), (2)

Enters up to a 16-character text for quick identification of a transceiver's content.

The programmed comment of the connected transceiver can be checked without reading all other existing programmed data. See ④ **CLONE MENU— [Clone]** in *2-1 MAIN SCREEN DESCRIPTION* (p. 3).

Go to ④ **CLONE MENU— [Clone]**

② Security— User Password

Enters up to a 4-digit user password for the power ON password function or for cancelling the "Stun" condition.

The power ON password function is specified in **PWR ON Password** as follows, and the "Stun" function is specified in **Stun** in *RX Code CH* (5-tone; p. 47, 2-tone; p. 55) or **Killer ID** in *MSK— ID Range* (MSK operation; p. 28).

Go to Stun (5-tone)

Go to Stun (2-tone)

Go to Killer ID

③ Security— PWR ON Password

Selects the power ON password function ON and OFF.

It is necessary to enter the 4-digit password programmed in the User Password as above. However, the password must be entered after receiving a "Stun (5-tone or 2-tone)" or the "Killer ID (MSK operation)" signal regardless of this setting.

④ Security— Transceiver Data Out

Selects the transceiver's programmed data out capability from enable and inhibit for both using this software and cloning between transceivers.

The setting does not inhibit data writing, therefore over writing data is still possible even when inhibit is selected.

⑤ Auto Reset— Timer A, Timer B

Enter the time period for returning the mute condition to the initial setting, specified in **CH Mute** in *Bank* (BIIS PMR; p. 11, PMR; p. 18), and/or restarting the scan from a disappearing signal, or when key operation is finished, if the power ON scan function is turned ON.

To turn OFF the Auto Reset function, enter "0 (zero)" to one of these settings. ("OFF" will be indicated)

The programmed settings are selected in **Auto Reset** in *Bank* (BIIS PMR; p. 10, PMR; p. 18, LMR; p. 26).

The power ON scan function is programmed in **Power ON Scan** in *Scan Setting* (p. 44).

Go to CH Mute (BIIS PMR)

Go to CH Mute (PMR)

Go to Auto Reset (BIIS PMR)

Go to Auto Reset (PMR)

Go to Auto Reset (LMR)

Go to Power ON Scan

12-3 Common (continued)

Timer A	30.000	
Timer B	OFF	
Inactive Timer	60.000	⑥
TOT/Lockout		
TOT Timer	30.000	⑦
Penalty Timer	20.000	⑧
5TONE ID Out	OFF	⑨
TOT Beep	OFF	⑩
Lockout Penalty Timer	5.000	⑪
5Tone / MSK Auto TX		
Auto TX Timer	60.000	⑫
EPTT		
EPTT Delay Timer	OFF	⑬
Tone Mute EPTT	OFF	⑭
RS-232C		
Connection Speed	4800	⑮
Mode	OFF	⑯
EXO/Horn		
EXO	OFF	⑰
EXO Delay Timer	OFF	⑱
EXO/Horn Timer	10.000	⑲
Scrambler		

⑥ Auto Reset— Inactive Timer

(BIIS PMR/PMR only)

The entered time period acts as the **Auto Reset— Timer A, Timer B**.

This setting is used with the **Auto Rest— Timer A** or **Timer B**, by selecting 'Timer A Inact' or 'Timer B Inact' in **Auto Reset** in **Bank** (BIIS PMR; p. 10, PMR; p. 18).

Go to Auto Reset (BIIS PMR)

Go to Auto Reset (PMR)

⑦ TOT/Lockout— TOT Timer

Enters the continuously transmittable time period (Time-out timer). Maximum time period is specified for 30, 60 or 180 sec. etc., according to country and local regulations.

The time-out timer function can be turned ON or OFF for each operating channel in **TOT** in **Bank** (BIIS PMR; p. 9, PMR; p. 17, LMR; p. 25).

DO NOT set to only a few seconds, as transmitting will be impossible.

