KENWOOD

NX-5000 series

DMR Function Reference (DMR FUNC)

Version:	2.20
Last Updated:	May 31, 2017
Language:	English
Type:	K, F

CONTENTS

About This Manual

This manual describes the functions of the NX-5200/ NX-5300/ NX-5400/ NX-5700/ NX-5800/ NX-5900 transceiver operated in the DMR system.

This document is created for the product having the following design specifications.

Item	Specifications	How to Verify
Market Code	K, F	Printed or labeled on the packaging and the model name plate on the transceiver.
Firmware Version of the Transceiver	2.20.00	Can be viewed in the **Transceiver Information** dialog box of KPG-D1/ KPG-D1N. Or, firmware version of the transceiver can be viewed by the following ways: **Portable transceiver:** Turning the transceiver on while pressing and holding the Side 3 key causes the firmware version to appear on the display. **Mobile transceiver:** Turning the transceiver on while pressing and holding the **[+]** key causes the firmware version to appear on the display. **Common to Portable and Mobile:** Turning the transceiver on while pressing and holding the **Menu** ([▯]) key causes the transceiver to display Radio Mode Selection. Then, if "Transceiver Info" is selected and the **Menu** ([▯]) key is pressed, the transceiver enters Transceiver Information Mode, and then the firmware version can be viewed.
Version of KPG-D1/ KPG-D1N	V 2.20	Can be viewed in the **About KPG-D1** dialog box or **About KPG-D1N** dialog box of KPG-D1/ KPG-D1N.

K, F: Designed for the North American markets.

Also, to use the functions of the DMR system described in this manual, the following Radio Feature Licenses are required:

Function Name	Radio Feature License Name
DMR Conventional	KWD-5300CV
Remote Control	KWD-5007RC

How to Read the In-depth Manual

The In-depth Manual has the following sections.

Common Function Reference (Common FUNC)

Describes the functions common to the transceivers.

Analog Function Reference (Analog FUNC)

Describes the analog functions of the transceiver.

P25 Function Reference (P25 FUNC)

Describes the P25 functions of the transceiver.

NXDN Function Reference (NXDN FUNC)

Describes the NXDN functions of the transceiver.

DMR Function Reference (DMR FUNC)

Describes the DMR functions of the transceiver.

5-tone Function Reference (5-tone FUNC)

Describes the 5-tone functions of the transceiver.

About Notations

The following notations are used in this manual.

[ ]

The characters in [ ] indicate the name of the operating portion of each device and the key of the PC.

“ ” (Double Quotation Mark)

The characters in “ ” indicate the name of functions, buttons, and menus shown on the FPU.

Bold Letters

The characters in bold letters indicate the names of the FPU functions, panes, sections, dialog boxes, tabs, edit boxes, dropdown lists, and checkboxes.

[ ] + [ ]

This notation is used for describing functions activated by pressing 2 keys on the PC keyboard at the same time. For example, the notation to enter a capitalized A on the PC is **[Shift]** + **[a]** for pressing the **[a]** key while pressing the **[Shift]** key.

PF (Programmable Function) Key

This function is used for describing the key that is assigned with any function. When the Reset function is assigned to the **[A]** key, the **[A]** key is described as “the Reset key”.

Notations for FPU names

KPG-D1 and KPG-D1N are referred to collectively as “KPG-D1/ D1N” in this document.

About the Notation of the Supported Models

This manual describes the supported models according to the following rules:

Model	Notation	
NX-5200	Portable	VHF
NX-5300		UHF
NX-5400		700 MHz/ 800 MHz
NX-5700	Mobile	VHF
NX-5800		UHF
NX-5900		700 MHz/ 800 MHz

About Examples of the Transceiver Display

This manual describes mainly by using the display examples of Portable display if the functions are common to the transceivers. The display examples of Mobile display are also described as needed. Also, the display examples of KCH-19 (Basic Panel) display are mainly used as the display examples for Mobile. The display examples of KCH-20R (Featured Panel) are also used as needed.

Abbreviations Used in This Document

The following abbreviations are used in this in-depth manual. Refer to the abbreviation table below.

Abbreviation	Full Spelling or Meaning
ACK	Acknowledgment
AMBE+2	Advanced Multi-Band Excitation
ARC4	Alleged RC4
AUX	Auxiliary
BCL	Busy Channel Lockout
CC	Color Code
CH	Channel
COM port	Communications port
DQT	Digital Quiet Talk
DTC	Data Transmission Control
DTMF	Dual Tone Multi-Frequency
ESN	Electronic Serial Number
FCC	Federal Communications Commission
FPU	Field Programming Unit
GPS	Global Positioning System
GTC	Go To Channel
ID	Identification
Mic	Microphone
PF	Programmable Function
PTT	Push-to-Talk
QT	Quiet Talk
RSSI	Received Signal Strength Indication
RX	Receive
TOT	Time-out Timer
TX	Transmit
UID	Unit ID
UTC	Universal Time Coordinated
VOX	Voice-operated Transmission

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About the Programming Software

Various functions and parameters of the transceiver can be configured by using the KPG-D1/ D1N software. Various functions can be enabled by connecting the transceiver to a PC by use of the KPG-36U/ KPG-36X (Portable) or KPG-46U/ KPG-46X (Mobile) programming cable and writing the data configured using KPG-D1/ D1N to the transceiver. In this manual, a corresponding reference in the help texts of KPG-D1/ D1N is described for each function of the Function Reference. Therefore, you can configure the function by referring to the function also appearing in the texts of KPG-D1/ D1N.

About KPG-D1N

KPG-D1N is the programming software to configure functions for the transceiver to be used in the U.S.A.

KPG-D1N is compliant with the FCC Part 90 standard so that the specification does not allow “Wide” (25 kHz) to be configured in **Channel Spacing** for a VHF or UHF (except 300 MHz) transceiver in the frequency band regulated by the FCC Part 90. Except for the function above, specifications of KPG-D1 and KPG-D1N are the same.

About the Notation of “Configuration Using KPG-D1/ D1N”

In this manual, for the description of each function written as “Configuration using KPG-D1/ D1N”, a corresponding reference in the help texts of KPG-D1/ D1N is described. Therefore, you can configure the function by referring to the function also appearing in the help texts of KPG-D1/ D1N.

About the Zone-channel Format

Using KPG-D1/ D1N, the zone information of the transceiver can be configured by selecting whether to configure for each zone the channels in the same communication system (Analog Conventional, P25 Conventional, NXDN Conventional, DMR Conventional, P25 Trunking, NXDN Trunking), or channels in different systems.

Channel Table:

The communication system to be used can be selected for each zone. Only channels which use the same communication system can be configure in a zone.

Personality:

The communication system to be used can be selected for each channel. Channels which use different communication systems can exist in a zone.

In this manual, the Channel Table format or the Personality format may be described in explanations and references. This indicates that the function is enabled only when the format is configured. Also, the data configured by the Channel Table format can be migrated to the Personality format, but the data configured by the Personality format cannot be migrated to the Channel Table format.

Refer to the help texts of KPG-D1/ D1N for the method for configuring **Zone-channel Format** using KPG-D1/ D1N.

About System Type

For KPG-D1/ D1N, “DMR Conventional” must be selected in **System Type** of **System Information** of KPG-D1/ D1N in order to configure the system data or Zone-channel data of a DMR Conventional system.

In this manual, for the description of each function written as “Configuration using KPG-D1/ D1N”, a corresponding reference in the help texts of KPG-D1/ D1N is described as follows:

Configuring Unit ID (Own) (See Transceiver Settings > Personal > System Information > DMR Conventional > ID (Own))

In this case, if “DMR Conventional” is selected in **System Type** of **System Information**, Unit ID (Own) in a DMR Conventional system can be configured.

Refer to the help texts of KPG-D1/ D1N for the method of **System Type** configuration using KPG-D1/ D1N.

About Multi RF Deck/ Multi Control Head

For Mobile, by connecting 1 or 2 Control Heads to multiple mobile transceivers (RF Deck), 1 Multi RF Deck system can be structured.

Refer to Common FUNC “Multi RF Deck/ Multi Control Head” for the instructions on how to structure and how to configure Multi RF Deck/ Multi Control Head, and for the special functions of Multi RF Deck/ Multi Control Head.

About Options to Use the Functions Described in This Document

To use the functions described in this document, the following KENWOOD optional accessories need to be prepared on your own as necessary.

Portable/ Mobile	Option
Portable	• KMC-41D (Speaker Microphone) • KMC-42WD (Speaker Microphone) • KMC-47GPSD (GPS Speaker Microphone) • KMC-54WD (Speaker Microphone) • KPG-36U/ KPG-36X (Programming Interface Cable)
Mobile	• KMC-27A (Microphone) • KMC-27B (Microphone) • KMC-28A (Microphone with 12-Keypad) • KMC-35 (Microphone) • KMC-36 (Microphone with 12-Keypad) • KMC-9C (Desktop Microphone) • KMC-53 (Desktop Microphone)*1 • KES-3 (External Speaker) • KES-5 (External Speaker) • KCT-18 (Ignition Sense Cable) • KCT-46 (Ignition Sense Cable) • KRA-40 (GPS Antenna) • KPG-46U/ KPG-46X (Programming Interface Cable)

*1 E type only

Supported models NX-5700/ NX-5800

About the Built-in GPS Receiver Unit

The GPS receiver is built-in for NX-5200/ NX-5300/ NX-5400/ NX-5700/ NX-5800/ NX-5900. Read the following warnings before using the built-in GPS receiver unit of NX-5200/ NX-5300/ NX-5400/ NX-5700/ NX-5800/ NX-5900.

- **On the use of the GPS**

  With frequency interference in the GPS receive frequency range to the transceiver or another transceiver, the GPS receiver may not position normally.

  1. If the GPS receiver positions while transmitting
     - The GPS receiver may be unable to position if the transmit spurious emission of the transceiver interfere within the GPS receive frequency range.
     - The interference to the GPS receiver changes depending on the transmission power of the transceiver. Greater transmission power results in the higher possibility of being unable to position.
  2. If the GPS receiver positions while receiving
     - The GPS receiver may be unable to position if the harmonics of the oscillator equipped in the transceiver interfere within the GPS receive frequency range.
  3. Effects of other interfering frequencies (such as if other transceivers transmit)
     - If even transmit and receive frequencies other than the above, the GPS receiver may be unable to position if frequencies emitted from other transceivers and electronic equipment interfere within the GPS receive frequency range.

- As the built-in GPS receiver unit consumes more power when powered on compared to when powered off, the battery life of the transceiver becomes shorter compared to when the built-in GPS receiver unit is powered off.

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For your convenience of reading through this document using Adobe Acrobat or Adobe Reader, a link to a corresponding item is pasted in the Contents page, Index page, the lower part of each page and in the context. Clicking the portion where a link is pasted enables a jump to the corresponding page.

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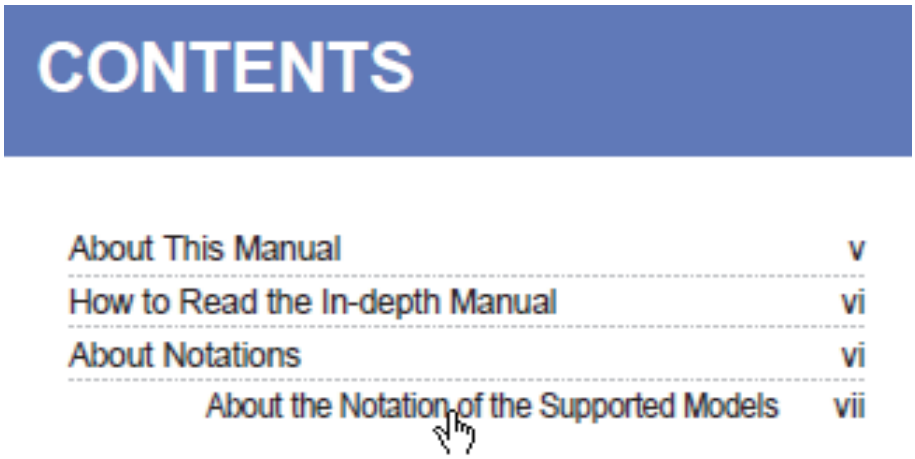
CONTENTS

Clicking a title in the Contents page allows a jump to the corresponding page.



INDEX

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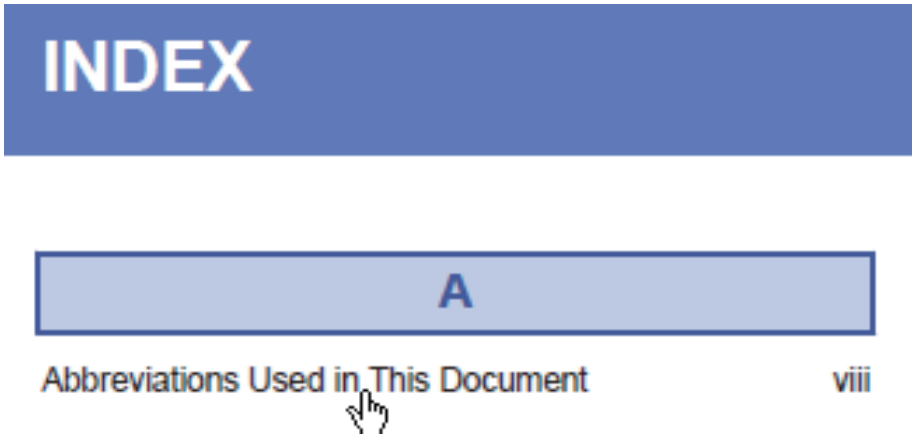

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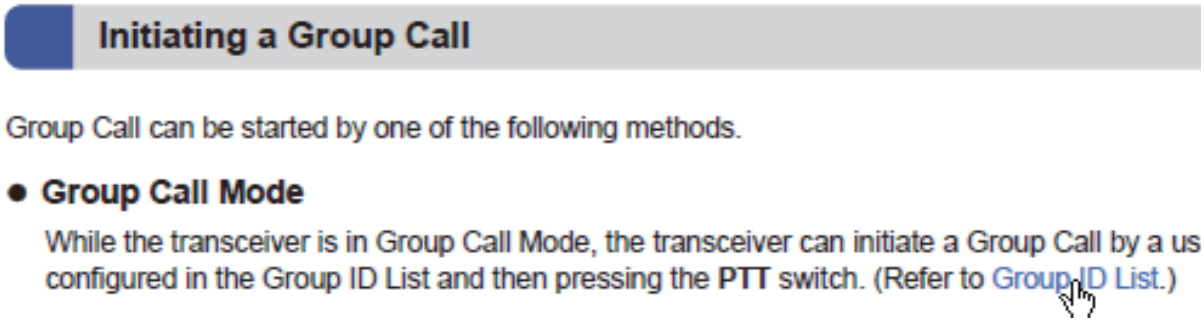

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Revision History

Date	Description
2017.5.31	1) Changed the version information in “About This Manual”. 2) Added description on Optional Signaling LED in Table 1-1. 3) Added “Optional Signaling LED” in “1.1 Initiating Voice Communications (Basic Transmission and Reception)”. 4) Added description on In-call Busy Channel Lockout in “Avoiding Interference with Other Communications (Busy Channel Lockout (DMR))”. 5) Added supplementary notes on the behavior during data communication in “Communicating via a Repeater (Repeater Mode)”. 6) Added descriptions on the use of PC commands to the following: Initiating an Individual Call Initiating an Individual Call (Individual Call Acknowledge Request) Initiating a Group Call Initiating a Broadcast Call 1.10 Sending and Receiving a Status Message (Status Call) Sending a Short Message 7) Added descriptions on Optional Signaling LED and Unit ID Serial Output in “Receiving an Individual Call”. 8) Added supplementary notes on Unit ID Serial Output in “Displaying the ID of the Communicating Caller on the LCD (Caller ID Display)”. 9) Added “Sending the Received Unit ID from the Communication Port (Unit ID Serial Output)” in “1.5 Making an Individual Call”. 10) Added supplementary notes on In-call Busy Channel Lockout in “1.6 Initiating an Individual Call After Ensuring That the Target Party Is Available for Communications (Individual Call Acknowledge Request)”. 11) Added description on Optional Signaling LED in “Receiving an Individual Call (Individual Call Acknowledge Request)”. 12) Added descriptions on Optional Signaling LED and Unit ID Serial Output in “Receiving a Group Call”. 13) Added descriptions on the behavior of the Selcall on PTT and Persistent Group ID (DMR) configurations in “Group ID Scan (DMR)”. 14) Added supplementary notes on the behavior during data communication in “Group ID Scan (DMR)”. 15) Added “Avoiding Receiving a Group Call during an Incoming Individual Call (Ignore Group Call during Individual Call)” to “1.7 Making a Group Call”. 16) Added descriptions on Optional Signaling LED and Unit ID Serial Output in “Receiving a Broadcast Group Call”. 17) Deleted “The default configuration is normally used.” from the descriptions on “Transmit Busy Wait Time” and “Maximum ACK Wait Time”. 18) Added description on the behavior for stopping the Alert Tone to the supplementary notes of “Receiving a Status Message” (Transceiver Behavior). 19) Revised the description on the number of data that can be saved and deleted supplementary notes in “Status Message Stack”. 20) Added description on the maximum number of characters that can be sent and received in “1.11 Sending and Receiving a Short Message (Short Data Call)”. Added “DMR Message Communication Configuration (DMR Message Type)”. 21) Added description on the behavior for stopping the Alert Tone to the supplementary notes of “Receiving a Short Message” (Transceiver Behavior). 22) Revised the description on the number of data that can be saved and added a table on the number of data that can be saved to the supplementary notes in “Short Message Stack”. 23) Added supplementary notes on the display when receiving an Individual Call in “1.12 Causing Transceivers Other than the Transceiver of the Specified ID to Participate in a Conversation (Open Voice Channel Mode)”.

Date	Description
2017.5.31	24) Added description on the use of PC commands and Unit ID Serial Output in “1.13 Calling All Transceivers Having the Same Color Code (Unaddressed Call)”. 25) Revised the descriptions in “1.14 Terminating Voice Communications by a Transceiver Other Than the Transmitting Transceiver (Call Interruption)” as follows: Changed “Busy Channel Lockout (Interrupt CALL)” to “In-call Busy Channel Lockout (Interrupt CALL)”. Added supplementary notes. Added “Sending a Call Interruption Request Message” and “Receiving a Call Interruption Request Message”. 26) Deleted “GPS Data Query Request” from “GPS Report Back to Requested ID”. 27) Added description on In-call Busy Channel Lockout in the supplementary notes of “Monitoring the Situation Around Another Transceiver by Remote Control (Remote Monitor)”. 28) Added “1.19 Migrating Automatically to the Site Providing Better Radio Environment (Site Roaming)”. 29) Added supplementary notes on the emission of Emergency Locator Tone in “Duration of Locator Tone 1” and “Duration of Locator Tone 2”. 30) Made changes to the overall description in “3 COMMUNICATION SECURITY”. Added the following descriptions: Enhanced Encryption format Secure Cryptographic Module 31) Added description on Non-Priority Scan LED and Priority Scan LED to the following sections: 4.2 Scanning in One Zone (Single Scan) 4.3 Scan by Registering Multiple Target Channels for Scan in the List (List Scan) 4.4 Scanning All Target Zones for Scanning (Multi-Zone Scan) 32) Added description on LTR and Conventional in Table 4-1. 33) Changed the transceiver screen in “4.4 Scanning All Target Zones for Scanning (Multi-Zone Scan)”. 34) Added supplementary notes on Priority-channel Stop Tone in “4.5 Scanning the Specific Channel Preferentially (Priority Scan)”. 35) Revised the description in “Priority-channel Stop Tone”. 36) Added the following tones to “7 Beep List”. Search Mode Tone Busy Tone 2 System Select Tone Key Fail Alert Tone 37) Changed the version number from 1.00 to 2.20.

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Functions for a DMR Conventional System

Making an Individual Call

A user can establish voice communication by calling an individual target transceiver.

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Functions for Communication Security

Enhancing Communication Security

The transceiver is equipped with functions to enhance secrecy in communications on a DMR channel.

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1 DMR CONVENTIONAL SYSTEM

DMR is a generic name for a digital communication system protocol utilizing 4-level FSK. Using DMR, the transceiver can initiate an individual call or group call for voice calls, text data communications or GPS data communications. Also, connecting a transceiver to an external device (such as a PC) allows communication because the transceiver supports serial command communication.

In a DMR Conventional system, digital signals can be transmitted and received on a DMR digital channel. Using a DMR ID (Unit ID or Group ID) allows the various communications.

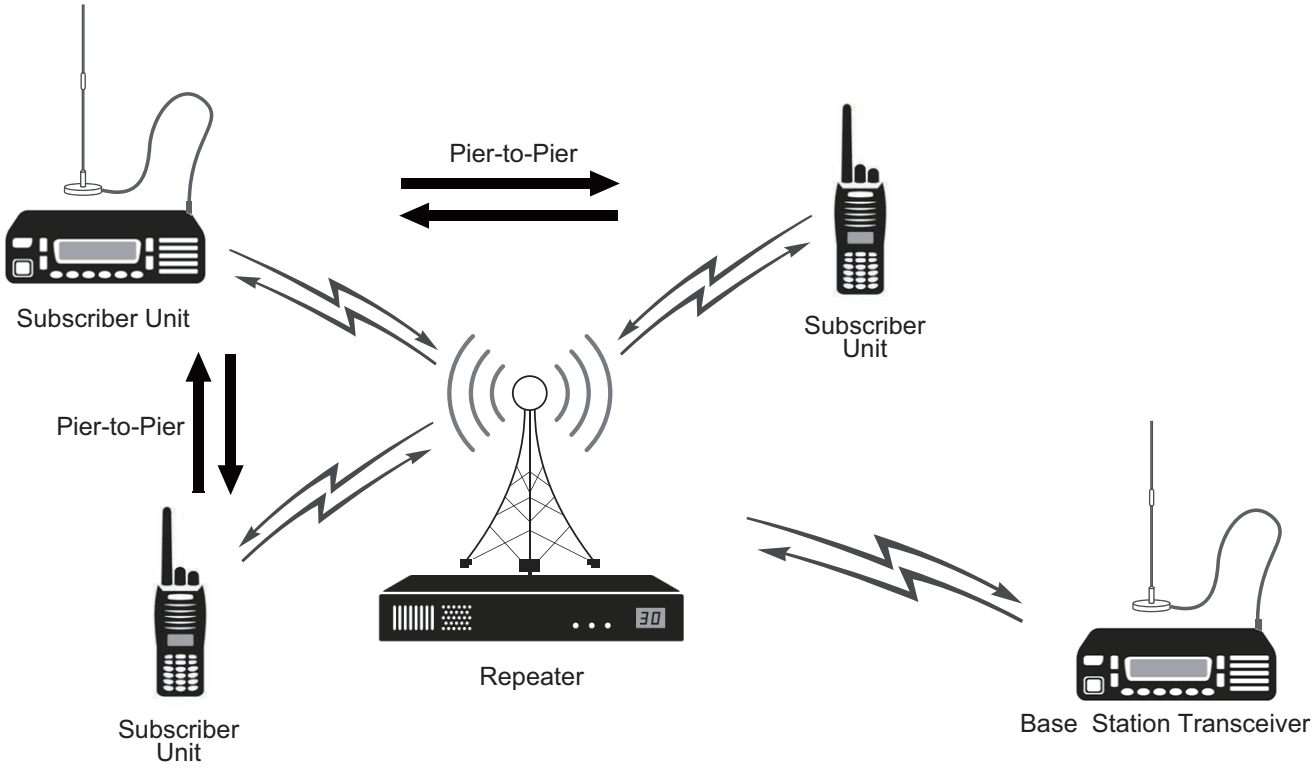


Figure 1-1 Image of Communications in a DMR Conventional System

Transceivers can communicate directly between transceivers without using a repeater. (Refer to Communicating Without Using a Repeater (Talk Around/ DMR Direct Mode).)

Or, the transceiver can communicate with another transceiver via a repeater. (Refer to Communicating via a Repeater (Repeater Mode).)

1.1 Initiating Voice Communications (Basic Transmission and Reception)

This section describes the basic methods for transmission and reception in a DMR Conventional system and the relevant functions.

About Own ID

To initiate various communications by using DMR, **Unit ID (Own)**, the identification code of a transceiver, needs to be configured for the transceiver.

A Unit ID can be configured in the range between 000001 and FFFCDF (hexadecimal), or between 1 and 16776415 (decimal).

If **Global ID** is enabled, a Unit ID is shared by all DMR Conventional.

If **Global ID** is disabled, a Unit ID needs to be configured for each DMR Conventional.

Also, a name specific to the transceiver can be configured for **Unit ID (Own)**.

Note

Since the management system of own ID in P25 and NXDN is different from the management system of own ID in DMR, each own ID needs to be configured separately.

Configuration using KPG-D1/ D1N

- Configuring Unit ID (Own) and Unit ID Name (Own) (See Transceiver Settings > Personal > System Information > DMR Conventional > Unit ID (Own))
- Configuring Global ID to be enabled or disabled (See Transceiver Settings > Personal > System Information > DMR Conventional > Unit ID (Own))

About Communication Security (Encryption)

The transceiver is equipped with the Encryption function, which can enhance the confidentiality of communications by encrypting communication data when making various communications on a DMR digital channel. (Refer to COMMUNICATION SECURITY.)

Receiving

Received audio sounds from the speaker if the transceiver receives digital signals, and the frequency matches the frequency of the channel on which the transceiver waits or the DMR ID matches the DMR ID preconfigured for the transceiver. When a signaling (Color Code) is used, communications are possible if the received Color Code matches the Color Code which the transceiver waits.

Auto Reset Timer

Auto Reset Timer is the amount of time from when the received Unit ID or Group ID matches the Unit ID or Group ID preconfigured for the transceiver until the LCD, blinking of LED and emission of Alert Tone will automatically be reset.

By using KPG-D1/ D1N, **Auto Reset Timer** can be configured. Also, how the transceiver behaves after the amount of time configured in **Auto Reset Timer** elapses can be configured.

Whether different **Auto Reset Timer** configurations are applied to voice communications and data communications can be configured.

Table 1-1 Auto Reset Timer

Configuration		Description
Auto Reset Timer (Voice or Message)	Off	**Auto Reset Timer** will not be activated.
	0 sec to 300 sec	After the configured time elapses, the matching state of the Unit ID or Group ID is automatically reset.
LED (Voice only)		If this function is enabled, the flashing LED for the **Selective Call Alert LED** turns off when the length of time configured in **Auto Reset Timer** elapses.
Alert Tone (Voice or Message)		If this function is enabled, the intermittently emitted Alert Tone stops when the length of time configured in **Auto Reset Timer** elapses.
LCD (Voice or Message)		While this function is enabled, the flashing LED for the **Optional Signaling LED** turns off, and the display will change from one of the following displays to the previous channel display if the amount of time configured for **Auto Reset Timer** elapses. • ID display after receiving an Individual Call or Group Call • Status Message display after receiving a Status Message • Short Message display after receiving a Short Message

Configuration using KPG-D1/ D1N

- Configuring **Auto Reset Timer** (Voice) (See Transceiver Settings > DMR > DMR Information > General > Auto Reset > Voice)
- Configuring **Auto Reset Timer** (Message) (See Transceiver Settings > DMR > DMR Information > General > Auto Reset > Message)

Selective Call Alert LED

Selective Call Alert LED is the function to make the LED flash when the transceiver receives a call using a DMR ID.
A user can notice by the LED that the transceiver is receiving a call.
One of the 7 colors can be used to make the LED flash, and the flashing color can be configured for each type of call.

- Yellow
- Purple
- Blue
- Light Blue
- Red
- Green
- White

Configuration using KPG-D1/ D1N

- Configuring **Selective Call Alert LED** (See Transceiver Settings > DMR > DMR Information > Conventional)
- Configuring **Alert LED Color** (See Transceiver Settings > DMR > DMR Information > Conventional > Alert LED Color)
- Configuring **Alert LED Color (Individual ID List)** (See Transceiver Settings > DMR > Individual ID List > Alert LED Color)
- Configuring **Alert LED Color (Group ID List)** (See Transceiver Settings > DMR > Group ID List > Alert LED Color)

Optional Signaling LED

Optional Signaling LED is the function that causes the LED to flash in yellow when the Optional Signaling received matches that of the transceiver.

A user can notice by the LED that the transceiver is receiving a call.

When Optional Signaling is no longer matching due to operation of the transceiver key or upon elapse of the time configured in **Auto Reset Timer**, the light of the LED goes off.

However, if **Selective Call Alert LED** is enabled, the LED flashes according to the configuration of **Selective Call Alert LED** even when **Optional Signaling LED** is enabled.

Configuration using KPG-D1/ D1N

Configuring **Optional Signaling LED** to be enabled or disabled (See Transceiver Settings > DMR > DMR Information> Conventional)

Participating in an On-going Voice Call Midway Through the Call (Late Entry)

The transceiver can participate in an on-going voice call even if the transceiver receives this call midway through.

The transceiver in a DMR Conventional system can participate in an on-going voice call by decoding control data always sent along with audio data, even if the transceiver receives a voice call midway through the call.

Searching Whether the Transceiver Receives a Call (Scan)

Using the Scan function, the transceiver can check each channel in turn whether the channel has a signal. If a channel has a signal, the transceiver receives the signal on the channel.

The following scan functions can be used in a DMR Conventional system.

- Single Scan
- List Scan
- Multi-Zone Scan

Refer to “SCAN” for details of Scan.

Transmitting

Transmitting can be initiated by pressing the **PTT** switch, or by selecting a DMR ID and then pressing the **PTT** switch. When a signaling (Color Code) is used, the transceiver sends the Color Code. In this case, if the transmitted Color Code matches the Color Code preconfigured for the receiving transceiver, the transceivers can communicate.

Restricting the Continuous Transmission Duration (Time-out Timer)

Time-out Timer (TOT) is the function to restrict the duration for the transceiver to continuously transmit.

This function is used to prevent a user from occupying a repeater or frequency which is shared with other users. The transceiver automatically stops transmitting and releases the channel if it continuously transmits longer than the configured time.

Time-out Timer can be configured for each system. Also, timers, such as **TOT Pre-alert**, **TOT Rekey Time**, and **TOT Reset Time**, relevant to **Time-out Timer** can be configured.

TOT Pre-alert

TOT Pre-alert is the function to notify a user that a continuous transmission is about to end by the **Time-out Timer**. A TOT Pre-alert Tone (3 beeps) sounds from the transceiver before the transceiver stops the continuous transmission by the **Time-out Timer**.

Example: Time-out Timer: 30 sec, TOT Pre-alert: 4 sec

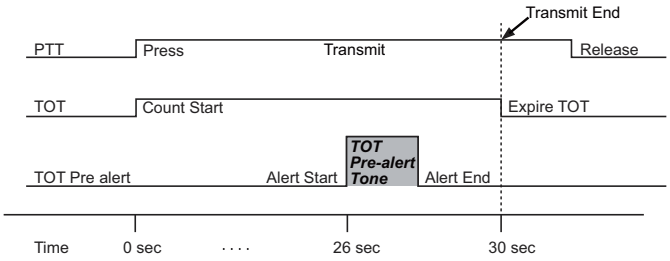


Figure 1-2 TOT Pre-alert

Note

If “Off” is configured for TOT Pre-alert, no TOT Pre-alert tone sounds from the transceiver.

TOT Rekey Time

TOT Rekey Time is the amount of time from when the transceiver stops the transmission by the **Time-out Timer** until transmission becomes possible again.

Example: Time-out Timer: 30 sec, TOT Rekey Time: 20 sec

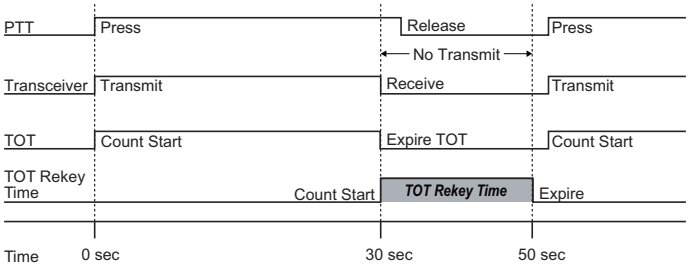


Figure 1-3 TOT Rekey Time

Note

- If “Off” is configured for **TOT Rekey Time**, the transceiver will immediately be ready to transmit.
- The timer will be reset if the zone or channel is changed while the **TOT Rekey Time** is counting down.

TOT Reset Time

TOT Reset Time is the time required to initialize and reset the elapsed time for **Time-out Timer**.

Example 1: Time-out Timer: 30 sec, TOT Reset Time: 10 sec

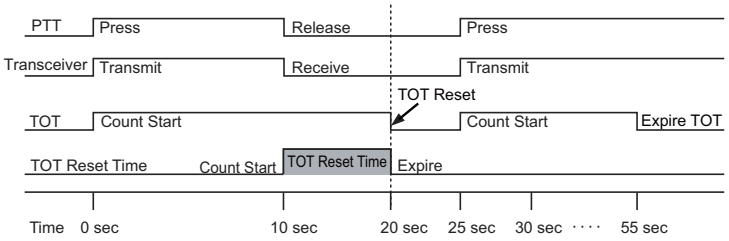


Figure 1-4 TOT Reset Time 1

The transceiver considers a retransmission within this configured length of time as a continuous transmission. In the following example, the counting of **Time-out Timer** continues because the transmission was started by a user pressing the **PTT** switch while the **TOT Reset Time** was counting down.

Example 2: Time-out Timer: 30 sec, TOT Reset Time: 10 sec

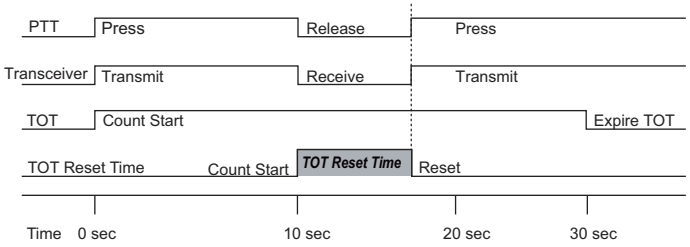


Figure 1-5 TOT Reset Time 2

Note

- If “Off” is configured for **TOT Reset Time**, the **Time-out Timer** will be reset immediately after the transceiver finishes transmitting.
- The timer will be reset if the zone or channel is changed while the **TOT Rekey Time** is counting down.

Configuration using KPG-D1/ D1N

Configuring various functions of **Time-out Timer** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > General > Time-out Timer)

Avoiding Interference with Other Communications (Busy Channel Lockout (DMR))

Busy Channel Lockout is the function to automatically restrict the transmission so as not to interfere with other communications.

If an attempt is made to transmit on a channel that is already being used by other groups, the transceiver automatically restricts the transmission.

If the **PTT** switch is pressed while **Busy Channel Lockout** is enabled, a Warning Tone A (continuous beep) sounds from the transceiver, and transmission is disabled. In this case, “BUSY” appears on the display. The Warning Tone A sounds from the transceiver until the **PTT** switch is released.

The following are conditions to disable transmission by **Busy Channel Lockout (DMR)**:

Table 1-2 Busy Channel Lockout (DMR)

Configuration	Description
No	**Busy Channel Lockout** is disabled. Transmission is not restricted even if the channel on which the transceiver attempts to transmit is busy.
Carrier Only	The transceiver cannot transmit while the transceiver is receiving a carrier.
Correct CC	The transceiver cannot transmit if the transceiver receives a carrier and the received Color Code matches the Color Code preconfigured for the transceiver.

The transceiver is controlled in the following manner according to the configuration in **Transmit Mode** on a channel with “Mixed” configured in **Channel Type**.

- **If “Analog” is configured for Transmit Mode:**

  The transceiver transmits according to the configuration in **Busy Channel Lockout** (Analog).

- **If “DMR” is configured for Transmit Mode:**

  The transceiver transmits according to the configuration in **Busy Channel Lockout (DMR)** and **In-call Busy Channel Lockout**.

Also, while the **Signaling Reset Timer** or **Auto Reset Timer** is activated on a channel with “Mixed” configured in **Channel Type**, the transceiver transmits according to the configuration in **Busy Channel Lockout** in the same mode as that of the received signal (Analog or DMR). If the transceiver receives an analog signal, the transceiver transmits according to the configuration in **Busy Channel Lockout (Analog)**. If the transceiver receives a DMR signal, the transceiver transmits according to the configuration in **Busy Channel Lockout (DMR)** and **In-call Busy Channel Lockout**.

In-call Busy Channel Lockout is used for configuration when audio output is possible during an incoming voice call.

The following are conditions for transmission and reception using **In-call Busy Channel Lockout**:

Table 1-3 In-call Busy Channel Lockout

Configuration	Description
Allow TX	During a voice call, pressing the **PTT** switch disables all transmission restrictions regardless of the configuration of **Busy Channel Lockout (DMR)**. However, **Busy Channel Lockout** will function when “Carrier Only” or “Correct CC” is configured for **Busy Channel Lockout (DMR)** and is in the following state. • When a different voice call is initiated during an incoming voice call • When a voice call with a different ID is initiated during an incoming voice call
Follow BCL	During a voice call, pressing the **PTT** switch enables restriction on the transmission according to the configuration of **Busy Channel Lockout (DMR)**.
Interrupt CALL	The receiving call can be terminated by pressing the **PTT** switch to respond (Talkback) while receiving an Individual Call or Group Call to one’s own station or when receiving an Unaddressed Call. (Refer to Terminating Voice Communications by a Transceiver Other Than the Transmitting Transceiver (Call Interruption).)

Note

- **Busy Channel Lockout** cannot be activated in Emergency Mode. However, when “Interrupt CALL” is configured for **In-call Busy Channel Lockout**, the configuration of **In-call Busy Channel Lockout** and **Busy Channel Lockout** will become “Interrupt CALL” and “No” respectively in the Emergency Mode.

Configuration using KPG-D1/ D1N

- Configuring **Busy Channel Lockout (DMR)**/ **In-call Busy Channel Lockout** (Personality) (See Transceiver Settings > Personal > Personality > DMR Conventional > DMR)
- Configuring **Busy Channel Lockout (DMR)**/ **In-call Busy Channel Lockout** (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > DMR)

Using a Channel Being Used by Other Parties (BCL Override)

BCL Override is the function to transmit on a busy channel even if **Busy Channel Lockout** is activated and transmission is restricted.

Operating the transceiver

1 **Press the PTT switch while transmission is restricted by Busy Channel Lockout.**

2 **Release the PTT switch, then press the PTT switch again within 500 ms.**

Busy Channel Lockout is temporarily disabled, and the transceiver starts transmitting.

Note

This function also works while the transceiver is transmitting using the VOX function. For a transmission using VOX, **Busy Channel Lockout** is temporarily disabled and the transceiver can transmit if audio is input within 500 ms after audio input terminates.

Configuration using KPG-D1/ D1N

Configuring **BCL Override** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > DMR Conventional > General)

Communicating Without Using a Repeater (Talk Around/ DMR Direct Mode)

Talk Around

Talk Around is the function allowing direct communication between transceivers without using a repeater.

If the transceiver cannot link to a repeater due to too great distance between the transceiver and the repeater, the transceiver can directly communicate with the target transceiver by using **Talk Around**.

The transceiver with **Talk Around** enabled transmits on the receive frequency and the Color Code configured for the selected channel.

On a channel with **Talk Around Key** enabled, **Talk Around** can be toggled between enabled and disabled by operating the transceiver.

- Pressing the **Talk Around** key toggles **Talk Around** between enabled and disabled.
- Pressing the **Menu** key causes the transceiver to enter Menu Mode, and then **Talk Around** can be toggled between enabled and disabled by selecting “Talk Around”. (Refer to Common FUNC Using Menu Mode.)
- Positioning the **Lever** switch to the position to which “Talk Around” is assigned enables **Talk Around**. Positioning the **Lever** switch to the position to which “Talk Around” is not assigned disables **Talk Around**.

For NX-5400/ NX-5900, by using KPG-D1/ D1N, **Talk Around** can be configured for each channel to be enabled or disabled.

The “ ” icon appears if a channel with **Talk Around** enabled is selected. **Talk Around** cannot be disabled by pressing a key of the transceiver such as the **Talk Around** key.

On a channel with **Talk Around** disabled, **Talk Around** can be toggled between enabled and disabled by pressing a key of the transceiver such as the **Talk Around** key.

Operating the transceiver

● Enabling the Talk Around

1 **Press the Talk Around key while Talk Around is disabled.**

The “ ” icon appears and **Talk Around** will be enabled.

● Disabling the Talk Around

1 **Press the Talk Around key while Talk Around is enabled.**

The “ ” icon disappears and **Talk Around** will be disabled.

Note

- **Talk Around** is disabled by changing the zone or channel while **Talk Around** is enabled. If **Talk Around** is enabled by the **Lever** switch, **Talk Around** is not disabled even if the zone or channel is changed. However, if **Talk Around Key** is disabled on the target channel, **Talk Around** becomes disabled.
- If **Talk Around** is enabled by operating the **Talk Around** key, **Talk Around** becomes disabled when the transceiver enters Emergency Mode. **Talk Around** does not become disabled when the transceiver enters Emergency Mode on the channel with **Talk Around** enabled by using KPG-D1/ D1N.

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Configuring **Talk Around** to be enabled or disabled (Personality) (See Transceiver Settings > Personal > Personality > DMR Conventional > General)
- Configuring **Talk Around** to be enabled or disabled (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > General)
- Configuring **Talk Around Key** to be enabled or disabled (Personality) (See Transceiver Settings > Personal > Personality > DMR Conventional > General)
- Configuring **Talk Around Key** to be enabled or disabled (Personality) (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > General)

DMR Direct Mode

DMR Direct Mode is the function allowing direct communication between transceivers without using a repeater.

If the transmit frequency and receive frequency are the same configuration on a DMR digital channel, the channel can be used in DMR Direct Mode. Also, the channel can be used in DMR Direct Mode even if the **Talk Around** function is enabled.

Simultaneous Communications by Dual Slot Direct Mode

The DMR Direct Mode communication methods have the new version (ETSI TS 102 361-1 V2.2.1 2013-02 or later) and old version (earlier than ETSI TS 102 361-1 V2.2.1 2013-02).

Which version is used to communicate can be configured by configuring **Dual Slot Direct Mode** by using KPG-D1/ D1N.

Table 1-4 Dual Slot Direct Mode

Configuration	Description
Enabled	The transceiver communicates using the new version of DMR Direct Mode. In the new version of DMR Direct Mode, if the slot numbers are different, communications of 2 parties can be realized separately without receiving interference even on the channel with the same frequency configured.
Disabled	The transceiver communicates using the old version of DMR Direct Mode. In the old version of DMR Direct Mode, if the slot numbers are different, communications of 2 parties cannot be realized separately without receiving interference even on the channel with the same frequency configured.

Note

Communication cannot be realized between the transceiver configured with the new version of DMR Direct Mode and the transceiver configured with the old version of DMR Direct Mode.

Configuration using KPG-D1/ D1N

- Configuring **Dual Slot Direct Mode** to be enabled or disabled (Personality) (See Transceiver Settings > Personal > Personality > DMR Conventional > DMR)
- Configuring **Dual Slot Direct Mode** to be enabled or disabled (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > DMR)

Communicating via a Repeater (Repeater Mode)

Repeater Mode is the function to communicate with another transceiver via a repeater.

If the transmit frequency and receive frequency are different configurations on a DMR digital channel, the channel can be used in Repeater Mode.

In Repeater Mode, the transceiver can synchronize with a repeater if the transceiver receives a synchronization signal from the repeater.

If a synchronization signal from a repeater cannot be detected, the transceiver sends a Wakeup Message to prompt synchronization. If the transceiver does not receive any response from the repeater after the lapse of a specific time interval, the transceiver resends the Wakeup Message.

The wait time from when a Wakeup Message is sent until a repeater transmits a synchronization signal (**Sync Wakeup Wait Time**) can be configured by using KPG-D1/ D1N. Also, the number of times a Wakeup Message is resent (**Number of Wakeup Message Retries**) can be configured.

Note

- If a response from a repeater cannot be detected after a Wakeup Message is sent for the number of times configured in **Number of Wakeup Message Retries**, a Call Fail Tone (2 beeps) sounds from the transceiver, and “Fail” appears on the display.
- If the **Talk Around** function is enabled, the transceiver does not behave in Repeater Mode, as the transceiver behaves in DMR Direct Mode even if the transmit frequency and receive frequency are different configurations.
- If synchronization signals from the repeater cannot be detected after resending the Wakeup Message during data communication, Wakeup Message will be resent for the number of times configured in **Number of Wakeup Message Retries**.

