

KENWOOD

NEXEDGE

NX-220/ NX-320



VHF DIGITAL TRANSCEIVER/
UHF DIGITAL TRANSCEIVER
INSTRUCTION MANUAL

ÉMETTEUR-RÉCEPTEUR NUMÉRIQUE VHF/
ÉMETTEUR-RÉCEPTEUR NUMÉRIQUE UHF
MODE D'EMPLOI

TRANSCPTOR DIGITAL VHF/
TRANSCPTOR DIGITAL UHF
MANUAL DE INSTRUCCIONES

Kenwood Corporation

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VHF DIGITAL TRANSCEIVER/
UHF DIGITAL TRANSCEIVER

NX-220/ NX-320

INSTRUCTION MANUAL

Kenwood Corporation

ENGLISH

THANK YOU

We are grateful you have chosen **Kenwood** for your land mobile radio applications.

NOTICES TO THE USER

- ◆ Government law prohibits the operation of unlicensed radio transmitters within the territories under government control.
- ◆ Illegal operation is punishable by fine and/or imprisonment.
- ◆ Refer service to qualified technicians only.

Safety: It is important that the operator is aware of, and understands, hazards common to the operation of any transceiver.

The AMBE+2™ voice coding Technology embodied in this product is protected by intellectual property rights including patent rights, copyrights and trade secrets of Digital Voice Systems, Inc. This voice coding Technology is licensed solely for use within this Communications Equipment. The user of this Technology is explicitly prohibited from attempting to extract, remove, decompile, reverse engineer, or disassemble the Object Code, or in any other way convert the Object Code into a human-readable form. U.S. Patent Nos. #5,870,405, #5,826,222, #5,754,974, #5,701,390, #5,715,365, #5,649,050, #5,630,011, #5,581,656, #5,517,511, #5,491,772, #5,247,579, #5,226,084 and #5,195,166.

Firmware Copyrights

The title to and ownership of copyrights for firmware embedded in Kenwood product memories are reserved for Kenwood Corporation.



ATTENTION:

The RBRC Recycle seal found on **Kenwood** lithium-ion (Li-ion) battery packs indicates **Kenwood's** voluntary participation in an industry program to collect and recycle Li-ion batteries after their operating life has expired. The RBRC program is an alternative to disposing Li-ion batteries with your regular refuse or in municipal waste streams, which is illegal in some areas.

For information on Li-ion battery recycling in your area, call (toll free) 1-800-8-BATTERY (1-800-822-8837).

Kenwood's involvement in this program is part of our commitment to preserve our environment and conserve our natural resources.



ATTENTION:

The RBRC Recycle seal found on **Kenwood** nickel metal hydride (Ni-MH) battery packs indicates **Kenwood's** voluntary participation in an industry program to collect and recycle Ni-MH batteries after their operating life has expired. The RBRC program is an alternative to disposing Ni-MH batteries with your regular refuse or in municipal waste streams, which is illegal in some areas.

For information on Ni-MH battery recycling in your area, call (toll free) 1-800-8-BATTERY (1-800-822-8837).

Kenwood's involvement in this program is part of our commitment to preserve our environment and conserve our natural resources.

TERMINAL DESCRIPTIONS

Speaker/ Microphone Jacks

You can use a resin-based cover for the Speaker/ Microphone jacks.

No.	Name	Description	Impedance	I/O
1	PTT/RXD	PTT input / Serial data input	10 k Ω	I
2	MICI	MIC input	1.8 k Ω	I
3	MICO	Output from internal MIC	–	O
4	OPTDET	Option Detect	74 k Ω	I
5	50V	5V output	–	O
6	AE	Audio Earth	GND	–
7	TXD	Serial data output	6.8 k Ω	O
8	SPI	To internal SP	8 Ω (Load)	I
9	SPO	AF power output	–	O

Antenna Terminal

50 Ω impedance

One or more of the following statements may be applicable:

FCC WARNING

This equipment generates or uses radio frequency energy. Changes or modifications to this equipment may cause harmful interference unless the modifications are expressly approved in the instruction manual. The user could lose the authority to operate this equipment if an unauthorized change or modification is made.

INFORMATION TO THE DIGITAL DEVICE USER REQUIRED BY THE FCC

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can generate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer for technical assistance.

PRECAUTIONS

- Do not charge the transceiver and battery pack when they are wet.
- Ensure that there are no metallic items located between the transceiver and the battery pack.
- Do not use options not specified by **Kenwood**.
- If the die-cast chassis or other transceiver part is damaged, do not touch the damaged parts.
- If a headset or headphone is connected to the transceiver, reduce the transceiver volume. Pay attention to the volume level when turning the squelch off.
- Do not place the microphone cable around your neck while near machinery that may catch the cable.
- Do not place the transceiver on unstable surfaces.
- Ensure that the end of the antenna does not touch your eyes.
- When the transceiver is used for transmission for many hours, the radiator and chassis will become hot. Do not touch these locations when replacing the battery pack.
- Always switch the transceiver power off before installing optional accessories.
- The charger is the device that disconnects the unit from the AC mains line. The AC plug should be readily accessible.



WARNING

Turn the transceiver power off in the following locations:

- Near explosives or blasting sites.
- In aircrafts. (Any use of the transceiver must follow the instructions and regulations provided by the airline crew.)
- Where restrictions or warnings are posted regarding the use of radio devices, including but not limited to medical facilities.
- Near persons wearing pacemakers.

Turn the transceiver power off in the following locations, unless the model is specifically qualified for such use (Intrinsically Safe such as approved by Factory Mutual, CSA):

- In explosive atmospheres (flammable gas, dust particles, metallic powders, grain powders, etc.).
- While taking on fuel or while parked at gasoline service stations.

