

# KENWOOD

## TKR-D710 TKR-D810

VHF DIGITAL REPEATER  
UHF DIGITAL REPEATER

### INSTRUCTION MANUAL

JVCKENWOOD Corporation

B5A-1121-00 (K)



# TKR-D710/TKR-D810

## INSTRUCTION MANUAL

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### THANK YOU!

We are grateful you purchased this **KENWOOD** repeater. We believe this easy-to-program repeater will be highly effective in your communications system, and will keep personnel operating at peak efficiency.

### PRECAUTIONS

- Do not expose the unit to rain or moisture; to prevent fire or electric shock.
- Do not open the unit under any circumstances; to avoid risk of electric shock.
- Do not expose the unit to long periods of direct sunlight, nor place it close to heating appliances.
- Do not place the unit in excessively dusty and/or humid areas, nor on unstable surfaces.
- Do not put the plastic bag used for packing of this equipment on the place which reaches a small child's hand. It will become a cause of suffocation if it wears flatly.
- Always switch the transceiver power off before installing optional accessories.
- If you detect an abnormal odor or smoke coming from the unit, disconnect the power from the unit immediately. Contact your **KENWOOD** service center or dealer.

### 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.

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 by the party responsible/JVC KENWOOD. 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.

#### Firmware Copyrights

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



#### WARNING

- ◆ Do not install the repeater in explosive atmospheres (flammable gas, dust particles, metallic powders, grain powders, etc.).



#### CAUTION

- ◆ This repeater is intended for use as a fixed base station with the antenna located outdoors on the rooftop or on an antenna tower.
- ◆ This repeater is designed for a 13.6 V DC power source! Never use a 24 V DC or higher source to power the repeater.
- ◆ Use only the supplied DC cord.
- ◆ Do not remove the ferrite core attached to the DC cord. Doing so may cause interference with radio communications.

### UNPACKING AND CHECKING EQUIPMENT

**Note:** The following unpacking information is for use by your **KENWOOD** dealer, an authorized **KENWOOD** service center, or the factory.

Carefully unpack the repeater. We recommend that you identify the items listed in the following table before discarding the packing material. If any items are missing or have been damaged during shipment, file a claim with the carrier immediately.

Item	Part Number	Quantity
Hardware fixture	J21-8559-XX	1
Front glass	B10-2635-XX	1
Name plates	B11-1259-XX	1
Cushion	G13-1801-XX	4
Cushion	G13-1802-XX	4
Foot	J02-0475-XX	2
Foot	J02-0492-XX	2
Grommet	J59-0302-XX	2
Handle	K01-0418-XX	1
Screws	N30-4006-XX	2
Screws	N35-3006-XX	5
DC cord	E30-3427-XX	1
Lead wire with connector (15 pin)	E31-3228-XX	1
Fuse	F05-1537-XX	1
Instruction Manual	B5A-1121-XX	1

### INSTALLATION

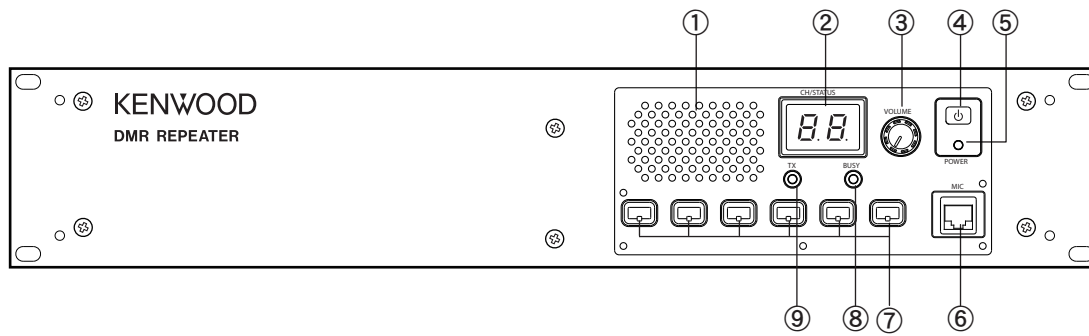
To install the handles onto the front panel of the repeater, align the handles with the holes on the front panel, then secure the handles using the supplied screws.

Please consult your dealer for installing the repeater and antenna.

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. #6,199,037, #6,912,495, #8,200,497, #7,970,606, and #8,359,197.

