Introduction

Features of this radio

- 144/430 MHz repeater is equipped with a standard C4FM digital communication modem capable of selecting the communications mode automatically
- Clear audio and data communication is achieved using the digital modem functions
- Transmit power 50 watts with cooling fan
- Full color 3.5-inch LCD, high luminance TFT touch panel controller
- Intuitive, user touch panel operation

About the touch panel

● Precautions in using the touch panel
  The touch panel of the controller is designed to work with the slightest touch of a finger.
  - The touch panel may not work when a protective film or sheet is affixed to the LCD.
  - Use of a pointed fingernail or pen to operate the touch panel, or pressing too hard may damage or scratch the screen.
  - Smart phone operations such as flicking, pinch in and pinch out are not possible.

● Maintaining the touch panel
  - To clean the touch panel, switch the power supply OFF before using a dry, soft cloth to wipe away dust and dirt from the touch panel.
  - When the touch panel is really dirty, wet a soft cloth and wring it out thoroughly before using it to wipe the touch panel.
  - When wiping the touch panel, be careful not to wipe too hard or scratch the surface with your nails.
  - When the touch panel is scratched, it may become difficult to see the display.

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How to read this manual

In this manual, controller operations are expressed as follows:

Touch [SQL] ....................................... Indicates that the symbol on the touch panel screen is to be touched quickly.
Select [MODE] ................................... Indicates that the items are to be highlighted on the touch panel screen.

The following symbols are also used in this manual:

Caution ...................................... Explains information to avoid incorrect operation.
Tip ............................................... Explains operating hints and helpful advice.

Also note: the actual product may differ from the drawings shown in this manual.
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**Advice When There Is a Problem**

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**Specifications**

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Safety Precautions (make sure to read these)

Make sure to read this manual in order to use this radio safely and correctly.

Note beforehand that the company shall not be liable for any damages suffered by the customer or third parties in using this product, or for any failures and faults that occur during the use or misuse of this product, unless otherwise provided for under the law.

Type and meaning of the marks

⚠️ DANGER
This symbol indicates the possibility of death or serious injury being inflicted on the user and the surrounding people when these instructions are ignored and the product is handled improperly.

⚠️ WARNING
This symbol indicates the possibility of death or serious injury being inflicted on the user and the surrounding people when these instructions are ignored and the product is handled improperly.

⚠️ CAUTION
This symbol indicates the possibility of physical impediments occurring or impediments being inflicted on the user and the surrounding people when these instructions are ignored and the product is handled improperly.

Type and meaning of symbols

🚫 Prohibited actions that must not be carried out in order to use this radio safely.
For example, 📈 signifies that disassembly is prohibited.

❗️ Precautions that must be adhered to in order to use this radio safely. For example, ⚠️ signifies that the power supply is to be disconnected.

⚠️ DANGER
Do not use the device in “locations or aircraft and vehicles where its use is prohibited” such as in hospitals and aeroplanes.
This may exert an impact on electronic and medical devices.

Never touch the antenna during transmission.
This may result in injury, electric shock and equipment failure.

Do not transmit in crowded places in consideration of people who are fitted with medical devices such as heart pacemakers.
Electromagnetic waves from the device may affect the medical device, resulting in accidents caused by malfunctions.

Do not operate the device when flammable gas is generated.
Doing so may result in fire and explosion.

Use good engineering, proper grounding and protective devices to protect the repeater from power surges, lightening and electrical damage via the power and external antenna connections.
Otherwise when it thunders, immediately disconnect the external antenna from the repeater and shut OFF the power supply.
If not, fire, electric shock and equipment failure may result.

Do not touch any liquid leaking from the liquid display with your bare hands.
There is a risk of chemical burns occurring when the liquid comes into contact with the skin or gets into the eyes. In this case, seek medical treatment immediately.

⚠️ WARNING
Do not use voltages other than the specified power supply voltage.
Doing so may result in fire and electric shock.

Do not transmit continuously for long periods of time.
This may cause the temperature of the main body to rise and result in burns and failures due to overheating.

Do not dismantle or modify the device.
This may result in injury, electric shock and equipment failure.

Do not handle the power plug and connector etc. with wet hands. Also do not plug and unplug the power plug with wet hands.
This may result in injury, electric shock and equipment failure.

When smoke or strange odors are emitted from the radio, turn off the power and disconnect the power cord from the socket.
This may result in fire, liquid leak, overheating, damage, ignition and equipment failure. Please contact our company amateur customer support or the retail store where you purchased the device.

Keep the power plug pins and the surrounding areas clean at all times.
This may result in fire, overheating, breakage, ignition etc.

Do not place the device in areas that may get wet easily (e.g. near a humidifier).
This may result in fire, electric shock and equipment failure.

When connecting a DC power cord, pay due care not to mix up the positive and negative polarities.
This may result in fire, electric shock and equipment failure.

Do not use power cords other than the one enclosed or specified.
This may result in fire, electric shock and equipment failure.

Do not bend, twist, pull, heat and modify the power cord and connection cables in an unreasonable manner.
This may cut or damage the cables and result in fire, electric shock and equipment failure.

Do not pull the cable when plugging and unplugging the power cord and connection cables.
Please hold the plug or connector when unplugging. If not, this may result in fire, electric shock and equipment failure.

Do not use the device when the power cord and connection cables are damaged, and when the power connector cannot be plugged in tightly.
Please contact our company amateur customer support or the retail store where you purchased the device as this may result in fire, electric shock and equipment failure.
Do not use fuses other than those specified. 
Doing so may result in fire and equipment failure.

Do not allow metallic objects such as wires and water to get inside the product. 
This may result in fire, electric shock and equipment failure.

Disconnect the power cord and connection cables before incorporating items sold separately or replacing the fuse. 
This may result in fire, electric shock and equipment failure.

CAUTION

Do not place this device near a heating instrument or in a location exposed to direct sunlight. 
This may result in deformation and discoloration.

Do not place this device in a location where there is a lot of dust and humidity. 
Doing so may result in fire and equipment failure.

Stay as far away from the antenna as possible during transmission. 
Long-term exposure to electromagnetic radiation may have a negative effect on the human body.

Do not wipe the case using thinner and benzene etc. 
Please use a soft and dry piece of cloth to wipe away the stains on the case.

Do not put heavy objects on top of the power cord and connection cables. 
This may damage the power cord and connection cables, resulting in fire and electric shock.

Do not transmit near the television and radio. 
This may result in electromagnetic interference.

Do not use optional products other than those specified. 
If not, this may result in equipment failure.

Do not place the device on an unsteady or sloping surface, or in a location where there is a lot of vibration. 
The device may fall over or drop, resulting in fire, injury and equipment failure.

Follow the instructions given when installing items sold separately and replacing the fuse. 
This may result in fire, electric shock and equipment failure.

Do not use the device when it thunders. 
For safety reasons, pull the power plug out of the AC socket. 
Never touch the antenna as well. This may result in fire, electric shock and equipment failure due to thunder.

CAUTION

For safety reasons, switch off the power and pull out the power cord when the device is not going to be used for a long period of time. 
If not, this may result in fire and overheating.