**CAUTION**

- Do not disassemble or modify the transceiver for any reason.
- Do not place the transceiver on or near airbag equipment while the vehicle is running. When the airbag inflates, the transceiver may be ejected and strike the driver or passengers.
- Do not transmit while touching the antenna terminal or if any metallic parts are exposed from the antenna covering. Transmitting at such a time may result in a high-frequency burn.
- If an abnormal odor or smoke is detected coming from the transceiver, switch the transceiver power off immediately, remove the battery pack from the transceiver, and contact your **Kenwood** dealer.
- Use of the transceiver while you are driving may be against traffic laws. Please check and observe the vehicle regulations in your area.
- Do not expose the transceiver to extremely hot or cold conditions.
- Do not carry the battery pack (or battery case) with metal objects, as they may short the battery terminals.
- Danger of explosion if the battery is incorrectly replaced; replace only with the same type.
- When operating the transceiver in areas where the air is dry, it is easy to build up an electric charge (static electricity). When using a earphone accessory in such conditions, it is possible for the transceiver to send an electric shock through the earphone and to your ear. We recommend you use only a speaker/ microphone in these conditions, to avoid electric shocks.

INFORMATION CONCERNING THE BATTERY PACK

The battery pack includes flammable objects such as organic solvent. Mishandling may cause the battery to rupture producing flames or extreme heat, deteriorate, or cause other forms of damage to the battery. Please observe the following prohibitive matters.



DANGER

- **Do not disassemble or reconstruct battery!**

The battery pack has a safety function and protection circuit to avoid danger. If they suffer serious damage, the battery may generate heat or smoke, rupture, or burst into flame.

- **Do not short-circuit the battery!**

Do not join the + and – terminals using any form of metal (such as a paper clip or wire). Do not carry or store the battery pack in containers holding metal objects (such as wires, chain-necklace or hairpins). If the battery pack is short-circuited, excessive current will flow and the battery may generate heat or smoke, rupture, or burst into flame. It will also cause metal objects to heat up.

- **Do not incinerate or apply heat to the battery!**

If the insulator is melted, the gas release vent or safety function is damaged, or the electrolyte is ignited, the battery may generate heat or smoke, rupture, or burst into flame.

- **Do not leave the battery near fires, stoves, or other heat generators (areas reaching over 80°C/ 176°F)!**

If the polymer separator is melted due to high temperature, an internal short-circuit may occur in the individual cells and the battery may generate heat or smoke, rupture, or burst into flame.

- **Avoid immersing the battery in water or getting it wet by other means!**

If the battery becomes wet, wipe it off with a dry towel before use. If the battery's protection circuit is damaged, the battery may charge at extreme current (or voltage) and an abnormal chemical reaction may occur. The battery may generate heat or smoke, rupture, or burst into flame.

**DANGER**

- **Do not charge the battery near fires or under direct sunlight!**

If the battery's protection circuit is damaged, the battery may charge at extreme current (or voltage) and an abnormal chemical reaction may occur. The battery may generate heat or smoke, rupture, or burst into flame.

- **Use only the specified charger and observe charging requirements!**

If the battery is charged in unspecified conditions (under high temperature over the regulated value, excessive high voltage or current over regulated value, or with a remodelled charger), it may overcharge or an abnormal chemical reaction may occur. The battery may generate heat or smoke, rupture, or burst into flame.

- **Do not pierce the battery with any object, strike it with an instrument, or step on it!**

This may break or deform the battery, causing a short-circuit. The battery may generate heat or smoke, rupture, or burst into flame.

- **Do not jar or throw the battery!**

An impact may cause the battery to leak, generate heat or smoke, rupture, and/or burst into flame. If the battery's protection circuit is damaged, the battery may charge at an abnormal current (or voltage), and an abnormal chemical reaction may occur.

- **Do not use the battery pack if it is damaged in any way!**

The battery may generate heat or smoke, rupture, or burst into flame.

- **Do not solder directly onto the battery!**

If the insulator is melted or the gas release vent or safety function is damaged, the battery may generate heat or smoke, rupture, or burst into flame.

- **Do not reverse the battery polarity (and terminals)!**

When charging a reversed battery, an abnormal chemical reaction may occur. In some cases, an unexpected large amount of current may flow upon discharging. The battery may generate heat or smoke, rupture, or burst into flame.

**DANGER**

- **Do not reverse-charge or reverse-connect the battery!**

The battery pack has positive and negative poles. If the battery pack does not smoothly connect with a charger or operating equipment, do not force it; check the polarity of the battery. If the battery pack is reverse-connected to the charger, it will be reverse-charged and an abnormal chemical reaction may occur. The battery may generate heat or smoke, rupture, or burst into flame.

- **Do not touch a ruptured and leaking battery!**

If the electrolyte liquid from the battery gets into your eyes, wash your eyes out with fresh water as soon as possible, without rubbing your eyes. Go to the hospital immediately. If left untreated, it may cause eye-problems.

**WARNING**

- **Do not charge the battery for longer than the specified time!**

If the battery pack has not finished charging even after the regulated time has passed, stop it. The battery may generate heat or smoke, rupture, or burst into flame.

- **Do not place the battery pack into a microwave or high pressure container!**

The battery may generate heat or smoke, rupture, or burst into flame.

- **Keep ruptured and leaking battery packs away from fire!**

If the battery pack is leaking (or the battery emits a bad odor), immediately remove it from flammable areas. Electrolyte leaking from battery can easily catch on fire and may cause the battery to generate smoke or burst into flame.

- **Do not use an abnormal battery!**

If the battery pack emits a bad odor, appears to have different coloring, is deformed, or seems abnormal for any other reason, remove it from the charger or operating equipment and do not use it. The battery may generate heat or smoke, rupture, or burst into flame.

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UNPACKING AND CHECKING EQUIPMENT

Note: These unpacking instructions are for use by your **Kenwood** dealer, an authorized **Kenwood** service facility, or the factory.

Carefully unpack the transceiver. If any items are missing or damaged, file a claim with the carrier immediately.

SUPPLIED ACCESSORIES

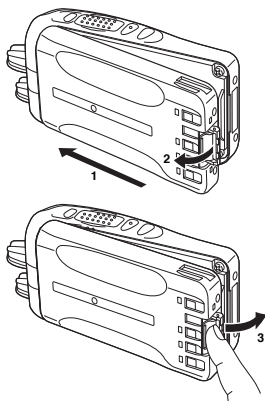
Belt clip	1
Speaker/ microphone jacks cap	1
Speaker/ microphone locking bracket	1
Stopper	1
Instruction manual	1

Note: Inquire at your dealer for a stopper.