Go to TOT (BIIS PMR)

Go to TOT (PMR)

Go to TOT (LMR)

⑧ TOT/Lockout— Penalty Timer

Enters the un-transmittable time period for the penalty when the continuously transmitted time has exceeded the specified time period programmed in the **TOT Timer** as at below left.

The TOT penalty time is the transmit inhibit period when the time-out timer is activated.

⑨ TOT/Lockout— 5TONE ID Out

(for BIIS PMR/PMR)

Turns the automatic ID transmission capability ON and OFF.

The function automatically transmits an ID code when the time-out timer activates, and just before transmission is inhibited.

The ID code is specified in **5Tone Signaling— ID** in **Bank** (BIIS PMR; p. 13, PMR; p. 20).

Go to 5Tone Signaling— ID (BIIS PMR)

Go to 5Tone Signaling— ID (PMR)

⑨ TOT/Lockout— DTMF ID Out (for LMR)

Turns the automatic ID transmission capability ON and OFF.

The function automatically transmits an ID code when the time-out timer activates, and just before transmission is inhibited.

The ID code is programmed in the 'No. Log/ID' in **DTMF Autodial** (p. 39).

Go to No. Log/ID

⑩ TOT/Lockout— TOT Beep

Selects the warning beep output capability for TOT function ON and OFF.

Emits a warning beep 10 sec. before compulsory shut down of the transmission (the time-out timer activates when this setting is turned ON).

⑪ TOT/Lockout— Lockout Penalty Timer

Enters the un-transmittable time period for the penalty when transmitted on a busy channel. The un-transmittable condition is kept for the programmed time period even if the channel is cleared.

The lockout penalty time is the transmit inhibit period when the user attempts to transmit while in a lockout condition. The transmission is inhibited for the lockout penalty time even when the lockout condition is cleared.

⑫ 5Tone/MSK Auto TX— Auto TX Timer
(BIIS PMR/PMR only)

Enter the desired time period for the automatic transmission.

When receiving a matched 5-tone/Status call, the microphone audio is automatically transmitted for the set period when **Auto TX** is set to "ON" in **MSK—Message—Status** (p. 33) or **RX Code CH** (p.46).

Go to Auto TX (MSK— Message— Status)

Go to Auto TX (RX Code CH)

⑬ EPTT— EPTT Delay Timer

Enter the desired time period for the transmit time prolongation, after the received signal has disappeared.

⑭ EPTT— Tone Mute EPTT

Selects the CTCSS/DTCS tone output condition with the external PTT control.

ON : No CTCSS or DTCS tone output with the external PTT control.

OFF : Outputs the set CTCSS or DTCS tone.

NOTE: Outputs the set CTCSS/DTCS tone even "ON" is selected when transmitting from the connected microphone.

⑮ RS-232C— Connection Speed (BIIS PMR only)
Select the data transfer speed from 1200, 2400, 4800, 9600 and 19200 bps when the optional OPC-822 is installed.

⑯ RS-232C— Mode (BIIS PMR only)

Select the appropriate output data format for connected equipment from OFF, Printer, GPS or PC CMD when the optional OPC-822 is installed.

Printer : Print out the received SDM.

GPS : Connect the GPS receiver.

PC CMD : PC control command can be used.

Be sure to use a suitable cable, either crossover or patch, for GPS or printer connection.

⑰ EXO/Horn— EXO

Selects the optional OPC-617 HORN terminal (pin 6) condition when receiving the matched 5-tone or Status call.

ON : Goes to ground when receiving a matched 5-tone code.

OFF : No function.

An external buzzer, horn honk, etc., can be controlled with this setting, as well as the following timers.

⑱ EXO/Horn— EXO Delay Timer

Enter the desired time period for the delay time to output the HORN terminal signal from receiving the matched 5-tone or Status call.

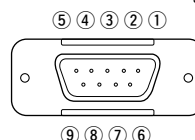
⑲ EXO/Horn— EXO/Horn Timer

Enter the desired time period for the Horn output function.