Configuration using KPG-D1/ D1N

- Configuring **Sync Wakeup Wait Time** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR > Parameters)
- Configuring **Number of Wakeup Message Retries** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR > Parameters)

About the Slot Numbers (Slot Selection)

In DMR, the transceiver communicates using the predetermined slot according to the standard.

If communicating in Repeater Mode, the transceiver needs to communicate using the predetermined slot, as the information indicating slot 1 or slot 2 is in the synchronization signal transmitted from a repeater.

Also, for example in Repeater Mode, the signal being transmitted using slot 2 cannot be received when using slot 1, even if the receive frequencies are the same.

The slot number used for communication (1 or 2) can be configured by using KPG-D1/ D1N.

Note

Slot Selection functions only in Repeater Mode or **Dual Slot Direct Mode**.

Configuration using KPG-D1/ D1N

- Configuring **Slot Selection** (Personality) (See Transceiver Settings > Personal > Personality > DMR Conventional > DMR)
- Configuring **Slot Selection** (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > DMR)

1.2 Using the Signaling

Color Code is the signaling to be used for facilitating communication within a group if the same channel is shared by several groups.

Sharing the Same Channel (Frequency) by Several Groups (Color Code)

Color Code is a digital signaling type having the same function as analog QT tone or DQT code. This signaling is used when the transceiver transmits or receives on a digital channel.

The transceiver mutes calls from a zone having a restricted Color Code if a Color Code is configured for each channel. Therefore, a user can communicate in a group without listening to conversations from other groups.

The transceiver can distinguish the signaling even if the transceiver receives any signaling during a call since this signaling type has a continuous waveform.

The following is transmission and reception behavior of a Color Code:

Table 1-5 Transmission and Reception Behavior of a Color Code

Reception/ Transmission	Description
Reception	If the transceiver receives a signal and the received Color Code matches the Color Code preconfigured for the transceiver, the transceiver unmutes the speaker and emits the received audio from the speaker.
Transmission	The transceiver sends the preconfigured Color Code while transmitting. Pressing the **PTT** switch causes the transceiver to send the Color Code.

Note

The transceiver transmits with the signaling of the received signal regardless of the configuration in **Transmit Mode** if within the amount of time configured in **Signaling Reset Timer** after the transceiver receives a signal on a channel with “Mixed” configured in **Channel Type**.

Configuration using KPG-D1/ D1N

- Configuring **Color Code** (Personality) (See Transceiver Settings > Personal > Personality > DMR Conventional > DMR)
- Configuring **Color Code** (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > DMR)

1.3 Waiting for Both Digital Signals and Analog Signals (Mixed Mode)

Mixed Mode can be used to wait for a call in both digital and analog modes.

The channel used in analog mode can also be used in digital mode, hence the transceiver can easily migrate from analog mode to digital mode.

The following is the transceiver behavior for transmission and reception on a channel with “Mixed” configured in **Channel Type**:

Table 1-6 Mixed Mode 1

Reception/ Transmission	Description
Reception	Mixed Mode can be used to wait for a call in both digital (Color Code) and analog (QT tone and DQT code) modes. The transceiver unmutes the speaker if the received signaling (QT tone, DQT code or Color Code) matches the signaling preconfigured for the transceiver (QT tone, DQT code or Color Code).
Transmission	The transceiver transmits in the mode (Analog or DMR) configured in **Transmit Mode**. If the received signaling (QT tone, DQT code, or Color Code) matches the signaling preconfigured for the transceiver, the transceiver can transmit in the same mode as the mode of the received signal regardless of the configuration in **Transmit Mode** before the length of time configured in **Signaling Reset Timer** elapses (except if the transceiver is doing data communications). If the received FleetSync ID or DMR ID matches the FleetSync ID or DMR ID preconfigured for the transceiver, the transceiver can transmit in the same mode as the mode of the received signal regardless of the configuration in **Transmit Mode** before the length of time configured in **Auto Reset Timer** elapses. The transceiver can also transmit in the same mode as that of the received signal regardless of the configuration in **Transmit Mode** while doing data communications as well.

The following is the difference in operation for transmission depending on the transceiver configuration and the received signal.

Table 1-7 Mixed Mode 2

Optional Signaling	Transmit Mode	Received signal	Transmission Operation
Disabled	Analog	Digital	The transceiver can transmit using the Color Code preconfigured for the transceiver until the length of time configured in **Signaling Reset Timer** elapses.
Disabled	Analog	Analog	The transceiver can transmit using the QT tone or DQT code preconfigured for the transceiver until the length of time configured in **Signaling Reset Timer** elapses.
Disabled	DMR	Digital	The transceiver can transmit using the Color Code preconfigured for the transceiver until the length of time configured in **Signaling Reset Timer** elapses.
Disabled	DMR	Analog	The transceiver can transmit using the QT tone or DQT code preconfigured for the transceiver until the length of time configured in **Signaling Reset Timer** elapses.
Enabled	Analog	Digital	The transceiver can transmit using the Color Code preconfigured for the transceiver and specifying the received ID until the length of time configured in **Auto Reset Timer** elapses.
Enabled	Analog	Analog	By specifying the received ID, the transceiver can transmit using the QT tone or DQT code preconfigured for the transceiver until the length of time configured in **Auto Reset Timer** elapses. However, ID can be specified only when FleetSync signaling is received. The transceiver can transmit using only QT tone or DQT code preconfigured for the transceiver if the transceiver receives a DTMF or 2-tone code, or an MDC-1200 ID.
Enabled	DMR	Digital	The transceiver can transmit using the Color Code preconfigured for the transceiver and specifying the received ID until the length of time configured in **Auto Reset Timer** elapses.
Enabled	DMR	Analog	By specifying the received ID, the transceiver can transmit using the QT tone or DQT code preconfigured for the transceiver until the length of time configured in **Auto Reset Timer** elapses. However, ID can be specified only when FleetSync signaling is received. The transceiver can transmit using only QT tone or DQT code preconfigured for the transceiver if the transceiver receives a DTMF or 2-tone code, or an MDC-1200 ID.

Note

- While the transceiver is in Emergency Mode, the transceiver transmits according to the configuration in **Transmit Mode**.
- If the transceiver receives FleetSync data, the transceiver sends an ACK in analog mode, and if the transceiver receives DMR data, the transceiver sends an ACK in digital mode. The transceiver transmits according to the configuration in **Transmit Mode** after the transceiver ends data communications regardless of the configuration in **Signaling Reset Timer** or **Auto Reset Timer**.
- If “Off” is configured in **Signaling Reset Timer**, the transceiver retains the status of transmission in the same mode as that of the received signal. This status will be reset by an operation such as changing a channel.
- If “0” is configured in **Signaling Reset Timer**, the transceiver transmits according to the configuration in **Transmit Mode**.

Configuration using KPG-D1/ D1N

- Configuring **Channel Type** and **Transmit Mode** (Personality) (See Transceiver Settings > Personal > Personality > DMR Conventional > General)
- Configuring **Channel Type** and **Transmit Mode** (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > General)
- Configuring **Signaling Reset Timer** (See Transceiver Settings > DMR > DMR Information > General)

1.4 Using DMR ID to Initiate a Selective Call

An individual call and group call are available by using DMR IDs. In addition, a message can be sent to a specified target ID in various types of message communications.

Available Calls

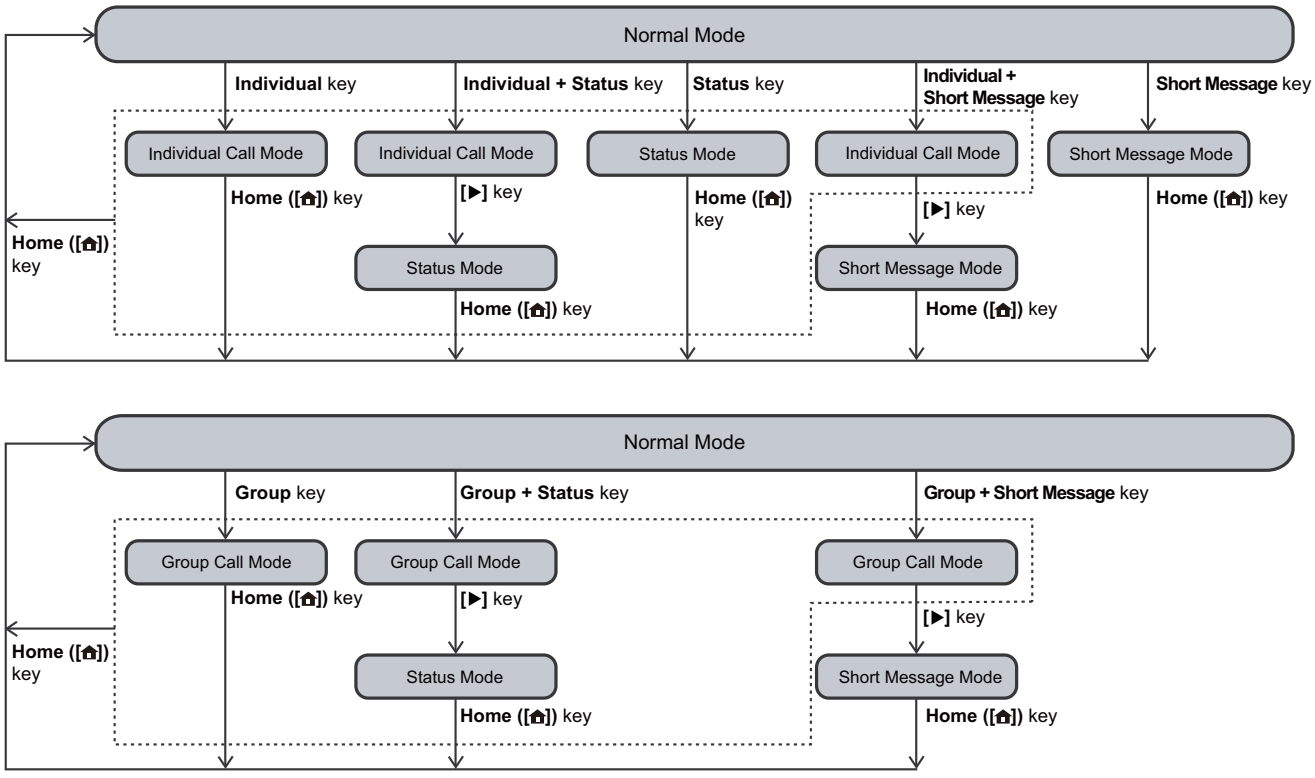
The following various types of calls can be used in a DMR Conventional system. For transceiver operations and behaviors, refer to the instructions of each call type.

- Individual Call/ Paging Call
- Individual Call (Individual Call Acknowledge Request)
- Group Call
- Broadcast Group Call
- Status Call
- Short Data Call

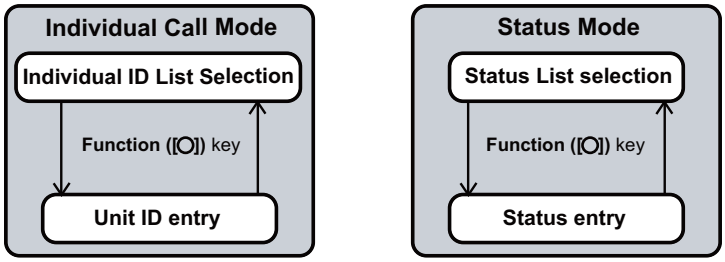
Transition for Each Mode

If a user wishes to send or receive an Individual Call, Group Call, Status Message, or Short Message, the user must operate the transceiver after selecting the desired mode. The following are the transition diagrams for each mode.

Transmission



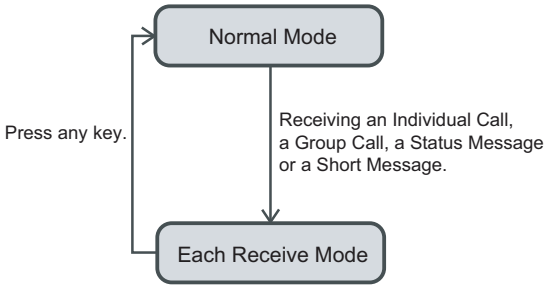
In Individual Call Mode, a Unit ID of the target transceiver can be selected from the Individual ID List or a Unit ID can directly be entered. Also, in Status Mode, a status to be sent can be selected from the Status List or the status can directly be entered. In either mode, the entry method can be changed by pressing and holding the **Function [◯]** key.



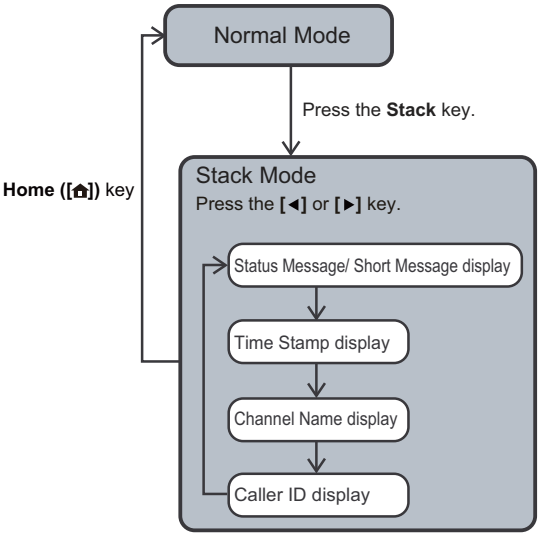
Note

If **Manual Dialing** is enabled, a Unit ID and status can be manually entered.

Reception



Checking the incoming call history of a received Individual Call, Group Call, Status Message or Short Message



1.5 Making an Individual Call

Individual Call can be used to initiate a call to a target transceiver individually to establish voice calls.

By specifying a Unit ID, the transceiver can initiate a call to the transceiver having the Unit ID.

Initiating an Individual Call

An Individual Call can be started by one of the following methods.

- **Individual Call Mode**

  In Individual Call Mode, an Individual Call is initiated by selecting a Unit ID configured in the Individual ID List or directly entering a Unit ID.

  Pressing the **Individual**, **Individual + Status**, or **Individual + Short Message** key places the transceiver in Individual Call Mode.

  The transceiver also enters Individual Call Mode by selecting “Individual”, “Individual + Status”, or “Individual + Short Message” after the transceiver enters Menu Mode by pressing the **Menu** key. (Refer to Common FUNC Using Menu Mode.)

  If “Individual”, “Individual + Status”, or “Individual + Short Message” is configured in **Keypad Operation**, pressing the **[0]** to **[9]** keys on the keypad also places the transceiver in Individual Call Mode. The transceiver enters Unit ID Shortcut Entry Mode or will be on hold as the first digit of the Unit ID is entered.

  (Refer to Common FUNC Keypad Operation.)

- **Selcall on PTT**

  The transceiver initiates an Individual Call when the **PTT** switch is pressed on a channel where “Individual Call” is configured for **Selcall on PTT**. The Unit ID of the target transceiver can be configured by selecting one Unit ID from the Individual ID List by using KPG-D1/ D1N.

- **Talkback**

  By pressing the **PTT** switch while the **Auto Reset Timer** is counting down after the transceiver receives an Individual Call, the transceiver can respond (Talkback) to the transceiver which made the Individual Call.

- **Stack Mode**

  Selecting the receive history in Stack Mode and pressing the **PTT** switch initiates an Individual Call. (Refer to Common FUNC Viewing the Receive History (Stack).)

- **PC command**

  The transceiver starts an Individual Call upon the receipt of a PC command from the communication port. To use a PC command, “Data” or “Data + GPS Data Output” needs to be assigned to the communication port of the transceiver. (Refer to Common FUNC Available Functions for COM Port.)

Operating the transceiver

The following describes how to initiate an Individual Call in Individual Call Mode.

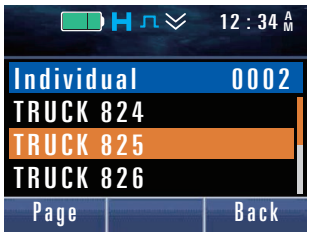
● Initiating an Individual Call by list selection

1 **Press the Individual, Individual + Status, or Individual + Short Message key.**

The transceiver enters Individual Call Mode, and a selection screen for the Individual ID List will appear.
The following operations are identical even if the transceiver enters Individual Call Mode by a user pressing the **Menu** key or using the keypad.

2 **Press the [▲] or [▼] key to select a Unit ID from the Individual ID List.**

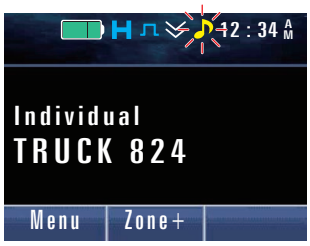
Refer to Common FUNC "Selecting or Clearing Data from a List" for selection methods.



3 **Initiating an Individual Call.**

Press the **PTT** switch to initiate a Voice Call. The "♪" icon blinks, and the display changes to "Individual" and the ID name of the target transceiver.

Press the **Menu** ([▢]) or **[*]** key to initiate a Paging Call.
If Individual Call Mode has been entered with "Individual + Status" or "Individual + Short Message", Status Mode or Short Message Mode is entered by pressing the **[▶]** key.



Note

The selection screen for the Individual ID List closes at the same time as pressing the **PTT** switch. If selecting an ID and sending an Individual Call again, reexecute the operations from step 1.

● Initiating an Individual Call using Manual Dialing

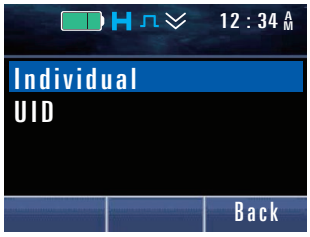
To initiate an Individual Call by directly entering a Unit ID, **Manual Dialing** needs to be enabled.

1 **Press the Individual, Individual + Status, or Individual + Short Message key.**

The transceiver enters Individual Call Mode, and a selection screen for the Individual ID List will appear.
The following operations are identical even if the transceiver enters Individual Call Mode by a user pressing the **Menu** ([▢]) key or using the keypad.

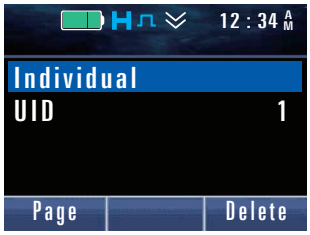
2 **Press the Function [○] key.**

The Unit ID entry display appears.



3 Enter a Unit ID.

Refer to Common FUNC "Entering or Deleting a Code" for the entry method.



● Using the PF keys

A numeric character can be selected by pressing the **[▲]** key or the **[▼]** key, and pressing the **Menu** (**[⊡]**) or **[*]** key can confirm the selected numeric character.

● Using the keypad

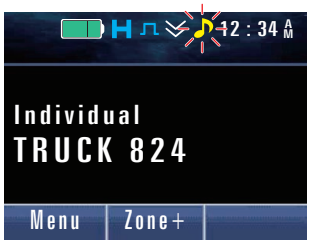
A Unit ID can be entered by pressing the **[0]** to **[9]** keys.

4 Initiating an Individual Call.

Press the **PTT** switch to initiate a Voice Call. The " " icon blinks, and the display changes to "Individual" and the ID name of the target transceiver.

Press the **Menu** (**[⊡]**) or **[*]** key to initiate a Paging Call.

If Individual Call Mode has been entered with "Individual + Status" or "Individual + Short Message", Status Mode or Short Message Mode is entered by pressing the **[▶]** key.



Note

The selection screen for the Individual ID List closes at the same time as pressing the **PTT** switch. If selecting an ID and sending an Individual Call again, reexecute the operations from step 1.

Note

- If the Individual Call Mode previously used is Manual Dialing mode, the transceiver enters Manual Dialing mode by pressing the **Individual** key. A selection screen for the Individual ID List will appear by pressing the **Function [◯]** key.
- If no ID is registered in the Individual ID List, the transceiver enters Manual Dialing mode by pressing the **Individual** key if **Manual Dialing** is enabled. In this case, the transceiver cannot enter Individual Call Mode if **Manual Dialing** is disabled.
- If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common FUNC Transmit LED.)
- If **PTT Proceed Tone** is enabled, a Proceed Tone (3 beeps) sounds from the transceiver when the transceiver becomes ready for communications after the **PTT** switch is pressed. (Refer to Common FUNC Using Sound to Notify the Timing to Start Communications (PTT Proceed Tone).)

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Configuring **Manual Dialing** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)
- Configuring **Selcall on PTT** (See Transceiver Settings > Personal > Personality > DMR Conventional > DMR > Selcall on PTT)
- Configuring **Selcall on PTT** (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > DMR > Selcall on PTT)

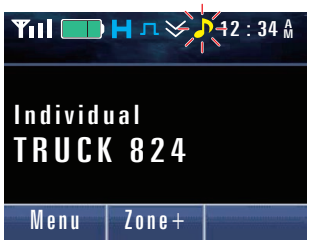
Receiving an Individual Call

The transceiver can receive an Individual Call if the received Unit ID matches the Unit ID (Own) preconfigured for the transceiver.

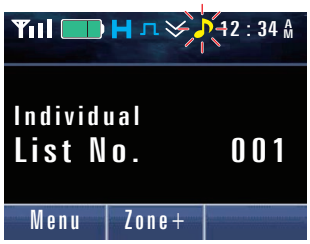
Transceiver behavior

1 **The transceiver receives an Individual Call.**

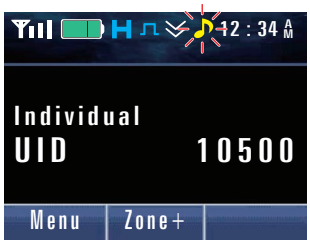
The "♪" icon blinks, and the ID Name of the transmitting transceiver appears.



If the ID Name is not configured in the Individual ID List, the Individual ID List number appears.



If the Unit ID is not configured in the Individual ID List, the Unit ID appears.



2 **Press the PTT switch.**

The transceiver can respond to the received Unit ID. When a key other than the **PTT** switch is pressed, the configured function will be activated.

Note

- If **Busy LED** is enabled, the LED lights green when the transceiver is receiving. (Refer to Common FUNC Busy LED.)
- If Alert Tone is configured to sound when receiving, an Alert Tone will sound. (Refer to Transceiver behavior when receiving an Individual Call/ Paging Call.)
- If **Selective Call Alert LED** or **Optional Signaling LED** is enabled, the LED flashes when the transceiver is receiving. (Refer to Transceiver behavior when receiving an Individual Call/ Paging Call.)
- The transceiver can send the ID of the transmitting transceiver from the communication port on the transceiver when receiving an Individual Call/ Paging Call. (Refer to Sending the Received Unit ID from the Communication Port (Unit ID Serial Output).)

Transceiver behavior when receiving an Individual Call/ Paging Call

Alert Tone

If the received Unit ID is configured in the Individual ID List, an Alert Tone sounds from the transceiver according to the configuration of **Alert Tone (Individual)** or **Alert Tone (Paging)** for the corresponding Unit ID.

However, if “Common” is configured for **Alert Tone (Individual)** or **Alert Tone (Paging)** in the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, an Alert Tone sounds from the transceiver according to the configuration of **Alert Tone (Individual Call)** or **Alert Tone (Paging Call)** used in common in a DMR Conventional system.

Selective Call Alert LED

If the received Unit ID is configured in the Individual ID List, the LED flashes according to the configuration of **Alert LED Color (Individual)** or **Alert LED Color (Paging)** for the corresponding Unit ID.

However, if “Common” is configured for **Alert LED Color (Individual)** or **Alert LED Color (Paging)** in the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, the LED flashes according to the configuration of **Alert LED Color (Individual Call)** or **Alert LED Color (Paging Call)** used in common in a DMR Conventional system.

Optional Signaling LED

If **Optional Signaling LED** is enabled, the LED flashes in yellow. However, when **Selective Call Alert LED** is enabled, LED will flash in accordance with the configuration of **Selective Call Alert LED**.

Also, when the transceiver key is operated while the LED flashes according to the **Selective Call Alert LED** configuration, the LED flashes in yellow if the matching state of Optional Signaling persists.

Configuration using KPG-D1/ D1N

- Configuring **Selective Call Alert LED** to be enabled or disabled (See Transceiver Settings > DMR > DMR Information > Conventional)
- Configuring **Optional Signaling LED** to be enabled or disabled (See Transceiver Settings > DMR > DMR Information > Conventional)
- Configuring **Alert Tone (Individual)**/ **Alert Tone (Paging)** (Individual ID List) (See Transceiver Settings > DMR > Individual ID List > Alert Tone)
- Configuring **Alert LED Color (Individual)**/ **Alert LED Color (Paging)** (Individual ID List) (See Transceiver Settings > DMR > Individual ID List > Alert LED Color)
- Configuring **Alert Tone (Individual Call)**/ **Alert Tone (Paging Call)** used in common in a DMR Conventional system (See Transceiver Settings > DMR > DMR Information > Conventional > Alert Tone)
- Configuring **Alert LED Color (Individual Call)**/ **Alert LED Color (Paging Call)** used in common in a DMR Conventional system (See Transceiver Settings > DMR > DMR Information > Conventional > Alert LED Color)

Individual ID List

If making Individual Calls, the desired Unit IDs need to be preconfigured in the transceiver using KPG-D1/ D1N prior to use of the transceiver. A maximum of 1500 Unit IDs can be configured for Individual ID List.

Table 1-8 Individual ID List

Configuration	Description
ID	A Unit ID can be configured in the range between 000001 and FFFCDF (hexadecimal), or between 1 and 16776415 (decimal).
ID Name	The caller's ID Name is configured. A maximum of 14 characters can be configured for the ID Name. If the ID Name of the transmitting transceiver is configured in the Individual ID List, the ID Name of the transmitting transceiver appears when the transceiver receives a call.
ID Mode	The permission or inhibition of transmission of the receiving party can be configured. An ID for which "Receive Only" is configured for **ID Mode** does not appear on the ID selection display in Individual Call Mode, and a user cannot select the ID in Individual Call Mode. If the transceiver receives a call from an ID for which "Receive Only" is configured for **ID Mode**, the caller's ID Name appears. In this case, a user cannot initiate a call to the party even if the user attempts to respond by pressing the **PTT** switch.
Alert Tone	**Individual:** The type of tone sounding from the transceiver can be configured for an Individual Call from the Unit IDs configured in the Individual ID List. **Paging:** The type of tone sounding from the transceiver can be configured for a Paging Call from the Unit IDs configured in the Individual ID List.
Alert LED Color	**Individual:** The color of flashing LED can be configured for an Individual Call from the Unit IDs configured in the Individual ID List. **Paging:** The color of flashing LED can be configured for a Paging Call from the Unit IDs configured in the Individual ID List. Note To use **Alert LED Color**, **Selective Call Alert LED** needs to be enabled.

Configuration using KPG-D1/ D1N

Configuring **Individual ID List** (See Transceiver Settings > DMR > Individual ID List)

Displaying the ID of the Communicating Caller on the LCD (Caller ID Display)

Caller ID Display is the function to display the received ID on the transceiver display when an Unaddressed Call is received.

While this function is enabled, the Unit ID Name or Unit ID of the transmitting transceiver appears if an Unaddressed Call is received and the received Color Code matches the Color Code preconfigured for the transceiver.

A user can identify the caller not only by voice, but also through the display.

Note

- If the ID Name of the transmitting transceiver is configured in the Individual ID List, the ID Name of the transmitting transceiver appears. If the ID Name of the transmitting transceiver is not configured in the Individual ID List, the Unit ID of the transmitting transceiver appears.
- If the transceiver receives an Individual Call or Group Call, **Caller ID Display** does not function. If the transceiver receives an Individual Call, the Unit ID of the transmitting transceiver appears. If the transceiver receives a Group Call, the ID appears according to the configuration in **Unit ID Display on Group Call**. (Refer to Display When the Transceiver Receives a Group Call (Unit ID Display on Group Call).)
- A user cannot reply to an ID on the transceiver while the ID appears on the main display.
- The Unit ID received can be sent from the communication port of the transceiver. (Refer to Sending the Received Unit ID from the Communication Port (Unit ID Serial Output).)

Configuration using KPG-D1/ D1N

Configuring **Caller ID Display** (See Transceiver Settings > DMR > DMR Information > Conventional)

Restricting IDs for Which the Transceiver Can Initiate a Call (Individual ID Encode Block)

Individual ID Encode Block is the range of the Unit ID used by the transceiver to initiate a call.

A Unit ID with which a user is allowed to initiate a call can be restricted using KPG-D1/ D1N. A user can initiate a call to a Unit ID configured in the Individual ID List even if it is outside the range of **Individual ID Encode Block**.

The transceiver for which **Individual ID Encode Block** is not configured can initiate a call to all transceivers.

The transceiver unmutes the speaker and emits received audio when the transceiver receives the Unit ID satisfying the receiving conditions. In this case, the Unit ID of the transmitting transceiver appears on the receiving transceiver. If the Unit ID of the transmitting transceiver is in the range of the **Individual ID Encode Block** or has been registered in the Individual ID List, the receiving transceiver can respond to the transmitting transceiver by pressing the **PTT** switch. If the Unit ID of the transmitting transceiver is outside the range of the **Individual ID Encode Block** and also has not been registered in the Individual ID List, the receiving transceiver cannot respond to the transmitting transceiver.

Configuration using KPG-D1/ D1N

Configuring **Individual ID Encode Block** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)

Sending the Received Unit ID from the Communication Port (Unit ID Serial Output)

Unit ID Serial Output is the function for sending the received Unit ID from the communication port of the transceiver.

By using **Unit ID Serial Output**, the dispatcher can monitor the transceiver that is engaged in a voice call in real time. Unit ID that is sent from the communication port can also be used for managing the call log.

Note

- The transceiver will send the Unit ID from the communication port only when Color Code and Slot Selection match the Color Code and Slot Selection configured in the transceiver.
- When the transceiver receives a call via Selective Call, Unit ID is sent from the communication port regardless of the configuration of Unit ID Serial Output.
- To use **Unit ID Serial Output**, the “Data” or “Data + GPS Data Output” must be assigned to the communication port of the transceiver.

Configuration using KPG-D1/ D1N

- Configuring **Unit ID Serial Output** (See Transceiver Settings > DMR > DMR Information > General > Serial Output)
- Assigning functions to **COM port** (See Transceiver Settings > Optional Features > Optional Features 1 > Serial Interface > COM Port)

1.6 Initiating an Individual Call After Ensuring That the Target Party Is Available for Communications (Individual Call Acknowledge Request)

Individual Call Acknowledge Request is the function that allows a user to distinguish whether or not the receiving transceiver is available to communicate so as to initiate an Individual Call in a DMR Conventional system.

Individual Call Acknowledge Request enables a call to the particular transceiver having the specified Unit ID in the same way as a normal Individual Call; however, an acknowledgment message must be received from the receiving transceiver for the communication to start (also, receiving an Individual Call from the receiving transceiver allows the communication to start).

The transmitting transceiver sends a message requesting an acknowledgment when initiating an Individual Call. Upon receipt of the message requesting an acknowledgment, the receiving transceiver sends to the transmitting transceiver an acknowledgment message to notify that the receiving transceiver is available for the call. The transmitting transceiver becomes enabled for the communication upon receipt of the acknowledgment message from the receiving transceiver.

To use this function, **Individual Call Acknowledge Request** needs to be enabled and a value other than “No” needs to be configured in **Busy Channel Lockout (DMR)** by using KPG-D1/ D1N for the channel to be used by the transmitting transceiver. Also, using KPG-D1/ D1N, the parameters of the following various functions to be used with **Individual Call Acknowledge Request** can be configured.

- Call Request Tone
- Call Processing Tone
- Call Processing Tone Delay Time
- Call in Progress Tone

Note

- When “Interrupt CALL” is configured for **In-call Busy Channel Lockout**, **Individual Call Acknowledge Request** can be used even when “No” is configured for **Busy Channel Lockout (DMR)**.
- **Individual Call Acknowledge Request** cannot be used while the transceiver is placed in Emergency Mode. A normal Individual Call, which does not require the sending of a message requesting an acknowledgment, can only be used.
- For an Individual Call (**Individual Call Acknowledge Request**), the following functions used for a normal Individual Call are available. (Refer to Making an Individual Call.)
  - Unit ID List
  - Caller ID Display
  - Unit ID Encode Block

Configuration using KPG-D1/ D1N

- Configuring **Individual Call Acknowledge Request** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR > Individual Call Acknowledge Request)
- Configuring **Busy Channel Lockout (DMR)** (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > DMR)

Initiating an Individual Call (Individual Call Acknowledge Request)

An Individual Call (Individual Call Acknowledge Request) can be activated by one of the following methods.

- **Individual Call Mode**

  Selecting a Unit ID configured in the Individual ID List or directly entering a Unit ID while the transceiver is in Individual Call Mode, and then pressing the **PTT** switch or the **Menu** ([]) key sends a message requesting an acknowledgment.

  Pressing the **Individual**, **Individual + Status**, or **Individual + Short Message** key places the transceiver in Individual Call Mode.

  The transceiver also enters Individual Call Mode by selecting “Individual”, “Individual + Status”, or “Individual + Short Message” after the transceiver enters Menu Mode by pressing the **Menu** key. (Refer to Common FUNC Using Menu Mode.)

  If “Individual”, “Individual + Status”, or “Individual + Short Message” is configured in **Keypad Operation**, pressing the **[0]** to **[9]** keys on the keypad also places the transceiver in Individual Call Mode. The transceiver enters Unit ID Shortcut Entry Mode or will be on hold as the first digit of the Unit ID is entered. (Refer to Common FUNC Keypad Operation.)

- **Stack Mode**

  Selecting the receive record in Stack Mode and then pressing the **PTT** switch sends a message requesting an acknowledgment. (Refer to Common FUNC Viewing the Receive History (Stack).)

- **Selcall on PTT**

  Selecting the channel where the target Unit ID for **Selcall on PTT** is configured and then pressing the **PTT** switch sends a message requesting an acknowledgment. The Unit ID of the target transceiver can be configured by selecting one Unit ID from the Individual ID List by using KPG-D1/ D1N.

- **Call key**

  Pressing one of the **Call 1** key to the **Call 6** key sends a message requesting an acknowledgment to the Unit ID which corresponds to the key pressed.

  For Mobile, a message requesting an acknowledgment is sent to the Unit ID which corresponds to the active port when any of the “Call 1” to “Call 6” ports allocated to the AUX Input port becomes active.

- **PC command**

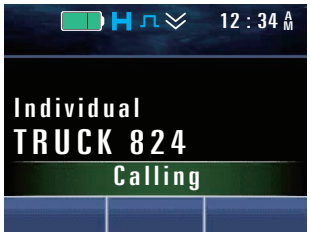
  A message requesting an acknowledgment is sent when the PC command is received from the communication port. To use a PC command, “Data” or “Data + GPS Data Output” needs to be assigned to the communication port of the transceiver. (Refer to Common FUNC Available Functions for COM Port.)

Operating the transceiver

1 **Follow one of the methods mentioned above to initiate an Individual Call (Individual Call Acknowledge Request).**

A message requesting an acknowledgment is sent.

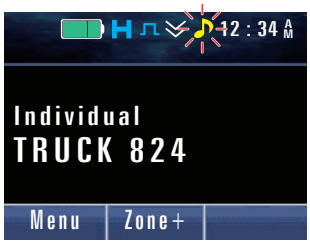
When the receiving transceiver is inside the communication range, “Calling” appears on the display, and the transceiver waits to receive an acknowledgment message from the receiving transceiver.



2 Receive an acknowledgment message from the receiving transceiver.

The "♪" icon blinks, and the transceiver enters a state allowing transmission of an Individual Call.

Receiving an acknowledgment message while the **PTT** switch is being pressed initiates an Individual Call.



3 Press the PTT switch.

The Individual Call is initiated.

Note

- If the **Call Request Tone** is enabled, a Call Request Tone (1 beep) sounds from the transceiver when a call request for an Individual Call (Individual Call Acknowledge Request) is initiated. Also, if the **Call Processing Tone** is enabled, a Call Processing Tone (2 beeps) sounds from the transceiver until the transceiver receives an acknowledgment message from the receiving transceiver after the call request for an Individual Call (Individual Call Acknowledge Request) is sent. (Refer to Notifying the User with a Tone That a Call Request Has Been Initiated (Call Request Tone), Notifying the User with a Tone That a Call Request Is in Progress (Call Processing Tone).)
- If **Call in Progress Tone** is enabled, a Call in Progress Tone (2 beeps) sounds from the transceiver when the transceiver becomes ready for transmissions with Individual Call.
- If **PTT Proceed Tone** is enabled, a Proceed Tone (3 beeps) sounds from the transceiver when the transceiver becomes ready for communications after the **PTT** switch is pressed. (Refer to Common FUNC Using Sound to Notify the Timing to Start Communications (PTT Proceed Tone).)
- While the transceiver is on standby to receive an acknowledgment message from the receiving transceiver, canceling the call is possible by pressing the **Clear** key.
- The transmitting transceiver sends a message requesting another acknowledgment when the length of time configured in **Maximum ACK Wait Time** elapses without receiving an automatic response message for a message requesting an acknowledgment from the receiving transceiver. If a response message cannot be received, the transmitting transceiver can send a message requesting an acknowledgment up to the number of times configured for **Number of Retries**. (Refer to Maximum ACK Wait Time, Number of Retries.)
- The transceiver terminates the call if the transceiver cannot receive an automatic response message from the receiving transceiver even if a message requesting an acknowledgment has been sent for the number of times configured in **Number of Retries**. At that time, "No Reply" appears on the display for 1 sec. (Refer to Number of Retries.)

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Assigning functions to the AUX Input port (See Transceiver Settings > Extended Function > AUX)
- Configuring **Selcall on PTT** (See Transceiver Settings > Personal > Personality > DMR Conventional > DMR > Selcall on PTT)
- Configuring **Selcall on PTT** (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > DMR > Selcall on PTT)
- Configuring the Unit ID corresponding to the **Call 1** to **Call 6** key or port (See Transceiver Settings > Key Assignment > Call)

Receiving an Individual Call (Individual Call Acknowledge Request)

The transceiver can receive an Individual Call if the received Unit ID matches the Unit ID (Own) preconfigured for the transceiver.

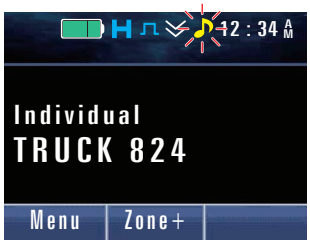
To receive an Individual Call (Individual Call Acknowledge Request), the receiving transceiver must receive a message requesting an acknowledgment from the transmitting transceiver. The transceiver becomes enabled for the communication after the transmitting transceiver receives an acknowledgment message.

Operating the transceiver

1 **Receive a message requesting an acknowledgment.**

The "♪" icon blinks, and the ID Name of the transmitting transceiver appears.

An acknowledgment message is automatically sent to the transmitting transceiver.



2 **Press the PTT switch after transmission of an acknowledgment.**

The transceiver initiates an Individual Call to the transmitting transceiver.

Note

- If **Busy LED** is enabled, the LED lights green when the transceiver is receiving. (Refer to Common FUNC Busy LED.)
- If Alert Tone is configured to sound when receiving, an Alert Tone will sound. (Refer to Transceiver behavior when receiving an Individual Call (Individual Call Acknowledge Request).)
- If **Selective Call Alert LED** or **Optional Signaling LED** is enabled, the LED flashes when the transceiver is receiving. (Refer to Transceiver behavior when receiving an Individual Call (Individual Call Acknowledge Request).)

Transceiver behavior when receiving an Individual Call (Individual Call Acknowledge Request)

● Alert Tone

If the received Unit ID is configured in the Individual ID List, an Alert Tone sounds from the transceiver according to the configuration for **Alert Tone (Individual)** of the corresponding Unit ID.

However, if "Common" is configured in **Alert Tone (Individual)** of the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, an Alert Tone sounds from the transceiver according to the configuration in **Alert Tone (Individual Call)** used in common in a DMR Conventional system.

● Selective Call Alert LED

If the received Unit ID is configured in the Individual ID List, the LED flashes according to the configuration for **Alert LED Color (Individual)** of the corresponding Unit ID.

However, if "Common" is configured in **Alert LED Color (Individual)** of the Individual ID List, or if the received Unit ID is not configured in the Individual ID List, the LED flashes according to the configuration in **Alert LED Color (Individual Call)** used in common in a DMR Conventional system.

● Optional Signaling LED

If **Optional Signaling LED** is enabled, the LED flashes in yellow. However, when **Selective Call Alert LED** is enabled, LED will flash in accordance with the configuration of **Selective Call Alert LED**.

Also, when the transceiver key is operated while the LED flashes according to the **Selective Call Alert LED** configuration, the LED flashes in yellow if the matching state of Optional Signaling persists.

Configuration using KPG-D1/ D1N

- Configuring **Selective Call Alert LED** to be enabled or disabled (See Transceiver Settings > DMR > DMR Information > Conventional)
- Configuring **Optional Signaling LED** to be enabled or disabled (See Transceiver Settings > DMR > DMR Information > Conventional)
- Configuring **Alert Tone (Individual)** (Individual ID List) (See Transceiver Settings > DMR > Individual ID List > Alert Tone)
- Configuring **Alert LED Color (Individual)** (Individual ID List) (See Transceiver Settings > DMR > Individual ID List > Alert LED Color)
- Configuring **Alert Tone (Individual Call)** used in common in a DMR Conventional system (See Transceiver Settings > DMR > DMR Information > Conventional > Alert Tone)
- Configuring **Alert LED Color (Individual Call)** used in common in a DMR Conventional system (See Transceiver Settings > DMR > DMR Information > Conventional > Alert LED Color)

Notifying the User with a Tone That a Call Request Has Been Initiated (Call Request Tone)

Call Request Tone is the function to emit a Call Request Tone (1 beep) from the transceiver when a call request for an Individual Call (Individual Call Acknowledge Request) is initiated in a DMR Conventional system.

The Call Request Tone (1 beep) from the transceiver notifies the user that a call request for an Individual Call (Individual Call Acknowledge Request) has been initiated.

The user can initiate the communication after the call request has been established.

Configuration using KPG-D1/ D1N

Configuring **Call Request Tone** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR > Individual Call Acknowledge Request)

Notifying the User with a Tone That a Call Request Is in Progress (Call Processing Tone)

Call Processing Tone is the function to emit a Call Processing Tone (2 beeps) from the transceiver until the transceiver receives an acknowledgment message from the receiving transceiver after the call request for an Individual Call (Individual Call Acknowledge Request) is initiated in a DMR Conventional system.

The Call Processing Tone (2 beeps) from the transceiver notifies a user that the call request for an Individual Call (Individual Call Acknowledge Request) is in progress. A Call Processing Tone stops when the call request is established, and the user can initiate the communication.

After the call request for an Individual Call (Individual Call Acknowledge Request) is initiated, a Call Processing Tone (2 beeps) sounds from the transceiver upon the elapse of the time configured for **Call Processing Tone Delay Time**.

Configuration using KPG-D1/ D1N

Configuring **Call Processing Tone** and **Call Processing Tone Delay Time** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR > Individual Call Acknowledge Request > Call Processing Tone)

1.7 Making a Group Call

Group Call is the function to establish 2-way group voice communications by initiating a call to a group.

The transceiver can initiate a call to the transceivers having the same Group ID by specifying the Group ID. The transceiver can also initiate a call to all transceivers by specifying the Group ID for which “ALL” is configured.

Initiating a Group Call

Group Call can be started by one of the following methods.

- **Group Call Mode**

  While the transceiver is in Group Call Mode, the transceiver can initiate a Group Call by a user selecting a Group ID configured in the Group ID List and then pressing the **PTT** switch. (Refer to Group ID List.)

  Pressing the **Group**, **Group + Status**, or **Group + Short Message** key places the transceiver in Group Call Mode.

  The transceiver also enters Group Call Mode by selecting “Group”, “Group + Status”, or “Group + Short Message” after the transceiver enters Menu Mode by pressing the **Menu** key. (Refer to Common FUNC Using Menu Mode.)

  If “Group”, “Group + Status”, or “Group + Short Message” is configured in **Keypad Operation**, pressing the **[0]** to **[9]** keys on the keypad also places the transceiver in Group Call Mode. The transceiver enters Group ID Shortcut Entry Mode or will be on hold as the first digit of the Group ID is entered. (Refer to Common FUNC Keypad Operation.)

- **Selcall on PTT**

  The transceiver initiates a Group Call when the **PTT** switch is pressed on a channel where “Group Call” is configured for **Selcall on PTT**. The Group ID of the target transceiver can be configured by selecting one Group ID from the Group ID List by using KPG-D1/ D1N.

