

YAESU
The radio

VHF/UHF C4FM/FM
50W AMS DIGITAL REPEATER

DR-1X FR

DR-1XE FR

Operating Manual



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About this manual

This manual contains symbols and conventions to call attention to important information.

| Symbols | Description |
|---|--|
|  | This icon indicates cautions and alerts the user should be aware of. |
|  | This icon indicates helpful notes, tips and information. |

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

-  **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.

-  **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.

Setting up the Repeater

Safety measures for installation

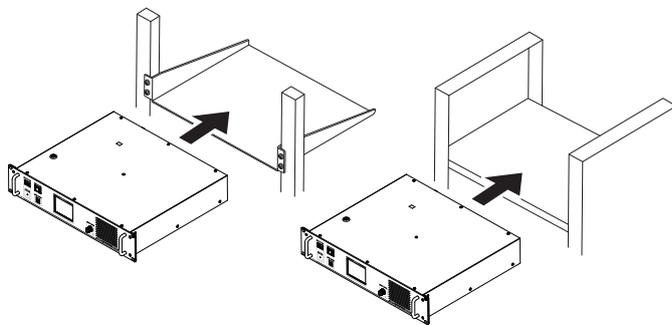
Note the following precautions when installing this repeater:

- Use good engineering, proper grounding and protective devices to protect the repeater from power surges, lightning 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.

Installing the repeater

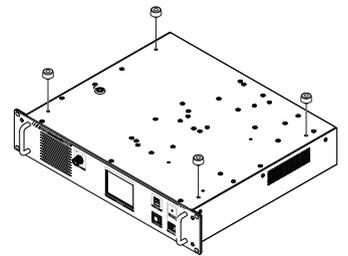
Place the repeater on a flat and level rack or shelf, with its bottom side down. We recommend securing the wings of the repeater front panel to the equipment rack or shelf with bolts.

● Mounting on rack or shelf



● Mounting on a desk

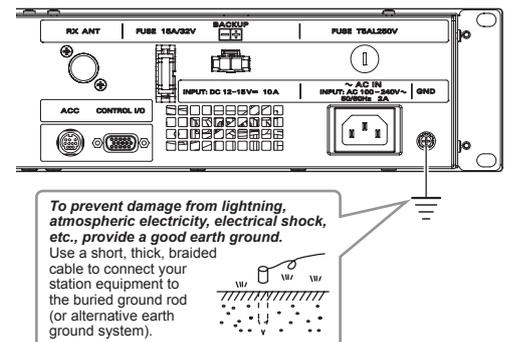
When using the repeater in a desktop location instead of a rack or shelf, attach the four supplied legs onto the bottom of the repeater case.



About electrical grounding

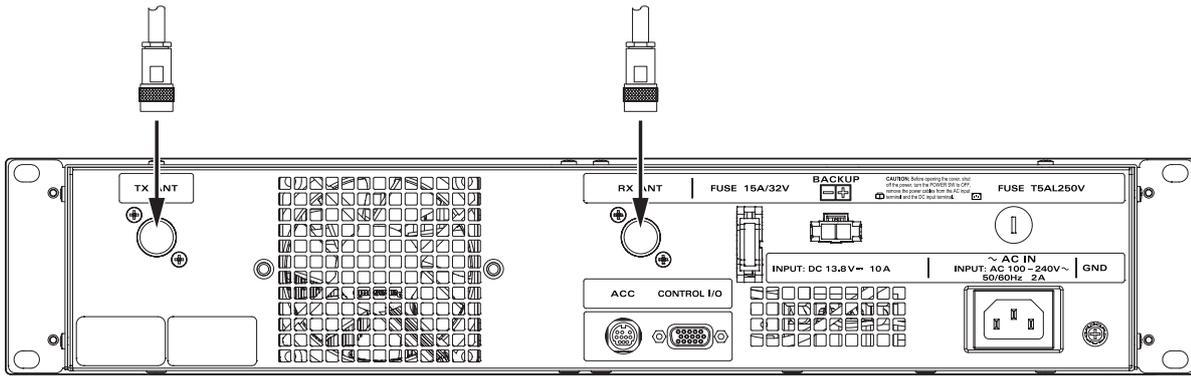
The DR-1X repeater, like any other communications apparatus, requires an effective ground system for maximum electrical safety and best communications effectiveness. A good ground system can contribute to station efficiency in a number of ways:

- 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.



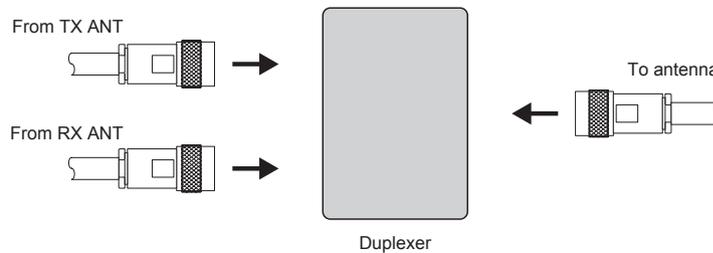
The figure above shows the rear panel of the DR-1X.

Connecting Antenna Cables



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

- 1 When using a duplexer, plug the coaxial cables from the TX ANT and RX ANT terminals into the jacks of the duplexer, and tighten the connectors.
- 2 Plug in the terminal of the coaxial cable connected to the antenna into the jack of the duplexer, and turn to tighten.



Connecting the Power Supply

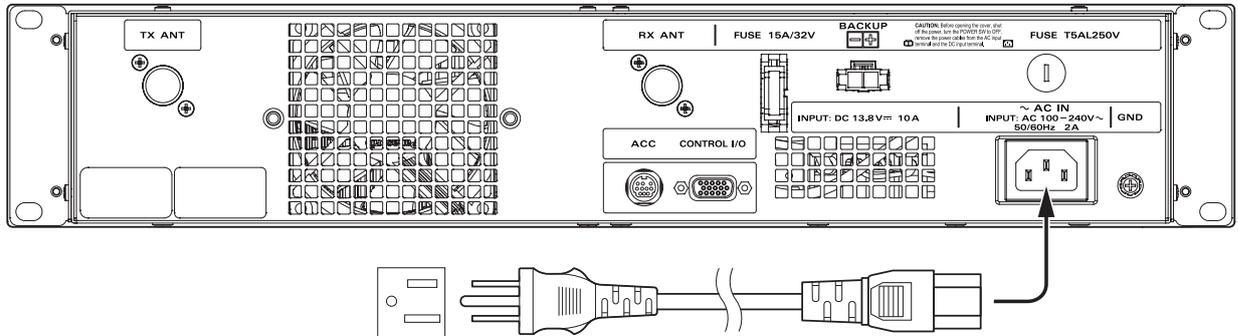
Connection for DR-1X (US and Asian versions)

● Main power



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

- 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 13.8V 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 switch the repeater to the backup battery, and operation will not be interrupted.

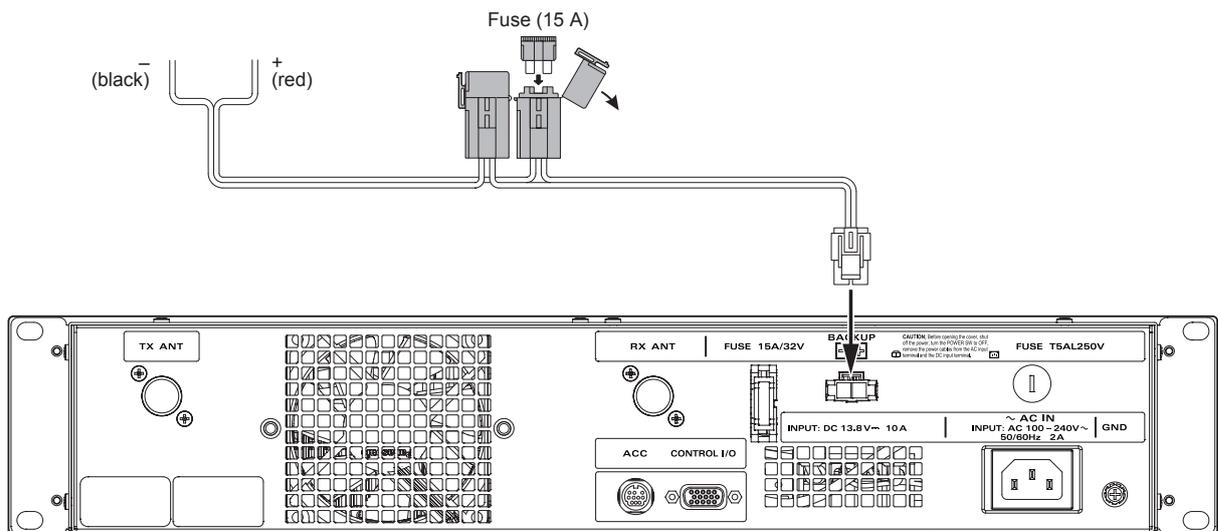
While operating from a battery or DC supply, the repeater requires approximately 14A at 13.8V during transmit.

Always observe proper polarity when making DC connections.



- Use a power source capable of supplying DC 13.8V and a current capacity of 14A or more.
- Make sure to switch OFF the power of the external power source before connecting.
- If the transmit power is set to "HI" (50W), the transmit power is automatically set to "MD" (20W) when operation is switched to the backup power supply.

- 1 Insert the connector of the provided DC power cord into 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 (European and Australian versions)

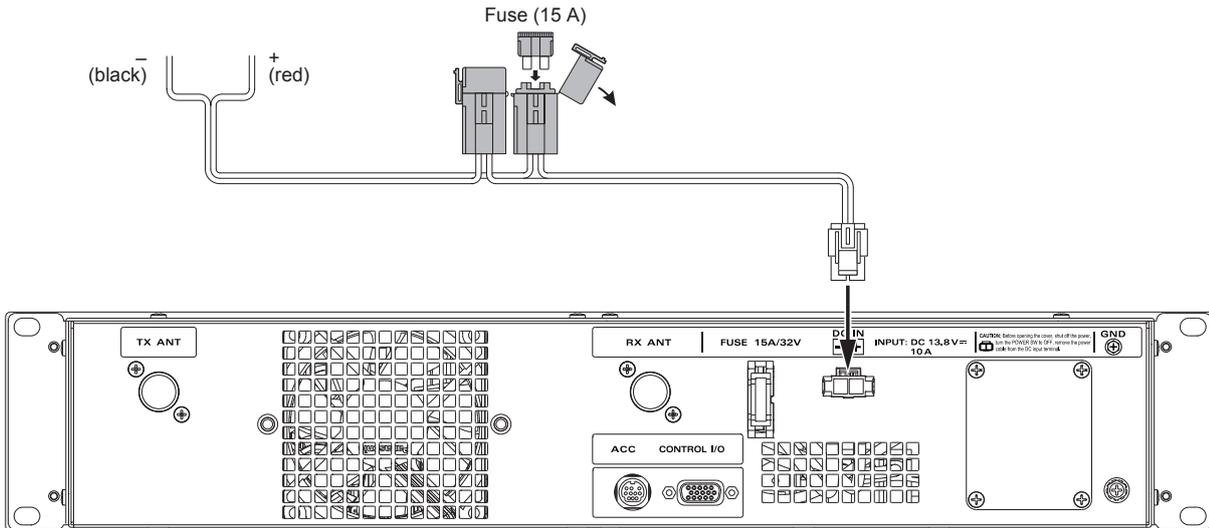
Follow the outline in the illustration regarding the proper connection for the required External Power Supply. The DC power connector for the DR-1XE must only be connected to a DC source providing 13.8V DC ($\pm 15\%$), and capable of at least 10A of current.