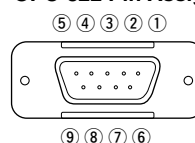
The optional OPC-617 HORN terminal is grounded for this period when receiving the matched 5-tone or Status call.

NOTE:

EXO, EXO Delay Timer, EPTT Delay Timer and Tone Mute EPTT functions are prepared for a simplified repeater system which is constructed with IC-F510/F520/F610/F620 series transceivers.

OPC-617 Pin Assignment

- | | |
|------------------------|------------------------|
| ① LCD backlit cont. IN | ⑥ Horn drive cont. OUT |
| ② AF OUT | ⑦ AF GND |
| ③ Det. AF OUT | ⑧ Det. AF GND |
| ④ Mod. IN | ⑨ Mod. GND |
| ⑤ PTT control IN | |

OPC-822 Pin Assignment

- | | |
|--------|--------|
| ① N.C. | ⑥ DSR |
| ② RX D | ⑦ RTS |
| ③ TX D | ⑧ CTS |
| ④ DTR | ⑨ N.C. |
| ⑤ GND | |

12-3 Common (continued)

EXO/Horn Timer	10.000	
Scrambler		
Type	Rolling	⑳
Group Code	1	㉑
Synchronous Capture	Standard	㉒
Tone Start Timing	OFF	㉓
Emergency		
Emer SW ON Timer	2.000	㉔
Emer SW OFF Timer	1.000	㉕
Emer Start/Repeat	10.000	㉖

㉑ Scrambler— Type

Selects the scrambler type from Rolling and Non-Rolling.

Selects 'Rolling' when the optional voice scrambler unit, UT-110 (#02), is installed, and selects 'Non-Rolling' when UT-109 is installed.

UT-110 and UT-109 are not compatible due to different scrambling systems. However, UT-110 can be used instead of UT-109 by selecting 'Non-Rolling' type in this item

The **Scrambler— Group Code** as follows, must be programmed when UT-110 is used with the Rolling setting.

㉑ Scrambler— Group Code

Selects the scrambler group code from 1, 2, 3 and 4 when the optional voice scrambler unit, UT-110 (#02), is installed and 'Rolling' is selected in **Scrambler— Type** as above.

Programming is not required when the optional voice scrambler unit, UT-109, is installed.

㉒ Scrambler— Synchronous Capture

Selects the synchronous capture mode from Standard and Continuous.

It is recommended that 'Standard' is selected for simplex/normal operation, 'Continuous' for repeater operation.

㉓ Scrambler— Tone Start Timing

Selects the reference tone signal delay time from OFF, 0.3sec., 0.6 sec. and 1.1 sec.

The setting is used to synchronize voice scrambling timing when the other stations/transceivers are in power save mode.

㉔ Emergency— Emer SW ON Timer

Enters the time period for which [Emergency Repeat] or [Emergency Single] key must be held to activate the emergency function.

Push and hold [Emergency Repeat] or [Emergency Single] key for the programmed time period to make an emergency call.

[Emergency Repeat] or [Emergency Single] key is assigned in **Key & Display** (p. 60).

Go to Emergency Repeat, Emergency Single

㉕ Emergency— Emer SW OFF Timer

Enters time period for which [Emergency Repeat] or [Emergency Single] key must be held to cancel the emergency function.

Push and hold [Emergency Repeat] or [Emergency Single] key for the programmed time period to cancel an emergency call before an emergency signal is transmitted.

However, once an emergency call is transmitted, the call cannot be cancelled regardless of this setting.

[Emergency Repeat] or [Emergency Single] key is assigned in **Key & Display** (p. 60).

Go to Emergency Repeat, Emergency Single

②6 Emergency— Emer Start/Repeat

Enter the time periods for the emergency call delay and interval.