- **PC Command**

  The transceiver starts a Group Call upon the receipt of a PC command from the communication port. To use a PC command, “Data” or “Data + GPS Data Output” needs to be assigned to the communication port of the transceiver. (Refer to Common FUNC Available Functions for COM Port.)

Operating the transceiver

The following describes how to initiate a Group Call in Group Call Mode.

1 **Press the Group, Group + Status, or Group + Short Message key.**

The transceiver enters Group Call Mode and the Group ID List selection display appears.

The following operations are identical even if the transceiver enters Group Call Mode by a user pressing the **Menu** key or using the keypad.

2 **Press the [▲] or [▼] key to select a Group ID from the Group ID List.**

Refer to Common FUNC “Selecting or Clearing Data from a List” for selection methods.

3 Press the PTT switch.

The transceiver initiates a Group Call.

If Group Call Mode has been entered with “Group + Status” or “Group + Short Message”, Status Mode or Short Message Mode is entered by pressing the [▶] key.

Note

- The selection screen for the Group ID List closes at the same time as pressing the **PTT** switch. If selecting an ID and sending a Group Call again, reexecute the operations from step 1.
- If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common FUNC Transmit LED.)
- If **PTT Proceed Tone** is enabled, a Proceed Tone (3 beeps) sounds from the transceiver when the transceiver becomes ready for communications after the **PTT** switch is pressed. (Refer to Common FUNC Using Sound to Notify the Timing to Start Communications (PTT Proceed Tone).)
- The transceiver starts a Group Call only by a user pressing the **PTT** switch if the transceiver transmits on a channel with “Group Call” configured for **Selcall on PTT**. In this case, a Group ID does not need to be selected by using the transceiver.

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Configuring **Selcall on PTT** (Personality) (See Transceiver Settings > Personal > Personality > DMR Conventional > DMR > Selcall on PTT)
- Configuring **Selcall on PTT** (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > DMR > Selcall on PTT)

Receiving a Group Call

If the received Group ID matches the Group ID configured for the transceiver, the transceiver can receive the Group Call.

Transceiver behavior

1 The transceiver receives a Group Call.

The “♪” icon blinks and a received Group ID appears. If **Unit ID Display on Group Call** is enabled, the ID Name of the transmitting transceiver is displayed. (Refer to Display When the Transceiver Receives a Group Call (Unit ID Display on Group Call).)

2 Press the PTT switch.

The transceiver can respond to the received Group ID. When a key other than the **PTT** switch is pressed, the configured function will be activated.

Note

- If **Busy LED** is enabled, the LED lights green when the transceiver is receiving. (Refer to Common FUNC Busy LED.)
- If Alert Tone is configured to sound when receiving, an Alert Tone will sound. (Refer to Transceiver behavior when receiving a Group Call.)
- If **Selective Call Alert LED** or **Optional Signaling LED** is enabled, the LED flashes when the transceiver is receiving. (Refer to Transceiver behavior when receiving a Group Call.)
- The transceiver can record the receipt of a Group Call. The record can be checked in Stack Mode. (Refer to Common FUNC Viewing the Receive History (Stack).)
- If **Group ID Scan (DMR)** is enabled, the transceiver is on standby to receive a Group Call from all Group IDs configured in the Group ID List. (Refer to Group ID Scan (DMR).)
- The transceiver can send the ID of the transmitting transceiver from the communication port on the transceiver when receiving a Group Call. (Refer to Sending the Received Unit ID from the Communication Port (Unit ID Serial Output).)

Transceiver behavior when receiving a Group Call

Alert Tone

If the received Group ID is configured in the Group ID List, an Alert Tone sounds from the transceiver according to the configuration for **Alert Tone** of the corresponding Group ID.

However, if “Common” is configured for **Alert Tone** in the Group ID List, or if the received Group ID is not configured in the Group ID List, an Alert Tone sounds from the transceiver according to the configuration for **Alert Tone (Group Call)** used in common in a DMR Conventional system.

Selective Call Alert LED

If the received Group ID is configured in the Group ID List, the LED blinks according to the configuration for **Alert LED Color** of the corresponding Group ID.

However, if “Common” is configured for **Alert LED Color** of the Group ID List, or if the received Group ID is not configured in the Group ID List, the LED blinks according to the configuration in **Alert LED Color (Group Call)** used in common in a DMR Conventional system.

Optional Signaling LED

If **Optional Signaling LED** is enabled, the LED flashes in yellow. However, when **Selective Call Alert LED** is enabled, LED will flash in accordance with the configuration of **Selective Call Alert LED**.

Also, when the transceiver key is operated while the LED flashes according to the **Selective Call Alert LED** configuration, the LED flashes in yellow if the matching state of Optional Signaling persists.

Configuration using KPG-D1/ D1N

- Configuring **Selective Call Alert LED** to be enabled or disabled (See Transceiver Settings > DMR > DMR Information > Conventional)
- Configuring **Optional Signaling LED** to be enabled or disabled (See Transceiver Settings > DMR > DMR Information > Conventional)
- Configuring **Alert Tone**/ **Alert LED Color** (Group ID List) (See Transceiver Settings > DMR > Group ID List)
- Configuring **Alert Tone (Group Call)** used in common in a DMR Conventional system (See Transceiver Settings > DMR > DMR Information > Conventional > Alert Tone)
- Configuring **Alert LED Color (Group Call)** used in common in a DMR Conventional system (See Transceiver Settings > DMR > DMR Information > Conventional > Alert LED Color)

Group ID List

The transceiver uses a Group ID configured in the Group ID List to initiate a Group Call in a DMR Conventional system. The desired Group IDs must be preconfigured using KPG-D1/ D1N for the transceiver to initiate a Group Call. A maximum of 1,500 Group IDs can be configured in the Group ID List.

Table 1-9 Group ID List

Configuration	Description
ID	A Group ID can be configured in the range between 000001 and FFFCDF (hexadecimal), between 1 and 16776415 (decimal), or “ALL”. “ALL” allows initiation of a call to all groups.
ID Name	The caller’s ID Name is configured. A maximum of 14 characters can be configured for the ID Name. If the ID Name of the group is configured in the Group ID List, the ID Name appears when the transceiver receives a call. If the ID Name is not configured in the Group ID List, the Group ID List number appears.
ID Mode	The permission or inhibition of transmission of the receiving party can be configured. An ID for which “Receive Only” is configured for **ID Mode** does not appear on the ID selection display in Group Call Mode, and a user cannot select the ID in Group Call Mode. If the transceiver receives a call from an ID for which “Receive Only” is configured for **ID Mode**, the caller’s ID Name appears. In this case, a user cannot initiate a call to the party even if the user attempts to respond by pressing the **PTT** switch.
Alert Tone	The tone type sounding from the transceiver can be configured for a Group Call from the Group IDs registered in the Group ID List.
Alert LED Color	The color of flashing LED can be configured for a Group Call from the Group IDs registered in the Group ID List. Note To use **Alert LED Color**, **Selective Call Alert LED** needs to be enabled.

Configuration using KPG-D1/ D1N

Configuring **Group ID List** (See Transceiver Settings > DMR > Group ID List)

Display When the Transceiver Receives a Group Call (Unit ID Display on Group Call)

Unit ID Display on Group Call is the function to display the Unit ID of the transmitting transceiver when the transceiver receives a Group Call.

If this function is enabled, the ID Name of the transmitting transceiver is displayed when the transceiver receives a Group Call. (Refer to Receiving a Group Call.)

Configuration using KPG-D1/ D1N

Configuring **Unit ID Display on Group Call** (See Transceiver Settings > DMR > DMR Information > General)

Group ID Scan (DMR)

Group ID Scan (DMR) is the function to standby to receive a Group Call from all Group IDs in a DMR Conventional system.

If this function is enabled, the transceiver is on standby to receive a Group Call from all Group IDs configured for Group ID List.

If this function is disabled, the transceiver is on standby to receive only the Group Calls from the Group IDs configured for **Selcall on PTT** or for **Persistent Group ID (DMR)**.

However, when “Off” or “Individual Call” is configured for **Selcall on PTT**, calls will only be received from the Group ID configured in **Persistent Group ID (DMR)**.

Note

- Group IDs from which data is received when **Group ID Scan (DMR)** is disabled vary according to the firmware version of the transceiver.
  2.10.00 or earlier versions: Group IDs configured in **Group ID List**
  2.20.00 or later versions: Group IDs configured in **Selcall on PTT** and **Persistent GID**
- **Group ID Scan (DMR)** can also be utilized for communication of data such as Status Message, Short Message and GPS data.

Configuration using KPG-D1/ D1N

- Configuring **Group ID Scan (DMR)** to be enabled or disabled (Personality) (See Transceiver Settings > Personal > Personality > DMR Conventional > DMR)
- Configuring **Group ID Scan (DMR)** to be enabled or disabled (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > DMR)
- Configuring **Selcall on PTT** (Personality) (See Transceiver Settings > Personal > Personality > DMR Conventional > DMR > Selcall on PTT)
- Configuring **Selcall on PTT** (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > DMR > Selcall on PTT)
- Configuring **Persistent Group ID (DMR)** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR > Persistent Group ID (DMR))

Preventing the Functions Working with Group Call Reception from Activating (Call Alert Inhibit (Group Calls Only))

Call Alert Inhibit (Group Calls only) is the function that disables the Alert Tone, Selective Call Alert LED, Horn Alert, Vibrator and Caller ID Stack functions when the transceiver receives a Group Call.

Use of this function prevents specific functions from activating as follows even if these functions are enabled or configured to be enabled when the transceiver receives a Group Call.

- **Alert Tone**
  The following Alert Tones do not sound from the transceiver even if the transceiver receives a Group Call.
  - Alert Tone (Group Call List)
  - Group Call (Alert Tone) (Conventional)
- **Selective Call Alert LED**
  A Selective Call Alert LED does not blink even if the transceiver receives a Group Call.
- **Horn Alert (Mobile only)**
  The headlight of the vehicle connected to Horn Alert does not light up and the horn is not sounded even when a Group Call is received.
- **Vibrator (Portable only)**
  The Vibrator does not function even if the transceiver receives a Group Call.
- **Caller ID Stack**
  The Caller ID will not be stored in the transceiver stack memory even if the transceiver receives a Group Call.

Configuration using KPG-D1/ D1N

Configuring the **Call Alert Inhibit (Group Calls only)** to be enabled or disabled (See Transceiver Settings > DMR > DMR Information > General)

Avoiding Receiving a Group Call during an Incoming Individual Call (Ignore Group Call during Individual Call)

Ignore Group Call during Individual Call is the function that disables receiving of Group Calls while an Individual Call is being received.

Use this function to assign priority to Individual Calls that are received.

Enabling this function disables receiving of Group Calls (including data communication) while the transceiver is receiving an Individual Call and the Auto Reset Timer is counting down.

Note

- The following types of Group Call can be received even when this function is enabled.
  - Group Call via All Group ID
  - Emergency Group Call
- When this function is enabled, receiving of Unaddressed Call will also be disabled while receiving an Individual Call.
- When this function is enabled, OVCM via receiving of Group Call will be deactivated while receiving an Individual Call. (Refer to Causing Transceivers Other than the Transceiver of the Specified ID to Participate in a Conversation (Open Voice Channel Mode).)

Configuration using KPG-D1/ D1N

Configuring **Ignore Group Call during Individual Call** to be enabled or disabled (See Transceiver Settings > DMR > DMR Information > General)

1.8 Making an Informative Group Call (Broadcast Group Call)

Broadcast Group Call can be used to engage in one-way informative group voice calls by initiating a call to a group.

The transceiver can initiate a call to the transceivers having the same Group ID by specifying the Group ID. The transceiver can also initiate a call to all transceivers by specifying the Group ID for which “ALL” is configured.

Initiating a Broadcast Call

Broadcast Group Call can be started by one of the following methods:

- **Broadcast key**

  Broadcast Call information is added to a Group Call and sent by the transceiver initiating a Group Call while Broadcast Group Call is enabled.

  Pressing the **Broadcast** key toggles the Broadcast Group Call between enabled and disabled.

  If the **Menu** key is pressed to enter Menu Mode and then “Broadcast” is selected, Broadcast Group Call can also be toggled between enabled and disabled. (Refer to Common FUNC Using Menu Mode.)

- **PC command**

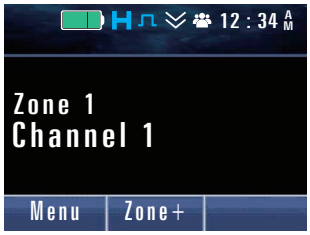
  The transceiver starts a Broadcast Group Call upon the receipt of a PC command from the communication port. To use a PC command, “Data” or “Data + GPS Data Output” needs to be assigned to the communication port of the transceiver. (Refer to Common FUNC Available Functions for COM Port.)

Operating the transceiver

1 **Press the Broadcast key.**

Broadcast Group Call is enabled after a Key Beep A (1 beep) sounds from the transceiver. The “ ” icon appears.

The following operations are identical even if Broadcast Group Call is enabled by pressing the **Menu** key.



2 **Initiating a Group Call.**

Refer to “Initiating a Group Call” for methods to initiate a Group Call.

Pressing the **Broadcast** key after the transmission causes Broadcast Group Call to be disabled.

Configuration using KPG-D1/ D1N

Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)

Receiving a Broadcast Group Call

If the received Group ID matches the Group ID configured for the transceiver, the transceiver can receive the Broadcast Group Call.

Note

The transceiver can receive the Broadcast Group Call initiated using the Group ID for which “ALL” is configured even if no Group ID is configured for the transceiver.

Operating the transceiver

1 Press the Broadcast key.

The “♪” icon blinks, and then “Broadcast” and a received Group ID appear.

If Unit ID Display on Group Call is enabled, the ID Name of the transmitting transceiver is displayed. (Refer to Display When the Transceiver Receives a Group Call (Unit ID Display on Group Call).)

Note

- If **Busy LED** is enabled, the LED lights green when the transceiver is receiving. (Refer to Common FUNC Busy LED.)
- If Alert Tone is configured to sound when receiving, an Alert Tone will sound. (Refer to Transceiver behavior when receiving a Group Call.)
- If **Selective Call Alert LED** or **Optional Signaling LED** is enabled, the LED flashes when the transceiver is receiving. (Refer to Transceiver behavior when receiving a Group Call.)
- The transceiver can send the ID of the transmitting transceiver from the communication port on the transceiver when receiving a Broadcast Group Call. (Refer to Sending the Received Unit ID from the Communication Port (Unit ID Serial Output).)

1.9 Common Functions for Data Communications

The following functions are used in common for data communications such as Status Call and Short Data Call:

- Number of Retries
- Transmit Busy Wait Time
- Maximum ACK Wait Time
- Preamble Length

Number of Retries

If the transceiver does not receive the acknowledgment after the transceiver sends data and the time configured for **Maximum ACK Wait Time** elapses, the transceiver resends data. **Number of Retries** is the number of times for the transceiver to resend data. A smaller number can be configured if there is good communicating conditions, and a larger number can be configured if there are inferior communicating conditions.

Configuration using KPG-D1/ D1N

Configuring **Number of Retries** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR > Parameters)

Transmit Busy Wait Time

The transceiver confirms that the traffic channel is available before sending data and then starts sending data when the channel is available. **Transmit Busy Wait Time** is the duration to wait for the traffic channel to become available.

A transmission is canceled when the channel is busy and the Transmit Busy Wait Time elapses.

Configuration using KPG-D1/ D1N

Configuring **Transmit Busy Wait Time** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR > Parameters)

Maximum ACK Wait Time

Maximum ACK Wait Time is the length of time that the transceiver stands by to receive the acknowledgment after the transceiver sends data. If the transceiver does not receive the acknowledgment within the time configured for **Maximum ACK Wait Time**, the transceiver resends data.

Configuration using KPG-D1/ D1N

Configuring **Maximum ACK Wait Time** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR > Parameters)

Preamble Length

Preamble Length is the function to extend the duration for sending a preamble when the DMR frame is sent.

Extending the time for sending a preamble at the beginning of transmission makes the receiving transceiver easier to receive a call and reduces missing of the beginning of the audio during the scan.

The extended time of a preamble is determined by using the following equation.

Time [sec] = 60 ms x Configuration value for **Preamble Length**

Configuration using KPG-D1/ D1N

Configuring **Preamble Length** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR > Parameters)

1.10 Sending and Receiving a Status Message (Status Call)

Status Call is a simple messaging system that allows a user to send and receive a status (Status Message). Since the message is replaced by status, communications can take place quickly and communication traffic can be reduced.

The following methods are available to send a Status Message.

Table 1-10 Sending Status Messages

Transmission Methods	Description
Status Mode	The transceiver enters Status Mode by a user pressing a **PF** key or a key on the keypad, and then the transceiver will send a Status Message. (Refer to Sending a Status Message.)
Call key	Pressing one of the “Call 1” to “Call 6” keys allocated to the **PF** keys of the transceiver causes the transceiver to send the preconfigured Status Message. For Mobile, the Status Message preconfigured in the transceiver is sent when any of the “Call 1” to “Call 6” ports allocated to the AUX Input port becomes active. “Call 1” to “Call 6” can be assigned to the **PF** keys or AUX Input ports by using KPG-D1/ D1N, and the Status Message corresponding to each key can be selected from the Status List in DMR. In this case, a Status Message is always sent to the preconfigured Base ID.
Turning the transceiver on/ off	The transceiver sends the Status Message configured in the transceiver when the transceiver is turned on or off. (Refer to Power-on Status Message, Power-off Status Message.) In this case, a Status Message is always sent to the preconfigured Base ID.
AUX Input Status Message (Mobile Only)	The specified Status Message is sent when the AUX Input port goes high level to low level or goes low level to high level. (Refer to AUX Input Status Message (Mobile Only).)
PC Command	The transceiver will send a Status Message when the transceiver receives a PC command from the communication port. To use a PC command, “Data” or “Data + GPS Data Output” needs to be assigned to the communication port of the transceiver. (Refer to Common FUNC Available Functions for COM Port.)

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Assigning functions to the AUX Input port (See Transceiver Settings > Extended Function > AUX)
- Configuring the Status Message corresponding to the **Call 1** to **Call 6** keys (See Transceiver Settings > Key Assignment > Call)

Sending a Status Message

This section describes how to send a Status Message in Status Mode.

The transceiver enters Status Mode with one of the following operations, and then the transceiver will send a Status Message.

- **Status, Individual + Status, or Group + Status key**

  Pressing the **Status** key places the transceiver in Status Mode. In this case, a Status Message is addressed to a Base ID.

  Or, pressing the **Individual + Status** or **Group + Status** key places the transceiver in Individual Call Mode or Group Call Mode. The transceiver enters Status Mode by pressing the **[▶]** key after selecting the target Unit ID or Group ID.

- **Menu key**

  Pressing the **Menu** key places the transceiver in Menu Mode, and then the transceiver enters Status Mode by selecting "Status". In this case, a Status Message is addressed to a Base ID.

  Or, if "Individual + Status" or "Group + Status" is selected after entering Menu Mode by pressing the **Menu** key, the transceiver enters Individual Call Mode or Group Call Mode. The transceiver enters Status Mode by pressing the **[▶]** key after selecting the target Unit ID or Group ID. (Refer to Common FUNC Using Menu Mode.)

- **Keypad entry**

  If "Status" is configured for **Keypad Operation**, pressing the **[0]** to **[9]** keys on the transceiver keypad causes the transceiver to enter Status Mode. In this case, a Status Message is addressed to a Base ID.

  If "Individual + Status" or "Group + Status" is configured in **Keypad Operation**, pressing the **[0]** to **[9]** keys on the keypad also places the transceiver in Individual Call Mode or Group Call Mode. The transceiver enters Status Mode by pressing the **[▶]** key after selecting the target Unit ID or Group ID. (Refer to Common FUNC Keypad Operation.)

Note

For operating in Individual Call Mode or Group Call Mode, refer to the information on the various call types of DMR.

Operating the transceiver

- **Sending a Status Message by list selection**

1 **Select one of the following operations to place the transceiver in Status Mode.**

- **Press the Status key.**

  The transceiver enters Status Mode. In this case, a Status Message is addressed to a Base ID.

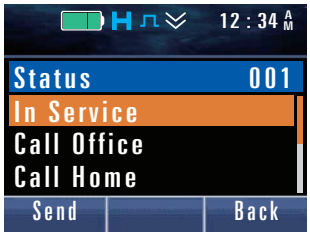
- **Press the Individual + Status key.**

  Pressing the **[▶]** key after selecting the Unit ID of the target transceiver causes Status Mode to be entered.

- **Press the Group + Status key.**

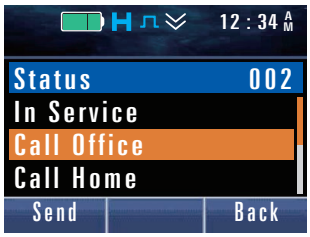
  Pressing the **[▶]** key after selecting the Group ID of the target transceiver causes Status Mode to be entered.

Or, the transceiver enters Status Mode by pressing the **Menu** key or using a keypad. In this case, the following operations are identical.



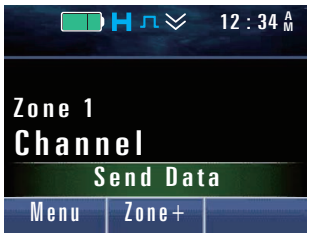
2 **Press the [▲] key or [▼] key and then select the target data from the Status List.**

Refer to Common FUNC "Selecting or Clearing Data from a List" for selection methods.

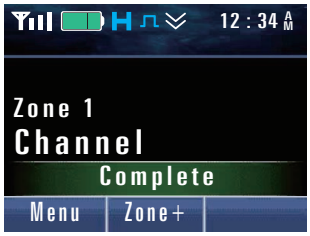


3 **Press the PTT switch or the Menu ([▯]) key.**

The transcriber sends the Status Message.



If the Status Message is properly sent to the target transceiver, "Complete" appears.



Note

The selection screen for the Status List closes at the same time as pressing the **PTT** switch or **Menu** ([▯]) key. If selecting an ID and sending a Status Call again, reexecute the operations from step 1.

● Sending a Status Message using Manual Dialing

To send a Status Message using **Manual Dialing**, **Manual Dialing** must be enabled using KPG-D1/ D1N.

1 **Select one of the following operations to place the transceiver in Status Mode.**

- **Press the Status key.**

  The transceiver enters Status Mode. In this case, a Status Message is addressed to a Base ID.

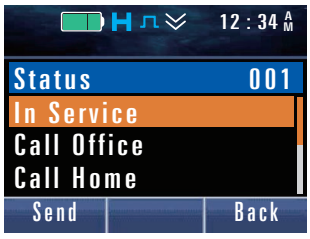
- **Press the Individual + Status key.**

  Pressing the **[▶]** key after selecting the Unit ID of the target transceiver causes Status Mode to be entered.

- **Press the Group + Status key.**

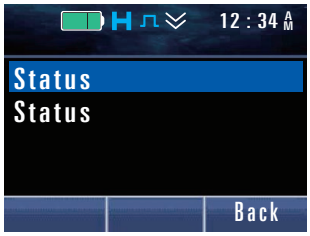
  Pressing the **[▶]** key after selecting the Group ID of the target transceiver causes Status Mode to be entered.

Or, the transceiver enters Status Mode by pressing the **Menu** key or using a keypad. In this case, the following operations are identical.



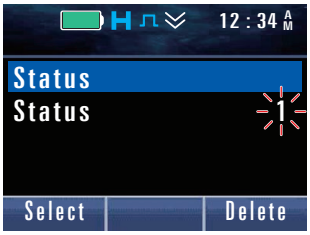
2 Press the Function [ ] key.

The status entry display appears.



3 Enter a status.

Refer to Common FUNC “Entering or Deleting a Code” for the entry method.



- **Using the PF keys**

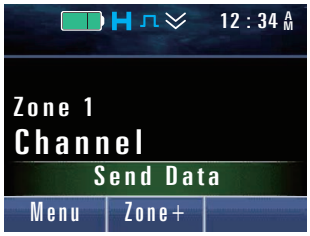
  A numeric character can be selected by pressing the **[▲]** key or the **[▼]** key, and pressing the **Menu** ([ ]) or **[*]** key can confirm the selected numeric character.

- **Using the keypad**

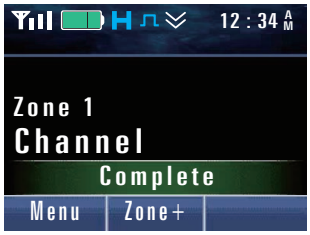
  A code can be entered by pressing the **[0]** to **[9]** keys.

4 Press the PTT switch or the Menu ([ ]) key.

The transceiver sends the Status Message.



If the Status Message is properly sent to the target transceiver, “Complete” appears.



Note

- The entry screen for status closes at the same time as pressing the **PTT** switch or **Menu** ([ ]) key. If entering status and sending a Status Call again, reexecute the operations from step 1.
- Transmission can be canceled by pressing the **Clear** key while a Status Message is being transmitted.
- “No Reply” appears on the display and transmission of a Status Message is terminated if no response is received from the target transceiver. If transmission fails because of busy status, “Busy” appears on the display and transmission of a Status Message is terminated.

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Assigning functions to the **Keypad Operation** of the transceiver (See Transceiver Settings > Key Assignment > General > Primary/ Secondary)
- Configuring **Manual Dialing** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)
- Configuring **Base ID Type** and **Base ID** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)

Receiving a Status Message

Upon receiving a Status Message, the received Status Message appears on the display, and the transceiver can send the Status Message to an external device from the communication ports.

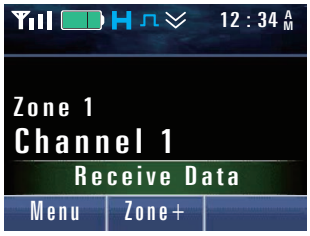
Note

- To use serial communications, a user needs to prepare DMR compatible software or external devices.
- A received Status Message can be left as a record. The record can be checked in Stack Mode. (Refer to Common FUNC Viewing the Receive History (Stack).)

Transceiver behavior

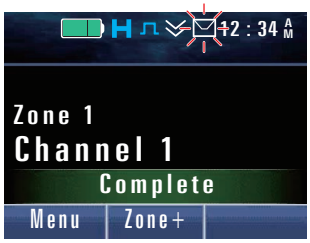
1 **The transceiver starts receiving a Status Message.**

"Receive Data" appears.

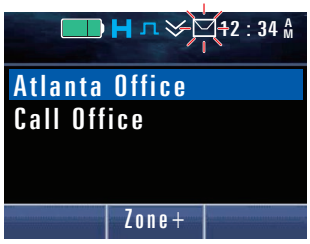


2 **A Status Message is received.**

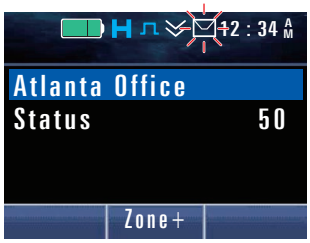
The " " icon blinks and "Complete" appears.



The Status Message appears.



- If the status is not configured for Status List or the Status Name is not configured, a status No. appears.



If any Emergency status or Horn Alert status (Mobile only) is configured by using KPG-D1/ D1N, the display appears as below when each status is received:

Table 1-11 Status reception

Status	Display
Reception of Emergency Status	Emergency
Reception of Man-down Status	Man Down
Reception of Lone Worker Status	Emg Lone-Work
Reception of Stationary Status	Emg Stationary
Reception of Motion Status	Emg Motion
Reception of Horn Alert Status (Mobile only)	Horn Alert

Note

- If the transceiver receives a Status Message by a Group Call, the ID Name appears according to the configuration for **Unit ID Display on Group Call**. (Refer to Display When the Transceiver Receives a Group Call (Unit ID Display on Group Call).)
- If the received status number is configured in the Status List, an Alert Tone sounds from the transceiver according to the configuration of the corresponding Status List. However, if “Common” is configured in **Alert Tone** of the Status List, or if the received status number is not configured in the Status List, an Alert Tone sounds from the transceiver according to the configuration in **Alert Tone (Status/Short Message Call)** used in common in a DMR Conventional system. Pressing any key on the transceiver stops the Alert Tone.

Configuration using KPG-D1/ D1N

- Configuring **Alert Tone** (Status List) (See Transceiver Settings > DMR > Status List)
- Configuring **Alert Tone (Status/Short Message Call)** used in common in a DMR Conventional system (See Transceiver Settings > DMR > DMR Information > Conventional > Alert Tone)
- Configuring the contents that appear on the display when various types of status are received (See Transceiver Settings > Personal > Personal Features > DMR Conventional > Emergency > Emergency ID (DMR Conventional))
- Configuring **Horn Alert Status** (See Transceiver Settings > DMR > DMR Information > Status > Option)

About the Behavior When a Message Requesting the Status Transmission Is Received

The transceiver sends the status configured for **Default Status** if a status has never been selected, such as when the transceiver is turned on.

Configuration using KPG-D1/ D1N

Configuring **Default Status** (See Transceiver Settings > DMR > DMR Information > Conventional > Option)

Status List

To use a Status Message, the status to be sent must be preconfigured in the transceiver by using KPG-D1/ D1N prior to the transmission. A maximum of 1024 statuses can be configured in the Status List.

Table 1-12 Status List

Configuration	Description
Status	The status number can be configured. A status number can be configured in the range between 0 and 1023.
Status Name	The status name can be configured. It is not easy to recognize the meaning of a status only by viewing a status number. In this case, a user can link the status number to a short message; hence, it can be easily understood. A maximum of 16 characters can be configured. If the status number is configured in the Status List, the Status Name appears when the transceiver receives a Status Message. If the transceiver receives a status that is not configured in the Status List, the status number appears on the transceiver display.
Transmit Inhibit	The permission or inhibition of transmission of status can be configured. The status for which **Transmit Inhibit** is enabled does not appear on the status selection display in Status Mode. In this case, a user cannot select a status for which **Transmit Inhibit** is enabled in Status Mode.
Alert Tone	The type of tone sounding from the transceiver can be configured for a received status number from the status numbers registered in the Status List.
Voice Announcement	Voice guidance of when the transceiver receives a status can be configured for each status. If the transceiver receives a status for which voice guidance is configured, the voice guidance is executed. If Alert Tone is enabled, voice guidance is executed after an Alert Tone is emitted. To configure voice guidance for Voice Announcement, “User Programmable” needs to be configured in **Voice Announcement Type**.

Configuration using KPG-D1/ D1N

- Configuring **Status List** (See Transceiver Settings > DMR > Status List)
- Configuring **Voice Announcement Type** (See Transceiver Settings > Optional Features > Optional Features 1 > Voice Announcement)

Status Message Stack

Status Message Stack is the function to store a Status Message in the stack memory. Up to 250 Status Messages and Caller IDs in total can be stored in the stack memory of the transceiver.

If a message is stored in the transceiver, the “ ” icon blinks as notification. In this case, a user can read the stored Status Message if the transceiver enters Stack Mode. (Refer to Common FUNC Viewing the Receive History (Stack).)

Configuration using KPG-D1/ D1N

Configuring **Status Message Stack** (See Transceiver Settings > DMR > DMR Information > General > Stack)

Status Message on Data Zone-Channel

Status Message on Data Zone-Channel is the function that allows the transceiver to automatically change the channel to the Data Zone-Channel to send a Status Message in a DMR Conventional system.

The transceiver automatically changes the channel to the channel in a DMR Conventional system configured in **Data Zone-Channel (DMR)** to send a Status Message. When the transmission ends, the transceiver restores the Zone-channel that was used before sending the Status Message. **Status Message on Data Zone-Channel** can be used to send data using a specific dedicated channel.

Note

This function is enabled if “Channel Table” is configured in **Zone-channel Format** by using KPG-D1/ D1N.

Configuration using KPG-D1/ D1N

- Configuring **Status Message on Data Zone-Channel** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)
- Configuring **Data Zone-Channel (DMR)** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)

Status Message on Data System-Personality

Status Message on Data System-Personality is the function that allows the transceiver to automatically change the channel to the Data System-Personality to send a Status Message in a DMR Conventional system.

The transceiver automatically changes the channel to the channel in a DMR Conventional system configured in **Data System-Personality (DMR)** to send a Status Message. When the transmission ends, the transceiver restores the Zone-channel that was used before sending the Status Message. **Status Message on Data System-Personality** can be used to send data using a specific dedicated channel.

Note

This function is enabled if “Personality” is configured in Zone-channel Format by using KPG-D1/ D1N.

Configuration using KPG-D1/ D1N

- Configuring **Status Message on Data System-Personality** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)
- Configuring **Data System-Personality (DMR)** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)

Sending the Received Status Message from the Communication Port (Status Message Serial Output)

Status Message Serial Output allows the transceiver to send the Status and the Unit ID of the transmitting transceiver from its communication port when the transceiver receives a Status Message.

Using **Status Message Serial Output**, the dispatcher can monitor the received Status Message in real time.

Note

To use **Status Message Serial Output**, the “Data” or “Data + GPS Data Output” must be assigned to the communication port of the transceiver.

Configuration using KPG-D1/ D1N

- Configuring **Status Message Serial Output** to be enabled or disabled (See Transceiver Settings > DMR > DMR Information > General > Serial Output)
- Assigning functions to **COM port** (See Transceiver Settings > Optional Features > Optional Features 1 > Serial Interface > COM Port)

Power-on Status Message

Power-on Status Message allows the transceiver to send the selected Status Message when the transceiver is turned on.

Using the **Power-on Status Message**, the base station can recognize that the transceiver has been turned on. The transceiver sends the message to the Base ID of the system to which the channel selected when the transceiver is turned on belongs.

Note

If **Transceiver Password** is used at the same time, a Status Message is sent when the transceiver is turned on and the transceiver migrates from Transceiver Password Mode to user mode.

Configuration using KPG-D1/ D1N

Configuring **Power-on Status Message** (See Transceiver Settings > DMR > DMR Information > Conventional > Power-on/off Status Message)

Power-off Status Message

Power-off Status Message allows the transceiver to send the selected Status Message when the transceiver is turned off.

Using the **Power-off Status Message**, the base station can recognize that the transceiver has been turned off. The transceiver sends the message to the Base ID of the system to which the channel selected when the transceiver is turned off belongs.

Configuration using KPG-D1/ D1N

Configuring **Power-off Status Message** (See Transceiver Settings > DMR > DMR Information > Conventional > Power-on/off Status Message)

Base ID

Base ID is the target transceiver's ID used to send GPS data or Transparent data and the following Status Messages and Short Messages.

- AUX Input Status Message (Mobile Only)
- Power-on Status Message
- Power-off Status Message
- A Status Message that is sent by selecting a status number or directly entering a status number after the transceiver enters Status Mode by pressing the **Status** key or the **[0]** to **[9]** keys on the keypad
- A Status Message that is sent by selecting a status number or directly entering a status number after the transceiver enters Status Mode by a user selecting "Status" from Menu Mode
- A Status Message that is sent by pressing any of the **PF** keys having "Call 1" to "Call 6" allocated
- A Status Message that is sent when any of the AUX Input ports having "Call 1" to "Call 6" allocated becomes active (Mobile only)
- A Short Message that is sent by entering a text string after the transceiver enters Short Message Mode by pressing the **Short Message** key or the **[0]** to **[9]** keys on the keypad
- A Short Message that is sent by entering a text string after the transceiver enters Short Message Mode by a user selecting "Short Message" from Menu Mode

Base ID can be configured using KPG-D1/ D1N. Either Unit ID or Group ID can be configured. ID of the base station that manages operations is normally configured for Base ID.

Configuration using KPG-D1/ D1N

Configuring **Base ID Type** and **Base ID** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)

Emergency Status Response

Emergency Status Response is the function to emit an Alert Tone when the transceiver receives an Emergency Status. The transceiver behaves as follows according to the configuration using KPG-D1/ D1N.

Table 1-13 Emergency Status Response

Configuration	Description
Alert Tone	The Alert Tone configured for **Alert Tone (Emergency Response)** sounds from the transceiver when receiving an Emergency Status.
Horn (Mobile only)	If receiving an Emergency Status, the Alert Tone configured for **Alert Tone (Emergency Response)** sounds from the transceiver and the Horn Alert port is activated.
Voice Announcement	If the transceiver receives an Emergency Status for which voice guidance is configured, the voice guidance is executed. If **Alert Tone** is enabled, voice guidance is executed after an Alert Tone is emitted. To configure voice guidance for Voice Announcement, "User Programmable" needs to be configured in **Voice Announcement Type**.

Configuration using KPG-D1/ D1N

- Configuring **Emergency Status Response (Alert Tone/ Horn/ Voice Announcement)** (See Transceiver Settings > DMR > DMR Information > General > Emergency Status Response)
- Configuring **Alert Tone (Emergency Response)** (See Transceiver Settings > DMR > DMR Information > Conventional > Alert Tone)

AUX Input Status Message (Mobile Only)

Supported Models: Mobile

AUX Input Status Message is the function that sends out a specified Status Message when the AUX Input port goes high level to low level or goes low level to high level.

A Status Message can be sent out when there is a change in the AUX Input port status by attaching a sensor to the port. The target transceiver is the ID configured in Base ID. (Refer to Base ID.)

To use this function, **AUX Input Status Message** must be assigned to one of AUX Input ports.

Configuration using KPG-D1/ D1N

- Configuring **AUX Input Status Message** (See Transceiver Settings > DMR > DMR Information > Conventional > AUX Input Status Message)
- Assigning functions to the AUX Input port (See Transceiver Settings > Extended Function > AUX)

AUX Output Status Message (Mobile Only)

Supported Models: Mobile

AUX Output Status Message is the function to switch the status of the AUX Output port from high to low or from low to high when the transceiver receives the specified Status Message. This function can be used to remotely turn the external device on or off.

To use this function, **AUX Output Status Message** must be assigned to one of AUX Output ports.

Configuration using KPG-D1/ D1N

- Configuring **AUX Output Status Message** (See Transceiver Settings > DMR > DMR Information > Conventional > AUX Output Status Message)
- Assigning functions to the AUX Output port (See Transceiver Settings > Extended Function > AUX)

Storing the Selected or Sent Status (Status Hold)

Status Hold is the function to store in the transceiver the status selected from the Status List in Status Mode and the transmitted status.

When the transceiver receives a status request message, the status stored in the transceiver will automatically be transmitted. Also, the status stored in the transceiver will automatically be stored in GPS data and transmitted.

Table 1-14 Status Hold

Configuration	Description
Selected	The transceiver stores the status selected from the Status List in Status Mode.
Selected + Transmit	The transceiver stores a status selected from the Status List in Status Mode and a status transmitted by one of the following method. • The status transmitted when one of the AUX Input Status Message 1 to AUX Input Status Message 3 ports change (Mobile only) • The status transmitted when the transceiver is turned on (Power-on Status) • The status transmitted by pressing any of the **PF** keys having “Call 1” to “Call 6” allocated • The status transmitted when any of the AUX Input ports having “Call 1” to “Call 6” allocated becomes active (Mobile only) • The status transmitted by using a PC command

Configuration using KPG-D1/ D1N

Configuring **Status Hold** (See Transceiver Settings > DMR > DMR Information > General)

1.11 Sending and Receiving a Short Message (Short Data Call)

Short Data Call is the message communication function to send and receive a text string. Information which is difficult to send by voice, such as an address or a telephone number, can be reliably sent.

The number of characters that can be sent and received is as follows:

- **The number of characters that can be sent**

  During communication via Group Call excluding Individual Call: up to 365 characters

  During communication via Individual Call: up to 489 characters

- **The number of characters that can be received**

  During communication via Group Call excluding Individual Call: up to 369 characters

  During communication via Individual Call: up to 493 characters

DMR Message Communication Configuration (DMR Message Type)

When “KENWOOD-defined Data” is configured for **DMR Message Type**, the transceiver carries out communication of mutually-compatible messages with transceivers that support KENWOOD’s DMR Protocol. It is also compatible with the original communication standards of Hytera.

When “DMR Standard” is configured for **DMR Message Type**, the transceiver carries out communication in accordance with the DMR standard. Communication of mutually-compatible messages can be carried out with the transceiver of a different manufacturer that supports the configuration of the DMR standard.

Short Message in both the KENWOOD-defined Data and DMR Standard configuration can be received regardless of the configuration of **DMR Message Type**.

Configuration using KPG-D1/ D1N

Configuring **DMR Message Type** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)

Sending a Short Message

The transceiver sends a Short Message by one of the following operations.

● Short Message Mode

The transceiver enters Short Message Mode and sends a Short Message by one of the following operations.

- **Short Message, Individual + Short Message, or Group + Short Message key**

  Pressing the **Short Message** key places the transceiver in Short Message Mode. In this case, a Short Message is addressed to a Base ID.

  Pressing the **Individual + Short Message** key places the transceiver in Individual Call Mode. Pressing the **[▶]** key after selecting the Unit ID of the target transceiver causes Short Message Mode to be entered.

  Pressing the **Group + Short Message** key places the transceiver in Group Call Mode. Pressing the **[▶]** key after selecting the Group ID of the target transceiver causes Short Message Mode to be entered.

- **Menu key**

  The transceiver enters Short Message Mode when the **Menu** key is pressed to enter Menu Mode and then “Short Message” is selected. In this case, a Short Message is addressed to a Base ID.

  The transceiver enters Individual Call Mode when the **Menu** key is pressed to enter Menu Mode and then “Individual + Short Message” is selected. Pressing the **[▶]** key after selecting the Unit ID of the target transceiver causes Short Message Mode to be entered.

  The transceiver enters Group Call Mode when the **Menu** key is pressed to enter Menu Mode and then “Group + Short Message” is selected. Pressing the **[▶]** key after selecting the Group ID of the target transceiver causes Short Message Mode to be entered.

  Refer to Common FUNC “Using Menu Mode” for operations in Menu Mode.

- **Keypad entry**

  If “Short Message” is configured for **Keypad Operation**, pressing the **[0]** to **[9]** keys on the transceiver keypad causes the transceiver to enter Short Message Mode. The transceiver will be on hold as the first digit of the Short Message is entered. In this case, a Short Message is addressed to a Base ID.

  If “Individual + Short Message” is configured in **Keypad Operation**, pressing the **[0]** to **[9]** keys on the keypad places the transceiver in Individual Call Mode. Pressing the **[▶]** key after selecting the Unit ID of the target transceiver causes Short Message Mode to be entered.

  If “Group + Short Message” is configured in **Keypad Operation**, pressing the **[0]** to **[9]** keys on the keypad places the transceiver in Group Call Mode. Pressing the **[▶]** key after selecting the Group ID of the target transceiver causes Short Message Mode to be entered.

- **PC command**

  The transceiver will send a Short Message when a PC sends a command to the transceiver communication port specifying to send a Short Message. To use a PC command, “Data” or “Data + GPS Data Output” needs to be assigned to the communication port of the transceiver. (Refer to Common FUNC Available Functions for COM Port.)

This section describes how to send a Short Message in Short Message Mode.

Note

For operating in Individual Call Mode or Group Call Mode, refer to the information on the various call types of DMR.

Operating the transceiver

1 Select one of the following operations to place the transceiver in Short Message Mode.

- Press the **Short Message** key.

  The transceiver enters Short Message Mode. In this case, a Short Message is addressed to a Base ID.

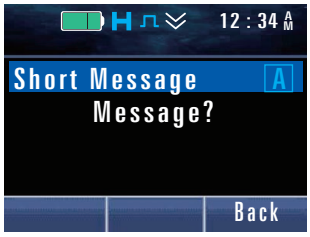
- Press the **Individual + Short Message** key.

  Pressing the **[▶]** key after selecting the Unit ID of the target transceiver causes Short Message Mode to be entered.

- Press the **Group + Short Message** key.

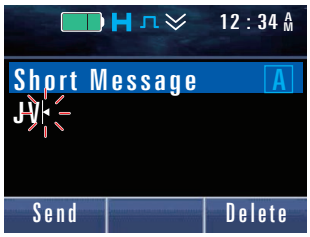
  Pressing the **[▶]** button after selecting the Group ID of the target transceiver causes Short Message Mode to be entered.

Or, the transceiver enters Short Message Mode by pressing the **Menu** key or using a keypad. In this case, the following operations are identical.



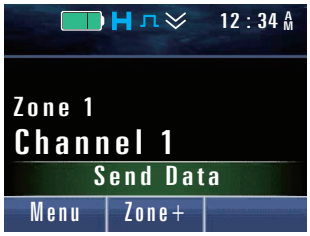
2 Enter a Short Message.

For a Group call, a maximum of 365 characters can be entered, and for an Individual Call, a maximum of 489 characters can be entered. Refer to Common FUNC “Entering or Deleting Characters” for the entry method.