Do not throw or subject the device to strong impact forces. 
This may result in equipment failure.

Do not put this device near magnetic cards and video tapes. 
The data in the cash card and video tape etc. may be erased.

Keep out of the reach of small children. 
If not, this may result in injuries to children.

Do not stand on top of the product, and do not place heavy objects on top or insert objects inside it. 
If not, this may result in equipment failure.

Do not use a microphone other than those specified when connecting a microphone to the device. 
If not, this may result in equipment failure.

Do not touch the heat radiating parts. 
When used for a long period of time, the temperature of the heat radiating parts will get higher, resulting in burns when touched.

Do not open the case of the product except when replacing the fuse and when installing items sold separately. 
This may result in injury, electric shock and equipment failure.
## Accessories

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*1: For DR-1X only

## Options

- DTMF Microphone MH-48A6JA
- Hand Microphone MH-42C6J
- Voice Guide Unit FVS-2
Name and Function of Each Component

Front

1. **POWER switch**
   Press “|” side to switch the radio on, and “O” side to switch the radio off.

2. **Power supply monitor (LED indicator)**
   - When the indicator illuminates in green, the power is supplied from the AC IN jack (DR-1X only).
   - When the indicator illuminates in red, the power supply is backed up through the BACKUP terminals (13.8 V DC).

3. **SETUP button**
   Press to switch the display on and off.

4. **MIC jack**
   Insert the plug of the optional microphone to this 6-pin modular jack.

5. **Touch panel display**

6. **VOL knob**
   The audio volume of the received (up link) signal will increase when the knob is turned in a clockwise direction and decrease when turned in a counter-clockwise direction.

7. **Speaker**
   The internal speaker is located here.

8. **Handle**
Name and Function of Each Component

Rear

Note: The figure above shows the rear panel of the DR-1X.

1. TX ANT terminal
   Connect to the transmitting antenna (down link) with the coaxial cable.
   The output impedance requirement is 50 ohms.
2. Air outlet for cooling fan
3. RX ANT terminal
   Connect to the receiving antenna (up link) with the coaxial cable.
   The input impedance requirement is 50 ohms.
4. FUSE 15A jack
   A 15 A fuse for the DC power supply through the BACKUP terminals is attached.
5. BACKUP terminals
   Connect to the 13.8 V DC power supply.
6. FUSE 5A jack (DR-1X only)
   A 5 A fuse for the AC power supply through the AC IN jack is attached.
7. ACC jack
   Connect to a personal computer with the provided PC connection cable “SCU-20”.
8. CONTROL I/O connector
   This connector allows the repeater to be connected to an external controller for remote operation.
9. AC IN jack (DR-1X only)
   Connect to the 100 V to 240 V AC power supply with the provided power cable.
10. GND terminal
**Explanation of the screen**

**Operation mode screen**

RX  Receive (up link) band display area
TX  Transmit (down link) band display area

① Operation mode display area

- **[AUTO]** Touch here to activate the AMS (automatic mode select) function. The communication mode switches automatically according to the received/transmitted signal types.
- **[FIX]** Touch here to receive/transmit signals in the selected communication mode at all time.

② Communication mode display area

- **[NORMAL]** Indicates operation is in the simultaneous voice and data communication mode (digital).
- **[VOICE WIDE]** Indicates operation is in the high-rate voice communication mode (digital).
- **[DATA]** Indicates operation is in the high speed data communication mode (digital).
- **[FM]** Indicates operation is in the analog communication mode on the FM band.

③ RX indicator

This indicator shows green when a signal is received and white when there is no signal.

④ TX indicator

This indicator shows red when the repeater transmits and white when there is no transmit.

⑤ Settings display area

- **[REMOTE]** Displayed in red when remote operation with an external controller is enabled (see page 24).
- **[SETUP]** Touch here to switch the display to the setup mode screen.
Name and Function of Each Component

Setup mode screen

RX  Receive (up link) band display area
TX  Transmit (down link) band display area

① Touch key display area
  [BACK]  Touch here to return to the operation mode screen.
  [SQL]  Touch here to set the squelch level of the receiver.
  [Tx PWR]  Touch here to set the transmitter output level.
  [F]  Touch here to display the setup menu.

② Direction display area
  "UP LINK" is displayed on the RX band.
  "DOWN LINK" is displayed on the TX band.

③ Status display area
  A green bar is displayed during receive when signals are detected.
  The bar will not be displayed when the squelch is turned on.

④ Frequency display
⑤ VOL/SQL level display
⑥ S-meter/transmission power level display
⑦ Communication mode display

● Squelch level setting screen
The screen appears as below after [SQL] is touched.

[▲][▼]  The squelch threshold will increase by touching [▲] and decrease by touching [▼].
Setting up the Repeater

Safety measures for installation

Note the followings precautions when installing this repeater.

- Use good engineering, proper grounding and protective devices to protect the repeater from power surges, lightening and electrical damage via the power and external antenna connections.
- Do not install the repeater in a place where there is extreme vibration, where there is a lot of dust, excessive humidity or high temperature, or where it is exposed to direct sunlight.
- Install the repeater in a well ventilated position, so heat dissipation is not obstructed. The heat sink becomes hot when transmitting for long periods of time.
- Do not place any objects on top of the repeater.
- Note that there is a risk that hum and noise may be introduced, depending on the installation conditions and the external power source used.
- Install the repeater as far as possible away from TV and radio equipment to avoid (TVI, BCI).
  In particular, do not install the repeater near indoor antenna elements.

Installing the repeater

Place the repeater on a flat and level rack or shelf, with its bottom side down.
We recommend securing the wings of the repeater front panel to the equipment rack or shelf with bolts.

Mounting on a desk

When using the repeater in a desktop location instead of a rack or shelf, attach the four supplied legs onto the bottom of the repeater case.
About electrical grounding

The DR-1X/DR-1XE repeater, like any other communications apparatus, requires an effective ground system for maximum electrical safety and best communications effectiveness. A good ground system can contribute to station efficiency in a number of ways:

- It can minimize the possibility of electrical shock to the operator.
- It can minimize RF currents flowing on the shield of the coaxial cable and the chassis of the repeater. Such currents may lead to radiation, which can cause interference to home entertainment devices or laboratory test equipment.
- It can minimize the possibility of erratic repeater/accessory operation caused by RF feedback and/or improper current flow through logic devices.

To prevent damage from lightning, atmospheric electricity, electrical shock, etc., provide a good earth ground. Use a short, thick, braided cable to connect your station equipment to the buried ground rod (or alternative earth ground system).

Note: The figure above shows the rear panel of the DR-1X.

About the antenna

A good antenna installation is extremely important for transmission and reception purposes. Note the followings, as the type and characteristics of the antenna largely determines whether the performance of the repeater can be fully realized.

- Use an antenna that is designed for the installation conditions and application objective.
- Use an antenna that is tuned for the operating band and frequency.
- Use an antenna and a coaxial cable with a characteristic impedance of 50Ω.
- Adjust the VSWR (standing wave ratio) until it is 1.5 or less for an antenna with an adjusted impedance of 50Ω.
- Keep the coaxial cable routing length as short as possible.
- Use lightening and voltage surge protection devises.