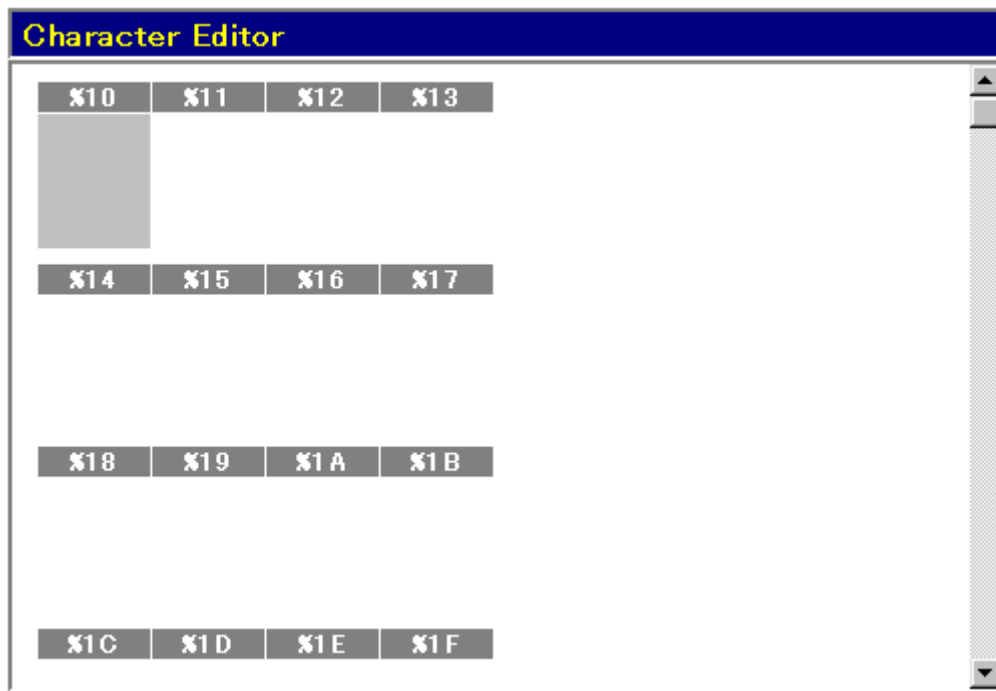
The transceiver makes an emergency call after passing the programmed time period when the emergency function is activated.

The transceiver transmits an emergency signal repeatedly at this interval until an “Emergency Cancel” code is received when [Emergency Repeat] is used.

[Emergency Repeat] key is assigned in **Key & Display** (p. 60).

Go to Emergency Repeat

12-4 CHARACTER EDITOR



Up to 16 original characters or symbols can be edited/created in this sheet for a variety of information indication.

• Thumbnail %11–%1F

Shows the created original character or symbol.

The characters or symbols are displayed on the LCD when they are programmed in **Opening Text** in **Key & Display** (p. 63), **Text** in **Bank** (BIIS PMR; p. 8, PMR; p. 16, LMR; p. 24), **MSK— Call List** (p. 30), **DTMF Autodial** (p. 39), **Scan List** (p. 43), **RX Code CH** (5-tone; p. 45, 2-tone; p. 54) and **TX Code CH** (p. 49), in **Display Text** in **MSK— Own ID/Group** (p. 29), **Message— Status** (RX Status; p. 32, TX Status; p. 33) and **Message— SDM** (p. 34).

Go to Opening Text

Go to Text (Bank; BIIS PMR)

Go to Text (Bank; PMR)

Go to Text (Bank; LMR)

Go to Text (MSK— Call List)

Go to Text (DTMF Autodial)

Go to Text (Scan List)

Go to Text (5-tone; RX Code CH)

Go to Text (2-tone; RX Code CH)

Go to Text (TX Code CH)

Go to Display Text (Own ID/Group)

Go to Display Text (Message— Status)

Go to Display Text (Message— SDM)

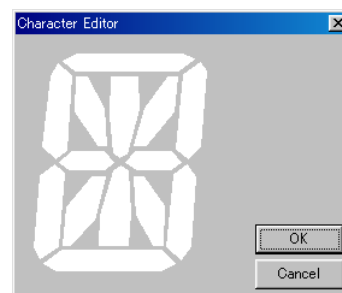
• Character Edit Map

Original character editing image map.

