
INTRODUCTION

Thank you for choosing this Icom product. This product is designed and built with Icom's state of the art technology and craftsmanship. With proper care, this product should provide you with years of trouble-free operation.

This product combines traditional analog technologies with the new digital technology, Digital Smart Technologies for Amateur Radio (D-STAR), for a balanced package.

ABOUT THE CONSTRUCTION OF THE MANUAL

(As of November 2017)

You can use the following manuals to understand and operate this transceiver.

① If necessary, you can download a glossary of HAM radio terms from the Icom website.

Basic manual (Comes with the transceiver)

Instructions for the basic operations and precautions. **D-STAR GUIDE** that explains registering your call sign to a gateway repeater and the basic operations of D-STAR is also included.

About the DV Gateway function (PDF type)

Instructions for the system requirements or operations to use the DV Gateway function.

① "About the DV Gateway function" can be downloaded from the Icom website.

Advanced manual (This manual)

- Using a microSD card <Advanced>*
- Battery charging <Advanced>*
- Menu screen <Advanced>*
- Memory operation <Advanced>*
- Scan operation <Advanced>*
- D-STAR operation <Advanced>*
- GPS operation
- Voice memory operation
- Priority watch operation
- Repeater and duplex operations
- Other functions
- Options

*The basic instructions are described on BASIC MANUAL.

For Users in California (USA)

This ML414HIV01E Lithium Battery contains Perchlorate Material—special handling may apply. See the following URL.

<http://www.dtsc.ca.gov/hazardouswaste/perchlorate>

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- The use of Icom transceivers with any equipment that is not manufactured or approved by Icom.

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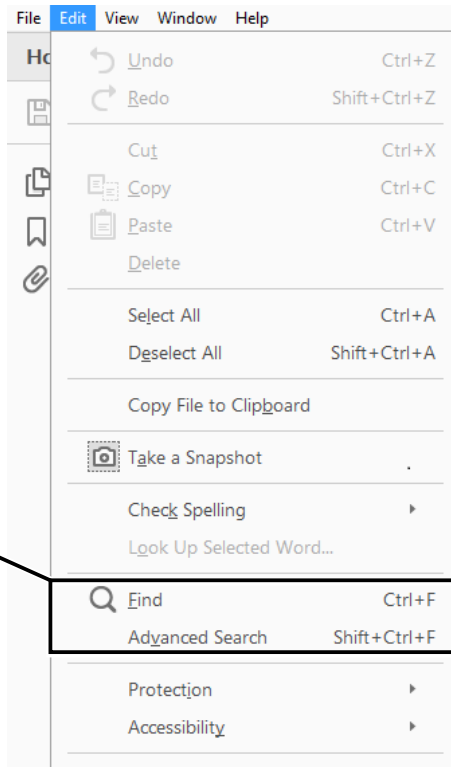
Functions and features of Adobe® Acrobat® Reader®

The following functions and features can be used with Adobe Acrobat Reader.

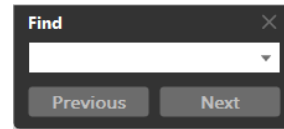
• **Keyword search**

Click “Find” (Ctrl+F) or “Advanced Search” (Shift+Ctrl+F) in the Edit menu to open the search screen. This is convenient when searching for a particular word or phrase in this manual.
* The menu screen may differ, depending on the Adobe Acrobat Reader version.

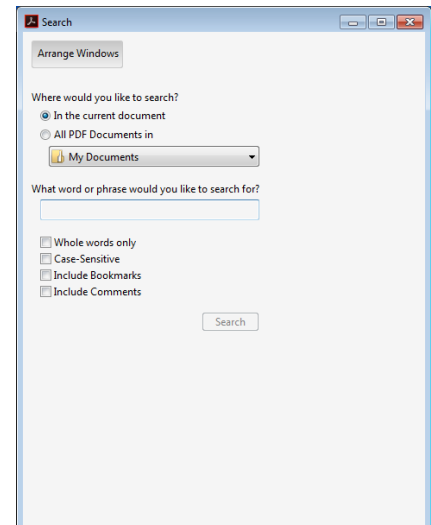
Click to open the find or search screen or advanced search screen.



• **Find screen**

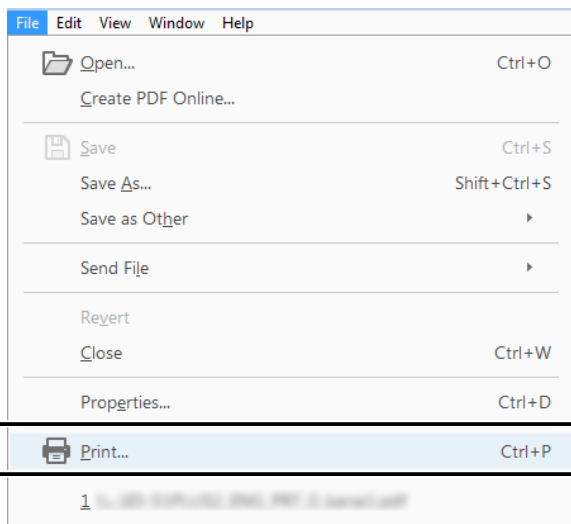


• **Advanced search screen**



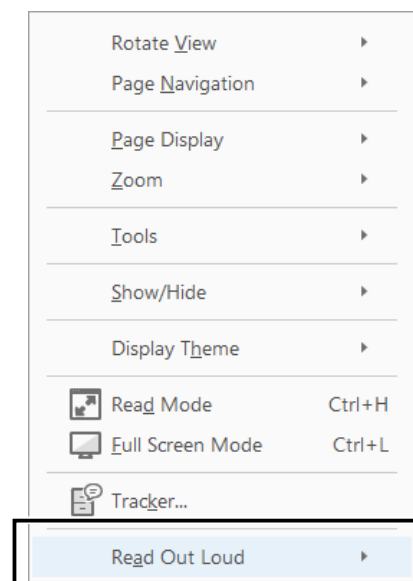
• **Printing out the desired pages.**

Click “Print” in the File menu, and then select the paper size and page numbers you want to print.
*The printing setup may differ, depending on the printer. Refer to your printer’s instruction manual for details.
*Select "A4" size to print out the page in the original manual size.



• **Read Out Loud feature.**

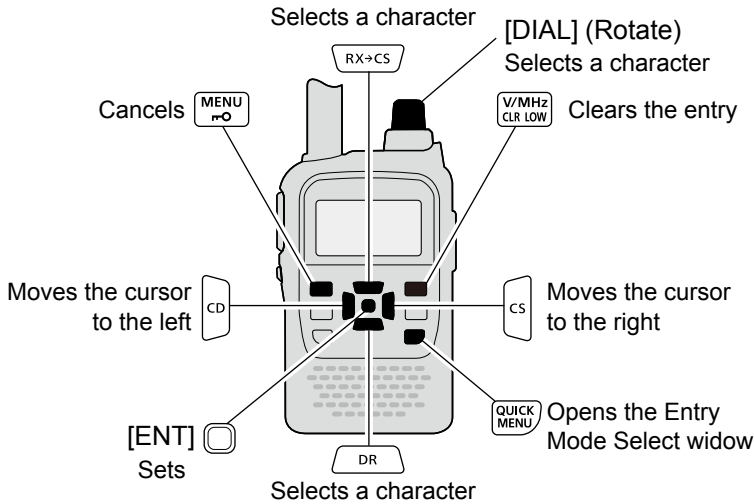
The Read Out Loud feature reads aloud the text in this PDF.
Refer to the Adobe Acrobat Reader Help for the details.
(This feature may not be usable, depending on your PC environment including the operating system.)



* The screen may differ, depending on the Adobe Acrobat Reader version.

Entering and editing text

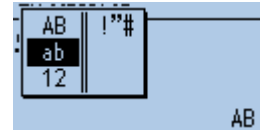
Controls used for text entry



- To insert a text, move the cursor to a place to enter, then rotate [DIAL] or push [RX→CS]/[DR].
- To clear a character, push [CLR].
- To consecutively clear characters, continuously hold down [CLR].

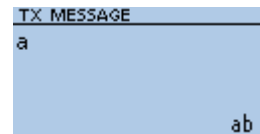
To change the character type

1. When not selecting text, or an entered text is selected, push [QUICK].
2. Rotate [DIAL] to select the character type, then push [ENT].

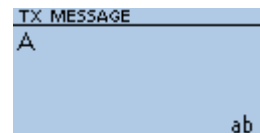


Character type	Selectable characters and symbols	Character conversion
AB	A to Z, 0 to 9, (space)	A/a
ab	a to z, 0 to 9, (space)	A/a
12	0 to 9, (space)	-
!"#	!"#\$%&'()*+,-./:;<=>?@[\\]^_`{ }~(space)	-

TIP: When the character type is “AB” or “ab,” and while entering a character, push [QUICK] to select upper case or lower case letters.



▲▼ Push [QUICK]



Entering and editing text (Continued)

◆ Usable characters

The usable characters and symbols, and the maximum characters differ, depending on the item. See the following list for details.

① The usable characters and symbols for each character type are described at the bottom of the page.

Category	Item	Character type	Maximum characters	Information	Reference
Memory mode	Memory name	[AB] [ab] [12] [!"#]	16	—	p. 7-9
	Bank name	[AB] [ab] [12] [!"#]	16	—	
Program scan	Scan name	[AB] [ab] [12] [!"#]	16	—	
P-LINK	Scan Link name	[AB] [ab] [12] [!"#]	16	—	
My Station	TX Message	[AB] [ab] [12] [!"#]	20	—	p. 8-7
GPS TX Mode	Unproto Address	[AB] [ab] [12] [!"#]	56	Normally 12 characters (API31,DSTAR*)	p. 5-13
	Comment	[AB] [ab] [12] [!"#]	43	The number of characters you can enter differs, depending on the data extension and altitude settings.	p. 11-16
	GPS Message	[AB] [ab] [12] [!"#]	20	—	p. 5-19
SD Card	Save Setting	[AB] [ab] [12] [!"#]	15	Illegal characters: / ; * < >	p. 2-2
	Export	[AB] [ab] [12] [!"#]	15	Illegal characters: / ; * < >	p. 2-8
Repeater List	Group name	[AB] [ab] [12] [!"#]	16	—	p. 4-40
	Repeater name	[AB] [ab] [12] [!"#]	16	—	
	Sub name	[AB] [ab] [12] [!"#]	8	—	
	Call sign	A to Z, 0 to 9, /, (space)	8	—	p. 4-33
	GW Call sign	A to Z, 0 to 9, /, (space)	8	—	
CS screen	UR	A to Z, 0 to 9, /, (space)	8	—	p. 11-19
	R1	A to Z, 0 to 9, /, (space)	8	—	
	R2	A to Z, 0 to 9, /, (space)	8	—	
My Call Sign	Call sign	A to Z, 0 to 9, /, (space)	12 (+1)	Includes “/” between the Call sign and Memo field.	p. 11-23
Your Call sign	Name	[AB] [ab] [12] [!"#]	16	—	p. 4-41
	Call sign	A to Z, 0 to 9, /, (space)	8	—	
GPS Memory	Memory name	[AB] [ab] [12] [!"#]	16	—	p. 5-20
	Group name	[AB] [ab] [12] [!"#]	16	—	p. 5-23
DR screen	Direct Input (UR)	A to Z, 0 to 9, /, (space)	8	—	p. 4-11
	Direct Input (RPT)	A to Z, 0 to 9, /, (space)	8	—	p. 4-12
DTMF Memory	DTMF code	0 to 9, A, B, C, D, *, #	24	—	p. 12-6

[AB]: A to Z, 0 to 9, (space)

[ab]: a to z, 0 to 9, (space)

[12]: 0 to 9, (space)

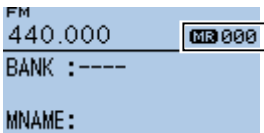
[!"#]: ! " # \$ % & ' () * + , - . / : ; < = > ? @ [\] ^ _ ` { | } ~ (space)

Entering and editing text (Continued)

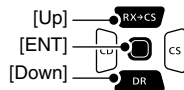
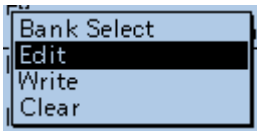
◇ How to enter

Example: Entering “Calling” as a Memory name.

1. Push [M/CALL] to enter a Memory mode.
2. Hold down [S.MW] for 1 second.
 - Enters the Select Memory Write mode.
 - The Memory channel number blinks.
3. Rotate [DIAL] to select a Memory channel.

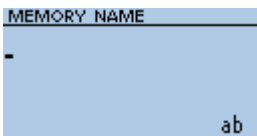
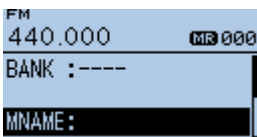


4. Push [QUICK].
5. Select “Edit.”



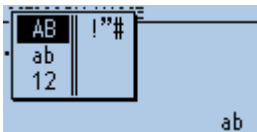
• The Edit screen is displayed.

6. Select “MNAME”.



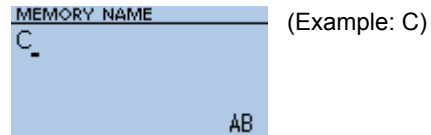
• MEMORY NAME screen is displayed.

7. Push [QUICK].
8. Select the character type.



① To enter symbols, select [!"/>

9. Rotate [DIAL] to select a character, then push [ENT].



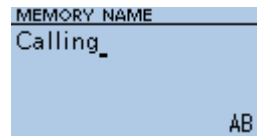
① Information

- To move the cursor forward, push [CS].
- To move the cursor backward, push [CD].
- To insert a text, move the cursor to a place to enter, then rotate [DIAL].
- To clear a character, push [CLR].
- To consecutively clear characters, continuously hold down [CLR].
- When the character type is “AB” or “ab,” and while entering a character, push [QUICK] to select upper case or lower case letters.

10. Repeat steps 7 ~ 9 to enter a name.

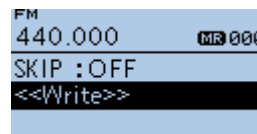


11. After entering, push [ENT].



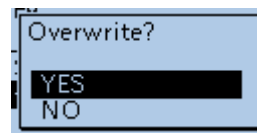
• Returns to the Edit screen and the entered name is displayed.

12. Select “<<Write>>.”



• A confirmation dialog is displayed.

13. Select <YES>.



• Returns to the Memory mode.

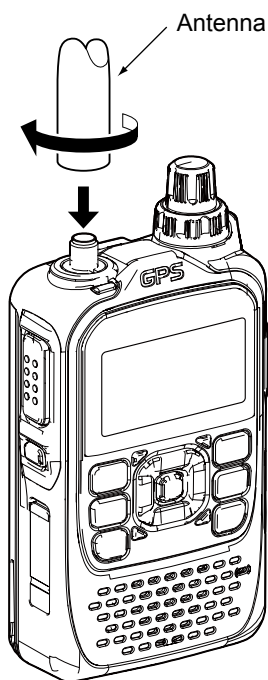
Section 1 ATTACHING ACCESSORIES

Attaching the antenna.....	1-2
Attaching and detaching the battery	1-2
Attaching and detaching the belt clip.....	1-3
Attaching the hand strap.....	1-3

Attaching the antenna

Insert the antenna into the base of the SMA antenna connector and tighten the antenna.

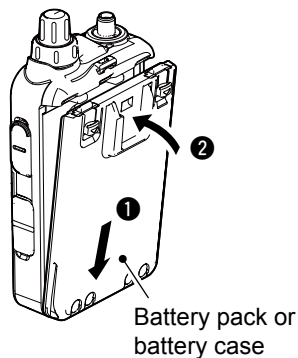
TIP: Third-party high gain antennas may increase transceiver performance. The optional **AD-92SMA** ANTENNA CONNECTOR ADAPTER enables you to use antennas with a BNC connector. (p. 13-2)



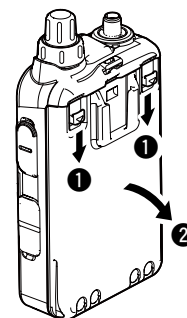
Attaching and detaching the battery

To attach or detach the battery pack or battery case, see the illustration below. See page 3-4 for battery case details.

To attach



To detach



NOTE:

- Even when the transceiver is turned OFF, a small current still flows in the transceiver. When not using the transceiver for a long time, remove the battery pack or case to prevent the batteries from becoming exhausted.
- The battery protection function automatically reduces power to Low 1 power (0.5 W) when the temperature is around 0°C (32°F) or below. In addition, High, Mid and Low 2 power selections are disabled.

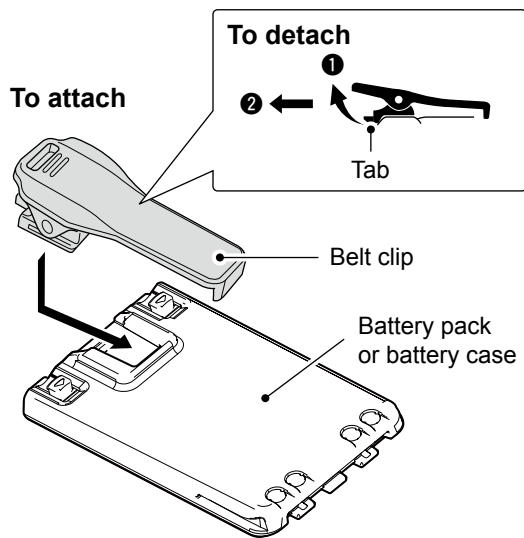
1 ATTACHING ACCESSORIES

Attaching and detaching the belt clip

To attach or detach the belt clip, first remove the battery pack or case, if it is attached. (p. 1-2) See the illustration below.

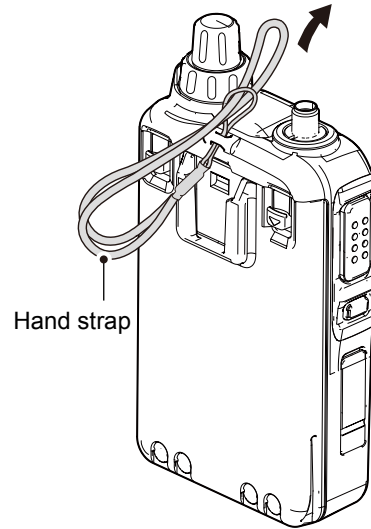
To attach the belt clip, slide the belt clip in the direction of the arrow until the belt clip locks in place, and makes a 'click' sound.

To detach the belt clip, lift the tab up (1), and slide the belt clip in the direction of the arrow (2).



Attaching the hand strap

Slide the hand strap through the loop on the top of the rear panel, as illustrated below.



⚠ WARNING! NEVER swing the transceiver by holding the hand strap. This can cause injury to yourself or others.

Section 2 USING A microSD CARD

NOTE: See BASIC MANUAL Section 6 for details on how to insert or remove a microSD card and precautions.

- About data saved on a microSD card.....2-2
- Saving settings onto a microSD card2-2
 - ◇ Saving as a new file2-2
 - ◇ Overwriting a current file2-2
- Saving with a different file name.....2-3
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- Backing up data saved on the microSD card onto a PC2-5
 - ◇ About the microSD card's folder2-5
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- Importing or Exporting a CSV format file2-7
 - ◇ Importing2-7
 - ◇ Exporting2-8

About data saved on a microSD card

The following data can be saved onto the card:

- **Transceiver data**
Memory channel contents, Repeater List, Your (UR) call sign memory, and GPS memory that are saved in the transceiver.
- **Communication audio**
The transmitted and received audio.
- **Communication log**
The QSO log and RX history log.
- **Automatic answering voice audio in the DV mode**
Voice audio to use with the Auto Reply function in the DV Mode.
- **Voice audio for the Voice TX function**
Voice audio to use with the Voice TX function.
- **Position data from the GPS receiver**
Position and time data from a GPS receiver that is in a log file as a route.
- **Voice Recorder**
The microphone audio.

Saving settings onto a microSD card

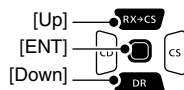
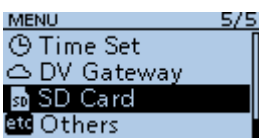
Memory channels, settings on the MENU screen, and Repeater List can be saved on the microSD card. Saving data on the microSD card enables you to easily restore the transceiver to its previous configuration, even if you perform an All reset.

You can save settings data as a new file, or you can overwrite to the current file.

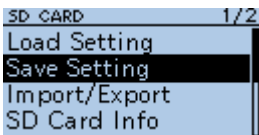
◇ Saving as a new file

MENU > SD Card > **Save Setting**

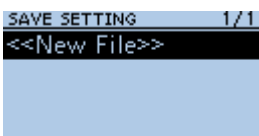
1. Push [MENU].
2. Select "SD Card."



3. Select "Save Setting."

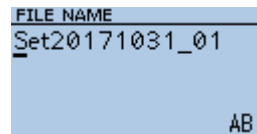


4. Select "<<New File>>."

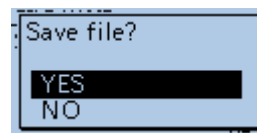


- The file is named in the following format:
Setyyyyymmdd_xx
(yyyy: Year, mm: month, dd: day, xx: file number).
- ① To change the file name, see page iii on how to enter characters.

5. Push [ENT].



6. Select <YES>.

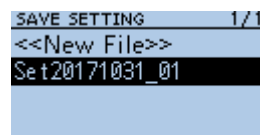


- While saving, a progress bar is displayed. When saving is completed, the SD CARD screen is displayed.

① To exit the MENU screen, push [MENU].

◇ Overwriting a current file

To overwrite data in a current file, select the file you want to overwrite in step 4 to the left.

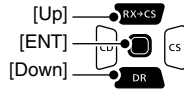
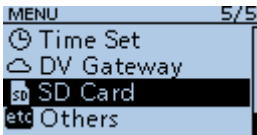


TIP: Data is saved in the "icf" file format. You can copy the icf data on a PC and edit it using the CS-31PLUS CLONING SOFTWARE.

Saving with a different file name

MENU > SD Card > Save Setting

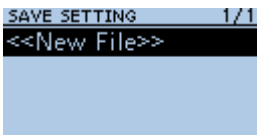
1. Push [MENU].
2. Select "SD Card."



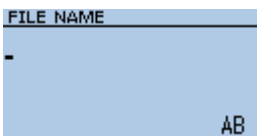
3. Select "Save Setting."



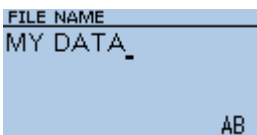
4. Select "<<New File>>."



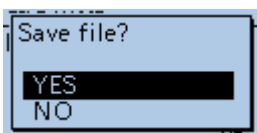
5. Hold down [CLR] to delete the characters.



6. Enter a file name and push [ENT].
① See page iii on how to enter characters.



7. Select <YES>.



• While saving, a progress bar is displayed. When saving is completed, the SD CARD screen is displayed.

① To exit the MENU screen, push [MENU].

Loading the saved files on the microSD card

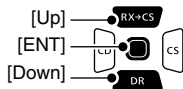
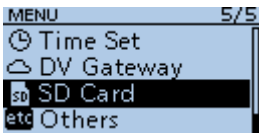
The saved Memory channels, MENU screen settings, and Repeater List can be copied to the transceiver. This makes it easy to copy Memory channels or the Repeater List, to another ID-31A PLUS/ID-31E PLUS and operate with the same data.

NOTE: Saving the current data is recommended before loading other data into the transceiver.

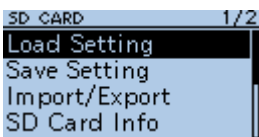
Example: Loading all the data in the "Set20171031_01" file

MENU > SD Card > Load Setting

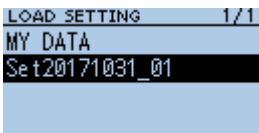
1. Push [MENU].
2. Select "SD Card."



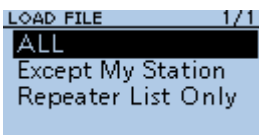
3. Select "Load Setting."



4. Select a data file to load into the transceiver.

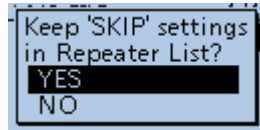


5. Select a loading content.



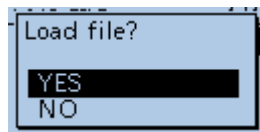
- **ALL:**
Loads all Memory channels, settings on the MENU screen, and the Repeater List into the transceiver.
- **Except My Station:**
Loads all memory channels, setting on the MENU screen except MY call signs, and the Repeater List into the transceiver.
- **Repeater List Only:**
Loads only the Repeater List into the transceiver.

6. Select <YES> or <NO>.

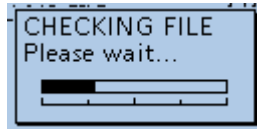


- **YES:**
The skip settings of the Repeater List are retained.
- **NO:**
The skip settings of the Repeater List are cleared.

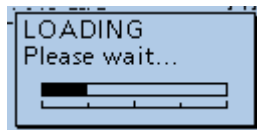
7. Select <YES>.



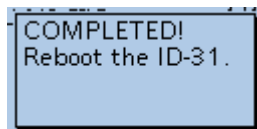
- The data file is checked.



- After checking, loads the data file.



- After loading, "COMPLETED!" is displayed.



8. Reboot the transceiver to use with loaded settings data.

Backing up data saved on the microSD card onto a PC

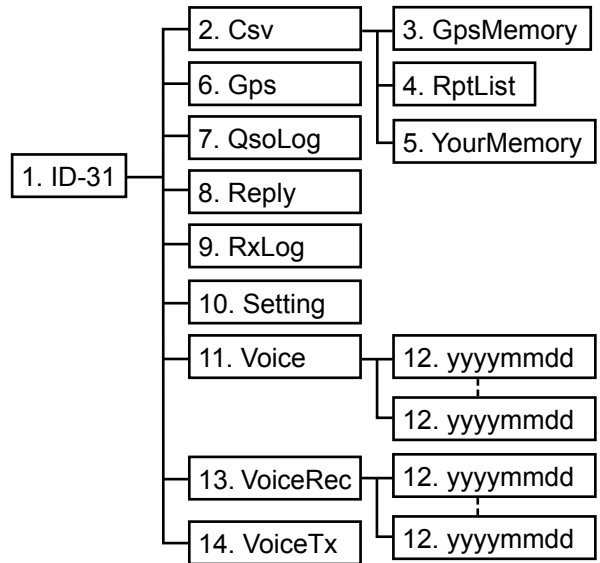
A backup file enables easy restoration, even if the data on the microSD card is accidentally deleted.

① If your PC does not have a microSD card slot, connect a memory card reader (user supplied) to use the microSD card.

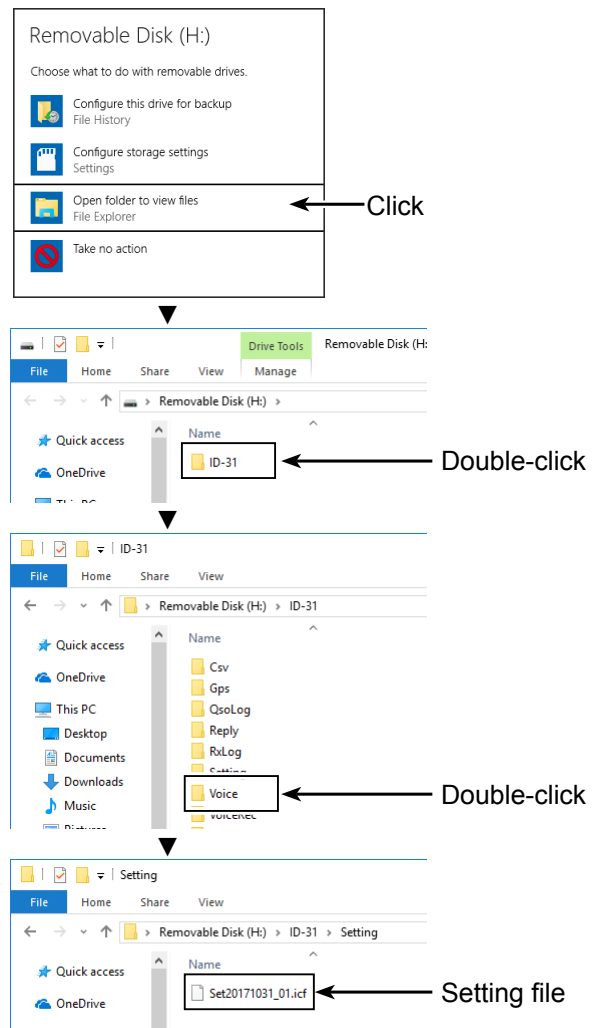
◆ About the microSD card's folder

The folders contained in the microSD card:

1. ID-31 folder
The folders created in the transceiver.
2. Csv folder
Repeater List, Your (UR) call sign memory, and GPS Memory folders.
3. GpsMemory folder
GPS Memory in the "csv" format.
4. RptList folder
Repeater List in the "csv" format.
5. YourMemory folder
Your (UR) call sign memory in the "csv" format.
6. GPS folder
GPS logging file in the "log" format.
7. QsoLog
QSO log file in the "csv" format.
8. Reply folder
Automatic reply file is saved in the "wav" format.
9. RxLog folder
RX record log file in the "csv" format.
10. Setting folder
Transceiver setting files in the "icf" format.
11. Voice folder
Recorded QSO audio files and folders.
12. yyyymmdd folder
Recorded audio file is saved in the "wav" format.
13. VoiceRec folder
Recorded Voice recorder audio files.
14. VoiceTx folder
Recorded voice audio files for the Voice TX function in the "wav" format.



(Example: Selecting the setting file)
When the microSD card is inserted into the microSD card slot of your PC or the microSD card reader, the screen is displayed as shown below.

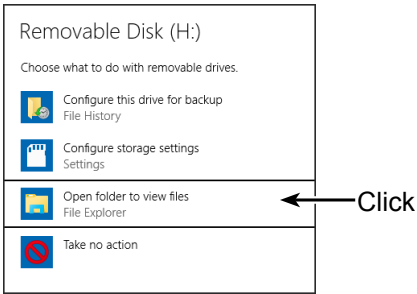


Backing up data saved on the microSD card onto a PC

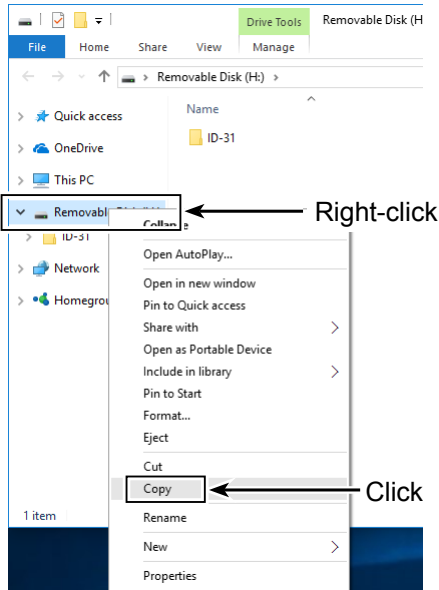
◇ Making a backup file on your PC

Windows® 10 is used for these instructions.

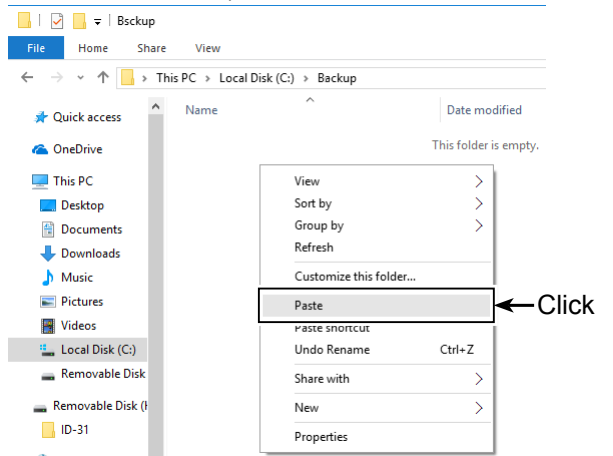
1. Insert the microSD card into the microSD card drive or a memory card reader on your PC.
2. Click the “Open folder to view files” option to access the card.



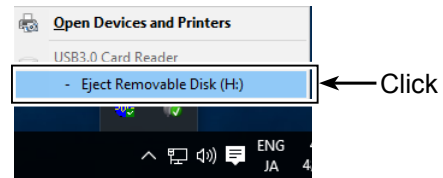
- Displays the ‘ID-31’ folder.
3. Right-click “Removable disk.”
 4. Click “Copy.”



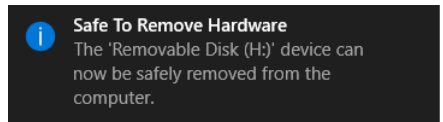
5. Open a folder to copy a backup file to, then right-click, and then click “Paste.”
 - Copies the microSD card data onto your hard disk.
 (Example: Copying into the “Backup” folder on the C drive)



6. To remove the microSD card, click the remove media icon (“Eject”) in the task bar. Then, click “Eject Removable Disk.”



7. When “Safe To Remove Hardware” is displayed, remove the microSD card.



Importing or Exporting a CSV format file

Read this section before importing or exporting a Comma Separated Values (CSV) format file from the microSD card.

You can import or export Your Call Sign, Repeater List, and GPS Memory.

◆ Importing

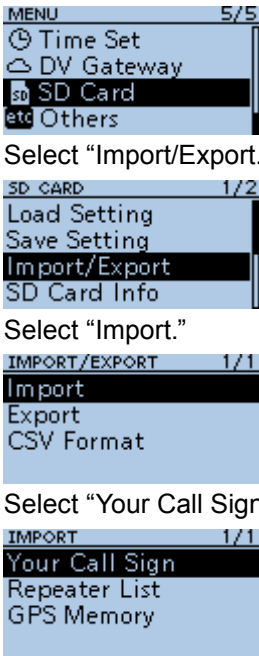
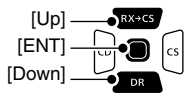
NOTE:

- Before importing, make a backup file of all the transceiver’s data to the microSD card in case of data loss.
- The transceiver cannot display files that have a file name longer than 21 characters. If necessary, rename them using 20 characters or less. When exporting CSV format files using the CS-31PLUS, BE SURE the names are 20 characters or less.

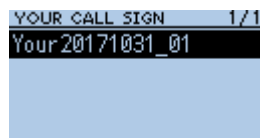
Example: Importing the Your Call sign memory.

SD Card > Import/Export > **Import**

1. Push [MENU].
2. Select “SD Card.”
3. Select “Import/Export.”
4. Select “Import.”
5. Select “Your Call Sign.”



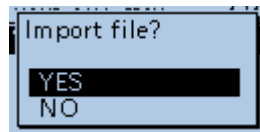
6. Select the CSV file to import.



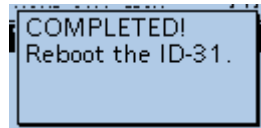
- A confirmation dialog is displayed.

TIP: When importing a Repeater List, “Keep ‘SKIP’ settings in Repeater List?” is displayed. See step 6 on page 2-4 for details.

7. Select <YES>.



- Starts to import.
- After importing ends, “COMPLETED!” is displayed.



8. To complete the importing, restart the transceiver.

Importing or Exporting a CSV format file

◇ **Exporting**

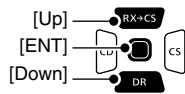
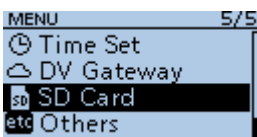
You can export Your Call Sign Memory, Repeater List and GPS Memory.

Saving as a new file:

Example: Exporting the Your Call sign memory.

SD Card > Import/Export > **Export**

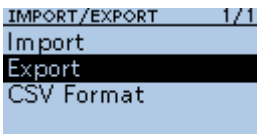
1. Push [MENU].
2. Select "SD Card."



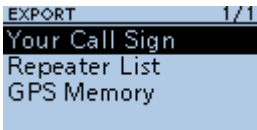
3. Select "Import/Export."



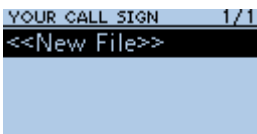
4. Select "Export."



5. Select "Your Call Sign."

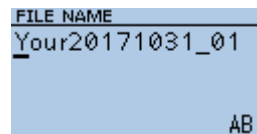


6. Select "<<New File>>."



- Displays the FILE NAME screen.
- ① The file is named in the following format:
 Your*yyyymmdd_xx
 (yyyy: Year, mm: month, dd: day, xx: file number).
 * "Rpt" is displayed for a repeater list, and "Gps" is displayed for a GPS memory.
- ① To change the file name, see page iii.

7. Push [ENT].



- A confirmation dialog is displayed.

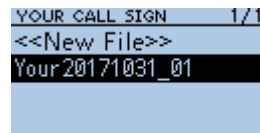
8. Select <YES>.



- Exports the setting data.
- ① To exit the MENU screen, push [MENU].

Overwriting a current file:

When you overwrite data in a current file, select the file you want to overwrite in step 4 to the left.



Section 3

BATTERY CHARGING

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Charging with the optional desktop charger	3-5
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External DC power operation	3-6
◇ Operating note	3-6
Specifications for the battery charger and battery pack	3-7
◇ BC-202 DESKTOP CHARGER (optional).....	3-7
◇ BP-271 Li-ion BATTERY PACK (supplied)	3-7
◇ BP-272 Li-ion BATTERY PACK (optional)	3-7

Battery information

◇ Battery life

The approximate battery life (operating time) as shown below is calculated under the following assumptions:

- Power save setting: Auto (Short)
- Duty cycle: TX : RX : Standby = 1 : 1: 8 (based on operating style)

The approximate battery life:

Battery pack	FM mode	DV mode
BP-271	4.5 hours	4.5 hours
BP-272	8 hours	7.5 hours

① See page 3-4 for the optional BP-273 battery case battery life.


NOTE: BE SURE to replace the battery pack with a new one approximately five years after purchasing, even if it still holds a charge. The material inside the battery cells will become weak after a period of time, even with little use.




The estimated number of times you can charge the pack is between 300 and 500. Even when the pack appears to be fully charged, the operating time of the transceiver may become short when:

- Approximately five years have passed since the pack was manufactured.
- The pack has been repeatedly charged.

TIP: Keep the battery terminals clean. It's a good idea to occasionally clean them.

◇ Battery icon

The “” battery icon is displayed when the BP-271 or BP-272 Li-ion BATTERY PACK is attached to the transceiver.

Icon	Battery status
	The battery has sufficient capacity.
	The battery is exhausted a little.
	The battery is nearing exhaustion.
Blinking	The battery is almost fully exhausted.

Charging the battery pack

NOTE:

- Prior to using the transceiver for the first time, the battery pack must be fully charged for optimum life and operation.
- **BE SURE** to turn OFF the transceiver while charging with the supplied battery charger. Otherwise the battery pack will not charge.

- ① While charging, the charging icon “

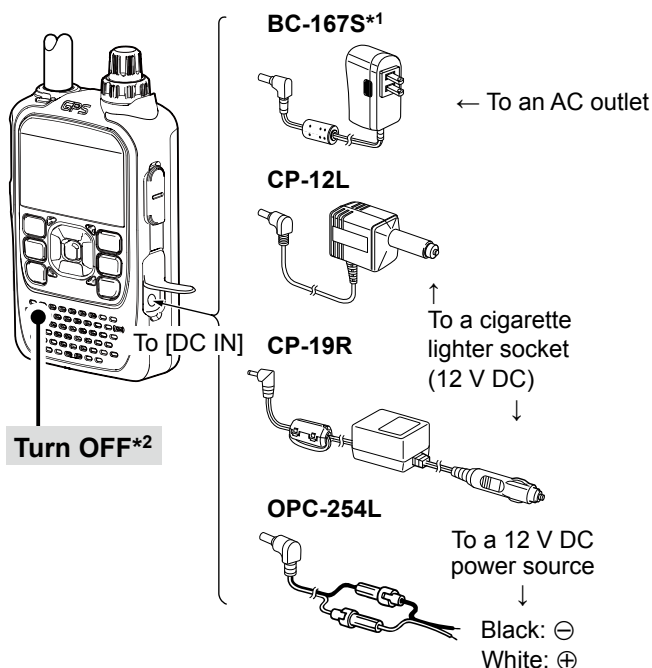
◇ Charging information

- When using the optional CP-12L, CP-19R, or OPC-254L, the battery pack can be charged with the power ON.
 - ① To connect, see the illustration below.
 - ① While charging, the icon display changes, as shown below.
“” → “”
- The BP-273 battery case has no charging capability or socket.

NOTE: BE SURE to attach the battery pack before connecting the DC cable

Approximate charging time

- BP-271: 6 hours
- BP-272: 9 hours



◇ Charging note

- Turn OFF the transceiver when using the BC-167S.
- To protect the battery pack, it cannot be fully charged when not using the optional BC-202 DESKTOP CHARGER. (p. 3-7)
- **DO NOT** charge the fully charged battery pack. This may cause a shorter battery life.

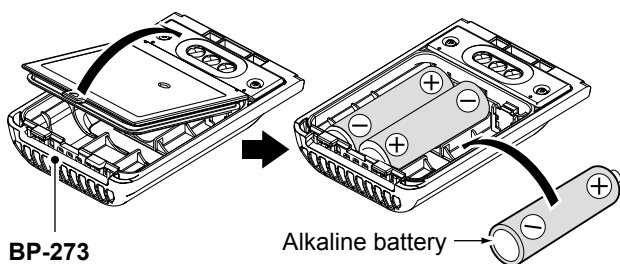
*1 The shape is different, depending on the version.

*2 When using the BC-167S, turn OFF the transceiver.

About the optional battery case

The BC-273 uses three AA (LR6) size alkaline batteries.

1. Remove the battery case top as shown below.
2. Install three AA (LR6) size alkaline batteries.
 - ① Install only alkaline batteries.
 - ① BE SURE to observe the correct polarity.
3. Attach the battery case. (p. 1-2)



◇ Batteries cautions

- When installing batteries, confirm that they are all the same brand, type and capacity. Do not mix new and old batteries together.
- **DO NOT** incinerate used battery cells since the internal battery gas may cause them to rupture.
- **DO NOT** expose a detached battery case to water. If the battery case gets wet, BE SURE to wipe it dry before using it.
- **DO NOT** use batteries whose insulated covering is damaged.
- Keep the battery terminals clean. It's a good idea to occasionally clean them.
- Remove the alkaline batteries when battery case is not used. Otherwise the installed alkaline batteries will be exhausted due to the built-in step-up converter.

TIP:

- A built-in step-up converter in the BP-273 increases the voltage to 5.5 V DC. Approximately 100 mW of output power is possible using the case. Also, the transmit output power selection is disabled.
- The transceiver meets IPX4 requirements for waterproof protection when the BP-273 is attached.
- The batteries may seem to have low capacity when used in low temperatures, such as -10°C ($+14^{\circ}\text{F}$) or below. Keep the batteries warm in this case.

◇ Battery life

The approximate battery life (operating time) as shown below is calculated under the following assumptions:

- Power save setting: Auto (Short)
- Duty cycle: TX : RX : Stand-by = 1 : 1 : 8 (based on operating style)

The approximate battery life:

FM mode	DV mode
8 hours	6.5 hours

- ① The battery life may differ, depending on your operating style, or the installed alkaline batteries.

◇ About the battery replacement

When the alkaline batteries are almost exhausted, "LOW BATTERY" is displayed and the battery icon starts to blink. After 10 seconds, the transceiver power is automatically turned OFF. In that case, replace all batteries with new alkaline batteries.

- ① The battery icon for the BP-273 cannot display the capacity of the alkaline batteries. The battery icon always displays "■", and it does not reflect with the true battery capacity.

Charging with the optional desktop charger

The optional BC-202 DESKTOP CHARGER rapidly charges the BP-271 or BP-272 Li-ion BATTERY PACK.

① The charging indicator lights orange while charging, and lights green when charging is completed.

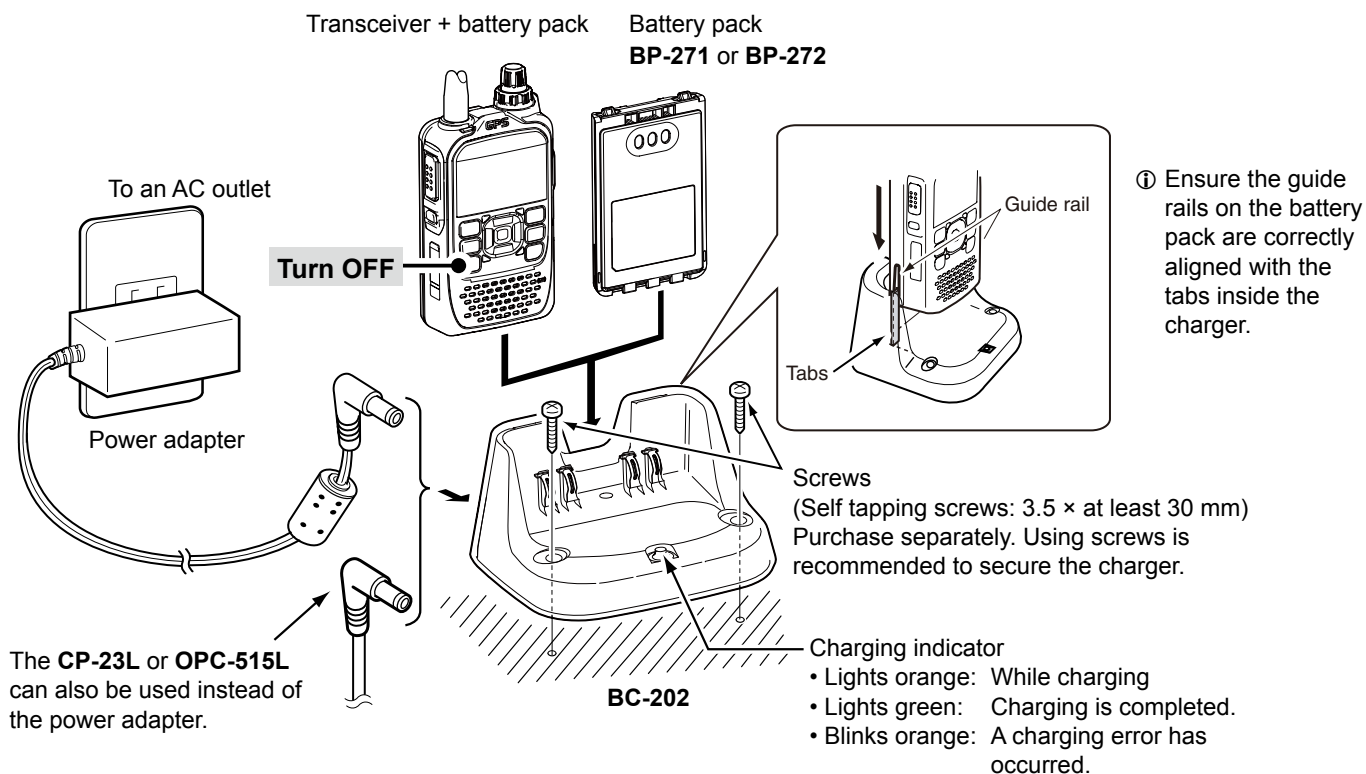
Approximate charging time

- BP-271 : 2 hours
- BP-272 : 3.5 hours

◇ Charging note

⚠ **DANGER! NEVER** use a battery pack that is not manufactured or approved by Icom.

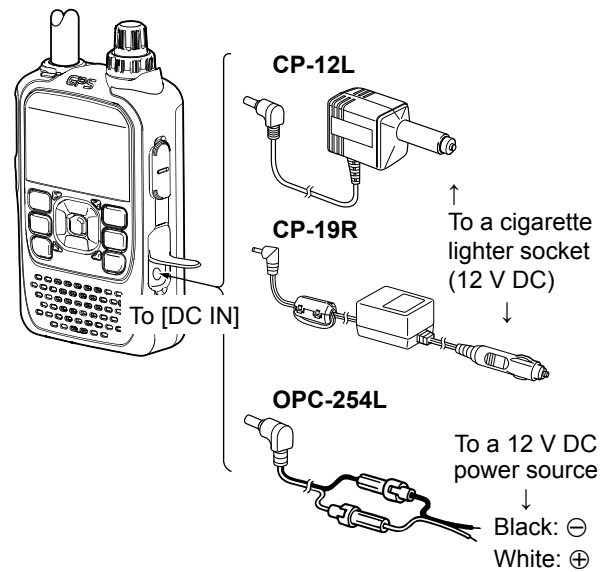
- **CAUTION: DO NOT** place the transceiver with the battery pack to the desktop charger when the transceiver is connected to the DC power source. This may cause the charger's malfunction. If the charging indicator lights red, disconnect the power adapter from the charger, and then reconnect it.
- **BE SURE** to turn OFF the transceiver. When the transceiver power cannot be turned OFF because of the battery exhaustion, detach the battery pack from the transceiver. Then charge the battery pack by itself.
- The BC-202 DESKTOP CHARGER can only charge the BP- 271 or BP-272 Li-ion BATTERY PACK. Other types of rechargeable batteries, Ni-Cd or Ni-MH cannot be charged.
- If the charging indicator blinks orange, there may be a problem with the battery pack or charger. Contact your dealer if you have problems charging a new battery pack.



External DC power operation

◇ Operating note

- **DO NOT** connect over 16 V DC directly into the [DC IN] jack of the transceiver. The power source voltage must be between 10.0 V ~ 16.0 V DC.
- **DO NOT** transmit at high power for a long period of time. The transceiver becomes hot and it may cause a burn.
- Use the optional CP-12L, CP-19R, or OPC-254L when using the external DC power.
- Confirm the correct polarity of the OPC-254L supply connection. Connect the OPC-254L to an external power source (user supplied).
- Use an external DC-DC converter to connect the transceiver through the optional CP-12L, CP-19R, or OPC-254L to a 24 V DC power source. Ask your dealer for details.
- Up to 5 W (approximately) of maximum output power is possible when using the external DC power. However, when the supply voltage exceeds 14 V, the built-in protection circuit activates to reduce the transmit output power to approximately 2.5 W.
- When the external power is used, the Power Save function (p. 11-33) is automatically turned OFF.
- Depending on the external power voltage, the battery pack may be used to operate the transceiver, and the battery pack capacity is consumed.



- ① The BC-167S cannot be used for the external DC power operation.

Specifications for the battery charger and battery pack

◇ BC-202 DESKTOP CHARGER (optional)

- Power source requirement: 12 V ~ 16 V DC or the specified Icom power adapter (BC-123S)
- Charging temperature range: 0°C ~ 40°C, 32°F ~ 104°F
- Weight: Approximately 104 g, 3.7 oz
(without power adapter)
- Dimensions: 88.0 (W) × 47.5 (H) × 72.5 (D) mm, 3.5 (W) × 1.9 (H) × 2.9 (D) inches
(projections are not included)

◇ BP-271 Li-ion BATTERY PACK (supplied)

- Voltage: 7.4V
- Discharge Capacity: 1150 mAh (minimum)
- Usable temperature range: -20°C ~ +60°C, -4°F ~ +140°F
- Charging temperature range: 0°C ~ 40°C, 32°F ~ 104°F
- Storage temperature range: -20°C ~ +50°C, -4°F ~ +122°F (within a month)
-20°C ~ +35°C, -4°F ~ +95°F (within 3 months)
-20°C ~ +20°C, -4°F ~ +68°F (within a year)
- Dimensions: 58 (W) × 86.9 (H) × 9.1 (D) mm, 2.3 (W) × 3.4 (H) × 0.4 (D) inches
(projections are not included)

◇ BP-272 Li-ion BATTERY PACK (optional)

- Voltage: 7.4V
- Discharge Capacity: 1880 mAh (minimum)
- Usable temperature range: -20°C ~ +60°C, -4°F ~ +140°F
- Charging temperature range: 0°C ~ 40°C, 32°F ~ 104°F
- Storage temperature range: -20°C ~ +50°C, -4°F ~ +122°F (within a month)
-20°C ~ +35°C, -4°F ~ +95°F (within 3 months)
-20°C ~ +20°C, -4°F ~ +68°F (within a year)
- Dimensions: 58 (W) × 86.9 (H) × 14.2 (D) mm, 2.3 (W) × 3.4 (H) × 0.6 (D) inches
(projections are not included)

Section 4 D-STAR OPERATION

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IMPORTANT!

- The repeater list, described in this manual, may differ from your transceiver's preloaded contents.
- Although Japanese repeaters are used in the setting examples, the Japanese repeater node (port) letters are different from other country's.

BE SURE to add the repeater node letter in the 8th digit of the call sign, according to the frequency band shown below.

1200 MHz : A (B in Japan)

430 MHz : B (A in Japan)

144 MHz : C (no D-STAR repeaters in Japan)

To begin the Digital mode communication using other than the D-STAR Repeater (DR) function

To begin Digital mode communication using other than the DR function, you can use the VFO mode, Memory mode, or Call channel mode.

This manual description focuses on the DR function operation which can be easily set up. If you want to use other than the DR function, see the procedures as described to the right, or select the repeater in a Memory channel.

For a Local area call or Gateway call:

1. Set the access repeater's frequency. (p. 10-2)
2. Set the frequency offset for the Duplex operation. (p. 10-4)
3. Set the Duplex direction. (p. 10-4)
4. Set the call signs (UR/R1/R2). (p. 11-19)

For a Simplex call:

1. Set the operating mode to the DV mode.
2. Set the operating frequency. (BASIC MANUAL p. 51)

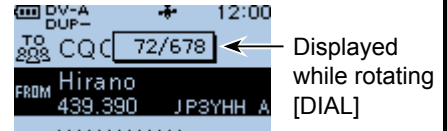
“FROM” (Access repeater) setting

Your Access repeater must be set in “FROM” when you make a call on the DR screen.

You have 5 ways to set the Access repeater.

By rotating [DIAL]

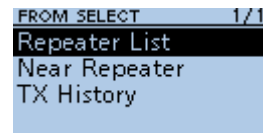
Select the preset repeater by rotating [DIAL] on the DR screen.



• When you know your access repeater

From the repeater list (p. 4-4)

You can select your Access repeater from the repeater list by selecting the repeater area and name, if entered, or call sign.



• When you do not know which repeater you can access

Search for a repeater using the DR scan (p. 4-5)

The Normal DR scan searches for output repeater frequencies of nearby repeaters. The scan stops when a signal is detected.

- The scan also stops on Simplex signals.



The Near Repeater scan searches for output repeater frequencies of nearby repeaters that are within 160 kilometer (100 miles) from your position and the repeater’s position that is entered in the repeater list. The DR scan starts scanning and stops when a signal is detected.

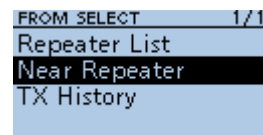
You can also find only FM repeaters using the Near Repeater (FM) scan.

Search for near repeaters (p. 4-6)

Searches for near repeaters that are within 160 kilometer (100 miles) from your position using your GPS position and the repeater’s position that is entered in the repeater list.

The nearest repeaters in your transceiver’s repeater list are displayed as selectable options.

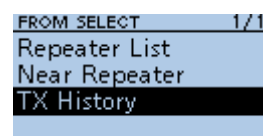
You can select the nearby DV only, FM only, or both repeater types.



• When “FROM” data is saved in the TX History.

From the TX History (p. 4-7)

Select a repeater that you have accessed before from the TX History.



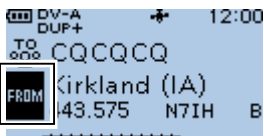
“FROM” (Access repeater) setting

◇ Using your transceiver’s repeater list

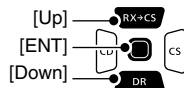
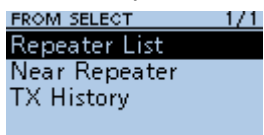
When your access repeater is in your transceiver’s repeater list, you can select it from the list. By just selecting the repeater from the list, the repeater call sign, its frequency, duplex setting, and frequency offset are automatically set for easy operation.

Example: Selecting the “Hirano” repeater in Japan from the repeater list.

1. Hold down [DR] for 1 second to display the DR screen.
2. Push [DR] to select “FROM,” then push [ENT].



3. Select “Repeater List.”

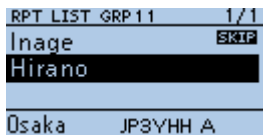


4. Select the repeater group where your access repeater is listed.



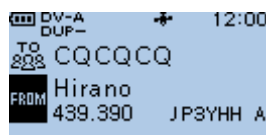
(Example: “11: Japan”)

5. Select your access repeater.



(Example: “Hirano”)

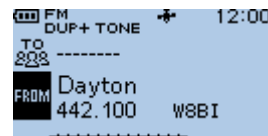
- Returns to the DR screen, and the selected repeater name, frequency, and call sign are displayed in “FROM.”



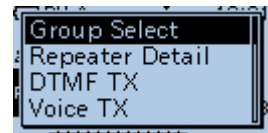
① The repeater list, described in this manual, may differ from your transceiver’s preloaded contents.

TIP:
When you select an FM repeater:
 When an FM repeater is in your transceiver’s repeater list, you can select it from the list. When selecting an FM repeater, the “TO” setting is not necessary and a “---” is displayed in “TO.”

When selecting an FM repeater.



How to change the repeater group:
 To change the repeater group on the DR screen, push [QUICK], then select “Group Select.”



“FROM” (Access repeater) setting

◇ Using the DR scan

The DR scan scans frequencies to find a signal on a repeater or a simplex frequency. You can use 2 kinds of DR scans, Normal scan and Near Repeater scan.

Normal scan

To quickly find a repeater, the Normal scan skips repeaters that are not set as an access repeater.

- ① The “USE (FROM)” setting (p. 11-23) is set to “NO” on the repeater list. (MENU > DV Memory > **Repeater List**)

Near Repeater scan

The Near Repeater scan searches for up to 20 nearby repeaters by using your position and the repeater’s entered position, and then lists the repeaters.

- ① The Near Repeater scan continues, even if you turn OFF the transceiver, and then turn it ON again during the scan.
- ① If your own position data is not being received, the last received position is used.

NOTE: Even if your transceiver receives a repeater signal, the repeater may not receive your signal, because the repeater’s output power is higher than your transceiver’s, and your signal does not reach the repeater.

TIP: The DR scan scans the simplex frequencies in the repeater list, in addition to D-STAR repeaters.

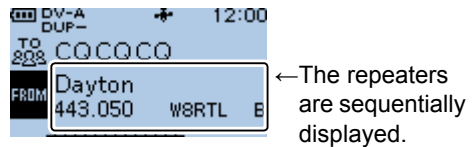
Example: Selecting an active repeater using the DR scan.

1. Hold down [DR] for 1 second to display the DR screen.
2. Hold down [SCAN] for 1 second.
 - Displays the DR scan setting window.



3. Rotate [DIAL] to select the scan type.
 - Normal: Searches for repeaters whose “USE (FROM)” setting is set to “YES.”
 - Near Repeater (ALL): Searches for up to 20 nearby DV or FM repeaters. (Total 40 repeaters)
 - Near Repeater (DV): Searches for up to 20 nearby DV repeaters.
 - Near Repeater (FM): Searches for up to 20 nearby FM repeaters.

4. Push [ENT].
 - The selected scan starts.



- In the DR scan, the repeaters are sequentially displayed by distance, in descending order.
- ① The scan resumes the same as other scans. (p. 11-5)

5. When the transceiver receives a signal from a repeater, the scan stops. Push [SCAN].



- The DR scan is canceled, and the repeater is set to “FROM.”



“FROM” (Access repeater) setting

◇ Using the Near Repeater Search function

The transceiver searches for the nearest repeaters by using your position and the repeater’s entered position.

The nearest repeaters in your transceivers’ repeater list are displayed as selectable options.

NOTE:

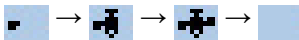
- When using the Near Repeater Search function, BE SURE to first receive your own position data, or manually enter your position data.
- If no repeater is found within a 160 kilometer (100 miles) range, “No Repeater Found” is displayed.
- If the last received position can be used, “GPS is invalid. Search by last valid position” is displayed.

Example: Selecting a nearby repeater from the Near Repeater list.

Step 1: Receiving your own position from the GPS satellite

Confirm the GPS receiver is receiving your position.

- The GPS icon blinks when searching for satellites.



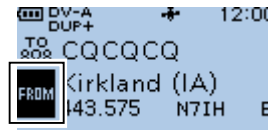
- The GPS icon stops blinking when the minimum needed number of satellites is found.



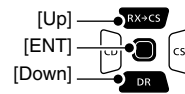
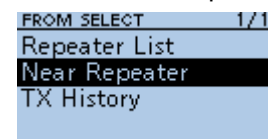
- ① It may take only a few seconds to receive, or it may take a few minutes, depending on your operating environment. If you have difficulties receiving, we recommend that you try a different position.
- ① If your own position is not being received, the last received position is used for your location.

Step 2: Selecting the Access repeater from the Near Repeater list

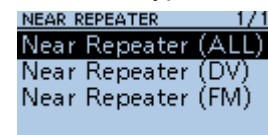
1. Hold down [DR] for 1 second to display the DR screen.
2. Push [DR] to select “FROM,” then push [ENT].



3. Select “Near Repeater.”

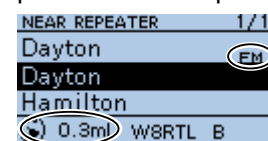


4. Select the type of nearby repeater to display.



- Near Repeater (ALL): Displays up to 20 nearby DV and FM repeaters. (A total 40 repeaters)
- Near Repeater (DV): Displays up to 20 nearby DV repeaters.
- Near Repeater (FM): Displays up to 20 nearby FM repeaters.

5. Select the repeater to use as your access repeater, considering the distance from your position to the repeater.



←“FM” is displayed for FM repeaters.

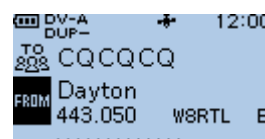
←Repeater call sign

↑ Distance and direction from your position to the repeater*

* When the “POSITION” setting (p. 4-35) is set to “Approximate” on the repeater list, the direction data is not displayed if the distance to the repeater is less than 5 kilometers.

(MENU > DV Memory > **Repeater List**)

- Returns to the DR screen, and the selected repeater is set in “FROM.”



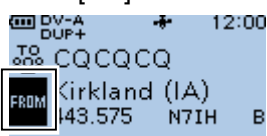
“FROM” (Access repeater) setting

◇ Using TX History

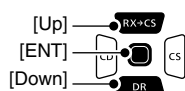
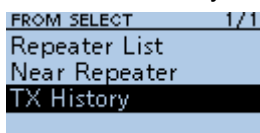
The TX History saves up to 10 of the latest Access (From) repeaters you transmitted on. You can select a repeater from TX History as your Access repeater.

Example: Selecting the “Hirano” repeater from TX History.

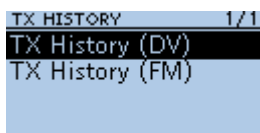
1. Hold down [DR] for 1 second to display the DR screen.
2. Push [DR] to select “FROM,” then push [ENT].



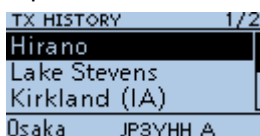
3. Select “TX History.”



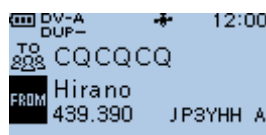
4. Select the TX History (DV) or TX History (FM).
 - TX History (DV): Displays the TX History of the DV repeaters.
 - TX History (FM): Displays the TX History of the FM repeaters.



5. Select the repeater to use it as your Access repeater.



- Returns to the DR screen, and the selected repeater is set in “FROM.”



TIP: When you push [QUICK] in step 5, you can display the REPEATER DETAIL screen, or delete the repeater information from the TX HISTORY screen.

Detail
Delete
Delete All

“TO” (Destination) setting

“CQCQCQ,” the destination repeater, or station call sign must be set in “TO” when you make a call in the DV mode. You have 8 ways to set the destination.

TIP: After you receive the individual station or repeater’s signal, the call sign can be captured by holding down the Call Sign Capture key ([RX→CS]), and you can quickly and easily reply to a call.

By rotating [DIAL]

Rotate [DIAL] to select the repeater or Your Call Sign that is displayed on the DR screen. (This operation is disabled when “CQCQCQ” is set.)

• **To make a Local Area CQ call**

“Local CQ” setting (p. 4-9)
Set “CQCQCQ” in “TO” (Destination).

• **To make a Gateway CQ call**

“Gateway CQ” setting (p. 4-9)
Select a repeater from the repeater List, if you want to make a Gateway call.

• **To make a call to a specific station**

“Your Call Sign” setting (p. 4-10)
Select the station call sign in the Your Call Sign memory.

• **To make a call through a Reflector**

“Reflector” setting (p. 4-14)
Select a reflector you want to call through.

• **To select from RX History**

Setting from RX History (p. 4-10)
When you receive a call, repeater or caller station data is saved in RX History. Select the destination from the record.

• **To select from TX History**

Setting from TX History (p. 4-11)
When you make a call, the destination repeater or called station data is saved in TX History. Select the destination from the record.