Antenna consideration

Repeater operation without a duplexer requires that two antennas be installed, one for receiving and one for transmitting, so that the receiving antenna does not absorb energy from the transmitting antenna. There are a number of ways to do this, depending on the TX/RX frequency separation, and on the locations available for antenna mounting. If a duplexer is used, a single antenna suffices for both transmitting and receiving. If using a reduced-size duplexer, a six-cavity model (minimum) is recommended. Yaesu recommends the use of the duplexer. For further details, contact your Yaesu dealer.

Regardless of the above choice, it is of paramount importance that the antenna(s) be mounted as high and in the clear as possible, preferably within line-of-sight to all repeater users. Furthermore, losses in the feedline(s) must be minimized, so the feedline(s) should be high quality, and as short as possible. If a long feedline is necessary, use coaxial “hardline” cable to reduce losses. Repeater antennas should have an impedance of 50 Ω at the operating frequency. When separate receive and transmit antennas are used, high-Q narrow-band types may serve to minimize interaction. However, when a single antenna is used with a duplexer, it should be a low-Q wide-band type.

Cautions

- Never transmit without having a transmit antenna connected to the TX antenna jack of the Repeater.
- Create a loop (slack) in the coaxial cable directly underneath the antenna and fasten it so that the weight of the cable does not pull on the antenna or connector itself.
- Install the antenna taking into consideration the securing supports and how the guying wires are positioned, so that the antenna does not fall over or get blown away in strong winds.
Connecting the antenna

1. Plug the coaxial connectors into the TX ANT and RX ANT jacks respectively at the rear of the repeater, and tighten the shields onto the jacks.

2. To use a duplexer prepared by yourself, plug in the terminal of the coaxial cables from the TX ANT and RX ANT terminals into the jacks of the duplexer, and turn to tighten.

3. Plug in the terminal of the coaxial cable connected to the antenna into the jack of the duplexer, and turn to tighten.

Note: The figure above shows the rear panel of the DR-1X.
Connecting the Power Supply

Connection for DR-1X

- **Main power**

  **Caution**

  - Use an AC outlet capable of supplying AC 100 to 240 V at 50 or 60 Hz.

1. Insert the socket of the provided AC power cord into the AC IN jack at the rear of the repeater
2. Insert the plug of the provided AC power cord into the AC outlet

- **Backup power**

  For uninterrupted operation during power failures, a 13.8 V rechargeable automotive type battery (55-Ah or more recommended) may be connected to the BACKUP terminal posts on the rear panel. In the event of an AC power outage, the automatic power control circuit will automatically switch the repeater to the backup battery, and operation will not be interrupted.

  If the power is out for a long time, the battery may be completely discharged. When the power is restored the DC startup current may blow the protection fuse. So the protection fuse in charge circuit should be checked after an outage.

  While operating from a battery or DC supply, the repeater requires approximately 14 A at 13.8 V during transmit.

  Follow the outline in the illustration regarding the proper connection of the DC power cable.

  Always observe proper polarity when making DC connection.

  **Cautions**

  - Use a power source capable of supplying DC 13.8 V and a current capacity of 14 A or more.
  - Make sure to switch OFF the power of the external power source before connecting.

1. Insert the socket of the provided DC power cord to the BACKUP jack at the rear of the repeater
2. Connect the **red** wire (+) of the provided DC power cord to the positive (+) terminal of the external power source, and the **black** wire (-) to the negative (-) terminal
**Connection for DR-1XE**

Follow the outline in the illustration regarding the proper connection of the DC power cable.

The DC power connector for the DR-1XE must only be connected to a DC source providing 13.8 V DC (±15 %), and capable of at least 10 A of current.

Always observe proper polarity when making DC connection.

**Caution**

- Make sure to switch OFF the power of the external power source before connecting.

1. Insert the socket of the provided DC power cord to the DC IN jack at the rear of the repeater
2. Connect the **red** wire (+) of the provided DC power cord to the positive (+) terminal of the external power source, and the **black** wire (-) to the negative (-) terminal

![Diagram](image)

**Tip**

The external power source should be installed near the equipment and should be easily accessible.

---

Permanent damage can result when improper supply voltage, or reverse-polarity voltage, is applied to the DR-1XE. The Limited Warranty on this radio does not cover damage caused by application of AC voltage, reverse polarity DC, or DC voltage outside the specified range of 13.8 V ±15 %. When replacing fuses, be certain to use a fuse of the proper rating. The DR-1XE requires a 15 A blade fuse.
Connecting External Devices

Connection of an external microphone or PTT switch
By connecting an optional microphone MH-48A6JA to the [MIC] jack on the front panel, voice communications are possible in the mode which is set on the transmitter. Except, when AMS is set on the transmitter, data transmission is not available via the [MIC] jack.

Connection to a personal computer
The provided PC connection cable “SCU-20” and other optional cables can be used to connect the repeater to a personal computer as a COM port.
Use the [ACC] jack at the back of the repeater to connect with the personal computer.
The pin assignments of the [ACC] jack are as follows.

1. PKD (packet data input)
2. GND
3. PSK (PTT)
4. RX 9600 (9600 bps packet data output)
5. RX 1200 (1200 bps packet data output)
6. PK SQL (squelch control)
7. TXD (serial data output [transceiver → PC])
8. RXD (serial data output [transceiver ← PC])
9. CTS (data communication control)
10. RTS (data communication control)

Tips
- Make sure to switch off the power to the radio before connecting the cable.
- When using the PC connection cable “SCU-20”, a dedicated driver needs to be installed in the personal computer. Download and use the driver and installation manual from the YAESU website.
Installation and Connection

Connecting External Devices

Connection to an external controller

To control the DR-1X/DR-1XE remotely, optional cables can be used to connect the repeater to an external controller. Use the [CONTROL I/O] connector at the back of the repeater to connect with the external controller.

To interface the DR-1X/DR-1XE with an external controller, additional cables with a 15-pin mini d-sub connector are needed to connect to the [CONTROL I/O] connector. Your controller may also require rewiring.

Link operation may require four connections: receiver audio, transmitter audio, receiver COR, and transmitter PTT; however these are not available on the [CONTROL I/O] connector.

The pin assignment of the [CONTROL I/O] connector is as follows.