PREPARATION

INSTALLING/ REMOVING THE (OPTIONAL) BATTERY PACK

- 1 Match the guides of the battery pack with the grooves on the upper rear of the transceiver, then firmly press the battery pack in place.
- 2 Lock the safety catch to prevent accidentally releasing the battery pack.
- 3 To remove the battery pack, lift the safety catch, press the release latch, then pull the battery pack away from the transceiver.



Note:

- ◆ For battery pack charging procedures and useage, refer to the battery charger Instruction Manual.
- ◆ The battery pack is not charged at the factory; charge it before use.
- ◆ Before charging a battery pack that is attached to the transceiver, ensure that the safety catch is firmly closed.

INSTALLING/ REMOVING ALKALINE BATTERIES (OPTIONAL BATTERY CASE)



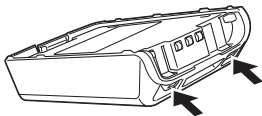
WARNING

- ◆ Do not install batteries in a hazardous environment where sparks could cause an explosion.
- ◆ Never discard batteries in fire; extremely high temperatures can cause batteries to explode.
- ◆ Do not short circuit the battery case terminals.
- ◆ Do not use rechargeable batteries.

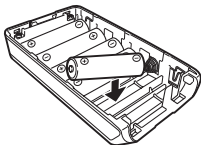
Note:

- ◆ If you do not plan to use the transceiver for a long period, remove the batteries from the battery case.
 - ◆ This battery case has been designed for transmitting at a power of approximately 1 W (the low power setting on your transceiver). If you want to transmit a stronger signal (using the high power setting on your transceiver), use an optional rechargeable battery pack.
-

- 1** To open the battery case, press on the two tabs on the upper rear of the case, then pull the two halves apart.



- 2** Insert 6 AA (LR6) Alkaline batteries into the battery case.
- Be sure to match the polarities with those marked in the bottom of the battery case.

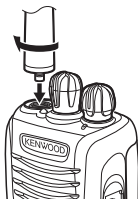


- 3** Align the tabs of the cover with the base, then push down on the cover until it locks in place.



INSTALLING THE (OPTIONAL) ANTENNA

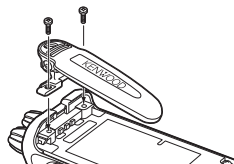
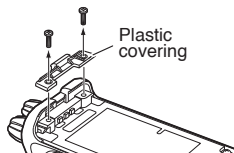
Screw the antenna into the connector on the top of the transceiver by holding the antenna at its base and turning it clockwise until secure.



INSTALLING THE BELT CLIP

Note: When first installing the belt clip, you must remove the battery pack from the rear of the transceiver.

- 1 Remove the 2 screws from the rear of the transceiver, then remove the small, plastic black covering that was held in place.
- 2 Insert the belt clip mount into the space on the rear of the transceiver.
- 3 Using the 2 screws, affix the belt clip in place.



CAUTION

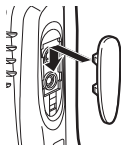
- When the belt clip is not installed, leave the plastic covering in place.
- Do not use glue which is designed to prevent screw loosening when installing the belt clip, as it may cause damage to the transceiver. Acrylic ester, which is contained in these glues, may crack the transceiver's back panel.

INSTALLING THE CAP OVER THE SPEAKER/ MICROPHONE JACKS

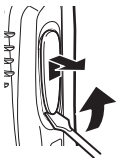
Install the cap over the speaker/ microphone jacks when not using an optional speaker/ microphone.

Note: To keep the transceiver water resistant, you must cover the speaker/ microphone jacks with the supplied cap.

- 1 Place the cap over the jacks so that the locking tabs insert into the transceiver grooves.



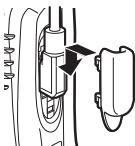
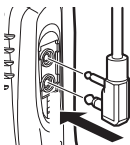
- 2 While holding the cap in place, push it towards the bottom of the transceiver until the tabs on the cap click into place.
- To remove the cap, hold the top of the cap in place with your finger while inserting a 3 mm or smaller flat blade screwdriver under the bottom of the cap. Slowly slide the screwdriver in until its tip touches the tab inside the cap, then gently pry the cap up (handle of screwdriver moving away from the transceiver) to remove the cap.



INSTALLING THE (OPTIONAL) SPEAKER/ MICROPHONE

Note: The transceiver is not fully water resistant when using a speaker/ microphone or headset.

- 1 Insert the speaker/ microphone plugs into the speaker/ microphone jacks of the transceiver.
- 2 Place the locking bracket over the speaker/ microphone plugs so that the locking tabs insert into the transceiver grooves.
- 3 While holding the locking bracket in place, push it towards the bottom of the transceiver until the tabs on the bracket click into place.
- To remove the locking bracket, push the bracket up from the base.



ORIENTATION

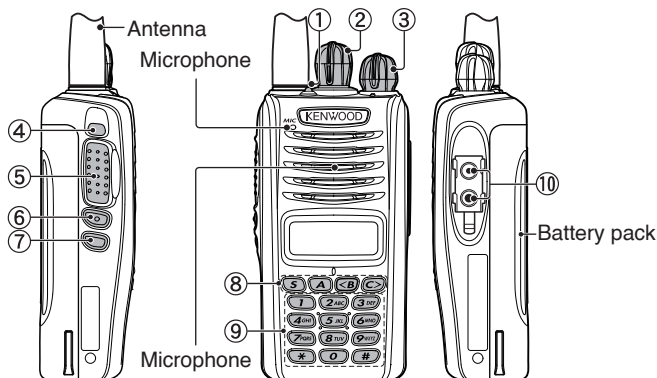
There are 3 types available:

Type I: Equipped with a display and full keypad.