The edited characters are shown in the thumbnails %11–%1F, respectively.

Character editing instructions are as follows.

- ① Select a character thumbnail from %11–%1F to be edited with mouse operation.
 - “Character Editor” screen appears as follows.



- ② Click the desired segment on the map with the mouse pointer.
 - Clicked segment boxes/dots become black.
 - To cancel, click the unwanted black segment again.
- ③ Click [OK] button in this screen, or click on another character thumbnail if programming more characters.
 - Common Setting screen will be closed after [OK] button is clicked.

- *This programming is necessary when an optional UT-105 SmarTrunk II Logic Board is installed. Programming operation methods are also written in the instruction manual for UT-105.*

13-1 SOFTWARE INSTALLATION

- ① Boot up Windows®. (Quit all applications when Windows is running.)
- ② Insert the CS-F500 disk into the appropriate CD-ROM drive.
- ③ Select 'Run' from the [Start] menu.
- ④ Type the setup program name with full path name, then press the [Enter] key.
(e.g. D:\csut105\disk1\setup [Enter])
- ⑤ Follow the prompts.
- ⑥ Program group 'CS-UT105' appears in the 'Programs' folder of the start menu.

13-2 PROGRAMMING RECOMMENDATION

When programming/operating with SmarTrunk II, please re-confirm the following condition of each item programmed with the CS-F500.

• Priority, Emergency channel

Do not specify both priority and emergency channels in the bank for SmarTrunk II operation.

The priority and emergency channels are specified in **Atr** in **Bank** (BIIS PMR; p. 7, PMR; p. 15, LMR; p. 23).

Go to Atr (BIIS PMR)

Go to Atr (PMR)

Go to Atr (LMR)

• Frequency

Operating frequencies must be programmed from channel 1 without a blank (BIIS PMR; p. 7, PMR; p. 15, LMR; p. 23).

Go to Frequency (MHz)— RX, TX (BIIS PMR)

Go to Frequency (MHz)— RX, TX (PMR)

Go to Frequency (MHz)— RX, TX (LMR)

• TOT

Deactivate the TOT function (BIIS PMR; p. 9, PMR; p. 17, LMR; p. 25).

Go to TOT (BIIS PMR)

Go to TOT (PMR)

Go to TOT (LMR)

• Scan

Do not specify the scan list. (BIIS PMR; p. 9, PMR; p. 17, LMR; p. 25).

Go to Scan List— List (BIIS PMR)

Go to Scan List— List (PMR)

Go to Scan List— List (LMR)

• Log IN/OFF

Select OFF. (BIIS PMR; p. 11, PMR; p. 18, LMR; p. 26).

Go to Log-In/Off (BIIS PMR)

Go to Log-In/Off (PMR)

Go to Log (LMR)

• Power ON Scan

Deactivate the power ON scan function. (p. 44).

Go to Power ON Scan

13-3 SCREEN MENU OPERATION— Speed Dial

Routing Code	Destination
1	Subscriber to Landline 1
2	Subscriber to Landline 2
3	Subscriber to Subscriber
4	Fleet-Dispatch(Group Call)
9	Mobile Operator
0	Emergency

• Speed Dial— 0–9

Enter up to a 16-digit telephone or subscriber number for simple and quick dialling operation.

• Turbo Speedial— A, B, C, D

Enter up to a 16-digit telephone or subscriber number for simple and quick dialling operation.

The programmed number is immediately recalled and transmitted by pushing the [Turbo Speedial A], [Turbo Speedial B], [Turbo Speedial C] or [Turbo Speedial D] key assigned in the **Key & Display** screen (p. 62).

