KENWOOD

NX-5000 series

P25 Function Reference (P25 FUNC)

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Language:	English
Type:	K

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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 P25 system.

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

Item	Specifications	How to Verify
Market Code	K, F	Printed on the label on the product.
Firmware Version of the Transceiver	2.20.00	Can be viewed in the **Transceiver Information** dialog box of KPG-D1/ 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.
KPG-D1/ D1N version number	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, the following Radio Feature License is required to use the functions of the P25 system described in this manual:

Function Name	Radio Feature License
P25 Conventional*1	KWD-5100CV
P25 Phase 1 Trunking	KWD-5101TR
P25 Phase 2 Trunking	KWD-5102TR
P25 OTAR	KWD-5103RK
P25 Packet Data	KWD-5106DT
Secure Cryptographic Module*2	KWD-5005AE
DES 4 Keys*2	KWD-5006DE

*1 Implemented before factory shipment for the F-type transceiver.

*2 Implemented before the factory shipment for the K- and F-type transceiver.

IMPORTANT NOTICE:

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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.

Describes the DMR functions of the transceiver.

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 the functions, buttons, and menus shown on the KPG-D1/ D1N or the display of the transceiver.

Bold Letters

The characters in bold letters indicate the name of the windows, tabs, checkboxes in KPG-D1/ D1N and functions assigned to keys on the transceiver.

[ ] + [ ]

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 Name	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.

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
AES	Advanced Encryption Standard
AMBE+2	Advanced Multi-Band Excitation
AUX	Auxiliary
BCL	Busy Channel Lockout
C4FM	Compatible 4-level FM
CAI	Common Air Interface
CH	Channel
CKEK	Common Key Encryption Key
CKR	Common Key Reference
COM port	Communications port
CQPSK	Compatible Quadrature Phase Shift Keying
DES	DATA Encryption Standard
DTMF	Dual Tone Multi-frequency
ESN	Electronic Serial Number
FCC	Federal Communications Commission
FDMA	Frequency Division Multiple Access
FEC	Forward Error Correction
FNE	Fixed Network Equipment

Abbreviation	Full Spelling or Meaning
FPU	Field Programming Unit
GPS	Global Positioning System
H-CPM	Harmonized Continuous Phase Modulation
H-DQPSK	Harmonized Differential Quadrature Phase Shift Keying
HDU	Header Data Unit
ID	Identification
KEK	Key Encryption Key
KMF	Key Management Facility
KMM	Key Management Message
KVL	Key Variable Loader
LRRP	Location Request/Response Protocol
MAC	Message Authentication Code
Mic	Microphone
MNP	Message Number Period
MSEL	Multi Select
NAC	Network Access Code
OTAR	Over-The Air-Rekeying
PF	Programmable Function
PTT	Push-to-Talk
PTT ID	PTT (Push-to-talk) ID
RCM	Radio Control Manager
RFSS	Radio Frequency Sub-system
RSI	Radio Set Identifier
RSSI	Received Signal Strength Indication
RX	Receive
SCM	Secure Cryptographic Module
SNDCP	Sub-network Dependent Convergence Protocol
TA	Talk Around
TDMA	Time Division Multiple Access
TEK	Traffic Encryption Key
TOT	Time-out Timer
TX	Transmit
UKEK	Unique Key Encryption Key
UTC	Universal Time Coordinated
VOX	Voice-operated Transmission
WACN ID	Wide Area Communication Network ID
WUID	Working Unit ID

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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 help texts of KPG-D1/ KPG-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 to configure “Wide” (25 kHz) for **Channel Spacing** with a VHF or UHF 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 mode names above may be described in explanations and references. This indicates that the function is enabled only when the described mode 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, “P25 Conventional” or “P25 Trunking” 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 P25 Conventional or P25 Trunking 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 > P25 Conventional > Unit ID (Own))

In this case, if “P25 Conventional” is configured in **System Type** of **System Information**, **Unit ID (Own)** in P25 Conventional 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-25 (Speaker Microphone) • KMC-41 (Speaker Microphone) • KMC-41D (Speaker Microphone) • KMC-42W (Speaker Microphone) • KMC-42WD (Speaker Microphone) • KMC-47GPS/ KMC-47GPSD (GPS Speaker Microphone) • KMC-54WD (Speaker Microphone) • KWD-AE30 (Secure Cryptographic Module) • KWD-AE31 (Secure Cryptographic Module) • KWD-DE31 (Secure Cryptographic Module) • KPG-93 (Keyloader Interface Cable) • 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) • KES-3 (External Speaker) • KES-5 (External Speaker) • KCT-18 (Ignition Sense Cable) • KCT-46 (Ignition Sense Cable) • KRA-40 (GPS Antenna) • KWD-AE30 (Secure Cryptographic Module) • KWD-AE31 (Secure Cryptographic Module) • KWD-DE31 (Secure Cryptographic Module) • KPG-115 (Keyloader Interface Cable) • KPG-46U/ KPG-46X (Programming Interface Cable)

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.

How to Search for Information

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.

Placing a pointer over the portion where a link is pasted changes the shape of the pointer to a hand (☟).

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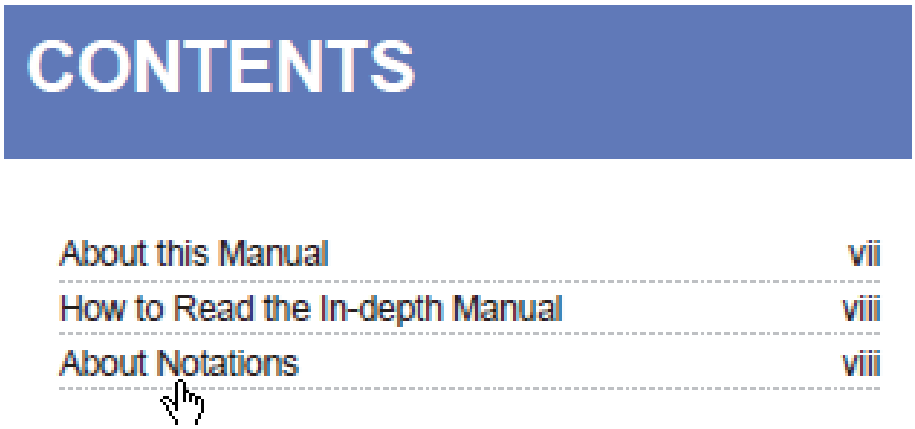
Clicking a title in the Contents page allows a jump to the corresponding page.

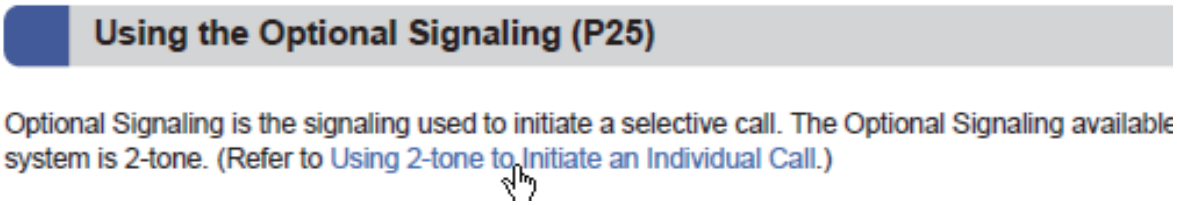


INDEX

Clicking a function name, a title or a page number in the Index pages allows a jump to the corresponding page.

Blue characters in the main text

Clicking a portion with blue characters in the main context allows a jump to the corresponding page.



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Revision History

Date	Description
2015.10.31	1) Added NX-5900 (700 MHz/ 800 MHz model) as a supported model. 2) Added the information of KCH-20R (Featured Panel) as a supported Control Head. 3) Added KPG-36X and KPG-46X as supported programming cables. 4) Changed the description in “About this Manual” as follows: • Changed the version information • Changed the Left Up key to the [+] key • Added Radio Feature License 5) Added terms to “Abbreviations Used in this Document”. 6) Added “About Multi RF Deck/ Multi Control Head”. 7) Added option information to “About Options to Use the Functions Described in this Document”. 8) Corrected the address of the reference help texts according to V1.60 of the help texts. 9) Corrected the description of “Auto Reset Timer” of P25 Conventional. 10) Added “Multi-Zone Scan” to P25 Conventional “Searching Whether the Transceiver Receives a Call (Scan)”. 11) Added the description related to the behavior of a channel with “Mixed” configured in Channel Type to the following items: Avoiding Interference with Other Communications (Busy Channel Lockout) Temporarily Disabling the Squelch (Squelch Off) Temporarily Disabling the Signaling (Monitor) Unmuting the Speaker by Linking with the Microphone (Off-hook Decode) 4.1 Toggling the Encryption during Transmission between Enabled and Disabled 12) Added the note to “Using a Channel Being Used by Other Parties (BCL Override)”. 13) Corrected the description on the configuration range in “Changing the Transmit Time for Preamble Data at the Beginning of Transmission (Preamble Length)”. 14) Added “Changing the Transmit Time for Preamble Data at the Beginning of Data Transmission (Data Scan Preamble Time)” to “1.1 Initiating Voice Communications (Basic Transmission and Reception)” 15) Added “Using the Optional Signaling (P25)”to “1.2 Using the Signaling”. 16) Added “1.3 Waiting for Both Digital Signals and Analog Signals (Mixed Mode)”. 17) Corrected the description and procedure of the migration operation to Individual Call Mode of P25 Conventional and P25 Trunking. 18) Added “1.7 Using 2-tone to Initiate an Individual Call”. 19) Added “1.8 Using the Tactical Zone”. 20) Added the note to “1.11 Disabling the Transceiver Capability by Remote Control (Radio Inhibit / Uninhibit)”. 21) Added “1.13 Migrating Automatically to the Site Providing Better Radio Environment (P25 Voting)”. 22) Added “Sending and Receiving a Text Message (Text Messaging)”. 23) Added the note to “Receiving an Individual Call” of “2.5 Making an Individual Call”. 24) Added the note to “Receiving a Telephone Call” of “2.8 Communicating with a Telephone (Telephone Call)”. 25) Added the note to “3.1 Placing the Transceiver in Emergency Mode”. 26) Added “About the Behavior in Emergency Mode in a P25 Voting Zone” to “3.2 Configuration Related to Transmission and Reception in Emergency Mode”. 27) Added the note to “Emergency Channel Type”. 28) Corrected the description on the configuration range in “Emergency Microphone Sense”. 29) Added “Background Transmission” to “3.4 Automatically Transmitting and Receiving in Emergency Mode”. 30) Added the behavior description to “Emergency LED”. 31) Added the description of the turn-off behavior for Mobile to “Suspended Power-off”. 32) Added the description of DES encryption type (Built-in DES) in “4 COMMUNICATION SECURITY”. 33) Added “Data Encryption” to “4.3 Transceiver Behavior upon Transmission of Encrypted Communication Data”. 34) Added KWD-DE31 to Table 4-2. 35) Added “4.6 Built-in DES”. 36) Added the note to “5 P25 OTAR”.

Date	Description
2015.10.31	37) Added the notes to “5.3 CAI Data Packet Communication”. 38) Corrected the information of “Data Packet Communication During a Scan (P25 Conventional System Only)” and moved “Data Packet Communication During a Scan (P25 Conventional System Only)” to “6.8 Scan Function”. 39) Added “Response Time” to Table 5-1. 40) Added the description of Multi-Zone Scan to “6 SCAN”. 41) Added the note related to P25 Voting in a P25 Conventional system to “6 SCAN”. 42) Added the note to “Changing the Scan List (Scan Program)”. 43) Added “6.4 Scanning All Target Zones for Scanning (Multi-Zone Scan)”. 44) Added the behavior description of when Optional Signaling is used to “Reception Behavior during the Scan in a P25 Conventional System”. 45) Added “Adding or Deleting a Zone to or from the Target Zones for Scanning (Zone Delete/Add)”. 46) Added “P25 Data Packet Communication During a Scan (P25 Data Channel for Scan) (P25 Conventional System Only)”. 47) Added the conditions to the note in “Prioritizing Data Communications Using an External Device (Data Override)”. 48) Added the keys of KCH-20R (Featured Panel) to the table in “Key Operations for Each Mode”. 49) Added 2-tone Mode and Text Messaging Mode to “Key Operations for Each Mode”. 50) Changed the version number from 1.00 to 1.60 (the Japanese draft version only).
2016.6.20	1) Corrected each version information in “About this Manual”. 2) Added the description related to Talk Around Key to “Communicating Without Using a Repeater (Talk Around)”. 3) Added the description related to the configuration for decoding a 2-tone code to “Using the Optional Signaling (P25)”. 4) Added the following items to “1.7 Using 2-tone to Initiate an Individual Call”: Using the PC Command to Send the 2-tone Code Decoding the 2-tone Code 5) Added the note to “Selecting and Sending the 2-tone Code from a List” of “1.7 Using 2-tone to Initiate an Individual Call”. 6) Added “2.2 Using the Optional Signaling (Optional Signaling for Group Call)”. 7) Added “2.9 Using 2-tone to Initiate an Individual Call”. 8) Added the operation keys and Selector to step 1 in “Initiating a Group Call” of “2.7 Making a Group Call”. 9) Changed the description of “Response Time” in Table 5-1. 10) Changed the version number from 1.60 (the Japanese draft version only) to 1.70.

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” to “1.1 Initiating Voice Communications (Basic Transmission and Reception)”. 4) Added description on Optional Signaling LED in “Initiating an Individual Call” and “Receiving an Individual Call” of “1.5 Making an Individual Call”. 5) Added description on Optional Signaling LED in “Receiving a Group Call” of “1.6 Making a Group Call”. 6) Added descriptions on Voting LED and Revert Channel backup in “P25 Voting Behavior”. Added supplementary notes. 7) Revised description on Complete Tone in “Sending a Text Message”. 8) Revised description on the number of data that can be saved in “Text Message Stack”. 9) Added description on Optional Signaling LED in Table 2-1. 10) Added “Selective Call Alert LED” and “Optional Signaling LED” to “2.1 Initiating Voice Communications (Basic Transmission and Reception)”. 11) Added “IDEN_UP Temporary Sync” and “SYS_SRV_BCST Message Validation” to “2.4 Control Channel Hunt”. 12) Added description on Optional Signaling LED in “Initiating an Individual Call” and “Receiving an Individual Call” of “2.6 Making an Individual Call”. 13) Added description on Optional Signaling LED in “Initiating a Group Call” and “Receiving a Group Call” of “2.7 Making a Group Call”. 14) Added description on Optional Signaling LED in “Receiving a Paging Call” of “2.8 Making a Paging Call”. 15) Added description on Optional Signaling LED in “Initiating a Telephone Call” and “Receiving a Telephone Call” of “2.10 Communicating with a Telephone (Telephone Call)”. 16) Revised the overall description in “2.16 Notifying the System of the Transceiver Status (Status)”. 17) Added supplementary notes on the emission of Emergency Locator Tone in “Duration of Locator Tone 1” and “Duration of Locator Tone 2”. 18) Added description on Non-Priority Scan LED and Priority Scan LED to the following sections: 6.2 Scanning in One Zone (Single Scan) 6.3 Scan by Registering Multiple Target Channels for Scan in the List (List Scan) 6.4 Scanning All Target Zones for Scanning (Multi-Zone Scan) 19) Added description on LTR and Conventional in Table 6-1. 20) Changed the transceiver screen in “6.4 Scanning All Target Zones for Scanning (Multi-Zone Scan)”. 21) Revised the supplementary notes on Priority-channel Stop Tone in “6.5 Scanning the Specific Channel Preferentially (Priority Scan)”. 22) Revised description on “Priority-channel Stop Tone”. 23) Revised description on “Status Mode (P25 Trunking)” in “A.1 Key Operations for Each Mode”. 24) Changed the version number from 1.70 to 2.20.

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A user can call an individual transceiver and initiate voice communication.

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A voice call can be established by calling a group of transceivers registered as a call group.

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By using a built-in or optional GPS receiver unit, the transceiver can send its own location information to the base station.

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Functions for P25 Trunking System

Making an Individual Call

A user can call an individual transceiver and initiate voice communication.

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A voice call can be established by calling a group of transceivers registered as a call group.

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This function enables the transceiver to make a call to a telephone, or a telephone to make a call to the transceiver.

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By using a built-in or optional GPS receiver unit, the transceiver can send its own location information to the base station.

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The transceiver is equipped with functions to enhance secrecy in communications on a P25 digital channel.

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The keys for P25 encryption can be overwritten using radio communication without using the Key Loader.

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1 P25 CONVENTIONAL SYSTEM

P25 is a generic name for a digital communication system protocol which complies with the APCO Project25 Standard specified in TIA-102.

Using P25, the transceiver can make an individual call or group call for voice calls, communicate various types of messages, or send and receive GPS data.

The transceiver supports P25 Phase 1 Conventional. In a P25 Conventional system, communications are realized by sending and receiving digital signals on a P25 digital channel. Using a P25 ID (Individual ID or Group ID) allows the various communications.

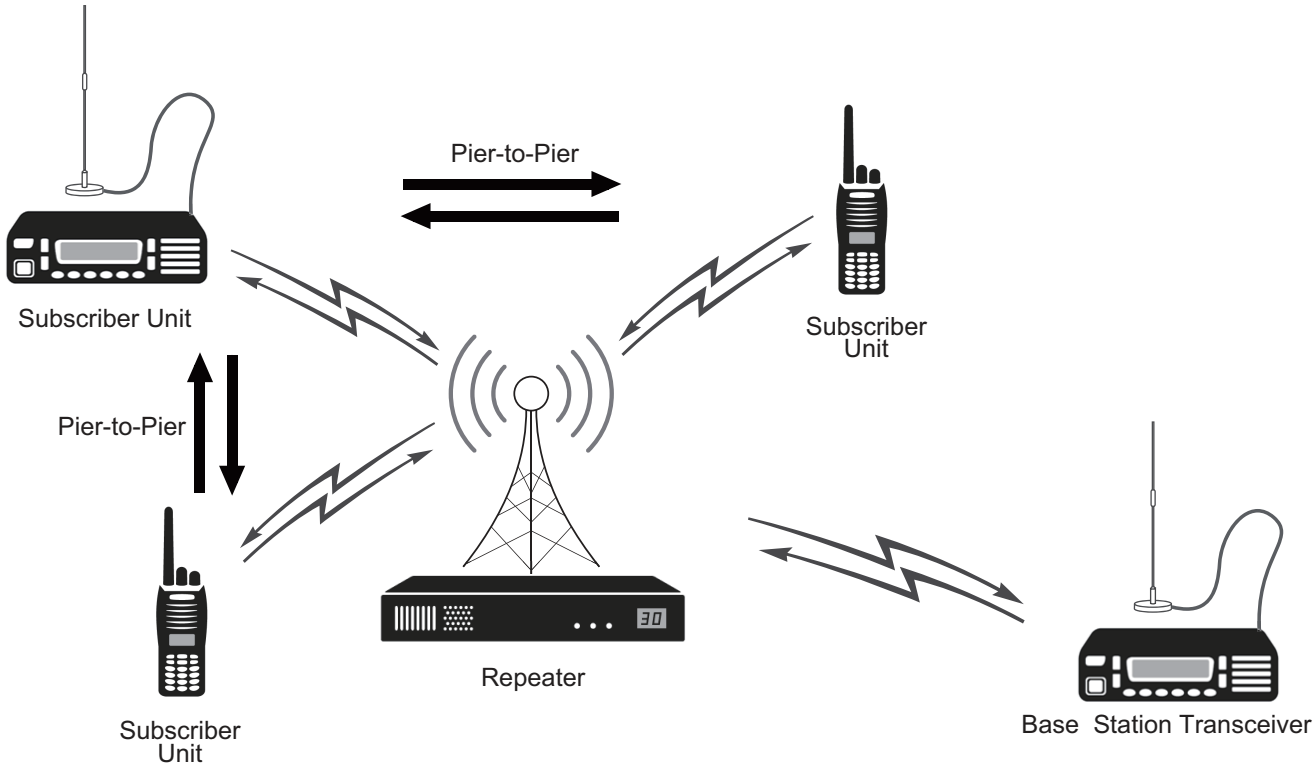


Figure 1-1 Image of Communications in a P25 Conventional System

To use the P25 Phase 1 Conventional function, Radio Feature License KWD-5100CV is required.

1.1 Initiating Voice Communications (Basic Transmission and Reception)

This section describes the basic methods for transmission and reception in a P25 Conventional system and the relevant functions.

About Own ID

To initiate various communications using P25, a 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 FFFFFF (hexadecimal), or between 1 and 16777215 (decimal).

If **Global ID** is enabled, a Unit ID is shared by all P25 Conventional and P25 Trunking systems.

If **Global ID** is disabled, a Unit ID needs to be configured for each P25 Conventional system and P25 Trunking system.

Note

Since the management systems of own ID in P25, NXDN and DMR are different from one another, an own ID needs to be configured for each of them separately.

Configuration using KPG-D1/ D1N

- Configuring **Unit ID (Own)** (See Transceiver Settings > Personal > System Information > P25 Conventional (P25 Voting with NAC) > Unit ID (Own))
- Configuring **Global ID** to be enabled or disabled (See Transceiver Settings > Personal > System Information > P25 Conventional (P25 Voting with NAC) > 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 P25 digital channel. (Refer to COMMUNICATION SECURITY.)

Receive

Received audio sounds from the speaker if the transceiver receives P25 digital signals, and the frequency matches the frequency of the channel on which the transceiver has waited for or the P25 ID matches the P25 ID preconfigured for the transceiver. When a signaling (NAC) is used, communications are possible if the received NAC matches the NAC which the transceiver waits for.

The receiving behavior of the transceiver varies as below depending on the configuration in **Squelch Type**:

- **If “NAC” is configured in Squelch Type:**

  If the received NAC matches the preconfigured NAC, the transceiver disables muting and emits the received audio.

- **If “Selective Call” is configured in Squelch Type:**

  If the received NAC matches the NAC preconfigured for the transceiver and the received Talkgroup ID or Individual ID matches the preconfigured Talkgroup ID or Individual ID, the transceiver unmutes the speaker and emits the received audio.

Auto Reset Timer

Auto Reset Timer is the time until the status of the LCD display, flashing LED and sounding Alert Tone is automatically reset when communication is established by the transmission or reception of a voice call.

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

There are 2 types of **Auto Reset Timer**: **Auto Reset Timer** (Voice) for voice communications and **Auto Reset Timer** (Message) for text messages.

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 Individual ID or Group ID is automatically reset. Configuring “0 sec” resets the matching state at the same time when the call ends.
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)		When this function is enabled and the time configured in **Auto Reset Timer** has elapsed, the flashing LED light triggered by **Optional Signaling LED** goes off and the display changes from the ID display after receipt of an Individual Call or Group Call to the previous channel display. Or, the display changes from the message display after receipt of a text message to the previous channel display.

Configuration using KPG-D1/ D1N

- Configuring **Auto Reset Timer** (Voice) (See Transceiver Settings > P25 > P25 Information > General > Auto Reset > Voice)
- Configuring **Auto Reset Timer** (Message) (See Transceiver Settings > P25 > P25 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 P25 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

Note

Configuring “Off” in **Alert LED Color** can disable the LED from flashing.

Configuration using KPG-D1/ D1N

- Configuring **Selective Call Alert LED** (See Transceiver Settings > P25 > P25 Information > Conventional)
- Configuring **Alert LED Color** (See Transceiver Settings > P25 > P25 Information > Conventional > Alert LED Color)
- Configuring **Alert LED Color (Individual ID List)** (See Transceiver Settings > P25 > Individual ID List > Alert LED Color)
- Configuring **Alert LED Color (Talkgroup ID List)** (See Transceiver Settings > P25 > Talkgroup ID List)

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 > P25 > P25 Information > Conventional)

Late Entry Fast Unmute

Late Entry Fast Unmute is the function to immediately unmute the speaker before the transceiver determines whether the received signal is encrypted upon receipt of a signal.

- **Transceiver behavior if this function is enabled**

  Upon receipt of a P25 digital signal, the transceiver immediately unmutes the speaker and emits the received audio from the speaker prior to determining whether or not the signal is encrypted. The transceiver can unmute the speaker for the length of time from approximately 180 ms to 360 ms. The transceiver determines whether or not the received signal is encrypted after the transceiver completes unmuting the speaker.

  If no signal is encrypted, the transceiver keeps unmuting the speaker.

  If the signal is encrypted, the transceiver keeps unmuting the speaker after decrypting the received signal normally.

  If the transceiver does not have information required for decryption, the transceiver determines that the encrypted signal cannot be decrypted, and then mutes the speaker.

  This function can be used to listen to the received audio even a little earlier. However, if the transceiver unmutes the speaker prior to validating the received data, noises may be audible; hence, extra caution is required for this configuration.

- **Transceiver behavior if this function is disabled**

  Upon receipt of a P25 digital signal, the transceiver determines whether or not the received signal is encrypted.

  If the signal is not encrypted, the transceiver unmutes the speaker and emits the received audio from the speaker.

  If the signal is encrypted, the transceiver unmutes the speaker and emits the received audio from the speaker after decrypting the received signal normally.

Configuration using KPG-D1/ D1N

- Configuring **Late Entry Fast Unmute** (Personality) to be enabled or disabled (See Transceiver Settings > Personal > Personality > P25 Conventional (P25 Voting with NAC) > P25)
- Configuring **Late Entry Fast Unmute** (Channel Edit) to be enabled or disabled (See Transceiver Settings > Zone/ Channel > Channel Edit > P25 Conventional (P25 Voting with NAC) > P25)

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 P25 Conventional system:

- Single Scan
- List Scan
- Multi-Zone Scan
- Priority Scan

Refer to “SCAN” for details of Scan.

Transmitting

Transmitting can be initiated by pressing the **PTT** switch, or by selecting a P25 ID and then pressing the **PTT** switch. When a signaling (NAC) is used, the transceiver sends the NAC. In this case, if the transmitted NAC matches the NAC 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 avoid 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

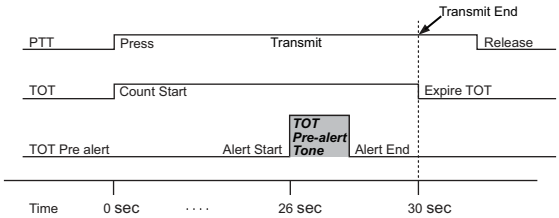


Figure 1-2 TOT Pre-alert

Note

If “Off” is configured for TOT Pre-alert, no TOT Pre-alert tone will sound 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

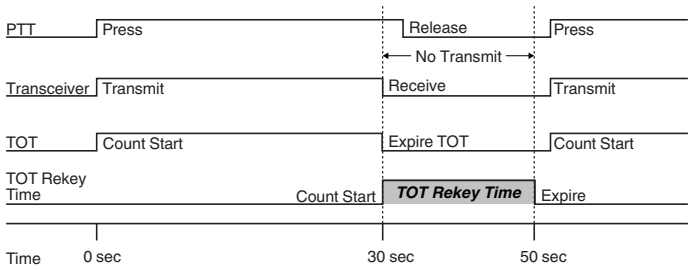


Figure 1-3 TOT Rekey Time

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

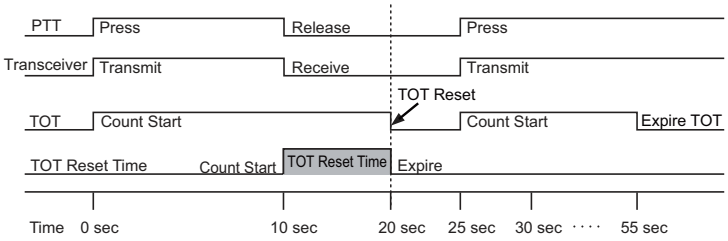


Figure 1-4 TOT Reset Time 1

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

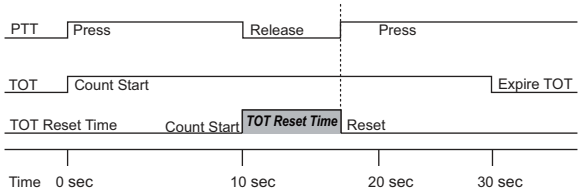


Figure 1-5 TOT Reset Time 2

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 Reset Time is counting down.

Configuration using KPG-D1/ D1N

- Configuring **Time-out Timer** (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > General > Time-out Timer)
- Configuring **TOT Pre-alert** (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > General > Time-out Timer)
- Configuring **TOT Rekey Time** (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > General > Time-out Timer)
- Configuring **TOT Reset Time** (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > General > Time-out Timer)

Avoiding Interference with Other Communications (Busy Channel Lockout)

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, “Busy” appears on the display, and at the same time a Warning Tone A (continuous beep) sounds from the transceiver, and the transceiver cannot transmit.

The following are the conditions to disable transmission by Busy Channel Lockout.

Table 1-2 Busy Channel Lockout

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.
Incorrect NAC	The transceiver cannot transmit if the transceiver receives a carrier and the received NAC does not match the NAC preconfigured for the transceiver.
Correct NAC	The transceiver cannot transmit if the transceiver receives a carrier and the received NAC matches the NAC preconfigured for the transceiver.
Status Symbols (Busy)	If the value of Status Symbols broadcast by the P25 Conventional repeater or the transceiver is determined as “Busy”, “TA”, or “UNKNOWN”, the transceiver cannot transmit. However, if the value of Status Symbols is determined as “UNKNOWN”, a PTT Warning Tone does not sound from the transceiver while the **PTT** switch is pressed. In this case, the transceiver starts transmitting after the status of the transceiver changes from the “UNKNOWN” state to the transmit state.

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 in Transmit Mode:**

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

- **If “P25” is configured in Transmit Mode:**

  The transceiver transmits according to the configuration for Busy Channel Lockout (P25).

  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 for Busy Channel Lockout in the same mode as that of the received signal (Analog or P25). If the transceiver receives an analog signal, the transceiver transmits according to the configuration in **Busy Channel Lockout (Analog)**. If the transceiver receives a P25 signal, the transceiver transmits according to the configuration in **Busy Channel Lockout (P25)**.

Note

Busy Channel Lockout does not function in Emergency Mode.

Configuration using KPG-D1/ D1N

- Configuring **Busy Channel Lockout** (Personality) (See Transceiver Settings > Personal > Personality > P25 Conventional (P25 Voting with NAC) > P25)
- Configuring **Busy Channel Lockout** (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > P25 Conventional (P25 Voting with NAC) > P25)

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** (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > General)

Communicating Without Using a Repeater (Talk Around)

Talk Around is the function that allows transceivers to communicate directly 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 using the receive frequency and the Decode Signaling (NAC) 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 where Talk Around is configured to be 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 Talk Around

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

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

● Disabling 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 will be disabled when the transceiver enters Emergency Mode. Talk Around will not be disabled when the transceiver enters Emergency Mode on the channel with Talk Around enabled in 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 > P25 Conventional (P25 Voting with NAC) > General)
- Configuring **Talk Around** to be enabled or disabled (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > P25 Conventional (P25 Voting with NAC) > General)
- Configuring **Talk Around Key** to be enabled or disabled (Personality) (See Transceiver Settings > Personal > Personality > P25 Conventional > General)
- Configuring **Talk Around Key** to be enabled or disabled (Personality) (See Transceiver Settings > Personal > Personality > P25 Voting with NAC > General)
- Configuring **Talk Around Key** to be enabled or disabled (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > P25 Conventional > General)
- Configuring **Talk Around Key** to be enabled or disabled (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > P25 Voting with NAC > General)

Changing the Transmit Time for Preamble Data at the Beginning of Transmission (Preamble Length)

Preamble Length is the function to extend time for sending a preamble when the P25 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 configuration range is between 0 and 255 for a P25 Conventional system, and between 0 and 4800 for a P25 Voting with NAC. The “01 01 11 11” symbol is prefixed to the synchronization signal (Frame Sync.) of HDU for each 1 configuration value.

Configuration using KPG-D1/ D1N

Configuring **Preamble Length** (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > P25 > Digital Option)

Changing the Transmit Time for Preamble Data at the Beginning of Data Transmission (Data Scan Preamble Time)

Data Scan Preamble Time is the function to extend time for sending a Packet Data Scan Preamble when Text Messaging, OTAP data, or GPS data is sent.

Sending a Packet Data Scan Preamble before sending various data makes the receiving transceiver stop scanning if the receiving transceiver is scanning, and makes the receiving transceiver easier to receive data.

The configuration range is between 0.0 sec and 25.0 sec. A Packet Data Scan Preamble is sent for the configured length of time.

Note

If the other party is FNE, a Packet Data Scan Preamble is not sent.

Configuration using KPG-D1/ D1N

Configuring **Data Scan Preamble Time** (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > P25)

1.2 Using the Signaling

NAC 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 (NAC)

NAC (Network Access 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 P25 channel.

The transceiver mutes calls that the transceiver does not wait for if a NAC is configured for each channel. Therefore, a user can communicate in a group without listening to conversations from other groups.

The following are transmission and reception behaviors of NAC.

Table 1-3 NAC Transmission/ Reception Behaviors

Reception	The transceiver behavior varies depending on the configuration in **Squelch Type** (NAC or Selective Call). **NAC:** If the received NAC matches the NAC preconfigured for the transceiver, the transceiver emits the received audio from the speaker. **Selective Call:** If the received NAC matches the NAC preconfigured for the transceiver and the received Talkgroup ID or Individual ID matches the Talkgroup ID or Individual ID preconfigured for the transceiver, the transceiver emits the received audio from the speaker.
Transmission	The transceiver sends the preconfigured NAC when transmitting. Pressing the **PTT** switch causes the transceiver to send the NAC.

Configuration using KPG-D1/ D1N

- Configuring **NAC Decode/Encode** (Personality) (See Transceiver Settings > Personal > Personality > P25 Conventional (P25 Voting with NAC) > P25)
- Configuring **NAC Decode/Encode** (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > P25 Conventional (P25 Voting with NAC) > P25)
- Configuring **Squelch Type** (Personality) (See Transceiver Settings > Personal > Personality > P25 Conventional (P25 Voting with NAC) > P25)
- Configuring **Squelch Type** (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > P25 Conventional (P25 Voting with NAC) > P25)

Using the Optional Signaling (P25)

Optional Signaling is the signaling used to initiate a selective call. The Optional Signaling available for a P25 Conventional system is 2-tone. (Refer to Using 2-tone to Initiate an Individual Call.)

2-tone signaling uses a pair of 2 different tone frequencies in series for an individual call. The transceiver emits a ringing tone (Alert Tone) and starts the Transpond if the received NAC matches the NAC preconfigured for the transceiver and the received 2-tone code matches the 2-tone code preconfigured for the transceiver.

The transceiver behaves as follows according to the type of a received signal on a channel with “Mixed” configured in **Channel Type**.

- **If the transceiver receives analog signals**

  The transceiver behaves according to the configuration in **Optional Signaling (Analog)**.

- **If the transceiver receives digital signals**

  The transceiver behaves according to the configuration in **Optional Signaling (P25)**.

To decode a 2-tone code in a P25 Conventional system, “2-tone 1”, “2-tone 2”, “2-tone 3”, or “2-tone 4” needs to be configured in **Optional Signaling (P25)** for the channel.

Configuration using KPG-D1/ D1N

- Configuring **Optional Signaling (P25)** (Personality) (See Transceiver Settings > Personal > Personality > P25 Conventional (P25 Voting with NAC) > P25 > Optional Signaling)
- Configuring **Optional Signaling (P25)** (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > P25 Conventional (P25 Voting with NAC) > P25 > Optional Signaling)

Unmuting the Speaker (Audio Control (P25))

Audio Control is the condition which allows the transceiver to unmute the speaker by a NAC and Optional Signaling. The conditions on which the transceiver unmutes the speaker can be configured for each channel by using KPG-D1/ D1N.

The transceiver unmutes the speaker and emits the received audio when the conditions configured in **Audio Control** are satisfied.

Conditions to unmute the speaker can be changed by a combination of the NAC and the Optional Signaling.

The following are the conditions to unmute the speaker:

Table 1-4 Audio Control (P25)

Configuration	Description
NAC	The transceiver unmutes the speaker if the received NAC matches the NAC preconfigured for the transceiver. Conditions remain unchanged even if the transceiver transmits.
NAC and Optional Signaling	The transceiver unmutes the speaker if the received NAC matches the NAC preconfigured for the transceiver and the received Optional Signaling matches the Optional Signaling preconfigured for the transceiver. Conditions remain unchanged even if the transceiver transmits.

The transceiver behaves as follows according to the type of a received signal on a channel with “Mixed” configured in **Channel Type**.

- **If the transceiver receives analog signals**
  The transceiver behaves according to the configuration in **Audio Control (Analog)**.
- **If the transceiver receives digital signals**
  The transceiver behaves according to the configuration in **Audio Control (P25)**.

Configuration using KPG-D1/ D1N

- Configuring **Audio Control (P25)** (Personality) (See Transceiver Settings > Personal > Personality > P25 Conventional (P25 Voting with NAC) > P25 > Optional Signaling)
- Configuring **Audio Control (P25)** (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > P25 Conventional (P25 Voting with NAC) > P25 > Optional Signaling)

Temporarily Disabling the Squelch (Squelch Off)

Squelch Off is the function to disable the NAC configured for the channel on which the transceiver waits for and unmutes the speaker upon detection of a frame.

The same as with the Monitor function, the Squelch Off function is used to monitor the availability of channels prior to transmitting in order to avoid interfering with other parties.

Also, if an analog channel is configured in a P25 Conventional system, the Squelch Off function is used to listen to the audio even when the speaker is muted due to a very weak carrier on an analog channel.

To use this function, the **Squelch Off** key or the **Squelch Off Momentary** key is used.

Or, pressing the **Menu** key causes the transceiver to enter Menu Mode, and then Squelch Off can be toggled between enabled and disabled by selecting “Squelch Off”. (Refer to Common FUNC Using Menu Mode.)

Operating the transceiver

- **Squelch Off key**

1 **Press the Squelch Off key while Squelch Off is disabled.**

The “” icon appears.

For the channel where **NAC Decode** is configured, the transceiver unmutes the speaker just by disabling the NAC and detecting a frame.

The Busy LED lights green if Busy LED is enabled.

2 **Press the Squelch Off key while Squelch Off is enabled.**

The “” icon disappears. For a channel where **NAC Decode** is configured, Signaling Squelch is resumed.

- **Squelch Off Momentary key**

1 **Press and hold the Squelch Off Momentary key.**

The "🔊" icon appears.

For the channel where **NAC Decode** is configured, the transceiver unmutes the speaker just by disabling the NAC and detecting a frame.

The Busy LED lights green if Busy LED is enabled.

2 **Release the Squelch Off Momentary key.**

The "🔊" icon disappears. For a channel where **NAC Decode** is configured, Signaling Squelch is resumed.

Note

- If **Squelch Off** becomes enabled during the scan, the transceiver pauses scanning on a channel where the transceiver is scanning. The transceiver does not resume scanning until **Squelch Off** is disabled.
- If **Squelch Off** is enabled on a channel with "Mixed" configured in **Channel Type**, the transceiver forcibly unmutes the speaker. White noise is audible if no carrier is present. In this case, the QT tone, DQT code, or NAC is disabled. If the transceiver receives an analog signal, the transceiver unmutes the speaker only with a carrier. The transceiver unmutes the speaker when the transceiver receives a digital signal even if the received NAC does not match the NAC preconfigured for the transceiver.

Configuration using KPG-D1/ D1N

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

Temporarily Disabling the Signaling (Monitor)

Monitor is the function that temporarily disables the NAC configured for a channel on which the transceiver waits.

Monitor is used to check the availability of channels prior to transmitting in order to avoid interfering with other parties.

Using the Monitor function temporarily unmutes the speaker if the speaker is muted because the NAC does not match. However, if the speaker is muted due to a very weak carrier, the speaker is not unmuted even by using the Monitor function. In this case, using the Squelch Off function temporarily unmutes the speaker and the audio can be heard.

To use this function, the **Monitor** key or the **Monitor Momentary** key is used.

Or, pressing the **Menu** key causes the transceiver to enter Menu Mode, and then **Monitor** can be toggled between enabled and disabled by selecting "Monitor". (Refer to Common FUNC Using Menu Mode.)

While **Monitor** is enabled, the "🔊" icon appears, and the NAC will be disabled.

On a channel with "Mixed" configured in **Channel Type**, while **Monitor** is enabled, the "🔊" icon appears, and the NAC, QT tone or DQT code, and Analog or P25 Optional Signaling are disabled.

Operating the transceiver

- **Monitor key**

1 **Press the Monitor key while Monitor is disabled.**

The "🔊" icon appears.

For the channel where **NAC Decode** is configured, the transceiver unmutes the speaker just by disabling the NAC and detecting a frame.

2 **Press the Monitor key while Monitor is enabled.**

The "🔊" icon disappears.

For a channel where **NAC Decode** is configured, Signaling Squelch is resumed.

- **Monitor Momentary key**

1 **Press and hold the Monitor Momentary key.**

The "🔊" icon appears.

For the channel where **NAC Decode** is configured, the transceiver unmutes the speaker just by disabling the NAC and detecting a frame.

2 **Release the Monitor Momentary key.**

The "🔊" icon disappears.

For a channel where **NAC Decode** is configured, Signaling Squelch is resumed.

Configuration using KPG-D1/ D1N

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

Unmuting the Speaker by Linking with the Microphone (Off-hook Decode) (Mobile Only)

Off-hook Decode is the function that enables the transceiver to decode the signaling even when the microphone is in the off-hook state.

The transceiver behaves as follows according to the configuration in **Off-hook Decode**:

Table 1-5 Off-hook Decode

Configuration	Description
Enabled	The transceiver unmutes the speaker according to the configuration in **Squelch Type** while the microphone is in either the on-hook state or off-hook state.
Disabled	The transceiver unmutes the speaker when the transceiver detects a frame if the microphone is in the off-hook state. The transceiver unmutes the speaker according to the configuration in **Squelch Type** while the microphone is in the on-hook state.

Note

- If "Mixed" is configured in **Channel Type**, the transceiver behaves according to the type of a received signal (Analog or P25).
- 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 Decode** to be enabled or disabled (See Transceiver Settings > Optional Features >Optional Features 1 > Microphone-hook)

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

Mixed Mode is the function to wait for both digital signals and analog signals.

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**:

- **Reception**

  The transceiver can wait for a call in both digital (NAC) and analog (QT tone or DQT code) modes. The transceiver unmutes the speaker if the received signaling (QT tone, DQT code, or NAC) matches the signaling preconfigured for the transceiver (QT tone, DQT code, or NAC).

- **Transmission**

  The transceiver transmits in the mode (Analog or P25) configured in **Transmit Mode**.

  If the received signaling (QT tone, DQT code, or NAC) matches the signaling preconfigured for the transceiver, the transceiver can transmit in the same mode as that 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 Optional Signaling (DTMF, 2-tone, FleetSync, or MDC-1200) matches the Optional Signaling preconfigured for the transceiver, the transceiver can transmit in the same mode as that 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 1-6 Mixed Mode

Optional Signaling	Transmit Mode	Received signal	Transmission Operation
Disabled	Analog	Digital	The transceiver can transmit using the NAC 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.
Disabled	P25	Digital	The transceiver can transmit using the NAC preconfigured for the transceiver.
Disabled	P25	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 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. However, ID can be specified only if the transceiver receives the FleetSync signaling. 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	P25	Digital	The transceiver can transmit specifying the received ID.
Enabled	P25	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 if the transceiver receives the FleetSync signaling. 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

- Conditions for unmuting the speaker vary depending on the **Audio Control** configuration. (Refer to Unmuting the Speaker (Audio Control (P25)), Analog FUNC Unmuting the Speaker (Audio Control (Analog)).)
- While the transceiver is in Emergency Mode, the transceiver transmits according to the configuration in **Transmit Mode**.
- 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 > P25 Conventional (P25 Voting with NAC) > General)
- Configuring **Channel Type** and **Transmit Mode** (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > P25 Conventional (P25 Voting with NAC) > General)
- Configuring **Signaling Reset Timer** (See Transceiver Settings > P25 > P25 Information > General)

1.4 Using P25 ID to Initiate a Selective Call

An individual call and group call are available by using P25 IDs.

Available Calls

The following various types of calls can be used in a P25 Conventional system. For transceiver operations and behaviors, refer to the instructions of each call type.

- **Individual Call**

  Individual Call is the function used to initiate a call to a target transceiver individually to establish voice calls. An Individual Call can be initiated by selecting or directly entering an Individual ID in Individual Call Mode, or by selecting the receive history in Stack Mode. Responding to the transmitting transceiver of the Individual Call (Talkback) is also available.

  Also, to receive an Individual Call in a P25 Conventional system, the transceiver needs to wait on a channel with “Selective Call” configured in **Squelch Type**.

- **Group Call**

  Group Call is the function used to make a voice call by calling all transceivers configured as group members. A Group Call can be made using the Talkgroup ID configured for a channel by selecting the channel on which a Talkgroup ID is configured and pressing the **PTT** switch.

  Also, to receive a Group Call in a P25 Conventional system, the transceiver needs to wait on a channel with “Selective Call” configured in **Squelch Type**.

1.5 Making an Individual Call

Individual Call is the function used to initiate a call to a target transceiver individually to establish voice calls.
By specifying an Individual ID, the transceiver can initiate a call to the transceiver having the Individual 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 an Individual ID configured in the Individual ID List or directly entering an Individual ID.

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

  Or, 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.)

  Or, pressing the **[0]** to **[9]** keys on the keypad causes the transceiver to enter Individual Call Mode if “Individual”, “Individual + Status”, or “Individual + Short Message” is configured in **Keypad Operation**. The transceiver enters Individual ID Shortcut Entry Mode or will be on hold as the first digit of the Individual ID is entered. An Individual ID can be entered as a decimal. (Refer to Common FUNC Keypad Operation.)

- **Talkback**

  After an Individual Call is received, pressing the **PTT** switch while the ID name of the transmitting transceiver is displayed enables the transceiver to respond (Talkback) to the transmitting transceiver of 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).)

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

Operating the transceiver

- **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 the Individual ID List selection screen appears.

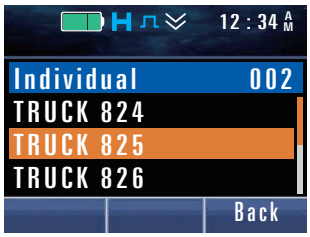
The following operations are identical even if the transceiver enters Individual Call Mode by pressing the **Menu** key or using the keypad.

Note

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

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

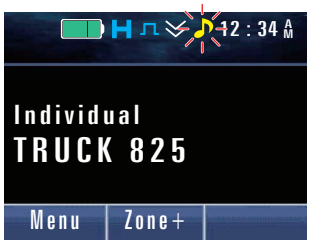
Refer to Common FUNC "Selecting or Clearing Data from a List" for selection methods.



3 **Press the PTT switch.**

An Individual Call is initiated to the selected Individual ID.

The "♪" icon blinks, and the display changes to "Individual" and the ID name of the target transceiver.



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 using Manual Dialing, Manual Dialing needs to be enabled.

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

The transceiver enters Individual Call Mode and the Individual ID List selection screen appears.

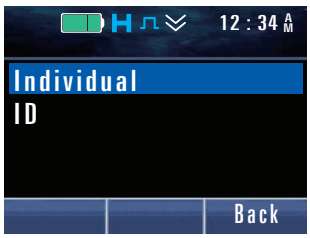
The following operations are identical even if the transceiver enters Individual Call Mode by pressing the **Menu** key or using the keypad.

Note

- If the Individual Call Mode previously used is Manual Dialing mode, the transceiver enters Manual Dialing mode.
- If no ID is registered in the Individual ID List, the transceiver enters Manual Dialing mode if **Manual Dialing** is enabled. In this case, the transceiver cannot enter Individual Call Mode if **Manual Dialing** is disabled.

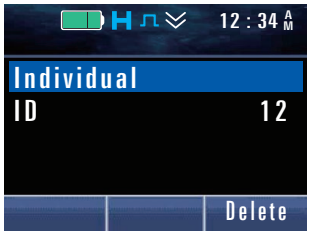
2 **Press the Function [○] key.**

The Individual ID entry screen appears.



3 Enter an Individual ID.

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



- **If using the PF keys:**

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

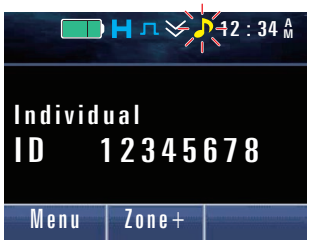
- **If using the keypad:**

  An Individual ID can be entered by pressing the **[0]** to **[9]** keys as a decimal.

4 Press the PTT switch.

An Individual Call is initiated to the selected Individual ID.

The "♪" icon blinks, and the display changes to "Individual" and the ID name of the target transceiver.