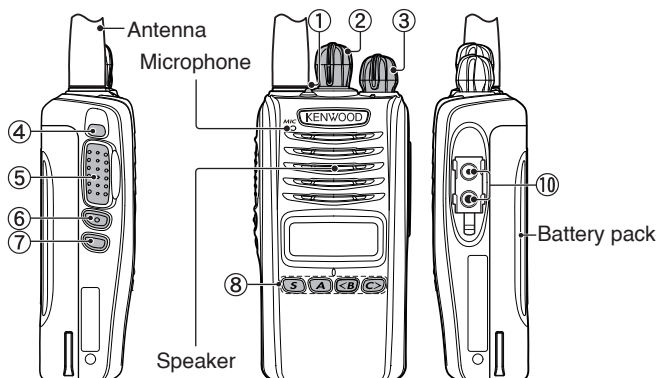
Type II: Equipped with a display and 4-key keypad (S, A, <B, and C>).

Type III: Basic models.

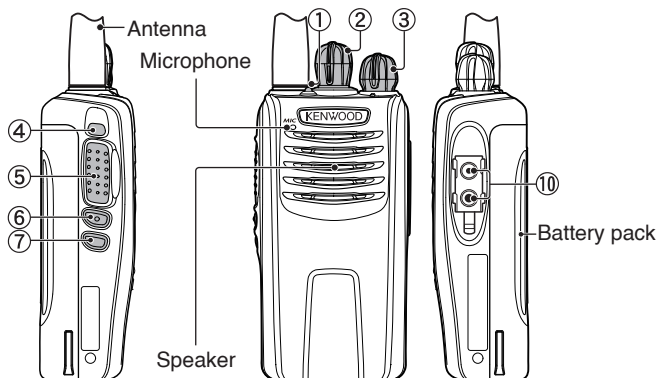
Type I



Type II



Type III



- ① **Transmit/ Receive/ Battery low indicator**
If enabled by your dealer, lights red while transmitting, green while receiving a call (Conventional channels only), and orange when receiving an optional signaling call. Blinks red when the battery power is low while transmitting.
- ② **Selector knob**
Rotate to select a zone or channel/group ID (default).
- ③ **Power switch/ Volume control**
Rotate to turn the transceiver ON/OFF and to adjust the volume.
- ④ **Auxiliary (orange) key**
Press to activate its programmable function {page 10}.
- ⑤ **PTT (Push-To-Talk) switch**
Press and hold this switch, then speak into the microphone to call a station.
- ⑥ **Side 1 key**
Press to activate its programmable function {page 10}.
The default is Squelch Off Momentary.

- ⑦ **Side 2 key**
Press to activate its programmable function {page 10}.
The default is Backlight.
- ⑧ **S, A, <B, C> key <Type I, II>**
Press to activate its programmable function {page 10}.
S key: The default setting is **[None]** (no function).
A key: The default setting is **[None]** (no function).
<B key: The default setting is **[Channel Down]**.
C> key: The default setting is **[Channel Up]**.
- ⑨ **Keypad <Type I>**
Press these keys to send DTMF tones. These keys can also be programmed with secondary functions {page 10} if a programmable function key is programmed as "Function".
- ⑩ **Speaker/ Microphone jacks**
Insert the Speaker/ Microphone or Headset plug into this jack.

DISPLAY <TYPE I, II>



Indicator	Description
	Signal strength indicator {page 28}.
	Monitor or Squelch Off is activated.
	Blinks when an incoming call matches your Optional Signaling.
	Talk Around is activated.
	Scan is in progress. Blinks while scan is paused.
	A message is stored in memory. Blinks when a new message has arrived.
	The current channel is a Priority channel.
	The channel is using low transmit power.
	Scrambler/ Encryption is activated.
	Battery power indicator {page 27}.
	The current zone (left icon) or CH/GID (right icon) is added to scan.
	VOX is activated.
	The auxiliary function is activated.

PROGRAMMABLE AUXILIARY FUNCTIONS

The **Selector**, **Auxiliary (orange)**, **Side 1**, **Side 2**, **S**, **A**, **<B**, and **C>** keys can be programmed with the functions listed below. Please contact your dealer for further details on these functions.

- None
- 2-tone ^{1, 7}
- Activity Detection
- Activity Reset
- Autodial ¹
- Autodial Programming ¹
- Auto Telephone ^{1, 2}
- AUX
- Backlight ¹
- Battery Indicator ³
- Broadcast ⁴
- Call 1 ~ 6
- CH/GID Down
- Channel Entry ¹
- CH/GID Recall
- CH/GID Select ⁵
- CH/GID Up
- CW Message ⁶
- Direct CH/GID 1 ~ 5
- Direct CH/GID Select 1 ~ 5
- Display Format ¹
- Emergency ⁷
- Fixed Volume
- Forced Search ⁴
- Function
- GPS Position Display ¹
- Group ⁶
- Group + Short Message ^{1, 8}
- Group + Status ^{1, 8}
- Home CH/GID
- Home CH/GID Select
- Individual ^{1, 8}
- Individual + Short Message ^{1, 8}
- Individual + Status ^{1, 8}
- Key Lock
- Lone Worker
- Low Transmit Power
- Maintenance ^{1, 8}
- Monitor ⁹
- Monitor Momentary ⁹
- Operator Selectable Tone (OST) ^{1, 10}
- Priority-channel Select ⁷
- Scan
- Scan Delete/Add
- Scrambler/ Encryption
- Selcall ^{1, 10}
- Selcall + Short Message ^{1, 10}
- Selcall + Status ^{1, 10}
- Send the GPS data
- Site Down ⁴
- Site Lock ⁴
- Site Select ⁴
- Site Up ⁴
- Squelch Level ^{1, 10}
- Squelch Off ¹⁰
- Squelch Off Momentary ¹⁰
- Stack ¹
- Status ¹
- Short Message ¹
- Talk Around

- Telephone Disconnect ²
- Transceiver Password ¹
- VOX ¹
- Zone Delete/Add
- Zone Down
- Zone Select ⁵
- Zone Up

¹ Available only for Type I, II.

² Available only for Analog Trunking operation.

³ Available only for Type III.

⁴ Available only for NXDN Trunking operation.