Go to Turbo Speedial A, B, C, D

13-4 SCREEN MENU OPERATION— Configuration

Configuration		Group Code	
Primary Code	0000	Lower Block Decode	0000
Secondary Code	0000	Upper Block Decode	
Five Digit Access Code	12345	0	0001
Trunking System ID Number	00	1	
System Tone	3:123.0Hz	2	
Busy Channel Detect	System Tone	3	
<input type="checkbox"/> Priority Subscriber Enable		4	
<input type="checkbox"/> Fleet Dispatch Mode		5	
<input type="checkbox"/> Emergency Call Override		6	
<input type="checkbox"/> Clear Channel Alerting Mode		7	
<input checked="" type="checkbox"/> Memory Speed-dialing Programming		8	
		9	
		10	
		11	
		12	
		13	
		14	
		15	

- **Primary Code**

Enters a specified 4-digit primary code given from the system.

- **Secondary Code**

Enters a specified 4-digit secondary code given from the system.

- **Lower Block Decode**

Enters a specified 4-digit code for lower block decode capability given from the system.

- **Upper Block Decode**

Enters a specified 4-digit code, or turns off the upper block decode capability given from the system.

The decode code must be in the range of less than +19 from the code programmed in the **Lower Block Decode** as above.

When the code "0000" is programmed in the **Lower Block Decode** as above, "OFF" is automatically programmed in this setting.

- **Five Digit Access Code**

Enters a specified 5-digit access code given from the system.

- **Trunking System ID Number**

Enters a specified 2-digit trunking system ID number given from the system.

- **System Tone**

Selects a specified system tone code to detect the trunking channel condition (busy or clear) from 0–6, given from the system.

The same system tone must be programmed when 'System Tone' is selected in **Busy Channel Detect** as follows.

- **Busy Channel Detect**

Selects the specified busy channel detection method from the Carrier and System Tone given from the system.

- **Priority Subscriber Enable**

Selects the Priority Subscriber Enable capability from ON and OFF.

- **Fleet Dispatch Mode**

Selects the specified fleet dispatch mode availability given from the system from ON and OFF.

- **Emergency Call Override**

Selects emergency call override capability from ON and OFF.

- **Clear Channel Alerting Mode**

Selects alerting capability when a trunking channel is cleared from ON and OFF.

- **Memory Speed-dialing Programming**

Selects Speed Dial and Turbo SpeedDial memory programming capability from the transceiver's keypad from ON and OFF.

- **Group Code— 0–15**

Enter a 4-digit group code given from the system for simple and quick group call operation.

*All the other programming operation methods are the same as CS-F500.

14 PROGRAMMING for LTR® TRUNKING operation

■ *This programming is necessary when an optional UT-111 TRUNKING UNIT is installed. For details of programming operation methods, ask a system operator.*

14-1 SOFTWARE INSTALLATION

- ① Boot up Windows®. (Quit all applications when Windows is running.)
- ② Insert the CS-F500 disk into the appropriate CD-ROM drive.
- ③ Select 'Run' from the [Start] menu.
- ④ Type the setup program name with full path name, then press the [Enter] key.
(e.g. D:\csut111\disk1\setup [Enter])
- ⑤ Follow the prompts.
- ⑥ Program group 'CS-UT111' appears in the 'Programs' folder of the start menu.

14-2 SCREEN MENU OPERATION— Global

Five Digit Access Code	TX Data Polarity
12345	+(Plus)
Scan Resume Timer	RX Data Polarity
7.000	+(Plus)
Selective Call Timeout	TX Data Delay
1.000	113
DTMF Decoder ID	
12345	
DTMF Decoder Kill ID	
OK	Cancel

• Five Digit Access Code

Enter the specified 5-digit access code given from the system.

• Scan Resume Timer (sec)

Enter the time period for switching the decoded group ID during group scan.

When the group ID code is decoded, the timer is renewed.