Note

At the same time as pressing the **PTT** switch, the entry screen for the ID closes. If entering an ID and sending an Individual Call again, reexecute the operations from step 1.

Note

- If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common FUNC Transmit LED.)
- If **Optional Signaling LED** is enabled, the LED flashes in yellow. (Refer to Optional Signaling 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 finishes transmitting when the **PTT** switch is released. In this case, a PTT Release Tone (1 beep) is transmitted to the target transceiver if **PTT Release Tone** is enabled. (Refer to Common FUNC Using Sound to Notify the Other Party that the Communication Ends (PTT Release 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 > P25 Conventional (P25 Voting with NAC) > P25)

Receiving an Individual Call

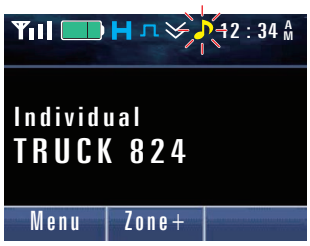
If the received Individual ID matches the Individual ID configured for the transceiver, the transceiver can receive the Individual Call.

To receive an Individual Call in a P25 Conventional system, the transceiver needs to wait on a channel with “Selective Call” configured in **Squelch Type**. (Refer to Sharing the Same Channel (Frequency) by Several Groups (NAC).)

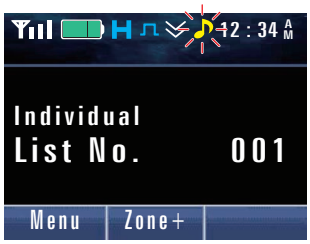
Transceiver behavior

1 **Receiving an Individual Call.**

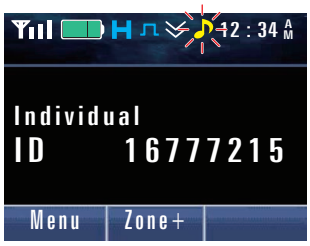
The “ ” icon blinks, and the ID Name of the transmitting transceiver appears.



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



If the Individual ID is not configured in the Individual ID List, the Individual ID appears as a decimal.



2 **Press the PTT switch.**

The transceiver can respond to the received Individual 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 sounds. (Refer to About the behavior of the transceiver when receiving an Individual Call (P25 Conventional).)
- If **Selective Call Alert LED** or **Optional Signaling LED** is enabled, the LED flashes when the transceiver is receiving a call. (Refer to About the behavior of the transceiver when receiving an Individual Call (P25 Conventional).)

About the behavior of the transceiver when receiving an Individual Call (P25 Conventional)

- **Alert Tone**

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

  However, if “Common” is configured in **Alert Tone (Individual)** of the Individual ID List, or if the received Individual ID is not configured in the Individual ID List, an Alert Tone sounds according to the configuration in **Alert Tone (Individual Call)** common to P25 Conventional.

- **Selective Call Alert LED**

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

  However, if “Common” is configured in **Alert LED Color (Individual)** of the Individual ID List, or if the received Individual ID is not configured in the Individual ID List, the LED flashes according to the configuration in **Alert LED Color (Individual Call)** common to P25 Conventional.

- **Optional Signaling LED**

  If **Optional Signaling LED** is enabled, the LED flashes in yellow. However, if **Selective Call Alert LED** is enabled, the LED flashes according to the configuration of **Selective Call Alert LED**.

  Also, when a key on the transceiver is operated while the LED flashes according to the configuration of **Selective Call Alert LED**, the LED will flash in yellow if the Optional Signaling received continues to match that of the transceiver.

Configuration using KPG-D1/ D1N

- Configuring **Selective Call Alert LED** to be enabled or disabled (See Transceiver Settings > P25 > P25 Information > Conventional)
- Configuring **Optional Signaling LED** to be enabled or disabled (See Transceiver Settings > P25 > P25 Information > Conventional)
- Configuring **Alert Tone (Individual)** (Individual ID List) (See Transceiver Settings > P25 > Individual ID List > Alert Tone)
- Configuring **Alert LED Color (Individual)** (Individual ID List) (See Transceiver Settings > P25 > Individual ID List > Alert LED Color)
- Configuring **Alert Tone (Individual Call)** common to P25 Conventional (See Transceiver Settings > P25 > P25 Information > Conventional > Alert Tone)
- Configuring **Alert LED Color (Individual Call)** common to P25 Conventional (See Transceiver Settings > P25 > P25 Information > Conventional > Alert LED Color)

Individual ID List

If making Individual Calls, the desired Individual IDs need to be preconfigured in the transceiver using KPG-D1/ D1N prior to use of the transceiver. A maximum of 1500 Individual IDs can be configured for Individual ID List. A user can store a maximum of 32 Individual IDs in the Individual ID List.

Table 1-7 Individual ID List

Configuration	Description
ID	An Individual ID can be configured in the range between “000001” and “FFFFFF” (hexadecimal), or between 1 and 16777215 (decimal).
ID Name	A name with a maximum of 14 characters can be configured for an Individual ID. If only an Individual ID appears on the transceiver display, it may be difficult for a user to quickly identify the caller. If an identifiable name or common name appears on the transceiver display, the user can easily recognize these with a glance. If the **ID Name** of the calling transceiver is configured in the Individual ID List, the **ID Name** of the calling transceiver appears on the transceiver display when a call is received. If the **ID** is configured and the **ID Name** is not configured in the Individual ID List, the Individual ID List number of the transceiver appears on the transceiver display. If the **ID** is not configured in the Individual ID List, the Individual ID of the calling transceiver appears on the transceiver display.
ID Mode	Whether to permit or prohibit transmission to the target transceiver can be configured. An ID with “Receive Only” configured in **ID Mode** does not appear on the ID selection screen in Individual Call Mode, and a user cannot select the ID in Individual Call Mode. If the transceiver receives a call from a caller having an ID with “Receive Only” configured in **ID Mode**, the ID Name of the calling transceiver appears on the transceiver display. In this case, a user cannot initiate a call to the calling transceiver even if the user attempts to respond by pressing the **PTT** switch.
Individual (Alert Tone)	The type of tone sounding from the transceiver can be configured for an Individual Call from the Individual IDs registered in the Individual ID List.
Individual (Alert LED Color)*1	The color of flashing LED can be configured for an Individual Call from the Individual IDs registered in the Individual ID List.
Encryption	How Encryption is used when the transceiver transmits on a P25 digital channel can be configured. (Refer to COMMUNICATION SECURITY.) **Clear:** The transceiver always sends communication data without encrypting the data. Even if Encryption is enabled by operating the transceiver, the transceiver sends communication data without encryption. **Secure:** The transceiver always encrypts and sends communication data. Even if Encryption is disabled by operating the transceiver, the transceiver encrypts and sends communication data. **Select:** The transceiver encrypts and sends communication data if Encryption is enabled. The transceiver sends communication data without encrypting the data if Encryption is disabled. Note The status of Encryption can be toggled between enabled or disabled by using the **Encryption** key or **Menu** key. (Refer to Toggling the Encryption during Transmission between Enabled and Disabled.)
Multi-key List No.	Encryption Key to be used by the transceiver to transmit using the Encryption function can be configured by selecting from the Multi-key List. (Refer to Multi-key List.)
EKR List No.	When using the OTAR function, the Encryption Key to be used in combination with an Individual ID can be configured. (Refer to P25 OTAR.)

Configuration	Description
KMF Profile	When using the OTAR function, whether to use the KMF Profile can be configured. (Refer to P25 OTAR.)
KMF Profile Number	When using the OTAR function, the profile number of a KMF which will communicate with the transceiver can be configured. (Refer to P25 OTAR.)

*1 To use this function, Selective Call Alert LED needs to be enabled.

Configuration using KPG-D1/ D1N

Configuring **Individual ID List** (See Transceiver Settings > P25 > Individual ID List)

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

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

An Individual 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 an Individual ID configured in the Individual ID List even if it is outside the range of **Individual ID Encode Block**.

The transceiver for which no **Individual ID Encode Block** is configured can initiate a call to all transceivers.

The transceiver opens the squelch and emits the received audio upon receipt of an Individual ID satisfying the receiving conditions. In this case, the Individual ID of the transmitting transceiver appears on the receiving transceiver. The receiving transceiver can respond to the transmitting transceiver by pressing the **PTT** switch. However, the transceiver cannot respond if initiating a call to the Individual ID of the transmitting transceiver is restricted.

Configuration using KPG-D1/ D1N

Configuring **Individual ID Encode Block** (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > P25)

1.6 Making a Group Call

Group Call is the function used to make a voice call by calling all transceivers configured as group members.

Specifying a Talkgroup ID enables a call to all transceivers having the same Talkgroup ID.

Initiating a Group Call

A Group Call can be made using the Talkgroup ID configured for a channel by selecting the channel on which a Talkgroup ID is configured and pressing the **PTT** switch.

The Talkgroup ID configured for a channel can be changed in Talkgroup ID Select Mode.

The following are the methods that can place the transceiver in Talkgroup ID Select Mode:

- **Key operation**

  Pressing the **Group** key places the transceiver in Talkgroup ID Select Mode.

  The transceiver can also be placed in Talkgroup ID Select Mode by selecting “Group” after placing the transceiver in Menu Mode by pressing the **Menu** key. (Refer to Common FUNC Using Menu Mode.)

- **Keypad entry**

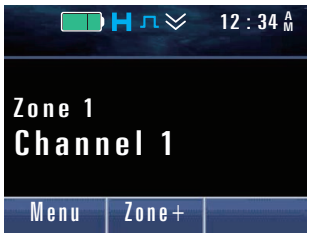
  If “Group” is configured in Keypad Operation, pressing one of the **[0]** to **[9]** keys on the transceiver keypad places the transceiver in Talkgroup ID Select Mode.

By pressing the **Talkgroup** key, or selecting “Talkgroup Reset” after the transceiver enters Menu Mode by pressing the **Menu** key, the Talkgroup ID changed in Talkgroup ID Select Mode can be restored to the value configured using KPG-D1/ D1N.

Operating the transceiver

● Making a Group Call

1 **Select a channel where a Talkgroup ID is configured.**



2 **Press the PTT switch.**

The transceiver initiates a Group Call by using the Talkgroup ID configured for the channel.

Note

- The transceiver can initiate a Group Call to all Talkgroup IDs by using “$FFFF” as the Talkgroup ID (ALL CALL).
- 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 finishes transmitting when the **PTT** switch is released. In this case, a PTT Release Tone (1 beep) is transmitted to the target transceiver if **PTT Release Tone** is enabled. (Refer to Common FUNC Using Sound to Notify the Other Party that the Communication Ends (PTT Release Tone).)

● Changing the Talkgroup ID

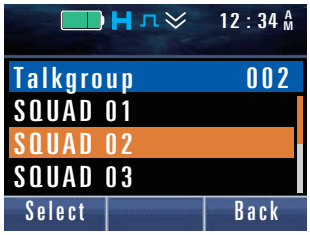
1 **Press the Group key.**

The transceiver enters Talkgroup ID Select Mode, and a selection screen for the Talkgroup ID List appears. The Talkgroup ID currently in use appears.

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

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

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



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

The Talkgroup ID selected in step 2 is configured for the selected channel.

Note

In the following cases, the transceiver cannot be placed in Talkgroup ID Select Mode:

- If an analog channel is selected
- If no Talkgroup ID is configured for the selected channel
- If Talkgroup Strapped is enabled (Refer to Prohibiting Change to the Talkgroup ID (Talkgroup Strapped).)

Configuration using KPG-D1/ D1N

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

Receiving a Group Call

The transceiver can receive a Group Call if the received Talkgroup ID matches the Talkgroup ID preconfigured for the transceiver.

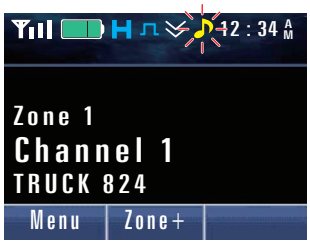
To activate the receiving behavior of the transceiver (blinking the " " icon, emitting the Alert Tone, flashing the LED) when receiving a Group Call in a P25 Conventional system, the transceiver needs to wait on the channel with "Selective Call" configured in Squelch Type. Although a Group Call can be received even if "NAC" is configured in Squelch Type, these receiving behaviors of the transceiver cannot be activated. (Refer to Sharing the Same Channel (Frequency) by Several Groups (NAC).)

Transceiver behavior

1 The transceiver receives a Group Call.

The " " icon blinks.

If **Unit ID Display on Group Call** is enabled, the ID Name of the transmitting transceiver is displayed. If the ID Name is not configured in the Individual ID List, the Individual ID List number or the Individual ID is displayed.



Note

- On a channel for which no Talkgroup ID is configured, the transceiver can receive a call by using "$0001" as the Talkgroup ID.
- Upon receipt of a signal containing "$FFFF" as a Talkgroup ID (All Call), the transceiver emits the received audio from the speaker regardless of the Talkgroup ID configured for the received channel. In this case, if a Group Call is initiated before the length of time configured in **Auto Reset Timer** elapses after reception is complete, the transceiver can initiate a Group Call to all Talkgroup IDs.
- 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 sounds. (Refer to About the behavior of the transceiver when receiving a Group Call (P25 Conventional).)
- If **Selective Call Alert LED** or **Optional Signaling LED** is enabled, the LED flashes when the transceiver is receiving a call. (Refer to About the behavior of the transceiver when receiving a Group Call (P25 Conventional).)

About the behavior of the transceiver when receiving a Group Call (P25 Conventional)

- **Alert Tone**

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

  However, if “Common” is configured in **Alert Tone (Talkgroup ID List)** of the Talkgroup ID List, or if the received Talkgroup ID is not configured in the Talkgroup ID List, the Alert Tone sounds from the transceiver according to the configuration in **Alert Tone (Group Call)** common to P25 Conventional.

- **Selective Call Alert LED**

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

  However, if “Common” is configured in **Alert LED Color (Talkgroup ID List)** of the Talkgroup ID List ID List, or if the received Talkgroup ID is not configured in the Talkgroup ID List, the LED flashes according to the configuration in **Alert LED Color (Group Call)** common to P25 Conventional.

- **Optional Signaling LED**

  If **Optional Signaling LED** is enabled, the LED flashes in yellow. However, if **Selective Call Alert LED** is enabled, the LED flashes according to the configuration of **Selective Call Alert LED**.

  Also, when a key on the transceiver is operated while the LED flashes according to the configuration of **Selective Call Alert LED**, the LED will flash in yellow if the Optional Signaling received continues to match that of the transceiver.

Configuration using KPG-D1/ D1N

- Configuring **Selective Call Alert LED** to be enabled or disabled (See Transceiver Settings > P25 > P25 Information > Conventional)
- Configuring **Optional Signaling LED** to be enabled or disabled (See Transceiver Settings > P25 > P25 Information > Conventional)
- Configuring **Alert Tone (Talkgroup ID List)** (See Transceiver Settings > P25 > Talkgroup ID List)
- Configuring **Alert LED Color (Talkgroup ID List)** (See Transceiver Settings > P25 > Talkgroup ID List)
- Configuring **Alert Tone (Group Call)** common to P25 Conventional (See Transceiver Settings > P25 > P25 Information > Conventional > Alert Tone)
- Configuring **Alert LED Color (Group Call)** common to P25 Conventional (See Transceiver Settings > P25 > P25 Information > Conventional > Alert LED Color)

Talkgroup ID List

When making a Group Call, the transceiver communicates using a Talkgroup ID registered in the Talkgroup ID List. By using KPG-D1/ D1N, a target Talkgroup ID needs to be preconfigured for the transceiver as the Talkgroup ID List. A maximum of 1,500 Talkgroup IDs can be configured in the Talkgroup ID List. A maximum of 32 Talkgroup ID Lists can be registered.

Table 1-8 Talkgroup ID List

Configuration	Description
ID	A Talkgroup ID can be configured in the range between “0000” and “FFFF” (hexadecimal), or between 0 and 65535 (decimal). If the following Talkgroup IDs are configured for the transceiver, the transceiver behavior differs from normal: **FFFF** By using this Talkgroup ID, the transceiver can initiate a Group Call to all Talkgroup IDs. Also, upon receipt of a signal containing “FFFF” as a Talkgroup ID, the transceiver emits the received audio from the speaker regardless of the Talkgroup ID configured for the channel where the transceiver received the signal. **0000** • This Talkgroup ID does not allow an initiation of a Group Call. However, the transceiver transmits using “0001” as a Talkgroup ID in order to initiate an Emergency Call. • Only if the transceiver receives an Individual Call or “FFFF” as a Talkgroup ID, the transceiver emits the received audio from the speaker. • The transceiver cannot transmit even if the **PTT** switch is pressed while the transceiver is receiving after receipt of “FFFF” as the Talkgroup ID.
ID Name	A name with a maximum of 14 characters can be configured for a Talkgroup ID. If only a Talkgroup ID appears on the transceiver display, it may be difficult for a user to quickly identify the caller. If an identifiable name or common name appears on the transceiver display, the user can easily recognize these with a glance. If the **ID Name** of the calling transceiver is configured in the Talkgroup ID List, the **ID Name** of the calling transceiver appears on the transceiver display when a call is received. If the **ID** is configured and the **ID Name** is not configured in the Talkgroup ID List, the Talkgroup ID List number of the transceiver appears on the transceiver display.
ID Mode	Whether to permit or prohibit transmission to the Talkgroup ID can be configured. If “Transmit / Receive” is configured in **ID Mode** of the Talkgroup ID configured for the channel, the transceiver can initiate a call by using the Talkgroup ID, or wait for the Talkgroup ID. If “Receive Only” is configured in **ID Mode** of the Talkgroup ID configured for the channel, the transceiver can wait for the Talkgroup ID but cannot initiate a call by using the Talkgroup ID.
Group (Alert Tone)	The tone type sounding from the transceiver can be configured for a Group Call from the Talkgroup IDs registered in the Talkgroup ID List.
Group (Alert LED Color)*1	The color of flashing LED can be configured for a Group Call from the Talkgroup IDs registered in the Talkgroup ID List.

Configuration	Description
Encryption	How Encryption is used when the transceiver transmits on a P25 digital channel can be configured. (Refer to COMMUNICATION SECURITY.) **Clear:** The transceiver always sends communication data without encrypting the data. Even if Encryption is enabled by operating the transceiver, the transceiver sends communication data without encryption. **Secure:** The transceiver always encrypts and sends communication data. Even if Encryption is disabled by operating the transceiver, the transceiver encrypts and sends communication data. **Select:** The transceiver encrypts and sends communication data if Encryption is enabled. The transceiver sends communication data without encrypting the data if Encryption is disabled. Note The status of Encryption can be toggled between enabled or disabled by using the **Encryption** key or **Menu** key. (Refer to Toggling the Encryption during Transmission between Enabled and Disabled.)
Multi-key List No.	Encryption Key to be used by the transceiver to transmit and receive using the Encryption function can be configured by selecting the desired option from the Multi-key List. (Refer to Multi-key List.)
EKR List No.	When using the OTAR function, the Encryption Key to be used in combination with a Talkgroup ID can be configured. (Refer to P25 OTAR.)
KMF Profile	When using the OTAR function, whether to use the KMF Profile can be configured. (Refer to P25 OTAR.)
KMF Profile Number	When using the OTAR function, the profile number of a KMF which will communicate with the transceiver can be configured. (Refer to P25 OTAR.)

*1 To use this function, Selective Call Alert LED needs to be enabled.

Configuration using KPG-D1/ D1N

Configuring **Talkgroup ID List** (See Transceiver Settings > P25 > Talkgroup ID List)

Prohibiting Change to the Talkgroup ID (Talkgroup Strapped)

Talkgroup Strapped is the function used to disable changing the Talkgroup ID configured for a channel.
On a channel where this function is enabled, the transceiver cannot enter Talkgroup ID Select Mode. Therefore, a Talkgroup ID configured for a channel cannot be changed by operating the transceiver. (Refer to Initiating a Group Call.)

Configuration using KPG-D1/ D1N

- Configuring **Talkgroup Strapped** (Personality) (See Transceiver Settings > Personal > Personality > P25 Conventional (P25 Voting with NAC) > P25 > Talkgroup ID)
- Configuring **Talkgroup Strapped** (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > P25 Conventional (P25 Voting with NAC) > P25 > Talkgroup ID)

Displaying the ID of the Communicating Caller on the LCD (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. If the ID Name is not configured in the Individual ID List, the Individual ID List number or the Individual ID is displayed. (Refer to Receiving a Group Call.)

Configuration using KPG-D1/ D1N

Configuring **Unit ID Display on Group Call** (See Transceiver Settings > P25 > P25 Information > General)

1.7 Using 2-tone to Initiate an Individual Call

2-tone signaling uses a pair of 2 different tone frequencies in series for an individual call.

2-tone is a signaling system that can receive a signal with squelch disabled only when 2 tone signals in series sent from the transmitting transceiver match the tone signals preconfigured for the receiving transceiver.

2-tone consists of 2 tone signals in series with 2 different frequencies within the frequency range between 281.25 Hz and 3093.75 Hz in a P25 Conventional system. These 2 tone signals are sent in series with the carrier wave.

The following are the methods for sending the 2-tone code:

- 2-tone encoding list selection
- **Call** key
- PC command

Selecting and Sending the 2-tone Code from a List

The transceiver can send a 2-tone code by initiating transmission after selecting a 2-tone code configured in the 2-tone encoding list. (Refer to 2-tone Encoding List.)

An encoding tone configured in the 2-tone encoding list can be selected by pressing the 2-tone key.

Or, by selecting “2-tone” after the transceiver enters Menu Mode by pressing the **Menu** key, an encoding tone configured in the 2-tone encoding list can be selected.

Operating the transceiver:

1 **Press the 2-tone key.**

The transceiver enters 2-tone Mode, and the 2-tone encoding list appears.

The following operations are the same even if the transceiver enters 2-tone Mode by pressing the **Menu** key:

Note

If the transceiver enters 2-tone Mode on a channel with “Mixed” configured in **Channel Type**, the 2-tone encoding list for analog or the 2-tone encoding list for P25 appears according to the configuration in **Transmit Mode**.

2 **Press the [▲] key or [▼] key and select the 2-tone code.**

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

Note

A fixed text string ("List No.") and the list number appear for a 2-tone code for which **2-tone Name** is not configured in the 2-tone encoding list.

3 **Press the PTT switch.**

The display returns to the channel display, and the selected 2-tone code is sent. Even after the 2-tone code is sent, the transmission continues while the **PTT** switch is pressed and held.

If the transceiver transmits by pressing the **Menu** ([□]) or **[*]** key, the transceiver reverts to receive mode immediately after transmitting a 2-tone code.

Note

If "NAC and Optional Signaling" is configured in **Audio Control**, the Optional Signaling is in the matching state if transmission is on a channel with "2-tone 1" to "2-tone 4" configured in **Optional Signaling**. In this case, the "♪" icon appears, and the LED flashes yellow. (Refer to Unmuting the Speaker (Audio Control (P25)).)

Configuration using KPG-D1/ D1N

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

Using the Call Key to Send the 2-tone Code

Pressing one of the **Call 1** to **Call 6** keys causes the transceiver to transmit the preconfigured tone.

Call 1 to **Call 6** can be assigned to the **PF** keys by using KPG-D1/ D1N and the tone corresponding to each key can be configured by selecting from the 2-tone encoding list of 2-tone.

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Configuring the tones corresponding to **Call 1** to **Call 6** keys (See Transceiver Settings > Key Assignment > Call)

Using the PC Command to Send the 2-tone Code

The transceiver sends a 2-tone code when a transmission command for a 2-tone code is sent from a PC to the communication port of the transceiver.

To send a 2-tone code by using 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.)

Functions Related to 2-tone Code Encoding

Functions related to 2-tone code encoding are shown below.

- Duration of 1st Tone
- Duration of 2nd Tone
- Duration of Single Tone
- Gap Time
- First Tone Delay Time
- Sidetone
- 2-tone Encoding List

Duration of 1st Tone

Duration of 1st Tone is the 1st Tone Encode duration for transmitting the 2-tone code (1st Tone and 2nd Tone) configured in the 2-tone encoding list.

Duration of 1st Tone is configured using KPG-D1/ D1N. Usually, 1 sec is configured for this function.

Duration of 2nd Tone

Duration of 2nd Tone is the 2nd Tone Encode duration for transmitting the 2-tone code (1st Tone and 2nd Tone) configured in the 2-tone encoding list.

Duration of 2nd Tone is configured using KPG-D1/ D1N. Usually, 3 sec is configured for this function.

Duration of Single Tone

Duration of Single Tone is the Single Tone Encode duration for transmitting the Single Tone configured in the 2-tone encoding list.

Duration of Single Tone is configured using KPG-D1/ D1N. Usually, 5 sec is configured for this function.

Gap Time

Gap Time is the unmodulated duration between the 1st Tone and the 2nd Tone when sending the 2-tone code (1st Tone and 2nd Tone) configured in the 2-tone encoding list.

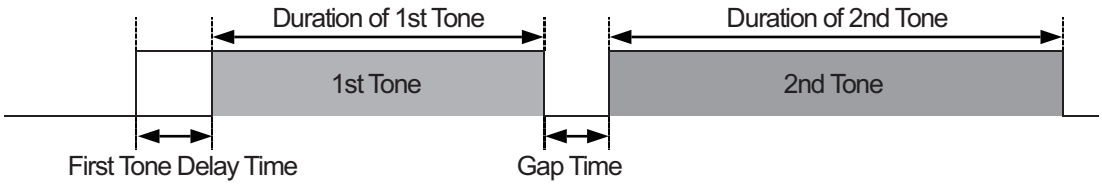
Gap Time is configured using KPG-D1/ D1N. Usually, 0 ms is configured for this function.

First Tone Delay Time

First Tone Delay Time is the length of time from when the transceiver starts transmission until the transceiver actually starts transmitting a tone when the transceiver sends a 2-tone code.

The transceiver transmits an unmodulated signal until the length of time configured in **First Tone Delay Time** elapses.

● **2-tone Encode**



● **Single Tone Encode**

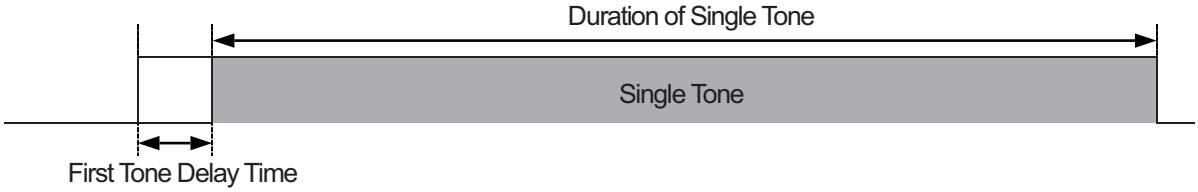


Figure 1-6 Duration of Single Tone/ Gap Time/ First Tone Delay Time

Sidetone

Sidetone is the function to emit the tone of the 2-tone code from the speaker while the transceiver transmits the 2-tone code.

2-tone Encoding List

2-tone encoding list is the code list used for transmitting a 2-tone code. By selecting a code configured in this list, the transceiver can transmit a 2-tone code.

The following items can be configured in the 2-tone encoding list:

Table 1-9 2-tone Encoding List Configuration

Configuration	Description
Single Tone	Whether the code to be sent for each list number is used as a Single Tone is configured. **2nd Tone** cannot be configured if the code is configured to be used as a Single Tone.
2-tone Name	2-tone Name can be used to assign a name to each list number. A maximum of 14 characters can be configured.
1st Tone	The 1st Tone frequency is configured. The frequency can be configured in the range between 281.25 Hz and 3093.75 Hz inclusive.
2nd Tone	The 2nd Tone frequency is configured. The frequency can be configured in the range between 281.25 Hz and 3093.75 Hz inclusive. **2nd Tone** cannot be configured if **Single Tone** is configured.

Configuration using KPG-D1/ D1N

- Configuring **Duration of 1st Tone** (See Transceiver Settings > 2-tone > 2-tone (Digital) > Encode)
- Configuring **Duration of 2nd Tone** (See Transceiver Settings > 2-tone > 2-tone (Digital) > Encode)
- Configuring **Duration of Single Tone** (See Transceiver Settings > 2-tone > 2-tone (Digital) > Encode)
- Configuring **Gap Time** (See Transceiver Settings > 2-tone > 2-tone (Digital) > Encode)
- Configuring **First Tone Delay Time** (See Transceiver Settings > 2-tone > 2-tone (Digital) > Encode)
- Configuring **Sidetone** to be enabled or disabled (See Transceiver Settings > 2-tone > 2-tone (Digital) > Encode)
- Configuring the **2-tone encoding list** (See Transceiver Settings > 2-tone > 2-tone (Digital) > Encode)

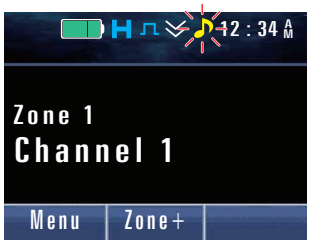
Decoding the 2-tone Code

The transceiver can wait for a 2-tone code on a channel with “2-tone 1”, “2-tone 2”, “2-tone 3”, or “2-tone 4” configured in **Optional Signaling (P25)**. (Refer to Using the Optional Signaling (P25).)

Transceiver behavior

1 Receive the 2-tone code corresponding to the Call Format preconfigured for the transceiver.

The “ ” icon blinks and the transceiver emits the received audio according to the configuration in **Audio Control (P25)** if the received 2-tone code matches the 2-tone code preconfigured for the transceiver. (Refer to Unmuting the Speaker (Audio Control (P25)).)



Note

- If **Busy LED** is enabled. the LED lights green. (Refer to Common FUNC Busy LED.)
- If **Selective Call Alert LED** is enabled, the LED flashes when the transceiver is receiving. The LED color varies according to the configuration in **Alert LED Color** of **Call Format**.
- If anything other than “Off” is configured in **Alert Tone** of **Call Format**, an Alert Tone sounds from the transceiver. Also, if **Transpond** of **Call Format** is enabled, the transceiver transmits a multiplexed Transpond tone.
- After the length of time configured in **Auto Reset Timer** elapses, the matching state of the 2-tone code is reset.

Functions Related to 2-tone Code Decoding

The following functions associated with 2-tone code decoding can be configured for each of 2-tone 1, 2-tone 2, 2-tone 3, and 2-tone 4.

- Decoder 1 to Decoder 4
- A Tone/ B Tone/ C Tone/ D Tone
- Auto Reset Timer
- Clear to Transpond
- Selective Call Alert LED

Standby code (Decoder 1 to Decoder 4)

Four types of Decoders can be configured for 2-tone 1, 2-tone 2, 2-tone 3, and 2-tone 4 respectively. The transceiver can wait to receive the 2-tone codes configured in Decoder 1 to Decoder 4 at the same time.

The following items can be configured for each Decoder.

Call Format

Call Format is the combination of A Tone, B Tone, C Tone, and D Tone the transceiver waits to receive. The following combinations are available.

Table 1-10 List of Call Format Combinations

Combination	Description
A and B	The transceiver waits to receive A Tone and B Tone.
A and C	The transceiver waits to receive A Tone and C Tone.
A and D	The transceiver waits to receive A Tone and D Tone.
B and A	The transceiver waits to receive B Tone and A Tone.
B and C	The transceiver waits to receive B Tone and C Tone.
B and D	The transceiver waits to receive B Tone and D Tone.
C and A	The transceiver waits to receive C Tone and A Tone.
C and B	The transceiver waits to receive C Tone and B Tone.
C and D	The transceiver waits to receive C Tone and D Tone.
D and A	The transceiver waits to receive D Tone and A Tone.
D and B	The transceiver waits to receive D Tone and B Tone.
D and C	The transceiver waits to receive D Tone and C Tone.
Long A	The transceiver waits to receive A Tone.
Long B	The transceiver waits to receive B Tone.
Long C	The transceiver waits to receive C Tone.
Long D	The transceiver waits to receive D Tone.

Note

If anything other than “Long A”, “Long B”, “Long C”, or “Long D” is configured in **Call Format**, the transceiver waits to receive the first tone for 1 sec and the second tone for 3 sec. If “Long A”, “Long B”, “Long C”, or “Long D” is configured in **Call Format**, the transceiver waits to receive the corresponding tone for 5 or more sec.

Transpond/ Alert Tone

Transpond and **Alert Tone** are functions that allow the transceiver to transmit a multiplexed Transpond tone, or that allow an Alert Tone to sound from the transceiver when the transceiver is called with 2-tone signaling.

Table 1-11 Transpond/ Alert

Transpond	Alert	Description
No	Off	The transceiver does not respond at all.
Yes	Off	The transceiver transmits a Transpond tone.
No	Anything other than Off	An Alert Tone sounds from the transceiver.
Yes	Anything other than Off	An Alert Tone sounds from the transceiver after transmitting a Transpond tone.

The Alert Tone to be emitted when the transceiver is called with 2-tone signaling is selected from 8 types of tones configured in **Alert Tone Pattern**. (Refer to Common FUNC Configuring the Alert Tone (Alert Tone Pattern).)

- **Alert LED Color**

  When the 2-tone code matches, the LED flashes according the configuration in **Alert LED Color**.

Table 1-12 Alert LED Color

Configuration	Description
Off	The LED does not flash.
Red	The LED flashes red.
Blue	The LED flashes blue.
Green	The LED flashes green.
Yellow	The LED flashes yellow.
Light Blue	The LED flashes light blue.
Purple	The LED flashes purple.
White	The LED flashes white.

Frequencies for standby code (A Tone/ B Tone/ C Tone/ D Tone)

A Tone, B Tone, C Tone, and D Tone are the frequencies of the tone signals the receiving transceiver waits to receive. The frequency can be configured between 281.25 Hz and 3093.75 Hz inclusive.

However, in a P25 Conventional system and a P25 Trunking system (Phase 1 FDMA), the 2-tone code matches if either frequency of each combination of the following frequencies is received:

1562.50 - 1593.75
1781.25 - 1812.50
1906.25 - 1937.50
1968.75 - 2000.00
2093.75 - 2125.00
2187.50 - 2218.75
2250.00 - 2281.25
2343.75 - 2375.00
2437.50 - 2468.75
2500.00 - 2531.25
2562.50 - 2593.75
2625.00 - 2656.25
2687.50 - 2718.75
2750.00 - 2781.25
2812.50 - 2843.75
2875.00 - 2906.25
2937.50 - 2968.75
3000.00 - 3031.25
3062.50 - 3093.75

For example, if 3062.50 Hz is configured for the frequency, the 2-tone code matches even if a 3093.75 Hz 2-tone code is received. If 3093.75 Hz is configured for the frequency, the 2-tone code matches even if a 3062.50 Hz 2-tone code is received.

Auto Reset Timer

Auto Reset Timer is the length of time from when the received 2-tone code matches the 2-tone code preconfigured for the transceiver until the matching state is automatically reset.

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

Table 1-13 Auto Reset Timer

Configuration		Description
Auto Reset Timer	Off	**Auto Reset Timer** does not function.
	0 sec to 300 sec	After the configured time elapses, the matching state of the 2-tone code is automatically reset.
LED		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		If this function is enabled, the intermittently emitted Alert Tone stops when the length of time configured in **Auto Reset Timer** elapses.
Monitor		If this function is enabled, the matching state of the 2-tone code is reset when the length of time configured in **Auto Reset Timer** elapses.

Clear to Transpond

Clear to Transpond is the function that allows the transceiver to wait for the Transpond until the channel becomes available if the channel is occupied by other users when the transceiver attempts to initiate the Transpond.

Selective Call Alert LED

Selective Call Alert LED is the function to make the LED flash when the transceiver receives a 2-tone code.

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

Note

The matching state of 2-tone code is reset on the following conditions. Also, the Transpond is reset on the following conditions. The Transpond is suspended if transmission is disabled by **Clear to Transpond**.

Table 1-14 Conditions to Reset the 2-tone Code

Conditions	Description
Pressing a key	When the following keys are pressed • **Channel Up** key • **Channel Recall** key • **Channel Down** key • **Clear** key • **Direct Channel 1 to Direct Channel 5** keys • **Direct Channel 1 Select to Direct Channel 5 Select** keys • **Emergency** key • **Home Channel** key • **Home Channel Select** key • **Monitor** key • **Monitor Momentary** key • **Scan** key • **Scan Normal** key • **Scan Program** key • **Front Panel Programming** key • **Squelch Off** key • **Squelch Off Momentary** key • **Talkgroup Reset** key • **Transceiver Password** key • **Zone Up** key • **Zone Down** key • **Zone Up/Down** key • **Zone Select** key • **Channel Up/Down** key • **Channel Select** key
Hook (Mobile only)	When the microphone is in the on-hook state
Expiration of the Auto Reset Timer	When the length of time configured in **Auto Reset Timer** elapses (This condition is only applicable to 2-tone.)
Transmission	When transmission is made using the following (This condition is only applicable to the Transpond.) • **PTT** switch • External PTT (Voice) port (Mobile only) • External PTT (Data) port (Mobile only)

Configuration using KPG-D1/ D1N

- Configuring **Call Format** (See Transceiver Settings > 2-tone > 2-tone (Digital) > Decode (2-tone 1 to 4))
- Configuring **Transpond** (See Transceiver Settings > 2-tone > 2-tone (Digital) > Decode (2-tone 1 to 4))
- Configuring **Alert Tone** (See Transceiver Settings > 2-tone > 2-tone (Digital) > Decode (2-tone 1 to 4))
- Configuring **Alert LED Color** (See Transceiver Settings > 2-tone > 2-tone (Digital) > Decode (2-tone 1 to 4))
- Configuring **A Tone/ B Tone/ C Tone/ D Tone** (See Transceiver Settings > 2-tone > 2-tone (Digital) > Decode(2-tone 1 to 4))
- Configuring **Auto Reset Timer** (See Transceiver Settings > 2-tone > 2-tone (Digital) > Decode (2-tone 1 to 4) > Auto Reset)
- Configuring **Clear to Transpond** to be enabled or disabled (See Transceiver Settings > 2-tone > 2-tone (Digital) > Decode (2-tone 1 to 4))
- Configuring **Selective Call Alert LED** to be enabled or disabled (See Transceiver Settings > 2-tone > 2-tone (Digital) > Decode (2-tone 1 to 4))

1.8 Using the Tactical Zone

Tactical Zone is the function to create a new group by registering an arbitrary channel in the Tactical Zone after selecting the channel from the P25 Conventional system channels configured for the transceiver. This function is used when the channels registered in each zone are operated in a single zone.

Note

This function is unavailable for NX-5400/ NX-5900.

Registering a Channel in the Tactical Zone

A channel with “Analog Conventional” or “P25 Conventional” configured in **System Type** can be registered in the Tactical Zone. A maximum of 512 channels can be registered in the Tactical Zone.

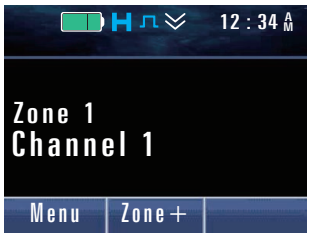
Pressing the **Tactical Zone** key registers the selected channel in the Tactical Zone.

Also, if the **Tactical Zone** key is pressed and held, the registrable channels of the selected zone can be collectively registered in the Tactical Zone.

Operating the transceiver

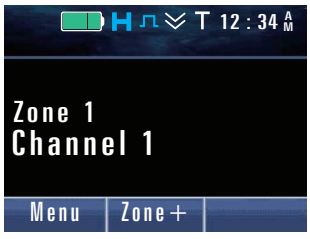
- **Registering the selected channel in the Tactical Zone**

1 **Select a channel which is not registered in the Tactical Zone.**



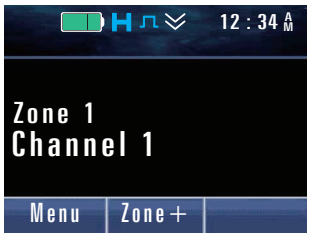
2 **Press the Tactical Zone key.**

A Key Beep A (1 beep) sounds from the transceiver, and the selected channel is registered in the Tactical Zone. At this time, the “ T ” icon appears for 1 sec.



● Registering channels of a zone collectively in the Tactical Zone

1 Select a zone other than the Tactical Zone.



2 Press and hold the Tactical Zone key.

A Rollover Tone (1 beep) sounds from the transceiver, and all registrable channels of the selected zone are registered in the Tactical Zone. At this time, the " T " icon appears for 1 sec.

Note

- If the number of channels to be registered in the Tactical Zone exceeds 512 when the channels are collectively registered in the Tactical Zone, the channels of the selected zone are registered in order from the smallest channel number for as many channels as available for registration.
- If the transceiver configuration data is updated by receiving OTAP data or by writing configuration data by using KPG-D1/ D1N, the channels registered in the Tactical Zone are cleared.
- If the transceiver data is copied to another transceiver by using the Clone function, the channel data registered in the Tactical Zone is not copied.
- Each channel registered in the Tactical Zone behaves according to the FPU configuration of the original zone or channel.

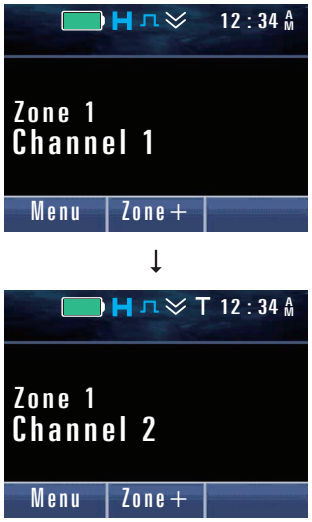
Configuration using KPG-D1/ D1N

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

Migrating to the Tactical Zone

A Tactical Zone is treated as Zone 0. Zone 0 is the zone number between the highest zone number and the lowest zone number of the zones registered by using KPG-D1/ D1N.

Zone 0 (the Tactical Zone) is selected by operating the **Zone Up/ Zone Down** key or the **Selector**. The transceiver migrates to Zone 0 (the Tactical Zone) when attempting to increase the zone number while the zone having the highest number is selected. Or, the transceiver migrates to Zone 0 (the Tactical Zone) when attempting to decrease the zone number while the zone having the lowest number is selected.



If the transceiver migrates to the Tactical Zone, the "T" icon appears, and the registered channels are displayed. The "T" icon appears while the transceiver is in the Tactical Zone.

The original Zone-channel names of the registered channels appear on the standby display of Zone 0 (the Tactical Zone). Also, the original Zone-channel numbers of the registered channels appear as the Zone-channel numbers.

Changing the channel

The channels registered in the Tactical Zone are sorted by original channel number in ascending order after sorted by original zone number in ascending order. In Zone 0 (the Tactical Zone), channels can be selected in the sorted order by operating the **Channel Up/ Channel Down** key.

Table 1-15 Registration Example of the Tactical Zone

Tactical Zone	Zone 1	Zone 2
CH1: Zone 1- Channel 1	Channel 1	Channel 1
CH2: Zone 1- Channel 3	Channel 2	Channel 2
CH3: Zone 2- Channel 2	Channel 3	Channel 3
CH4: Zone 2- Channel 4	Channel 4	Channel 4
	Channel 5	
	Channel 6	

The above table shows an example of when Channel 1 and Channel 3 of Zone 1 and Channel 2 and Channel 4 of Zone 2 are registered in the Tactical Zone. If Channel 6 of Zone 1 is registered in the Tactical Zone in this condition, the channel is also registered as CH3 of the Tactical Zone, and the subsequent channel numbers are moved down by one.

Note

- If “End Stop” is configured in **Rollover/End Stop**, pressing the **Zone Up** key while the zone having the highest number is selected causes the transceiver to migrate to Zone 0 (the Tactical Zone), but pressing the **Zone Down** key while the zone having the lowest number is selected cannot cause the transceiver to migrate to Zone 0. This behavior is identical even if the **Selector** with “Zone Up/Down” configured is operated. Also, if “Zone Select” is configured for the **Selector**, the transceiver cannot migrate to Zone 0 (the Tactical Zone) by operating the **Selector**.
- If “Standard” is configured in **Voice Announcement Type**, “Zone 0” is announced by voice by selecting Zone 0 (the Tactical Zone). If the transceiver migrates to Zone 0 (the Tactical Zone) by operating the **Zone Up/ Zone Down** key, “Zone0, Channel yy” is announced by voice. (“yy” is the channel number of the sort order of when the channel was registered in the Tactical Zone.) If the channel is changed by operating the **Channel Up/ Channel Down** key in the Tactical Zone, the channel number of the sort order of when the channel was registered in the Tactical Zone is announced by voice.
- Pressing the **Home Channel** key in the Tactical Zone causes the transceiver to migrate to the Home Channel configured for the original zone of the selected channel. Pressing the **Home Channel** key again causes the transceiver to return to the previous channel of the Tactical Zone. Also, if the Home Channel is changed by operating the Home Channel Select key in the Tactical Zone, the selected channel is configured as the Home Channel for the original zone. (Refer to Common FUNC Home Channel.)
- If one of the **Direct Channel 1** to **Direct Channel 5** keys is pressed in the Tactical Zone, the transceiver migrates to the corresponding Direct Channel. If **Return** is enabled, pressing one of the **Direct Channel 1** to **Direct Channel 5** keys causes the transceiver to return to the previous channel of the Tactical Zone. Also, if the Direct Channel is changed by operating one of the **Direct Channel 1 Select** to **Direct Channel 5 Select** keys in the Tactical Zone, the original Zone-channel of the selected channel is configured as the Direct Channel. (Refer to Common FUNC Home Channel.)
- The scan function does not work in the Tactical Zone. If the transceiver migrates to the Tactical Zone while scanning, the transceiver pauses scanning. If the transceiver migrates to another zone from the Tactical Zone, the transceiver resumes scanning if the conditions to resume scanning are satisfied. However, if the transceiver migrates to the Home Channel or Direct Channel from the Tactical Zone, scanning remains paused.
- The transceiver behaves as follows if the operations associated with the scan function are executed in the Tactical Zone. The transceiver also behaves in the same manner by the operations in Menu Mode.

Table 1-16 Operations Associated with the Scan Function in the Tactical Zone

Transmission Operation		Description
PF key	**Scan** key	The operation to change Scan On to Scan Off is available. The operation to change Scan Off to Scan On is not available.
	Scan Normal key	The operation to change Scan On to Scan Off is available. The operation to change Scan Off to Scan On is not available.
	Scan Delete/ Add key	No operation is available.
	Scan Program key	No operation is available.
AUX Input (Mobile only)	Scan	The operation to change Scan On to Scan Off is available. The operation to change Scan Off to Scan On is not available.
Lever switch (Portable only)	Scan	The operation to change Scan On to Scan Off is available. The behavior is suspended after the operation to change Scan Off to Scan On.
	Scan Normal	The operation to change Scan On to Scan Off is available. The behavior is suspended after the operation to change Scan Off to Scan On.

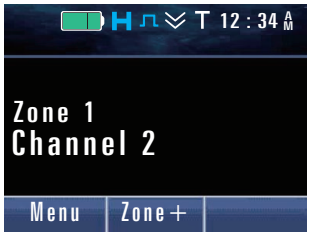
Deregistering the Tactical Zone

The registration status of a channel registered in the Tactical Zone can be deregistered.

Operating the transceiver

- **Deregistering the selected channel from the Tactical Zone**

1 **Select a channel to be deregistered in Zone 0 (the Tactical Zone).**



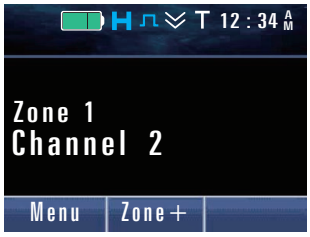
2 **Press the Tactical Zone key.**

A Key Beep B (2 beep) sounds from the transceiver, and the selected channel is deregistered from the Tactical Zone.

The transceiver migrates to the registered channel having a channel number back by one. If the deregistered channel is the channel having the lowest number in Zone 0 (the Tactical Zone), the transceiver migrates to the registered channel having the next number.

- **Deregistering all channels from the Tactical Zone**

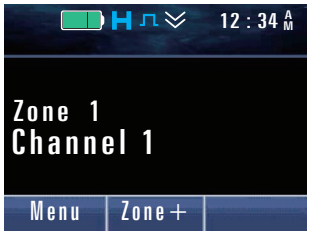
1 **Select Zone 0 (the Tactical Zone).**



2 **Press and hold the Tactical Zone key.**

A Rollover Tone (1 beep) sounds from the transceiver, and all channels are deregistered from the Tactical Zone.

The transceiver migrates to the Zone-channel having the lowest number registered in the transceiver.



1.9 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.

In a P25 Conventional system, the location information received from the built-in GPS receiver unit or the GPS receiver unit connected to the transceiver can be sent to the parties that are registered beforehand using Tier 1 Location Service compliant with TIA-102.BAJB and the P25 CAI of P25 Conventional.