<table>
<thead>
<tr>
<th>Pin No</th>
<th>Pin Name</th>
<th>I/O</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EXT I/O</td>
<td>Input</td>
<td><img src="image" alt="Pin Assignment" /></td>
</tr>
<tr>
<td>2</td>
<td>PTT</td>
<td>Input</td>
<td><img src="image" alt="PTT Descriptions" /></td>
</tr>
<tr>
<td>3</td>
<td>CTCSS/DCS (PKSQL)</td>
<td>Output</td>
<td><img src="image" alt="CTCSS/DCS Descriptions" /></td>
</tr>
<tr>
<td>4</td>
<td>SQL DET (Noise SQL)</td>
<td>Output</td>
<td><img src="image" alt="SQL DET Descriptions" /></td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>GND</td>
<td>Chassis ground for all logic levels and power supply return</td>
</tr>
<tr>
<td>6</td>
<td>TONE IN</td>
<td>Input</td>
<td><img src="image" alt="TONE IN Descriptions" /></td>
</tr>
<tr>
<td>7</td>
<td>AF IN</td>
<td>Input</td>
<td><img src="image" alt="AF IN Descriptions" /></td>
</tr>
<tr>
<td>8</td>
<td>DISC OUT</td>
<td>Output</td>
<td><img src="image" alt="DISC OUT Descriptions" /></td>
</tr>
<tr>
<td>9</td>
<td>AF OUT</td>
<td>Output</td>
<td><img src="image" alt="AF OUT Descriptions" /></td>
</tr>
<tr>
<td>10</td>
<td>GND</td>
<td>GND</td>
<td>Chassis ground for all logic levels and power supply return</td>
</tr>
</tbody>
</table>
Connecting External Devices

<table>
<thead>
<tr>
<th>Pin No</th>
<th>Pin Name</th>
<th>I/O</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>EXT port 1*1</td>
<td>Input</td>
<td>In Remote mode, the logic combination of Ports 1 and 2 determines the transmit and receive modes as below:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>![Port 2</td>
</tr>
<tr>
<td>12</td>
<td>EXT port 2*1</td>
<td>Input</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>EXT port 3*1</td>
<td>Input</td>
<td>[L] GND: RX Tone OFF  [H] OPEN: Setup mode Input a low level signal to indicate that the receiving tone is invalid.</td>
</tr>
<tr>
<td>14</td>
<td>EXT port 4*1</td>
<td>Input</td>
<td>[L] GND: TX Tone OFF  [H] OPEN: Setup mode Input a low level signal to indicate that the transmitting tone is invalid.</td>
</tr>
<tr>
<td>15</td>
<td>VCC</td>
<td>VCC</td>
<td>Power supply This pin provides 13.8 V, 2.0 A, DC from the repeater supply. There is an internal 3 A fuse to prevent damage to the repeater.</td>
</tr>
</tbody>
</table>

*1: These functions may only be activated while the repeater is in Remote mode.

Pins 6, 7, 8, and 9 Functions Controlled by Operation Mode

<table>
<thead>
<tr>
<th>Pin No</th>
<th>Pin Name</th>
<th>Receive Mode</th>
<th>In Repeater / Remote Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>TONE IN</td>
<td>Digital</td>
<td>Invalid</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Analog</td>
<td>Invalid</td>
</tr>
<tr>
<td>7</td>
<td>AF IN</td>
<td>Digital</td>
<td>Invalid</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Analog</td>
<td>Invalid</td>
</tr>
<tr>
<td>8</td>
<td>DISC OUT</td>
<td>Digital</td>
<td>Invalid</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Analog</td>
<td>Discriminator output</td>
</tr>
<tr>
<td>9</td>
<td>AF OUT</td>
<td>Digital</td>
<td>Demodulated digital audio output</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Analog</td>
<td>Analog audio output</td>
</tr>
</tbody>
</table>

Caution
Even when using the DR-1X/DR-1XE with an external controller, the COR, analog and digital IDs, TOT, DSC/CTCSS, TX power, etc. are already controlled by the DR-1X/DR-1XE internal control. These internal controls cannot be disabled. The external controller must not conflict with these functions. Some functions of the internal controller cannot be overridden. Before connecting an external controller you must make sure which functions are already internally controlled. Special precautions must be considered when planning to link with external systems.

Tips
- Make sure to switch off the power to the radio before connecting the cable.
- In case of jamming or interfering signal while in Repeater mode, Pin 1 may be grounded by external control to temporarily disable repeating the receiver input.

**To use DR-1X/DR-1XE in Remote mode**

By setting [REMOTE] in the setup menu to ON and inputting a low level to Pin 1 of the [CONTROL I/O] connector, the repeater may be used in Remote mode and controlled remotely by the external controller. Pins 1, 8, 9, 11, 12, 13 and 14 may be used for input, output and control while in Remote mode. For details, see “Remote Operation” (Page 25).
Basic Operations

Turning the power on

1 Press the "|" side of the POWER switch
The power will be switched on, and the power supply monitor (LED indicator) will illuminate.

Tips
• When the power is supplied from the AC IN jack, the indicator illuminates in green (DR-1X only).
• When the power is supplied through the BACKUP terminals (13.8 V DC), the indicator illuminates in red.

The operation mode screen will appear on the display.

Switching the power off

1 Press the "O" side of the POWER switch
The power supply monitor and the display will turn off, and the power will be switched off.

Setting the ID (call sign)

When switching the power on for the first time after purchasing, or after resetting the radio, you must enter the call sign.

1 Touch [F] in the setup mode screen
The setup menu will appear.

2 Touch [ID SET]
The character input screen will appear.

3 Touch a character key
The touched character will be displayed at the top of the screen.

Tips
• Each time [X] is touched the cursor will move to the left and erase one character.
• The input screen changes between numbers input and alphabet input each time [ABC] is touched.
• The cursor in the input field moves left or right when [←] or [→] are touched.
• Alphabets, numbers, and a hyphen up to 10 characters can be entered.

4 Touch [ENT]
The ID setting is saved and the display will return to the setup menu.

Tip
When switching the power ON for the first time after purchasing, or after resetting the radio, a screen will be displayed requesting the repeater ID be entered.
Basic Operations

Turning the display on and off

1. Press the SETUP button for 1 second to turn the display off.

2. Press the SETUP button for 3 seconds to turn the display on.

Tip

The display can be set to turn off automatically after a period of time with no operation. See “Setting the display turn-on time” (Page 37) for details.

Adjusting the volume

1. Turn the VOL knob.

   The monitor speaker audio volume of the received (up link) signal will increase when the knob is turned in a clockwise direction and decrease when the knob is turned in a counter-clockwise direction.
Switching the operating mode

The operating mode can be switched between the AUTO mode in which the communication mode switches automatically corresponding to the received/transmitted signal types, and the FIX mode in which the signals are always received/transmitted in the previously selected communication mode.

Tip

In the factory default, the RX band is set to the AUTO mode, and the TX band to the FIX mode.

1. Touch [AUTO] to activate the AMS (automatic mode select) function
   One of the communication modes will be selected automatically and the corresponding indicator will be displayed in red (also see the next page).

2. Touch [FIX] to operate in the FIX mode
   The indicator of the selected communication mode will turn yellow on the operation mode screen.
Basic Operations

Switching the communication mode

This repeater is equipped with the AMS (automatic mode select) function which automatically selects one of four communication modes to match the signal received or transmitted. C4FM digital signals or analog signals are identified in order to automatically match the communication mode of the partner station. When using AUTO mode, the AMS function is activated and the selected communication mode is indicated in red on the operation mode screen.

When using FIX mode, touch [FIX] repeatedly on the operation mode screen to select the communication mode. The selected mode is indicator in yellow and changes each time [FIX] is touched.

Tip
The combination of UP LINK for "FIX mode" and DOWN LINK for "AUTO mode" can not be set.