3 **Press the PTT switch or the Menu ([ ]) key.**

The transceiver sends the Short Message.



"Complete" appears if the Short Message is properly sent to the target transceiver.

Note

- The entry screen for message closes at the same time as pressing the **PTT** switch or **Menu** ([ ]) key. If entering a message and sending a Short Data Call again, reexecute the operations from step 1.
- "No Reply" appears on the display and transmission of a Short Message is terminated if no response is received from the target transceiver. If transmission fails because of busy status, "Busy" appears on the display and transmission of a Short Message is terminated.

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Assigning functions to the **Keypad Operation** of the transceiver (See Transceiver Settings > Key Assignment > General > Primary/ Secondary)
- Configuring **Base ID Type** and **Base ID** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)

Receiving a Short Message

Upon receiving a Short Message, the received Status Message appears on the display, and the transceiver can send the Short Message to an external device from the communication ports.

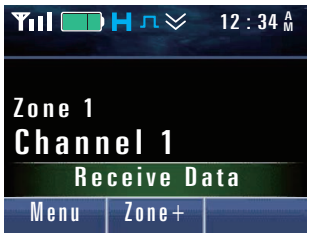
Note

- To use serial communications, a user needs to prepare DMR compatible software or external devices.
- A received Short Message can be left as a record. The record can be checked in Stack Mode. (Refer to Common FUNC Viewing the Receive History (Stack).)

Transceiver behavior

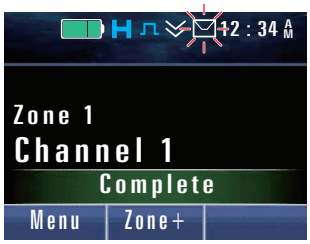
1 **The transceiver starts receiving a Short Message.**

"Receive Data" appears.

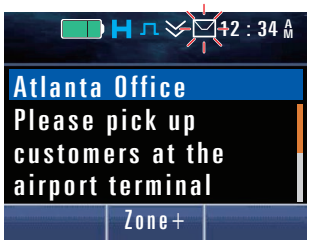


2 **The transceiver receives a Short Message.**

The " " icon blinks and "Complete" appears.



The initial portion (three lines) of the ID Name and Short Message of the transmitting transceiver appears for three seconds. Then, the display is scrolled line by line every two seconds until the last line is shown. After the last line is shown, the display scroll is repeated from the first line.



Note

- If the transceiver receives a Short Message by a Group Call, the ID Name appears according to the configuration for **Unit ID Display on Group Call**. (Refer to Display When the Transceiver Receives a Group Call (Unit ID Display on Group Call).)
- If **Alert Tone (Status/Short Message Call)** is configured to sound when receiving, an Alert Tone will sound. Pressing any key on the transceiver stops the Alert Tone.

Configuration using KPG-D1/ D1N

Configuring **Alert Tone (Status/Short Message Call)** (See Transceiver Settings > DMR > DMR Information > Conventional)

Short Message Stack

Short Message Stack is used to store a Short Message in the stack memory. A maximum of 128 Short Messages can be stored in the stack memory.

If a message is stored in the transceiver, the " " icon blinks as notification. In this case, a user can read the stored Short Message when the transceiver enters Stack Mode. (Refer to Common FUNC Viewing the Receive History (Stack).)

Note

The maximum number of Short Message data that can be stored in the transceiver stack memory varies as follows depending on the configuration of **Short Message Stack** in each communication protocol.

Table 1-15 No. of Short Message Data that Can be Saved

Short Message Stack Configuration				No. of Data that Can be Saved
FleetSync	NXDN	P25	DMR	
Disabled	Disabled	Disabled	Disabled	0
Enabled	Disabled	Disabled	Disabled	128
Disabled	Enabled	Disabled	Disabled	128
Enabled	Enabled	Disabled	Disabled	128
Disabled	Disabled	Enabled	Disabled	64
Enabled	Disabled	Enabled	Disabled	64
Disabled	Enabled	Enabled	Disabled	64
Enabled	Enabled	Enabled	Disabled	64
Disabled	Disabled	Disabled	Enabled	32
Enabled	Disabled	Disabled	Enabled	32
Disabled	Enabled	Disabled	Enabled	32
Enabled	Enabled	Disabled	Enabled	32
Disabled	Disabled	Enabled	Enabled	32
Enabled	Disabled	Enabled	Enabled	32

Configuration using KPG-D1/ D1N

Configuring **Short Message Stack** (See Transceiver Settings > DMR > DMR Information > General > Stack)

Short Message on Data Zone-Channel

Short Message on Data Zone-Channel is the function that allows the transceiver to automatically change the channel to the Data Zone-Channel to send a Short Message in a DMR Conventional system.

The transceiver automatically changes the channel to the channel in a DMR Conventional system configured in **Data Zone-Channel (DMR)** to send a Short Message. When the transmission ends, the transceiver restores the Zone-channel that was used before sending the Short Message. **Short Message on Data Zone-Channel** can be used to send data using a specific dedicated channel.

Note

This function is enabled if "Channel Table" is configured in **Zone-channel Format** by using KPG-D1/ D1N.

Configuration using KPG-D1/ D1N

- Configuring **Short Message on Data Zone-Channel** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)
- Configuring **Data Zone-Channel (DMR)** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)

Short Message on Data System-Personality

Short Message on Data System-Personality is the function that allows the transceiver to automatically change the channel to the **Data System-Personality** to send a Short Message in a DMR Conventional system.

The transceiver automatically changes the channel to the channel in a DMR Conventional system configured in **Data System-Personality (DMR)** to send a Short Message. When the transmission ends, the transceiver restores the Zone-channel that was used before sending the Short Message. **Short Message on Data System-Personality** can be used to send data using a specific dedicated channel.

Note

This function is enabled if “Personality” is configured in **Zone-channel Format** by using KPG-D1/ D1N.

Configuration using KPG-D1/ D1N

- Configuring **Short Message on Data System-Personality** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)
- Configuring **Data System-Personality (DMR)** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)

Sending the Received Short Message from the Communication Port (Short Message Serial Output)

Short Message Serial Output allows the transceiver to send a Short Message and the Unit ID of the transmitting transceiver from the transceiver’s communication port when the transceiver receives a Short Message.

Using **Short Message Serial Output**, the dispatcher can monitor received Short Messages in real time.

Note

To use **Short Message Serial Output**, the “Data” or “Data + GPS Data Output” must be assigned to the communication port of the transceiver.

Configuration using KPG-D1/ D1N

- Configuring **Short Message Serial Output** to be enabled or disabled (See Transceiver Settings > DMR > DMR Information > General > Serial Output)
- Assigning functions to **COM port** (See Transceiver Settings > Optional Features > Optional Features 1 > Serial Interface > COM Port)

1.12 Causing Transceivers Other than the Transceiver of the Specified ID to Participate in a Conversation (Open Voice Channel Mode)

Open Voice Channel Mode (OVCM) is the function to hear a conversation even if the received ID does not match when the transceiver receives various voice calls (Individual Call, Group Call, Broadcast Call).

When the use of OVCM is permitted for the transceiver receiving the various voice calls, the transceiver can hear the conversations even if the received ID does not match.

This function is used for transceivers other than the transceiver of the Specified ID to participate in a conversation.

To use this function, **Open Voice Channel Mode** must be enabled by using KPG-D1/ D1N. Also, to send out a signal that is applied with OVCM, press the **OVCM** key to enable **Open Voice Channel Mode**.

Or, calls by OVCM can be enabled if “OVCM” is selected from Menu Mode. (Refer to Common FUNC Using Menu Mode.)

The “ ” icon blinks on the transceiver display when OVCM is enabled.

Table 1-16 Open Voice Channel Mode

Configuration	Description
Enabled	**Transmit Operation:** By pressing the **OVCM** key, or by selecting “OVCM” from Menu Mode, calls by OVCM can be enabled or disabled. The transceiver can transmit a signal with OVCM applied while calls by OVCM are in the enabled status. **Receive Operation:** Conversations can be heard even if the ID does not match when the transceiver receives a call with OVCM applied.
Disabled	**Transmit Operation:** Calls by OVCM cannot be enabled nor disabled even if the **OVCM** key is pressed or “OVCM” is selected from Menu Mode. Therefore, the transceiver cannot transmit a signal with OVCM applied. **Receive Operation:** Conversations cannot be heard if the ID does not match even when the transceiver receives a call with OVCM applied.

For example, Transceiver A specifies the ID of Transceiver B, and initiates a call with OVCM applied (refer to the figure below).

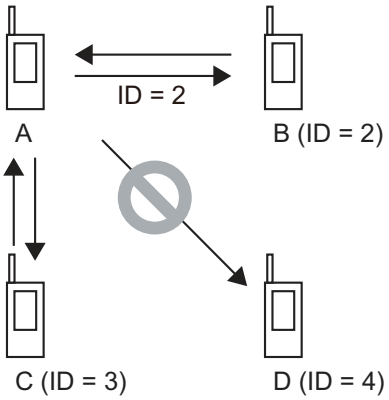


Figure 1-6 Operation Examples

Table 1-17 Configuration Examples

Transceivers	Open Voice Channel Mode	Call by OVCM
A	Enabled	Enabled
B	Disabled	Disabled
C	Enabled	Disabled
D	Disabled	Disabled

- Because the ID matches, Transceiver B can communicate with Transceiver A even if **Open Voice Channel Mode** is disabled.
- Because **Open Voice Channel Mode** is enabled, Transceiver C can communicate with Transceiver A even if the ID does not match.
- Because **Open Voice Channel Mode** is disabled and the ID does not match, Transceiver D cannot communicate with Transceiver A.

Also, even if calls by OVCM are disabled, Transceiver B or C receiving a call with OVCM applied transmits a signal with OVCM applied when replying.

Note

- If the transceiver is turned off and turned back on while calls by OVCM are enabled, calls by OVCM are disabled.
- OVCM does not function for the transmission of an Unaddressed Call or All Group Call.
- OVCM does not function while the transceiver is in Emergency Mode.
- Calls transmitted by OVCM are not stored in the stack memory of the transceiver.
- Even when the Unit ID is configured in the Individual ID List, the list number of the Individual ID List will be displayed on the screen when an Individual Call that is applied with OVCM is received if the ID name is not configured. If the Unit ID is not configured in the Individual ID List, the received Unit ID is displayed.

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Configuring **Open Voice Channel Mode** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)

1.13 Calling All Transceivers Having the Same Color Code (Unaddressed Call)

Unaddressed Call is the function to initiate 2-way voice communication with multiple transceivers without specifying a group.

In a regular Group Call, the transceiver can communicate only with transceivers included in the Group ID specified. Unaddressed Call can initiate a call to all transceivers having the same Color Code on the same channel.

Using this function, such as during an emergency, the transceiver can initiate a call without distinguishing the group to share information with the users of multiple groups.

To use this function, “Off” needs to be configured in **Selcall on PTT** of the channel to be used for an Unaddressed Call by using KPG-D1/ D1N.

Note

- The transceiver can send the ID of the transmitting transceiver from the communication port on the transceiver when receiving an Unaddressed Call. (Refer to Sending the Received Unit ID from the Communication Port (Unit ID Serial Output).)
- An Unaddressed Call can also be initiated by receiving a PC command from the communication port. To use a PC command, “Data” or “Data + GPS Data Output” needs to be assigned to the communication port of the transceiver. (Refer to Common FUNC Available Functions for COM Port.)

Configuration using KPG-D1/ D1N

- Configuring **Color Code** (Personality) (See Transceiver Settings > Personal > Personality > DMR Conventional > DMR)
- Configuring **Color Code** (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > DMR)
- Configuring **Selcall on PTT** (Personality) (See Transceiver Settings > Personal > Personality > DMR Conventional > DMR > Selcall on PTT)
- Configuring **Selcall on PTT** (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > DMR > Selcall on PTT)

1.14 Terminating Voice Communications by a Transceiver Other Than the Transmitting Transceiver (Call Interruption)

Call Interruption is the function to enable a transceiver other than the transmitting transceiver to terminate voice communications by sending and receiving the Call Interruption request message. A transceiver receiving the Call Interruption request message on the channel where the transceiver is performing voice communication terminates voice communication.

By pressing the **Call Interruption** key, a Call Interruption request message can be sent.

Also, a Call Interruption request message can be sent by the following functions:

- **In-call Busy Channel Lockout (Interrupt CALL)**

  The current incoming call can be interrupted by pressing the **PTT** switch to respond (Talkback) while receiving an Individual Call or Group Call addressed to the own transceiver on the channel where “Interrupt CALL” is configured for **In-call Busy Channel Lockout**.

- **Interrupt ALL CALL**

  Call Interruption is executed and voice communication can be terminated when an All Call is initiated during voice communication (including voice communication not addressed to the own transceiver) on the selected channel.

- **Interrupt Message CALL**

  Call Interruption is executed and voice communication can be terminated when transmission of a message is initiated during voice communication (including voice communication not addressed to the own station) on the selected channel.

- **Interrupt Emergency CALL**

  When the transceiver enters Emergency Mode, **Call Interruption** is executed and voice communication can be terminated if voice communication (including voice communication not addressed to the own station) is performed on the channel used for Emergency Mode.

To send a Call Interruption request message using these functions, **Encode (Call Interruption)** of the channel used needs to be enabled. To receive a Call Interruption request message, **Decode (Call Interruption)** of the channel used also needs to be enabled.

Note

- In DMR Direct Mode, Call Interruption does not function if the received Color Code does not match the Color Code configured in the transceiver, or if the slot number does not match. (Refer to Communicating Without Using a Repeater (Talk Around/ DMR Direct Mode), About the Slot Numbers (Slot Selection).)
- In Repeater Mode, Call Interruption does not function if the received Color Code does not match the Color Code configured in the transceiver. (Refer to Communicating via a Repeater (Repeater Mode).)
- When a signal encrypted in the AES/ DES, DES (Built-in DES) or Enhanced Encryption format is received, Call Interruption is not activated regardless of the matching status of Color Code and slot number. When a signal that is encrypted by means of bit scrambling, Call Interruption is activated according to the matching or non-matching status of Color Code and slot number. (Refer to COMMUNICATION SECURITY.)
- A Call Interruption request message can also be transmitted by receiving a PC command from the communication port. To use a PC command, “Data” or “Data + GPS Data Output” needs to be assigned to the communication port of the transceiver. (Refer to Common FUNC Available Functions for COM Port.)

Sending a Call Interruption Request Message

To receive a Call Interruption request message, **Encode (Call Interruption)** of the channel used also needs to be enabled.

Operating the transceiver

- **Transmission using the Call Interruption key**

1 **Press the Call Interruption key during voice communication.**

Key Beep A (1 beep) sounds from the transceiver, and “Interrupt” appears on the display. A Call Interruption request message is sent to all IDs.

Note

- When the **Call Interruption** key is pressed while receiving a signal encrypted in the AES/ DES, DES (Built-in DES) or Enhanced Encryption format, Call Fail Tone (2 beeps) is emitted from the transceiver and “Fail” appears on the display for 1 second. A Call Interruption request message is not sent in this case.
- When the **Interruption** key is pressed and “Interrupt” appears on the display, transmission of the Call Interruption request message can be canceled by pressing the **Clear** key.

2 **Transmission of Call Interruption request message is complete.**

When there is no more signal, Transaction Confirmed Tone (2 beeps) is emitted from the transceiver, and voice communication ends after “Complete” appears on the display for 1 second.

Note

If the signal persists even after transmission of the Call Interruption request message is complete, Call Fail Tone (2 beeps) is emitted from the transceiver and “Fail” appears on the display for 1 second.

● Transmission using the In-call Busy Channel Lockout (Interrupt CALL) function

The **In-call Busy Channel Lockout (Interrupt CALL)** function can be used to send a Call Interruption request message before a voice call starts to end voice communication. “Interrupt CALL” needs to be configured in **In-call Busy Channel Lockout** of the channel in use. (Refer to Avoiding Interference with Other Communications (Busy Channel Lockout (DMR)).)

1 Press the PTT switch during voice communication to respond (Talkback).

“Interrupt” appears on the display, and a Call Interruption request message is sent to all IDs.

Note

When the **PTT** switch is pressed and a response (Talkback) is sent while receiving a signal encrypted in the AES/ DES, DES (Built-in DES) or Enhanced Encryption format, Call Fail Tone (2 beeps) is emitted from the transceiver and “Fail” appears on the display for 1 second. A Call Interruption request message is not sent in this case.

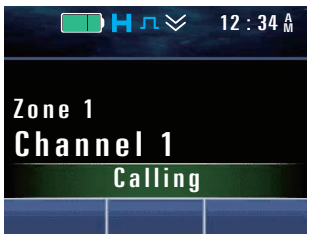
The same applies during transmission via an Interrupt Emergency Call and Interrupt ALL Call. However, “Fail” does not appear on the display for Interrupt Emergency Call and Interrupt ALL Call.

2 Transmission of Call Interruption request message is complete.

When there is no more signal, “Complete” appears on the display for 1 second and voice communication ends.

If the **PTT** switch remains depressed, this will be followed by an outgoing call.

When **Individual Call Acknowledge Request** is enabled, “Calling” appears on the display when there is no more signal, and a request message for confirmation of receipt is sent. (Refer to Initiating an Individual Call After Ensuring That the Target Party Is Available for Communications (Individual Call Acknowledge Request).)



Note

If the signal persists even after transmission of the Call Interruption request message is complete, Call Fail Tone (2 beeps) is emitted from the transceiver and “Fail” appears on the display for 1 second.

● Transmission using the Interrupt Message Call function

The Interrupt Message Call function can be used to send a Call Interruption request message before sending a message to end voice communication.

1 Send a message during voice communication.

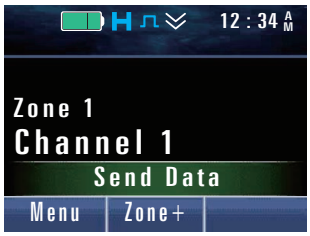
"Interrupt" appears on the display, and a Call Interruption request message is sent to all IDs.

Note

When message sending operation is performed while receiving a signal encrypted in the AES/ DES, DES (Built-in DES) or Enhanced Encryption format, Busy Tone 2 (3 beeps) is emitted from the transceiver and "Busy" appears on the display for 1 second. A Call Interruption request message is not sent in this case.

2 Transmission of Call Interruption request message is complete.

When there is no more signal, "Send Data" appears on the display and the message is sent.



Note

If the signal persists even after transmission of the Call Interruption request message is complete, Busy Tone 2 (3 beeps) is emitted from the transceiver and "Busy" appears on the display for 1 second.

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Configuring **Encode (Call Interruption)** to be enabled or disabled (Personality) (See Transceiver Settings > Personal > Personality > DMR Conventional > DMR > Call Interruption)
- Configuring **Encode (Call Interruption)** to be enabled or disabled (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > DMR > Call Interruption)
- Configuring **In-call Busy Channel Lockout** (Personality) (See Transceiver Settings > Personal > Personality > DMR Conventional > DMR)
- Configuring **In-call Busy Channel Lockout** (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > DMR)
- Configuring **Interrupt ALL CALL** to be enabled or disabled (See Transceiver Settings > DMR > DMR Information > General)
- Configuring **Interrupt Message CALL** to be enabled or disabled (See Transceiver Settings > DMR > DMR Information > General)
- Configuring **Interrupt Emergency CALL** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > DMR Conventional > Emergency)

Receiving a Call Interruption Request Message

To receive a Call Interruption request message, **Decode (Call Interruption)** of the channel used also needs to be enabled.

Transceiver behavior

1 **Receive a Call Interruption Request Message while voice communication is in progress.**

Voice communication ends.

During the interval while the **PTT** switch is depressed, Key Beep A (1 beep) is emitted from the transceiver and “Interrupted” appears on the display.

Configuration using KPG-D1/ D1N

- Configuring **Decode (Call Interruption)** to be enabled or disabled(Personality) (See Transceiver Settings > Personal > Personality > DMR Conventional > DMR > Call Interruption)
- Configuring **Decode (Call Interruption)** to be enabled or disabled (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > DMR > Call Interruption)

1.15 Sending GPS Data

Global Positioning System (GPS) is the system to acquire the current location information of the own transceiver by receiving signals from the Global Positioning System satellites orbiting the earth.

The transceiver of the mobile station can send the acquired own location information (GPS data) to the base station. The base station can send received GPS data to the PC as serial commands.

A GPS receiver unit compatible with the NMEA-0183 standard is required for the communication port of the mobile station transceiver to send GPS data. The transceiver has a built-in GPS receiver unit. The optional GPS receiver unit also can be connected with the transceiver.

Note

- To use the built-in GPS receiver unit, **Built-in GPS Receiver/Bluetooth** must be enabled when configuring data by using KPG-D1/ D1N. In this case, the configuration for the communication port is not required.
- To use the optional GPS receiver unit, “GPS” must be assigned to the communication port connected to the GPS receiver unit. For Portable, a GPS microphone (KMC-47GPS/ KMC-47GPSD) is usable. For Mobile, an optional third-party GPS receiver unit is usable.

Transmission Method of GPS Data

The following are the methods to send GPS data:

- **Automatic GPS data transmission**

  →Sending GPS Data Automatically at Certain Intervals (GPS Report Mode))

  →Sending GPS Data According to the Request from the Base Station (GPS Report Mode))

- **Manual GPS data transmission**

  →Sending GPS Data Manually by Using a Key (Send the GPS Data))

- **GPS data transmission linked with travel distance**

  →Sending GPS Data Based On Travel Distance (GPS Distance Change))

The ID of the Target Transceiver (GPS Base ID)

GPS Base ID is the ID of the target transceiver used for sending GPS data.

By using KPG-D1/ D1N, either Unit ID or Group ID can be configured as **GPS Base ID**. The ID of the base station which is responsible for operation and administration of system is normally configured.

Note

If **GPS Base ID** is not configured, GPS data is sent to the **Base ID** to which data such as a Status Message and Short Message is to be sent. (Refer to Base ID.)

Configuration using KPG-D1/ D1N

Configuring **GPS Base ID Type** and **GPS Base ID** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > GPS > DMR)

Sending GPS Data Automatically at Certain Intervals (GPS Report Mode)

GPS data can be sent automatically at the intervals configured in **GPS Report Interval Time**.

This function is used for controlling or monitoring vehicles on a time basis by periodically sending location information to the base station.

To use this function, “Auto” must be configured for **GPS Report Mode** by using KPG-D1/ D1N.

Note

- The transceiver sends the GPS data upon receipt of the GPS data transmission request from the base station even if “Auto” is configured for **GPS Report Mode**.
- If the transceiver is under the following conditions, the automatic transmission of GPS data at certain intervals will be canceled. The transceiver suspends transmission for the period of time configured for **Transmit Busy Wait Time**, to avoid collisions with GPS data transmissions by other transceivers. A transmission is canceled when the channel is busy and the **Transmit Busy Wait Time** elapses. (Refer to Transmit Busy Wait Time.)
  - While the transceiver is transmitting
  - While the transceiver is in busy state
  - While the transceiver unmutes the speaker
  - While the **Public Address** function is used (Mobile only)
  - If the transmit frequency is not configured
  - While transmission is disabled by the **Time-out Timer**
  - While the transceiver is sending or receiving the DMR data
  - Transceiver Password Mode
  - Emergency Mode

Configuration using KPG-D1/ D1N

Configuring **GPS Report Mode** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > GPS)

Sending GPS Data According to the Request from the Base Station (GPS Report Mode)

GPS Report Mode allows the transceiver to automatically send GPS data when a GPS data transmission request is received from the base station.

This function is used when the base station controls the timing to require GPS data. This function is also used to avoid a data collision if there are many transceivers.

To use this function, “Poll” must be configured for GPS Report Mode by using KPG-D1/ D1N.

Note

The transceiver sends GPS data to the ID configured for **GPS Base ID** or **Base ID**, not to the ID that sent the data transmission request. However, if **GPS Report Back to Requested ID** is enabled, GPS data is sent to the ID that sent the data transmission request. (Refer to GPS Report Back to Requested ID.)

Configuration using KPG-D1/ D1N

Configuring **GPS Report Mode** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > GPS)

Sending GPS Data Manually by Using a Key (Send the GPS Data)

GPS data can be sent manually by a user pressing the **Send the GPS Data** key. Or, pressing the **Menu** key causes the transceiver to enter Menu Mode, and then the GPS data can be sent manually by selecting the “Send the GPS Data”. (Refer to Common FUNC Using Menu Mode.)

Configuration using KPG-D1/ D1N

Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)

Sending GPS Data Based On Travel Distance (GPS Distance Change)

GPS Distance Change allows the transceiver to send GPS data when the distance between the location of the previous GPS data transmission and the current location exceeds the value configured in Distance Value.

The transceiver calculates the distance between the position where the GPS data was sent and the current position at regular time intervals (3 sec) after the transceiver automatically or manually sent GPS data. The GPS data is sent if the calculated distance exceeds the value configured for **Distance Value**. If no GPS data is sent after the transceiver is turned on, the transceiver regards the location information first received from the GPS unit as the previous transmission position and calculates the distance to the current position. The distance is calculated from the latitudinal and longitudinal values.

Configuration using KPG-D1/ D1N

- Configuring **GPS Distance Change** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > DMR Conventional > GPS > GPS Distance Change)
- Configuring **Distance Value** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > GPS > GPS Distance Change)

Selecting the Transmission Method of GPS Data (GPS Report Channel)

GPS Report Channel is the function to lock analog mode or DMR mode for the transmission method of GPS data regardless of the mode used for voice communications when the transceiver automatically sends GPS data (including Polling) by using the **GPS Report on Data Zone-Channel** or **GPS Report on Data System-Personality** function.

The transceiver behaves as follows according to the configuration in **GPS Report Channel**.

Table 1-18 GPS Report Channel

Configuration	Description
Selected	If “Analog” is configured in **Transmit Mode** of the selected channel, GPS data is automatically sent by **Data Zone-Channel (Analog)** or **Data System-Personality (Analog)**. If “DMR” is configured in **Transmit Mode** of the selected channel, GPS data is automatically sent by **Data Zone-Channel (DMR)** or **Data System-Personality (DMR)**.
Analog	GPS data is automatically sent by **Data Zone-Channel (Analog)** or **Data System-Personality (Analog)** regardless of the configuration in **Transmit Mode** of the selected channel.
DMR	GPS data is automatically sent by **Data Zone-Channel (DMR)** or **Data System-Personality (DMR)** regardless of the configuration in **Transmit Mode** of the selected channel.

Note

- This function is not applicable to GPS data sent by pressing the **Send the GPS Data** key.
- If anything other than “Selected” is configured in **GPS Report Channel**, **GPS Report Back to Requested ID** becomes disabled.
- In an LTR Trunking system, analog mode or DMR mode cannot be locked for the transmission method of GPS data. In an LTR Trunking system, the transceiver always behaves by the configuration of “Selected”.
- Even if “Analog” or “DMR” is configured in **GPS Report Channel**, the transceiver behaves by the configuration of “Selected” for the first transmission when the transceiver receives a Polling request and sends GPS data. If the transceiver is to subsequently continue GPS data transmission, **GPS Report Channel** is enabled for automatic transmission, and the transceiver behaves by the configuration of “Analog” or “DMR”.

Configuration using KPG-D1/ D1N

- Configuring **GPS Report on Data Zone-Channel** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > DMR Conventional > GPS)
- Configuring **Data Zone-Channel (DMR)** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)
- Configuring **GPS Report on Data System-Personality** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > GPS)
- Configuring **Data System-Personality (DMR)** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)
- Configuring **GPS Report Channel** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > GPS)

1.16 GPS Functions

The following functions are relevant to GPS data transmission:

- Number of Times
- GPS Report Interval Time
- GPS Time Mark
- GPS Message Type
- GPS Report on Data Zone-Channel
- GPS Report on Data System-Personality
- GPS Report Back to Requested ID
- GPS Data Storage

Number of Times

Number of Times allows the transceiver to automatically send GPS data for the configured number of times if “Poll” is configured for **GPS Report Mode**.

The transceiver sends GPS data for the number of times configured for **Number of Times** at the intervals configured for **GPS Report Interval Time**.

Configuration using KPG-D1/ D1N

Configuring **Number of Times** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > GPS)

GPS Report Interval Time

GPS Report Interval Time allows the transceiver to send GPS data at the configured intervals if “Auto” is configured for **GPS Report Mode**.

GPS Report Interval Time (Portable/Ignition On)

GPS Report Interval (Portable/Ignition On) is the interval to send the GPS data while the vehicle’s engine is running. Also, in order to automatically send GPS data with Portable, this configuration is used.

GPS Report Interval Time (Ignition Off) (Mobile only)

GPS Report Interval (Ignition Off) is the interval to send GPS data while the vehicle is parked. Also, if the Ignition Sense function is not used (nothing is entered in the Ignition Sense port), GPS data is sent according to the configuration in **Ignition Off**. (Refer to Common FUNC Turning the Transceiver ON or OFF According to the State of the Ignition Sense Port (Ignition Sense).)

Note

GPS Report Interval Time is used to configure the trigger cycle to start sending GPS data. The timing at which the receiving transceiver completes receiving GPS data may vary depending on the transmit conditions at the transmitting transceiver.

Configuration using KPG-D1/ D1N

Configuring **GPS Report Interval Time** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > GPS > GPS Report Interval Time)

GPS Time Mark

GPS Time Mark is the offset time from UTC (Coordinated Universal Time) to send GPS data.

This function is useful for avoiding a data collision if there are many transceivers that send GPS data.

Configuring a different timing for each transceiver allows each transceiver to send GPS data with different timing. Using this function can avoid a data collision.

Configuration using KPG-D1/ D1N

Configuring **GPS Time Mark** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > GPS)

GPS Message Type

GPS Message Type allows the transceiver to change the length of the message to send GPS data.

Table 1-19 GPS Message Type

Configuration	Behavior
Full	The message to be sent is the GPS data corresponding to $GPGGA, $GPRMC and $GPGLL.
Short	The message to be sent is the GPS data corresponding to $GPGLL. When the base station receives this GPS data, a part of the data is sent as blank data even if $GPGGA and $GPRMC are configured for PC serial output at **Base Station Setting**.

Configuration using KPG-D1/ D1N

Configuring **GPS Message Type** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > GPS)

GPS Report on Data Zone-Channel

GPS Report on Data Zone-Channel is the function that allows the transceiver to automatically change the channel to the Data Zone-Channel to send GPS data in a DMR Conventional system.

The transceiver automatically changes the channel to the channel of a DMR Conventional system configured in **Data Zone-Channel (DMR)** when sending GPS data. When the transmission ends, the transceiver restores the Zone-channel which was used before sending GPS data. **GPS Report on Data Zone-Channel** can be used to send data by using a specific dedicated channel.

Note

This function is enabled if “Channel Table” is configured in Zone-channel Format by using KPG-D1/ D1N.

Configuration using KPG-D1/ D1N

- Configuring **GPS Report on Data Zone-Channel** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > DMR Conventional > GPS)
- Configuring **Data Zone-Channel (DMR)** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)

GPS Report on Data System-Personality

GPS Report on Data System-Personality is the function that allows the transceiver to automatically change the channel to the Data System-Personality to send GPS data in a DMR Conventional system.

The transceiver automatically changes the channel to the channel of a DMR Conventional system configured in **Data System-Personality (DMR)** when sending GPS data. When the transmission ends, the transceiver restores the Zone-channel which was used before sending GPS data. **GPS Report on Data System-Personality** can be used to send data by using a specific dedicated channel.

Note

This function is enabled if “Personality” is configured in **Zone-channel Format** by using KPG-D1/ D1N.

Configuration using KPG-D1/ D1N

- Configuring **GPS Report on Data System-Personality** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > GPS)
- Configuring **Data System-Personality (DMR)** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)

GPS Report Back to Requested ID

GPS Report Back to Requested ID is the function that enables the receiving transceiver to send the GPS data to the ID of the transceiver, which sends a GPS Polling Request, upon receipt of the following GPS Polling Requests:

- GPS Data Single Polling Request
- GPS Data Multiple Polling Request

When the above-mentioned GPS Polling Request is received, the GPS data is sent to the ID of the transceiver which sends the GPS Polling Request, if this function is enabled.

If this function is disabled, the GPS data is sent to the ID configured with **GPS Base ID** or **Base ID** even when the above-mentioned **GPS Polling Request** is received.

Configuration using KPG-D1/ D1N

Configuring **GPS Report Back to Requested ID** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > DMR Conventional > GPS)

GPS Data Storage

GPS Data Storage is the function that allows GPS data to be saved in both the internal memory and microSDHC card.

The transceiver stores the GPS data at the intervals configured for **GPS Storage Interval** . The stored GPS data can be sent from the transceiver or can be read using a PC. (Refer to Common FUNC Storing the GPS Data (GPS Data Storage).)

Acquired GPS data is temporarily saved in the RAM in the transceiver. When the number of saved data items reaches 3, the GPS data is written on both the internal memory and microSDHC card. If the transceiver is turned off when the number of GPS data items temporarily saved in the RAM in the transceiver is 1 or 2, the GPS data is erased without being written on the internal memory and microSDHC card.

The internal memory allows a maximum of 3,500 GPS data items to be written.

The microSDHC card allows GPS data acquired for up to 250 days or GPS data which do not exceed the capacity of the card to be written.

Note

GPS data is written in the output format configured in **GPS Data Record Format**. If no output format is configured, GPS data is not written. (Refer to Common FUNC About microSD Card.)

Configuration using KPG-D1/ D1N

- Configuring **GPS Data Storage** to be enabled or disabled (See Transceiver Settings > Optional Features > Optional Features 2 > microSD/Memory > GPS Data)
- Configuring **GPS Storage Interval** to be enabled or disabled (See Transceiver Settings > Optional Features > Optional Features 2 > microSD/Memory > GPS Data)

1.17 Receiving GPS Data

The base station receiving GPS data from the mobile station transceiver can send the GPS data to a PC as serial commands. If a PC installed with a mapping application is connected to the communication port of the base station transceiver, the location information of mobile station transceivers appears on a map on the PC display. This function enables a dispatch control or traffic control system.

Also, if a mobile station transceiver connecting to a GPS receiver unit or having a built-in GPS receiver unit receives location information (GPS data) from a GPS satellite, the current location information of the own transceiver can be displayed on the LCD.

Note

- The GPS data acquired from the GPS satellite can be stored at certain intervals in both the internal memory of the transceiver and a microSDHC card. (Refer to Common FUNC Storing the GPS Data (GPS Data Storage).)
- For a transceiver receiving GPS data, “Data + GPS Data Output” needs to be assigned to the communication port connected to a PC with the mapping application installed. (Refer to Common FUNC Available Functions for COM Port.)

Map Header

Whether to send data to the mapping application when the base station transceiver receives the GPS data from the mobile station transceiver can be configured.

The following are the type of data that can be sent to the mapping application.

Table 1-20 Map Header

Data	Description
$GPGGA (NMEA)	Upon receipt of the GPS data, the base station transceiver extracts the $GPGGA data in the NMEA-0183 format from the received GPS data and sends the extracted data from the communication port.
$GPGLL (NMEA)	Upon receipt of the GPS data, the base station transceiver extracts the $GPGLL data in the NMEA-0183 format from the received GPS data and sends the extracted data from the communication port.
$GPRMC (NMEA)	Upon receipt of the GPS data, the base station transceiver extracts the $GPRMC data in the NMEA-0183 format from the received GPS data and sends the extracted data from the communication port.
$PKNDS (KW)	Upon receipt of the GPS data, the base station transceiver creates the $PKNDS data which is the KENWOOD proprietary sentence from the received GPS data and sends the created data from the communication port. The $PKNDS data contains the $GPRMC data in the NMEA-0183 format, Unit ID, and the status information.
$PKNID (KW)	Upon receipt of the GPS data, the base station transceiver creates the $PKNID data which is the KENWOOD proprietary sentence from the received GPS data and sends the created data from the communication port. The base station transceiver extracts only Unit ID and the status information from the received GPS data and sends the extracted data from the communication port of the repeater. This sentence is recommended to be used along with $GPGGA (NMEA), $GPGLL (NMEA) or $GPRMC (NMEA). For example, if $GPGGA (NMEA) and $PKNID are used simultaneously, the base station transceiver sends from the communication port of the repeater the $GPGGA data in addition to the Unit ID and the status information extracted from the GPS data.
$PKNSH (KW)	Upon receipt of the GPS data, the base station transceiver creates the $PKNSH data which is the KENWOOD proprietary sentence from the received GPS data and sends the created data from the communication port. The $PKNSH data contains the $GPGLL data in the NMEA-0183 format and the Unit ID. In order to send GPS data in Emergency Mode or by pressing the **PTT** switch, this sentence is used.

Configuration using KPG-D1/ D1N

Configuring **Map Header** (See Transceiver Settings > Optional Features > Optional Features 2 > GPS > Base Station Settings)

GPS Position Display

GPS Position Display is the function to display the current location information of the own transceiver on the LCD.

Refer to Common FUNC "USING THE GPS FUNCTION" for details about **GPS Position Display**.

1.18 Remote Operation by Radio Communication (Remote Control)

Remote Control is the function to remotely operate using radio communication the control of an individually specified transceiver.

An individually specified transceiver can be controlled by sending various Remote Control messages and by making the transceiver receive the messages.

Remote Control has the following functions:

Table 1-21 Remote Control Functions

Function	Description
Remote Stun	This is the function to disable the use of an individually specified transceiver (Stun state) by making the transceiver receive a Remote Stun message. If the transceiver receives the Remote Revive message, the Stun state will be reset. (Refer to Disabling the Transceiver Capability by Remote Control (Stun/ Kill).)
Remote Kill	This is the function to inhibit the use of an individually specified transceiver and disable all operations by making the transceiver receive a Remote Kill message. (Refer to Disabling the Transceiver Capability by Remote Control (Stun/ Kill).)
Remote Monitor	This is the function to make an individually specified transceiver transmit continuously by making the transceiver receive a Remote Monitor message. (Refer to Monitoring the Situation Around Another Transceiver by Remote Control (Remote Monitor).)
Radio Check	This is the function to check whether or not an individually specified transceiver is being operated by making the transceiver receive a Radio Check message. (Refer to Checking Whether Another Transceiver Is in Operation (Radio Check).)

An individually specified transceiver can be controlled by sending various Remote Control messages in Remote Control Mode and by making the transceiver receive the messages.

Pressing the **Remote Control** key places the transceiver in Remote Control Mode. Or, pressing the **Menu** key to enter Menu Mode and then selecting "Remote Control" places the transceiver in Remote Control Mode. (Refer to Common FUNC Using Menu Mode.)

Also, various Remote Control messages can be sent by sending a transmission command of the various Remote Control messages from a PC to the transceiver. In this case, "Data" or "Data + GPS Data Output" needs to be assigned to the communication port of the transceiver.

Configuration using KPG-D1/ D1N

Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)

Sending a Remote Control Message in Remote Control Mode

Various Remote Control messages can be sent in Remote Control Mode.

Operating the transceiver

- **Initiating an Individual Call by list selection**

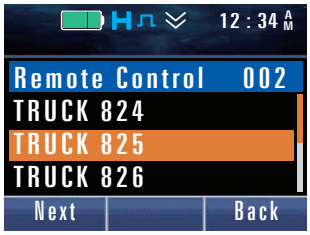
1 **Press the DMR Remote Control key.**

The transceiver enters Remote Control Mode and then the Unit ID selection display will appear.

The following operations are identical even if the transceiver enters Remote Control Mode by pressing the **Menu** key.

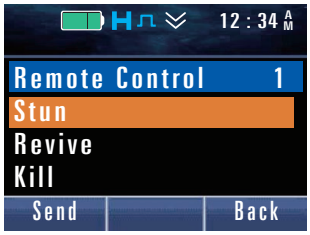
2 **Press the [▲] or [▼] key to select a Unit ID from the Individual ID List.**

Refer to Common FUNC "Selecting or Clearing Data from a List" for selection methods.



3 **Press the Menu ([□]) or [*]key.**

The selection display of the options menu appears.



4 **Press the [▲] or [▼] key to select the Remote Control message to send.**

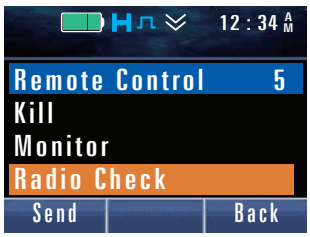
Stun: A Remote Stun message is sent.

Revive: A Remote Revive message is sent.

Kill: A Remote Kill message is sent.

Monitor: A Remote Monitor message is sent.

Radio Check: A Radio Check message is sent.



5 **Press the PTT switch, the Menu ([□]) key, or the [*] key.**

The selected Remote Control message is sent.

● Sending a Remote Control message by using Manual Dialing

To send a Remote Control message by directly entering a Unit ID, Manual Dialing needs to be enabled.

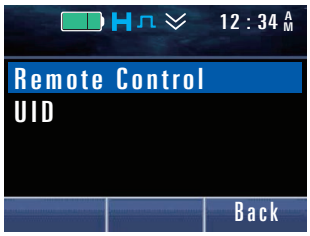
1 Press the DMR Remote Control key.

The transceiver enters Remote Control Mode and then the Unit ID selection display will appear.

The following operations are identical even if the transceiver enters Remote Control Mode by pressing the **Menu** key.

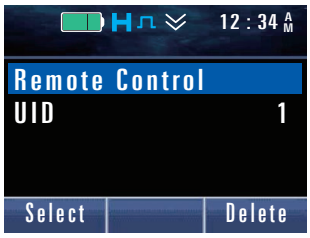
2 Press the Function [○] key.

The Unit ID entry display appears.



3 Enter a Unit ID.

Refer to Common FUNC “Entering or Deleting a Code” for the entry method.



● Using the PF keys

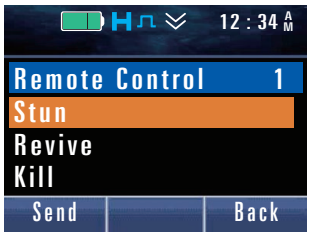
A numeric character can be selected by pressing the **[▲]** key or the **[▼]** key, and pressing the **Menu** (**[▯]**) or **[*]** key can confirm the selected numeric character.

● Using the keypad

A Unit ID can be entered by pressing the **[0]** to **[9]** keys.

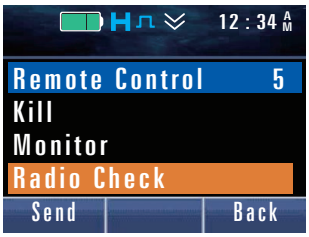
4 Press the Menu ([▯]) or [*]key.

The selection display of the options menu appears.



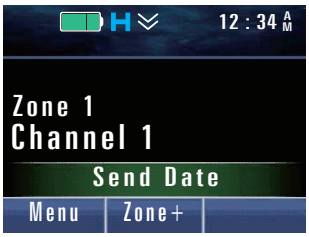
5 Press the [▲] or [▼] key to select the Remote Control message to send.

Stun:: A Remote Stun message is sent.
Revive:: A Remote Revive message is sent.
Kill:: A Remote Kill message is sent.
Monitor:: A Remote Monitor message is sent.
Radio Check: A Radio Check message is sent.



6 Press the PTT switch, the Menu ([⊡]) key, or the [*] key.

The selected Remote Control message is sent.



"Complete" appears if the Remote Control message is properly sent to the target transceiver.

Note

- If the Remote Control Mode previously used is Manual Dialing mode, the transceiver enters Manual Dialing mode by pressing the **Remote Control** key. A selection screen for the Individual ID List will appear by pressing the **Function [◯]** key.
- If no ID is registered in the Individual ID List, the transceiver enters Manual Dialing mode by pressing the **Remote Control** key if **Manual Dialing** is enabled. In this case, the transceiver cannot enter Remote Control Mode if **Manual Dialing** is disabled.

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Configuring **Manual Dialing** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)

Disabling the Transceiver Capability by Remote Control (Stun/ Kill)

The transceiver capability can be disabled by wireless remote control. This function allows an system administrator to remotely disable the transceiver, for instance, if the transceiver is lost.

The transceiver which has been disabled by this function can be enabled to be usable again by remote control from an external device using radio communication.

An individually specified transceiver can be controlled by sending a Remote Stun message, Remote Revive message, or Remote Kill message in Remote Control Mode and by making the transceiver receive the message.

(Refer to Sending a Remote Control Message in Remote Control Mode.)