Note

- GPS data is not sent in the non-positioning state that the location information is not received from the GPS receiver unit. The " " icon blinks in the non-positioning state. (Refer to Common FUNC The Icons on the LCD.)
- The transmission of GPS data sent on a P25 Conventional channel with Encryption enabled will not be encrypted. (Refer to COMMUNICATION SECURITY.)

Transmission Method of GPS Data

The following are the methods to send GPS data:

- **Manual GPS data transmission**
  (Refer to Sending GPS Data Manually by Using a Key (Send the GPS Data).)
- **Automatic GPS data transmission**
  (Refer to Sending GPS Data Automatically (Auto GPS Report).)
- **GPS data transmission linked with operation of the PTT switch**
  (Refer to Sending GPS Data Linked With the PTT Switch Operation (GPS Report).)
- **GPS data transmission linked with operation of turning the transceiver ON and OFF**
  (Refer to Sending GPS Data Linked With the Operation of Turning the Transceiver ON and OFF (GPS Report).)
- **GPS data transmission linked with an Emergency Call**
  (Refer to Sending GPS Data in Emergency Mode (GPS Report).)
- **GPS data transmission linked with travel distance**
  (Refer to Sending GPS Data Based On Travel Distance (GPS Distance Change).)

The ID of the Target Transceiver (GPS Target ID)

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

By using KPG-D1/ D1N, a Target ID can be configured in the range between 000001 and FFFFFF (hexadecimal), or between 1 and 16777215 (decimal).

The ID of the base station which is responsible for operation and administration of system is normally configured.

If **GPS Target ID** is not configured, no GPS data will be sent.

Configuration using KPG-D1/ D1N

Configuring **GPS Target ID** (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > 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 Automatically (Auto GPS Report)

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

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 GPS Report** needs to be enabled by using KPG-D1/ D1N.

Note

- The transceiver sends GPS data upon receipt of the GPS data transmission request from the base station even if **Auto GPS Report** is disabled.
- GPS data is not sent automatically by **Auto GPS Report** when the transceiver is in the following state. Also, to avoid a collision with a GPS transmission from another transceiver, the transmission is not suspended.
  - When the transceiver is not receiving location information for 5 sec or longer (non-positioning state)
  - When location information is not updated after the last GPS data transmission by Auto GPS Report
  - In the Radio Inhibit state (Refer to Disabling the Transceiver Capability by Remote Control (Radio Inhibit / Uninhibit).)
  - While Scan Program Mode is activated (Refer to Changing the Scan List (Scan Program).)
  - When transmission is restricted by Time-out Timer
  - While the data communication including GPS data transmission by the P25 Conventional CAI is in progress
  - While the transceiver is transmitting by using Transpond or ACK
  -
  - When no Target ID is configured
  - When the GPS Storage Data is being sent to a PC (Refer to Common FUNC Storing the GPS Data (GPS Data Storage).)
  - When no transmit frequency is configured
  - While Transceiver Password Mode is activated (Refer to Common FUNC Password for Transceiver Operation (Transceiver Password).)

- When a channel not configured for the transceiver is selected
- While the transceiver is in the TX Unlock state
- While the transceiver is in busy state
- While the transceiver is transmitting
- While the transceiver unmutes the speaker
- When the Public Address function is used (Mobile only) (Refer to Common FUNC Using the Transceiver as a Megaphone (Public Address).)

Configuration using KPG-D1/ D1N

Configuring **Auto GPS Report** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > GPS)

Sending GPS Data Linked With the PTT Switch Operation (GPS Report)

GPS data can be sent when the **PTT** switch is released after the communication ends.
To use this function, **PTT Release** (GPS Report) needs to be enabled by using KPG-D1/ D1N.

Note

GPS data is not sent when the transceiver is in the following states:

- When transmission is restricted by Time-out Timer
- When no Target ID is configured
- When the GPS Storage Data is being sent to a PC (Refer to Common FUNC Storing the GPS Data (GPS Data Storage).)
- When no transmit frequency is configured
- When a channel not configured for the transceiver is selected
- While the transceiver is in the TX Unlock state
- While the transceiver unmutes the speaker

Configuration using KPG-D1/ D1N

Configuring **PTT Release** (GPS Report) to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > GPS > GPS Report)

Sending GPS Data Linked With the Operation of Turning the Transceiver ON and OFF (GPS Report)

GPS data can be sent when the transceiver is turned ON or OFF.

Transceiver behavior when the transceiver is turned ON

GPS data will be sent if the transceiver receives the $GPGGA or $GPRMC positioning data from the GPS receiver unit within 100 sec after the transceiver is turned ON. The GPS data transmission by **Power-on** (GPS Report) is stopped if the channel is changed within 100 sec or the transceiver enters Emergency Mode.

- **If the transceiver is transmitting at the timing of GPS data transmission by Power-on**

  GPS data is not sent. In this case, the transceiver executes again the GPS data transmission by **Power-on** after 3 sec elapses. The transceiver behavior of retransmission repeats until the GPS data is sent.

- **If the timing of GPS data transmission by Power-on comes while the transceiver is in busy state**

  The transceiver starts checking the busy state for the GPS data transmission. During this time, “Send Data” appears on the transceiver display. If GPS data cannot be sent as a result of checking the busy state, “Busy” appears on the transceiver display, and the GPS data transmission by **Power-on** is executed again after 3 sec elapses. The transceiver behavior of retransmission repeats until the GPS data is sent.

To use this function, **Power-on** (GPS Report) needs to be enabled by using KPG-D1/ D1N.

Transceiver behavior when the transceiver is turned OFF

The GPS data transmission behavior is sustained for 1 sec after the transceiver is turned OFF while a P25 Conventional channel is selected.

If location information is received from the GPS receiver unit during this 1 sec, the GPS data will be sent.

If location information cannot be received from the GPS receiver unit during this 1 sec, the GPS data left unsent while the transceiver is turned ON will be sent and the transceiver is turned OFF. If there is no data left, the transceiver is turned OFF without sending data.

To use this function, **Power-off** needs to be enabled by using KPG-D1/ D1N.

Note

- If the transceiver is turned OFF with no location information received while the transceiver is turned ON, the transceiver will be turned OFF before 1 sec elapses.
- If the transceiver is turned OFF with no location information received for 5 sec or longer (non -positioning state) while the transceiver is turned ON, the transceiver will be turned OFF before 1 sec elapses.
- If the transceiver is turned OFF during the scan, the GPS data transmission by **Power-off** is executed only if the Revert Channel is a P25 Conventional channel.
- If the transceiver is turned OFF in Scan Program Mode, the GPS data transmission by **Power-off** is executed just after Scan Program Mode is reset, and then the transceiver is turned OFF.
- GPS data is not sent when the transceiver is in the following states:
  - When transmission is restricted by Time-out Timer
  - When no Target ID is configured
  - When the GPS Storage Data is being sent to a PC (Refer to Common FUNC Storing the GPS Data (GPS Data Storage).)
  - When no transmit frequency is configured
  - When a channel not configured for the transceiver is selected
  - While the transceiver is in the TX Unlock state
  - While the transceiver unmutes the speaker

Configuration using KPG-D1/ D1N

- Configuring **Power-on** (GPS Report) to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > GPS > GPS Report)
- Configuring **Power-off** (GPS Report) to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > GPS > GPS Report)

Sending GPS Data in Emergency Mode (GPS Report)

If the transceiver enters Emergency Mode or if **Emergency Alarm** is enabled, GPS data can be sent when the transceiver enters Emergency Mode after the **Emergency Alarm** behavior completes. (Refer to COMMUNICATIONS IN AN EMERGENCY.)

Also, GPS data can be sent at the following timings while the transceiver is in Emergency Mode:

- When **Transmit Duration** ends
- When the **PTT** switch is released
- When a channel is changed

To use this function, **Emergency** (GPS Report) needs to be enabled by using KPG-D1/ D1N.

Note

- If **Emergency** (GPS Report) is enabled, even if the GPS Report functions except for **Power-off**, or **Auto GPS Report** is enabled, these functions do not function, and only **Emergency** (GPS Report) function.
- If **Power-off** (GPS Report) is enabled, and if the transceiver is turned OFF in Emergency Mode, the GPS data transmission by **Power-off** is executed just after Emergency Mode is reset, and then the transceiver is turned OFF.
- GPS data is not sent when the transceiver is in the following states:
  - When transmission is restricted by Time-out Timer
  - When no Target ID is configured
  - When the GPS Storage Data is being sent to a PC (Refer to Common FUNC Storing the GPS Data (GPS Data Storage).)
  - When no transmit frequency is configured
  - When a channel not configured for the transceiver is selected
  - While the transceiver is in the TX Unlock state
  - While the transceiver unmutes the speaker

Configuration using KPG-D1/ D1N

Configuring **Emergency** (GPS Report) to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > GPS > GPS Report)

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

GPS data can be sent 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 sent GPS data using one method selected from **Send the GPS Data, Auto GPS Report, PTT Release, Power-on/ off**, and **Emergency**. 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 > P25 Conventional (P25 Voting with NAC) > GPS > GPS Distance Change)
- Configuring **Distance Value** (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > GPS > GPS Distance Change)

GPS Report Interval Time

GPS Report Interval Time is the function to send GPS data at regular intervals if **Auto GPS Report** is enabled.

GPS Report Interval Time (Portable/Ignition On)

GPS Report Interval (Portable/Ignition On) is the interval to send GPS data while the Ignition Sense port goes high level. In order to automatically transmit GPS data for 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 Ignition Sense port goes low level. 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**.

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.
- If the large number of transceivers is sending GPS data, and if a short time is configured in **GPS Report Interval Time**, the timing of sending the next GPS data comes before all the transceivers complete the GPS data transmission, and a data collision may occur. In this case, a longer time needs to be configured in **GPS Report Interval Time** to avoid a data collision.

Configuration using KPG-D1/ D1N

- Configuring **GPS Report Interval (Portable/Ignition On)** (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > GPS > GPS Report Interval Time)
- Configuring **GPS Report Interval (Ignition Off)** (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > 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.

Note

GPS Time Mark cannot be configured longer than **GPS Report Interval Time**.

Configuration using KPG-D1/ D1N

Configuring **GPS Time Mark** (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > GPS)

1.10 Receiving GPS Data

The base station receiving GPS data from the transceiver of a mobile station 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 is convenient for 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 received from a GPS satellite can be stored in both the internal memory of the transceiver and a microSD card or a microSDHC card at regular time intervals. (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.)

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**.

1.11 Disabling the Transceiver Capability by Remote Control (Radio Inhibit / Uninhibit)

Radio Inhibit is the function that disables the transceiver capability by remote control. This function allows an administrator to remotely disable the transceiver, for instance, if the transceiver is lost.

Also, **Radio Uninhibit** is the function that can reset the Radio Inhibit state.

The transceiver in the Radio Inhibit state appears to be in the same state as if the transceiver is turned OFF. However, the transceiver actually remains turned ON even though it appears to be turned OFF.

Note

This transceiver can only receive but cannot send a Radio Inhibit/ Uninhibit request message.

Transceiver Behavior upon Receipt of the Radio Inhibit Request Command

The transceiver enters the Radio Inhibit state when the transceiver receives a Radio Inhibit request message.

After the transceiver enters the Radio Inhibit state, the transceiver that received the Radio Inhibit request message sends an ACK to the system that sent the Radio Inhibit request message.

However, the transceiver that receives the Radio Inhibit request message does not enter the Radio Inhibit state in the following cases:

Also, the transceiver does not send any ACK.

- If the Target ID for a Radio Inhibit request message is configured for other than own
- If **Radio Inhibit** is disabled

To receive a Radio Inhibit request message and accept the received message, **Radio Inhibit** needs to be enabled.

Note

The transceiver enters the Radio Inhibit state when the transceiver receives a Radio Inhibit request message even if the transceiver receives DTMF or FleetSync signaling and enters the Stun state. If the transceiver in this state receives a command to reset the Stun state, the Stun state is reset, but the Radio Inhibit state is not reset.

Configuration using KPG-D1/ D1N

Configuring **Radio Inhibit** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > P25)

Transceiver Behavior upon Receipt of the Radio Uninhibit Request Command

If the transceiver receives a Radio Uninhibit request message while in the Radio Inhibit state, the transceiver sends an ACK to the system that sent the Radio Uninhibit request message. Then, the Radio Inhibit state is reset and the transceiver can be used again.

However, the Radio Inhibit state is not reset if the Target ID for the Radio Inhibit request message is configured for other than own. Also, the transceiver does not send any ACK.

To receive a Radio Uninhibit request message and accept the received message, **Radio Inhibit** needs to be enabled.

Note

Only if all of the following conditions are satisfied, the password entry screen appears upon reset of the Radio Inhibit state:

- A Transceiver Password is configured for the transceiver.
- “Transceiver Password” is not assigned to a key of the transceiver.
- The transceiver has been turned OFF to ON when the transceiver is in the Radio Inhibit state.

Configuration using KPG-D1/ D1N

Configuring **Radio Inhibit** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > P25)

Transceiver Behavior in the Radio Inhibit State

The transceiver in the Radio Inhibit state appears to be in the same state as if the transceiver is turned OFF.

The following is the transceiver behavior while the transceiver is placed in the Radio Inhibit state:

- The LCD, LED, and Backlight are all turned Off.
- The speaker is muted.
- Operations other than turning the transceiver OFF cannot be done.
- Communications using commands other than the following commands are ignored:
  - Radio Check
  - Radio Inhibit/ Radio Uninhibit
- The control commands specified by the PC Interface Protocol are not accepted. In this case, neither an ACK nor a NACK is returned.
- PC commands, such as the J Command, are not sent even if the transceiver status changes.
- The AUX Input functions do not function. (Mobile only)
- However, the following AUX Output functions are disabled: (Mobile only)
  - LOK
  - COR
  - TOR
  - PTT Output
  - TXS

The following are the modes that function while the transceiver is placed in the Radio Inhibit state:

- FPU Programming Mode (only Read is available)
- Transceiver Information Mode
- PC Test Mode
- PC Tuning Mode

Note

- The Radio Inhibit state cannot be reset until the transceiver receives the Radio Uninhibit request message. The Radio Inhibit state is retained even after the transceiver is turned OFF.
- If the transceiver in Emergency Mode receives a Radio Inhibit request message, the transceiver resets the Emergency behavior and is placed in the Radio Inhibit state. In this case, the transceiver does not resume the Emergency behavior even if the Radio Inhibit state is reset after the transceiver receives the Radio Uninhibit request message.
- If the transceiver receives a Radio Inhibit request message during the scan, the transceiver stops scanning and is placed in the Radio Inhibit state. In this case, the transceiver does not resume scanning even if the Radio Inhibit state is reset after the transceiver receives a Radio Uninhibit request message.

1.12 Actions for Other Transceivers

Remote control using radio communications enables monitoring the situation around another transceiver or checking whether another transceiver is in operation.

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

Remote Monitor is the function to automatically transmit at a certain length of time the ambient audio collected through a microphone by the transceiver upon receipt of a request sent by the other transceiver.

For example, if transceiver A receives the Remote Monitor request message, transceiver A sends an ACK to transceiver B. Then, transceiver A initiates an Individual Call to transceiver B.

In this case, the length of the transmit time for an Individual Call can be obtained by multiplying the value configured for Transmit Multiplier contained in a Remote Monitor request message by the value configured for Remote Monitor Timer.

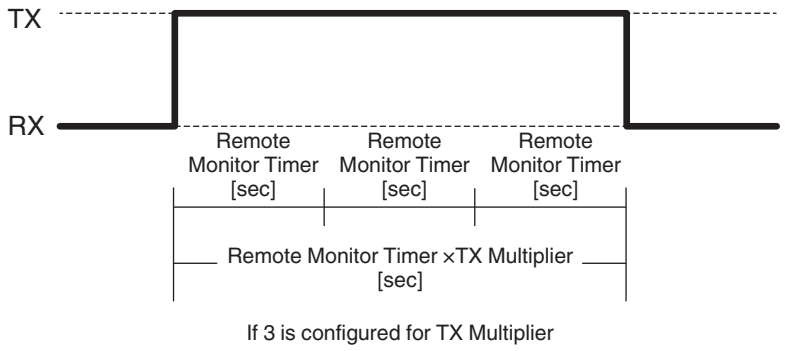


Figure 1-7 The Length of Time for Sending an Individual Call

The following is the transceiver behavior of when the transceiver initiates an Individual Call by a Remote Monitor request message:

- The transceiver transmits on a channel where the transceiver receives a Remote Monitor request message.
- If **Time-out Timer** is enabled, **Time-out Timer** becomes disabled, and the transceiver transmits for the requested length of the transmit time.
- If **Busy Channel Lockout** is enabled, **Busy Channel Lockout** becomes disabled, and the transceiver transmits for the requested length of the transmit time.
- Even if the transceiver is placed in Emergency Mode, if the transceiver is in the receiving state, the transceiver transmits for the requested length of the transmit time.

However, the following are the cases that the transceiver does not send an ACK nor initiate an Individual Call:

- If the Target ID for a Remote Monitor request message is configured for other than own
- If the transceiver receives a Radio Monitor request message while the transceiver is in the Radio Inhibit state
- If the transceiver receives a Radio Monitor request message on a channel where no transmit frequency is configured and only reception is available
- If Remote Monitor is disabled

To receive a Remote Monitor request message and accept the received message, **Remote Monitor** needs to be enabled.

Note

This transceiver can only receive but cannot send a Remote Monitor request message.

Configuration using KPG-D1/ D1N

- Configuring **Remote Monitor** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > P25)
- Configuring **Remote Monitor Timer** (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > P25)

Checking Whether Another Transceiver Is in Operation (Radio Check)

Radio Check is the function used to notify the requesting system whether the transceiver that receives the request is located within the communication range upon receipt of a request from the other transceiver.

If the transceiver receives the Radio Check request message, the transceiver sends an ACK to the transmitting system. The transmitting transceiver can determine whether or not the transceiver is available for communication by receiving this ACK.

However, the receiving transceiver does not send an ACK in the following configurations:

- If the Target ID for a Radio Check request message is configured for other than own
- If the channel used for transmission and reception is an analog channel.
- If the transceiver receives a P25 Radio Check request message on a P25 channel where no transmit frequency is configured and only reception is available
- If Radio Check is disabled

To receive a Radio Check request message and accept the received message, **Radio Check** needs to be enabled.

Note

- If the transceiver in the Radio Inhibit state receives a Radio Check request message, the transceiver sends an ACK if the above conditions to disable transmission of an ACK do not apply. However, in this case, the Transmit LED does not light.
- This transceiver can only receive but cannot send a Radio Check request message.

Configuration using KPG-D1/ D1N

Configuring **Radio Check** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > P25)

1.13 Migrating Automatically to the Site Providing Better Radio Environment (P25 Voting)

P25 Voting is the function to migrate automatically to the site (channel) providing better radio environment if the transceiver is operated in a P25 Conventional system.

The transceiver detects the RSSI level when the transceiver receives a call. Therefore, the transceiver migrates automatically to the channel providing better radio environment.

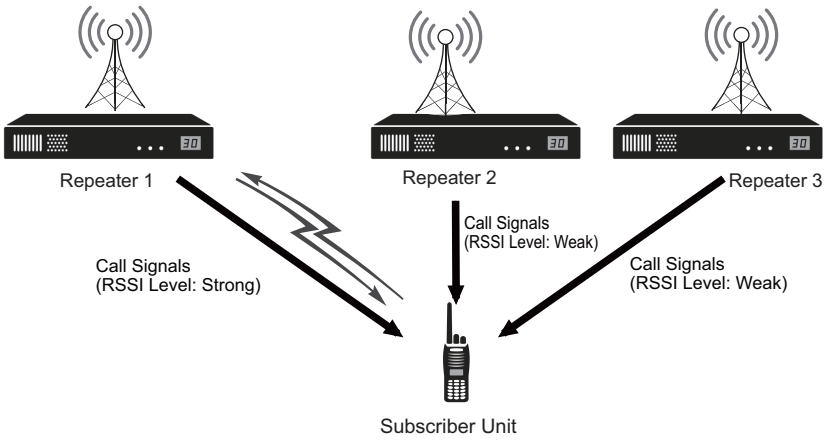
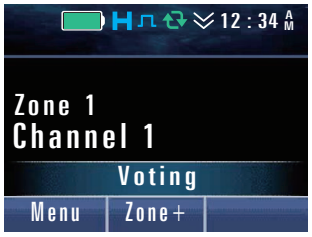


Figure 1-8 Image of Communications of P25 Voting

This function can be used by configuring P25 Voting with NAC channels for each system by using KPG-D1/ D1N.

P25 Voting Behavior

When a Zone-channel or System-Personality of the system configured as P25 Voting with NAC is selected, P25 Voting starts automatically. The " " icon lights up and "Voting" appears on the display if **"Voting" Displayed** is enabled. For portable transceivers, the LED flashes according to the configuration of **Voting LED**.



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

  If a channel to which a Personality is assigned in a system with "P25 Voting with NAC" configured is selected, P25 Voting is initiated for the Personality in the same system. At this time, the Personality name appears.

  During transmission by the transceiver, the NAC configured for the Personality that is the Revert Channel is multiplexed on a signal. As scan is performed on Personalities, 1 Personality is backed up as a Revert Channel on 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 channel is used as the Revert Channel. While the transceiver is receiving, or if the transceiver transmits while the length of time configured in **Dropout Delay Time** or **Dwell Time** is elapsing, the transceiver transmits using the Revert Channel.

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

  If a zone in a system with "P25 Voting with NAC" configured is selected, P25 Voting is initiated for the channels configured in the zone.

  When the transceiver transmits, the NAC configured for the Revert Channel is multiplexed on a signal.

  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 in **Dropout Delay Time** or **Dwell Time** is elapsing, the transceiver transmits using the Revert Channel.

When the transceiver receives a call from another transceiver, the basic behaviors of the transceiver are as follows:

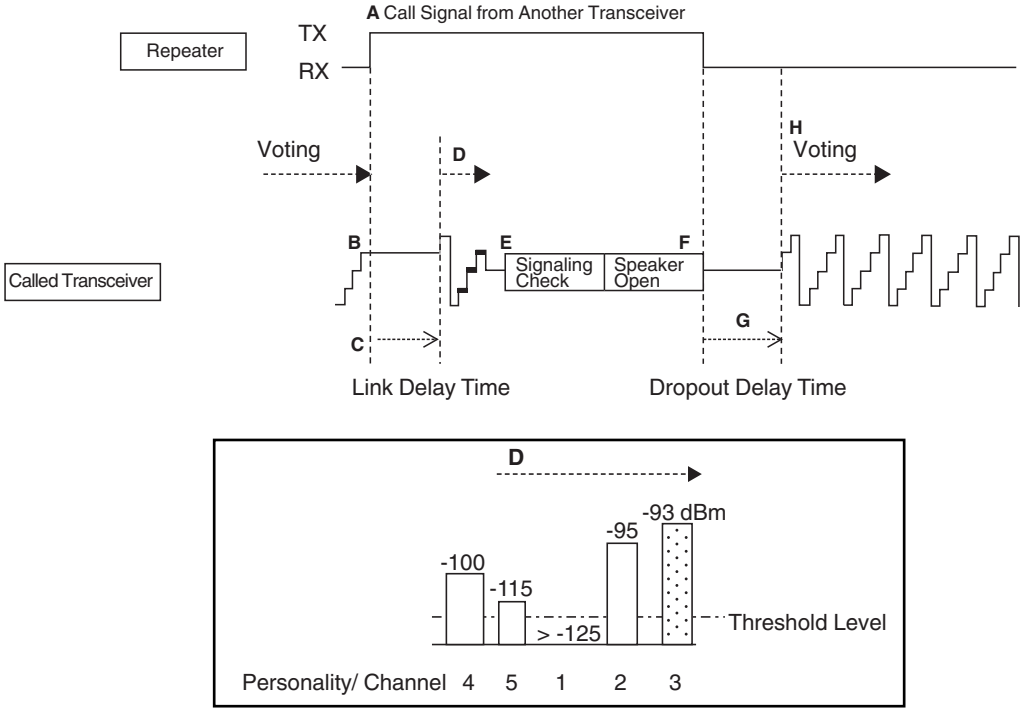


Figure 1-9 Basic Behaviors of P25 Voting

A: The repeater starts transmission by a call request from another transceiver.
B: For example, the transceiver in a system with "P25 Voting with NAC" configured detects the Frame Sync at an adequate RSSI level on Personality 4.
C: The transceiver activates **Voting Link Delay Time**.
D: Upon elapse of the length of time configured in **Voting Link Delay Time**, the transceiver checks all Personalities in the same system and searches for the Personality having the strongest RSSI level of when the Frame Sync is detected.
E: After checking all the Personalities, the transceiver migrates to the Personality having the strongest RSSI level (for example, Personality 3) and checks whether the received NAC matches the NAC preconfigured for the Personality.
If the NAC matches, the transceiver unmutes the speaker and changes the Revert Channel to Personality 3.
If the NAC does not match, the transceiver migrates to the Personality having the second strongest RSSI level (for example, Personality 2) and checks whether the NAC matches. If the NAC matches in this step, the transceiver unmutes the speaker and changes the Revert Channel to Personality 2.
F: While the NAC matches, the transceiver remains on the Personality and does not resume Voting.
G: If the Frame Sync disappears or the NAC does not match, **Dropout Delay Time** is activated.
H: After the length of time configured in **Dropout Delay Time** elapses, the transceiver resumes Voting.

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:
  - 2 or more and a maximum of 512 Personalities can be configured for a system with “P25 Voting with NAC” configured.
  - The following functions cannot be configured for a channel with “P25 Voting with NAC” configured:
    - Scan Add
    - Scan List Number

  Channel Table:
  - 2 or more and a maximum of 512 Personalities can be configured for a zone with “P25 Voting with NAC” configured.
  - The following functions cannot be configured for a channel with “P25 Voting with NAC” configured:
    - Scan Add
    - Scan List Number
    - Emergency Profile Number
    - Key Assignment
- A Personality or channel with “P25 Voting with NAC” configured cannot be configured for the following functions:
  - Home Channel
  - Scan List Members
  - Emergency Zone – Channel
- The transceiver does not respond at all even if the following keys are operated on a Personality or channel with “P25 Voting with NAC” configured:
  - **Home Channel** key
  - **Home Channel Select** key
  - **Scan** key
- If the Emergency behavior of the transceiver is active on the Zone-channel of the system configured as P25 Voting with NAC, the transceiver behaves according to the configuration of **Emergency Channel Type**.
- When **Zone-channel Format** is configured as “Personality” and the following conditions are met, the transceiver starts up in the Emergency Mode on the Revert Channel (Personality).
  - “Selected” is configured for **Emergency Channel Type**
  - A P25 Voting with NAC channel is selected
- The Revert Channel that is configured as P25 Voting with NAC 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.
- P25 Voting starts if the Zone-channel is changed and a P25 Voting with NAC channel is selected while scan is enabled.
- If a P25 Voting with NAC Zone-channel is configured as the selected Zone-channel when the transceiver turns on, the transceiver behaves 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 P25 Voting with NAC Zone-channel.
  - When “Personality” is configured for **Zone-channel Format**

    If a Revert Channel (Personality) is backed up, the transceiver starts up in this Personality. If a Revert Channel (Personality) not backed up, the transceiver starts up in the Personality that is configured for the channel.

Configuration using KPG-D1/ D1N

- Configuring **“Voting” Displayed** to be enabled or disabled (See Transceiver Settings > Scan > Scan Information > P25 Voting)
- Configuring **Voting LED** (See Transceiver Settings > Scan > Scan Information > P25 Voting)

Voting Link Delay Time

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

If the transceiver detects the Frame Sync on a Personality or channel after Voting is initiated, **Voting Link Delay Time** is activated. Upon the elapse of the length of time configured in **Voting Link Delay Time** after detecting the Frame Sync, the transceiver checks all Personalities in the same system or the other channels in the same zone to search for the Frame Sync. The transceiver checks all Personalities or channels, migrates to the Personality or channel having the strongest RSSI level, and checks whether the NAC matches. If the NAC does not match or if a NAC is not configured for the Personality or channel, the transceiver migrates to the Personality or channel having the second strongest RSSI level and checks whether the NAC matches.

Configuration using KPG-D1/ D1N

Configuring **Voting Link Delay Time** (See Transceiver Settings > Scan > Scan Information > P25 Voting)

Dropout Delay Time (Voting)

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

If the received signals disappear or the NAC does not match, **Dropout Delay Time** is activated. After the length of time configured in **Dropout Delay Time** elapses, the transceiver resumes Voting.

Configuration using KPG-D1/ D1N

Configuring **Dropout Delay Time** (See Transceiver Settings > Scan > Scan Information > P25 Voting)

Dwell Time

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

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

Configuration using KPG-D1/ D1N

Configuring **Dwell Time** (See Transceiver Settings > Scan > Scan Information > P25 Voting)

Quick Vote Level

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

If the transceiver receives a signal with a level higher than the value configured in **Quick Vote Level** during Voting, the channel becomes the Revert Channel. In this case, **Voting Link Delay Time** becomes disabled, and if the NAC matches, the transceiver unmutes the speaker.

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

Configuration using KPG-D1/ D1N

Configuring **Quick Vote Level** (See Transceiver Settings > Scan > Scan Information > P25 Voting)

Standard Vote Level

Standard Vote Level is the function to allow Voting 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 Vote Level** during Voting.

Since a Personality or channel having a signal with a level lower than the value configured in **Standard Vote Level** is excluded from Voting, the transceiver does not search the Personality or channel. If the transceiver receives a signal with a level higher than the value configured in **Standard Vote Level** during Voting, Voting pauses and then **Voting Link Delay Time** is activated. Then, if the NAC matches, the transceiver unmutes the speaker.

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

Configuration using KPG-D1/ D1N

Configuring **Standard Vote Level** (See Transceiver Settings > Scan > Scan Information > P25 Voting)

Off-hook Voting

Supported Models: Mobile

Off-hook Voting is the function to initiate Voting depending on the status of microphone, either on-hook or off-hook.

The transceiver behaves as follows according to the configuration in **Off-hook Voting**:

Table 1-17 Off-hook Voting

Configuration	Description
Enabled	The transceiver can initiate Voting 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 Voting, Voting does not pause.
Disabled	The transceiver can initiate Voting if the microphone is in the on-hook state. The transceiver cannot initiate Voting if the microphone is in the off-hook state. If the microphone changes from the on-hook state to off-hook state during Voting, Voting pauses on the Revert Channel. Even if the microphone changes from the on-hook state to off-hook state while Voting pauses, the channel is not changed. When the microphone goes to on-hook state, the transceiver resumes Voting.

Configuration using KPG-D1/ D1N

Configuring **Off-hook Voting** (See Transceiver Settings > Scan > Scan Information > P25 Voting)

1.14 Sending and Receiving a Text Message (Text Messaging)

Text Messaging is the message communication function to send and receive a maximum of 200-byte text string. The information which is difficult to send by voice, such as an address or a telephone number, can be sent by using text.

A text message can be sent to and received from the target transceiver without using a repeater.

To use this function, **Text Messaging Service** needs to be enabled.

Configuration using KPG-D1/ D1N

Configuring **Text Messaging Service** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > Text Messaging)

Sending a Text Message

A text message can be sent by one of the following methods:

- **Text Messaging Mode**

  Select the target transceiver's Individual ID, or directly enter the Individual ID. Then, by pressing the **PTT** switch after entering a text message, the entered text message is sent. The transceiver enters Text Messaging Mode and sends a text message by one of the following operations:

  - **Individual + Short Message key**

    Pressing the **Individual + Short Message** key places the transceiver in Individual Call Mode. Pressing the **[▶]** key after selecting the target transceiver's Individual ID or directly entering the Individual ID places the transceiver in Text Messaging Mode.

  - **Menu key**

    The transceiver enters Menu Mode by pressing the **Menu** key and then the transceiver enters Individual Call Mode by selecting "Individual + Short Message". Pressing the **[▶]** key after selecting the target transceiver's Individual ID or directly entering the Individual ID places the transceiver in Text Messaging Mode. (Refer to Common FUNC Using Menu Mode.)

  - **Keypad entry**

    If "Individual + Short Message" is configured in **Keypad Operation**, pressing the **[0]** to **[9]** keys on the keypad causes the transceiver to enter Individual Call Mode. Pressing the **[▶]** key after selecting the target transceiver's Individual ID or directly entering the Individual ID places the transceiver in Text Messaging Mode. (Refer to Common FUNC Keypad Operation.)

- **PC command**

  If the transceiver receives a PC command from the communication port, the transceiver starts sending a text message.

Operating the transceiver

- **Sending a text message by selecting the target transceiver's Individual ID from the list**

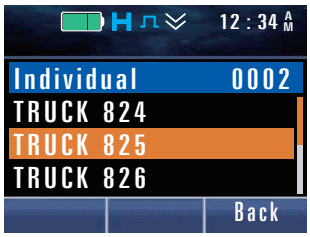
1 **Press the Individual + Short Message key.**

The transceiver enters Individual Call Mode and the Individual ID List selection screen appears.

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

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

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

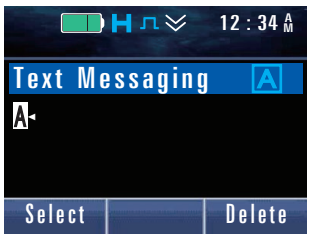


3 Press the [▶] key.

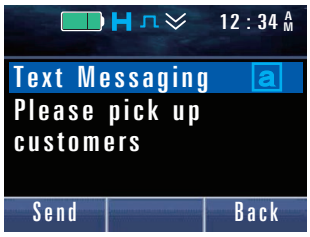
The transceiver enters Text Messaging Mode.

4 Enter a text message.

A maximum of 200 characters can be entered. Refer to Common FUNC "Entering or Deleting Characters" for the entry method.



If the entered text string continues on the next line, a line feed is automatically inserted at the space just before where the text string continues. However, if the entered line contains no space, a line feed is not automatically inserted.

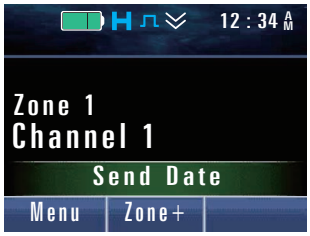


Note

If the transceiver exits Text Messaging Mode after a text message is entered, the transceiver retains the entered text message. The text message retained in the transceiver appears when the transceiver enters Text Messaging Mode next time, but the text cannot be added or modified. If a character is entered in this state, the displayed text message is cleared, and the transceiver enters the state to enter characters from the first character. Also, if the **[▲]**/ **[▼]** key is pressed while the text message retained in the transceiver appears, the text message is scrolled upwards or downwards.

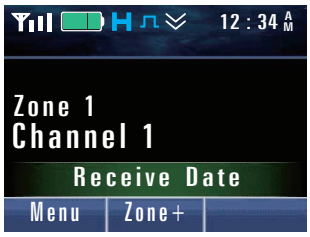
5 **Press the PTT switch or the Menu ([ ]) key.**

A text message is sent.



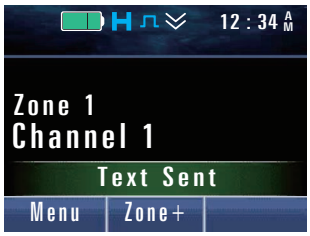
If an ACK is received from the target transceiver, “Complete” appears for 1 sec, and the transmission completes.

If a reception notification message is received from the target transceiver, “Receive Data” appears. When the reception of the reception notification message completes, the transceiver sends an ACK.



If an ACK is sent, “Complete” appears for 1 sec, and the reception completes.

The Complete Tone (5 beeps) sounds from the transceiver, and “Text Sent” appears for 1 sec.



● Sending a text message by directly entering the target transceiver's Individual ID

To send a text message by directly entering the target transceiver's Individual ID, **Manual Dialing** needs to be enabled using KPG-D1/ D1N.

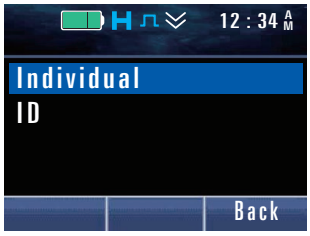
1 **Press the Individual + Short Message key.**

The transceiver enters Individual Call Mode and the Individual ID List selection screen appears.

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

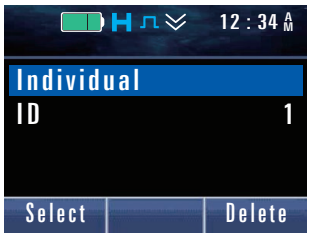
2 **Press the Function [◯] key.**

The Individual ID entry screen appears.



3 **Enter an Individual ID.**

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



● If using the PF keys:

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

● If using the keypad:

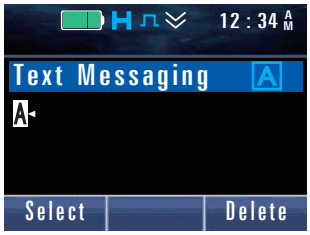
An Individual ID can be entered by pressing the **[0]** to **[9]** keys.

4 **Press the [▶] key.**

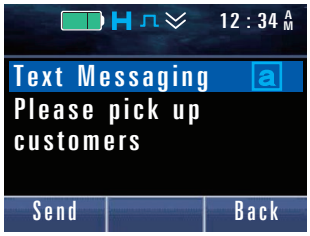
The transceiver enters Text Messaging Mode.

5 Enter a text message.

A maximum of 200 characters can be entered. Refer to Common FUNC "Entering or Deleting Characters" for the entry method.



If the entered text string continues on the next line, a line feed is automatically inserted at the space just before where the text string continues. However, if the entered line contains no space, a line feed is not automatically inserted.

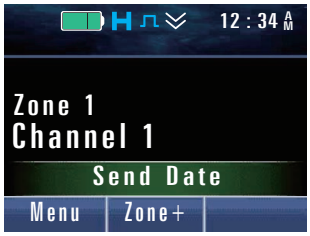


Note

If the transceiver exits Text Messaging Mode after a text message is entered, the transceiver retains the entered text message. The text message retained in the transceiver appears when the transceiver enters Text Messaging Mode next time, but the text cannot be added or modified. If a character is entered in this state, the displayed text message is cleared, and the transceiver enters the state to enter characters from the first character. Also, if the **[▲]/ [▼]** key is pressed while the text message retained in the transceiver appears, the text message is scrolled upwards or downwards.

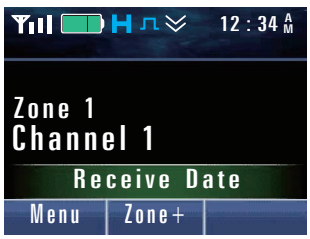
6 Press the PTT switch or the Menu ([ ]) key.

A text message is sent.



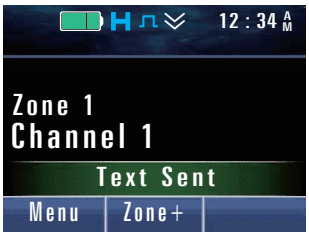
If an ACK is received from the target transceiver, "Complete" appears for 1 sec, and the transmission completes.

If a reception notification message is received from the target transceiver, "Receive Data" appears. When the reception of the reception notification message completes, the transceiver sends an ACK.



If an ACK is sent, “Complete” appears for 1 sec, and the reception completes.

The Complete Tone (5 beeps) sounds from the transceiver, and “Text Sent” appears for 1 sec.



Note

- If an ACK cannot be received from the target transceiver, a No Reply Tone (4 beeps) sounds from the transceiver, “No Reply” appears for 1 sec, and the transceiver terminates the transmission of a text message.
- If the transceiver cannot send a text message because the channel is busy, a Busy Tone 2 (3 beeps) sounds from the transceiver, “Busy” appears for 1 sec, and the transceiver terminates the transmission of a text message.
- When the transceiver sends an encrypted text message and the target transceiver cannot decrypt the received data, an Unable to Decrypt Message is sent from the target transceiver. If the transceiver receives an Unable to Decrypt Message, a Call Fail Tone sounds from the transceiver, “Key ID Mismatch” appears for 1 sec, and the transceiver terminates the transmission of a text message.

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 > P25 Conventional (P25 Voting with NAC) > P25)

Receiving a Text Message

If the transceiver receives a text message, the transceiver can display the received text message on the display and send the received text message to an external device from the communication ports.

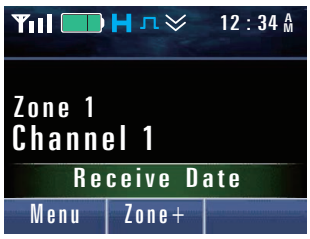
Note

- To use serial communications, a user needs to prepare P25 compatible software or external devices.
- A received text message can be left as a record. The record can be checked in Stack Mode. (Refer to Common FUNC Viewing the Receive History (Stack).)

Operating the transceiver

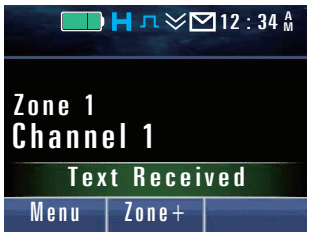
1 Start receiving a text message.

"Receive Data" appears.



2 Receive a text message.

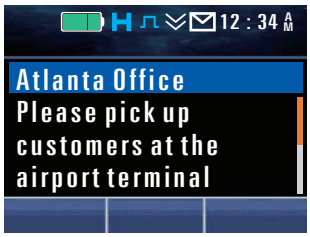
The " " icon blinks and "Text Received" appears for 1 sec.



The ID name of the transmitting transceiver and the initial portion (three lines) of the text message appear for 3 sec.

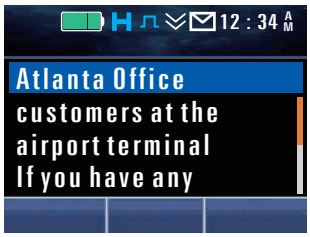
Then, the display is scrolled line by line every 2 seconds until the last line is shown.

After the last line is shown, the display scroll is repeated from the first line.



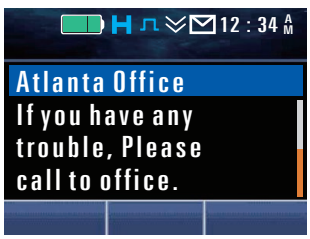
3 seconds

↓



2 seconds

↓



Note

- If **Alert Tone (Text Message Call)** is configured to sound when receiving, an Alert Tone sounds.
- To receive a text message, the received NAC needs to match.
- The transceiver can send and receive a text message even if **Optional Signaling** is configured. (Refer to Using the Optional Signaling (P25).)
- As for the **Auto Reset Timer**, the **Auto Reset Timer** for text messages is used. (Refer to Auto Reset Timer.)

Configuration using KPG-D1/ D1N

Configuring **Alert Tone (Text Message Call)** (See Transceiver Settings > P25 > P25 Information > Conventional > Alert Tone)

Text Message Stack

Text Message Stack is the function to store a text message in the stack memory. A maximum of 128 text messages can be stored in the stack memory.

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

Note

The maximum number of text 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 1-18 No. of Short Message Data That can be Stored

Short Message Stack or Text Message Stack Configuration				The maximum number of data that can be stored
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 **Text Message Stack** (See Transceiver Settings > P25 > P25 Information > General > Stack)

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

Text Message Serial Output is the function that allows the transceiver to send the text message and the Individual ID of the transmitting transceiver from the transceiver's communication port when the transceiver receives a text message.

If **Text Message Serial Output** is used, the dispatcher can monitor received text messages in real time.

Note

To use **Text Message Serial Output**, "Data" or "Data + GPS Data Output" needs to be assigned to the communication port of the transceiver.

Configuration using KPG-D1/ D1N

- Configuring **Text Message Serial Output** to be enabled or disabled (See Transceiver Settings > P25 > P25 Information > General > Serial Output)
- Assigning functions to the **COM port** (See Transceiver Settings > Optional Features > Optional Features 1 > Serial Interface > COM Port)

As with P25 Conventional, P25 Trunking is a digital communication mode which complies with the APCO Project25 Standard specified in TIA-102. The transceiver supports P25 Phase 1 Trunking and P25 Phase 2 Trunking.

Using this function, the transceiver can initiate an Individual Call or a Group Call for voice communications in a P25 digital channel.

In a P25 Conventional system, each user handles the assignment of system resources, but in a P25 Trunking system, a system controller assigns system resources.

In a P25 Trunking system, all channels must be registered in the Trunking controller. However, once registration is complete, resources that are used can be minimized and the most efficient method can be used for calling. This includes the setting up of talk groups quickly without wasting resources.

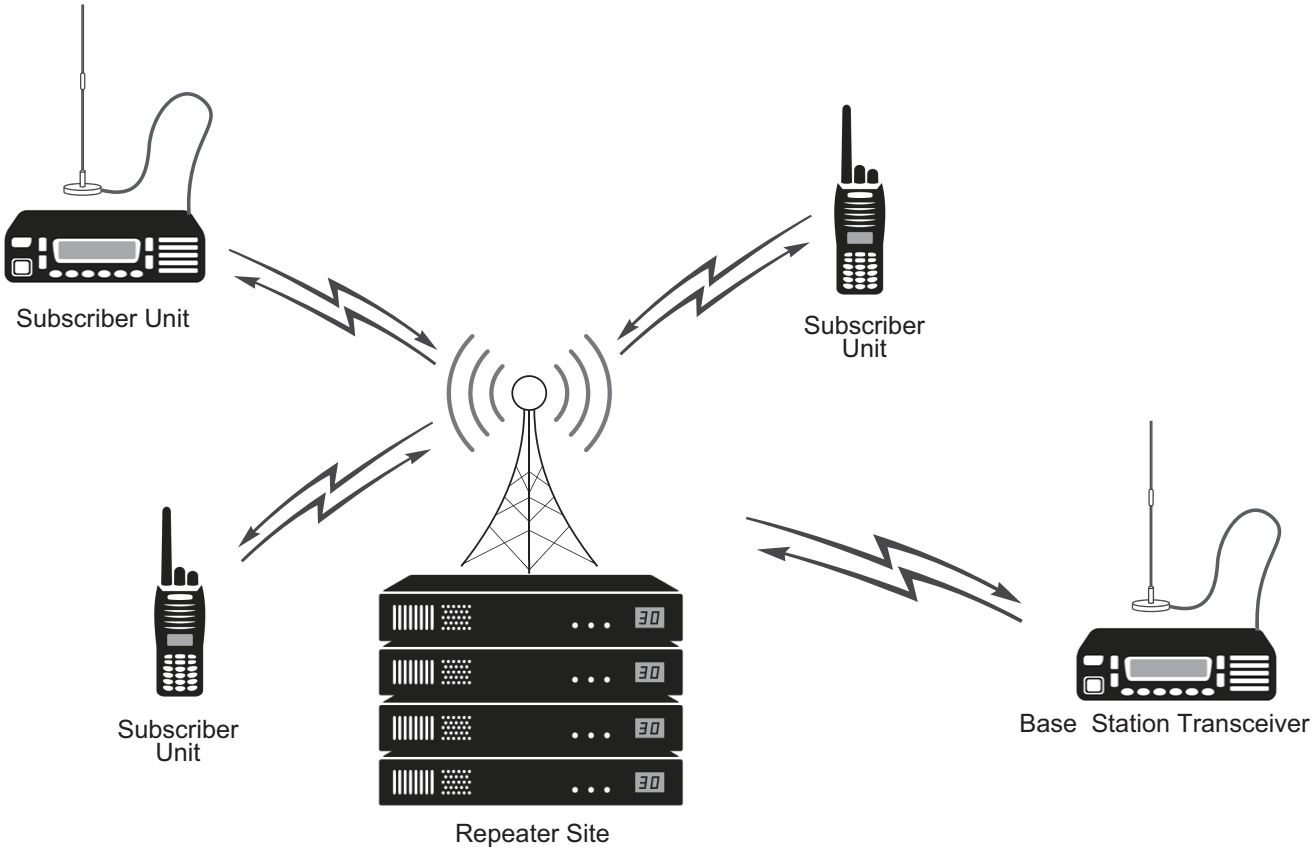


Figure 2-1 Image of Communications in a P25 Trunking System

Radio Feature License KWD-5101TR and KWD-5102TR are needed to use the P25 Phase 1 Trunking and P25 Phase 2 Trunking functions.

2.1 Initiating Voice Communications (Basic Transmission and Reception)

The following describes the basic methods for transmission and reception in a P25 Trunking system and the relevant functions.

About Own ID

To initiate various communications using P25, a 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 FFFFFF (hexadecimal), or between 1 and 16777215 (decimal).

If **Global ID** is enabled, a Unit ID is shared by all P25 Conventional and P25 Trunking systems.