⁵ Can be programmed only on the Selector.

⁶ Available only for NXDN Conventional operation.

⁷ Can be programmed only on the Auxiliary (orange) key.

⁸ Available only for NXDN Conventional operation, and NXDN Trunking operation.

⁹ Available only for Analog Conventional, Analog Trunking, and NXDN Conventional operation.

¹⁰ Available only for Analog Conventional operation.

¹¹ Available only for Analog Conventional and NXDN Conventional operation.

BASIC OPERATIONS

SWITCHING POWER ON/OFF

Turn the **Power** switch/ **Volume** control clockwise to switch the transceiver ON.

Turn the **Power** switch/ **Volume** control counterclockwise fully to switch the transceiver OFF.

■ Transceiver Password <Type I, II>

If your transceiver is password protected, you must first enter the password before you can use the transceiver.

- 1 Rotate the **Selector** to select the first digit of the password.
- 2 Press the **C>** key to accept the entry and move to the next digit.
 - Press the **A** or **#** key to delete an incorrect digit.
- 3 Repeat steps 1 and 2 to enter the entire password.
 - The password can contain a maximum of 6 digits.
- 4 Press the **S** or **✕** key to confirm the entered password.
 - If you enter an incorrect password, an error tone sounds and the transceiver remains locked.

ADJUSTING THE VOLUME

Rotate the **Power** switch/ **Volume** control to adjust the volume. Clockwise increases the volume and counterclockwise decreases it.

SELECTING A ZONE AND CHANNEL/GROUP ID

Select the desired zone using the key programmed as **[Zone Select]** or **[Zone Up/Down]**. Each zone contains a group of channels.

Select the desired channel/group ID using the **Selector** knob (default). Each channel/group ID is programmed with settings for transmitting and receiving.

TRANSMITTING

- 1 Select the desired zone and channel/group ID.
- 2 Press the key programmed as **[Monitor]** or **[Squelch Off]** to check whether or not the channel is free.
 - If the channel is busy, wait until it becomes free.
- 3 Press the **PTT** switch and speak into the microphone. Release the **PTT** switch to receive.
 - For best sound quality, hold the transceiver approximately 1.5 inches (3 ~ 4 cm) from your mouth.

■ Making Group Calls (Digital) <Type I, II>

If a key has been programmed with **[Group]** or **[Group + Status]**, you can select a group ID from the list to make a call to those parties on a Conventional channel.

To select a group ID:

- 1 Press the key programmed as **[Group]** or **[Group + Status]**.
- 2 Press the **<B** or **C>** key programmed to select a group ID/name from the list.
- 3 Press and hold the **PTT** switch to make the call.
 - Speak into the transceiver as you would during a normal transmission.

■ Making Individual Calls (Digital) <Type I, II>

If a key has been programmed with **[Individual]** or **[Individual + Status]**, you can make calls to specific persons.

- 1 Press the key programmed as **[Individual]** or **[Individual + Status]**.
- 2 Press the **<B** or **C>** to select a unit ID from the list.
 - On Type I, you can enter a unit ID directly.
- 3 Press and hold the **PTT** switch to make the call.
 - Speak into the transceiver as you would during a normal transmission.

RECEIVING

Select the desired zone and channel. If signaling has been programmed on the selected channel, you will hear a call only if the received signal matches your transceiver settings.

Note: Signaling allows your transceiver to code your calls. This will prevent you from listening to unwanted calls. Refer to “SIGNALING” on page 24 for details.

■ Receiving Group Calls (Digital)

When you receive a group call on a Conventional channel and the received group ID matches the ID set up on your transceiver, you can hear the caller's voice.

When you receive a group call on a Trunking channel, the transceiver automatically switches to the communications channel to receive the call.

■ Receiving Individual Calls (Digital)

When you receive an individual call, a ringing tone will sound and the caller's ID will appear on the display <Type I, II>. To respond to the call, press and hold the PTT switch and speak into the transceiver as you would during a normal transmission.

SCAN

Scan monitors for signals on the transceiver channels. While scanning, the transceiver checks for a signal on each channel and only stops if a signal is present.

To begin scanning, press the key programmed as **[Scan]**.

- The  indicator on the display <Type I, II>.
- The LED blinks green.
- When a signal is detected on a channel, Scan pauses at that channel. The transceiver will remain on the busy channel until the signal is no longer present, at which time Scan resumes.

To stop scanning, press the **[Scan]** key again.

Note: To use Scan, there must be at least 2 channels in the scan sequence.

TEMPORARY CHANNEL LOCKOUT

During scan, you can temporarily remove specific channels from the scanning sequence by selecting them and pressing the key programmed as **[Scan Delete/Add]**.

- The channel is no longer scanned. However, when scanning is ended and restarted, the channels are reset and deleted channels will again be in the scanning sequence.

PRIORITY SCAN

If a Priority channel has been programmed, the transceiver will automatically change to the Priority channel when a call is received on that channel, even if call is being received on a normal channel.

- The  indicator appears when the selected channel is the Priority channel (depending on dealer setting) <Type I, II>.

SCAN REVERT

The Scan Revert channel is the channel selected when you press the **PTT** switch to transmit during scan. Your dealer can program one of the following types of Scan Revert channels:

- **Selected:** The last channel selected before scan.
- **Selected + Talkback:** Same as “Selected”, plus you can respond to calls on the channel at which scan is paused.
- **Priority:** The Priority channel.
- **Priority + Talkback:** Same as “Priority”, plus you can respond to calls on the channel at which scan is paused.
- **Last Called + Selected:** The last channel on which you receive a call.

SCAN DELETE/ADD

You can add and remove zones and/or channels/group IDs to and from your scan list.

- 1 Select your desired zone and/or channel/group ID.
- 2 Press the key programmed as **[Zone Delete/Add]** (to add/remove zones) or **[Scan Delete/Add]** (to add/remove channels/group IDs) <Type I, II>.
 - You can also press and hold the key programmed as **[Scan Delete/Add]** to add/remove zones.