The following is the transceiver behavior when the transceiver receives a Remote Control message:

Table 1-22 Remote Control

Remote Control Message	Description
Remote Stun	The transceiver is disabled if the transceiver receives the Remote Stun message. Whether to accept a Remote Stun message when the transceiver receives the Remote Stun message can be configured using KPG-D1/ D1N.
Remote Revive	If the transceiver is in the Stun state when receiving a Remote Revive message, the Stun state is reset.
Remote Kill	If the transceiver receives the Remote Kill message, use of the transceiver is prohibited and all operations are disabled. All configuration data of the transceiver is cleared, hence the Kill state is not reset even if the transceiver receives the Remote Revive message. However, the configuration data can be written to the transceiver by using KPG-D1/ D1N. Also, whether to accept a Remote Kill message when the transceiver receives the Remote Kill message can be configured using KPG-D1/ D1N.

Note

- This function is applicable only when an individual call is initiated.
- The received Color Code and the Color Code configured for the transceiver need to match to receive the Remote Stun message, Remote Revive message, or Remote Kill message.
- The Stun state is identical to Stun for DTMF and FleetSync.
- The Stun state is reset by Remote Revive even if the transceiver entered the Stun state by receiving DTMF or FleetSync signaling.
- The Stun state is also reset by receiving the DTMF code (Stun Code + #) or FleetSync status (Status 92).

Configuration using KPG-D1/ D1N

Configuring **Remote Stun/Kill** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)

Monitoring the Situation Around Another Transceiver by Remote Control (Remote Monitor)

Remote Monitor is the function to remotely operate using radio communication an individually specified transceiver to transmit continuously.

Use of this function allows the base station to monitor the situation around the transceiver.

If a PC sends the Remote transmission command to the transceiver, the transceiver will send a message requesting the Remote transmission by using Individual Call. The target ID of the Individual Call is specified in Remote Control Mode or by the Remote transmission command.

An individually specified transceiver can be controlled by sending a Remote Control message in Remote Control Mode and by making the transceiver receive the message. (Refer to Sending a Remote Control Message in Remote Control Mode.)

The transceiver which has received the Remote Control message sends an acknowledgment to the transmitting transceiver, and then unmutes the speaker and initiates a continuous transmission using Individual Call. The duration of the continuous transmission is determined according to the configuration in **Remote Monitor Timer** (10 sec to 120 sec) of the transceiver which has received the message requesting the Remote transmission.

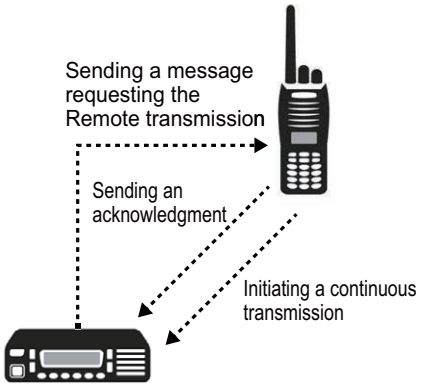


Figure 1-7 Remote Monitor

Remote Monitor has a Normal Mode and a Silence Mode: the former is a mode notifying a user of the transceiver's status of continuous transmission by an indication on the LCD and by lighting the Transmit LED, and the latter is a mode not notifying a user of the transceiver's status of continuous transmission. Which mode is used is determined according to the configuration in **Remote Monitor Display** of the transceiver which has received the message requesting the Remote transmission.

- **If "On" is configured in Remote Monitor Display (Normal Mode)**

  The transceiver which received the message requesting the Remote transmission sends an acknowledgment to the transmitting transceiver, and then displays "Remote TX" on the display and transmits with the Transmit LED lighting.

- **If "Off" is configured in Remote Monitor Display (Silence Mode)**

  The transceiver which received the message requesting the Remote transmission sends an acknowledgment to the transmitting transceiver, and then transmits without changing the indication of LCD and without lighting the Transmit LED.

Note

- To receive a Remote Monitor request message and accept the received message, **Remote Monitor** needs to be enabled.
- The transceiver initiates a continuous transmission only if the message requesting the Remote transmission is received by an Individual Call. The transceiver does not initiate a continuous transmission even if the message requesting the Remote transmission is received using anything other than Individual Call.
- While the transceiver is in the status of continuous transmission by **Remote Monitor**, the **Time-out Timer**, **Busy Channel Lockout** and **In-call Busy Channel Lockout** functions are disabled.
- The received Color Code and the Color Code configured for the transceiver need to match to receive a Remote Monitor request message.

Configuration using KPG-D1/ D1N

- Configuring **Remote Monitor** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR > Remote Monitor)
- Configuring **Remote Monitor Timer** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR > Remote Monitor)
- Configuring **Remote Monitor Display** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR > Remote Monitor)

Checking Whether Another Transceiver Is in Operation (Radio Check)

Radio Check can be used to check by using radio communication whether an individually specified transceiver is operated in the system.

An individually specified transceiver can be controlled by sending a Radio Check message in Remote Control Mode and by making the transceiver receive the message. (Refer to Sending a Remote Control Message in Remote Control Mode.)

Note

- Whether to accept a Radio Check message when the transceiver receives the Radio Check message can be configured using KPG-D1/ D1N.
- The received Color Code and the Color Code configured for the transceiver need to match to receive the Radio Check message.

Configuration using KPG-D1/ D1N

Configuring **Radio Check** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)

1.19 Migrating Automatically to the Site Providing Better Radio Environment (Site Roaming)

Site Roaming is the function that automatically switches the channel to a site (channel) that provides a better radio environment when the transceiver is used under the DMR Conventional system.

The transceiver receives a synchronization signal transmitted from the repeaters in multiple sites at regular time intervals, and detects the RSSI level. Therefore, the transceiver migrates automatically to the channel providing better radio environment.

Up to a maximum of 16 sites can be configured for KENWOOD's repeaters. It is therefore recommended that the Site Roaming system be used by a maximum number of 16 channels.

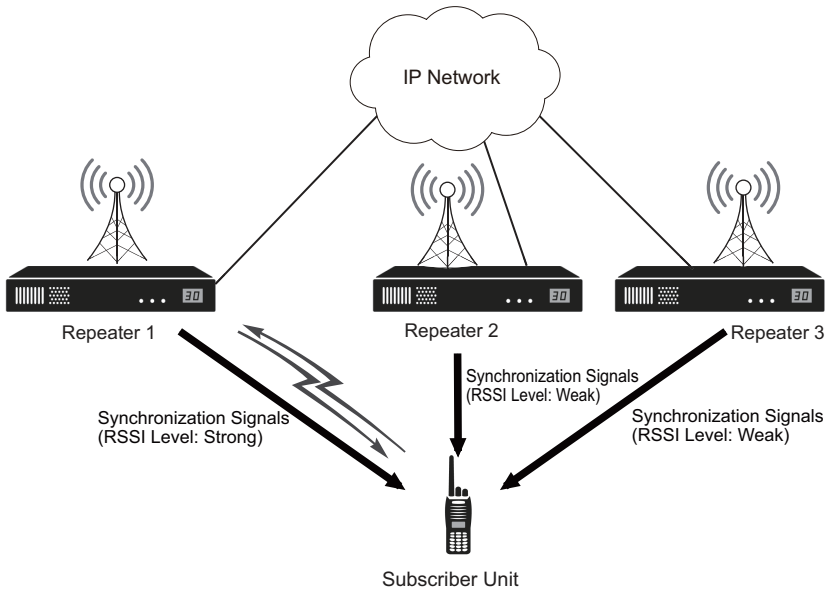
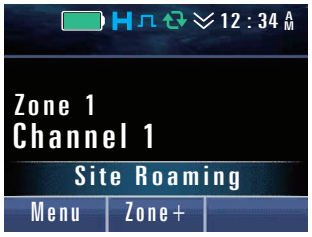


Figure 1-8 Image of Communications of Site Roaming

This function can be used by configuring the DMR Site Roaming channels for each system using KPG-D1/ D1N.

Site Roaming Behaviors

When System-Personality or the Zone-channel of the system that is configured as “DMR Site Roaming” is selected, Site Roaming starts automatically. “Site Roaming” is displayed when the “ ” icon lights up and “**Site Roaming**” **Displayed** is enabled. For portable transceivers, the LED light flashes according to the configuration of **Site Roaming LED**.



- **The behavior if “Personality” is configured in Zone-channel Format**

  When the channel selected is assigned with Personality of the system configured as “DMR Site Roaming”, Site Roaming starts for the Personalities of the same system. In this case, the Personality name is displayed.

  Transmission by a transceiver will be in accordance with the **Slot Selection** and **Color Code** configurations of Personality to be used as the Revert Channel. As scan is performed on Personality, one Personality is backed up as a Revert Channel for each system.

  The Personality the transceiver received last time is retained even if the transceiver is turned OFF. When the transceiver is turned ON and transmits next time, the Personality is used as the Revert Channel. If no Revert Channel exists, the Personality configured for the selected Zone-channel is used as the Revert Channel. While the transceiver is receiving, or if the transceiver transmits while the **Dropout Delay Time** or **Dwell Time** is counting down, the transceiver transmits using the Revert Channel.

- **The behavior if “Channel Table” is configured in Zone-channel Format**

  When the zone of a system that is configured as “DMR Site Roaming” is selected, Site Roaming starts for channels that are configured within the zone.

  Transmission by a transceiver will be in accordance with the **Slot Selection** and **Color Code** configurations of the Revert Channel.

  The channel the transceiver received last time is retained even if the transceiver is turned OFF. When the transceiver is turned ON and transmits next time, the channel will be used as the Revert Channel. If there is no Revert Channel, the channel of the lowest number configured for the zone will be used as the Revert Channel. While the transceiver is receiving, or if the transceiver transmits while the length of time configured for **Dropout Delay Time** or **Dwell Time** is elapsing, the transceiver transmits using the Revert Channel.

When the transceiver receives a synchronization signal from the repeater, the transceiver basically behaves as follows.

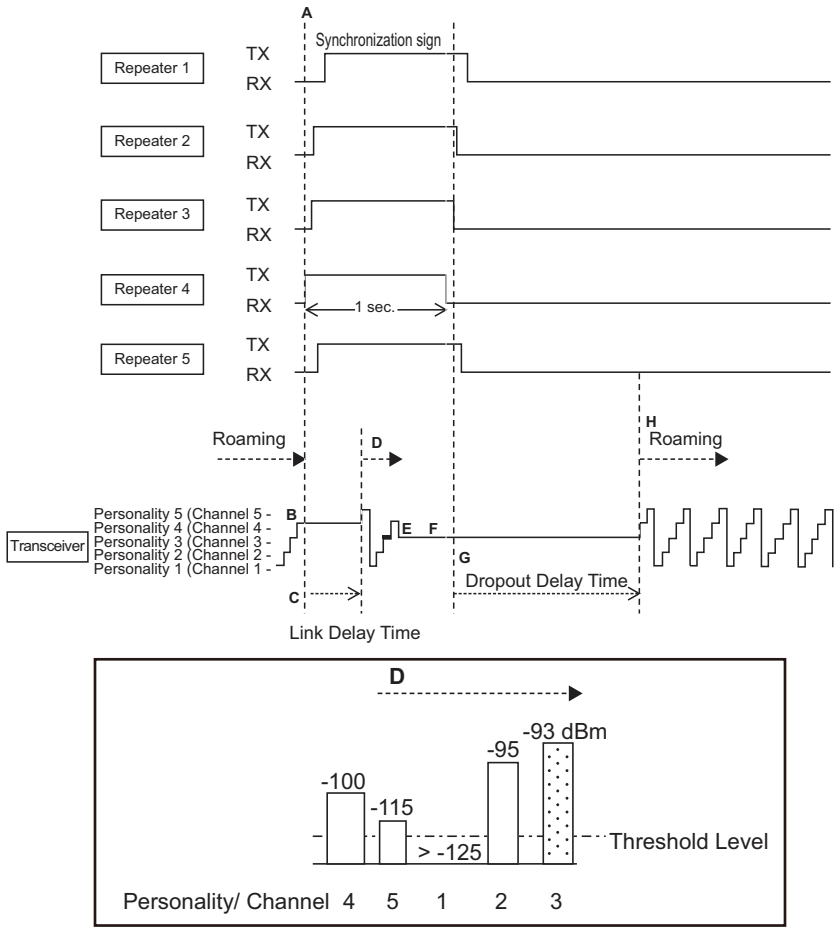


Figure 1-9 Basic Behaviors of Site Roaming

A: The repeater of the DMR Conventional system sends out synchronization signals at a fixed interval. Alternatively, the repeater of the DMR Conventional system sends out call signals according to the transmission request from other transceivers.

B: Assuming that the transceiver detected a sufficient RSSI level in a system that is configured as “DMR Site Roaming” on Personality 4, for example.

C: The transceiver activates **Site Roaming Link Delay Time**.

D: Upon elapse of the length of time configured in **Site Roaming Link Delay Time**, the transceiver checks all Personalities in the same system and searches for the Personality having the strongest RSSI level.

E: After all the Personality checks are complete, the transceiver moves to the Personality with the highest RSSI level (e.g., Personality 3) and checks whether the Color Code received matches the Color Code configured as Personality.
If the Color Codes match each other, Revert Channel is updated to Personality 3. Furthermore, if the ID and **Slot Selection** are found to be matching in a voice call, the speaker is unmuted.
If the Color Codes do not match each other, the transceiver moves to the Personality with the second highest RSSI level (e.g., Personality 2) and checks whether the Color Codes match each other. If the Color Codes match each other, Revert Channel is updated to Personality 2.

F: The transceiver stays in the same Personality and Site Roaming does not resume while the Color Codes are matching.

G: When there is no more signal or when the Color Codes are no longer matching, Dropout Delay Time is activated.

H: After the length of time configured in **Dropout Delay Time** elapses, the transceiver resumes Site Roaming.

Note

- The configurations by using KPG-D1/ D1N are restricted as follows according to the configuration for Zone-channel Format (Personality or Channel Table).

  Personality:

  - A minimum of 2 Personalities and a maximum of 512 Personalities can be configured for a system that is configured as “DMR Site Roaming”.
  - The following functions cannot be configured for the Personalities that are configured as “DMR Site Roaming”.
    - Scan Add
    - Scan List Number

  Channel Table:

  - A minimum of 2 channels and a maximum of 512 channels can be configured for a zone that is configured as “DMR Site Roaming”.
  - The following functions cannot be configured for the channels that are configured as “DMR Site Roaming”.
    - Scan Add
    - Scan List Number
    - Emergency Profile Number
    - Key Assignment
- The Personalities or channels that are configured as “DMR Site Roaming” cannot be configured for the following functions.
  - Home Channel
  - Scan List Members
  - Data System-Personality (DMR) (Data Zone-Channel (DMR))
  - Emergency Zone-Channel
- The following key operations are disabled on the Personalities or channels that are configured as “DMR Site Roaming”.
  - **Home Channel** key
  - **Home Channel Select** key
  - **Scan** key
- The Emergency behavior of the transceiver on the Zone-channel of DMR Site Roaming is in accordance with the configuration of **Emergency Channel Type**.
- If “Personality” is configured for **Zone-channel Format** and the following conditions are met, the Emergency Mode starts up in the Personality of Revert.
  - “Selected” is configured for **Emergency Channel Type**
  - DMR Site Roaming channel is selected
- The Revert Channel during Site Roaming will be backed up even when the transceiver is turned off. However, if “Channel Table” is configured for **Zone-channel Format**, the backed-up Revert Channel will be cleared when the Zone-channel is changed. If “Personality” is configured for **Zone-channel Format**, the backed-up Revert Channel will not be cleared when the Zone-channel is changed.
- Site Roaming starts if the Zone-channel is changed and a DMR Site Roaming channel is selected while scan is enabled.
- If a Zone-channel of DMR Site Roaming is configured as the selected Zone-channel when the transceiver turns on, the transceiver will behave as follows.
  - When “Channel Table” is configured for **Zone-channel Format**

    The backed-up Revert Channel is cleared and the transceiver starts up in the preset DMR Site Roaming Zone-channel.
  - When “Personality” is configured for **Zone-channel Format**

    The transceiver starts up in the Personality in question if the Personality of Revert is backed up. The transceiver starts up in the Personality configured for the channel if the Personality of Revert is not backed up.
- Among the Personalities (Channels), the following functions will behave according to the selected Personality (Channel) instead of that of Revert.
  - Lone Worker
  - Activity Detection

Configuration using KPG-D1/ D1N

- Configuring **"Site Roaming" Displayed** to be enabled or disabled (See Transceiver Settings > Scan > Scan Information > DMR Site Roaming)
- Configuring **Site Roaming LED** (See Transceiver Settings > Scan > Scan Information > DMR Site Roaming)

Behavior in Asynchronous State

If the transceiver is unable to detect the synchronization signal from the repeater, it will send out a Wakeup Message to prompt the repeater for synchronization during transmission on the Revert Channel or selected channel. The waiting time for transmitting the synchronization signal and number of times for sending the Wakeup Message are determined by the configuration of **Sync Wakeup Wait Time** and **Number of Wakeup Message Retries** respectively.

The Wakeup Message is sent in the following ways according to the configuration of **Active Site Hunt**.

Table 1-23 Active Site Hunt

Configuration	Description
Enabled	If the transceiver is unable to detect the synchronization signal from the repeater, it will send out a Wakeup Message to prompt the repeater for synchronization during transmission on the Revert Channel or selected channel. If a response from the repeater cannot be detected after sending out the Wakeup Message for the number of times as configured in **Number of Wakeup Message Retries**, the transceiver moves to another channel in the same system that is configured as "DMR Site Roaming" and sends out the Wakeup Message once to search for repeaters that can be synchronized. A Wakeup Message will be sent out once on each channel in sequence starting from the one following the Revert Channel or selected channel. (Refer to (Example) Behavior of Active Site Hunt.) The transceiver searches for the repeater available for synchronization, and if there is a synchronized Personality that is equal to or higher than the RSSI level set by **Standard Site Roaming Level**, the search for the repeater terminates at the time. The channel that is synchronized becomes the Revert Channel.
Disabled	If the transceiver is unable to detect the synchronization signal from the repeater, it will send out a Wakeup Message to prompt the repeater for synchronization during transmission on the Revert Channel or selected channel. If a response from a repeater cannot be detected after a Wakeup Message is sent for the number of times configured in **Number of Wakeup Message Retries**, the transceiver outputs a Call Fail Tone (2 beeps) from the speaker and "Out of Range" appears on the display for 1 second.

(Example) Behavior of Active Site Hunt

This is an example of the behavior of **Active Site Hunt** when **Active Site Hunt** is enabled and transmission started with Revert Channel (Channel 2). Assuming that the channels registered to the transceiver are Channel 1 to Channel 4.

Channel 2	The transceiver is unable to detect synchronization signals from the repeater, thus Wakeup Message is sent when transmission starts ↓ Unable to detect a response from the repeater after sending Wakeup Message for the number of times configured in **Number of Wakeup Message Retries** ↓ Moves to Channel 3

Channel 3	Wakeup Message is sent out once ↓ The transceiver cannot detect the synchronization signal even if the **Sync Wakeup Wait Time** elapses, or the transceiver can detect the synchronization signal but it is not equal to or higher than the RSSI level set by **Standard Site Roaming Level**. ↓ Moves to Channel 4

Channel 4	Wakeup Message is sent out once ↓ The transceiver cannot detect the synchronization signal even if the **Sync Wakeup Wait Time** elapses, or the transceiver can detect the synchronization signal but it is not equal to or higher than the RSSI level set by **Standard Site Roaming Level**. ↓ Moves to Channel 1

Channel 1	Wakeup Message is sent out once ↓ The transceiver cannot detect the synchronization signal even if the **Sync Wakeup Wait Time** elapses, or the transceiver can detect the synchronization signal but it is not equal to or higher than the RSSI level set by **Standard Site Roaming Level**. ↓ Call Fail Tone (2 beeps) is emitted from the speaker and “Out of Range” appears on the display for 1 second

Note

- Wakeup Message is not sent if the transceiver is able to synchronize with a repeater.
- The number of times for sending out Wakeup Messages on other channels is limited to once regardless of the configuration of **Number of Wakeup Message Retries**.
- The Revert Channel appears on the display while the transceiver is searching for a synchronizable repeater.
- As the transceiver searches in sequence for a repeater on other channels, it may take a longer time for voice connection via transmission to be established.
- When the transceiver sends out a Power-on/off Status Message and when it is in the Emergency Mode, **Active Site Hunt** will be disabled. “Out of Range” does not appear on the display even when a response from the repeater is not detected.
- The transceiver determines whether to migrate to the Revert Channel based on the RSSI level set by **Standard Site Roaming Level**. The transceiver does not determine it based on the RSSI level set by **Quick Site Roaming Level**.

Configuration using KPG-D1/ D1N

- Configuring **Sync Wakeup Wait Time**
  - (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR > Parameters)
  - (See Transceiver Settings > Personal > Personal Features > DMR Site Roaming > DMR > Parameters)
- Configuring **Number of Wakeup Message Retries**
  - (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR > Parameters)
  - (See Transceiver Settings > Personal > Personal Features > DMR Site Roaming > DMR > Parameters)

Moving to Other Sites that Allow Synchronization with the Repeater (Manual Site Hunt)

Manual Site Hunt is the function for searching for a synchronizable repeater regardless of the current synchronization status with a repeater.

As with **Active Site Hunt**, the transceiver is able to search for a synchronizable repeater by sending out a Wakeup Message once on other channels in the same system that is configured as “DMR Site Roaming”.

Manual Site Hunt is used for shifting from the current Revert Channel to the channel of another site.

By pressing the **Manual Site Hunt** key or the **Menu** key to enter the Menu Mode, followed by selecting “Manual Site Hunt”, Search Mode Tone (1 beep) is emitted from the speaker, after which the search for a synchronizable repeater starts. Once the search for a repeater starts, a Wakeup Message is sent out once on each channel in sequence starting from the one following the Revert Channel. (Refer to (Example) Behavior of Manual Site Hunt.)

The transceiver searches for the repeater available for synchronization, and if a channel is synchronized and equal to or higher than the RSSI level set by **Standard Site Roaming Level**, the search for the repeater terminates at that time and a System Select Tone (4 beeps) sounds. The channel that is synchronized becomes the Revert Channel.

(Example) Behavior of Manual Site Hunt

This is an example of the behavior of **Manual Site Hunt** on the Revert Channel (Channel 2) when the **Manual Site Hunt** key is pressed. Assuming that the channels registered to the transceiver are Channel 1 to Channel 4.

Channel 2	Press the **Manual Site Hunt** key ↓ Moves to Channel 3
Channel 3	Wakeup Message is sent out once ↓ The transceiver cannot detect the synchronization signal even if the **Sync Wakeup Wait Time** elapses, or the transceiver can detect the synchronization signal but it is not equal to or higher than the RSSI level set by **Standard Site Roaming Level**. ↓ Moves to Channel 4
Channel 4	Wakeup Message is sent out once ↓ The transceiver cannot detect the synchronization signal even if the **Sync Wakeup Wait Time** elapses, or the transceiver can detect the synchronization signal but it is not equal to or higher than the RSSI level set by **Standard Site Roaming Level**. ↓ Moves to Channel 1
Channel 1	Wakeup Message is sent out once ↓ The transceiver cannot detect the synchronization signal even if the **Sync Wakeup Wait Time** elapses, or the transceiver can detect the synchronization signal but it is not equal to or higher than the RSSI level set by **Standard Site Roaming Level**. ↓ Moves to Channel 2
Channel 2	Wakeup Message is sent out once ↓ The transceiver cannot detect the synchronization signal even if the **Sync Wakeup Wait Time** elapses, or the transceiver can detect the synchronization signal but it is not equal to or higher than the RSSI level set by **Standard Site Roaming Level**. ↓ Call Fail Tone (2 beeps) is emitted from the speaker and “Out of Range” appears on the display for 1 second

Note

- The behavior of **Manual Site Hunt** is independent of the configuration of **Active Site Hunt**. Also, it runs even when the transceiver is already synchronized with a repeater.
- **Manual Site Hunt** runs only when a channel of the DMR Conventional system that is configured as “DMR Site Roaming” is selected.
- **Manual Site Hunt** does not function while the transceiver is in Emergency Mode.
- “Search” appears on the display while the transceiver is searching for a synchronizable repeater.
- Pressing the **Clear** key while the transceiver is searching for a synchronizable repeater ends Manual Site Hunt.
- The transceiver determines whether to migrate to the Revert Channel based on the RSSI level set by **Standard Site Roaming Level**. The transceiver does not determine it based on the RSSI level set by **Quick Site Roaming Level**.

Configuration using KPG-D1/ D1N

Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)

Site Roaming LED

Supported Models: Portable

Site Roaming LED is the function that sends a visual notification to inform the user that the transceiver is executing Site Roaming.

The LED can be configured to flash in one of the 7 colors below when the transceiver starts Site Roaming.

- Yellow
- Purple
- Blue
- Light Blue
- Red
- Green
- White

Configuration using KPG-D1/ D1N

Configuring **Site Roaming LED** to be enabled or disabled (See Transceiver Settings > Scan > Scan Information > DMR Site Roaming)

Site Roaming Link Delay Time

The length of time until the repeater in each site is activated may vary depending on the site. **Site Roaming Link Delay Time** is the function to configure the length of time to tolerate a variation in time of when each repeater is activated by delaying the time to start searching for a signal on other channels.

If the transceiver detects a signal on a Personality or channel after Site Roaming has started, **Site Roaming Link Delay Time** is activated. When the time interval configured in **Site Roaming Link Delay Time** has elapsed after a signal has been detected, the transceiver checks all Personalities in the same system or other channels within the same zone to search for signals. The transceiver checks all Personalities or channels and moves to the Personality or channel with the highest RSSI level to check whether the Color Codes match each other. If the Color Codes do not match each other, the transceiver moves to the Personality or channel with the second highest RSSI level and checks whether the Color Codes match each other.

Configuration using KPG-D1/ D1N

Configuring **Site Roaming Link Delay Time** (See Transceiver Settings > Scan > Scan Information > DMR Site Roaming)

Dropout Delay Time (Site Roaming)

If the transceiver receives a synchronization signal or call from the repeater during Site Roaming, Site Roaming pauses. **Dropout Delay Time** is the length of time from when the transceiver finishes receiving signals until the transceiver resumes Site Roaming.

When there is no more signal or when the Color Codes are no longer matching, **Dropout Delay Time** is activated. After the length of time configured in **Dropout Delay Time** elapses, the transceiver resumes Site Roaming.

Configuration using KPG-D1/ D1N

Configuring **Dropout Delay Time** (See Transceiver Settings > Scan > Scan Information > DMR Site Roaming)

Dwell Time

When the transceiver starts transmitting by pressing the **PTT** switch during Site Roaming, Site Roaming pauses. **Dwell Time** is the length of time from when the transceiver terminates transmission until the transceiver resumes Site Roaming.

After the transceiver terminates the transmission, **Dwell Time** is activated. After the length of time configured in **Dwell Time** elapses, the transceiver resumes Site Roaming.

Configuration using KPG-D1/ D1N

Configuring **Dwell Time** (See Transceiver Settings > Scan > Scan Information > DMR Site Roaming)

Quick Site Roaming Level

Quick Site Roaming Level is the function to allow Site Roaming to behave faster when the transceiver is in an area with a strong signal.

When the transceiver receives a signal with a level higher than the value configured in **Quick Site Roaming Level** during Site Roaming, the channel in question becomes the Revert Channel. When this occurs, **Site Roaming Link Delay Time** is disabled and Revert Channel is updated when the Color Codes match each other.

However, if “Off” is configured in **Quick Site Roaming Level** and **Standard Site Roaming Level**, the transceiver initiates Site Roaming using the threshold value preconfigured in the transceiver.

Configuration using KPG-D1/ D1N

Configuring **Quick Site Roaming Level** (See Transceiver Settings > Scan > Scan Information > DMR Site Roaming)

Standard Site Roaming Level

Standard Site Roaming Level is the function to allow Site Roaming to behave faster when the transceiver is in an area with a strong signal.

The transceiver searches for a signal with a level higher than the value configured in **Standard Site Roaming Level** during Site Roaming.

Personalities or channels with a signal that falls below the value configured in **Standard Site Roaming Level** are excluded from Site Roaming, and the search will not run on these Personalities or channels. When the transceiver receives a signal with a level higher than the value configured in **Standard Site Roaming Level** during Site Roaming, Site Roaming is paused and **Site Roaming Link Delay Time** is activated. If the Color Codes match each other, Revert Channel is updated.

However, if “Off” is configured in **Quick Site Roaming Level** and **Standard Site Roaming Level**, the transceiver initiates Site Roaming using the threshold value preconfigured in the transceiver.

Configuration using KPG-D1/ D1N

Configuring **Standard Site Roaming Level** (See Transceiver Settings > Scan > Scan Information > DMR Site Roaming)

Site Roaming Resume Level

Site Roaming Resume Level is the threshold value of the RSSI level used for determining whether to resume Site Roaming according to the rise and fall of the RSSI level for the signal received by the transceiver.

If the RSSI level of the received signal is lower than the level configured in **Site Roaming Resume Level** while the transceiver remains on the channel synchronized by Site Roaming, **Dropout Delay Time** is activated.

After the length of time configured in **Dropout Delay Time** elapses, the transceiver resumes Site Roaming. If the RSSI level of the received signal becomes higher than the level configured in **Site Roaming Resume Level** while the **Dropout Delay Time** is counting down, the **Dropout Delay Time** is automatically extended and the transceiver does not resume Site Roaming.

When **Auto Reset Timer** is activated upon receiving a call and the receiving status continues after the time interval configured in **Dropout Delay Time** has elapsed, the transceiver does not resume Site Roaming. When the time interval configured in **Dropout Delay Time** has elapsed after receiving has ended, the transceiver resumes Site Roaming.

Configuration using KPG-D1/ D1N

Configuring **Site Roaming Resume Level** (See Transceiver Settings > Scan > Scan Information > DMR Site Roaming)

Off-hook Site Roaming

Supported Models: Mobile

Off-hook Site Roaming is the function to start Site Roaming depending on the status of microphone, either on-hook or off-hook.

The transceiver behaves as follows according to the configuration in **Off-hook Site Roaming**.

Table 1-24 Off-hook Site Roaming

Configuration	Description
Enabled	The transceiver can start Site Roaming while the microphone is in either the on-hook state or off-hook state. Even if the microphone changes from the on-hook state to off-hook state during Site Roaming, Site Roaming does not pause.
Disabled	The transceiver can start Site Roaming if the microphone is in the on-hook state. The transceiver cannot start Site Roaming if the microphone is in the off-hook state. If the microphone changes from the on-hook state to off-hook state during Site Roaming, Site Roaming pauses on the Revert Channel. Even if the microphone changes from the on-hook state to off-hook state while Site Roaming pauses, the channel does not change. When the microphone goes to on-hook state, the transceiver resumes Site Roaming.

Configuration using KPG-D1/ D1N

Configuring **Off-hook Site Roaming** (See Transceiver Settings > Scan > Scan Information > DMR Site Roaming)

Emergency is the function to be used for the transceiver to transmit and receive for emergency purposes. This function is used for a user to immediately contact the base station in emergency situations.

The transceiver behaves according to the configurations in Emergency Mode when the transceiver is placed in Emergency Mode. The base station transceiver can notice an occurrence of an emergency situation in the transmitting transceiver upon receipt of a call by use of Emergency.

2.1 Placing the Transceiver in Emergency Mode

One of the following operations can place the transceiver in Emergency Mode:

● Emergency key

Pressing and holding the **Emergency** key for longer than the time configured in **Hold Delay** causes the transceiver to enter Emergency Mode.

For Portable, “Emergency” can be assigned to the **AUX** key or the **PF 1** key of the speaker microphone only as the function when the key is held.

For Mobile, “Emergency” can be assigned to the **AUX** key only as the function when the key is held.

Also, “Emergency” can be assigned to the AUX Input port for Mobile. In this case, the transceiver enters Emergency Mode if the AUX Input port to which “Emergency” is assigned goes low level. (Refer to Common FUNC Available Functions for AUX Input Ports.)

● Lone Worker

Using **Lone Worker**, the transceiver can automatically enter Emergency Mode and notify the base station of the emergency status when the transceiver becomes disabled from operating due to an accident.

When the time configured in **Lone Worker Interval** elapses and then the time configured in **Duration of Lone Worker Tone** elapses while the transceiver is in Lone Worker Mode, the transceiver enters Emergency Mode. (Refer to Placing the Transceiver in Emergency Mode Using the Lone Worker Function.)

● Activity Detection

If **Activity Detection** is used, the transceiver automatically enters Emergency Mode and notifies the base station of the emergency status when the transceiver is detected to be in tilted, stationary, or shaking state for a certain period of time due to an accident. **Man-down Detection**, **Stationary Detection**, and **Motion Detection** are the functions available in **Activity Detection**. (Refer to Placing the Transceiver in Emergency Mode by Using the Activity Detection Function.)

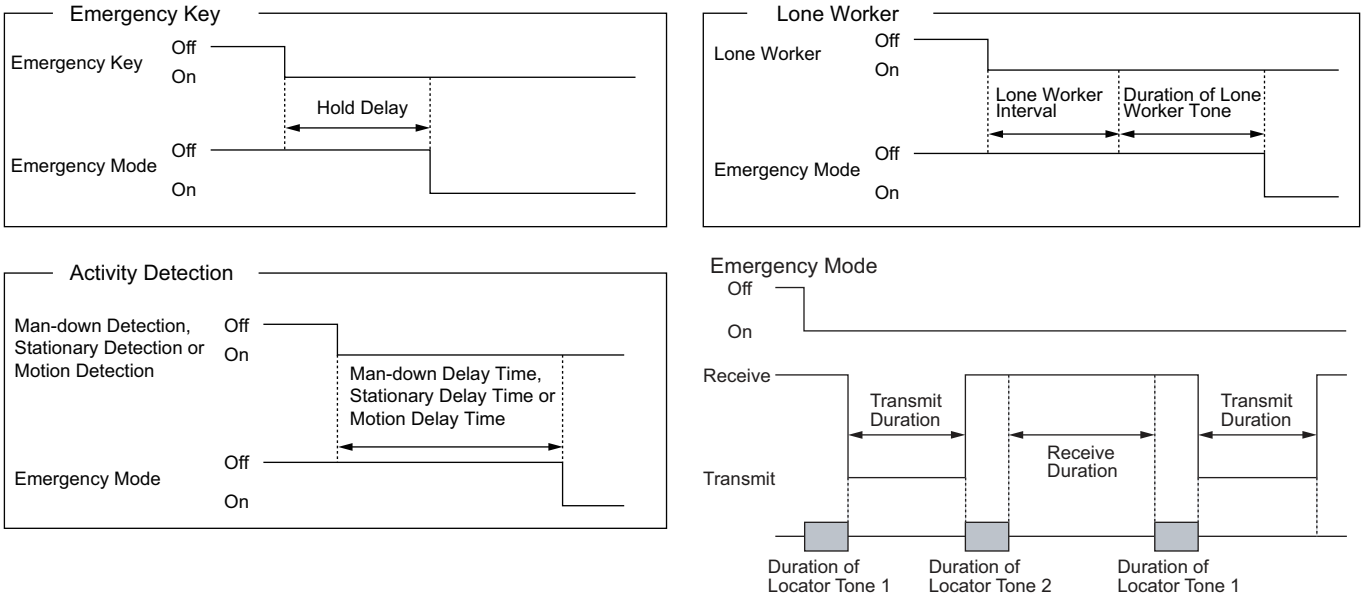


Figure 2-1 Emergency Mode

If Emergency Mode is activated by pressing the **Emergency** key or by the Lone Worker function, Emergency Mode will be exited when the **Emergency** key is pressed longer than the time configured in **Hold Delay** or when the transceiver is turned off.

If Emergency Mode is activated by the Activity Detection function, Emergency Mode will be exited when the transceiver is turned off.

However, if **Suspended Power-off** is enabled, the transceiver will not be turned off and remains in Emergency Mode even if the transceiver is operated to be turned off while in Emergency Mode. (Refer to Suspended Power-off.)

Note

- If the transceiver enters Emergency Mode during a scan, Emergency behaves according to the configuration in **Emergency Profile** for the selected channel.
- The **PTT** switch can be used even if the transceiver is in Emergency Mode. The transceiver reverts to automatic receive mode when the transceiver completes transmitting by releasing the **PTT** switch.
- In Emergency Mode, the microphone sensitivity is determined by the configuration in **Emergency Microphone Sense**. (Refer to Emergency Microphone Sense.)
- The transceiver does not decode the Stun Code and Optional Signaling in Emergency Mode.
- If the transceiver receives the status configured for **Emergency Termination Status** in Emergency Mode, the transceiver exits Emergency Mode.
- While the transceiver is under the following conditions, the transceiver does not enter Emergency Mode:
  - In the Stun state
  - If the transceiver is in Transceiver Password entry state
  - When “Selected” is configured in **Emergency Channel Type** and the selected channel is an error channel
- The Radio Check command can also be received when the transceiver is in Emergency Mode.
- The following functions are disabled while the transceiver is in Emergency Mode:
  - **Lone Worker** key
  - Lone Worker Channel (if “Preset” is configured in **Lone Worker Type**)

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Configuring **Emergency Termination Status** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > Emergency > Emergency ID (DMR Conventional))

Interrupt Emergency CALL

Interrupt Emergency CALL is the function to execute **Call Interruption** if voice communication (including voice communication not addressed to the own transceiver) is made on a channel used in Emergency Mode when the transceiver enters Emergency Mode.

Call Interruption is the function to enable a transceiver other than the transmitting transceiver to terminate voice communications by sending and receiving the Call Interruption request message. A transceiver receiving the Call Interruption request message on the channel where the transceiver is performing voice communication terminates voice communication. (Refer to Terminating Voice Communications by a Transceiver Other Than the Transmitting Transceiver (Call Interruption).)

Configuration using KPG-D1/ D1N

Configuring **Interrupt Emergency CALL** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > DMR Conventional > Emergency)

Emergency Alarm

Emergency Alarm is the function to send an Emergency Alarm before the transceiver enters Emergency Mode to notify the base station that the transceiver is in an Emergency situation.

Using this function can reliably notify the base station that the transceiver is in an Emergency situation.

Behavior of the transmitting transceiver

- The transceiver sends an Emergency Alarm when the **Emergency** key is pressed and when Lone Worker or various Activity Detection functions are activated on a DMR digital channel.
- If the transceiver receives an acknowledgment from the receiving transceiver, the transceiver enters Emergency Mode.
- After sending an Emergency Alarm, if the transceiver receives no acknowledgment until the length of time configured for **Maximum ACK Wait Time** elapses, the transceiver resends the Emergency Alarm. If the transceiver still cannot receive an acknowledgment after sending the Emergency Alarm 5 times, the transceiver enters Emergency Mode.

Behavior of the receiving transceiver

- If the transceiver receives an Emergency Alarm, the transceiver notifies a user of the receipt of the Emergency Alarm according to the configuration for **Emergency Alarm Response**.
- If **Emergency Alarm Ack** is enabled, the transceiver returns an acknowledgment when the transceiver receives an Emergency Alarm.

Note

If a zone or channel is changed while the transceiver is in Emergency Mode, the transceiver resends an Emergency Alarm on the channel to which the transceiver has migrated.

About the configuration of Emergency Alarm

For the transceiver to send an Emergency Alarm, the configurations by using KPG-D1/ D1N need to be as follows:

Emergency Alarm (DMR): Enabled

Emergency ID (DMR Conventional): DMR

Emergency DMR ID Type: Group ID

For the receiving transceiver to return an acknowledgment when an Emergency Alarm is received, **Emergency Alarm Ack** needs to be enabled.

Emergency Alarm Response

Emergency Alarm Response is the function to enable the transceiver to notify a user of the receipt of an Emergency Alarm when the transceiver receives the Emergency Alarm.

The transceiver behaves as follows according to the configuration using KPG-D1/ D1N.

Table 2-1 Emergency Alarm Response

Configuration	Description
LCD	If an Emergency Alarm is received, the Group ID appears on the display. Also, the Emergency message and the Unit ID of the transmitting transceiver alternately appear.
Alert Tone	The Alert Tone configured for **Alert Tone (Emergency Response)** sounds from the transceiver when receiving an Emergency Alarm.
Horn (Mobile Only)	The Horn Alert port becomes active when receiving an Emergency Alarm.

Configuration using KPG-D1/ D1N

- Configuring **Emergency Alarm (DMR)** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > DMR Conventional > Emergency)
- Configuring **Maximum ACK Wait Time** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR > Parameter)
- Configuring **Emergency Alarm Response** (See Transceiver Settings > DMR > DMR Information > General > Emergency Alarm Response)
- Configuring **Emergency Alarm Ack** (Personality) (See Transceiver Settings > Personal > Personality > DMR Conventional > DMR)
- Configuring **Emergency Alarm Ack** (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > DMR)

2.2 Configuration Related to Transmission and Reception in Emergency Mode

The transceiver can have a maximum of 8 configurations related to transmission and reception in Emergency Mode as the Emergency Profile. By allocating **Emergency Profile** to each zone or channel, the Emergency behavior of the transceiver can vary depending on the zone or channel.

The functions that can be configured as an **Emergency Profile** are as follows:

- Emergency Channel Type
- Emergency Zone-Channel
- Emergency Mode Type
- Emergency Cycle
- Duration of Locator Tone 1
- Transmit Duration
- Duration of Locator Tone 2
- Receive Duration
- Emergency LED

The common functions in Emergency Mode are as follows. One configuration from below is available for the transceiver:

- Emergency Display
- Emergency Microphone Sense
- Emergency Text
- Background Transmission
- Emergency Channel Lock
- Suspended Power-off
- Surveillance Mode
- Functions related to Lone Worker
- Functions related to Activity Detection

Emergency Profile can be configured for each zone or channel. If “Common” is configured in **Emergency Profile** for a channel, the transceiver executes the Emergency behavior by using **Emergency Profile Number** configured for the zone of the channel.

Also, in a DMR Conventional system, **Emergency ID** (DMR Conventional) can be configured for each system. (Refer to ID Sent When Emergency Mode is Activated.)

Configuration using KPG-D1/ D1N

- Configuring the various functions of **Emergency Profile** (See Transceiver Settings > Emergency Information > Emergency Profile)
- Configuring Common Functions for **Emergency Mode** (See Transceiver Settings > Emergency Information)

2.3 Zone-channel Functioning in Emergency Mode

The channel to be used when the transceiver enters Emergency Mode can be configured.

Emergency Channel Type

Emergency Channel Type is the type of a channel used when the transceiver is placed in Emergency Mode.

Table 2-2 Emergency Channel Type

Configuration	Description
Selected	When the transceiver enters Emergency Mode, the transceiver resets the migration state of channels, such as Home Channel, and then the transceiver executes Emergency on the previously selected channel.
Fixed	After entering Emergency Mode, the transceiver migrates to the Zone-channel configured in **Emergency Zone-Channel** and then executes the Emergency behavior.

The transceiver behaves as below according to the configuration for Emergency Channel Type:

- **Selected**
  - **If a channel in a DMR Conventional system is selected:**

    The transceiver behaves according to the configurations of **Emergency ID** and **Emergency DMR ID Type** (DMR Conventional).

Table 2-3 Emergency ID (DMR Conventional)

Configuration	Description
None	The transceiver transmits only using the Color Code.
DMR	If “Group ID” is configured for **Emergency DMR ID Type**, the transceiver initiates a Group Call by using the Group ID configured for **Emergency DMR ID**. If “Unit ID” is configured for **Emergency DMR ID Type**, the transceiver initiates an Individual Call by using the Unit ID configured for **Emergency DMR ID**.

- **Fixed**
  - **If a channel in a DMR Conventional system is configured for Emergency Zone-Channel:**

    The transceiver behaves according to the configurations of **Emergency ID** and **Emergency DMR ID Type** (DMR Conventional).

Table 2-4 Emergency ID (DMR Conventional)

Configuration	Description
None	The transceiver transmits only using the Color Code.
DMR	If “Group ID” is configured for **Emergency DMR ID Type**, the transceiver initiates a Group Call by using the Group ID configured for **Emergency DMR ID**. If “Unit ID” is configured for **Emergency DMR ID Type**, the transceiver initiates an Individual Call by using the Unit ID configured for **Emergency DMR ID**.

Configuration using KPG-D1/ D1N

- Configuring **Emergency Channel Type** (See Transceiver Settings > Emergency > Emergency Profile)
- Configuring **Emergency ID (DMR Conventional)** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > Emergency > Emergency ID (DMR Conventional))

Emergency Zone-Channel

Emergency Zone-Channel is the Zone-channel used in Emergency Mode if “Fixed” is configured in **Emergency Channel Type**.