<table>
<thead>
<tr>
<th>Communication mode</th>
<th>Indicator</th>
<th>Explanation of mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>V/D mode (Simultaneous voice and data communication mode)</td>
<td>NORMAL / DN</td>
<td>The audio signal error is detected and repaired during the transmission of the digital audio signal. This reduces interruptions to the conversation and is the basic C4FM FDMA digital mode.</td>
</tr>
<tr>
<td>Voice FR mode (Voice full-rate mode)</td>
<td>VOICE WIDE / VW</td>
<td>Digital voice data is transmitted using the entire 12.5 kHz bandwidth. High quality voice communication is possible.</td>
</tr>
<tr>
<td>Data FR mode (High speed data communication mode)</td>
<td>DATA / DW</td>
<td>High speed data communication mode using the entire 12.5 kHz bandwidth for data communication. Automatically switches to this mode for video communication.</td>
</tr>
<tr>
<td>Analog FM mode</td>
<td>FM</td>
<td>Analog communications using the FM mode. This mode is effective for communication when the signal strength is so weak that the voice is cut off or interrupted in the digital mode.</td>
</tr>
</tbody>
</table>

Caution
In the V/D mode (“NORMAL” is displayed), the position information is included in the transmitted signal during the conversation, however in the Voice FR mode (“VOICE WIDE” is displayed), the position information is not included.

Adjusting the squelch level

Annoying noises can be muted when no signal is detected. The noise can be canceled more effectively when the squelch threshold is increased, but it may become more difficult to receive weak signals. Adjust the squelch level as required.

Note
When the squelch level is set to “open” the repeater will transmit, it must be connected to the duplexer and antenna. Use extreme caution when making the squelch adjustment or measurement with a signal generator. Do not connect the signal generator to the duplexer antenna port. To avoid damaging the test equipment, connect the signal generator directly to the RX antenna connector on the DR-1X/DR-1XE.

1 Touch [SETUP]
The setup mode screen will appear.
2 Touch [SQL]
When [SQL] turns orange, the VOL meter below the frequency of the RX band will change to the SQL meter showing the squelch level setting.

3 Touch [▲] or [▼] to adjust the squelch level
The level will be displayed in the SQL meter.

4 Touch [BACK]
The squelch level is set and the display will return to the previous screen.

Adjusting the transmit power
The transmit power can be reduced to save on power consumption.

1 Touch [SETUP]
The setup mode screen will appear.

2 Touch [Tx PWR] to select the transmit power
The setting is changed in the following sequence, each time [Tx PWR] is touched.
“HI” → “LO” → “MD”

<table>
<thead>
<tr>
<th></th>
<th>HI</th>
<th>MD</th>
<th>LO</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 W</td>
<td>20 W</td>
<td>5 W</td>
<td></td>
</tr>
</tbody>
</table>

Tips
• The current setting is displayed below [Tx PWR] on the screen.
• Factory default: HI

3 Touch [BACK]
The transmit power level is set and the display will return to the operation mode screen.
Basic Operations

Setting the TX Inhibit

1. Touch [SETUP] on the operation mode screen
   The setup mode screen will appear.
2. Touch [F] in the setup mode screen
   The setup menu will appear.
3. Touch [MODE/REMOTE]
   The menu list will appear.

4. Select [TX INHIBIT]

5. Touch [TX INHIBIT]
   The set value will change between [OFF] and [ON] each time it is touched.

<table>
<thead>
<tr>
<th>ON</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disable transmission</td>
<td>Enable transmission</td>
</tr>
</tbody>
</table>

Tip: Factory default: OFF
Note: When [TX INHIBIT] is set to "ON", all transmit action will be disabled.

6. Touch [BACK]
   The setting is saved and the display will return to the setup menu.
Repeater Operation

You can control the repeater operation remotely by connecting an external controller through the [CONTROL I/O] connector at the back of the repeater (see “Connection to an external controller” (Page 17)).

The following features are available while in remote operation:
- Changing the communication mode of repeater transmission and reception
- Turning the RX and TX tone signal “ON” or “OFF”
- Monitoring the discriminator and analog or demodulated digital audio during up-link reception

To use the repeater under remote control, set up the repeater as explained below, after it is connected to the external controller.

**Turning remote operation ON/OFF**

When the remote operation is “ON”, the repeater operates according to the control instructions received from the external controller (the instructions are received through Pin 11 to Pin 14 of the [CONTROL I/O] connector). When the remote operation is “OFF”, the repeater operates according to the settings determined through the setup mode.

1. Touch [SETUP]
   - The setup mode screen will appear.

2. Touch [F]
   - The setup menu will appear.

3. Touch [MODE/REMOTE]
   - The menu list will appear.

4. Select and touch [REMOTE]
   - The set value will change between [OFF] and [ON] each time it is touched.
   - Tip: Factory default: OFF

5. Touch [BACK] three times
   - The setting is determined and the display will return to the operation mode screen.
   - Note that [REMOTE] at the bottom left of the screen is displayed in red.
Remote Operation

Control from external controller

Your external controller must generate and accept the following signals through a connection cable with a 15-pin mini d-sub connector corresponding to the [CONTROL I/O] connector of the repeater.

Caution

Do not use a VGA cable for PC display to connect your external controller to the repeater.

<table>
<thead>
<tr>
<th>Pin No</th>
<th>Pin Name</th>
<th>I/O</th>
<th>Descriptions and Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EXT I/O</td>
<td>Input</td>
<td>L (GND) Mode selection. Fix this input to low level to enable remote operation.</td>
</tr>
<tr>
<td>2</td>
<td>PTT</td>
<td>Input</td>
<td>L (GND): EXT PTT ON   H (OPEN): EXT PTT OFF When this pin is pulled low by an external device, it keys the repeater transmitter.</td>
</tr>
<tr>
<td>3</td>
<td>CTCSS/DCS (PKSQL)</td>
<td>Output</td>
<td>L (GND): Decoded   H (OPEN): Un-decoded Signaling settings in the repeater setup menu will be applied.</td>
</tr>
<tr>
<td>4</td>
<td>SQL DET (Noise SQL)</td>
<td>Output</td>
<td>L (GND): SQL open   H (OPEN): SQL close This indicates whether the receiver squelch is open. If the squelch control is properly set, this indicates a carrier on the receiver channel.</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>GND</td>
<td>Chassis ground for all logic levels and power supply return</td>
</tr>
<tr>
<td>6</td>
<td>TONE IN</td>
<td>Input</td>
<td>CTCSS/DCS EXT input / 600 ohm, 500 mV peak to peak Valid during external PTT control</td>
</tr>
<tr>
<td>7</td>
<td>AF IN</td>
<td>Input</td>
<td>EXT Modulation input / 600 ohm, 1.5 V peak to peak Valid during external PTT control</td>
</tr>
<tr>
<td>8</td>
<td>DISC OUT</td>
<td>Output</td>
<td>Up-link RX DISC output (w/o de-emphasis), 500 mV peak to peak Discriminator output during up-link reception</td>
</tr>
<tr>
<td>9</td>
<td>AF OUT</td>
<td>Output</td>
<td>Up-link RX AF output (w/ de-emphasis), 300 mV peak to peak Analog or demodulated digital audio output during up-link reception</td>
</tr>
<tr>
<td>10</td>
<td>GND</td>
<td>GND</td>
<td>Chassis ground for all logic levels and power supply return</td>
</tr>
<tr>
<td>11</td>
<td>EXT port 1</td>
<td>Input</td>
<td>The logic combination of these two pins determines the communication mode of transmission and reception as below:</td>
</tr>
<tr>
<td>12</td>
<td>EXT port 2</td>
<td>Input</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>EXT port 3</td>
<td>Input</td>
<td>L (GND): RX Tone OFF   H (OPEN): RX Tone ON (with signal type set in the setup mode) Input a low level signal to indicate that the receiving tone is invalid.</td>
</tr>
<tr>
<td>14</td>
<td>EXT port 4</td>
<td>Input</td>
<td>L (GND): TX Tone OFF   H (OPEN): TX Tone ON (with signal type set in the setup mode) Input a low level signal to indicate that the transmitting tone is invalid.</td>
</tr>
<tr>
<td>15</td>
<td>VCC</td>
<td>VCC</td>
<td>Power supply (13.8 V DC)</td>
</tr>
</tbody>
</table>