• Selective Call Timeout (sec)

Enter the stand-by time period from after the group ID code is decoded, and before the selective call code to be decoded, during the DTMF selective calling operation.

When the group ID code is decoded, the timer is renewed.

• DTMF Decoder ID

Enter an 8-digit ID code for the DTMF decoder.

• DTMF Decoder Kill ID

Enter an 8-digit ID code for the DTMF decoder kill function.

The decoder becomes deactivated when the matched DTMF code is received.

• TX Data Polarity, RX Data Polarity

Select the specified polarity for each transmit and receive data from + (Plus) and - (Minus), depending on the type of transceiver.

• TX Data Delay

Enter the specified transmit data delay within 0–255, depending on the type of transceiver.

14-3 SCREEN MENU OPERATION— System 1–10

System1	System2	System3	System4	System5	System6	System7	System8	System9	System10
---------	---------	---------	---------	---------	---------	---------	---------	---------	----------

Area Number

Home Repeater

Priority Receive ID

Receive Block Decode Upper ID

Receive Block Decode Lower ID

Group Code	TX ID	RX ID	Scan	Inter-connect	Sel Call	Trans-pond	ANI
1			Yes	No	No	No	No
2			Yes	No	No	No	No
3			Yes	No	No	No	No
4			Yes	No	No	No	No
5			Yes	No	No	No	No
6			Yes	No	No	No	No
7			Yes	No	No	No	No
8			Yes	No	No	No	No
9			Yes	No	No	No	No
10			Yes	No	No	No	No

• Area Number

Selects the specified area number given from the system from 1 and 0.

• Home Repeater

Selects the specified home repeater number given from the system within 1–20.

• Priority Receive ID

Enters the specified priority receive ID given from the system.

• Receive Block Decode Upper ID, Lower ID

Enter each specified receive block decode ID for upper and lower given from the system.

• TX ID, RX ID

Enter a 3-digit ID code for both transmit and receive.

• Scan

Selects automatic scanning capability from Yes and No.

• Inter-connect

Selects inter-connect capability from Yes and No.

• Selective Call

Selects selective calling capability from Yes and No.

• Transponds

Selects answer back capability from Yes and No.

• ANI

Selects ANI (Automatic Numbering Identification) transmission capability from Yes and No.

*All the other programming operation methods are the same as CS-F500.

15 OPTIONAL UNIT INSTALLATION

■ General

The IC-F500 series transceiver can be installed with one of the following optional units.

UT-105 SmarTrunk II™ Logic Board

Required to access SmarTrunk II™ network/subscriber.

UT-109 VOICE SCRAMBLER UNIT (Non-rolling type)

UT-110 VOICE SCRAMBLER UNIT (Rolling type)

Required if secure communication is necessary.

/// IMPORTANT!:

Extra hardware setup is required **BEFORE** installing either voice scrambler unit.

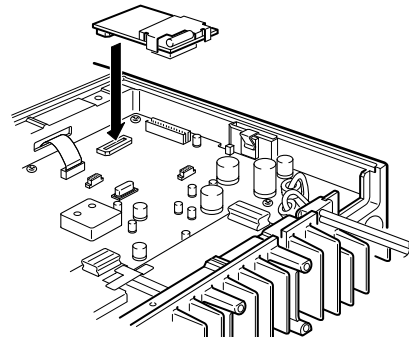
See **Hardware Setup** as follows for details.

UT-111 LTR® TRUNKING UNIT

Required to access LTR® trunking network.

15-1 Installation

- ① Turn power off, then disconnect the DC power cable.
- ② Unscrew the 4 screws, then remove the bottom cover.
- ③ Install the unit as shown in the diagram at right.
- ④ Attach the bottom cover and screws to their original position, then connect the DC power cable.