If **Global ID** is disabled, a Unit ID needs to be configured for each P25 Conventional system and P25 Trunking system.

Note

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

Configuration using KPG-D1/ D1N

- Configuring **Unit ID (Own)** (See Transceiver Settings > Personal > System Information > P25 Trunking > Unit ID (Own))
- Configuring **Global ID** to be enabled or disabled (See Transceiver Settings > Personal > System Information > P25 Trunking > Unit ID (Own))

Control Channel Acquisition and Registration

To establish various types of communications in an P25 Trunking system, the transceiver needs to acquire a control channel and register in a system before starting communication. The control channel acquisition and registration are automatically executed when the transceiver is turned ON or when a system to be used is changed with site roaming.

Refer to “Control Channel Hunt” for details on the transceiver behavior of control channel acquisition.

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 P25 digital channel. (Refer to COMMUNICATION SECURITY.)

Receive

If a message requesting various types of communications is received on a control channel from a system, and if a message requesting various types of communications is received from a system on a control channel, the transceiver migrates to a traffic channel and the received audio sounds from the speaker.

Auto Reset Timer

Auto Reset Timer is the time until the status of the LCD display, flashing LED and sounding Alert Tone is automatically reset when communication is established by the transmission or reception of a voice call.

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

Table 2-1 Auto Reset Timer

Configuration	Description
Off	Auto Reset Timer will not be activated.
0 sec to 300 sec	After the configured time elapses, the matching state of the Individual ID or Talkgroup ID is automatically reset.
LED	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	If this function is enabled, the intermittently emitted Alert Tone stops when the time configured in **Auto Reset Timer** elapses.
LCD	When this function is enabled and the time configured in **Auto Reset Timer** has elapsed, the flashing LED light triggered by **Optional Signaling LED** goes off and the display changes from the ID display after receipt of an Individual Call or Group Call to the previous channel display.

Configuration using KPG-D1/ D1N

Configuring **Auto Reset Timer** (See Transceiver Settings > P25 > P25 Information > General > Auto Reset)

Selective Call Alert LED

Selective Call Alert LED is the function to make the LED flash when the transceiver receives a call using a P25 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

Note

Configuring “Off” in **Alert LED Color** can disable the LED from flashing.

Configuration using KPG-D1/ D1N

- Configuring **Selective Call Alert LED** (See Transceiver Settings > P25 > P25 Information > Trunking)
- Configuring **Alert LED Color** (See Transceiver Settings > P25 > P25 Information > Trunking > Alert LED Color)
- Configuring **Alert LED Color** (Individual ID List) (See Transceiver Settings > P25 > Individual ID List > Alert LED Color)
- Configuring **Alert LED Color** (Talkgroup ID List) (See Transceiver Settings > P25 > Talkgroup ID List)

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 > P25 > P25 Information > Trunking)

Searching Whether the Transceiver Receives a Call (Scan)

Using the Scan function, the transceiver remains on a control channel during a scan, and can check each channel in order on whether a channel has a signal. If the transceiver receives a Talkgroup ID and if the Talkgroup ID matches a Talkgroup ID configured in the Talkgroup ID List, the transceiver migrates to a traffic channel using this Talkgroup ID.

The following scan functions can be used in a P25 Trunking system:

- **Single Scan**

  In a P25 Trunking system, Priority Monitor Scan can be used as the Single Scan function.

- **List Scan**

  In a P25 Trunking system, Priority Monitor Scan and Limited Talkgroup Scan can be used as the List Scan function.

Refer to “SCAN” for details of Scan.

Transmitting

Pressing the **PTT** switch, or selecting an Individual ID or Talkgroup ID and then pressing the **PTT** switch sends a message requesting various types of communications to a system on a control channel. The transceiver can start communications after the system assigns a traffic channel to the transceiver.

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)

Call Request Tone is the function to sound a Call Request Tone (1 beep) from the transceiver when a call request for an Individual Call or Group Call is initiated by pressing the **PTT** switch in a P25 Trunking system.

Also, **Call Processing Tone** is the function to sound a Call Processing Tone (2 beeps) from the transceiver while the **PTT** switch is pressed and held after a call request for an Individual Call or Group Call is initiated by pressing the **PTT** switch in a P25 Trunking system.

Depending on the system condition, it may take few seconds to determine the call request upon the initiation of a call request using Individual Call or Group Call. Use of this function notifies a user by emitting a tone from the transceiver of the condition from when the transceiver initiates a call request using Individual Call or Group Call until the call request is determined.

When the transceiver initiates an Individual Call or Group Call using this function, the transceiver behaves as follows:

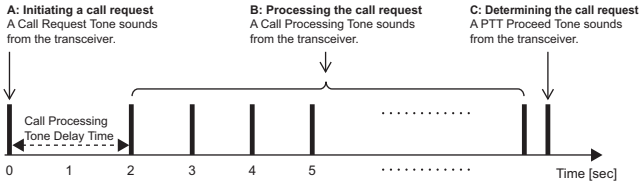


Figure 2-2 Call Request Tone/ Call Processing Tone

A: A Call Request Tone (1 beep) sounds from the transceiver when a call request is initiated by pressing the **PTT** switch.

B: A Call Processing Tone (2 beeps) sounds from the transceiver while the **PTT** switch is pressed and held after initiating a call request by pressing the **PTT** switch. The length of time from when a call request is initiated by pressing the **PTT** switch until the Call Processing Tone (2 beeps) sounds from the transceiver can be configured in **Call Processing Tone Delay Time**.

C: If **PTT Proceed Tone** is enabled, a PTT Proceed Tone (3 beeps) sounds from the transceiver when a call request is determined. A user can start conversations. (Refer to Common FUNC Using Sound to Notify the Timing to Start Communications (PTT Proceed Tone).)

Configuration using KPG-D1/ D1N

- Configuring **Call Request Tone** to be enabled or disabled (See Transceiver Settings > P25 > P25 Information > Trunking)
- Configuring **Call Processing Tone** to be enabled or disabled (See Transceiver Settings > P25 > P25 Information > Trunking > Call Processing Tone)
- Configuring **Call Processing Tone Delay Time** be enabled or disabled (See Transceiver Settings > P25 > P25 Information > Trunking > Call Processing Tone)

2.2 Using the Optional Signaling (Optional Signaling for Group Call)

Optional Signaling is the signaling used to initiate a selective call. In a P25 Trunking system, **Optional Signaling for Group Call** is the Optional Signaling for a Group Call, and an individual call can be made using 2-tone. (Refer to Using 2-tone to Initiate an Individual Call.)

2-tone signaling uses a pair of 2 different tone frequencies in series for an individual call. The transceiver emits a ringing tone (Alert Tone) and flashes the LED if the received Talkgroup ID matches the Talkgroup ID preconfigured for the transceiver and the received 2-tone code matches the 2-tone code preconfigured for the transceiver.

To decode a 2-tone code in a P25 Trunking system, “2-tone 1”, “2-tone 2”, “2-tone 3”, or “2-tone 4” needs to be configured in **Optional Signaling for Group Call** used for the channel.

Configuration using KPG-D1/ D1N

- Configuring **Optional Signaling for Group Call** (Personality) (See Transceiver Settings > Personal > Personality > P25 Trunking)
- Configuring **Optional Signaling for Group Call** (Channel Edit) (See Transceiver Settings > Zone/Channel > Channel Edit > P25 Trunking)

Unmuting the Speaker (Audio Control for Group Call)

Audio Control for Group Call is the condition which allows the transceiver to unmute the speaker by a Talkgroup ID and Optional Signaling (2-tone). The conditions on which the transceiver unmutes the speaker can be configured for each P25 Trunking system by using KPG-D1/ D1N.

The transceiver unmutes the speaker and emits the received audio when the conditions configured in **Audio Control for Group Call** are satisfied.

Conditions to unmute the speaker can be changed by a combination of the Talkgroup ID and the Optional Signaling.

The following are the conditions to unmute the speaker:

Table 2-2 Audio Control for Group Call

Configuration	Description
Talkgroup ID	The transceiver unmutes the speaker if the received Talkgroup ID matches the Talkgroup ID preconfigured for the transceiver. The conditions for unmuting the speaker do not change even if the transceiver transmits.
Talkgroup ID and Optional Signaling	The transceiver unmutes the speaker if the received Talkgroup ID matches the Talkgroup ID preconfigured for the transceiver and the received Optional Signaling (2-tone) matches the Optional Signaling preconfigured for the transceiver. The conditions for unmuting the speaker do not change even if the transceiver transmits.

Configuration using KPG-D1/ D1N

Configuring **Audio Control for Group Call** (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General)

Temporarily Disabling the Squelch (Squelch Off)

Squelch Off is the function to disable the Optional Signaling (2-tone) configured for the channel on which the transceiver waits and to unmute the speaker if the received Talkgroup ID alone matches the Talkgroup ID preconfigured for the transceiver.

The same as with the Monitor function, the Squelch Off function is used to monitor the availability of channels prior to transmitting in order to avoid interfering with other parties.

To use this function, the **Squelch Off** key or the **Squelch Off Momentary** key is used.

Or, pressing the **Menu** key causes the transceiver to enter Menu Mode, and then **Squelch Off** can be toggled between enabled and disabled by selecting “Squelch Off”. (Refer to Common FUNC Using Menu Mode.)

Operating the transceiver:

- **Squelch Off key**

1 **Press the Squelch Off key while Squelch Off is disabled.**

The “” icon appears.

The squelch function by the Optional Signaling is disabled. The transceiver unmutes the speaker if the received Talkgroup ID matches the Talkgroup ID preconfigured for the transceiver.

The Busy LED lights green if **Busy LED** is enabled.

2 **Press the Squelch Off key while Squelch Off is enabled.**

The “” icon disappears.

The squelch function by the Optional Signaling is enabled.

- **Squelch Off Momentary key**

1 **Press and hold the Squelch Off Momentary key.**

The “” icon appears.

The squelch function by the Optional Signaling is disabled. The transceiver unmutes the speaker if the received Talkgroup ID matches the Talkgroup ID preconfigured for the transceiver.

The Busy LED lights green if **Busy LED** is enabled.

2 **Release the Squelch Off Momentary key.**

The “” icon disappears.

The squelch function by the Optional Signaling is enabled.

Configuration using KPG-D1/ D1N

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

Temporarily Disabling the Optional Signaling (Monitor)

Monitor is the function that temporarily disables the Optional Signaling (2-tone) configured for a channel on which the transceiver waits.

This function is used to check the availability of channels prior to transmitting in order to avoid interfering with other parties.

Using the Monitor function temporarily unmutes the speaker if the speaker is muted because the Optional Signaling does not match. However, if the speaker is muted due to a very weak carrier, the speaker is not unmuted even by using the Monitor function. In this case, using the Squelch Off function temporarily unmutes the speaker and the audio can be heard.

To use this function, the **Monitor** key or the **Monitor Momentary** key is used.

Or, pressing the Menu key causes the transceiver to enter Menu Mode, and then **Monitor** can be toggled between enabled and disabled by selecting “Monitor”. (Refer to Common FUNC Using Menu Mode.)

While **Monitor** is enabled, the “🔊” icon appears, and the Optional Signaling will be disabled.

Operating the transceiver

- **Monitor key**

1 **Press the Monitor key while Monitor is disabled.**

The “🔊” icon appears.

The squelch function by the Optional Signaling is disabled. The transceiver unmutes the speaker if the received Talkgroup ID matches the Talkgroup ID preconfigured for the transceiver.

2 **Press the Monitor key while Monitor is enabled.**

The “🔊” icon disappears.

The squelch function by the Optional Signaling is enabled.

- **Monitor Momentary key**

1 **Press and hold the Monitor Momentary key.**

The “🔊” icon appears.

The squelch function by the Optional Signaling is disabled. The transceiver unmutes the speaker if the received Talkgroup ID matches the Talkgroup ID preconfigured for the transceiver.

2 **Release the Monitor Momentary key.**

The “🔊” icon disappears.

The squelch function by the Optional Signaling is enabled.

Configuration using KPG-D1/ D1N

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

Unmuting the Speaker by Linking with the Microphone (Off-hook Decode) (Mobile Only)

Off-hook Decode is the function that enables the transceiver to decode the Optional Signaling (2-tone) even when the microphone is in the off-hook state.

The transceiver behaves as follows according to the configuration in **Off-hook Decode**:

Table 2-3 Off-hook Decode

Configuration	Description
Enabled	The transceiver unmutes the speaker according to the configuration in **Audio Control for Group Call** regardless of the microphone on-hook or off-hook state.
Disabled	The transceiver unmutes the speaker if the received Talkgroup ID matches the Talkgroup ID preconfigured for the transceiver while the microphone is in the off-hook state. The transceiver unmutes the speaker according to the configuration in **Audio Control for Group Call** while the microphone is in the on-hook state.

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 Decode** to be enabled or disabled (See Transceiver Settings > Optional Features >Optional Features 1 > Microphone-hook)

2.3 About the P25 Standard (Phase 1/ Phase 2)

The P25 standard consists of Phase 1 and Phase 2. In Phase 1, communications using the FDMA (Frequency Division Multiple Access) method is available.

In Phase 2, communications using the TDMA (Time Division Multiple Access) system are also available in addition to communications using the FDMA system.

The following are the difference between Phase 1 and Phase 2:

Table 2-4 Comparison of Phase 1 and Phase 2

Item	Phase 1 FDMA/ Phase 2 FDMA	Phase 2 TDMA
TDMA/ FDMA	FDMA	2-slot TDMA (Downlink is continuous)
TDMA slot length	-	30 ms
Method of Adjustment	C4FM (Continuous 4 level FM) CQPSK (Compatible Quadrature Phase Shift Keying)	H-CPM (Harmonized Continuous Phase Modulation) (Uplink) H-DQPSK (Harmonized Differential Quadrature Phase Shift Keying) (Downlink)
Data Rate	9.6 kbps	12 kbps/ 2 sub-channels
Symbol Rate	4.8 kbps	6 kbps (H-CPM, H-DQPSK)
Vocoder	7.2 kbps (full rate)	3.6 kbps (half rate)
FEC	Golay code Hamming code Reed-Solomon code BCH code Short-circuit code	Block code Reed-Solomon code
Power Control	None	Open Loop Closed Loop

Interoperability and Compatibility between Phase 1 and Phase 2

Regarding the common operations of Phase 1 and Phase 2, the communication method behavior of the transceiver depends on the communication system.

If the transceiver communicates in a system composed of only transceivers in Phase 2, the transceiver behaves in the TDMA system only when the transceiver migrates to a traffic channel in a P25 Trunking system. If the transceiver communicates on a control channel in a P25 Trunking system, the transceiver behaves in the FDMA system compatible with Phase 1.

If the transceiver communicates in a system composed of transceivers in Phase 1 and Phase 2, the transceiver behaves in the FDMA system compatible with Phase 1.

Table 2-5 Common Operations of Phase 1 and Phase 2

Communication System		Communication System Behavior of the Transceiver	
		If All Phase 2 Transceivers	If Phase 1 and Phase 2 Transceivers Coexist
P25 Trunking	Control Channel	FDMA	FDMA
	Traffic Channel	TDMA	FDMA

Differences between the TDMA System and FDMA System

Only the following functions when sending a Voice Call using a traffic channel in a TDMA system behave differently in a FDMA system:

- Voice communication of a Group Call in the Hang Time state
- Receipt of release notification

Voice communication of a Group Call in the Hang Time state

When the system is in the Hang Time state, regardless of the configuration for **Trunking Type**, how the transceiver starts transmitting audio signals during a Group Call varies as follows according to the value in the R field of the RFSS status message (RFSS_STS_BCST) sent from the system. (Refer to Trunking Type.)

- If the value of the R field is “%0”, voice transmission is initiated on a traffic channel.
- If the value of the R field is “%1”, the transceiver migrates to a control channel once and transmits a Group Call request (GRP_V_REQ). Then, the transceiver waits for a channel assignment message (GRP_V_CH_GRANT) from the system.

Receipt of a MAC_Release message

If the transceiver receives a MAC_Release message (MAC_REL) from the system during voice transmission, the transceiver ends voice transmission.

After the transceiver ends voice transmission, the transceiver behaves as follows depending the value in the C/A field of the MAC_Release message (MAC_REL).

- If the value in the C/A field is “%0”, the transceiver migrates to a control channel.
- If the value in the C/A field is “%1”, the transceiver retains the link to a traffic channel.

Trunking Type

Trunking Type is the function to determine the transmission behavior in a P25 Trunking system.

Table 2-6 Trunking Type

Configuration	Description
Message	When the transceiver migrates from a control channel to a traffic channel, the transceiver occupies the traffic channel until all communications on the traffic channel end.
Transmit	When communications end after migrating from a control channel to a traffic channel, the transceiver immediately opens the traffic channel and returns to the control channel.
PTT ID	When the transceiver migrates from a control channel to a traffic channel, the transceiver occupies the traffic channel until all communications on the traffic channel end. The transceiver always adds the PTT ID when initiating transmission on a traffic channel.

Configuration using KPG-D1/ D1N

Configuring **Trunking Type** (See Transceiver Settings > Personal > Personality > P25 Trunking)

2.4 Control Channel Hunt

Such as when the transceiver is turned ON, the transceiver searches for a control channel in a system and executes registration. This is called control channel hunt. The transceiver automatically executes a control channel hunt in the following conditions:

- When the transceiver is turned ON (if the starting channel is in a P25 Trunking system)
- If a P25 Trunking system is selected not satisfying conditions of a control channel when changing the zone or channel
- If the transceiver cannot receive a control channel signal
- If communications on a traffic channel end

The control channel table needs to be configured using KPG-D1/ D1N in order to search for a control channel. Control channel tables are the **Trunked Channel Plan** table and **Normal Hunt Channel** table.

Trunked Channel Plan:

A frequency block table can be configured to provide compatibility between the channel number and frequency used for a P25 Trunking system. A maximum of 16 frequency blocks can be configured.

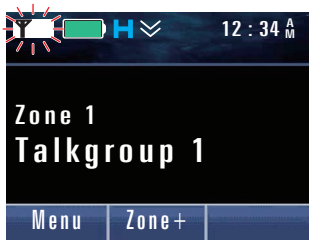
Normal Hunt Channel:

A control channel to used in a control channel hunt can be configured. A maximum of 256 control channels can be configured.

A control channel references the frequency block table. Therefore, a **Trunked Channel Plan** table must be initially created, and then a **Normal Hunt Channel** table created.

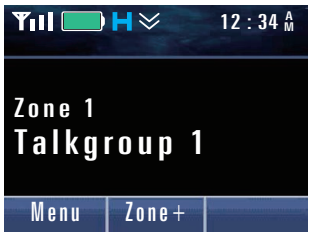
● When searching for a control channel

When searching for a control channel, the very weak signal icon ( ) blinks.



● When registration is complete

When a control channel is detected and registration is completed, the icon corresponding to the signal strength level lights.



Configuration using KPG-D1/ D1N

- Configuring **Trunked Channel Plan** (See Transceiver Settings > P25 Network > Trunked Channel Plan)
- Configuring **Normal Hunt Channel** (See Transceiver Settings > P25 Network > Normal Hunt Channel)

Full Spectrum Control Channel Hunt

Full Spectrum Control Channel Hunt is executed if the transceiver cannot acquire a control channel in the normal control channel hunt. The normal control channel hunt is the search for a channel configured as the Normal Hunt Control Channel by the transceiver.

If **Full Spectrum CC Hunt** is enabled, the transceiver executes **Full Spectrum Control Channel Hunt** if a control channel cannot be acquired by a control channel hunt. In **Full Spectrum Control Channel Hunt,** all detected channels are searched as control channel candidates by a **Trunked Channel Plan** from 1 to 16 configured “FDMA” in **Channel Type**.

If the transceiver fails to acquire a control channel from any control channel candidates, the transceiver starts the normal control channel hunt again.

Also, a control channel in a certain frequency range (**Withdraw Channel**) not to be searched in **Full Spectrum Control Channel Hunt** can be configured.

Configuration using KPG-D1/ D1N

- Configuring **Full Spectrum CC Hunt** to be enabled or disabled (See Transceiver Settings > P25 Network > Hunt Options > Full Spectrum CC Hunt)
- Configuring **Withdraw Channel** (See Transceiver Settings > P25 Network > Hunt Options > Full Spectrum CC Hunt)

Background Hunt

Background Hunt is the function used to acquire a control channel providing better conditions. After acquiring a control channel, the transceiver changes to the idle state and waits for a call message and notification information. If **Background Hunt** is enabled, the transceiver executes **Background Hunt** based on information obtained from the adjacent site channels (Adjacent Channel Status Broadcast) in order to reacquire a channel with better conditions than the current control channel.

The following are the conditions for the transceiver to acquire a control channel candidate as the new control channel after **Background Hunt** is executed. The conditions differ depending on the configuration in **RSSI Control Channel Hunt**. RSSI Control Channel Hunt is the function for acquiring the control channel with the highest signal strength level when the transceiver executes a control channel hunt.

● If RSSI Control Channel Hunt is disabled

- If the level difference of the signal strength level that meets the following conditions is the value configured in **Level Margin 1** or higher:
  - The currently received control channel does not have a Preferred ID, and the signal strength is equal to or less than the value configured in Good RSSI Level
  - The candidate control channel does not have a Preferred ID
- If the level difference of the signal strength level that meets the following conditions is the value configured in **Level Margin 2** or higher:
  - The currently received control channel has a Preferred ID, and the signal strength is equal to or less than the value configured in Good RSSI Level
  - The candidate control channel has a Preferred ID with higher or equal priority
- If the level difference of the signal strength level configured in **Acceptable RSSI Level** that meets the following conditions is the value configured in **Level Margin 3** or higher:
  - The currently received control channel does not have a Preferred ID
  - The candidate control channel has a Preferred ID
- If the level difference of the signal strength level configured in **Acceptable RSSI Level** that meets the following conditions is the value configured in **Level Margin 4** or higher:
  - The currently received control channel has a Preferred ID
  - The candidate control channel has a Preferred ID with higher priority
- If the currently receiving control channel is in the Site Trunking mode and the candidate control channel is not in the Site Trunking mode:

- **If RSSI Control Channel Hunt is enabled**
- If the level difference between the signal strength of the currently receiving control channel and the signal strength of the candidate control channel is equal to the value configured in **Level Margin 1**:
- If the currently receiving control channel is in the Site Trunking mode and the candidate control channel is not in the Site Trunking mode:

PTT Release Hunt

PTT Release Hunt is the function that starts **Background Hunt** 1 sec after the transceiver returns to the control channel when a Group Call ends on a traffic channel.

The transceiver returns to the control channel after a Group Call ends by releasing the **PTT** switch. If **PTT Release Hunt** is enabled, **Background Hunt** starts 1 sec after the transceiver returns to the control channel.

Configuration using KPG-D1/ D1N

- Configuring **Background Hunt** to be enabled or disabled (See Transceiver Settings > P25 Network > Hunt Options > Background Hunt)
- Configuring **RSSI Control Channel Hunt** to be enabled or disabled (See Transceiver Settings > P25 Network > Hunt Options > Background Hunt)
- Configuring **PTT Release Hunt** to be enabled or disabled (See Transceiver Settings > P25 Network > Hunt Options > Background Hunt)

Preferred ID Hunt

Preferred ID Hunt is the function used to search for a control channel by specifying the preferentially used combination of **RFSS ID** and **Site ID**.

If a normal control channel hunt or **Background Hunt** is executed and multiple control channels exist, the transceiver normally selects the best control channel by BER (Bit Error Rate) and signal strength. If **Preferred ID Hunt** is enabled, the transceiver selects a control channel based on the site priority as well as BER and signal strength. This function allows for multiple transceivers to focus on a particular site resulting in better Group Call efficiency.

Preferred ID List can be configured by using KPG-D1/ D1N. In the **Preferred ID List**, a maximum of 32 combinations of **RFSS ID** and **Site ID** and their priority levels can be configured.

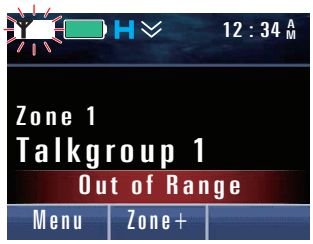
Configuration using KPG-D1/ D1N

- Configuring **Preferred ID Hunt** to be enabled or disabled (See Transceiver Settings > P25 Network > Hunt Options > Preferred ID Hunt)
- Configuring **Preferred ID List** (See Transceiver Settings > P25 Network > Hunt Options > Preferred ID Hunt)

Out of Range Indicator/ Out of Range Tone

Out of Range Indicator and **Out of Range Tone** are functions to notify a user that no available control channel is found after searching for a control channel.

If **Out of Range Indicator** is enabled and no available control channel is detected after approximately 10 sec of searching, “Out of Range” appears on the display.



If **Out of Range Tone** is enabled and no available control channel is detected after approximately 10 sec of searching, the Out of Range Tone (1 beep) sounds from the transceiver at 30 sec intervals.

Configuration using KPG-D1/ D1N

- Configuring **Out of Range Indicator** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General)
- Configuring **Out of Range Tone** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General)

WUID Validity Time

WUID Validity Time is the timer for retaining the validity of WUID assigned from a system when registration is executed.

The transceiver executes registration again if the time configured in **WUID Validity Time** elapses for retaining the validity of WUID.

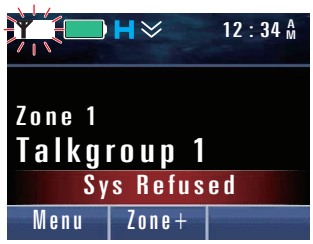
Configuration using KPG-D1/ D1N

Configuring **WUID Validity Time** (See Transceiver Settings > P25 Network > Network Options > Timers)

Invalid ID State

If registration to a system is rejected such as because of the improper use of the transceiver, the transceiver records this system, and registration to the system does not subsequently occur. This state is called Invalid ID State.

If the transceiver enters the Invalid ID State, “Sys Refused” appears on the display.



Note

- Record of a system rejected for registration is cleared if the transceiver is turned OFF.
- While in the Invalid ID State, the transceiver is in a state allowing receipt of signals from a control channel in the area, but various communications cannot be initiated because the transceiver is not registered to a system.
- While in the Invalid ID State, the transceiver cannot enter Emergency Mode.
- If any of the following keys are pressed or any of the following functions are selected in **Menu** mode while the transceiver is in the Invalid ID State, a Key-entry Error Tone (1 beep) sounds from the transceiver and the function does not function.
  - Auto Dial
  - Individual Call
  - Regroup Request
  - Site Lock
  - System Search
  - Status
  - Message
  - Send the GPS Data
  - Rekey Request
- If the configuration of **Coverage Type** for a system is “Inter-System” or “Inter-WACN”, the transceiver can roam between systems. In this case, the transceiver does not enter the Invalid ID State because the behavior of the transceiver is to search for other systems.

Radio Detach

Radio Detach is the function to send an ACK upon receipt of a message from the system and execute registration again.

This function is used such as if the registration of the transceiver is cleared from a system.

The transceiver sends an ACK upon receipt of a Radio Detach message. Then, registration is executed.

To use this function, the address of the sent message needs to be the address configured in **Default RCM** (Radio Control Manager) in this function. **Default RCM** corresponding to a system needs to be configured by using KPG-D1/ D1N.

Configuration using KPG-D1/ D1N

Configuring **Default RCM** (See Transceiver Settings > P25 Network > Network Information)

NAC Validation

NAC Validation is the function comparing the top 8 bit of the NAC received on a control channel and the top 8 bit of the own System ID.

NAC is the signaling used when sending and receiving in a P25 Conventional system, but also the signaling used for initiating registration to a system in a P25 Trunking system.

If this function is enabled, the upper 8 bits of the NAC received on a control channel and the upper 8 bits of the own System ID are compared. If the upper 8 bits match, the transceiver can be registered in this system. If the upper 8 bits do not match, the transceiver cannot be registered in this system.

Configuration using KPG-D1/ D1N

Configuring **NAC Validation** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General)

IDEN_UP Temporary Sync

IDEN_UP Temporary Sync is the function for updating the **Trunked Channel Plan** table by receiving a Channel Identifier (IDEN_UP, IDEN_UP_VU, IDEN_UP_TDMA) message notified from the system.

The transceiver compares the Channel Identifier message from the system with the **Trunked Channel Plan** table, and updates the **Trunked Channel Plan** table accordingly when differences are found.

The KPG-D1/ D1N can be used to configure whether to update the **Trunked Channel Plan** table for each system.

Note

- The updated **Trunked Channel Plan** table is not retained in the transceiver.
- When roaming on a system other than the Home system, the transceiver will not update the **Trunked Channel Plan** table even when a Channel Identifier message is received.

Configuration using KPG-D1/ D1N

Configuring **IDEN_UP Temporary Sync** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General)

SYS_SRV_BCST Message Validation

SYS_SRV_BCST Message Validation is the function for running different services using the “SYSTEM SERVICES AVAILABLE”, “SYSTEM SERVICES SUPPORTED” and “Twuid_validity” parameters contained in the SYS_SRV_BCST (System Service Broadcast) message that is received on the control channel.

“SYSTEM SERVICES AVAILABLE” and “SYSTEM SERVICES SUPPORTED” are used by the transceiver to determine the services that are available for use on the system. “Twuid_validity” is used by the transceiver to determine the validity of the WUID assigned by the system during registration.

The KPG-D1/ D1N can be used to configure whether to use the “SYSTEM SERVICES AVAILABLE”, “SYSTEM SERVICES SUPPORTED” and “Twuid_validity” parameters contained in the SYS_SRV_BCST message.

Table 2-7 Table 2-7 SYS_SRV_BCST Message Validation

Configuration	Description
Enabled	The transceiver is able to make use of the “SYSTEM SERVICES AVAILABLE” and “SYSTEM SERVICES SUPPORTED” parameters in the SYS_SRV_BCST message. Functions that cannot be used with the SYS_SRV_BCST message will not be executed by the transceiver. For example, when Group Call cannot be used (System Service > group voice = “0”), a Warning Tone A (continuous beep) will be emitted from the transceiver and a Group Call is not initiated even when the **PTT** switch is pressed after registration is complete. The transceiver is able to make use of the “Twuid_validity” parameter in the SYS_SRV_BCST message. The value of the “Twuid_validity” parameter is used by the transceiver to determine the validity of the WUID assigned by the system during registration.
Disabled	The transceiver is unable to make use of the “SYSTEM SERVICES AVAILABLE” and “SYSTEM SERVICES SUPPORTED” parameters in the SYS_SRV_BCST message. Functions that cannot be used with the SYS_SRV_BCST message can also be executed by the transceiver. For example, when Group Call cannot be used (System Service > group voice = “0”), a Group Call is initiated when the **PTT** switch is pressed after registration is complete. The transceiver is unable to make use of the “Twuid_validity” parameter in the SYS_SRV_BCST message. The value of **WUID Validity Time** is used by the transceiver to determine the validity of the WUID assigned by the system during registration. (Refer to WUID Validity Time.)

Configuration using KPG-D1/ D1N

Configuring **IDEN_UP Temporary Sync** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General)

2.5 Using P25 ID to Initiate a Selective Call

An individual call and group call are available by using P25 IDs.

Available Calls

The following various types of calls can be used in a P25 Trunking system. For transceiver operations and behaviors, refer to the instructions of each call type.

- Individual Call
- Group Call
- Paging Call
- Telephone Call

2.6 Making an Individual Call

Individual Call is the function used to initiate a call to a target transceiver individually to establish voice calls.
By specifying an Individual ID, the transceiver can initiate a call to the transceiver having the Individual 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 an Individual ID configured in the Individual ID List or directly entering an Individual ID.

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

Or, 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.)

Or, pressing the **[0]** to **[9]** keys on the keypad causes the transceiver to enter Individual Call Mode if “Individual”, “Individual + Status”, or “Individual + Short Message” is configured in **Keypad Operation**. The transceiver enters Individual ID Shortcut Entry Mode or will be on hold as the first digit of the Individual ID is entered. An Individual ID can be entered as a decimal. (Refer to Common FUNC Keypad Operation.)

● Talkback

After an Individual Call is received, pressing the **PTT** switch while the ID of the transmitting transceiver is displayed enables the transceiver to respond (Talkback) to the transmitting transceiver of 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).)

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

Operating the transceiver

● 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 the Individual ID List selection screen appears.

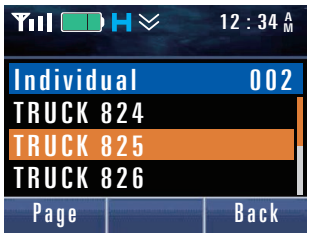
The following operations are identical even if the transceiver enters Individual Call Mode by pressing the **Menu** key or using the keypad.

Note

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

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

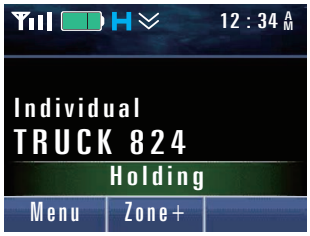
Refer to Common FUNC "Selecting or Clearing Data from a List" for selection methods.



3 Press the PTT switch.

A message requesting an Individual Call is sent to a system.

"Holding" appears on the display, and the transceiver waits to receive a response from the receiving transceiver.

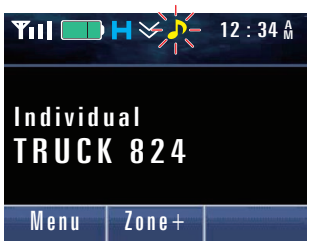


Note

- 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.
- If a system transmits a channel assignment message by a No Availability Check, the transceiver migrates to a communication channel without displaying "Holding", and the transceiver enters a state allowing communication. (Refer to No Availability Check (system configuration).)
- If the time configured in **PTT Warning Time** elapses while the **PTT** switch is being pressed and held, a Warning Tone A (continuous beep) sounds from the transceiver.

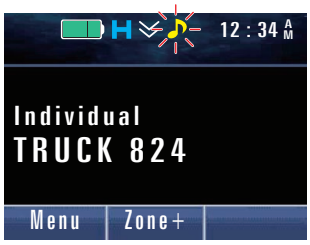
4 Receive from the system a message for traffic channel assignment.

The "♪" icon blinks, and the transceiver enters a state allowing transmission of an Individual Call. If **Call in Progress Tone** is enabled, a Call in Progress Tone (2 beeps) sounds from the transceiver.



5 Press the PTT switch.

The Individual Call is initiated.



Press the **Clear** key to terminate communication.

If **Disconnect Indication** Tone is enabled, a Disconnect Indication Tone (2 beeps) sounds from the transceiver, the link to a traffic channel is disconnected, and the transceiver restores the channel display.

● Initiating an Individual Call using Manual Dialing

To initiate an Individual Call using Manual Dialing, **Manual Dialing** needs to be enabled.

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

The transceiver enters Individual Call Mode and the Individual ID List selection screen appears.

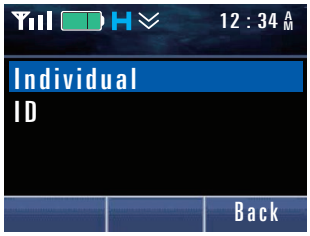
The following operations are identical even if the transceiver enters Individual Call Mode by pressing the **Menu** key or using the keypad.

Note

- If the Individual Call Mode previously used is Manual Dialing mode, the transceiver enters Manual Dialing mode.
- If no ID is registered in the Individual ID List, the transceiver enters Manual Dialing mode if **Manual Dialing** is enabled. In this case, the transceiver cannot enter Individual Call Mode if **Manual Dialing** is disabled.

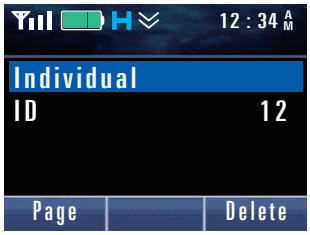
2 Press the Function [○] key.

The Individual ID entry screen appears.



3 Enter an Individual ID.

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



- **If using the PF keys:**

  Pressing the **[▲]** or **[▼]** key to select a code, and then press the **Menu** ([▭]) key to confirm the selected code.

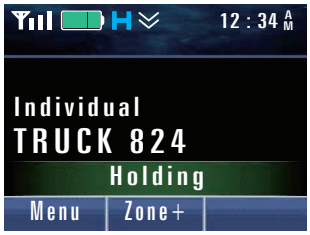
- **If using the keypad:**

  An Individual ID can be entered by pressing the **[0]** to **[9]** keys.

4 Press the PTT switch.

A message requesting an Individual Call is sent to a system.

"Holding" appears on the display, and the transceiver waits to receive a response from the receiving transceiver.

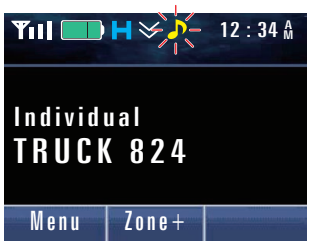


Note

- The entry screen for the ID closes at the same time as pressing the **PTT** switch. If entering an ID and sending an Individual Call again, reexecute the operations from step 1.
- If a system transmits a channel assignment message by a No Availability Check, the transceiver migrates to a communication channel without displaying "Holding", and the transceiver enters a state allowing communication. (Refer to No Availability Check (system configuration).)
- If the time configured in **PTT Warning Time** elapses while the **PTT** switch is being pressed and held, a Warning Tone A (continuous beep) sounds from the transceiver.

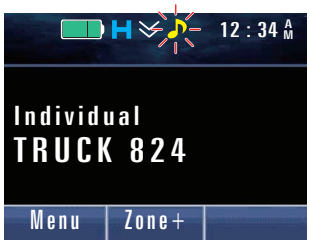
5 Receive from the system a message for traffic channel assignment.

The "♪" icon blinks, and the transceiver enters a state allowing transmission of an Individual Call. If **Call in Progress Tone** is enabled, a Call in Progress Tone (2 beeps) sounds from the transceiver.



6 Press the PTT switch.

The Individual Call is initiated.



Press the **Clear** key to terminate communication.

If **Disconnect Indication Tone** is enabled, a Disconnect Indication Tone (2 beeps) sounds from the transceiver, the link to a traffic channel is disconnected, and the transceiver restores the channel display.

Note

- If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common FUNC Transmit LED.)
- If **Busy LED** is enabled, the LED lights green regardless of whether reception is enabled or disabled on a traffic channel. (Refer to Common FUNC Busy LED.)
- If **Optional Signaling LED** is enabled, the LED flashes in yellow. (Refer to Optional Signaling LED.)
- If **Selective Call Alert LED** is enabled, the LED flashes when the transceiver is receiving a call. (Refer to About the behavior of the transceiver when receiving an Individual Call (P25 Trunking).)
- If **Call Request Tone** is enabled, a Call Request Tone (1 beep) sounds from the transceiver when a call requesting an Individual Call is initiated. Also, if **Call Processing Tone** is enabled, a Call Processing Tone (2 beeps) sounds from the transceiver until the transceiver receives from the system a message for traffic channel assignment after the call requesting an Individual Call is initiated. (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 **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).)
- For Mobile, if the **Mic On-hook Disconnect** is enabled, an Individual Call terminates by placing the microphone in the on-hook state.

About the behavior of the transceiver when sending an Individual Call

The transceiver behaves as follows depending on the response message from the system after initiating an Individual Call in a P25 Trunking system:

Table 2-8 Behavior of the Transceiver When Sending an Individual Call

Status	Transceiver Behavior
When a rejection response message is received from the target transceiver	The Call Deny Tone (3 beeps) sounds from the transceiver, and “Call Deny” appears on the display for 1 sec. Then, the transceiver restores the channel display and the Individual Call ends. If Incoming Reset Time of the transmitting transceiver elapses and the call ends, the behavior of the transceiver is also the same.
When no response is received from the target transceiver	If the other party does not respond even if the time configured in Initiating Reset Timer expires, No reply Tone (4 beeps) sounds from the transceiver, and “No reply” appears on the display for 1 sec. Then, the transceiver restores the channel display and the Individual Call ends.
When the transceiver receives a response message indicating the queue state from the system	The Call Queue Tone (2 beeps) sounds from the transceiver, “Queued” appears on the display, and the transceiver enters the standby state.
When the transceiver receives a service invalid message from the system	The Call Invalid Tone (4 beeps) sounds from the transceiver, and “System Deny” appears on the display for 1 sec. Then, the transceiver restores the channel display and the Individual Call ends.
When the transceiver does not receive any messages from the system	The Call Fail Tone (2 beeps) sounds from the transceiver, and “Fail” appears on the display for 1 sec. Then, the transceiver restores the channel display and the Individual Call ends.

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 > P25 Trunking > General)
- Configuring **Call in Progress Tone** to be enabled or disabled (See Transceiver Settings > P25 > P25 Information > Trunking)
- Configuring **Disconnect Indication Tone** to be enabled or disabled (See Transceiver Settings > P25 > P25 Information > Trunking)

Receiving an Individual Call

If the received Individual ID matches the Individual ID configured for the transceiver, the transceiver can receive the Individual Call. Depending on the configuration in KPG-D1/ D1N and system configuration, the transceiver receives an Individual Call in the following states:

Automatic Response (KPG-D1/ D1N configuration)

If **Automatic Response** is enabled, and when the receiving transceiver receives from the system a message requesting reception, the transceiver automatically sends an acknowledgment and can initiate an Individual Call.

If **Automatic Response** is disabled, and when the receiving transceiver receives from the system a message requesting reception, the transceiver can initiate an Individual Call by pressing the **PTT** switch or **Call Response** key to send an acknowledgment.

Availability Check (system configuration)

The transmitting transceiver sends a message requesting an Individual Call to a system when initiating an Individual Call, and the system sends a message requesting an acknowledgment to the receiving transceiver to confirm the availability of the receiving transceiver.

The transmitting transceiver sends a message requesting connection to the system, and the system sends a message for traffic channel assignment if the system allows this request. When the transceiver receives this message, the transceiver automatically migrates to a traffic channel, and then the transceiver will emit the received audio on a traffic channel.

- **No Availability Check (system configuration)**

  After receiving the message requesting an Individual Call from the transmitting transceiver, a system immediately sends a message for traffic channel assignment without confirming the availability of the receiving transceiver.

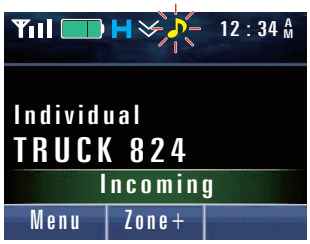
  After the transmitting transceiver initiates an Individual Call, the transmitting transceiver will immediately enter the communication state by receiving the message for traffic channel assignment. The receiving transceiver will also immediately enter the communication state by receiving the message for traffic channel assignment.

Transceiver behavior

- **Availability Check**

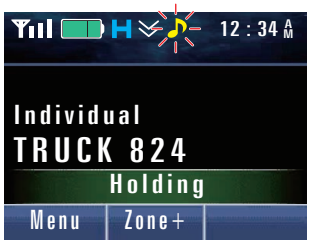
1 Receive from the system a message requesting reception of an Individual Call.

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



If Automatic Response is enabled:

A message requesting the connection is automatically sent to the system. "Holding" appears, and the transceiver waits for a message for traffic channel assignment. Go to step 3.

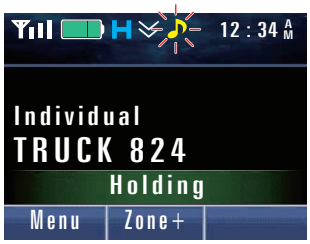


If Automatic Response is disabled:

A message requesting the connection needs to be manually sent to the system. Go to step 2.

2 Press the PTT switch or the Call Response key.

A message requesting the connection is sent to the system. "Holding" appears, and the transceiver waits for a message for traffic channel assignment.

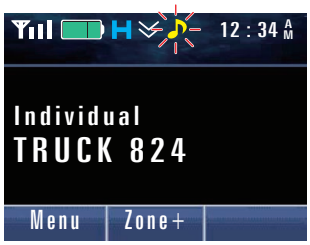


Note

For Mobile, if **Off-hook Connect** is enabled, a message requesting connection is sent to a system even if the microphone is placed in the off-hook state.

3 Receive from the system a message for traffic channel assignment.

The transceiver enters a state allowing communication. If **Call in Progress Tone** is enabled, a Call in Progress Tone (2 beeps) sounds from the transceiver.



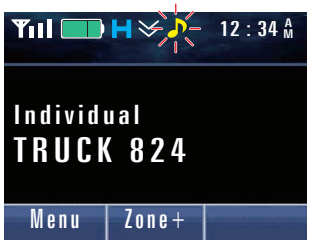
4 **Press the PTT switch.**

The Individual Call is initiated. Even if the **PTT** switch is being pressed and held to receive a message for traffic channel assignment, transmission by an Individual Call is initiated.

- **No Availability Check**

1 **Receive from the system a message for traffic channel assignment.**

The "♪" icon blinks and the transceiver enters a state allowing communication.



2 **Press the PTT switch.**

The Individual Call is initiated.

Note

- If Alert Tone is configured to sound when receiving, an Alert Tone sounds. (Refer to About the behavior of the transceiver when receiving an Individual Call (P25 Trunking).)
- If **Selective Call Alert LED** or **Optional Signaling LED** is enabled, the LED flashes when the transceiver is receiving a call. (Refer to About the behavior of the transceiver when receiving an Individual Call (P25 Trunking).)
- 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).)
- Receipt can be canceled by pressing the **Clear** key while "Incoming" or "Holding" appears on the display.
- If the transceiver receives an Individual Call from a transceiver in a different Home system, "ISSI Call" appears on the display.
- **Incoming Reset Time** is activated if an Individual Call is received. If the time configured in **Incoming Reset Time** elapses with no operation, "Missed Call" appears on the display. If the time configured in **Auto Reset Timer** expires, the channel display is restored.

About the behavior of the transceiver when receiving an Individual Call (P25 Trunking)

- **Alert Tone**

If Auto Response is disabled and receiving by an Availability Check:

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

However, if "Common" is configured in **Alert Tone (Individual Call Incoming)** of the Individual ID List, or if the received Individual ID is not configured in the Individual ID List, the Alert Tone sounds from the transceiver according to the configuration in **Alert Tone (Individual Call Incoming)** common to P25 Trunking.

If receiving by a No Availability Check:

If the received Individual 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 Individual ID.

However, if "Common" is configured in **Alert Tone (Individual)** of the Individual ID List, or if the received Individual ID is not configured in the Individual ID List, the Alert Tone sounds from the transceiver according to the configuration in **Alert Tone (Individual Call)** common to P25 Trunking.

- **Selective Call Alert LED**

  If Auto Response is disabled and receiving by an Availability Check:

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

  However, if "Common" is configured in **Alert LED Color (Individual Call Incoming)** of the Individual ID List, or if the received Individual ID is not configured in the Individual ID List, the LED flashes according to the configuration in **Alert LED Color (Individual Call Incoming)** common to P25 Trunking.

  If receiving by a No Availability Check:

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

  However, if "Common" is configured in **Alert LED Color (Individual)** of the Individual ID List, or if the received Individual ID is not configured in the Individual ID List, the LED flashes according to the configuration in **Alert LED Color (Individual Call)** common to P25 Trunking.

- **Optional Signaling LED**

  If **Optional Signaling LED** is enabled, the LED flashes in yellow. However, if **Selective Call Alert LED** is enabled, the LED flashes according to the configuration of **Selective Call Alert LED**.

  Also, when a key on the transceiver is operated while the LED flashes according to the configuration of **Selective Call Alert LED**, the LED will flash in yellow if the Optional Signaling received continues to match that of the transceiver.

Configuration using KPG-D1/ D1N

- Configuring **Automatic Response** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General > Individual Call)
- Configuring **Selective Call Alert LED** to be enabled or disabled (See Transceiver Settings > P25 > P25 Information > Trunking)
- Configuring **Optional Signaling LED** to be enabled or disabled (See Transceiver Settings > P25 > P25 Information > Trunking)
- Configuring **Alert Tone (Individual)** or **Alert Tone (Individual Call Incoming)** (Individual ID List) (See Transceiver Settings > P25 > Individual ID List > Alert Tone)
- Configuring **Alert LED Color (Individual)** or **Alert LED Color (Individual Call Incoming)** (Individual ID List) (See Transceiver Settings > P25 > Individual ID List > Alert LED Color)
- Configuring **Alert Tone (Individual Call)** or **Alert Tone (Individual Call Incoming)** common to P25 Trunking (See Transceiver Settings > P25 > P25 Information > Trunking > Alert Tone)
- Configuring **Alert LED Color (Individual Call)** or **Alert LED Color (Individual Call Incoming)** common to P25 Trunking (See Transceiver Settings > P25 > P25 Information > Trunking > Alert LED Color)
- Configuring **Call in Progress Tone** to be enabled or disabled (See Transceiver Settings > P25 > P25 Information > Trunking)
- Configuring **Incoming Reset Time** (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General)

Individual ID List

If making Individual Calls, the desired Individual IDs need to be preconfigured in the transceiver using KPG-D1/ D1N prior to use of the transceiver. A maximum of 1500 Individual IDs can be configured for Individual ID List. A user can store a maximum of 32 Individual IDs in the Individual ID List.