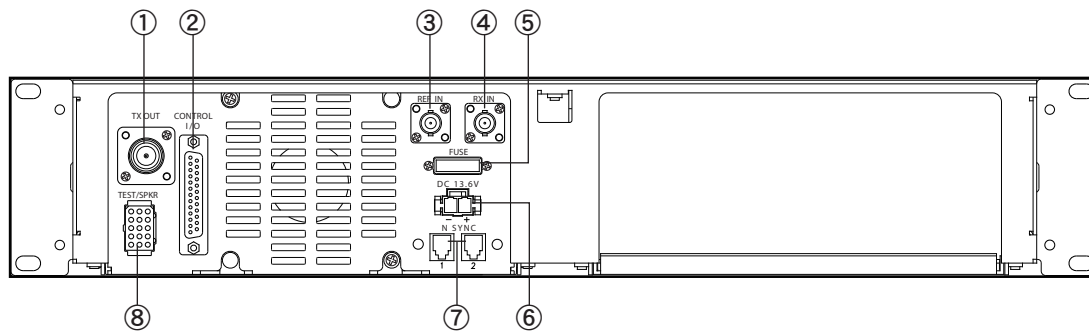
## CONTROLS AND FUNCTIONS

### ■ Front Panel



- ① **Speaker**
- ② **CH/STATUS Display**  
Two 7-segment digits display the channel number, name, or status.
- ③ **VOLUME control**  
Rotate to adjust the audio.
- ④ **POWER switch**
- ⑤ **POWER indicator**  
Lights green when power is supplied to the DC 13.6V jack.
- ⑥ **MIC jack**  
Connect a microphone to this 8-pin modular jack.
- ⑦ **Programmable Function keys**  
Press these keys to activate their programmable functions.
- ⑧ **BUSY indicator**  
Lights green while a signal is being received.
- ⑨ **TX indicator**  
Lights red while transmitting.

### ■ Rear Panel



- ① **TX OUT jack**  
Connect a TX antenna or a duplexer to this receptacle.
- ② **CONTROL I/O jack**  
Connect a repeater controller or a remote panel to this DB-25 interface.
- ③ **REF IN jack**  
This jack is currently not used.
- ④ **RX IN jack**  
Connect an RX antenna or a duplexer to this BNC receptacle.
- ⑤ **FUSE**  
Insert 15 A blade fuse into this fuse holder.
- ⑥ **DC 13.6V jack**  
Connect a 13.6 V DC power supply to this jack.
- ⑦ **N SYNC 1 / 2 jack**  
This jack is currently not used. Future functions include connecting another repeater or optional device.
- ⑧ **TEST/SPKR jack**  
Test input/output jack. Connect an external speaker to this jack. When using a Built-in speaker, connect the attached Lead wire with connector (15 pin) to this jack.

## REPEATER OPERATION

### Note:

- ◆ Please consult your dealer for programming the repeater.
- ◆ After switching the power on, the CH/STATUS display blinks for approximately 30 seconds, until the internal circuit stabilizes. Wait until the display remains lit, before operating.

When power is applied to the unit, the **POWER** indicator lights:

- Green when using the DC jack.

The **BUSY** indicator lights green while receiving a signal and the **TX** indicator lights red while transmitting.

## TRANSCEIVER OPERATION (Analog mode only)

### ■ Receive

Adjust the volume to your desired level. You may need to readjust the volume if you are having interference while receiving a message from your dispatcher or another member in your fleet.

The **BUSY** indicator lights green while a signal is being received.

### ■ Transmit

- 1 Listen to the channel before transmitting, to make sure it is not being used.
- 2 Press the microphone **PTT** switch, then speak in your normal speaking voice.  
The **TX** indicator lights red while transmitting.
- 3 When you finish speaking, release the **PTT** switch.

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# ADDENDUM

## Terminal Description

### MIC (Modular Jack)

Pin NO.	Pin Name	Description	Specification	I/O	Notes
1	NC	Not used	Not used	-	
2	SB	Power Output	13.6 V	O	
3	GND	GND	GND	-	
4	PTT	PTT Signal/ TXD2 Asynchronous Send Data	Input Impedance 22 kΩ	I/O	
5	MICG	MIC GND	MIC GND	-	
6	MIC	MIC Input	600 Ω	I	
7	HOOK	Hook Detection/ RXD2 Asynchronous Receive Data	Input Impedance 100 kΩ	I	
8	NC	Not used	Not used	-	

### TEST/ SPEAKER CONNECTOR

Pin NO.	Pin Name	Description	Specification	I/O	Notes
1	SB	Power Output	13.6 V	O	
2	SB	Power Output	13.6 V	O	
3	NC	Not used	Not used	-	
4	GND	GND	GND	-	
5	GND	GND	GND	-	
6	SPG	Speaker GND	Speaker GND	-	
7	NC	Not used	Not used	-	
8	RSSI	RSSI Signal Output	Output Level 0 or 3.3 V	O	
9	SPI	Internal Speaker Input	Short with "SPO"	I	
10	AO1	Open Collector Terminal	Allowable current value MAX 200mA	O	
11	AO2	Open Collector Terminal	Allowable current value MAX 200mA	O	
12	SPO	External Speaker Output	Output Level 4W (5% Distortion)	O	
13	AO3	Open Collector Terminal	Allowable current value MAX 200mA	O	
14	AO4	Open Collector Terminal	Allowable current value MAX 200mA	O	
15	AO5	Open Collector Terminal	Allowable current value MAX 200mA	O	