Always observe proper polarity when making DC connection.



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

- 1 Insert the connector of the provided DC power cord into 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.



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 $\pm 15\%$. When replacing fuses, be certain to use a fuse of the proper rating. The DR-1XE requires a 15A blade fuse.

Connecting External Devices

Connection of an external microphone

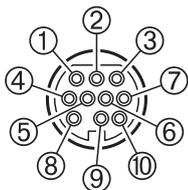
By connecting an optional microphone MH-48A6JA or MH-42C6J to the [MIC] jack on the front panel, voice communications are possible in the mode which is set on the transmitter. Except when AMS is set on the transmitter, data transmission is not available via the [MIC] jack.

Connection to a personal computer

The supplied PC connection cable "SCU-20" can be used to connect the repeater to a personal computer as a USB port.

Use the [ACC] jack to connect with the optional WIRES-X Internet Linking Kit "HRI-200".

The pin assignments of the [ACC] jack are as follows.



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



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

Accessories and Options

Supplied Accessories

| | |
|------------------------------------|---|
| AC Power Cord (T9017882)*1 | 1 |
| DC Power Cord with Fuse (T9026115) | 1 |
| Spare Fuse 15 A (Q0000075) | 1 |
| 5 A (Q0000143)*1 | 1 |
| Case Legs (S4000052) | 4 |
| PC Connection Cable SCU-20 | 1 |
| Operating Manual (this manual) | 1 |

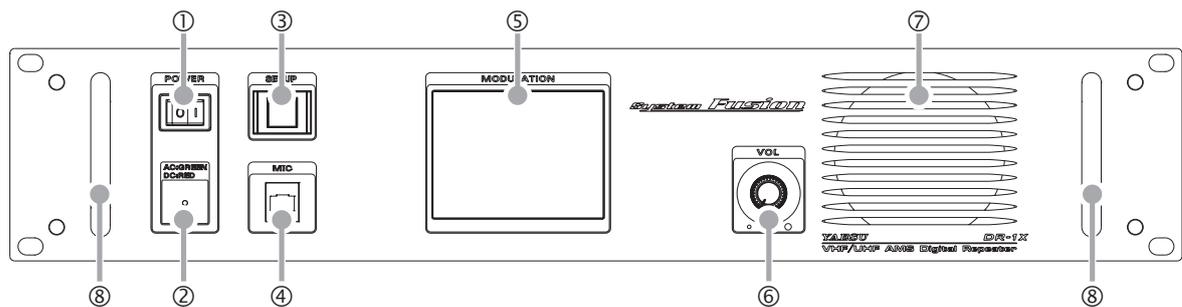
*1: For DR-1X only (except the Australian version))

Optional Accessories

| | |
|------------------|-----------|
| DTMF Microphone | MH-48A6JA |
| Hand Microphone | MH-42C6J |
| Voice Guide Unit | FVS-2 |

Name and Function of Each Component

Front Panel



① POWER Switch

Press “I” side to switch the repeater ON, and “O” side to switch the repeater OFF.

② 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 is supplied from the DC IN terminals (DR-1XE) or BACKUP terminals (DR-1X).

③ SETUP Button

Press and hold to switch the display ON and OFF.

When a display is OFF, operation of a touch panel will be locked.

④ MIC Jack

Insert the plug of the optional microphone MH-48A6JA or MH-42C6J to this 6-pin modular jack.

⑤ TOUCH PANEL DISPLAY

⑥ VOL Knob

The VOL knob adjusts the audio volume level of the received (uplink) signal and the beep sound.

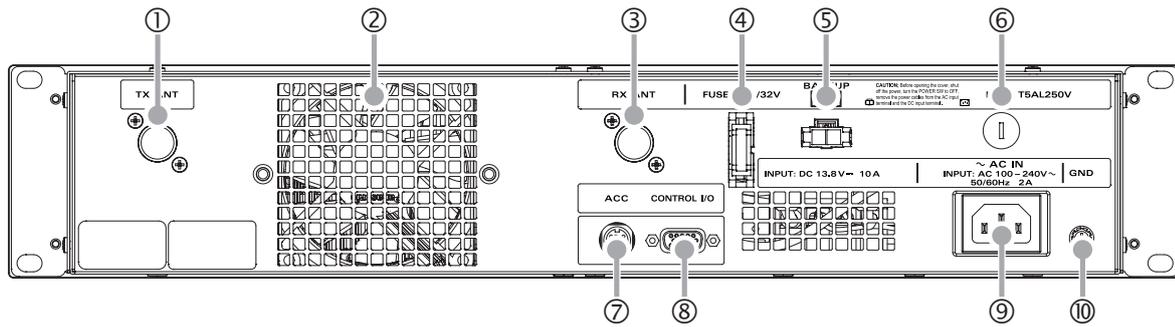
⑦ SPEAKER

The internal speaker is located here.

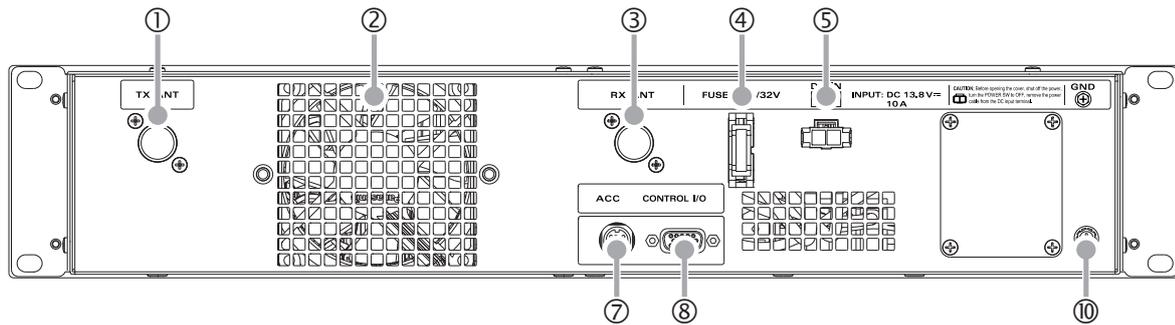
⑧ HANDLE

Rear Panel

○ DR-1X (US and Asian versions)



○ DR-1XE (European and Australian versions)



- ① **TX Antenna Terminal** (N-type connector, 50 ohms)
Connect to the transmitting antenna (downlink) with the coaxial cable.
- ② **Cooling fan**
- ③ **RX Antenna Terminal** (N-type connector, 50 ohms)
Connect to the receiving antenna (uplink) with the coaxial cable.
- ④ **FUSE Holder (15A/ 32V)**
A 15A fuse for the DC power supply through the BACKUP / DC IN jack is attached.
- ⑤ **Power Supply BACKUP Jack (DR-1X) / DC IN jack (DR-1XE)**
Connect to a 13.8V DC power supply with the supplied DC power cord.
- ⑥ **FUSE Holder (DR-1X only)**
A 5A fuse for the AC power supply through the AC IN jack is attached.
- ⑦ **ACC Jack**
Connect to a HRI-200 WIRES-X Interface Unit or 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 a 100-240V AC line outlet with the supplied AC power cord.
- ⑩ **GND Terminal**

1. Initial set up

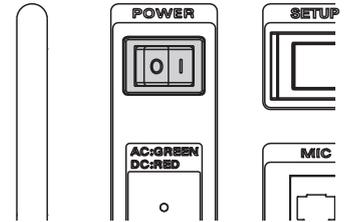
Turn the power on

- 1 Press the POWER switch.

The power will be switched ON, and the power supply monitor (LED indicator) will illuminate.



- 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 / DC IN terminal (13.8V DC), the indicator illuminates in red.



The operation mode screen will appear on the display.

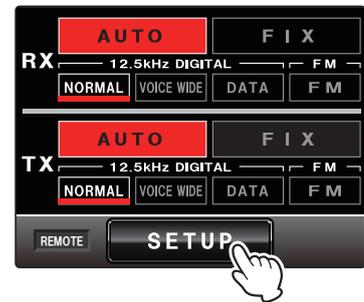
Set up the ID (call sign)

The call sign or ID must be entered for the first time after purchasing, or after resetting the repeater.

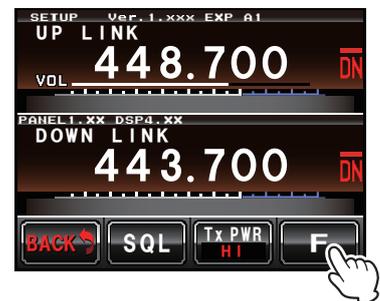


After performing a factory reset, the ID call sign setup begins with 2.

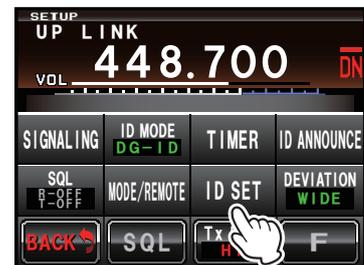
- 1 Touch [SETUP] to display Frequency screen.



- 2 Touch [F] to display the Function screen pops up.



- 3 Touch ID SET area.
The character input screen will appear.



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



- 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.
- Up to 10 alphabet characters, numbers, or the hyphen can be entered.



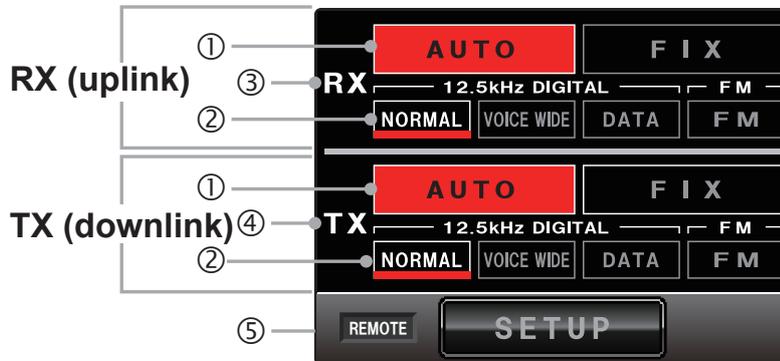
- 5 Touch [ENT].
The ID setting is saved and the display will return to the Function screen.

2. Set up Operation Mode

When the Power Switch is turned ON, Operation Mode screen appears.

This screen is for normal operation.

The DR-1X could be set up with two frequencies for the uplink and the downlink and also different operation modes for each frequency.



To receive Analog FM and Digital C4FM signals simultaneously, set RX to [AUTO] mode.

This mode may activate the AMS (Automatic Mode Select) function, then receive (uplink) and transmit (downlink) signals of the Analog FM and Digital C4FM. The default setting is [AUTO].

If operating the repeater using the DG-ID, select the [NORMAL] in the [FIX] mode. The DG-ID function is not available because the Analog FM mode does not include the DG-ID information.