Configuration using KPG-D1/ D1N

Configuring **Emergency Zone-Channel** (See Transceiver Settings > Emergency > Emergency Profile)

2.4 Automatically Transmitting and Receiving in Emergency Mode

The number of times for which the transceiver toggles between transmission and reception, or the duration for a single session of automatic transmission or reception for emergency in Emergency Mode can be configured. Also, the microphone sensitivity can be changed and the Background Tone (1 beep) can be multiplexed on the audio to be transmitted in Emergency Mode.

Emergency Cycle

Emergency Cycle is the number of times that the transceiver toggles between transmission and reception for an emergency in Emergency Mode.

Table 2-5 Emergency Cycle

Configuration	Description
1 to 200	The transceiver repeats automatic transmission and automatic reception for the configured number of times, and then the transceiver exits Emergency Mode.
Infinite	The transceiver continues to alternate between automatic transmission and reception until the **Emergency** key is pressed again or the transceiver is turned off.
Off	The transceiver does not automatically transmit and receive in Emergency Mode.

Configuration using KPG-D1/ D1N

Configuring **Emergency Cycle** (See Transceiver Settings > Emergency Information > Emergency Profile)

Duration of Locator Tone 1

Duration of Locator Tone 1 is the duration to emit an Alert Tone which notifies that the transceiver will start transmission before the transceiver starts automatic transmission in Emergency Mode.

The transceiver automatically repeat transmitting and receiving in Emergency Mode. When the transceiver switches from reception to transmission, an Emergency Locator Tone (2 beeps) sounds from the transceiver for the length of the time configured for **Duration of Locator Tone 1**.

When the tone sounds, a user can easily recognize without viewing the transceiver that the transceiver is about to automatically transmit in Emergency Mode. This tone can also be used to locate a user who is in emergency situations.

Note

- This function is enabled if “Audible” is configured for **Emergency Mode Type**.
- For a portable transceiver that is connected to a Bluetooth or external speaker, Emergency Locator Tone (2 beeps) is emitted from the speaker of the transceiver regardless of the configuration of **Bluetooth Speaker** and **External Speaker**. Also, the audio received will be output according to the configuration of the **Bluetooth Speaker** and **External Speaker**.
- For Mobile, where an Emergency Locator Tone (2 beeps) and received audio are emitted from depends on the configuration in External Speaker.
- Refer to Common FUNC “Switching the Speaker to Emit Audio (Bluetooth Speaker)” for the speaker to emit the Locator Tone (2 beeps) if a speaker supporting Bluetooth is connected.

Configuration using KPG-D1/ D1N

Configuring **Duration of Locator Tone 1** (See Transceiver Settings > Emergency Information > Emergency Profile)

Duration of Locator Tone 2

Duration of Locator Tone 2 is the duration to emit an Alert Tone which notifies that the transceiver has completed an automatic transmission in Emergency Mode, and starts receiving.

The transceiver automatically repeat transmitting and receiving in Emergency Mode. When the transceiver switches from reception to transmission, an Emergency Locator Tone (2 beeps) sounds from the transceiver for the length of time configured for **Duration of Locator Tone 2**.

When the tone sounds, a user can easily recognize without viewing the transceiver that the transceiver ends to automatically transmit in Emergency Mode. This tone can also be used to locate a user who is in emergency situations.

Note

- This function is enabled if “Audible” is configured for **Emergency Mode Type**.
- For a portable transceiver that is connected to a Bluetooth or external speaker, Emergency Locator Tone (2 beeps) is emitted from the speaker of the transceiver regardless of the configuration of **Bluetooth Speaker** and **External Speaker**. Also, the audio received will be output according to the configuration of the **Bluetooth Speaker** and **External Speaker**.
- For Mobile, where an Emergency Locator Tone (2 beeps) and received audio are emitted from depends on the configuration in **External Speaker**.
- Refer to Common FUNC “Switching the Speaker to Emit Audio (Bluetooth Speaker)” for the speaker to emit the Locator Tone (2 beeps) if a speaker supporting Bluetooth is connected.

Configuration using KPG-D1/ D1N

Configuring **Duration of Locator Tone 2** (See Transceiver Settings > Emergency Information > Emergency Profile)

Transmit Duration

Transmit Duration is the duration of a single automatic transmission cycle in Emergency Mode.

The transceiver switches to automatic reception for emergency when the time configured in Transmit Duration elapses after the transceiver starts automatic transmission for emergency.

The transceiver behaves as follows when “0” is configured in **Transmit Duration**:

- **If “None” is configured for Emergency ID:**
  The transceiver does not send anything during automatic transmission.
- **If anything other than “None” is configured for Emergency ID:**
  The transceiver sends only an Emergency Status during automatic transmission.

Configuration using KPG-D1/ D1N

Configuring **Transmit Duration** (See Transceiver Settings > Emergency Information > Emergency Profile)

Receive Duration

Receive Duration is the duration for a single session of automatic reception for emergency in Emergency Mode.

The transceiver switches to automatic transmission for emergency when the time configured in **Receive Duration** elapses after the transceiver starts automatic reception for emergency.

Configuration using KPG-D1/ D1N

Configuring **Receive Duration** (See Transceiver Settings > Emergency Information > Emergency Profile)

Emergency Microphone Sense

Emergency Microphone Sense is the function used to adjust the microphone input sensitivity in Emergency Mode.

In **Emergency Microphone Sense**, the microphone sensitivity can be configured within the following range:

6 dB, 4 dB, 2 dB, 0 dB, -2 dB, -4 dB, -6 dB, -8 dB, -10 dB, -12 dB, -14 dB, -16 dB, -18 dB, -20 dB

The appropriate level of microphone sensitivity for normal operation is 0 dB. Based on this level, the parameter of the microphone sensitivity can be configured.

Note

The microphone sensitivity of the headset connected via Bluetooth also functions according to the configuration in **Emergency Microphone Sense** while the transceiver is in Emergency Mode.

Configuration using KPG-D1/ D1N

Configuring **Emergency Microphone Sense** (See Transceiver Settings > Emergency > Emergency Information)

Background Transmission

Background Transmission is the function to multiplex a Background Tone (1 beep) on the transmitted audio when the transceiver transmits in Emergency Mode. Background Tone (1 beep) is multiplexed every second while the transceiver is transmitting audio data.

The audio signal is not muted since the Background Tone is transmitted with lower deviation than normal. The receiving transceiver can easily recognize that the transmitting transceiver is in Emergency Mode if the tone is multiplexed while initiating a voice call.

Note

A Background Tone is not emitted from the speaker of the transmitting transceiver.

Configuration using KPG-D1/ D1N

Configuring **Background Transmission** (See Transceiver Settings > Emergency > Emergency Information)

2.5 Indication and Sound in Emergency Mode

Functions related to the tone that sounds from the transceiver when the automatic transmission starts or ends in Emergency Mode, and display and the LED notification in Emergency Mode can be configured.

Locator Tone

An Emergency Locator Tone (2 beeps) sounds from the transceiver before the automatic transmission starts or when the automatic transmission completes in Emergency Mode.

In Emergency Mode, the transceiver repeats an automatic communication only the number of times configured in Emergency Cycle. (Refer to Automatically Transmitting and Receiving in Emergency Mode.)

Emergency Display

Emergency Display is the function to display the channel configured in **Emergency Zone-Channel** when in Emergency Mode or to retain the display appearance before the transceiver enters Emergency Mode.

Table 2-6 Emergency Display

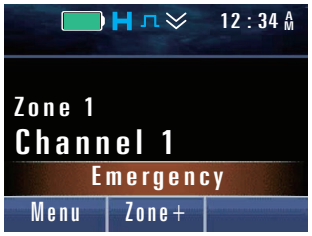
Configuration	Description
Selected	The previously selected channel is retained on the display even if the transceiver enters Emergency Mode.
Emergency Channel	A channel configured in **Emergency Zone-Channel** appears when the transceiver enters Emergency Mode.

Configuration using KPG-D1/ D1N

Configuring **Emergency Display** (See Transceiver Settings > Emergency > Emergency Information)

Emergency Text

Emergency Text is the function to display the text on the transceiver display while in Emergency Mode.
If this function is enabled, the text configured in **Text** appears on the display when the transceiver enters Emergency Mode.
Display example:
Emergency Zone-Channel: Zone 1, Channel 1
Emergency Display: Emergency Channel
Text: “Emergency”



Configuration using KPG-D1/ D1N

- Configuring **Emergency Text** to be enabled or disabled (See Transceiver Settings > Emergency > Emergency Information)
- Configuring **Text** (See Transceiver Settings > Emergency > Emergency Information)

Emergency Mode Type

Emergency Mode Type is the function to determine whether the received audio or various tones are muted while the transceiver is in Emergency Mode.

Table 2-7 Emergency Mode Type

Configuration	Description
Silent	The transceiver mutes the received audio and various tones while in Emergency Mode.
Audible	The transceiver emits the received audio and various tones in the same manner as in normal mode even while in Emergency Mode.

Configuration using KPG-D1/ D1N

Configuring **Emergency Mode Type** (See Transceiver Settings > Emergency Information > Emergency Profile)

Emergency LED

Emergency LED is the function to light the Transmit LED when the transceiver transmits in Emergency Mode and light the Busy LED when the transceiver receives in Emergency Mode.

The transceiver behaves as follows depending on the **Emergency LED** configuration.

● If the Emergency LED is enabled:

- While in Emergency Mode, the Transmit LED is on during data transmission, and the Busy LED is on during data receipt.
- For Portable, if “Audible” is configured in **Emergency Mode Type**, the backlight lights while the transceiver is in Emergency Mode.
- The Busy LED lights even though the received audio is not output due to the output of the Locator Tone while the transceiver is on the traffic channel.
- For Portable, if the transceiver enters Emergency Mode while the backlight is lit, the backlight continues to light. However, when “Silent” is configured in **Emergency Mode Type**, the backlight turns off when entering Emergency Mode.
- For Mobile, regardless of the configuration in **Emergency LED** and the configuration in **Emergency Mode Type**, the state of the backlight when the transceiver enters Emergency Mode does not change.

● If the Emergency LED is disabled:

- While in Emergency Mode, the Transmit LED is off during data transmission, and the Busy LED is off during data receipt.
- For Portable, the backlight does not light while the transceiver is in Emergency Mode.
- For Portable, if the transceiver enters Emergency Mode while the backlight is lit, the backlight turns off.
- For Mobile, regardless of the configuration in **Emergency LED** and the configuration in **Emergency Mode Type**, the state of the backlight when the transceiver enters Emergency Mode does not change.

Configuration using KPG-D1/ D1N

Configuring **Emergency LED** (See Transceiver Settings > Emergency Information > Emergency Profile)

Surveillance Mode

Surveillance Mode is the function to continue the Surveillance function as enabled even if the transceiver enters Emergency Mode while the Surveillance function is enabled.

While the Surveillance function is enabled, the transceiver does not emit a tone or light the backlight even when the transceiver functions.

The Surveillance function is used when the change of the transceiver status needs to be kept unnoticed, such as while on a Public Safety operation.

The transceiver behaves as follows according to the configuration in **Surveillance Mode**:

● If Surveillance Mode is enabled

Even if the transceiver enters Emergency Mode while the Surveillance function is enabled, the Surveillance function remains enabled, and the transceiver does not emit a tone and the backlight and LED do not light. The Surveillance function remains enabled even if the transceiver exits Emergency Mode.

● If Surveillance Mode is disabled

The Surveillance function is disabled if the transceiver enters Emergency Mode while the Surveillance function is enabled. The transceiver behaves according to the configurations in Emergency Mode when the transceiver is placed in Emergency Mode. The Surveillance function remains disabled even if the transceiver exits Emergency Mode.

Note

While in Emergency Mode, the Surveillance function cannot be toggled between enabled and disabled by operating the transceiver.

Configuration using KPG-D1/ D1N

Configuring **Surveillance Mode** to be enabled or disabled (See Transceiver Settings > Emergency > Emergency Information)

2.6 ID Sent When Emergency Mode is Activated

The Emergency ID can be sent each time the transceiver starts automatic transmission and reception in Emergency Mode.

Emergency ID

In a DMR Conventional system, an **Emergency ID** is the type of code to be sent out each time the transceiver starts automatic emergency transmission and reception in Emergency Mode.

Table 2-8 Emergency ID (DMR Conventional)

Configuration	Description
None	The transceiver transmits and receives according to the configuration for Color Code of the Zone-channel used for Emergency Mode.
DMR	When transmitting in Emergency Mode, the transceiver initiates a Group Call or an Individual Call according to the configurations for **Emergency DMR ID Type** and **Emergency DMR ID**. Also, the following status IDs that are sent when automatic transmission in Emergency Mode is started can be configured for each factor that activates Emergency Mode (Emergency Key, Lone Worker, Man-down, Stationary, or Motion): ● **Emergency Call Status** The status ID that is sent when the transceiver enters Emergency Mode by pressing the **Emergency** key ● **Lone Worker Status** The status ID that is sent when the transceiver enters Emergency Mode by the Lone Worker function ● **Man-down Status** The status ID that is sent when the transceiver enters Emergency Mode by the Man-down function ● **Stationary Status** The status ID that is sent when the transceiver enters Emergency Mode by the Stationary function ● **Motion Status** The status ID that is sent when the transceiver enters Emergency Mode by the Motion function If the status ID of the corresponding activation factor is not configured and the activation factor places the transceiver in Emergency Mode, the status ID configured in **Emergency Call Status** is sent.

Configuration using KPG-D1/ D1N

- Configuring **Emergency ID (DMR Conventional)** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > Emergency > Emergency ID (DMR Conventional))
- Configuring various status IDs (See Transceiver Settings > Personal > Personal Features > DMR Conventional > Emergency > Emergency ID (DMR Conventional))

Emergency DMR ID Type

Emergency DMR ID Type is the type of DMR ID used for automatic transmission while the transceiver is in Emergency Mode in a DMR Conventional system.

“Group ID” or “Unit ID” can be configured for **Emergency DMR ID Type** in each system.

Configuration using KPG-D1/ D1N

Configuring **Emergency DMR ID Type** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > Emergency > Emergency ID (DMR Conventional))

Emergency DMR ID

Emergency DMR ID is the DMR ID used for transmission and reception while the transceiver is in Emergency Mode in a DMR Conventional system.

If “Unit ID” is configured for **Emergency DMR ID Type**, the Unit ID used for initiating an Individual Call in Emergency Mode can be configured for each system.

If “Group ID” is configured for **Emergency DMR ID Type**, the Group ID used for initiating a Group Call in Emergency Mode can be configured for each system.

Configuration using KPG-D1/ D1N

Configuring **Emergency DMR ID** (See Transceiver Settings> Personal> Personal Features> DMR Conventional> Emergency> Emergency ID (DMR Conventional))

2.7 Other Functions in Emergency Mode

Emergency Channel Lock and **Suspended Power-off** are other available functions in Emergency Mode.

Emergency Channel Lock

Emergency Channel Lock is the function to disable changing a zone or channel while the transceiver is in Emergency Mode.

If this function is enabled, a zone or channel cannot be changed while the transceiver is in Emergency Mode.

If this function is disabled, a zone or channel can be changed while the transceiver in Emergency Mode is not transmitting.

Configuration using KPG-D1/ D1N

Configuring **Emergency Channel Lock** to be enabled or disabled (See Transceiver Settings > Emergency > Emergency Information)

Suspended Power-off

Suspended Power-off is the function to disable the transceiver to be turned off and retain the transceiver to be in Emergency Mode even if the transceiver is operated to be turned off while in Emergency Mode.

For Mobile, the transceiver behavior varies as below depending on the configuration in **Emergency Mode Type**:

- **If "Silent" is configured in Emergency Mode Type:**

  The transceiver will not be turned off and remains in Emergency Mode even if the **Power** switch is pressed while the transceiver is in Emergency Mode. In this case, the LCD is tuned off and the transceiver appears to be turned off. The LED behaves according to the configuration in **Emergency LED** while **Suspended Power-off** is enabled.

- **If "Audible" is configured in Emergency Mode Type:**

  The transceiver will not be turned off and remains in Emergency Mode even if the **Power** switch is pressed while the transceiver is in Emergency Mode. In this case, the LCD display does not change. The LED behaves according to the configuration in **Emergency LED** while **Suspended Power-off** is enabled.

For Portable, the transceiver will not be turned off and remains in Emergency Mode even if the transceiver is operated to be turned off while in Emergency Mode. In this case, the LCD display does not change. The LED behaves according to the configuration in **Emergency LED** while **Suspended Power-off** is enabled.

If **Suspended Power-off** is enabled, the transceiver cannot be turned off until the transceiver exits Emergency Mode. However, for Mobile, the transceiver can be turned off by pressing and holding the **Power** switch for 5 sec or more even while **Suspended Power-Off** is activated.

Note

- If Emergency Mode is activated by the Activity Detection function, **Suspended Power-off** does not function.
- If Emergency Mode is activated by the Lone Worker function, **Suspended Power-off** functions.

Configuration using KPG-D1/ D1N

Configuring **Suspended Power-off** to be enabled or disabled (See Transceiver Settings > Emergency > Emergency Information)

2.8 Placing the Transceiver in Emergency Mode Using the Lone Worker Function

Lone Worker is the function that automatically places the transceiver in Emergency Mode if the transceiver is not operated for a certain period of time.

If the transceiver is placed in Lone Worker Mode while the user has a task at a dangerous place, for instance, the transceiver automatically enters Emergency Mode and notifies a base station of the emergency status because a user cannot operate the transceiver due to an accident.

Since the Lone Worker Tone (2 beeps) sounds from the transceiver prior to entering Emergency Mode if the transceiver is in the Lone Worker Mode, the Lone Worker function can also be used to warn a user.

Enabling the Transceiver in Lone Worker Mode/Disabling Lone Worker Mode

The transceiver enters or exits Lone Worker Mode by a user operating the keys on the transceiver.

Operating the transceiver

- **Placing the transceiver in Lone Worker Mode**

1 **Do either of the following operations while the transceiver is not in Lone Worker Mode:**

- Press the **Lone Worker** key.
- Select a channel where **Lone Worker** is enabled.
- Press the **Menu** key to enter Menu Mode, and select “Lone Worker” and then select “ON”.

The “ ” icon appears, the transceiver enters Lone Worker Mode, and then **Lone Worker Interval** is activated. The Key Beep A (1 beep) sounds from the transceiver when the **Lone Worker** key is pressed.

If no key is pressed after **Lone Worker Interval** is activated, the Lone Worker Tone (2 beeps) sounds from the transceiver when the time configured in **Lone Worker Interval** elapses. The Lone Worker Tone (2 beeps) sounds for the duration configured in **Duration of Lone Worker Tone**. If no key is pressed while the Lone Worker Tone (2 beeps) continues to sound from the transceiver, and if the time configured in **Duration of Lone Worker Tone** elapses, the transceiver enters Emergency Mode.

The transceiver behaves according to the configuration of Emergency after the transceiver enters Emergency Mode.

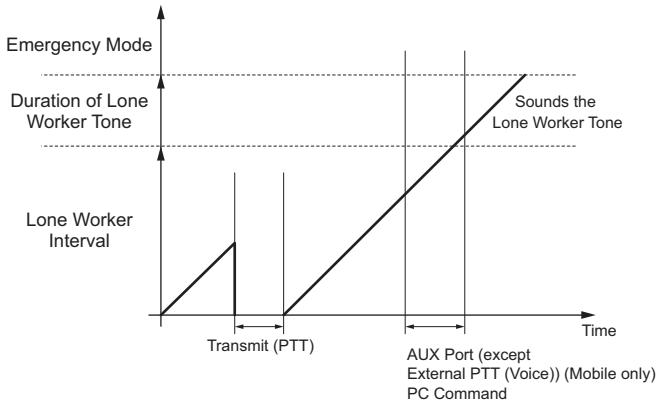
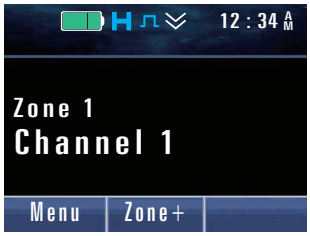


Figure 2-2 Lone Worker Mode

● Exiting Lone Worker Mode

1 **Do either of the following operations while the transceiver is in Lone Worker Mode:**

- Press the **Lone Worker** key.
- Select a channel where **Lone Worker** is disabled.
- Press the **Menu** key to enter Menu Mode, and select “Lone Worker” and then select “OFF”.
- The “ ” icon disappears and the transceiver exits Lone Worker Mode.
  The Key Beep B (2 beeps) sounds from the transceiver when the **Lone Worker** key is pressed.



Note

- If “Transmit/Receive Inhibit” is configured in **Lone Worker Type**, Lone Worker cannot be turned ON or OFF in Menu Mode. (Refer to Lone Worker Type.)
- Lone Worker cannot be activated while the transceiver is in the Stun state or while in Transceiver Password Mode.
- For Mobile, if the AUX Input port to which “Emergency” is assigned becomes active for the time configured in **Emergency Delay Time** while the transceiver is in Lone Worker Mode, the transceiver enters Emergency Mode.
- Lone Worker can be activated even if the Key Lock state is activated while the transceiver is in Lone Worker Mode.
- If the transceiver migrates from Lone Worker Mode to Emergency Mode, the transceiver exits Emergency Mode if the **Emergency** key is pressed for a length of time greater than the length of time configured in **Hold Delay**.
- If a scan initiates while the transceiver is in Lone Worker Mode, the scan initiates with Lone Worker Mode enabled. If the scan starts while the transceiver is in a mode other than Lone Worker mode, the scan starts with Lone Worker Mode disabled.

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Configuring **Lone Worker (DMR Conventional)** to be enabled or disabled (Personality) (See Transceiver Settings > Personal > Personality > DMR Conventional > General)
- Configuring **Lone Worker (DMR Conventional)** to be enabled or disabled (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > General)

Functions in Lone Worker Mode

The transceiver enters or exits Lone Worker Mode by a user operating the keys on the transceiver.

The following functions are relevant to Lone Worker Mode.

- Lone Worker Type
- Lone Worker Interval
- Duration of Lone Worker Tone

Lone Worker Type

Lone Worker Type allows you to configure how the transceiver behaves in Lone Worker Mode.

The transceiver behaves as below while in Lone Worker Mode according to the configuration in **Lone Worker Type**:

Table 2-9 Lone Worker Type

Configuration	Description
Normal	Lone Worker Mode can be enabled or disabled by a user pressing the **Lone Worker** key. A user can transmit and receive using the transceiver in the same manner as normal even if the transceiver enters Lone Worker Mode and while the time configured in **Lone Worker Interval** is counted. The status of Lone Worker Mode, either enabled or disabled by a user pressing the **Lone Worker** key, is retained in the transceiver. The status of Lone Worker Mode, either enabled or disabled, is also retained in the transceiver even if the channel is changed or the transceiver is turned on or off.
Transmit/ Receive Inhibit	Lone Worker Mode can be enabled or disabled by a user pressing the **Lone Worker** key. A user cannot transmit or receive using the transceiver while the time configured in **Lone Worker Interval** is counted after the transceiver enters Lone Worker Mode. Only the following **PF** keys can be used while the transceiver is in Lone Worker Mode: • **Lone Worker** key • **Emergency** key • **Function** key • **Backlight** key • **LCD Brightness** key • **Zeroize** key • **Battery Status** key The status of Lone Worker Mode, either enabled or disabled by a user pressing the **Lone Worker** key, is retained in the transceiver. The status of Lone Worker Mode, either enabled or disabled, is also retained in the transceiver even if the channel is changed or the transceiver is turned on or off.
Preset	If a channel is selected, Lone Worker Mode is enabled or disabled depending on the configuration in Lone Worker for the selected channel. Lone Worker Mode can also be enabled or disabled by a user pressing the **Lone Worker** key. A user can transmit and receive using the transceiver in the same manner as normal even if the transceiver enters Lone Worker Mode and while the time configured in **Lone Worker Interval** is counted. The status of Lone Worker Mode, either enabled or disabled by a user pressing the **Lone Worker** key, is not retained in the transceiver. If “Lone Worker” is assigned to the **Lever** switch, whether Lone Worker is enabled or disabled for the transceiver when a channel is changed depends on the selection in the **Lever** switch.

Lone Worker Type can be configured using KPG-D1/ D1N depending on the usage of the transceiver. The transceiver behavior varies as below depending on the configuration in **Lone Worker Type**:

Table 2-10 Lone Worker Type

Transceiver Behavior	Configuration in Lone Worker Type		
	Normal	Transmit/Receive Inhibit	Preset
Toggling Lone Worker Mode between enabled and disabled when a channel is changed	No	No	Yes
Toggling the Lone Worker Mode between enabled and disabled by a user pressing the **Lone Worker** key	Yes	Yes	Yes
Retaining the status of Lone Worker Mode, either enabled or disabled, in the transceiver	Yes	Yes	No
Transmitting and receiving by operating the transceiver in the same manner as normal mode	Yes	No	Yes

Yes: Available

No: Unavailable

Configuration using KPG-D1/ D1N

Configuring **Lone Worker Type** (See Transceiver Settings > Emergency > Emergency Information > Lone Worker)

Lone Worker Interval

Lone Worker Interval is the interval time from when the transceiver enters Lone Worker Mode until the Lone Worker Tone (2 beeps) sounds from the transceiver.

If no key is pressed after the transceiver enters Lone Worker Mode and then **Lone Worker Interval** is activated, the Lone Worker Tone (2 beeps) sounds from the transceiver when the time configured in Lone Worker Interval elapses. For the time configured in **Duration of Lone Worker Tone**, the Lone Worker Tone (2 beeps) sounds from the transceiver.

If any key is pressed before the time configured in **Lone Worker Interval** elapses, **Lone Worker Interval** is reset and then restarts counting down from the beginning. Also, if the **Lone Worker** key is pressed before the time configured in **Lone Worker Interval** elapses, Lone Worker Mode becomes disabled and then the transceiver reverts to the normal mode.

Configuration using KPG-D1/ D1N

Configuring **Lone Worker Interval** (See Transceiver Settings > Emergency > Emergency Information > Lone Worker)

Duration of Lone Worker Tone

Duration of Lone Worker Tone is the length of time that the Lone Worker Tone (2 beeps) sounds from the transceiver.

If no key is pressed after the transceiver enters Lone Worker Mode and then **Lone Worker Interval** is activated, the Lone Worker Tone (2 beeps) sounds from the transceiver when the time configured in **Lone Worker Interval** elapses. For the time configured in **Duration of Lone Worker Tone**, the Lone Worker Tone (2 beeps) sounds from the transceiver. If no key is pressed while the Lone Worker Tone (2 beeps) continues to sound from the transceiver, and if the time configured in **Duration of Lone Worker Tone** elapses, the transceiver enters Emergency Mode.

If any key is pressed while the Lone Worker Tone (2 beeps) continues to sound from the transceiver, the Lone Worker Tone (2 beeps) stops sounding, and **Lone Worker Interval** is reset, and then restarts counting down from the beginning.

Configuration using KPG-D1/ D1N

Configuring **Duration of Lone Worker Tone** (See Transceiver Settings > Emergency > Emergency Information > Lone Worker)

2.9 Placing the Transceiver in Emergency Mode by Using the Activity Detection Function

Supported Models: Portable

Activity Detection is the function to detect the status of the transceiver by analyzing the behavior of the transceiver by using the acceleration sensor and tilt sensor embedded in the transceiver, and to automatically place the transceiver in Emergency Mode.

Using this function, if the transceiver detects that the transceiver is tilted, remains stationary, or moves vigorously for a certain period of time due to an accident, the transceiver automatically enters Emergency Mode and notifies the base station of the emergency status.

To use this function, **Activity Detection** must be enabled.

Operating the transceiver

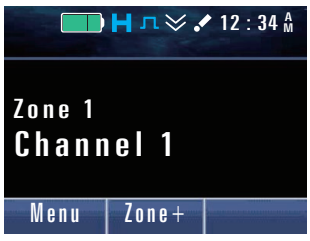
- **Configuring Activity Detection to be enabled**

1 **Do either of the following operations while Activity Detection is disabled:**

- Press the **Activity Detection** key.
- Select a channel where **Activity Detection** is enabled.
- Press the **Menu** key to enter Menu Mode, and select “Activity Detection” and then select “On”.

The “” icon appears and **Activity Detection** will be enabled.

If **Activity Detection** is enabled by using the **Activity Detection** key or the **Menu** key, the Key Beep A (1 beep) sounds from the transceiver.



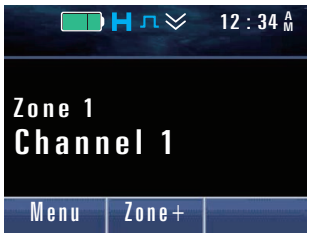
● Configuring Activity Detection to be disabled

1 **Do either of the following operations while Activity Detection is disabled:**

- Press the **Activity Detection** key.
- Select a channel where **Activity Detection** is disabled.
- Press the **Menu** key to enter **Menu Mode**, and select “Activity Detection” and then select “Off”.

The “” icon disappears and Activity Detection will be disabled.

If **Activity Detection** is disabled by using the **Activity Detection** key or the **Menu** key, the Key Beep B (2 beeps) sounds from the transceiver.



Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Configuring **Activity Detection** (DMR Conventional) to be enabled or disabled (Personality) (See Transceiver Settings > Personal > Personality > DMR Conventional > General)
- Configuring **Activity Detection (DMR Conventional)** to be enabled or disabled (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > General)

Man-down Detection

Man-down Detection is the function to place the transceiver automatically in Emergency Mode when the transceiver becomes tilted and continues this position even after the time configured in **Man-down Delay Time** elapses.

Using this function, the transceiver can automatically enter Emergency Mode and notify a base station of the emergency status when a user falls due to an accident.

If **Man-down Pre-alert** is configured, a Man-down Pre-alert (1 beep) sounds from the transceiver before the transceiver enters Emergency Mode. The transceiver does not enter Emergency Mode if the transceiver returns from the tilted position before the time configured in **Man-down Delay Time** elapses.

The threshold value of the tilt angle (**Man-down Angle**) to be used to detect that the transceiver is tilted can be configured to 45 °, 60 °, or 75 °.

Note

- Pressing the **PTT** switch while the time configured in **Man-down Delay Time** elapses pauses the **Man-down Delay Time** count down. Releasing the **PTT** switch resumes the counting down.
- Pressing the **Activity Reset** key resets the **Man-down Delay Time** timer and restarts counting down from the beginning.

Configuration using KPG-D1/ D1N

- Configuring **Man-down Detection** to be enabled or disabled (See Transceiver Settings > Emergency > Emergency Information > Activity Detection)
- Configuring **Man-down Delay Time** (See Transceiver Settings > Emergency > Emergency Information > Activity Detection)
- Configuring **Man-down Pre-alert** to be enabled or disabled (See Transceiver Settings > Emergency > Emergency Information > Activity Detection)
- Configuring **Man-down Angle** (See Transceiver Settings > Emergency > Emergency Information > Activity Detection)

Stationary Detection

Stationary Detection is the function to place the transceiver automatically in Emergency Mode when the transceiver becomes stationary and continues this position even after the time configured in **Stationary Delay Time** elapses.

Using this function, the transceiver can automatically enter Emergency Mode and notify a base station of the emergency status when a user cannot operate the transceiver due to an accident.

If **Stationary Pre-alert** is configured, a Stationary Pre-alert (1 beep) sounds from the transceiver before the transceiver enters Emergency Mode. The transceiver does not enter Emergency Mode if the transceiver returns from the stationary state before the time configured in **Stationary Delay Time** elapses.

Note

- Pressing the **PTT** switch while the time configured in **Stationary Delay Time** elapses pauses the **Stationary Delay Time** count down. Releasing the **PTT** switch resumes the counting down.
- Pressing the **Activity Reset** key resets the **Stationary Delay Time** timer and restarts counting down from the beginning.

Configuration using KPG-D1/ D1N

- Configuring **Stationary Detection** to be enabled or disabled (See Transceiver Settings > Emergency > Emergency Information > Activity Detection)
- Configuring **Stationary Delay Time** (See Transceiver Settings > Emergency > Emergency Information > Activity Detection)
- Configuring **Stationary Pre-alert** (See Transceiver Settings > Emergency > Emergency Information > Activity Detection)

Motion Detection

Motion Detection is the function to place the transceiver automatically in Emergency Mode when the transceiver receives strong shocks by being strongly shaken or swung and continues this state for the time configured in **Motion Delay Time**.

Using this function, the transceiver can automatically enter Emergency Mode and notify a base station of the emergency status when the transceiver repeatedly receives powerful shocks due to an accident.

If **Motion Pre-alert** is configured, a Motion Pre-alert (1 beep) sounds from the transceiver before the transceiver enters Emergency Mode.

The transceiver does not enter Emergency Mode if the severe movement of the transceiver stops before the time configured in **Motion Delay Time** elapses.

Note

- Pressing the **PTT** switch while the time configured in **Motion Delay Time** elapses pauses the **Motion Delay Time** count down. Releasing the **PTT** switch resumes the counting down.
- Pressing the **Activity Reset** key resets the **Motion Delay Time** timer and restarts counting down from the beginning.

Configuration using KPG-D1/ D1N

- Configuring **Motion Detection** to be enabled or disabled (See Transceiver Settings > Emergency > Emergency Information > Activity Detection)
- Configuring **Motion Delay Time** (See Transceiver Settings > Emergency > Emergency Information > Activity Detection)
- Configuring **Motion Pre-alert** (See Transceiver Settings > Emergency > Emergency Information > Activity Detection)

Using Motion Detection and Stationary Detection Simultaneously (Man-down with Stationary)

Man-down with Stationary is the function to detect emergency using both the **Man-down Detection** and Stationary Detection functions.

If this function is enabled, the transceiver detects emergency using both the **Man-down Detection** and **Stationary Detection** functions. If both **Man-down Detection** and **Stationary Detection** enter the detection state, **Man-down Delay Time** is activated. If the time configured in **Man-down Delay Time** elapses while the transceiver continues to be in the state, the transceiver enters Emergency Mode.

Configuration using KPG-D1/ D1N

Configuring **Man-down with Stationary** to be enabled or disabled (See Transceiver Settings > Emergency > Emergency Information > Activity Detection)

2.10 Transceiver Behavior When the Transceiver Receives an Emergency Status

An Alert Tone can sound when the transceiver receives a DMR Emergency Status. This behavior can be configured for **Emergency Status Response**.

Refer to “Emergency Status Response” for details of Emergency Response.

Encryption is the function that enhances confidentiality in communications on the DMR digital channels by encrypting audio data and user data such as Short Message.

The following Encryption functions can be used in a DMR Conventional system.

- Bit scramble encryption type
- AES/ DES encryption type
- DES encryption type (Built-in DES)
- Enhanced Encryption format

The AES/ DES encryption function offers enhanced encryption strength compared to encryption functions using the bit scrambling format or the DES (Built-in DES) or Enhanced Encryption format. To make use of the AES/ DES encryption function, it is necessary to mount the optional Secure Cryptographic Module (henceforth "SCM") to the transceiver and write the encryption key data to the SCM. (Refer to Secure Cryptographic Module (SCM) (for AES/ DES Only).)

When a transceiver transmits or receives a signal in the bit scrambling, DES (Built-in DES) or Enhanced Encryption format, the communication data is encrypted or decrypted using the encryption key data configured in the transceiver. In comparison, the AES/ DES method encrypts or decrypts the communication data using the encryption key data configured for SCM.

Transmission

If Encryption is enabled, the transceiver encrypts and sends out audio data or user data such as Short Message. If Encryption is disabled, the transceiver transmits communication data without encryption.

Reception

Upon receipt of the encrypted communication data, the transceiver decrypts the received data using the encryption key data configured in the transceiver or SCM. If the data is properly decrypted, the received audio sounds from the speaker. The receive behavior of the transceiver, however, differs depending on the Encryption status (enabled or disabled) and the configuration for **Encryption Type**. Refer to "Transceiver Behavior upon Receipt of Encrypted Communication Data" for details.

About the configuration of encryption key data

By using the KPG-D1/ D1N, it is possible to configure up to a total of 32 encryption key data used by encryption functions in the bit scrambling, DES (Built-in DES) or Enhanced Encryption format as well as encryption key information used by the AES/ DES encryption function in the **Multi-key List**. The Encryption status (to be enabled or disabled) and the **Multi-key List Number** with the encryption key data can be configured for each channel. (Refer to Multi-key List.)

When the SCM uses the AES/ DES method, up to 1,024 encryption key data can be stored inside the SCM. The encryption key data that is linked to the CKR ID of the **Multi-key List** can be selected. The **Multi-key List** can be configured to contain a combination of encryption key data in the bit scrambling or Enhanced Encryption format and encryption key information in the AES/DES format.

When the SCM uses the DES (Built-in DES) format, up to 4 encryption key data can be stored inside the built-in memory of the transceiver. The encryption key data that is configured in the **Multi-key List** can be selected. The **Multi-key List** can be configured to contain a combination of encryption key data in the bit scrambling, Enhanced Encryption and DES (Built-in DES) formats.

Also, the Encryption status (enabled or disabled) and Encryption Key used for communications can be changed by the transceiver operation.

Note

The following are the types of user data and whether the various user data can be encrypted or not:

Table 3-1 Encryptable User Data

User Data	Bit Scrambling	AES/ DES (KWD-AE30/ KWD-AE31/ KWD-DE31)	Built-in DES	Enhanced Encryption
Status Message	×	×	×	×
Short Message	×	○	○	○

○: encryptable, ×: not encryptable

- Upon transmission using the Encryption function by means of AES/ DES, the transmission cannot be done if no SCM is installed in the transceiver, if the SCM is disabled, or if an Encryption Key corresponding to the **Multi-key List Number** is not configured on the SCM. In this case, the Key Fail Alert Tone (6 beeps) sounds from the transceiver, and “Key Fail” appears on the transceiver display for 1 sec.

Configuration using KPG-D1/ D1N

- Enabling or disabling **Encryption** and configuring the **Multi-key List Number** for DMR Conventional (Personality) (See Transceiver Settings > Personal > Personality > DMR Conventional > DMR > Encryption Settings)
- Enabling or disabling **Encryption** and configuring the **Multi-key List Number** for DMR Conventional (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > DMR > Encryption Settings)
- Configuring **Encryption Type** of DMR (See Transceiver Settings > Encryption > DMR)

3.1 Toggling the Encryption during Transmission between Enabled and Disabled

Pressing the **Scrambler/ Encryption** key toggles the status of Encryption during transmission between enabled and disabled.

Or, Encryption during transmission can be toggled between enabled and disabled by pressing the **Menu** key to enter Menu Mode, and then selecting “Scrambler/Encryption”. (Refer to Common FUNC Using Menu Mode.)

If Encryption is enabled, the transceiver encrypts and sends out audio data or user data such as Short Message. If Encryption is disabled, the transceiver transmits communication data without encryption.

The receiving behavior of the transceiver differs depending on the Encryption status, either to be enabled or disabled, and the configuration for **Encryption Type**. Refer to “Transceiver Behavior upon Receipt of Encrypted Communication Data” for details.

Note

- The Encryption status (to be enabled or disabled) can be configured for each channel, so the configured Encryption status applies only for the selected channel.
- If the status of Scrambler/Encryption (to be enabled or disabled) is switched for the channel where “Mixed” is configured in **Channel Type**, the status of Scrambler/Encryption (to be enabled or disabled) applies for a channel according to the mode (either Analog or DMR) configured in **Transmit Mode** of the channel.

Operating the transceiver

● Configuring Encryption during transmission to be enabled

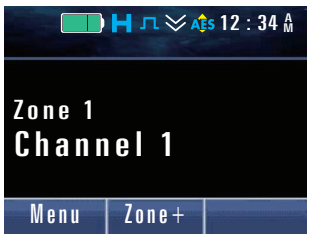
1 Press the Scrambler/ Encryption key while Encryption is disabled.

● For the bit scramble encryption type

The “ ” icon appears and then Encryption will be enabled.

● AES/ DES or DES (Built-in DES) format

The “ ” icon or “ ” icon appears and Encryption is enabled.

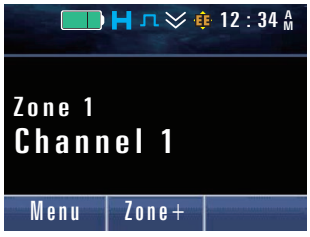


Note

The “ ” icon appears if the encryption type is AES, and the “ ” icon appears if the encryption type is DES.

● Enhanced Encryption format

The “ ” icon appears and then Encryption will be enabled.



Pressing the **PTT** switch encrypts and sends the audio data.

- **Configuring Encryption during transmission to be disabled**

1 **Press the Scrambler/ Encryption key while Encryption is enabled.**

- **For the bit scramble encryption type**

  The "◆" icon disappears and Encryption will be disabled.

- **AES/ DES or DES (Built-in DES) format**

  The "AES" icon or "DES" icon disappears and Encryption is disabled.

- **Enhanced Encryption format**

  The "EE" icon disappears and Encryption will be disabled.

Configuration using KPG-D1/ D1N

Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)

3.2 Configuring the Encryption Key Data Used for Communications

An Encryption Key used for communications can be selected from **Multi-key List** and configured.

When the transceiver is using the bit scrambling, AES/ DES or Enhanced Encryption format, it can store up to 32 Encryption Keys (Key ID, Key Data). When the transceiver is using the DES (Built-in DES) format, it can store up to 4 Encryption Keys (Key ID, Key Data). However, only 1 of the Encryption Keys can be used for transmission.

The Encryption Key to be used for transmission can be configured for each channel by making a selection from the Multi-Key List using the KPG-D1/ D1N. (Refer to Multi-key List.)

The transceiver needs to enter Scrambler/ Encryption Code Mode in order to change an Encryption Key. In Scrambler/ Encryption Code Mode, a Multi-key corresponding to the Encryption Key data used for transmission can be selected from the Multi-Key List configured for the transceiver.

Pressing the **Scrambler/Encryption Code** key causes the transceiver to enter Encryption Code Mode.

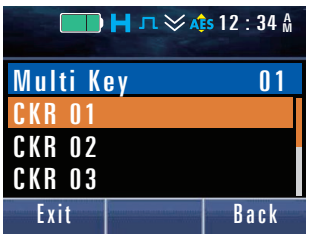
Or, the transceiver can also enter Scrambler/Encryption Code Mode by pressing the **Menu** key to place the transceiver in Menu Mode and then selecting "Scrambler/Encryption Code". (Refer to Common FUNC Using Menu Mode.)

Operating the transceiver

1 Press and hold the Scrambler/ Encryption key.

The transceiver enters Scrambler/Encryption Code Mode. The Multi-key configured for a channel appears.

The following operations can also be used even if the transceiver enters Scrambler/ Encryption Code Mode by pressing the **Menu** key or the **Scrambler/Encryption Code** key.



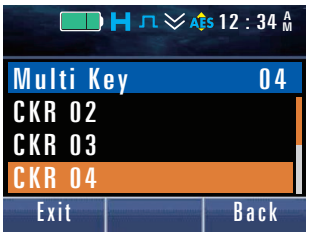
Note

If Encryption is disabled, Encryption will be enabled when the transceiver enters Scrambler/Encryption Code Mode. Even after the transceiver exits from Scrambler/Encryption Code Mode, Encryption remains enabled.

2 Press the [▲] or [▼] key to select Key Data.

Refer to Common FUNC "Selecting or Clearing Data from a List" for selection methods.

Selecting "Preset" can restore the value preconfigured for the selected channel.



Note

- If the Encryption Key corresponding to the selected Multi-key is not configured on the SCM, or if the Encryption Key is deleted from the SCM, "Erased" appears (the AES/ DES encryption only).
- When the channels of P25, NXDN and DMR are configured to coexist using the KPG-D1/ D1N, only a Multi-key corresponding to the **System Type** (P25, NXDN, or DMR) of the channel on which the transceiver is waiting appears in the **Multi-key List**.

3 Press the Menu ([▢]) or [*] key.

The Multi-key selected in step 2 is configured for the selected channel.

Configuration using KPG-D1/ D1N

Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)

3.3 Transceiver Behavior upon Receipt of Encrypted Communication Data

Upon receipt of the encrypted communication data, the transceiver behaves as follows according to the Encryption status (enabled or disabled) and the configuration for **Encryption Type**.

If Encryption is enabled:

For audio data, regardless of the configuration for **Encryption Type**, the received audio sounds from the speaker according to the audio control conditions and the configuration in **Multi-key List**.

In the case of user data such as Short Message, the behavior when receiving data is determined according to the registration status of the **Multi-key List**.