Caution

It is impossible to input analog modulation signals and convert them to digital signals on DR-1X/DR-1XE.

Tip

AF IN is usually used for analog modulation input with a packet speed of 1200 bps, however, to input C4FM digital signals for digital modulation operations, enter the DR-1X/DR-1XE Repeater mode, then touch the up-link frequency display area to change the packet speed to 9600bps (see the next page).
You can use the repeater as a VHF/UHF base station by connecting an optional MH-48A6JA microphone to the [MIC] jack on the front panel.

### Transmitting C4FM digital signals

For digital modulation operation, the packet speed (data transmission rate) of the repeater must be set to 9600 bps, remember to change the default setting from 1200 bps.

If the repeater is expected to transmit digital modulation signals while in base station operation, set the packet speed to 9600 bps before starting base station operation as below.

1. Touch [SETUP] on the operation mode screen
   The setup mode screen will appear.
2. Touch [F]
   The setup menu will appear.
3. Touch the up-link frequency display area
   “Packet Speed 9600bps” will appear for a while.

4. Touch [BACK]
   The display will return to the setup mode screen.
Setting up the Repeater

Using the setup menu, the various functions of the repeater can be customized to match the method of use. You can select the items that you would like to adjust from the respective lists and enter or select the appropriate settings for the intended repeater operation.

**Setup menu basic operations**

1. Touch [SETUP] on the operation mode screen
   The setup mode screen will appear.

2. Touch [F]
   The setup menu will appear.

3. Touch the menu item
   The menu list will appear.

4. Touch the item to be set
   The item will turn orange in color.

5. Touch [▲] or [▼], or touch the item repeatedly
   The set value will change each time it is touched.

6. Touch [BACK]
   The setting is determined and the display will return to the setup menu.
Setting the frequency

1 Touch the TX or RX band area.
   The number input screen will appear.

2 Touch a number key
   The touched number will be displayed at the top of the screen.
   **Tips**
   • Each time [X] is touched the cursor will move to the left and erase one character.
   • Touch the "DOWN LINK" or "UP LINK" area to change the frequency setting between TX or RX.
   • When the last digit is entered, the display will return to the setup menu.
   • The entered frequency will be displayed on the selected band.

3 Touch [ENT]
   The display will return to the setup menu.
   The entered frequency will be displayed on the selected band.
Setting the tone signals

Setting the tone frequency
1 Touch [F] in the setup mode screen
   The setup menu will appear.
2 Touch [SIGNALING]
   The menu list will appear.
3 Select [TONE SQL FREQ]
4 Touch [▲] or [▼]
   The set value will change each time it is touched.
   **Tips**
   • Tone frequencies between 67.0 Hz and 254.1 Hz can be selected.
   • Factory default: 100.0 Hz
5 Touch [BACK]
   The setting is determined and the display will return to the setup menu.

Setting the DCS code
1 Touch [F] in the setup mode screen
   The setup menu will appear.
2 Touch [SIGNALING]
   The menu list will appear.
3 Select [DCS CODE]
4 Touch [▲] or [▼]
The set value will change each time it is touched.

Tips
• DCS codes between 023 and 754 can be selected.
• Factory default: 023

5 Touch [BACK]
The setting is determined and the display will return to the setup menu.

Switching the tone signal types

1 Touch [F] in the setup mode screen
   The setup menu will appear.

2 Touch [SQL] in the setup menu
   The menu list will appear.

3 Select [RX SQL] to set the tone signal type during reception, or select [TX SQL] to set
   the tone signal type during transmission

4 Touch [▲] or [▼]
The setting will change in the following sequence each time it is touched.
   “OFF” → “TONE” → “DCS”
   Tip: Factory default: OFF

5 Touch [BACK]
The setting is determined and the display will return to the setup menu.
**Setting up the Repeater**

**Setting the digital squelch code**

1. Touch **[F]** in the setup mode screen
   The setup menu will appear.

2. Touch **[DSQ CODE]**
   The menu list will appear.

3. Touch **[▲]** or **[▼]**
   The set value will change each time it is touched.
   **Tips**
   - Tone squelch codes between 001 and 126 or OFF can be selected.
   - Factory default: OFF

4. Touch **[BACK]**
   The setting is determined and the display will return to the setup menu.
   The set value will be displayed below **[DSQ CODE]** on the menu.

**Setting the ID (call sign)**

1. Touch **[F]** in the setup mode screen
   The setup menu will appear.

2. Touch **[ID SET]**
   The character input screen will appear.
3 Touch a character key
   The touched character will be displayed at the top of the screen.
   **Tips**
   - One character to the left of the cursor is erased when [←] is touched.
   - The screen changes to the input screen for numbers and alphabet each time [ABC] is touched.
   - The cursor in the input field moves left and right when [←] and [→] are touched.
   - Alphabets, numbers, and a hyphen up to 10 characters can be entered.

4 Touch [ENT]
   The setting is determined and the display will return to the setup menu.
   **Tip** When switching the power ON for the first time after purchasing, or after resetting the radio, a screen will be displayed requesting the repeater ID entered.