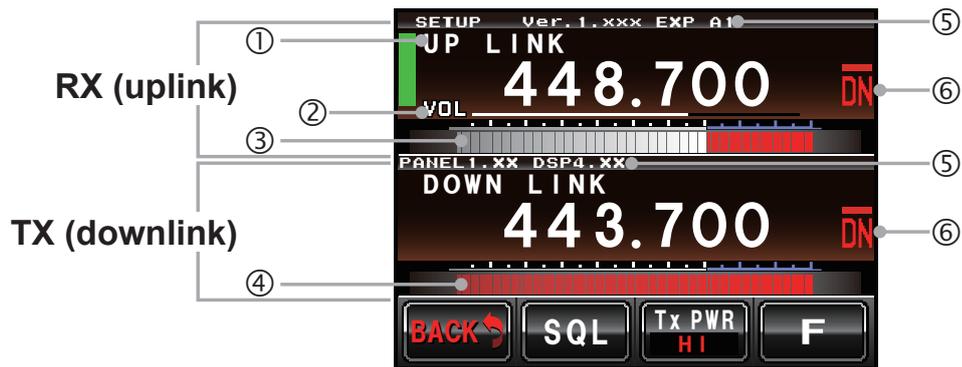
In the C4FM digital mode, three digital modes are recognized automatically. In normal C4FM digital, it will be in V/D mode.

- ① Touch [AUTO] or [FIX] in the operation mode screen area to set the operating mode.
 - [AUTO] Touch here to activate the AMS function. The mode switches automatically according to the received/transmitted signal types. [AUTO] is turned red, [NORMAL] automatically light up.
 - [FIX] Touch here to activate the FIX mode. [FIX] is turned yellow. Note that when selecting the [FIX] mode, that other mode signals may not be received.
- ② Either [VOICE WIDE] or [DATA] modes are automatically recognized in the C4FM uplink Signal, and receive mode is changed to fit the signals, so no setting is necessary.

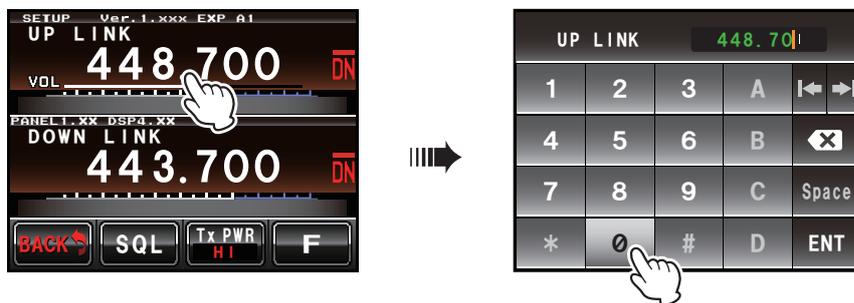
| | |
|--------------|-----------------------------------|
| [NORMAL] | Normal C4FM digital mode |
| [VOICE WIDE] | High-rate voice C4FM digital mode |
| [DATA] | High-speed data C4FM digital mode |
| [FM] | Analog FM communication mode |

- 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 **[REMOTE]** Displayed in red when remote operation with an external controller is enabled (see page 33).
- [SETUP]** Touch here to switch the display to set up the frequency.

3. Set up Frequency



- ① 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 and the received signal level is below the squelch level.
- ② VOL/SQL level display
- ③ S-meter level display
- ④ PO-meter level display
- ⑤ Firmware Version Information
Ver. x.xx: RX-UNIT CPU Firmware Version
PANEL x.xx: PANEL-UNIT CPU Firmware Version
DSP x.xx: DSP-UNIT CPU Firmware Version
- ⑥ Mode display



Touch **[SETUP]** to display the frequency set up screen, then set the uplink and downlink frequency.
Touch the uplink frequency, the numeric input popup screen appears. Input the uplink frequency.
After completing the input frequency, the input popup screen automatically disappears and the input frequency is set.
Input the downlink frequency in the same way.
Touch **[Back]** to return to the operation mode screen.

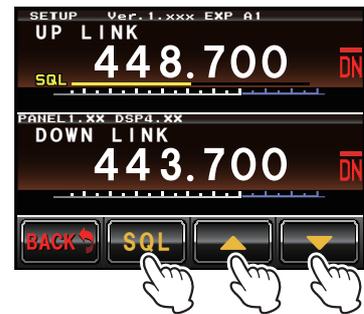
4. Set up Other Functions

Adjusting the squelch level

- When the squelch level is set to “open” the repeater will transmit, so the TX output 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 damage to the test equipment, always connect the signal generator directly to the RX antenna connector on the DR-1X.
- While the squelch level is being set, repeater transmit operation is temporarily permitted. This will facilitate checking the performance of the Duplexer, and allow evaluation of the receiver sensitivity degradation (“desense”), during simultaneous transmit/receive operation.



- 1 Touch **[SETUP]**.
The setup mode screen will appear.
- 2 Touch **[SQL]**.
When **[SQL]** turns yellow, the VOL meter below the RX band frequency display, will change to the SQL meter and show 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 operation mode screen.

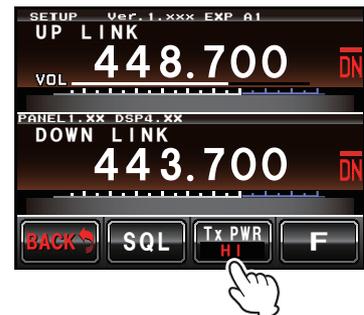


Adjusting the transmit power

- 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” →

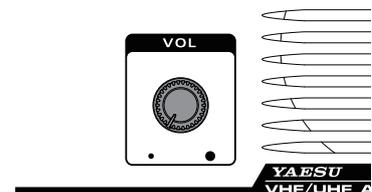
| HI | MD | LO |
|------|------|-----|
| 50 W | 20 W | 5 W |

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



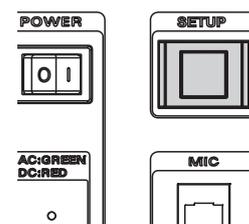
Adjusting the volume

Turn the VOL knob.
The VOL knob adjusts the audio volume level of the received (uplink) signal.



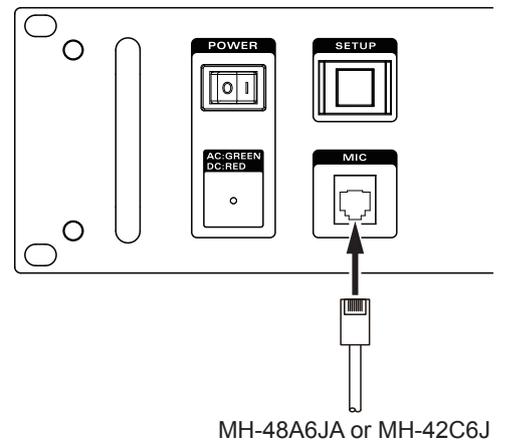
Turning the display ON and OFF

- 1 Press and hold the **SETUP** button to turn the display OFF.
When a display is OFF, operation of the touch panel will be locked.
The display will turn OFF automatically after a period of time (default 1 min) with no operation.
The display duration time setting may be selected from “1min”, “5min”, “10min”, or “30min” (see page 27 “Setting the display turn-off time”).
- 2 Press and hold the **SETUP** button for 3 seconds to turn the display ON.



5. Base mode operation

The repeater can be used as a VHF/UHF base station by connecting an optional MH-48A6JA or MH-42C6J microphone to the “**MIC**” jack on the front panel.



6. Set up DG-ID Number

Digital Group Identification (DG-ID)

The Digital Group Identification (DG-ID) feature controls access to the repeaters by using the two-digit numbers from 01 to 99.

This feature is similar to the CTCSS function used in the Analog FM mode.

The DG-ID number 00 detects signals with all ID numbers.

The default DG-ID number is set to "00". All the C4FM digital stations' uplink signal may be operated.

- If operating this repeater using the DG-ID, select the FIX DIGITAL mode in the operation mode screen. The DG-ID function is not available because the Analog FM mode does not include the DG-ID information.

In order to use the DG-ID feature, update the C4FM digital transceivers to the latest firmware compatible with the DG-ID feature.

- The latest firmware for each transceiver is available on the YAESU website.
- The DR-1X will repeat on the downlink, only the uplink signals with the corresponding DG-ID number if the DG-ID number is set to an arbitrary number from "01" to "99", other than "00". Signals with a different DG-ID number will not transmit on the downlink.
- If the DG-ID number is set to "00", all the C4FM digital signals are transmitted on the downlink.
- DG-ID numbers may be registered in the DG-ID memories (up to 100 entries).

Setting the DG-ID Number

1 Touch [SETUP] to display the frequency set up screen, then touch [F] on the bottom of the screen.

2 Keep touching [ID MODE] (DG-ID).
The DG-ID list screen appears.

3 Touch the Group you want to register twice.
The group setting screen appears.

4 Touch [▲] or [▼] to select the desired DG-ID number to be registered to the DR-1X repeater.



When using the DR-1X as an Open Repeater that anyone may use, set the DG-ID to "00".

When group name change is unnecessary → proceed to step 8.



- 5 Touch **[Group Name]** twice.
The character input screen appears.

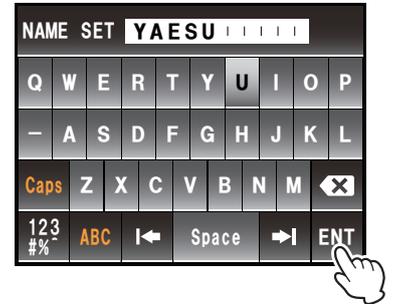


- 6 Input the name to be registered to the DR-1X repeater.



Up to 10 characters may be input.

- 7 Touch **[ENT]**.
The input characters are registered and operation returns to the group setting screen.
- 8 Touch **[BACK]** 4 times.
The screen returns to the operation mode screen.



7. Set up DP-ID

Digital Personal Identification (DP-ID)

Digital Personal Identification (DP-ID) is the digital ID number each transceiver is programmed with. The system manager may operate the DR-1X repeater functions, by registering the DG-ID number of the controlling C4FM digital transceiver to the DR-1X.

In order to use the DP-ID feature, update the C4FM digital transceivers to the latest firmware compatible with the DP-ID feature.

- The latest firmware for each transceiver is available on the YAESU website.
- The DP-ID may be registered in the DP-ID memories (up to 24 items).

Registering the DP-ID

- 1 Touch **[SETUP]** to display the frequency set up screen, then touch **[F]** on the bottom of the screen.
- 2 Touch **[ID MODE]** to select the "DP-ID".

Touching **[ID MODE]** switches the setting as follows:

DP-ID → DG-ID → DP-ID →



The DP-ID display returns to the DG-ID display in about 5 seconds.

- 3 Keep touching **[ID MODE]** (DP-ID) for more than two seconds. The DP-ID list screen appears.

- 4 Touch **[REG]**.

The Registration Confirmation Screen appears for about 5 seconds.

- 5 Tune the registering transceiver to the repeater frequency, then transmit in the C4FM mode.

- The call sign and Radio ID from the received transceiver are displayed.

- 6 Touch **[OK?]** to register Radio ID, or touch **[Cancel]** to return to the DP-ID list screen without registering.

- If registering another transceiver, repeat step 4 to 6.



Up to 24 DP-ID information data may be registered.

- 7 Touch **[BACK]** 3 times.

The screen returns to the operation mode screen.



Delete the registered DP-ID

1 Touch [SETUP] or [B SETUP] to display the frequency set up screen, then touch [F] on the bottom of the screen.

2 Touch [ID MODE] to select the “DP-ID”.

Touching [ID MODE] switches the setting as follows:

⇒ “DP-ID” ⇒ “DG-ID” ⇒ “DP-ID” ⇒



The DP-ID display returns to the DG-ID display in about 5 seconds.