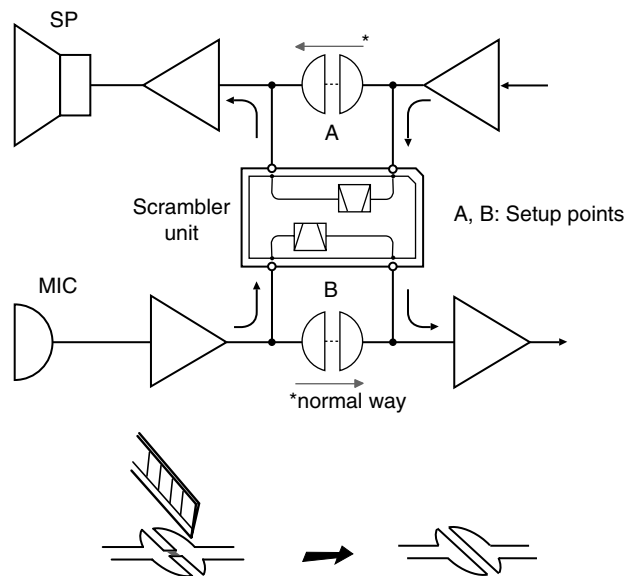


15-2 Hardware Setup

The following hardware setup is required before installing the optional UT-109/UT-110 VOICE SCRAMBLER UNIT, as the scrambler unit is installed into the microphone amplifier circuit (for transmission) and AF circuit (for reception).

■ Setup instruction

- ① Turn the power OFF, then disconnect the DC power cable.
- ② Disassemble the transceiver, as instructed in ①–② in **Installation** as above.
- ③ Cut the printed circuit patterns A and B on the PC board, described below and in page 79.
- ④ Install the voice scrambler unit, as instructed in ③ in **Installation**.

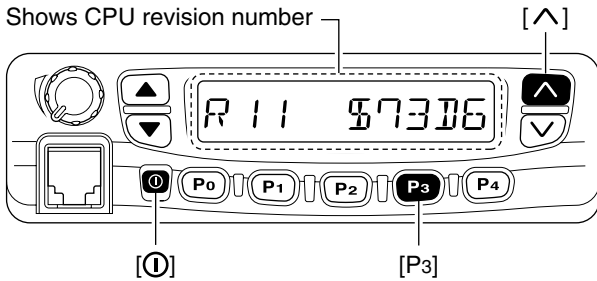


16 SPECIAL FUNCTIONS

16-1 CPU Revision Indication

■ Operation

Shows CPU revision number



*Displayed number is sample only.

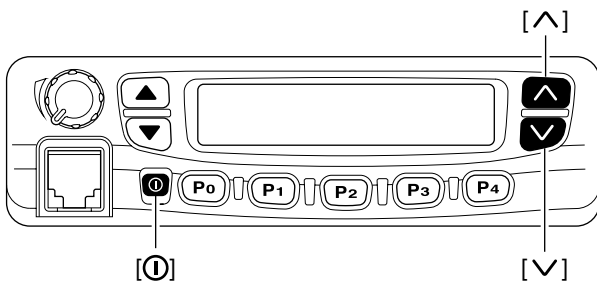
The revision number of the CPU can be indicated on the LCD. It is convenient when confirming the CPU revision number if the CS-F500 is not installed in the PC.

While pushing and holding [^] and [P3] keys, turn the power ON.

- Clone comment and installed optional unit name are also indicated after the CPU revision number is indicated.

16-2 User Set Mode

■ Operation



Some functions and items, specified in **Set Mode** (p. 66), can be set/adjusted from the transceiver's keypad.

Go to Set Mode

- ① Turn the power ON while pushing [^] and [v].
 - "SETMODE" is displayed.
- ② Push [P0] for 1 sec. to enter into *User Set Mode*.
- ③ Push [P0] momentarily to select the desired function/item.
- ④ Push [^] or [v] to set/adjust the condition/value.
- ⑤ Repeat step ③ and ④ for other functions/items.
- ⑥ Push [P0] for 1 sec. to exit from *User Set Mode*.

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Count on us!

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P-62491-1EX
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