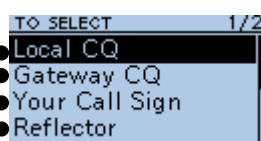
• **To directly enter the destination station call sign**

Direct Input (UR) (p. 4-11)
Directly enter the destination station’s call sign.

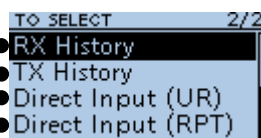
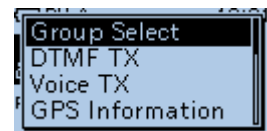
• **To directly enter the destination repeater call sign**

Direct Input (RPT) (p. 4-12)
Directly enter the destination repeater’s call sign.

TO SELECT screen



TIP: How to change the repeater group:
When “Local CQ” or “Gateway CQ” is selected, you can change the repeater group. To change the repeater group on the DR screen, push [QUICK], then select “Group Select.”



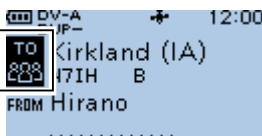
“TO” (Destination) setting

◇ Using the “Local CQ” (Local Area call)

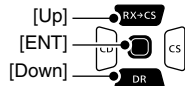
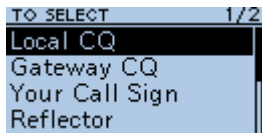
When “Local CQ” is selected on the TO SELECT screen, “CQCQCQ” is set in “TO.”

Example: Making a Local area call by accessing the “Hirano” repeater.

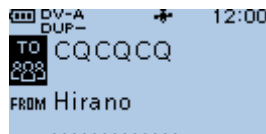
1. Hold down [DR] for 1 second to display the DR screen.
2. Push [RX→CS] to select “TO,” then push [ENT].



3. Select “Local CQ.”



• Returns to the DR screen, and “CQCQCQ” is displayed in “TO.”

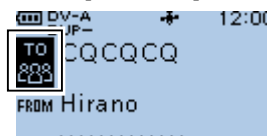


◇ Using the “Gateway CQ” (Gateway call)

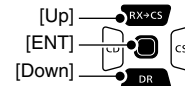
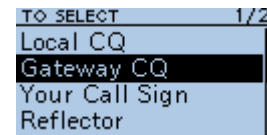
When “Gateway CQ” is selected on the TO SELECT screen, you can select the repeater to make a gateway call on the repeater list.

Example: Making a Gateway CQ call to the “Kirkland (IA)” repeater from the “Hirano” repeater.

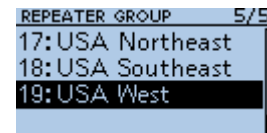
1. Hold down [DR] for 1 second to display the DR screen.
2. Push [RX→CS] to select “TO,” then push [ENT].



3. Select “Gateway CQ.”



4. Select the repeater group where your destination repeater is listed.



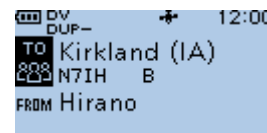
(Example: “19: USA West”)

5. Select the destination repeater.
 - ① Each repeater has a correct node (A, B or C band) that you want to transmit on. See page 4-2, “IMPORTANT” for band letter details.



(Example: “Kirkland (IA)”)

• Returns to the DR screen, and “Kirkland (IA)” is displayed in “TO.”



TIP: After selecting a destination repeater, you can select another repeater preset in your repeater List by rotating [DIAL].



“TO” (Destination) setting

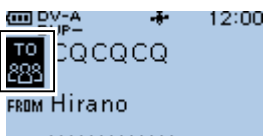
◇ Using “Your Call Sign”

The “Your Call Sign” memory saves individual or repeater station call signs. When you select the call sign for the “TO” (Destination) setting, you can make a Gateway call. When you call an individual station through a gateway, the signal is automatically sent to the last repeater that the individual station accessed. Therefore, even if you do not know where the individual station is located, you can make a call.

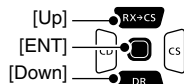
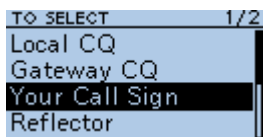
NOTE: If the repeater, set in “FROM” (Access repeater) has no Gateway call sign, you cannot make a gateway call.

Example: Selecting “Rick” from “Your Call Sign.”

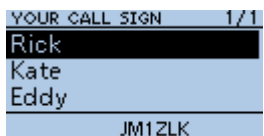
1. Hold down [DR] for 1 second to display the DR screen.
2. Push [RX→CS] to select “TO,” then push [ENT].



3. Select “Your Call Sign.”

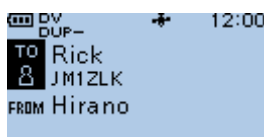


4. Select a destination name or call sign.



(Example: Rick)

- Returns to the DR screen, and “Rick” is displayed in “TO.”



TIP: After selecting a destination, you can select another station preset in your transceiver by rotating [DIAL].

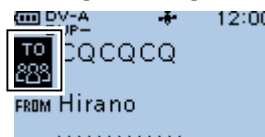


◇ Using RX History

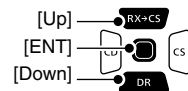
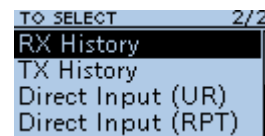
When a call is received in the DV mode, the call data is saved in the RX History. Up to 50 callers, and only the last called call signs, a total of 51 histories can be saved.

Example: Selecting “Rick” in the RX History.

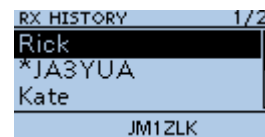
1. Hold down [DR] for 1 second to display the DR screen.
2. Push [RX→CS] to select “TO,” then push [ENT].



3. Select “RX History.”

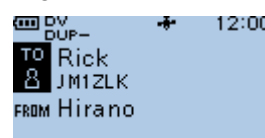


4. Select a destination name or call sign.

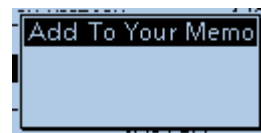


(Example: Rick)

- Returns to the DR screen, and “Rick” is displayed in “TO.”



TIP: To add an RX HISTORY data to the “Your Call Sign” memory, push [QUICK], then select “Add To Your Memory.”



“TO” (Destination) setting

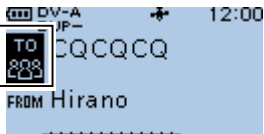
◇ Using TX History

TX History saves the repeater and station name and call sign of up to 20 “TO” (Destination) settings that were used when you made the calls.

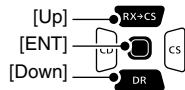
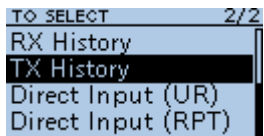
NOTE: Until you make a call in the DV mode, you cannot select “TO” (destination) from the TX History.

Example: Selecting the “Kirkland (IA)” repeater in the TX History.

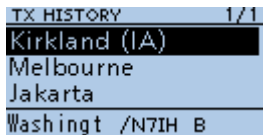
1. Hold down [DR] for 1 second to display the DR screen.
2. Push [RX→CS] to select “TO,” then push [ENT].



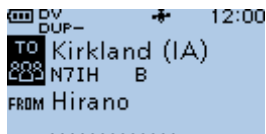
3. Select “TX History.”



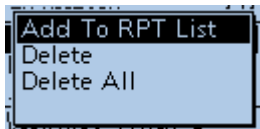
4. Select a destination repeater.



• Returns to the DR screen, and “Kirkland (IA)” is displayed in “TO.”



TIP: You can add the TX HISTORY data to memory, or delete it from the TX HISTORY screen, push [QUICK], then select the option.

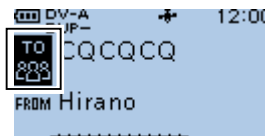


◇ Directly entering (UR)

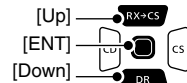
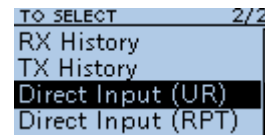
The destination station call sign can be directly entered.

Example: Directly entering the call sign “JM1ZLK.”

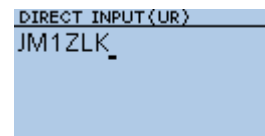
1. Hold down [DR] for 1 second to display the DR screen.
2. Push [RX→CS] to select “TO,” then push [ENT].



3. Select “Direct Input (UR).”

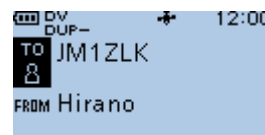


4. Enter a call sign of up to 8 characters, including spaces.



① See page iii on how to enter characters.

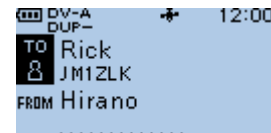
5. After entering, push [ENT].
 - Returns to the DR screen, and “JM1ZLK” is displayed in “TO.”



① After entry, you can correct the call sign in the DIRECT INPUT (UR) screen.

① The entered call sign remains on the DIRECT INPUT (UR) screen, until you enter a new call sign.

TIP: If the entered call sign is duplicated in the “Your Call Sign” memory, the name is displayed. (Only when the name has been entered.)



“TO” (Destination) setting

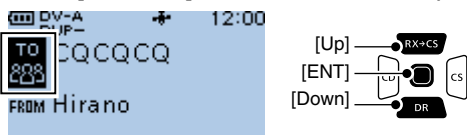
◇ Directly entering (RPT)

The destination repeater call sign can be directly entered.

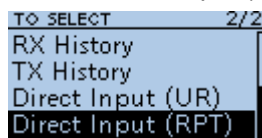
NOTE: BE SURE to include a “/” at the beginning and the node letter as the 8th digit. See page 4-2 “IMPORTANT” about the node letters.

Example: Directly entering the call sign “/JP3YDHA.”

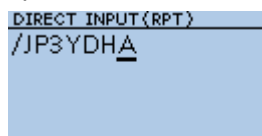
1. Hold down [DR] for 1 second to display the DR screen.
2. Push [RX→CS] to select “TO,” then push [ENT].



3. Select “Direct Input (RPT).”



4. Enter a call sign of up to 8 characters, including spaces.



- ① See page iii on how to enter characters.
5. After entering, push [ENT].
 - Returns to the DR screen, and “/JP3YDHA” is displayed in “TO.”
 - ① After entry, you can correct the call sign in the DIRECT INPUT (RPT) screen.
 - ① The entered call sign remains on the DIRECT INPUT (RPT) screen, until you enter a new call sign.

TIP:

If the entered call sign is duplicated in the repeater list, the name is displayed in “TO” (Only when the name has been entered).

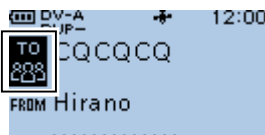
REPEATER DETAIL screen

Depending on the content, such as position data or UTC offset, the distance between your position and the repeater or the repeater time can be displayed on the REPEATER DETAIL screen.

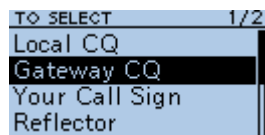
The detail screen can also be entered from the FROM SELECT screen.

Example: Displaying the “Hamacho” repeater detail screen

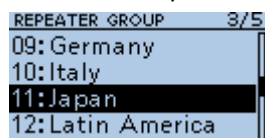
1. Hold down [DR] for 1 second to display the DR screen.
2. Push [RX→CS] to select “TO,” then push [ENT].



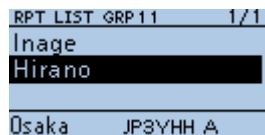
3. Select “Gateway CQ.”



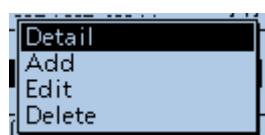
4. Select “11: Japan.”



5. Select “Hirano.”
① DO NOT push [ENT].

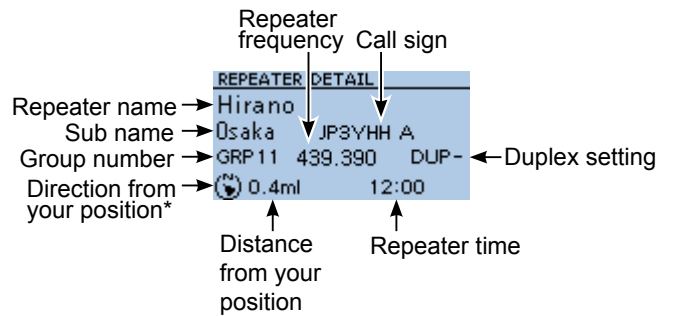


6. Push [QUICK]
7. Select “Detail.”



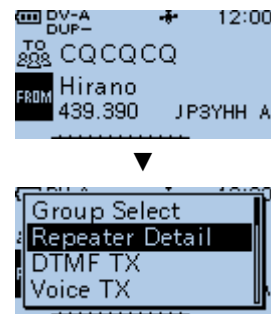
- ① If there is no position data, the distance and direction from your position are not displayed. See page 5-3 to confirm your position.
- ① When selecting the FM repeater, either of “FM” or “FM-N” and the tone setting are displayed.
8. Push [ENT].
• Returns to the previous screen.

The REPEATER DETAIL screen



* When the “POSITION” setting (p. 4-35) is set to “Approximate” on the repeater list, the direction data is not displayed if the distance to the repeater is less than 5 kilometers.

TIP: You can display the REPEATER DETAIL screen when the DR screen is displayed. When you set the repeater as shown below, push [QUICK], then select “Repeater Detail.”

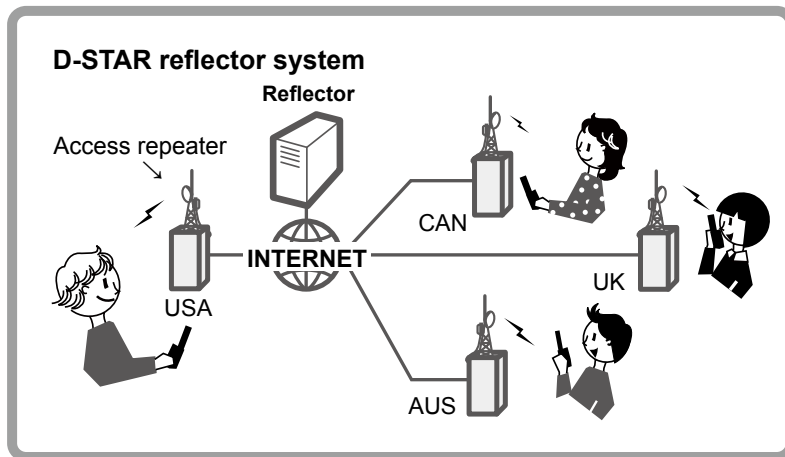


• Displays the REPEATER DETAIL screen.

Connecting to a reflector

◇ What is a reflector?

A reflector is a special server connected to the Internet and running a version of the D-Plus software. If the D-Plus software is installed on your Access repeater, it provides various functions including gateway and reflector linking capabilities (It is known as the D-STAR reflector system). The D-STAR reflector system enables a number of D-STAR repeaters anywhere to link to a reflector. This means that when you transmit through a D-STAR repeater linked to a reflector, your voice can be heard on other repeaters linked to the reflector, and you can hear other stations that are connected to the reflector.

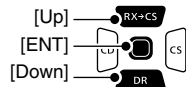
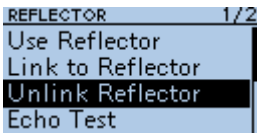


◇ Unlinking a reflector

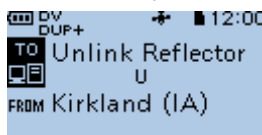
Before trying to link to another reflector, BE SURE to unlink the current connected reflector.

NOTE: If a reflector is already connected, ask on the air whether or not you can change reflectors and wait for responses. BE SURE to reconnect back to the same reflector when you finish your conversation.

1. Push [RX→CS] to select “TO,” then push [ENT].
 - Displays the TO SELECT screen.
2. Select “Reflector.”
 - Displays the REFLECTOR screen.
3. Select “Unlink Reflector.”



- Returns to the DR screen, and “Unlink Reflector” and “U” are displayed in “TO.”



4. Hold down [PTT] to unlink the reflector.

Connecting to a reflector

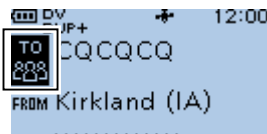
◊ Linking to a reflector

If your repeater is not currently linked to a Reflector, or if you want to change it to another Reflector, follow the steps below. Before linking to another Reflector, BE SURE to unlink the current Reflector. (p. 4-14)

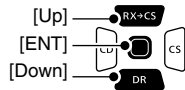
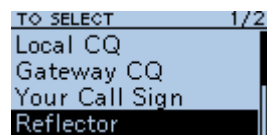
Direct inputting a Reflector

Example: Directly enter “REF030CL.”

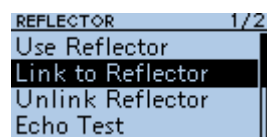
1. Push [RX→CS] to select “TO,” then push [ENT].



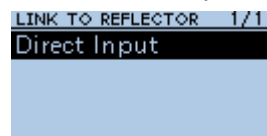
2. Select “Reflector.”



3. Select “Link to Reflector.”



4. Select “Direct Input.”

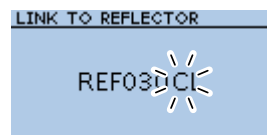


5. Rotate [DIAL] to select the reflector number.



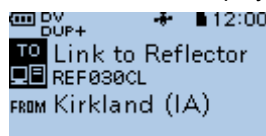
6. Push [CS] to move the cursor to the right box.

7. Rotate [DIAL] to select the module letter.



8. Push [ENT].

- Returns to the DR screen, and “Link to Reflector” and “REF030CL” are displayed in “TO.”



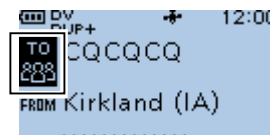
9. Hold down [PTT] to link to the Reflector.

Using TX History

TX History saves up to 5 reflectors that your Access repeater linked to before.

Example: Select the “REF030CL” in TX History.

1. Push [RX→CS] to select “TO,” then push [ENT].



- Displays the TO SELECT screen.

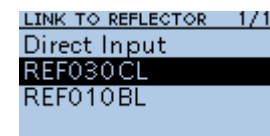
2. Select “Reflector.”

- Displays the REFLECTOR screen.

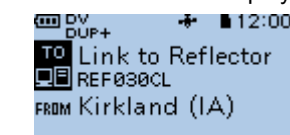
3. Select “Link to Reflector.”

- Displays the LINK TO REFLECTOR screen.

4. Select the reflector that you want to link to.



- Returns to the DR screen, and “Link to Reflector” and “REF030CL” are displayed in “TO.”

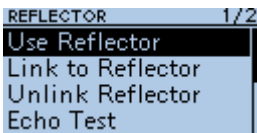


5. Hold down [PTT] to link to the reflector.

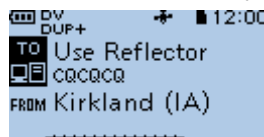
Connecting to a reflector

◇ Using a reflector

1. Push [RX→CS] to select “TO,” then push [ENT].
 - Displays the TO SELECT screen.
2. Select “Reflector.”
 - Displays the REFLECTOR screen.
3. Select “Use Reflector.”



- Returns to the DR screen, and “Use Reflector” and “CQ CQ CQ” are displayed in “TO.”

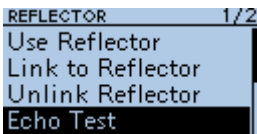


4. Hold down [PTT] to transmit.

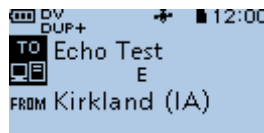
◇ Reflector Echo Testing

To confirm that your signal is correctly getting into the repeater, you can transmit a short message as a trial. After releasing [PTT], your message will be played back.

1. Push [RX→CS] to select “TO,” then push [ENT].
 - Displays the TO SELECT screen.
2. Select “Reflector.”
 - Displays the REFLECTOR screen.
3. Select “Echo Test.”



- Returns to the DR screen, and “Echo Test” and “E” are displayed in “TO.”

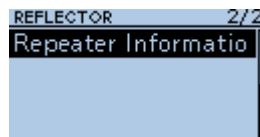


4. Hold down [PTT] and speak into the microphone.
5. Release [PTT] to hear your message.

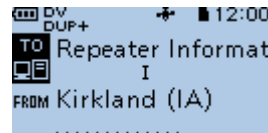
◇ Requesting repeater information

When you send the repeater information command, an ID message is sent back.

1. Push [RX→CS] to select “TO,” then push [ENT].
 - Displays the TO SELECT screen.
2. Select “Reflector.”
 - Displays the REFLECTOR screen.
3. Select “Repeater Information.”



- Returns to the DR screen, and “Repeater Information” and “I” are displayed in “TO.”



4. Hold down [PTT] to transmit the repeater Information command.
5. Release [PTT] to hear the repeater ID message.

Message operation

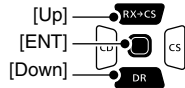
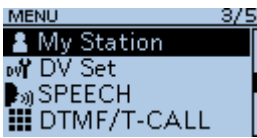
You can save up to 5 short messages in the transceiver's memory to transmit in the DV mode. Each message can be up to 20 characters.

◇ Entering a TX message

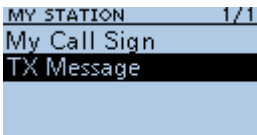
MENU > My Station > TX Message

Example: Entering "JAPAN TOM" into TX message memory number 1.

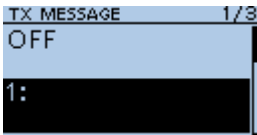
1. Push [MENU].
2. Select "My Station."



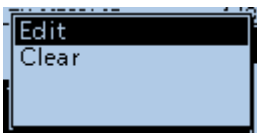
3. Select "TX Message."



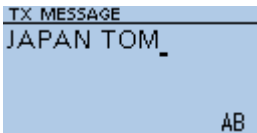
4. Select a TX message memory number.
① Do not push [ENT].



5. Push [QUICK].
6. Select "Edit."



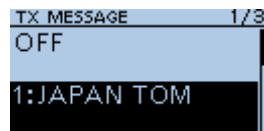
7. Enter a message of up to 20 characters. (Example: JAPAN TOM)



Selectable characters and symbols

A to Z, a to z, 0 to 9, ! " # \$ % & ' () * +
, - . / : ; < = > ? @ [\] ^ _ ` { | } ~ (space)

8. After entering, push [ENT].
• Returns to the TX MESSAGE screen.



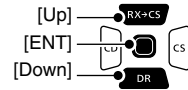
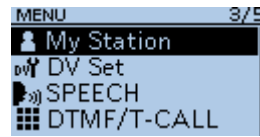
① To exit the MENU screen, push [MENU].

◇ Transmitting a message

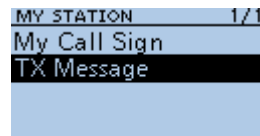
You can transmit a preset TX message by pushing [PTT] in the DV mode. First, select a TX message which also turns ON the Message Transmission function.

MENU > My Station > TX Message

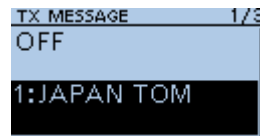
1. Push [MENU].
2. Select "My Station."



3. Select "TX Message."



4. Select a TX message memory number.



- ① To not transmit any message, select "OFF."
- ① To exit the MENU screen, push [MENU].

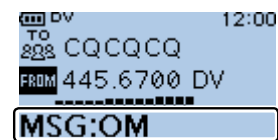
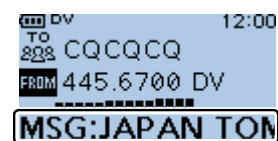
① Information

- The message is transmitted with your voice signal.
- The message is transmitted each time you push [PTT].
- When continuously transmitting, the selected TX message is transmitted every 30 seconds.

TIP: RX call sign and message display

As the default, the received call sign and message are automatically displayed and scrolled. To not display and scroll them, set **RX Call Sign** or **RX Message** to "OFF."

(MENU > Display > **RX Call Sign**, **RX Message**)



Scrolls

Message operation

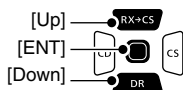
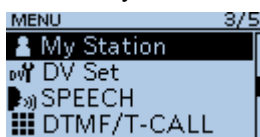
◇ Deleting a TX message

You can delete the entered TX message.

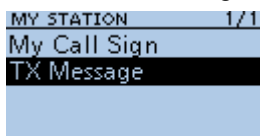
MENU > My Station > TX Message

Example: Deleting the entered TX message “JAPAN TOM” from TX message memory number 1.

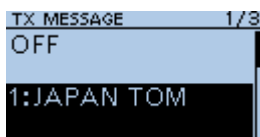
1. Push [MENU].
2. Select “My Station.”



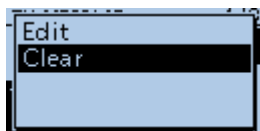
3. Select “TX Message.”



4. Select a TX message memory number.
① Do not push [ENT].

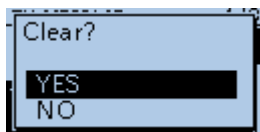


5. Push [QUICK].
6. Select “Clear.”



• The confirmation dialog is displayed.

7. Select <YES>.



• Clears the entered message.

① To exit the MENU screen, push [MENU].

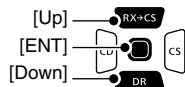
Viewing received call signs

When you receive a DV call, the calling station and the repeater call signs are saved. Up to 50 calls can be saved. When you receive the 51st call, the oldest history is deleted.

① Even if the transceiver is turned OFF, the RX record is not deleted.

◇ Viewing the call signs on the RX History screen

1. Hold down [CD] for 1 second.
2. Select an RX history memory to view the details.



① Information

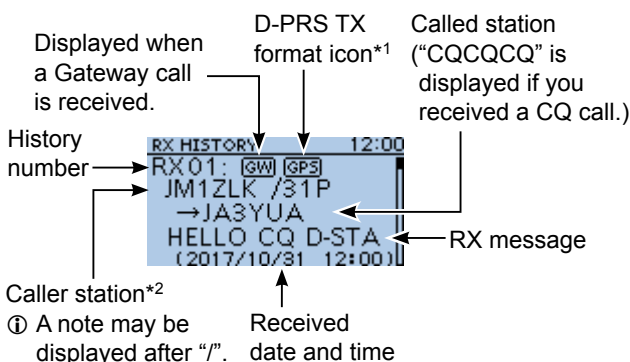
- The RX history number, the caller's name (or call sign), destination, RX message, RX date and time, "GW," and "GPS" are displayed.
- "GW" is displayed when the Gateway call is received.
- "GPS" is displayed when the received call includes position data.
- "UP" is displayed when the repeater uplink signal is received.
- In the Quick Menu window, you can select the following options.
 - RX>CS:** Temporarily sets to the destination.
 - Call Sign Display:** The received data is displayed in the Call Sign Display mode.
 - Name Display:** The received data is displayed in the Name Display mode.
 - Delete:** Deletes the selected RX history.
 - Delete All:** Deletes the all RX history.

3. Push [ENT].
 - Displays the RX history detail screen.

① Information

- Push [Up] or [Down] to view the content.
- In the Quick Menu window, you can select the following options.
 - RX>CS:** Temporarily sets to the destination.
 - Call Sign Display:** The received data is displayed in the Call Sign Display mode.
 - Name Display:** The received data is displayed in the Name Display mode.
 - Add to RPT List:** Adds the repeater's call sign to **Repeater List**.
 - Add to Your Memory:** Adds the caller station's call sign to **Your Call Sign**.
 - Delete:** Deletes the selected RX history.

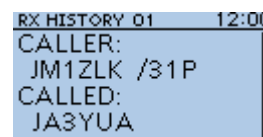
RX HISTORY screen (RX01)



*1 The displayed icon differs, depending on the D-PRS TX format.

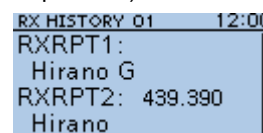
GPS: Position OBJ: Object
ITEM: Item WX: Weather

*2 When a name is not entered in the DV Memory, the call sign is displayed.



<2nd page>

- **RXRPT1:** Displays the repeater's name*2 that was accessed by the caller station. If the received call was a Gateway call, this item displays the gateway call sign of the repeater you received the call from.
 - **RX RPT2:** Displays the repeater's name*2 you received the call from.
- ① The operating frequency is displayed instead of above items when the call was not through a repeater (Simplex call).



▶ Continued on the next page

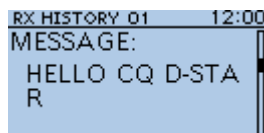
4 D-STAR OPERATION

Viewing the received call signs

◇ View the call signs on the RX History screen

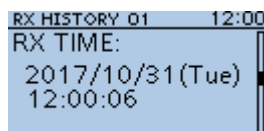
<3rd page>

- **RX MESSAGE:** Displays any message included in the received call, if entered.



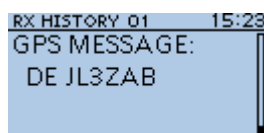
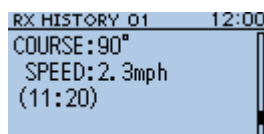
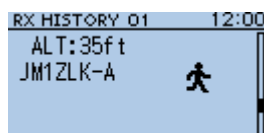
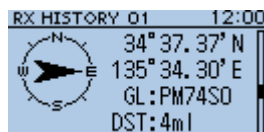
<4th page>

- **RX TIME:** Displays the date and time the call was received.



<5th ~ 8th page>

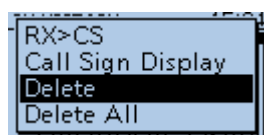
Displays position data of the caller station. If a received signal has no data, then no position data is displayed.



① To exit the MENU screen, push [MENU].

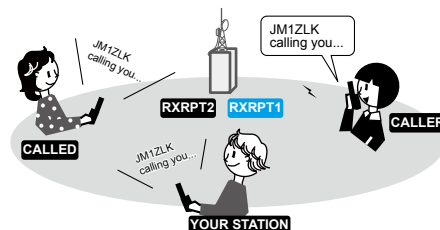
TIP: To delete RX HISTORY data

On the RX HISTORY or the detail screen, push [QUICK], then select "Delete" or "Delete All."

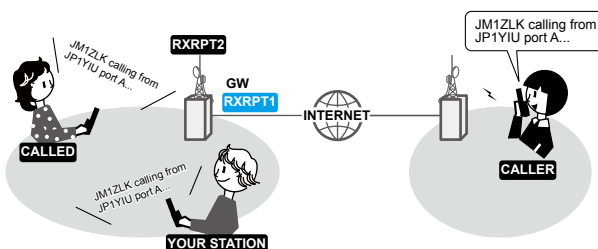


TIP: "RX RPT1" setting may differ, depending on the way the call was made.

Example 1: When a Local area call is received.



Example 2: When a Gateway call is received.



BK mode communication

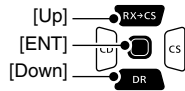
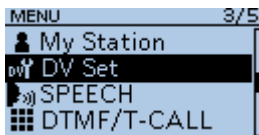
The Break-in (BK) function enables you to break into a conversation, where the 2 stations are communicating with the call sign squelch (DSQL) enabled.

① The BK function is automatically turned OFF when you turn OFF the transceiver.

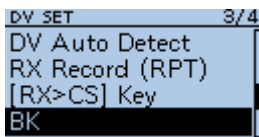
MENU > DV Set > BK

- While 2 stations are communicating in the DV mode, hold down [RX→CS] for 1 second.
 - After releasing [RX→CS], the calling station's call sign or the repeater's call sign is set to "TO" (Destination).
 - Beeps sound and the calling station's call sign is announced.
 - ① When a call sign is not received correctly, error beeps sound, and no call sign is set.

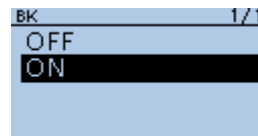
- Push [MENU].
- Select "DV Set."



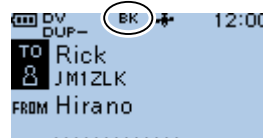
- Select "BK."



- Select "ON."



- Push [MENU].
 - Returns to the standby screen, and "BK" is displayed.



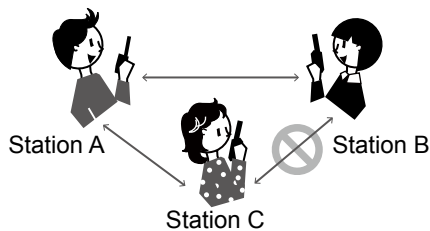
- When both stations are in standby, push [PTT] to transmit.
 - ① "BK" blinks when receiving a Break-in call.
 - ① To cancel the BK mode, select "OFF" in step 5, or turn OFF the transceiver.

How to use Break-in?

While using the Digital Call Sign squelch (DSQL), the squelch never opens (no audio is heard) even if a call is received, unless the call is addressed to your own call sign. However, when a call including the "BK ON" signal (break-in call) is received, the squelch opens and audio is heard even if the call is addressed to another station.

Station C calling to Station A with "BK OFF"

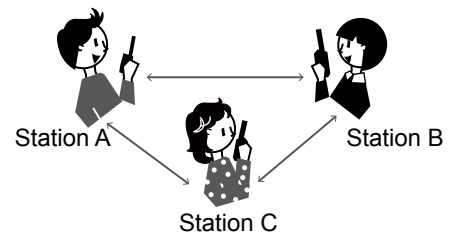
Station A and B are communicating using the Digital Call Sign squelch.



Station B does not hear that Station C is calling Station A.

Station C calling to Station A with "BK ON"

Station A and B are communicating using the Digital Call Sign squelch.



Station B also hears that Station C is calling Station A.

EMR communication

The Enhanced Monitor Request (EMR) communication function can be used in only the DV mode. Using the EMR function, no call sign setting is necessary.

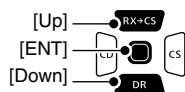
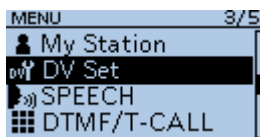
① Information

- All transceivers that receive an EMR signal automatically open their squelch to receive the signal. DO NOT use this function except in the case of emergency.
- When an EMR signal is received, the audio (voice) is heard at the set level, even if the volume setting level is set to the minimum level.
- The EMR communication function is automatically turned OFF when you turn OFF the transceiver.

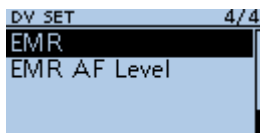
MENU > DV Set > EMR

Example: Transmitting from the “Hirano” repeater using the EMR function.

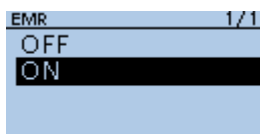
1. Push [MENU].
2. Select “DV Set.”



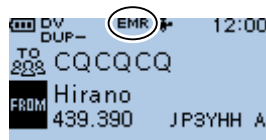
3. Select “EMR.”



4. Select “ON.”



5. Push [MENU].
 - Returns to the standby screen, and “EMR” is displayed.



6. Push [PTT] to transmit.
 - The TX/RX indicator lights red while transmitting.
 - ① “EMR” blinks on a station that receives the EMR signal. The audio (voice) is heard at the set level, or the [VOL] level, whichever is higher.
 - ① To cancel the EMR mode, select “OFF” in step 4, or turn OFF the transceiver.

◇ Adjusting the EMR AF level

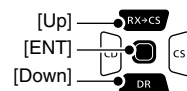
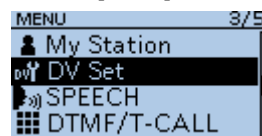
The audio output level when an EMR signal is received is adjustable between 0 and 39.

When an EMR signal is received, the audio is heard at the preset level, or the [VOL] control level, whichever is higher.

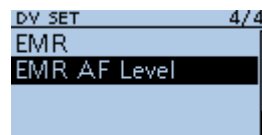
To turn OFF the setting, set to “0.”

MENU > DV Set > EMR AF Level

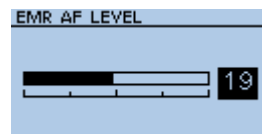
1. Push [MENU].
2. Rotate [DIAL] to select “DV Set.”



3. Select “EMR AF Level.”



4. Rotate [DIAL] to adjust the EMR audio output level between 0 (OFF) and 39 (maximum). (Default: 19)



① To exit the MENU screen, push [MENU].

Automatic DV detection

If you receive an FM signal while in the DV mode, the “DV” and “FM” icons alternately blink to indicate the received signal is FM.

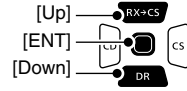
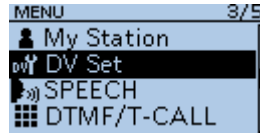
When the DV Auto Detect function is ON, the transceiver automatically selects the FM mode to temporarily monitor the signal. (Default: OFF)

① Regardless of this setting, the “DV” and “FM” icons alternately blink if you receive an FM signal while in the DV mode.

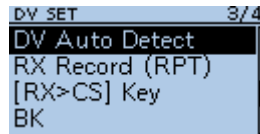
NOTE: When Digital Call Sign squelch (DSQL) or Digital Code squelch (CSQL) is selected, the transceiver does not receive FM signals, even if this function is ON. You can silently wait for calls from others.

MENU > DV Set > DV Auto Detect

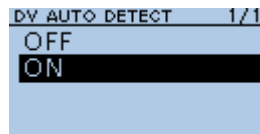
1. Push [MENU].
2. Select “DV Set.”



3. Select “DV Auto Detect.”



4. Select “ON.”



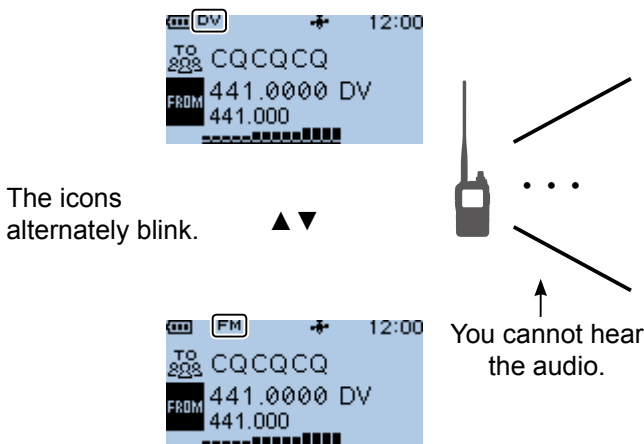
① To exit the MENU screen, push [MENU].

① When an FM signal is received while in the DV mode, the “DV” and “FM” icons sequentially blink, and the transceiver receives the signal in the FM mode.

When an FM signal is received while in the DV mode

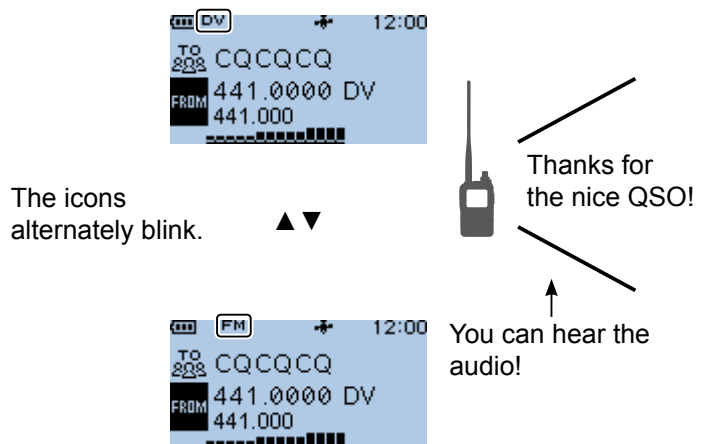
DV Auto Detect function: OFF

The “DV” and “FM” icons alternately blink, but the audio cannot be heard.



DV Auto Detect function: ON

The “DV” and “FM” icons alternately blink, and the audio can be heard.



Automatic Reply function

When a call addressed to your own call sign is received, the Automatic Reply function sounds beeps and automatically replies with your call sign.

(Default: OFF)

Depending on the setting, a recorded message may be transmitted with the call sign.

NOTE: The Automatic Reply function temporarily sets the received call sign to “TO” (destination).

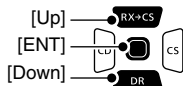
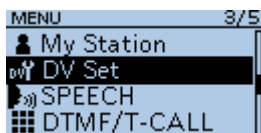
TIP: To record the Auto Reply message

You can record the Auto Reply message. See page 4-25 for details.

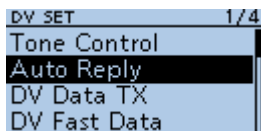
(MENU > Voice Memo > **DV Auto Reply**)

MENU > DV Set > Auto Reply

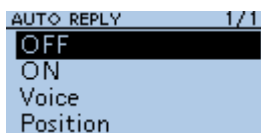
1. Push [MENU].
2. Select “DV Set.”



3. Select “Auto Reply.”



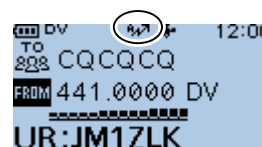
4. Select an option.



- ON: Automatically replies with your own call sign. (No audio reply is sent)
- Voice: Automatically replies with your call sign and an Auto Reply message recorded on the microSD card (up to 10 seconds).
 - ① If no SD card is inserted, or no message is recorded, replies with your own call sign (No audio reply is sent).
- Position: Automatically replies with your own call sign and your position data using the internal or external GPS receiver.
 - ① When **GPS Select** is set to “OFF” or “Manual,” the internal GPS receiver is temporarily turned ON. When **GPS Select** is set to “External GPS,” but if the external GPS receiver is not connected, the internal GPS receiver is temporarily turned ON. (MENU > GPS > GPS Set > **GPS Select**)

5. Push [MENU].
 - Returns to the standby screen, and displays “.”
 - ① When “ON” or “Voice” is selected, the Automatic Reply function is automatically turned OFF, when you push [PTT]. When “Position” is selected, the Automatic Reply function remains ON, when you push [PTT].

Example: After receiving a call from “JM1ZLK,” beeps sound and the transceiver automatically sends a reply call.



The “TO” setting does not change, but “UR: JM1ZLK (Caller’s call sign)” is displayed.

Automatic Reply function

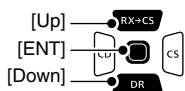
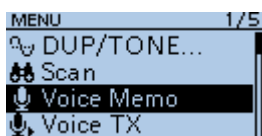
◇ Recording an Auto Reply message

You can record the Auto Reply message and saved on a microSD card to reply to the call with your voice.

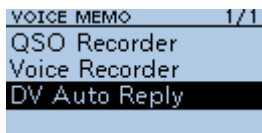
NOTE: Confirm a microSD card is in the card slot.

MENU > Voice Memo > DV Auto Reply

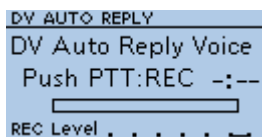
1. Push [MENU].
2. Select "Voice Memo."



3. Select "DV Auto Reply."



4. Hold down [PTT] to start a recording, release it to stop recording.



① Information

- The Maximum recording time is 10 seconds.
 - Hold the microphone 5 ~ 10 cm (2 ~ 4 inches) from your mouth, then speak at your normal voice level.
 - Only 1 message can be recorded. The current contents is overwritten if you record again.
5. Push [MENU] twice.
 - Returns to the standby screen.

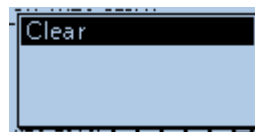
The DV AUTO REPLY screen



Audio level is displayed

Adjust the Mic gain so that the REC Level does not reach to this range
(MENU > Function > **MIC Gain (Internal)**, **MIC Gain (External)**)

TIP: To delete the recorded message, push [QUICK] on the DV AUTO REPLY screen, then select "Clear."



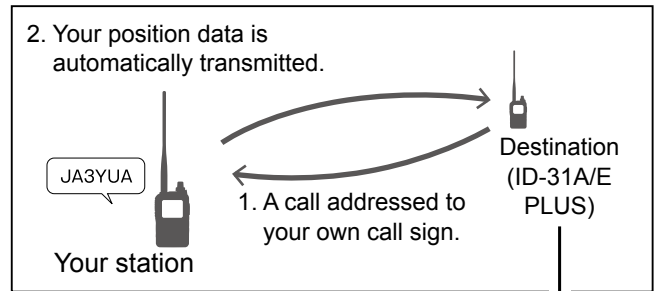
Automatic Reply function

◇ Auto Position Reply function

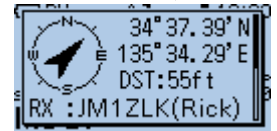
When you receive a call addressed to your own call sign, but are in a situation that makes it difficult to operate the transceiver, this function sounds beeps and automatically replies with your own call sign and transmits your position data.

After receiving the Auto Position Reply call, the caller's position data is displayed in a window.

- ① Only the Icom transceivers, the ID-31A/E PLUS, ID-4100A/E, ID-5100A/E, ID-51A/E PLUS, or ID-51A/E PLUS2, displays the position after receiving a call.
(As of November 2017)
- ① You can turn OFF the caller's position display.
(MENU > Display > **Reply Position Display**)
(p. 11-40)



3. After receiving, position data is displayed on the destination's transceiver.



Scrolls your call sign or the TX message.
① Your status message may be displayed.

When no valid position data is received

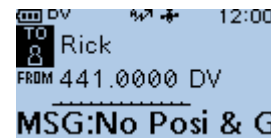
After receiving a call addressed to your own call sign, the internal GPS receiver is temporarily turned ON for approximately 5 minutes to receive your position data, even if **GPS Select** is set to "OFF," "External GPS," or "Manual." Then, the transceiver automatically replies with a message, as described below.

(MENU > GPS > GPS Set > GPS Select)

- ① When the internal GPS receiver is temporarily ON, and valid position data is received, the transceiver transmits your position data if a call addressed to your own call sign is received again.

Reply message list when no valid position data is received

Message	Status
No Position	When no position is received.
Old Position	2 minutes or more has passed since receiving position data.
No Posi & GPS Start	The internal GPS receiver is temporarily turned ON, but has not received your position data yet.
Old Posi & GPS Start	The internal GPS receiver is temporarily turned ON, and 2 minutes or more have passed since receiving position data.



Scrolls your message.

TIP:

- The position data is transmitted according to the **GPS TX Mode**. (p. 11-15)
- When the **GPS TX Mode** settings are incorrect for the Automatic Reply function, the transceiver automatically corrects them to reply to a call.
- When **GPS TX Mode** is set to "OFF," "D-PRS" is automatically selected.

Data communication

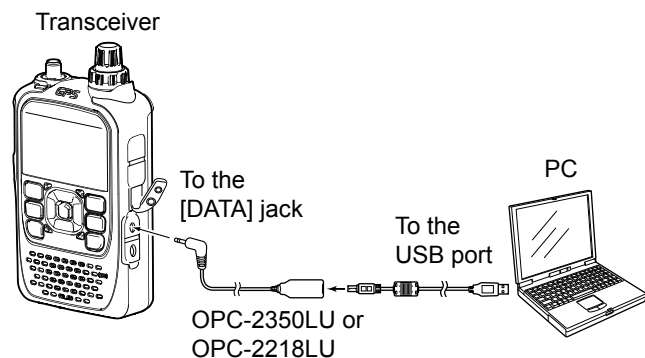
In addition to digital voice communication, you can send and receive data. Also, you can use the DV Fast Data function for data communication. (p. 4-28)

To send and receive data, the optional OPC-2350LU or OPC-2218LU, and a data communication software (user supplied) are required.

NOTE: DV Data TX is set to “Auto” as the default setting. When you enter text data into your communication software, the transceiver may automatically transmit it, depending on the software and the software settings.

◇ Connection

Connect the transceiver to your PC using the optional OPC-2350LU, as shown below.



NOTE: Before you start sending data, BE SURE to set the following items. (pp. 11-9, 11-39)

- Set **GPS Select** to other than “External GPS.”
(MENU > GPS > GPS Set > **GPS Select**)
 - Set **GPS Out (To DATA Jack)** to “OFF.”
(MENU > GPS > GPS Set > **GPS Out (To DATA Jack)**)
 - Set **CI-V (DATA Jack)** to “OFF.”
(MENU > Function > CI-V > **CI-V (DATA Jack)**)
- ① When using the CI-V function, set **CI-V (DATA Jack)** to other than “OFF.”

◇ Data communication application setting

Set the communication software, as shown below.

- Port: The COM port number that is used by the ID-31A/E PLUS.*¹
- Baud rate: 4800/9600 bps*²
- Data: 8 bit
- Parity: none
- Stop: 1 bit
- Flow control: Xon/Xoff

*¹ Depending on the PC environment, the COM port number used by the ID-31A/E PLUS may be higher than 5. In that case, use an application that can set it to higher than 5.

*² Set the baud rate in **Data Speed**. (p. 11-38)
(MENU > Function > **Data Speed**)

◇ Sending data

1. Set your own call sign, the destination call sign, and the repeater call sign.
2. Follow the instructions of your data communication application software.
3. When you enter text data into your communication software, the transceiver may automatically transmit it, depending on the software and the software settings.
 - ① When **DV Data TX** is set to “PTT,” pushing [PTT] transmits the text data and a voice signal. (p. 11-26)
(MENU > DV Set > **DV Data TX**)
 - ② Before transmission, the transceiver sends approximately 500 milliseconds of carrier sense.

NOTE:

- Only ASCII code can be used for data communication.
- The transceiver has also the Message Transmission function that transmits up to 20 characters. (p. 4-17)
- Depending on the combination of your PC and your communication software, some data may be lost.
- While receiving voice or data through the Internet, some packets may be lost due to network error (poor data throughput performance). In such a case, an “L” is displayed on the screen to indicate that packet loss has occurred.

Data communication

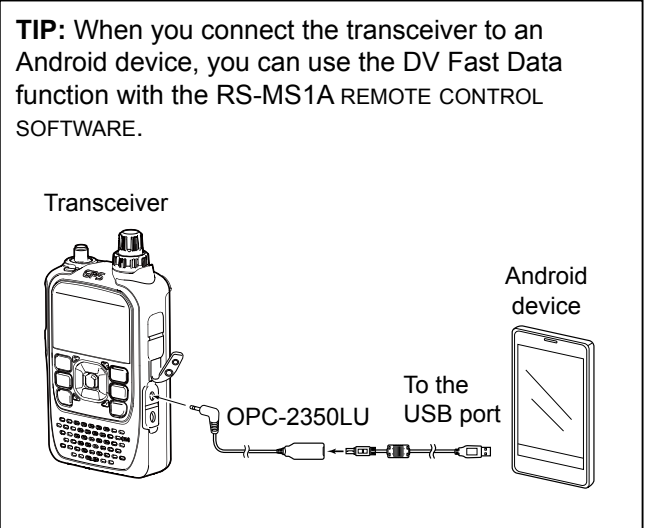
◇ DV Fast Data function

To send data using the DV Fast Data function, follow the instructions below.

- ① The DV Fast Data communication can be made by only the following Icom transceivers:
ID-31A/E PLUS, ID-4100A/E, ID-5100A/E*, or ID-51A/E (PLUS, PLUS2, 50th Anniversary model).
(As of November 2017)

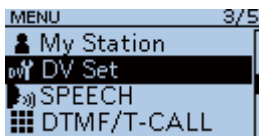
* Usable only when firmware versions CPU M 1.10, S 1.00, C 1.10, and DSP 1.10 or later are installed.

NOTE: If you want to send GPS data to other transceivers that can receive only slow speed data, set **GPS Data Speed** to “Slow.” (p. 11-26)
(MENU > DV Set > DV Fast Data > **GPS Data Speed**)

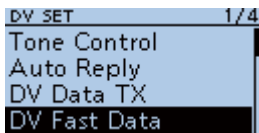


DV Set > DV Fast Data > Fast Data

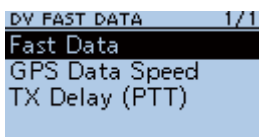
1. Push [MENU].
2. Select “DV Set.”



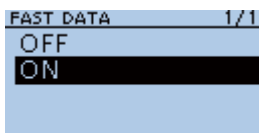
3. Select “DV Fast Data.”



4. Select “Fast Data.”



5. Select “ON.”



① To exit the MENU screen, push [MENU].

Digital squelch functions

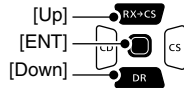
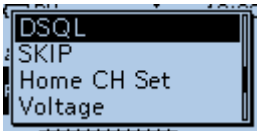
The digital squelch opens only when you receive a signal addressed to your own call sign, or a signal that includes a matching digital code.
 You can silently wait for calls from others.
 You can independently set the Digital squelch function in the VFO mode, Memory mode, Call channel mode, or DR function.

NOTE:

- **DO NOT** use the Digital Call Sign Squelch function when communicating with 2 or more stations, because the function opens only when receiving a signal addressed to your own call sign. Therefore the function can be used when communicating with only 1 station.
- Even if the squelch is closed by the Digital Call Sign Squelch function, you can receive data in the DV mode.

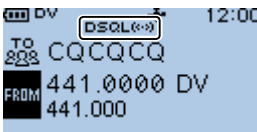
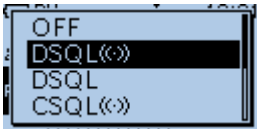
◇ The Digital Call Sign squelch setting

1. Push [QUICK].
2. Select "DSQL."



3. Select "DSQL ((•))" or "DSQL."

 - DSQL ((•)) : Turns ON the Digital Call Sign Squelch function with the Pocket beep function.
 - ① "DSQL ((•))" is displayed.
 - DSQL: Turns ON the Digital Call Sign Squelch function.
 - ① "DSQL" is displayed.



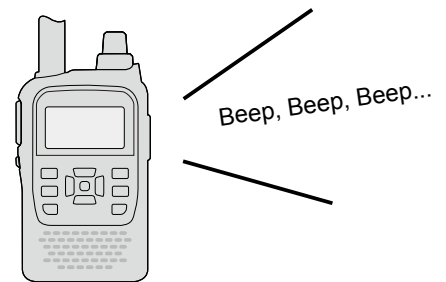
- When the received signal includes a matching call sign, the squelch opens and you can hear the audio.
- ① When the received signal does not include a matching call sign, the digital call sign squelch does not open. However, the S/Rf meter displays the received signal level.

◇ Digital call sign squelch function with the Pocket beep

NOTE: Confirm "DSQL ((•))" is selected and displayed on the screen. Do not push any key or rotate any control after setting. Otherwise "DSQL ((•))" will be canceled.

When a received signal is addressed to your own call sign, the beeps sound for 30 seconds and "((•))" blinks, and the caller's call sign is announced.. Within 30 seconds, push [PTT] to answer, or push [ENT] to stop the beeps and turn OFF the Pocket beep function.

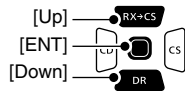
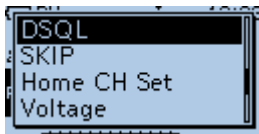
- "((•))" disappears.
- ① If you make no operation for 30 seconds, the beeps automatically stop, but "((•))" continues to blink to indicate that you received a call.



Digital squelch functions

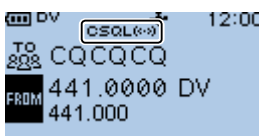
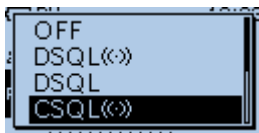
◇ The Digital Code Squelch setting

1. Push [QUICK].
2. Select "DSQL."

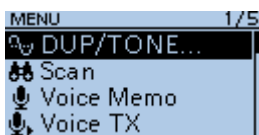


3. Select "CSQL ((·))" or "CSQL."

 - CSQL ((·)) : Turns ON the Digital Code Squelch function with the Pocket beep.
 - CSQL: Turns ON the digital code squelch function.



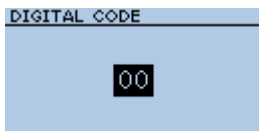
- "CSQL ((·))" or "CSQL" is displayed.
4. Push [MENU].
 5. Select "DUP/TONE..."



6. Select "Digital Code."



7. Rotate [DIAL] to select a digital code.



- When the received signal includes a matching code, the squelch opens and you can hear the audio.
- ① When the received signal does not include a matching code, the digital code squelch does not open. However, the S/RF meter displays the signal level.
- ① To exit the MENU screen, push [MENU].

◇ Digital code squelch function with a Pocket beep

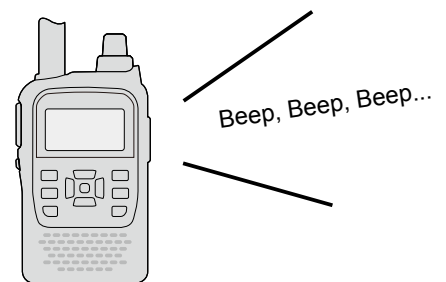
NOTE: Confirm "CSQL ((·))" is selected and displayed on the screen. Do not push any key or rotate any control after setting. Otherwise "CSQL ((·))" will be canceled.

When a received signal matches your digital code, beeps sound for 30 seconds and "((·))" blinks, and the caller's call sign is announced.

Within 30 seconds, push [PTT] to answer, or push [ENT] to stop the beeps and turn OFF the Pocket beep function.

- "((·))" disappears.

- ① If you make no operation for 30 seconds, the beeps automatically stop, but "((·))" continues to blink to indicate that you received a call.



NOTE: Even if the squelch is closed by the Digital Code Squelch function, you can receive data in the DV mode.

Repeater list

You can save repeater information for quick and simple communication in up to 750 repeaters (repeater list) in up to 30 Groups. Data must be in the repeater list to use the DR function.

You can add and edit repeater content and groups in the repeater list.

You can enter 4 types of frequencies into the repeater list, as shown below:

- DV Repeater
- DV Simplex
- FM Repeater
- FM Simplex

TIP:

- For easy operation, the repeater list is preloaded into your transceiver. However, if you do an All Reset, the CPU deletes all setting data, the Memory channels, and the repeater list. We recommend that you back up the memory data to a microSD card or save it to a PC using the CS-31 PLUS CLONING SOFTWARE.
- The repeater list can be downloaded from the Icom website. See D-STAR GUIDE (p. 57) in BASIC MANUAL for details.

<http://www.icom.co.jp/world/support/download/firm/index.html>

◆ Repeater list contents

The following contents are included in the repeater list:

- TYPE: Communication type (p. 4-33)
- NAME: Repeater name (p. 4-33)
- SUB NAME: Repeater sub name (p. 4-33)
- CALL SIGN: Repeater call sign and port letter (p. 4-33)
- GW CALL SIGN: Gateway repeater's call sign and port "G" (p. 4-34)
- GROUP: Repeater group (p. 4-34)
- USE(FROM): Access repeater use (p. 4-34)
- FREQUENCY: Access repeater's frequency (p. 4-34)
- DUP: Duplex direction (p. 4-34)
- OFFSET FREQ: Frequency offset (p. 4-34)
- MODE: Operating mode (p. 4-35)
- TONE: Tone setting (p. 4-35)
- REPEATER TONE: Repeater tone (p. 4-35)
- POSITION: Position data accuracy level (p. 4-35)
- LATITUDE: Latitude of the repeater (p. 4-35)
- LONGITUDE: Longitude of the repeater (p. 4-35)
- UTC OFFSET: UTC Offset (p. 4-36)

Example: "Hirano" repeater information

```
REPEATER LIST 1/7
TYPE:
  DV Repeater
NAME:
  Hirano
```

```
REPEATER LIST 2/7
SUB NAME:
  Osaka
CALL SIGN:
  JP3YHH A
```

```
REPEATER LIST 3/7
GW CALL SIGN:
  JP3YHH G
GROUP:
  11 Japan
```

```
REPEATER LIST 4/7
USE(FROM):
  YES
FREQUENCY:
  439.390.00
```

```
REPEATER LIST 5/7
DUP:
  DUP-
OFFSET FREQ:
  5.000.00
```

```
REPEATER LIST 6/7
POSITION:
  Exact
LATITUDE:
  34°37.55'N
```

```
REPEATER LIST 7/7
LONGITUDE:
  135°34.09'E
UTC OFFSET:
  + 9:00
```

Entering new information into the repeater list

This section describes how to manually enter new repeater information into the repeater list. The required setting items differ, depending on your communication usage. Confirm the required items, as shown below.

NOTE: To enter repeater information into the repeater list, the repeater's call sign must be entered first.

◇ Required items for the communication cases

Repeater list contents	Used as an access repeater	Used as a destination repeater	Used for DV Simplex	Used as an FM repeater	Used for FM Simplex
TYPE	DV Repeater	DV Repeater	DV Simplex	FM Repeater	FM Simplex
NAME	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
SUB NAME	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CALL SIGN	<input checked="" type="radio"/>	<input checked="" type="radio"/>	N/A	<input type="radio"/>	N/A
GW CALL SIGN	<input checked="" type="radio"/> (For a Gateway call)	<input checked="" type="radio"/>	N/A	N/A	N/A
GROUP	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
USE(FROM)	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
FREQUENCY	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
DUP	<input checked="" type="radio"/>	<input type="radio"/>	N/A	<input checked="" type="radio"/>	N/A
OFFSET FREQ	<input checked="" type="radio"/>	<input type="radio"/>	N/A	<input checked="" type="radio"/>	N/A
MODE	N/A	N/A	N/A	<input type="radio"/>	<input type="radio"/>
TONE	N/A	N/A	N/A	<input type="radio"/>	<input type="radio"/>
REPEATER TONE	N/A	N/A	N/A	<input type="radio"/>	<input type="radio"/>
POSITION	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
LATITUDE	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
LONGITUDE	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
UTC OFFSET	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

●: Must be entered
 ○: Possible to enter
 N/A: Not Applicable

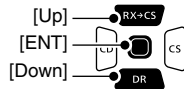
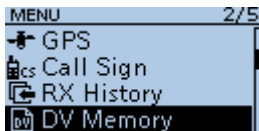
Entering new information into the repeater list

◇ Entering new information into the repeater list

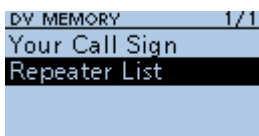
Step 1. Selecting the repeater group

MENU > DV Memory > Repeater List

1. Push [MENU].
2. Select "DV Memory."



3. Select "Repeater List."

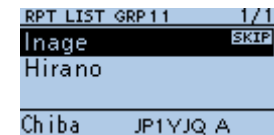


4. Select a repeater group to add a repeater to.

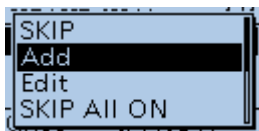


(Example: 11: Japan)

• Displays the repeater list of the selected repeater group.



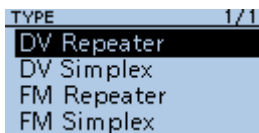
5. Push [QUICK].
6. Select "Add."



• The REPEATER LIST EDIT screen is displayed.

Step 2. Selecting the communication type

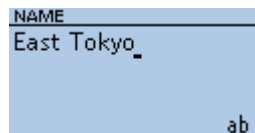
1. Select "TYPE."
2. Select the communication type.



- DV Repeater: Repeater operation in the DV mode.
- DV Simplex: Simplex operation in the DV mode.
- FM Repeater: Repeater operation in the FM mode.
- FM Simplex: Simplex operation in the FM mode.

Step 3. Entering the repeater name

1. Select "NAME."
2. Enter a name of up to 16 characters.



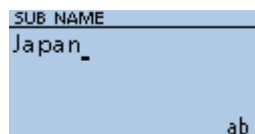
Selectable characters and symbols
 A to Z, a to z, 0 to 9, ! " # \$ % & ' () * +
 , - . / : ; < = > ? @ [\] ^ _ ` { | } ~ (space)

① See page iii on how to enter characters.

3. After entering, push [ENT].

Step 4. Entering the repeater sub name

1. Select "SUB NAME."
2. Enter a sub name of up to 8 characters.

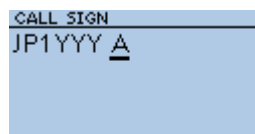


3. After entering, push [ENT].

Step 5. Entering the repeater call sign

① When **Step 2. Selecting the communication type** is set to "DV Simplex" or "FM Simplex," go to **Step 7. Changing the repeater group.**

1. Select "CALL SIGN."
2. Enter the repeater call sign of up to 8 characters, including spaces and the node letter.



NOTE: BE SURE to add the repeater node letter in the 8th digit of the call sign, according to the frequency band shown below. Note that there are almost always different node letters between Japanese D-STAR repeaters and repeaters in other countries.

Cross band operation between different nodes at the same repeater site can be made.

- 1200 MHz: A (B in Japan)
- 430 MHz: B (A in Japan)
- 144 MHz: C (no D-STAR repeaters in Japan)

3. After entering, push [ENT].

► Continued on the next page

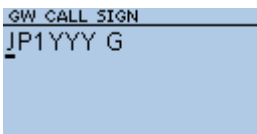
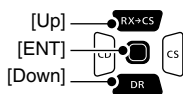
Entering new information into the repeater list

◇ Entering new information into the repeater list

Step 6. Entering the gateway repeater call sign

- ① This item is displayed when **Step 2. Selecting the communication type** is set to “DV Repeater.”
- ① The 8th digit in the call sign, entered in **Step 5. Entering the repeater call sign** is automatically set to “G” as the gateway port, so you can skip this setting and go to the next item.