- **Bit scramble encryption type**

  The bit scrambling format allows the transceiver to decrypt only encrypted audio data. Upon receipt of the encrypted audio data, the transceiver decrypts the received data using the Encryption Key corresponding to the **Multi-key List Number** that is configured for the channel on which the transceiver is waiting. If the data is properly decrypted, the received audio sounds from the speaker. If the data is decrypted incorrectly, the received audio sounds incompletely from the speaker.

- **AES/ DES encryption type**

  When an encrypted signal is received, the transceiver searches for the Key ID (1 to 255) inside the SCM.

  For audio data, if the Algorithm (AES or DES) and Key ID included in the Encryption Key used for encryption of the received communication data match the Algorithm and Key ID included in the Encryption Key configured on the SCM, the transceiver uses the Encryption Key to decrypt the data. If the data is properly decrypted, the received audio sounds from the speaker. If the data is decrypted incorrectly, the received audio sounds incompletely from the speaker. The transceiver mutes the speaker if the parameters for Algorithm do not match or if the Key IDs do not match.

  When user data such as a Short Message is received, the transceiver decrypts the data in the same way. After the data is successfully decrypted, the transceiver will proceed to receive the data. If decryption of the data is not successful, the data will be discarded.

- **DES encryption type (Built-in DES)**

  When an encrypted signal is received, the transceiver searches for the Key ID (1 to 255) inside the **Multi-key List**.

  For audio data, if the Algorithm (DES) and Key ID included in the Encryption Key used for encryption of the received communication data match the Key ID included in the Encryption Key configured for the transceiver, the transceiver uses the Encryption Key to decrypt the data. If the data is properly decrypted, the received audio sounds from the speaker. If the data is decrypted incorrectly, the received audio sounds incompletely from the speaker. The transceiver mutes the speaker if the parameters for Algorithm do not match or if the Key IDs do not match.

  When user data such as a Short Message is received, the transceiver decrypts the data in the same way. After the data is successfully decrypted, the transceiver will proceed to receive the data. If decryption of the data is not successful, the data will be discarded.

- **Enhanced Encryption format**

  When an encrypted signal is received, the transceiver searches for the Key ID (1 to 255) in the Multi-key List.

  For audio data, if the Key ID included in the Encryption Key used for encryption of the received communication data matches the Key ID included in the Encryption Key configured for the transceiver, the transceiver uses the Encryption Key to decrypt the data. If the data is properly decrypted, the received audio sounds from the speaker. If the data is decrypted incorrectly, the received audio sounds incompletely from the speaker. The transceiver mutes the speaker if the Key IDs do not match each other.

  When user data such as a Short Message is received, the transceiver decrypts the data in the same way. After the data is successfully decrypted, the transceiver will proceed to receive the data. If decryption is not successful, the data will be discarded.

If Encryption is disabled:

The following are the transceiver behaviors that may vary depending on the configuration for Encryption Type (Type 1 or Type 2):

- **Type 1**

  The transceiver behaves in the same manner as a transceiver with Encryption enabled.

- **Type 2**

  No received audio sounds from the speaker.

Note

- When unencrypted communication data is received, the transceiver emits the received audio from the speaker according to the audio control conditions regardless of the Encryption status (enabled or disabled) or configuration for Encryption Type.
- When encrypted communication data is received by the transceiver at the receiving end, the transceiver will still return a receipt confirmation even when data decryption is not successful. For this reason, the transceiver at the transmitting end behaves in the same way as when data communication is successful.

Configuration using KPG-D1/ D1N

Configuring **Encryption Type** (See Transceiver Settings > Encryption > DMR)

Behavior when Data Received Cannot be Properly Decrypted

in the case of the AES/ DES and Enhanced Encryption formats, when encrypted communication data is received and decryption is successful, the transceiver will proceed to receive the data and output the received audio from the speaker.

When data decryption is not successful, the behavior of the transceiver changes as follows according to the configuration in **DMR Message Type**.

Table 3-2 Behavior when Data Received Cannot be Properly Decrypted

DMR Message Type Configuration	Description
DMR Standard	If data decryption is not successful, the data is discarded and data receiving operation is not performed by the transceiver. However, under certain conditions, the transceiver may proceed with the data receiving operation without discarding it, and the data that is not properly decrypted may appear on the display.
Kenwood-defined Data	When data decryption is not successful, the transceiver proceeds with the data receiving operation without discarding it, and the data that is not properly decrypted appears on the display.

Configuration using KPG-D1/ D1N

Configuring **DMR Message Type** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR)

About the Behavior of the Encryption Icon

Bit scramble encryption type

If the transceiver satisfies the following conditions when the encrypted audio data is received, the "◆" icon blinks:

- Color Code matches.
- Group ID matches (upon receipt of an Unaddressed Call/ Group Call).
- Unit ID matches (upon receipt of an Individual Call).

AES/ DES and DES (Built-in DES) formats

If the transceiver satisfies the following conditions when the encrypted audio data is received, the "AES" or "DES" icon will appear blinking. The "DES" icon blinks in the DES (Built-in DES) format.

- Color Code matches.
- Key ID matches.
- Group ID matches (upon receipt of an Unaddressed Call/ Group Call).
- Unit ID matches (upon receipt of an Individual Call).

Enhanced Encryption format

If the transceiver satisfies the following conditions when the encrypted audio data is received, the "EE" icon blinks:

- Color Code matches.
- Key ID matches.
- Group ID matches (upon receipt of an Unaddressed Call/ Group Call).
- Unit ID matches (upon receipt of an Individual Call).

3.4 Secure Cryptographic Module (SCM) (for AES/ DES Only)

The Encryption function by means of AES/ DES can be used by installing a Secure Cryptographic Module (SCM) in the transceiver. All encryption and decryption of communication data can be processed by the SCM. The encryption and decryption of communication data using AES/ DES encryption is not available in a transceiver where no SCM is installed.

To make use of the Encryption function, it is necessary to configure the Encryption Key for SCM using Key Loader. (Refer to Key Loader.)

Configuration using KPG-D1/ D1N

Configuring **Secure Cryptographic Module** to be enabled or disabled (See Model > Product Information > Feature Selection)

Applicable SCMs

The following are the SCMs that can be used with the transceiver:

Table 3-3 Available SCMs

SCM	Firmware Version
KWD-AE30	A3.0.3
KWD-AE31	A3.0.3
KWD-DE31	D4.0.3

Note

- The Encryption function using AES/ DES is unavailable if an SCM having firmware version earlier than the versions described above is installed in the transceiver.
- Information (such as the model name and the firmware version of the SCM installed in the transceiver) can be viewed in the **Transceiver Information** dialog box using KPG-D1/ D1N.

Installing KWD-AE30/ KWD-AE31

Refer to the Installation Manual or the service manual supplied with KWD-AE30/ KWD-AE31 for instructions on how to install KWD-AE30/ KWD-AE31 in the transceiver.

Key Loader

Using the Key Variable Loader or the Software Key Loader, Encryption Key data can be configured on the SCM and configured Encryption Key data can be deleted.

Key Variable Loader

An Encryption Key can be configured on the SCM by using the Motorola KVL 3000/ KVL 3000 Plus/ KVL 4000.

“KEYLOAD” appears on the display and the transceiver enters the KVL mode, after connecting KVL 3000/ KVL 3000Plus/ KVL 4000 to the transceiver with the connection cable and turning ON the transceiver.

Alternatively, “KEYLOAD” appears on the display and the transceiver enters the KVL mode, after connecting KVL 3000/ KVL 3000Plus/ KVL 4000 to the transceiver with the connection cable and turning ON the transceiver with the **[▼]** key being pressed. The operations available using KVL 3000/ KVL 3000Plus/ KVL 4000 are as follows:

- **Key Load**

  An Encryption Key can be configured on the SCM.

- **Key Delete**

  The Encryption Key configured on the SCM can be deleted.

- **Key View**

  A Key ID, CKR and Algorithm ID configured in the transceiver can be displayed.

Software Key Loader

An Encryption Key can be configured on the SCM using the Software Key Loader (KPG-AE1/ KPG-DE1).

When the transceiver is turned ON after connecting the transceiver to a PC with KPG-AE1/ KPG-DE1 installed using the KPG-36U/ KPG-36X (Portable) or KPG-46U/ KPG-46X (Mobile) programming cable, the following operations can be executed. “KEYLOAD” appears on the display while KPG-AE1/ KPG-DE1 and the transceiver communicate.

- **Key Load**

  An Encryption Key can be configured on the SCM.

- **Key Delete**

  The Encryption Key configured on the SCM can be deleted.

- **Key View**

  A Key ID configured in the transceiver can be displayed.

KPG-AE1/ KPG-DE1 supports KWD-AE31. Also, a USB Secure Key is required for use with KPG-AE1.

For KWD-AE30, the Encryption Key cannot be configured using KPG-AE1/ KPG-DE1.

Note

- To connect KVL 4000 to the portable transceiver by using the KCT-51 HRS Adapter, the transceiver must be placed in Key Loader Mode before connecting. The transceiver enters Key Loader Mode by turning ON the transceiver while pressing and holding the **[▼]** key. This operation is not required if not using the KCT-51 HRS Adapter or if using Software Key Loader.
- Contact KENWOOD for the connection cable.
- Refer to the instruction manual supplied with the KVL 3000/ KVL 3000Plus/ KVL 4000 or the help texts for KPG-AE1/ KPG-DE1 for details.

3.5 Built-in DES

The Encryption function by means of DES (Built-in DES) can be used by enabling **DES 4 Keys** by using KPG-D1/ D1N.

The DES (Built-in DES) encryption function enables encryption or decryption of communication data during voice or data communication by configuring the Encryption Key (Key ID, Key Data) in the **Multi-key List**. The transceiver is able to store up to 4 Built-in DES Encryption Keys (Key ID, Key Data). (Refer to Multi-key List.)

Note

- SCM and Built-in DES cannot be used at the same time.
- If the transceiver with an SCM installed is turned ON while the Encryption Key of Built-in DES is configured for the transceiver, the SCM is not initialized, and encrypted communication is executed by using Built-in DES.

Configuration using KPG-D1/ D1N

Configuring **DES 4 Keys** to be enabled or disabled (See Model > Product Information > Feature Selection)

3.6 Enhanced Encryption

The ARC4-format encryption function can be used by enabling **Enhanced Encryption** using the KPG-D1/ D1N.

The Enhanced Encryption type is the encryption type that is defined by the DMR Association, and is the Encryption function using a 40 bit encryption key.

The ARC4 encryption function enables encryption or decryption of communication data during voice or data communication by configuring the Encryption Key (Key ID, Key Data) in the **Multi-key List**. The transceiver is able to store up to 32 ARC4 Encryption Keys (Key ID, Key Data). (Refer to Multi-key List.)

Note

- **Enhanced Encryption** is the function to convert audio data or communication data to encrypted data. ARC4 (Alleged RC4) used for **Enhanced Encryption** and RC4 use the same encryption type. Secrecy in communications can be enhanced by encryption.
- “RC4” is a registered trademark of RSA Security LLC.

Configuration using KPG-D1/ D1N

Configuring **Enhanced Encryption** to be enabled or disabled (See Model > Product Information > Feature Selection)

3.7 Protection Function of Encryption Key (Key Retention)

Key Retention is the function for retaining or deleting Encryption Key information stored in the SCM or the Encryption Key of Built-in DES or Enhanced Encryption according to the configuration of the KPG-D1/ D1N.

Using this function, Encryption Key data can automatically be deleted, for instance, in case the transceiver is stolen or the transceiver has been left unused.

The behavior of the transceiver varies depending on the configuration in **Key Retention** as shown below:

SCM

- **Disable**

  Since the security level is high, this configuration (Disable) is the default.

  If the SCM is configured, the encryption key data is deleted when Tamper is detected or when the ESN is determined as inconsistent.

  The behavior specifications of when Tamper is detected under each condition are as follows:

Table 3-4 Behavior Specifications

Power Off	Conditions	About Encryption Key Data
With the battery removed	Less than 30 sec (power off time)	The encryption key data is still retained when the transceiver is turned ON again.
	Elapse of 30 sec or more (power off time)	The encryption key data is deleted when the transceiver is turned ON again.
	If the SCM is temporarily removed	The encryption key data is deleted when the transceiver is turned ON again.
With the battery attached	Less than 30 sec (power off time)	The encryption key data is still retained when the transceiver is turned ON again.
	Elapse of 30 sec or more (power off time)	The encryption key data is still retained when the transceiver is turned ON again.
	If the SCM is temporarily removed	The encryption key data is deleted when the transceiver is turned ON again.

- **Timed**

  If the transceiver is turned OFF for a duration longer than the duration configured by using the FPU, and if the ESN is inconsistent, the encryption key data is deleted. For the duration that can be configured by using the FPU, 1, 3, 7, 10, or 30 (days) can be selected. By directly editing the memory map, a value other than the values above can also be configured.

  In addition to when the transceiver is turned OFF, in consideration that the battery pack may be removed, the date and time history of when the transceiver is turned OFF is backed up once an hour while the transceiver behaves in user mode.

  Note

  The time configured for Duration is counted down using the internal clock. The internal clock operates on a built-in rechargeable lithium battery pack if the battery pack of the transceiver is detached. The lithium battery pack is automatically charged from the battery pack connected to the transceiver.

  If the battery pack is removed, the battery life of the built-in lithium battery pack is approximately 2 weeks.

- **Infinite**

  If the SCM is configured, the encryption key data is deleted only when the ESN is determined as inconsistent.

  Since the security level of this configuration (Infinite) is low, using this configuration along with **Transceiver Password** is recommended. If **Transceiver Password** is configured, the Encryption Key will be deleted if an incorrect password is entered 15 times in a row. For **Transceiver Password**, refer to Common FUNC “Password for Transceiver Operation (Transceiver Password)”.

Note

- Encryption Key data is deleted when the transceiver is turned ON. However, Encryption Key data is deleted immediately only if the SCM is detached from the transceiver, while the power source is supplied to the SCM.
- If the SCM installed in the transceiver is uninstalled and is reinstalled in another transceiver, the Encryption Key data is deleted regardless of the configuration for Key Retention.

Built-in DES/ Enhanced Encryption

- **Infinite**

  An Encryption Key is not deleted. The transceiver behaves as an ESN is always matched.

- **Timed**

  If the transceiver is turned OFF for a duration longer than the duration configured by using the FPU, the encryption key data is deleted. For the duration that can be configured by using the FPU, 1, 3, 7, 10, or 30 (days) can be selected. By directly editing the memory map, a value other than the values above can also be configured.

  In addition to when the transceiver is turned OFF, in consideration that the battery pack may be removed, the date and time history of when the transceiver is turned OFF is backed up once an hour while the transceiver behaves in user mode.

  Note

  The time configured for Duration is counted down using the internal clock. The internal clock operates on a built-in rechargeable lithium battery pack if the battery pack of the transceiver is detached. The lithium battery pack is automatically charged from the battery pack connected to the transceiver.

3.8 Deleting the Encryption Key (Key Delete)

Key Delete is the function for deleting the Encryption Key that is configured using the Key Loader in the SCM or the Encryption Key of Built-in DES and Enhanced Encryption.

The transceiver needs to enter Key Delete Mode in order to delete Encryption Key data using this function.

Pressing the **Key Delete** key places the transceiver in Key Delete Mode.

The transceiver can also enter Key Delete Mode by pressing the **Menu** key to place the transceiver in Menu Mode and then selecting “Key Delete”. (Refer to Common FUNC Using Menu Mode.)

Operating the transceiver

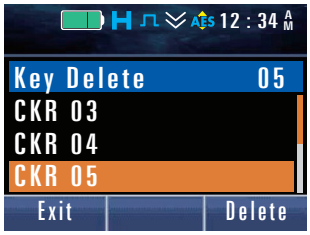
1 **Press the Key Delete key.**

Enters Key Delete Mode.

The following operations can also be used even if the transceiver enters Delete Mode by pressing the **Menu** key:

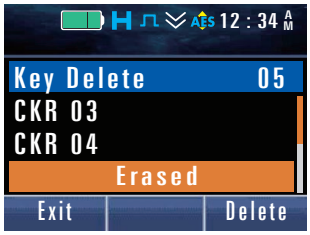
2 **Press the [▲] key or [▼] key and then select a Multi-key from the Multi-Key List.**

Refer to Common FUNC “Selecting or Clearing Data from a List” for selection methods.



3 **Press the Back ([⮌]) or [#] key.**

The selected Multi-key is deleted.



Note

- Pressing and holding either the **Back** (**[⮌]**) key or **[#]** key deletes all Multi-key data.
- If the Encryption Key corresponding to the selected Multi-key is not configured on the SCM, or if the Encryption Key is deleted from the SCM, “Erased” appears.

Configuration using KPG-D1/ D1N

Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)

3.9 Deleting All Encryption Keys (Zeroize)

Zeroize is the function for deleting all the Encryption Keys that are configured in the SCM or all the Encryption Keys of Built-in DES and Enhanced Encryption.

While using the SCM, the transceiver executes Zeroize in the following cases:

1) **If Zeroize is executed by pressing the Zeroize key**

   → Refer to Executing Zeroize using the Zeroize key.
2) **If Zeroize is executed from Menu Mode**

   → Refer to Executing Zeroize using the Menu Mode.
3) **If Zeroize of the AUX Input port is executed on Mobile**

   → Refer to Executing Zeroize using the AUX Input port (Mobile only).
4) **If ESN authentication is determined inconsistent when the transceiver is turned ON**
5) **If the transceiver detects Tamper when turned ON**
6) **If the transceiver has been turned OFF longer than the time configured in KPG-D1/ D1N when the transceiver is turned ON**

   → Refer to Protection Function of Encryption Key (Key Retention).
7) **If Zeroize is enabled when configuration data is written to the transceiver using KPG-D1/ D1N**

   All encryption key data configured on an SCM are deleted when writing the configuration data to the transceiver with Zeroize enabled (in the Write Data to the Transceiver dialog box) in KPG-D1/ D1N.
8) **If Transceiver Password entry fails 15 times in a row**

   All Encryption Keys configured on an SCM are deleted if an incorrect password is entered 15 times in a row when the transceiver is turned ON with the transceiver password configured. In this case, the user will not be notified that the Encryption Key has been deleted. Therefore, “Key Erased” does not appear on the display.

   Also, the number of failed times cannot be reset until the entered password matches the password configured in the transceiver even if the transceiver is turned OFF.
9) **If all Keys are deleted in Key Delete Mode**

   → Refer to Deleting the Encryption Key (Key Delete).
10) **If Zeroize (Key Erasure/ Key Delete) is executed in Key Loader**

   → Refer to Key Loader.

While using Built-in DES or Enhanced Encryption, the transceiver executes Zeroize in the following cases:

1) **If Zeroize is executed by pressing the Zeroize key**

   → Refer to Executing Zeroize using the Zeroize key.
2) **If Zeroize is executed from Menu Mode**

   → Refer to Executing Zeroize using the Menu Mode.
3) **If Zeroize of the AUX Input port is executed on Mobile**

   → Refer to Executing Zeroize using the AUX Input port (Mobile only).
4) **If the transceiver has been turned OFF longer than the time configured in KPG-D1/ D1N when the transceiver is turned ON**

   → Refer to Protection Function of Encryption Key (Key Retention).
5) **If Transceiver Password entry fails 15 times in a row**

   All Encryption Keys configured on an SCM are deleted if an incorrect password is entered 15 times in a row when the transceiver is turned ON with the transceiver password configured. In this case, the user will not be notified that the Encryption Key has been deleted. Therefore, “Key Erased” does not appear on the display.

   Also, the number of failed times cannot be reset until the entered password matches the password configured in the transceiver even if the transceiver is turned OFF.
6) **If all Keys are deleted in Key Delete Mode**

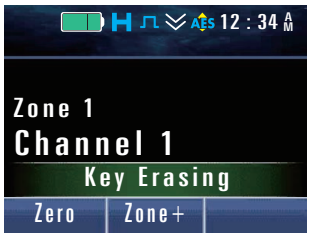
   → Refer to Deleting the Encryption Key (Key Delete).
7) **When the Enhanced Encryption (KWD-5500EE) status on the KPG-300LMC has been changed from permitted to prohibited (Enhanced Encryption only)**

The following describes the operation from 1) to 3):

Executing Zeroize using the Zeroize key

1 **Press the Zeroize key.**

"Key Erasing" appears on the display and Zeroize is executed.



2 **Zeroize completes.**

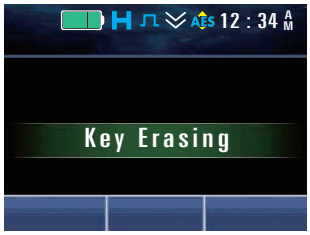
A Key Beep C (3 beeps) sounds from the transceiver, and "Key Erased" appears on the display for 2 sec.

Then, A Key Fail Alert Tone (6 beeps) sounds from the transceiver every 10 sec and displays "Key Fail" for 1 sec, and then the transceiver restores the channel display.

Executing Zeroize using the Menu Mode

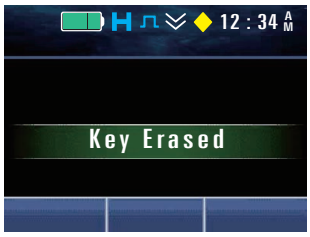
1 **Press the Menu key to enter Menu Mode and then select "Zeroize".**

"Key Erasing" appears on the display and Zeroize is executed.

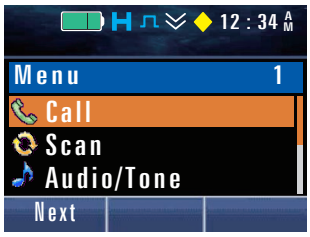


2 **Zeroize completes.**

A Key Beep C (3 beeps) sounds from the transceiver, and “Key Erased” appears on the display for 2 sec.



Then, the transceiver restores the Menu Mode display.



Executing Zeroize using the AUX Input port (Mobile only)

The Encryption Key can be deleted by assigning “Zeroize” to an AUX Input port and toggling the status of the port between High and Low.

All Encryption Keys stored in the SCM are deleted if Low or High level is continuously detected for the time configured in **Zeroize Delay Time**.

Note

If Zeroize is executed, keys for the AES-128 bit authentication used in **P25 Radio Authentication** are also deleted. (Refer to P25 FUNC P25 Radio Authentication (P25 Trunking System Only).)

If the transceiver is in the following state, the Zeroize process is not executed:

- In the Transceiver Inhibit state
- In the Stun state
- While transmitting Power Off Status
- In Transceiver Password Mode
- While Emergency Indicator functions
- While executing Zeroize

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Allocating functions to the AUX Input port (See Extended Function > AUX)
- Configuring **Zeroize Delay Time** (See Extended Function > AUX > AUX Input)
- Configuring **Zeroize** to be enabled or disabled (See Program > Write Data to the Transceiver)

About the SCM Communication Error Display

If a communication error occurs between the transceiver and the SCM when the transceiver transmits or receives using the Encryption function, “SCM Init Error” appears on the transceiver display for 1 sec.

In this status, the transceiver cannot use the Encryption function to transmit or receive.

If this communication error occurs, contact the place of purchase.

3.10 Multi-key List

Multi-key List is the list to configure the Encryption Key and the encryption key information that are used for encryption and decryption of communication data. A maximum of 32 sets of Encryption Keys and encryption key information can be configured in **Multi-key List** by using KPG-D1/ D1N.

The parameters that need to be configured vary depending on the encryption type to be used.

Bit scramble encryption type

To use bit scramble encryption, an Encryption Key needs to be configured in **Multi-key List**.

- **Key Data**

  Key Data allows you to configure the Encryption Key in the range of 1 to 32767.

- **Key Name**

  Key Name allows you to configure using a maximum of 14 alphanumeric characters and symbols a name corresponding to the Encryption Key.

AES/ DES encryption type

SCM is used for the AES/ DES format. To make use of SCM, it is necessary to configure the Encryption Key for SCM using Key Loader. (Refer to Key Loader.)

In **Multi-key List**, a CKR ID, which is encryption key information used to associate it with an Encryption Key configured in the SCM, must be configured.

- **CKR ID**

  CKR ID allows you to configure a CKR ID of the Encryption Key configured on an SCM in the range of 1 to 4095.

- **Key Name**

  Key Name allows you to configure using a maximum of 14 alphanumeric characters and symbols a name corresponding to the Encryption Key.

DES encryption type (Built-in DES)

In **Multi-key List**, a CKR ID, which is encryption key information used to associate it with an Encryption Key configured in the transceiver, must be configured.

- **CKR ID**
  CKR ID 1 to CKR ID 4 are automatically configured.
- **Key Name**
  Key Name allows you to configure using a maximum of 14 alphanumeric characters and symbols a name corresponding to the Encryption Key.

Enhanced Encryption format

To use the Enhanced Encryption format, an Encryption Key needs to be configured in the **Multi-key List**.

- **Key Data**
  Key Data allows you to configure the Encryption Key in the range of 1 to FFFFFFFFFE.
- **Key ID**
  Key Data allows an ID code for identifying an Encryption Key to be configured to a value between 1 to 255.
- **Key Name**
  Key Name allows you to configure using a maximum of 14 alphanumeric characters and symbols a name corresponding to the Encryption Key.

A **Multi-key List Number** corresponding to the Encryption Key configured in the **Multi-key List** can be configured for each channel.

Configuration using KPG-D1/ D1N

Configuring **Multi-key List** (See Transceiver Settings > Encryption > Multi-key List)

3.11 Transmit Clear Alert Tone

Transmit Clear Alert Tone is the function used to notify a user with a short beep that the communication data is not encrypted when the transceiver starts transmitting without communication data being encrypted.

With this function enabled, the Transmit Clear Alert Tone (1 beep) sounds from the transceiver if the Encryption function of the channel is disabled when the transceiver transmits.

Configuration using KPG-D1/ D1N

Configuring **Transmit Clear Alert Tone** to be enabled or disabled (See Transceiver Settings > Encryption > General)

3.12 Scrambler/Encryption Status Memory

Scrambler/Encryption Status Memory is the function to retain the enabled or disabled status of the Encryption function for each channel and the configuration of a Multi-key for each channel.

If **Scrambler/Encryption Status Memory** is enabled, the stored configurations of the enabled/disabled status of the Encryption function and **Multi-key List Number** are read as default when data is read from the transceiver by using KPG-D1/ D1N.

Configuration using KPG-D1/ D1N

Configuring **Scrambler/Encryption Status Memory** (See Transceiver Settings > Optional Features > Optional Features 1 > Others)

Scan is the function to check whether the transceiver receives a call from other transceivers.

The transceiver sequentially searches for availability of signal on each channel, and the transceiver receives on the channel where the signal is detected.

Three methods are available for Scan as shown below.

- **Single Scan**

  The transceiver scans target channels in the same zone.

- **List Scan**

  The transceiver scans the Zone-channel registered as a member in a Scan List.

- **Multi-Zone Scan**

  The transceiver scans all target channels in the target zones.

4.1 Starting the Scan

Scan can be started by one of the following methods:

- **Operating the PF Keys**
  - Pressing the **Scan** key starts or stops scanning.
  - Pressing the **Scan Normal** key starts or stops scanning.
  - Even if the Priority Channel is configured, pressing the **Scan Normal** key disables the Priority Channel and mandatorily executes Non-Priority Scan.
  - Executing “Scan” or “Scan Normal” after pressing the **Menu** key to enter Menu Mode starts or stops scanning.

- **Lever switch operation**

  Operating the **Lever** switch to be in the position where “Scan” or “Scan Normal” is allocated starts scanning. Operating the **Lever** switch to be in the position where “Scan” or “Scan Normal” is not allocated stops scanning.

- **Status changes of the AUX Input port (Mobile only)**

  When the AUX Input port where “Scan” is assigned goes low level, the scan starts. When the AUX Input port where “Scan” is assigned goes high level, the scan stops.

- **Turning the transceiver on**

  If **Power-on Scan** is enabled, the scan starts when the transceiver is turned on. (Refer to Power-on Scan.)

- **Selecting a channel**

  The scan starts if a channel with **Auto Scan** enabled is selected. (Refer to Auto Scan.)

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Allocating functions to the **Lever** switch (See Transceiver Settings > Key Assignment > Top/Side)
- Allocating functions to the AUX Input port (See Extended Function > AUX)

4.2 Scanning in One Zone (Single Scan)

The transceiver scans using Single Scan all the added channels in the zone where the transceiver starts scanning.

If a scan starts in the zone where “Single” is configured in **Scan Type**, Single Scan is executed. Or, if the transceiver migrates during the scan to the zone where “Single” is configured in Scan Type, Single Scan is executed.

The target channel for scan is either the channel with **Scan Add** enabled by using KPG-D1/ D1N or the channel with **Scan Add** enabled by using the **Scan Delete/Add** key.

Operating the transceiver

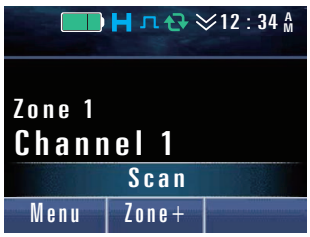
1 Press the Scan key.

The scan starts after a Key Beep A (1 beep) sounds from the transceiver.

The “ ” icon appears and then Revert Channel is displayed.

If **“Scan” Displayed** is enabled, “Scan” is displayed.

For portable transceivers, the LED light flashes according to the configuration of **Non-Priority Scan LED** in the case of non-priority scan, and according to the configuration of **Priority Scan LED** in the case of priority scan.

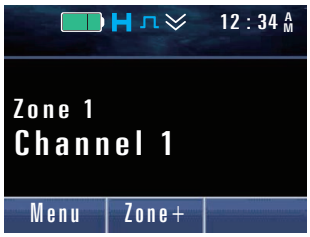


Note

The transceiver behaves in the same manner even if the scan is started by other method. (Refer to Starting the Scan.)

2 Press the Scan key during the scan.

The scan completes after a Key Beep B (2 beeps) sounds from the transceiver and the “ ” icon disappears.



Note

- Single Scan functions only in the zone consisting of channels of the same system. However, Single Scan functions even when the zone includes Conventional channels of other systems or channels of an LTR Trunking system.
- If **Selected Channel Scan** is enabled, the selected channel can be scanned even if the channel is excluded from the target channels for scan. (Refer to Selected Channel Scan.)
- For Portable, if the transceiver changes the zone during a Single Scan by using **Selector** with “Zone Select” configured and if the new zone is not configured, the “ ” icon blinks and the scan pauses.
- If another zone is selected during the Single Scan, the transceiver starts the scan according to the configuration in **Scan Type** of the selected zone.

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Configuring **Scan Add** to be enabled or disabled (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > General)
- Configuring **Scan Type** (See Transceiver Settings > Zone/Channel > Zone Edit > Scan)
- Configuring **"Scan" Displayed** to be enabled or disabled (See Transceiver Settings > Scan > Scan Information > General)

Conditions to Activate the Scan (Single Scan)

One of the following conditions must be satisfied for the transceiver to start the Single Scan:

- Two or more channels exist in the zone where the transceiver scans.
- A channel to be scanned and a Priority Channel exist in the zone.
- Even if no channel to be scanned exists, Priority Channel 1 and Priority Channel 2 exist in the zone.

Conditions to Resume the Scan (Single Scan)

One of the following conditions must be satisfied to resume the scan while the transceiver pauses the scan:

- Two or more channels exist in the zone where the transceiver scans.
- A channel to be scanned and a Priority Channel to be scanned exist in the zone.
- Even if no channel to be scanned exists, Priority Channel 1 and Priority Channel 2 to be scanned exist in the zone.

If the transceiver does not satisfy the conditions to resume the scan, the scan remains paused.

Transceiver Behavior in the Case that the Scan Cannot Be Resumed (Single Scan)

If the transceiver manually switches during the scan to the zone or channel which does not satisfy the condition to resume the scan, the transceiver displays the selected channel and the scan remains paused.

If the **PTT** switch is pressed while the condition to resume the scan is not satisfied, the transceiver transmits using the **Revert Channel**. Upon elapse of the time configured in Dwell Time after completion of the transmission, the transceiver reverts to the selected channel; however, the scan does not resume.

4.3 Scan by Registering Multiple Target Channels for Scan in the List (List Scan)

Using the List Scan enables the transceiver to scan the Zone-channels registered as a member in a Scan List.

If a scan starts in a zone where “List” is configured in **Scan Type** or on a channel where a Scan List Number is configured, List Scan is executed. Or, if the transceiver is in the zone where “List” is configured in **Scan Type** and migrates to the channel where a Scan List Number is configured during the scan, List Scan is executed.

Operating the transceiver

1 Press the Scan key.

The scan starts after a Key Beep A (1 beep) sounds from the transceiver.

The “ ” icon appears and then Revert Channel is displayed.

If **“Scan” Displayed** is enabled, “Scan nnn” (nnn indicates Scan List No.) is displayed.

For portable transceivers, the LED light flashes according to the configuration of **Non-Priority Scan LED** in the case of non-priority scan, and according to the configuration of **Priority Scan LED** in the case of priority scan.

Note

The transceiver behaves in the same manner even if the scan is started by other method. (Refer to Starting the Scan.)

2 Press the Scan key during the scan.

The scan completes after a Key Beep B (2 beeps) sounds from the transceiver and the “ ” icon disappears.

Note

- If **Selected Channel Scan** is enabled, the selected channel can be scanned even if the channel is excluded from the target channels for scan. (Refer to Selected Channel Scan.)
- If another zone is selected during the List Scan, the transceiver starts the scan according to the configuration in **Scan Type** of the selected zone.

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Configuring **Scan List** (See Transceiver Settings > Scan > Scan List)
- Configuring **Scan List Number** (Zone) (See Transceiver Settings > Zone/Channel > Zone/Channel Information > Conventional)
- Configuring **Scan List Number** (Channel) (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > General)
- Configuring **Scan Type** (See Transceiver Settings > Zone/Channel > Zone Edit > Scan)
- Configuring **"Scan" Displayed** to be enabled or disabled (See Transceiver Settings > Scan > Scan Information > General)

Conditions to Activate the Scan (List Scan)

For the transceiver to start the List Scan, 2 or more Zone-channels must be registered as members in a Scan List.

Note

- A Priority Channel is always registered as a member in a Scan List. However, if "Selected" is configured for the type of the Priority Channel (**Type**), the selected channel becomes the Priority Channel and target channel for scan, regardless of the configuration in **Selected Channel Scan** or whether the selected channel is registered as a member in a Scan List. (Refer to Priority Channel Type (Type).)
- If **Selected Channel Scan** is enabled, the scan can be initiated even if only a single Zone-channel is configured as a member in a Scan List because the selected channel also becomes the target channel for scan.

Conditions to Resume the Scan (List Scan)

For the transceiver to resume the List Scan, 2 or more Zone-channels to be scanned must be registered as members in a Scan List.

If the transceiver does not satisfy the conditions to resume the scan, the scan remains paused.

Note

- If a channel is temporarily excluded from the target channels for scanning by the **Priority Temporary Delete/Add** function, the channel is not scanned even if the channel is registered as a member in Scan List.
- If **Selected Channel Scan** is enabled, the scan can be resumed even if only a single Zone-channel is configured as a member in a Scan List because the selected channel also becomes the target channel for scan.

Transceiver Behavior in the Case that the Scan Cannot Be Resumed (List Scan)

If the transceiver manually switches during the scan to the zone or channel which does not satisfy the condition to resume the scan, the transceiver displays the selected channel and the scan remains paused.

If the **PTT** switch is pressed while the condition to resume the scan is not satisfied, the transceiver transmits using the **Revert Channel**. Upon elapse of the time configured in Dwell Time after completion of the transmission, the transceiver reverts to the selected channel; however, the scan does not resume.

Scan List

In order to use List Scan, target members for List Scan must be registered in a Scan List. A maximum of 128 Scan Lists can be configured. In each Scan List, a maximum of 31 Zone-channels can be registered as target members for List Scan.

Scan Type (Scan List)

In order to register a target member for List Scan, **Scan Type (Scan List)** must be configured.

Table 4-1 Scan Type (Scan List)

Configuration	Description
Conventional	A Zone-channel in a system where “Analog Conventional”, “P25 Conventional”, “NXDN Conventional”, or “DMR Conventional” is configured in **System Type** can be registered as a member for List Scan. Configuring a Priority Channel enables Priority Scan.
LTR and Conventional	A Zone-channel in a system where “LTR Trunking”, “Analog Conventional”, “Analog Conventional”, “Analog Conventional”, “P25 Conventional”, “NXDN Conventional”, or “DMR Conventional” is configured in **System Type** can be registered as a member for List Scan.

Scan List Number (Channel)

List Scan is executed according to the Scan List Number configured for the channel where scan is initiated. According to the configuration in **Scan List Number**, List Scan is executed as follows:

Table 4-2 Scan List Number (Channel)

Configuration	Description
Zone Common	List Scan is executed by referring to the **Scan List Number** configured for the zone.
1 to 128	List Scan is executed according to the List Number in the corresponding Scan List.
None	List Scan is not executed.

Configuration using KPG-D1/ D1N

Configuring **Scan List** (See Transceiver Settings > Scan > Scan List > Members)

Changing the Scan List (Scan Program)

A desired Zone-channel can be registered as a member for List Scan in the Scan List by operating the transceiver. Also, a registered member in the Scan List can be deleted from the list.

The Scan List can be edited in Scan Program Mode.

Pressing the **Scan Program** key places the transceiver in Scan Program Mode.

Or, pressing the **Menu** key to enter Menu Mode and then selecting “Scan Program ” places the transceiver in Scan Program Mode. (Refer to Common FUNC Using Menu Mode.)

Operating the transceiver

- **Adding a member for List Scan**

1 **Select the channel for which the Scan List to be edited is configured and then press the Scan Program key.**

A Key Beep A (1 beep) sounds from the transceiver.

The transceiver enters Scan Program Mode and the edit screen of the Scan List appears.

The following operations are identical even if the transceiver enters Scan Program Mode by pressing the **Menu** key.

Note

If the selected channel is registered in the Scan List, the “” icon appears on the left of the channel name.

2 **Select a Zone-channel to add to the Scan List.**

Select a channel by pressing the **[▲]** or **[▼]** key.

Select a zone by pressing the **[◀]** or **[▶]** key.

Refer to Common FUNC “Selecting or Clearing Data from a List” for selection methods.

3 **Press the Menu ([ ]) or [*] key.**

A Key Beep A (1 beep) sounds from the transceiver, and then the Zone-channel selected in Step 2 is added to a Scan List. The “” icon appears on the left of the channel name.

Note

In the following cases, a member cannot be added to a Scan List:

- If the zone channel to be added to a Scan List is already configured as a member in the Scan List
- If a channel which is inappropriate for the configuration in **Scan Type (Scan List)**, such as a channel in an NXDN Trunking system, is selected for the Scan List with “Conventional” configured in **Scan Type (Scan List)**

● Deleting a member from List Scan

1 Select the channel for which the Scan List to be edited is configured and then press the Scan Program key.

A Key Beep A (1 beep) sounds from the transceiver.

The transceiver enters Scan Program Mode and the edit screen of the Scan List appears.

The following operations are identical even if the transceiver enters Scan Program Mode by pressing the **Menu** key.

Note

If the selected channel is registered in the Scan List, the "⩔" icon appears on the left of the channel name.

2 Select a Zone-channel to be deleted from the Scan List.

Select a channel by pressing the **[▲]** or **[▼]** key.

Select a zone by pressing the **[◀]** or **[▶]** key.

Refer to Common FUNC "Selecting or Clearing Data from a List" for selection methods.

3 Press the Menu ([ ]) or [*] key.

Key Beep B (2 beeps) sounds from the transceiver, and then the Zone-channel selected in Step 2 is deleted from the Scan List. The "⩔" icon disappears from the left of the channel name.

Note

In the following cases, a member cannot be deleted from the Scan List:

- If the zone channel to be deleted from the Scan List is a Priority Channel
- If the number of members registered in the Scan List is zero

Configuration using KPG-D1/ D1N

Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)

4.4 Scanning All Target Zones for Scanning (Multi-Zone Scan)

In a DMR Conventional system, by using Multi-Zone Scan, the transceiver can scan all channels to be scanned in the target zones.

If a scan starts in the zone where “Multi-Zone” is configured in **Scan Type**, Multi-Zone Scan is executed. Or, if the transceiver migrates during the scan to the zone where “Multi-Zone” is configured in **Scan Type**, Multi-Zone Scan is executed.

The target zone for scanning is either the zone with **Zone Add** enabled by using KPG-D1/ D1N or the zone with **Zone Add** enabled by using the **Zone Delete/Add** key.

The target channel for scan is either the channel with **Scan Add** enabled by using KPG-D1/ D1N or the channel with **Scan Add** enabled by using the **Scan Delete/Add** key.

Operating the transceiver

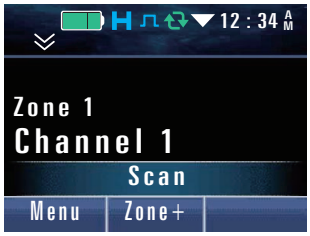
1 Press the Scan key.

The scan starts after a Key Beep A (1 beep) sounds from the transceiver.

The “ ” icon appears and then Revert Channel is displayed.

If **“Scan” Displayed** is enabled, “Scan” is displayed.

For portable transceivers, the LED light flashes according to the configuration of **Non-Priority Scan LED** in the case of non-priority scan, and according to the configuration of **Priority Scan LED** in the case of priority scan.



Note

The transceiver behaves in the same manner even if the scan is started by other method. (Refer to Starting the Scan.)

2 Press the Scan key during the scan.

The scan completes after a Key Beep B (2 beeps) sounds from the transceiver and the “ ” icon disappears.

Note

- “Multi-Zone” can be configured in **Scan Type** only for the zones structured with the following systems:
  - System Type = Analog Conventional
  - System Type = P25 Conventional
  - System Type = NXDN Conventional
  - System Type = LTR Trunking
  - System Type = DMR Conventional

  Even if these systems exist in the same zone, “Multi-Zone” can be configured in **Scan Type**. In this case, “Single” can also be configured in **Scan Type**, and starting Multi-Zone Scan can also scan the zones with “Single” configured in **Scan Type**.

- If **Selected Channel Scan** is enabled, the selected channel can be scanned even if the channel is excluded from the target channels for scan. (Refer to Selected Channel Scan.)
- For Portable, if the transceiver changes the zone during Multi-Zone Scan by using the **Selector** with "Zone Select" configured and if the new zone is not configured, the " " icon blinks and the scan pauses.
- If another zone is selected during the Multi-Zone Scan, the transceiver starts the scan according to the configuration in **Scan Type** of the selected zone.

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Configuring **Scan Add** to be enabled or disabled (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > General)
- Configuring **Zone Add** to be enabled or disabled (See Transceiver Settings > Zone/Channel > Zone Edit > Scan)
- Configuring **Scan Type** (See Transceiver Settings > Zone/Channel > Zone Edit > Scan)
- Configuring **"Scan" Displayed** to be enabled or disabled (See Transceiver Settings > Scan > Scan Information > General)

Conditions to Activate the Scan (Multi-Zone Scan)

One of the following conditions must be satisfied for the transceiver to start the Multi-Zone Scan:

- When a total of two or more channels targeted to be scanned exists in the zone targeted to be scanned
- When only one target zone exists, and when one target channel exists in the target zone and a Priority Channel exists in the target zone or another zone
- When Priority Channel 1 and Priority Channel 2 exist in another zone, even if no zone to be scanned exists

Conditions to Resume the Scan (Multi-Zone Scan)

One of the following conditions must be satisfied to resume the Multi-Zone Scan while the transceiver pauses the scan:

- When a total of two or more channels targeted to be scanned exists in the zone targeted to be scanned
- When only one target zone exists, and when one target channel exists in the target zone and a Priority Channel exists in the target zone or another zone
- When Priority Channel 1 and Priority Channel 2 exist in another zone, even if no zone to be scanned exists

If the transceiver does not satisfy the conditions to resume the scan, the scan remains paused.

Transceiver Behavior in the Case that the Scan Cannot Be Resumed (Multi-Zone Scan)

If the transceiver manually switches during the scan to the zone or channel which does not satisfy the condition to resume the scan, the transceiver displays the selected channel and the scan remains paused.

If the **PTT** switch is pressed while the condition to resume the scan is not satisfied, the transceiver transmits using the **Revert Channel**. Upon elapse of the time configured in **Dwell Time** after completion of the transmission, the transceiver reverts to the selected channel, and the scan does not resume.

4.5 Scanning the Specific Channel Preferentially (Priority Scan)

Priority Scan is the function to prioritize and scan the target channels.

This function can be used for Single Scan or List Scan in a Conventional channel.