---

**Setting the ID announcement**

**Setting the way to announce**

1 Touch [F] in the setup mode screen
   The setup menu will appear.

2 Touch [ID ANNOUNCE]
   The menu list will appear.

3 Select and touch [ANNOUNCE]
   The menu list will appear.

4 Select and touch [ANNOUNCE MODE]
   The set value will change between [CW] and [VOICE] each time it is touched.
   **Caution** [VOICE] cannot be selected when the optional voice guide unit “FVS-2” is not mounted on the repeater.
   **Tip** Factory default: CW

5 Touch [BACK]
   The setting is determined and the display will return to the menu list.
Setting up the Repeater

### Setting the announcement output level

1. Touch [F] in the setup mode screen
   The setup menu will appear.

2. Touch [ID ANNOUNCE]
   The menu list will appear.

3. Select and touch [ANNOUNCE]
   The menu list will appear.

4. Select and touch [ANNOUNCE LEVEL]
   The set value will change in the following sequence each time it is touched.
   
   "HIGH" → "MID" → "LOW"

   **Tip**  Factory default: MID

5. Touch [BACK]
   The setting is determined and the display will return to the menu list.

### Setting the ID announcement CW speed

1. Touch [F] in the setup mode screen
   The setup menu will appear.

2. Touch [ID ANNOUNCE]
   The menu list will appear.

3. Select and touch [ANNOUNCE]
   The menu list will appear.
4 Select and touch [CW ID SPEED]

The set value will change in the following sequence each time it is touched.
“16wd/min” → “18wd/min” → “20wd/min” → “22wd/min” → “24wd/min”

* Tip  Factory default: 20wd/min

* Note  When operating in the USA the CW ID SPEED setting time must not exceed 20 words per minute when keyed by an automatic device, to comply with the FCC rule Part 97: Sec. 97.119 (b)(1) Station identification.

5 Touch [BACK]

The setting is determined and the display will return to the menu list.

### Setting the announcement time interval

1 Touch [F] in the setup mode screen

The setup menu will appear.

2 Touch [ID ANNOUNCE]

The menu list will appear.

3 Select [INTERVAL]

4 Touch [▲] or [▼]

The set value will change in the following sequence each time it is touched.
“OFF” → “3min” → “5min” → “10min” → “15min” → “20min” → “30min” → “TOT”

* Tip  Factory default: 10min

* Note  When operating in the USA, the ID setting time should be ten minutes or less to comply with the FCC rule Part 97: Sec. 97.119 (a) Station identification.

5 Touch [BACK]

The setting is determined and the display will return to the setup menu.
Setting up the Repeater

**Setting the TOT (timeout timer)**

1. Touch [F] in the setup mode screen
   The setup menu will appear.

2. Touch [TOT]
   The menu list will appear.

3. Touch [▲] or [▼]
   The set value will change in the following sequence each time it is touched.
   “OFF” → “30sec” → “1min” → “1.5min” → “2min” → “2.5min” → “3min” → “4min” → “5min” → “10min”
   **Tip**  Factory default: 3min

4. Touch [BACK]
   The setting is determined and the display will return to the setup menu.
   The set value will be displayed below [TOT] on the menu.

**Setting other configuration**

- Setting the repeater for remote operation
  See page 24 for details.

- Turning transmission ON/OFF from the remote controller
  See page 23 for details.
Setting up the Repeater

Setting the display turn-on time

1. Touch [F] in the setup mode screen
   The setup menu will appear.

2. Touch [MODE/REMOTE]
   The menu list will appear.

3. Select [DISPLAY TIMER]

4. Touch [DISPLAY TIMER]
   The set value will change in the following sequence each time it is touched.
   “CONTINUE” → “1min” → “5min” → “10min” → “30min”
   Tip: Factory default: CONTINUE

5. Touch [BACK]
   The setting is determined and the display will return to the menu list.

Setting the Packet Speed

1. Touch [F] in the setup mode screen
   The setup menu will appear.

2. Touch the RX band area.
   The set value will change between [1200 bps] and [9600 bps] each time it is touched.
   Tip: Factory default: 1200 bps

3. Three seconds after selecting the packet speed, the new setting is automatically saved and the display will return to the menu list.
Restoring Default Settings (Factory Reset)

1. Turn the radio off.
2. Press and hold in the SETUP button while turning the radio on.
   Tip: Continue pressing the SETUP button until the operation mode screen appears on the display.

3. Touch [SETUP]
   The setup mode screen will appear.

4. Touch [F] in the setup mode screen
   The setup menu will appear.

5. Touch [F]
   The reset confirmation screen will appear.

6. Touch [OK?]
   The settings will be reset to the factory default values.
   Tips:  
   • Touch [Cancel] to stop the reset and keep the current settings.
   • After resetting the repeater, the call sign must be entered (see page 32).
Installation of the Optional Voice Guide Unit "FVS-2"

1. Turn the DR-1X/DR-1XE [POWER] switch to “OFF”.
2. Disconnect all the cables from the DR-1X/DR-1XE.
3. Referring to Figure 1, remove the 4 screws from each side and 7 screws from the top cover of the DR-1X/DR-1XE, then remove the top cover.
   
   **Note** Figures in this page show the outline of the DR-1X.

4. Referring to Figure 2, remove the 4 screws from the top cover of the RX-Unit, then remove the top cover.

5. Refer to Figure 3 for the mounting location for the FVS-2.

6. Push the FVS-2 (component side up) onto the pins corresponding to its assigned mounting location on the DR-1X/DR-1XE.
   Gently press the FVS-2 down until it is firmly seated on the connector.

7. Replace the top cover of the RX-Unit and the 4 screws.
8. Replace the top cover of the DR-1X/DR-1XE and 15 screws.
9. Connect all the cables to the DR-1X/DR-1XE.
**Maintenance**

**Care and maintenance**

Switch the power supply OFF before wiping away any dust and stains on the radio using a dry and soft cloth. For stubborn stains, wet a piece of soft cloth and wring it hard before using it to wipe away the stains.

**Caution** Never use washing detergents or organic solvents (thinner, benzene etc.). These may result in the paint peeling off or the cover being damaged.

**Replacing the fuse**

When the fuses attached at the rear of the radio are blown and the radio can no longer operate, replace them with correct rating one (5 A for AC power supply (DR-1X only), 15 A for DC power supply).

**Caution** When replacing the fuse, disconnect the power supply cable from the radio.
Advice When There Is a Problem

Check the following before requesting repair services.

<table>
<thead>
<tr>
<th>There is no power</th>
</tr>
</thead>
</table>
| ● Is the external power supply connected correctly?  
  Check the AC power supply (DR-1X only); plug the connectors of the provided power supply cable all the way into the jacks.  
  Check the DC power supply; connect the black wire to the minus terminal and the red wire to the plus terminal.  |
| ● Is the voltage and current capacity of the external power supply sufficient?  
  Check the voltage and current capacity of the external power supply.  |
| ● Is the fuse open/blown?  
  Replace the fuse.  |

<table>
<thead>
<tr>
<th>There is no sound</th>
</tr>
</thead>
</table>
| ● Is the squelch level or setting too high?  
  Adjust the squelch level when receiving weak signals.  |
| ● Is the volume too low?  
  Increase the volume by turning the VOL knob in a clockwise direction.  |
| ● Is the tone squelch or DCS turned on?  
  When the tone squelch or DCS is turned on, no sound will be heard until signals containing the same tone frequency or DCS code as the repeater setting are received.  |

<table>
<thead>
<tr>
<th>There is no transmission</th>
</tr>
</thead>
</table>
| ● Is the transmit frequency set to the amateur band?  
  Transmission outside the amateur band is not possible.  |
| ● Is the antenna or coaxial cable at fault?  
  Replace the antenna or coaxial cable.  |
| ● Is the voltage of the external power supply normal?  
  When the voltage of the power supply drops during transmission, the radio may not function correctly.  
  Use a stable power supply with a proper voltage and current capacity.  |

<table>
<thead>
<tr>
<th>There is no screen on the display</th>
</tr>
</thead>
</table>
| ● Is the screen timeout timer set to ON?  
  Press and hold the SETUP button for 3 seconds to turn on the display.  
  Set a longer period of time for the timeout timer in the setup mode.  |

About internal spurious signals

Due to the combination of oscillator signals produced at the same time in the receiver, there may be some internal heterodynes due to the high frequency of the internal oscillator. However, this is not a malfunction (refer to the calculation formula below: \( n \) is any integer). Depending on the combination of the frequencies received at the same time, there may also be fluctuations in the reception sensitivity.