1. Select “GW CALL SIGN.”
2. Enter a gateway repeater call sign of up to 8 characters, including spaces.
 - ① Only a space or “G” can be entered in the 8th digit.

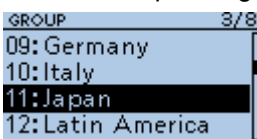


3. After entering, push [ENT].

Step 7. Changing the repeater group

- ① The repeater group that is selected in **Step 1. Selecting the repeater group** is displayed. You can skip this setting and go to the next item. To change the group, follow the steps, described below.

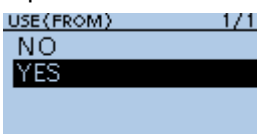
1. Select “GROUP.”
2. Select the repeater group. (01 ~ 30)



Step 8. Setting “USE(FROM)” to be used as an Access repeater

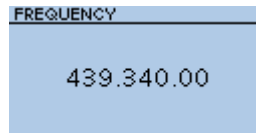
- ① You can use the entered repeaters as an access repeater when using the DR function. When not using as an access repeater, select “NO,” and go to **Step 15. Selecting the position data accuracy level**. In that case, the entered repeater is not displayed in “FROM” on the DR screen.

1. Select “USE(FROM).”
2. Select “YES” to use the repeater as an access repeater.



Step 9. Entering the access repeater frequency

1. Select “FREQUENCY.”
2. Rotate [DIAL] to enter the repeater frequency.

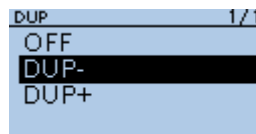


- ① Push [CD] or [CS] to move the cursor.
- 3. After entering, push [ENT].

Step 10. Selecting the Duplex direction

- ① When **Step 2. Selecting the communication type** is set to “DV Simplex” or “FM Simplex,” this item is not displayed.
- ① “DUP-” is automatically set when the access repeater frequency is entered in **Step 9. Entering the access repeater frequency**. If necessary, you can change the Duplex direction.

1. Select “DUP.”
2. Select a Duplex direction.

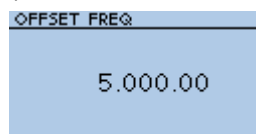


- OFF: Turn the duplex function OFF.
- DUP-: The transmit frequency shifts down from the receive frequency by the offset amount.
- DUP+: The transmit frequency shifts up from the receive frequency by the offset amount.

Step 11. Entering the frequency offset

- ① When **Step 2. Selecting the communication type** is set to “DV Simplex” or “FM Simplex,” this item is not displayed.
 - ① The offset value* is automatically set when the access repeater frequency is entered in **Step 9. Entering the access repeater frequency**. If necessary, you can change the frequency offset.
- * The default value differs, depending on the transceiver version.

1. Select “OFFSET FREQ.”
2. Rotate [DIAL] to enter the frequency offset (0.000.00 ~ 59.995.00 MHz).



- ① Push [CD] or [CS] to move the cursor.
- 3. After entering, push [ENT].

▶ Continued on the next page

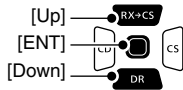
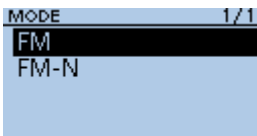
Entering new information into the repeater list

◇ Entering new information into the repeater list

Step 12. Setting the FM mode

① When **Step 2. Selecting the communication type** is set to “DV Repeater” or “DV Simplex,” this item is not displayed.

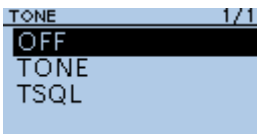
1. Select “MODE.”
2. Select “FM” or “FM-N.”



Step 13. Setting the tone

① When **Step 2. Selecting the communication type** is set to “DV Repeater” or “DV Simplex,” this item is not displayed.

1. Select “TONE.”
2. Select an option.



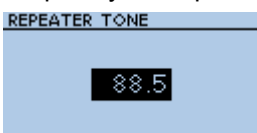
- OFF: Turn OFF the Tone function.
- TONE: Select when the repeater requires an access tone.
- TSQ: Select when you want to use the tone squelch operation in simplex.

Step 14. Selecting the repeater tone frequency

① When **Step 2. Selecting the communication type** is set to “DV Repeater” or “DV Simplex,” this item is not displayed.

① This setting is required when **Step 13. Setting the tone** is set to “TONE” or “TSQ.”

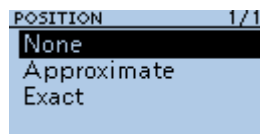
1. Select “REPEATER TONE.”
2. Rotate [DIAL] to select the repeater tone frequency, then push [ENT].



Step 15. Selecting the position data accuracy level

① When the Near Repeater Search function is not used, or the distance between your position and a repeater is not needed, select “OFF,” and go to **Step 18. Setting the UTC offset.**

1. Select “POSITION.”
2. Select the position data accuracy level.

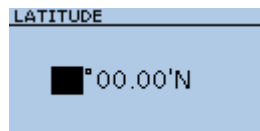


- None: Select when the repeater has no position data.
- Approximate: Select when the entered position data is approximate.
- Exact: Select when the entered position data is exactly correct.

Step 16. Entering the latitude

① This item is displayed only when **Step 15. Selecting the position data accuracy level** is set to “Approximate” or “Exact.”

1. Select “LATITUDE.”
2. Rotate [DIAL] to enter the latitude.

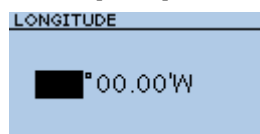


- ① Push [CD] or [CS] to move the cursor.
- ① To enter a north latitude, select “N,” and to enter a south latitude, select “S.”
3. After entering, push [ENT].

Step 17. Entering the longitude

① This item is displayed only when **Step 15. Selecting the position data accuracy level** is set to “Approximate” or “Exact.”

1. Select “LONGITUDE.”
2. Rotate [DIAL] to enter the longitude.



- ① Push [CD] or [CS] to move the cursor.
- ① To enter an east longitude, select “E,” and to enter a west longitude, select “W.”
3. After entering, push [ENT].

► Continued on the next page

4 D-STAR OPERATION

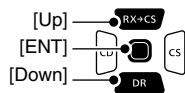
Entering new information into the repeater list

◇ Entering new information into the repeater list

Step 18. Setting the UTC offset

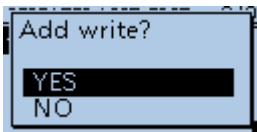
- ① Universal Time Coordinated (UTC) offset is the time difference between UTC and repeater local time. This is a useful function to know the local time of the destination repeater before you make a call.
(p. 4-13)

1. Select "UTC OFFSET."
2. Rotate [DIAL] to set the time difference between UTC and the local time, then push [ENT].



Step 19. Saving the repeater list

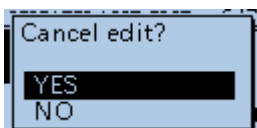
1. Select "<<Add Write>>".
 - The confirmation dialog is displayed.
2. Select <YES>.



- The entered contents are saved to the repeater list, and the display returns to the selected repeater group screen.

TIP: To cancel the entered data

1. Push [CLR] to display the "Cancel edit?" window.
2. Select <YES>.



- Cancels entry and returns to the selected repeater group screen.

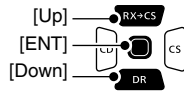
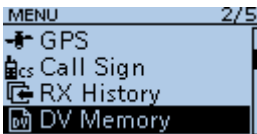
Repeater list operation

◇ Editing repeater data

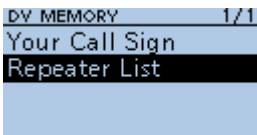
You can edit repeater data. This is useful when already-entered data is incorrect, has changed, or some data needs to be added to the list.

MENU > DV Memory > Repeater List

1. Push [MENU].
2. Select "DV Memory."



3. Select "Repeater List."

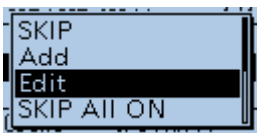


4. Select a repeater group where the repeater you want to edit is listed.

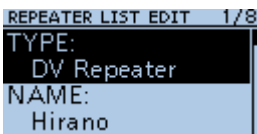


(Example: 11: Japan)

5. Select a repeater you want to edit, then push [QUICK].
6. Select "Edit."

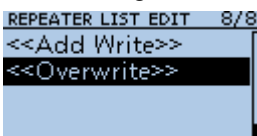


7. Select an item, then edit it.



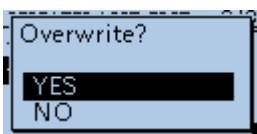
① See pages 4-33 ~ 4-36 for details.

8. After editing, select "<<Overwrite>>."



• The confirmation dialog is displayed.

9. Select <YES>.



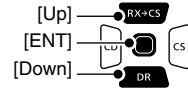
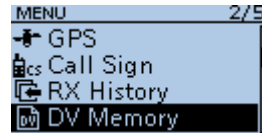
• The edited contents are saved to the repeater list, and returns to the selected repeater group screen.

① To exit the MENU screen, push [MENU].

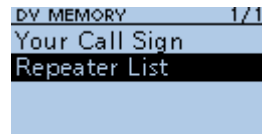
◇ Deleting repeater data

MENU > DV Memory > Repeater List

1. Push [MENU].
2. Select "DV Memory."



3. Select "Repeater List."

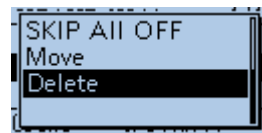


4. Select a repeater group where the repeater you want to delete is listed



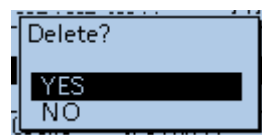
(Example: 11: Japan)

5. Select the repeater to be deleted, then push [QUICK].
6. Select "Delete."



• The confirmation dialog is displayed.

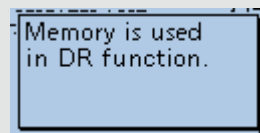
7. Select <YES>.



• The selected repeater contents are deleted from the repeater list, and returns to the selected repeater group screen.

① To exit the MENU screen, push [MENU].

NOTE: The currently selected repeater on the DR screen cannot be edited or deleted. To edit or delete the repeater, select another repeater on the DR screen.



Repeater list operations

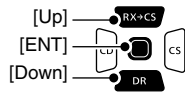
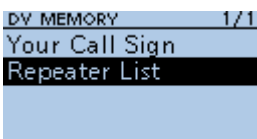
◇ Rearranging the display order of the repeaters

You can move the entered repeaters to rearrange their display order in the selected repeater group.

MENU > DV Memory > Repeater List

Example: Moving “Decatur” above “Lake County.”

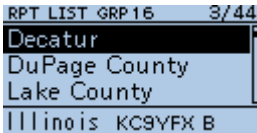
1. Push [MENU].
2. Select “DV Memory.”
3. Select “Repeater List.”



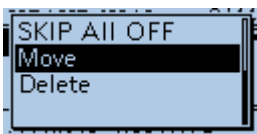
4. Select a repeater group where the repeater you want to move is listed.



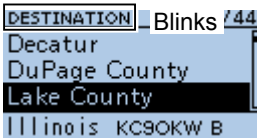
5. Select the repeater to be moved.
 - ① Do not push [ENT].



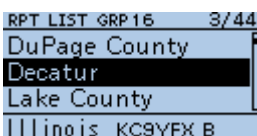
6. Push [QUICK].
7. Select “Move.”



8. Select the position to insert the repeater you want to move the repeater above.



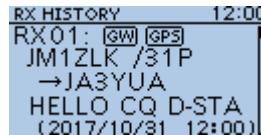
① While moving, “DESTINATION” blinks at the top left of the screen.



- The selected repeater is inserted above the destination repeater name.
- ① If “<<Move End>>” is selected, the repeater is moved to the bottom of the group.
- ① To exit the MENU screen, push [MENU].

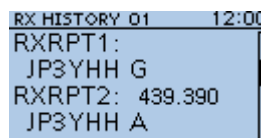
◇ Adding a new repeater information from RX History

1. Hold down [CD] for 1 second.
 - The RX HISTORY screen is displayed.
2. Push [Up] or [Down] to display the repeater you want to add to the repeater list, then push [ENT].



- Displays the RX history detail screen.

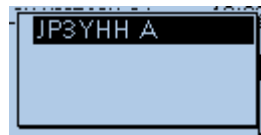
3. Push [Up] or [Down] to display “RXRPT1” and “RXRPT2.”



4. Push [QUICK].
5. Select “Add To RPT List.”

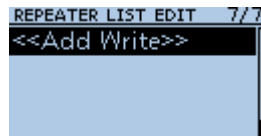


6. Select the repeater call sign that you want to add to the repeater list.



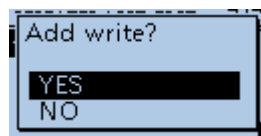
- Displays the REPEATER LIST EDIT screen. The selected repeater call sign is automatically entered.
- ① If the selected repeater is already in the repeater list, “Duplicate Call Sign” is displayed.
- ① See pages 4-33 ~ 4-36 to edit the contents.

7. Select “<<Add Write>>.”



- The confirmation dialog is displayed.

8. Select <YES>.



- The repeater contents are added to the repeater list, and the display returns to the RX HISTORY screen.
- ① To exit the RX HISTORY screen, push [MENU].

Repeater list operations

◇ Skip setting for the DR scan

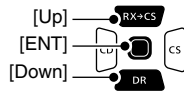
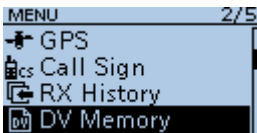
You can set repeaters as scan skip repeaters. The selected repeaters are skipped for faster scanning. You can set the skip setting to all repeaters in the selected repeater group, or to individual repeaters.

- ① When a repeater is set as a skip repeater, its “USE (FROM)” setting is automatically set to “NO.” In that case, the repeater cannot be selected in “FROM” (Access repeater) on the DR screen.

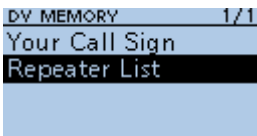
<Individual skip setting>

MENU > DV Memory > Repeater List

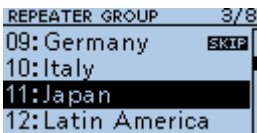
1. Push [MENU].
2. Select “DV Memory.”



3. Select “Repeater List.”

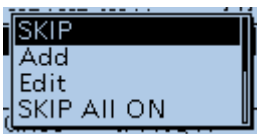


4. Select a repeater group where the repeater you set the skip setting is listed.

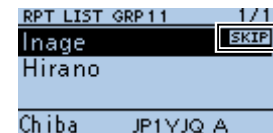


(Example: 11: Japan)

5. Select the repeater to be skipped, then push [QUICK].
6. Select “SKIP.”



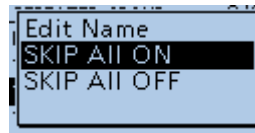
- Displays “SKIP” by the selected repeater.



- ① Select “SKIP” again to cancel the skip setting.
- ① Select “SKIP All ON” to set the skip setting to all repeaters in the group.

<Group skip setting>

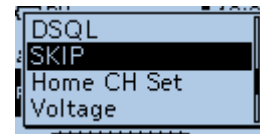
1. On the REPEATER GROUP screen, select a repeater group, as described to the left.
2. Push [QUICK], then select “SKIP All ON” to skip the repeaters in the group during the DR scan.



- ① To cancel the skip settings in the group, select “SKIP All OFF.”

TIP:

- When you select “Repeater List” on the FROM SELECT screen, you can set the skip setting as described to the left.
- When “FROM” is selected on the DR screen, push [QUICK] to set the skip setting, as shown below.



- ① Displays “SKIP” in the “FROM” field.

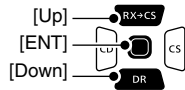
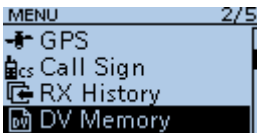
4 D-STAR OPERATION

Repeater list operations

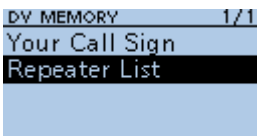
◇ Entering or editing a repeater group name

MENU > DV Memory > Repeater List > **Repeater Group**

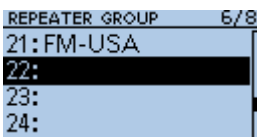
1. Push [MENU].
2. Select "DV Memory."



3. Select "Repeater List."

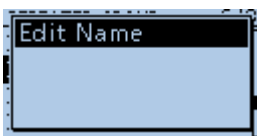


4. Select a Repeater group that you edit the name.
① Do not push [ENT].

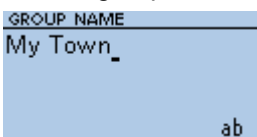


① If you select an already named group, the name is overwritten.

5. Push [QUICK].
6. Select "Edit Name."



7. Enter a group name of up to 16 characters.

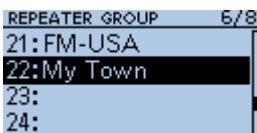


Selectable characters and symbols

A to Z, a to z, 0 to 9, !"# \$ % & ' () * +
, - . / : ; < = > ? @ [\] ^ _ ` { | } ~ (space)

① See page iii on how to enter characters.

8. After entering [ENT].



• Sets the entered name.

① To exit the MENU screen, push [MENU].

Your Call Sign

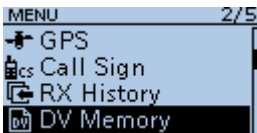
◇ Entering Your Call Sign

You can manually enter a Your (destination) Call Sign. When a Your Call Sign is set to “TO,” you can make a call to the station, even if you do not know where the station is currently located. Up to 200 “Your Call Signs” can be entered.

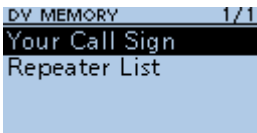
MENU > DV Memory > **Your Call Sign**

Example: Entering “Rick/JM1ZLK” to the Your Call Sign memory.

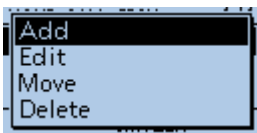
1. Push [MENU].
2. Select “DV Memory.”



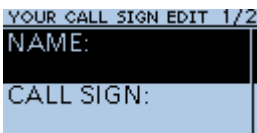
3. Select “Your Call Sign.”



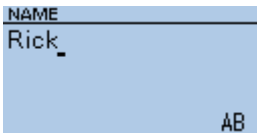
4. Push [QUICK] on the YOUR CALL SIGN screen.
5. Select “Add.”



6. Select “NAME.”



7. Enter a station name of up to 16 characters.



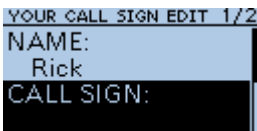
(Example: Rick)

Selectable characters and symbols

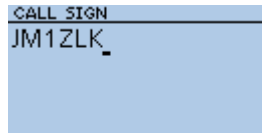
A to Z, a to z, 0 to 9, ! " # \$ % & ' () * + , - . / : ; < = > ? @ [\] ^ _ ` { | } ~ (space)

① See page iii on how to enter characters.

8. After entering, push [ENT].
9. Select “CALL SIGN.”

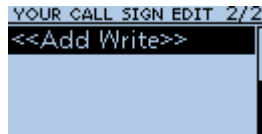


10. Enter Your call sign of up to 8 characters, including spaces.



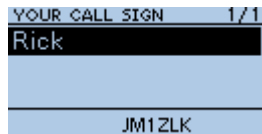
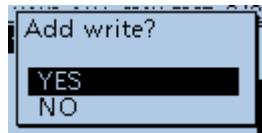
(Example: JM1ZLK)

11. After entering, push [ENT].
12. Select “<<Add Write>>.”



• The confirmation dialog is displayed.

13. Select <YES>.



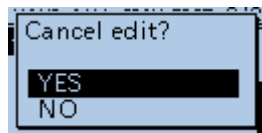
• “Rick JM1ZLK” is entered into the Your Call Sign memory.

① To exit the MENU screen, push [MENU].

TIP:

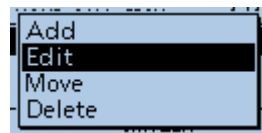
To cancel the entered call sign

1. Push [CLR] to display the “Cancel edit?” window.
2. Select “YES” to cancel the entry and return to the YOUR CALL SIGN screen.



To edit the entered call sign

To edit the entered call sign, select “Edit” in step 5. This is useful when already-entered data is incorrect, has changed, or some data needs to be added to the list.

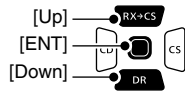
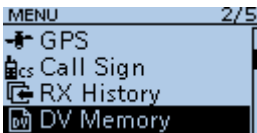


Your Call Sign

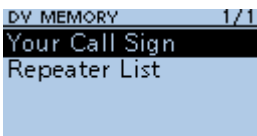
◇ Deleting Your Call Sign

MENU > DV Memory > Your Call Sign

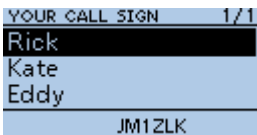
1. Push [MENU].
2. Select "DV Memory."



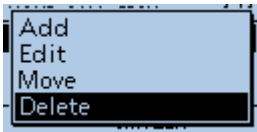
3. Select "Your Call Sign."



4. Select a call sign you want to delete.
① Do not push [ENT].

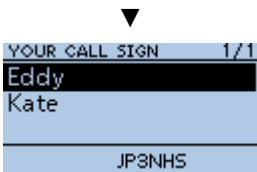
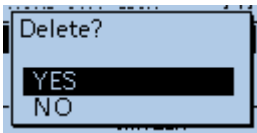


5. Push [QUICK].
6. Select "Delete."



• A confirmation dialog is displayed.

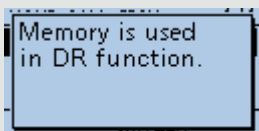
7. Select <YES>.



• The selected call sign is deleted from the Your Call Sign list, and the returns to the YOUR CALL SIGN screen.

① To exit the MENU screen, push [MENU].

NOTE: The currently selected Your Call Sign on the DR screen cannot be edited or deleted. To edit or delete the Your Call Sign, select another Your Call Sign on the DR screen.



◇ Rearranging the display order of Your Call Signs

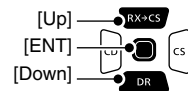
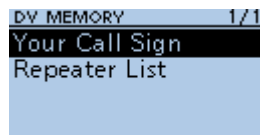
You can move Your Call Signs to rearrange their display order.

If the stations you often communicate with are moved to the top of the list, it is easy to find them.

MENU > DV Memory > Your Call Sign

Example: Moving "Rick" above "Eddy."

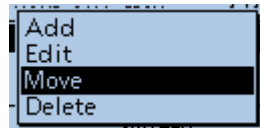
1. Push [MENU].
2. Select "DV Memory."
3. Select "Your Call Sign."



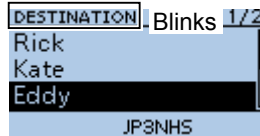
4. Select a Your Call Sign to be moved.
① Do not push [ENT].



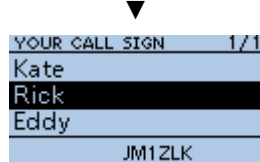
5. Push [QUICK].
6. Select "Move."



7. Select the position to insert the Your Call Sign you want to move the call sign above.



① While moving, "DESTINATION" blinks.



• The selected call sign is inserted above the destination call sign.

① If "<<Move End>>" is selected, the Your Call Sign is moved to the bottom of the group.

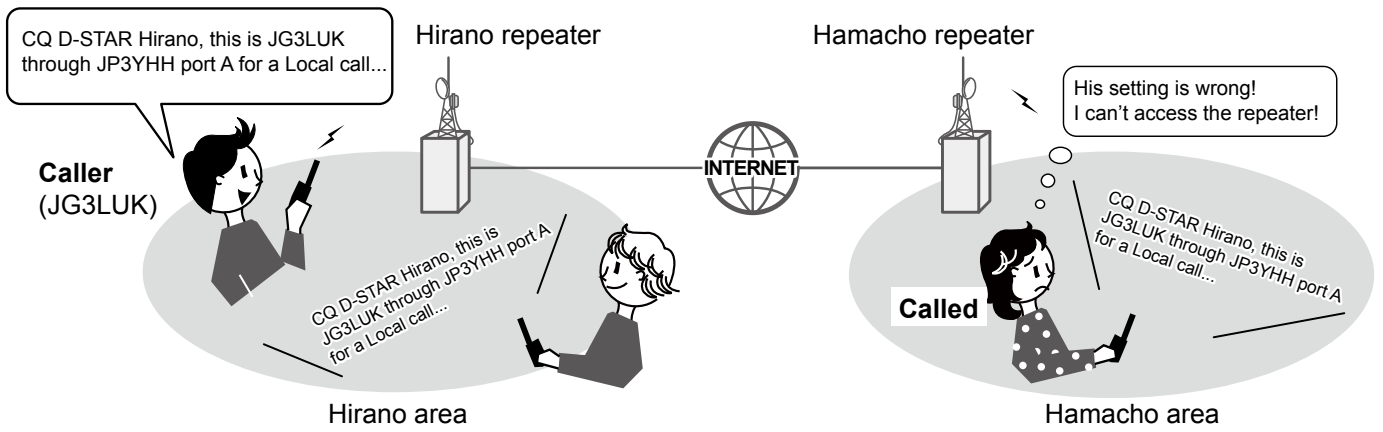
① To exit the MENU screen, push [MENU].

Are your settings correct?

If you make a Local Area call with a gateway setting still selected in "TO," the destination repeater will be busy while you transmit. The stations that want to use the repeater as their Access repeater cannot access it, as shown below.

BE SURE to set CQCQCQ in "TO" on the DR screen when you intend to make a Local Area call, or after you finish a Gateway call.

Example: JG3LUK wants to make a Local Area call.



JG3LUK's setting



NOTE: With this setting, you can make a Local Area call, but the destination Repeater, selected in "TO," is also busy while you transmit. The stations that want to use the repeater as their Access Repeater cannot access it.

The destination ("TO") setting is incorrect.

Correct setting



To make a Local Area call, set the destination ("TO") to "CQCQCQ." See page 4-9 for details.

Section 5 GPS OPERATION

GPS operation features	5-2
Before starting GPS operation.....	5-3
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GPS TX mode and TX format types	5-4
Difference between older models	5-4
Checking your position	5-5
◇ Displaying Position Data	5-5
◇ GPS POSITION screens and their meanings	5-6
◇ About the RX screen	5-7
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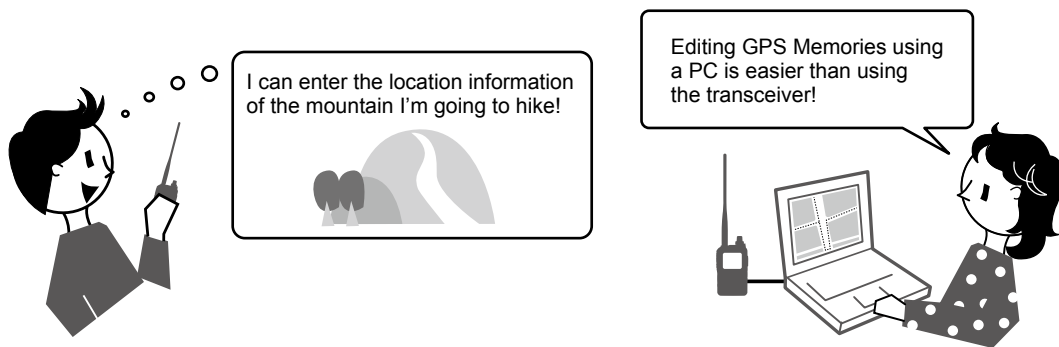
GPS operation features

D-PRS Extension function (p. 5-4)

The D-PRS Extension function enables you to receive Object, Item, and Weather information in addition to Position data. With this extension, you can simultaneously receive earthquake information, traffic accident information, emergency information, or weather information, and so on, along with voice audio in the DV mode.

GPS Memory (p. 5-20)

You can enter up to 200 GPS Memories in the transceiver. By adding destination position information in a GPS Memory, you can effectively use the GPS Alarm function. The position information that you acquired can also be entered in a GPS Memory.



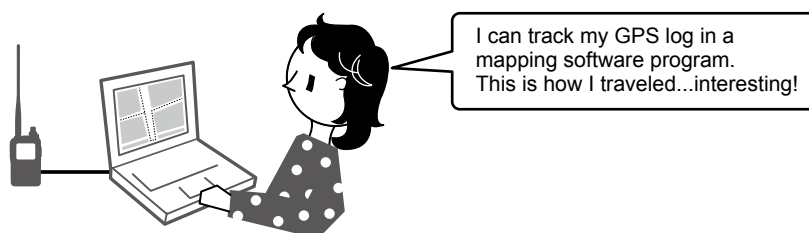
GPS Alarm function (p. 5-25)

When a target station comes into the set alarm area, or when you approach an entered GPS Memory position, the function can sound an alarm. With this function, you can know that you are approaching the destination.



GPS Logger function (p. 5-28)

The GPS Logger function enables you to save the position data from a GPS receiver into a microSD card as a log. If you use this GPS Logger while driving, you can check your driving history on a mapping software program.



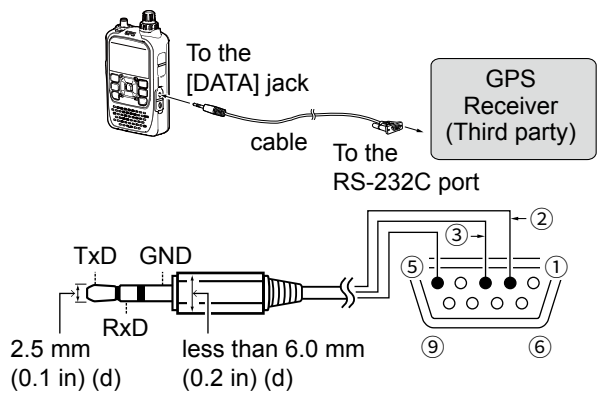
Before starting GPS operation

NOTE: Before using the GPS function, read “IMPORTANT NOTES” about the GPS receiver in BASIC MANUAL page vi.

The transceiver has a built-in internal GPS receiver. The GPS receiver’s position data can be received in any mode. Also, a NMEA format compatible external GPS receiver can be connected to the transceiver through the [DATA] jack. To receive signals from an external GPS receiver, connect it to the transceiver as shown below.

NOTE: Transmit or receive position data can be transmitted in only the DV mode.

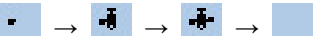
Connection



- Connect Pin ② to RxD (Ring).
- Connect Pin ③ to TxD (Tip).
- Connect Pin ⑤ to GND (Sleeve).

◇ **Confirming the GPS signal receiving**

Confirm the GPS receiver is receiving satellite signals. The GPS icon blinks when searching for satellites.



The GPS icon stops blinking when the minimum number of satellites needed are found.



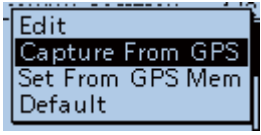
① **Information**

- It may take only a few seconds to receive, or it may take a few minutes, depending on your operating environment. If you have difficulties receiving, we recommend that you try a different position.
- When **GPS Select** is set to “Manual,” the icon is not displayed. When using a third party GPS receiver, set to “External GPS.”
(MENU > GPS > GPS Set > **GPS Select**)
- Set **GPS Indicator** to “ON” to display the GPS icon.
(MENU > GPS > GPS Set > **GPS Indicator**)

NOTE: Continuously using the Internal GPS mode causes the transceiver’s battery to quickly be exhausted. Turn ON the Power Save mode if needed. See page 11-9 for details.
(MENU > GPS > GPS Set > **Power Save (Internal GPS)**)

TIP: To prolong the battery life in the GPS mode
To prolong the battery life while operating in the GPS mode, manually update your position with the received GPS data.

1. Set **GPS Select** to “Internal GPS,” and receive your position from the internal GPS receiver.
(MENU > GPS > GPS Set > **GPS Select**)
2. Open the MANUAL POSITION screen, and then push [QUICK] .
(MENU > GPS > GPS Set > **Manual Position**)
3. Select “Capture From GPS.”

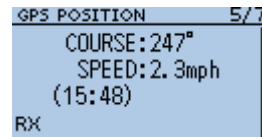
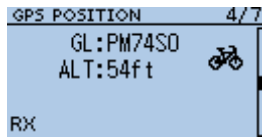
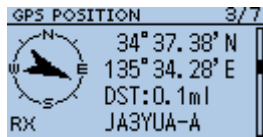


- Your current position is now memorized and displayed on the MANUAL POSITION screen.
4. Set **GPS Select** to “Manual.”
(MENU > GPS > GPS Set > **GPS Select**)

GPS TX mode and TX format types

GPS position data has 2 TX modes, D-PRS and NMEA. Moreover, with the D-PRS mode data, 5 position formats. Position (Mobile station/Base station), Object, Item, and Weather, are selectable.

Example: When the caller's TX format is D-PRS Position (Mobile)



D-PRS	D-PRS is a function that simultaneously sends position data received from the internal or external GPS receiver, using the slow speed data packet space, along with voice.
Position (Mobile)	A station operating from a vehicle, or other position, away from it's normal base position.
Position (Base)*	A station operating at home or in a building.
Object*	Transmitting Object data such as an earthquake information, satellite track information, and so on. An Object contains a time stamp.
Item*	Transmitting Item data such as a traffic accident, lighthouse, antenna, or DV access point position, and so on. An Item does not contain a time stamp.
Weather*	A station transmitting weather information received from a weather device.
NMEA	A station transmitting position data (NMEA0183) received from the internal or an external GPS receiver.

* You can receive, but cannot transmit this format with the ID-31A PLUS or ID-31E PLUS.

Difference between older models

(As of November 2017)

- The GPS TX mode, “GPS (DV-G)” and “GPS-A (DV-A),” are now called as “NMEA (DV-G)” and “D-PRS (DV-A).”
GPS (DV-G) → NMEA (DV-G)
GPS-A (DV-A) → D-PRS (DV-A)
- For users who have one of the following models:
(ID-800H, IC-91AD/E91, IC-U82, IC-V82, IC-7100, ID-51A/E, ID-31A/E, IC-9100, IC-80AD/E80D, ID-880H/E880, IC-92AD/E92D, IC-2820H/E2820)
When you receive a D-PRS position (Base), Object, Item, or Weather information, their data is not displayed.
- Only the ID-51A/E PLUS, ID-51A/E PLUS2, ID-31A/E PLUS, ID-5100A/E, and ID-4100A/E, can receive Power, Height, Gain, and Directivity data.
- For users who have one of the following models:
(IC-9100, IC-80AD, IC-E80D, ID-880H, ID-E880, IC-92AD, ICE92D, IC-U82, IC-V82)
If you transmit with the Altitude setting ON, the character string is included in a comment on the products that cannot display the altitude.
- Set the GSV sentence to OFF when sending the GPS message to conventional digital transceivers (IC-2820H, IC-E2820, ID-800H, IC- 91AD, IC-E91, IC-V82, IC-U82, IC-2200H). The GSV sentence is incompatible with them. They will not display GPS messages properly if sent as a GSV sentence from the ID-31A/E PLUS.

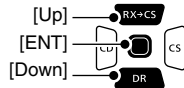
Checking your position

You can check your current position. This section is described using received position data.
 ① The screens are just examples.

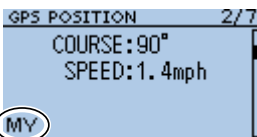
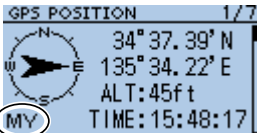
NOTE: Latitude, longitude, and altitude data may differ, depending on your received GPS signal.

◇ Displaying Position Data

1. Push [QUICK] in the standby mode.
2. Select "GPS Position."



3. Rotate [DIAL].
 - My screens (MY), received screens (RX), the GPS Memory channel screen (MEM), and the GPS Alarm channel screen (ALM) are displayed.



↑
 The displayed icon depends on the type of screen (MY, RX, MEM, or ALM).

TIP:

- If you transmit with the GPS POSITION screen open, the screen is temporarily canceled. To check the position, push [QUICK], then select "GPS Position" while transmitting.
- On the MY screen or RX screen, you can enter the displayed position information in a GPS Memory by pushing [QUICK] and selecting "GPS Memory."
- See page 5-20 about the GPS Memory function and see page 5-25 about the GPS Alarm function to know more details.

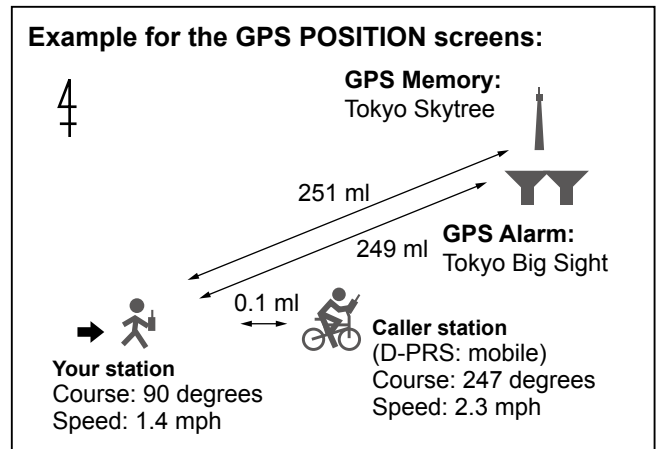
① To exit the MENU screen, push [MENU].

Checking your position

◇ GPS POSITION screens and their meanings

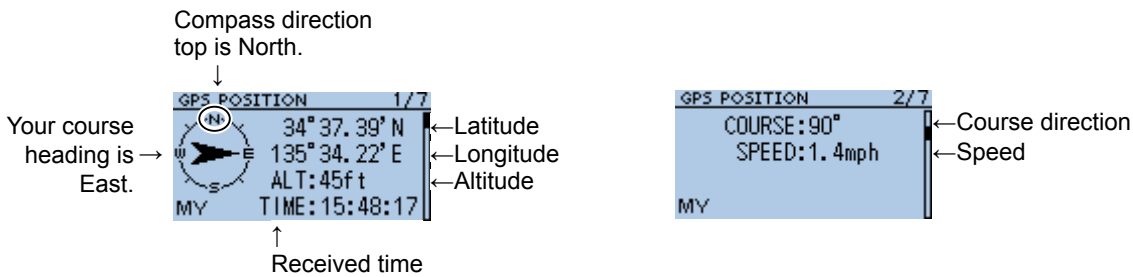
① Information

- Pushing [QUICK] to change the compass direction. (p. 5-9)
- About the Course (p. 5-8)
- About the Grid Locator (p. 5-8)



MY screen (Your position information)

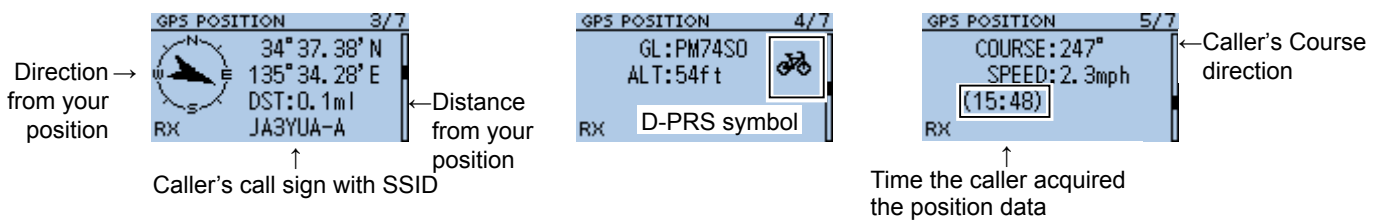
When GPS Select is set to “Manual,” compass heading and course direction are not displayed. (p. 11-9)



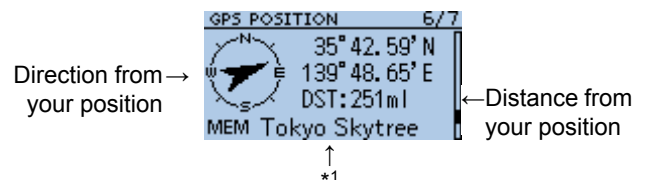
RX screen (Caller's position information)

Depending on the caller's GPS TX Mode and TX format, displayed item's meanings differ, and some data may not be displayed. (p. 5-7)

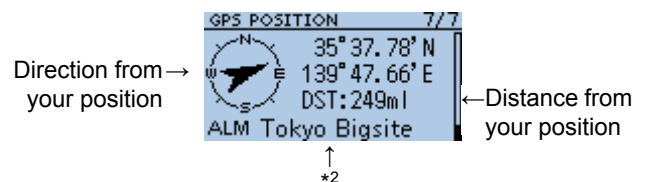
Example: The caller station's GPS TX Mode is “D-PRS” and its TX format is “Position (Mobile).”



MEM screen (GPS Memory channel's information)



ALM screen (GPS Alarm Memory channel's information)



*1 When a name is not entered in the GPS Memory channel, date and time are displayed instead of the name.

*2 In the Quick Menu window, you can change the GPS Memory or GPS Alarm in the GPS POSITION screen. (p. 5-8)

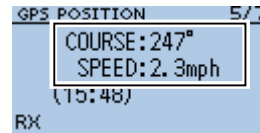
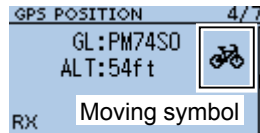
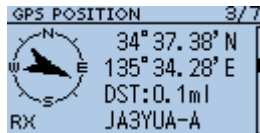
Checking your position

◇ About the RX screen

TX format:

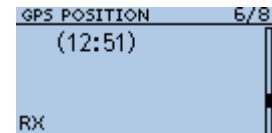
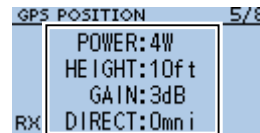
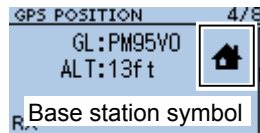
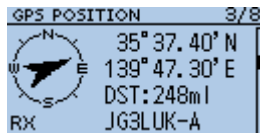
D-PRS

Position (Mobile)



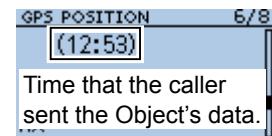
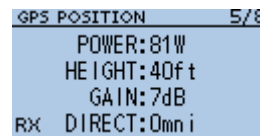
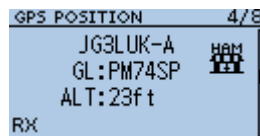
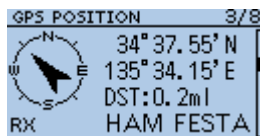
← For a mobile station, Course and Speed are displayed.

Position (Base)

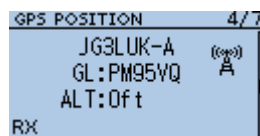
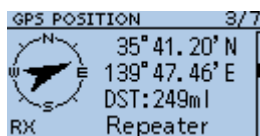


↑ For a base station, Output power, Antenna height, Antenna gain, and Antenna direction are displayed.

Object

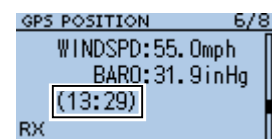
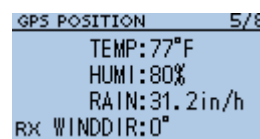
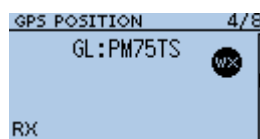
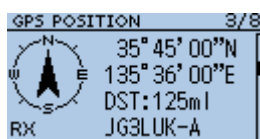


Item



① For an Item station, Time is not displayed.

Weather



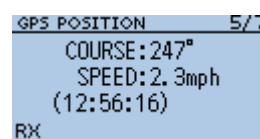
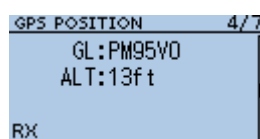
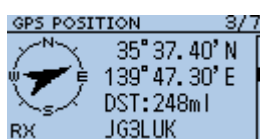
↑ Time that the caller acquired the weather data.

① Call sign is displayed with an SSID.

① When the Object or Item's status is finished, "KILLED" is displayed.

TX format:

NMEA



① Symbol or SSID is not displayed when the TX format is NMEA.

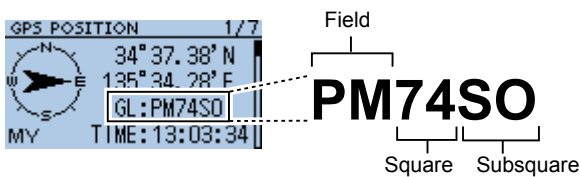
Checking your position

◇ About the Grid Locator

Grid Locator (GL) is a position compressed into a 6 character code, calculated by the longitude and the latitude.

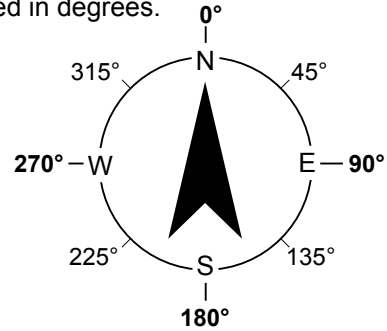
The locator is simply calculated by dividing the earth surface into squares.

It is used to find the area of a transceiver station.

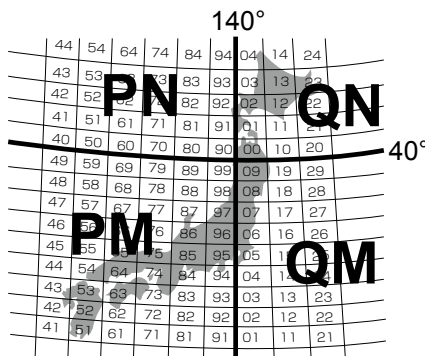


◇ About the Course

The course displayed on the GPS POSITION screens are indicated in degrees.



The grid locator map of Japan



◇ Displaying the Grid Locator

You can exchange the Altitude display or the Distance display with the Grid Locator display, depending on the displayed GPS POSITION screen.

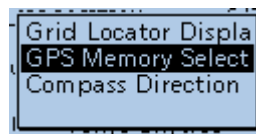
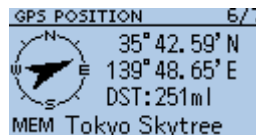
1. While selecting the MY screen (1st), MEM screen, or ALM screen, push [QUICK].
2. Select "Grid Locator Display."
 - On the MY screen, the GL is displayed instead of the altitude.
 - On the MEM screen or ALM screen, the GL is displayed instead of the distance.
- ① While displaying the GL, pushing [QUICK] and selecting "Altitude Display" or "Distance Display," to return to the previous display.

◇ Changing the GPS Memory or Alarm

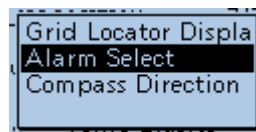
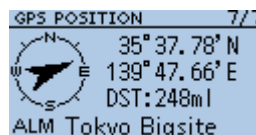
You can change the GPS Memory or GPS Alarm in the GPS POSITION screen.

1. While selecting the MEM screen or ALM screen, push [QUICK].
2. Select "GPS Memory Select," or select "Alarm Select."

MEM screen



ALM screen



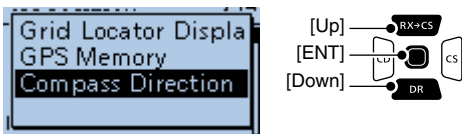
3. Select the GPS Memory or GPS Alarm to display on the GPS POSITION screen.
 - ① Adding or editing a GPS Memory: p. 5-20
 - ① Setting the GPS Alarm: pp. 5-26, 5-27

Checking your position

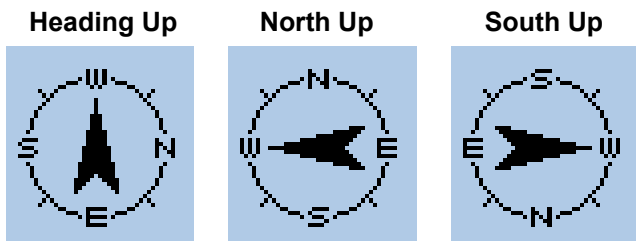
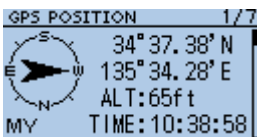
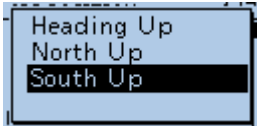
◇ Changing the Compass Direction

You can set the compass direction to Heading Up, North Up, or South Up.

1. Push [QUICK].
2. Select "GPS Position."
 - Displays the GPS POSITION screen.
3. Push [QUICK].
4. Select "Compass Direction."



5. Select the compass direction.
 - Heading Up: The top is always your course direction.
 - North Up: The top is always north.
 - South Up: The top is always south.

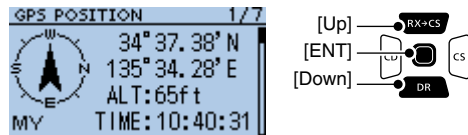


◇ Saving your own or a received station's position

You can save position of your station and the position of the caller station.

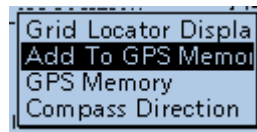
The GPS Memory has a total of 200 channels, and the channels can be assigned into one of 27 banks, A ~ Z, and (No Group).

1. Push [QUICK].
2. Select "GPS Position."
 - Displays the GPS POSITION screen.
3. Select the screen that you want to save.



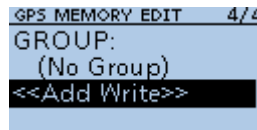
- ① To save your own position: MY screen
- ① To save a received position: RX screen

4. Push [QUICK].
5. Select "Add To GPS Memory."



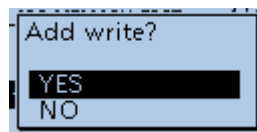
① See pages 5-20 ~ 5-22 for entering details.

6. Select "<<Add Write>>."



- The confirmation dialog is displayed.
- ① To select the destination group to be saved, select "GROUP."

7. Select <YES>.



- Saves the data in the GPS Memory, then returns to the GPS POSITION screen.

8. Push [CLR].
 - Returns to the standby screen.

TIP: The position is saved in the selected group with the "GROUP" item.
(MENU > GPS > **GPS memory**)

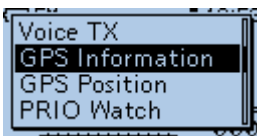
Checking GPS information (Sky view screen)

This screen is used to view GPS satellite information when the GPS icon does not stop blinking for a long time.

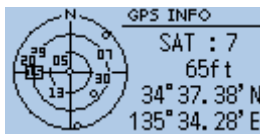
The GPS Information displays the quantity, signal power, and position of the GPS satellites.

The sky view screen displays the position of GPS satellites. The screen also displays the direction, elevation angle, satellite numbers, and their receiving signal strength status.

1. Push [QUICK].
2. Select "GPS Information."



• Displays the GPS INFORMATION screen.

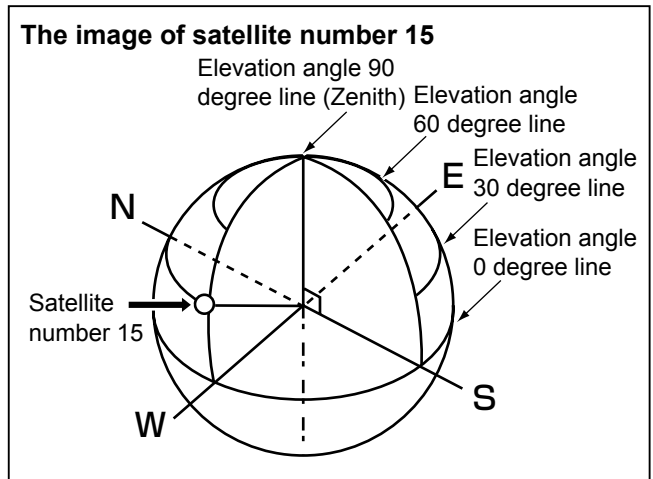
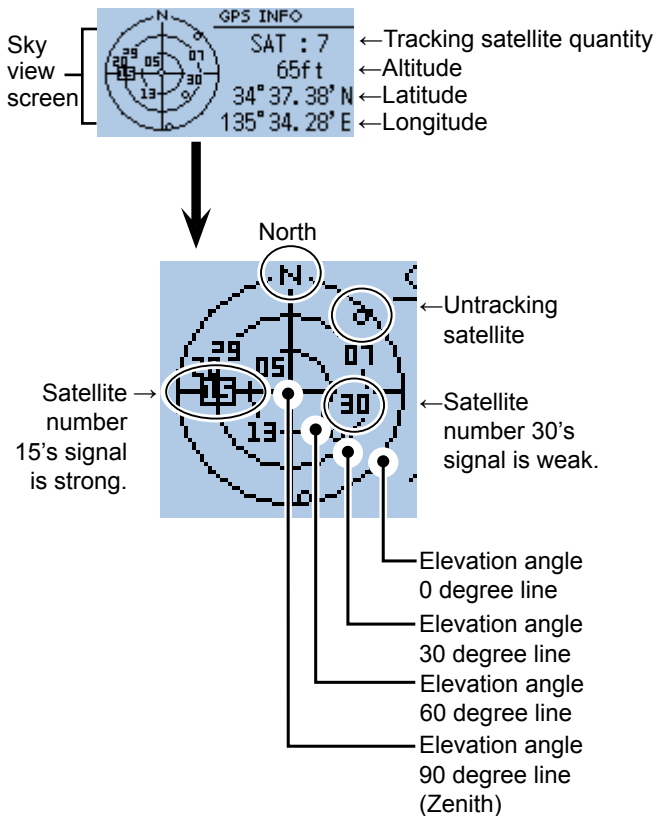


3. Push [CLR].
- Returns to the standby screen.

◇ Meaning of each icon

- (○): Untracking satellite.
- (01): Tracking satellite with a weak signal, shown by the satellite number.
- (01): Tracking satellite with a strong signal, shown by the satellite number.
- (SAT): The quantity of tracking satellites.
- Altitude: The altitude of your station.
The altitude is only displayed when 4 or more satellites are tracked. When 3 or less satellites are tracked, "-----ft" is displayed.
- Longitude/Latitude:
Longitude and Latitude of your station position.

◇ About the display



Transmitting D-PRS data

When D-PRS is selected as the GPS TX mode, you can transmit D-PRS data.

When operating in the D-PRS mode, the following codes are transmitted to the PC.

D-PRS code is based on APRS® code.

(APRS®: Automatic Packet Reporting System).

◇ D-PRS

D-STAR Packet Reporting System (D-PRS) is a mode that simultaneously sends position data received from the internal or external GPS receiver, using the slow speed data packet space, along with voice audio in the DV mode. In the Analog mode, you can transmit or receive only voice audio or data at one time. However a D-PRS capable radio can transmit or receive message data or GPS position data at the same time voice is being transmitted or received.

I-GATE is required to send position data to the APRS server.

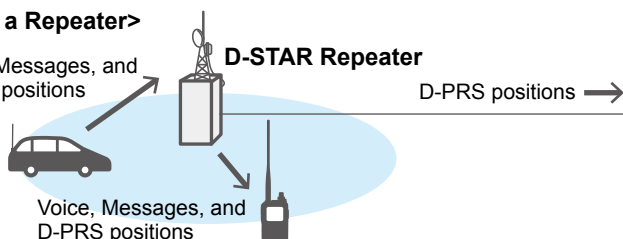
NOTE:

- If **GPS select** is set to “Manual,” the manually entered position data in **Manual Position** is change to the D-PRS data format to transmit. (p. 11-9)
(MENU > GPS > GPS Set > **Manual Position**)
- Note that if **GPS Auto TX** is set to any other setting than “OFF,” the data is transmitted according to the set time. (p. 11-18)
(MENU > GPS > **GPS Auto TX**)

The image of D-PRS

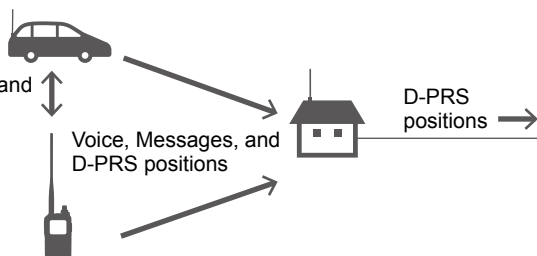
<Using a Repeater>

Voice, Messages, and D-PRS positions



<Simplex>

Voice, Messages, and D-PRS positions



APRS server

Information from an APRS network

D-PRS positions

INTERNET



You can check the position on a map site!

◇ Operating in the D-PRS mode

To transmit in D-PRS, follow the steps below, and for more details, see the pages listed along with the steps.

1. “MY” (Your own call sign) entering (BASIC MANUAL)
2. Receiving GPS data (p. 5-3)
3. Set GPS TX mode to “D-PRS (DV-A).” (p. 5-12)
4. Set TX information (p.5-12)
 - ① You must set **SSID** and **Symbol**.
(GPS > GPS TX Mode > D-PRS (DV-A) > **SSID**, **Symbol**)



Complete! (You can transmit in the D-PRS mode.)

Transmitting D-PRS data

◇ **Setting D-PRS Position (Mobile)**

Set each item to transmit as a D-PRS Position (Mobile).

① You can receive Position (Base), Object, Item, or Weather format data but cannot transmit them with the ID-31A PLUS or ID-31E PLUS.

1. Setting the operating mode to DV mode

Push [FM/DV] to select the DV mode.

2. Setting the GPS TX Mode to D-PRS

MENU > GPS > GPS TX Mode > **D-PRS (DV-A)**

3. Checking the Unproto Address

You should use the default address, and editing is not recommended.

4. Setting the Symbol

Select the Symbol that indicates your operating situation.

① See p. 11-15 to directly enter the Symbol.

5. Setting the SSID

To assist in identifying your station's type, add the APRS® (Automatic Packet Reporting System) based SSID after the D-PRS data call sign. (p. 5-13)

6. Entering a comment

Enter a comment of up to 43 characters, and transmit it with the D-PRS position data.

1. Select "Comment."
2. Push [QUICK].
3. Select "Edit."
4. Enter a comment.

Selectable characters and symbols

A to Z, a to z, 0 to 9, ! " # \$ % & ' () * + , - . / : ; < = > ? @ [\] ^ _ ` { | } ~ (space)

- ① See page iii on how to enter characters.
- ① The symbol "J" shows the transmittable comment range. Note that the characters that exceed the range is not transmitted.
5. After entering, push [ENT].
6. Push [ENT] again.

7. Setting the Time Stamp

Set the Time Stamp function to transmit the received time data in UTC (Universal Time Coordinated) time. (p. 5-14)

8. Setting the Altitude

Set the altitude data acquired from the GPS receiver.

NOTE: If you transmit with the altitude setting ON, the character string is included in a comment on the products that cannot display the altitude.

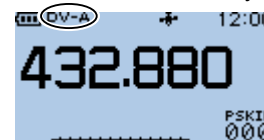
9. Setting the Data Extension

Set the Data Extension to "Course/Speed" to transmit as a mobile station.

10. Exiting the MENU screen

Push [MENU].

- Returns to the standby screen, then "DV-A" is displayed.



Transmitting D-PRS data

◇ About each setting item

Unproto Address

Displays an unproto address of up to 56 alphanumeric characters.

NOTE: You should use the default address, and editing is not recommended.

Symbol

Select the symbol that indicates your operating situation. The selected Symbol channel's Symbol (1 ~ 4) is transmitted with position data.

① See "Selectable Symbol list." (p. 5-15)

TIP: To change the Symbol

1. Select a Symbol channel you want to edit.
 - ① Do not push [ENT].
2. Push [QUICK].
3. Select "Edit Symbol."
4. Select a Symbol.
 - Sets the Symbol into the Symbol channel.

SSID

Select an SSID based on APRS® to add to your call sign, to show your operating style to other stations. The addition methods of the SSID differ, depending on whether the call sign includes a space or not.

- ---: The space in call sign is converted to "-."
 - ① If no text is entered after the space, the space will be deleted, and the space is not converted to "-."
 - Example:** JA3YUA → JA3YUA
JA3YUA A → JA3YUA-A
- (-0): No SSID is added.
 - ① If a call sign includes a space, any text or digit after the space will be deleted.
 - Example:** JA3YUA → JA3YUA
JA3YUA A → JA3YUA
- -1~-15: Adds an SSID of -1 to -15 to your call sign.
 - ① **Example:** SSID is "-9."
JA3YUA → JA3YUA-9
JA3YUA A → JA3YUA-9
- -A~Z: Adds an SSID of -A to -Z to your call sign.
 - ① **Example:** SSID is "-Z."
JA3YUA → JA3YUA-Z
JA3YUA A → JA3YUA-Z

TIP: About the SSID

To assist in identifying a station's type, designated call sign SSIDs are used in D-PRS (or APRS®), according to a common guideline.

The guideline may be changed when the infrastructure environment, such as a product or network, is changed. Please check the latest guideline in the web site related to D-PRS and APRS®, and correctly set.

<http://aprs.org/aprs11/SSIDs.txt>

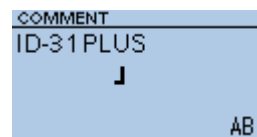
Comment

Enter a comment to transmit it with the D-PRS position data. You can enter up to 4 comments. The number of characters you can enter differs, depending on the **Altitude** and **Data Extension** settings.

(MENU > GPS > GPS TX Mode > D-PRS (DV-A) > **Altitude, Data Extension**)

Data Extension	Altitude	Characters entered (Maximum)
OFF	OFF	43 (Default)
OFF	ON	35
Course/Speed	OFF	36
Course/Speed	ON	28

The symbol "J" displays the transmittable comment range. Note that the characters that exceed the range are not transmitted.



Transmittable comment range display (In case of up to 28 characters)

Transmitting D-PRS data

◇ About each setting item (Continued)

Time Stamp

Select the transmitting time stamp type.

The time stamp is transmitted with position data in the D-PRS mode, and UTC (Universal Time Coordinated) time is used.

① When your position is manually set, time stamp data is not transmitted.

- OFF: Does not transmit the time information.
- DHM: Transmits the time stamp in the Day, Hour, and Minute format.
- HMS: Transmits the time stamp in the Hour, Minute, and Second format.

Altitude

Select whether or not to transmit altitude data with the position data in the D-PRS mode.

① The number of characters you can enter in **Comment** differs, depending on the **Altitude** and **Data Extension** settings.

(MENU > GPS > GPS TX Mode > D-PRS (DV-A) > **Comment, Altitude, Data Extension**)

- OFF: No altitude data is transmitted.
- ON: Transmits altitude data with position data.

Data Extension

Select whether or not to transmit course/speed data with position data in the D-PRS mode.

① The number of characters you can enter in **Comment** differs, depending on the **Data Extension** and **Altitude** settings.

- OFF: Does not transmit any information.
- Course/Speed: Transmits course and speed data with the position data.
 - ① The Course and Speed data is not transmitted when your position is manually set.
 - ① When transmitting with this setting, your station is regarded as a mobile station.

Transmitting D-PRS data

◇ About each setting item (Continued)

Selectable Symbol list

	Sheriff		SSTV		Ship (powerboat)		Gale Flags
	Digipeater		Bus		Truck (18-wheeler)		Ham Store
	Gateway		ATV		Van		Work Zone
	Small Aircraft		WX Service		Yagi @ QTH		Speed post (Value Signpost)
	Red Cross		Helicopter		Overlaid Digipeater		Triangle
	House QTH (VHF)		Yacht		Overlaid Gateway		Small Circle
	X		Person		House (HF)		Overlaid Ship
	Red Dot		DF Station		Big Question Mark		Tornado
	Fire		Large Aircraft		Circle		Overlaid Truck
	Campground		WX Station		Park/Picnic Area		Overlaid Van
	Motorcycle		Dish Antenna		Overlaid Car		Wreck
	Railroad Engine		Ambulance		Lighthouse		Other
	Car		Bicycle		Satellite		
	Canoe		Fire Truck		Sunny		
	Eyeball		Glider		Overlaid WX Service		
	School		Hospital		Radio		
	PC User		Jeep		Icom Radio		
	Balloon		Truck		Aircraft		
	Police		Node		Overlaid WX Station		
	Recreational Vehicle		Rover		Overlaid Diamond		
	Shuttle		Repeater		RACES		

Transmitting D-PRS data

◇ Displaying your position using a mapping software

If you transmit to an I-GATE station, and then enter the call sign information on the Internet map website, the selected symbol is displayed.

You can check on the Internet!



PC



Smartphone

Example: Check your position on the APRS.fi site.

1. Display a free APRS® related map site on the Internet.
 ① Example: <http://aprs.fi/>
2. Enter your call sign in the “Track callsign” field.
3. Click <Search>.
 - The icon (D-PRS symbol) is displayed on the map site.

Enter your call sign, and then click <Search>.

Transmitting D-PRS data

TIP:

D-PRS data content

D-PRS data content are shown below.