FleetSync: ALPHANUMERIC 2-WAY PAGING FUNCTION

FleetSync is an Alphanumeric 2-way Paging Function, and is a protocol owned by **Kenwood** Corporation.

Note: This function is available only in analog operation.

SELCALL (SELECTIVE CALLING)

A Selcall is a voice call to a station or group of stations.

■ Transmitting <Type I, II>

- 1 Select your desired zone and channel.
- 2 Press the key programmed as **[Selcall]** or **[Selcall + Status]** to enter Selcall mode.
- 3 Press the **<B or C>** key to select the station you want to call.
 - On keypad models, if Manual Dialing is enabled, you can directly enter the station ID.
- 4 Press the **PTT** switch and begin your conversation.

■ Receiving

An alert tone will sound and the transceiver will enter Selcall mode. The calling station's ID will appear when a Selcall is received <Type I, II>. You can respond to the call by pressing the **PTT** switch and speaking into the microphone.

■ Identification Codes

An ID code is a combination of a 3-digit Fleet number and a 4-digit ID number. Each transceiver has its own ID.

- Enter a Fleet number (100 ~ 349) to make a group call.
- Enter an ID number (1000 ~ 4999) to make an individual call in your fleet.
- Enter a Fleet number to make a call to all units in the selected fleet (Fleet call).
- Enter an ID number to make a call to the selected ID in all fleets (Supervisor call).

- Select “ALL” Fleet and “ALL” ID to make a call to all units (Broadcast call).

STATUS MESSAGE <TYPE I, II>

You can send and receive 2-digit Status messages which may be decided in your talk group. Messages can contain up to 16 alphanumeric characters. Status messages range from 10 to 99 (80 ~ 99 are reserved for special messages).

A maximum of 15 received messages (combined status messages and short messages) can be stored in the stack memory of your transceiver.

■ Transmitting

- 1 Select your desired zone and channel.
- 2 Press the key programmed as **[Status]** to enter Status mode (proceed to step 5) or **[Selcall + Status]** to enter Selcall mode (proceed to step 3).
- 3 Press the **<B or C>** key to select the station you want to call.
 - If Manual Dialing is enabled, you can enter a station ID by using the DTMF keypad, or by using the **<B or C>** key. When using the **<B or C>** key, cycle through the digits to select a digit, then press the **S** key to set the digit and move the cursor to the right. Repeat this process until the entire ID is entered.
- 4 Press the **S** key to enter Status mode.
- 5 Press the **<B or C>** key to select the status you want to transmit.
 - If Manual Dialing is enabled, you can enter a status ID by using the DTMF keypad, or by using the **<B or C>** key (refer to step 3, above).
- 6 Press the **PTT** switch or **Side 2** key to initiate the call.
 - “COMPLETE” appears on the display when the status has been successfully transmitted.

■ Receiving

A calling ID or text message will appear when a Status call is received. Press any key to return to normal operation.

■ Reviewing Messages in the Stack Memory

- 1 Press the key programmed as **[Stack]**, or press and hold the key programmed as **[Selcall]**, **[Status]**, or **[Selcall + Status]** to enter Stack mode.
 - The last received message is displayed.
- 2 Press the **<B** or **>C** key to select the desired message.
 - Message types are identified as follows:
I: Caller ID, S: Status Message, M: Short Message
 - Press and hold the **S** key for 1 second to cycle the display information as follows:
ID Name > Status/Short Message > CH/GID > Time Stamp
- 3 Press the **Side 1** key to return to normal operation.
 - To delete the selected message, press the **A** key. To confirm the deletion, Press the **S** key.
 - To delete all messages, press and hold the **A** or **#** key for 1 second. To confirm the deletion, Press the **S** or ***** key.

SHORT/LONG MESSAGES

Received short messages are displayed the same as Status messages and are stored in the same stack memory (Type I, II). To send short messages, and to send and receive long messages, you must connect the transceiver to a PC. Ask your dealer for details.

GPS REPORT

To send your location data, you must first connect a GPS unit to the transceiver. GPS data can be manually transmitted by pressing the key programmed as **[Send the GPS data]**. If set up by your dealer, GPS data may be automatically transmitted at a preset time interval.

TRUNKING CALLS (ANALOG)

PLACING A DISPATCH CALL

- 1 Select the desired zone and group ID using the selector and the Zone or CH/GID keys.
- 2 Press and hold the **PTT** switch.
- 3 If the “PTT Proceed” tone sounds, communication is possible; start speaking into the microphone. Release the **PTT** switch to receive.
 - For best sound quality at the receiving station, hold the microphone approximately 1.5 inches (3 ~ 4 cm) from your mouth.
 - Your dealer can deactivate the Proceed PTT tone, if necessary. Ask your dealer for details.

RECEIVING A DISPATCH CALL

- 1 When a dispatch call is received, the transceiver will automatically change to the correct group ID and you will hear the call.
- 2 Readjust the volume as necessary.

PLACING A TELEPHONE CALL

- 1 Select the desired zone and group ID using the selector and the Zone or CH/GID keys.
 - Alternatively, you can press the key programmed as **[Auto Telephone]** to automatically search for a Telephone Repeater.
- 2 Press and hold the **PTT** switch for approximately 1 second to ensure a connection.
 - Confirm that there is a dial tone after you release the **PTT** switch.
- 3 Place the call, following the instructions for making a DTMF call, starting on page 22.

- 4 When the called party responds, press the **PTT** switch and speak into the microphone. Release the **PTT** switch to receive.
 - Only one person can speak at a time.
- 5 To end the call, press and hold the **PTT** switch, then press the # key or the key programmed as **[Telephone Disconnect]**.

RECEIVING A TELEPHONE CALL

- 1 When a telephone call is received, the transceiver will automatically change to the correct group ID and you will hear the call.
 - A ringer tone will sound when a call is received.
- 2 Press and hold the **PTT** switch to speak, and release it to receive.
 - Only one person can speak at a time.
- 3 To end the call, press and hold the **PTT** switch, then press the # key or the key programmed as Telephone Disconnect.