Refer to "Individual ID List" of "1 P25 CONVENTIONAL SYSTEM" for details of Individual ID List.

2.7 Making a Group Call

Group Call is the function used to make a voice call by calling all transceivers configured as group members.
Specifying a Talkgroup ID enables a call to all transceivers having the same Talkgroup ID.

Initiating a Group Call

Selecting the channel configured for the Talkgroup to call by pressing one of the following keys or operating the **Selector**, and then pressing the **PTT** switch, a Group Call can be initiated.

- **Channel Up** key
- **Channel Down** key
- **Channel Up/Down (Selector)**
- **Channel Select (Selector)**

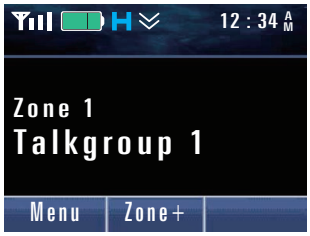
Note

If **Receive Only TG/AG** of the selected channel is disabled, the transceiver can call or wait for a call with a Talkgroup ID configured for the channel. If **Receive Only TG/AG** is enabled, the transceiver can only wait for a call with a Talkgroup ID configured for this channel, and the transceiver cannot call with the Talkgroup ID.

Operating the transceiver

1 **Selecting the channel configured for the Talkgroup to call by pressing one of the following keys or operating the Selector.**

- **Channel Up** key
- **Channel Down** key
- **Channel Up/Down (Selector)**
- **Channel Select (Selector)**



2 **Press the PTT switch.**

The transceiver initiates a Group Call.

Note

- If **Receive Only TG/AG** is enabled, a Warning Tone A (continuous beep) sounds from the transceiver while the **PTT** switch is pressed and held.
- If the time configured in **PTT Warning Time** elapses while the **PTT** switch is being pressed and held, a Warning Tone A (continuous beep) sounds from the transceiver.

3 Receive from the system a message for traffic channel assignment.

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

4 Press the PTT switch.

The Group Call is initiated. Even if the **PTT** switch is being pressed and held to receive a message for traffic channel assignment, transmission by a Group Call is initiated.

If the transceiver receives a message to terminate the call on the traffic channel, the Group Call ends and the transceiver restores the control channel.

Note

- If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common FUNC Transmit LED.)
- If **Busy LED** is enabled, the LED lights green regardless of whether reception is enabled or disabled on a traffic channel. (Refer to Common FUNC Busy LED.)
- If **Optional Signaling LED** is enabled, the LED flashes in yellow. (Refer to Optional Signaling LED.)
- If **Selective Call Alert LED** is enabled, the LED flashes when the transceiver is receiving. (Refer to About the behavior of the transceiver when receiving a Group Call (P25 Trunking).)
- If **Call Request Tone** is enabled, a Call Request Tone (1 beep) sounds from the transceiver when a call requesting a Group Call is initiated. Also, if **Call Processing Tone** is enabled, a Call Processing Tone (2 beeps) sounds from the transceiver until the transceiver receives from the system a message for traffic channel assignment after the call requesting a Group Call is initiated. (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 **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)Using Sound to Notify the Timing to Start Communications (PTT Proceed Tone).)
- If the **PTT** switch is released immediately after being pressed, the transceiver sends a message requesting a Group Call, and sends a 3 sec voice transmission on a traffic channel after receiving a message for traffic channel assignment from the system. If the **PTT** switch is pressed during this time, the transmission can be continued.

About Hang Time

If the voice communication by Group Call is terminated by releasing the **PTT** switch, the system sends muted data for a fixed time on the control channel. The period of sending this muted data is referred to as Hang Time.

If transmitting again during Hang Time, the behavior differs as the following:

● If the traffic channel is FDMA:

The transceiver behaves as follows according to the configuration in **Trunking Type**. (Refer to Trunking Type.)

- If "Transmit" is configured in **Trunking Type**:
  Cannot transmit again even if the **PTT** switch is pressed.
- If "Message" is configured in **Trunking Type**:
  Voice transmission is initiated if the **PTT** switch is pressed.
- If "PTT ID" is configured for **Trunking Type**:
  The transceiver migrates to a control channel and then sends a request message for a Group Call if the **PTT** switch is pressed.

- **If the traffic channel is TDMA:**

  Refer to "Voice communication of a Group Call in the Hang Time state" for details.

Note

Hang Time may not exist depending on the system.

About the behavior of the transceiver when sending a Group Call

The transceiver behaves as follows depending on the response message from the system after initiating a Group Call in a P25 Trunking system:

Table 2-9 Behavior of the Transceiver When Sending a Group Call

Status	Transceiver Behavior
When the transceiver receives a response message indicating the queue state from the system	The Call Queue Tone (2 beeps) sounds from the transceiver, "Queued" appears on the display, and the transceiver enters the standby state.
When the transceiver receives a service invalid message from the system	The Call Invalid Tone (4 beeps) sounds from the transceiver, and "System Deny" appears on the display for 1 sec. Then, the Group Call ends.
When the transceiver does not receive any messages from the system	The Call Fail Tone (2 beeps) sounds from the transceiver, and "Fail" appears on the display for 1 sec. Then, the Group Call ends.

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Configuring **Receive Only TG/AG** to be enabled or disabled (See Transceiver Settings > Personal > Personality > P25 Trunking)
- Configuring **Trunking Type** (See Transceiver Settings > Personal > Personality > P25 Trunking)

Receiving a Group Call

The transceiver can receive a Group Call if the received Talkgroup ID matches the Talkgroup ID preconfigured for the transceiver.

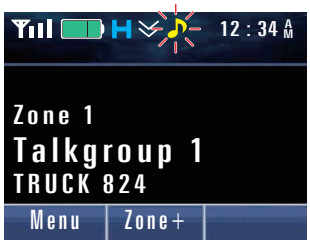
Transceiver behavior

1 The transceiver receives a Group Call.

The "♪" icon blinks.

If **Unit ID Display on Group Call** is enabled, the ID Name of the transmitting transceiver is displayed.

If the transceiver receives a message to terminate the call on the traffic channel, the Group Call ends and the transceiver restores the control channel.



Note

- If **Busy LED** is enabled, the LED lights green regardless of whether reception is enabled or disabled on a traffic channel. (Refer to Common FUNC Busy LED.)
- If Alert Tone is configured to sound when receiving, an Alert Tone sounds. (Refer to About the behavior of the transceiver when receiving a Group Call (P25 Trunking).)
- If **Selective Call Alert LED** or **Optional Signaling LED** is enabled, the LED flashes when the transceiver is receiving a call. (Refer to About the behavior of the transceiver when receiving a Group Call (P25 Trunking).)
- If the transceiver receives an Individual call from the transceiver in a different Home system, “ISSI Call” appears on the display when **Unit ID Display on Group Call** is enabled.
- Refer to “About Hang Time” for the behavior of the transceiver if transmitting during **Hang Time**.

About the behavior of the transceiver when receiving a Group Call (P25 Trunking)

Alert Tone

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

However, if “Common” is configured in **Alert Tone (Talkgroup ID List)** of the Talkgroup ID List, or if the received Talkgroup ID is not configured in the Talkgroup ID List, the Alert Tone sounds from the transceiver according to the configuration in **Alert Tone (Group Call)** common to P25 Trunking.

Selective Call Alert LED

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

However, if “Common” is configured in **Alert LED Color (Talkgroup ID List)** of the Talkgroup ID List, or if the received Talkgroup ID is not configured in the Talkgroup ID List, the LED flashes according to the configuration in **Alert LED Color (Group Call)** common to P25 Trunking.

Optional Signaling LED

If **Optional Signaling LED** is enabled, the LED flashes in yellow. However, if **Selective Call Alert LED** is enabled, the LED flashes according to the configuration of **Selective Call Alert LED**.

Also, when a key on the transceiver is operated while the LED flashes according to the configuration of **Selective Call Alert LED**, the LED will flash in yellow if the Optional Signaling received continues to match that of the transceiver.

Configuration using KPG-D1/ D1N

- Configuring **Selective Call Alert LED** to be enabled or disabled (See Transceiver Settings > P25 > P25 Information > Trunking)
- Configuring **Optional Signaling LED** to be enabled or disabled (See Transceiver Settings > P25 > P25 Information > Trunking)
- Configuring **Alert Tone (Talkgroup ID List)** (See Transceiver Settings > P25 > Talkgroup ID List)
- Configuring **Alert LED Color (Talkgroup ID List)** (See Transceiver Settings > P25 > Talkgroup ID List)
- Configuring **Alert Tone (Group Call)** common to P25 Trunking (See Transceiver Settings > P25 > P25 Information > Trunking > Alert Tone)
- Configuring **Alert LED Color (Group Call)** common to P25 Trunking (See Transceiver Settings > P25 > P25 Information > Trunking > Alert LED Color)
- Configuring **Unit ID Display on Group Call** to be enabled or disabled (See Transceiver Settings > P25 > P25 Information > General)

Announcement Group Call

Announcement Group Call is the Group Call used to make a call to all transceivers. Normally, Announcement Group Call is used to call a Talkgroup dedicated to reception.

Transceiver behavior upon receipt of an Announcement Group Call is the same as for a normal Group Call.

Pressing the **PTT** switch while receiving an Announcement Group Call, the transceiver can reply with the Talkgroup ID of the received Announcement Group Call.

By using KPG-D1/ D1N, whether to receive the Announcement Group Call can be configured.

Announcement Group ID is used for transmission only to a Talkgroup in which an Announcement Group ID is configured as the Talkgroup ID.

Note

- The behavior of Encryption when replying with the Talkgroup ID of the received Announcement Group Call depends on the configuration of **Announcement Group Encryption** and **Announcement Group Multi-key List Number**.
- To use the Announcement Group Call, consistency with the system needs to be ensured.
- Announcement Group ID is determined by the system.

Configuration using KPG-D1/ D1N

Configuring **Announcement Group Call** to be enabled or disabled (See Transceiver Settings > Personal > Personality > P25 Trunking > Announcement Group Call)

Super Group Call

Super Group Call is one of the Group Calls used to make a call to multiple Talkgroups. A notification message sent from the system forces multiple Talkgroups to be grouped into one Super Group. If the transceiver makes a Group Call in this state, the transceiver makes a Super Group Call. However, the user of transceiver cannot distinguish between a normal Group Call and a Super Group Call.

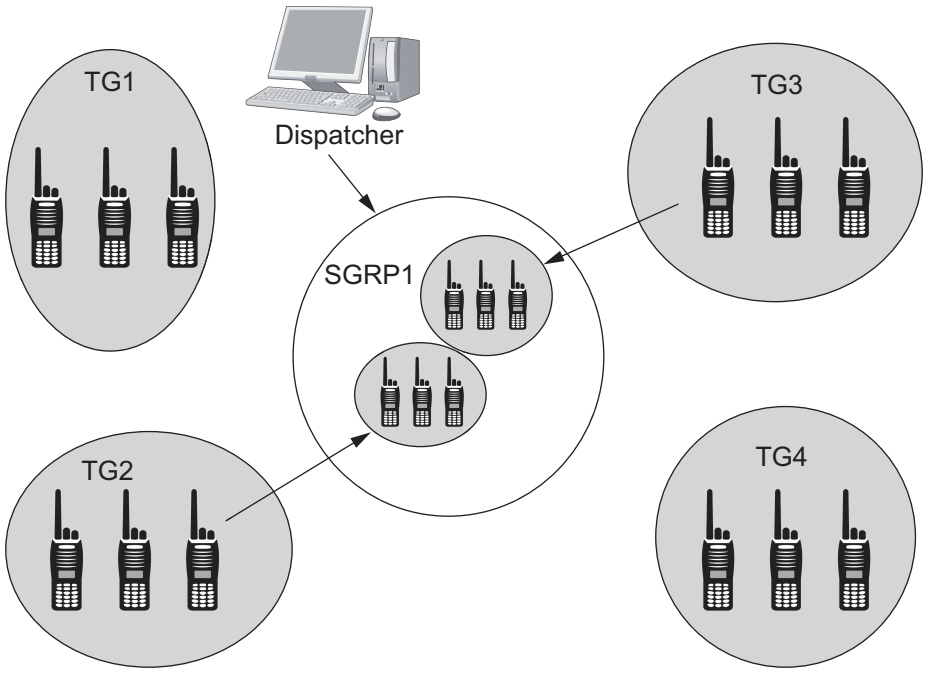


Figure 2-3 Call Super Group Call

Transceiver behavior is the same as for a normal Group Call.

Note

- The Encryption Key used for a Super Group Call can be configured in **Multi-key List No.** using KPG-D1/ D1N. The transceiver in the Secure or Clear state functions according to the configuration of **Encryption** for the Talkgroup configured in a Personality. (See Transceiver Settings > Personal > Personal Features > P25 Trunking > Encryption > Multi-key List No.)
- A Super Group Call is also referred to as Patch/MSEL. If Patch is selected, the transceiver sends and receives a Super Group Call. If MSEL is selected, the transceiver receives a Super Group Call but transmits only a normal Group Call.

System Call

System Call is a Group Call with the Group Address field $FFFF.

If the transceiver receives a System Call, the “ ” icon blinks and “System Call” appears on the display.

The behavior of reception is the same as the behavior for Group Call. In Portable, a System Call can only be received. In Mobile, a System Call can also be sent by the use of a PC command.

Note

The transceiver cannot reply to a received System Call. Pressing the **PTT** switch while the “ ” icon is blinking, “Receive Only” appears while the **PTT** switch is pressed and held, and a Warning Tone A (continuous beep) sounds from the transceiver.

2.8 Making a Paging Call

Paging Call is the function used to initiate a call to the target transceiver. This function can be used to initiate a call without using voice communication.

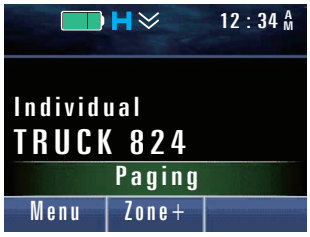
Initiating a Paging Call

In Individual Call Mode, a Paging Call is initiated by selecting an Individual ID configured in the Individual ID List, or directly specifying an Individual ID and pressing the **Menu** ([▯]) key.

Operating the transceiver

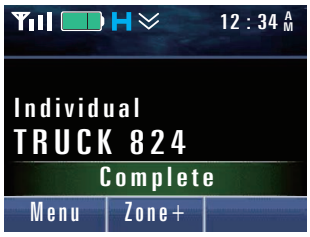
1 **In Individual Call Mode, select an Individual ID configured in the Individual ID List, or directly specifying an Individual ID and press the Menu ([▯]) key.**

Refer to "Initiating an Individual Call" for operations in Individual Call Mode.



2 **Receive from the system a message requesting reception.**

Completing transmission of a Paging Call, the Complete Tone (5 beeps) sounds from the transceiver and "Complete" appears for 1 sec.



Note

If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common FUNC Transmit LED.)

About the behavior of the transceiver when sending a Paging Call

The transceiver behaves as follows depending on the response message from the system after sending a Paging Call in a P25 Trunking system:

Table 2-10 Behavior of the Transceiver When Sending a Paging Call

Status	Transceiver Behavior
When no response is received from the target transceiver	The No reply Tone (4 beeps) sounds from the transceiver, and "No reply" appears on the display for 1 sec. Then, the transceiver restores the channel display and the Paging Call ends.
When the transceiver receives a service invalid message from the system	The Call Invalid Tone (4 beeps) sounds from the transceiver, and "System Deny" appears on the display for 1 sec. Then, the transceiver restores the channel display and the Paging Call ends.
When the transceiver does not receive any messages from the system	The Call Fail Tone (2 beeps) sounds from the transceiver, and "Fail" appears on the display for 1 sec. Then, the transceiver restores the channel display and the Paging Call ends.

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 > P25 Trunking > General)

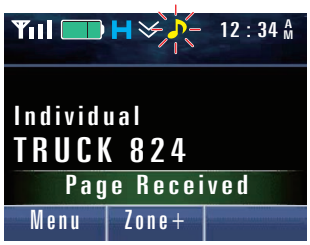
Receiving a Paging Call

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

Transceiver behavior

1 **Receive from the system a message requesting reception of a Paging Call.**

The " " icon blinks, and the ID Name of the transmitting transceiver and "Page Received" appear.



Note

- If Alert Tone is configured to sound when receiving, an Alert Tone sounds. (Refer to About the behavior of the transceiver when receiving a Paging Call.)
- If **Selective Call Alert LED** or **Optional Signaling LED** is enabled, the LED flashes when the transceiver is receiving a call. (Refer to About the behavior of the transceiver when receiving a Paging Call.)
- If the transceiver receives a Paging Call from the transceiver of a different Home system, the transceiver will not activate.
- Pressing the **PTT** switch while the ID of the transmitting transceiver is displayed enables the transceiver to reply with an Individual Call to the transmitting transceiver of the Paging Call.
- The received Paging Call can be retained as a Caller ID in the record. The record can be checked in Stack Mode. (Refer to Common FUNC Viewing the Receive History (Stack).)

About the behavior of the transceiver when receiving a Paging Call

Alert Tone

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

However, if "Common" is configured in **Alert Tone (Paging)** of the Individual ID List, or if the received Individual ID is not configured in the Individual ID List, an Alert Tone sounds according to the configuration in **Alert Tone (Paging Call)** common to P25 Trunking.

Selective Call Alert LED

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

However, if "Common" is configured in **Alert LED Color (Paging)** of the Individual ID List, or if the received Individual ID is not configured in the Individual ID List, the LED flashes according to the configuration in **Alert LED Color (Paging Call)** common to P25 Trunking.

- **Optional Signaling LED**

  If **Optional Signaling LED** is enabled, the LED flashes in yellow. However, if **Selective Call Alert LED** is enabled, the LED flashes according to the configuration of **Selective Call Alert LED**.

  Also, when a key on the transceiver is operated while the LED flashes according to the configuration of **Selective Call Alert LED**, the LED will flash in yellow if the Optional Signaling received continues to match that of the transceiver.

Configuration using KPG-D1/ D1N

- Configuring **Selective Call Alert LED** to be enabled or disabled (See Transceiver Settings > P25 > P25 Information > Trunking)
- Configuring **Optional Signaling LED** to be enabled or disabled (See Transceiver Settings > P25 > P25 Information > Trunking)
- Configuring **Alert Tone (Paging)** (Individual ID List) (See Transceiver Settings > P25 > Individual ID List > Alert Tone)
- Configuring **Alert LED Color (Paging)** (Individual ID List) (See Transceiver Settings > P25 > Individual ID List > Alert LED Color)
- Configuring **Alert Tone (Paging Call)** common to P25 Trunking (See Transceiver Settings > P25 > P25 Information > Trunking > Alert Tone)
- Configuring **Alert LED Color (Paging Call)** common to P25 Trunking (See Transceiver Settings > P25 > P25 Information > Trunking > Alert LED Color)

2.9 Using 2-tone to Initiate an Individual Call

2-tone signaling uses a pair of 2 different tone frequencies in series for an individual call.

2-tone is a signaling system that can receive a signal with squelch disabled only when 2 tone signals in series sent from the transmitting transceiver match the tone signals preconfigured for the receiving transceiver.

2-tone consists of 2 tone signals in series with 2 different frequencies within the frequency range between 281.25 Hz and 3093.75 Hz in a P25 Trunking system. These 2 tone signals are sent in series with the carrier wave.

The following are the methods for sending the 2-tone code:

- 2-tone encoding list selection
- **Call** key
- PC command

Selecting and Sending the 2-tone Code from a List

The transceiver can send a 2-tone code by initiating a Group Call after the 2-tone code configured in the 2-tone encoding list is selected. (Refer to 2-tone Encoding List.)

An encoding tone configured in the 2-tone encoding list can be selected by pressing the **2-tone** key.

An encoding tone configured in the 2-tone encoding list can also be selected by selecting “2-tone” after entering Menu Mode by pressing the **Menu** key.

Note

If **Receive Only TG/AG** of the selected channel is disabled, the transceiver can call or wait for a call with a Talkgroup ID configured for the channel. If **Receive Only TG/AG** is enabled, the transceiver can only wait for a call with a Talkgroup ID configured for this channel, and the transceiver cannot call with the Talkgroup ID.

Operating the transceiver:

1 Press the 2-tone key.

The transceiver enters 2-tone Mode, and the 2-tone encoding list appears.

The following operations are the same even if the transceiver enters 2-tone Mode by pressing the **Menu** key:

2 Press the [▲] key or [▼] key and select the 2-tone code.

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

Note

A fixed text string ("List No.") and the list number appear for a 2-tone code for which **2-tone Name** is not configured in the 2-tone encoding list.

3 Press the PTT switch.

The transceiver initiates a Group Call.

Note

- If **Receive Only TG/AG** is enabled, a Warning Tone A (continuous beep) sounds from the transceiver while the **PTT** switch is pressed and held.
- If the time configured in **PTT Warning Time** elapses while the **PTT** switch is being pressed and held, a Warning Tone A (continuous beep) sounds from the transceiver.

4 Receive from the system a message for traffic channel assignment.

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

5 **Press the PTT switch.**

Transmission of a Group Call is initiated, and the selected 2-tone code is sent. Even if the **PTT** switch is being pressed and held to receive a message for traffic channel assignment, transmission by a Group Call is initiated. Even after the 2-tone code is sent, the transmission continues while the **PTT** switch is pressed and held.

Note

- If "Talkgroup ID and Optional Signaling" is configured in **Audio Control for Group Call**, the Optional Signaling is in the matching state if transmission is on a channel with "2-tone 1" to "2-tone 4" configured in **Optional Signaling for Group Call**. In this case, the "♪" icon appears, and the LED flashes yellow. (Refer to Using the Optional Signaling (Optional Signaling for Group Call).)
- If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common FUNC Transmit LED.)
- If **Busy LED** is enabled, the LED lights green regardless of whether reception is enabled or disabled on a traffic channel. (Refer to Common FUNC Busy LED.)
- If **Selective Call Alert LED** is enabled, the LED flashes when the transceiver is receiving. (Refer to About the behavior of the transceiver when receiving a Group Call (P25 Trunking).)
- If **Call Request Tone** is enabled, a Call Request Tone (1 beep) sounds from the transceiver when a call requesting a Group Call is initiated. Also, if **Call Processing Tone** is enabled, a Call Processing Tone (2 beeps) sounds from the transceiver until the transceiver receives from the system a message for traffic channel assignment after the call requesting a Group Call is initiated. (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).)
- Refer to "About Hang Time" for details on the transceiver behavior in a system that is in the **Hang Time** state.

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Configuring **Receive Only TG/AG** to be enabled or disabled (See Transceiver Settings > Personal > Personality > P25 Trunking)

Using the Call Key to Send the 2-tone Code

Pressing one of the **Call 1** to **Call 6** keys causes the transceiver to transmit the preconfigured tone.

Call 1 to **Call 6** can be assigned to the **PF** keys by using KPG-D1/ D1N and the tone corresponding to each key can be configured by selecting from the 2-tone encoding list of 2-tone.

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Configuring the tones corresponding to **Call 1** to **Call 6** keys (See Transceiver Settings > Key Assignment > Call)

Using the PC Command to Send the 2-tone Code

The transceiver sends a 2-tone code when a transmission command for a 2-tone code is sent from a PC to the communication port of the transceiver.

To send a 2-tone code by using 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.)

Functions Related to 2-tone Code Encoding

Functions related to 2-tone code encoding are shown below.

- Duration of 1st Tone
- Duration of 2nd Tone
- Duration of Single Tone
- Gap Time
- First Tone Delay Time
- Sidetone
- 2-tone Encoding List

Refer to “Functions Related to 2-tone Code Encoding” of 1 P25 CONVENTIONAL SYSTEM for details of each function.

Decoding the 2-tone Code

The transceiver can wait for a 2-tone code on a channel with “2-tone 1”, “2-tone 2”, “2-tone 3”, or “2-tone 4” configured in **Optional Signaling for Group Call**. (Refer to Using the Optional Signaling (Optional Signaling for Group Call).)

Transceiver Behavior:

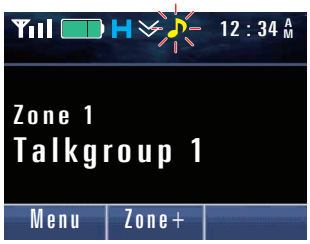
The transceiver behavior varies depending on the configuration in **Audio Control for Group Call** (Talkgroup ID, or Talkgroup ID and Optional Signaling). (Refer to Unmuting the Speaker (Audio Control for Group Call).)

- **If “Talkgroup ID” is configured in Audio Control for Group Call**

1 **Receive a Group Call.**

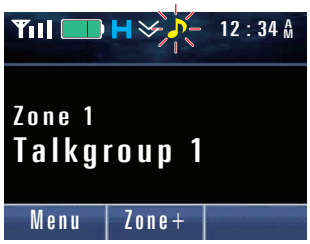
The transceiver migrates to the traffic channel.

The “♪” icon blinks and the transceiver emits the received audio if the received Talkgroup ID matches the Talkgroup ID preconfigured for the transceiver.



2 **Receive the 2-tone code corresponding to the Call Format for which the transceiver waits.**

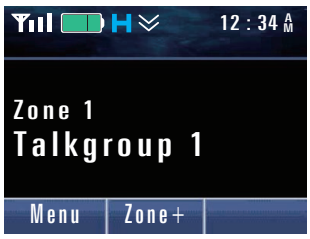
The “♪” icon blinks if the received 2-tone code matches the 2-tone code preconfigured for the transceiver.



- **If “Talkgroup ID and Optional Signaling” is configured in Audio Control for Group Call**

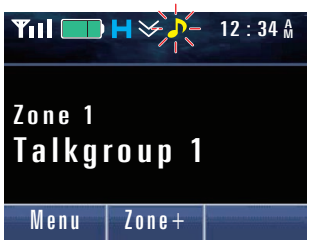
1 **Receive a Group Call.**

The transceiver migrates to the traffic channel.



2 **Receive the 2-tone code corresponding to the Call Format for which the transceiver waits after the received Talkgroup ID matches the Talkgroup ID preconfigured for the transceiver.**

The “♪” icon blinks and the transceiver emits the received audio if the received 2-tone code matches the 2-tone code preconfigured for the transceiver.



Note

- If **Busy LED** is enabled, the LED lights green regardless of whether reception is enabled or disabled on a traffic channel. (Refer to Common FUNC Busy LED.)
- If **Selective Call Alert LED** is enabled, the LED flashes when the transceiver is receiving. The LED color varies according to the configuration in **Alert LED Color** of **Call Format**.
- If anything other than “Off” is configured in **Alert Tone** of **Call Format**, an Alert Tone sounds from the transceiver. Also, if **Transpond** of **Call Format** is enabled, the transceiver transmits a multiplexed Transpond tone.
- After the length of time configured in **Auto Reset Timer** elapses, the matching state of the 2-tone code is reset.
- The transceiver cannot transmit even if the **PTT** switch is pressed while in the matching state of the 2-tone codes after the transceiver receives the 2-tone code by a System Call. In this case, while the **PTT** switch is being pressed, “Receive Only” appears on the display and Warning Tone A (continuous beep) sounds from the transceiver. (Refer to System Call.)
- While in the matching state of the 2-tone code, the matching state of the 2-tone code is reset if the transceiver initiates communication on a priority channel by Priority Monitor Scan. (Refer to Priority Monitor Scan (P25 Trunking system only).)

Functions Related to 2-tone Code Decoding

The following functions associated with 2-tone code decoding can be configured for each of 2-tone 1, 2-tone 2, 2-tone 3, and 2-tone 4.

- Decoder 1 to Decoder 4
- A Tone/ B Tone/ C Tone/ D Tone
- Auto Reset Timer
- Clear to Transpond
- Selective Call Alert LED

Refer to "Functions Related to 2-tone Code Decoding" of 1 P25 CONVENTIONAL SYSTEM for details of each function.

Note

The **Transpond** and **Clear to Transpond** functions of 2-tone decoding cannot be used in a P25 Trunking system.

2.10 Communicating with a Telephone (Telephone Call)

Telephone Call is the function to initiate voice communications using a telephone by connecting a P25 Trunking system and telephone line.

This function enables the transceiver to make a call to a telephone, or a telephone to make a call to the transceiver.

Note

In a P25 Trunking system, a DTMF Sidetone does not sound. In addition, caller number display is not supported.

Configuring the Transmission and Reception Behaviors of a Telephone Call (Telephone Interconnect)

The behavior when the transceiver sends a Telephone Call can be configured in the following manner in **Telephone Interconnect** of KPG-D1/ D1N.

Table 2-11 Telephone Interconnect

Configuration	Description
Disable	The transceiver cannot send or receive a Telephone Call.
List Only	The transceiver can send a Telephone Call by selecting a DTMF code from the Autodial List.
Unlimited	The transceiver can send a Telephone Call by directly selecting a DTMF code from the Autodial List or directly entering a DTMF code.
Answer Only	A Telephone Call cannot be sent. Only reception is available. However, transmission in response to reception is available.

Configuration using KPG-D1/ D1N

Configuring **Telephone Interconnect** (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General > Telephone Interconnect)

Initiating a Telephone Call

In Autodial Mode, a Telephone Call is initiated by selecting a DTMF code configured in the Autodial List or directly entering a DTMF code.

To initiate a Telephone Call, “List Only” or “Unlimited” needs to be configured in **Telephone Interconnect**.

Pressing the **Autodial** key places the transceiver in Autodial Mode.

The transceiver can also be placed in Autodial Mode by selecting “Autodial” after placing the transceiver in Menu Mode by pressing the **Menu** key. (Refer to Common FUNC Using Menu Mode.)

If “Autodial” is configured in **Keypad Operation**, or if “Unlimited” is configured in **Telephone Interconnect**, the transceiver enters Autodial Mode by pressing the **[0]** to **[9]** keys on the keypad. The transceiver will be on hold as the first digit of the DTMF code is entered. (Refer to Common FUNC Keypad Operation.)

Operating the transceiver

● Initiating a Telephone Call by list selection

To make a Telephone Call by list selection, “List Only” or “Unlimited” needs to be configured in **Telephone Interconnect**.

1 Press the Autodial key.

The transceiver enters Autodial Mode. If a Telephone Call is sent last time by using a selection screen for the Autodial List, the selection screen for the Autodial List will appear.

If the Autodial Mode used last time is Manual Dialing mode, the transceiver enters Manual Dialing mode by pressing the **Autodial** key. A selection screen for the Autodial List appears by pressing the **Function [◯]** key.

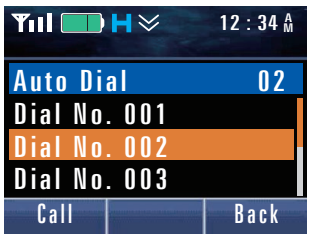
The following operations are identical even if the transceiver enters Autodial Mode by pressing the **Menu** key.

Note

If no DTMF code is registered in the Autodial List, the transceiver enters Manual Dialing mode by pressing the **Autodial** key if “Unlimited” is configured in **Telephone Interconnect**. In this case, the transceiver cannot enter Autodial Mode if “List Only” is configured in **Telephone Interconnect**.

2 Press the [▲] or [▼] key to select the DTMF code from the Autodial List.

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



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

A message requesting a Telephone Call is sent to a system.

Note

- The selection screen for the Autodial List closes at the same time as pressing the **PTT** switch or **Menu** ([ ]) key. If selecting a DTMF code and sending a Telephone Call again, reexecute the operations from step 1.
- If the time configured in **PTT Warning Time** elapses while the **PTT** switch is being pressed and held, a Warning Tone A (continuous beep) sounds from the transceiver.
- Selecting a DTMF code including one of “A”, “B”, “C” or “D”, and pressing the **PTT** switch, a Warning Tone A (continuous beep) sounds from the transceiver and transmission is unavailable. Pressing the **Menu** ([ ]) key, a Key-entry Error Tone (1 beep) also sounds from the transceiver and transmission is unavailable.

4 Receive from the system a message for traffic channel assignment.

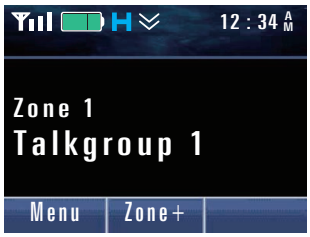
The “ ” icon blinks, and the transceiver enters a state allowing transmission of a Telephone Call. If **Call in Progress Tone** is enabled, a Call in Progress Tone (2 beeps) sounds from the transceiver.

5 Press the PTT switch.

The Telephone Call is initiated.

Press the **Clear** key to terminate communication.

If **Disconnect Indication** Tone is enabled, a Disconnect Indication Tone (2 beeps) sounds from the transceiver, the link to a traffic channel is disconnected, and the transceiver restores the channel display.



● Initiating a Telephone Call using Manual Dialing

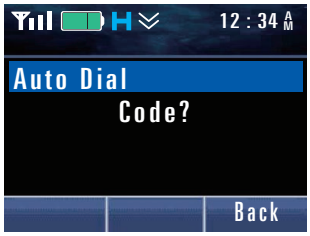
To initiate a Telephone Call using Manual Dialing, “Unlimited” needs to be configured in Telephone Interconnect.

1 Press the Autodial key.

The transceiver enters Autodial Mode. If a Telephone Call is sent last time in Manual Dialing mode, the transceiver is placed in Manual Dialing mode.

If a Telephone Call is sent last time by using a selection screen for the Autodial List, the selection screen for the Autodial List will appear by pressing the **Autodial** key. The transceiver enters Manual Dialing mode by pressing the **Function [○]** key.

The following operations are identical even if the transceiver enters Manual Dialing Mode by pressing the **Menu** key or using the keypad.



2 Enters a DTMF code.

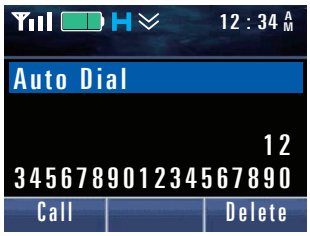
Refer to Common FUNC “Entering or Deleting a Code” for the entry method.

● If using the PF keys:

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

● If using the keypad:

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



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

A message requesting a Telephone Call is sent to a system.

Note

- The entry screen for the DTMF code closes at the same time as pressing the **PTT** switch or **Menu** ([□]) key. If entering a DTMF code and sending a Telephone Call again, reexecute the operations from step 1.
- If the time configured in **PTT Warning Time** elapses while the **PTT** switch is being pressed and held, a Warning Tone A (continuous beep) sounds from the transceiver.
- Pressing the **PTT** switch with one of the DTMF code of “A”, “B”, “C” or “D” entered, a Warning Tone A (continuous beep) sounds from the transceiver and transmission is unavailable. Pressing the **Menu** ([□]) key, a Key-entry Error Tone (1 beep) also sounds from the transceiver and transmission is unavailable.

4 Receive from the system a message for traffic channel assignment.

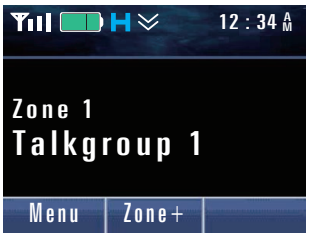
The “♪” icon blinks, and the transceiver enters a state allowing transmission of a Telephone Call. If **Call in Progress Tone** is enabled, a Call in Progress Tone (2 beeps) sounds from the transceiver.

5 Press the PTT switch.

The Telephone Call is initiated.

Press the **Clear** key to terminate communication.

If **Disconnect Indication** Tone is enabled, a Disconnect Indication Tone (2 beeps) sounds from the transceiver, the link to a traffic channel is disconnected, and the transceiver restores the channel display.



Note

- If **Transmit LED** is enabled, the LED lights red when the transceiver is transmitting. (Refer to Common FUNC Transmit LED.)
- If **Busy LED** is enabled, the LED lights green regardless of whether reception is enabled or disabled on a traffic channel. (Refer to Common FUNC Busy LED.)
- If **Optional Signaling LED** is enabled, the LED flashes in yellow. (Refer to Optional Signaling LED.)
- If **Call Request Tone** is enabled, a Call Request Tone (1 beep) sounds from the transceiver when a call requesting a Telephone Call is initiated. Also, if **Call Processing Tone** is enabled, a Call Processing Tone (2 beeps) sounds from the transceiver until the transceiver receives from the system a message for traffic channel assignment after the call requesting a Telephone Call is initiated. (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 **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).)
- For Mobile, if the **Mic On-hook Disconnect** is enabled, a Telephone Call terminates by placing the microphone in the on-hook state.

About the behavior of the transceiver when sending a Telephone Call

The transceiver behaves as follows depending on the response message from the system after initiating a Telephone Call:

Table 2-12 Behavior of the Transceiver When Sending a Telephone Call

Status	Transceiver Behavior
When no response is received from the target transceiver	The No reply Tone (4 beeps) sounds from the transceiver, and “No reply” appears on the display for 1 sec. Then, the transceiver restores the channel display and the Telephone Call ends.
When the transceiver receives a response message indicating the queue state from the system	The Call Queue Tone (2 beeps) sounds from the transceiver, “Queued” appears on the display, and the transceiver enters the standby state.
When the transceiver receives a service invalid message from the system	The behavior differs depending on the type of Reason Code of the received message. **Reason Code: Other than $40, $41, $42 or $51** The Call Invalid Tone (4 beeps) sounds from the transceiver, and “System Deny” appears on the display for 1 sec. Then, the transceiver restores the channel display and the Telephone Call ends. **Reason Code: $40 or $42** The Invalid Dial Tone (5 beeps) sounds from the transceiver, and “Invalid Dial” appears on the display for 1 sec. Then, the transceiver restores the channel display and the Telephone Call ends. **Reason Code: $41** The Not Authorized Tone (4 beeps) sounds from the transceiver, and “Not Auth” appears on the display for 1 sec. Then, the transceiver restores the channel display and the Telephone Call ends. **Reason Code: $51** A Call Invalid Tone (4 beeps) sounds from the transceiver. Then, the transceiver restores the channel display and the Telephone Call ends.
When the transceiver does not receive any messages from the system	The Call Fail Tone (2 beeps) sounds from the transceiver, and “Fail” appears on the display for 1 sec. Then, the transceiver restores the channel display and the Telephone Call ends.

About the Encryption Key used when sending a Telephone Call

“Encryption” needs to be assigned to a key of the transceiver to encrypt and send transmission data by Telephone Call.

If “Encryption” is not assigned to a key of the transceiver, the transceiver sends transmission data without encryption. (Refer to COMMUNICATION SECURITY.)

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Configuring **Telephone Interconnect** (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General > Telephone Interconnect)
- Configuring **Call in Progress Tone** to be enabled or disabled (See Transceiver Settings > P25 > P25 Information > Trunking)
- Configuring **Disconnect Indication Tone** to be enabled or disabled (See Transceiver Settings > P25 > P25 Information > Trunking)

Receiving a Telephone Call

To send a Telephone Call, a configuration other than “Disable” needs to be configured in **Telephone Interconnect**.

Operating the transceiver

1 **Receive from the system a message requesting reception of a Telephone Call.**

The “ ” icon blinks and “Phone Call” appears.

2 **Press the PTT switch or the Call Response key.**

A message requesting the connection is sent to the system. “Holding” appears, and the transceiver waits for a message for traffic channel assignment.

Note

For Mobile, if **Off-hook Connect** is enabled, a message requesting connection is sent to a system even if the microphone is placed in the off-hook state.

3 **Receive from the system a message for traffic channel assignment.**

The transceiver enters a state allowing communication. If **Call in Progress Tone** is enabled, a Call in Progress Tone (2 beeps) sounds from the transceiver.

4 **Press the PTT switch.**

The Telephone Call is initiated. Receiving a message for traffic channel assignment while the **PTT** switch is being pressed and held starts transmission by a Telephone Call.

Note

- If **Alert Tone (Telephone Call)** is configured to sound when receiving, an Alert Tone will sound.
- If **Telephone Call Alert LED** is enabled, the LED flashes when the transceiver is receiving. The LED flashes according to the configuration in **Alert LED Color (Telephone Call)**.
- If **Optional Signaling LED** is enabled, the LED light flashes in yellow when the transceiver is receiving a call. However, if **Telephone Call Alert LED** is enabled, the LED flashes according to the configuration of **Telephone Call Alert 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).)
- **Incoming Reset Time** is activated if a Telephone Call is received. If the time configured in **Incoming Reset Time** elapses, the Telephone Call ends, and the channel display is restored.

Configuration using KPG-D1/ D1N

- Configuring **Telephone Interconnect** (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General > Telephone Interconnect)
- Configuring **Telephone Call Alert LED** to be enabled or disabled (See Transceiver Settings > P25 > P25 Information > Trunking)
- Configuring **Optional Signaling LED** to be enabled or disabled (See Transceiver Settings > P25 > P25 Information > Trunking)
- Configuring **Alert Tone (Telephone Call)** (See Transceiver Settings > P25 > P25 Information > Trunking > Alert Tone)
- Configuring **Alert LED Color (Telephone Call)** (See Transceiver Settings > P25 > P25 Information > Trunking > Alert LED Color)
- Configuring **Call in Progress Tone** to be enabled or disabled (See Transceiver Settings > P25 > P25 Information > Trunking)
- Configuring **Incoming Reset Time** (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General)

Transmitting a DTMF Code During Reception

The transceiver can transmit a DTMF code during communication of a Telephone Call.

Operating the transceiver

● Sending a DTMF Code in Autodial Mode

1 Press the Autodial key during transmission.

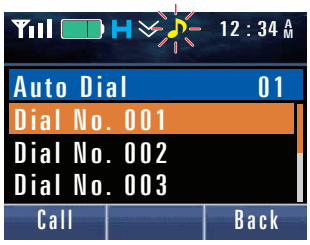
The transceiver enters Autodial Mode. If **Store & Send** is enabled, the transceiver enters Manual Dialing mode. If **Store & Send** is disabled, a selection screen for the Autodial List will appear.

Note

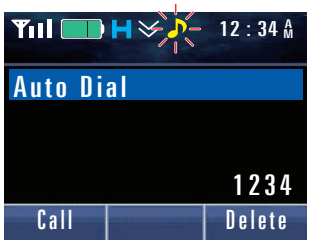
If **Store & Send** is enabled and a DTMF code is registered in the Autodial List, the selection screen for a list and Manual Dialing mode can be switched by pressing the **Function [◯]** key.

2 **Select the DTMF code from the Autodial List or enter the DTMF code in Manual Dialing Mode, and then press the PTT switch or Menu ([ ]) key.**

The transceiver sends the DTMF code.



Selecting a list



Manual Dialing

The transceiver restores the previous communication display when transmission of a DTMF code ends.

- **Transmit the DTMF code using Keypad Auto PTT**

  If “Keypad Auto PTT” is configured in **Keypad Operation**, the corresponding DTMF code is transmitted by pressing a key on the keypad during communication.

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Configuring **Store & Send** to be enabled or disabled (See Transceiver Settings > DTMF > Encode)
- Configuring **Keypad Operation** (See Transceiver Settings > Key Assignment > General)

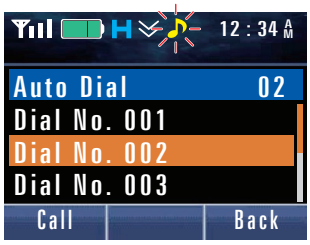
Redialing

A previously transmitted DTMF code can be transmitted again.

Operating the transceiver

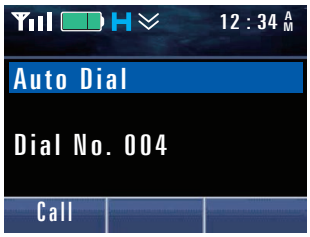
1 **Press the Autodial key during transmission.**

The transceiver enters Autodial Mode.



2 **Press the [*] key and then [0] key.**

The DTMF code last sent appears on the main display.



Example of the Display if Last Time Sent Using “Dial No. 4” :

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

A message requesting a Telephone Call is sent to a system.

Refer to “Initiating a Telephone Call” for previous operations.

2.11 Manually Searching for a New Site (System Search)

System Search is the function that allows the user to manually search for a new site.
This function can be used to search for a site providing better conditions than the current site.

Operating the transceiver

● Displaying the Site Information

1 **Press the System Search key or Menu key to enter Menu Mode, and then select “Site No.”.**

A Key Beep A (1 beep) sounds from the transceiver, and then the RFSS ID and Site ID or the Site Name of the currently used site will appear on the display for 2 sec. The signal strength level appears on the sub-display.

If Site Name Is Not Configured

If Site Name Is Configured

● Initiating a System Search Using the System Search Key

1 **Press and hold the System Search key.**

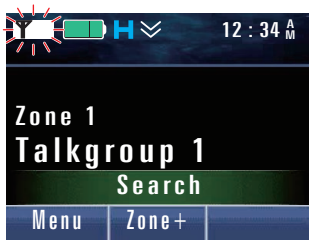
A Key Beep A (1 beep) sounds from the transceiver, and then the RFSS ID and Site ID or the Site Name of the currently used site will appear on the display for 2 sec. The signal strength level appears on the sub-display.

If Site Name Is Not Configured

If Site Name Is Configured

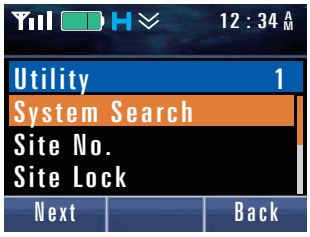
Then, a Search Mode Tone (1 beep) sounds from the transceiver, and “Search” will appear for 1 sec. The transceiver starts searching for a site with available information. During a search, the antenna icon (of the very weak electric field) blinks.

If a site with conditions better than the current site is found after a site search completes, the transceiver migrates to the new site. If no site with conditions better than the current site is found, the transceiver returns to the current site.



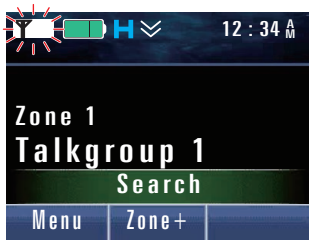
● Initiating a System Search using the Menu Key

1 **Press the Menu key to enter Menu Mode and then select “System Search”.**



A Search Mode Tone (1 beep) sounds from the transceiver, and “Search” appears for 1 sec. The transceiver starts searching for a site with available information. During a search, the antenna icon (of the very weak electric field) blinks.

If a site with conditions better than the current site is found after a site search completes, the transceiver migrates to the new site. If no site with conditions better than the current site is found, the transceiver returns to the current site.



Note

- The Site Name appears if the combination of an RFSS ID and a Site ID is configured in the **Site Name** table by using KPG-D1/ D1N.
- For Portable, “>70” is displayed if the signal strength level is higher than -70 dBm. For Mobile, “>80” is displayed if the signal strength level is higher than -80 dBm.

Configuration using KPG-D1/ D1N

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

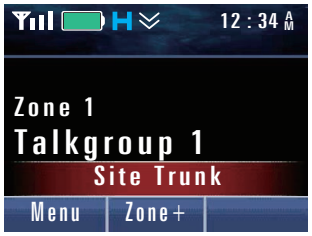
2.12 Behavior of the Transceiver When Communication with Other Sites is Disabled (Site Trunking)

When the site operates properly but communication with other sites cannot be executed, such as if the network is unavailable, the system enters Site Trunking Mode.

When the system enters Site Trunking Mode, the system notifies the transceivers of this information on a control channel. The transceiver receiving this notification can notify users that the network is in Site Trunking Mode.

When a system enters Site Trunking Mode, if **Site Trunking Indicator** is enabled, “Site Trunk” appears on the display of the transceiver.

Also, if **Site Trunking Tone** is enabled, Site Trunking Tone (2 beeps) sounds from the transceiver every 5 sec.



In Site Trunking Mode, the transceiver can communicate only with a registered site. If the network recovers, the system exits Site Trunking Mode, and then the system notifies the transceivers of the information on a control channel. The transceivers receiving the notification will turn off the Site Trunking Mode display and communications between networks will recover.

While the transceiver is in Site Trunking Mode, the transceiver automatically executes Background Hunt since the transceiver cannot communicate with a roaming site.

Configuration using KPG-D1/ D1N

- Configuring **Site Trunking Tone** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General)
- Configuring **Site Trunking Indicator** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General)

2.13 Transceiver Behavior When the System Fails to Provide the Trunking Control Service (Failsoft)

If a P25 Trunking system becomes unavailable, the transceiver which received the notice behaves according to the configuration in **Failsoft Type**.