◇Position (Mobile)

(e.g.) JA3YUA-A>API31,DSTAR*:/002338h3437.38N/13534.29E>090/002/A=000012ID-31PLUS OP.SATOH
 ① ② ③ ④ ⑦ ⑧ ⑨ ⑩ ⑨ ⑪ ⑬ ⑭

◇Position (Base)

(e.g.) JA3YUA-A>API410,DSTAR*:/002338h3437.38N/13534.29E-PHG5132OP.SATOH
 ① ② ③ ④ ⑦ ⑧ ⑨ ⑩ ⑨ ⑫ ⑭

◇Object

(e.g.) JA3YUA-A>API410,DSTAR*::HAM FESTA*012345z3437.38N\13534.29Eh2017.10.31 am10-pm4
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑨ ⑭

◇Item

(e.g.) JA3YUA-A>API410,DSTAR*):REPEATER!3454.00N/13536.00ErPHG5132439.39MHZ DV RPT JP3YHH A
 ① ② ③ ④ ⑤ ⑥ ⑧ ⑨ ⑩ ⑨ ⑫ ⑭

◇Weather

(e.g.) JA3YUA-A>API410,DSTAR*:/012345z3454.00N/13536.00E_220/004g005t077r000p000P000h50b09900
 ① ② ③ ④ ⑦ ⑧ ⑨ ⑩ ⑨ ⑮ ⑯ ⑰ ⑱ ⑲ ⑳ ㉑ ㉒

① Call sign

② SSID

③ Unproto Address

④ D-PRS Data type

/ Position with time stamp

! Position without time stamp

; Object

) Item

⑤ Object Name/Item Name

⑥ Data Type

* Live Object

! Live Item

_ Killed Object/Killed Item

⑦ Time Stamp (UTC)

h Hour Minute Second

z Day Hour Minute

⑧ Latitude

⑨ Symbol

⑩ Longitude

⑪ Data Extension (Course/Speed)

Course:0 ~ 360°

Speed:0 ~ 999 knots

⑫ Data Extension(PHG codes)

PHG codes definitions

	0	1	2	3	4	5	6	7	8	9	
First: Power	0	1	4	9	16	25	36	49	64	81	(W)
Second: Height	10	20	40	80	160	320	640	1280	2560	5120	(feet)
Third: Gain	0	1	2	3	4	5	6	7	8	9	(dB)
Fourth: Directivity	omni	45°NE	90°E	135°SE	180°S	225°SW	270°W	315°NW	360°N	-	-

⑬ Altitude

-99999 ~ 999999 feet

⑭ Comment

⑮ Wind direction/Wind speed

Wind direction:0 ~ 360°

Wind speed: 0 ~ 999 mph

⑯ Gust speed

0 ~ 999 mph

⑰ Temperature

-99 ~ 999°F

⑱ Rainfall

0.00 ~ 9.99 inch

⑲ Rainfall (24 Hours)

0.00 ~ 9.99 inch

⑳ Rainfall (Midnight)

0.00 ~ 9.99 inch

㉑ Humidity

1 ~ 99%, 00=100%

㉒ Barometric pressure

0.0 ~ 9999.9 hPa

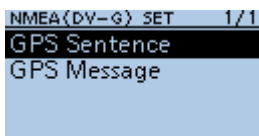
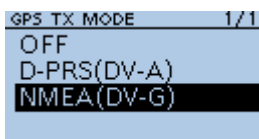
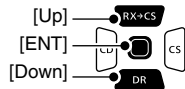
Transmitting NMEA data

Set a GPS sentence to transmit GPS data in the DV mode.

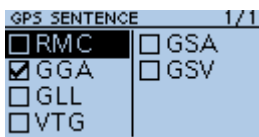
◇ Setting the GPS data sentence

MENU > GPS > GPS TX Mode > NMEA (DV-G)>
GPS Sentence

1. Push [MENU].
2. Select "GPS."
3. Select "GPS TX Mode."
4. Select "NMEA (DV-G)" and then select "GPS Sentence."

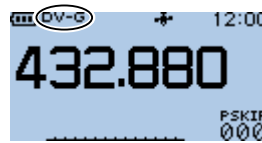


5. Select the GPS sentence.



- Displays "✓" when the sentence is set to ON.
- ① The selectable GPS sentences are RMC, GGA, GLL, VTG, GSA, and GSV. The GGA sentence is set to ON as the default GPS sentence.
- ② Pushing [QUICK] and selecting "Default" returns to the default setting.

6. Repeat step 5 to set the GPS sentence.
 - ① Up to 4 GPS sentences can be set at a time.
7. Push [MENU].
 - Returns to the standby screen, then "DV-G" is displayed.



NOTE:

- Set **GSV Sentence** to "OFF" when sending the GPS message to a conventional digital transceivers. (p. 5-4)
- If **GPS Select** is set to "Manual," the transceiver automatically sets the NMEA sentence, and transmits it along with the manually entered position data in **Manual Position**. (p. 11-9) (GPS > GPS Set > **GPS Select**) (GPS > GPS Set > **Manual Position**)
- Note that if **GPS Auto TX** is set to any other option than "OFF," data is automatically transmitted according to the set time. (p. 11-18) (GPS > **GPS Auto TX**)

Contents of GPS sentence

Sentence	Lon/Lat	Alt	UTC	Date (UTC)	Status	2D /3D	COG (True)	SOG (knot)	Others
RMC	✓		✓	✓	✓		✓	✓	Magnetic variation, Mode Indicator
GGA	✓	✓	✓		✓				Number of satellites in use, HDOP, Geoidal separation, Age of Differential GPS data
GLL	✓		✓		✓				Mode Indicator
VTG							✓	✓	COG (Magnetic north), SOG (km/h), Mode Indicator
GSA					✓	✓			ID numbers of satellites used in solution, PDOP, HDOP, VDOP
GSV									Total number of sentences, Sentence number, Total number of satellites in view, Satellite information (ID, Elevation, Azimuth, S/N)

Transmitting NMEA data

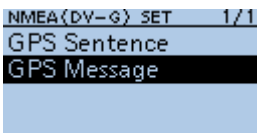
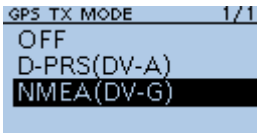
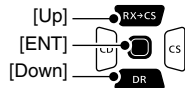
◇ Entering a GPS message

Enter a GPS message to be transmitted with the position data.

Example: Entering “Japan TOM”

MENU > GPS > GPS TX Mode > NMEA (DV-G) > GPS Message

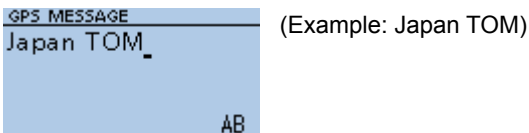
1. Push [MENU].
2. Select “GPS.”
3. Select “GPS TX Mode.”
4. Select “NMEA (DV-G)” and then select “GPS Message.”



5. Push [QUICK].
6. Select “Edit.”



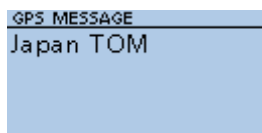
7. Enter a GPS message of up to 20 characters.



Selectable characters and symbols

A to Z, a to z, 0 to 9, ! " # \$ % & ' () * + , - . / : ; < = > ? @ [\] ^ _ ` { | } ~ (space)

- ① See page iii on how to enter characters.
8. After entering, push [ENT].
 - Displays the entered message.



- ① To exit the MENU screen, push [MENU].

GPS Automatic Transmission

NOTE:

- Use the GPS Automatic Transmission function in only the Simplex mode.
- Using the function through a Repeater may interfere with other communications.

MENU > GPS > GPS Auto TX

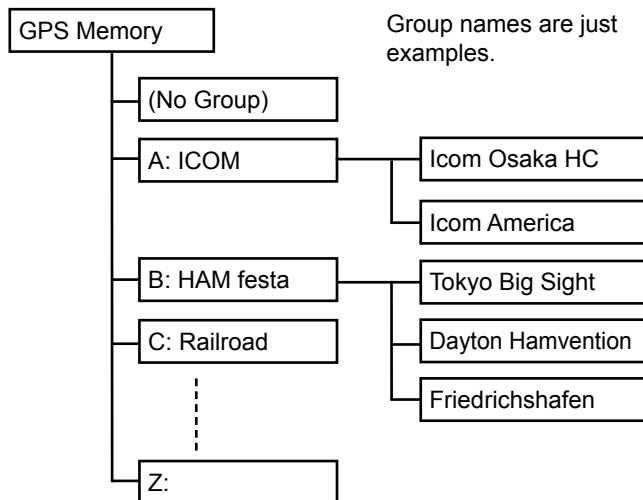
If you set the GPS Automatic Transmission function, GPS data is automatically transmitted according to the set time.

- ① This function is not activated if your call sign (MY) is not entered in the transceiver.
- ① If **GPS Select** is set to “OFF” or “Manual,” this function is not activated.

GPS Memory

You can add GPS data to GPS Memory. You can add your own position, other station's position, or any positions that are manually entered.

You can save the GPS Memory up to 200 channels, and conveniently saved in up to 27 groups, from A ~ Z and "(No Group)." The A to Z groups can also be named.



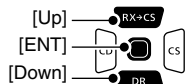
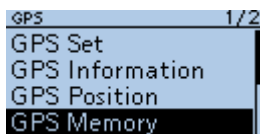
◇ Adding a GPS Memory

Example: Add "HOME" into (No Group)

1. Adding a GPS Memory and entering the edit mode

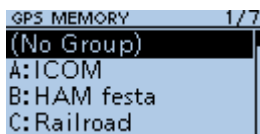
MENU > GPS > **GPS Memory**

1. Push [MENU].
2. Select "GPS."
3. Select "GPS Memory."

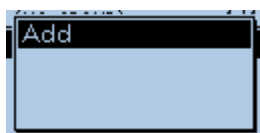


• The previously added GPS Memories are displayed on the GPS MEMORY screen.

4. Select "(No Group)."



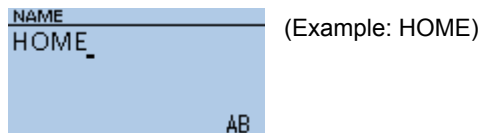
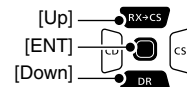
5. Push [QUICK].
6. Select "Add."



• The GPS MEMORY EDIT screen is displayed.

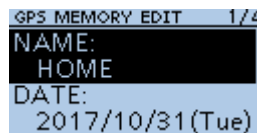
2. Entering a GPS Memory name

1. Select "NAME."
2. Enter a GPS Memory name of up to 16 characters.



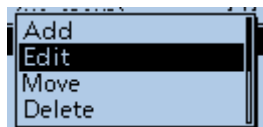
Selectable characters and symbols
 A to Z, a to z, 0 to 9, ! " # \$ % & ' () * + , - . / : ; < = > ? @ [\] ^ _ ` { | } ~ (space)

3. After entering, push [ENT].
- Returns to the GPS MEMORY EDIT screen.



▶ Continued on the next page.

TIP: To edit the previously saved GPS Memory, select "Edit" in step 6. You can enter the content in the same way as described above.

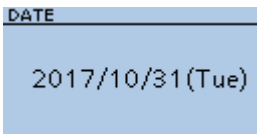
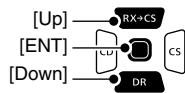


GPS Memory

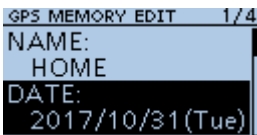
◇ Add a GPS Memory (Continued)

3. Entering the GPS Memory date

1. Select "DATE."
2. Push [CD] or [CS] to move the cursor to select a digit to enter.
3. Rotate [DIAL] to enter the date.
① Set to between 2000/01/02 and 2099/12/30.
4. Repeat steps 2 and 3 to enter the date.

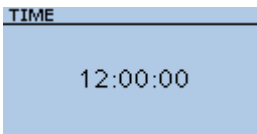
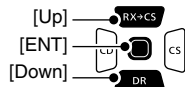


5. After entering, push [ENT].

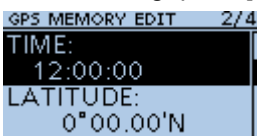


4. Entering the GPS Memory time

1. Select "TIME."
2. Push [CD] or [CS] to move the cursor to select a digit to enter.
3. Rotate [DIAL] to enter the time.
① Set to between 00:00:00 and 23:59:59.
4. Repeat steps 2 and 3 to enter the time.

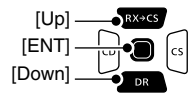


5. After entering, push [ENT].



5. Entering the GPS Memory latitude

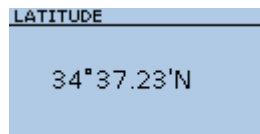
1. Select "LATITUDE."
2. Push [CD] or [CS] to move the cursor to select a digit to enter.
3. Rotate [DIAL] to enter the latitude.



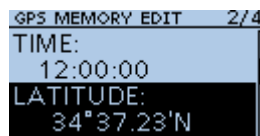
① Information

- Set to between 0°00.00' to 90°00.00'.
- You can change the unit to "ddd°mm'ss". (p. 11-41)
- To enter a north latitude, select "N," and to enter a south latitude, select "S."

4. Repeat steps 2 and 3 to enter the latitude.

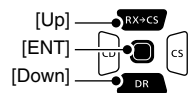


5. After entering, push [ENT].



6. Entering the GPS Memory longitude

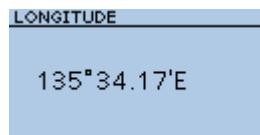
1. Select "LONGITUDE."
2. Push [CD] or [CS] to move the cursor to select a digit to enter.
3. Rotate [DIAL] to enter the longitude.



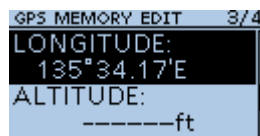
① Information

- Range: Set to between 0°00.00' to 180°00.00'.
- You can change the unit to "ddd°mm'ss". (p. 11-41)
- To enter an east longitude, select "E," and to enter a west longitude, select "W."

4. Repeat steps 2 and 3 to enter the longitude.



5. After entering, push [ENT].



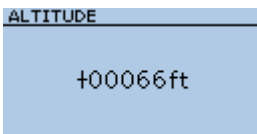
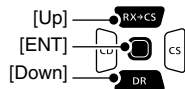
▶ Continued on the next page.

GPS Memory

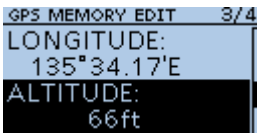
◇ Add a GPS Memory (Continued)

7. Entering the GPS Memory altitude

1. Select "ALTITUDE."
2. Rotate [DIAL] to select plus or minus.
3. Push [CD] or [CS] to move the cursor to select a digit to enter.
4. Rotate [DIAL] to enter the altitude.
① Set to between -32808 and +32808 feet.
5. Repeat steps 3 and 4 to enter the altitude.

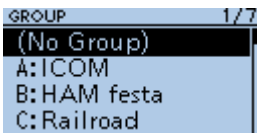
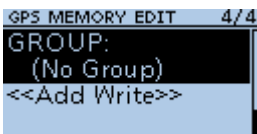
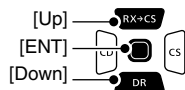


6. After entering, push [ENT].



8. Selecting a GPS Memory group

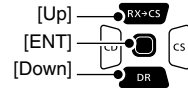
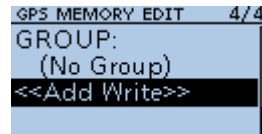
1. Select "GROUP."
2. Select the group between (No Group) and A ~ Z.



① You can save up to 200 Memories in each group.

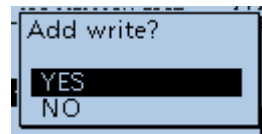
9. Writing the GPS Memory

1. Select "<<Add Write>>."

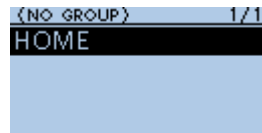


- The confirmation dialog is displayed.
- ① If you edit a previously added GPS Memory, select "<<Overwrite>>."

2. Select <YES>.



- The data is added to the GPS memory, and then the selected GPS Memory group screen is displayed.

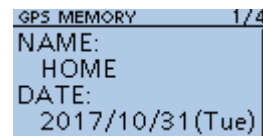


① To exit the MENU screen, push [MENU].

TIP:

To view the entered content:

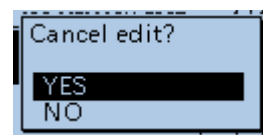
Select the GPS Memory channel. Rotate [DIAL] to check the whole content.



To cancel the entered data:

While entering or editing the GPS Memory, push [CLR] to display the confirmation dialog, as shown below.

Select <YES> to cancel entering and the display returns to the GPS Memory group screen.



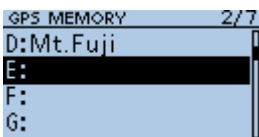
GPS Memory

◇ Entering the GPS Memory group name

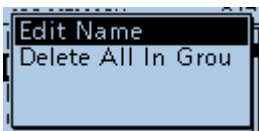
You can enter a name for each GPS Memory group.

MENU > GPS > **GPS Memory**

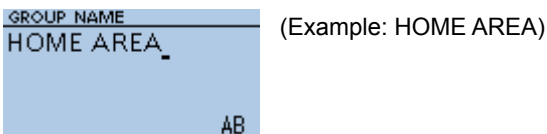
1. Push [MENU].
2. Rotate [DIAL] to select "GPS."
3. Select "GPS Memory."
 - Displays the GPS MEMORY screen.
4. Select the group that the name to be entered, then push [QUICK].



5. Select "Edit Name."



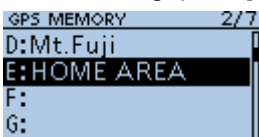
6. Enter a group name of up to 16 characters.



Selectable characters and symbols

A to Z, a to z, 0 to 9, ! " # \$ % & ' () * + , - . / : ; < = > ? @ [\] ^ _ ` { | } ~ (space)

- ① See page iii on how to enter characters.
7. After entering, push [ENT].



- ① To exit the MENU screen, push [MENU].

◇ Deleting GPS Memory

You can delete the GPS Memories.

There are 2 ways to delete the Memories:

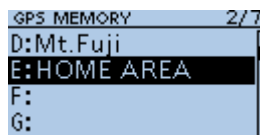
- Deletes all GPS Memory in a group.
- Deletes a specific GPS Memory.

NOTE: Deleted GPS Memories cannot be restored.

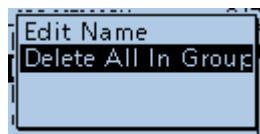
MENU > GPS > **GPS Memory**

Example: Deleting all in the Group E.

1. Push [MENU].
2. Select "GPS."
3. Select "GPS Memory."
 - Displays the GPS MEMORY screen.
4. Select the group where the GPS Memory to delete is saved, then push [QUICK].

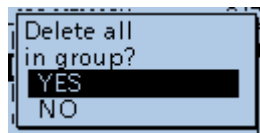


5. Select "Delete All In Group."



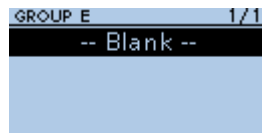
- The confirmation dialog is displayed.

6. Select <YES>.



- All GPS Memory in the selected group are deleted, then returns to the GPS MEMORY screen.

- ① When selecting a blank group, "Blank" is displayed.

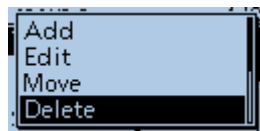


- ① To exit the MENU screen, push [MENU].

TIP: Deleting a specific GPS Memory

You can delete a specific GPS Memory.

1. Select the GPS Memory to delete, then push [QUICK].
2. Select "Delete."



- The confirmation dialog is displayed.

3. Select <YES>.
 - The selected GPS Memory is deleted.

GPS Memory

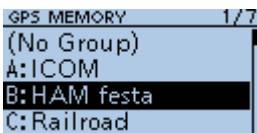
◇ Rearranging the display order of the GPS data

You can move the entered GPS Memories to rearrange their display order in the selected GPS Memory group.

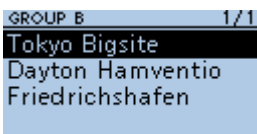
In order to move the GPS Memory out of their assigned Memory group, edit and move, and then save.

MENU > GPS > GPS Memory

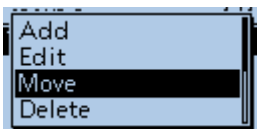
1. Push [MENU].
2. Select "GPS."
3. Select "GPS Memory."
 - Displays the GPS MEMORY screen.
4. Select the group where the GPS Memory you want to move is saved.



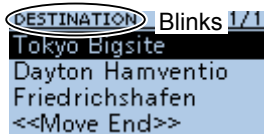
5. Select the GPS Memory to move, then push [QUICK].



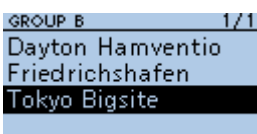
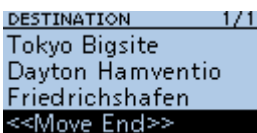
6. Select "Move."



• "DESTINATION" blinks at the top left of the screen.



7. Select the position to insert the Memory you want to move.



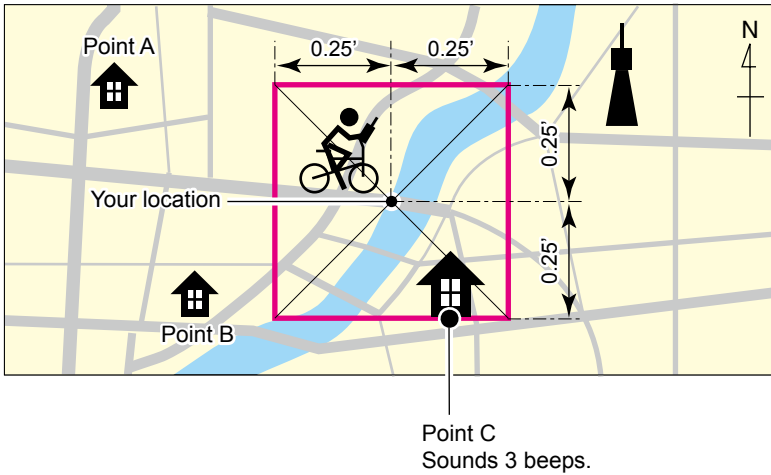
- The selected Memory is inserted above the destination Memory name.
- ① If you select "<<Move End>>," the Memory is moved to the bottom of the group.
- ① To exit the MENU screen, push [MENU] several times.

GPS Alarm

The transceiver can sound a GPS Alarm when a target station or position comes into the alarm area. This function can be set to a caller station, all GPS Memories, a selected GPS Memory group, or a selected GPS Memory.

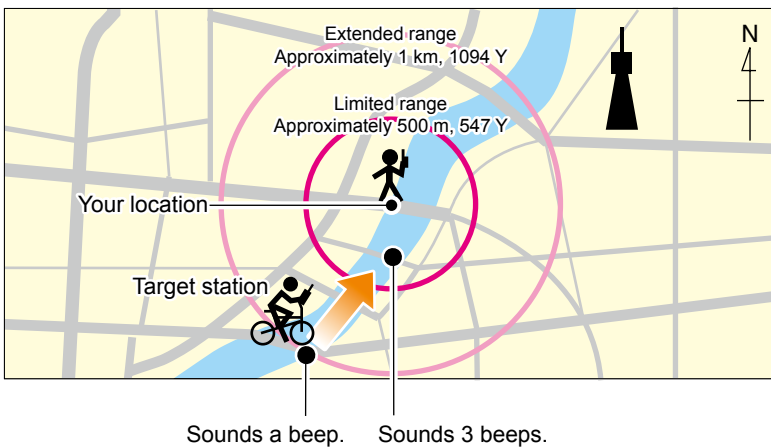
Alarm Area (Group) (Setting plural stations)

When "All Memories" or a GPS Memory group is selected:



Alarm Area (RX/Memory) (Setting specific station)

When a specific GPS Memory is selected:

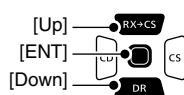
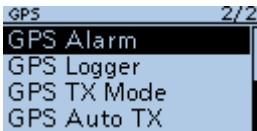


GPS Alarm

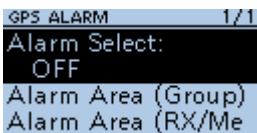
◇ Setting the GPS Alarm function to All Memories (all GPS Memories)

MENU > GPS > GPS Alarm

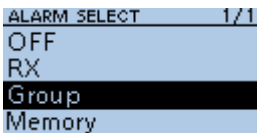
1. Push [MENU].
2. Select "GPS."
3. Select "GPS Alarm."



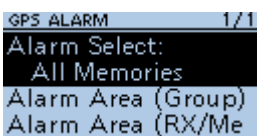
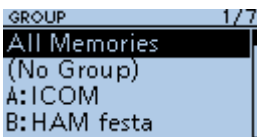
4. Select "Alarm Select."



5. Select "Group."



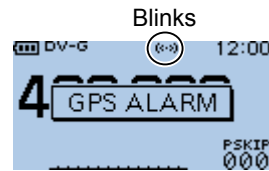
6. Select "All Memories."



- Returns to the GPS ALARM screen.
- ① If you want to set the alarm to a specific GPS Memory group, select "(No Group)" or "A" to "Z."
- ① To exit the MENU screen, push [MENU].

① Information

- When either one of the stations in the group enters the set range, the alarm sounds 3 times.
- When the transceiver sounds a GPS Alarm, "GPS ALARM" pops up on the screen, and "((•))" blinks. See the illustration below.
- To cancel the GPS Alarm function, select "OFF" in step 5 to the left.



"GPS ALARM" pops up on the screen and the alarm sounds 3 times.

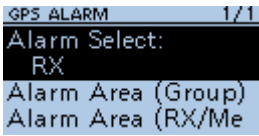
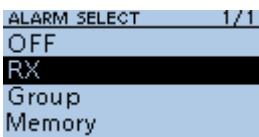
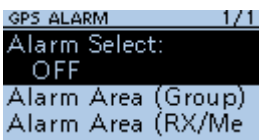
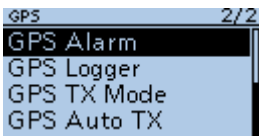
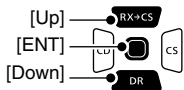
TIP: When selecting "All Memories," "No Group," or a GPS Memory group (A ~ Z) in step 6 to the left, you also have to set **Alarm Area (Group)** to use the GPS Alarm function. (p. 11-13)
(MENU > GPS > GPS Alarm > **Alarm Area (Group)**)

GPS Alarm

◇ Setting the GPS Alarm function to RX (a caller station)

MENU > GPS > GPS Alarm

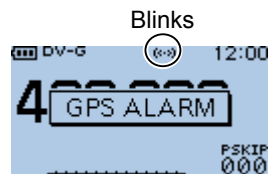
1. Push [MENU].
2. Select "GPS."
3. Select "GPS Alarm."
4. Select "Alarm Select."
5. Select "RX."



- Returns to the GPS ALARM screen.
- ① If you want to set the alarm to a specific GPS Memory, select "Memory" and then select a GPS Memory in a GPS Memory group.
- ① To exit the MENU screen, push [MENU].

① Information

- When a station with its GPS Alarm set enters within an approximate 1 kilometer (1094 yard) range, the alarm sounds once. When it enters within an approximate 500 meter (547 yard) range, the alarm sounds 3 times.
- When the transceiver sounds a GPS Alarm, "GPS ALARM" pops up on the screen, and "(•)" blinks. See the illustration below.
- To cancel the GPS Alarm function, select "OFF" in step 5 to the left.



"GPS ALARM" pops up on the screen and the alarm sounds, depending on the set range.

NOTE: Even if "RX" is selected in step 5, when the received signal has no position data, the GPS Alarm does not sound.

TIP: When selecting "RX" or a specific GPS Memory in step 6 to the left, you also have to set **Alarm Area (RX/Memory)** to use the GPS Alarm function. (p. 11-14) (MENU > GPS > GPS Alarm > **Alarm Area (RX/Memory)**)

GPS Logger function

The GPS Logger function enables you to save position data from a GPS receiver into a microSD card as a log.

The GPS Logger saves Latitude, Longitude, Altitude, Positioning state, Course, Speed, Date, and Time. If you use this GPS Logger while driving, you can check your driving history on a mapping software.

◆ GPS Logger operating outline

To use GPS Logger function, perform following operations.

1. Insert a microSD card*.
*User supplied.
2. Check whether or not the GPS receiver is receiving your position data. (p. 5-3)
3. Turn ON the GPS Logger function.



Completed!

You can start using the GPS Logger function.

NOTE:

- The GPS Logger function requires a microSD card (User supplied).
- Once the GPS Logger function is turned ON, the transceiver continuously saves position data from the GPS receiver, even if the transceiver is turned OFF, then ON again. To cancel this function, turn OFF the function. While this function is ON, and when the transceiver is turned OFF, the log file will be closed. Then the transceiver is turned ON and Positioning is carried out by the GPS receiver, a new log file will be created.
- When the microSD card is full, this function is automatically paused.

TIP: Using the <<GPS Logger Only>> mode

The transceiver has the exclusive GPS Logger mode where only the GPS Logger functions. This mode is useful when you are traveling and do not want to use the transceiver for communication, but you do want to use just the GPS Logger. See page 5-32 for details.

◆ Confirming the GPS Logger function

Confirm the GPS Logger function is turned ON.

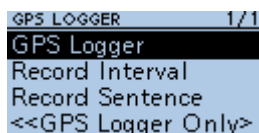
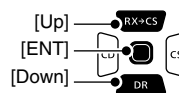
When the GPS Logger function is ON, the transceiver saves the position data from the GPS receiver into a microSD card in a set time interval.

- ① The saved GPS sentences are GGA, RMC, GSA, and VTG.

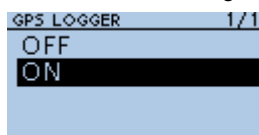
NOTE: When using an external GPS receiver, the saved GPS sentences differ depending on GPS the receiver you use.

MENU > GPS > GPS Logger > GPS Logger

1. Push [MENU].
2. Select "GPS."
3. Select "GPS Logger."
4. Select "GPS Logger" on the GPS LOGGER screen.



5. Select "ON."
- ① The default setting is "ON."



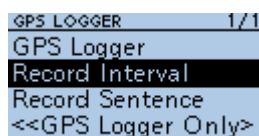
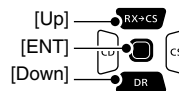
- ① To exit the MENU screen, push [MENU].

◆ Setting the GPS record interval

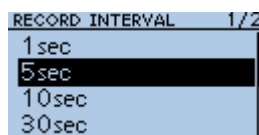
For example, when you are walking and if the time interval is set to "1 sec," a lot of position data is saved at near place. Select the GPS Logger function record interval to suit your travel speed.

MENU > GPS > GPS Logger > Record Interval

1. Push [MENU].
2. Select "GPS."
3. Select "GPS Logger."
4. Select "Record Interval."



5. Select a record interval.
- ① Set to between 1, 5, 10, 30, and 60 seconds.



- ① To exit the MENU screen, push [MENU].

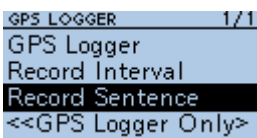
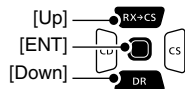
GPS Logger function

◇ Setting the GPS record sentence

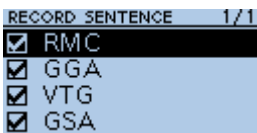
Select the GPS sentence for the GPS Logger function.
 Select only required sentences to reduce the data volume.
 See the contents table shown below before selecting.

MENU > GPS > GPS Logger > Record Sentence

1. Push [MENU].
2. Select "GPS."
3. Select "GPS Logger."
4. Select "Record Sentence."



5. Push [ENT] to remove the checkmark from the unrequired sentence.



- "✓" disappears when the sentence is set to OFF.
- ① The selectable GPS sentences are RMC, GGA, VTG, and GSA. All sentences are set to ON as the default.
- ① To exit the MENU screen, push [MENU].

Contents of GPS sentence

Sentence	Lon /Lat	Alt	UTC	Date (UTC)	Status	2D /3D	COG (True)	SOG (knot)	Others
RMC	✓		✓	✓	✓		✓	✓	Mode Indicator
GGA	✓	✓	✓		✓				Number of satellites in use, HDOP, Geoidal separation, Age of Differential GPS data
VTG							✓	✓	COG (Magnetic north), SOG (km/h), Mode Indicator
GSA					✓	✓			ID numbers of satellites used in solution, PDOP, HDOP, VDOP

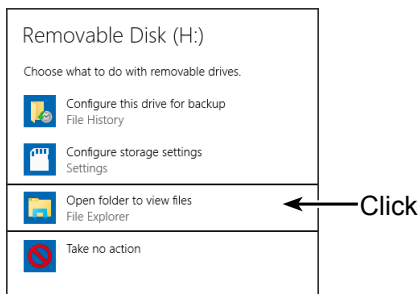
GPS Logger function

◇ Viewing the log data on a PC Map

If you want to display your log data, copy the log file to your PC.

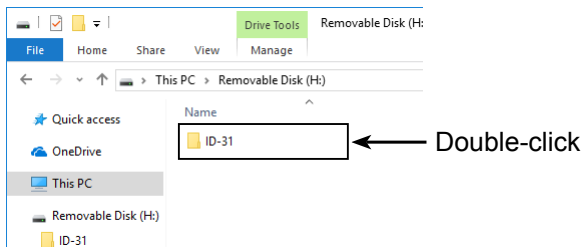
① Windows 10 is used for these instructions.

1. Turn OFF the transceiver, then remove the microSD card from the transceiver.
 - ① To remove the card while the transceiver is ON, unmount it first. (See BASIC MANUAL Section 6)
2. Insert the card into the microSD card drive or a memory card reader* on your PC.
 - *User supplied.
3. Click the “Open folder to view files” option to access the card.



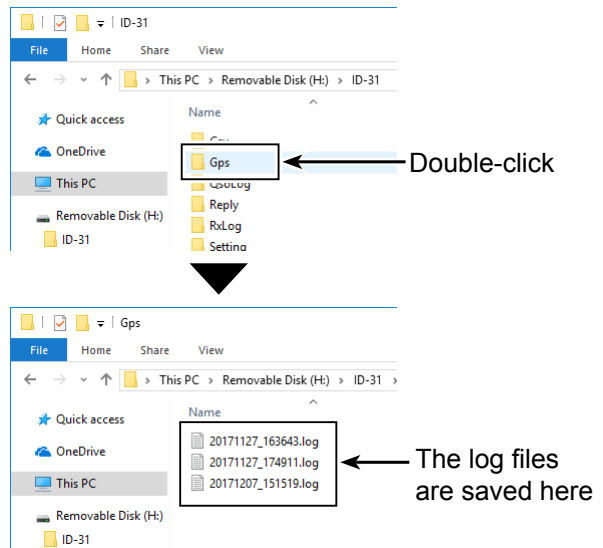
• Displays the 'ID-31' folder.

4. Double-click the “ID-31” folder.



• Displays 8 folders.

5. Double-click the “Gps” folder.

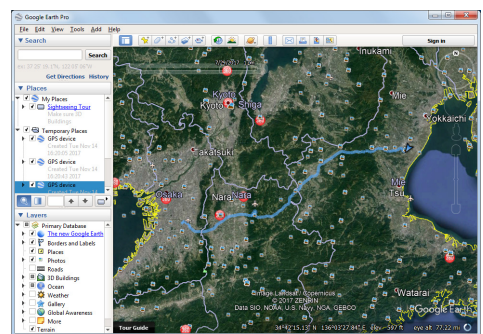


• The log files are displayed.

① The files are named with the time the log was started, in the following format:
 yyyyymmdd_hhmmss.log
 yyyy = year, mm = month, dd = day, hh = hour, mm = minute, ss = second

6. Import the log file to a mapping software.
 - You can see your route on the software map.
 - ① The file may not be compatible with all mapping software.

TIP: You can display your route on Google Earth (free map software). Select “Open” in the <File> menu of Google Earth to open the log file.
 • Your route is displayed on the map, as shown below.



GPS Logger function

TIP: About the recorded NMEA sentence for GPS logging

Regarding the GPS logging data of the ID-31A/E PLUS, each sentence corresponds to the NMEA standard and is recorded in the following format.

◇ **GGA sentence**

(e.g.) \$GPGGA,161229.487,3723.2475,N,12158.3416,W,1,07,1.0,9.0,M,25.5,M,3,0000*18<CR><LF>
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫

- ① GGA protocol header (\$GPGGA)
- ② UTC of position (16:12:29.487)
- ③ Latitude (North 37° 23.2475') N=North, S=South
- ④ Longitude (West 121° 58.3416') E=East, W=West
- ⑤ GPS quality indicator (1)
 0=Fix not available or invalid, 1=SPS mode
 2=DGPS (SPS), 6=Estimated (Dead Reckoning) mode
- ⑥ Number of satellites in use (7), 00–12
- ⑦ Horizontal Dilution of Precision (1.0) 0.0–50.0
- ⑧ Altitude re: mean-sea-level (geoid), meters (9.0 meters)
- ⑨ Geoidal separation, meters (25.5 meters)
- ⑩ Age of Differential GPS data (3 seconds)
- ⑪ Check Sum (*18) Error detection data started with "*" (hex code)
- ⑫ End code
 *Blank shows when not positioned.

◇ **RMC sentence**

(e.g.) \$GPRMC,161229.487,A,3723.2475,N,12158.3416,W,0.13,309.62,311017,,D*10<CR><LF>
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

- ① RMC protocol header (\$GPRMC)
- ② UTC of position (16:12:29.487)
- ③ Status (A) A=Data valid
 V=Data invalid/not positioned
- ④ Latitude (North 37° 23.2475') N=North, S=South
- ⑤ Longitude (West 121° 58.3416') E=East, W=West
- ⑥ Speed over ground (0.13 knots)
- ⑦ Course Over Ground (309.62°; degrees True)
 0.00°–359.99°
- ⑧ UTC date of position ('17 Oct 31st) ddmmyy
- ⑨ Mode Indicator (D)
 A=Autonomous mode, D=DGPS,
 E=Estimated (dead reckoning) mode,
 N=Data not valid, R=Almanac data
- ⑩ Check Sum (*10) Error detection data started with "*" (hex code)
- ⑪ End code
 *Blank shows when not positioned.

◇ **GSA sentence**

(e.g.) \$GPGSA,A,3,07,02,26,27,09,04,, , , , ,15,1.8,1.0,1.5*33<CR><LF>
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

- ① GSA protocol header (\$GPGSA)
- ② Mode indicator 1 (A)
 M=Manual, forced to operate in 2D or 3D mode
 A=Automatic, allowed to automatically switch 2D/3D
- ③ Mode indicator 2 (3)
 1=Fix not available,
 2=2D (using satellites; less than 3),
 3=3D (using satellites; more than 4)
- ④ ID numbers of satellites used in solution (07, 02, 26, 27, 09, 04...15)
 01–32 *Shows up to 12 ID's
- ⑤ Position Dilution of Precision (1.8) 0.0–50.0
- ⑥ Horizontal Dilution of Precision (1.0) 0.0–50.0
- ⑦ Vertical Dilution of Position (1.5) 0.0–50.0
- ⑧ Check Sum (*33) Error detection data started with "*" (hex code)
- ⑨ End code
 *Blank shows when not positioned.

◇ **VTG sentence**

(e.g.) \$GPVTG,309.62,T,M,0.13,N,0.2,K,A*03<CR><LF>
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

- ① VTG protocol header (\$GPVTG)
- ② Course Over Ground (309.62°; degrees True)
 0.00°–359.99°
- ③ Course over ground degrees; Magnetic north
- ④ Speed over ground, knots (0.13 knots)
- ⑤ Speed over ground, kilometer per hour (0.2 km/hr)
- ⑥ Mode Indicator (A)
 A=Autonomous mode, D=DGPS,
 E=Estimated (dead reckoning) mode,
 N=Data not valid, R=Almanac data
- ⑦ Check Sum (*03) Error detection data started with "*" (hex code)
- ⑧ End code
 *Blank shows when not positioned.

GPS Logger function

◇ The <<GPS Logger Only>> mode

The transceiver has the exclusive GPS Logger mode where only the GPS Logger functions. This mode is useful when you are traveling and do not want to use the transceiver for communication, but you do want to use just the GPS Logger.

NOTE: In the “GPS Logger Only” mode, the GPS Logger function is ON, but the transceiver function is disabled, until you reboot the transceiver.

◇ <<GPS Logger Only>> outline

1. Insert the microSD card*.
* User supplied.
2. Confirm that the GPS receiver is receiving your position and time. (p. 5-3)
3. Confirm that the GPS Logger function is ON. (p. 5-28)
4. Turn ON the <<GPS Logger Only>> mode.

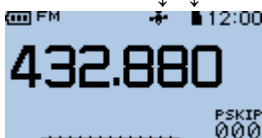
↓
Completed!

You can start using the <<GPS Logger Only>> mode.

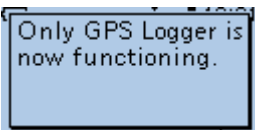
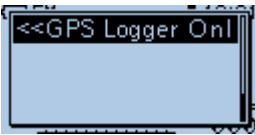
◇ Setting the <<GPS Logger Only>> mode

1. Push [QUICK].

The GPS icon is displayed. microSD card is inserted.

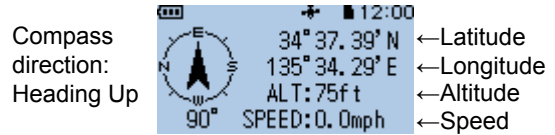


2. Select <<GPS Logger Only>>.



- “Only GPS Logger is now functioning.” is displayed.
- ① You can also set the <<GPS Logger Only>> mode on the MENU screen.

The <<GPS Logger Only>> mode screen



↑
Your course is indicated in degrees. North is 0° so you are now heading to South.

TIP: When **GPS Logger** is set to “OFF,” the following dialog is displayed.
(MENU > GPS > GPS Logger > **GPS Logger**)

To use the <<GPS Logger Only>> mode, select <YES>.

TIP: You can change the GPS Information, Grid Locator Display, or Compass Direction settings. In the <<GPS Logger Only>> mode, push [QUICK] to open the Quick Menu window.

Select a setting item you want to change.

TIP: To cancel the <<GPS Logger Only>> mode
Turn OFF the transceiver then ON again.
① When the transceiver is tuned ON again, the normal GPS Logger function is still ON.

Section 6 VOICE MEMORY FUNCTION

NOTE: See BASIC MANUAL Section 6 for details on how to insert or remove a microSD card and precautions.

- Recording a QSO audio6-2
- Playing back a recorded audio6-3
- Changing the QSO recorder settings6-4
- Deleting the audio folder/file6-5
 - ◇ Deleting an audio folder6-5
 - ◇ Deleting an audio file6-5
- Viewing the file information.....6-6
- Viewing the microSD card memory capacity6-8
- Playing back the recorded audio on the PC6-9

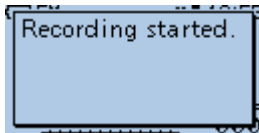
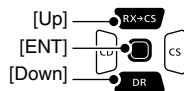
Recording a QSO audio

NOTE:

- You must insert a microSD card into the transceiver before recording audio.
- The recording function is continuously ON, even if the transceiver is turned OFF then ON again.

To start recording

1. Push [QUICK].
2. Select <<REC Start>>.



- "Recording started" is displayed and then returns to the main display screen.



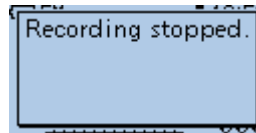
Recording standby



The recording starts when you transmit or the squelch opens. While recording, the SD card icon blinks.

To stop recording

1. Push [QUICK].
2. Select "<<REC Stop>>".



Information

- The recording pauses while no signal is received, and resumes when a signal is received again.
- The recording continues until you manually stop recording, or the card becomes full.
- If the recording file's content reaches 2GB, the transceiver automatically creates a new file, and continues recording.

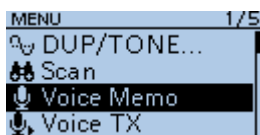
TIP: When **RX REC Condition** is set to "Always," the recording automatically starts when "<<REC Start>>" is selected. In that case, recording continues, even when no signal is received.* See [page 11-?](#) for details.
 * The recorded file contains no sound.
 (MENU > Voice Memo > QSO Recorder > Recorder Set > **RX REC Condition**)

Playing back a recorded audio

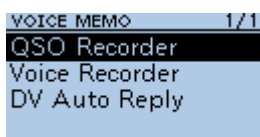
NOTE: Insert the microSD card that contains the recorded audio file into the transceiver's slot.

MENU > Voice Memo > QSO Recorder > Play Files

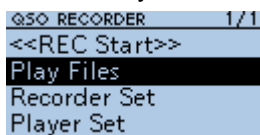
1. Push [MENU].
2. Select "Voice Memo."



3. Select "QSO Recorder."

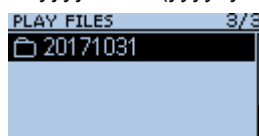


4. Select "Play Files."

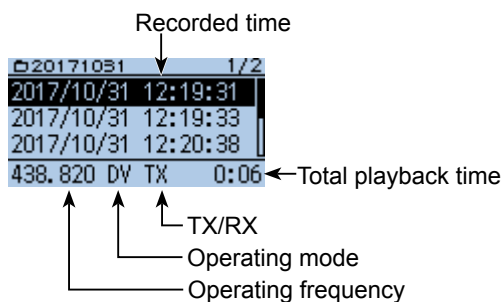


5. Select the folder that contains the audio file to play.

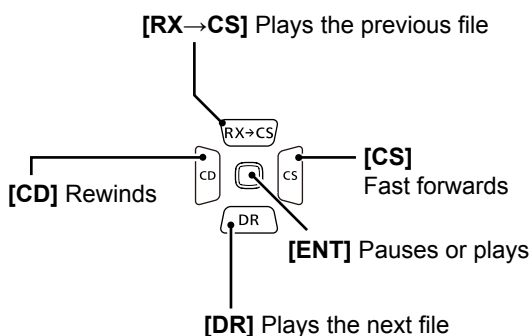
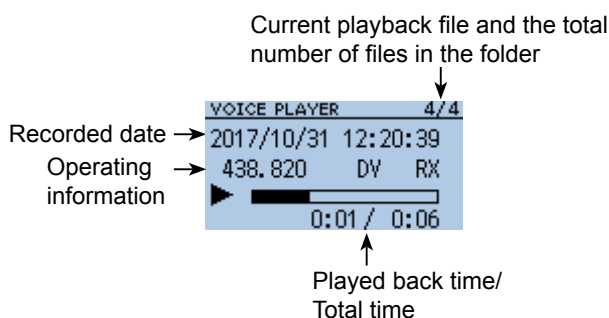
① The folder is named in the following format: yyyymmdd (yyyy: year, mm: month, dd: day)



6. Select the audio file to play.
 - The VOICE PLAYER screen is displayed, and the file starts to play.



The VOICE PLAYER screen description



Fast forward [CS]/Rewind [CD]

- Hold down for 1 second to continuously fast forward or rewind the file.
- The default skip time is 10 seconds. If you want to change it, see page 11-7 for details.
- You can fast forward or rewind the file by rotating [DIAL]. The fast forward/rewind time is 1/20 of the total file time, regardless of the skip time setting.

Rewind while playing [CD]

If you push [CD] within the first 1 second of the file, at the end of the previous file is played back.

Playing the previous file [RX->CS]

- While the oldest file in the folder is playing back, pushing [RX->CS] plays back the same file.
- While the file is paused, pushing [RX->CS] moves to the beginning of the previous file.

Playing the next file [DR]

While the latest file in the folder is playing back, pushing [DR] plays back the same file.

Operating information

The operating frequency, mode, and audio category (RX/TX audio) are displayed.

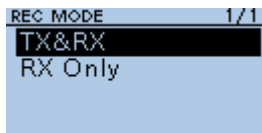
Changing the QSO recorder settings

You can change the recording setting on the MENU screen.

See pages 11-6 and 11-7 for details.

Record only the received audio

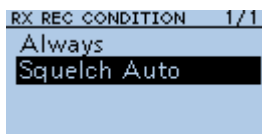
MENU > Voice Memo > QSO Recorder > Recorder Set > **REC Mode**



① The default setting is “TX&RX” (Both transmit and receive audio are recorded).

Continue to record, even while the squelch is closed

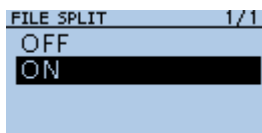
MENU > Voice Memo > QSO Recorder > Recorder Set > **RX REC Condition**



① The default setting is “Squelch Auto” (Records only while the squelch is open).

Record the QSO audio as one file

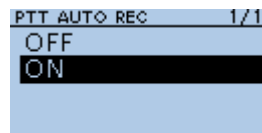
MENU > Voice Memo > QSO Recorder > Recorder Set > **File Split**



- ① The default setting is “ON” (transmit and receive audio are separately recorded in different files).
- ① When **RX REC Condition** is set to “Squelch Auto,” an audio file is created every time the squelch opens. The received audio is recorded in a separated file.

Synchronize the recording to PTT

MENU > Voice Memo > QSO Recorder > Recorder Set > **PTT Auto REC**



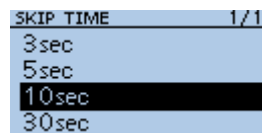
① The default setting is “ON” (Recording is synchronized to PTT).

TIP: When PTT Auto REC is set to “ON”

- Starts recording not only when PTT is pushed, but also when switched to transmit by a CI-V command or by the VOX function.
- When **REC Mode** is set to “RX Only,” the transmit audio is not recorded.
- A signal that is received within 10 seconds after the squelch is closed is recorded in the same file.

Change the Skip Time

MENU > Voice Memo > QSO Recorder > Player Set > **Skip Time**



① The default setting is “10sec.”

Deleting the audio folder/file

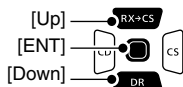
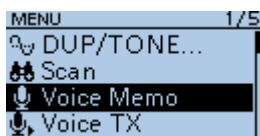
NOTE: A deleted audio file can NOT be recovered.

◇ Deleting an audio folder

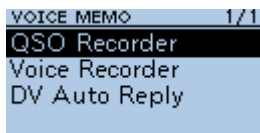
NOTE: All audio files in the folder are deleted.

MENU > Voice Memo > QSO Recorder > **Play Files**

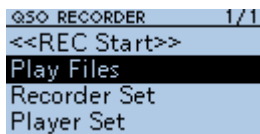
1. Push [MENU].
2. Select "Voice Memo."



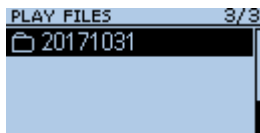
3. Select "QSO Recorder."



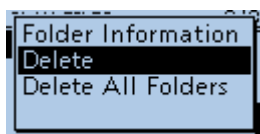
4. Select "Play Files."



5. Select the folder to delete.
ⓐ Do not push [ENT].



6. Push [QUICK].
7. Select "Delete."



• The confirmation dialog is displayed.

8. Select <YES>.

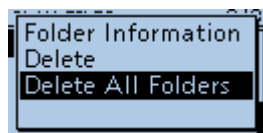


• The folder is deleted.

ⓐ To exit the MENU screen, push [MENU].

TIP: To delete all folders

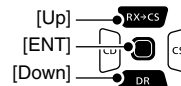
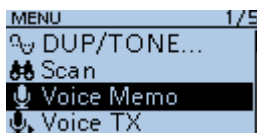
Select "Delete All Folders" in step 7.



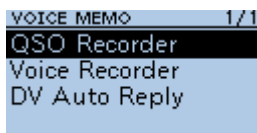
◇ Deleting an audio file

MENU > Voice Memo > QSO Recorder > **Play Files**

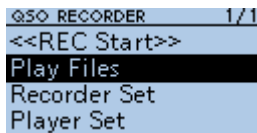
1. Push [MENU].
2. Select "Voice Memo."



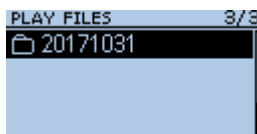
3. Select "QSO Recorder."



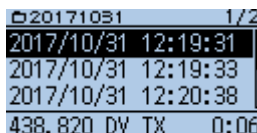
4. Select "Play Files."



5. Select the folder that contains the audio file to delete.



6. Select the audio file to delete.
ⓐ Do not push [ENT].

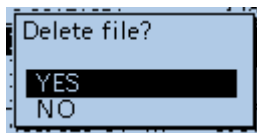


7. Push [QUICK].

8. Select "Delete."

• The confirmation dialog is displayed.

9. Select <YES>.

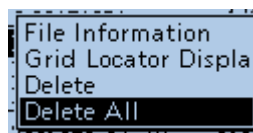


• The file is deleted.

ⓐ To exit the MENU screen, push [MENU].

TIP: To delete all files

Select "Delete All" in step 8.

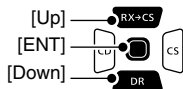
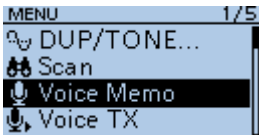


Viewing the file information

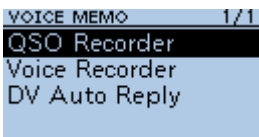
The recorded audio file contains the recording data. See p. 6-7 for the recorded contents.

MENU > Voice Memo > QSO Recorder > Play Files

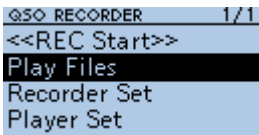
1. Push [MENU].
2. Select "Voice Memo."
3. Select "QSO Recorder."



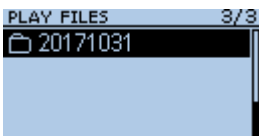
4. Select "Play Files."



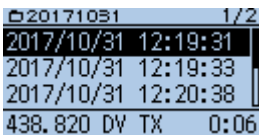
5. Select the folder that contains the file to view the information.



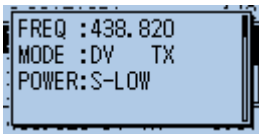
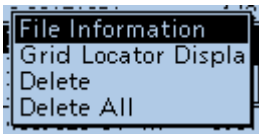
6. Select the folder that contains the file to view the information.



7. Select the audio file to view the information.



8. Select "File Information."



9. Rotate [DIAL] to change the screen.
 - ① To exit the MENU screen, push [MENU] several times.

TIP: To view the folder information
Push [QUICK] in step 5, and then select "Folder Information" to view the folder information.



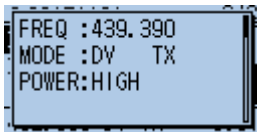
←Folder name
←Total files (total size)
←Created date and time

Viewing the file information

File information examples

- ① Depending on the recording status, some data may not be displayed.
- ② The file is named in the following format:
 yyyyymmdd_hhmmss (yyyy: year, mm: month, dd: day, hh: hour, mm: minute, ss: second)

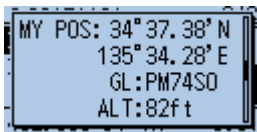
• TX audio file information (Example)



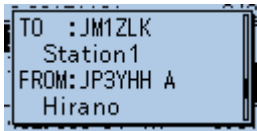
Operating information (TX)



Recording date and time



MY station position

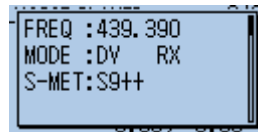


DR setting



File data

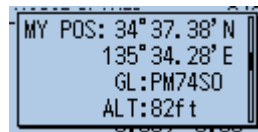
• RX audio file information (Example)



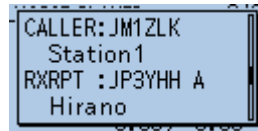
Operating information (RX)



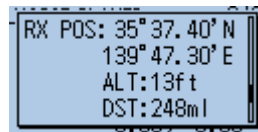
Recording date and time



MY station position



Caller and received repeater



RX station position



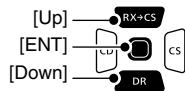
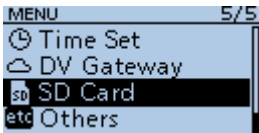
File data

Viewing the microSD card memory capacity

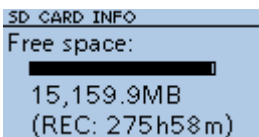
You can check the microSD card memory capacity and available recording time.

MENU > SD Card > SD Card Info

1. Push [MENU].
2. Select "SD Card."



3. Select "SD Card Info."



- Displays the remaining capacity and available recording time.
- ① To exit the MENU screen, push [MENU] several times.

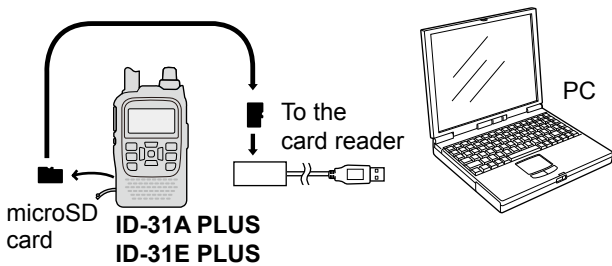
Playing back the recorded audio on the PC

You can play back the recorded QSO audio on your PC.

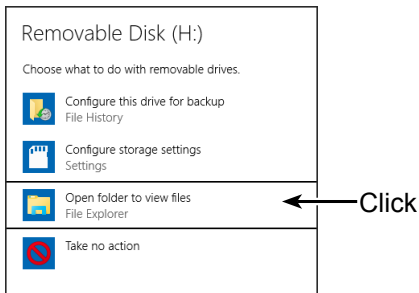
- ① Operation data is not displayed.
- ① Windows 10 is used for these instructions.

Example: Playing back the audio file on the microSD card on your PC.

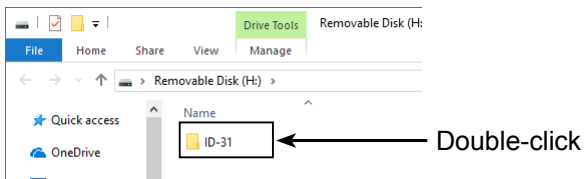
1. Insert the microSD card into the memory card slot or memory card reader on your PC.



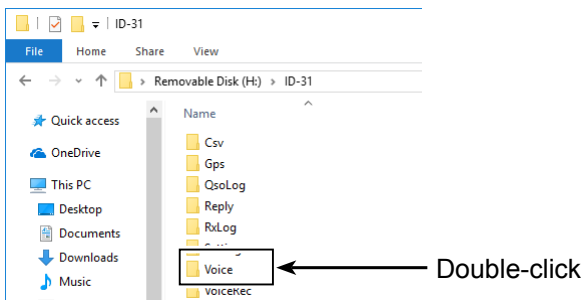
2. Click the "Open folder to view files" option to access the card.



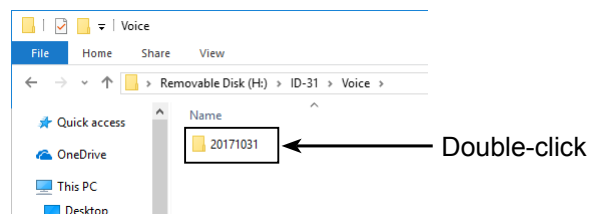
3. Double-click the 'ID-31' folder.



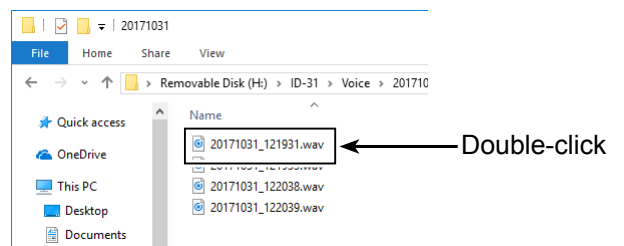
4. Double-click the 'Voice' folder.



5. Double-click the folder that contains the audio file to play it back. (Example: "20171031")



6. Double-click the file to play it back. (Example: "20171031_121931.wav")



- ① See the instruction manual of your player for operation details.
- ① The audio file may not play back, depending on the player.

Section 7 MEMORY OPERATION

- General description 7-2
 - ◇ The number of Memory channels 7-2
 - ◇ Memory channel content 7-2
- Selecting a Memory channel 7-3
- Selecting a Call channel 7-3
- Writing to a Memory channel 7-4
 - ◇ Writing to the selected channel 7-4
 - ◇ Auto increment 7-4
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 - ◇ Directly writing into a Memory Bank 7-7
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- Entering a Memory, Bank, or Program Scan name 7-9
 - ◇ Entering a name 7-9
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- Clearing a Memory channel content 7-11

General description

The Memory mode is useful to quickly select often-used frequencies.

◇ The number of Memory channels

Channel type	Number of channel
Regular Memory channel (M-CH)	500 channels (000 ~ 499)
Program Scan Edge channel (PROGRAM-CH)	50 channels (00A/00B ~ 24A/24B)
Call channel (CALL-CH)	2 channels (C0/C1)

◇ Memory channel content

The following information can be entered into the Memory channels:

- Operating frequency
- Duplex ON/OFF
- Duplex direction (DUP+ or DUP-)
- Duplex frequency offset
- Memory name
- Scan skip setting
- Tuning step
- Operating mode
- Subaudible tone encoder, tone squelch, or DTCS squelch ON/OFF
- Subaudible tone frequency, tone squelch frequency, or DTCS code with polarity
- Digital code
- Digital Call sign squelch or Digital code squelch ON/OFF
- UR station call sign
- R1/R2 call signs
- Memory Bank

NOTE: Memory content may be accidentally cleared by static electricity, electric transients, and other causes. In addition, it may be cleared by a malfunction, or during repairs. Therefore, we recommend that you backup the Memory content or save it to a microSD card* or to a PC.

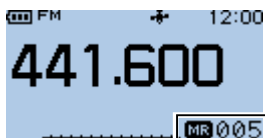
*User supplied

① The CS-31PLUS CLONING SOFTWARE can also be used to backup your memory content. See its instruction manual for details.

Selecting a Memory channel

In the Memory mode, rotate [DIAL] to select the Memory channels.

1. Push [M/CALL] to enter the Memory mode.



① Pushing [M/CALL] selects the Memory mode or Call channel mode.

2. Rotate [DIAL].
 - Selects a Memory channel.



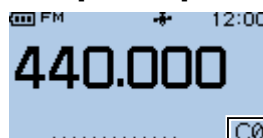
① Blank channels are not selectable.

Selecting a Call channel

Call channels are used for quick recall of most often-used operating settings.

Factory default frequencies and operating modes are entered into the Call channels. Change these to suit your operating needs.

1. Push [M/CALL] to enter the Call Channel mode.



① Pushing [M/CALL] selects the Memory mode or Call channel mode.

2. Rotate [DIAL].
 - Selects a Call channel.



① To return to the VFO mode, push [V/MHz].

① To return to the Memory mode, push [M/CALL].

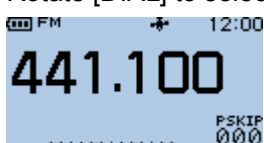
Writing to a Memory channel

After selecting a frequency in the VFO mode, you can write it to a selected channel or an automatically selected blank channel. Memory channels 001 to 499 are blank as the default.

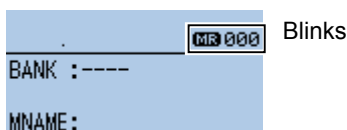
◇ Writing to the selected channel

Example: Writing 441.100 MHz into Memory channel 011

1. Push [V/MHz] to enter the VFO mode.
2. Rotate [DIAL] to select 441.100 MHz.

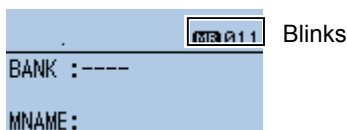


3. Hold down [S.MW] for 1 second.



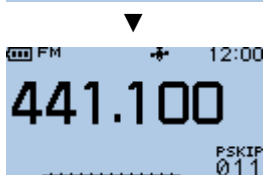
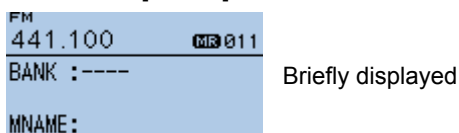
- Enters the Select Memory Write mode.
- The Memory channel number blinks.

4. Rotate [DIAL] to select the Memory channel "011."



- ① If you select a pre-entered channel, the previous channel content will be overwritten.

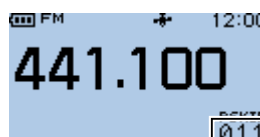
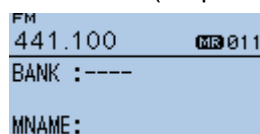
5. Hold down [S.MW] for 1 second.



- Writes into the selected Memory channel.
- Returns to the standby screen (VFO mode).

◇ Auto increment

If you keep holding down [S. MW] after writing to the selected Memory channel, the Memory channel number is automatically incremented after returning to the VFO mode. (Step 5 to the left)



TIP: You can also save the Memory content to another channel by selecting:

- 00A/00B ~ 24A/24B: Saves to a Program Scan Edge channel
- C0, C1: Overwrites to a Call channel
- VFO: Overwrites to a VFO

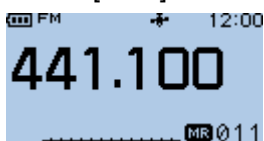
Writing to a Memory channel

◇ Copying Memory content to the VFO

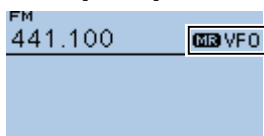
It is convenient when you want to operate on a channel frequency near a Memory or Call channel.