3 Keep touching [ID MODE] (DP-ID) for more than two seconds.

The DP-ID list screen appears.

4 Touch the desired DP-ID to delete.

DELETE (Deletion Confirmation Screen) appears.

5 Touch the [OK?] to delete or touch the [Cancel] to return to the DP-ID list screen without deleting.

- If deleting another transceiver, repeat step 4 to 5.

6 Touch [BACK].

The screen returns to the setup screen.

- If using the DP-ID, select the FIX Digital mode in the operation mode screen. When transmitting the DP-ID signal, set the transceiver to C4FM mode.

The system manager may control the repeater setting remotely from designated transceivers by using this function.

The transceivers compatible with the remote-control is the FTM-400D, FTM-100D, FTM-3200D and FTM-3207D.

Example:

- Sets the repeater function ON or OFF
- Changing Downlink Transmission Power
- Setting of the Emergency Call



8. Remote Controls

Setting the remote control

- Remote control of the DR-1X repeater can be performed in either C4FM digital mode or analog FM mode. For C4FM digital mode, use the FTM-400D, FTM-100D, FTM-3200D or FTM-3207D transceiver. For security reasons, we recommend using a mobile C4FM transceiver with the DP-ID that is registered to the DR-1X repeater.
- Remote operation sends commands on the uplink frequency.
- When remote control is required, it is necessary to set whether to control the DR-1X with analog FM or C4FM in advance.

Selection of analog FM, C4FM digital

- 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 and touch **[COMMAND]** twice.
The command list will appear.



- 5 Touch **[◀▶]**.
The set value will change in the following sequence each time **[◀▶]** is touched.

⇒ "DIGITAL" (C4FM Digital) ⇒ "ECS" (Analog FM) ⇒ "DIGITAL" (C4FM Digital) ⇒



DIGITAL (C4FM Digital)



ECS (Analog FM)

- 6 Touch **[BACK]** 4 times.
The screen returns to the operation mode screen.

C4FM DIGITAL CONTROL

- Set the operation mode to “AUTO” or “FIX NORMAL”.
- The transceivers compatible with the remote-control are the FTM-400D, FTM-100D, FTM-3200D and FTM-3207D.
- Remote control with C4FM digital can be done only when the transceiver DP-ID has been registered to the DR-1X in advance. Remote operation cannot be performed with a transceiver when the DP-ID has not been registered, so you can securely manage repeaters.
- When the remote operation is accepted, the repeater responds and the operation completion is shown by the respective functions on the screen of the mobile transceiver.

ECS (for analog FM mode)

- Set the operation mode to “AUTO” or “FIX FM”.
- Any transceiver with ECS (Enhanced Code Squelch) code can be used.
- When the remote operation is accepted, the CW ID of the operation that has been completed by the respective function is transmitted on the repeater downlink frequency.

Remote Control Command List (Default setting)

| Function | Description | C4FM | Analog FM | C4FM | Analog FM |
|--------------------|---|---------|-----------|-----------------------------------|-----------|
| | | Code | | Display of the transceiver screen | CW ID |
| ACTIVATE | Activate the repeater operation of CH-A and CH-B. | 1111 | ECS ※2 | Activate Set | O |
| DEACTIVATE | Deactivate the local repeater operation. | 2222 | ECS ※2 | Local Deactivate Set | S |
| FIX DIGITAL | Set the repeater to C4FM mode. | 3333 ※1 | - | DIGI/DIGI Set | - |
| AUTO | Set the repeater to AMS (Automatic Mode Select) mode. Both analog FM and C4FM digital signals operate. | 4444 ※1 | - | AUTO/AUTO Set | - |
| HIGH TX POWER | Set the transmit power to HI (50 W). | 0050 ※1 | - | High Power Set | - |
| MID TX POWER | Set the transmit power to MD (20 W). | 0020 ※1 | - | Mid Power Set | - |
| LOW TX POWER | Set the transmit power to LO (5 W). | 0005 ※1 | - | Low Power Set | - |
| EMERGENCY CALL OFF | When accessing the repeater by a transceiver with registered DP-ID, select the downlink from the repeater or the downlink in accordance with the DG-ID setting. | 8888 ※1 | - | EMERGENCY OFF | - |
| EMERGENCY CALL ON | | 9999 ※1 | - | EMERGENCY ON | - |

※1: It is only available with the C4FM digital.

※2: For additional details on this function, refer to page 21.

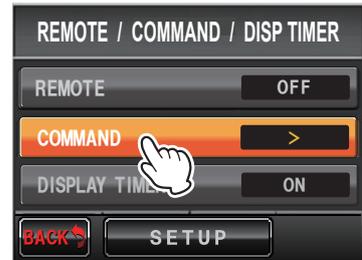
When remote control is activated by a Digital Code, the status is shown on the transceiver display.

When remote control is activated by ECS, the status is responded with CW ID on the Downlink frequency.

Change the remote command

To change the factory command code of C4FM digital

- 1 Touch [SETUP] on the operation mode screen.
The setup mode screen will appear.
- 2 Touch [F] on the setup mode screen.
The setup menu will appear.
- 3 Touch [MODE/REMOTE].
The menu list will appear.
- 4 Touch [COMMAND] twice.
The command list will appear.



- 5 Touch [◀▶] to select "DIGITAL".
The set value will change in the following sequence each time [◀▶] is touched.
 ◀▶ "DIGITAL" (C4FM Digital) ▶▶ "ECS" (Analog FM) ▶▶ "DIGITAL" (C4FM Digital) ▶▶



DIGITAL (C4FM Digital)



ECS (Analog FM)

- 6 Touch [▲] or [▼] to select the desired command.
- 7 Touch the command to enable setting the remote control code.



- 8 Enter a 4-digit control code.
The screen returns to the command list.



- The same code as another function may not be set.
- Touch [D] to delete the 4-digit code and disable that command.

- 9 Touch [BACK] 4 times.
The screen returns to the operation mode screen.



To change the factory command code of analog FM

- 1 Touch [SETUP] on the operation mode screen.

The setup mode screen will appear.

- 2 Touch [F] on the setup mode screen.

The setup menu will appear.

- 3 Touch [MODE/REMOTE].

The menu list will appear.

- 4 Touch [COMMAND] twice.

The command list will appear.

- 5 Touch [◀▶] to select "ECS".

The set value will change in the following sequence each time [◀▶] is touched.

▣ "DIGITAL" (C4FM Digital) ▣ "ECS" (Analog FM) ▣

The ECS (Enhanced Code Squelch) code setting screen will be displayed.

- 6 Touch [ACTIVATE] twice.

- 7 Touch [▲] or [▼] repeatedly to select the first ACTIVATE code.

Refer to the following table when setting the ECS (Enhanced Code Squelch) of the transceiver that is used to control the DR-1X.

| | |
|---|--------------------------------|
| When RX Tone is 151.4 Hz or less, or DCS is "ON" | 01 (67 Hz) to 25 (151.4 Hz) |
| When RX Tone is 156.7 Hz or higher, or RX Tone is "OFF" | 26 (156.7 Hz) to 50 (254.1 Hz) |

- 8 Touch [◀▶]

The cursor "[]" moves.

- 9 Touch [▲] or [▼] repeatedly to select the second ACTIVATE code.

The second code must be different from the first code.

- 10 Touch [DEACTIVATE] twice.

Select the DEACTIVATE code in the same manner as described in steps 7 to 9.

- 11 Touch [BACK] 4 times.

The screen returns to the operation mode screen.



9. Actual remote control procedure

Remote Control for C4FM Digital

When controlling remotely with the FTM-400D

- 1 Please confirm that the FTM-400D DP-ID is registered on the DR-1X repeater.
- 2 Tune the transmit frequency of the FTM-400D to the uplink frequency of the DR-1X.
- 3 Set the FTM-400D to the digital mode, then press and hold the “*” key on the microphone (MH-48A6JA).
- 4 “REMOTE REC/PLY” is displayed on the top of the FTM-400D screen, the remote-control is available.
 - To cancel the remote-control, press the “*” key on the microphone (MH-48A6JA).
- 5 Input the 4-digits remote command by using the numeric keys (MH-48A6JA).
 - Press the “*” key on the microphone (MH-48A6JA) to cancel the input command at any point in the process.
- 6 Press the “#” key on the microphone (MH-48A6JA) to transmit the input command.
- 7 After transmitting the command, press the “*” key on the microphone (MH-48A6JA) to return to the normal operation.



- If the FTM-400D firmware is not compatible with the DP-ID function, update to the latest firmware to use the DP-ID function.
 - The latest firmware is available on the YAESU website.
-

When controlling remotely with the FTM-100D

- 1 Please confirm that the FTM-100D DP-ID is registered on DR-1X repeater.
- 2 Tune the transmit frequency of the FTM-100D to the uplink frequency of the DR-1X.
- 3 Set the FTM-100D to the digital mode, then press and hold the “*” key on the microphone (MH-48A6JA).
- 4 “REC/PLY” is displayed on the top of the screen of the FTM-100D, the remote-control is available.
 - Cancelling the remote-control, press the “*” key on the microphone (MH-48A6JA).
- 5 Input the 4-digits remote command by using the numeric key (MH-48A6JA).
 - Press the “*” key on the microphone (MH-48A6JA) to cancel the input command at any point in the process.
- 6 Press the “#” key on the microphone (MH-48A6JA) to transmit the input command.
- 7 After transmitting the command, press the “*” key on the microphone (MH-48A6JA) to return to the normal operation.



- If the FTM-100D firmware is not compatible with the DP-ID function, update to the latest firmware to use the DP-ID function.
 - The latest firmware is available on the YAESU website.
-

When controlling remotely with the FTM-3200D

- 1 Please confirm that the FTM-3200D DP-ID is registered on DR-1X repeater.
- 2 Tune the transmit frequency of the FTM-3200D to the uplink frequency of the DR-1X.
- 3 Set the FTM-3200D to the digital mode, then press and hold the “*” key on the microphone (MH-48A6JA).
- 4 “REMOTE” is displayed on the screen of the FTM-3200D, the remote-control is available.
 - Cancelling the remote-control, press the “*” key on the microphone (MH-48A6JA).
- 5 Input the 4-digits remote command by using the numeric key (MH-48A6JA).
 - Press the “*” key on the microphone (MH-48A6JA) to cancel the input command at any point in the process.
- 6 Press the “#” key on the microphone (MH-48A6JA) to transmit the input command.
- 7 After transmitting the command, press the “*” key on the microphone (MH-48A6JA) to return to the normal operation.



- If the FTM-3200D firmware is not compatible with the DP-ID function, update to the latest firmware to use the DP-ID function.
 - The latest firmware is available on the YAESU website.
-

When controlling remotely with the FTM-3207D

- 1 Please confirm that the FTM-3207D DP-ID is registered on DR-1X repeater.
- 2 Tune the transmit frequency of the FTM-3207D to the uplink frequency of the DR-1X.
- 3 Set the FTM-3207D to the digital mode, then press and hold the “*” key on the microphone (MH-48A6JA).
- 4 “REMOTE” is displayed on the screen of the FTM-3207D, the remote-control is available.
 - Cancelling the remote-control, press the “*” key on the microphone (MH-48A6JA).
- 5 Input the 4-digits remote command by using the numeric key (MH-48A6JA).
 - Press the “*” key on the microphone (MH-48A6JA) to cancel the input command at any point in the process.
- 6 Press the “#” key on the microphone (MH-48A6JA) to transmit the input command.
- 7 After transmitting the command, press the “*” key on the microphone (MH-48A6JA) to return to the normal operation.