If “Failsoft Channel (Receive / Transmit)” or “Personality” is configured in **Failsoft Type**, the transceiver enters Failsoft Mode when the transceiver receives a notice that a P25 Trunking system is unavailable.

When the transceiver enters Failsoft Mode, “Failsoft” appears on the display of the transceiver.

After entering Failsoft Mode, the transceiver behaves as follows according the configuration in **Failsoft Type**:

- **Failsoft Channel (Receive / Transmit)**

  The transceiver migrates to the failsoft channel having the frequency configured in **Failsoft Channel**. However, if the transceiver is in the Site Lock state, the last acquired control channel or a Normal Hunt Channel is used as the failsoft channel.

- **Personality**

  The last acquired control channel or a Normal Hunt Channel is used as the failsoft channel.

The transceiver executes a control channel hunt at intervals configured in **Failsoft Inactivity Time** while the transceiver is in Failsoft Mode. When the transceiver receives a message that the control channel has recovered, the transceiver returns from the failsoft channel to the control channel.

Note

- If “Off” is configured in **Failsoft Inactivity Time**, the transceiver remains on the failsoft channel without starting the Control Channel Hunt.
- The Encryption Key used in Failsoft Mode can be configured in **Failsoft** of **Multi-key List No.** using KPG-D1/ D1N. (See Transceiver Settings > Personal > Personal Features > P25 Trunking > Encryption > Multi-key List No.)
- The transceiver in Secure or Clear state behaves according to the configuration in **Encryption**. (See Transceiver Settings > Personal > Personality > P25 Trunking > Encryption Settings)

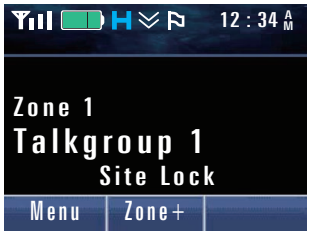
2.14 Locking the Site to Be Used (Site Lock)

Site Lock is the function used to fix the transceiver to the current site and disable roaming. This function is effective when using the transceiver near critical points of the system coverage area.

Operating the transceiver

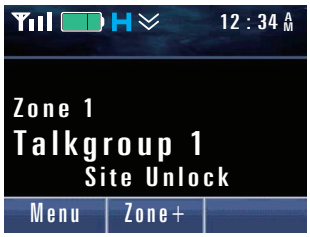
1 Press the Site Lock key.

A Key Beep A (1 beep) sounds from the transceiver. “Site Lock” appears on the display and the “⚑” icon appears.



2 Press the Site Lock key when the transceiver is in the Site Lock state.

A Key Beep B (2 beeps) sounds from the transceiver. “Site Unlock” appears on the transceiver display and the “⚑” icon disappears.



Note

The transceiver behavior is identical even if the transceiver enters Menu Mode by pressing the **Menu** key and then executing “Site Lock”.

2.15 Making the Transceiver Migrate to a Particular Talkgroup (Dynamic Regrouping)

Dynamic Regrouping is the function by which a dispatcher in the RFSS makes the transceiver migrate to a particular Talkgroup. By using an air message from the system, a dispatcher can form a Talkgroup as desired. Also, changing the transceiver Talkgroup by a user can be prohibited if necessary. These functions are operated by a dispatcher, but a Regroup request from a user is also available.

The following figure shows the usage of Dynamic Regrouping. This is a diagram showing how the dispatcher selects multiple transceivers (transceivers enclosed with dotted lines in the following figure) on a PC application, and regroups registered Talkgroups (TG 1 to TG 4) to TG 5.

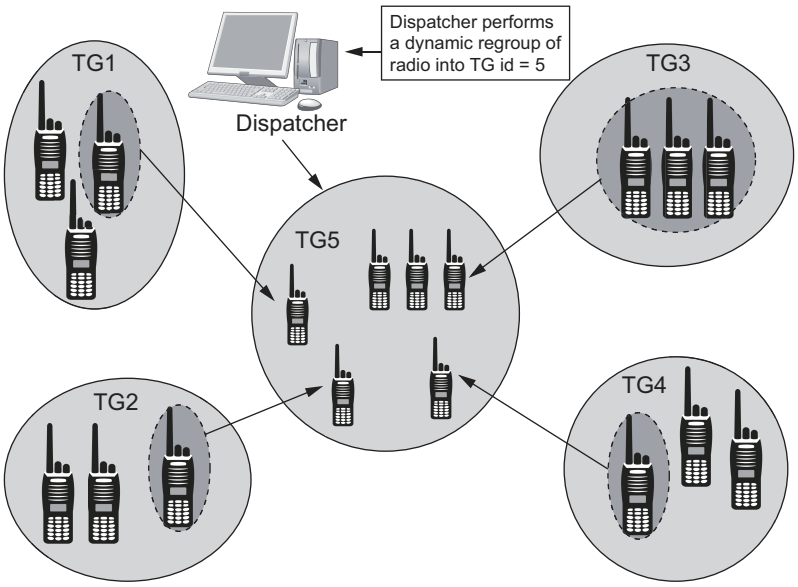


Figure 2-4 Dynamic Regrouping

Configuring the Dynamic Regrouping

The following functions related to Dynamic Regrouping can be configured by using KPG-D1/ D1N:

- **Dynamic Regrouping**

  Dynamic Regrouping can be enabled or disabled. To use Dynamic Regrouping, the function needs to be enabled in each P25 Trunking system.

- **Dynamic Regrouping Zone - Channel**

  One Zone-channel used for Dynamic Regrouping can be assigned to each P25 Trunking system. If the transceiver receives a Dynamic Regrouping command from a system, the transceiver migrates to the Zone-channel configured with this function.

- **Dynamic Talkgroup (Multi-key List No.)**

  The Encryption Key used for changing a Talkgroup using Dynamic Regrouping can be configured. To execute Secure transmission using a regrouped Talkgroup, the “Scrambler/ Encryption” function needs to be assigned to one of the keys. If “Scrambler/ Encryption” is not assigned to any key on the transceiver, the transceiver only sends a Clear transmission.

Configuration using KPG-D1/ D1N

- Configuring **Dynamic Regrouping** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General > Dynamic Regrouping)
- Configuring **Dynamic Regrouping Zone – Channel** (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General > Dynamic Regrouping)
- Configuring **Dynamic Talkgroup (Multi-key List No.)** (See Transceiver Settings > Personal > Personal Features > P25 Trunking > Encryption > Multi-key List No.)
- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)

Functions of Dynamic Regrouping

The following 5 functions are available in Dynamic Regrouping:

Dynamic Regroup command

When the transceiver receives the Dynamic Regroup command, the transceiver migrates to the Zone - channel configured in **Dynamic Regrouping Zone - Channel**, and then the transceiver is enrolled in the received Talkgroup. In this case, a Regroup Tone sounds from the transceiver. If the transceiver sends a Group Call in the regrouped Talkgroup, the Regroup Tone sounds in place of a Proceed Tone. In this case, whether the Regroup Tone sounds or not depends on the **Proceed Tone** configuration. (Refer to Common FUNC Tones that Sound When a User Operates the Transceiver or When the Transceiver Status Is Changed.)

After the transceiver is regrouped, the Zone - channel can be changed by operating **Selector**.

Dynamic Regroup Talkgroup Selector Lock command

If the transceiver receives a Dynamic Regroup Talkgroup Selector Lock command, changing a Zone-channel by operating the transceiver is disabled.

Dynamic Regroup Talkgroup Selector Unlock command

If the transceiver receives a Dynamic Regroup Talkgroup Selector Unlock command while the transceiver is in the Selector Lock state, changing a Zone-channel by operating the transceiver is enabled.

Dynamic Regroup Cancel command

If the transceiver receives the Dynamic Regroup Cancel command while the transceiver is in a regrouped state, the regrouped state is reset and the transceiver returns to the last zone channel used before the transceiver was regrouped. If the transceiver is in the Selector Lock state by the Dynamic Regroup Talkgroup Selector Lock command, this state will be continued.

Dynamic Regroup Reprogram request

This function allows a user to request the Dynamic Regroup command.

A user can request Dynamic Regrouping to a system by pressing the **Regroup Request** key.

If the system allows this request, a Dynamic Regroup command is transmitted from the system.

When the transceiver receives the Dynamic Regroup command, the transceiver migrates to the Zone - channel configured in **Dynamic Regrouping Zone - Channel**, and then the transceiver is enrolled in the received Talkgroup.

If the system rejects the Dynamic Regroup request, “System Deny” appears on the display. The transceiver restores the channel display in 1 sec.

To use this function, **Dynamic Regrouping** must be enabled and “Regroup Request” must be assigned to any key on the transceiver by using KPG-D1/ D1N.

Note

- If a Zone - channel configured in **Dynamic Regrouping Zone - Channel** is selected while the transceiver is not regrouped, transmission is disabled even though the channel name or number appears on the display.
- The Zone-channel configured in **Dynamic Regrouping Zone - Channel** cannot be registered in a scan list.

Configuration using KPG-D1/ D1N

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

2.16 Notifying the System of the Transceiver Status (Status)

Status is the function that notifies the system of the transceiver status by transmitting or receiving a Status (Status Message).

To use this function, the same Status List must be preconfigured for both the transceiver and the system.

The following methods are available to send a Status Message.

Table 2-13 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. The KPG-D1/ D1N can be used to assign “Call 1” to “Call 6” to the **PF** keys and to select the Status Message corresponding to each key from the Status List of P25. In this case, a Status Message is always sent to the preconfigured **Target ID**.

Note

If no **Target ID** is configured, the status is sent to the ID configured in **Default RCM**.

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Configuring the Status Message corresponding to the **Call 1** to **Call 6** keys (See Transceiver Settings > Key Assignment > Call)
- Configuring **Target ID** (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General)
- Configuring **Default RCM** (See Transceiver Settings > P25 Network > Network Information)

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 or Individual + Status key

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

Alternatively, pressing the **Individual + Status** key places the transceiver in Individual Call Mode. Pressing the **[▶]** key after selecting the target transceiver’s Individual ID or directly entering the Individual ID places the transceiver in Status Mode.

● 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 **Target ID**.

Or, the transceiver can also be placed in Individual Call Mode by selecting “Individual + Status” after placing the transceiver in Menu Mode by pressing the **Menu** key. Pressing the **[▶]** key after selecting the target transceiver’s Individual ID or directly entering the Individual ID places the transceiver in Status Mode. (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 **Target ID**.

If “Individual + Status” 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 target transceiver’s Individual ID or directly entering the Individual ID places the transceiver in Status Mode. (Refer to Common FUNC Keypad Operation.)

Note

- Refer to “Making an Individual Call” for operations in Individual Call Mode.
- If no **Target ID** is configured, the status is sent to the ID configured in **Default RCM**.

Operating the transceiver

● Sending a Status Message by list selection

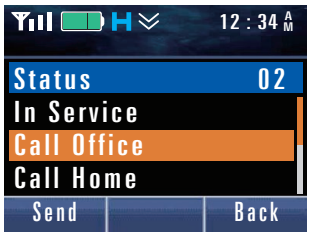
1 **Select one of the following operations to place the transceiver in Status Mode.**

- **Press the Status key.**

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

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

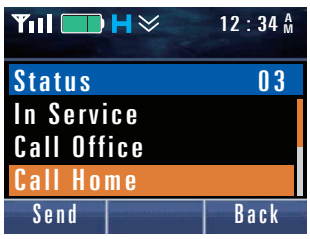
  Pressing the **[▶]** key after selecting the Individual ID of the target transceiver causes Status Mode to be entered.



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 a status 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.**

A message requesting a status update is sent to a system.

If the status update completes successfully, a Complete Tone (5 beeps) sounds from the transceiver and “Complete” appears on the display for 1 sec. Then, the transceiver restores the channel display.

Note

- The selection screen for the Status List closes at the same time as pressing the **PTT** switch or **Menu** ([]) key. If selecting a status and sending the status again, reexecute the operations from step 1.
- Transmission can be canceled by pressing the **Clear** key while a Status Message is being transmitted.
- If the transceiver roams to a system other than Home, the status update request message is sent to the Home system.

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Configuring **Target ID** (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General)
- Configuring **Default RCM** (See Transceiver Settings > P25 Network > Network Information)

About the behavior of the transceiver when sending a Status

The transceiver behaves as follows depending on the response message from the system after sending a status:

Table 2-14 Behavior of the Transceiver When Sending a Status

Status	Transceiver Behavior
When the system does not respond	The No reply Tone (4 beeps) sounds from the transceiver, and “No reply” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission of the Status ends.
When the system rejects the status update request	The Call Invalid Tone (4 beeps) sounds from the transceiver, and “System Deny” appears on the display for 1 sec. Then, the transceiver restores the channel display and transmission of the Status ends.
When the transceiver does not receive any messages from the system	If a receipt confirmation or status update message is not received from the system after a status update request message has been sent out, the transceiver emits a Call Fail Tone (2 beeps) and “Fail” appears on the display. Then, the transceiver restores the channel display and transmission of the Status ends.

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.

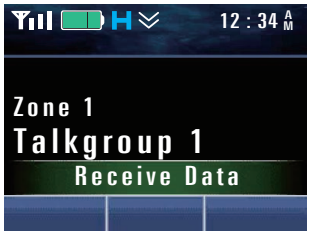
Note

- To use serial communications, a user needs to prepare P25 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

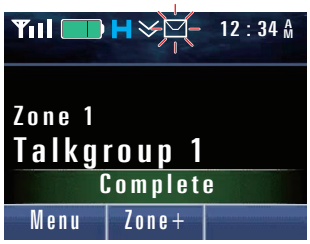
1 The transceiver starts receiving a Status Message.

“Receive Data” appears.

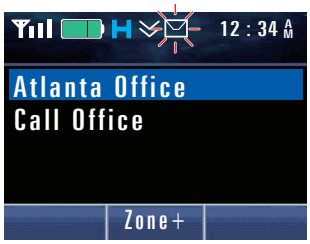


2 A Status Message is received.

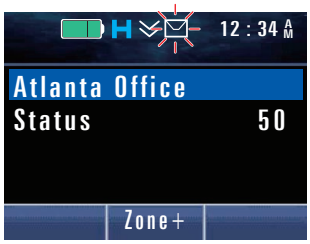
The “ ” icon blinks and “Complete” appears.



The Status Message appears.



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



Note

- If transmission of the response message by the transceiver is not successful, “Ack Error” appears on the display for 1 second and receiving of status ends.
- 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 Call)** used in common in a P25 Conventional system.

Configuration using KPG-D1/ D1N

- Configuring **Alert Tone** (Status List) (See Transceiver Settings > P25 > Status List)
- Configuring **Alert Tone (Status Call)** common to P25 Trunking (See Transceiver Settings > P25 > P25 Information > Trunking > Alert Tone)

Status List

When using Status, the Status to be sent must be preconfigured in the transceiver using KPG-D1/ D1N. A maximum of 240 statuses can be configured in the Status List. A maximum of 32 Status Lists can be registered.

Table 2-15 Status List

Configuration	Description
Status	The status number can be configured. The status number can be configured by using a number between 1 and 240.
Status Name	The status number 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.

Note

The same Status List needs to be configured also in the system.

Status Query

Status Query is the function to query the status of the transceiver. This function supports only the response behavior when the transceiver receives a Status Query message and does not support the behavior when the transceiver queries the status of another transceiver.

When the transceiver receives a Status Query message, the last transmitted status is automatically transmitted.

Status Message Stack

Status Message Stack is the function to store a Status Message in the stack memory. A maximum of 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 transceiver blinks the "✉" icon for 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 > P25 > P25 Information > General > Stack)

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

Status Message Serial Output allows the transceiver to send the Status Message and the Individual 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 > P25 > P25 Information > General > Serial Output)
- Assigning functions to **COM port** (See Transceiver Settings > Optional Features > Optional Features 1 > Serial Interface > COM Port)

2.17 SNDCP

SNDCP (Sub-network Dependent Convergence Protocol) is the protocol which allows the transceiver operated in a P25 Trunking system to establish data communications via an IP network.

P25 Packet Data Communication

Using SNDCP enables P25 packet data communication via an IP network by following the CAI (Common Air Interface) compliant with the P25 standard. Communication protocol such as UDP/IP or TCP/IP are used in this data communication.

To use each function of GPS and OTAR in a P25 Trunking system, the data communication function using SNDCP and UDP/IP is used.

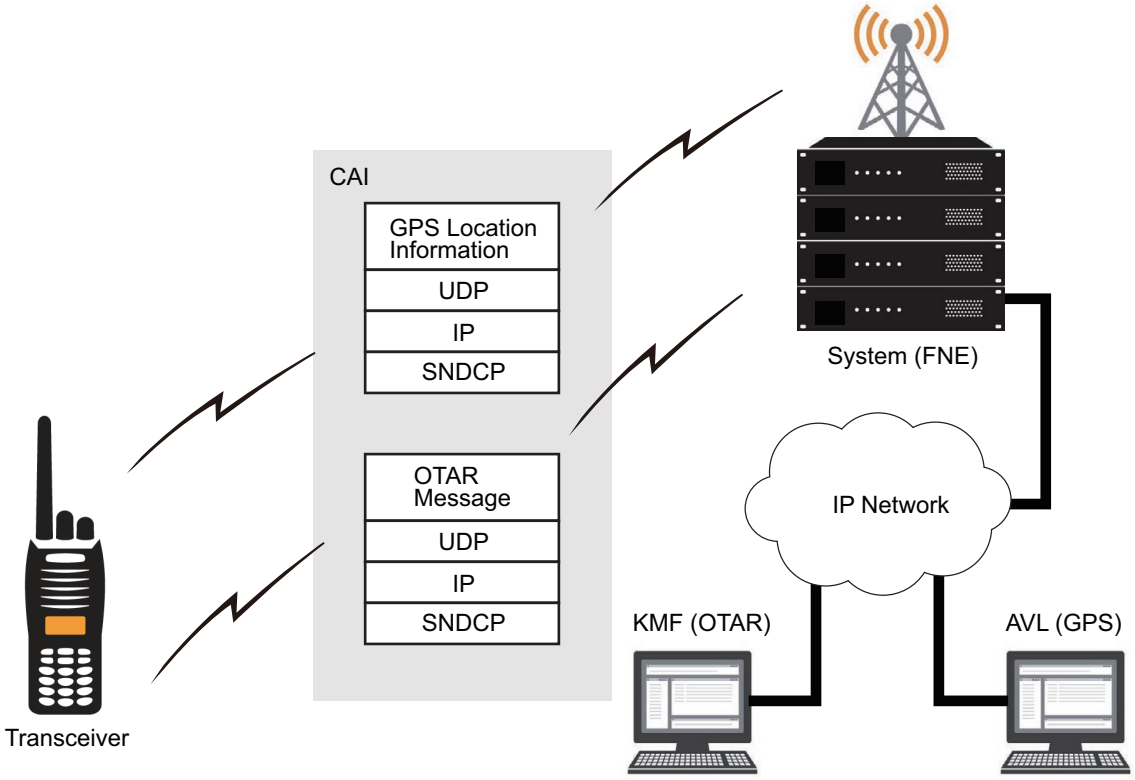


Figure 2-5 The Image of the Data Communications

To use SNDCP, SNDCP must be enabled and an IP address must be configured for the transceiver by using KPG-D1/ D1N. Or, the IP address for the transceiver can be acquired from the system by configuring **Dynamic IP Address**.

Also, the SNDCP version used in data communications using SNDCP can be configured in a P25 Trunking system.

Note

If “IP Address” is selected after entering Menu Mode by pressing the **Menu** key, the IP address configured for the transceiver or the IP address notified from the system appears on the display of the transceiver.

About Activation

To establish data communications in a P25 Trunking system, SNDCP Activation must be completed in advance for the system (FNE). The transceiver executes SNDCP Activation for the system at the following timings:

- After the execution of the P25 Trunking Full Registration for the system.
- When an Activation response message has not been received from the system at the time of starting the data transmission.
- When the transceiver receives an Activation Command message from the system.

When the SNDCP Activation is completed, data communications to a P25 Trunking system will be enabled.

About the data communications behavior during the Scan

When the transceiver is scanning, the scan is stopped on the Revert Channel and then data communications start. After that, the transceiver migrates from the data channel to the control channel and then resumes the scan after the time configured in Key Delay Time elapses.

Also, while the Limited Talkgroup Scan is being executed, data communications cannot be established.

Encryption status during data transmission

The Encryption status is as below during data transmission: **Packet Data Key List No.** is the Encryption Key used in Packet Data communications.

Table 2-16 Encryption Status During Data Transmission

Configuration using KPG-D1/ D1N	Existence of the Encryption Key Configured in the Packet Data Key List No.	Encryption Status	
Packet Data Key List No.		GPS	OTAR
Enabled	Yes	Secure	Clear
	No	Not sent*1	Clear
Disabled	-	Clear	Clear

*1 If sending the GPS position data is tried by pressing the **Send the GPS Data** key, the Period Key Fail Alert Tone (6 beeps) sounds from the transceiver and "<<KEY FAIL>>" appears on the display. If sending the GPS position data is tried by using anything other than the manual transmission with the **Send the GPS data** key, such as Auto GPS Report, no warning tone sounds from the transceiver and the display does not change.

Behavior when receiving the encrypted data

If an Encryption Key is loaded from a Key Loader and the transceiver receives encrypted data, the transceiver behaves as below regardless of the configuration in **Packet Data Key List No.**:

- If the Key ID and Key Data match the Key ID and Key Data configured in the Multi-Key List, the transceiver receives the data.
- If the Key ID matches the Key ID configured in the Multi-Key List and the Key Data does not match the Key Data configured in the Multi-Key List, the transceiver does not receive the data.
- If the Key ID does not match the Key ID configured in the Multi-Key List, the transceiver does not receive the data regardless of whether the Key Data matches or not.

Configuration using KPG-D1/ D1N

- Configuring **SNDCP** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Trunking > Packet Data)
- Configuring **IP Address** (See Transceiver Settings > P25 > P25 Information > Packet Data)
- Configuring **Dynamic IP Address** to be enabled or disabled (See Transceiver Settings > P25 > P25 Information > Packet Data)
- Configuring **SNDCP Version** (See Transceiver Settings > Personal > Personal Features > P25 Trunking > Packet Data)

RX Voice Interrupts Data

RX Voice Interrupts Data is the function to stop data communications and then start to receive audio when the transceiver receives a message including Group Call information (LC_GRP_V_CH_UPDT) during SNDCP data communications in a P25 Trunking system.

Note

If the transceiver is used with **RX Voice Interrupts Data** enabled, the system must be configured to send a message including the Group Call information on a data channel.

2.18 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.

The GPS function in a P25 Trunking system uses the data communication function by using SNDCP and UDP/IP. The location information received from the GPS receiver unit connected to or built in the transceiver can be transmitted to a preregistered destination, the requester of the location information, or the destination specified by the requester of the location information by using Location Request/ Response Protocol (LPRP) of Tier 2 Location Service which complies with P25 Packet Data communications and TIA-102 BAJC.

Note

The GPS function in a P25 Trunking system supports LRRP Version 1.

Transmission Method of GPS Data

In a P25 Trunking system, a user can send the GPS data by using the following services:

- **Immediate Location Service**

  The transceiver sends the GPS data when a transmission request message for GPS data is received from a base station or an external device such as a PC.

- **Triggered Location Service**

  If the transceiver receives a transmission request message for GPS data with following conditions specified from a base station or an external device such as a PC, the transceiver sends the GPS data according to the specified conditions.

  - The number of times to send the location information (once or at regular time intervals)
  - Destination (Recipient)
  - The time to start sending
  - The time to stop sending
  - Sending when the transceiver is turned ON
  - Sending when the transceiver is turned OFF
  - Sending when the transceiver enters Emergency Mode
  - Sending when the Interval Time elapses
  - Sending when the transceiver has moved a specified distance

Unsolicited Location Service

The transceiver sends the GPS data at the following timings. In this service, the transceiver sends the GPS data according to the configuration on the transceiver even if the transceiver does not receive a transmission request message for GPS data from a base station or an external device such as a PC. The behavior of transmitting GPS data in this service is the same as the behavior of the GPS function in a P25 Conventional system.

- **Manual transmission by using the Send the GPS Data key**
  Pressing the **Send the GPS Data** key sends the GPS data.
  (Refer to Sending GPS Data Manually by Using a Key (Send the GPS Data).)
- **Auto GPS Report**
  GPS data is sent at the intervals configured in **GPS Report Interval**.
  (Refer to Sending GPS Data Automatically (Auto GPS Report).)
- **Power-on/ Power-off**
  GPS data is sent when the transceiver is turned ON or OFF.
  (Refer to Sending GPS Data Linked With the Operation of Turning the Transceiver ON and OFF (GPS Report).)
- **Emergency**
  GPS data is sent in conjunction with an Emergency transmission.
  (Refer to Sending GPS Data in Emergency Mode (GPS Report).)
- **GPS Distance Change**
  GPS data is sent when the distance between the location of the previous GPS data transmission and the current location exceeds the value configured in **Distance Value**.
  (Refer to Sending GPS Data Based On Travel Distance (GPS Distance Change).)

Location Protocol Version Service

The transceiver reports the LRRP Version (1) to the requestor when the transceiver receives a request message for LRRP Version information from the external devices such as the base station or a PC.

Configuring Various Communication Parameters

In order to enable GPS on the transceiver in a P25 Trunking system, configuration data related to GPS needs to be created by following the procedure below and written to the transceiver by using KPG-D1/ D1N.

1 Configure as follows according to the GPS receiver unit to be used:

If a built-in GPS receiver unit is used:

Configure **Built-in GPS Receiver/Bluetooth** to be enabled. (See Transceiver Settings > Optional Features > Optional Features 2 > GPS/Bluetooth)

If an external GPS receiver unit is used:

Assign “GPS” to the communication port on the transceiver. (See Transceiver Settings > Optional Features > Optional Features 1 > Serial Interface > COM port)

2 Enable the SNDCP and configure an IP address for the transceiver.

Refer to “SNDCP” for details.

3 Enable the GPS.

Configure GPS to be enabled in a P25 Trunking system. (See Transceiver Settings > Personal > Personal Features > P25 Trunking > Packet Data > GPS)

4 Configure various communication parameters of the destination to which GPS data is sent.

Target IP Address

Configure the target IP address to which the transceiver sends the GPS data. (See Transceiver Settings > Personal > Personal Features > P25 Trunking > Packet Data > GPS)

Target UDP Port

Configure the target UDP port number to which the transceiver sends the GPS data. (See Transceiver Settings > Personal > Personal Features > P25 Trunking > Packet Data > GPS)

Transceiver GPS Port

Configure the UDP port number of the transceiver used for receiving a transmission request message of the GPS data. (See Transceiver Settings > Personal > Personal Features > P25 Trunking > Packet Data > GPS)

5 Configure the Parameters of Various Functions for GPS

Configure the parameters of various functions for GPS in Transceiver Settings > Personal > Personal Features > P25 Trunking > GPS of KPG-D1/ D1N.

2.19 Receiving GPS Data (GPS Position Display)

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

If a mobile station transceiver connected 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.

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

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).)

2.20 Disabling the Transceiver Capability by Remote Control (Radio Inhibit / Uninhibit)

Radio Inhibit is the function that disables the transceiver capability by remote control. This function allows an administrator to remotely disable the transceiver, for instance, if the transceiver is lost.

Also, **Radio Uninhibit** is the function that can reset the Radio Inhibit state.

Unlike a P25 Conventional system, the source of the message must be Default RCM (Radio Control Manager) when using the Radio Inhibit/ Radio Uninhibit function in a P25 Trunking system. An appropriate **Default RCM** corresponding to a system must be configured by using KPG-D1/ D1N.

Refer to "Disabling the Transceiver Capability by Remote Control (Radio Inhibit / Uninhibit)" in "1 P25 CONVENTIONAL SYSTEM" for the Radio Inhibit/ Radio Uninhibit behavior.

Note

This transceiver can only receive but cannot send a Radio Inhibit/ Uninhibit request message.

Configuration using KPG-D1/ D1N

Configuring **Default RCM** (See Transceiver Settings > P25 Network > Network Information)

2.21 Actions for Other Transceivers

Remote control using radio communications enables monitoring the situation around another transceiver or checking whether another transceiver is in operation.

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

Remote Monitor is the function to automatically transmit at a certain length of time the ambient audio collected through a microphone by the transceiver upon receipt of a request sent by the other transceiver.

Refer to "Disabling the Transceiver Capability by Remote Control (Radio Inhibit / Uninhibit)" in "1 P25 CONVENTIONAL SYSTEM" for the Remote Monitor behavior.

Note

This transceiver can only receive but cannot send a Remote Monitor request message.

Checking Whether Another Transceiver Is in Operation (Radio Check)

Radio Check is the function used to notify the requesting system whether the transceiver that receives the request is located within the communication range upon receipt of a request from the other transceiver.

If the transceiver receives the Radio Check request message, the transceiver sends an ACK to the transmitting system. The external transceiver can determine whether or not the transceiver is available for communication by receiving this ACK.

Unlike a P25 Conventional system, the source of the message must be Default RCM (Radio Control Manager) when using the Radio Check function in a P25 Trunking system. An appropriate **Default RCM** corresponding to a system must be configured by using KPG-D1/ D1N.

Configuration using KPG-D1/ D1N

Configuring **Default RCM** (See Transceiver Settings > P25 Network > Network Information)

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.

3.1 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 Using the Activity Detection Function (Portable Only).)

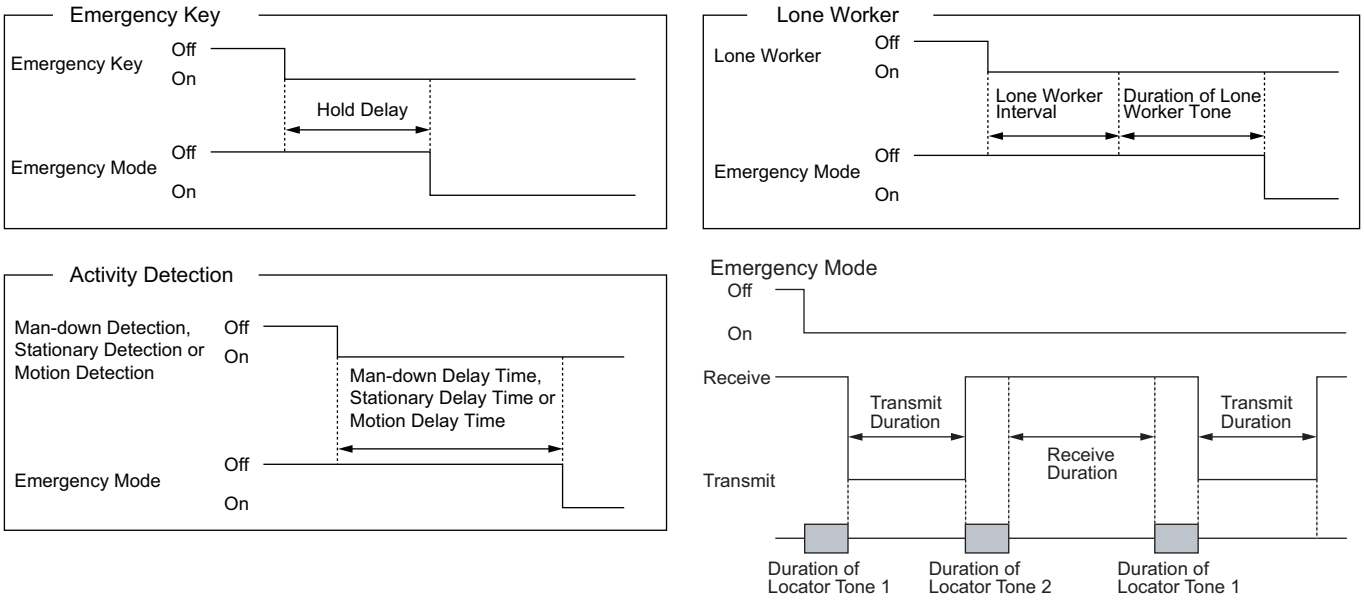


Figure 3-1 Emergency Mode

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 restores automatic receive mode when transmission is ended by releasing the **PTT** switch.
- The configuration in **Emergency Microphone Sense** applies to the microphone sensitivity in Emergency Mode. (Refer to Emergency Microphone Sense.)
- The transceiver does not decode the Stun Code and Optional Signaling in Emergency Mode.
- Remote Monitor (P25) functions even if the transceiver is in Emergency Mode. The transceiver restores automatic receive mode after transmission by Remote Monitor completes.
- While the transceiver is under the following conditions, the transceiver does not enter Emergency Mode:
  - While the transceiver is in the Stun state
  - If the transceiver is in Transceiver Password entry state
- When in Emergency Mode, the transceiver controls the mute in the same behavior as with “NAC” configured in **Squelch Type** on a channel in a P25 Conventional system.
- If the transceiver receives the Radio Inhibit command while the transceiver is in Emergency Mode, the transceiver exits Emergency Mode and then is placed in the Radio Inhibit state.
- The Radio Check command can also be received when the transceiver is in Emergency Mode.
- In a P25 Trunking system, the transceiver does not enter Emergency Mode while the transceiver is under the following conditions:
  - Invalid ID State (if Emergency Talkgroup is not configured)
  - Dynamic Regrouping Channel (if Emergency Talkgroup is not configured)
- In a P25 Trunking system, transceiver does not respond to the following commands from the base station while the transceiver is in Emergency Mode:
  - Individual Call (if **Emergency Cycle** is enabled)
  - Paging Call (if **Emergency Cycle** is enabled)
  - Telephone Call (if **Emergency Cycle** is enabled)
  - Dynamic Regrouping
- In a P25 Trunking system, the following functions are disabled while the transceiver is in Emergency Mode:
  - **Scan** key
  - The Scan function assigned to AUX Input (Mobile only)
- 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)

Emergency Alarm

Emergency Alarm is the function to send an Emergency Alarm Request message 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.

When the **Emergency** key is pressed or Lone Worker and various Activity Detection functions are activated, an Emergency Alarm Request message is sent to the base station if the transceiver is in a P25 Conventional system, or to the system if the transceiver is in a P25 Trunking system. When the transceiver receives an ACK from the base station or the system, “Ack Received” appears on the display and the transceiver enters Emergency Mode.

If the transceiver cannot receive the ACK after sending the Emergency Alarm Request message, the transceiver resends the Emergency Alarm Request message. If the transceiver still cannot receive the ACK after sending the Emergency Alarm Request message 5 times, the transceiver enters Emergency Mode.

Note

If a zone or channel is changed while the transceiver is in Emergency Mode, the transceiver sends the Emergency Alarm Request message on the new channel.

Configuration using KPG-D1/ D1N

- Configuring **Emergency Alarm** (P25 Conventional) to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > Emergency)
- Configuring **Emergency Alarm** (P25 Trunking) to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Trunking > Emergency)

Emergency Talkgroup (P25 Trunking System Only)

Emergency Talkgroup is the Talkgroup ID used in Emergency Mode in a P25 Trunking system.

The transceiver behaves as follows according to the configuration in **Emergency Talkgroup** of the system where Emergency Channel belongs to:

- **If the List Number of Emergency Talkgroup is configured “None”**

  When the transceiver is in Emergency Mode, the transceiver executes the Emergency behavior by using the Talkgroup ID configured in Emergency Channel.

- **If the List Number of Emergency Talkgroup is configured anything other than “None”**

  When the transceiver is in Emergency Mode, the transceiver executes the Emergency behavior by using the Talkgroup ID of the specified Talkgroup list number.

Note

If a Zone-channel is changed while the transceiver is in Emergency Mode, the transceiver sends or receives Emergency according to the configuration in Emergency Talkgroup configured in the system of the new channel.

Configuration using KPG-D1/ D1N

Configuring **List Number** (See Transceiver Settings > Personal > Personal Features > P25 Trunking > Emergency > Emergency Talkgroup)

3.2 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 **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
- 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, **Emergency Alarm** can be configured for each system in a P25 Conventional system.

In a P25 Trunking system, **Emergency Talkgroup** and **Emergency Alarm** can be configured for each system.

Configuration using KPG-D1/ D1N

- Configuring various functions of **Emergency Profile** (See Transceiver Settings > Emergency Information > Emergency Profile)
- Configuring Common Functions for **Emergency Mode** (See Transceiver Settings > Emergency Information > General)

About the Behavior in Emergency Mode in a P25 Voting Zone

If the transceiver enters Emergency Mode when a Personality or channel with “P25 Voting with NAC” configured is selected in a P25 Conventional system, the transceiver behaves as follows:

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

  Emergency behaves according to the configuration in **Emergency Profile** configured for the Personality.

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

  Emergency Profile cannot be configured for each channel in a zone with “P25 Voting with NAC” configured. Therefore, Emergency behaves according to the configuration in **Emergency Profile** configured for the zone.

  If “Selected” is configured in **Emergency Channel Type** of the **Emergency Profile** that is referred to when the transceiver enters Emergency Mode, Emergency behaves on the Revert Channel. If “Fixed” is configured in **Emergency Channel Type**, a channel with “P25 Voting with NAC” configured cannot be configured in **Emergency Zone-Channel**.

3.3 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 3-1 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. **A channel in a P25 Conventional system:** The transceiver transmits by using the NAC and Talkgroup ID configured for the channel. **A channel in a P25 Trunking system:** The transceiver functions according to the configuration in **Emergency Talkgroup**. (Refer to Emergency Talkgroup (P25 Trunking System Only).)
Fixed	After entering Emergency Mode, the transceiver migrates to the Zone-channel configured in **Emergency Zone-Channel** and then executes the Emergency behavior. **A channel in a P25 Conventional system:** The transceiver transmits by using the NAC and Talkgroup ID configured for the channel. **A channel in a P25 Trunking system:** The transceiver functions according to the configuration in **Emergency Talkgroup**. (Refer to Emergency Talkgroup (P25 Trunking System Only).) Note In **Emergency Zone-Channel**, a Zone-channel in an Analog Conventional system, NXDN Conventional system, DMR Conventional system, or NXDN Trunking system can also be configured.

Note

- If “Fixed” is configured in **Emergency Channel Type**, a channel with “P25 Voting with NAC” configured cannot be configured in **Emergency Zone-Channel**.
- If an analog channel is configured in **Emergency Zone-Channel**, a DTMF code, FleetSync ID, and MDC-1200 packet can be sent each time the transceiver starts automatic transmission or reception in Emergency Mode. Refer to Analog FUNC “ID to Be Sent When Emergency Mode Is Activated” for details.

Configuration using KPG-D1/ D1N

Configuring **Emergency Channel Type** (See Transceiver Settings > Emergency Information > Emergency Profile)

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 Information > Emergency Profile)

3.4 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 for which the transceiver toggles between transmission and reception for emergency in Emergency Mode.

Table 3-2 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. Pressing the **PTT** switch enables the transceiver to transmit by use of Emergency. Also, the transceiver behavior varies as below depending on the channel in use: **A channel in a P25 Conventional system:** The same restriction on the function is applied as when anything other than “Off” is configured in Emergency Cycle. Also, the tone is not emitted even if the transceiver is configured to emit the received audio. **A channel in a P25 Trunking system:** Even though some of the functions are restricted, the same operation is enabled as the transceiver in normal state. However, the following functions are disabled: • **Direct Channel 1 to Direct Channel 5** keys • **Direct Channel 1 Select to Direct Channel 5 Select** keys • **Group ID/Channel Entry** key • **Home Channel** key • **Home Channel Select** key • **Lone Worker** key • **Priority-channel Select** key • **Rekey Request** key • **Regroup Request** key • **Scan** key • **Scan Delete/ Add** key • **Scan Normal** key • **Scan Program** key • **Self Program** key • **System Search** key • **Transceiver Password** key • Channel Select A to Channel Select D (AUX Input) (Mobile only) • Home Channel (AUX Input) (Mobile only) • Scan (AUX Input) (Mobile only)

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 reception to transmission, a Locator Tone 1 (2 beeps) sounds from the transceiver for the length of time configured in **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 in **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 **Bluetooth Speaker** and **External Speaker**.
- For Mobile, where a 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 transmission to reception, a Locator Tone 2 (2 beeps) sounds from the transceiver for the length of time configured in **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 in **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 **Bluetooth Speaker** and **External Speaker**.
- For Mobile, where a 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 for a single session of automatic transmission for emergency.

The transceiver switches to automatic reception for emergency when the time configured in **Transmit Duration** elapses after the transceiver starts automatic transmission for emergency.

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 in the range between -20 dB and +20 dB (in steps of 2 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 Information > General)

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 1 sec 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)

3.5 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

A Locator Tone (2 beeps) sounds from the transceiver before the automatic transmission starts or when the automatic transmission completes in Emergency Mode.

A Locator Tone 1 (2 beeps) sounds from the transceiver before the transceiver starts automatic transmission in Emergency Mode. A Locator Tone 2 (2 beeps) sounds from the transceiver after the transceiver ends automatic transmission 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** or to retain the display appearance before the transceiver enters Emergency Mode.

Table 3-3 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 on the display when the transceiver enters Emergency Mode.

Configuration using KPG-D1/ D1N

Configuring **Emergency Display** (See Transceiver Settings > Emergency Information)

Emergency Text

Emergency Text is the function to display the text on the transceiver display while in Emergency Mode.

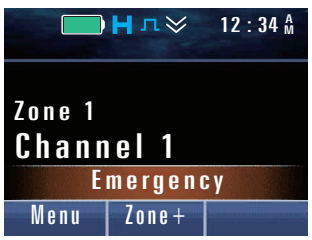
If this function is enabled, the text configured in **Text** appears on the display when the transceiver enters Emergency Mode.

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 Information > Emergency Profile)
- Configuring **Text** (See Transceiver Settings > 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 3-4 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.

If Emergency LED is enabled

- While in Emergency Mode, the Transmit LED lights when transmitting and the Busy LED lights when receiving.
- For Portable, if “Audible” is configured in **Emergency Mode Type**, the backlight lights while the transceiver is in Emergency Mode.
- If the transceiver is on a traffic channel, the Busy LED lights even if the transceiver does not emit received audio because the transceiver is emitting a Locator Tone.
- For Portable, if the transceiver enters Emergency Mode while the backlight is lit, the backlight continues to light. However, if “Silent” is configured in **Emergency Mode Type**, the backlight disappears if the transceiver enters 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 Emergency LED is disabled

- While in Emergency Mode, the Transmit LED does not light when transmitting and the Busy LED does not light when receiving.
- 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** to be enable or disabled (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 Information 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 Information > General)

3.6 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 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 Information)

3.7 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.

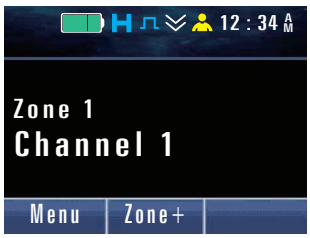
Operating the transceiver

- **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.

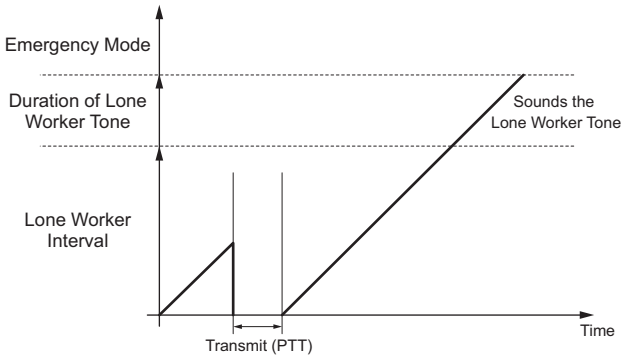


Figure 3-2 Lone Worker Mode (Portable)

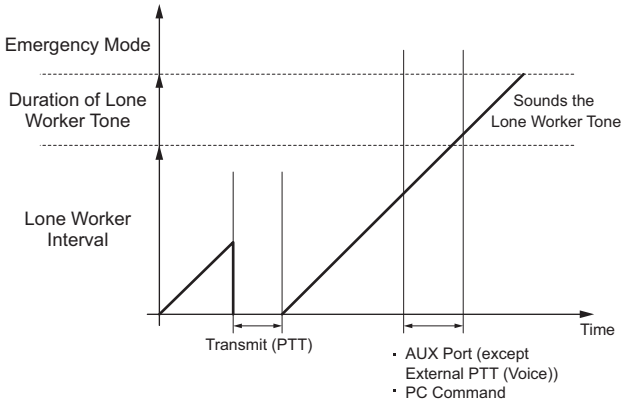


Figure 3-3 Lone Worker Mode (Mobile)

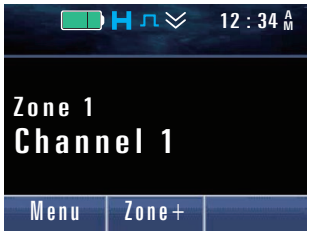
● Exiting Lone Worker Mode

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.
- If “Transmit/Receive Inhibit” is configured in **Lone Worker Type**, though the transceiver functions to receive when an Individual Call or Telephone Call to the own transceiver is received while in Lone Worker Mode in a zone in a P25 Trunking System, the transceiver cannot reply, cancel the reception state, or exit Lone Worker Mode. Lone Worker Mode can be disabled if Incoming Reset Time of the receiving transceiver elapses, if the transmitting transceiver cancels the transmission, or if Initiating Reset Time of the transmitting transceiver elapses.

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Configuring **Lone Worker** (P25 Conventional) to be enabled or disabled (See Transceiver Settings > Personal > Personality > P25 Conventional (P25 Voting with NAC))
- Configuring **Lone Worker** (P25 Trunking) to be enabled or disabled (See Transceiver Settings > Personal > Personality > P25 Trunking)

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 follows while in Lone Worker Mode according to the configuration in **Lone Worker Type**:

Table 3-5 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** elapses. 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** elapses 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** elapses. 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 3-6 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 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 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 Information > Lone Worker)

3.8 Placing the Transceiver in Emergency Mode Using the Activity Detection Function (Portable Only)

Activity Detection is the function to detect the status of the transceiver by analyzing the behavior of the transceiver 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 **Menu** key, the Key Beep A (1 beep) sounds from the transceiver.

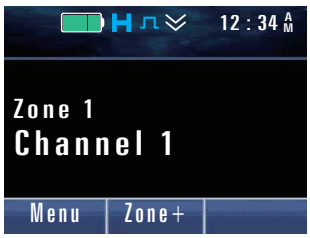
● Configuring Activity Detection to be disabled

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** (P25 Conventional) to be enabled or disabled (See Transceiver Settings > Personal > Personality > P25 Conventional (P25 Voting with NAC))
- Configuring **Activity Detection** (P25 Trunking) to be enabled or disabled (See Transceiver Settings > Personal > Personality > P25 Trunking)

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 Information > Activity Detection)
- Configuring **Man-down Delay Time** (See Transceiver Settings > Emergency Information > Activity Detection)
- Configuring **Man-down Pre-alert** to be enabled or disabled (See Transceiver Settings > Emergency Information > Activity Detection)
- Configuring **Man-down Angle** (See Transceiver Settings > 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 Information > Activity Detection)
- Configuring **Stationary Delay Time** (See Transceiver Settings > Emergency Information > Activity Detection)
- Configuring **Stationary Pre-alert** (See Transceiver Settings > Emergency Information > Activity Detection)

Motion Detection

Motion Detection is the function to place the transceiver automatically in Emergency Mode when the transceiver receives powerful shocks by being severely 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 Information > Activity Detection)
- Configuring **Motion Delay Time** (See Transceiver Settings > Emergency Information > Activity Detection)
- Configuring **Motion Pre-alert** (See Transceiver Settings > 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 Information > Activity Detection)

Encryption is the function used to enhance the confidentiality of communications by encrypting audio data while communicating by voice on a P25 digital channel.

The following Encryption function can be used in a P25 system:

- AES/ DES encryption type
- DES encryption type (Built-in DES)

A Secure Cryptographic Module (hereinafter referred to as “SCM”) needs to be installed in the transceiver in order to use the Encryption function by means of AES/ DES. The transceiver encrypts audio data or decrypts the encrypted communication data using the encryption method (DES or AES) configured on the SCM.

To use the Encryption function by means of DES (Built-in DES), DES 4 Keys needs to be enabled by using KPG-D1/ D1N.

4.1 Toggling the Encryption during Transmission between Enabled and Disabled

While a P25 digital channel for which “Select” is configured in **Encryption** is selected, pressing the **Scrambler/ Encryption** key can toggle 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.)

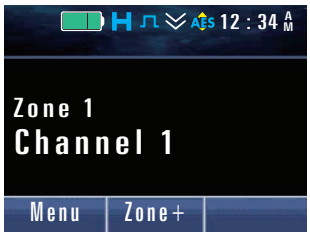
The status of Encryption, either enabled or disabled, configured by means of the **Encryption** key or the **Menu** key is applied to all P25 digital channels.