Example: Copying Memory channel “011” to the VFO.

1. Push [M/CALL] to enter the Memory mode.
2. Rotate [DIAL] to select the channel 011.



Hold down [S.MW] for 1 second.



Briefly displayed



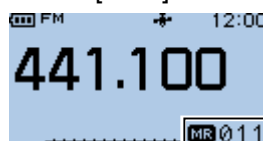
- Copies the selected Memory content to the VFO.
- Returns to the standby screen (VFO mode).

◇ Copying Memory content to another Memory channel

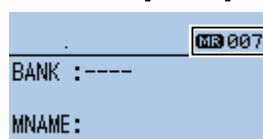
You can copy the memory content to another Memory channel.

Example: Copying Memory channel “011” to Memory channel “007”

1. Push [M/CALL] to enter the Memory mode.
2. Rotate [DIAL] to select the channel 011.



3. Hold down [S.MW] for 1 second.
 - Enters the Select Memory Write mode.
 - The Memory channel number blinks.
4. Rotate [DIAL] to select the channel 007.
5. Hold down [S.MW] for 1 second.



Briefly displayed



- Copies the content to the selected Memory channel.

TIP: You can also copy the Memory content to the following channels:

- 00A/00B ~ 24A/24B: Copies to a Program Scan Edge channel
- C0, C1: Copies to a Call channel
- VFO: Copies to a VFO

Memory Bank setting

The transceiver has a total of 26 Banks (A ~ Z). Regular Memory channels 000 ~ 499 can be assigned to any Bank for easy Memory management. Up to 100 channels can be assigned to a Bank.

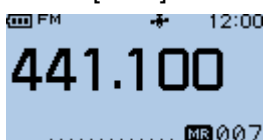
Categorizing Memory channels according to their types or purposes using Memory Banks is convenient. Also, You can use the Memory Bank Scan function. (p. 8-10)

NOTE: The Memory Banks are only used to hold Memory channels. Therefore, if the original Memory channel content has been changed, the Memory Bank content is also changed at the same time.

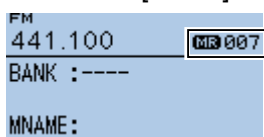
◇ Assigning a Memory channel to a Memory Bank

Example: Assigning Memory channel “007” to the Memory Bank channel “F-05”

1. Push [M/CALL] to enter the Memory mode.
2. Rotate [DIAL] to select the channel 007.

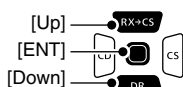
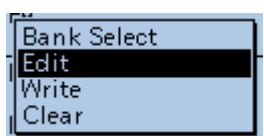


3. Hold down [S.MW] for 1 second.

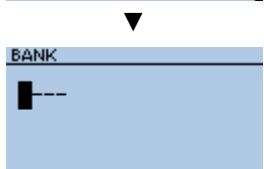
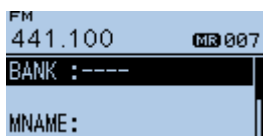


- Enters the Select Memory Write mode.
- The Memory channel number blinks.

4. Push [QUICK].
5. Select “Edit.”

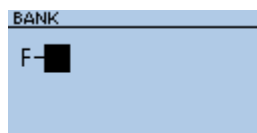


6. Select “BANK.”

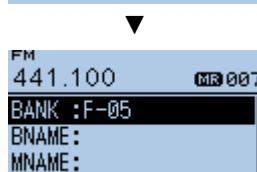
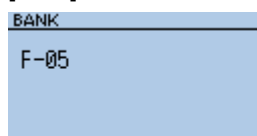


- “----” is displayed, then the first digit blinks.
- ① If the selected Memory channel has already been assigned to a Bank, the Bank group and the Bank channel number are displayed.
- ① If the Bank name has already been entered, it is also displayed.

7. Rotate [DIAL] to select a Bank. (Example: F)
8. Push [CS] to move the cursor.

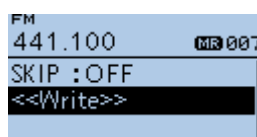


9. Rotate [DIAL] to select a Bank channel and push [ENT].



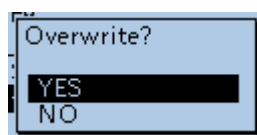
- ① The Bank channels are not displayed when a Memory channel is already assigned.

10. Select “<<Write>>.”



- The confirmation dialog is displayed.

11. Select <YES>.



- Assigns the selected Memory channel to the Bank.
- Returns to the Memory mode.

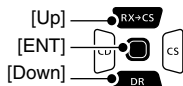
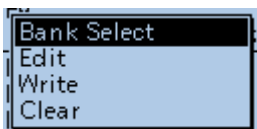
Memory Bank setting

◇ Directly writing into a Memory Bank

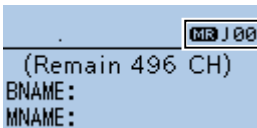
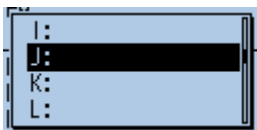
You can also write the Memory content directly into a Memory Bank channel. This way is a short cut to creating a Memory channel, and then assigning it to a Bank. In that case, the transceiver automatically selects the lowest blank Memory channel to write.

Example: Writing 441.100 MHz into Bank “J-01.”

1. Push [V/MHz] to enter the VFO mode.
2. Rotate [DIAL] to select 441.100 MHz.
3. Hold down [S.MW] for 1 second.
 - Enters the Select Memory Write mode.
 - The Memory channel number blinks.
4. Push [QUICK].
5. Select “Bank Select.”



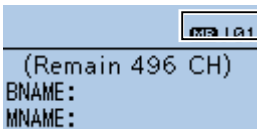
6. Rotate [DIAL] to select a Bank.



Blinks

- The Memory channel number blinks.
- ① To select another Bank, push [QUICK] and select “Bank Select.”

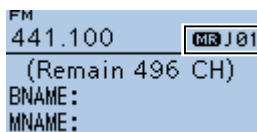
7. Rotate [DIAL] to select a Bank channel.



Blinks

- ① If you select an already assigned Bank channel, its content is displayed.

8. Hold down [S.MW] for 1 second.



Briefly displayed



- Writes the Memory content to the Bank channel.
- Returns to the Memory mode.
- ① If you select an already assigned Bank channel, the previous content is overwritten.

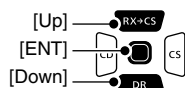
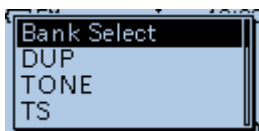
TIP: If you keep holding down [S. MW] after writing to the Bank channel, the Bank channel number is automatically incremented after returning to the VFO mode.

Memory Bank setting

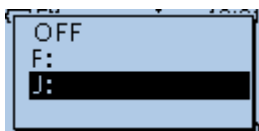
◇ Selecting the Memory Bank mode

When you select the Memory Bank mode, rotating [DIAL] selects only the entered bank channels in the selected bank.

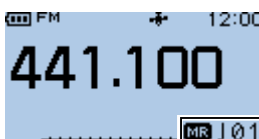
- 1. Push [M/CALL] to enter the Memory mode.
- 2. Push [QUICK].
- 3. Select "Bank Select."



- 4. Rotate [DIAL] to select a Bank.
① Only the entered Banks are displayed.



- 5. Rotate [DIAL] to select a Bank channel.



- ① Only the assigned Bank channels are selectable.
- ① To return to the Memory mode, select "OFF" in Step 4.

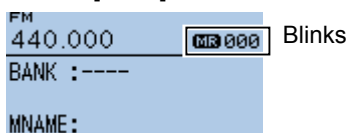
Entering a Memory, Bank, or Program Scan name

You can enter an alphanumeric name for Memory channels, Call channels, Banks, or Program Scans. Names can be a maximum of 16 characters.

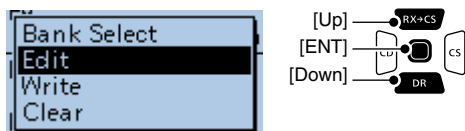
◇ Entering a name

Example: Entering a Memory name “CALLING” to a Memory channel 000 (440.000 MHz).

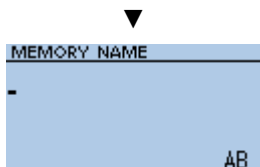
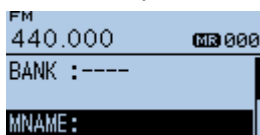
1. Push [M/CALL] to enter the Memory mode.
2. Hold down [S.MW] for 1 second.
 - Enters the Select Memory Write mode.
 - The Memory channel number blinks.
3. Rotate [DIAL] to select a Memory channel.



4. Push [QUICK].
5. Select “Edit.”



6. Select an option. (Example: “MNAME.”)

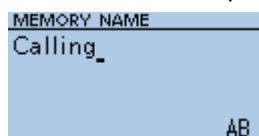


- MEMORY NAME screen is displayed.

TIP: The type of name you can enter is different depending on the selected Memory channel.

- 000 ~ 499, C0, C1: “MNAME” is displayed to enter a Memory channel name or Call channel name.
- 00A/00B ~ 24A/24B: “SNAME” is also displayed to enter a Program Scan name.
- Bank channels: “BNAME” is also displayed to enter a Bank name. The option is displayed only when the selected Memory channel is assigned to a Bank.

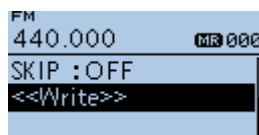
7. Enter a name and push [ENT].



- Returns to the Edit screen and the entered name is displayed.

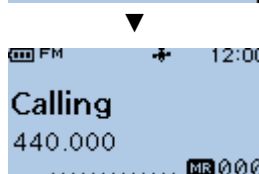
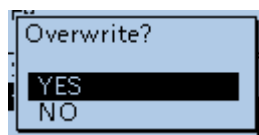
① See page iii on how to enter characters.

8. Select “<<Write>>.”



- The confirmation dialog is displayed.

9. Select <YES>.

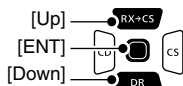
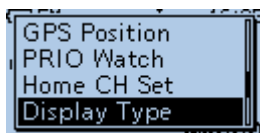


- Returns to the Memory mode.

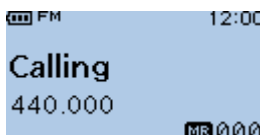
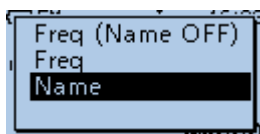
Selecting a Memory name display type

Example: When a name "CALLING" is set to a Memory channel 000.

1. Push [M/CALL] to enter the Memory mode.
2. Push [QUICK].
3. Select "Display Type."



4. Select the display type.



TIP: There are 3 types of Memory name displays.

• Freq (Name OFF)

Displays only the frequency.



• Freq

Displays the large font sized frequency and small font sized Memory name.



• Name

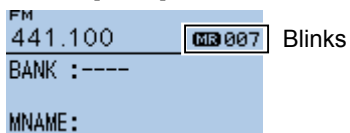
Displays the large font sized Memory name and small font sized frequency.



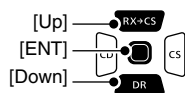
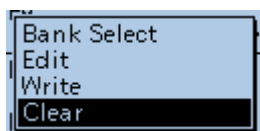
Clearing a Memory channel content

You can clear the entered Memory channel content.

1. Push [M/CALL] to enter the Memory mode.
2. Hold down [S.MW] for 1 second.
 - Enters the Select Memory Write mode.
 - The Memory channel number blinks.
3. Rotate [DIAL] to select a Memory channel.

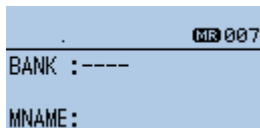
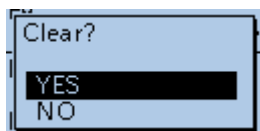


4. Push [QUICK].
5. Select "Clear."



- The confirmation dialog is displayed.

6. Select <YES>.



- The content is cleared.

NOTE:

- A cleared content cannot be recovered.
- If you clear all the Program Scan Edge channels contents, you cannot use the Program scan.

TIP: You can also clear the following contents depending on the selected Memory channel:

- 000 ~ 499: Memory channel content
- C0, C1: Call channel content
- 00A/00B ~ 24A/24B: Program Scan Edge channel content

Section 8 SCANNING

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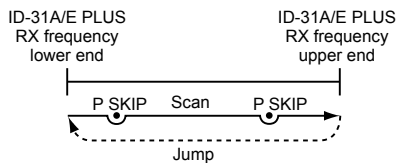
Scan type

Scanning is a versatile function that can automatically search for signals. A scan makes it easier to locate stations to contact or listen to, or to skip unwanted channels or frequencies.

◇ VFO scan

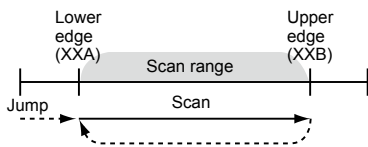
ALL (Full scan)

Repeatedly scans the entire band.



PROG 0 ~ 24 (Program scan)

Scans the Program Scan Edge channel (00A/00B ~ 24A/24B) range. (p. 8-5)

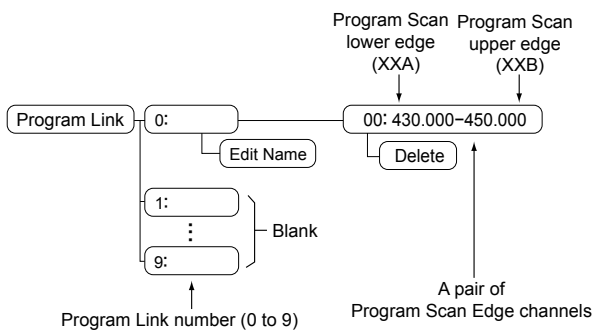


① At least one pair of Program Scan channel must be entered to start a Program scan.

P-LINK 0-9 (Program Link scan)

Sequentially scans the Program Scan Edge channel ranges. The links are set on the MENU screen. (MENU > Scan > **Program Link**)

See page 8-6 for more details.



◇ Memory scan

ALL (Memory Full scan)

Scans all Memory channels.

MODE (Mode Memory scan)

Scans Memory channels that are entered with the same receiving mode as the currently selected mode.

◇ Memory Bank scan

ALL (Full Bank scan)

Scans all Banks.

BANK-LINK (Bank Link scan)

Sequentially scans the Banks that are set to link on the MENU screen. (p. 11-5)

(MENU > Scan > **Bank Link**)

BANK-A-Z (Bank scan)

Scans the Memory channels in the selected Bank.

◇ Duplex (DUP) scan

The Duplex scan searches for signals in both TX and RX frequencies that are used in duplex operation

(p. 10-4).

See pages 8-4, 8-9, or 8-10 for its operation.

① “DUP-” or “DUP+” is displayed in the Duplex mode.

① A Duplex scan does not start when the frequency offset is set to “0.000 MHz.”

◇ Tone scan

The Tone scan searches for signals in tone frequencies or DTCS codes that are used by stations using the Tone Squelch function.

See pages 8-4, 8-9, or 8-10 for its operation.

① A Tone scan is usable in any VFO, Memory, or Call channel mode.

① During a scan, rotate [DIAL] to change the scan direction.

See “Tone squelch operation” or “DTCS code squelch operation” for details. (pp. 12-9, 12-10)

About Scans

◇ [DIAL] operation during a scan

- Rotate [DIAL] to change the scan direction during a scan.
- When the scan is paused, rotate [DIAL] to resume the scan.

◇ Squelch setting for a scan

You can change the squelch level to suit your operating needs. Set the squelch level to open the squelch, according to the received signal strength.

- ① During a scan, rotate [DIAL] while holding down [SQL] to adjust the squelch level. The scan resumes after adjusting.



◇ Tuning step for a VFO scan

The selected tuning step is applied to the scan. For a Program scan or Program Link scan, set the tuning step in the Program Scan Edge ranges.

◇ Scan Skip function

The skip function speeds up scanning by not scanning those frequencies set as skip channels.

In the VFO mode

The frequencies that are set as "PSKIP" are skipped during a scan. (p. 8-8)

In the Memory mode

Repeatedly scans all entered Memory channels. The frequencies that are set as skip channels "PSKIP" and "SKIP" are not scanned. (p. 8-11)

- ① You must enter 2 or more Memory channels to start a memory scan.

TIP: When **Program Skip** is set to OFF, you cannot use the Scan Skip function. (p. 11-5)
(MENU > Scan > **Program Skip**)

◇ Operating mode during a scan

- The VFO scan uses the selected operating mode.
- During a Memory or Bank scan, the operating mode entered into the channel is used.

◇ When a signal is received

When a signal is received, the scan pauses for approximately 10 seconds (default), then resumes. The scan resumes approximately 2 seconds (default) after the signal disappears.

- ① These settings can be changed on the MENU screen. (p. 11-5)
(MENU > Scan > **Pause Timer**)
(MENU > Scan > **Resume Timer**)

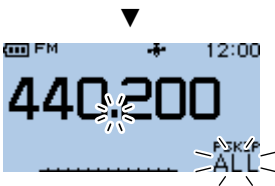
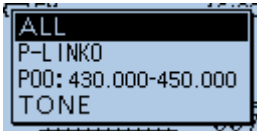


◇ Scan Stop Beep function

The Scan Stop Beep function sounds a beep when a signal is received. This function can be turned ON or OFF on the MENU screen. (p. 11-43)
(MENU > Sounds > **Scan Stop Beep**)

VFO scan

1. Push [V/MHz] to enter the VFO mode.
2. Push [FM/DV] to select the FM or DV mode.
3. Hold down [SCAN] for 1 second.
 - Opens the Scan Type Select window.
4. Select a scan type.



- The scan starts.
 - The decimal point and the selected Scan Type icon blink.
 - ① When receiving a signal, the S-meter displays the received signal strength.
5. Hold down [SCAN] for 1 second.
 - Cancels the scan.
 - ① Holding down [CLR] also cancels the scan.

◇ Scan type

- ALL: Full scan
- P-LINK0 ~ 9: Program Link scan
- P00 ~ 24: Program scan
- DUP: Duplex scan
(Displayed only when Duplex is set.)
- TONE: Tone scan
(For the Tone Squelch scanning)

① Information

- The frequencies that are set as a Skip channel (PSKIP) are skipped during a scan. (p. 8-8)
- When **Program Skip** is set to "OFF," the Skip channel frequencies are not skipped. (p. 11-5) (MENU > Scan > **Program Skip**)
- To set a Program Link scan, see page 8-6.
- To set a Program scan, see page 8-5.

TIP:

- During a scan, rotate [DIAL] to change the scanning direction.
- During a scan, push [FM/DV] to select the Receive mode.
- During a scan, hold down [LOCK] to turn the Lock function ON or OFF.
- The scan continuously runs, even if you push [MENU] or [QUICK] during a scan.
- You can select a scan type by rotating [DIAL] while holding down [SCAN]. Release [SCAN] to start the scan.

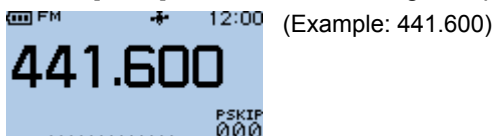
VFO scan

◇ Entering Program Scan Edges

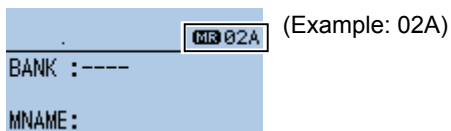
You can enter Program Scan Edge channels to set the upper and lower frequency edges for a Program scan. Each pair of Program Scan Edge channels has its own tuning step and operating mode. The default setting differ, depending on the transceiver version. You can enter up to 25 pairs of Program Scan Edge channels.

Example: Enter a pair of Program Scan Edge channels (02A/02B) whose range is from 441.600 to 442.600.

1. Push [V/MHz] to enter the VFO mode.
2. Rotate [DIAL] to select a lower edge frequency.

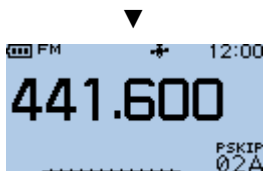
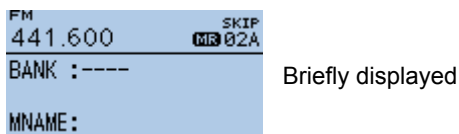


3. Hold down [S.MW] for 1 second.
 - Enters the Select Memory Write mode.
 - The Memory channel number blinks.
4. Rotate [DIAL] to select the Memory channel.



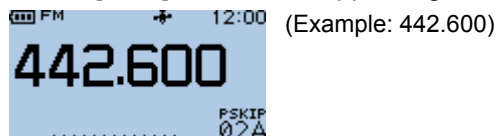
① If you select a pre-entered channel, the previous channel content will be overwritten.

5. Hold down [S.MW] for 1 second.

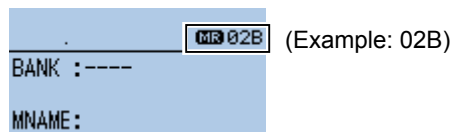


- Writes into the selected Memory channel.
- Returns to the standby screen (VFO mode).

6. Rotate [DIAL] to select an upper edge frequency.

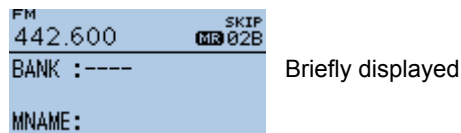


7. Hold down [S.MW] for 1 second.
 - Enters the Select Memory Write mode.
 - The Memory channel number blinks.
8. Rotate [DIAL] to select the Memory channel.



① If you select a pre-entered channel, the previous channel content will be overwritten.

9. Hold down [S.MW] for 1 second.



- Writes into the selected Memory channel.
- Returns to the standby screen (VFO mode).

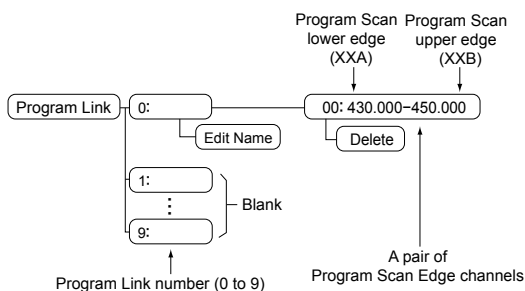
TIP: In the Scan Type Select window, the Program Scan Edge channels are displayed. If you enter a Program Scan name (p. 7-9), the name is displayed in the window.

VFO scan

◇ About the Program Link Scan

This item sets the Link function for 2 or more Program Scan Edge channels to sequentially scan during a Program Link scan. The Program Link scan scans all frequencies in the scan range.

Default settings of the Program Link



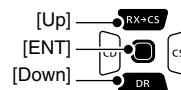
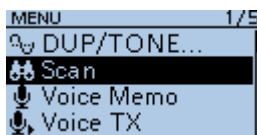
① Information

- The PROGRAM LINK No. screen displays the frequency range. (The default scan edge frequency may differ, depending on the transceiver version.)
- You can add a Link setting by pushing [QUICK] when 2 or more pairs of Program Scan Edge channels are entered.
- When only 1 pair of Program Scan Edge channels is entered, or there is no pair of Program Scan Edge channels (00A/00B ~ 24A/24B) left, "Add" is not displayed after pushing [QUICK].

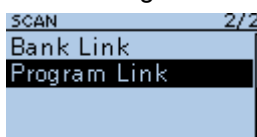
◇ Setting the Program Link function

MENU > Scan > Program Link

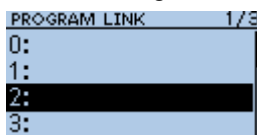
1. Push [MENU].
2. Select "Scan."



3. Select "Program Link."

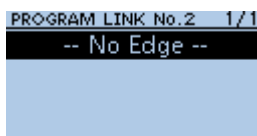


4. Select a Program Link number.



(Example: 2:)

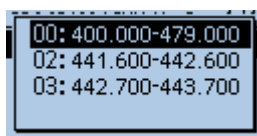
5. Push [QUICK] on the PROGRAM LINK No. screen.



6. Select "Add."

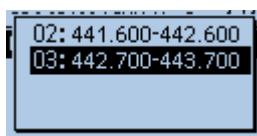


7. Select a pair of Program Scan Edge channels you want to add to the selected Program Link.

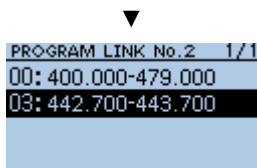


(Example: 00: 400.000-479.000)

8. Repeat steps 5 ~ 7, select other pairs of Program Scan Edge channels to add to the selected Program Link.



(Example: 03: 442.700-443.700)



- Program Scan Edge channels "00: 400.000-479.000" and "03: 442.700-443.700" are linked and set to the Program Link No. 2.

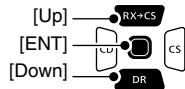
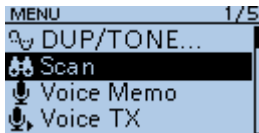
① To exit the MENU screen, push [MENU].

VFO scan

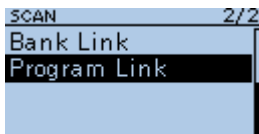
◇ Canceling the Program Link function

MENU > Scan > Program Link

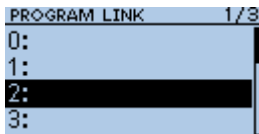
1. Push [MENU].
2. Select "Scan."



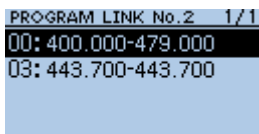
3. Select "Program Link."



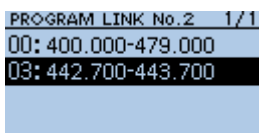
4. Select a Program Link number.



5. Push [QUICK] on the PROGRAM LINK No. screen.

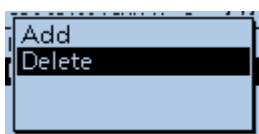


6. Select a pair of Program Scan Edge channels you want to delete.

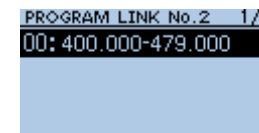


(Example: 03: 442.700-443.700)

7. Push [QUICK].
8. Select "Delete."



- Deletes the selected pair of Program Scan Edge channels from the Program Link.

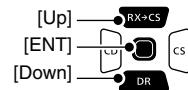
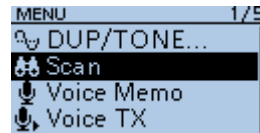


① To exit the MENU screen, push [MENU].

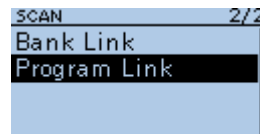
◇ Entering a Program Link name

MENU > Scan > Program Link

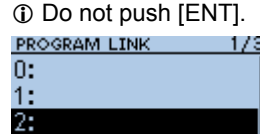
1. Push [MENU].
2. Select "Scan."



3. Select "Program Link."

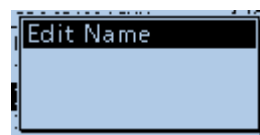


4. Select a Program Link number.

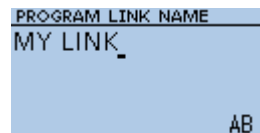


① Do not push [ENT].

5. Push [QUICK].
6. Select "Edit Name."



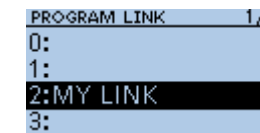
7. Enter a name.



① See page iii on how to enter characters.

8. Push [ENT].

- Sets the entered name.



① To exit the MENU screen, push [MENU].

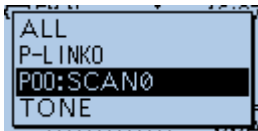
VFO scan

◇ About a Program scan name

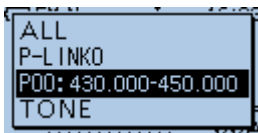
When a Scan name is assigned to a Program scan, the name is displayed in the Scan Type Select window. (p. 8-4)

- ① The name is not displayed during a scan.
- ① To enter the name, see page 7-9.

When the Scan name is assigned



When the Scan name is not assigned

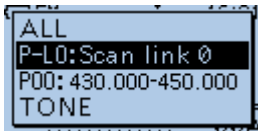


◇ About a Program Link scan name

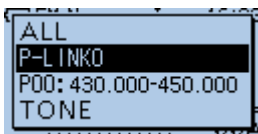
When a Program Link scan name is assigned, the name is displayed in the Scan Type Select window. (p. 8-4)

- ① The name is not displayed during a scan.
- ① To enter the name, see page 7-9.

When a Program Link name is assigned



When a Program Link name is not assigned



◇ Setting the skip frequencies

You can skip unnecessary frequencies during a scan. While a scan is paused and if you want to skip the frequency, you can set it as a Skip channel (PSKIP). The Scan Skip function speeds up a scan.

1. Start the VFO scan.
 - When a signal is received, the scan pauses.
2. Hold down [S.MW] for 1 second.



- Sets the frequency as a Skip channel into empty Memory channel 499.
- The entered Memory channel number blinks.
 - ① If channel 499 already has content, the transceiver automatically searches for another blank channel to use. If there is no blank channel, an error beep sounds, and the frequency is not set as a Skip channel.
 - ① After setting, the scan resumes.

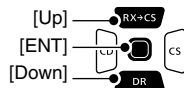
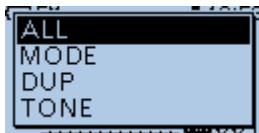
TIP: Once a frequency is set as a Skip channel, the frequency is skipped until you clear the skip setting. To clear the skip setting, see page 8-11.

- ① The skip setting is also cleared when the Memory channel set as a Skip channel is cleared.

Memory scan

NOTE: You must enter 2 or more Memory channels that are not set as Skip channels to start a Memory scan.

1. Push [M/CALL] to enter the Memory mode.
2. Hold down [SCAN] for 1 second.
 - Opens the Scan Type Select window.
3. Select a scan type.



- The scan starts.
 - The decimal point and **MR** blink.
 - ① When receiving a signal, the S-meter displays the received signal strength.
4. Hold down [SCAN] for 1 second.
 - Cancels the scan.
 - ① Pushing [CLR] also cancels the scan.

◇ Scan type

- ALL: Full scan
- MODE: Mode scan
- DUP: Duplex scan
(Displayed only when duplex is set.)
- TONE: Tone scan
(For the Tone squelch scanning)

- ① When 2 or more Memory channels that are not set as Skip channels are entered, the Memory scan is usable.
- ① The channel that is set as a Skip channel (PSKIP or SKIP) are skipped during a scan. (p. 8-11)

TIP:

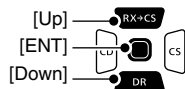
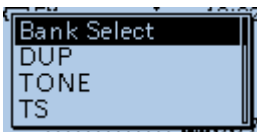
- During a scan, rotate [DIAL] to change the scanning direction.
- During a scan, hold down [L/O] to turn the Lock function ON or OFF.
- The scan continuously runs, even if you push [MENU] or [QUICK] during a scan.
- You can select a scan type by rotating [DIAL] while holding down [SCAN]. Release [SCAN] to start the scan.

Memory Bank scan

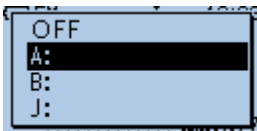
A Memory Bank scan scans the Memory channels in the selected Bank.

- ① You must enter 2 or more Memory channels that are not set as Skip channels to start a Memory Bank scan. (p. 7-6)
- ① When Bank Select is set to "OFF" in the QUICK MENU window, a Memory Bank scan does not start.

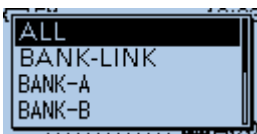
1. Push [M/CALL] to enter the Memory mode.
2. Push [QUICK].
3. Select "Bank Select."



4. Select a Bank.



5. Hold down [SCAN] for 1 second.
 - Opens the Scan Type Select window.
6. Select a Scan type.



- The scan starts.
 - The decimal point and **MR** blink.
 - ① When receiving a signal, the S-meter displays the received signal strength.
7. Hold down [SCAN] for 1 second.
 - Cancels the scan.
 - ① Pushing [CLR] also cancels the scan.

◇ Scan type

- ALL: Full Bank scan
- BANK-LINK: Bank Link scan
- BANK-A ~ Z: Bank scan
(Displays only Banks that contain a Memory channel.)
- DUP: Duplex scan
(Displayed only when duplex is set on the channel.)
- TONE: Tone scan (For tone scanning)

① Information

- When all Memory channels in a Bank are set as "SKIP" or "PSKIP," the Bank is skipped during a Bank Link scan. (p. 8-11)
- When all Memory channels in the selected Bank are set as "SKIP" or "PSKIP," the Memory Bank scan does not start.
- For the Bank Link scan setting, see page 11-5.

TIP:

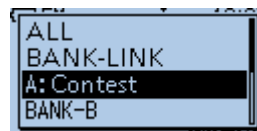
- During a scan, rotating [DIAL] changes the scanning direction.
- During a scan, holding down [r-O] to turn the Lock function ON or OFF.
- The scan continuously runs, even if you push [MENU] or [QUICK] during a scan.
- You can select a scan type by rotating [DIAL] while holding down [SCAN]. Release [SCAN] to start the scan.

◇ About a Bank name

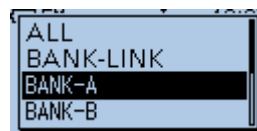
When a Bank name is assigned, the name is displayed on the Scan Type Select window.

- ① The name is not displayed during a scan.
- ① To enter the name, see page 7-9.

When the Bank name is assigned



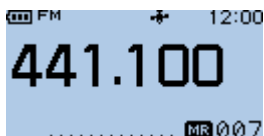
When the Bank name is not assigned



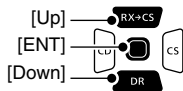
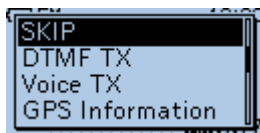
Setting the skip channel

You can set or clear a Skip Channel setting. The channels that are set as a Skip channel are skipped during a scan.

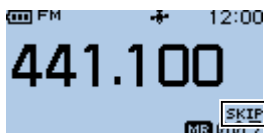
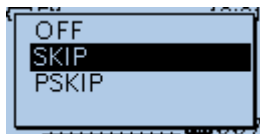
1. Push [M/CALL] to enter the Memory mode.
2. Rotate [DIAL] to select the Memory channel to be skipped.



3. Push [QUICK].
4. Select "SKIP."



5. Select an option.
 - OFF: Cancels the Skip Channel setting.
 - SKIP: Skipped during a Memory scan.
 - PSKIP: Skipped during both VFO and Memory scans.



• When a Skip channel is set, "SKIP" or "PSKIP" is displayed.

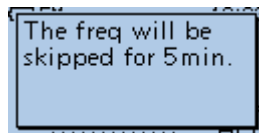
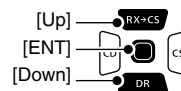
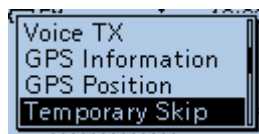
TIP: To cancel the Skip Channel setting, select "OFF" in Step 5.

Temporary skip function

This function temporarily skips unwanted frequencies during a scan for the set period of time, without changing the Skip Channel setting.

- ① You can change **Temporary Skip Timer** on the MENU screen. (Default: 5 min)
(MENU > Scan > **Temporary Skip Timer**)

1. Start the VFO scan.
 - When a signal is received, the scan pauses.
2. Push [QUICK].
3. Select "Temporary Skip."



- After setting, the scan resumes.
- ① After the Temporary Skip Timer period ends, or the scan is cancelled, the Temporary Skip function is turned OFF.

TIP:

- During Memory or DR scanning, follow Steps 2 ~ 3 to skip the Memory channel or repeater for the set period of time. (Default: 5 min)
- Up to 5 Temporary Skip frequencies or Memory channels can be set. When the 6th frequency or Memory channel is set, the oldest setting is automatically deleted.

Section 9 PRIORITY WATCH

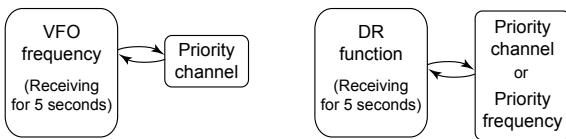
- About the Priority Watch function9-2
- Starting or canceling the Priority Watch function.....9-2
 - ◇ Starting the Priority watch9-2
 - ◇ Canceling the Priority watch9-2
- VFO frequency and a Priority channel.....9-3
 - ◇ When a signal is received9-3
- DR function and a Priority channel.....9-4
 - ◇ When a signal is received9-4
- VFO scan and a Priority channel.....9-5
 - ◇ When a signal is received9-5
- DR scan and a Priority channel.....9-6
 - ◇ When a signal is received9-6
- VFO frequency and a Memory/Bank scan.....9-7
 - ◇ When a signal is received9-7
- VFO scan and a Memory/Bank scan.....9-8
 - ◇ When a signal is received9-8

About the Priority Watch function

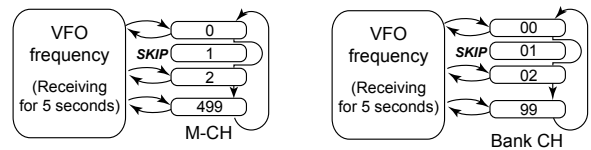
While operating in the VFO mode, using the DR function, or while scanning, Priority watch shortly checks for signals on a selected channel (frequency) every 5 seconds.

There are 6 ways to use the Priority Watch function.

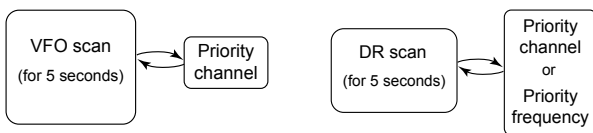
Watching a Priority channel while receiving in the VFO mode or using the DR function: (pp. 9-3, 9-4)



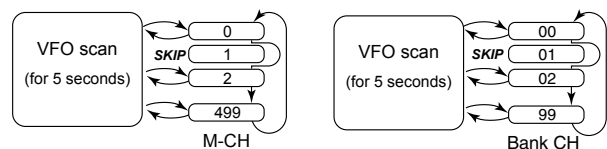
Scanning while receiving in the VFO mode: (p. 9-7)



Watching a Priority channel while scanning: (pp. 9-5, 9-6)



Scanning while scanning: (p. 9-8)



Starting or canceling the Priority Watch function

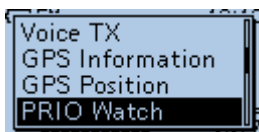
In any case described above, you can start or cancel the function in the same way.

Starting the Priority watch

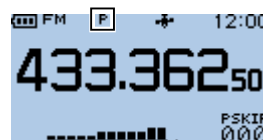
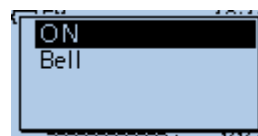
To start the Priority watch, select "ON" or "Bell," as described below.

- ON: When a signal is received on the Priority channel, the channel is automatically selected.
- Bell: When a signal is received on the Priority channel, beeps sound and the "((•))" icon blinks.

1. Push [QUICK].
2. Select "PRIO Watch."



3. Select an option.



- "P" is displayed, and the Priority watch starts.

Canceling the Priority watch

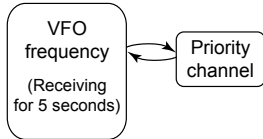
During the Priority watch, push [CLR] to cancel it.



- "P" disappears.

VFO frequency and a Priority channel

Checks the selected Priority channel every 5 seconds, while receiving on a VFO frequency.



Step 1. Set the VFO frequency (See BASIC MANUAL Section 3)

1. Push [V/MHz] to enter the VFO mode.
2. Set the frequency and operating mode (FM/DV) you want to monitor.

Step 2. Set the Priority channel

To select a Memory channel (p. 7-3)

1. Push [M/CALL] to enter the Memory mode.
2. Rotate [DIAL] to select the Memory channel you want to set to the Priority channel.

To select a Bank channel (p. 7-8)

1. Push [M/CALL] to enter the Memory mode.
2. Push [QUICK].
3. Select "Bank Select."
4. Rotate [DIAL] to select a Bank channel you want to set to the Priority channel.

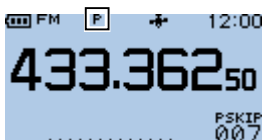
To select a Call channel (p.7-3)

1. Push [M/CALL] to enter the Call Channel mode.
2. Rotate [DIAL] to select the Call channel you want to set to the Priority channel.

Step 3. Starts the Priority watch (p. 9-2)

1. Push [QUICK].
2. Select "PRIO Watch."
3. Select a Priority watch option.
 - "P" is displayed, and the Priority watch starts.

Example: Checks Memory channel "007" while receiving on 433.3625 MHz.



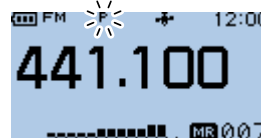
Checks Memory channel "007" every 5 seconds.

◇ When a signal is received

When the Priority watch option is set to "ON":

When a signal is received on the Priority channel, the channel is automatically selected.

- The "P" icon blinks.
- ① The scan pause timer and resume settings are the same as those for a normal scan. (p. 11-5)



Automatically selects the Priority channel.

When the Priority watch option is set to "Bell":

When a signal is received on the Priority channel, the display remains in the VFO mode.

- Beeps sound and the "((•))" icon blinks.



Remains in the VFO mode.

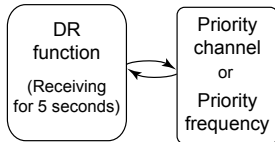
Step 4. Canceling the Priority watch (p. 9-2)

Push [CLR] to cancel it.

- "P" disappears.

DR function and a Priority channel

Checks the Priority channel every 5 seconds, while receiving a repeater or simplex frequency in "FROM" on the DR screen.



Step 1. Set the Priority channel

To set the VFO frequency

(See BASIC MANUAL Section 3)

1. Push [V/MHz] to enter the VFO mode.
2. Set the frequency and operating mode (FM/DV) you want to set to the Priority channel.

To select a Memory channel (p. 7-3)

1. Push [M/CALL] to enter the Memory mode.
2. Rotate [DIAL] to select the Memory channel you want to set to the Priority channel.

To select a Bank channel (p. 7-8)

1. Push [M/CALL] to enter the Memory mode.
2. Push [QUICK].
3. Select "Bank Select."
4. Select a Bank channel you want to set to the Priority channel.

To select a Call channel (p. 7-3)

1. Push [M/CALL] to enter the Call Channel mode.
2. Select a Call channel you want to set to the Priority channel.

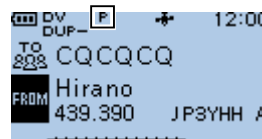
Step 2. Select the repeater or simplex frequency in the DR screen (p. 4-3)

1. Hold down [DR] for 1 second to display the DR screen.
2. Push [DR] to select "FROM," then push [ENT].
• Displays the FROM SELECT screen.
3. Rotate [DIAL] to select a repeater or a simplex frequency.

Step 3. Starts the Priority watch (p. 9-2)

1. Push [QUICK].
2. Select "PRIO Watch."
3. Select a Priority watch option.
• "P" is displayed, and the Priority watch starts.

Example: Checks Memory channel "010" every 5 seconds while receiving on the Hirano repeater.



Checks Memory channel "010" every 5 seconds.

Step 4. Canceling the Priority watch (p. 9-2)

Push [CLR] to cancel it.

- "P" disappears.

◇ When a signal is received

When the Priority watch option is set to "ON":

When a signal is received on the Priority channel, the channel is automatically selected.

- The "P" icon blinks.
- ① The scan pause timer and resume settings are the same as those for a normal scan. (p. 11-5)

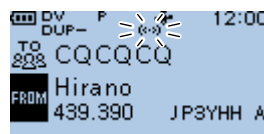


Automatically selects the Priority channel

When the Priority watch option is set to "Bell":

When a signal is received on the Priority channel, the display remains in the VFO scan.

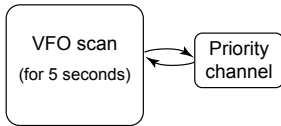
- Beeps sound and the "((•))" icon blinks.



Remains in the DR screen

VFO scan and a Priority channel

Checks the selected Priority channel every 5 seconds, during a VFO scan.



Step 1. Set the Priority channel

To select a Memory channel (p. 7-3)

1. Push [M/CALL] to enter the Memory mode.
2. Rotate [DIAL] to select the Memory channel you want to set to the Priority channel.

To select a Bank channel (p. 7-8)

1. Push [M/CALL] to enter the Memory mode.
2. Push [QUICK].
3. Select "Bank Select."
4. Rotate [DIAL] to select a Bank channel you want to set to the Priority channel.

To select a Call channel (p.7-3)

1. Push [M/CALL] to enter the Call Channel mode.
2. Rotate [DIAL] to select the Call channel you want to set to the Priority channel.

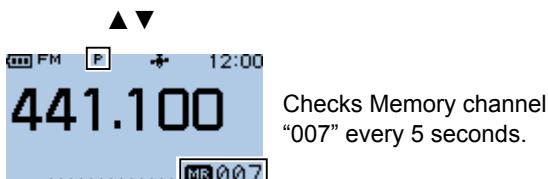
Step 2. Starts the Priority watch (p. 9-2)

1. Push [QUICK].
2. Select "PRIO Watch."
3. Select a Priority watch option.
 - "P" is displayed, and the Priority watch starts.

Step 3. Starts the VFO scan (p. 8-4)

1. Hold down [SCAN] for 1 second.
 - Opens the Scan Type Select window.
2. Select a scan type.
 - The scan starts.

Example: Checks Memory channel "007" that is set to the Priority channel during a VFO scan.



Step 4. Canceling the Priority watch (p. 9-2)

Push [CLR] to cancel it.

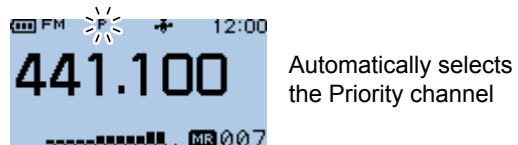
- "P" disappears.

◇ When a signal is received

When the Priority watch option is set to "ON":

When a signal is received on the Priority channel, the channel is automatically selected.

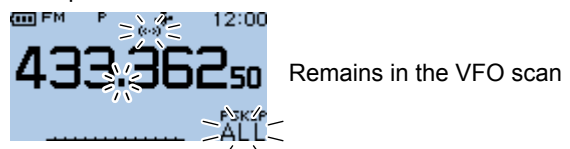
- The "P" icon blinks.
- ① The scan pause timer and resume settings are the same as those for a normal scan. (p. 11-5)



When the Priority watch option is set to "Bell":

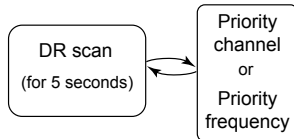
When a signal is received on the Priority channel, the display remains in the VFO scan.

- Beeps sound and the "((•))" icon blinks.



DR scan and a Priority channel

Checks the selected Priority channel every 5 seconds, during a DR scan.



Step 1. Set the Priority channel

To set the VFO frequency

(See BASIC MANUAL Section 3)

1. Push [V/MHz] to enter the VFO mode.
2. Set the frequency and operating mode (FM/DV) you want to set to the Priority channel.

To select a Memory channel (p. 7-3)

1. Push [M/CALL] to enter the Memory mode.
2. Rotate [DIAL] to select the Memory channel you want to set to the Priority channel.

To select a Bank channel (p. 7-8)

1. Push [M/CALL] to enter the Memory mode.
2. Push [QUICK].
3. Select "Bank Select."
4. Select a Bank channel you want to set to the Priority channel.

To select a Call channel (p. 7-3)

1. Push [M/CALL] to enter the Call Channel mode.
2. Select a Call channel you want to set to the Priority channel.

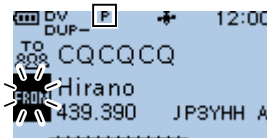
Step 2. Start the DR scan (p. 4-3)

1. Hold down [DR] for 1 second to display the DR screen.
2. Hold down [SCAN] for 1 second.
 - Displays the DR Scan Setting window.
3. Select a scan type.
 - The scan starts.

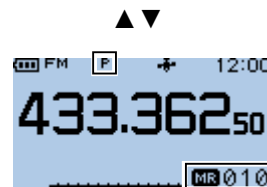
Step 3. Starts the Priority watch (p. 9-2)

1. Push [QUICK].
2. Select "PRIO Watch."
3. Select the Priority watch option.
 - "P" is displayed, and the Priority watch starts.

Example: Checks Memory channel "010" every 5 seconds during a DR scan.



DR scan



Checks Memory channel "010" every 5 seconds.

Step 4. Canceling the Priority watch (p. 9-2)

Push [CLR] to cancel it.

- "P" disappears.

◇ When a signal is received

When "ON" is selected.

When a signal is received on the Priority channel, the channel is automatically selected.

- The "P" icon blinks.
- ① The scan pause timer and resume settings are the same as those for a normal scan. (p. 11-5)

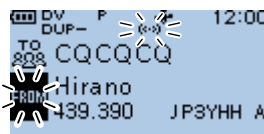


Automatically selects the Priority channel

When "Bell" is selected.

When a signal is received on the Priority channel, the display remains on the DR screen.

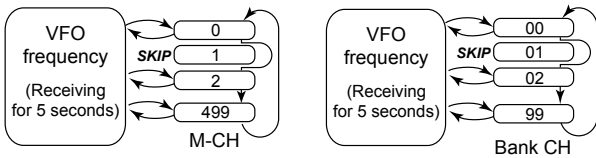
- A beep sounds and the "(••)" icon blinks.



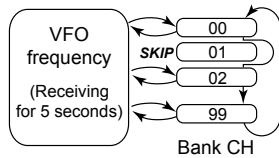
Remains in the DR screen

VFO frequency and a Memory/Bank scan

Sequentially checks the Memory or Bank channels every 5 seconds, while receiving on a VFO frequency.



When using a Memory scan



When using a Bank scan

Step 1. Set the VFO frequency (See BASIC MANUAL section 3)

1. Push [V/MHz] to enter the VFO mode.
2. Set the frequency and operating mode (FM/DV) you want to monitor.

Step 2. Start a Memory or Bank scan

To start a Memory scan (p. 8-9)

1. Push [M/CALL] to enter the Memory mode.
2. Hold down [SCAN] for 1 second.
 - Opens the Scan Type Select window.
3. Select a scan type.
 - The scan starts.

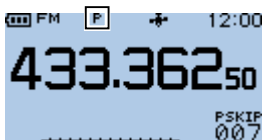
To start a Bank scan (p. 8-10)

1. Push [M/CALL] to enter the Memory mode.
2. Push [QUICK].
3. Select "Bank Select."
4. Select a Bank to be scanned.
5. Hold down [SCAN] for 1 second.
 - Opens the Scan Type Select window.
6. Select a scan type.
 - The scan starts.

Step 3. Starts the Priority watch (p. 9-2)

1. Push [QUICK].
2. Select "PRIO Watch."
3. Select a Priority watch option.
 - "P" is displayed, and the Priority watch starts.

Example: Sequentially checks the Memory channels while receiving on 433.3625 MHz.



Memory scan every 5 seconds

Step 4. Canceling the Priority watch (p. 9-2)

- Push [CLR] to cancel it.
- "P" disappears.

◇ When a signal is received

When the Priority watch option is set to "ON":

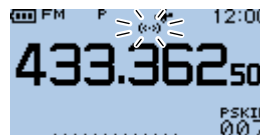
- When a signal is received on a Memory channel, the channel is automatically selected.
- The "P" icon blinks.
 - ① The scan pause timer and resume settings are the same as those for a normal scan. (p. 11-5)



Automatically selects the Memory channel.

When the Priority watch option is set to "Bell":

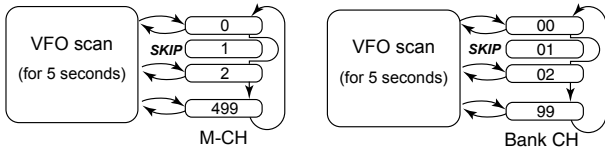
- When a signal is received on a Memory channel, the display remains in the VFO mode.
- Beeps sound and the "((•))" icon blinks.



Remains in the VFO mode.

VFO scan and a Memory/Bank scan

Sequentially checks the Memory or Bank channels every 5 seconds during a VFO scan.



When using a VFO scan and a Memory scan

When using a VFO scan and a Bank scan

Step 1. Start a Memory or Bank scan

To start a Memory scan (p. 8-9)

1. Push [M/CALL] to enter the Memory mode.
2. Hold down [SCAN] for 1 second.
 - Opens the Scan Type Select window.
3. Select a scan type.
 - The scan starts.

To start a Bank scan (p. 8-10)

1. Push [M/CALL] to enter the Memory mode.
2. Push [QUICK].
3. Select "Bank Select."
4. Select a Bank to be scanned.
5. Hold down [SCAN] for 1 second.
 - Opens the Scan Type Select window.
6. Select a scan type.
 - The scan starts.

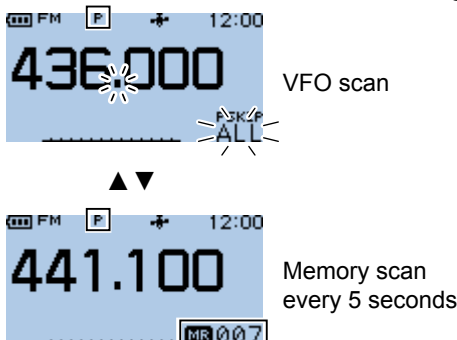
Step 2. Starts the Priority watch (p. 9-2)

1. Push [QUICK].
2. Select "PRIO Watch."
3. Select a Priority watch option.
 - "P" is displayed, and the Priority watch starts.

Step 3. Starts the VFO scan (p. 8-4)

1. Hold down [SCAN] for 1 second.
 - Opens the Scan Type Select window.
2. Select a scan type.
 - The scan starts.

Example: Sequentially checks the Memory channels while VFO scanning.



Step 4. Canceling the Priority watch (p. 9-2)

Push [CLR] to cancel it.

- "P" disappears.

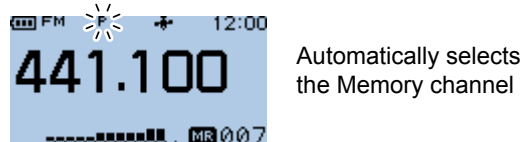
◇ When a signal is received

When the Priority watch option is set to "ON":

When a signal is received on a Memory channel, the channel is automatically selected.

- The "P" icon blinks.

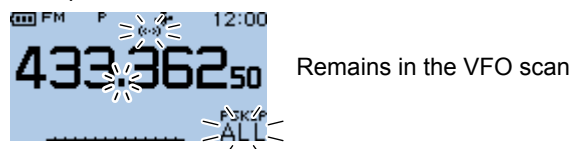
① The scan pause timer and resume settings are the same as those for a normal scan. (p. 11-5)



When the Priority watch option is set to "Bell":

When a signal is received on a Memory channel, the display remains in the VFO scan.

- Beeps sound and the "(•)" icon blinks.



Section 10 REPEATER AND DUPLEX OPERATIONS

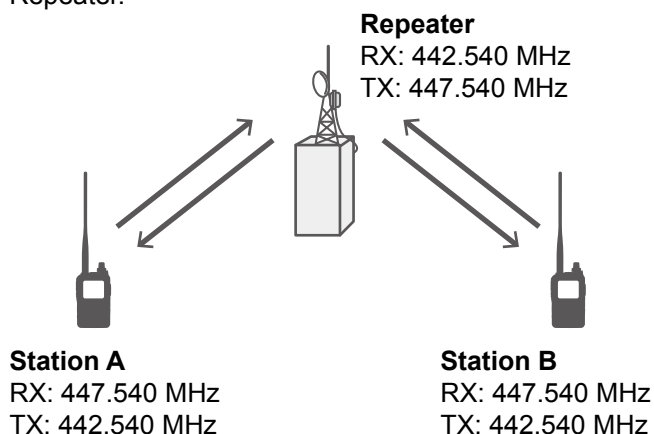
FM Repeater operation.....	10-2
◇ Setting the Repeater frequency	10-2
◇ Checking the Repeater input signal	10-3
◇ 1750 Hz tone burst	10-3
Duplex operation	10-4
◇ Setting the frequency offset	10-4
◇ Setting the Duplex direction	10-4
◇ Duplex operation.....	10-4
Auto Repeater function.....	10-5
Off band indication.....	10-5

FM Repeater operation

A Repeater receives signals and on one frequency, and then retransmits them on a different frequency. When using a Repeater, the transmit frequency is shifted from the receive frequency by a frequency offset.

A Repeater can be accessed using the Duplex function by setting the transceiver's offset to the same value as the Repeater's offset.

See Section 4 for details on accessing a D-STAR Repeater.

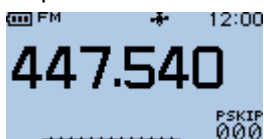


◇ Setting the Repeater frequency

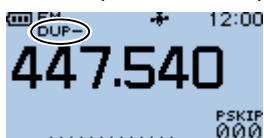
1. Push [V/MHz] to enter the VFO mode.
2. Push [FM/DV] to select the FM mode.



3. Rotate [DIAL] to set the frequency received from a Repeater.



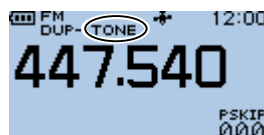
4. Set the offset frequency and the Duplex direction. (p. 10-4)
• The Duplex icon is displayed.



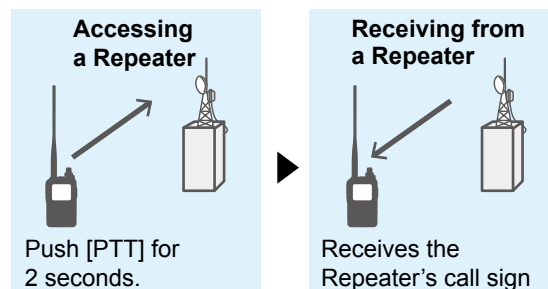
TIP: For only the USA version

The Auto Repeater function (p. 10-5) automatically sets the Repeater settings. When the function is ON, this step can be skipped.

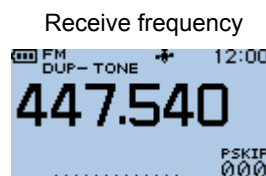
5. Set the Repeater tone. (Default: 88.5 Hz) (MENU > DUP/TONE... > **Repeater Tone**) (P. 11-4)
6. Push [MENU] to return to the standby screen.
7. Push [QUICK].
8. Select "TONE" and turn ON the Repeater Tone.
• The TONE icon is displayed.



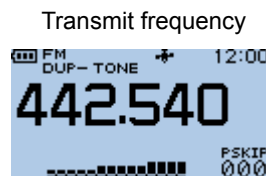
9. Hold down [PTT] for 2 seconds.
• If your transmit signal reached the Repeater, after releasing [PTT], you can hear the Repeater's call sign in morse codes or its announcement.



10. Operate in the same way as a simplex call, alternately transmit and receive.



▲ ▼ Shifts by the offset amount



TIP:

- When the Repeater tone frequency or the frequency offset is changed, the tone or offset for Auto Repeater function is also changed.
- If the offset value causes the transmit frequency to be out of the band, "OFF BAND" is displayed on the display when you push [PTT], and transmit is inhibited. (p. 10-5)
- To access a D-STAR Repeater, see BASIC MANUAL for details.

FM Repeater operation

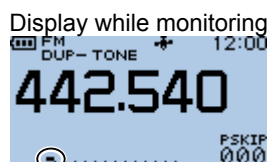
◇ Checking the Repeater input signal

You can check whether or not that another station's transmit signal can be received directly (not through a Repeater), by listening to the Repeater input frequency.

Hold down [SQL] to listen on the Repeater input frequency.

① Information

- While monitoring, the status indicator lights green and an S/RF meter dot blinks.
- While monitoring, the displayed frequency automatically changes to the transceiver transmit frequency (Repeater input frequency).
- When the other station's signal can be directly received, move to a non-Repeater frequency and use simplex. (Duplex OFF)

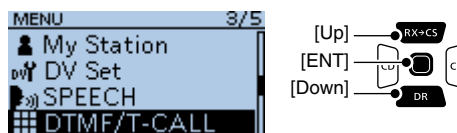


◇ 1750 Hz tone burst

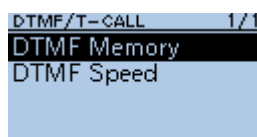
A 1750 Hz tone is required to access many European Repeaters.

① This operation is only for the ID-31E PLUS.

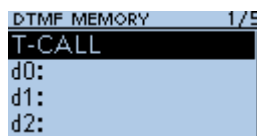
1. Push [MENU].
2. Select "DTMF/T-CALL."



3. Select "DTMF Memory."



4. Select "T-CALL."



5. Push [MENU] to exit the MENU screen.
6. Rotate [DIAL] to set the frequency received from a Repeater.
7. Set the offset frequency and the Duplex direction. (p. 10-4)
 - The Duplex icon is displayed.
8. While holding down [PTT] to transmit, push [SQL] to transmit a 1750 Hz tone signal.
 - Accesses the Repeater with a short tone burst.
9. Operate in the normal way.
 - ① In the same way as a simplex call, alternately transmit and receive.

Duplex operation

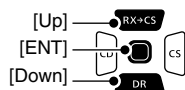
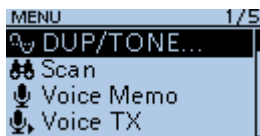
The Duplex operation shifts the transmit frequency up or down from the receive frequency by an offset amount.

◇ Setting the frequency offset

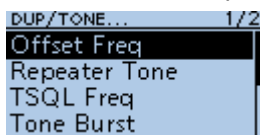
NOTE: The frequency offset cannot be changed when using the DR function.

MENU > DUP/TONE... > Offset Freq

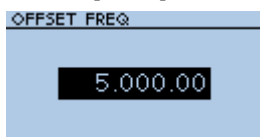
1. Push [MENU].
2. Select "DUP/TONE..."



3. Select "Offset Freq."



4. Rotate [DIAL] to set the offset.



(Example: 5.000.00 MHz)

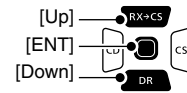
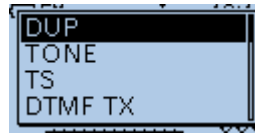
① Information

- Set to between 0.000.00 and 59.99500 MHz.
- The selected tuning step in the VFO mode is used to set the offset.
- To exit the MENU screen, push [MENU].

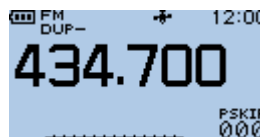
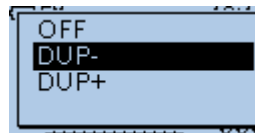
TIP: If the offset value causes the transmit frequency to be out of the band, "OFF BAND" is displayed when you push [PTT], and transmit will be inhibited. (p.10-5)

◇ Setting the Duplex direction

1. Push [QUICK].
2. Select "DUP."



3. Select the Duplex direction.
 - OFF: For simplex operation (the receive and transmit frequencies are the same).
 - DUP-: The transmit frequency shifts down from the receive frequency by the offset amount.
 - DUP+: The transmit frequency shifts up from the receive frequency by the offset amount.



- Displays "DUP-" or "DUP+."

◇ Duplex operation

1. Hold down [SQL] to listen to the transmit frequency to check whether another station is transmitting on it, or not.
 - The shifted transmit frequency is displayed.
2. Operate in the normal way.
 - ① In the same way as a simplex call, alternately transmit and receive.

NOTE: When the **Auto Repeater** function is ON, and the operating frequency is set out of the Repeater output frequency range, the duplex mode is automatically cancelled.
(MENU > Function > **Auto Repeater**)

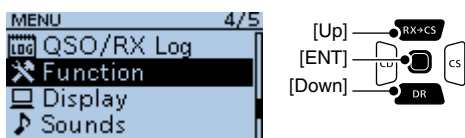
Auto Repeater function

When the operating frequency falls within the Repeater output frequency range, the Auto Repeater function automatically sets the Repeater settings (Duplex ON/OFF, Duplex direction, Tone encoder ON/OFF). The Auto Repeater function uses the preset Repeater tone frequency and frequency offset.

NOTE for the USA version transceiver:
 When turned ON, the Auto Repeater function has priority over the manual Duplex setting. If the transmit frequency changes after setting, the Auto Repeater function may have changed the Duplex setting.

MENU > Function > **Auto Repeater**

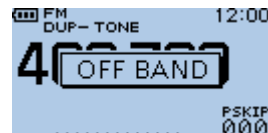
1. Push [MENU].
2. Select "Function."



3. Select "Auto Repeater."
 4. Select the option to turn ON the Auto Repeater function.
 - OFF: Turns OFF the function.
 - ON (DUP): Turns ON only the Duplex operation. (Default)
 - ON (DUP, TONE): Turns ON the Duplex operation and Tone encoder.
- ① To exit the MENU screen, push [MENU].