- If the FTM-3207D firmware is not compatible with the DP-ID function, update to the latest firmware to use the DP-ID function.
- The latest firmware is available on the YAESU website.

Remote Control for Analog FM

In analog FM mode, the ON/OFF setting of the repeater can be operated remotely.

Remote Control can only be operated from a transceiver* capable of sending a code combining two CTCSS tones.

*: FT2D/DE, FT1XD/DE, FTM-400XDR/XDE, FTM-100DR/DE, FTM-3200DR/DE, and FTM-3207DR/DE.

- 1 Set the same code that is registered in the DR-1X into the transceiver that can transmit the two combined CTCSS tones.

| Function | Code |
|-----------------------------------|--|
| Activate the repeater operation | The same code as “ACTIVATE” of DR-1X |
| Deactivate the repeater operation | The same code as “DEACTIVATE” of DR-1X |

For instructions on setting the codes, refer to the Transceiver Operating Manual.

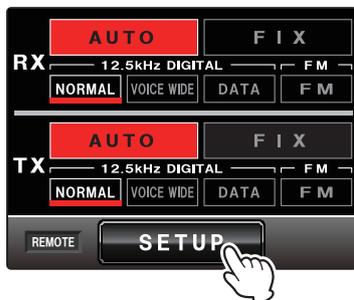
- 2 Set the transceiver to the analog FM mode.
- 3 When the remote operation code is accepted, the CW ID of the operation that has been completed is transmitted on the repeater downlink frequency.

| Description | CW ID |
|--|-------------------------------|
| When the repeater operation is resumed | CW “O” (— — —) is transmitted |
| When the repeater operation is stopped | CW “S” (• • •) is transmitted |

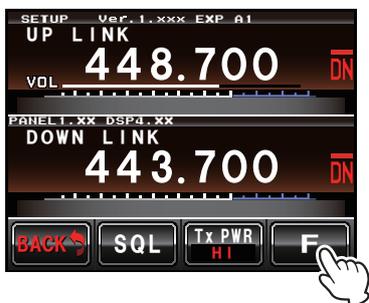
10. Set Up Various Functions

Using the setup menu, the various functions of the repeater can be customized to match the desired applications. Items to be adjusted can be selected from the respective lists, and the settings entered or selected that are appropriate for the intended repeater operation.

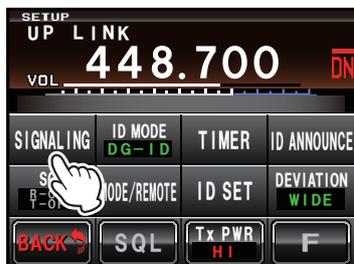
- 1 Touch **[SETUP]** on the operation mode screen.
The setup mode screen will appear.



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



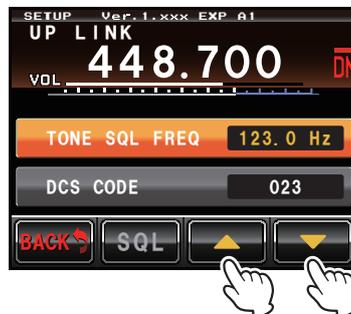
- 3 Touch the menu item.
The menu list will appear.



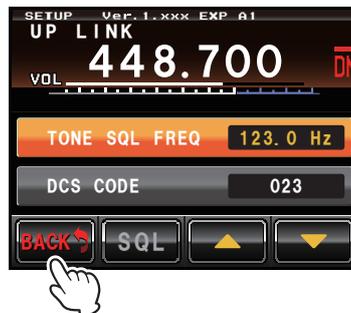
- 4 Touch the item to be set.
The item will turn orange in color.



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



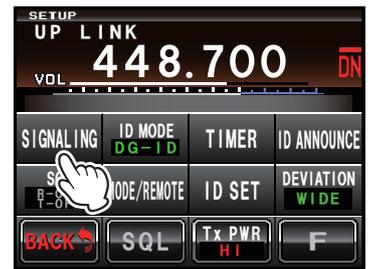
- 6 Touch **[BACK]**.
The setting is determined and the display will return to the setup menu.



Setting the tone signals for analog FM mode

Setting the tone frequency

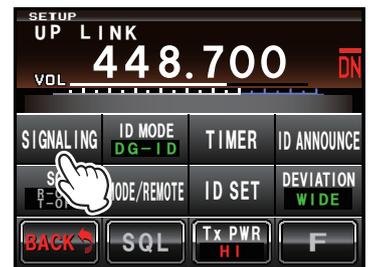
- 1 Touch [SETUP] then touch [F].
- 2 Touch [SIGNALING], then touch [TONE SQL FREQ].
- 3 Touch [▲] or [▼].
The set value will change each time [▲] or [▼] is touched.
- 4 Touch [BACK] 3 times.
The setting is determined and the display will return to the operation mode screen.



- Factory default: 100.0 Hz
- Tone frequencies between 67.0 Hz and 254.1 Hz can be selected.

Setting the DCS code

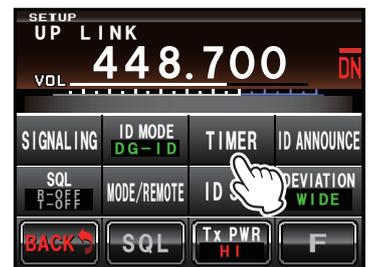
- 1 Touch [SETUP], then touch [F].
- 2 Touch [SIGNALING], then touch [DCS CODE].
- 3 Touch [▲] or [▼].
The set value will change each time [▲] or [▼] is touched.
- 4 Touch [BACK] 3 times.
The setting is determined and the display will return to the operation mode screen.



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

Setting the TOT (time out timer)

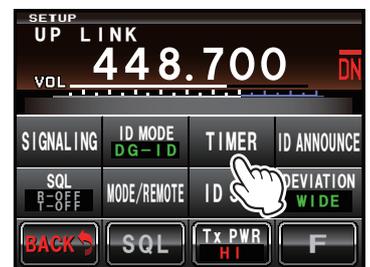
- 1 Touch [SETUP], then touch [F], and then touch [TIMER].
- 2 Touch [TOT].
The set value will change in the following sequence each time [TOT], [▲], or [▼] is touched.
⇒ "3 min" ⇒ "4 min" ⇒ "5 min" ⇒ "10 min" ⇒ "OFF" ⇒
⇒ "30sec" ⇒ "1 min" ⇒ "1.5 min" ⇒ "2 min" ⇒ "2.5 min" ⇒
- 3 Touch [BACK] 3 times.
The setting is determined and the display will return to the operation mode screen.



Factory default: 3 min

Setting the SQL HYSTERESIS

- 1 Touch [SETUP], then touch [F], and then touch [TIMER].
- 2 Touch [SQL HYSTERESIS].
The set value will change in the following sequence each time [SQL HYSTERESIS], [▲], or [▼] is touched.
⇒ "NORMAL" ⇒ "HIGH" ⇒ "MAX" ⇒
NORMAL: The squelch open signal level and the squelch close signal level are the same.
HIGH: The squelch open signal level is higher than the squelch close signal level. (Makes squelch less likely to close.)
MAX: The squelch open signal level is much higher than the squelch close level. (Makes squelch even less likely to close.)
- 3 Touch [BACK] 3 times.
The setting is determined and the display will return to the operation mode screen.



Factory default: NORMAL

Setting the SQL TAIL LENGTH

Enables setting the time duration of the downlink transmit after the uplink signal ceases.

- 1 Touch **[SETUP]**, then touch **[F]**, and then touch **[TIMER]**.
- 2 Touch **[SQL TAIL LENGTH]**.
The set value will change in the following sequence each time **[SQL TAIL LENGTH]**, **[▲]**, or **[▼]** is touched.
 ►► “0ms” ►► “50ms” ►► “100ms” ►► ►► “2500ms” ►►
- 3 Touch **[BACK]** 3 times.
The setting is determined and the display will return to the operation mode screen.

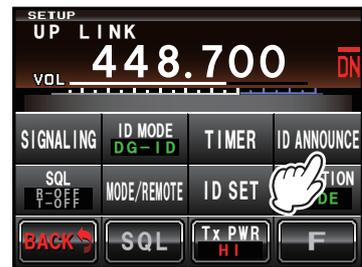


Factory default: 0ms

Set the ID announcement for analog FM mode

Set the announcement mode

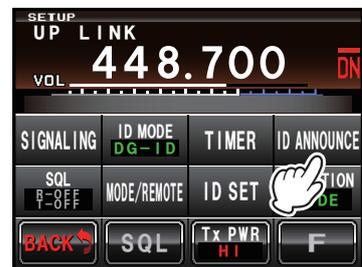
- 1 Touch **[SETUP]**, then touch **[F]**, and then touch **[ID ANNOUNCE]**.
- 2 Touch **[ANNOUNCE]**, then touch **[ANNOUNCE MODE]**.
The set value will change in the following sequence each time **[ANNOUNCE MODE]**, **[▲]**, or **[▼]** is touched.
 ►► “CW” ►► “CW wo TONE” ►► “VOICE”* ►►
 ►► “VC wo TONE”* (VOICE wo TONE) ►►
- 3 Touch **[ANNOUNCE LEVEL]**.
The set value will change in the following sequence each time **[ANNOUNCE LEVEL]**, **[▲]**, or **[▼]** is touched.
 ►► “HIGH” ►► “MID” ►► “LOW” ►►
- 4 Touch **[CW ID SPEED]**.
The set value will change in the following sequence each time **[CW ID SPEED]**, **[▲]**, or **[▼]** is touched.
 ►► “16wd/min” ►► “20wd/min” ►► “24wd/min” ►► “32wd/min” ►►
- 5 Touch **[BACK]** 4 times.
The setting is determined and the display will return to the operation mode screen.



- Factory default:
ANNOUNCE MODE: CW
ANNOUNCE LEVEL: MID
CW ID SPEED: 20wd/min
- 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.

Set announcement time interval

- 1 Touch **[SETUP]**, then touch **[F]**, and then touch **[ID ANNOUNCE]**.
- 2 Touch **[INTERVAL]**.
The set value will change in the following sequence each time **[INTERVAL]**, **[▲]**, or **[▼]** is touched.
 ►► “OFF” ►► “3min” ►► “5min” ►► “10min” ►►
 ►► “15min” ►► “20min” ►► “30min” ►► “TOT” ►►
- 3 Touch **[BACK]** 3 times.
The setting is determined and the display will return to the operation mode screen.



- Factory default: 10min
- When “CW wo TONE” or “VC wo TONE” on “ANNOUNCE MODE” is set, the time interval is fixed at 10 minutes.
- 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.

Set the tone signal type for analog FM mode

- 1 Touch [SETUP], then touch [F], and then touch [SQL].
- 2 Select [RX SQL] to set the tone signal type during reception, or select [TX SQL] to set the tone signal type during transmission.
- 3 Touch [▲] or [▼].
The setting will change in the following sequence each time [▲] or [▼] is touched.
 ►► “OFF” ►► “TONE” ►► “DCS” ►►
- 4 Touch [BACK] 3 times.
The setting is determined and the display will return to the operation mode screen.