- **Single Scan**

  A maximum of 2 Priority Channels can be configured in each zone.

- **List Scan**

  A maximum of 2 Priority Channels can be configured in each Scan List.

If a Priority Channel is configured, the transceiver monitors Priority Channel by executing Lookback even when receiving on a normal channel.

On the channel where Priority 1 has the highest priority, Lookback is not executed while receiving on Priority 1.

Priority 2 is the channel prioritized next to Priority 1; therefore, Lookback is executed on Priority 1 while receiving on Priority 2.

Priority Channel Type (Type)

Priority Channel Type can be selected from “None”, “Fixed”, “Selected” and “Operator Selectable”.

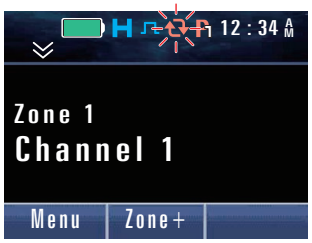
Table 4-3 Type

Configuration	Description
None	No Priority Channel is configured.
Fixed	The channel configured using KPG-D1/ D1N is configured as the Priority Channel. The Priority cannot be changed by operating the transceiver.
Selected	The channel selected on the Transceiver is configured as the Priority Channel.
Operator Selectable	The channel configured by a user in Priority-channel Select Mode (Single Scan/ Multi-Zone Scan) or Scan Program (List Scan) is configured as the Priority Channel. (Refer to Changing the Priority Channel, Changing the Scan List (Scan Program).)

Transceiver behavior

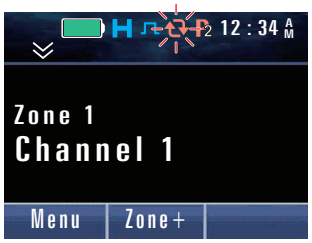
- **If the Zone-channel configured for the Priority 1 is selected, or if the scan is paused on the Zone-channel configured for the Priority 1**

  The “ ” icon appears. When Priority Scan is paused, the “ ” icon blinks.



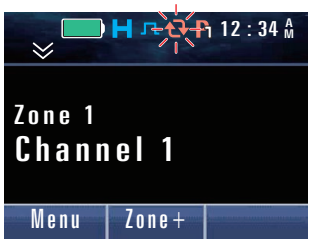
- **If the Zone-channel configured for the Priority 2 is selected, or if the scan is paused on the Zone-channel configured for the Priority 2**

  The “ ” icon appears. When Priority Scan is paused, the “ ” icon blinks.



- **If the same Zone-channel is selected for Priority 1 and the Priority 2, or if the scan is paused on the same Zone-channel configured for Priority 1 and the Priority 2**

  The “ ” icon with higher priority appears. When Priority Scan is paused, the “ ” icon blinks.



Note

- If **Priority-channel Stop Tone** is enabled, a Priority-channel Tone (1 beep) is emitted from the transceiver when the scan is paused on the Priority Channel and the speaker is unmuted.
- The Priority Channel is scanned even if the Priority Channel is excluded from the target channels for scan. However, the Priority Channel can be temporarily excluded from the target channels for scan by using the **Priority Temporary Delete/Add** function.
- If the same channel is selected for **Priority 1** and **Priority 2**, and if **Priority Temporary Delete/Add** of either Priority 1 or Priority 2 is permitted, **Priority Temporary Delete/Add** is executed only on the permitted Priority Channel when the **Scan Delete/Add** key is pressed.
- Pressing the **Home Channel** key during the scan does not change the Priority Channel even if “Selected Priority Scan” is configured for the Priority.
- The transceiver behaves as follows if one of the **Direct Channel 1** to **Direct Channel 5** keys is pressed during the scan:
  - If **Return** is disabled, Direct Channel 1 to Direct Channel 5 become the Priority Channels if Direct Channel 1 to Direct Channel 5 are Conventional channels.
  - If **Return** is enabled, the Priority Channel does not change.

Configuration using KPG-D1/ D1N

- Configuring **Priority 1** (Single Scan) (See Transceiver Settings > Zone/Channel > Zone Edit > Single Scan > Priority 1)
- Configuring **Priority 2** (Single Scan) (See Transceiver Settings > Zone/Channel > Zone Edit > Single Scan > Priority 2)
- Configuring **Priority 1** (List Scan) (See Transceiver Settings > Scan > Scan List > Options > Priority 1)
- Configuring **Priority 2** (List Scan) (See Transceiver Settings > Scan > Scan List > Options > Priority 2)
- Configuring **Priority-channel Stop Tone** to be enabled or disabled (See Transceiver Settings > Scan > Scan Information > General)

Changing the Priority Channel

The Priority Channel can be changed by operating the transceiver.

- **Single Scan**

  The Priority Channel can be changed in Priority-channel Select Mode.

  Pressing the **Priority-channel Select** key places the transceiver in Priority-channel Select Mode.

  Or, pressing the **Menu** key to enter Menu Mode and then selecting “Priority-channel Select” places the transceiver in Priority-channel Select Mode. (Refer to Common FUNC Using Menu Mode.)

  The transceiver can enter Priority-channel Select Mode only if “Operator Selectable Priority Scan” is configured in either **Priority 1** or **Priority 2**.

- **List Scan**

  The Priority Channel can be changed on the Priority Channel edit screen in Scan Program Mode.

  Pressing the **Scan Program** key places the transceiver in Scan Program Mode.

  Or, pressing the **Menu** key to enter Menu Mode and then selecting “Scan Program ” places the transceiver in Scan Program Mode. (Refer to Common FUNC Using Menu Mode.)

  Pressing the **Function [◯]** key in Scan Program Mode displays the Priority Channel edit screen.

  The transceiver can enter the Priority Channel edit screen only if “Operator Selectable Priority Scan” is configured in either **Priority 1** or **Priority 2**.

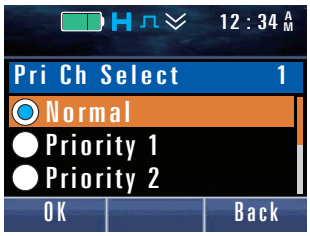
Operating the transceiver

- **Changing the Priority Channel in Priority-channel Select Mode (Single Scan)**

1 **Press the Priority-channel Select key after selecting the channel to be configured as the Priority Channel.**

The transceiver enters Priority-channel Select Mode.

The following operations are identical if the transceiver enters Priority-channel Select Mode by pressing the **Menu** key.



2 **Select the priority of a channel by pressing the [▲] or [▼] key.**

Priority can be selected from “Normal”, “Priority 1”, “Priority 2”, and “Priority 1&2”.

3 **Press the Menu ([ ]) or [*] key.**

After the Key Beep B (2 beeps) sounds, the transceiver exits Priority-channel Select Mode and restores the previous channel display.

● Changing the Priority Channel in Scan Program Mode (List Scan)

1 **Press the Scan Program key after selecting the channel to be configured as Priority Channel.**

A Key Beep A (1 beep) sounds from the transceiver.

The transceiver enters Scan Program Mode and the edit screen of the Scan List appears.

The following operations are identical even if the transceiver enters Autodial Mode by pressing the **Menu** key.

2 **Press the Function [ ] key.**

The transceiver enters the Priority Channel edit screen.

3 **Select the priority of a channel by pressing the [▲] or [▼] key.**

Priority can be selected from “Normal”, “Priority 1”, “Priority 2”, and “Priority 1&2”.

4 **Press the Menu ([ ]) or [*] key.**

After a Key Beep C (3 beeps) sounds, the transceiver exits Scan Program Mode and restores the previous channel display.

Configuration using KPG-D1/ D1N

Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)

Lookback

Lookback is the function to periodically checks for a Priority Channel if a Priority Channel is configured for the transceiver and the transceiver receives on a normal channel (a channel which is not Primary Channel).

Either **Lookback Time A** or **Lookback Time B** is applied for the interval to initiate checking for a signal on a Priority Channel according to the receiving status of the Priority Channel.

Lookback Time A

Lookback Time A is the interval time to check during a Priority Scan for a signal on a Priority Channel without a carrier while the transceiver receives a signal on a normal channel whose carrier is different from the carrier of the Priority Channel.

Since the transceiver may receive a call on the Priority Channel, the time configured in **Lookback Time A** must be shorter than the time configured in **Lookback Time B**.

Lookback Time B

Lookback Time B is the interval time to check during a Priority Scan for a signal on a Priority Channel which does not match the QT/DQT in an Analog Conventional system or a Priority Channel which does not match the Color Code in a DMR Conventional system even though a carrier exists, while the transceiver receives a signal on a normal channel whose carrier is different from the carrier of the Priority Channel.

Note

If DMR digital signals are received on a normal channel in a DMR Conventional system, **Lookback Time A** and **Lookback Time B** function according to the sum of 500 ms added to the value configured using KPG-D1/ D1N.

Configuration using KPG-D1/ D1N

- Configuring **Lookback Time A/ Lookback Time B** (Single Scan) (See Transceiver Settings > Zone/Channel > Zone Edit > Single Scan)
- Configuring **Lookback Time A/ Lookback Time B** (List Scan) (See Transceiver Settings > Scan > Scan List > Options)

Priority 1 Temporary Delete/Add, Priority 2 Temporary Delete/Add

A Priority Channel is always scanned regardless of the Scan Delete/Add configuration. If this function is enabled, pressing the **Scan Delete/Add** key temporarily deletes a Priority Channel from the target channels for scan when the scan pauses on the Priority Channel during the scan.

Configuration using KPG-D1/ D1N

- Configuration **Priority 1 Temporary Delete/Add** (Single Scan) to be enabled or disabled (See Transceiver Settings > Zone/Channel > Zone Edit > Single Scan > Priority 1)
- Configuration **Priority 2 Temporary Delete/Add** (Single Scan) to be enabled or disabled (See Transceiver Settings > Zone/Channel > Zone Edit > Single Scan > Priority 2)
- Configuring **Priority 1 Temporary Delete/Add** (List Scan) to be enabled or disabled (See Transceiver Settings > Scan > Scan List > Options > Priority 1)
- Configuring **Priority 2 Temporary Delete/Add** (List Scan) to be enabled or disabled (See Transceiver Settings > Scan > Scan List > Options > Priority 2)

Scan Normal Channel

Scan Normal Channel is the function to execute the scan by disabling the Priority Channel configuration even if a Priority Channel is configured.

Even if the Priority Channel is configured, pressing the **Scan Normal** key disables the configuration and mandatorily executes Scan Normal Channel.

Configuration using KPG-D1/ D1N

Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)

4.6 Transceiver Behavior during the Scan

This section describes various behaviors of the transceiver during the scan.

Note

The length of time from when the transceiver pauses the scan for transmission or reception until the transceiver resumes the scan can be configured using **Dropout Delay Time** and **Dwell Time**. (Refer to Dropout Delay Time, Dwell Time.)

Transceiver Behavior When a Zone-channel Is Changed during the Scan

If a Zone-channel is changed manually during the scan, the transceiver pauses the scan on a new channel. After a second elapses, the scan resumes.

If a Zone-channel is changed manually while the scan pauses for reception, and if the channel where the scan is paused is different from the selected channel, the scan pauses on the selected channel.

Reception during the Scan

The following are the reception behaviors during the scan.

If the Color Code and ID (Unaddress ID, Group ID, or Individual ID) received on each channel match the Color Code and ID (Unaddress ID, Group ID, or Individual ID) preconfigured for the transceiver, the transceiver pauses scanning. If the Color Code or ID (Unaddress ID, Group ID, or Individual ID) does not match, **Dropout Delay Time** is activated. After the time configured in **Dropout Delay Time** elapses, the transceiver resumes the scan.

4.7 Scan Function

The following functions are relevant to the scan.

- Scan Delete/Add
- Zone Delete/Add
- Revert Channel
- Dropout Delay Time
- Dwell Time
- Channel Recall
- Priority-channel Stop Tone
- Auto Scan
- Selected Channel Scan
- Power-on Scan
- Off-hook Scan (Mobile Only)
- Scan Stop Tone
- Preamble Length

Adding or Deleting a Channel to/from the Target Channels for Scan (Scan Delete/ Add)

Scan Delete/Add is the function to add a channel to be scanned to the Scan List or delete a channel to be scanned from the Scan List.

This function is used to reliably receive a call from a primary channel by deleting unnecessary channels to increase the scan speed.

The following are the transceiver behavior:

● When Scan is disabled

For a zone with “Single” or “Multi-Zone” configured in Scan Type:

Pressing the **Scan Delete/Add** key allows you to add the selected channel to the target channels for scan or delete the selected channel from the target channel s for scan. The Scan Delete/Add information is retained in the transceiver.

For a zone with “List” configured in Scan Type:

Pressing the **Scan Delete/Add** key allows you to add the selected channel as a member to the Scan List configured for the selected channel, or delete the channel from the Scan List configured for the selected channel. The Scan Delete/Add information is retained in the transceiver.

● When the scan is paused

For a zone with “Single” or “Multi-Zone” configured in Scan Type:

Pressing the **Scan Delete/Add** key allows you to add the selected channel temporarily to the target channels for scan or delete the selected channel temporarily from the target channels for scan (Temporary Delete/ Add). This status is retained until the scan is terminated by operations such as pressing the **Scan** key, and the status is cleared when the scan completes.

For a zone with “List” configured in Scan Type:

Pressing the **Scan Delete/Add** key temporarily deletes a selected channel if it is registered in the members of Scan List. Pressing the **Scan Delete/Add** key again restores it (Temporary Delete/ Add). This status is retained until the scan is terminated by operations such as pressing the Scan key, and the status is cleared when the scan completes.

● During the scan

Pressing the **Scan Delete/Add** key causes a Key-entry Error Tone (1 beep) to sound from the transceiver but the transceiver does not respond at all.

Note

- The operation above is enabled even if the transceiver enters Menu Mode by pressing the **Menu** key and then executes “Scan Delete/Add”. (Refer to Common FUNC Using Menu Mode.)
- For the zone with “List” configured in Scan Type, a target channel for scan can be added or deleted in Scan Program Mode. (Refer to Changing the Scan List (Scan Program).)

Configuration using KPG-D1/ D1N

Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)

Adding or Deleting a Zone to or from the Target Zones for Scanning (Zone Delete/ Add)

Zone Delete/Add is the function to add a zone to the target zones for scanning or delete a zone from the target zones for scanning when using Single Scan or Multi-Zone Scan.

For Multi-Zone Scan, this function is used to increase the scan speed and reliably receive a call from a primary zone by deleting unnecessary zones.

Pressing the **Zone Delete/Add** key adds or deletes a zone to or from the target zones for scanning.

Or, a zone can be added to or deleted from the target zones for scanning by executing “Zone Delete/Add” after entering Menu Mode by pressing the **Menu** key. (Refer to Common FUNC Using Menu Mode.)

Note

- For Multi-Zone Scan, only zones structured with a Conventional system or an LTR Trunking system can be added to or deleted from the target zones for scanning.
- If there is only one target zone left while Multi-Zone Scan pauses, the zone cannot be deleted from the target zones even if Zone Delete/Add is executed.
- Even if Zone Delete/Add is executed while the scan other than Multi-Zone Scan pauses, the selected zone cannot be deleted from the target zones.

Configuration using KPG-D1/ D1N

Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)

Revert Channel

Revert Channel is the Zone-channel which is used when the transceiver transmits by pressing the **PTT** switch during the scan.

Table 4-4 Revert Channel

Configuration	Description
Last Called + Selected	The transceiver transmits on the last-called Zone-channel by pressing the **PTT** switch during the scan. The transceiver transmits on the Zone-channel where the transceiver pauses the scan by pressing the **PTT** switch during the scan. If the Zone-channel is changed, the transceiver transmits using the new channel after the Zone-channel is changed until the transceiver receives another call.
Selected	The transceiver transmits on the new channel after the Zone-channel is changed regardless of the scan status.
Selected + Talkback	During the scan, the transceiver transmits on the new Zone-channel after the zone-channel is changed. While the scan is paused, the transceiver transmits on the Zone-channel where the transceiver pauses scanning.
Priority 1	The transceiver transmits on a Priority 1 regardless of the scanning status.
Priority 1 + Talkback	The transceiver transmits on a Priority 1 during the scan. While the scan is paused, the transceiver transmits on the Zone-channel where the transceiver pauses scanning.
Priority 2	The transceiver transmits on a Priority 2 regardless of the scanning status.
Priority 2 + Talkback	The transceiver transmits on a Priority 2 during the scan. While the scan is paused, the transceiver transmits on the Zone-channel where the transceiver pauses scanning.

Note

- Revert Channel always appears on the display of the transceiver during the scan.
- If Home Channel is activated, the transceiver transmits on the Home Channel regardless of the configuration in **Revert Channel**.
- If the Direct Channel function (Return = Check) is activated, the transceiver transmits on the Direct Zone-Channel regardless of the configuration in **Revert Channel**.

Configuration using KPG-D1/ D1N

- Configuring **Revert Channel** (Single Scan) (See Transceiver Settings > Zone/Channel > Zone Edit > Single Scan)
- Configuring **Revert Channel** (List Scan) (See Transceiver Settings > Scan > Scan List > Options)

Dropout Delay Time

Dropout Delay Time is the time from when the transceiver finishes receiving signals until the transceiver resumes scanning.

The transceiver pauses scanning when the transceiver receives a call during the scan. The transceiver resumes the scan when the time configured in **Dropout Delay Time** elapses after the transceiver finishes receiving.

The following are conditions to resume scanning:

- There is no signal to receive.
- The matching state of the Color Code becoming inconsistent

The transceiver activates Talkback according to the configuration in **Revert Channel** while the time configured in **Dropout Delay Time** elapses.

If the scan is paused while the time configured in **Dropout Delay Time** elapses, and if the channel is not the Priority Channel 1 or Priority Channel 2, the Priority Channel 1 and Priority Channel 2 are monitored by executing Lookback.

Configuration using KPG-D1/ D1N

Configuring **Dropout Delay Time** (See Transceiver Settings > Scan > Scan Information > General)

Dwell Time

During the scan, the scan pauses when the **PTT** switch is pressed to transmit. **Dwell Time** is the time from when the transceiver completes transmitting until the transceiver resumes scanning.

The transceiver activates Talkback according to the configuration in **Revert Channel** while the time configured in **Dwell Time** elapses.

If the scan is paused while the time configured in **Dwell Time** elapses, and if the channel is not the Priority Channel 1 or Priority Channel 2, the Priority Channel 1 and Priority Channel 2 are monitored by executing Lookback.

Configuration using KPG-D1/ D1N

Configuring **Dwell Time** (See Transceiver Settings > Scan > Scan Information > General)

Channel Recall

Channel Recall is the function to migrate to the last called Zone-channel by pressing the **Channel Recall** key.

Even if a user is away from the transceiver, the user can notice later that the transceiver has received a call during the scan.

Note

- If the **Channel Recall** key is pressed while no signal is received after scan starts, the transceiver migrates to the channel from which the transceiver started scanning.
- If **Channel Recall** is enabled, the transceiver does not resume the scan even if the time configured in **Dropout Delay Time** or **Dwell Time** elapses.
- **Channel Recall** is disabled if the channel is changed while **Channel Recall** is enabled. The transceiver resumes scanning after the Key Delay Time elapses (1 sec).
- The transceiver does not execute Lookback while **Channel Recall** is enabled.
- If the scan is paused with **Channel Recall** and **Scan Stop Tone** enabled, the Scan Stop Tone (2 beeps) sounds from the transceiver at 30-sec intervals.
- The channel to which the transceiver migrated using **Channel Recall** is not configured as the Selected Channel.
- Even if **Channel Recall** is enabled, the transmission using GPS Auto is executed by **Revert Channel**.

Configuration using KPG-D1/ D1N

Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)

Priority-channel Stop Tone

Priority-channel Stop Tone is the function that emits a Priority-channel Tone (1 beep) from the transceiver when the scan is paused and the speaker is unmuted upon receipt of a signal on a Priority Channel during the scan.

Configuration using KPG-D1/ D1N

Configuring **Priority-channel Stop Tone** to be enabled or disabled (See Transceiver Settings > Scan > Scan Information > General)

Auto Scan

Auto Scan is the function to start the scan automatically by selecting the channel with **Auto Scan** enabled.
Whether to enable or disable **Auto Scan** can be configured for each channel. The scan on a channel where **Auto Scan** is enabled cannot be stopped. The scan starts unconditionally if the transceiver migrates to a channel with **Auto Scan** enabled.

Note

- If “Personality” is configured in **Zone-channel Format** for KPG-D1/ D1N, whether to enable or disable **Auto Scan** can be configured for each Personality.
- When the transceiver migrates to a channel where **Auto Scan** is enabled, the scan pauses if the conditions for starting the scan are not satisfied.
- If the transceiver migrates to a channel where **Auto Scan** is enabled after the scan is started by pressing the **Scan** key, the scan cannot be terminated even if the **Scan** key is pressed.
- In a zone where “None” is configured in Scan Type, the scan does not start even if the transceiver migrates to a channel with **Auto Scan** enabled.

Configuration using KPG-D1/ D1N

- Configuring **Auto Scan** (Personality > DMR Conventional) to be enabled or disabled (See Transceiver Settings > Personal > Personality > DMR Conventional > General)
- Configuring **Auto Scan** (Channel Edit > DMR Conventional) to be enabled or disabled (See Transceiver Settings > Zone/Channel > Channel Edit > DMR Conventional > General)

Selected Channel Scan

Selected Channel Scan is the function to add the selected channel to the target channels for scan even if the channel is excluded from the target.

Configuration using KPG-D1/ D1N

Configuring **Selected Channel Scan** to be enabled or disabled (See Transceiver Settings > Scan > Scan Information > General)

Power-on Scan

Power-on Scan is the function to start the scan automatically when the transceiver is turned on.

Portable

If “Zone Select” is configured in **Selector** or for the **Lever** switch, the transceiver starts the scan according to the configuration in **Scan Type** for the zone number indicated by the pointer of **Selector** or the **Lever** switch when the transceiver is turned on. If the zone number indicated by the pointer of the **Selector** or the **Lever** switch is not configured for the transceiver, the scan does not start.

If anything other than “Zone Select” is configured in **Selector** or for the **Lever** switch, the transceiver starts the scan according to the configuration in **Scan Type** for the zone selected when the transceiver is turned on.

Mobile

The transceiver starts the scan according to the configuration in **Scan Type** for the zone selected when the transceiver is turned on.

Configuration using KPG-D1/ D1N

Configuring **Power-on Scan** to be enabled or disabled (See Transceiver Settings > Scan > Scan Information > General)

Starting Scanning by Linking with the Microphone (Off-hook Scan)

Supported Models: Mobile

Off-hook Scan is the function to start scanning regardless of the microphone hook status.

The transceiver scans as follows according to the configuration in **Off-hook Scan**:

Table 4-5 Off-hook Scan

Configuration	Description
Enabled	Pressing the **Scan** key causes the transceiver to start scanning regardless of the microphone on- or off-hook state.
Disabled	If the microphone is in the on-hook state, pressing the **Scan** key causes the transceiver to start scanning; however if the microphone is in the off-hook state, the transceiver cannot start scanning. If the microphone changes from the on-hook state to off-hook state in Scan Mode, the scan pauses on the Revert Channel. When the microphone goes to on-hook state, the transceiver resumes scanning.

Note

On-hook indicates the state that the microphone is hooked. Off-hook indicates the state that the microphone is not hooked.

Configuration using KPG-D1/ D1N

Configuring **Off-hook Scan** to be enabled or disabled (See Transceiver Settings > Scan > Scan Information > General)

Scan Stop Tone

Scan Stop Tone is the function to emit the Scan Stop Tone (2 beeps) from the transceiver while the scan pauses, for example, while the transceiver migrates to a Home Channel or Direct Channel.

The transceiver pauses scanning if the conditions to start the scan are not satisfied, such as while the transceiver is migrating to a Home Channel or Direct Channel, and then a Scan Stop Tone (2 beeps) sounds from the transceiver at 30-sec intervals.

Note

The Scan Stop Tone (2 beeps) does not sound while the transceiver is transmitting or while the speaker is unmuted for reception.

Configuration using KPG-D1/ D1N

Configuring **Scan Stop Tone** to be enabled or disabled (See Transceiver Settings > Scan > Scan Information > General)

Preamble Length

Preamble Length is the function to extend the duration for sending a preamble when the DMR frame is sent.

Extending the time for sending a preamble at the beginning of transmission makes the receiving transceiver easier to receive a call and reduces missing of the beginning of the audio during the scan.

The range is from 0 to 144.

Configuration using KPG-D1/ D1N

Configuring **Preamble Length** (See Transceiver Settings > Personal > Personal Features > DMR Conventional > DMR > Parameters)

Data communications are available for the transceiver by using the functions of DMR, or by using an external device connected to the transceiver.

5.1 Prioritizing Data Communications Using an External Device (Data Override)

Data Override is the function that allows prioritization of data communication using an external device even if the communication is made by a user operating the transceiver.

This function is used to send GPS data periodically even during reception.

The transceiver behaves as follows according to the configuration in **Data Override**:

Table 5-1 Data Override

Configuration	Description
Enabled	Data communications using an external device has a high priority level. **Data Override** is activated when the following AUX Input ports (Mobile only) are activated and when the transceiver receives a PC command from the serial port: • External PTT (Data) • Data PTT • DTC • Channel Select A to Channel Select D When **Data Override** is activated, the transceiver automatically exits the following statuses: • Function Mode • Public Address Mode (Mobile only) • The state when the transceiver temporarily migrates to a channel by pressing one of the **Direct Channel 1** to **Direct Channel 5** keys or **Home Channel** or **Channel Recall** key
Disabled	The transceiver key control has the priority. The transceiver suspends the transmission even if the transceiver receives the above data transmission request from an external device.

Note

While the transceiver is under the following conditions, **Data Override** is not activated:

- While the transceiver is transmitting
- While transmitting with the Public Address function (Mobile only)
- While External PTT (PA) is active (Mobile only)
- While the transceiver is in Emergency Mode
- In Transceiver Password Mode
- In the Stun state

Configuration using KPG-D1/ D1N

- Configuring **Data Override** to be enabled or disabled (See Transceiver Settings > Optional Features > Optional Features 1 > Serial Interface > Serial Input)
- Configuring **Data Override** to be enabled or disabled (See Extended Function > AUX > AUX Input)

5.2 Restricting the Warning Display during Data Communications (Silent Report)

Silent Report is the function to configure whether the transceiver transmits in standby display state without emitting the Alert Tone and flashing or lighting the LED, when sending and receiving the status and GPS data.

This function is used to keep a user from noticing the data communication request from a base station and GPS data transmission.

If this function is enabled, the LCD display, the LED display, and emitting the Alert Tone during data communications can be restricted as follows:

- The display during data communications (such as “Send Data”, “Complete”, “Busy”, and “No Reply”) is not displayed.
- The LED does not light or flash during data transmission.
- The Alert Tone, Control Tone, or Warning Tone is not emitted.

This function can be used for the following communications in a DMR Conventional system:

- AUX Input Status Message transmission
- Status transmission on receipt of Status Request
- Automatic GPS data transmission
- GPS transmission by GPS Polling reception

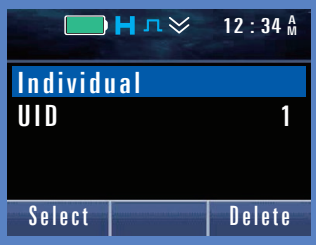
Note

Silent Report is not applied when the transceiver receives a Status Request or receives GPS Polling.

Configuration using KPG-D1/ D1N

Configuring **Silent Report** to be enabled or disabled (See Transceiver Settings > Optional Features > Optional Features 1 > Others)

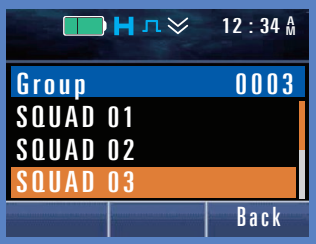
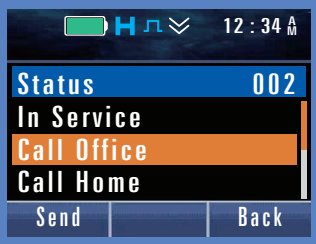
Key operations for selecting a list or entering characters are described for each mode in this chapter. Refer to Common FUNC "Operating the Transceiver in Each Mode (Common Operation)" for instruction.

Key		Individual Call Mode	
		Selecting a list 	**Manual entry** 
Menu ([▯])	Press	Initiates a Paging Call after aborting the current mode.	Initiates a Paging Call after aborting the current mode (after finalizing the Digit No.). Finalizes the Digit No. (While the Digit No. is flashing)
Back ([⮌])	Press	Returns to the menu (if the transceiver enters this mode by pressing the **Menu** key).	Deletes one character. Returns to the menu if no character is entered (if the transceiver enters this mode by pressing the **Menu** key).
	Hold Down	-	Deletes all characters.
Function ([◯])	Press	Migrates to the code entry mode (only if **Manual Dialing** is enabled).	Migrates to the list selection mode.
Home ([⌂])	Press	Aborts the current mode.	
Side 1 *1 or [+] *2	Press	The configured function functions.	
Side 2 *1 or [-] *2	Press	The configured function functions.	
Side 3 *1	Press	The configured function functions.	
[▲]/ [▼]	Press	Selects Unit IDs registered in the Individual ID List one at a time.	Selects Digit No. one at a time.
	Hold Down	Selects Unit IDs registered in the Individual ID List continuously.	Selects Digit No. continuously.
[◀] or [△] *2	Press	-	
[▶] or [□] *2	Press	Migrates to Status Mode or Short Message Mode.	
Selector *3	-	The configured function functions after aborting the current mode.	
Lever Switch*1	-	The configured function functions after aborting the current mode.	
[0] to [9]	Press	Directly selects a Unit ID registered in the list.	Enters the Digit No.
[*]	Press	Initiates a Paging Call after aborting the current mode.	Initiates a Paging Call after aborting the current mode (after finalizing the Digit No.). Finalizes the Digit No. (While the Digit No. is flashing)
[#]	Press	Returns to the menu (if the transceiver enters this mode by pressing the **Menu** key).	Deletes one character. Returns to the menu if no character is entered (if the transceiver enters this mode by pressing the **Menu** key).
	Hold Down	-	Deletes all characters.
PTT Switch	Press	Transmits after aborting the current mode.	

*1 Portable only

*2 KCH-20R (Featured Panel) only

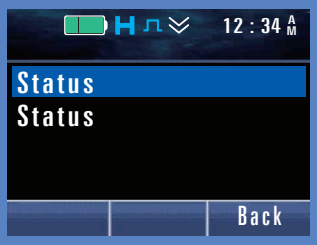
*3 Portable and KCH-20R (Featured Panel) only

Key		Group Call Mode (NXDN Conventional)	Status Mode
		Selecting a list 	Selecting a list 
Menu ([▯])	Press	-	Transmits the status after aborting the current mode.
Back ([⮌])	Press	Returns to the menu (if the transceiver enters this mode by pressing the **Menu** key).	
	Hold Down	-	
Function ([◯])	Press	-	Migrates to the status entry mode (only if **Manual Dialing** is enabled).
Home ([⌂])	Press	Aborts the current mode.	
Side 1 *1 or [+] *2	Press	The configured function functions.	
Side 2 *1 or [-] *2	Press	The configured function functions.	
Side 3 *1	Press	The configured function functions.	
[▲]/ [▼]	Press	Selects Group IDs registered in the Group ID List one at a time.	Selects statuses registered in the Status ID List one at a time.
	Hold Down	Selects Group IDs registered in the Group ID List continuously.	Selects statuses registered in the Status ID List continuously.
[◀] or [△] *2	Press	-	Migrates to Individual Call Mode or Group Call Mode.
[▶] or [□] *2	Press	Migrates to Status Mode or Short Message Mode.	-
Selector *3	-	The configured function functions after aborting the current mode.	
Lever Switch*1	-	The configured function functions after aborting the current mode.	
[0] to [9]	Press	Directly selects a Group ID registered in the list.	Directly selects a status registered in the list.
[*]	Press	-	Transmits the status after aborting the current mode.
[#]	Press	Returns to the menu (if the transceiver enters this mode by pressing the **Menu** key).	
PTT Switch	Press	Transmits after aborting the current mode.	Transmits the status after aborting the current mode.

*1 Portable only

*2 KCH-20R (Featured Panel) only

*3 Portable and KCH-20R (Featured Panel) only

Key		Status Mode	Short Message Mode
		Manual entry 	Manual entry 
Menu ([ ])	Press	Transmits the status after aborting the current mode (after finalizing the Digit No.). Finalizes the Digit No. (While the Digit No. is flashing)	Sends the message after aborting the current mode (after finalizing the characters). Finalizes the characters. (While the characters are flashing)
Back ([ ])	Press	Deletes one character. Returns to the menu if no character is entered (if the transceiver enters this mode by pressing the **Menu** key).	
	Hold Down	Deletes all characters.	
Function ([ ])	Press	Migrates to the list selection mode.	Switches character types (upper case/lower case/figure).
Home ([ ])	Press	Aborts the current mode.	
Side 1 *1 or [+] *2	Press	The configured function functions.	
Side 2 *1 or [-] *2	Press	The configured function functions.	
Side 3 *1	Press	The configured function functions.	
[▲]/ [▼]	Press	Selects Digit No. one at a time.	**If "Characters" is configured in Up/Down:** Selects characters one at a time. **If "Line Up/Down" is configured in Up/Down:** Shifts the cursor up and down.
	Hold Down	Selects Digit No. continuously.	**If "Characters" is configured in Up/Down:** Selects characters continuously. **If "Line Up/Down" is configured in Up/Down:** Shifts the cursor up and down continuously.
[◀] or [▲] *2	Press	Migrates to Individual Call Mode or Group Call Mode.	Shifts the cursor to the left. Migrates to Individual Call Mode or Group Call Mode if no character is entered.
	Hold Down	-	Shifts the cursor to the left continuously.
[▶] or [■] *2	Press	-	Shifts the cursor to the right.
	Hold Down	-	Shifts the cursor to the right continuously.
Selector *3	-	The configured function functions after aborting the current mode.	
Lever Switch*1	-	The configured function functions after aborting the current mode.	
[0] to [9]	Press	Enters the Digit No.	Enters characters.
[*]	Press	Transmits the status after aborting the current mode (after finalizing the Digit No.). Finalizes the Digit No. (While the Digit No. is flashing)	Switches character types (upper case/lower case/figure) (after finalizing the characters). Finalizes the characters. (While the characters are flashing)
[#]	Press	Deletes one character. Returns to the menu if no character is entered (if the transceiver enters this mode by pressing the **Menu** key).	
	Hold Down	Deletes all characters.	
PTT Switch	Press	Transmits the status after aborting the current mode.	Sends the message after aborting the current mode.

*1 Portable only

*2 KCH-20R (Featured Panel) only

*3 Portable and KCH-20R (Featured Panel) only

Key		Scrambler/Encryption Code Mode
		
Menu ([⊡])	Press	Confirms the configuration and then aborts the current mode. (If Key is selected) Restores the presets and then aborts the current mode. (If Preset is selected)
Back ([⮌])	Press	Returns to the menu (if the transceiver enters this mode by pressing the **Menu** key).
Function ([◯])	Press	-
Home ([⌂])	Press	Aborts the current mode.
Side 1 *1 or [+] *2	Press	The configured function functions.
Side 2 *1 or [-] *2	Press	The configured function functions.
Side 3 *1	Press	The configured function functions.
[▲]/ [▼]	Press	Selects Multi-keys registered in the Multi-key List one at a time.
	Hold Down	Selects Multi-keys registered in the Multi-key List continuously.
[◀]/ [▶] or [△]/ [□] *2	Press	-
	Hold Down	-
Selector *3	-	The configured function functions after aborting the current mode.
Lever Switch*1	-	The configured function functions after aborting the current mode.
[0] to [9]	Press	Directly selects a Multi-key registered in the list.
[*]	Press	Confirms the configuration and then aborts the current mode. (If Key is selected)
		Restores the presets and then aborts the current mode. (If Preset is selected)
[#]	Press	Returns to the menu (if the transceiver enters this mode by pressing the **Menu** key).
PTT Switch	Press	Transmits after aborting the current mode.

*1 Portable only
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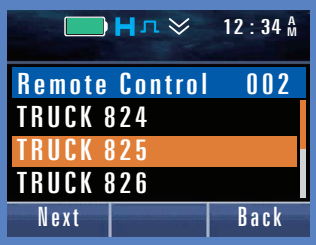
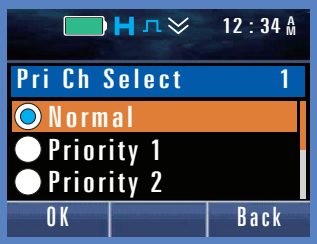
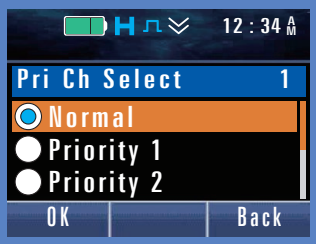
*3 Portable and KCH-20R (Featured Panel) only

Key		Remote Control Mode		
		Selecting a list	Manual entry	Selecting a list
				
Menu ([▢])	Press	Migrates to the Remote Control Option selection display.	Migrates to the Remote Control Option selection display. Finalizes the Digit No. (While the Digit No. is flashing)	Transmits the selected Remote Control Message after aborting the current mode.
Back ([⮌])	Press	Returns to the menu (if the transceiver enters this mode by pressing the **Menu** key).	Deletes one character. Returns to the menu if no character is entered (if the transceiver enters this mode by pressing the **Menu** key).	Returns to the menu (if the transceiver enters this mode by pressing the **Menu** key).
	Hold Down	-	Deletes all characters.	-
Function ([◯])	Press	Migrates to the code entry mode (only if Manual Dialing is enabled).	Migrates to the list selection mode.	-
Home ([⌂])	Press	Aborts the current mode.		
Side 1 *1 or [+] *2	Press	The configured function functions.		
Side 2 *1 or [-] *2	Press	The configured function functions.		
Side 3 *1	Press	The configured function functions.		
[▲]/ [▼]	Press	Selects Unit IDs registered in the Individual ID List one at a time.	Selects Digit No. one at a time.	Selects configuration items one at a time.
	Hold Down	Selects Unit IDs registered in the Individual ID List continuously.	Selects Digit No. continuously.	Selects configuration items continuously.
[◀]/ [▶] or [△]/ [□] *2	Press	-		Migrates to the Unit ID list selection mode.
	Hold Down	Migrates to the Remote Control Option selection display.		-
Selector *3	-	The configured function functions after aborting the current mode.		
Lever Switch*1	-	The configured function functions after aborting the current mode.		
[0] to [9]	Press	Directly selects a Unit ID registered in the list.	Enters the Digit No.	Selects a configuration item from the list.
[*]	Press	Migrates to the Remote Control Option selection display.	Migrates to the Remote Control Option selection display. Finalizes the Digit No. (While the Digit No. is flashing)	Transmits the selected Remote Control Message after aborting the current mode.
[#]	Press	Returns to the menu (if the transceiver enters this mode by pressing the **Menu** key).	Deletes one character. Returns to the menu if no character is entered (if the transceiver enters this mode by pressing the **Menu** key).	Returns to the menu (if the transceiver enters this mode by pressing the **Menu** key).
	Hold Down	-	Deletes all characters.	-
PTT Switch	Press	Transmits after aborting the current mode.		Transmits the selected Remote Control Message after aborting the current mode.

*1 Portable only

*2 KCH-20R (Featured Panel) only

*3 Portable and KCH-20R (Featured Panel) only

Key		Scan Program Mode	Priority-Channel	Priority-channel Select Mode
				
Menu ([▭])	Press	Confirms addition or deletion.	Confirms the configuration and then restores the Scan List edit screen.	Confirms the configuration and then aborts the current mode.
Back ([⮌])	Press	Returns to the menu (if the transceiver enters this mode by pressing the **Menu** key).	Restores the Scan List edit screen.	Returns to the menu (if the transceiver enters this mode by pressing the **Menu** key).
Function ([◯])	Press	The transceiver enters the Priority Channel edit screen.	Restores the Scan List edit screen.	-
Home ([⌂])	Press	Aborts the current mode.		
Side 1 *1 or [+] *2	Press	The configured function functions.		
Side 2 *1 or [-] *2	Press	The configured function functions.		
Side 3 *1	Press	The configured function functions.		
[▲]/ [▼]	Press	Selects channels one at a time.	Selects configuration items one at a time.	
	Hold Down	Selects channels continuously.	Selects configuration items continuously.	
[◀]/ [▶] or [△]/ [□] *2	Press	Selects zones one at a time.	-	
	Hold Down	Selects zones continuously.	-	
Selector *3	-	The configured function functions after aborting the current mode.		
Lever Switch*1	-	The configured function functions after aborting the current mode.		
[0] to [9]	Press	-	Selects a configuration item from the list.	
[*]	Press	Confirms addition or deletion.	Confirms the configuration and then restores the Scan List edit screen.	Returns to the menu (if the transceiver enters this mode by pressing the **Menu** key).
[#]	Press	Returns to the menu (if the transceiver enters this mode by pressing the **Menu** key).	Restores the Scan List edit screen.	Returns to the menu (if the transceiver enters this mode by pressing the **Menu** key).
PTT Switch	Press	-		Transmits after aborting the current mode.

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*3 Portable and KCH-20R (Featured Panel) only

● Control Tone

Tone Name	Pattern	Reference
Key Beep A	1 beep  1630 Hz (50 ms)	Broadcast Group Call Lone Worker Activity Detection Single Scan List Scan Multi-Zone Scan Scan Program Priority Scan
Key Beep B	2 beeps  1630 Hz (50 ms)	Lone Worker Activity Detection Single Scan List Scan Multi-Zone Scan Scan Program Priority Scan
Key Beep C	3 beeps  1630 Hz (50 ms)	Priority Scan
Key-entry Error Tone	1 beep  700 Hz (50 ms)	Scan Delete/Add
Priority-channel Tone	1 beep  2000 Hz (50 ms)	Priority Scan Priority-channel Stop Tone
Scan Stop Tone	2 beeps  700 Hz (50 ms)	Channel Recall Scan Stop Tone
Search Mode Tone	1 beep  770 Hz (400 ms)	DMR Site Roaming
Call Request Tone	1 beep  1630 Hz (50 ms)	Individual Call Acknowledge Request Call Request Tone

Tone Name	Pattern	Reference
Call In Progress Tone	2 beeps  980 Hz (100 ms)	Individual Call Acknowledge Request
Transaction Confirmed Tone	2 beeps  490 Hz (300 ms) 980 Hz (300 ms)	Call Interruption

● Warning Tone

Tone Name	Pattern	Reference
Warning Tone A	continuous beep  700 Hz (until the **PTT** switch is released)	Busy Channel Lockout
Busy Tone 2	3 beeps  940 Hz (150 ms)	Call Interruption
TOT Pre-alert Tone	3 beeps  1630 Hz (50 ms)	Time-out Timer
System Select Tone	4 beeps  980 Hz (50 ms) 1220 Hz (50 ms) 980 Hz (50 ms) 1220 Hz (50 ms)	DMR Site Roaming
Call Fail Tone	2 beeps  440 Hz (50 ms) 440 Hz (1 sec)	Repeater Mode DMR Site Roaming Call Interruption
Lone Worker Tone	2 beeps  1630 Hz (150 ms) 940 Hz (150 ms)	Lone Worker
Call Processing Tone	2 beeps  940 Hz (50 ms)	Individual Call Acknowledge Request Call Processing Tone

Tone Name	Pattern	Reference
Man-down Pre-alert Tone	1 beep  1630 Hz (50 ms)	Man-down Detection
Stationary Pre-alert Tone	1 beep  770 Hz (50 ms)	Stationary Detection
Motion Pre-alert Tone	1 beep  1210 Hz (50 ms)	Motion Detection
Key Fail Alert Tone	6 beeps  940 Hz (100 ms)	Zeroize

● Locator Tone

Tone Name	Pattern	Reference
Emergency Locator Tone	2 beeps  1630 Hz (90 ms) 940 Hz (90 ms)	Emergency Mode

● Sidetone

Tone Name	Pattern	Reference
Proceed Tone	3 beeps  1000 Hz (20 ms)	Individual Call Acknowledge Request Group Call

● Alert Tone

Tone Name	Pattern	Reference
Transmit Clear Alert Tone	1 beep  1477 Hz (50 ms)	Transmit Clear Alert Tone

● Transmit Tone

Tone Name	Pattern	Reference
Background Tone	1 beep  1630 Hz (50 ms)	Background Transmission

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