Off band indication

If the transmit frequency is out of the amateur band, the off band indication, "OFF BAND," is displayed when you push [PTT]. Check the frequency offset or duplex direction in this case. (p. 10-4)



Frequency range and offset direction

Frequency range	Shift direction
442.000 ~ 444.995 MHz	"DUP+" is set
447.000 ~ 449.995 MHz	"DUP-" is set

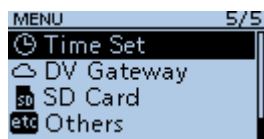
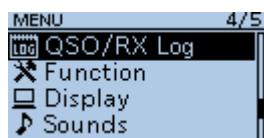
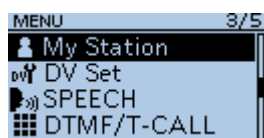
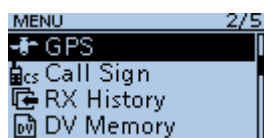
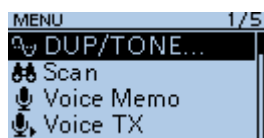
Section 11 MENU SCREEN

Selecting a Menu item	11-2
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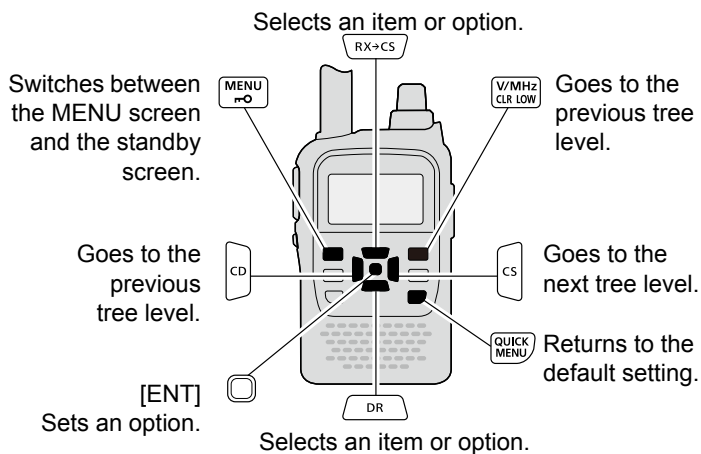
Selecting a Menu item

You can use the MENU screen to set infrequently changed values or function settings. In addition to this page, see pages 11-4 through 11-46 for details of each item's options and their default values.

TIP: The MENU screen is constructed in a tree structure. You may go to the next tree level, or go back a level, depending on the selected item.



◇ MENU screen operation

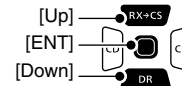


Simplified description—'Select' operation

In this manual, the user's 'Select' operation is simplified, as described below.

Simplified description:

1. Push [MENU].
2. Select "Time Set."
3. Select "Auto Power OFF."
4. Select "30min."



Detailed operation:

1. Push [MENU] to enter the MENU screen.
2. Push [Up] (RX→CS) or [Down] (DR) to select "Time Set," and then push [ENT].
3. Push [Up] (RX→CS) or [Down] (DR) to select "Auto Power OFF," and then push [ENT].
4. Push [Up] (RX→CS) or [Down] (DR) to select "30min," and then push [ENT].

► Continued on the next page.

Selecting a Menu item

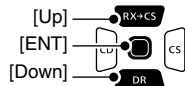
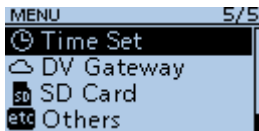
◇ MENU screen operation (Continued)

Example: Set the "Auto Power OFF" item to "30 min."

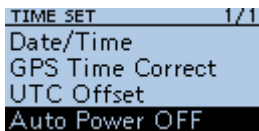
Simplified description:

MENU > Time Set > Auto Power OFF

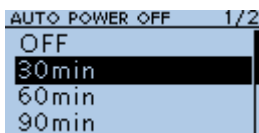
1. Push [MENU].
2. Select "Time Set."



3. Select "Auto Power OFF."



4. Select "30min."



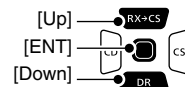
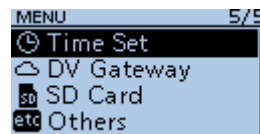
• Sets the option, then goes back a tree level. (TIME SET screen is displayed.)

① To exit the MENU screen, push [MENU].

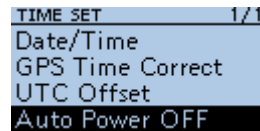
Detailed operation:

MENU > Time Set > Auto Power OFF

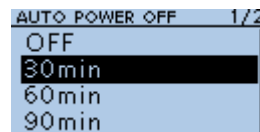
1. Push [MENU] to enter the MENU screen.
2. Push [Up] (RX→CS) or [Down] (DR) to select "Time Set," and then push [ENT].



3. Push [Up] (RX→CS) or [Down] (DR) to select "Auto Power OFF," and then push [ENT].



4. Push [Up] (RX→CS) or [Down] (DR) to select "30min," and then push [ENT].

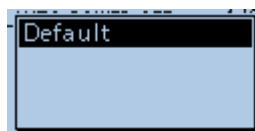


• Sets the option, then goes back a tree level. (TIME SET screen is displayed.)

① To exit the MENU screen, push [MENU].

TIP: To return to the default setting:

1. Push [QUICK] in step 4.
2. Select "Default."



DUP/TONE items

NOTE: The default settings shown below are for the USA transceiver version. The default settings may differ, depending on your transceiver version. To return to your transceiver version's default settings, see page 11-3.

Offset frequency (Default: 5.000.00)

MENU > DUP/TONE... > Offset Freq

Set the frequency offset for Duplex (repeater) operation to between 0.000.00 and 59.995.00 MHz.

- ① Push [V/MHz] to select the 1 MHz or 10 MHz tuning step.
- ① The Duplex shift direction (DUP-/DUP+) (p. 10-4) or the tuning step is set in the Quick Menu window.
- ① When the DR function is ON, editing is disabled.

Repeater Tone (Default: 88.5)

MENU > DUP/TONE... > Repeater Tone

Select a CTCSS tone frequency for repeater access and other functions. You can select 50 tone frequencies (67.0 ~ 254.1 Hz).

TSQL Freq (Default: 88.5)

MENU > DUP/TONE... > TSQL Freq

Select a CTCSS tone frequency for the Tone Squelch or the Pocket Beep function. You can select 50 tone frequencies (67.0 ~ 254.1 Hz).

• Selectable Repeater Tone/TSQL frequencies (Unit: Hz)

67.0	85.4	107.2	136.5	165.5	186.2	210.7	254.1
69.3	88.5	110.9	141.3	167.9	189.9	218.1	
71.9	91.5	114.8	146.2	171.3	192.8	225.7	
74.4	94.8	118.8	151.4	173.8	196.6	229.1	
77.0	97.4	123.0	156.7	177.3	199.5	233.6	
79.7	100.0	127.3	159.8	179.9	203.5	241.8	
82.5	103.5	131.8	162.2	183.5	206.5	250.3	

Tone Burst (Default: OFF)

MENU > DUP/TONE... > Tone Burst

Turn the Tone Burst function ON or OFF in the FM mode when using the Tone Squelch function.

- OFF: When you transmit a signal that superimposes the CTCSS tone, the other station may hear a short burst of noise from their receiver, just after you stop transmitting.
- ON: When you transmit a signal that superimposes the CTCSS tone, the function mutes the noise from being heard in the other station's receiver.

DTCS Code (Default: 023)

MENU > DUP/TONE... > DTCS Code

Select a DTCS (both encoder/decoder) code for the DTCS Squelch.

You can select a total of 104 codes (023 ~ 754).

• Selectable DTCS codes

023	072	152	244	311	412	466	631
025	073	155	245	315	413	503	632
026	074	156	246	325	423	506	654
031	114	162	251	331	431	516	662
032	115	165	252	332	432	523	664
036	116	172	255	343	445	526	703
043	122	174	261	346	446	532	712
047	125	205	263	351	452	546	723
051	131	212	265	356	454	565	731
053	132	223	266	364	455	606	732
054	134	225	271	365	462	612	734
065	143	226	274	371	464	624	743
071	145	243	306	411	465	627	754

DTCS Polarity (Default: Both N)

MENU > DUP/TONE... > DTCS Polarity

Select the DTCS polarity to use for transmitting (TX) and receiving (RX).

- Both N: Normal polarity is used for both TX and RX.
- TN-RR: Normal polarity is used for TX, Reverse polarity for RX.
- TR-RN: Reverse polarity is used for TX, Normal polarity for RX.
- Both R: Reverse polarity is used for both TX and RX.

DTCS code's polarity for transmitting or receiving can be independently set with this item.

Digital Code (Default: 00)

MENU > DUP/TONE... > Digital Code

Select the digital code for Digital Code Squelch. You can select a total of 100 codes (00 ~ 99).

Scan items

NOTE: The default settings shown below are for the USA transceiver version. The default settings may differ, depending on your transceiver version. To return to your transceiver version's default settings, see page 11-3.

Pause Timer (Default: 10sec)

MENU > Scan > **Pause Timer**

Select the Scan Pause Timer. When receiving a signal, the scan pauses for this set period of time.

- 2sec ~ 20sec : When a signal is received, the scan pauses for 2 ~ 20 seconds (in 2 second steps).
- HOLD : The scan pauses on a received signal until the signal disappears.

Resume Timer (Default: 2sec)

MENU > Scan > **Resume Timer**

Select the scan Resume Timer. When a received signal disappears, the scan resumes for this set period of time.

- 0sec: The scan resumes immediately after the signal disappears.
- 1sec ~ 5sec: The scan resumes 1 ~ 5 seconds after the signal disappears.
- HOLD: The scan remains paused for the **Pause Timer** setting, even if the signal disappears.

NOTE: Rotate [DIAL] to resume the scan. The **Resume Timer** must be set shorter than the **Pause Timer**, otherwise this timer does not work properly.

Temporary Skip Timer (Default: 5min)

MENU > Scan > **Temporary Skip Timer**

Set the Temporary Skip Timer to 5, 10, or 15 minutes. The unwanted frequencies that are set as Skip channels (PSKIP or SKIP) are skipped for this set period of time during a scan.

This timer is activated for the VFO scan, Memory scan, and DR scan.

Program Skip (Default: ON)

MENU > Scan > **Program Skip**

Turn the Program Skip Scan function ON or OFF for a VFO scan.

This function enables the transceiver to skip the unwanted frequencies that are entered as a Memory channel and is set to "PSKIP." (p. 8-11)

- OFF: The transceiver scans all frequencies.
- ON: The transceiver does not scan frequencies set as "PSKIP" frequencies.

Bank Link (Default: A: ~ Z:)

MENU > Scan > **Bank Link**

Select Banks to be scanned during a Bank Link Scan. The Bank Link function scans all channels in the selected banks.

Select a bank, A ~ Z, then push [ENT] to turn the Link function ON or OFF.

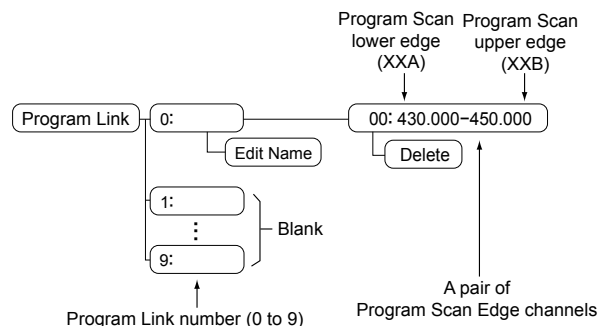
- Displays "✓" when the function is set to ON.
- ① Push [QUICK] to quickly turn all the banks ON or OFF.

Program Link (Default: Refer to the illustration below)

MENU > Scan > **Program Link**

This item sets the Link function for 2 or more Program Scan Edge channels to sequentially scan during a Program Link scan. (p. 8-6) The Program Link scan scans all frequencies in the scan range.

Default settings of the Program Link



① Information

- The PROGRAM LINK No. screen displays the frequency range.
- You can add a Link setting by pushing [QUICK] when 2 or more pairs of Program Scan Edge channels are entered.
- When only 1 pair of Program Scan Edge channels is entered, or there is no pair of Program Scan Edge channels (00A/00B ~ 24A/24B) left, "Add" is not displayed after pushing [QUICK].

Voice Memo items (For Record/Playback)

NOTE: The default settings shown below are for the USA transceiver version. The default settings may differ, depending on your transceiver version. To return to your transceiver version's default settings, see page 11-3.

<<REC Start>>

MENU > Voice Memo > QSO Recorder > <<REC Start>>

After selecting "<<REC Start>>," push [ENT] to start QSO recording.

- "Recording started." is displayed.

① Information

- BE SURE to insert a microSD card.
- While recording, "<<REC Stop>>" is displayed on the QSO RECORDER screen. To stop recording, select "<<REC Stop>>."
- Once recording has started, the recording will continue, even if the transceiver is turned OFF and then ON again.

Play Files

MENU > Voice Memo > QSO Recorder > Play Files

Follow the instructions below to play back the recorded QSO audio on the microSD card.

- ① BE SURE to insert a microSD card.

<Playing back>

1. Select "Play Files."
 - Displays the folders on the microSD card
 - ① These folders contain the recorded audio files.
2. Select a folder that includes an audio file to play back.
3. Select a file to play back.
 - The VOICE PLAYER screen is displayed and the selected file is played back.
 - ① See "The VOICE PLAYER screen description" for forwarding or rewinding. (p. 6-3)

NOTE:

- The folder name is automatically created, as shown below:

(Example)

Recording date: 31st October 2017

Folder name: 20171031

- The file name is automatically created, as shown below:

(Example)

Recording date and time: 31st October 2017

15:30:00

File name: 20171031_153000

- The voice audio is recorded onto a microSD card, and saved in the "wav" format. (".wav" is not displayed on the transceiver's screen.)
- The recorded voice audio can also be played back on a PC.

REC Mode

(Default: TX&RX)

MENU > Voice Memo > QSO Recorder > Recorder Set > REC Mode

Records both the transmit (TX) and receive (RX) audio as the default.

- TX&RX: Records both the transmit and receive voice audio.
- RX Only: Records only the receive voice audio.

TIP: When transmitted while recording

When **File Split** is set to "OFF," the recording is paused while transmitting. After you finish transmitting, the recording resumes.

When **File Split** is set to "ON," a new file is automatically created, and the voice audio is recorded into the new file.

(MENU > Voice Memo > QSO Recorder > Recorder Set > **File Split**)

RX REC Condition

(Default: Squelch Auto)

MENU > Voice Memo > QSO Recorder > Recorder Set > RX REC Condition

Select whether or not the squelch status affects the receive voice audio recording.

- Always: The transceiver always records the receive voice audio regardless of the squelch status.
- Squelch Auto: The transceiver records the receive voice audio only when a signal is received (the squelch is opened). When the squelch closes while recording, the recording will continue for 2 seconds, and then pause.

File Split

(Default: ON)

MENU > Voice Memo > QSO Recorder > Recorder Set > File Split

Turn the File Split function ON or OFF.

- OFF: Once a recording starts, the transceiver continues to record on the same file.
 - ① If the file size exceeds 2 GB, a new file is automatically created in the same folder, and the voice audio is recorded there.
- ON: During recording, if transmission and reception, or squelch status (open and close) is changed, a new file is automatically created in the same folder, and the voice audio is saved into a new file.

Voice Memo items (For Record/Playback)

PTT Auto REC (Default: ON)

MENU > Voice Memo > QSO Recorder > Recorder Set > **PTT Auto REC**

Turn the PTT Automatic Recording function ON or OFF.

- ① Transmitting from a speaker microphone, using the VOX function, or sending a CI-V command also starts recording.
- ① When **REC Mode** is set to "RX Only," the transmit voice audio is not recorded.
(MENU > Voice Memo > QSO Recorder > Recorder Set > **REC Mode**)

- OFF: Turns OFF the function.
- ON: The recording automatically starts when you push [PTT].

The recording stops when:

- No signal is transmitted for 10 seconds after releasing [PTT].
- No signal is received for 10 seconds after releasing [PTT].
 - ① When the transceiver receives a signal within 10 seconds after releasing [PTT], the recording automatically starts.
- The operating frequency or operating mode is changed after releasing [PTT].

Skip Time (Default: 10sec)

MENU > Voice Memo > QSO Recorder > Player Set > **Skip Time**

Set the Skip Timer to 3, 5, 10, or 30 seconds to rewind or skip forward for this set period of time when you push the fast-rewind or fast-forward key while playing the recorded QSO audio.

- ① See "The VOICE PLAYER screen description" for forwarding or rewinding. (p. 6-3)

Record

MENU > Voice Memo > Voice Recorder > **Record**

Push [ENT] to display the VOICE RECORDER screen, and then push [PTT] to start a voice recording. While recording, push [PTT] again to stop the recording.

① Information

- BE SURE to insert a microSD card.
- This function cannot record a QSO.
- While recording a QSO, you cannot use this function.

Play Files

MENU > Voice Memo > Voice Recorder > **Play Files**

Play back the voice audio that is recorded on the VOICE RECORDER screen.

Push [ENT] to display the folders that contains the recorded voice audio files.

- ① BE SURE to insert a microSD card.

MIC Gain (Default: 3)

MENU > Voice Memo > Voice Recorder > Recorder Set > **MIC Gain**

Set the internal microphone sensitivity to between 1 (minimum sensitivity) and 4 (maximum sensitivity) for the Voice Recorder function. Higher values make the microphone more sensitive to your voice.

Skip Time (Default: 10sec)

MENU > Voice Memo > Voice Recorder > Player Set > **Skip Time**

Set the Skip Timer to 3, 5, 10, or 30 seconds to rewind or skip forward for this set period of time when you push the fast-rewind or fast-forward key while playing the recorded voice audio.

- ① See "The VOICE PLAYER screen description" for forwarding or rewinding. (p. 6-3)

DV Auto Reply

MENU > Voice Memo > **DV Auto Reply**

Up to 10 seconds of audio can be recorded for the Automatic Reply function.

- ① BE SURE to insert a microSD card.
- ① See "Automatic Reply function" for details. (p. 4-24)

Voice TX items

NOTE: The default settings shown below are for the USA transceiver version. The default settings may differ, depending on your transceiver version. To return to your transceiver version's default settings, see page 11-3.

Record

MENU > Voice TX > **Record**

Up to 1 minute of audio can be recorded onto a microSD card for voice transmission. (p. 12-3)

The transceiver can save only 1 voice audio.

① BE SURE to insert a microSD card.

① While recording a QSO, you cannot use this function.

Repeat Time (Default: 5sec)

MENU > Voice TX > TX Set > **Repeat Time**

Set the Repeat Time to between 1 and 15 seconds (in 1 second steps).

The transceiver repeatedly transmits the recorded voice audio for this set interval.

NOTE: The recorded voice audio is repeatedly transmitted for up to 10 minutes. If 10 minutes passes while transmitting, the transceiver continues to transmit until the complete voice audio transmission is finished.

TX Monitor (Default: ON)

MENU > Voice TX > TX Set > **TX Monitor**

Turn the TX Monitor function ON or OFF.

- OFF: The TX voice audio is not heard from the speaker.
- ON: The TX voice audio is heard from the speaker.

<<Single TX>>

MENU > Voice TX > <<**Single TX**>>

The transceiver transmits the recorded voice audio only once.

① You can also select "Single TX" in the Quick Menu window.

(Quick Menu > Voice TX > **Single TX**)

<<Repeat TX>>

MENU > Voice TX > <<**Repeat TX**>>

The transceiver repeatedly transmits the recorded voice audio for up to 10 minutes, according to the **Repeat Time** setting.

① Information

- You can also select "Single TX" in the Quick Menu window. (Quick Menu > Voice TX > **Repeat TX**)
- If 10 minutes passes while transmitting, the transceiver continues to transmit until the complete voice audio transmission is finished.
- Any of the following action cancels the transmission.
 - Pushing [PTT]
 - Turning OFF the transceiver, then turning it ON again.
 - Pushing any key (except for [VOL] and [⏻])

GPS items

NOTE: The default settings shown below are for the USA transceiver version. The default settings may differ, depending on your transceiver version. To return to your transceiver version's default settings, see page 11-3.

GPS Select (Default: Internal GPS)

MENU > GPS > GPS Set > **GPS Select**

Select how to capture position data.

- ① Data communication is disabled when you select "External GPS."
- ① When "External GPS" is set, but if the external GPS receiver is not connected, the internal GPS receiver is temporarily turned ON when you use the Automatic Position Reply function.

- OFF: A GPS receiver is not used.
- Internal GPS: Position data of the internal GPS data is used for the GPS functions.
- External GPS: Position data of an external GPS receiver is used for the GPS functions.
- Manual: Manually enter the current Latitude, Longitude, and Altitude in **Manual Position**.

Power Save (Internal GPS) (Default: Auto)

MENU > GPS > GPS Set > **Power Save (Internal GPS)**

Select whether or not to use the Power Save function for the internal GPS receiver.

When this function is ON, and if the GPS receiver does not receive signals from a satellite for 5 minutes, the function turns OFF the GPS receiver for this set period of time.

- OFF: The GPS receiver is always turned ON.
- 1, 2, 4, 8min: When the receiver cannot receive signals from a satellite for 5 minutes, the GPS receiver is turned OFF for the selected period of time. (1, 2, 4, or 8 minutes). After this period, the receiver resumes receiving.
- Auto: When the receiver cannot receive signals from a satellite for 5 minutes, the GPS receiver is turned OFF for 1 minute. After this period, the receiver resumes receiving. The Power Save interval time extends to 2, 4, and then 8 minutes when receiving no signals for another 5 minutes, respectively.

Manual Position

(Default: LATITUDE: 0°00.00'N,
LONGITUDE: 0°00.00'W, ALTITUDE: -----ft)

MENU > GPS > GPS Set > **Manual Position**

Manually enter the latitude, longitude, and Altitude of your current position.

- ① You can capture position data from the GPS receiver if "Capture From GPS" is selected. (p. 5-3)

GPS Indicator (Default: ON)

MENU > GPS > GPS Set > **GPS Indicator**

Select whether or not to display the GPS icon (📶).

- OFF: The GPS icon is not displayed.
- ON: The GPS icon is displayed when valid position data is received, and blinks when no position data is received.
 - ① When **GPS Select** is set to "Manual," the GPS icon is not displayed.

Selected GPS receiver	Not connected	Connected/ Searching	Connected/ Received
Internal GPS	–	Blinks	Displayed
External GPS	Not displayed	Blinks	Displayed

GPS Out (To DATA jack) (Default: OFF)

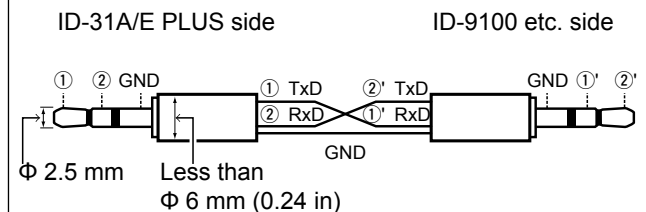
MENU > GPS > GPS Set > **GPS Out (To DATA Jack)**

Select whether or not position data of the internal GPS receiver is output from the [DATA] jack.

- OFF: GPS position data is not output from the [DATA] jack.
- ON: GPS position data is output from the [DATA] jack.

TIP:

- When **GPS Select** is set to "OFF," "External GPS," or "Manual," GPS position data is not output from the [DATA] jack.
- When you want to operate data communication (p. 5-3) in the DV mode, set this item to "OFF."
- When this item is set to "ON," you can output GPS position data to another transceiver using its [DATA] jack. In this case, you can use a handmade stereo cable (Φ 2.5 mm).

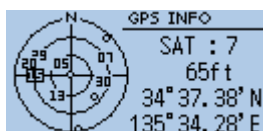


GPS items

GPS Information

MENU > GPS > GPS Information

Displays the GPS satellite direction, altitude, satellite number and receiving status. (p. 5-10)



(Example:
Tracking 7 satellites)

○ (White circle)	Untracked satellite
Regular characters (Example: 01)	Tracking satellites (weak signal)
Reversed characters (Example: 01)	Tracking satellites (strong signal)
SAT	Number of tracking satellite
Altitude	The altitude of your station. The altitude is only displayed when 4 or more satellites are tracked. When 3 or less satellites are tracked, "-----ft" is displayed.
Latitude	--°--'--" (Non-positioning)/ Latitude of your station
Longitude	---°---'---" (Non-positioning)/ Longitude of your station

GPS Position

MENU > GPS > GPS Position

Your current position, received position, or GPS Memory Alarm position information is displayed. (p. 5-6) Pushing [Up] or [Down] selects the MY, RX, MEM, and ALM screens.

MY screen (MY Position)

Compass*1	Displays your direction.
Latitude	Displays your latitude.
Longitude	Displays your longitude .
GL*2	Displays the grid locator based on the latitude and longitude of your position.
ALT*2	Displays your own altitude.
SPEED	Displays your speed over ground.
TIME	Displays current time received from the GPS.
COURSE	Displays your direction heading.

① When **GPS Select** is set to "Manual," the screen displays only latitude, longitude, altitude, GL (Grid locator), and time (internal clock).

RX screen (Received position of the other station)

Depending on the caller's TX mode or TX format, the displayed items and these meanings are different.

The following lists describe the items for each category.

No data is displayed when no position data is received on your transceiver.

<1. When the caller's TX mode is NMEA>

Compass*1	Displays the caller's direction from your position.
Latitude	Displays the caller's latitude.
Longitude	Displays the caller's longitude.
GL	Displays the grid locator based on the latitude and longitude of the caller's position.
ALT	Displays the caller's altitude.
DST	Displays the caller's distance from your position.
COURSE	Displays the caller's direction over ground.
SPEED	Displays the caller's speed.
GPS Time Stamp	Displays the time that the caller acquired the position data.
Call sign	Displays the caller's call sign.

<2. When the caller's TX format is D-PRS Position (Mobile station)>

Compass*1	Displays the caller's direction from your position.
Latitude	Displays the caller's latitude.
Longitude	Displays the caller's longitude.
GL	Displays the grid locator based on the latitude and longitude of the caller's position.
ALT	Displays the caller's altitude.
DST	Displays the caller's distance from your position.
COURSE	Displays the caller's direction over ground.
SPEED	Displays the caller's speed.
Symbol	Displays the caller's D-PRS symbol.
GPS Time Stamp	Displays the time that the caller acquired the position data.
Call sign	Displays the caller's call sign (with SSID).

*1 You can change the direction in the Quick Menu window.

*2 You can change these display types in the Quick Menu window.

GPS items

GPS Position (continued)

MENU > GPS > **GPS Position**

<3. When the caller's TX format is D-PRS Position (Base station)>

Compass*1	Displays the caller's direction from your position.
Latitude	Displays the caller's latitude.
Longitude	Displays the caller's longitude
GL	Displays the grid locator based on the latitude and longitude of the caller's position.
ALT	Displays the caller's altitude.
DST	Displays the caller's distance from your position.
POWER	Displays the caller's TX power level.
HEIGHT	Displays the caller's antenna height.
GAIN	Displays the caller's antenna gain.
DIRECT	Displays the direction of caller's antenna was pointing.
Symbol	Displays the caller's D-PRS symbol.
GPS Time Stamp	Displays the time that the caller acquired the position data.
Call sign	Displays the caller's call sign (with SSID).

<4. When the caller's TX format is D-PRS Object/Item>

Compass*1	Displays the Object/Item's direction from your position.
Latitude	Displays the Object/Item's latitude.
Longitude	Displays the Object/Item's longitude.
GL	Displays the grid locator based on the latitude and longitude of the Object/Item's position.
ALT	Displays the Object/Item's altitude.
DST	Displays the Object/Item's distance from your position.
COURSE	Displays the Object/Item's direction over ground.
SPEED	Displays the Object/Item's speed.
POWER	Displays the Object/Item's TX power level.
HEIGHT	Displays the Object/Item's antenna height.
GAIN	Displays the Object/Item's antenna gain.
DIRECT	Displays the direction that the Object/Item's antenna was pointing.
Symbol	Displays the Object/Item's D-PRS symbol.
GPS Time Stamp	Displays the time that the caller sent the Object's data.
Call sign	Displays the caller's call sign (with SSID).
Object/Item name	Displays the Object/Item's name.

① When the object or Item is disabled, "KILLED" is displayed.

*1 You can change the direction in the Quick Menu window.

GPS items

GPS Position (continued)

MENU > GPS > **GPS Position**

<5. When the caller's TX format is D-PRS Weather>

Compass*1	Displays the caller's direction from your position.
Latitude	Displays the caller's latitude.
Longitude	Displays the caller's longitude.
GL	Displays the grid locator based on the latitude and longitude of the caller station's position.
DST	Displays the caller's distance from your position.
TEMP	Displays the temperature of the caller station's area.
RAIN	Displays the rainfall of the caller station's area.
WIND DIR	Displays the wind direction of the caller station's area.
WIND SPD	Displays the wind speed of the caller station's area.
BARO	Displays the barometric pressure of the caller station's area.
HUMI	Displays the humidity of the caller station's area.
Symbol	Displays the caller station's D-PRS symbol.
GPS Time Stamp	Displays the time that the caller acquired the weather data.
Call sign	Displays the caller's call sign (with SSID).

MEM screen (GPS memory alarm position)

Compass*1	Displays GPS Memory channel's direction from your position.
Latitude	Displays GPS Memory channel's latitude.
Longitude	Displays GPS Memory channel's longitude.
GL*2	Displays the grid locator based on the latitude and longitude of GPS Memory channel's.
DST*2	Displays GPS Memory channel's distance from your position.
GPS memory name*2	Displays the selected GPS memory name.

ALM screen (GPS alarm position)

Compass*1	Displays GPS Alarm area's direction from your position.
Latitude	Displays GPS Alarm area's latitude.
Longitude	Displays GPS Alarm area's longitude.
GL*2	Displays the grid locator based on the latitude and longitude of GPS Alarm area's.
DST*2	Displays GPS Alarm area's distance from your position.
GPS Alarm*2	Displays "RX," GPS memory group name, or GPS memory name specified for the GPS Alarm function.

*1 You can change the direction in the Quick Menu window.

*2 You can change these display types in the Quick Menu window.

GPS items

GPS Memory

MENU > GPS > **GPS Memory**

The transceiver has 200 GPS Memory channels to save the received position data, or often-used position data, with an alphanumeric channel name. The channels can be divided into the “(No Group)” group and each Memory group (A to Z) for easy Memory management.

The display of the GPS Memory

(No Group)	GPS Memories not assigned to any group
A ~ Z : Group Name	GPS Memories assigned to the selected group.

GPS Memory Groups (A ~ Z)

GROUP NAME	GPS Memory Group name (Up to 16 alphanumeric characters)
------------	--

① You can edit the GPS Memory Group name. (p. 5-23)

GPS Memory channels

NAME	GPS memory channel name (Up to 16 alphanumeric characters)
DATE	Saved date
TIME	Saved time
LATITUDE	Saved position (latitude)
LONGITUDE	Saved position (longitude)
ALTITUDE	Saved altitude
GROUP	The group letter and the name of the group

- ① When you save the received position data on the GPS POSITION screen, the received station’s call sign is used as the GPS Memory name.
- ① In the Quick Menu window, you can edit the GPS Memory contents, such as the GPS Memory name. (p. 5-20)

Alarm Select

(Default: OFF)

MENU > GPS > GPS Alarm > **Alarm Select**

Select the target positions for the GPS Alarm function.

- OFF: Turns OFF the function.
- RX: The GPS Alarm sounds when a target (the last received position) enters in your active alarm range.
- Group: The GPS Alarm sounds when a target (positions in the GPS Memory, or in the selected GPS Memory Group) enters in your active alarm range.
- Memory: The GPS Alarm sounds when a target (the entered position in the GPS Memory) enters in the active alarm range.

Alarm Area (Group)

(Default: 0.25')

MENU > GPS > GPS Alarm > **Alarm Area (Group)**

Set the GPS active alarm range.

When a target enters in this set active alarm range, the GPS Alarm sounds and the GPS Alarm icon blinks.

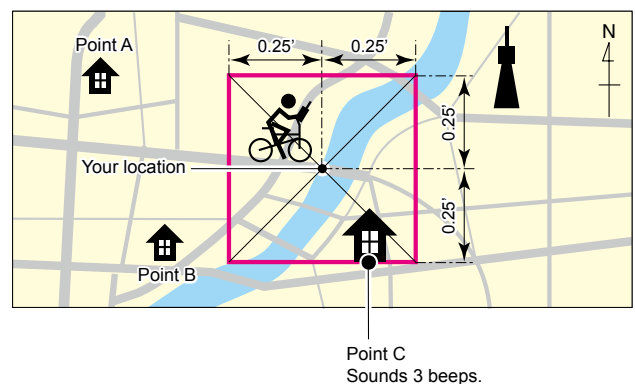
① When **Alarm Select** is set to “Group,” this setting is enabled.

Ranges differs, depending on **Latitude/Longitude** setting.

- Latitude/Longitude = ddd°mm.mm'
Ranges: 00.08' to 59.99' (0.01' steps)
- Latitude/Longitude = ddd°mm'ss"
Ranges: 00'05" to 59'59" (0'01" steps)

Example:

When a target enters in the active alarm range, the GPS Alarm sounds and the GPS alarm icon blinks.



GPS items

Alarm Area (RX/Memory) (Default: Both)

MENU > GPS > GPS Alarm > **Alarm Area (RX/Memory)**

Select the GPS active alarm range.

When a target enters in the active alarm range, the GPS Alarm sounds and the GPS alarm icon blinks.

① When **Alarm Select** is set to “RX” or “Memory,” this setting is enabled.

- **Limited:** The transceiver sounds 3 beeps and the GPS Alarm icon blinks when the target enters the 500 meter range.
- **Extended:** The transceiver sounds 3 beeps and the GPS Alarm icon blinks when the target enters the 1 kilometer range.
- **Both:** The transceiver sounds a beep and the GPS Alarm icon blinks when the target enters the 1 kilometer range, and sounds 3 beeps and the icon blinks when it enters the 500 meter range.
When the target exits the 500 meter range, but is still in the 1 kilometer range, the icon continues to blink, but no beeps sound.

Example:

When a target station enters in the active alarm range (500 meter or 1 kilometer range, depending on the setting), the GPS Alarm sounds and the GPS Alarm icon blinks.



Sounds a beep. Sounds 3 beeps.

GPS Logger (Default: ON)

MENU > GPS > GPS Logger > **GPS Logger**

Turn the GPS Logger function ON or OFF.

This function logs the position, altitude, course, speed, and number of satellites being used.

① BE SURE to insert a microSD card.

① When **GPS select** is set to “OFF” or “Manual,” this function does not save the log.

- **OFF:** Turns OFF the function.
- **ON:** The transceiver automatically logs GPS data. Once this function is turned ON, the GPS data will be continuously logged until the function is turned OFF, even if the transceiver is turned OFF, then ON again.

TIP: The log data is saved on the microSD card. The file name is automatically created, as shown below:

- Log start date and time: 31st October 2017
15:30:00
- File name: 20171031_153000.log

Record Interval (Default: 5sec)

MENU > GPS > GPS Logger > **Record Interval**

Set the GPS Logger function record interval to 1, 5, 10, 30, or 60 seconds.

Record Sentence

(Default: RMC/GGA/VTG/GSA)

MENU > GPS > GPS Logger > **Record Sentence**

Set the GPS Logger function record sentence to RMC, GGA, VTG, or GSA.

- Displays “✓” when the sentence is set.

NOTE: Select at least one sentence, otherwise an error beep will sound.

<<GPS Logger Only>>

MENU > GPS > GPS Logger > **<<GPS Logger Only>>**

You can turn ON the GPS Logger Only mode ON. In this mode, only the GPS Logger is functioning and the transceiver does not transmit or receive. (p. 5-32)

① **Information**

- BE SURE to insert a microSD card.
- Set **GPS Select** to “Internal GPS,” or “External GPS.” (p. 11-9)
- To cancel the mode, reboot the transceiver.

GPS items

GPS TX Mode (Default: OFF)

MENU > GPS > **GPS TX Mode**

Select a GPS transmission format to send GPS position data while in the DV mode.

- OFF: Does not transmit GPS data.
- D-PRS (DV-A): Transmits GPS data in the D-PRS format.
- NMEA (DV-G): Transmits GPS data in the NMEA format.

Unproto Address (Default: API31,DSTAR*)

MENU > GPS > GPS TX Mode > D-PRS (DV-A) > **Unproto Address**

Displays an unproto address of up to 56 alphanumeric characters.

NOTE: You should use the default address, and editing is not recommended.

Symbol (Default: Person)

MENU > GPS > GPS TX Mode > D-PRS (DV-A) > **Symbol**

Select the symbol that indicates your operating situation. The selected symbol channel's symbols (1 ~ 4) are transmitted with position data. See "Selectable Symbol list." (p. 5-15)

<Selecting a symbol with a 2 character symbol code>

1. Select a symbol channel, and then push [QUICK].
2. Select "Edit Symbol."
3. Push [QUICK].
4. Select "Direct Input."
5. Rotate [DIAL] to select a character or symbol.
6. Push [CS] to select the second digit.
7. Rotate [DIAL] to select a character or symbol.

Selectable characters and symbols
<For the first digit> /, \, 0 to 9, A to Z
<For the second digit> A to Z, a to z, 0 to 9, !"#\$%&'()*+,-./:;<=>?@[\] ^ _ ` { } ~

8. After selecting, push [ENT].
 - Sets the symbol into the symbol channel.

<Selecting a preset symbol>

1. Select a symbol channel, and then push [QUICK].
2. Select "Edit Symbol."
3. Select a symbol.
 - Sets the symbol into the symbol channel.

SSID (Default: ---)

MENU > GPS > GPS TX Mode > D-PRS (DV-A) > **SSID**

Select an SSID based on APRS® to add to your call sign, to show your operating style to other stations. The addition methods of the SSID differ, depending on whether the call sign includes a space or not.

- ---: The space in call sign is converted to "-."
 - ① If no text is entered after the space, the space will be deleted, and the space is not converted to "-."
 - Example:** JA3YUA → JA3YUA
JA3YUA A → JA3YUA-A
- (-0): No SSID is added.
 - ① If a call sign includes a space, any text or digit after the space will be deleted.
 - Example:** JA3YUA → JA3YUA
JA3YUA A → JA3YUA
- -1~-15: Adds an SSID of -1 to -15 to your call sign.
 - ① **Example:** SSID is "-9."
JA3YUA → JA3YUA-9
JA3YUA A → JA3YUA-9
- -A~-Z: Adds an SSID of -A to -Z to your call sign.
 - ① **Example:** SSID is "-Z."
JA3YUA → JA3YUA-Z
JA3YUA A → JA3YUA-Z

TIP: About the SSID

To assist in identifying a station's type, designated call sign SSIDs are used in D-PRS (or APRS®), according to a common guideline.

The guideline may be changed when the infrastructure environment, such as a product or network, is changed. Please check the latest guideline in the web site related to D-PRS and APRS®, and correctly set.

<http://aprs.org/aprs11/SSIDs.txt>

GPS items

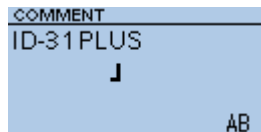
Comment

MENU > GPS > GPS TX Mode > D-PRS (DV-A) > **Comment**

Enter a comment to transmit it with the D-PRS position data. The number of characters you can enter differs, depending on the **Data Extension** and **Altitude** settings.

Data Extension	Altitude	Characters entered (Maximum)
OFF	OFF	43 (Default)
OFF	ON	35
Course/Speed	OFF	36
Course/Speed	ON	28

The symbol “**J**” displays the transmittable comment range. Note that the characters that exceed the range is not transmitted.



Transmittable comment range display
(In case of up to 28 characters)

Time Stamp (Default: OFF)

MENU > GPS > GPS TX Mode > D-PRS (DV-A) > **Time Stamp**

Select the transmitting time stamp type. The time stamp is transmitted with position data in the D-PRS mode, and UTC (Universal Time Coordinated) time is used.

① When your position is manually set, time stamp data is not transmitted.

- OFF: Does not transmit the time information.
- DHM: Transmits the time stamp in the Day, Hour, and Minute format.
- HMS: Transmits the time stamp in the Hour, Minute, and Second format.

Altitude (Default: OFF)

MENU > GPS > GPS TX Mode > D-PRS (DV-A) > **Altitude**

Select whether or not to transmit altitude data with the position data in the D-PRS mode.

① The number of characters you can enter in **Comment** differs, depending on the **Altitude and Data Extension** settings.

- OFF: No altitude data is transmitted.
- ON: Transmits altitude data with position data.

Data Extension (Default: OFF)

MENU > GPS > GPS TX Mode > D-PRS (DV-A) > **Data Extension**

Select whether or not to transmit course/speed data with position data in the D-PRS mode.

① The number of characters you can enter in **Comment** differs, depending on the **Data Extension and Altitude** settings.

- OFF: Does not transmit any information.
- Course/Speed: Transmits course and speed data with the position data.
 - ① The Course and Speed data is not transmitted when your position is manually set.
 - ① When transmitting with this setting, your station is regarded as a mobile station.

GPS items

GPS Sentence (Default: GGA)

MENU > GPS > GPS TX Mode > NMEA (DV-G) > **GPS Sentence**

Select sentences to be transmitted in the GPS mode to transmit position data. Set to between RMC, GGA, GLL, VTG, GSA, and GSV.

NOTE: Set the GSV sentence to OFF when sending the GPS message to conventional digital transceivers (IC-2820H, IC-E2820, ID-800H, IC-91AD, IC-E91, IC-V82, IC-U82, IC-2200H). The GSV sentence is incompatible with them.

GPS Message

MENU > GPS > GPS TX Mode > NMEA (DV-G) > **GPS Message**

Enter a GPS message of up to 20 alphanumeric characters. (p. 5-19)

NOTE: When you do not want to send a message, delete the entered message.

① **Information**

- Up to 4 GPS sentences can be set at a time.
- Displays “✓” when the sentence is set to ON.
- Even if **GPS Auto TX Timer** is set to “5 sec.,” when 4 sentences are selected, the time is automatically changed to “10 sec.”
- “VTG,” “GSA,” and “GSV” sentences is not transmitted when your position has been manually set.

TIP: Contents of GPS sentence

The Time Stamp is displayed based on the UTC (Universal Time Coordinated) time.

Sentence	Lat/Lon	Alt	GPS Time Stamp (UTC)	Date (UTC)	Status	2D/3D	COG (True)	SOG (knot)
RMC	✓		✓	✓	✓		✓	✓
GGA	✓	✓	✓		✓			
GLL	✓		✓		✓			
VTG							✓	✓
GSA					✓	✓		
GSV								

Sentence	Others
RMC	Magnetic Variation, Mode Indicator
GGA	Number of used satellites, HDOP, Geoidal separation, Age of Differential GPS data, Differential reference station ID
GLL	Mode Indicator
VTG	COG (Magnetic north), SOG (km/h), Mode Indicator
GSA	PRN number of satellites, PDOP, HDOP, VDOP
GSV	Total number of sentences, Sentence number, Total number of satellites in view, Satellite information (ID, Altitude, Azimuth, S/N)

GPS items

GPS Auto TX (Default: OFF)

MENU > GPS > **GPS Auto TX**

Select an option for the GPS Automatic Transmission function.

This function automatically transmits current position data received from a GPS receiver, as well as any entered GPS message, at this set interval.

NOTE: When **GPS TX Mode** is “NMEA,” set **GPS Select** to “Internal GPS” or “External GPS.” If you set to “Manual” or “OFF,” the current position data is automatically transmitted.

- OFF: Does not automatically transmit position data. (When you push [PTT], the transceiver transmits position data.)
- 5 sec to 30 min: Transmits current position data at the selected interval (5*, 10, or 30 seconds, or 1, 3, 5, 10, or 30 minutes).

* Not displayed when you set 4 GPS sentences in **GPS Sentence**.

Call Sign items

Call Sign

MENU > Call Sign

Set or view the “UR,” “R1,” “R2,” and “MY” call signs to use in the DV mode.
When not using the DR function, sets the call signs on this screen.

For Simplex operation (DV mode)

You can set the “UR” and “MY” call signs.

For Duplex (repeater) operation (DV mode/DR function)

You can set only “MY” call sign when the DR function is ON.

<To manually set the Duplex (repeater) operation>

Example: Making a gateway CQ call to Kirkland (IA) repeater (N71H B) from the Hirano repeater (JP3YHH A), in the DV mode.

- ① Before starting to set the call sign, set the frequency of your Access repeater and duplex direction on the standby screen. (Section 4)

TIP: When the **Digital Repeater Set** function is ON, the repeater call sign is automatically set. (p. 11-26)

Step 1. Setting the call sign “R1”

1. Select “R1.”
2. Push [QUICK].
3. Select “Edit.”
4. Rotate [DIAL] to enter the first character.
 - ① Selectable characters are Alphanumeric characters and symbol (“/”).
5. Push [CD] or [CS] to move the cursor.
6. Repeat steps 4 and 5 to enter the repeater call sign of up to 8 characters, including a space. (Example: JP3YHH A)
7. After entering, push [ENT].
 - Sets the entered repeater call sign.

Step 2. Gateway “R2” setting

1. Select “R2.”
 - ① To manually enter a call sign, push [QUICK], then select “Edit.”
2. Select “GW.”

About the RPT2 SELECT screen

NOT USED*	For local area calls
GW	To select the gateway call sign from the repeater list
Repeater name	To select the repeater that has the same gateway as the “R1” repeater.

Step 3. Destination “UR” setting

1. Select “UR.”
 - ① To manually enter the call sign, push [QUICK], then select “Edit.”
2. Select “Gateway CQ.”
3. Select repeater group where your destination repeater is listed. (Example: 19: USA West)
4. Select a destination repeater. (Example: Kirkland (IA))

About the YOUR SELECT screen

CQCQCQ	To select “CQCQCQ” to make a non-call sign specific call.
Gateway CQ*	To select “Gateway CQ” to make a call using the repeater list.
Your Call Sign	To select the destination “UR” call sign using the Your Call Sign memory.
RX History	To select the destination “UR” call sign using the RX History.
TX History	To select the destination “UR” call sign using the TX History.

* Not displayed in the Simplex mode.

RX History items

RX History

MENU > RX History

When a call is received in the DV mode, the call information such as the caller station's call sign or the repeater's call sign are saved on this screen. Up to 50 records can be saved.

① Even if the transceiver is turned OFF, the saved records are not deleted.

TIP: To display the RX record contents

On the RX HISTORY screen, push [Up] or [Down] to display the RX record contents (RX01 ~ RX50).

Contents of the RX History Top screen

RX01 ~ RX50	RX history number
CALLER* ¹	Displays the caller station's name.
CALLED* ¹	Displays the called station's name.
MESSAGE	Displays any message included in the received call, if entered.
RX TIME	Displays the date and time the call was received.
GW	Displays when a call is received through the internet.
GPS * ²	Displays when position data is included. (NMEA or Mobile/Base station)
OBJ * ²	Displays when the Object's data is included.
ITEM * ²	Displays when the Item's data is included.
WX * ²	Displays when the weather station's data is included.
(UP)	Displays when an uplink signal is received.

*¹ You can change the display type in the Quick Menu window. When you select "Call Sign Display," the call sign and a note that is entered after the call sign are displayed. If the name is not entered, the call sign and a note that is entered after the call sign are displayed.

*² Displayed if position data is included in received data.

*³ "FREQUENCY" is displayed instead of these items when the call was not through a repeater (Simplex call).

*⁴ If you have no position data, these items are not displayed.

Contents of the detail screen

The contents of the detail screen differ, whether position data is included in received data or not. Position data that is included in received data can be divided into 5 categories. Depending on the caller's TX mode or TX format, the displayed items and these meanings differ.

The following lists show the items for each category.

① No data is displayed when no position data is received.

TIP: On the RX HISTORY screen, push [ENT] to display the detail screen.

Common items

CALLER* ¹	Displays the caller station's name* ¹ .
CALLED* ¹	Displays the called station's name* ¹ .
RXRPT1* ¹ , * ³	Displays the name of the repeater that was accessed by the caller station. If it was a call through a gateway and the Internet, this item displays the Gateway repeater name of your local area repeater.
RXRPT2* ¹ , * ³	Displays the name of the repeater you received the call from.
MESSAGE	Displays any message included in the received call, if entered.
RX TIME	Displays the date and time the call was received.

<1. When the caller's TX mode is NMEA>

Compass* ⁴	Displays the caller's direction from your position.
Latitude	Displays the caller's latitude.
Longitude	Displays the caller's longitude.
GL	Displays the grid locator based on the caller's latitude and longitude.
ALT	Displays the caller's altitude.
DST* ⁴	Displays the caller's distance from your position.
COURSE	Displays the caller's direction over ground.
SPEED	Displays the caller's speed.
GPS Time Stamp	Displays the time that the caller acquired the position data.
Call sign	Displays the caller's call sign.
GPS MESSAGE	Displays the GPS message included in the position data of the received call.

RX History items

<2. When the caller's TX format is D-PRS Position (Mobile station)>

Compass*	Displays the caller's direction from your position.
Latitude	Displays the caller's latitude.
Longitude	Displays the caller's longitude.
GL	Displays the grid locator based on the caller's latitude and longitude.
ALT	Displays the caller's altitude.
DST*	Displays the caller's distance from your position.
COURSE	Displays the caller's direction over ground.
SPEED	Displays the caller's speed.
GPS Time Stamp	Displays the time that the caller acquired position data.
Call sign	Displays the caller's call sign (with SSID).
GPS MESSAGE	Displays the GPS message included in the position data of the received call.
Symbol	Displays the caller's D-PRS symbol.

<3. When the caller's TX format is D-PRS Position (Base station)>

Compass*	Displays the caller's direction from your position.
Latitude	Displays the caller's latitude.
Longitude	Displays the caller's longitude.
GL	Displays the grid locator based on the caller's latitude and longitude.
ALT	Displays the caller's altitude.
DST*	Displays the caller's distance from your position.
POWER	Displays the caller's TX power level.
HEIGHT	Displays the height of caller's antenna.
GAIN	Displays the gain of caller's antenna.
DIRECT	Displays the direction that the caller's antenna was pointing.
GPS Time Stamp	Displays the time that the caller acquired the position data.
Call sign	Displays the caller's call sign (with SSID).
GPS MESSAGE	Shows the GPS message included in the position data of the received call.
Symbol	Displays the caller's D-PRS symbol.

<4. When the caller's TX format is D-PRS Object/Item>

Compass*	Displays the Object/Item's direction from your position.
Latitude	Displays the Object/Item's latitude.
Longitude	Displays the Object/Item's longitude.
GL	Displays the grid locator based on the Object/Item's latitude and longitude.
ALT	Displays the Object/Item's altitude.
DST*	Displays the Object/Item's distance from your position.
COURSE	Displays the Object/Item's direction over ground.
SPEED	Displays the Object/Item's speed.
POWER	Displays the Object/Item's TX power level.
HEIGHT	Displays the height of Object/Item's antenna.
GAIN	Displays the gain of Object/Item's antenna.
DIRECT	Displays the direction that the Object/Item's antenna was pointing.
GPS Time Stamp	Displays the time that the caller sent the Object's data.
Call sign	Displays the caller's call sign (with SSID).
GPS MESSAGE	Displays the GPS message included in position data of the received call.
Symbol	Displays the Object/Item's D-PRS symbol.
Object/Item name	Displays the Object/Item station's name.

① When the object or item station is disabled, "KILLED" appears.

*If you have no position data, these items are not displayed.

RX History items

<5. When the caller's TX format is D-PRS Weather>

Compass*	Displays the caller's direction from your position.
Latitude	Displays the caller's latitude.
Longitude	Displays the caller's longitude.
GL	Displays the grid locator based on the caller's latitude and longitude.
DST*	Displays the caller's distance from your position.
TEMP	Displays the temperature of the caller's area.
RAIN	Displays the rainfall of the caller's area.
WIND DIR	Displays the wind direction of the caller's area.
WIND SPD	Displays the wind speed of the caller's area.
BARO	Displays the barometric pressure of the caller's area.
HUMI	Displays the humidity of the caller's area.
Symbol	Displays the caller's D-PRS symbol.
GPS Time Stamp	Displays the time that the caller acquired the position data.
Call sign	Displays the caller's call sign (with SSID)

*If you have no position data, these items are not displayed.

DV Memory items

Your Call Sign

MENU > DV Memory > Your Call Sign

The transceiver has up to 200 memories to save individual station call signs.

The saved call sign and name are displayed on the YOUR CALL SIGN or RX HISTORY screen.

- ① You can enter the Your (UR) Call Sign into the memory using the RX History. (BASIC MANUAL Section 11)
- ① To add, edit, or move the Your Call Sign in the memory, see pages 4-41 ~ 4-42 for details.

Repeater List

MENU > DV Memory > Repeater List

You can save repeater information for quick and simple communication when using repeaters. The transceiver has up to 750 repeaters that can be saved in 30 groups.

You can save "DV Repeater," "DV Simplex," "FM Repeater," and "FM Simplex" information in the repeater list.

NOTE: For easy operation, a repeater list is preloaded into your transceiver. However, if the CPU clears all entered contents (All Reset), the repeater list is also cleared. We recommend that memory data be backed up using a microSD card, or be saved to a PC using the CS-31PLUS CLONING SOFTWARE.

TIP: About the repeater list

The repeater list can be downloaded from the Icom website.

<http://www.icom.co.jp/world/support/download/firm/>

Repeater Group (01 ~ 30)

Group name	Repeater group name of up to 16 alphanumeric characters
------------	---

- ① You can set the Skip setting. (p. 4-39)

Repeater List

Depending on the type, the displayed items differ.

- ① The TYPE order is different from actual display.

<TYPE: DV Repeater>

TYPE	DV repeater
NAME	Repeater name of up to 16 alphanumeric characters
SUB NAME	Repeater sub name of up to 8 alphanumeric characters
CALL SIGN	Repeater call sign
GW CALL SIGN	Gateway call sign
GROUP	Repeater group where the repeater is assigned
USE (FROM)	Select whether or not to use the repeater as an Access repeater (FROM) in the DR screen.
FREQUENCY*1	Operating frequency of the Access repeater
DUP*1	Duplex setting to use the Access repeater
OFFSET FREQ*1	Frequency offset to use the Access repeater
POSITION	Position data accuracy level ("None," "Approximate," or "Exact")
LATITUDE*2	Latitude position of the repeater
LONGITUDE*2	Longitude position of the repeater
UTC OFFSET	Time difference between UTC (Universal Time Coordinated) and the local time

*1 Set these items when USE (FROM) is set to "YES."

*2 Displayed when POSITION is set to "Approximate" or "Exact."

DV Memory items

<TYPE: FM Repeater>

TYPE	FM repeater
NAME	FM repeater name of up to 16 alphanumeric characters
SUB NAME	FM repeater sub name of up to 8 alphanumeric characters
CALL SIGN	FM repeater call sign
GROUP	Repeater group where the repeater is assigned
USE (FROM)	Select whether or not to use the FM repeater as an Access repeater (FROM) on the DR screen.
FREQUENCY*1	Operating frequency of the FM repeater
DUP*1	Duplex setting to use the FM repeater
OFFSET FREQ*1	Frequency offset to use the FM repeater
MODE	Receiving mode of the FM repeater
TONE	Tone function setting of the FM repeater
REPEATER TONE	FM repeater tone frequency
POSITION	Position data accuracy level ("None," "Approximate," or "Exact")
LATITUDE*2	Latitude position of the FM repeater
LONGITUDE*2	Longitude position of the FM repeater
UTC OFFSET	Time difference between UTC (Universal Time Coordinated) and the local time

<TYPE: DV Simplex>

TYPE	DV Simplex
NAME	DV Simplex name of up to 16 alphanumeric characters
SUB NAME	DV Simplex sub name of up to 8 alphanumeric characters
GROUP	Group where the DV Simplex is assigned
USE (FROM)	Select whether or not to set in the "FROM" field on the DR screen
FREQUENCY*1	Frequency to operate DV Simplex
POSITION	Position data accuracy level ("None," "Approximate," or "Exact")
LATITUDE*2	Latitude position of the access point
LONGITUDE*2	Longitude position of the access point
UTC OFFSET	Time difference between UTC (Universal Time Coordinated) and the local time

<TYPE: FM Simplex>

TYPE	FM Simplex
NAME	FM Simplex name of up to 16 alphanumeric characters
SUB NAME	FM Simplex sub name of up to 8 alphanumeric characters
GROUP	Group where the FM Simplex is assigned
USE (FROM)	Select whether or not to set in the "FROM" field on the DR screen.
FREQUENCY*1	Frequency to operate FM Simplex
MODE	Receiving mode for FM Simplex
TONE	Tone function setting for FM Simplex
REPEATER TONE	FM simplex tone frequency
POSITION	Position data accuracy level ("None," "Approximate," or "Exact")
LATITUDE*2	Latitude position of the station
LONGITUDE*2	Longitude position of the station
UTC OFFSET	Time difference between UTC (Universal Time Coordinated) and the local time

TIP: You can save DV Simplex frequencies or a FM Simplex frequencies in the repeater list. Simplex frequencies in the repeater list can be used in the DR screen. See to the right for details.

① You can set the Skip setting. (p. 4-39)

*1 Set these items when USE (FROM) is set to "YES."
 *2 Displayed when POSITION is set to "Approximate" or "Exact."

My Station items

My Call Sign

MENU > My Station > My Call Sign

The transceiver has a total of 6 memories to save your own call signs.

You can enter a call sign of up to 8 digits. Also, a note of up to 4 characters for operating radio type or area can be entered.

- ① See D-STAR GUIDE in BASIC MANUAL for MY Call Sign entry.
- ① To select another My Call Sign, push [Up] or [Down] to select a call sign, and then push [ENT] on the MY CALL SIGN screen.

TX Message

MENU > My Station > TX Message

The transceiver has a total of 5 memories to save short messages for simultaneous transmission in the DV mode.

Enter a message of up to 20 alphanumeric characters for each memory.

- ① See page 4-17 for TX message entry.
- ① To select other TX message, push [Up] or [Down] to select a memory, and then push [ENT] on the TX MESSAGE screen.

TIP: To not transmit a message, select "OFF."

DV Set items

NOTE: The default settings shown below are for the USA transceiver version. The default settings may differ, depending on your transceiver version. To return to your transceiver version's default settings, see page 11-3.

RX Bass (Default: Normal)

MENU > DV Set > Tone Control > **RX Bass**

Select the receive audio bass filter level.

- Cut: Reduces the low frequencies.
- Normal: Normal tone balance.
- Boost: Increases the low frequencies.

RX Treble (Default: Normal)

MENU > DV Set > Tone Control > **RX Treble**

Select the receive audio treble filter level.

- Cut: Reduces the high frequencies.
- Normal: Normal tone balance.
- Boost: Increases the high frequencies.

RX Bass Boost (Default: OFF)

MENU > DV Set > Tone Control > **RX Bass Boost**

Turn the Receive Audio Bass Boost function ON or OFF.

① This function is different from the "Boost" setting of **RX Bass**.

- OFF: Turns OFF the function.
- ON: This function boosts the receive audio bass.

TX Bass (Default: Normal)

MENU > DV Set > Tone Control > **TX Bass**

Select the transmit audio bass filter level.

- Cut: Reduces the low frequencies.
- Normal: Normal tone balance.
- Boost: Increases the low frequencies.

TX Treble (Default: Normal)

MENU > DV Set > Tone Control > **TX Treble**

Select the transmit audio treble filter level.

- Cut: Reduces the high frequencies
- Normal: Normal tone balance
- Boost: Increases the high frequencies

Auto Reply (Default: OFF)

MENU > DV Set > **Auto Reply**

Select an option for the Automatic Reply function in the DV mode. This function automatically replies to a call addressed to your own call sign, even if you are away from the transceiver.

① When "ON" or "Voice" is selected, the Automatic Reply function is automatically turned OFF when you push [PTT]. When "Position" is selected, the Automatic Reply function is not turned OFF, even if you push [PTT].

- OFF: Turns OFF the function.
- ON: Replies with your own call sign (No audio reply is sent).
- Voice: Replies with your call sign and any Auto Reply message recorded on the SD (up to 10 seconds).
 - ① The transmitted audio can be monitored.
 - ① If no microSD card is inserted, or no message is recorded, only your call sign is transmitted.
- Position*: Replies with your own call sign and transmits your position data using the internal or external GPS receiver.

*When **GPS Select** is set to "OFF" or "Manual," the internal GPS receiver is temporarily turned ON.

When **GPS Select** is set to "External GPS," but if the external GPS receiver is not connected, the internal GPS receiver is temporarily turned ON.

DV Data TX (Default: Auto)

MENU > DV Set > **DV Data TX**

Select whether or not to manually or automatically transmit data in the DV mode.

- PTT: Push [PTT] to manually transmit data.
- Auto: When data is input from a PC through the [DATA] jack, the transceiver automatically transmits it.

DV Set items

Fast Data (Default: OFF)MENU > DV Set > DV Fast Data > **Fast Data**

Turn the DV Fast Data function ON or OFF for data communication in the DV mode.

The DV Fast Data function uses data and the audio frames to send data approximately 3.5 times faster than the normal speed. No audio can be sent.

① While holding down [PTT], the data is sent at the slow speed, even if "ON" is selected. This is because the audio frame is used for the microphone audio transmission and the audio transmission has priority. The GPS data speed is set in **GPS Data Speed**.

② When you send data to other transceivers that can receive only slow speed data, set to "OFF."

- OFF: Sends data at the slow speed (approximately 950 bps).
- ON: Sends data at the fast speed (approximately 3480 bps).

GPS Data Speed (Default: Slow)MENU > DV Set > DV Fast Data > **GPS Data Speed**

Set the GPS data speed when the data is sent using the DV Fast Data function.

① When you send GPS data to other transceivers that can receive only slow speed data, set to "Slow."

- Slow: Sends GPS data in the slow speed (approximately 950 bps).
- Fast: Sends GPS data in the fast speed (approximately 3480 bps).

TX Delay (PTT) (Default: 2sec)MENU > DV Set > DV Fast Data > **TX Delay (PTT)**

Set the TX delay time.

In the data communication mode and after releasing [PTT], the transceiver automatically sends the data using the DV Fast Data function for this set period of time.

NOTE: This function is usable only when **DV Data TX** is set to "PTT."

- OFF: After releasing [PTT], the transceiver returns to receive.
- 1 ~ 10sec: After releasing [PTT], the transceiver sends data by using the DV Fast Data function for this set period of time. The transceiver automatically returns to receive when the TX data is completely sent, or when this period of time ends, whichever is sooner.

Digital Monitor (Default: Auto)MENU > DV Set > **Digital Monitor**

Select a Receive mode when you push [SQL] in the DV mode.

- Auto: Receives in the DV mode or the FM mode, depending on the received signal.
- Digital: Receives in the DV mode.
- Analog: Receives in the FM mode.

Digital Repeater Set (Default: ON)MENU > DV Set > **Digital Repeater Set**

Turn the Digital Repeater Setting function ON or OFF. In any DV mode except when using the DR function, and when accessing a repeater that has a call sign different from the transceiver's setting, this function reads the repeater's signal and automatically sets the repeater call sign in R1 and R2.

- OFF: Turns OFF the function.
- ON: Automatically sets the repeater call sign.

RX Call Sign Write (Default: OFF)MENU > DV Set > **RX Call Sign Write**

Set the RX Call Sign Automatic Write function to Auto or OFF. When receiving a call addressed to your own call sign in any DV mode except when using the DR function, this function automatically sets the caller station call sign into "UR."

- OFF: Turns OFF the function.
- Auto: Automatically sets the call sign of the caller station into "UR."

RX Repeater Write (Default: OFF)MENU > DV Set > **RX Repeater Write**

Set the Repeater Call Sign Automatic Write function to Auto or OFF. When receiving a call addressed to your own call sign through a repeater in any DV mode except when using the DR function, this function automatically sets the call sign of the repeater into "R1" or "R2."

- OFF: Turns OFF the function.
- Auto: Automatically sets the call sign of the repeater into "R1" or "R2."

DV Auto Detect (Default: OFF)MENU > DV Set > **DV Auto Detect**

Turn the DV Mode Automatic Detect function ON or OFF. If you receive an FM signal in the DV mode, this function temporarily switches to the FM mode.

- OFF: Turns OFF the function. The operating mode is fixed to the DV mode.
- ON: Automatically selects the FM mode for temporal operation.

DV Set items

RX Record (RPT) (Default: ALL)

MENU > DV Set > **RX Record (RPT)**

The transceiver can record the data of up to 50 individual calls. When the received signal includes a status message (“UR?” or “RPT?”) that is sent back from the Access repeater, you can record up to 50 messages, or only the last call, in the Received Call Record.

- ALL: Records up to 50 calls.
- Latest Only: Records only the last call.

[RX>CS] Key (Default: Call Sign Capture)

MENU > DV Set > **[RX>CS] Key**

Select the [RX→CS] Call Sign Capture key operation when you hold down.