- Factory default: OFF
- Both TX and RX can be set to different tone signal type.

Setting the display turn-off time

- 1 Touch [SETUP], then touch [F], and then touch [MODE/REMOTE].
- 2 Touch [DISPLAY TIMER] to display “ON” or “OFF”.
The set value will change between “OFF” and “ON” each time [DISPLAY TIMER] is touched.
- 3 Touch [SETUP].
The display timer setting screen will be displayed.
- 4 Touch [TIMER].
The set value will change in the following sequence each time [TIMER], [▲], or [▼] is touched (Default 1min).
 ►► “1min” ►► “5min” ►► “10min” ►► “30min” ►►
- 5 Touch [BACK] 4 times.
The setting is determined and the display will return to the operation mode screen.



- Factory default:
DISPLAY TIMER: ON
TIMER: 1min

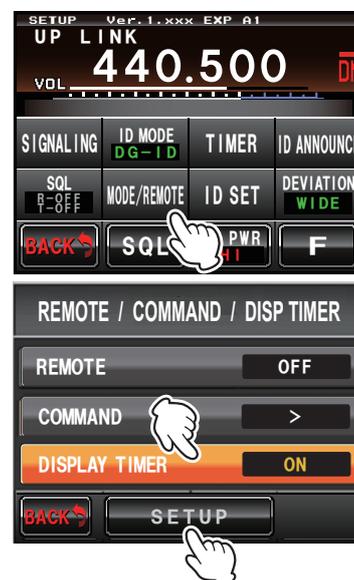
Password

To continue operating the DR-1X when the power is turned ON or after the display has been turned OFF, the password must be entered.



- Password is factory set to “0000”. It is possible to change the password.
- If you forget your password, you will need to do an all reset. Please note that when all reset is performed, all settings and memory contents are returned to the factory default state.
- Use the factory default password “0000”, unless it is necessary to change it for management security.

- 1 Touch [SETUP], then touch [F], and then touch [MODE/REMOTE].
- 2 Touch [DISPLAY TIMER].
- 3 If [DISPLAY TIMER] is set to “OFF”, touch [DISPLAY TIMER] and turn it to “ON”.
- 4 Touch [SETUP].

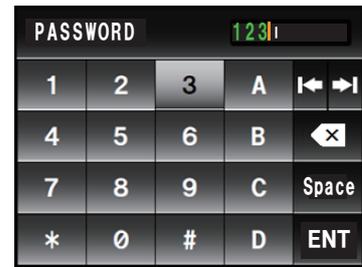


5 Touch **[PASSWORD]** twice.

The character input screen will appear.

The touched character will be displayed at the top of the screen.

- Four numeric characters can be entered.
- The cursor in the input field moves left or right when **[←]** or **[→]** is touched.
- After completing the input password, the character input screen automatically disappears and the input password is set.



6 Touch **[BACK]** 4 times.

The setting is determined and the display will return to the operation mode screen.

- The password input screen will be displayed when the power is turned ON, or after the display has been turned OFF. Enter the previously registered 4-digit password (default "0000").



- To reset the DR-1X, press and hold in the **[SETUP]** button while turning the transceiver ON → the password input screen will appear → press and hold the **[SETUP]** button for 2 seconds → the reset confirmation screen will appear → touch "OK?".

Setting the half deviation operation

1 Touch **[SETUP]** then touch **[F]**.

2 Touch **[DEVIATION]** to display "NARROW".

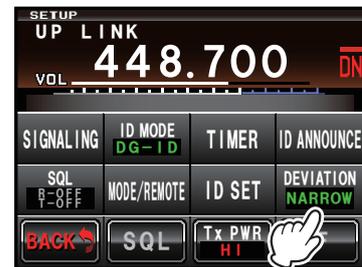
The setting will toggle between "NARROW" and "WIDE" each time **[DEVIATION]** is touched.

NARROW: Reduces the analog FM/C4FM digital modulation to half.

WIDE: Uses the normal analog FM/C4FM digital modulation.

3 Touch **[BACK]** twice.

The setting is determined and the display will return to the operation mode screen.



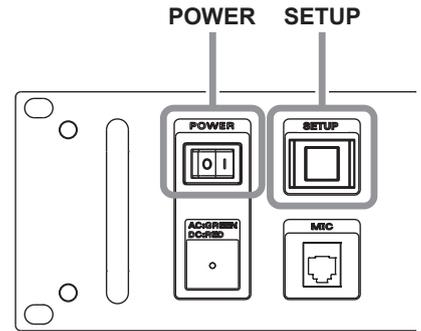
Factory default: WIDE

11. Restoring Default Settings (Factory Reset)

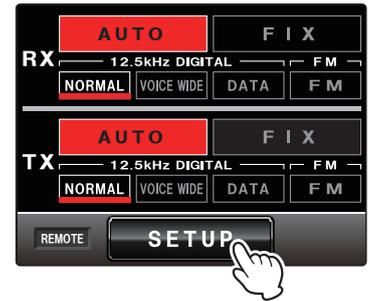
- 1 Turn the DR-1X OFF.
- 2 Press and hold in the [SETUP] button while turning the repeater ON.



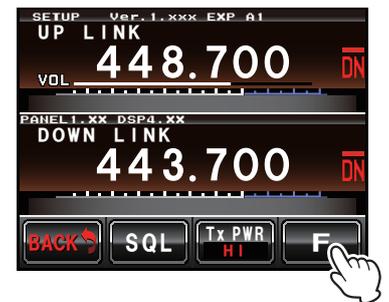
Continue pressing the [SETUP] button until the operation mode screen appears on the display.



- 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.



12. Connect to the HRI-200 node station

To use WIRES-X with DR-1X, connect HRI-200 directly to the 10-pin plug on the back of the DR-1X. Alternatively, there is a method the HRI-200 Node station may be located in a place different from the repeater site.

Since the repeater site does not normally have a large capacity Internet line, and the HRI-200 must always be connected to the computer, it may be advantageous to set up the HRI-200 in a different location and uplink it to the repeater with the Node Station transceiver. It is recommended to downlink and connect to WIRES-X.

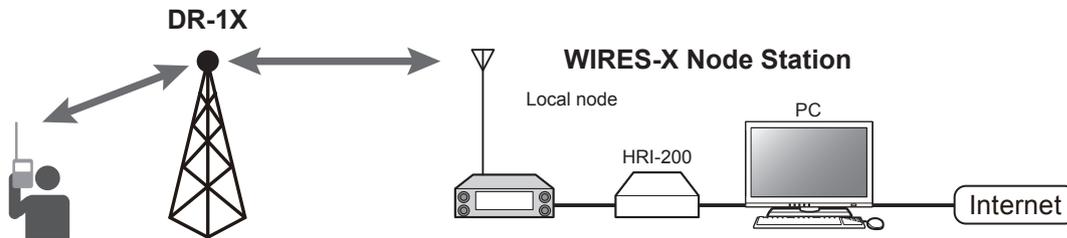
For HRI-200 and WIRES-X, please refer to their respective instruction manuals.

RF Link

Link the DR-1X and the node station with the uplink and downlink signals using the DG-ID, WIRES-X may be operated using the repeater.

Example using the DG-ID "01":

When the DR-1X and the node station transceiver are set to DG-ID "01", the downlink signal of the DR-1X is received only by the node stations with the DG-ID set to "01". The repeater connects to the Internet when a signal containing the DG-ID "01" is received on the uplink.



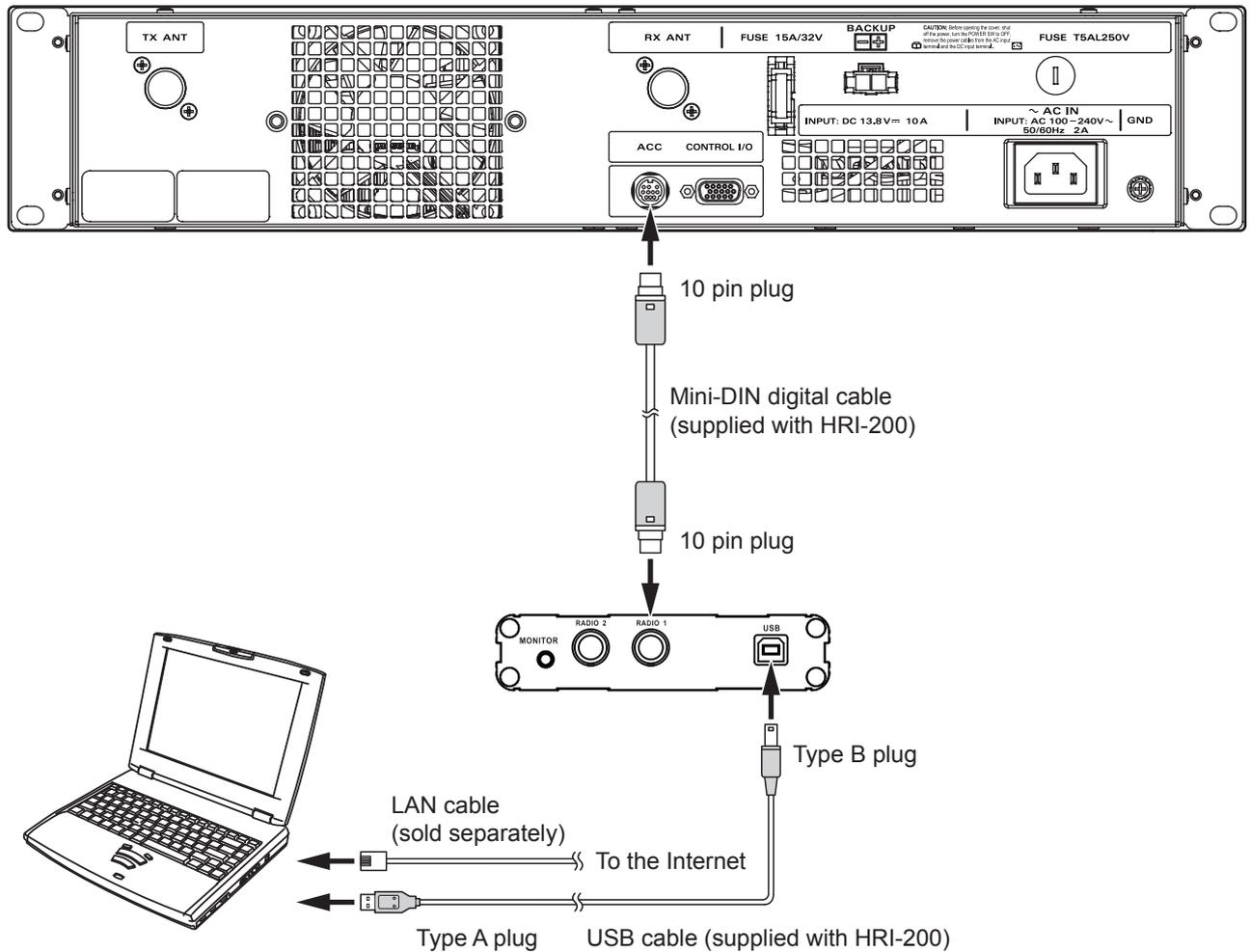
Setting method

- 1 Set the DR-1X repeater DG-ID to "01" (see page 14).
- 2 Set the node station transceiver DG-ID to "01" for both transmit and receive.
For instructions on setting the DG-ID, refer to the transceiver Operating Manual.
- 3 Set the WIRES-X node station transmit frequency to the uplink frequency of the DR-1X repeater.
- 4 Set the WIRES-X node station receive frequency to the downlink frequency of the DR-1X repeater.