- Reception frequency = 12.288 MHz \( \times n \) times
- Reception frequency = 15.6 MHz \( \times n \) times
- Reception frequency = 15.6 MHz \( \times n \) times
- Reception frequency = 2.4576 MHz \( \times n \) times
- Reception frequency = 6.1444 MHz \( \times n \) times
- Reception frequency = 11.1 MHz \( \times n \) times
- Reception frequency = 18.432 MHz \( \times n \) times
- Reception frequency = 11.1 MHz \( \times n \) times
- Upper (Band A) frequency = (Lower (Band B) frequency ± 44.85 MHz) \( \times n \) times
- Lower (Band B) frequency = (Upper (Band A) frequency ± 47.25 MHz) \( \times n \) times @ Upper band (Band A) MODE = NFM

After-market Services

- **The warranty period is 1 year or 2 years from the date of purchase**
  The warranty certificate is enclosed with the product. Malfunction arising during normal use of the product in accordance with the instructions in the operating manual, within a period of 1 year (DR-1X) or 2 years (DR-1XE) from the date of purchase, shall be repaired free-of-charge.

- **Keep the warranty certificate in a safe location**
  When the warranty certificate is lost, failures which occur during the warranty period will be treated as chargeable non-warranty claims.  
  A warranty certificate where the necessary information such as the purchase date and the name of the retail store have not been filled in will also be treated as void. Please ensure that the date of purchase and the name of the retail store are filled in correctly on the warranty certificate.

- **You may also check with us for any non-warranty repairs**
  We will make repairs at your expense if the functions can be reliably maintained after the repairs. Please check with the retail store or Yaesu customer support for more information.

- **Save the packaging box**
  When sending this product for inspection and repair, use the original product packaging box to prevent shipping damages during the transport.
### General

**Frequency range**  
144 to 146 MHz, 430 to 440 MHz  
144 to 148 MHz, 430 to 450 MHz

**Channel steps**  
5 / 6.25 kHz

**Emission type**  
F1D, F2A, F2D, F3E, F7W

**Frequency stability**  
±2.5 ppm (~4°F to +140°F (~−20°C to +60°C))

**Antenna impedance**  
50 Ω

**Supply voltage**  
AC 100 to 240 V (DR-1X)  
DC 11.7 to 15.8 V, negative grounding

**Current consumption**  
AC: 2 A (max) (@ 117 V Input) (DR-1X)  
DC: 1.5 A (receive)  
10 A (50 W TX, 144 MHz band)  
10 A (50 W TX, 430 MHz band)

**Operating temperature**  
DR-1X: −4°F to +140°F (~−20°C to +60°C)  
DR-1XE: −20°C to +55°C

**Dimensions**  
19” (W) × 3.5” (H) × 15” (D) (482 × 88 × 380 mm)

**Weight (approx.)**  
DR-1X: 22.05 lbs (10 kg)  
DR-1XE: 8.8 kg

### Transmitter

**RF power output**  
50 / 20 / 5 W

**Modulation type**  
F1D, F2A, F2D, F3E Variable Reactance Modulation  
F7W 4FSK (C4FM)

**Spurious emission**  
At least 60 dB below

### Receiver

**Circuit type**  
Double conversion super-heterodyne

**Intermediate frequencies**  
1st: 47.25 MHz, 2nd: 450 kHz

**Receiver sensitivity**  
0.3 μV (Digital 2 m/70 cm) BER 1 %  
0.2 μV (FM 2 m/70 cm) 12 dB SINARD

**Adjacent Channel Selectivity**  
Better than 65 dB TYP (20 kHz offset)

**Selectivity**  
FM 12 kHz/35 kHz (~6 dB/−60 dB)

**Intermodulation**  
Better than 65 dB TYP (20 /40 kHz offset)

**Audio output**  
4 W (4 Ω, THD 10%, 13.8 V; internal speaker)

### Cautions

- Rated values are at normal temperature and pressure.  
- Ratings and specifications are subject to change without notice for product improvement reasons.

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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 radiate 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 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:

- Increase the separation between the equipment and receiver.  
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.  
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
**Declaration of Conformity**

We, Yaesu UK Ltd. declare under our sole responsibility that the following equipment complies with the essential requirements of the Directive 1999/5/EC and Directive 2011/65/EU.

**Type of Equipment:** VHF/UHF AMS Digital / Analogue Repeater

**Brand Name:** YAESU

**Model Number:** DR-1XE

**Manufacturer:** YAESU MUSEN CO., LTD.

**Address of Manufacturer:** Tennozu Parkside Building, 2-5-8 Higashi-Shinagawa, Shinagawa-ku, Tokyo, 140-0002 Japan

**Applicable Standards:**

This equipment is tested and conforms to the essential requirements of directive, as included in following standards.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Health</td>
<td>EN 62311:2008</td>
<td>3 (1) (a)</td>
<td></td>
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<tr>
<td>Safety</td>
<td>EN 60950-1:2006+A12:2011</td>
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<td></td>
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<tr>
<td>EMC</td>
<td>EN 301 489-01 V1.9.2</td>
<td>3 (1) (b)</td>
<td>EN 301 489-15 V1.2.1</td>
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<td>Radio Spectrum</td>
<td>EN 301 783-02 V1.2.1</td>
<td>3 (2)</td>
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<tr>
<td>RoHS2</td>
<td>EN 50581:2012</td>
<td>7 (b)</td>
<td></td>
</tr>
</tbody>
</table>

The technical documentation as required by the Conformity Assessment procedures is kept at the following address:

**Company:** Yaesu UK Ltd.

**Address:** Unit 12, Sun Valley Business Park, Winnal Close, Winchester Hampshire, SO23 0LB, U.K.

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**Disposal of your Electronic and Electric Equipment**

Products with the symbol (crossed-out wheeled bin) cannot be disposed as household waste. Electronic and Electric Equipment should be recycled at a facility capable of handling these items and their waste by products.

In EU countries, please contact your local equipment supplier representative or service center for information about the waste collection system in your country.

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**Attention in case of use**

This transceiver works on frequencies which are not generally permitted. As for the actual usage, the user has to possess an amateur radio licence. Usage is allowed only in the frequency bands which are allocated for amateur radios.

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**List of national codes**

<table>
<thead>
<tr>
<th>AT</th>
<th>BE</th>
<th>BG</th>
<th>CY</th>
<th>CZ</th>
<th>DE</th>
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