- Call Sign Capture: While holding down, the RX History is displayed. After releasing, the last received call station’s call sign is set to “TO” (destination).
- RX>CS List: When you holding down for 1 second, the RX History is displayed. Rotate [DIAL] to select a call sign to set to “TO” (destination), and then push [ENT].

BK (Default: OFF)

MENU > DV Set > **BK**

The Break-in (BK) function enables you to break into a conversation, where the 2 other stations are communicating with the Digital Call Sign Squelch function.

① The BK function is automatically turned OFF when transceiver is turned OFF.

- OFF: Turns OFF the function.
- ON: Turns ON the function.

EMR (Default: OFF)

MENU > DV Set > **EMR**

The Enhanced Monitor Request (EMR) function enables all transceivers that receive an EMR signal automatically open their squelch to receive the signal.

① The EMR function is automatically turned OFF when transceiver is turned OFF.

- OFF: Turns OFF the function.
- ON: Turns ON the function.

EMR AF Level (Default: 19)

MENU > DV Set > **EMR AF Level**

Set the audio output level to between 0 and 39 for when an EMR communication signal is received. When an EMR signal is received, the audio is heard at this set level, or the [VOL] control level, whichever is higher.

To disable the setting, set to “0.”

NOTE: After an EMR signal disappears, the audio level will remain at the EMR level. In this case, rotate [VOL] to adjust the audio level.

SPEECH items

NOTE: The default settings shown below are for the USA transceiver version. The default settings may differ, depending on your transceiver version. To return to your transceiver version's default settings, see page 11-3.

RX Call Sign SPEECH (Default: ON (Kerchunk))

MENU > SPEECH > RX Call Sign SPEECH

Turn the RX Call Sign Speech function ON or OFF for calls received in the DV mode.

① Information

- When the Digital Squelch function is used, the calling station's call sign is not announced if the received signal is not addressed to your call sign, or does not include a matching digital code.
- When you receive a signal from a repeater ("UR?" or "RPT?"), the caller station's call sign is not announced.
- While scanning, the transceiver resumes the scan during an announcement.
- Even if a note is entered after the call sign, it is not announced.
- When you receive a signal during an announcement, the transceiver cancels the announcement, and you can hear the received audio.
- OFF: The caller station's call sign is not announced, even when a call is received.
- ON (Kerchunk): The caller station's call sign is announced only when they make a short transmission.
- ON (All): The caller station's call sign is always announced.

RX>CS SPEECH (Default: ON)

MENU > SPEECH > RX>CS SPEECH

Turn the RX>CS Speech function ON or OFF. The RX>CS Speech function announces the station call sign that is selected from a Received Call Record by pushing [RX→CS].

- ① If a call is received during an announcement, the received audio is muted, and the audio is not recorded onto the microSD card. If the call sign is announced while recording, no audio is recorded.

- OFF: The station call sign is not announced.
- ON: The station call sign is announced.

DIAL SPEECH (Default: OFF)

MENU > SPEECH > DIAL SPEECH

Turn the Dial Speech function ON or OFF. The Dial Speech function announces the frequency or repeater call sign that is selected by rotating [DIAL].

- ① When using the DR function, the frequency is announced if the Simplex mode is selected or the FM repeater does not have a call sign.
- ① When you receive a signal during an announcement, the transceiver cancels the announcement, and you can hear the received audio.

- OFF: The frequency or repeater call sign is not announced.
- ON: The frequency or repeater call sign is announced, 1 second after rotating [DIAL]. In the VFO, Memory, or Call channel mode, the frequency is announced. When using the DR function, the repeater call sign is announced.

MODE SPEECH (Default: OFF)

MENU > SPEECH > MODE SPEECH

Turn the Operating Mode Speech function ON or OFF. When this function is ON, the selected operating mode is announced.

- ① While the VFO scanning, the operating mode is announced when you change the mode.

- OFF: The selected operating mode is not announced.
- ON: The selected operating mode is announced.

SPEECH Language (Default: English)

MENU > SPEECH > SPEECH Language

Set the speech language to English or Japanese.

Alphabet (Default: Normal)

MENU > SPEECH > Alphabet

Select either "Normal" or "Phonetic Code" to announce the alphabet characters.

- Normal: Normal code is used. (Example: A as eh, B as bee)
- Phonetic Code: The Phonetic code is used. (Example: A as Alfa, B as Bravo)

SPEECH items

SPEECH Speed (Default: Fast)

MENU > SPEECH > **SPEECH Speed**

Set the speech speed to Slow or Fast.

SPEECH Level (Default: 7)

MENU > SPEECH > **SPEECH Level**

Adjust the voice synthesizer volume level to between 0 (OFF), 1 (minimum) and 9 (maximum).

- ① The voice synthesizer audio output level is linked with the [VOL] setting from the minimum audio volume up to this set level.

DTMF/T-CALL items

NOTE: The default settings shown below are for the USA transceiver version. The default settings may differ, depending on your transceiver version. To return to your transceiver version's default settings, see page 11-3.

You can set the DTMF tone code and DTMF Memory channel for DTMF tone operation. See page 12-6 for details.

DTMF Memory (Default: d0)

MENU > DTMF/T-CALL > **DTMF Memory**

Displays a list of the DTMF Memory channels.

- T-CALL: 1750 Hz tone burst signal
- d0 ~ d#: DTMF memory channel list

DTMF Speed (Default: 100ms)

MENU > DTMF/T-CALL > **DTMF Speed**

Select the DTMF transmit speed.

- 100ms: Transmits the DTMF codes at about 100 milliseconds per code.
5 characters per second.
- 200ms: Transmits the DTMF codes at about 200 milliseconds per code.
2.5 characters per second.
- 300ms: Transmits the DTMF codes at about 300 milliseconds per code.
1.6 characters per second.
- 500ms: Transmits the DTMF codes at about 500 milliseconds per code.
1 character per second.

QSO/RX Log items

NOTE: The default settings shown below are for the USA transceiver version. The default settings may differ, depending on your transceiver version. To return to your transceiver version's default settings, see page 11-3.

QSO Log (Default: ON)

MENU > QSO/RX Log > **QSO Log**

Select whether or not to make a communication log on a microSD card. The communication log is made on a microSD card, and saved in the “csv” format.

① BE SURE to insert a microSD card.

- OFF: Turns OFF the function.
- ON: The transceiver makes a log on the microSD card.
The transceiver starts making a log when you begin talking.

TIP:

- The folder name is automatically created, as [ID-31\QsoLog].
- The file name is automatically created, as described below:
Example:
Log start date and time: 31st October 2017
15:30:00
File name: 20171031_153000.csv
- The log contents is not displayed on the transceiver. You can display the log contents on a PC.

RX History Log (Default: OFF)

MENU > QSO/RX Log > **RX History Log**

Select whether or not to make a DV mode's receive history log on a microSD card. The receive history log is made on a microSD card, and saved in the “csv” format.

① BE SURE to insert a microSD card.

- OFF: Turns OFF the function.
- ON: The transceiver makes a DV mode's receive history log on the microSD card.
The transceiver starts making a receive history log when you finish talking.

TIP:

- The folder name is automatically created, as [ID-31\RxLog].
- The file name is automatically created, as described below:
Example:
Log start date and time: 31st October 2017
15:30:00
File name: 20171031_153000.csv
- The log contents is not displayed on the transceiver. You can display the log contents on a PC.

Separator/Decimal (Default: Sep [,] Dec [.])

MENU > QSO/RX Log > CSV Format > **Separator/Decimal**

Select the separator and the decimal character for the CSV format.

- Sep [,] Dec [.]: Separator is “,” and Decimal is “.”
- Sep [;] Dec [.]: Separator is “;” and Decimal is “.”
- Sep [;] Dec [,]: Separator is “;” and Decimal is “,”

Date (Default: mm/dd/yyyy)

MENU > QSO/RX Log > CSV Format > **Date**

Select the date format between “yyyy/mm/dd,” “mm/dd/yyyy” and “dd/mm/yyyy.” (y: year, m: month, d: day)

QSO/RX Log items

The **QSO Log** contents are described below:

Contents	Example		Descriptions
TX/RX	TX	RX	Transmission and reception
Date	10/31/2017 13:51:48	10/31/2017 13:51:48	Date and time the call was started.
Frequency	438.010000	438.010000	Operating frequencies (When Duplex is set, the RX frequency is displayed.)
Mode	DV	DV	Operating mode (FM/FM-N/DV)
My Latitude	34.764667	34.764667	Your latitude (unit: degree) (+: North latitude, -: South latitude)
My Longitude	135.375333	135.375333	Your longitude (unit: degree) (+: East longitude, -: West longitude)
My Altitude	50.5	50.5	Your altitude (unit: m) Records to one decimal place.
RF Power	Low	(Blank)	TX output power level
S-meter	(Blank)	S0	The relative signal strength of the receive signal (in 12 levels)
RPT Call Sign	JP3YHJ A	JP3YHJ A	Repeater call sign (DV mode only)
TX Call Sign	CQCQCQ	(Blank)	TX Call sign (DV mode only)
RX Call Sign	(Blank)	JA3YUA A/ 4100	RX Call sign (DV mode only)
RX Latitude	(Blank)	34.764667	Caller's latitude, if sent. (unit: degree) (+: North latitude, -: South latitude) Records only when you receive in the DV mode.
RX Longitude	(Blank)	135.375333	Caller's longitude, if sent. (unit: degree) (+: East longitude, -: West longitude) Records only when you receive in the DV mode.
RX Altitude	(Blank)	30.5	Caller's altitude, if sent. (unit: m) Records only when you receive in the DV mode.

QSO/RX Log items

The **RX log** contents are shown below:

Contents	Example	Descriptions
Frequency	438.010000	RX Frequency
Mode	DV	Operating mode (DV mode is fixed)
Caller	JA3YUA A	Call sign of the caller station (up to 8 characters)
/	ID31	Note after the call sign (up to 4 characters)
Called	CQCQCQ	Call sign of the called station
Rx RPT1	JP3YHH G	Access repeater call sign of the caller station or the gateway repeater call sign of your local area repeater.
Rx RPT2	JP3YHJ A	Access repeater call sign of the called station
Message	Hello CQ D-STAR!	Message included in the received call (up to 20 characters)
Status	(Blank)	Normal: blank, Uplink: "RPT UP", Access repeater reply: "UR?" or "RPT?"
Received date	10/31/2017 13:51:48	Date and time the call was received Depending on the setting, the format may differ.
BK	*	BK call: "**", Normal call: Blank
EMR	*	EMR call: "**", Normal call: Blank
Latitude	34.764667	Caller's latitude, if sent. (unit: degree) (+: North latitude, -: South latitude)
Longitude	135.375333	Caller's longitude, if sent. (unit: degree) (+: East longitude, -: West longitude)
Altitude	30.5	Caller's altitude, if sent. (unit: m) Records to 1 decimal place.
SSID	-A	Caller's SSID, if sent. (0, -1 ~ -15, -A ~ -Z)
D-PRS Symbol	Car	Icon: Converts to text, None: Code
Course	123	Caller's course (unit: degree)
Speed	23.5	Caller's speed (unit: km/h) Records to 1 decimal place.
Power	49	TX power (unit: W)
Height	24	Antenna height (unit: m)
Gain	6	Antenna gain (unit: dB)
Directivity	Omni	Antenna directivity (Omni, 45, 90, 135, 180, 225, 270, 315, or 360)
Object/Item Name	HAM FES	Object name or Item name (up to 9 characters)
Data Type	Live Object	Data type of Object or Item (Live or Kill)
Temperature	20.5	Temperature (unit: °C) Records to 2 decimal places.
Rainfall	253.75	Rainfall (unit: mm) Records to 2 decimal places.
Rainfall (24 Hours)	253.75	Rainfall (24 Hours) (unit: mm) Records to 2 decimal places.
Rainfall (Midnight)	253.75	Rainfall (Midnight) (unit: mm) Records to 2 decimal places.
Wind Direction	315	Wind Direction (unit: degree)
Wind Speed	10.0	Wind Speed (unit: m/s) Records to 1 decimal place.
Gust Speed	10.0	Gust Speed (unit: m/s) Records to 1 decimal place.
Barometric	1013.0	Barometric (unit: hPa) Records to 1 decimal place.
Humidity	85	Humidity (unit: %)
GPS Time Stamp	12:00:00	Time data that the caller station acquires position data
GPS Message	Osaka City/ ID-31	Caller is "NMEA": Records the GPS message Caller is "D-PRS": Records the D-PRS comment

Function items

NOTE: The default settings shown below are for the USA transceiver version. The default settings may differ, depending on your transceiver version. To return to your transceiver version's default settings, see page 11-3.

Power Save

(Default: Auto (Short))

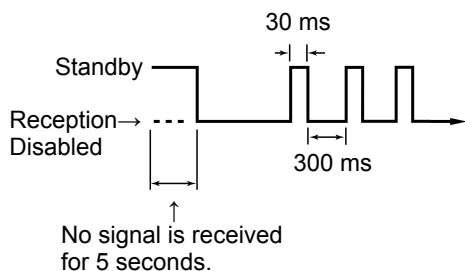
MENU > Function > Power Save

Set the Power Save function to reduce current drain and conserve battery power.

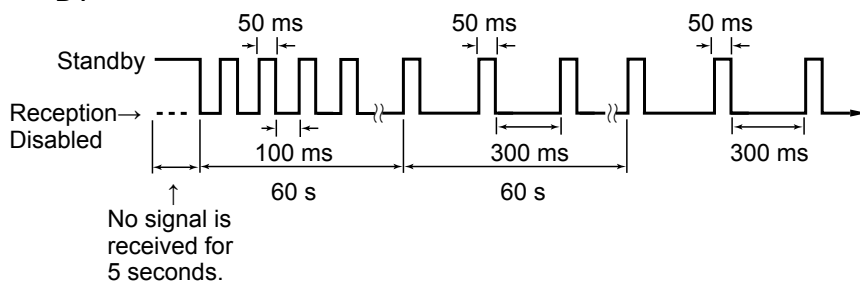
When the Power Save function is activated, the call sign or the beginning of the signal may not be received correctly.

NOTE: The Power Save function is disabled when using an external power source, or if the **Auto Reply** is set to "ON," "Voice," or "Position." (MENU > DV Set > **Auto Reply**)

- OFF: Turns the function OFF.
- Auto (Short): Sets the Power saving time to "Short."
<FM/FM-N>



<DV>



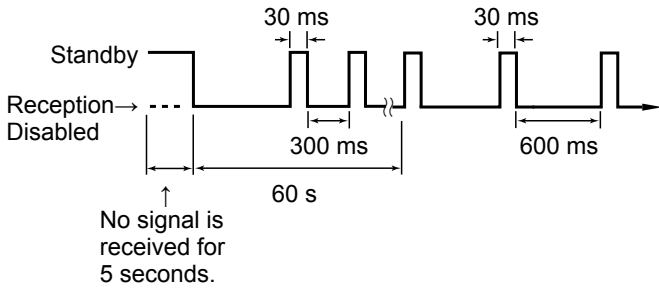
Function items

Power Save (continued)

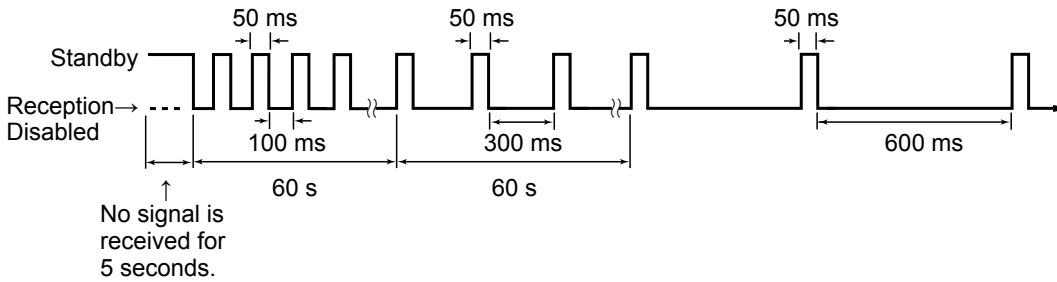
(Default: Auto (Short))

MENU > Function > Power Save

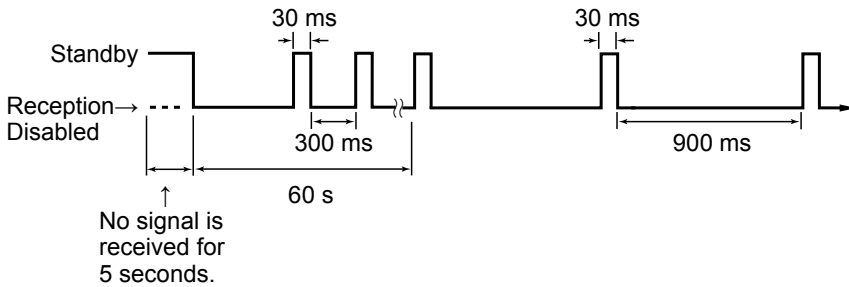
- Auto (Middle): Sets the Power saving time to "Middle."
<FM/FM-N>



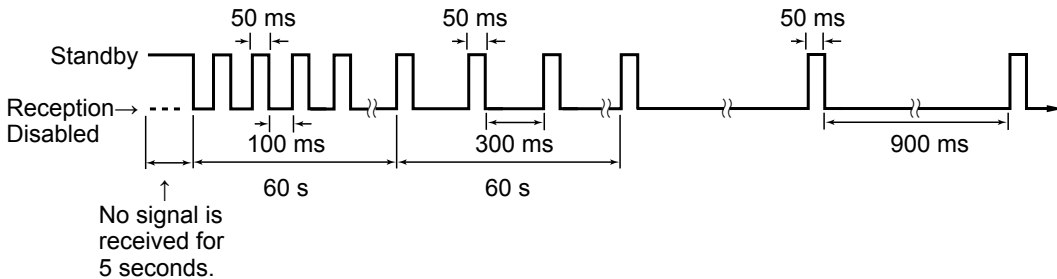
<DV>



- Auto (Long): Sets the Power saving time to "Long."
<FM/FM-N>



<DV>



Function items

Monitor (Default: Push)MENU > Function > **Monitor**

Select an option for the [SQL] Monitor function. (BASIC MANUAL Section 3)

- Push: Hold down [SQL] to monitor the frequency. Release to stop monitoring.
- Hold: Push [SQL] momentarily to monitor the frequency and push momentarily again to cancel it.

Dial Speed-UP (Default: ON)MENU > Function > **Dial Speed-UP**

Turn the Dial Speed Acceleration ON or OFF. The acceleration automatically speeds up the tuning dial speed when you rapidly rotate [DIAL].

- OFF: Turns OFF the function.
- ON: Turns ON the function.

Auto Repeater (Default: ON (DUP))MENU > Function > **Auto Repeater**

The Auto Repeater function automatically turns the Duplex operation and Tone Encoder* ON or OFF. The offset and repeater tone are not changed by this function. Reset these setting values, if necessary.

① This item is displayed only in the USA version transceiver.

- OFF: Turns OFF the function.
- ON (DUP): Turns ON the Duplex operation only. (Default)
- ON (DUP, TONE): Turns ON the Duplex operation and Tone Encoder*.

* The Tone Encoder is not turned ON in the DV mode.

Remote MIC KeyMENU > Function > **Remote MIC Key**

The function assignments for the [A], [B], [△], and [▽] keys on the optional HM-75LS REMOTE CONTROL SPEAKER MICROPHONE can be changed.

See pages 11-36 and 11-37 for the assignable key functions.

- During RX/Standby: The assigned key function is enabled while receiving or in the standby mode.
- During TX: The assigned key function is enabled while transmitting.

TIP: Volume level adjustment while monitoring

- When [VOL UP]/[VOL DOWN] are assigned, push these keys to adjust the volume level.
- When [VOL UP]/[VOL DOWN] are not assigned, but [UP]/[DOWN] are assigned, push these keys to adjust the volume level.
- When [VOL UP]/[VOL DOWN]/ [UP]/[DOWN] are not assigned, push [△]/[▽] to adjust the volume level, if [Monitor (Push)] or [Monitor (Hold)] is not assigned to [△]/[▽].

Function items

• During RX/Standby:

●: Default setting

Function	Description	Remote MIC Key			
		[A]	[B]	[△]	[▽]
---	No function				
UP	Push to increase the frequency, Memory channel, repeater, or station call sign.			●	
DOWN	Push to decrease the frequency, Memory channel, repeater, or station call sign.				●
VOL UP	Push to increase the volume level.				
VOL DOWN	Push to decrease the volume level.				
Monitor (Push)	Hold down [SQL] to open the squelch. Release to close the squelch.				
Monitor (Hold)	Push to open or close the squelch.				
CALL	Push to select a Call channel.	●			
MR (000 CH)	In the Memory mode, push to select Memory channel 000.				
MR (001 CH)	In the Memory mode, push to select Memory channel 001.				
VFO/MR	Push to select the VFO mode and the Memory mode.		●		
DR	Push to turn the DR function ON or OFF.				
FROM (DR)	On the DR screen, push to select "FROM."				
TO (DR)	On the DR screen, push to select "TO."				
Home CH	Push to directly select the Home CH that is set to the selected mode (VFO/Memory) or DR screen. While in the CALL CH mode, or when no Home CH is set, an error beep sounds.				
SCAN	Push to start a scan. While scanning, push to stop the scan.				
Temporary Skip	Push to set the frequency to be skipped during scanning. The selected frequencies are temporarily skipped for faster scanning.				
RX>CS	Hold down for 1 second to set the last calling station's call sign to "TO" (destination).				
SPEECH	Push to announce the frequency, operating mode or call sign. ① In the VFO, Memory or Call channel mode, the frequency and the operating mode are announced. ② In the DR screen, the call sign is announced. If Simplex is selected, the frequency is announced.				
Voice TX	Push to transmit the voice audio recorded on the microSD. Hold down for 1 second to repeatedly transmit the voice audio.				

11 MENU SCREEN

Function items

• During TX:

●: Default setting

Function	Description	Remote MIC Key			
		[A]	[B]	[△]	[▽]
---	No function		●	●	●
VOL UP	Push to increase the volume level.				
VOL DOWN	Push to decrease the volume level.				
Voice TX	Push to transmit the voice audio recorded on the microSD. Hold down for 1 second to repeatedly transmit the voice audio. ① To make a repeat transmission, [PTT] must be released after the transmission is started.				
T-CALL	Push to transmit a 1750 Hz tone.	●			

Function items

Key Lock (Default: Normal)

MENU > Function > Key Lock

Select the key lock type when the Key Lock function is ON.

NOTE: Regardless of the setting, You can still use [P], [PTT] and [MENU] even if the Key Lock function is ON.

- Normal: All keys and dials except [SQL] and [VOL] are locked.
- No SQL: All keys and dials except [SQL] is locked.
- No VOL: All keys and dials except [VOL] is locked.
- ALL: All keys and dials are locked.

PTT Lock (Default: OFF)

MENU > Function > PTT Lock

Turn the PTT lock function ON or OFF. To prevent accidental transmissions, this function disables [PTT].

- OFF: Turns OFF the function.
- ON: Turns ON the function.

Busy Lockout (Default: OFF)

MENU > Function > Busy Lockout

Turn the Busy Lockout function ON or OFF. This function inhibits a transmission while receiving a signal, or when the squelch is open.

- OFF: Turns OFF the function.
- ON: Turns ON the function.

Time-Out Timer (Default: 5min)

MENU > Function > Time-Out Timer

To prevent an accidental prolonged transmission, the transceiver has a time-out timer. The function inhibits continuous transmissions longer than this set period of time.

- OFF: Turns OFF the function.
- 1 to 30 min: The transmission is cut OFF after the set period of time ends (1, 3, 5, 10, 15, or 30 minutes).

Active Band (Default: All)

MENU > Function > Active Band

Enables continuous frequency selection of the operating frequency across all bands using [DIAL].

① This setting does not affect the scan.

- All: When you rotate [DIAL] on the band edge, the top or bottom frequency in the displayed band is selected.
- HAM: When you rotate [DIAL], the top or bottom frequency in the amateur band is selected. You cannot select a frequency out of the amateur band.

MIC Gain (Internal) (Default: 3)

MENU > Function > MIC Gain (Internal)

Set the internal microphone gain to between 1 (minimum) and 4 (maximum), to suit your operation needs.

Higher values make the microphone more sensitive to your voice.

MIC Gain (External) (Default: 2)

MENU > Function > MIC Gain (External)

Set the external microphone gain to between 1 (minimum) and 4 (maximum), to suit your operation needs.

Higher values make the microphone more sensitive to your voice.

Data Speed (Default: 9600bps)

MENU > Function > Data Speed

Set the following data speed in the DV mode to 4800 bps or 9600 bps.

- Data communication speed
- GPS information output speed
- External GPS device communication speed

Function items

VOX (Default: OFF)

MENU > Function > VOX > **VOX**

Turn the VOX function ON or OFF.
The Voice Operated Transmission (VOX) function starts transmission without pushing [PTT] when you speak into the microphone, and then, automatically returns to receive when you stop speaking.

- OFF: Turns OFF the function.
- ON: Starts transmission without pushing [PTT] when you speak into the microphone. Then automatically returns to receive when you stop speaking.

VOX Level (Default: 5)

MENU > Function > VOX > **VOX Level**

Set the VOX gain level to between 1 and 10, or OFF. Higher values make the VOX function more sensitive to your voice. To turn the VOX function OFF, set to "OFF."

- OFF: Turns the VOX function OFF.
- 1 ~ 10: 1 (The minimum sensitivity)
10 (The maximum sensitivity)

VOX Delay (Default: 0.5sec)

MENU > Function > VOX > **VOX Delay**

Set the VOX Delay to 0.5, 1.0, 1.5, 2.0, 2.5, or 3.0 seconds. The VOX Delay is the amount of time the transmitter stays ON after you stop speaking before the VOX switches to receive.

VOX Time-Out Timer (Default: 3min)

MENU > Function > VOX > **VOX Time-Out Timer**

Set the VOX Time-Out Timer to prevent an accidental prolonged transmission. To disable the function, set to "OFF."

- OFF: Turns the function OFF.
- 1, 2, 3, 4, 5, 10, or 15min: If a continuous transmission exceeds the set period of time, the transmission is cut off.

Headset Select (Default: Other)

MENU > Function > VOX > **Headset Select**

- Select the headset type to be connected.
- HS-95: Select when using the HS-95.
 - Other: Select when using the HS-94 or HS-97.

CI-V (DATA Jack) (Default: OFF)

MENU > Function > CI-V > **CI-V (DATA Jack)**

Selects whether or not to use the [DATA] jack to remotely control the transceiver.

- ① When you use the optional RS-MS1A, set to "ON (Echo Back OFF)."
- OFF: Does not use the [DATA] jack to remotely control the transceiver.
- ON (Echo Back OFF): Use the [DATA] jack to remotely control the transceiver.
 - ① Does not send back the CI-V command input from the [DATA] jack.
- ON (Echo Back ON): Use the [DATA] jack to remotely control the transceiver.
 - ① Sends back the CI-V command input from the [DATA] jack.

CI-V Address (Default: A0)

MENU > Function > CI-V > **CI-V Address**

To distinguish devices, each CI-V transceiver has its own Icom standard address in hexadecimal code. The ID-31A/ID-31E PLUS's default address is A0. When 2 or more ID-31A/ID-31E PLUSs are simultaneously controlled by a PC, set a different address for each transceiver between 02h and DFh (hexadecimal).

CI-V Baud Rate (Default: Auto)

MENU > Function > CI-V > **CI-V Baud Rate**

Set the CI-V data transfer speed to 300, 1200, 4800, 9600, 19200 bps, or Auto. When "Auto" is selected, the baud rate is automatically set according to the data rate of the controller.

- ① You can select "300," "1200," or "Auto" only when CI-V (DATA Jack) is set to "OFF."

CI-V Transceive (Default: OFF)

MENU > Function > CI-V > **CI-V Transceive**

Turn the CI-V Transceive function ON or OFF.

- ① When you use the optional RS-MS1A, set to "ON."

- OFF: Turns OFF the function.
- ON: When you change a setting on one transceiver, the same settings is automatically changed on the other connected transceivers or receivers.

Display items

NOTE: The default settings shown below are for the USA transceiver version. The default settings may differ, depending on your transceiver version. To return to your transceiver version's default settings, see page 11-3.

Backlight (Default: Auto (DC IN: ON))

MENU > Display > Backlight

Select an option for the transceiver backlight.

- OFF: The backlight does not light.
- ON: The backlight lights continuously.
- Auto: The backlight lights when you push a key or rotate [DIAL], and goes out after the set period of time in the **Backlight Timer**.
- Auto (DC IN:ON): The backlight lights when you push a key or rotate [DIAL], and goes out after the set period of time in the **Backlight Timer**.
 - ① When an external DC power source is connected, lights continuously.

Backlight Timer (Default: 5sec)

MENU > Display > Backlight Timer

Set the Backlight Timer to 5 or 10 seconds. Depending on the **Backlight** option, the backlight lights for this set period of time, and then automatically goes out.

LCD Dimmer (Default: Bright)

MENU > Display > LCD Dimmer

Set the LCD backlight brightness level.

- Bright: The LCD backlight brightness level is bright.
- Dark: The LCD backlight brightness level is dim.

LCD Contrast (Default: 8)

MENU > Display > LCD Contrast

Set the LCD Contrast level to between 1 (the lowest) and 16 (the highest).

Busy LED (Default: ON)

MENU > Display > Busy LED

Usually, the TX/RX indicator lights green while receiving a signal, or the squelch is open. The indicator can be turned OFF to conserve battery power.

- OFF: The indicator does not light, even if a signal is received.
- ON: The indicator lights green while receiving a signal, or the squelch is open.

RX Call Sign (Default: Auto)

MENU > Display > RX Call Sign

Select whether or not to display the call sign and the message of the caller station, when a call is received in the DV mode.

- ① When this item is set to "Auto" or "Auto (RX Hold)," and if you enter the caller station's call sign and name in **Your Call Sign**, the entered name is displayed with "()" after the call sign.
(MENU > DV Memory > **Your Call Sign**)

- OFF: Turns OFF the function.
- Auto: The caller station's call sign scroll only once across the display.
- Auto (RX Hold): The caller station's call sign scroll once, and then the call sign is continuously displayed until the signal disappears.

RX Message (Default: Auto)

MENU > Display > RX Message

Select whether or not to display and scroll a received message.

- OFF: Does not display the message. To check the message, hold down [CD] for 1 second to display the call record.
- Auto: Automatically displays and scrolls the message. The message is automatically displayed every 30 seconds until the signal disappears.
When "Auto" or "Auto (RX Hold)" is selected in **RX Call Sign**, the message is displayed after displaying the caller station's call sign.

Reply Position Display (Default: ON)

MENU > Display > Reply Position Display

Select whether or not to display the caller's position in a dialog when the Auto Reply signal contains a caller station's position.

- OFF: Does not display the caller's position.
- ON: Displays the caller's position.

Display items

DV RX Backlight (Default: ON)

MENU > Display > **DV RX Backlight**

Turn the DV RX Backlight function ON or OFF. In the DV mode, this function turns ON the LCD backlight while displaying the calling station's call sign or a received message.

NOTE: When you set this item to "ON," set **Backlight** to "Auto" or "Auto (DC IN: ON)."

- OFF: Turns OFF the function.
- ON: The LCD backlight automatically lights while displaying the calling station's call sign or a received message. The backlight stays ON while the call sign or message is scrolling.

TX Call Sign (Default: Your Call Sign)

MENU > Display > **TX Call Sign**

Select whether or not to display your own or the destination call sign while transmitting in the DV mode.

- OFF: Does not display any call sign.
- Your Call Sign: Displays and scrolls the destination's call sign. When the destination's call sign and name are entered in **Your Call Sign**, the transceiver displays the name after the call sign in any DV mode except when using the DR function. (MENU > DV Memory > **Your Call Sign**)
- My Call Sign: Displays and scrolls your own call sign.

Scroll Speed (Default: Fast)

MENU > Display > **Scroll Speed**

Set the scrolling speed of the message, call sign, or other text, that is displayed on the screen.

- Slow: The scroll speed is slow.
- Fast: The scroll speed is fast.

Opening Message (Default: ON)

MENU > Display > **Opening Message**

Select whether or not to display the opening message at power ON.

- OFF: Opening message is not displayed.
- ON: Icom logo, MY call sign, the product model ("ID-31A PLUS" or "ID-31E PLUS")* are displayed.

* Depending on the version.

Voltage (Power ON) (Default: ON)

MENU > Display > **Voltage (Power ON)**

Select whether or not to display the power source voltage at power ON.

NOTE: When the voltage of the external DC power source is over 15.6 V, "HI Voltage" is displayed. In that case, immediately disconnect the DC power source.

- OFF: Turns OFF the function.
- ON: Displays the voltage of the battery or external DC power source at power ON.

Latitude/Longitude (Default: ddd °mm.mm')

MENU > Display > Display Unit > **Latitude/Longitude**

Select either the ddd °mm.mm' or ddd °mm:ss" format to display the position.

Altitude/Distance (Default: ft/mi)

MENU > Display > Display Unit > **Altitude/Distance**

Select either the meter or feet/mile format to display the distance and altitude.

Speed (Default: mph)

MENU > Display > Display Unit > **Speed**

Select either the km/h, mph, or knots format to display the speed.

Temperature (Default: °F)

MENU > Display > Display Unit > **Temperature**

Select either the degrees °C or °F format to display the temperature.

Barometric (Default: inHg)

MENU > Display > Display Unit > **Barometric**

Select either the hPa, mb, mmHg, or inHg format to display the barometric pressure.

Rainfall (Default: inch)

MENU > Display > Display Unit > **Rainfall**

Select either the mm or inch format to display the amount of rainfall.

Display items

Wind Speed (Default: mph)

MENU > Display > Display Unit > **Wind Speed**

Select either the m/s, mph, or knots format to display the wind speed.

Display Language (Default: English)

MENU > Display > **Display Language**

Set the screen display language type in the DR screen or MENU screen to English or Japanese.

① This item is displayed only when the **System Language** is set to “Japanese.” See “Choose your language carefully” to the right about setting cautions.

System Language (Default: English)

MENU > Display > **System Language**

Set the system language of the transceiver.

① When this item is set to “English,” **Display Language** is not displayed.

- English: The system language of the transceiver is English. Only alphabetical characters (A to Z, a to z, 0 to 9) and symbols (! " # \$ % & ' () * + , - . / : ; < = > ? @ [\] ^ _ ` { | } ~) can be displayed. If Japanese characters (Kanji, Hiragana, and Katakana) are included, the display shows “=” or “_” instead of that character. In that case, you can only delete “=” or “_” in the transceiver’s edit mode.
- Japanese: The system language of the transceiver is Japanese. Kanji, Hiragana and Katakana characters, and the 2-bytes symbols can be displayed. To display such characters in the DR screen or Menu mode, set **Display Language** to “Japanese.”

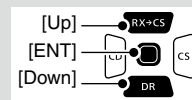
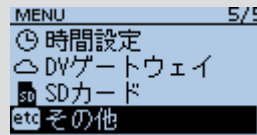
Choose your language carefully

When the system language of the transceiver is set to Japanese, the transceiver has the capability to display both English and Japanese characters. HOWEVER, if you select Japanese as the display language, all menu items throughout the transceiver system are displayed in only Japanese characters. There will be no English item names. Unless you are fluent in reading Japanese characters, use this feature with extreme caution.

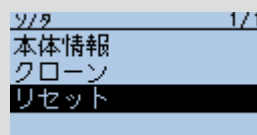
If you change the transceiver’s language to Japanese, and cannot understand the menu system in the new setting, you have to change the language back to English in **Display Language** or **System Language**, or by doing a partial reset of the transceiver CPU. A partial reset will not delete your call sign databases.

To do a partial reset of the CPU, do the following steps:

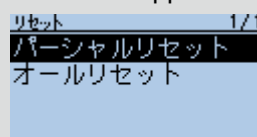
1. Push [MENU].
2. Push [Up] or [Down] to select the bottom item, then push [ENT].



3. Select the bottom item, then push [ENT].

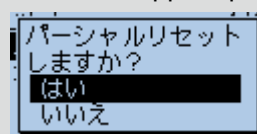


4. Select the upper item, then push [ENT].



① DO NOT select the lower item. The lower item is for the All reset function, and the All reset clears all entries and returns all settings to their factory defaults.

5. The dialog is displayed. Select the upper option, then push [ENT].



- When the partial reset is completed, “PARTIAL RESET” is displayed, then the display automatically returns to the default screen.

Sounds items

NOTE: The default settings shown below are for the USA transceiver version. The default settings may differ, depending on your transceiver version. To return to your transceiver version's default settings, see page 11-3.

Beep Level (Default: 3)

MENU > Sounds > Beep Level

Set the beep audio output level to 0 (OFF) or 1 (minimum) ~ 9 (maximum).

Beep/Vol Level Link (Default: OFF)

MENU > Sounds > Beep/Vol Level Link

Select whether or not the beep output level can be adjusted by rotating [VOL].

- OFF: The output level is fixed to the level set in **Beep Level**.
- ON: The output level can be adjusted by rotating [VOL].

Key-Touch Beep (Default: ON)

MENU > Sounds > Key-Touch Beep

Turn the confirmation beep tones ON or OFF.

- OFF: No beep sounds.
- ON: A beep sounds when you push a key.

Home CH Beep (Default: ON)

MENU > Sounds > Home CH Beep

Turn the Home CH Beep ON or OFF.

- ① In the VFO or Memory mode, when the Home CH frequency or Home CH Memory channel is selected, the Home CH Beep sounds.
- ① In the DR screen, when the Home CH Access repeater is set to FROM, the Home CH Beep sounds.

- OFF: No beep sounds.
- ON: Sounds a beep when you select the Home CH by rotating [DIAL].

Scan Stop Beep (Default: OFF)

MENU > Sounds > Scan Stop Beep

Turn the scan stop beep ON or OFF.

- OFF: No beep sounds.
- ON: A beep sounds when a scan stops by receiving a signal.

Standby Beep (Default: ON (to me: Alarm/High Tone))

MENU > Sounds > Standby Beep

Turn the Standby Beep function ON or OFF.

This function sounds a beep after a received signal disappears, in the DV mode.

- ① The Standby Beep sounds even when **Key-Touch Beep** is set to "OFF."
- ① The Standby Beep output level is depending on the **Beep level** setting.

- OFF: Does not sound a beep after a received signal disappears.
- ON: Sounds a beep after a received signal disappears.
- ON (to me: High Tone): Sounds a high pitched beep when a received signal addressed to your call sign (MY) disappears. When any other received signal disappears, a regular beep sounds.
- ON (to me: Alarm/High Tone): Sounds an alarm (PiRoPiRoPiRo) when a received signal addressed to your call sign (MY) disappears. When any other received signal disappears, a regular beep sounds.

Scope AF Output (Default: ON)

MENU > Sounds > Scope AF Output

Select an audio output option during a sweep by the Band Scope function.

- OFF: No audio is heard during the sweep.
- ON: Audio is heard during the sweep.

Time Set items

NOTE: The default settings shown below are for the USA transceiver version. The default settings may differ, depending on your transceiver version. To return to your transceiver version's default settings, see page 11-3.

DATE

MENU > Time Set > Date/Time > **DATE**

Manually set the date to between 2000/01/01 and 2099/12/31.

TIME

MENU > Time Set > Date/Time > **TIME**

Manually set the time that is displayed at the top of the screen. The time is displayed in the 24 hour format.

① When **GPS Time Correct** is set to "Auto," the GPS receiver automatically sets the time by calculating the received Universal Time of Coordinated (UTC) time and **UTC Offset**.

GPS Time Correct (Default: Auto)

MENU > Time Set > **GPS Time Correct**

This function corrects the time by using the time information that a GPS sentence contains. It is corrected by calculating the received UTC time and the "UTC Offset" setting.

- OFF: Does not correct the time.
- Auto: Automatically corrects the time.

UTC Offset (Default: ±0:00)

MENU > Time Set > **UTC Offset**

Set the time difference between UTC time and the local time to between -14:00 and +14:00 in 00:05 steps.

Auto Power OFF (Default: OFF)

MENU > Time Set > **Auto Power OFF**

Select whether or not to automatically turn OFF the transceiver after inactivity for this set period of time.

- ① "AUTO POWER OFF" is displayed and beeps sound 5 seconds before turning OFF the transceiver. If you operate the transceiver during this period of time, the Auto Power OFF timer is reset.
- OFF: Does not turn OFF the transceiver.
 - 30/60/90/120min: Turns OFF the transceiver after inactivity for this set period of time.

DV Gateway items

Enters the Terminal mode or Access Point mode.
See “About the DV Gateway function” for details.
① “About the DV Gateway function” can be downloaded from the Icom website.

<<Terminal Mode>>

MENU > DV Gateway > <<Terminal Mode>>

The Terminal mode enables you to make a direct Gateway call through the Internet using the optional OPC-2350LU, and a Windows or Android device.

① To cancel the Terminal mode, select “<<Normal Mode>>” in the Quick Menu window.

<<Access Point Mode>>

MENU > DV Gateway > <<Access Point Mode>>

The Access Point mode enables the D-STAR transceiver to make a Gateway call through the ID-31A PLUS/ID-31E PLUS connected to a Windows or Android device with the optional OPC-2350LU.

① To cancel the Access Point Mode, select “<<Normal Mode>>” in the Quick Menu window.

SD Card items

NOTE: The default settings shown below are for the USA transceiver version. The default settings may differ, depending on your transceiver version. To return to your transceiver version’s default settings, see page 11-3.

Load Setting

MENU > SD Card > **Load Setting**

Select a setting file to load from the list.

Save Setting

MENU > SD Card > **Save Setting**

Save the setting file.

Import

MENU > SD Card > Import/Export > **Import**

Import Your Call Sign, Repeater List, or GPS Memory data in the CSV format file.

Export

MENU > SD Card > Import/Export > **Export**

Export Your Call Sign, Repeater List, or GPS Memory data in the CSV format file.

Separator/Decimal (Default: Sep [.] Dec [.])

MENU > SD Card > Import/Export > CSV Format > **Separator/Decimal**

Select the separator and the decimal character for the CSV format.

- Sep [.] Dec [.] : Separator is “,” and Decimal is “.”
- Sep [;] Dec [.] : Separator is “;” and Decimal is “.”
- Sep [;] Dec [;] : Separator is “;” and Decimal is “;”

Date

(Default: mm/dd/yyyy)

MENU > SD Card > Import/Export > CSV Format > **Date**

Select the date format “yyyy/mm/dd,” “mm/dd/yyyy,” or “dd/mm/yyyy.” (y: year, m: month, d: day)

SD Card Info

MENU > SD Card > **SD Card Info**

Displays the microSD card’s free space and its remaining recording time.

Format

MENU > SD Card > **Format**

Formats the microSD card, deleting all data.

Unmount

MENU > SD Card > **Unmount**

Electrically unmounts the microSD card while the transceiver is ON.

Others items

Voltage

MENU > Others > Information > **Voltage**

Displays the battery voltage of the attached Li-ion battery pack or external power source.

- ① When you attach the Li-ion battery pack, the remaining battery capacity (in 11 level steps) and the battery voltage are displayed.
- ① When you attach the optional battery case, the battery case's terminal voltage is displayed.

Version

MENU > Others > Information > **Version**

Displays the transceiver firmware's version number.

Clone Mode

MENU > Others > Clone > **Clone Mode**

Select to enter the Clone mode to read or write the CS-31PLUS data from or to the PC.

- ① See page 12-15 for details.

Clone Master Mode

MENU > Others > Clone > **Clone Master Mode**

Select to write your ID-31A PLUS/ID-31E PLUS (Master) data to another ID-31A PLUS/ID-31E PLUS (Sub).

- ① See page 12-15 for details.

Partial Reset

MENU > Others > Reset > **Partial Reset**

Select to reset the operating settings to their default values (VFO frequency, VFO settings, MENU contents) without clearing the items below.

- ① See page 12-16 for details.

- Memory channel content
- Scan Edge content
- Call channel content
- Call sign memories
- Message content
- DTMF memory content
- GPS Memory content
- Repeater list content

All Reset

MENU > Others > Reset > **All Reset**

Select to clear all contents and return all settings to their factory defaults.

- ① See page 12-16 for details.

Section 12 OTHER FUNCTIONS

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Band Scope function

Use the Band Scope function to visually search for a specified frequency range around the displayed frequency. You can use this function to search for a signal, and see the relative received signal strength level.

The Band Scope function has 2 sweep types.

- **Single Sweep:** Searches the specified frequency range only once. The Single Sweep starts from the lower frequency and the sweep stops after reaching to the upper frequency.
- **Continuous Sweep:** Repeatedly searches the specified frequency range.

The transceiver's sweep bandwidth is $\pm 25 \times$ the tuning step number, centered on the operating frequency.

① The ± 25 times is a fixed value.

Example:

The operating frequency is 433.000 MHz and the tuning step is set to 20 kHz. Therefore, the sweep range is between 432.500 MHz (lower edge frequency) and 433.500 MHz (higher edge frequency).

The calculation is as follows:

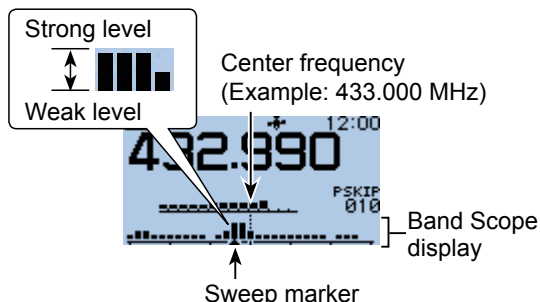
$$\begin{aligned} \text{Lower edge frequency} &= -25 \times 20 \text{ kHz} \\ &= -500 \text{ kHz } (-0.5 \text{ MHz}) \\ \text{Higher edge frequency} &= +25 \times 20 \text{ kHz} \\ &= +500 \text{ kHz } (+0.5 \text{ MHz}) \end{aligned}$$

The operating (center) frequency is 433.000 MHz

The lower (start) frequency is 432.500 MHz
(= 433.000 MHz - 0.5 MHz)

The higher (stop) frequency 433.500 MHz
(= 433.000 MHz + 0.5 MHz)

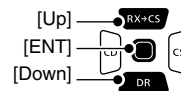
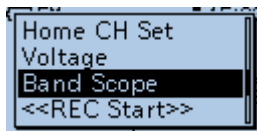
Example: A strong signal is received on 432.990 MHz.
(Tuning step: 5 kHz)



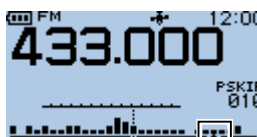
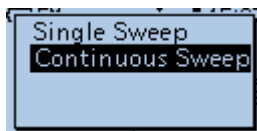
◇ Sweep operation

Example: Continuous sweeps centered on 433.000 MHz

1. Push [V/MHz] to enter the VFO mode.
2. Rotate [DIAL] to set 433.000 MHz.
3. Push [QUICK].
4. Select "Band Scope."



5. Select an option.



- Returns to the frequency display and starts the continuous sweep.

6. Push [ENT].
 - Stops the sweep.
 - ① Push [ENT] again, to resume the sweep for the Continuous Sweep function.
7. When the sweeping stops, rotate [DIAL] to move the sweep marker to a detected signal.



- You can hear the signal audio.
- ① While the sweep is paused, push [CLR] to turn OFF the Band Scope function.

TIP:

- If the tuning step is set too wide, the signals in the sweep range may not be displayed (they may be skipped), even if they are strong signals. Therefore, we recommend that you set the tuning step to 20 kHz or less to use the Band Scope function. See BASIC MANUAL Section 3 for details on how to set the tuning step.
- You can hear the displayed frequency's audio during a sweep.
- You can turn OFF the audio output during a sweep in the MENU screen. (p. 11-43)
(MENU > Sounds > **Scope AF Output**)

Voice TX function

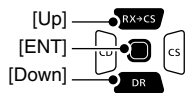
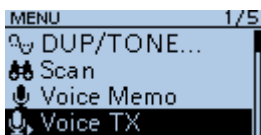
The Voice TX function transmits the recorded audio that is on the microSD card, one time or repeatedly, for up to 10 minutes at the set interval. This function is convenient to repeatedly call CQ, or for other events. You can assign the [Voice TX] key function to an optional microphone key. (p. 13-4)

NOTE: BE SURE to insert a microSD card into the transceiver.

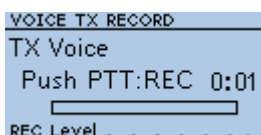
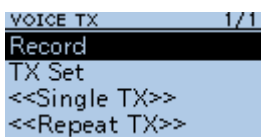
◇ Recording the voice audio

MENU > Voice TX > Record

1. Push [MENU].
2. Select "Voice TX."



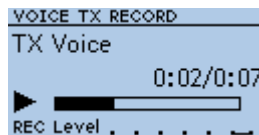
3. Select "Record."



4. Hold down [PTT] to record.



5. Push [ENT] to confirm the recorded voice.
 - The voice is played back.



- ① If you hold down [PTT], the recording starts again. In this case, the previous recorded audio will be overwritten.
- ① To exit the MENU screen, push [MENU] several times.

- ① Hold the microphone 5 ~ 10 cm (2 ~ 4 inches) from your mouth, then speak at your normal voice level.
- ① The maximum record time is 1 minute.
- ① Only 1 voice memory can be recorded.

TIP: On the VOICE TX RECORD screen, push [QUICK], then select "Clear" to clear the recorded audio.

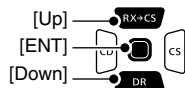
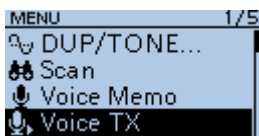
Voice TX function

◇ Transmitting the recorded voice audio

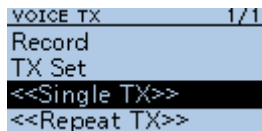
NOTE: BE SURE to insert a microSD card into the transceiver.

MENU > Voice TX > <<TX>>

1. Push [MENU].
2. Select "Voice TX."



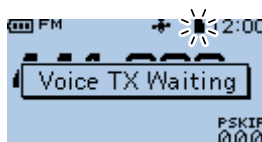
3. Select an option.
 - <<Single TX>>: The recorded voice audio is transmitted only once.



- <<Repeat TX>>: The recorded voice audio is repeatedly transmitted.



While transmitting

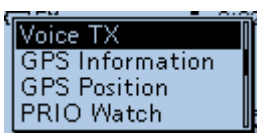


Transmission is paused

① Information

- While transmitting, the SD card icon blinks.
- When you select <<Repeat TX>>, the transceiver repeatedly transmits the recorded voice audio for up to 10 minutes at the interval set in **Repeat Time**. (MENU > Voice TX > TX Set > **Repeat Time**)
- To cancel a recorded voice transmission, push [PTT].
- After the second transmission, the transmission continues pausing, if receiving a signal, even if Busy Lockout is set to ON. (MENU > Function > Busy Lockout)
However, if the squelch is manually opened in the FM mode, the voice audio is repeatedly transmitted, according to the Repeat Time setting.

TIP: To send the recorded voice audio in the Quick Menu window, push [QUICK], then select "Voice TX."



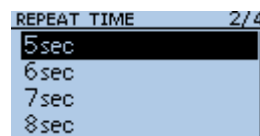
◇ The Voice TX settings

You can change the Voice TX settings on the MENU screen. (p. 11-8)

Setting the Repeat Time

Set the repeat interval for the voice repeat transmission. (Default: 5 sec)

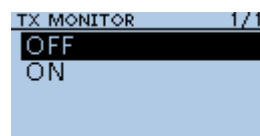
MENU > Voice TX > TX Set > Repeat Time



Using the TX Monitor function

The TX voice audio is output from the speaker. (Default: ON)

MENU > Voice TX > TX Set > TX Monitor



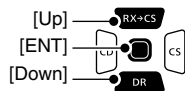
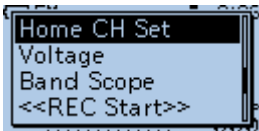
Home channel function

Home channels are often-used frequencies you can preset in the transceiver's VFO mode, Memory mode and DR function.

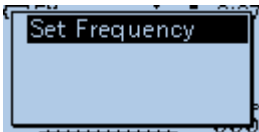
◇ Home channel setting

Example: In the VFO mode

1. Select a mode (VFO or Memory) or the DR screen in which you want to set the Home channel.
2. Select a frequency, channel, or repeater to be set as the Home channel.
 - ① On the DR screen, select "FROM."
3. Push [QUICK].
4. Select "Home CH Set."



5. Select "Set Frequency."
 - ① In the Memory mode, select "Set Channel." On the DR screen, select "Set Repeater."

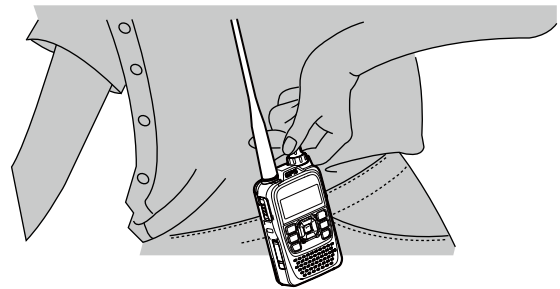


• Returns to the standby mode.

◇ Home CH Beep function

When the set Home CH is selected by rotating [DIAL], a beep sounds.

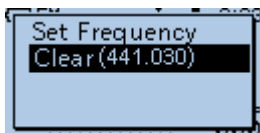
You will know the Home CH selection without looking at the display.



You can assign the [Home CH] key function to an optional microphone key. (p. 13-4)

- ① You can turn OFF the Home CH Beep function on the MENU screen.
(MENU > Sounds > **Home CH Beep**)

TIP: Selecting "Clear" in Step 4 clears the Home channel setting.



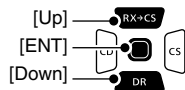
Using the DTMF memory

The transceiver can save up to 16 memories of 24 digit DTMF code.

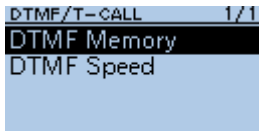
◇ Entering DTMF code

MENU > DTMF/T-CALL > **DTMF Memory**

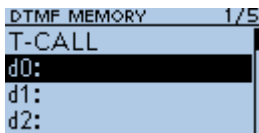
1. Push [MENU].
2. Select “DTMF/T-CALL.”



3. Select “DTMF Memory.”



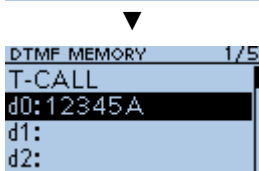
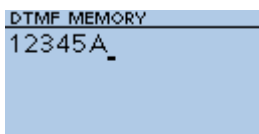
4. Select a DTMF Memory.



5. Push [QUICK].
6. Select “Edit.”



7. Enter a DTMF code, then push [ENT].
(Example: 12345A)



• Saves the Memory, and returns to the DTMF MEMORY screen.

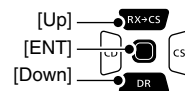
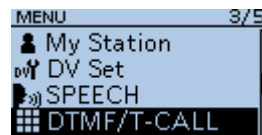
- ① See page iii on how to enter characters.
- ① To exit the MENU screen, push [MENU].

◇ Monitoring the entered DTMF code

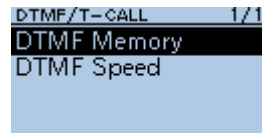
You can check and hear the entered DTMF code.

MENU > DTMF/T-CALL > **DTMF Memory**

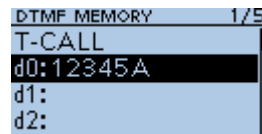
1. Push [MENU].
2. Select “DTMF/T-CALL.”



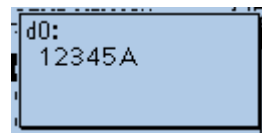
3. Select “DTMF Memory.”



4. Select a DTMF Memory to monitor.



5. Push [SQL].

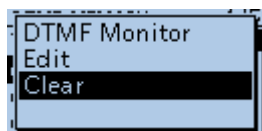


- The DTMF code sounds.
- After sounding, returns to the DTMF MEMORY screen.
- ① To exit the MENU screen, push [MENU].

TIP: You can also check the DTMF code by pushing [QUICK] and select “DTMF Monitor” on the DTMF MEMORY screen in step 4.



TIP: To clear the entered DTMF code, push [QUICK] on the DTMF MEMORY screen, then select “Clear.”

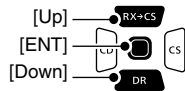


Transmitting the DTMF code

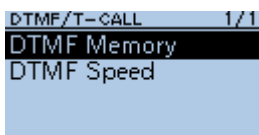
◇ Transmitting the entered DTMF code

MENU > DTMF/T-CALL > DTMF Memory

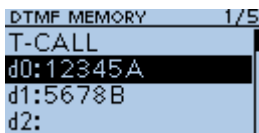
1. Push [MENU].
2. Select "DTMF/T-CALL."



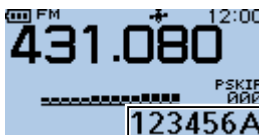
3. Select "DTMF Memory."



4. Select a DTMF Memory to transmit.

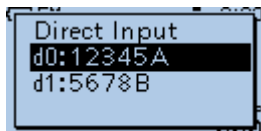


5. Push [ENT].
• The selected DTMF channel is set to transmit.
6. Push [MENU].
• Exits the MENU screen.
7. While holding down [PTT], push [SQL].



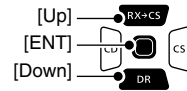
- The selected DTMF code in step 3 is transmitted.
- Even if you release [PTT], the transceiver keeps transmitting the code until all the code is transmitted.

TIP: In the standby mode, you can transmit a DTMF code by pushing [QUICK] and selecting a code.

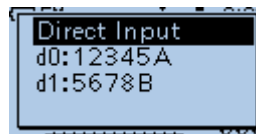


◇ Transmitting a DTMF code (Direct Input)

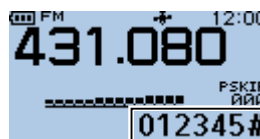
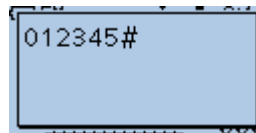
1. Push [QUICK].
2. Select "DTMF TX."



3. Select "Direct Input."



4. Enter a DTMF code, then push [ENT].
(Example: 012345#)

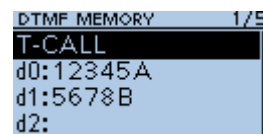


- Transmits the entered DTMF code.
- ① The DTMF code scrolls during transmission.
- ① See page iii on how to enter characters.

TIP: About the 1750 Hz tone

When you select "T-CALL" on the DTMF MEMORY screen, 1750 Hz tone can be transmitted.

1. While holding down [PTT], push [SQL].
• The 1750 Hz tone is transmitted.
① You can hear the 1750 Hz tone from a speaker.



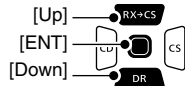
Transmitting the DTMF code

◇ Selecting the DTMF transmit speed

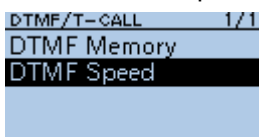
You can select the DTMF transmit speed.

MENU > DTMF/T-CALL > DTMF Speed

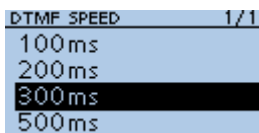
1. Push [MENU].
2. Select “DTMF/T-CALL.”



3. Select “DTMF Speed.”

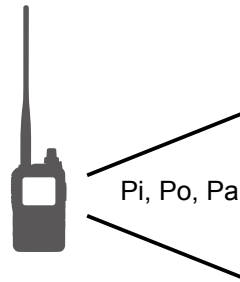


4. Select a transmit speed.

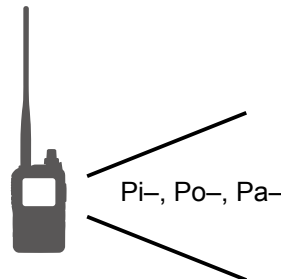


- 100ms: Transmits the DTMF tones at about 100 milliseconds per code.
5 characters per second.
- 200ms: Transmits the DTMF tones at about 200 milliseconds per code.
2.5 characters per second.
- 300ms: Transmits the DTMF tones at about 300 milliseconds per code.
1.6 characters per second.
- 500ms: Transmits the DTMF tones at about 500 milliseconds per code.
1 character per second.

① To exit the MENU screen, push [MENU].



When “100ms” is selected, the DTMF transfer speed is fast.



When “500ms” is selected, the DTMF transfer speed is slow.

Tone squelch operation

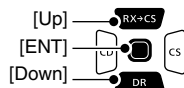
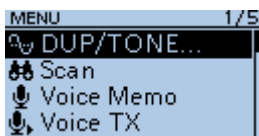
The tone squelch opens only when you receive a signal including a matching subaudible tone in the FM or FM narrow mode. You can silently wait for calls from others using the same tone. Also, the reversed tone squelch function mutes the squelch when a signal including a matching subaudible tone.

◇ Tone squelch frequency setting and operation

Step 1. Setting the tone squelch frequency

MENU > DUP/TONE... > TSQL Freq

1. Push [V/MHz] to enter the VFO mode.
2. Push [FM/DV] to select the FM or FM-N (FM narrow) mode.
3. Rotate [DIAL] to set an operating frequency.
4. Push [MENU].
5. Select "DUP/TONE..."



6. Select "TSQL Freq."
7. Rotate [DIAL] to set a Tone Squelch frequency, then push [ENT].

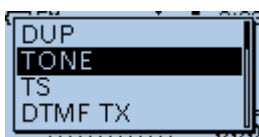


① Set to between 67.0 and 254.1 Hz.

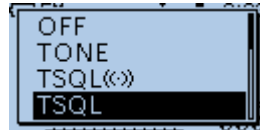
8. Push [MENU].
 - Returns to the standby screen.

Step 2. Using the tone squelch

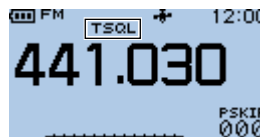
1. Push [QUICK].
2. Select "TONE."



3. Select the Tone Squelch type.



(Example: TSQ L)



4. Operate normally.
 - You will only hear the audio of stations that are using the same Tone Squelch frequency. All other signals will be muted.

About the tone squelch type:

- TSQ L ((·)): Enables the Tone Squelch with the Pocket Beep function.
- TSQ L: Enables the Tone Squelch function.
- TSQ L-R: Enables the Reverse Tone Squelch function.
- TONE(T)/DTCS(R) ("T-DTCS" is displayed, "T" blinks.):
When you transmit, the selected subaudible tone is superimposed on your normal signal. When you receive, the DTCS squelch opens only for a signal that includes a matching DTCS code and polarity. (Audio is heard)
- DTCS(T)/TSQ L(R) ("D-TSQ L" is displayed, "D" blinks.):
When you transmit, the selected DTCS code is superimposed on your normal signal. When you receive, the tone squelch opens only for a signal that includes a matching tone frequency. (Audio is heard)
- TONE(T)/TSQ L(R) ("T-TSQ L" is displayed, "T" blinks.):
When you transmit, the selected subaudible tone is superimposed on your normal signal. When you receive, the tone squelch opens only for a signal that includes a matching tone frequency. (Audio is heard)

TIP: To sound beeps when a call is received
If "TSQ L ((·))" is selected, beeps sound for 30 seconds and "((·))" blinks when a call with a matching tone signal is received.



- ① Within 30 seconds, push [PTT] to stop the beeps. ("((·))" disappears) After that, the transceiver selects the regular tone squelch operation. If you make no operation for 30 seconds, the beeps automatically stop, but "((·))" continues to blink to indicate that you received a call.

DTCS squelch operation

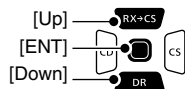
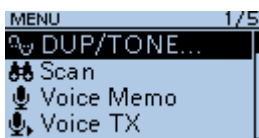
The tone squelch opens only when you receive a signal including a matching DTCS code in the FM or FM narrow mode. You can silently wait for calls from others using the same tone. Also, a reversed tone squelch function mutes the squelch when you receive a signal including a matching DTCS code.

◇ DTCS code setting and operation

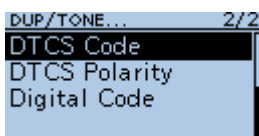
Step 1. Setting the DTCS code

MENU > DUP/TONE... > DTCS Code

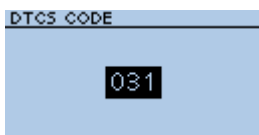
1. Push [V/MHz] to enter the VFO mode.
2. Push [FM/DV] to select the FM or FM-N (FM narrow) mode.
3. Rotate [DIAL] to set an operating frequency.
4. Push [MENU].
5. Select "DUP/TONE..."



6. Select "DTCS Code."



7. Rotate [DIAL] to set a DTCS code.

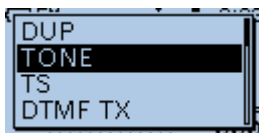


① Set to between 023 and 754.