When the DR-1X repeater is connected to a Node Station with the DG-ID "01", it downlinks only WIRES-X signals that include the DG-ID "01". Communications via the WIRES-X node and the DR-1X repeater are commenced.

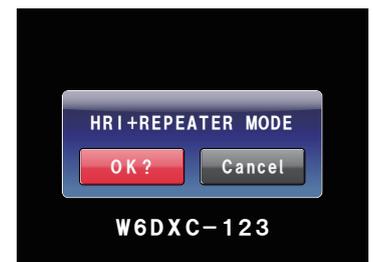
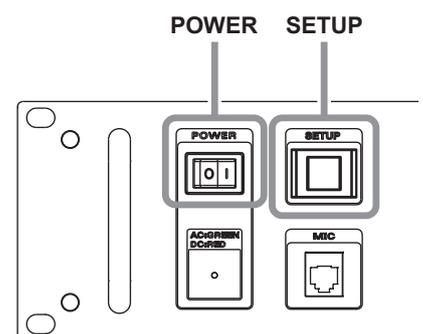
Connecting HRI-200 to DR-1X

The following explains how to connect HRI-200 directly to DR-1X.



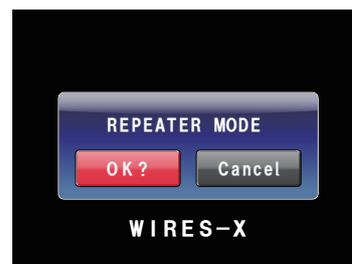
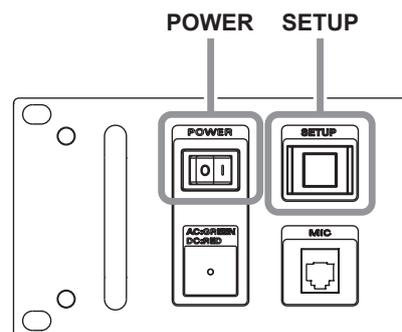
Change the repeater to the HRI mode

- 1 Turn the DR-1X power OFF.
- 2 While pressing and holding the **[SETUP]** button, press the **[POWER]** switch.
- 3 While the “YAESU” logo is being displayed, release the **[SETUP]** button.
“HRI+REPEATER MODE” will appear on the display.
- 4 Touch **[OK?]**.
HRI mode will activate.



Return to REPEATER mode from HRI mode

- 1 Turn the DR-1X power OFF.
- 2 While pressing and holding the **[SETUP]** button, press the **[POWER]** switch.
- 3 While the “YAESU” logo is being displayed, release the **[SETUP]** button.
“REPEATER MODE” will appear on the display.
- 4 Touch **[OK?]**.
The operation mode screen will appear on the display.



13. Remote Operation with External Controller

Repeater operation may be controlled remotely by connecting an external controller through the [CONTROL I/O] connector at the back of the repeater.

The following features are available while in remote operation:

- Change the communication mode of repeater transmit and receive
- Turn the RX and TX tone signal “ON” or “OFF”
- Monitor the discriminator 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 Touch [REMOTE].

The set value will change between [OFF] and [ON] each time [REMOTE] is touched.



- Factory default: OFF
- Remote operation is not available in the “HRI + REPEATER MODE”.



5 Touch [BACK] 3 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.



You can transmit by the microphone and PTT input of the front panel in all settings except AMS/AMS.

Control from external controller

To control the DR-1X 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 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.



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

CONTROL I/O connector



(as viewed from rear panel)

| Pin No | Pin Name | I/O | Descriptions | | | | | | | | | | | | | | | | | | | | |
|--|---------------------|---------------|--|--------|--------|----|----|---|---|------------|----------|---|---|----------|----------|---|---|---------------|---------------|---|---|------------|------------|
| 1 | EXT I/O | Input | [L] GND: Remote mode [H] OPEN: Repeater mode | | | | | | | | | | | | | | | | | | | | |
| 2 | PTT | Input | [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.  On signaling while controlling the external PTT: Pin 6 (TONE IN) ... Valid Pin 7 (AF IN) ... Invalid | | | | | | | | | | | | | | | | | | | | |
| 3 | CTCSS/DCS (PKSQL) | Output | [L] GND: Decoded [H] OPEN: Undecoded Signaling settings in the repeater setup menu will be applied. | | | | | | | | | | | | | | | | | | | | |
| 4 | SQL DET (Noise SQL) | Output | [L] GND: SQL open [H] OPEN: SQL close This is an open-collector, active-low output capable of sinking about 10 mA. It indicates that the receiver squelch is open. If the squelch control is properly set, this indicates a carrier on the receiver channel. | | | | | | | | | | | | | | | | | | | | |
| 5 | GND | GND | Chassis ground for all logic levels and power supply return | | | | | | | | | | | | | | | | | | | | |
| 6 | TONE IN | Input | CTCSS/DCS EXT input / 600 ohm, 500 mV peak to peak Valid during external PTT control This pin is sub-audible tone input, and has a flat response characteristic (repeater deviation is constant for a given signal level over the frequency range of 5 - 250 Hz). Injecting a too high signal level here causes over-deviation of CTCSS or DCS, degrading performance. Use shielded cable to connect to this pin, connecting the shield to GND. | | | | | | | | | | | | | | | | | | | | |
| 7 | AF IN | Input | EXT Modulation input / 600 ohm, 1.5 V peak to peak Valid during external PTT control This pin is audio input (300 - 3,000 Hz). This audio is injected before the splatter filter stage, so excess signal input levels are clipped. It is impossible to input analog modulation signals and convert them to digital signals on DR-1X. Use shielded cable to connect to this pin, and connect the shield to GND.  To use the external AF input, set the Pin11/Pin12 EXT port setting to RX: Auto (AMS) / TX: FM (FIX). | | | | | | | | | | | | | | | | | | | | |
| 8 | DISC OUT | Output | Up-link RX DISC output (w/o de-emphasis), 500 mV peak to peak Discriminator output during uplink reception. Does not affect the operation mode of the repeater. Received signals with standard deviation produce 500 mVp-p audio (300 - 3,000 Hz) are output at this pin. The signal is extracted before the de-emphasis and squelch circuitry. Use shielded cable to connect to this pin, and connect the shield to GND. | | | | | | | | | | | | | | | | | | | | |
| 9 | AF OUT | Output | Up-link RX AF output (w/ de-emphasis), 300 mV peak to peak Analog audio output during uplink reception. Does not affect the operation mode of the repeater. This pin is an output for AF signal (300 mVp-p), being extracted after the de-emphasis. Demodulated digital signals can be output as well. | | | | | | | | | | | | | | | | | | | | |
| 10 | GND | GND | Chassis ground for all logic levels and power supply return | | | | | | | | | | | | | | | | | | | | |
| 11 | EXT port 1* | Input | In Remote mode, the logic combination of Ports 1 and 2 determines the transmit and receive modes as below: | | | | | | | | | | | | | | | | | | | | |
| 12 | EXT port 2* | Input | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Port 1</th> <th>Port 2</th> <th>RX</th> <th>TX</th> </tr> </thead> <tbody> <tr> <td>H</td> <td>H</td> <td>Auto (AMS)</td> <td>FM (FIX)</td> </tr> <tr> <td>L</td> <td>H</td> <td>FM (FIX)</td> <td>FM (FIX)</td> </tr> <tr> <td>H</td> <td>L</td> <td>Digital (FIX)</td> <td>Digital (FIX)</td> </tr> <tr> <td>L</td> <td>L</td> <td>Auto (AMS)</td> <td>Auto (AMS)</td> </tr> </tbody> </table> | | | | Port 1 | Port 2 | RX | TX | H | H | Auto (AMS) | FM (FIX) | L | H | FM (FIX) | FM (FIX) | H | L | Digital (FIX) | Digital (FIX) | L | L | Auto (AMS) | Auto (AMS) |
| Port 1 | Port 2 | RX | TX | | | | | | | | | | | | | | | | | | | | |
| H | H | Auto (AMS) | FM (FIX) | | | | | | | | | | | | | | | | | | | | |
| L | H | FM (FIX) | FM (FIX) | | | | | | | | | | | | | | | | | | | | |
| H | L | Digital (FIX) | Digital (FIX) | | | | | | | | | | | | | | | | | | | | |
| L | L | Auto (AMS) | Auto (AMS) | | | | | | | | | | | | | | | | | | | | |
| 13 | EXT port 3* | Input | [L] GND: RX Tone OFF [H] OPEN: Setup mode Input a low level signal to indicate that the receiving tone is invalid. | | | | | | | | | | | | | | | | | | | | |
| 14 | EXT port 4* | Input | [L] GND: TX Tone OFF [H] OPEN: Setup mode Input a low level signal to indicate that the transmitting tone is invalid. | | | | | | | | | | | | | | | | | | | | |
| 15 | VCC | VCC | Power supply This pin provides 13.8V, 2.0A, DC from the repeater supply. There is an internal 3 A fuse to prevent damage to the repeater. | | | | | | | | | | | | | | | | | | | | |

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

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

| Pin No | Pin Name | Receive Mode | In Repeater / Remote Mode |
|--------|----------|--------------|----------------------------------|
| 6 | TONE IN | Digital | Invalid |
| | | Analog | Invalid |
| 7 | AF IN | Digital | Invalid |
| | | Analog | Invalid |
| 8 | DISC OUT | Digital | Invalid |
| | | Analog | Discriminator output |
| 9 | AF OUT | Digital | Demodulated digital audio output |
| | | Analog | Analog audio output |



Even when using the DR-1X with an external controller, the COR, analog and digital IDs, TOT, DCS/CTCSS, TX power, etc. are already controlled by the DR-1X 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.



- 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 in Remote mode

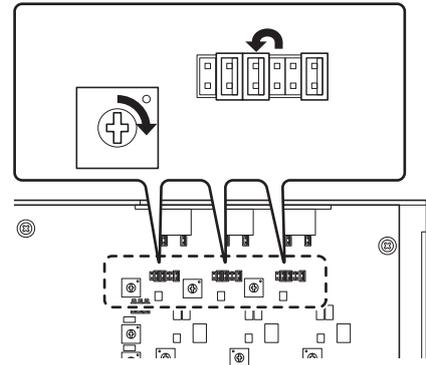
By setting [REMOTE] in the setup menu to ON and inputting a low level to Pin 1 of the [CONTROL I/O] connector, the repeater may be used in Remote mode and controlled remotely by the external controller. Pins 1, 8, 9, 11, 12, 13 and 14 may be used for input, output and control while in Remote mode. For details, see "Remote Operation" (see page 33).

Setting to connect the repeater controller S-COM7330

Set up instructions to interface the Triple Repeater Controller S-COM7330 with the DR-1X.