Operating the transceiver

- **Configuring Encryption during transmission to be enabled**

1 **Press the Scrambler/Encryption key while Encryption is disabled.**

The “AES” icon or “DES” icon appears and Encryption is enabled.



Pressing the **PTT** switch encrypts and sends the communication data. However, when the transceiver actually transmits, the configuration of **Encryption** for each P25 digital channel, the configuration of **Encryption** for the Talkgroup ID List, or the configuration of **Encryption** for the Individual ID List is prioritized.

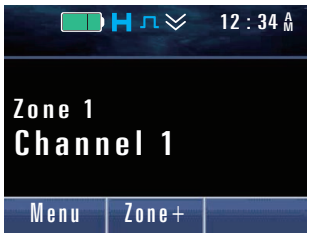
Note

The “AES” icon appears if the encryption type is AES, and the “DES” icon appears if the encryption type is DES.

● Configuring Encryption during transmission to be disabled

1 **Press the Scrambler/Encryption key while Encryption is enabled.**

The “AES” icon or “DES” icon appears and Encryption is disabled.



Note

- Whether the status of Encryption is enabled or disabled, the transceiver can receive encrypted communication data.
- 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 P25) configured in **Transmit Mode** of the channel.

Configuration using KPG-D1/ D1N

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

4.2 Configuring the Encryption Key Data Used for Communications (P25 Conventional System Only)

The encryption key data used for communications can be configured by selecting the key data from the Multi-key List.

The transceiver can have a maximum of 32 Encryption Keys (Key ID and Key Data) if SCM is used. Also, the transceiver can have a maximum of 4 Encryption Keys (Key ID and Key Data) if Built-in DES is used. However, only one of these Encryption Keys can be used for transmission.

An Encryption Key used for transmission can be configured using KPG-D1/ D1N for a P25 digital channel by selecting the Encryption Key from the Multi-Key List. (Refer to Multi-key List.)

On a channel in a P25 Conventional system configured as below, the Encryption Key configured for the channel can be changed by operating the transceiver:

- Key Strapped: Select
- Talkgroup ID List Number: None

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.

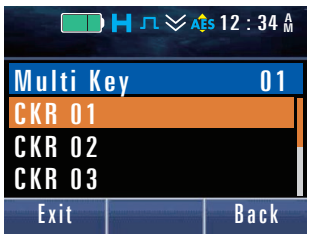
Pressing and holding the **Scrambler/Encryption** key or pressing the **Scrambler/Encryption Code** key places the transceiver in Scrambler Encryption Code Mode.

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 **Select a channel in a P25 Conventional system and then press and hold the Encryption key.**

The transceiver enters Scrambler/Encryption Code Mode. The Multi-key configured for a channel appears.



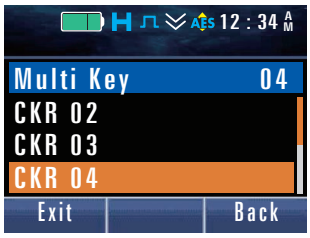
The following operations can also be used even if the transceiver enters Scrambler/ Encryption Code Mode by pressing the **Menu** key or the **Scrambler/Encryption Code** key.

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 [▲] 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.



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.

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)
- Configuring **Key Strapped** (See Transceiver Settings > Personal > Personality > P25 Conventional (P25 Voting with NAC) > P25 > Encryption Settings)
- Configuring **Talkgroup ID List Number** (See Transceiver Settings > Personal > Personality > P25 Conventional (P25 Voting with NAC) > P25 > Talkgroup ID)

4.3 Transceiver Behavior upon Transmission of Encrypted Communication Data

The behavior of the transceiver when the transceiver encrypts and sends communication data differs depending on the configuration in **Encryption** for the P25 digital channel or the configuration in **Encryption** for the Talkgroup ID List as follows:

- **Clear**

  The transceiver always sends communication data without encrypting the data. Even if **Encryption** is enabled by operating the transceiver, the transceiver sends communication data without encrypting the data.

- **Secure**

  The transceiver always encrypts and sends communication data. Even if **Encryption** is disabled by operating the transceiver, the transceiver encrypts and sends communication data.

- **Select**

  The transceiver encrypts and sends communication data if **Encryption** is enabled. The transceiver sends communication data without encrypting the data if **Encryption** is disabled.

Either “Secure” or “Select” needs to be configured in **Encryption** mentioned above in order to encrypt and send communication data.

Note

- The status of Encryption can be toggled between enabled or disabled by using the **Scrambler/Encryption** key or **Menu** key. (Refer to Toggling the Encryption during Transmission between Enabled and Disabled.)
- If the Encryption Key (Key ID and Key Data) used to encrypt communication data is deleted, “Key Fail” appears on the transceiver display and a Key Fail Alert Tone (6 beeps) sounds from the transceiver when the **PTT** switch is pressed to transmit data. In this case, the transceiver cannot transmit.

Data Encryption

Whether to encrypt and send a Text Message, GPS data, or OTAP control data can be switched by toggling the status of Scrambler/Encryption between enabled and disabled using the **Scrambler/Encryption** key or Menu Mode.

In a P25 Conventional system, the configuration for encrypting a Text Message, GPS data, or OTAP control data can be done for each system.

If **KMF Profile** is disabled, data is encrypted according to each configuration in **Multi-key List Number**, regardless of the OTAR configuration for the current channel. If **KMF Profile** is enabled, data is encrypted according to each configuration in **EKR List Number**, regardless of the OTAR configuration for the current channel.

An icon indicating the encryption type for the transmitting channel appears during Text Messaging Mode or the length of time from when the transceiver starts sending a Text Message or GPS data until the transceiver finishes the transmission. An icon indicating the encryption type for the transmitting channel also appears during the length of time from when the transceiver starts sending OTAP control data after entering OTAP Mode until the transceiver exits OTAP Mode.

Configuration using KPG-D1/ D1N

- Configuring **Multi-key List Number** for data communications (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > Encryption > Multi-key List Number)
- Configuring **EKR List Number** for data communications (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > Encryption > EKR List Number)

4.4 Transceiver Behavior upon Receipt of Encrypted Communication Data

The transceiver can decrypt the received encrypted data using Encryption Key configured on the SCM.
Following is the transceiver behavior upon receipt of encrypted communication data if Encryption Key data (Key ID and Key Data) corresponding to the CKR ID in the Multi-Key List is configured on the SCM. (Refer to Multi-key List.)

- **If the received Key ID matches the Key ID configured on the SCM:**
  If the received Key Data matches the Key Data configured on the SCM, the transceiver decrypts the received communication data, and then the transceiver can emit the received audio normally if the received audio data can be correctly decrypted.
  If the received Key Data does not match the Key Data configured on the SCM, the received audio sounds without being decrypted.
- **In the case that the received Key ID does not match the Key ID configured on the SCM:**
  No received audio sounds from the speaker.

Note

- Whether the status of Encryption is enabled or disabled, the transceiver behavior upon receipt of encrypted communication data is not affected.
- If the transceiver receives unencrypted communication data, the transceiver emits the received audio from the speaker regardless of whether the status of the Encryption Key is consistent or inconsistent.
- While Monitor is enabled, the transceiver emits the received audio from the speaker regardless of whether the status of the Encryption Key is consistent or inconsistent. However, if the received Key ID does not match the Key ID configured on the SCM, or if the received Key Data does not match the Key Data configured on the SCM even though the received Key ID matches the Key ID configured on the SCM, enabling Monitor emits the received audio from the transceiver without being decrypted.

About the Behavior of the Encryption Icon

The "AES" icon appears if the encryption type used for transmission and reception is AES, and the "DES" icon appears if the encryption type used for transmission and reception is DES.
The icon appears in the following manner depending on the status of the transceiver:

- **Waiting**
  The icon of the encryption type configured on the transmitting channel appears.
- **Receiving**
  The icon of the encryption type used upon receipt blinks.
  In a P25 Conventional system, if the transceiver satisfies the following conditions according to the configuration in **Squelch Type** (NAC or Selective Call) upon receipt of the encrypted communication data, the "AES" icon or "DES" icon blinks:

  NAC:
  - NAC matches.
  - Key ID matches.

  Selective Call:
  - NAC matches.
  - Key ID matches.
  - Talkgroup ID matches (upon receipt of a Group Call).
  - Unit ID matches (upon receipt of an Individual Call).

In a P25 Conventional system, the icon of the encryption type used in the previous reception blinks from when the reception completes until the time configured in **Receive Hang Time** if **Receive Hang Time** is configured. If the **PTT** switch is pressed and the transceiver activates Talkback before the time configured in **Receive Hang Time** elapses, the encryption type and Key ID used in the previous reception is used to transmit. The icon changes from the blinking state to lighting state.

In a P25 Trunking system, the "AES" icon or "DES" icon blinks if the following conditions are satisfied:

- Key ID matches.
- Talkgroup ID matches (upon receipt of a Group Call).
- Unit ID matches (upon receipt of an Individual Call).

- **Transmitting:**

The icon of the encryption type configured on the transmitting channel appears.

In a P25 Conventional system, the icon of the encryption type used in the previous reception blinks until the time configured in **Transmit Hang Time** expires if **Transmit Hang Time** is configured. After the time configured in **Transmit Hang Time** elapses, the icon of the encryption type configured on the transmitting channel appears. If the **PTT** switch is pressed and the transceiver activates Talkback before the time configured in **Transmit Hang Time** elapses, the icon of the encryption type used in the previous reception appears and the transceiver starts transmission.

About the Behavior of the LED (Secure Indicator) (P25 Trunking System Only)

Secure Indicator is the function to flash the LED green when the transceiver receives an encrypted voice call in a P25 Trunking system.

If this function is enabled, the LED of the transceiver flashes green when the transceiver receives an encrypted voice call on a communication channel.

The following is the relationship between Busy LED and secure Indicator:

Table 4-1 LED Statuses upon Receipt of Voice Communication

Configuration using KPG-D1/ D1N		Encryption status of the received signal	
Secure Indicator	Busy LED	Clear	Secure
Check	Check	Lights	Flashes
	Uncheck	Disappears	Flashes
Uncheck	Check	Lights	Lights
	Uncheck	Disappears	Disappears

Note

On a communication channel, the Busy LED lights even during the Hold Time by the system.

Configuration using KPG-D1/ D1N

Configuring **Secure Indicator** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Trunking > Encryption)

4.5 Secure Cryptographic Module (SCM) (AES/ DES)

The Encryption function in the P25 format 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. A transceiver in which no SCM is installed cannot encrypt or decrypt communication data.

Also, Encryption Key data needs to be configured for the SCM using the Key Loader in order to use the Encryption function. (Refer to Key Loader.)

Applicable SCMs

Following are the SCMs that can be used with the transceiver:

Table 4-2 Available SCMs

SCM	Firmware Version
KWD-AE30	A3.0.3
KWD-AE31	A4.0.3
KWD-DE31	D4.0.3

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.

After connecting KVL 3000/ KVL 3000 Plus/ KVL 4000 to the transceiver using the KPG-93 (Portable) or KPG-115 (Mobile) cable, when the transceiver is turned ON, “KEYLOAD” appears on the display and the following operations can be executed:

- **Key Load**
  An Encryption Key data 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.

Software Key Loader

Encryption Key data 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 data 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

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.

Key Loader and Connection Cable Supporting the SCM

Depending on the type of the key written to the SCM, the supporting Key Loader and connection cable are used as follows:

Table 4-3 Key Loader and Connection Cable Supporting the SCM

Type	Key Loader Supporting the SCM		Connection Cable	
	KWD-AE30	KWD-AE31	Portable	Mobile
AES Keyload	KVL 3000	KVL 3000	KPG-93	KPG-115
	KVL 3000 Plus	KVL 3000 Plus	KPG-93	KPG-115
	KVL 4000	KVL 4000	KPG-93	KPG-115
	-	KPG-AE1	KPG-36U/ KPG-36X	KPG-46U/ KPG-46X
DES Keyload	KVL 3000	KVL 3000	KPG-93	KPG-115
	KVL 3000 Plus	KVL 3000 Plus	KPG-93	KPG-115
	KVL 4000	KVL 4000	KPG-93	KPG-115
	-	KPG-AE1	KPG-36U/ KPG-36X	KPG-46U/ KPG-46X
		KPG-DE1	KPG-36U/ KPG-36X	KPG-46U/ KPG-46X
P25 Radio Authentication Keyload	KVL 4000	KVL 4000	KPG-93AUT	KPG-115AUT
	-	KPG-AE1	KPG-36U/ KPG-36X	KPG-46U/ KPG-46X
P25 OTAR AES KEK Keyload	KVL 3000	KVL 3000	KPG-93	KPG-115
	KVL 3000 Plus	KVL 3000 Plus	KPG-93	KPG-115
	KVL 4000	KVL 4000	KPG-93	KPG-115
	-	KPG-AE1	KPG-36U/ KPG-36X	KPG-46U/ KPG-46X
P25 OTAR DES KEK Keyload	KVL 3000	KVL 3000	KPG-36U/ KPG-36X	KPG-46U/ KPG-46X
	KVL 3000 Plus	KVL 3000 Plus	KPG-93	KPG-115
	KVL 4000	KVL 4000	KPG-93	KPG-115
	-	KPG-AE1	KPG-36U/ KPG-36X	KPG-46U/ KPG-46X
		KPG-DE1	KPG-36U/ KPG-36X	KPG-46U/ KPG-46X

4.6 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 Encryption function by means of DES (Built-in DES) can encrypt and decrypt communication data during voice communication or data communication by configuring an Encryption Key (Key ID and Key Data) in Multi-key List. The transceiver can have a maximum of 4 Encryption Keys of Built-in DES (Key ID and 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)

4.7 Protection Function of Encryption Key (Key Retention)

Key Retention is the function to retain or delete Encryption Key information stored in the SCM or the Encryption Key configured for Built-in DES according to the configuration using 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 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 4-4 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 function is low; using this function 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

- **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.

4.8 Deleting the Encryption Key (Key Delete)

Key Delete is the function to delete the Encryption Key configured for an SCM by using the Key Loader or the Encryption Key configured for Built-in DES.

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

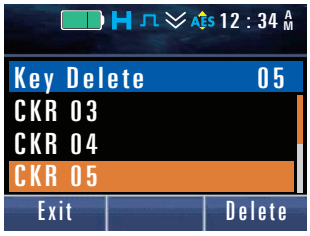
1 **Press the Key Delete key.**

Enters Key Delete Mode.

The following operations can also be used even if the transceiver enters Delete Mode by pressing the **Menu** key.

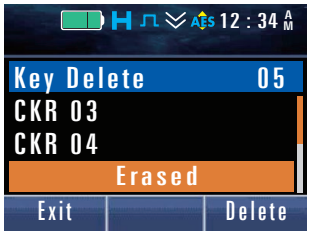
2 **Press the [▲] key or [▼] key and then select a Multi-key from the Multi-Key List.**

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



3 **Press the Back ([⮌]) key 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)

4.9 Deleting all Encryption Keys (Zeroize)

Zeroize is the function to delete all Encryption Keys stored in the SCM or configured for Built-in DES.

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 the Zeroize process by using the Zeroize key.)
2) **If Zeroize is executed from Menu Mode**
   (Refer to Executing the Zeroize process by using the Menu Mode.)
3) **If Zeroize of the AUX Input port is executed on Mobile**
   (Refer to Executing Zeroize by 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**
   The transceiver detects Tamper if the SCM is removed from the transceiver.
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, the transceiver executes Zeroize in the following cases:

1) **If Zeroize is executed by pressing the Zeroize key**
   (Refer to Executing the Zeroize process by using the Zeroize key.)
2) **If Zeroize is executed from Menu Mode**
   (Refer to Executing the Zeroize process by using the Menu Mode.)
3) **If Zeroize of the AUX Input port is executed on Mobile**
   (Refer to Executing Zeroize by 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).)

The following describes the operation from 1) to 3):

Executing the Zeroize process by using the Zeroize key

1 Press the Zeroize key.

"Key Erasing" appears on the display and the transceiver executes Zeroize.

2 Zeroize completes.

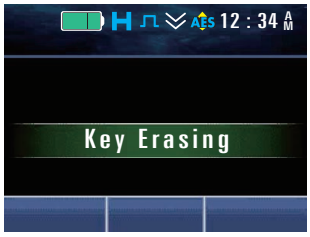
A Key Beep C (3 beeps) sounds from the transceiver, and "Key Erased" appears on the display for 2 sec.

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 the Zeroize process by using the Menu Mode

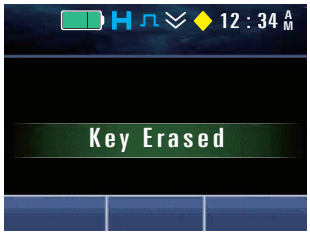
1 Press the Menu key to enter Menu Mode and then select "Zeroize".

"Key Erasing" appears on the display and the transceiver executes Zeroize.

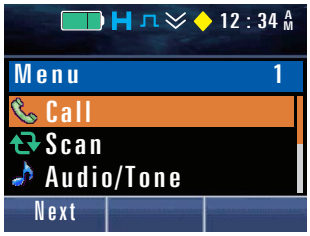


2 **Zeroize completes.**

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 by 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.

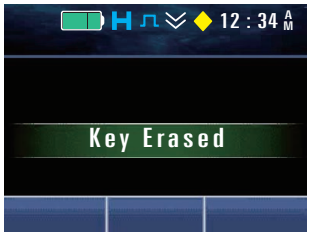
If Active High is configured for an AUX Input port, all Encryption Keys stored in the SCM are deleted regardless of the time configured in **Zeroize Delay Time**.

1 **Low or High level is continuously detected for the time configured in Zeroize Delay Time.**

“Key Erasing” appears on the display and the transceiver executes Zeroize.

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 previous display.



Note

- If Zeroize is executed, the AES-128 bit Encryption Key is also deleted. An AES-128 bit Encryption Key is an authentication key assigned to each transceiver and used for P25 Radio Authentication in a P25 Trunking system. (Refer to 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.

If a communication error occurs between the transceiver and the SCM due to problems such as the corruption of SCM memory, transmission and reception using the Encryption function is disabled.

If this communication error occurs, contact the place of purchase.

4.10 P25 Radio Authentication (P25 Trunking System Only)

P25 Radio Authentication is the function to exclude access from an invalid transceiver in a P25 Trunking system. Only the transceiver which is successfully authenticated by P25 Radio Authentication can be used in a P25 Trunking system.

By transmitting an authentication request message from the RFSS for the transceiver, and then the transceiver transmits a response to this message to the RFSS, the RFSS determines whether the access from the transceiver is invalid or not.

The following are information of the transceiver required for P25 Radio Authentication. Authentication does not succeed if the following information does not match:

- **The Encryption Key dedicated to authenticating AES-128 bit**

  The authentication key assigned to each transceiver. The authentication key can be written to the transceiver using Software Key Loader (KPG-AE1) or Key Variable Loader (KVL 4000). The authentication key is stored on the SCM. A maximum of 64 authentication keys can be configured on the SCM.

  To use KPG-AE1, the transceiver is connected to a PC with KPG-AE1 installed using the KPG-36U/ KPG-36X (Portable) or KPG-46U/ KPG-46X (Mobile) programming cable.

  To use KVL 4000, the transceiver is connected to KVL 4000 using the KPG-93AUT (portable) or KPG-115AUT (mobile) cable.

- **System ID**

An ID assigned to each system.

- **Unit ID**

  An ID assigned to each transceiver.

- **WACN ID (Wide Area Communication Network ID)**

  An ID assigned to each network.

Note

- Refer to the instruction manual supplied with the KVL 4000 or the help texts for KPG-AE1/ KPG-DE1 for various configurations necessary for P25 Radio Authentication.
- **Radio Authentication** cannot be used for the Encryption function by means of DES (Built-in DES).

4.11 Multi-key List

Multi-key List is the list for which a Common Key Reference (CKR) ID and a Key Name corresponding to an Encryption Key configured for the SCM or Built-in DES are configured. The transceiver can encrypt communication data based on the Encryption Key information corresponding to a Multi-key when the transceiver communicates using Encryption.

A maximum of 32 Multi Keys can be configured for AES/ DES. A maximum of 4 Multi Keys can be configured for DES (Built-in DES).

- **CKR ID**

  CKR ID is the ID corresponding to the Encryption Key configured for the SCM or Built-in DES. The transceiver can acquire the Encryption Key information by referring to a CKR ID and encrypt the communication data. A CKR ID can be used as the reference to specify the storage area to store Encryption Key data.

- **Key Name**

  Key Name is the name corresponding to the Encryption Key configured for the SCM or Built-in DES. When selecting an Encryption Key by operating the transceiver, the information configured in Key Name appears on the transceiver display. (Refer to Configuring the Encryption Key Data Used for Communications (P25 Conventional System Only).)

Note

Encryption Key data can be configured on the SCM using a Key Loader. (Refer to Key Loader.)

Configuration using KPG-D1/ D1N

Configuring **Multi-key List** (See Transceiver Settings > Encryption > Multi-key List)

4.12 Ignore Encryption Switch When Strapped

Ignore Encryption Switch When Strapped is the function used to notify a user that the transceiver cannot transmit if the transceiver attempts to transmit when the status of Encryption configured to be enabled (Secure) or disabled (Clear) differs from the configuration of Encryption for the channel or Talkgroup ID List (Clear, Secure, or Select).

Below is the transceiver behavior when attempting to transmit data with the following combinations of configurations.

Table 4-5 Ignore Encryption Switch When Strapped

Configuration of Encryption configured for a Channel or a Talkgroup ID List	Status of Encryption configured for the transceiver	
	Enabled (Secure)	Disabled (Clear)
Clear	1	2
Secure	3	5
Select	4	4

1: “Clear TX Only” appears on the display and an Ignore Encryption Switch Alert Tone (continuous beep) sounds from the transceiver. The transceiver cannot transmit.
2: The transceiver sends communication data without encryption.
3: The transceiver sends communication data with encryption.
4: The transceiver transmits according to the status of Encryption for the transceiver.
5: “Secure TX Only” appears on the display and an Ignore Encryption Switch Alert Tone (continuous beep) sounds from the transceiver. The transceiver cannot transmit.

Enabling this function allows the transceiver transmits according to the configuration of Encryption for either a channel or a Talkgroup ID List if the status of Encryption configured for the transceiver differs from the configuration of Encryption configured for either the channel or the Talkgroup ID List (as indicated in grayed out cells in Table 4-5).

Note

The configuration for Ignore Encryption Switch When Strapped does not influence the receiving behavior of the transceiver.

Configuration using KPG-D1/ D1N

Configuring **Ignore Encryption Switch When Strapped** to be enabled or disabled (See Transceiver Settings > Encryption > P25 > Options)

4.13 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.

If this function is enabled, the following are the conditions under which a Transmit Clear Alert Tone (1 beep) sounds from the transceiver when the transceiver transmits:

- If “Clear” is configured in Encryption for either a channel or the corresponding Talkgroup ID
- If “Select” is configured for Encryption for either a channel or the corresponding Talkgroup ID and that Encryption is disabled (Clear) for the transceiver.

Configuration using KPG-D1/ D1N

Configuring **Transmit Clear Alert Tone** to be enabled or disabled (See Transceiver Settings > Encryption > General)

4.14 Transmit Hang Time/ Receive Hang Time (P25 Conventional System Only)

Receive Hang Time/ Transmit Hang Time is the time during which the transceiver can transmit using the Key ID and Key Data used for reception, without using a preset Key ID or Key Data, when the **PTT** switch is pressed.

To use this function, the Key ID and Key Data used for reception need to be preconfigured for the SCM or Built-in DES.

Receive Hang Time

During or after receiving an encrypted signal, pressing the **PTT** switch within the time configured in **Receive Hang Time** transmits the signal encrypted with the algorithm ID and Key ID used for reception.

If the **PTT** switch is pressed after the time configured in **Receive Hang Time** elapses, the transceiver transmits the signal encrypted with a preconfigured CKR ID. Or, if 0 ms is configured in **Receive Hang Time**, the transceiver always transmits the signal encrypted with a preconfigured CKR ID.

Transmit Hang Time

After receiving an encrypted signal, pressing the **PTT** switch within the time configured in **Receive Hang Time** to transmit the signal, and then pressing the **PTT** switch again within the time configured in **Transmit Hang Time** enables the transceiver to continuously transmit the signal by encrypting with the algorithm ID and Key ID used for reception. However, if 0 ms is configured in **Transmit Hang Time**, the transceiver always transmits the signal encrypted with a preconfigured CKR ID.

Note

- If 0 ms is configured in both **Receive Hang Time** and **Transmit Hang Time**, the transceiver can transmit by pressing the **PTT** switch only during reception.
- If the transceiver receives a signal without encryption, **Receive Hang Time** and **Transmit Hang Time** do not function. In this case, the transceiver can transmit using a preconfigured CKR ID.

Configuration using KPG-D1/ D1N

- Configuring **Receive Hang Time** (See Transceiver Settings > Encryption > P25 > Options)
- Configuring **Transmit Hang Time** (See Transceiver Settings > Encryption > P25 > Options)

4.15 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 enabled or disabled status of **Encryption** and the Multi-key configuration is read by default when data is read from the transceiver using KPG-D1/ D1N.

Configuration using KPG-D1/ D1N

Configuring **Scrambler/Encryption Status Memory** to be enabled or disabled (See Transceiver Settings > Optional Features > Optional Features 1 > Others)

OTAR (Over-The Air-Rekeying) is the function to overwrite an Encryption Key for P25 encryption by radio. Using this function, the Encryption Key can be updated without using the Key Loader by remote operation.

OTAR realizes the function by transmitting and receiving an OTAR message called Key Management Message (KMM) in CAI Data Packets which comply with the P25 standards. (Refer to CAI Data Packet Communication.)

The Encryption Key is managed by the Key Manager function of the Key Management Facility (KMF) which is a component of the system.

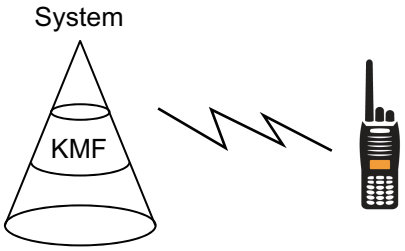


Figure 5-1 Key Manager

Note

OTAR cannot be used for the Encryption function by means of DES (Built-in DES).

5.1 About the Encryption Key

The following are 2 types of Encryption Keys which are used for OTAR:

Traffic Encryption Key

The Traffic Encryption Key (TEK) is used for voice and data communications. The transceiver must have at least one TEK. The TEK is the Encryption Key which is used other than for OTAR.

Key Encryption Key

Key Encryption Key (KEK) is used for encrypting an Encryption Key which is included in the KMM. To use OTAR, the transceiver must have at least one KEK. The KEK is the Encryption Key which is used for OTAR only. The KEK is configured from CKR No. 61440 to 65535 (from F000 to FFFF) and can be distinguished from the TEK.

The KEK unique to the transceiver is called UKEK (Unique KEK), and the KEK common to a group is called CKEK (Common KEK).

Note

- The SCM retains the Key Names different from the Key Names which are configured in the Multi-key List of KPG-D1/ D1N. The Key Name retained by the SCM supports a maximum of 31 characters.
- Multi-key List is the list to configure the CKR No. of Encryption Keys. The CKR No. corresponds to the CKR ID in the Multi-key List of KPG-D1/ D1N.

5.2 Configurations for the Transceiver Required for Using OTAR

For using OTAR, the following configurations needs to be configured in the transceiver:

- **Prepare the SCM which supports OTAR**

  The SCMs which support OTAR are KWD-AE30 and KWD-AE31.

- **Configure data in KPG-D1/ D1N and write the data to the transceiver**

  The configurations related to P25 Encryption and OTAR are configured by using KPG-D1/ D1N. (Refer to Configuration using KPG-D1/ D1N.)

- **Configure necessary configurations by Key Loader**

  The following configurations needs to be configured by using the Key Loader. The following information is retained in the SCM: (Refer to Key Loader.)

  - UKEK

    UKEK is usually used as CKR No. 61440 (F000) and Key ID 62880 (F5A0). (The KEK can be configured from CKR No. 61440 to 65535 (from F000 to FFFF).)

    Preconfiguring the TEK in the transceiver is not required because the TEK is tentatively written to the transceiver when receiving Warm - start - Command. Also, there is no configuration distinction between the UKEK and the CKEK.

  - Unit RSI

    Unit RSI is an ID of the transceiver used for OTAR. The ID is the same as the Individual OTAR Radio ID configured by using KPG-D1/ D1N. Normally, the Unit RSI is configured by the Key Loader at the same time as other configurations. The Unit RSI can be configured in Target RSI of the Key Loader.

    Default: 000001 (default of the SCM)

  - KMF RSI

    KMF RSI is the RSI of the KMF of the other party. Normally, the KMF RSI is 9,999,999 (98967F).

    Default: 9,999,999 (98967F)

  - MNP

    MNP (Message Number Period) is a parameter which depends on the system, and is normally chosen by the System Administrator.

    Range: 0 to 65,535 (0000 to FFFF)

    Default: FFFF

5.3 CAI Data Packet Communication

OTAR can overwrite an Encryption Key by transmitting and receiving in CAI Data Packets which comply with the P25 standards the OTAR message called a KMM.

Note

- On a channel where **Receive Only** is enabled, including the transmission of Response Packets, the Data Packets, as well as voice communications, cannot be transmitted. OTAR also does not function.
- Refer to "P25 Data Packet Communication During a Scan (P25 Data Channel for Scan) (P25 Conventional System Only)" for the Data Packet communication during a scan.

CAI Data Registration (P25 Conventional System Only)

In a P25 Conventional system, the transceiver can register to Data Packet System by transmitting a Registration Request - Connect command to the FNE. Also, the transceiver can deregister from Data Packet System by transmitting a Registration Request - Disconnect command to the FNE.

Registration Request - Connect

In KPG-D1/ D1N, when one of the following operations is on a channel which allows OTAR in a system where **CAI Data Registration** is enabled, the transceiver transmits a Registration Request - Connect command to the FNE and starts registration:

- When the transceiver is turned ON (including the state after the transceiver is reset in KVL mode or PC Programming Mode)
- When the channel is changed (the command is sent after the channel is switched)
- When enabling or disabling the scan

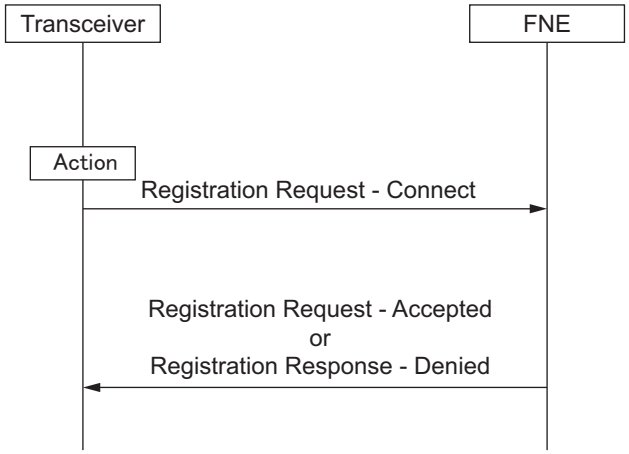


Figure 5-2 Registration Request - Connect

If registration is successful, a Registration Response - Accepted is sent back from the FNE. If registration is denied, a Registration Response - Denied is sent back from the FNE.

When scanning is enabled or disabled, the transceiver deregisters once and transmits again the Registration Request - Connect command which reflects the scan condition.

Note

- The Registration Request - Connect and Registration Response are sent in the Confirmed Data Packet Format.
- Even if registration is not successful, the transceiver sends back a response message when the transceiver receives the Response Kind 3 KMM.
- When scanning is enabled, the transceiver transmits a Registration Request - Disconnect command on the current channel before the transceiver starts the scan. Then, the transceiver transmits a Registration Request - Connect (Scan Mode Enable) command on a channel corresponding to the configuration of **P25 Data Channel for Scan**.

  The transceiver stops the scan before the transceiver transmits the Registration Request - Connect (Scan Mode Enable) command if there are receivable signals on the scan target channel when the transceiver started the scan. The transceiver transmits a Registration Request - Connect (Scan Mode Enable) command when the transceiver ends reception and resumes scanning.

  When the transceiver transmits a Registration Request - Connect (Scan Mode Enable) command while the transceiver is scanning, the scan is stopped until the transmission ends.
- When scanning is disabled, the transceiver transmits a Registration Request - Disconnect command on a channel corresponding to the configuration of **P25 Data Channel for Scan** before the scan is disabled. Then, scanning is disabled, and the transceiver transmits a Registration Request - Connect (Scan Mode Disable) command on the current channel.
- When registration is not successful or when registration is denied, the transceiver cannot transmit a Hello Command (Rekey Request) or Delayed Acknowledgment.
- Even if failing transmission of a Registration Request - Connect command, CAI Data Registration will be successful if the transceiver receives a Registration Response - Accept command after the failure.

Registration Request - Disconnect

In KPG-D1/ D1N, when one of the following operations is on a channel which allows OTAR in a system where **CAI Data Registration** is enabled, the transceiver transmits a Registration Request - Disconnect command to the FNE and starts deregistration.

- When the transceiver is turned OFF (including when entering KVL mode or PC Programming Mode)
- When the channel is changed (the channel switches to the target channel after transmitting on the previous channel)
- When enabling or disabling the scan

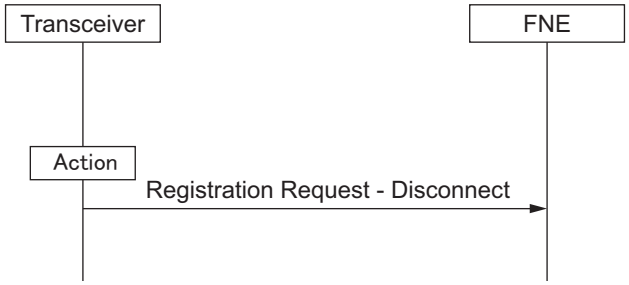


Figure 5-3 Registration Request - Disconnect

Note

The Registration Request - Disconnect is sent in the Unconfirmed Data Packet Format.

5.4 Configuration using KPG-D1/ D1N

This section describes the configuration using KPG-D1/ D1N in order to use OTAR.

Configurations Related to P25 Data Communication

The following are functions related to CAI Packet Data communication and used as methods to transmit the KMM of OTAR.

Table 5-1 Configurations Related to P25 Data Communication

Function	Description
Number of Data Transmit Retries	The number of times that the Confirmed Packet Data is resent. If the transceiver does not receive the Response Packet of successful receipt from the other party after the transceiver transmits the Confirmed Packet Data, the transceiver can retransmit the data for the number of times configured in **Number of Data Transmit Retries**.
Maximum ACK Wait Time	The wait time for the Response Packet of successful receipt from the other party after the transceiver transmits the CAI Packet Data. After the transceiver transmits CAI Packet Data in the Confirmed Data Format, if the transceiver does not receive the Response Packet from the other party while **Maximum ACK Wait Time** is counting down, the transceiver starts retransmission.
Frame Sync Seek Time	The time for the transceiver to detect the Frame Sync. If Frame Sync is not detected while **Frame Sync Seek Time** is counting down, the channel is determined as unused, and the transceiver transmits CAI Packet Data which needs to be sent. If the Frame Sync is detected, **Transmit Short Random Time** is activated.
Transmit Short Random Time	If the Frame Sync is first detected while **Frame Sync Seek Time** is counting down, the random timer starts counting down from the time configured in **Transmit Short Random Time** to 0. If Status Symbol is Idle after the timer expires, the transceiver starts transmitting the CAI Packet Data. Randomness is provided to prevent multiple transceivers from starting transmission simultaneously with the same timing.
Transmit Long Random Time	If Status Symbol is Busy after the time configured in **Transmit Short Random Time** elapses, or if a busy signal is received when the transceiver requests the start to transmission, the random timer is activated for the time configured in **Transmit Long Random Time** to 0. If Status Symbol is Idle after the timer expires, the transceiver starts transmitting the CAI Packet Data. If Status Symbol is Busy after the timer expires, **Transmit Short Random Time** is randomly activated again. However, if the CAI Packet Data to be sent are Response Packets, **Transmit ACK Random Time** is activated. Randomness is provided to prevent multiple transceivers from starting transmission simultaneously with the same timing.
Transmit ACK Random Time	When the CAI Packet Data to be sent are Response Packets, if Status Symbol is Busy after the time configured in **Transmit Short Random Time** elapses, or if a busy signal is received when the transceiver requests the start to transmission, the random timer is activated for the time configured in **Transmit ACK Random Time** to 0. If Status Symbol is Idle after the timer expires, the transceiver starts transmitting the CAI Packet Data. If Status Symbol is Busy after the timer expires, **Transmit ACK Random Time** is activated again randomly. Randomness is provided to prevent multiple transceivers from starting transmission simultaneously with the same timing.

Function	Description
Response Time	The wait time from when the transceiver receives the Response Packet of successful receipt from the receiving transceiver after the transceiver transmits the CAI Packet Data until the transceiver receives the acknowledgment of the CAI Packet Data. When the transceiver receives the acknowledgment of the CAI Packet Data, the transceiver transmits the Response Packet to the receiving transceiver.
IP Address	The IP address of the transceiver is configured.

Configuration using KPG-D1/ D1N

- Configuring **Number of Data Transmit Retries** (See Transceiver Settings > Personal > Personal Features > P25 Trunking > Packet Data > CAI Data)
- Configuring **Maximum ACK Wait Time** (See Transceiver Settings > Personal > Personal Features > P25 Trunking > Packet Data > CAI Data)
- Configuring **Frame Sync Seek Time** (See Transceiver Settings > Personal > Personal Features > P25 Trunking > Packet Data > CAI Data)
- Configuring **Transmit Short Random Time** (See Transceiver Settings > Personal > Personal Features > P25 Trunking > Packet Data > CAI Data)
- Configuring **Transmit Long Random Time** (See Transceiver Settings > Personal > Personal Features > P25 Trunking > Packet Data > CAI Data)
- Configuring **Transmit ACK Random Time** (See Transceiver Settings > Personal > Personal Features > P25 Trunking > Packet Data > CAI Data)
- Configuring **Response Time** (See Transceiver Settings > Personal > Personal Features > P25 Conventional > P25 > CAI Data)
- Configuring **IP Address** (See Transceiver Settings > P25 > P25 Information > Packet Data)

Configuration Related to Encryption

The following are the functions related to Encryption used for OTAR:

Table 5-2 Configuration Related to Encryption

Function	Description
Individual OTAR Radio ID	This ID is used for the Key Management Message (KMM). This ID is comparable to the Radio Set ID (RSI) specified in TIA-102.AACA and managed by the KMF. This ID can be configured by either KPG-D1/ D1N or Key Loader. However, after a value is configured by KPG-D1/ D1N, if the value is changed by the Key Loader, OTAR functions according to the changed value. In this state, even if KPG-D1/ D1N reads the configuration data from the transceiver, the value changed by the Key Loader is not reflected in KPG-D1/ D1N. If the ID configuration by using KPG-D1/ D1N is changed and the configuration data is written to the transceiver, the value configured by KPG-D1/ D1N is updated. As this ID is an ID different from the Unit ID configured in System Information of KPG-D1/ D1N, the same value configured for the IDs is not a problem.
Previous Keyset Erase (User Change)	If the Keyset is changed by operating the transceiver, this is the function that deletes all Encryption Keys included in the Keyset which were active before the change.

Configuration using KPG-D1/ D1N

- Configuring **Individual OTAR Radio ID** (See Transceiver Settings > Encryption > P25 > OTAR)
- Configuring **Previous Keyset Erase (User Change)** to be enabled or disabled (See Transceiver Settings > Encryption > P25 > OTAR)

Configuration Related to a KMF Profile

Up to 5 KMF Profiles (for 5 units) can be created by using KPG-D1/ D1N.

In a P25 Conventional system, a KMF Profile is configured for each Personality. The multiple KMF Profiles created can be used separately for each Personality.

In a P25 Trunking system, a KMF Profile is configured for each system.

The following are the functions related to the KMF Profile used for OTAR:

Table 5-3 Configuration Related to a KMF Profile

Function	Description
Previous Keyset Erase (OTAR Changeover)	If the Keyset is changed by a Changeover message of OTAR, this is the function that deletes all Encryption Keys included in the Keyset which were active before the change.
Rekey Request	This is the configuration on whether to permit the behavior to transmit a Hello Command (Rekey Request) by operating the **Rekey Request** key.
Receive Security Level	This is the configuration of the security level related to receipt of the KMM. **Basic:** A KMM can be received even if the KMM is not encrypted nor authenticated. **Enhanced:** A KMM can be received only in the following conditions: • KMMs which are encrypted and authenticated • KMMs which are only encrypted Note Even if “Enhanced” is configured, as an exception, an unencrypted Warm Start Command can be received. Some OTAR messages always require encryption and authentication. The configuration of the Receive Security Level does not affect these messages.
Transmit Security Level	This is the configuration of the security level related to the transmission of the Hello Command (Rekey Request), OTAR Registration, and Unable to Decrypt Response. **Basic:** The Hello Command (Rekey Request) is always transmitted without encryption and authentication. **Enhanced:** The Hello Command (Rekey Request), OTAR Registration, and Unable to Decrypt Response, which are encrypted and authenticated, are transmitted.
KMF IP Address (P25 Trunking system only)	This is the configuration of the KMF IP address.
KMF UDP Port (P25 Trunking system only)	This is the configuration of the UDP Port used when transmitting the KMM to the KMF.
Transceiver OTAR Port (P25 Trunking system only)	This is the configuration of the UDP Port used when receiving the KMM from the KMF.
Registration Response Kind	This is the configuration to switch the behavior of the OTAR Registration. **Unconfirmed:** The OTAR Registration behaves by a Registration – Command (Response Kind 1). **Confirmed:** The OTAR Registration behaves by a Registration – Command (Response Kind 3) and Registration – Response (Response Kind 1).

Configuration using KPG-D1/ D1N

- Configuring **Previous Keyset Erase (OTAR Changeover)** to be enabled or disabled (See Transceiver Settings > KMF Profile > OTAR Information)
- Configuring **Rekey Request** to be enabled or disabled (See Transceiver Settings > KMF Profile > OTAR Information)
- Configuring **Receive Security Level** (See Transceiver Settings > KMF Profile > OTAR Information)
- Configuring **Transmit Security Level** (See Transceiver Settings > KMF Profile > OTAR Information)
- Configuring **KMF IP Address** (See Transceiver Settings > KMF Profile > Packet Data)
- Configuring **KMF UDP Port** (See Transceiver Settings > KMF Profile > Packet Data)
- Configuring **Transceiver OTAR Port** (See Transceiver Settings > KMF Profile > Packet Data)
- Configuring **Registration Response Kind** (See Transceiver Settings > KMF Profile > OTAR Information)

Configuration Related to OTAR

The following are the functions related to OTAR:

P25 Conventional system

Table 5-4 Configuration Related to OTAR (P25 Conventional system)

Function	Description
OTAR	This is the configuration on whether to enable OTAR. **Disable:** OTAR is disabled. The CAI Packet Data also cannot be received. **RX Only:** Only a KMM can be received. The following messages cannot be transmitted related to KMM transmission: • Rekey Request • Delayed Acknowledge However, transmission of a response message to each message from the KMF of Response Kind 3 is not restricted. **Unlimited:** OTAR functions without restriction.
KMF Profile Number	This is the configuration of the KMF Profile No. applied to Personality.
P25 Data Channel for Scan	In the Scan List configured “Conventional” in **Scan Type**, this is the configuration for determining the channel which can transmit and receive the CAI Packet Data during the scan. (Refer to P25 Data Packet Communication During a Scan (P25 Data Channel for Scan) (P25 Conventional System Only).)
CAI Data Registration	This is the configuration on whether to execute the CAI Data Registration behavior to a Packet Data system on a channel in the system. (Refer to CAI Data Registration (P25 Conventional System Only).)
Individual ID List	Functions related to the KMF Profile can be configured for each ID in Individual ID List. **KMF Profile:** This is the configuration on whether to enable selection of an Encryption Key for encryption used in combination with an Individual ID, from the Encryption Key Reference List of the KMF Profile. **KMF Profile Index:** This is the configuration of the KMF Profile No. applied to an Individual ID. **EKR (Encryption Key Reference) List No.:** This is the configuration of the Encryption Key for encryption to be used. This can be selected from the Encryption Key Reference List of the specified KMF Profile.

Function	Description
Talkgroup ID List	The functions related to the KMF Profile can be configured in each Talkgroup ID in the Talkgroup ID List. **KMF Profile:** This is the configuration on whether to enable selection of an Encryption Key for encryption used in combination with a Talkgroup ID, from the Encryption Key Reference List of the KMF Profile. **KMF Profile Index:** This is the configuration of the KMF Profile No. applied to a Talkgroup ID. **EKR (Encryption Key Reference) List No.:** This is the configuration of the Encryption Key for encryption to be used. This can be selected from the Encryption Key Reference List of the specified KMF Profile.

Configuration using KPG-D1/ D1N

- Configuring **OTAR** to be enabled or disabled (See Transceiver Settings > Personal > Personality > P25 Conventional (P25 Voting with NAC) > P25 > OTAR)
- Configuring **KMF Profile Number** (See Transceiver Settings > Personal > Personality > P25 Conventional (P25 Voting with NAC) > P25 > OTAR)
- Configuring **P25 Data Channel for Scan** (See Transceiver Settings > Zone/Channel Information > Zone Edit > Single Scan)
- Configuring **CAI Data Registration** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > P25)
- Configuring **Individual ID List** (See Transceiver Settings > P25 > Individual ID List)
- Configuring **Talkgroup ID List** (See Transceiver Settings > P25 > Talkgroup ID List)

P25 Trunking system

Table 5-5 Configuration Related to OTAR (P25 Trunking system)

Function	Description
OTAR	This is the configuration on whether to enable OTAR. **Disable:** OTAR is disabled. The CAI Packet Data also cannot be received. **RX Only:** Only a KMM can be received. The following messages cannot be transmitted related to KMM transmission: • Rekey Request • Delayed Acknowledge However, transmission of a response message to each message from the KMF of Response Kind 3 is not restricted. **Unlimited:** OTAR functions without restriction.
Announcement Group EKR List Number	If **OTAR** is configured other than “Disable”, an Encryption Key for encryption is selected from the Encryption Key Reference List of the specified KMF Profile when using Announcement Group Call.
KMF Profile Number	This is the configuration of the KMF Profile No. applied to the system.
Individual ID List	Functions related to the KMF Profile can be configured for each ID in Individual ID List. **KMF Profile:** This is the configuration on whether to enable selection of an Encryption Key for encryption used in combination with an Individual ID, from the Encryption Key Reference List of the KMF Profile. **KMF Profile Index:** This is the configuration of the KMF Profile No. applied to an Individual ID. **EKR (Encryption Key Reference) List No.:** This is the configuration of the Encryption Key for encryption to be used. This can be selected from the Encryption Key Reference List of the specified KMF Profile.
Talkgroup ID List	Functions related to the KMF Profile to be applied can be configured in Talkgroup ID List. **KMF Profile:** This is the configuration on whether to enable selection of an Encryption Key for encryption used in combination with a Talkgroup ID, from the Encryption Key Reference List of the KMF Profile. **KMF Profile Index:** This is the configuration of the KMF Profile No. applied to a Talkgroup ID. **EKR (Encryption Key Reference) List No.:** This is the configuration of the Encryption Key for encryption to be used if anything other than “Disable” is configured in **OTAR**. This can be selected from the Encryption Key Reference List of the specified KMF Profile.
Encryption Key Reference List No. of Telephone Call	An Encryption Key for encryption is selected from the Encryption Key Reference List of the specified KMF Profile when using Telephone Call.
Encryption Key Reference List No. of Dynamic Talkgroup	An Encryption Key for encryption is selected from the Encryption Key Reference List of the specified KMF Profile when using Dynamic Talkgroup.
Encryption Key Reference List No. of Patch Talkgroup	An Encryption Key for encryption is selected from the Encryption Key Reference List of the specified KMF Profile when using Patch Talkgroup.
Encryption Key Reference List No. of Failsoft	An Encryption Key for encryption is selected from the Encryption Key Reference List of the specified KMF Profile when using Telephone Call.
Key Reference List No. of Packet Data	An Encryption Key for encryption is selected from the Encryption Key Reference List of the specified KMF Profile when using Failsoft.