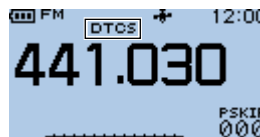
8. Push [MENU].
 - Returns to the standby screen.

Step 2 The DTCS code operation

1. Push [QUICK].
2. Select "TONE."



3. Select a DTCS code type. (Example: DTCS)



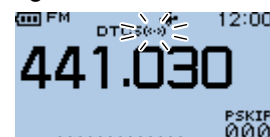
4. Operate normally.
 - You will only hear the audio of stations that are using the same DTCS code. All other signals will be muted.

About the DTCS code type:

- DTCS ((·)) : Enables the DTCS squelch with the Pocket Beep function.
- DTCS: Enables the DTCS Squelch function.
- DTCS-R: Enables the Reverse DTCS Squelch function.
- DTCS(T) ("DTCS" blinks):
 - When you transmit, the selected DTCS code is superimposed on your normal signal.
 - When you receive, the function is OFF.
- TONE(T)/DTCS(R) ("T-DTCS" is displayed, "T" blinks.):
 - When you transmit, the selected subaudible tone is superimposed on your normal signal.
 - When you receive, the DTCS squelch opens only for a signal that includes a matching DTCS code and polarity. (Audio is heard)
- DTCS(T)/TSQ(R) ("D-TSQL" is displayed, "D" blinks.):
 - When you transmit, the selected DTCS code is superimposed on your normal signal.
 - When you receive, the tone squelch opens only for a signal that includes a matching tone frequency. (Audio is heard)

TIP: To sound beeps when a call is received

If "DTCS ((·))" is selected, beeps sound for 30 seconds and "((·))" blinks when a call with the matching tone signal is received.

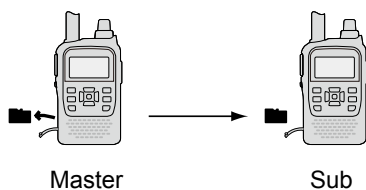


- ① Within 30 seconds, push [PTT] to stop the beeps. ("((·))" disappears) After that, the transceiver selects the regular tone squelch operation. If you make no operation for 30 seconds, the beeps automatically stop, but "((·))" continues to blink to indicate that you received a call.

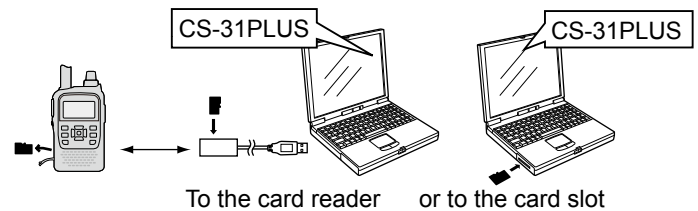
Cloning function

The transceiver has a data cloning capability. This function is useful when you want to copy all of the entered contents from one ID-31A PLUS/ ID-31E PLUS to another. You can also clone with a PC.

Transceiver-to-Transceiver cloning using a microSD card (p. 12-12)

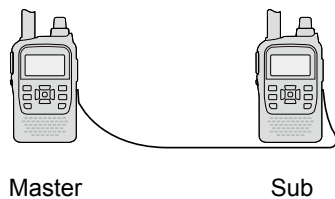


Cloning from a PC using a microSD card (p. 12-14, CS-31PLUS Instruction manual)

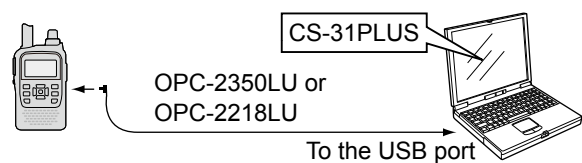


NOTE: If your PC does not have a microSD card slot, connect a memory card reader (user supplied) to use the microSD card.

Transceiver-to-Transceiver cloning using a cable (p. 12-15)



Cloning from a PC using an optional cloning cable (CS-31PLUS Instruction manual)



By using the CS-31PLUS CLONING SOFTWARE and an optional data cable, you can clone with a PC. See the CS-31PLUS instruction manual that can be downloaded from the Icom website.

<http://www.icom.co.jp/world/support/>

IMPORTANT: When using the optional OPC-2218LU or OPC-2350LU, set **DV Data TX** of the transceiver to "PTT," before reading or writing setting data. Otherwise, when a PC input data through the [DATA] jack, the transceiver automatically transmits it.
(MENU > DV Set > **DV Data TX**)

Cloning function

◇ Transceiver-to-Transceiver cloning using a microSD card

You can clone transceivers using a microSD card. Memory channel contents, MENU item settings and Repeater lists can be saved onto the microSD card.

- ① Recorded voice memories are not included in the cloning data. To play back the master transceiver's voice memory, insert the microSD card into a sub transceiver, or make a copy onto the sub transceiver's microSD card using a PC.
- ① Assumes that the microSD card has already been inserted into the transceiver.

NOTE:

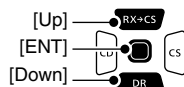
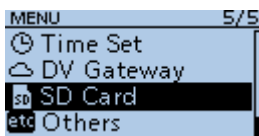
- Before removing or inserting, turn OFF the transceiver.
- If you do any of the following, the card data may be corrupted or deleted.
 - Remove the card from the transceiver while accessing the card.
 - Change the external power supply's voltage while accessing the card.
 - Drop, impact or vibrate the card.

① See BASIC MANUAL Section 6 for microSD card details.

Step 1. Saving the master transceiver's setting data onto the microSD card.

MENU > SD Card > Save Setting

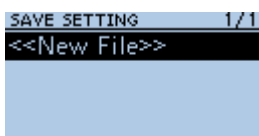
1. Push [MENU].
2. Select "SD Card."



3. Select "Save Setting."

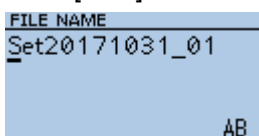


4. Select "<<New File>>."



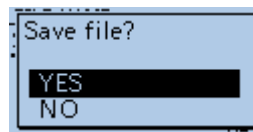
- Displays the FILE NAME screen.
- ① The file name is automatically named in the following manner: Setyyyymmdd_xx (yyyy: Year, mm: month, dd: day, xx: serial number)
Example: If a second file is saved on November 1, 2017, the file is named "Set20171101_02."
- ① To change the file name, see page iii on how to enter characters.

5. Push [ENT].



- The confirmation dialog is displayed.

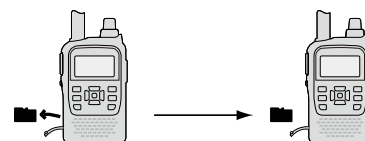
6. Select <YES>.



- Saves the data settings.
 - Returns to the SD CARD screen after the saving is completed.
7. Push [MENU].
 - Returns to the standby screen.

Step 2. Remove the microSD card from the master transceiver, then insert it into the sub transceiver.

1. Hold down the master transceiver's [⏻] to turn it OFF.
2. Remove the microSD card from the master transceiver.
3. Insert the microSD card into the sub transceiver, then hold down the sub transceiver's [⏻] to turn it ON.



TIP: The setting data are saved in the "icf" file format that is used in the CS-31PLUS CLONING SOFTWARE. When the saved data on a card is copied to a PC, you can edit it with the cloning software.

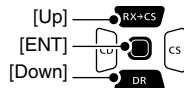
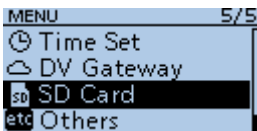
Cloning function

◇ Transceiver-to-Transceiver cloning using a microSD card (Continued)

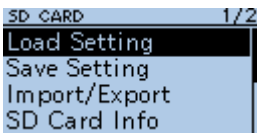
Step 3. Loading the setting data into the sub transceiver.

MENU > SD Card > Load Setting

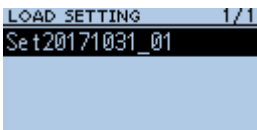
1. Push [MENU].
2. Select "SD Card."



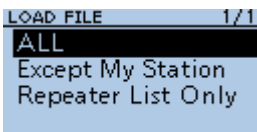
3. Select "Load Setting."



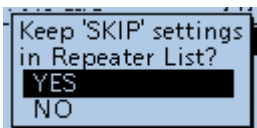
4. Select a file to load.



5. Select the loading option.
 - ALL: Loads all memory channels, Menu screen item settings and the repeater list into the transceiver.
 - Except My Station: Loads all memory channels, Menu screen item settings and the repeater list except MY call signs and TX message into the transceiver.
 - Repeater List Only: Loads only the repeater list into the transceiver.

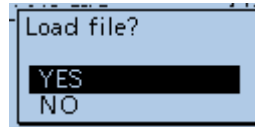


6. Select <YES> or <NO>.
 - YES: Retains the skip settings of the repeater list. (p. 4-39)
 - NO: Does not retain the skip settings of the repeater list.



- When you select <YES> or <NO>, the confirmation dialog is displayed.

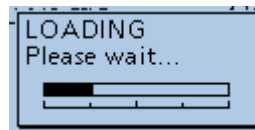
7. Select <YES>.



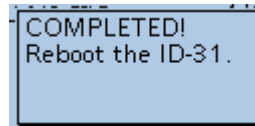
- Starts the file check.
- ① While checking the file, displays "CHECKING FILE" and a progress bar.



- After checking, settings data loading begins.
- ① While loading, "LOADING" and a progress bar are displayed.



- After loading ends, "COMPLETED!" is displayed.
- ① To complete the loading, restart the transceiver.



Cloning function

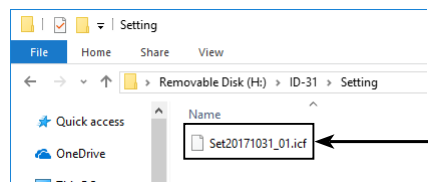
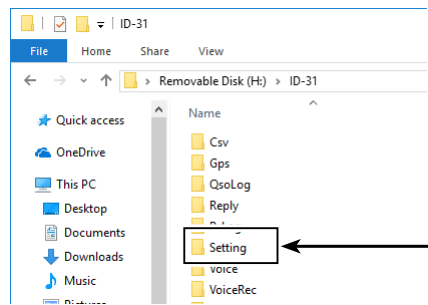
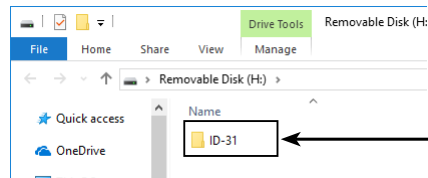
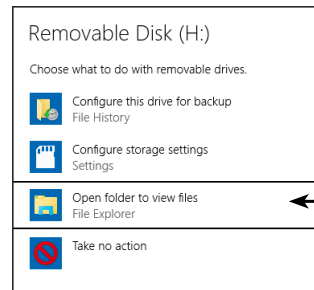
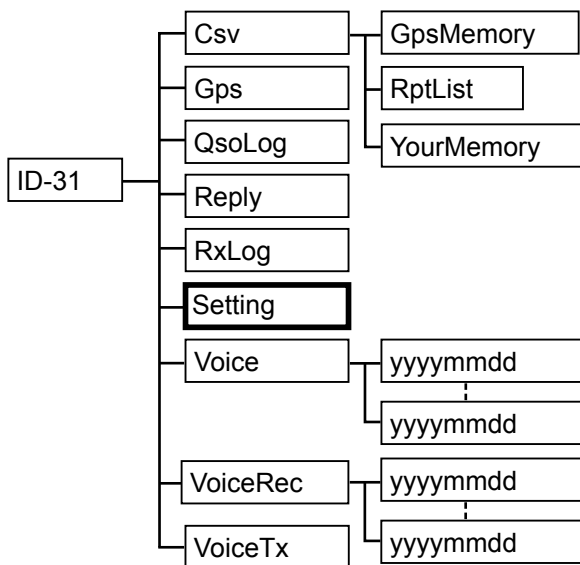
◇ Cloning from a PC using a microSD card

You can clone transceivers from a PC using a microSD card.

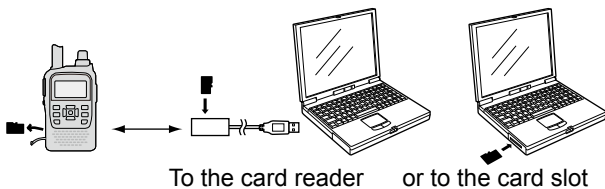
Set Memory content, Menu item settings, and repeater list in the CS-31PLUS CLONING SOFTWARE, and save. Copy the “icf” file to the “Setting” folder in the “ID-31” folder of the microSD card.

microSD card configuration

Insert the microSD card that includes the “icf” file, then load it to complete the cloning. (p. 2-4)
(MENU > SD Card > **Load Setting**)



Connections



Cloning function

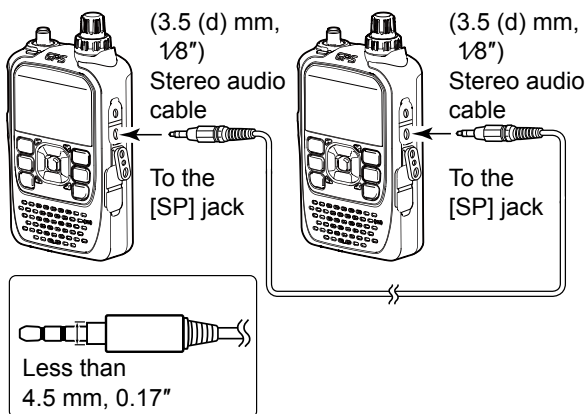
◇ Transceiver-to-Transceiver cloning using a cable

You can clone transceivers using a cable. Connect 2 transceivers (master and sub transceiver) using a user supplied stereo audio cable (3.5 (d) mm, 1/8").

① Depending on the stereo audio cable, it may not be used for cloning.

Step 1. Connecting transceivers.

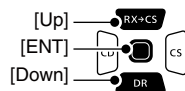
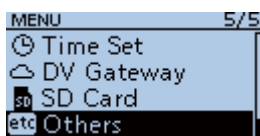
1. Turn OFF both master and sub transceivers.
2. Connect a stereo audio cable between the transceivers.



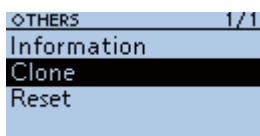
3. Turn ON both transceivers.

Step 2. Setting the sub transceiver.

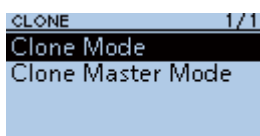
1. Push [MENU] on the sub transceiver.
2. Select "Others."



3. Select "Clone."

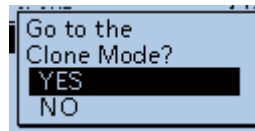


4. Select "Clone Mode."



• A confirmation dialog is displayed.

5. Select <YES>.

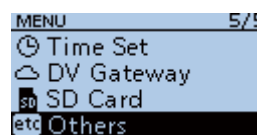


• The following screen is displayed.

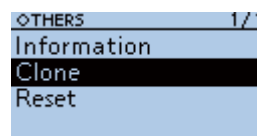


Step 3. Setting the master transceiver.

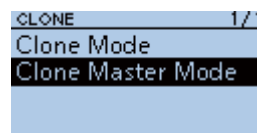
1. Push [MENU] on the master transceiver.
2. Select "Others."



3. Select "Clone."

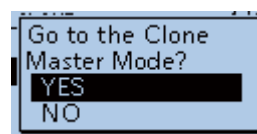


4. Select "Clone Master Mode."



• A confirmation dialog is displayed.

5. Select <YES>.



• The following screen is displayed.



6. Push [PTT] of the master transceiver.

• Starts the cloning.

• On the sub transceiver, "CLONE-IN" is displayed. On the master transceiver, "CLONE-OUT" is displayed.

• When cloning is completed, the master transceiver returns to the Clone Master Mode screen and the sub transceiver displays "CLONE End."

① If you have another transceiver to clone, connect it and then push [PTT] on the master transceiver.

7. Restart the sub transceiver to use it with the cloned setting data.

Resetting the CPU

Occasionally, erroneous information is displayed when, for example, first applying power. This may be caused externally by static electricity or by other factors. If this problem occurs, turn OFF the transceiver. After waiting a few seconds, turn ON the transceiver again. If the problem is still there, perform a Partial reset or an All reset.

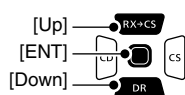
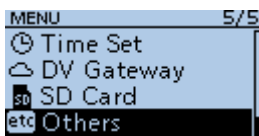
◇ Partial Reset

A Partial reset resets the operating settings to their default values (VFO frequency, VFO settings, Menu contents) without deleting the items below:

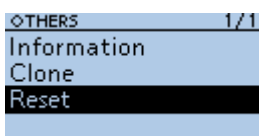
- Memory channel contents
- Scan Edge contents
- Call channel contents
- Call sign memories
- Message data
- DTMF memory contents
- GPS Memory contents
- Repeater list

MENU > Others > Reset > Partial Reset

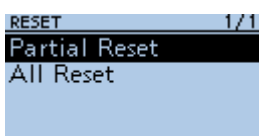
1. Push [MENU].
2. Select "Others."



3. Select "Reset."

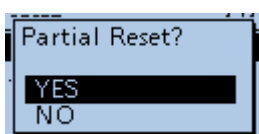


4. Select "Partial Reset."



- The confirmation dialog is displayed.

5. Select <YES>.



- When the partial reset is completed, "PARTIAL RESET" is displayed, then the display automatically returns to the default screen.

NOTE for the All reset:

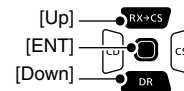
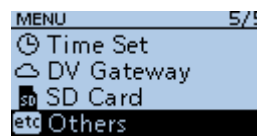
After you perform an All reset, you cannot use the DR function because the repeater list will be deleted. We recommend you save the setting data onto a microSD card, or to your PC using the CS-31PLUS CLONING SOFTWARE before performing an All reset. After the All reset is finished, load or write the saved data into your transceiver.

◇ All Reset

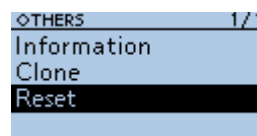
An All reset clears all setting, and returns all settings to their factory defaults. Therefore, the Repeater list, Memory channel contents, filter settings, and so on will be deleted, so you will need to reenter your Memories, list, and operating settings.

MENU > Others > Reset > All Reset

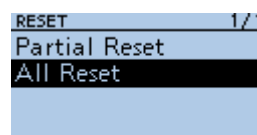
1. Push [MENU].
2. Select "Others."



3. Select "Reset."

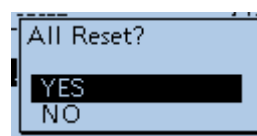


4. Select "All Reset."



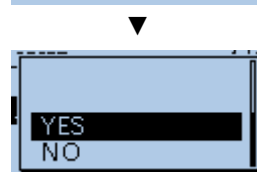
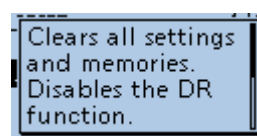
- The confirmation dialog is displayed.

5. Confirm the content and select <YES>.



- The confirmation dialog is displayed.

6. Confirm the content and select <YES>.



- After the All reset is finished, the default screen is displayed.

Section 13 OPTIONS

OPTION LIST	13-2
Optional HM-75LS REMOTE CONTROL SPEAKER MICROPHONE	13-3
◇ Assigning a Remote Control function	13-3
VOX function	13-4
◇ Setting the VOX function	13-4
◇ VOX-related settings.....	13-6
RS-MS1A.....	13-7
◇ Required items.....	13-7
◇ Installing the application	13-7
◇ Connecting the OPC-2350LU	13-7

OPTION LIST

You can find information for these options on the Icom website.

<http://www.icom.co.jp/world/>

Speaker microphones

HM-186LS SPEAKER MICROPHONE

Meets IPX4 requirements for waterproof protection (Splashing water from any direction).

HM-183LS SPEAKER MICROPHONE

Meets IPX7 requirements for waterproof protection (1 meter, 3.3 ft depth for 30 minutes).

HM-75LS REMOTE CONTROL SPEAKER MICROPHONE

Headsets/Earphones

HS-94/HS-95/HS-97 HEADSET

+ **OPC-2006LS** PLUG ADAPTER CABLE

HS-94: Ear hook type

HS-95: Neck and arm type

HS-97 Throat microphone

OPC-2006LS: Connects the HS-94/HS-95/HS-97 to the transceiver for the VOX function.

HM-153LS EARPHONE MICROPHONE

HM-166LS EARPHONE MICROPHONE

Smaller than the HM-153LS.

SP-40 EARPHONE

+ **OPC-2144** PLUG ADAPTER CABLE

When using the SP-40 you need the OPC-2144 slim L type conversion cable.

Batteries/Chargers

BC-167SA/BC-167SD BATTERY CHARGER

Same as the supplied charger. The shape is different depending on the charger version.

BC-202 DESKTOP CHARGER

BP-271 Li-ion BATTERY PACK

Voltage: 7.4 V

Discharge capacity: 1150 mAh (minimum)
1200 mAh (typical)

Battery life: Approximately 4.5 hours
(FM/DV)

BP-272 Li-ion BATTERY PACK

Voltage: 7.4 V

Discharge capacity: 1880 mAh (minimum)
2000 mAh (typical)

Battery life: Approximately 8 hours (FM)
Approximately 7.5 hours (DV)

BP-273 BATTERY CASE

Uses 3 LR6 (AA) alkaline batteries.

Software

CS-31PLUS CLONING SOFTWARE

RS-MS1A Android™ APPLICATION

The OPC-2350LU is required.

RS-MS3W TERMINAL MODE/ACCESS POINT MODE SOFTWARE

For Windows devices. The OPC-2350LU is required.

RS-MS3A TERMINAL MODE/ACCESS POINT MODE APPLICATION

For Android devices. The OPC-2350LU is required.

① To use the RS-MS3W or RS-MS3A, see “About the DV Gateway function” that can be downloaded from the Icom website.

Cables

CP-12L CIGARETTE LIGHTER CABLE

With noise filter. (Fuse: 4A)

CP-19R CIGARETTE LIGHTER CABLE

Provides an 11 V DC output. (Fuse: 5A)

OPC-254L DC POWER CABLE

Directly connects to a DC power source.

OPC-2218LU DATA CABLE

For DV data communication (p. 4-27) and data cloning with the CS-31PLUS.

OPC-2350LU DATA CABLE

For DV data communication between the transceiver and an Android or Windows device, or data cloning with the CS-31PLUS.

OPC-2006LS PLUG ADAPTER CABLE

Used with the HS-94/HS-95/HS-97 for the VOX function.

OPC-2144 PLUG ADAPTER CABLE

Slim L type conversion cable.

Others

AD-92SMA ANTENNA CONNECTOR ADAPTER

Connects an antenna or antenna cable that has a BNC connector.

FA-S270B UHF ANTENNA

Same as the supplied antenna.

For only the ID-31A PLUS and ID-31E PLUS.

LC-178 CARRYING CASE

MB-127 BELT CLIP

Same as the supplied belt clip.

CT-17 CI-V LEVEL CONVERTER UNIT

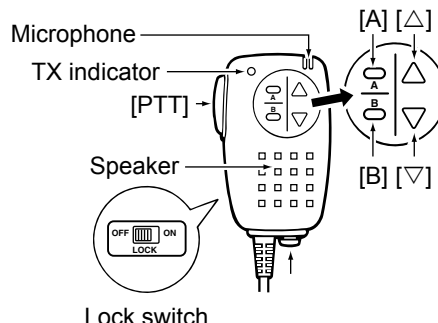
For remote transceiver control using a PC equipped with an RS-232C port. You can change frequencies, operating mode, or Memory channels through your computer.

Optional HM-75LS REMOTE CONTROL SPEAKER MICROPHONE

The optional HM-75LS enables you to remotely select operating frequencies, Memory channels, and other functions.

You can assign some functions to the keys on the HM-75LS for simple remote control operation. (pp. 11-36, 11-37)

The HM-75LS has a lock switch on the back to prevent accidental frequency changes.



NOTE:

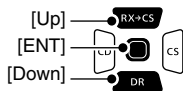
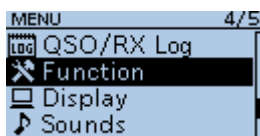
- BE SURE to turn OFF the transceiver when plugging or unplugging the HM-75LS into or from the [MIC/SP] jack.
- Firmly plug the HM-75LS into the transceiver.

◇ Assigning a Remote Control function

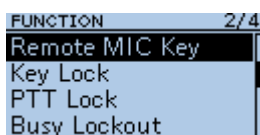
Example: Assigning the “TO (DR)” function to the [A] key.

MENU > Function > Remote MIC Key

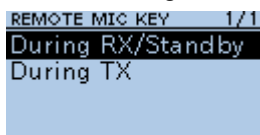
1. Push [MENU].
2. Select “Function.”



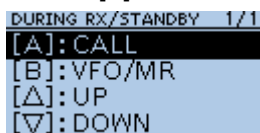
3. Select “Remote MIC Key.”



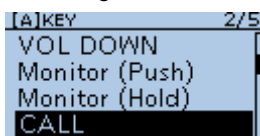
4. Select “During RX/Standby.”



5. Select “[A].”

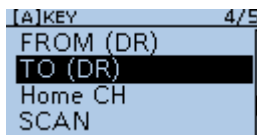


• The Assignable function list is displayed.

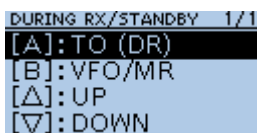


① About the functions, see pages 11-36 and 11-37.

6. Select “TO (DR).”

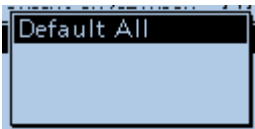


• The “TO (DR)” function is assigned.

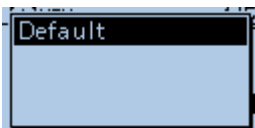


① To exit the MENU screen, push [MENU].

TIP: To return to the default settings
On the DURING RX/STANDBY screen or DURING TX screen, push [QUICK] and select “Default All.”



On the each key screen, push [QUICK] and select “Default.”



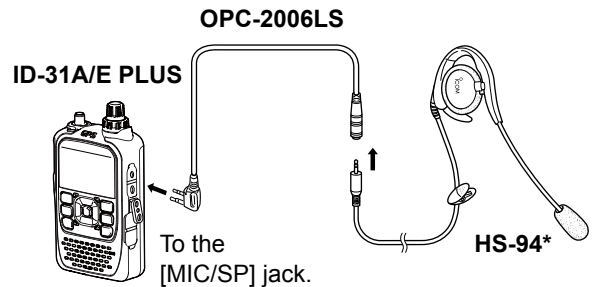
VOX function

The transceiver has the Voice Operated Transmission (VOX) function that enables hands-free operation. The optional HS-94, HS-95, or HS-97 HEADSET and the OPC-2006LS PLUG ADAPTER CABLE are required.

The VOX function starts transmission when you speak into the microphone, without pushing [PTT]. When you stop speaking, it automatically returns to receive.

NOTE:

- BE SURE to turn OFF the transceiver when plugging or unplugging the OPC-2006LS into or from the [MIC/SP] jack.
- Set the external microphone gain before setting the VOX gain on the MENU screen. We recommend you set the Microphone Gain level to 3. (MENU > Function > **MIC Gain (External)**)



* This can also be the HS-95 or HS-97.

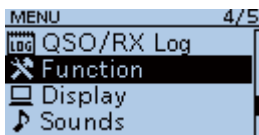
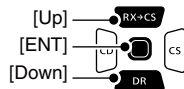
◇ Setting the VOX function

Step 1. Selecting the headset type

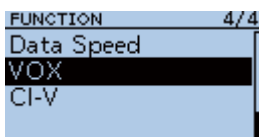
Before using the VOX function, select the headset type.

MENU > Function > VOX > Headset Select

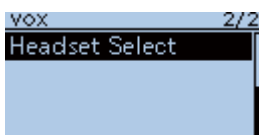
1. Push [MENU].
2. Select "Function."



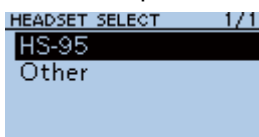
3. Select "VOX."



4. Select "Headset Select."



5. Select an option.



- HS-95: Select when using the HS-95.
- Other: Select when using the HS-94 or the HS-97.

① To exit the MENU screen, push [MENU].

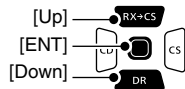
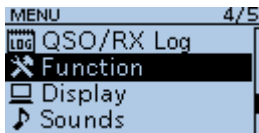
► Continued on the next page.

VOX function

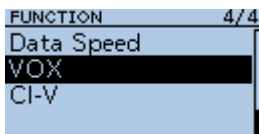
Step 2. Turning ON the VOX function

MENU > Function > VOX > **VOX**

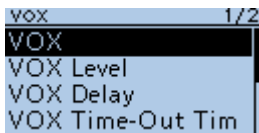
1. Push [MENU].
2. Select "Function."



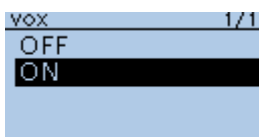
3. Select "VOX."



4. Select "VOX" (Turning the VOX function ON/OFF).



5. Select "ON."



- ① To exit the MENU screen, push [MENU].
- ① When you connect the HS-94, HS-95, or HS-97 headset, "VOX" is displayed on the standby screen.

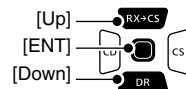
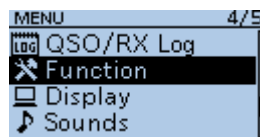


Step 3. Setting the VOX level

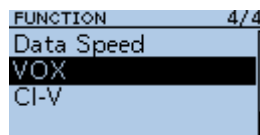
You can adjust the VOX level when the VOX function is too sensitive or not sensitive enough with your voice level.

MENU > Function > VOX > **VOX Level**

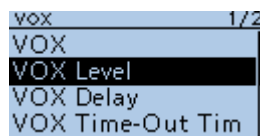
1. Push [MENU].
2. Select "Function."



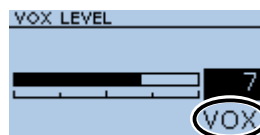
3. Select "VOX."



4. Select "VOX Level."



5. While speaking into the headset microphone, rotate [DIAL] to adjust the VOX Level until "VOX" is continuously displayed.

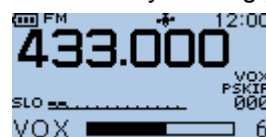


① **Information**

- You can set the VOX Level to between 1 (minimum) and 10 (maximum), or turn OFF.
- Higher values make the VOX function more sensitive to your voice.
- To exit the MENU screen, push [MENU].

TIP:

- If the status indicator blinks, set **VOX Delay** in the MENU screen. (p. 11-39) (MENU > Function > VOX > **VOX Delay**)
- When the VOX function is ON, you can adjust the VOX level by rotating [DIAL] while transmitting.

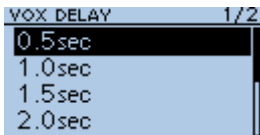


VOX function

◇ **VOX-related settings**

The VOX Delay and the VOX time-out timer can be set on the MENU screen. Change the settings to suit your needs.

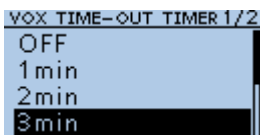
VOX Delay



MENU > Function > VOX > **VOX Delay**

The VOX delay is the amount of time that the transceiver keeps transmitting after you stop speaking. (p. 11-39)

VOX Time-Out Timer



MENU > Function > VOX > **VOX Time-Out Timer**

You can use this function to prevent accidental prolonged transmission. (p. 11-39)

RS-MS1A

The RS-MS1A is a freeware application for Android devices.

With the RS-MS1A, you can use the extended D-STAR functions to exchange image files or text messages, or display the received D-PRS station data on a map program.

To use the RS-MS1A, download it from the Google Play store of your Android device.

◇ Required items

The following system is required to use the RS-MS1A.
(As of November 2017)

• Android device

Android 4.0 or later with the USB host function.

- ① The RS-MS1A has been tested with the Android 4.x.x, 5.x.x, 6.x.x, and 7.x.x.

TIP: The USB host function is needed to use a USB device with an Android device. To check whether or not your Android device has the USB host system, ask the Android device's manufacturer.

• Data cable

OPC-2350LU DATA CABLE (purchase separately)

NOTE: Some function may not work correctly,

- depending on other applications installed in the Android device.
- depending on the memory capacity.

- ① For operations or settings of the Android device, read the Android device's instruction manual.
- ① Display indications may differ depending on the OS version or settings.

◇ Installing the application

1. Start the Android device.
2. Tap "Play store."
3. Enter "RS-MS1A."
 - ① Do not abbreviate the application name to be sure to find it.
4. Tap "Q (search)."
 - The RS-MS1A application information is displayed.
 - ① If your Android device is not compatible with the RS-MS1A, the application is not displayed.
5. Tap "RS-MS1A."
6. Tap "Install."
7. Tap "Agree to download."
 - Starts installing the application.
 - After the installation is completed, the icon is displayed on your home screen.

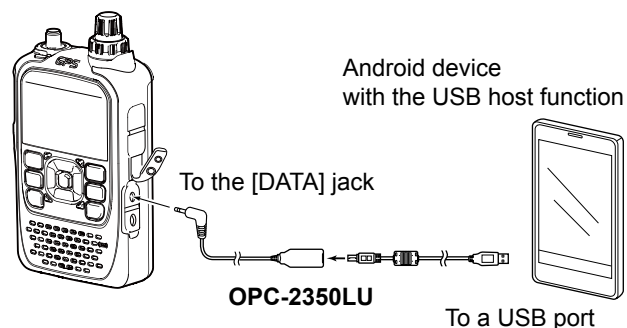


NOTE: Before starting, BE SURE to set the following items on the MENU screen.

- Set **CI-V (DATA Jack)** to "ON (Echo Back OFF)." (MENU > Function > CI-V > **CI-V (DATA Jack)**) (p. 11-39)
- Set **CI-V Transceiver** to "ON." (MENU > Function > CI-V > **CI-V Transceiver**) (p. 11-39)

◇ Connecting the OPC-2350LU

ID-31A PLUS/ID-31E PLUS



NOTE:

- Turn OFF the transceiver before connecting or removing the cable.
- Remove the OPC-2350LU when you do not use the cable. Otherwise, the battery will be quickly exhausted.
- If the application selection window is displayed, select "RS-MS1A" to start the application.

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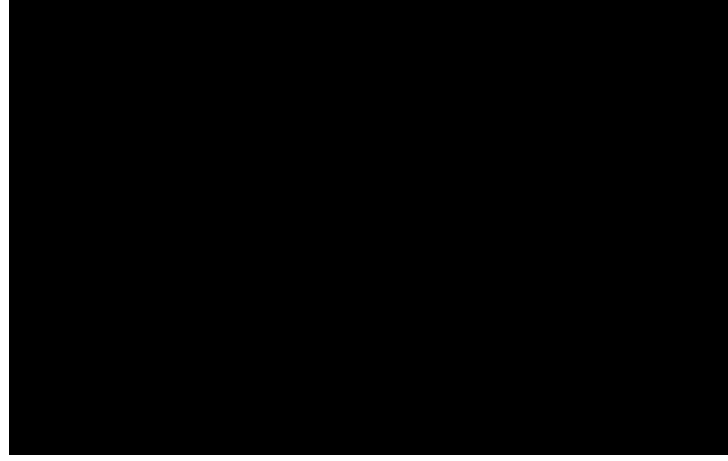
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Count on us!



Remote control (CI-V) information

◇ Command table

Command	Sub	Data	Description
00		See p. R-3	Send operating frequency for transceiver
01		See p. R-3	Send operating mode for transceiver
03		See p. R-3	Read operating frequency
04		See p. R-3	Read operating mode
05		See p. R-3	Send operating frequency
06		See p. R-3	Send operating mode
07			Select the VFO mode
0C		See p. R-3	Read frequency offset*1
0D		See p. R-3	Send frequency offset
0F			Read duplex setting (10= simplex, 11= DUP-, 12= DUP+)
	10		Set simplex operation
	11		Set DUP- operation
	12		Set DUP+ operation
14	01	See p. R-3	Send/Read audio output level
	03	See p. R-3	Send/Read squelch level
	0A	See p. R-3	Send/Read RF power setting
	0B	See p. R-3	Send/Read external microphone gain
15	01	00	Read noise/S-meter squelch status (squelch close)
		01	Read noise/S-meter squelch status (squelch open)
	02	0000 ~ 0255	Read S-meter level (0000= S0, 0170= S9)
	05	00	Read tone squelch and RF squelch status (squelch close)
		01	Read tone squelch and RF squelch status (squelch open)
	11	0000 ~ 0255	Read RF power meter (0005= S-LOW, 0026= LOW1, 0051= LOW2, 0128= MID, 0255= HIGH)
16	42	00	Send/Read Repeater tone OFF
		01	Send/Read Repeater tone ON
	43	00	Send/Read Tone squelch OFF
		01	Send/Read Tone squelch ON
		02	Send/Read Reversed Tone squelch ON
	46	00	Send/Read VOX function OFF
		01	Send/Read VOX function ON
	4B	00	Send/Read DTCS OFF
		01	Send/Read DTCS ON
		02	Send/Read Reversed DTCS ON
	5B	00	Send/Read DSQL/CSQL OFF (DV mode only)
		01	Send/Read DSQL ON (DV mode only)
02		Send/Read CSQL ON (DV mode only)	
5C	00 ~ 02		Send/Read GPS TX mode (00= OFF, 01= D-PRS, 02= NMEA)
5D	00 ~ 09		Send Tone setting (00= OFF, 01= TONE, 02= TSQL, 03=DTCS, 04=TSQL-R, 05=DTCS-R, 06=DTCS (T), 07=TONE (T)/DTCS (R), 08=DTCS (T)/TSQL (R), 09=TONE (T)/TSQL (R))
			See ADVANCED MANUAL Section 12 about the Tone function.
18	00		Turn OFF the transceiver
	01		Turn ON the transceiver*2
19	00		Read transceiver ID.
1B	00	See p. R-4	Send/Read Repeater tone frequency
	01	See p. R-4	Send/Read Tone squelch frequency
	02	See p. R-4	Send/Read DTCS code and polarity
	07	See p. R-4	Send/Read CSQL code (DV mode)
1C	00	00	Send/Read Transceiver's status (RX)
		01	Send/Read Transceiver's status (TX)

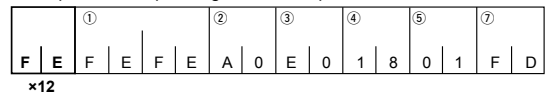
Command	Sub	Data	Description	
1F	00	See p. R-4	Send/Read DV MY call sign	
	01	See p. R-4	Send/Read DV TX call signs	
	02	See p. R-4	Send/Read DV TX message	
20	00	00/01*3	Send/Read Auto DV RX Call signs output (00= OFF, 01= ON)	
		01	See p. R-5	Output DV RX Call signs for transceiver
		02	See p. R-5	Read DV RX Call signs
	01	00	00/01*3	Send/Read Auto DV RX message output (00= OFF, 01= ON)
		01	See p. R-5	Output DV RX message for transceiver
	02	00	00/01*3	Send/Read Auto DV RX status output (00= OFF, 01= ON)
		01	See p. R-5	Output DV RX status for transceiver
	03	00	00/01	Send/Read Auto DV RX GPS/D-PRS data output (00= OFF, 01= ON)
		01	See p. R-6	Output DV RX GPS/D-PRS data for transceiver
	04	00	00/01	Send/Read Auto DV RX GPS/D-PRS message output (00= OFF, 01= ON)
		01	See p. R-8	Output DV RX GPS/D-PRS message for transceiver
	02	00	00/01	Send/Read Auto DV RX status output (00= OFF, 01= ON)
01		See p. R-5	Output DV RX status for transceiver	
03	00	00/01	Send/Read Auto DV RX GPS/D-PRS data output (00= OFF, 01= ON)	
	01	See p. R-6	Output DV RX GPS/D-PRS data for transceiver	
04	00	00/01	Send/Read Auto DV RX GPS/D-PRS message output (00= OFF, 01= ON)	
	01	See p. R-8	Output DV RX GPS/D-PRS message for transceiver	
22	00	See p. R-8	Send/Read DV TX data (Up to 30 bytes)	
	01	00	00/01	Send/Read Auto DV RX data output (00= OFF, 01= ON)
		01	See p. R-8	Output DV RX data for transceiver (Up to 30 byte)
	02		00/01	Send/Read DV data TX setting (00= PTT, 01= Auto)
	03		00/01	Send/Read DV fast data setting (00=OFF, 01= ON)
04		00/01	Send/Read GPS Data Speed setting (00= Slow, 01= Fast)	
05		00 ~ 10	Send/Read TX Delay (PTT) setting (00= OFF, 01= 1 sec. ~ 10= 10 sec.)	
23	00	See p. R-8	Read the position	
	01		00	Send/Read the internal GPS OFF
			01	Send/Read the internal GPS ON
			02	Send/Read the external GPS ON
		03	Send/Read the manual input	
02	See p. R-8	Send/read manually input position		
24	00	00/01	Send/read TX output power setting OFF (00=OFF, 01= ON)	
	01	00/01	TX output power setting for transceiver (00=OFF, 01= ON)	

*1 Less than 100 Hz is omitted.

*2 When sending the power ON command (18 01), the command "FE" must be sent before the basic format.

- 19200bps: 48 • 9600bps: 24 • 4800bps: 12
- 1200bps: 4 • 300bps: 2

Example: When operating with 4800 bps



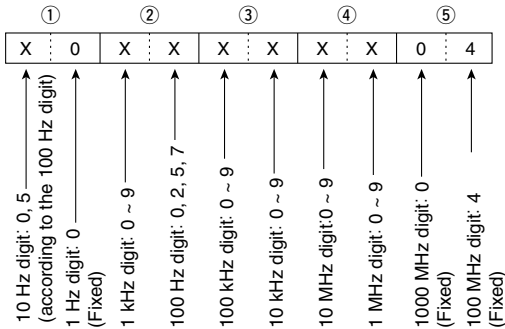
- ① Preamble code (fixed)
- ② Transceiver's default address
- ③ Controller's default address
- ④ Command number
- ⑤ Sub command number
- ⑥ End of message code (fixed)

*3 Output setting is automatically turned OFF after turning the power OFF, then ON.

Remote control (CI-V) information

• Receive frequency setting

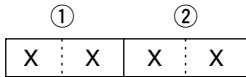
Command: **00, 03, 05**



* 10 Hz digit is fixed to "5" when 100 Hz digit is either "2" or "7," and fixed to "0" when 100 Hz digit is other than "2" and "7."

• Operating mode

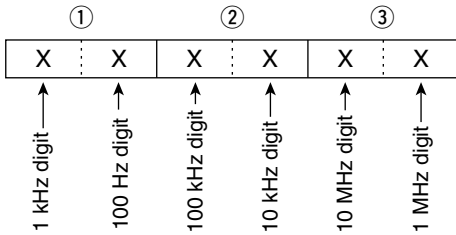
Command: **01, 04, 06**



Operating mode	① Mode	② Filter setting
FM	05	01
FM-N	05	02
DV	17	01

• Duplex Frequency offset setting

Command: **0C, 0D**



• Audio output level setting

Command: **14 01**

VOL0	VOL1	VOL2	VOL3	VOL4
0000 ~ 0006	0007 ~ 0012	0013 ~ 0019	0020 ~ 0025	0026 ~ 0031
VOL5	VOL6	VOL7	VOL8	VOL9
0032 ~ 0038	0039 ~ 0044	0045 ~ 0051	0052 ~ 0057	0058 ~ 0063
VOL10	VOL11	VOL12	VOL13	VOL14
0064 ~ 0070	0071 ~ 0076	0077 ~ 0083	0084 ~ 0089	0090 ~ 0095
VOL15	VOL16	VOL17	VOL18	VOL19
0096 ~ 0102	0103 ~ 0108	0109 ~ 0115	0116 ~ 0121	0122 ~ 0127
VOL20	VOL21	VOL22	VOL23	VOL24
0128 ~ 0134	0135 ~ 0140	0141 ~ 0147	0148 ~ 0153	0154 ~ 0159
VOL25	VOL26	VOL27	VOL28	VOL29
0160 ~ 0166	0167 ~ 0172	0173 ~ 0179	0180 ~ 0185	0186 ~ 0191
VOL30	VOL31	VOL32	VOL33	VOL34
0192 ~ 0198	0199 ~ 0204	0205 ~ 0211	0212 ~ 0217	0218 ~ 0223
VOL35	VOL36	VOL37	VOL38	VOL39
0224 ~ 0230	0231 ~ 0236	0237 ~ 0243	0244 ~ 0249	0250 ~ 0255

• Squelch level setting

Command: **14 03**

OPEN	AUTO	LEVEL1	LEVEL2	LEVEL3
0000 ~ 0023	0024 ~ 0046	0047 ~ 0069	0070 ~ 0093	0093 ~ 0116
LEVEL4	LEVEL5	LEVEL6	LEVEL7	LEVEL8
0117 ~ 0139	0140 ~ 0162	0163 ~ 0186	0187 ~ 0209	0210 ~ 0232
LEVEL9				
0233 ~ 0255				

• RF power level setting

Command: **14 0A**

S-LOW	LOW1	LOW2	MID	HIGH
0000 ~ 0051	0052 ~ 0102	0103 ~ 0153	0154 ~ 0204	0205 ~ 0255

• External microphone gain setting

Command: **14 0B**

1	2	3	4
0000 ~ 0063	0064 ~ 0127	0128 ~ 0191	0192 ~ 0255

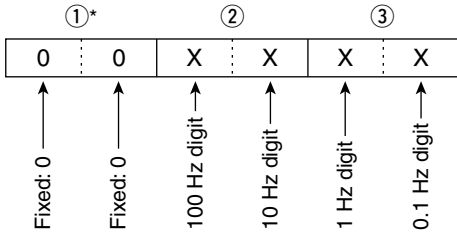
• VOX gain setting

Command: **14 16**

OFF	1	2	3	4
0000 ~ 0023	0024 ~ 0046	0047 ~ 0069	0070 ~ 0093	0094 ~ 0116
5	6	7	8	9
0117 ~ 0139	0140 ~ 0162	0163 ~ 0186	0187 ~ 0209	0210 ~ 0232
10				
0233 ~ 0255				

Remote control (CI-V) information

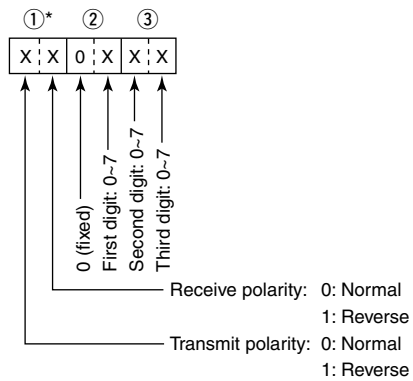
• Repeater tone/tone squelch frequency setting
 Command: **1B 00, 1B 01**



* Not necessary when setting a frequency.

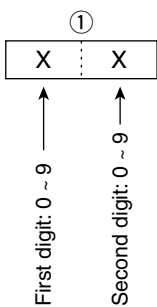
① See ADVANCED MANUAL Section 11 for the tone frequency list.

• DTCS code and polarity setting
 Command: **1B 02**



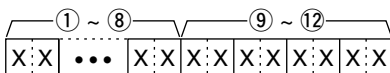
① See ADVANCED MANUAL Section 11 for the DTCS code list.

• Digital code squelch setting
 Command: **1B 07**



• DV MY call sign setting
 Command: **1F 00**

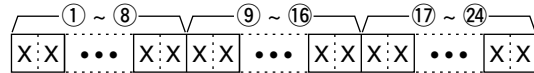
Set your own call sign and note of up to 12 characters.



① ~ ⑧: Your own call sign setting (8 characters)
 ⑨ ~ ⑫: Note setting (4 characters)

• DV TX call signs setting (24 characters)
 Command: **1F 01**

Set "UR," "R1," and "R2" call signs of 8 characters (fixed).



① ~ ⑧: UR (Destination) call sign setting
 ⑨ ~ ⑯: R1 (Access/Area repeater) call sign setting
 ⑰ ~ ⑳: R2 (Link/Gateway repeater) call sign setting (8 characters)

Character's code of the call sign

Character	ASCII code
0 ~ 9	30 ~ 39
A ~ Z	41 ~ 5A
(Space)	20
/	2F

• DV TX message setting
 Command: **1F 02**

Set the transmit message of up to 20 characters.
 ① FF: stops sending or reading messages.

Character	ASCII code	Character	ASCII code
A ~ Z	41 ~ 5A	a ~ z	61 ~ 7A
0 ~ 9	30 ~ 39	Space	20
!	21	#	23
\$	24	%	25
&	26	\	5C
?	3F	"	22
'	27	`	60
^	5E	+	2B
-	2D	*	2A
/	2F	.	2E
,	2C	:	3A
;	3B	=	3D
<	3C	>	3E
(28)	29
[5B]	5D
{	7B	}	7D
	7C	_	5F
-	7E	@	40

Remote control (CI-V) information

• **DV RX call sign setting**

Command: **20 0001, 20 0002**

① **Header flag data (First byte)**

Data		Description
bit7	(0: Fixed)	—
bit6	(0: Fixed)	—
bit5	(0: Fixed)	—
bit4	0/1	0= Voice, 1= Data
bit3	0/1	0= Direct, 1= Through repeater
bit2	0/1	0= No Break-in, 1= Break-in
bit1	0/1	0= Data, 1= Control
bit0	0/1	0= Normal, 1= EMR

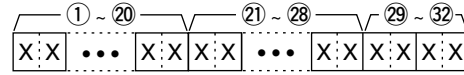
② **Header flag data (Second byte)**

Data			Description
bit2	bit1	bit0	
1	1	1	Repeater control
1	1	0	Send auto acknowledge
1	0	1	(Not used)
1	0	0	Request to re-transmit
0	1	1	Send acknowledge
0	1	0	Receive no reply
0	0	1	Repeater disabled
0	0	0	NULL

- ③ ~ ⑩: Call sign of the caller station (8 characters, fixed)
- ⑪ ~ ⑭: Note of the caller station (4 characters, fixed)
- ⑮ ~ ⑳: Call sign of the called station (8 characters, fixed)
- ㉓ ~ ㉟: Call sign of the Access/Area repeater (R1) (8 characters, fixed)
- ㉑ ~ ㉗: Call sign of the Link/Gateway repeater (R2) (8 characters, fixed)
- ① FF: When no call sign receiving after turning ON the transceiver.

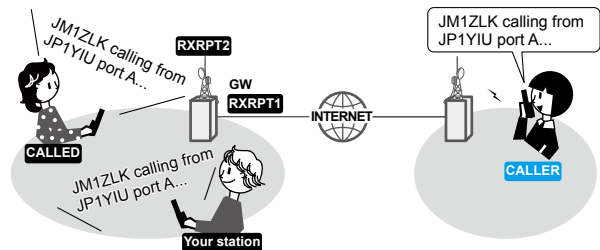
• **DV RX message**

Command: **20 0101, 20 0102**



- ① ~ ⑳: Message (20 characters)
- ㉑ ~ ㉗: Call sign of the caller station (8 characters)
- ㉘ ~ ㉜: Note of the caller station (4 characters)
- ① FF: When no call sign receiving after turning ON the transceiver.

Example: Gateway call



- CALLER: Caller's call sign
- CALLED: Called station call sign
- RXRPT1: Call sign of the repeater that was accessed by the caller station.
- ① If it was a call through a gateway and the Internet, the gateway call sign of the repeater you received the call from.
- RXRPT2: Call sign of the repeater you received the call from.

• **DV RX Status setting**

Command: **20 0201, 20 0202**

Data		Function	Description
bit7	0	(Fixed)	—
bit6	0/1	Receiving a voice call	While receiving a digital voice signal, select "1." (Regardless of the DSQ and CSQ setting)
bit5	0/1	Last call finisher	When you finish the last call, select "1."
bit4	0/1	Receiving a signal	When the audio tone can be heard, select "1."
bit3	0/1	Receiving a BK call	While receiving a BK call, select "1."
bit2	0/1	Receiving a EMR call	While receiving a EMR call, select "1."
bit1	0/1	Receiving a signal other than DV	When "DV" and "FM" are blinking, select "1."
bit0	0/1	Packet loss status	While displaying a packet loss.

Remote control (CI-V) information

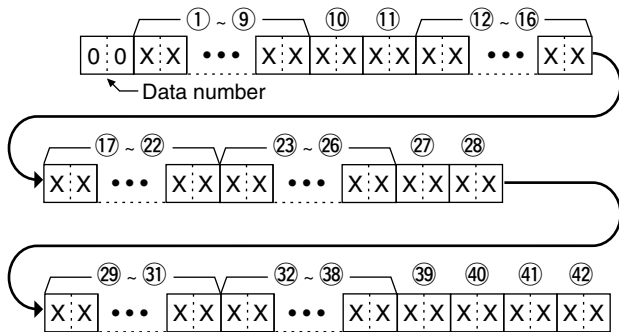
• GPS/D-PRS data

Command: 20 0301, 20 0302

Data number and description

Data number	Description
00	D-PRS— Position
01	D-PRS— Object
02	D-PRS— Item
03	D-PRS— Weather

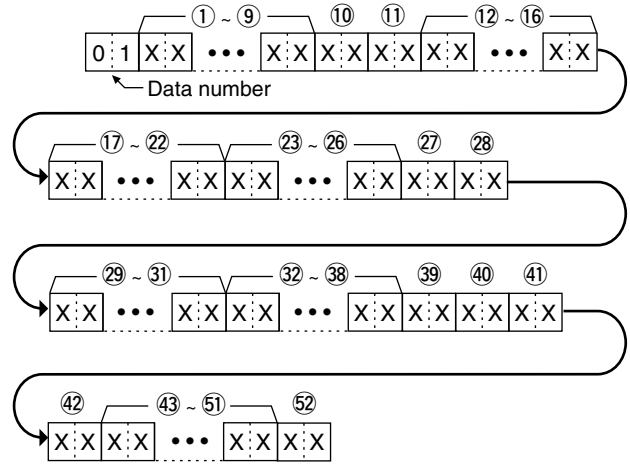
Position



- ① ~ ⑨: Call sign/SSID
* 9 ASCII characters (A ~ Z, 0 ~ 9, /, -, space)
- ⑩, ⑪: Symbol
* 2 ASCII characters (00h ~ EFh)
- ⑫ ~ ⑯: Latitude (dd°mm.mmm format)
- ⑰ ~ ⑳: Longitude (ddd°mm.mmm format)
- ㉓ ~ ㉖: Altitude (0.1 meter steps)
- ㉗, ㉘: Course (1 degree steps)
- ㉙ ~ ㉚: Speed (0.1 km/h steps)
- ㉛ ~ ㉞: Date (UTC: yyyyymmddHHMMSS)
* y: Year, m: Month, d: Day, H: Hour, M: Minute, S: Second
- ㉟: Power (see the table below)
- ④①: Height (see the table below)
- ④②: Gain (see the table below)
- ④③: Directivity (see the table below)

Data	Power (W)	Height (m/ft)	Gain (dB)	Directivity (deg)
0	0	3/10	0	Omni-direction
1	1	6/20	1	45° NE
2	4	12/40	2	90° E
3	9	24/80	3	135° SE
4	16	49/160	4	180° S
5	25	98/320	5	225° SW
6	36	195/640	6	270° W
7	49	390/1280	7	315° NW
8	64	780/2560	8	360° N
9	81	1561/5120	9	—

Object



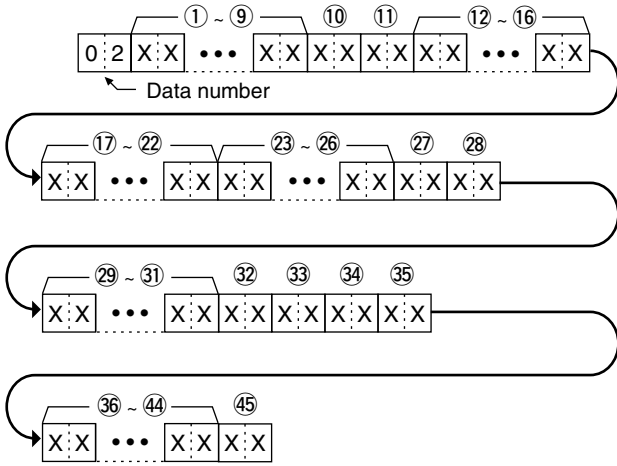
- ① ~ ⑨: Call sign/SSID
* 9 ASCII characters (A ~ Z, 0 ~ 9, /, -, space)
- ⑩, ⑪: Symbol
* 2 ASCII characters (00h ~ EFh)
- ⑫ ~ ⑯: Latitude (dd°mm.mmm format)
- ⑰ ~ ⑳: Longitude (ddd°mm.mmm format)
- ㉓ ~ ㉖: Altitude (0.1 meter steps)
- ㉗, ㉘: Course (1 degree steps)
- ㉙ ~ ㉚: Speed (0.1 km/h steps)
- ㉛ ~ ㉞: Date (UTC: yyyyymmddHHMMSS)
* y: Year, m: Month, d: Day, H: Hour, M: Minute, S: Second
- ㉟: Power (see the table below)
- ④①: Height (see the table below)
- ④②: Gain (see the table below)
- ④③: Directivity (see the table below)

Data	Power (W)	Height (m/ft)	Gain (dB)	Directivity (deg)
0	0	3/10	0	Omni-direction
1	1	6/20	1	45° NE
2	4	12/40	2	90° E
3	9	24/80	3	135° SE
4	16	49/160	4	180° S
5	25	98/320	5	225° SW
6	36	195/640	6	270° W
7	49	390/1280	7	315° NW
8	64	780/2560	8	360° N
9	81	1561/5120	9	—

- ④③ ~ ④⑤: Name
* 9 ASCII characters (00h ~ EFh)
- ④⑥: Type (1= Live, 0= Killed)

Remote control (CI-V) information

Item

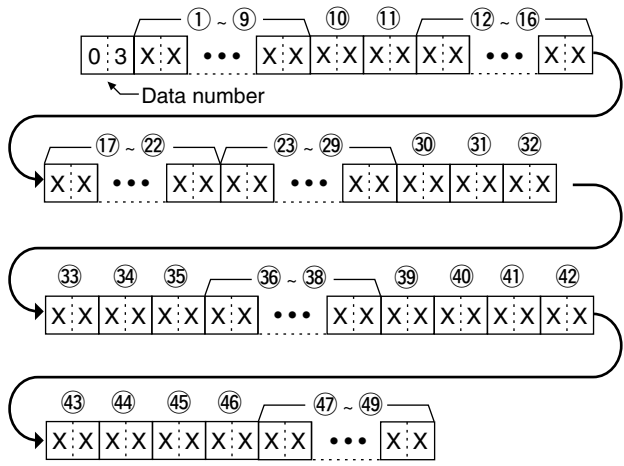


- ① ~ ⑨: Call sign/SSID
* 9 ASCII characters (A ~ Z, 0 ~ 9, /, -, space)
- ⑩, ⑪: Symbol
* 2 ASCII characters (00h ~ EFh)
- ⑫ ~ ⑯: Latitude (dd°mm.mmm format)
- ⑰ ~ ⑳: Longitude (ddd°mm.mmm format)
- ㉓ ~ ㉖: Altitude (0.1 meter steps)
- ㉗, ㉘: Course (1 degree steps)
- ㉙ ~ ㉛: Speed (0.1 km/h steps)
- ㉜: Power (see the table below)
- ㉝: Height (see the table below)
- ㉞: Gain (see the table below)
- ㉟: Directivity (see the table below)

Data	Power (W)	Height (m/ft)	Gain (dB)	Directivity (deg)
0	0	3/10	0	Omni-direction
1	1	6/20	1	45° NE
2	4	12/40	2	90° E
3	9	24/80	3	135° SE
4	16	49/160	4	180° S
5	25	98/320	5	225° SW
6	36	195/640	6	270° W
7	49	390/1280	7	315° NW
8	64	780/2560	8	360° N
9	81	1561/5120	9	—

- ㉞ ~ ㉟: Name
* 9 ASCII characters (00h ~ EFh)
- ㊱: Type (1= Live, 0= Killed)

Weather

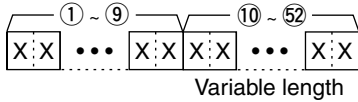


- ① ~ ⑨: Call sign/SSID
* 9 ASCII characters (A ~ Z, 0 ~ 9, /, -, space)
- ⑩, ⑪: Symbol
* 2 ASCII characters (00h ~ EFh)
- ⑫ ~ ⑯: Latitude (dd°mm.mmm format)
- ⑰ ~ ⑳: Longitude (ddd°mm.mmm format)
- ㉓ ~ ㉙: Date (UTC: yyyyymmddHHMMSS)
* y: Year, m: Month, d: Day, H: Hour, M: Minute, S: Second
- ㉚, ㉛: Wind direction (1 degree steps)
- ㉜, ㉝: Wind speed (0.1 m/s steps)
- ㉞, ㉟: Gust speed (0.1 m/s steps)
- ㊱ ~ ㊲: Temperature (0.1°C steps)
- ㊳: Temperature (0= + degree, 1= - degree)
- ㊴, ㊵: Rainfall (0.1 mm steps)
- ㊶, ㊷: Rainfall (24 hours) (0.1 mm steps)
- ㊸, ㊹: Rainfall (Midnight) (0.1 mm steps)
- ㊺, ㊻: Humidity (1% steps)
- ㊼ ~ ㊾: Barometric pressure (0.1 hPa steps)

Remote control (CI-V) information

• GPS/D-PRS message

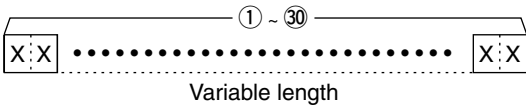
Command: **20 0401, 20 0402**



- ① ~ ⑨: Call sign/SSID
* 9 ASCII characters
(A ~ Z, 0 ~ 9, /, -, space)
- ⑩ ~ ⑫: Message
* Up to 43 ASCII characters (00h ~ EFh)

• DV TX data (transceive)

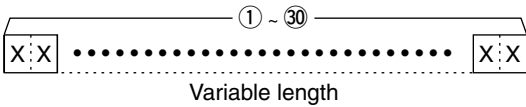
Command: **22 00**



- ① ~ ⑫: TX data (Up to 30 Byte)
* "FA" to "FF" are entered after converted to "FF 0A" to "FF 0F" automatically. Data of up to 60 Byte can be entered in this case.

• DV RX data (transceive)

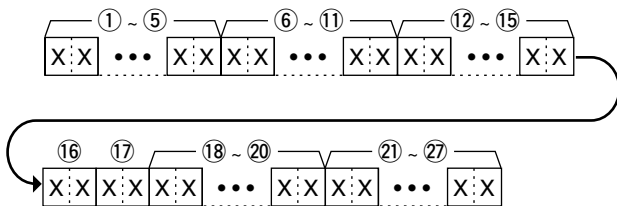
Command: **22 01 01**



- ① ~ ⑫: RX data (Up to 30 Byte)
* "FA" to "FF" are entered after converted to "FF 0A" to "FF 0F" automatically. Data of up to 60 Byte can be entered in this case.

• MY position data

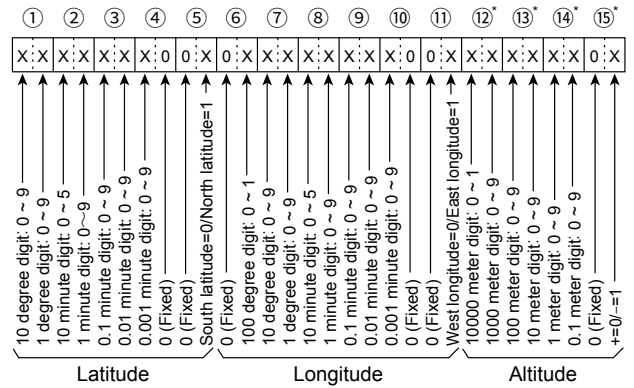
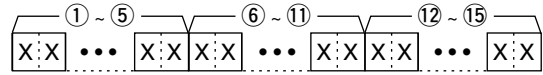
Command: **23 00**



- ① ~ ⑫: Latitude (dd°mm.mmm format)
- ⑬ ~ ⑱: Longitude (ddd°mm.mmm format)
- ⑲ ~ ⑲: Altitude (0.1 meter steps)
- ⑳, ㉑: Course (1 degree steps)
- ㉒ ~ ㉒: Speed (0.1 km/h steps)
- ㉓ ~ ㉓: Date (UTC: yyyyymmddHHMMSS)
*y: Year, m: Month, d: Day, H: Hour, M: Minute, S: Second

• Manually input position data

Command: **23 02**



- ① ~ ⑫: Latitude (dd°mm.mmm format)
- ⑬ ~ ⑱: Longitude (ddd°mm.mmm format)
- ⑲ ~ ⑲: Altitude (0.1 meter steps)
- ⑳ "FF" in all 4 byte characters stands for no altitude data sending or receiving.