ADVANCED OPERATIONS

DTMF (DUAL TONE MULTI FREQUENCY) CALLS

■ Making a DTMF Call <Type I, II>

Manual Dialing <Type I>

- 1 Press and hold the **PTT** switch.
- 2 Enter the desired digits using the DTMF keypad.
 - If you release the **PTT** switch, transmit mode will end even if the complete number has not been sent.
 - If the Keypad Auto PTT function has been enabled by your dealer, you do not need to press the **PTT** switch to transmit; you can make the call simply pressing the DTMF keys.

Store & Send

- 1 Press the key programmed as **[Autodial]**.
- 2 Enter up to 30 digits using the DTMF keypad.
 - Alternatively, you can enter digits by using the **<B** or **C>** key.
- 3 Press the **PTT** switch to make the call.

■ Autodial <Type I, II>

Autodial allows you to quickly call DTMF numbers that have been programmed onto your transceiver.

- 1 Press the key programmed as **Autodial**.
 - The first entry in the Autodial list appears on the display.
- 2 Press the **<B** or **C>** key to select your desired Autodial list number, or enter the list number directly (01 ~ 32).
 - The stored entry appears on the display.
- 3 Press the **PTT** switch to make the call.

■ Stun Code

This function is used when a transceiver is stolen or lost. When the transceiver receives a call containing a stun

code, the transceiver becomes disabled. The stun code is cancelled when the transceiver receives a call with a revive code.

EMERGENCY CALLS

If your transceiver has been programmed with the Emergency function, you can make emergency calls.

- 1 Press and hold the key programmed as **[Emergency]**.
 - Ask your dealer for the length of time necessary to hold this key before the transceiver enters Emergency mode.
 - When the transceiver enters Emergency mode, it will change to the Emergency channel and begin transmitting based on how it is set up by your dealer.
- 2 To exit Emergency mode, press the **[Emergency]** key again.
 - If the Emergency mode completes a preset number of cycles, Emergency mode will automatically end and the transceiver will return to the zone and channel that was in use before Emergency mode was entered.

Note:

- ◆ Your dealer can set the transceiver to emit a tone when transmitting in Emergency mode.
 - ◆ Your dealer can set the transceiver to emit tones and received signals as normal, or mute the speaker during Emergency operation.
-

■ Activity Detection

Press the key programmed as **[Activity Detection]**, toggle Activity Detection ON and OFF. If an event occurs while Activity Detection is enabled, the transceiver enters Emergency mode.

Note:

- ◆ When Activity Detection has been turned off, and the transceiver power is then turned off and back on, Activity Detection is automatically enabled.
 - ◆ When using this function, verify that it operates before taking the transceiver.
-

■ Activity Reset

While Activity Detection is active, press the key programmed as **[Activity Reset]** to reset the Activity Detection countdown timer. This will allow you to remain in a tilted or stationary position, etc., without the Emergency mode activating unnecessarily.

SCRAMBLER

Press the key programmed as **[Scrambler/ Encryption]**, to switch the transceiver to secure (encrypted) transmission.

- Pressing the **PTT** switch after the Scrambler function has been turned ON encrypts the transmitted signal.

SIGNALING

■ Quiet Talk (QT)/ Digital Quiet Talk (DQT)

Your dealer may have programmed QT or DQT signaling on your transceiver channels. A QT tone/ DQT code is a sub-audible tone/code which allows you to ignore (not hear) calls from other parties who are using the same channel.

Operator Selectable Tone <Type I, II>

If a key has been programmed with **[OST]**, you can reprogram the QT/DQT settings on each of your channels.

- 1 Select your desired channel.
- 2 Press and hold the key programmed as **[OST]** for 1 second.
- 3 Press the **<B or C>** key to select your desired tone or code.
 - Your dealer can set up to 40 tones/codes.
- 4 Press the **S** key to save your new setting.
- 5 When you have finished operating using OST, press the **[OST]** key again to turn the OST function OFF.

■ Radio Access Number (RAN)

RAN is a new signaling system designed for digital radio communications.

When a channel is set up with a RAN, squelch will only open when a call containing a matching RAN is received. If a call containing a different RAN is made on the same channel you are using, you will not hear the call. This allows you to ignore (not hear) calls from other parties who are using the same channel.

■ Optional Signaling

Your dealer may also program several types of optional signaling for your transceiver channels.

DTMF Signaling : DTMF Signaling opens the squelch only when the transceiver receives a call containing a matching DTMF code.

FleetSync Signaling : Refer to “SELCALL (SELECTIVE CALLING)” on page 17.

NXDN ID Signaling: NXDN ID is an optional signaling system available only for digital communications.

VOICE OPERATED TRANSMISSION (VOX)

VOX can be activated or deactivated by your dealer. VOX operation allows you to transmit hands-free.

Note: To operate VOX, you must use an optional headset.

■ VOX Gain Level <Type I, II>

- 1 Connect the headset to the transceiver.
- 2 Press the key programmed as **[VOX]**.
 - The current VOX Gain level appears on the display.
- 3 Press the **<B or C>** key to increase or decrease the VOX Gain level.
 - The VOX Gain can be adjusted from levels 1 to 10.

- 4 While adjusting the level, speak into the headset microphone to test the sensitivity level. (Your voice is not transmitted during this test procedure.)
 - When sound is recognized, the LED lights orange.
- 5 Press the **S** key to save the setting.

■ VOX Operation

- 1 Connect the headset to the transceiver.
- 2 Press and hold the key programmed as **[VOX]** for 2 seconds.
- 3 To transmit, simply speak into the microphone.
 - The transceiver recognizes sound levels depending on the VOX Gain level. If it is too sensitive, it will transmit when there is noise in the background. If it is not sensitive enough, it will not pick up your voice when you begin speaking.
- 4 When you finish speaking, transmission ends.
- 5 To turn the VOX function OFF, press and hold the **[VOX]** key again, for 2 seconds.

Note: If a speaker/ microphone is connected to the transceiver while VOX is ON, and the VOX Gain Level is set to a sensitive level, louder received signals may cause the transceiver to transmit.