Configuration using KPG-D1/ D1N

- Configuring **OTAR** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General > Encryption > OTAR)
- Configuring **Announcement Group EKR List Number** (See Transceiver Settings > Personal > Personality > P25 Conventional (P25 Voting with NAC) > P25 > OTAR)
- Configuring **KMF Profile Number** (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General > Encryption > OTAR)
- Configuring **Individual ID List** (See Transceiver Settings > P25 > Individual ID List)
- Configuring **Talkgroup ID List** (See Transceiver Settings > P25 > Talkgroup ID List)
- Configuring **Encryption Key Reference List No.** of Telephone Call (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General > Encryption > Encryption Key Reference List No.)
- Configuring **Encryption Key Reference List No.** of Dynamic Talkgroup (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General > Encryption > Encryption Key Reference List No.)
- Configuring **Encryption Key Reference List No.** of Patch Talkgroup (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General > Encryption > Encryption Key Reference List No.)
- Configuring **Encryption Key Reference List No.** of Failsoft (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General > Encryption > Encryption Key Reference List No.)
- Configuring **Encryption Key Reference List No.** of Packet Data (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General > Encryption > Encryption Key Reference List No.)

5.5 OTAR Registration

OTAR Registration is the function to register the availability of the transceiver to the KMF. If the transceiver succeeds in OTAR Registration, the transceiver is registered to the KMF and can use OTAR.

If **OTAR** is enabled, the transceiver executes OTAR Registration. If OTAR Registration is unsuccessful, by pressing and holding the **Rekey Request** key for 1 sec, OTAR Registration can be executed.

OTAR Registration functions differently depending on the configuration in **Registration Response Kind**. (Refer to Configuration Related to a KMF Profile.)

Configuration using KPG-D1/ D1N

- Configuring **OTAR** to be enabled or disabled (See Transceiver Settings > Personal > Personality > P25 Conventional (P25 Voting with NAC) > P25 > OTAR)
- Configuring **OTAR** to be enabled or disabled (See Transceiver Settings > Personal > Personal Features > P25 Trunking > General > Encryption > OTAR)

5.6 Requesting the Update of an Encryption Key (Rekey Request)

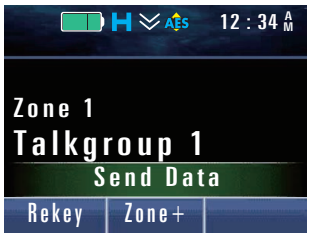
Rekey Request is the function to request the update of an Encryption Key by operating the transceiver.
This function requests the update of an Encryption Key by using a Hello Command.

Operating the transceiver

1 **Press and hold the Rekey Request key for approximately 1 sec.**

A Key Beep A (1 beep) sounds, and then the transceiver enters Ack Wait Mode. The Hello Command (Rekey Request) is transmitted.

Since a Hello Command is transmitted in the Confirmed Data Packet Format, the transceiver waits for Response Packets transmitted from the KMF after the transceiver transmits the Hello Command.



Note

- The Rekey Request is transmitted according to the configuration (Basic or Enhanced) in **Transmit Security Level** as follows:

  If Basic:

  The Rekey Request is transmitted without encryption and authentication.

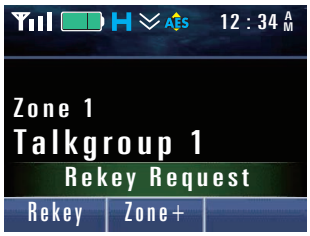
  If Enhanced:

  The Rekey Request is transmitted with encryption and authentication.
- The transceiver cannot transmit the Rekey Request on a channel which is configured with a KMF Profile where **Rekey Request** is disabled.
- The Hello Command is not transmitted while receiving a Group Call (Status Symbol = Busy). The transmission of the Hello Command is suspended until Status Symbol changes to the Idle state.
- If the Rekey Request requires encryption at the time of transmission, the Rekey Request is transmitted by using the Encryption Key of the lowest CKR No. of the lowest Keyset ID. However, if the transceiver has an AES Encryption Key, the AES Encryption Key has priority.
- While the transceiver is scanning, the scan is suspended if the transceiver transmits the Rekey Request and then enters Ack Wait Mode. When Ack Wait Mode ends, the scan is resumed after the time configured in **Dwell Time** or **Dropout Delay Time** elapses.

2 Receive the Response Packets.

"Complete" is displayed for 1 sec, and then an Ack Wait Enter Tone (7 beeps) sounds from the transceiver.

Then, the transceiver waits for an ACK (Rekey Command, Modify Key Command, or No Service) transmitted from the KMF for 90 sec.



Note

- If the transceiver received an Individual Call while in Ack Wait Mode, Ack Wait Mode ends, the Individual ID or ID Name appears on the display of the transceiver, and audio is emitted.
- "Rekey Fail" appears on the display for one of the following. The regular display is restored after 1 sec.

  If the transceiver has no KEK:

  In this case, a Hello Command (Rekey Request) is transmitted.

  If "Enhanced" is configured in Transmit Security Level and the transceiver has no TEK:

  In this case, a Hello Command (Rekey Request) is not transmitted.

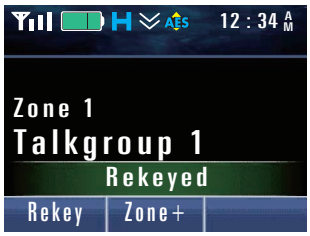
  If the transceiver having no KEK cannot transmit a Hello Command (Rekey Request) because a Group Call is being received (Status Symbol = Busy) while the transceiver is transmitting the Hello Command (Rekey Request):

  In this case, a Hello Command (Rekey Request) is not transmitted.
- If the Response Packets cannot be received after transmitting a Hello Command, a No Reply Tone (4 beeps) sounds from the transceiver, and then "No Reply" appears on the display. The regular display is restored after 1 sec.

3 Receive a Change RSI Command or Zeroize Command of Response Kind 3.

A Key Beep C (3 beeps) sounds from the transceiver, and then "Rekeyed" appears on the display. The regular display is restored after 1 sec.

The Change RSI Command and Zeroize Command are transmitted when the KMF finishes processing of the Rekey Request.



Note

- When the Change RSI Command of Response Kind 1 or Response Kind 2 is received, “Rekeyed” does not appear and the transceiver continues in Ack Wait Mode. Also, the Key Beep C (3 beeps) does not sound from the transceiver.
- If a No Service message is received, a Key-entry Error Tone (1 beep) sounds from the transceiver, and then “Rekey Deny” appears on the display. The regular display is restored after 1 sec. The transceiver receives the No Service message as follows according to the configuration of Receive Security Level (Basic or Enhanced):

  If Basic:

  The transceiver receives both an encrypted No Service message and an unencrypted No Service message.

  If Enhanced:

  The transceiver receives only an encrypted No Service message.
- When the Change RSI Command of Response Kind 1 or Response Kind 2 is received, “Rekeyed” does not appear and the transceiver continues in Ack Wait Mode. Also, the Key Beep C (3 beeps) does not sound from the transceiver.
- If 90 sec elapse without receiving an ACK after the transceiver enters Ack Wait Mode, a No Reply Tone (4 beeps) sounds from the transceiver, and then “No Reply” appears on the display. ACK Wait Mode ends and the regular display is restored after 1 sec.
- While in Ack Wait Mode, if the transceiver receives the No Service message after receiving a message other than the No Service message, the transceiver does not respond.

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Configuring **Rekey Request** to be enabled or disabled (See Transceiver Settings > KMF Profile > OTAR Information)
- Configuring **Receive Security Level** (See Transceiver Settings > KMF Profile > OTAR Information)
- Configuring **Transmit Security Level** (See Transceiver Settings > KMF Profile > OTAR Information)

Behavior If Registration Is Unsuccessful

P25 Conventional system

If registration (CAI Data Registration) is unsuccessful, the transceiver first transmits a Registration Request - Connect command when pressing and holding the **Rekey Request** key. Then, the transceiver behaves as follows:

- **If Registration Response - Accepted is received**

  If the transceiver receives a Registration Response - Accepted command, the transceiver transmits a Hello Command.

- **If Registration Response - Denied is received**

  A Call Deny Tone (3 beeps) sounds from the transceiver, and then “Reg Deny” appears on the display. The regular display is restored after 1 sec.

- **If Registration Response is not received**

  After the length of time configured in Maximum ACK Wait Time elapses from last resending the Registration Request - Connect command, “Reg Fail” appears on the display. The regular display is restored after 1 sec.

If CAI Data Registration is denied, a Call Deny Tone (3 beeps) sounds from the transceiver when pressing and holding the Rekey Request key, and then “Registration Deny” appears on the display for 1 sec. In this case, the Rekey Request is not transmitted.

Note

The Registration Request - Connect command cannot be transmitted during scanning on the channel configured “None” in P25 Data Channel. However, if pressing and holding the **Rekey Request** key, the transceiver behaves the same as “If Registration Response is not received” above, and a Registration Request - Connect command is transmitted only in this case.

P25 Trunking system

If registration (OTAR Registration) is unsuccessful, a Key Beep A (1 beep) sounds from the transceiver when pressing and holding the **Rekey Request** key, and then the transceiver migrates to a data channel. Then, the transceiver transmits a Registration - Command. If the transceiver receives a Registration Response - Accepted command, the transceiver transmits a Hello Command.

If registration failed, a Call Fail Tone (2 beeps) sounds from the transceiver, and then “Rekey Fail” appears on the display. The regular display is restored after 1 sec.

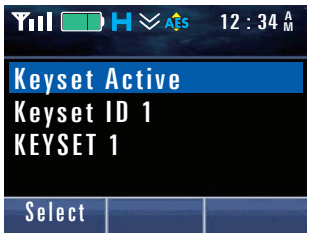
5.7 Changing Keysets (Keyset Select)

Keyset Select is the function to change the enabled Keyset by transceiver operation.

Operating the transceiver

1 **Press the Keyset key.**

A Key Beep A (1 beep) sounds, and then the transceiver enters Keyset Select Mode. “Keyset Active” and the Keyset ID and Keyset Name of the active Keyset appear on the display.

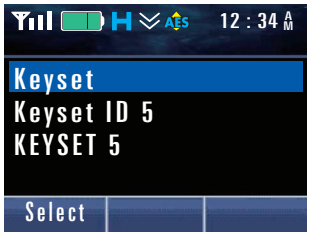


Note

- If the **Keyset** key is pressed without a Keyset, the transceiver behavior varies as follows depending on the configuration in **Encryption** of the selected channel:
  - If “Secure” is configured in **Encryption**, “Key Fail” appears on the display.
  - If “Clear” is configured in **Encryption**, a Key-entry Error Tone (1 beep) sounds from the transceiver and the display does not change.
- If a Keyset Name is not configured, “KEYSET XXX” (XXX is the Keyset ID) appears on the display.

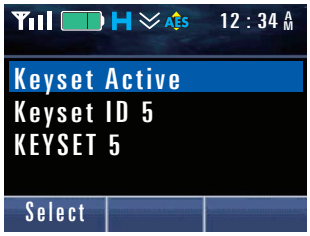
2 **Select a Keyset to be activated by pressing the [▲] or [▼] key.**

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



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

The Keyset selected in the step 2 is activated.



Note

- If the Keyset is unavailable by receiving a Delete Keyset Command while in Key Select Mode, and if Keyset selection operation is executed in this state, the transceiver behavior varies as follows depending on the configuration of **Encryption** of the selected channel:
  - If “Secure” is configured in **Encryption**, the transceiver restores the standby display after “Key Fail” appears.
  - If “Clear” is configured in **Encryption**, a Key-entry Error Tone (1 beep) sounds from the transceiver and the display does not change.
- If **Previous Keyset Erase (User Change)** is enabled, all Encryption Keys included in the Keyset which were active before the change are deleted when the Keyset is determined.

Configuration using KPG-D1/ D1N

- Assigning functions to the **PF** keys on the transceiver (See Transceiver Settings > Key Assignment)
- Configuring **Previous Keyset Erase (User Change)** to be enabled or disabled (See Transceiver Settings > Encryption > P25 > OTAR)

5.8 Operation Restrictions While OTAR Is Active

While OTAR is processing, some functions are restricted in order to prioritize OTAR processing.

PF keys and PTT switches

If the **PTT** switch or the **PF** key to which the following functions are assigned is operated while OTAR is processing, a Key-entry Error Tone (1 beep) sounds from the transceiver, and then “Rekeying” appears on the display for 1 sec. The operated function is disabled and the transceiver restores the normal display.

- Channel Up/Down
- Channel Recall
- Direct Channel
- Home Channel
- Key Delete
- Rekey Request
- Scan
- Scan Normal
- Zone Up/Down

Selector/ Lever switch (Portable only) and AUX Input (Mobile only)

If the following functions which are assigned to **Selector**, the **Lever** switch, or the AUX Input port, are activated while OTAR is processing, the Key-entry Error Tone (1 beep) sounds from the transceiver, and then “Rekeying” appears on the display. Active functions are suspended. When OTAR processing ends, the “Rekeying” display disappears, and then the suspended functions resume functioning.

- **Selector**
  - Channel Select
  - Zone Select
  - Channel Up/Down
  - Zone Up/Down
- **Lever switch**
  - Scan
  - Scan Normal
  - Zone Select
- **AUX Input port**
  - Channel Select
  - External PTT (Voice)
  - Scan

Note

The following functions are mandatorily executed even while OTAR is processing:

- Emergency
- Zeroize

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.

The following scan methods are available:

- **Single Scan**

  The transceiver scans target channels in the same zone. In a P25 Trunking system, Priority Monitor Scan can be used as the Single Scan function.

- **List Scan**

  The transceiver scans the Zone-channel registered as a member in a Scan List. In a P25 Trunking system, Priority Monitor Scan and Limited Talkgroup Scan can be used as the List Scan function.

- **Multi-Zone Scan**

  The transceiver scans all target channels in the target zones.

Note

In a P25 Conventional system, because P25 Voting is executed for a channel with “P25 Voting with NAC” configured in **System Type**, the configuration in **Scan Type** is disabled. Refer to “Migrating Automatically to the Site Providing Better Radio Environment (P25 Voting)” for instructions on scanning by P25 Voting in a P25 Conventional system.

6.1 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 **Concentric** switch to be in the position where “Scan” or “Scan Normal” is allocated starts scanning.
  Operating the **Concentric** 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/ OFF**

  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)

6.2 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.

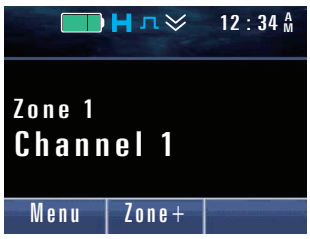
For portable transceivers, the LED flashes according to the configuration of **Non-Priority Scan LED** and **Priority Scan LED** respectively in the case of Non-priority Scan and Priority Scan.

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 Information > Zone Information > Conventional)
- Configuring **Scan Type** (See Transceiver Settings > Zone/Channel Information > Zone Edit)
- Configuring **"Scan" Displayed** to be enabled or disabled (See Transceiver Settings > 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 on 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.

6.3 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 during the scan to the channel where a Scan List Number is configured, 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.

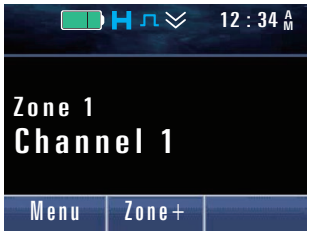
For portable transceivers, the LED flashes according to the configuration of **Non-Priority Scan LED** and **Priority Scan LED** respectively in the case of Non-priority Scan and Priority Scan.

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 Information > Scan List > Members)
- Configuring **Scan List Number** (Trunking Zone) (See Transceiver Settings > Zone/Channel Information > Zone Information > P25 Trunking)
- Configuring **Scan List Number** (Conventional Zone) (See Transceiver Settings > Zone/Channel Information > Zone Information > Conventional)
- Configuring **Scan List Number** (Channel) (See Transceiver Settings > Zone/Channel Information > Channel Edit > P25 Conventional)
- Configuring **Scan Type** (See Transceiver Settings > Zone/Channel Information > Zone Edit)
- Configuring **"Scan" Displayed** to be enabled or disabled (See Transceiver Settings > 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 **Temporary Delete/Add** function, the channel is not scanned even if the channel is registered as a member in a 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 on 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.

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 6-1 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.
P25 Trunking	A Zone-channel in a system where “P25 Trunking” is configured in **System Type** selected in **System Number** can be registered as a member for List Scan. Configuring a Priority Channel enables Priority Monitor Scan.
Limited Talkgroup	A Zone-channel in a system where “P25 Trunking” is configured in **System Type** selected in **System Number**, or a Zone-channel in a system where “Analog Conventional” or “P25 Conventional” is configured in **System Type** can be registered as a member for List Scan. No Priority Channel can be configured. (Refer to Limited Talkgroup Scan.)
LTR and Conventional	A Zone-channel in a system where “LTR Trunking”, “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 6-2 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 Information > 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.

Note

Zone 0 (the Tactical Zone) cannot be selected as a target to be edited for a Scan List.

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 a P25 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.

Note

Zone 0 (the Tactical Zone) cannot be selected as a target to be edited for a Scan List.

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)

Limited Talkgroup Scan

Limited Talkgroup Scan is one of the Scan Types used in a P25 Trunking system.

In Limited Talkgroup Scan, the transceiver waits for Group Calls from multiple Talkgroups on a control channel. If the transceiver receives a Group Call message for the Talkgroup of the channel registered in the Scan List, the transceiver migrates to a traffic channel and emits the audio. Also, the transceiver periodically checks for the presence of a signal on a Conventional Channel (Analog or P25). If the time configured in **System Search Time** elapses, the transceiver scans Conventional Channels registered in the Scan List.

If "Limited Talkgroup" is configured in **Scan Type (Scan List)**, a zone channel in a system where "P25 Trunking" is configured in **System Type** and a zone channel in a system where "Analog Conventional" or "P25 Conventional" is configured in **System Type** can be registered as a member for List Scan.

Configuration using KPG-D1/ D1N

- Configuring **Scan Type (Scan List)** (See Transceiver Settings > Scan Information > Scan List)
- Configuring **System Search Time** (See Transceiver Settings > Scan Information > Scan List > Options)

6.4 Scanning All Target Zones for Scanning (Multi-Zone Scan)

In a P25 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 scanning 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

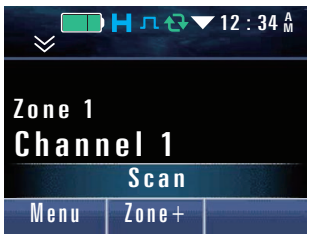
1 **Press the Scan key.**

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 flashes according to the configuration of **Non-Priority Scan LED** and **Priority Scan LED** respectively in the case of Non-priority Scan and 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 = NXDN Conventional
  - System Type = P25 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 > P25 Conventional (P25 Voting with NAC) > 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 on 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.

6.5 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 P25 Conventional system.

- **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”.

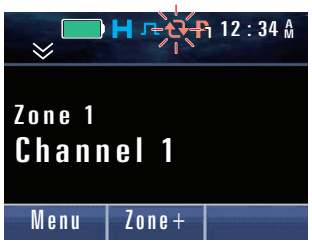
Table 6-3 Type

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

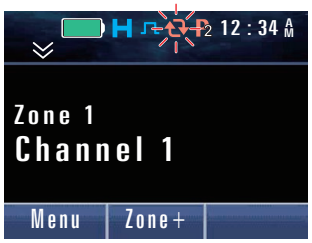
- **If the Zone-channel configured for the Priority 1 is selected, or if the scan is paused on the Zone-channel configured for the Priority 1**

  The "P1" icon appears. When Priority Scan is paused, the " " icon blinks.



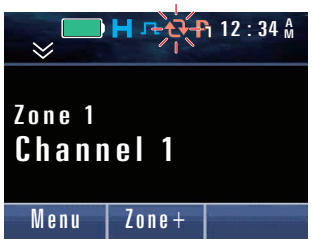
- **If the Zone-channel configured for the Priority 2 is selected, or if the scan is paused on the Zone-channel configured for the Priority 2**

  The "P2" icon appears. When Priority Scan is paused, the " " icon blinks.



- **If the same Zone-channel is selected for the Priority 1 and Priority 2, or if the scan is paused on the same Zone-channel configured for the Priority 1 and Priority 2**

  The "P1" 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 Information > Zone Edit > Single Scan > Priority 1)
- Configuring **Priority 2** (Single Scan) (See Transceiver Settings > Zone/Channel Information > Zone Edit > Single Scan > Priority 2)
- Configuring **Priority 1** (List Scan) (See Transceiver Settings > Scan Information > Scan List > Options > Priority 1)
- Configuring **Priority 2** (List Scan) (See Transceiver Settings > Scan Information > Scan List > Options > Priority 2)
- Configuring **Priority-channel Stop Tone** to be enabled or disabled (See Transceiver Settings > 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**.

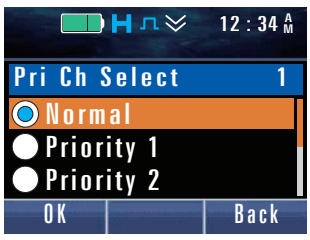
Operating the transceiver

- **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.

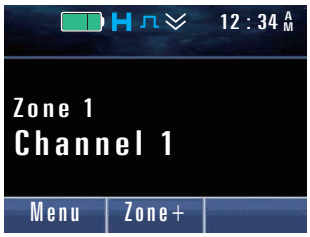


2 **Select the priority of a channel by pressing the [▲] or [▼] key.**

Priority can be selected from “Normal”, “Priority 1”, “Priority 2”, and “Priority 1&2”.

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

After a 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.**

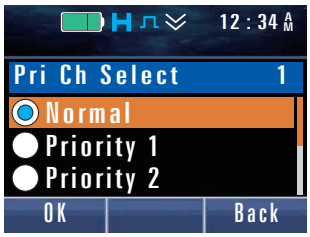
A Key Beep A (1 beep) sounds from the transceiver.

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 Scan Program Mode by pressing the **Menu** key.

2 **Press the Function [○] key.**

The transceiver enters the Priority Channel edit screen.

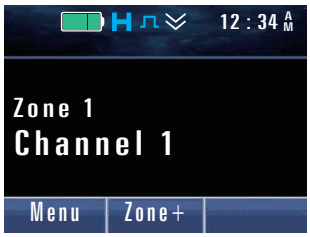


3 **Select the priority of a channel by pressing the [▲] or [▼] key.**

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 NAC in the P25 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.

Configuration using KPG-D1/ D1N

- Configuring **Lookback Time A**/ **Lookback Time B** (Single Scan) (See Transceiver Settings > Zone/Channel Information > Zone Edit > Single Scan)
- Configuring **Lookback Time A**/ **Lookback Time B** (List Scan) (See Transceiver Settings > Scan Information > 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

- Configuring **Priority 1 Temporary Delete/Add** (Single Scan) to be enabled or disabled (See Transceiver Settings > Zone/Channel Information > Zone Edit > Single Scan > Priority 1)
- Configuring **Priority 2 Temporary Delete/Add** (Single Scan) to be enabled or disabled (See Transceiver Settings > Zone/Channel Information > Zone Edit > Single Scan > Priority 2)
- Configuring **Priority 1 Temporary Delete/Add** (List Scan) to be enabled or disabled (See Transceiver Settings > Scan Information > Scan List > Options > Priority 1)
- Configuring **Priority 2 Temporary Delete/Add** (List Scan) to be enabled or disabled (See Transceiver Settings > Scan Information > 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.

This operation is also applied to Priority Monitor Scan in a P25 Trunking system.

Configuration using KPG-D1/ D1N

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

6.6 Priority Monitor Scan (P25 Trunking system only)

Priority Monitor Scan is the scan for a P25 Trunking system, and when a voice communication of higher priority is initiated while receiving on a normal channel, this function can switch on the traffic channel to the voice communication (on the Priority Channel).

In order to use this function, the system must be configured to send a message including Group Call information on the traffic channel. The transceiver determines based on this information whether or not to migrate to the Priority 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.

Priority Channel Type (Type)

Priority Channel Type can be selected from “None”, “Fixed”, “Selected” and “Operator Selectable”.

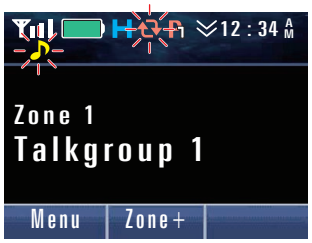
Table 6-4 Type

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) is configured as the Priority Channel. (Refer to Changing the Priority Channel.)

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.



- **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 "P2" icon appears.

- **If the same Zone-channel is selected for the Priority 1 and Priority 2, or if the scan is paused on the same Zone-channel configured for the Priority 1 and Priority 2**

  The "P1" icon with higher priority appears.

Note

- If **Priority-channel Stop Tone** is enabled, a Priority-channel Tone (1 beep) sounds from the transceiver when the scan is paused on the Priority Channel.
- 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.

Configuration using KPG-D1/ D1N

- Configuring **Priority 1** (Single Scan) (See Transceiver Settings > Zone/Channel Information > Zone Edit > Single Scan > Priority 1)
- Configuring **Priority 2** (Single Scan) (See Transceiver Settings > Zone/Channel Information > Zone Edit > Single Scan > Priority 2)
- Configuring **Priority 1** (List Scan) (See Transceiver Settings > Scan Information > Scan List > Options > Priority 1)
- Configuring **Priority 2** (List Scan) (See Transceiver Settings > Scan Information > Scan List > Options > Priority 2)
- Configuring **Priority-channel Stop Tone** to be enabled or disabled (See Transceiver Settings > Scan Information > General)

6.7 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 Behavior during the Scan in a P25 Conventional System

The following are the reception behaviors during the scan in a P25 Conventional system:

- **Squelch Type = NAC behavior**

  The transceiver receives a NAC in each channel, and pauses the scan if the received NAC matches the NAC preconfigured for the transceiver. If the matching state of the NAC becomes inconsistent, **Dropout Delay Time** is activated. After the time configured in **Dropout Delay Time** elapses, the transceiver resumes the scan.

- **Squelch Type = Selective Call behavior**

  The transceiver receives a NAC and ID (Talkgroup ID or Individual ID) on each channel, and pauses the scan if the received NAC and ID match the NAC and ID preconfigured for the transceiver.

  If the matching state of the NAC or ID becomes inconsistent, **Dropout Delay Time** is activated. After the time configured in **Dropout Delay Time** elapses, the transceiver resumes the scan. However, when an Individual Call is received, the scan may not resume even when the time configured in **Dropout Delay Time** elapses depending on the configuration in **Auto Reset Timer**.

- **Squelch Type = Optional Signaling behavior**

  If “Optional Signaling” is configured in **Squelch Type**, the transceiver behaves as follows according to the configuration in **Audio Control**:

  - **NAC behavior**

    The transceiver receives a NAC in each channel, and pauses the scan if the received NAC matches the NAC preconfigured for the transceiver. If the matching state of the NAC becomes inconsistent, **Dropout Delay Time** is activated. After the time configured in **Dropout Delay Time** elapses, the transceiver resumes the scan.

  - **NAC-Optional Signaling (2-tone) AND behavior**

    The transceiver receives a NAC in each channel, and pauses the scan if the received NAC matches the NAC preconfigured for the transceiver. In this case, no audio sounds from the speaker, and the transceiver waits to receive Optional Signaling (2-tone code). If the matching state of the NAC becomes inconsistent while the transceiver is waiting to receive Optional Signaling, **Dropout Delay Time** is activated. After the time configured in **Dropout Delay Time** elapses, the transceiver resumes the scan.

The transceiver emits the received audio from the speaker if the received Optional Signaling matches the Optional Signaling preconfigured for the transceiver while waiting to receive the Optional Signaling. After the Optional Signaling matches, the transceiver waits to receive on the channel where the transceiver received the Optional Signaling.

Reception Behavior during the Scan in a P25 Trunking System

During the scan, the transceiver waits for Group Calls from multiple Talkgroups on a control channel. When a Group Call for the Talkgroup of a channel to be scanned is received, the transceiver stops scanning and migrates to a traffic channel.

The transceiver can activate the Priority Monitor Scan until the transceiver returns to the control channel after migrating to the traffic channel. (Refer to Priority Monitor Scan (P25 Trunking system only).)

Transceiver behavior when receiving an Individual Call or Group Call during the Scan

If the transceiver receives an Individual Call or Group Call during the scan, the scan resumes at the following timings according to the configurations in **Dropout Delay Time** and **Auto Reset Timer**:

- **If the time configured in Auto Reset Timer is longer than the time configured in Dropout Delay Time**

  When the time configured in **Auto Reset Timer** elapses, the reception display for Individual Call or Group Call is disabled and the scan resumes. When the time configured in **Dropout Delay Time** elapses, the scan does not resume.

- **If the time configured in Auto Reset Timer is shorter than the time configured in Dropout Delay Time**

  When the time configured in **Auto Reset Timer** elapses, the reception state for Individual Call or Group Call is disabled, and when the time configured in **Dropout Delay Time** elapses, the scan resumes.

- **If “Off” is configured in Auto Reset Timer**

  Even if the time configured in **Dropout Delay Time** elapses, the scan does not resume.

6.8 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
- P25 Data Channel for Scan

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

If “Single” or “Multi-Zone” is 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.

If “List” is configured in Scan Type:

Pressing the **Scan Delete/Add** key allows you to add the selected channel temporarily as a member to the Scan List configured for the selected channel, or delete the channel temporarily from the Scan List configured for the selected channel (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 6-5 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 Information > Zone Edit > Single Scan)
- Configuring **Revert Channel** (List Scan) (See Transceiver Settings > Scan Information > 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 NAC 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 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 Information > General)

Channel Recall

Channel Recall can be used 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 **Channel Recall** is enabled and the scan is paused, a 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 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 > P25 Conventional) to be enabled or disabled (See Transceiver Settings > Personal > Personality > P25 Conventional (P25 Voting with NAC))
- Configuring **Auto Scan** (Personality > P25 Trunking) to be enabled or disabled (See Transceiver Settings > Personal > Personality > P25 Trunking)
- Configuring **Auto Scan** (Channel Edit > P25 Conventional) to be enabled or disabled (See Transceiver Settings > Zone/Channel Information > Channel Edit > P25 Conventional)
- Configuring **Auto Scan** (Channel Edit > P25 Trunking) to be enabled or disabled (See Transceiver Settings > Zone/Channel Information > Channel Edit > P25 Trunking)

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 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 Information > General)

Starting Scanning by Linking with the Microphone (Off-hook Scan) (Mobile Only)

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 6-6 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 Information > General)

Scan Stop Tone

Scan Stop Tone is the function to emit a 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 Information > General)

Preamble Length (P25 Conventional System Only)

Preamble Length is the function to extend time for sending a preamble when the P25 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 255. The “01 01 11 11” symbol is prefixed to the synchronization signal (Frame Sync.) of HDU for each 1 configuration value.

Configuration using KPG-D1/ D1N

Configuring **Preamble Length** (See Transceiver Settings > Personal > Personal Features > P25 Conventional (P25 Voting with NAC) > P25 > Digital Option)

P25 Data Packet Communication During a Scan (P25 Data Channel for Scan) (P25 Conventional System Only)

P25 Data Channel for Scan is the function to execute P25 Data Packet communication of P25 OTAR during a scan. (Refer to P25 OTAR.)

The transceiver performs the reception behavior as below according to the configuration in **Type** of **P25 Data Channel for Scan**.

Table 6-7 P25 Data Channel for Scan Type

Configuration	Description
None	The transceiver does not receive the P25 Data Packet during a scan.
Fixed	The transceiver receives the P25 Data Packet on a Zone-channel configured by KPG-D1/ D1N during a scan.
Selected	The transceiver receives the P25 Data Packet on a selected channel during a scan. However, if the selected channel cannot be used due to an error state, the transceiver does not receive the P25 Packet Data.

Note

- Audio can also be received by using **P25 Data Channel for Scan**.
- **Dwell Time** is activated after the transceiver sends packet data. **Dropout Delay Time** is activated after the transceiver receives packet data.
- A text message, GPS data, or OTAP control data is sent on a Revert Channel during a scan.
- If “None” or “Selected” is configured in **Type** of **P25 Data Channel for Scan**, a Rekey Request is sent on the selected channel. If “Fixed” is configured in **Type** of **P25 Data Channel for Scan**, a Rekey Request is sent on the Zone-channel configured by using KPG-D1/ D1N.

Configuration using KPG-D1/ D1N

- Configuring **P25 Data Channel for Scan** (Single Scan) (See Transceiver Settings > Zone/Channel > Zone Edit > Scan > Single Scan)
- Configuring **P25 Data Channel for Scan** (Multi-Zone Scan) (See Transceiver Settings > Scan > Multi-Zone Scan)
- Configuring **P25 Data Channel for Scan** (Scan List) (See Transceiver Settings > Scan > Scan List > Options)

The transceiver can establish data communications using external devices such as the MDT.

7.1 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 7-1 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 the Public Address function is used (Mobile only)
- While External PTT (PA) is active (Mobile only)
- While the transceiver is in Emergency Mode
- While the transceiver is in Transceiver Password Mode
- While the transceiver is 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)

7.2 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.

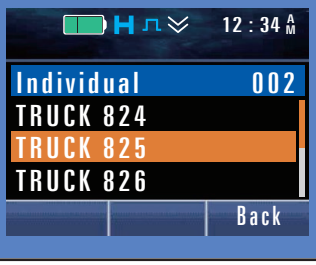
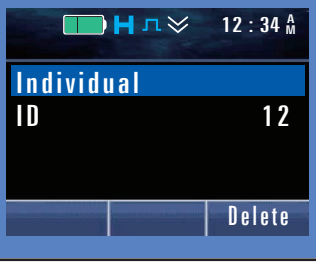
This function can be used for the following communications in a P25 system:

- Automatic GPS data transmission
- GPS transmission by GPS Polling reception
- GPS transmission by GPS Distance Change (Automatic GPS data transmission)

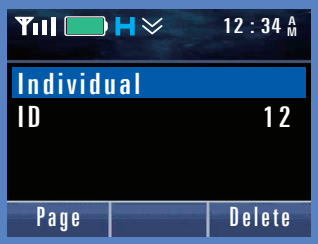
Configuration using KPG-D1/ D1N

Configuring **Silent Report** to be enabled or disabled (See Transceiver Settings > Optional Features > Optional Features 1 > Others)

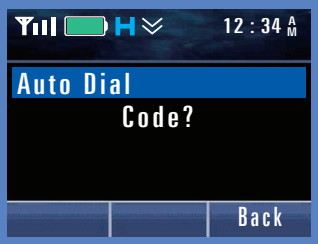
Key operations for selecting a list or entering characters are described for each mode in this section. Refer to Common FUNC "Operating the Transceiver in Each Mode (Common Operation)" for instruction.

Key		Individual Call Mode (P25 Conventional)		Talkgroup ID Select Mode (P25 Conventional)
		Selecting a list	Manual entry	Selecting a list
				
Menu ([▣])	Press	-	Confirms the Digit No. while the Digit No. blinks.	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).	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 an Individual ID registered in the Individual ID List one at a time.	Selects a Digit No. by changing the Digit No. one at a time.	Selects a Talkgroup ID registered in the Talkgroup ID List one at a time.
	Hold Down	Selects an Individual ID registered in the Individual ID List continuously.	Selects a Digit No. by changing continuously from one number to another.	Selects a Talkgroup ID registered in the Talkgroup ID List continuously.
[◀]/ [▶] or [△]/ [□]*2	Press	Migrates to Text Messaging Mode.	-	-
Selector*1	-	The configured function functions after aborting the current mode.		
Lever Switch*3	-	The configured function functions after aborting the current mode.		
[0] to [9]	Press	Directly selects an Individual ID registered in the list.	Enters the Digit No.	Directly selects a Talkgroup ID registered in the list.
[*]	Press	-	Confirms the Digit No. while the Digit No. blinks.	Confirms the configuration and then aborts 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.		

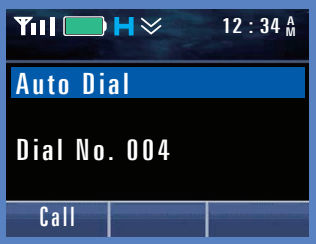
*1 Portable only
*2 KCH-20R (Featured Panel) only
*3 Portable and KCH-20R (Featured Panel) only

Key		Individual Call Mode (P25 Trunking)	
		Selecting a list 	Manual entry 
Menu ([▯])	Press	Initiates a Paging Call after aborting the current mode.	When the Digit No. does not blink, initiates the Paging Call after aborting the current mode. Confirms the Digit No. while the Digit No. blinks.
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 (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 an Individual ID registered in the Individual ID List one at a time.	Selects a Digit No. one at a time.
	Hold Down	Selects an Individual ID registered in the Individual ID List continuously.	Selects a Digit No. continuously.
[◀]/ [▶] or [△]/ [□]*2	Press	-	
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 an Individual ID registered in the list.	Enters the Digit No.
[*]	Press	Initiates a Paging Call after aborting the current mode.	When the Digit No. does not blink, initiates the Paging Call after aborting the current mode. Confirms the Digit No. while the Digit No. blinks.
[#]	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		Autodial Mode (P25 Trunking)	
		Selecting a list	Manual entry
			
Menu ([ ])	Press	Transmits after aborting the current mode.	Confirms the code while the code blinks.
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). Confirms the code while the code blinks.
	Hold Down	-	Deletes all characters.
Function ([ ])	Press	Migrates to the code entry mode (only if "Unlimited" is configured in Telephone Interconnect).	Migrates to the list selection mode.
Home ([ ])	Press	Aborts the current mode.	
Side 1*1 or [+]*3	Press	The configured function functions.	
Side 2*1 or [-]*3	Press	The configured function functions.	
Side 3*1	Press	The configured function functions.	
[▲]/ [▼]	Press	Selects a DTMF code registered in the Autodial List one at a time.	Selects a DTMF code one at a time.
	Hold Down	Selects a DTMF code registered in the Autodial List continuously.	Selects a DTMF code continuously.
[◀]/ [▶] or [ ]/ [ ]*3	Press	-	
Selector*3	-	The configured function functions after aborting the current mode.	
Lever Switch*4	-	The configured function functions after aborting the current mode.	
[0] to [9]	Press	Directly selects a DTMF code registered in the list.	Enters a DTMF code.
[A] to [D]*2	Press	-	Enters each of "A", "B", "C", or "D" code.
[*]	Press	Pressing **[0]** after **[*]** allows redialing.	**If * and # key-entry Pattern is enabled:** Migrates to the DTMF code entry mode. Pressing **[0]** subsequently allows redialing. Pressing the **[7]**, **[*]**, or **[#]** key subsequently causes the transceiver to enter "P", "*", or "#", respectively. **If * and # key-entry Pattern is disabled:** Enters "*".
	Hold Down	-	**If * and # key-entry Pattern is enabled:** Migrates to the DTMF code entry mode. Pressing the **[2]**, **[5]**, **[8]**, or **[0]** key subsequently causes the transceiver to enter "A", "B", "C", or "D", respectively.
[#]	Press	Returns to the menu (if the transceiver enters this mode by pressing the **Menu** key).	**If * and # key-entry Pattern is enabled:** Deletes one character. Returns to the menu if no character is entered (if the transceiver enters this mode by pressing the **Menu** key). **If * and # key-entry Pattern is disabled:** Enters "#".
	Hold Down	-	**If * and # key-entry Pattern is enabled:** Deletes all characters.
PTT Switch	Press	Transmits after aborting the current mode.	

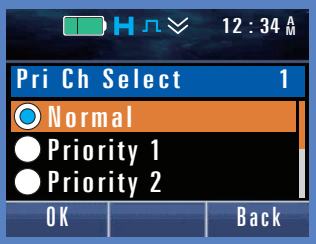
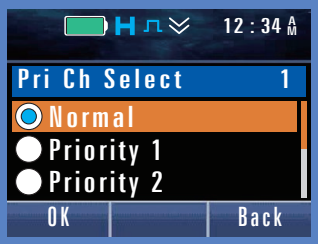
*1 Portable only
*2 Mobile (when using KMC-32) only
*3 KCH-20R (Featured Panel) only
*4 Portable and KCH-20R (Featured Panel) only

Key		Redial Mode (P25 Trunking)	Status Mode (P25 Trunking)	Scrambler/Encryption Code Mode
				
Menu ([▣])	Press	Transmits after aborting the current mode.	Transmits the status after aborting the current mode.	Confirms the configuration and then aborts the current mode. Restores the presets and then aborts the current mode.
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 a status registered in the Status List one at a time.	Selects a Multi-key registered in the Multi-key List one at a time.
	Hold Down	-	Selects a status registered in the Status List by changing continuously.	Selects a Multi-key registered in the Multi-key List continuously.
[◀] or [▲]*2	Press	-	Shifts to the Individual Call Mode.	-
[▶] or [■]*2	Press	-		
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 status registered in the list.	Directly selects a Multi-key registered in the list.
[*]	Press	-	Transmits the status after aborting the current mode.	Confirms the configuration and then aborts the current mode. Restores the presets and then aborts 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.	Transmits after aborting the current mode.

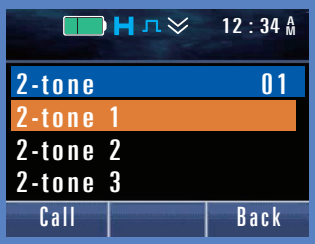
*1 Portable only
*2 KCH-20R (Featured Panel) only
*3 Portable and KCH-20R (Featured Panel) only

Key		Key Delete Mode	Keyset Select Mode	Scan Program Mode
				
Menu ([▣])	Press	Confirms the configuration and then aborts the current mode.	Confirms the active Keyset and then aborts the current mode.	Confirms addition or deletion.
Back ([⮌])	Press	Deletes the selected Multi-key.	Returns to the menu (if the transceiver enters this mode by pressing the **Menu** key).	
	Hold Down	Deletes all encryption keys written on the SCM.	-	
Function ([◯])	Press	-		The transceiver enters the Priority Channel 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 a Multi-key registered in the Multi-key List one at a time.	Selects a Keyset one at a time.	Selects a channel one at a time.
	Hold Down	Selects a Multi-key registered in the Multi-key List continuously.	Selects a Keyset continuously.	Selects a channel continuously.
[◀]/ [▶] or [△]/ [□]*2	Press	-		Selects a zone one at a time.
	Hold Down	-		Selects a zone 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	Directly selects a Multi-key registered in the list.	-	
[*]	Press	Confirms the configuration and then aborts the current mode.	Confirms the active Keyset and then aborts the current mode.	Confirms addition or deletion.
[#]	Press	Deletes the selected Multi-key.	Returns to the menu (if the transceiver enters this mode by pressing the **Menu** key).	
	Hold Down	Deletes all encryption keys written on the SCM.	-	
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		Priority-Channel	Priority-channel Select Mode
			
Menu ([▯])	Press	Confirms the configuration and then restores the Scan List edit screen.	Confirms the configuration and then aborts the current mode.
Back ([⮌])	Press	Restores the Scan List edit screen.	Returns to the menu (if the transceiver enters this mode by pressing the **Menu** key).
Function ([◯])	Press	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 a configuration item one at a time.	
	Hold Down	Selects a configuration item continuously.	
[◀]/ [▶] or [△]/ [▢]*2	Press	-	
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 the configuration and then restores the Scan List edit screen.	Confirms the configuration and then aborts the current mode.
[#]	Press	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.

*1 Portable only
*2 KCH-20R (Featured Panel) only
*3 Portable and KCH-20R (Featured Panel) only

Key		2-tone Mode	Text Messaging Mode
			
Menu ([▣])	Press	Transmits after aborting the current mode.	Sends a message after aborting the current mode (after finalizing the characters). Finalizes the characters (while the characters are blinking).
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	-	Switches character types (upper case/lower case/ numeric).
Home ([⌂])	Press	Aborts the current mode.	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 a 2-tone code one at a time.	**If "Characters" is configured in Up/Down:** Selects a character one at a time. **If "Line Up/Down" is configured in Up/Down:** Shifts the cursor up or down.
	Hold Down	Selects a 2-tone code continuously.	**If "Characters" is configured in Up/Down:** Selects characters continuously. **If "Line Up/Down" is configured in Up/Down:** Shifts the cursor up or down continuously.
[◀] or [△]*2	Press	-	Shifts the cursor to the left. Migrates to Individual Call Mode when a character is not 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	Directly selects a 2-tone code registered in the list.	Enters characters.
[*]	Press	Transmits after aborting the current mode.	Switches character types (upper case/lower case/ numeric) (after finalizing the characters). Finalizes the characters (while the characters are blinking).
[#]	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.	Sends a message after aborting the current mode.

*1 Portable only
*2 KCH-20R (Featured Panel) only
*3 Portable and KCH-20R (Featured Panel) only

● Control Tone

Tone Name	Pattern	Reference
Key Beep A	1 beep  1630 Hz (500 ms)	System Search Site Lock Lone Worker Mode Activity Detection Rekey Request Keyset Select Single Scan List Scan Scan Program
Key Beep B	2 beeps  1630 Hz (50 ms)	Site Lock Lone Worker Mode Activity Detection Single Scan List Scan Scan Program Priority-channel Select Mode
Key Beep C	3 beeps  1630 Hz (50 ms)	Zeroize Rekey Request Scan Program Mode
Key-entry Error Tone	1 beep  700 Hz (50 ms)	Telephone Call Rekey Request Keyset Select OTAR Scan Delete/Add
Priority-channel Tone	1 beep  2000 Hz (50 ms)	Priority Scan Priority Monitor 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)	System Search
Out of Range Tone	1 beep  770 Hz (400 ms)	Out of Range Indicator/ Out of Range Tone
Call Request Tone	1 beep  1630 Hz (50 ms)	Call Request Tone Individual Call (P25 Trunking) Group Call (P25 Trunking) Telephone Call

Tone Name	Pattern	Reference
Call In Progress Tone	2 beeps  980 Hz (100 ms)	Individual Call (P25 Trunking) Telephone Call
Disconnect Indication Tone	2 beeps  980 Hz (300 ms) 490 Hz (300 ms)	Individual Call (P25 Trunking) Telephone Call
Key Load Alert Tone	1 beep  1633 Hz (1 sec)	Secure Cryptographic Module (SCM)
Complete Tone	5 beeps  980 Hz (20 ms)	Paging Call Status

● Warning Tone

Tone Name	Pattern	Reference
Warning Tone A	continuous beep  700 Hz (until the **PTT** switch is released)	Busy Channel Lockout Individual Call (P25 Trunking) Group Call (P25 Trunking) Telephone Call
TOT Pre-alert Tone	3 beeps  1630 Hz (50 ms)	Time-out Timer
Call Queue Tone	2 beeps  940 Hz (50 ms)	Individual Call (P25 Trunking) Group Call (P25 Trunking) Telephone Call
Call Invalid Tone	4 beeps  440 Hz (1 sec) 440 Hz (50 ms)	Individual Call (P25 Trunking) Group Call (P25 Trunking) Telephone Call Status
Invalid Dial Tone	5 beeps  440 Hz (50 ms) 440 Hz (700 ms) 440 Hz (50 ms)	Telephone Call
Not Authorized Tone	4 beeps  440 Hz (300 ms) 440 Hz (50 ms) 440 Hz (800 ms)	Telephone Call

Tone Name	Pattern	Reference
No Reply Tone	4 beeps  440 Hz (50 ms) 440 Hz (1 sec)	Individual Call (P25 Trunking) Paging Call Telephone Call Status Rekey Request
Call Fail Tone	2 beeps  440 Hz (50 ms) 440 Hz (1 sec)	Individual Call (P25 Trunking) Group Call (P25 Trunking) Telephone Call Keyset Select
Call Deny Tone	3 beeps  440 Hz (200 ms) 440 Hz (80 ms) 440 Hz (900 ms)	Individual Call (P25 Trunking) Rekey Request Keyset Select
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 (P25 Trunking) Group Call (P25 Trunking) Telephone Call
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)	SNDCP Encryption Secure Cryptographic Module (SCM)
Ignore Encryption Switch Alert Tone	continuous beep  697 Hz (until the **PTT** switch is released)	Ignore Encryption Switch When Strapped
Site Trunking Tone	2 beeps  620 Hz (100 ms) 930 Hz (100 ms)	Site Trunking

● 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 (P25 Conventional) Group Call (P25 Conventional) Call Request Tone/ Call Processing Tone Individual Call (P25 Trunking) Group Call (P25 Trunking) Telephone Call

● Alert Tone

Tone Name	Pattern	Reference
Transmit Clear Alert Tone	1 beep  1477 Hz (50 ms)	Transmit Clear Alert Tone
Ack Wait Enter Tone	7 beeps  770 Hz (30 ms)	Rekey Request

● Transmit Tone

Tone Name	Pattern	Reference
PTT Release Tone	1 beep  1397 Hz (100 ms)	Individual Call (P25 Conventional) Group Call (P25 Conventional)
Background Tone	1 beep  1630 Hz (50 ms)	Emergency Mode

Numerics

A

B

C

D

E

F

G

H

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M

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P

Q

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W

Z