### Control I/O (D-SUB 25 Pin) CONNECTOR

Pin NO.	Pin Name	Description	Specification	I/O	Notes
1	NC	Not used	Not used	-	
2	RXD0	Asynchronous Receive Data	Conform to RS-232C standard	I	
3	TXD0	Asynchronous Send Data	Conform to RS-232C standard	O	
4	AI1	Programmable Function Input 1	Input Impedance 47 kΩ	I	
5	AI2	Programmable Function Input 2	Input Impedance 47 kΩ	I	
6	AI3	Programmable Function Input 3	Input Impedance 47 kΩ	I	
7	DG	Digital GND	Digital GND	-	
8	NC	Not used	Not used	-	
9	NC	Not used	Not used	-	
10	NC	Not used	Not used	-	
11	NC	Not used	Not used	-	
12	RXG	RX Signal GND	RX Signal GND	-	
13	SPM	Speaker Mute	Input Impedance 47 kΩ	I	
14	BER CLK	For Bit Error Rate Clock	CMOS	O	
15	NC	Not used	Not used	-	
16	NC	Not used	Not used	-	
17	SC	Squelch Control	Output level 0 or 5 V	O	
18	BER DAT	For Bit Error Rate Data	CMOS	O	
19	TXG	TX Signal GND	TX Signal GND	-	
20	IO1	Programmable Function I/O 1	Input Impedance 47 kΩ/ Output level 0 or 5 V	I/O	
21	IO2	Programmable Function I/O 2	Input Impedance 47 kΩ/ Output level 0 or 5 V	I/O	
22	IO3	Programmable Function I/O 3	Input Impedance 47 kΩ/ Output level 0 or 5 V	I/O	
23	IO4	Programmable Function I/O 4	Input Impedance 47 kΩ/ Output level 0 or 5 V	I/O	
24	IO5	Programmable Function I/O 5	Input Impedance 47 kΩ/ Output level 0 or 5 V	I/O	
25	IO6	Programmable Function I/O 6	Input Impedance 47 kΩ/ Output level 0 or 5 V	I/O	

### N SYNC 1, 2 Connector (There are two connectors)

Pin NO.	Pin Name	Description	Specification	I/O	Notes
1	N_SYNC 1_B	RS-485 Differential Signal B	Conform to RS-485	I/O	Connector#1,2
2	N_SYNC 1_A	RS-485 Differential Signal A	Conform to RS-485	I/O	Connector#1,2
3	N_SYNC 2_B	RS-485 Differential Signal B	Conform to RS-485	I/O	Connector#1,2
4	N_SYNC 2_A	RS-485 Differential Signal A	Conform to RS-485	I/O	Connector#1,2

**RX IN**      RX antenna terminal (BNC Receptacle)  
**TX OUT**     TX antenna terminal (N Receptacle)

**REF IN**      Reference CLK input terminal (BNC Receptacle)



# MANDATORY SAFETY INSTRUCTIONS TO INSTALLERS AND USERS

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- Use only manufacturer or dealer supplied antenna.
- **Antenna Minimum Safe Distance: 180 cm (6 feet), 50% duty Cycle.**
- Antenna Gain: 0 dBd referenced to a dipole.

The Federal Communications Commission has adopted a safety standard for human exposure to RF (Radio Frequency) energy which is below the OSHA (Occupational Safety and Health Act) limits.

- **Antenna Mounting:** The antenna supplied by the manufacturer or radio dealer must not be mounted at a location such that during radio transmission, any person or persons can come closer than the above indicated minimum safe distance to the antenna, i.e. **180 cm (6 feet) , 50% duty Cycle.**
- To comply with current FCC RF Exposure limits, the antenna must be installed at or exceeding the minimum safe distance shown above, and in accordance with the requirements of the antenna manufacturer or supplier.
- Vehicle installation: The antenna can be mounted at the center of a vehicle metal roof or trunk lid, if the minimum safe distance is observed.
- Base Station Installation: The antenna should be fixed-mounted on an outdoor permanent structure. RF Exposure compliance must be addressed at the time of installation.

**Antenna substitution:** Do not substitute any antenna for the one supplied or recommended by the manufacturer or radio dealer.

You may be exposing person or persons to excess radio frequency radiation. You may contact your radio dealer or the manufacturer for further instructions.



## WARNING

Maintain a separation distance from the antenna to person(s) of at least **180 cm (6 feet) , 50% duty Cycle.**

You, as the qualified end-user of this radio device must control the exposure conditions of bystanders to ensure the minimum separation distance (above) is maintained between the antenna and nearby persons for satisfying RF Exposure compliance. The operation of this transmitter must satisfy the requirements of Occupational/Controlled Exposure Environment, for work-related use, transmit only when person(s) are at least the minimum distance from the properly installed, externally mounted antenna. Transmit only when people outside the vehicle are at least the recommended minimum lateral distance away from the antenna/vehicle.