BACKGROUND OPERATIONS

Your dealer can activate a variety of transceiver functions to perform without any additional operation on your part.

TIME-OUT TIMER (TOT)

The Time-out Timer is used to prevent you from using a channel for an extended duration. If you continuously transmit for a preset time, the transceiver will stop transmitting and an alert tone will sound. Release the **PTT** switch.

BATTERY SAVER

The Battery Saver can be activated only on Conventional channels. This function decreases the amount of power used when a signal is not being received and no operations are being performed.

KEY LOCK

Press the key programmed as **[Key Lock]** to lock and unlock the transceiver keys.

- The following keys still function when Key Lock is activated:
Emergency, Backlight, Monitor, Monitor Momentary, Squelch Off, Squelch Off Momentary, Function, Key Lock, PTT.

LOW BATTERY WARNING <TYPE I, II>

Your dealer can set an alert tone to sound and the LED indicator to blink red when the battery power is low. The battery power icon displays the battery power remaining, as described in the table below. When the battery power is very low, recharge or replace the battery pack.

			
High	Sufficient	Low	Very low

LOW BATTERY WARNING <TYPE III>

Press the key programmed as **[Battery Indicator]**. The LED lights for 2 seconds, displaying the battery power remaining, as described in the table below. When the battery power is very low, recharge or replace the battery pack.

Lights Green	Lights Orange	Lights Red	Blinks Red
High	Sufficient	Low	Very low

SIGNAL STRENGTH INDICATOR <TYPE I, II>

The signal strength indicator displays the strength of received calls. No icon appears when no signal is available.

			
Strong	Sufficient	Weak	Very weak

 flashes when out of range (NXDN Trunking only).

COMPANDER

If programmed by your dealer for a channel, the compander will remove excessive noise from transmitted signals, to provide higher clarity of signals.

Note: The COMPANDER is used only in analog operation.

BUSY CHANNEL LOCKOUT (BCL)

On Conventional channels, if BCL is set up by your dealer, you will be unable to transmit if the channel is already in use. Use a different channel or wait until the channel becomes free.

If BCL Override has been programmed, you can transmit over the current signal:

- 1 Press and hold the **PTT** switch.
 - If the channel is already in use, a warning tone will sound.
- 2 Quickly release and then press the **PTT** switch again.
- 3 Speak into the transceiver as you would during a normal call.

CONTROL CHANNEL HUNT

On digital Trunking channels, the transceiver automatically searches for a control channel.

- While searching for a control channel, the antenna icon will flash <Type I, II> and no signals can be received.

PTT ID

PTT ID is the transceiver unique ID code which is sent each time the **PTT** switch is pressed and/or released.

Note: PTT ID can be made only in analog operation.

KENWOOD

RADIO FREQUENCY ENERGY SAFETY INFORMATION

This **Kenwood** transceiver has been tested and complies with the standards listed below, in regards to Radio Frequency (RF) energy and electromagnetic energy (EME) generated by the transceiver.

- FCC RF exposure limits for *Occupational Use Only*. RF Exposure limits adopted by the FCC are generally based on recommendations from the National Council on Radiation Protection and Measurements, & the American National Standards Institute.
- FCC OET Bulletin 65 Edition 97-01 Supplement C
- American National Standards Institute (C95.1 – 1992)
- American National Standards Institute (C95.3 – 1992)



WARNING

This **Kenwood** transceiver generates RF EME while transmitting. RF EME (Radio Frequency Electric & Magnetic Energy) has the potential to cause slight thermal, or heating effects to any part of your body less than the recommended distance from this radio transmitter's antenna. RF energy exposure is determined primarily by the distance to and the power of the transmitting device. In general, RF exposure is minimized when the lowest possible power is used or transmission time is kept to the minimum required for consistent communications, and the greatest distance possible from the antenna to the body is maintained. The transceiver has been designed for and is classified for *Occupational Use Only*. Occupational/ controlled exposure limits are applicable to situations in which persons are exposed to RF energy as a consequence of their employment, and such persons have been made aware of the potential for exposure and can exercise control over their exposure. This means you can use the transceiver only if you are aware of the potential hazards of operating a transceiver and are familiar in ways to minimize these hazards. This transceiver is not intended for use by the general public in uncontrolled environments. Uncontrolled environment exposure limits are applicable to situations in which the general public may be exposed to RF energy, or in which the persons who are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

The following list provides you with the information required to ensure that you are aware of RF exposure and of how to operate this transceiver so that the FCC RF exposure limitations are not exceeded.

- While transmitting (holding the **PTT** switch or speaking with **VOX** enabled), always keep the antenna and the radio at least 3 cm (1 3/16 inches) from your body or face, as well as from any bystanders. A LED on the top of the radio shows red when the transmitter is operating in both **PTT** and **VOX** modes.
- Do not transmit for more than 50% of the total transceiver use time; transmitting over 50% of the total use time may exceed the limits in accordance to the FCC RF exposure requirements. Nominal transceiver operation is 5% transmission time, 5% reception time, and 90% stand-by time.
- Use only the specified antenna for this transceiver; this may be either the antenna provided with the transceiver or another antenna authorized by **Kenwood**.

Use only **Kenwood** authorized accessories (antennas, battery packs, belt clips, Speaker/ Mics or headsets etc.): When worn on the body, always place the radio in a **Kenwood** recommended clip or carrying case meant for this product. The use of other than recommended or approved body-worn accessories may result in RF exposure levels which exceed the FCC's occupational/ controlled environment RF exposure limits.



CAUTION

To ensure that your exposure to RF EME is within the FCC limits for occupational use, you must observe and adhere to the above points.

Electromagnetic Interference Compatibility

Electronic devices are susceptible to electromagnetic interference (EMI) if they are not adequately shielded or designed for electromagnetic compatibility. Because this transceiver generates RF energy, it can cause interference to such equipment.

- Turn OFF your transceiver where signs are posted to do so. Hospitals and health care facilities use equipment that is sensitive to electromagnetic radiation.
- Turn OFF your transceiver while on board an aircraft when so instructed. Use of the transceiver must be in accordance with airline regulations and/or crew instructions.

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