Modification of S-COM7330

- 1 Remove the 6 screws from each side and 2 screws from the top cover of the S-COM7330, then remove the top cover.
- 2 Change Jumper pin J10C or J11C or J3C and adjust the semi fixed. AF volume gain up for RX1 or RX2 or RX3.
- 3 Command Settings.
 - Select Path Access Mode: Carrier and CTCSS
 - Select COR Filter Delay: 300 msec
 - Select Dropout Delay: 0 sec



Setting of DR-1X

Set the DR-1X as follows.

- Setting the communication mode RX: AUTO (AMS)
TX: FM (FIX)
- Setting the tone signals: RX-TONE (100 Hz) (see page 25 and 27)

Connection with S-COM7330 and DR-1X

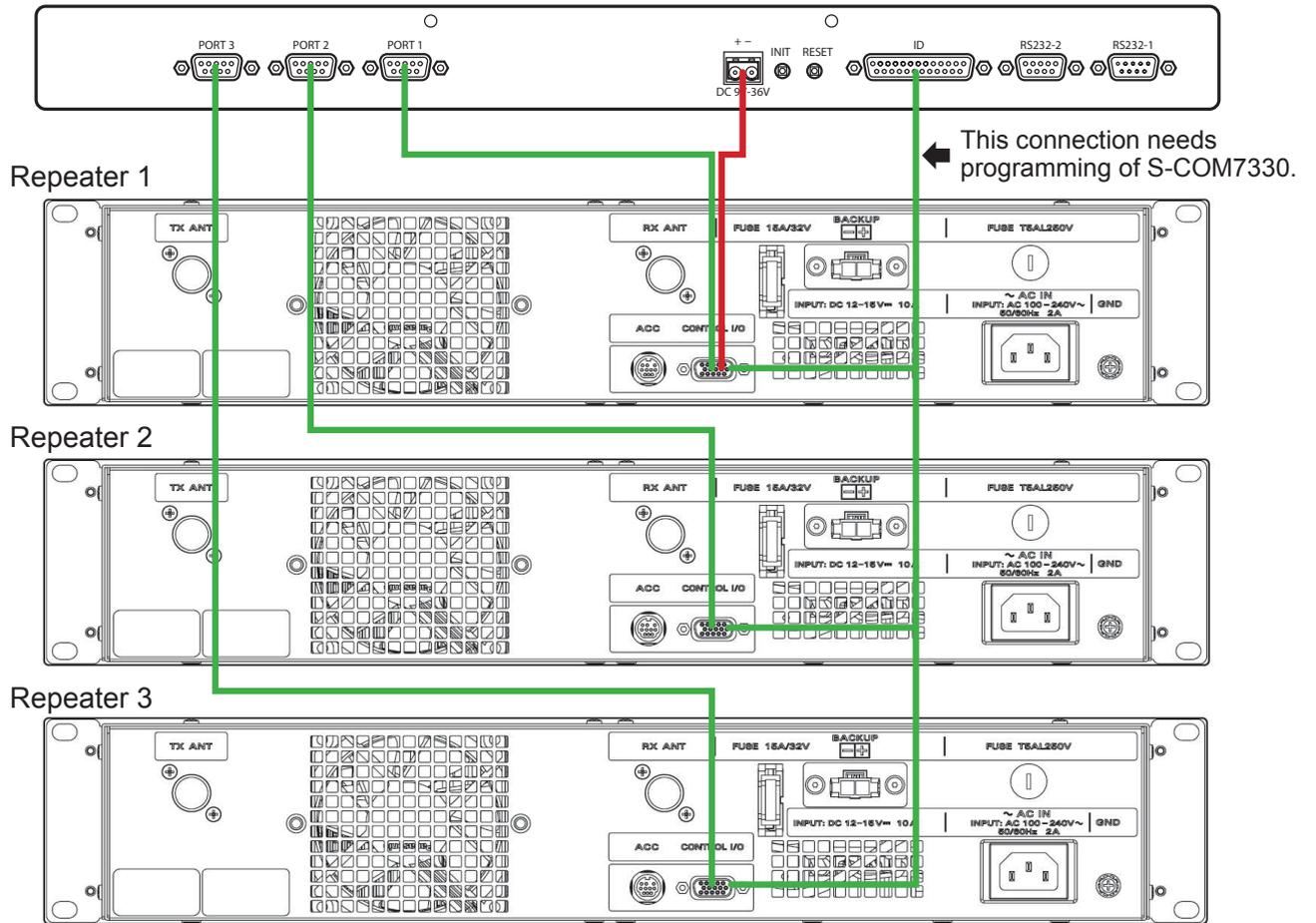
| DR-1X | | S-COM7330 | | Connection |
|--------|---------------|---------------------------|--------------|--|
| pin 1 | EXT I/O | pin 1 | RX Audio | Connect to DR-1X AF out |
| pin 2 | EXT PTT | pin 2 | RX COR | Connect to DR-1X SQL DET |
| pin 3 | CTCSS/DCS DET | pin 3 | CTCSS in | Connect to DR-1X CTCSS/DCS decode output |
| pin 4 | SQL DET | pin 4 | TX PTT | Connect to DR-1X EXT PTT |
| pin 5 | GND | pin 5 | TX Audio | Connect to DR-1X AF in |
| pin 6 | TONE IN | pin 6 | GND | DR-1X GND |
| pin 7 | AF IN | pin 7 | GND | DR-1X GND |
| pin 8 | DISC OUT | pin 8 | TX pin 8 | Select TX LOGIC or TX CTCSS by JP pin |
| pin 9 | AF OUT | pin 9 | GND | DR-1X GND |
| pin 10 | GND | I/O Controller pin 1 to 6 | Logic output | Connect to DR-1X EXT I/O (needs S-COM programming) |
| pin 11 | EXT PORT1 | I/O Controller pin 1 to 6 | Logic output | Connect to DR-1X EXT PORT1 (needs S-COM programming) |
| pin 12 | EXT PORT2 | I/O Controller pin 1 to 6 | Logic output | Connect to DR-1X EXT PORT2 (needs S-COM programming) |
| pin 13 | EXT PORT3 | I/O Controller pin 1 to 6 | Logic output | Connect to DR-1X EXT PORT3 (needs S-COM programming) |
| pin 14 | EXT PORT4 | I/O Controller pin 1 to 6 | Logic output | Connect to DR-1X EXT PORT4 (needs S-COM programming) |
| pin 15 | VCC OUT | DC jack | DC in | Connect to DR-1X VCC out |

The wiring paths shown by the dotted lines require programming the S-COM7330.

| | | |
|--------|---------------|---|
| pin 1 | EXT I/O | Jumper to pin 2 EXT PTT or connect to S-COM7330 LOGIC OUT (L: EXT I/O enable) |
| pin 2 | EXT PTT | EXT PTT input from S-COM7330. It will be controlled by RX COR normally. |
| pin 3 | CTCSS/DCS DET | Signaling decode output (CTCSS/DCS etc) |
| pin 4 | SQL DET | Noise SQL decode output (Connect to RX COR) |
| pin 5 | GND | GND |
| pin 6 | TONE IN | Tone input from S-COM7330 (Connect to TX pin8) |
| pin 7 | AF IN | Modulation input from S-COM7330 |
| pin 8 | DISC OUT | RX audio output without de-emphasis |
| pin 9 | AF OUT | RX audio output with de-emphasis |
| pin 10 | GND | GND |

Connecting S-COM7330

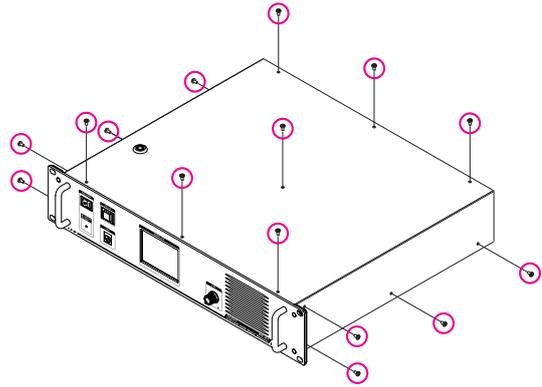
S-COM7330



14. Installation of the Optional Accessories

Installing the optional Voice Guide Unit FVS-2

- 1 Turn the DR-1X [POWER] switch to "OFF".
- 2 Disconnect all the cables from the DR-1X.
- 3 Remove the 4 screws from each side and 7 screws from the top cover of the DR-1X, then remove the top cover.



Figures in this page show the outline of the DR-1X.

- 4 Referring to Figure 1, remove the 4 screws from the top cover of the RX-UNIT, then remove the top cover.

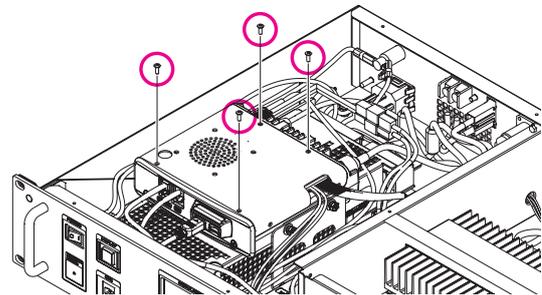


Figure 1

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

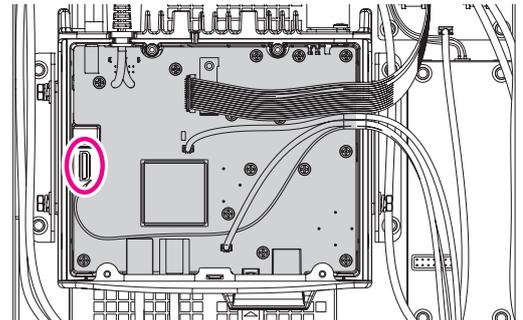


Figure 2

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

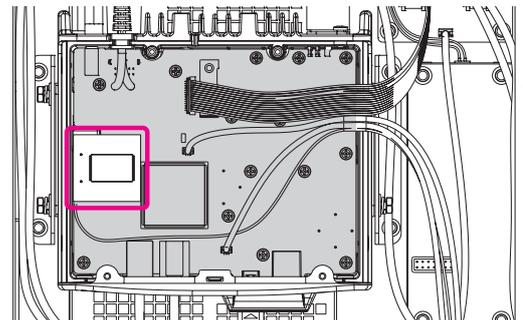


Figure 3

- 7 Replace the top cover of the RX-Unit and 4 screws.
- 8 Replace the top cover of the DR-1X and 15 screws.

15. Specifications

● General

| | |
|------------------------------|--|
| Frequency range | : 144 to 146 MHz, 430 to 440 MHz or 144 to 148 MHz, 430 to 450 MHz |
| Channel steps | : 5 / 6.25 kHz |
| Emission type | : F1D, F2A, F2D, F3E, F7W 16K0F1D F1D - Frequency modulation data transmission, double sideband, without using a modulating subcarrier 16K0F2D F2D - Frequency modulation data transmission, using a modulating subcarrier 16K0F3E F3E - Frequency modulation telephony 12K5F7W F7W - Two or more digital channels combinations of the above |
| Frequency stability | : ± 2.5 ppm (-4°F to $+140^{\circ}\text{F}$ (-20°C to $+60^{\circ}\text{C}$)) |
| Antenna impedance | : 50 Ω |
| Supply voltage | : AC 100-240V (DR-1X only) DC 11.7 to 15.8 V, negative grounding |
| Current consumption | : AC: 2 A (max) (@ 117 V Input) (DR-1X only) DC: 1.5 A (receive) 10 A (50 W TX, 144 MHz / 430 MHz band) |
| Operating temperature | : DR-1X: -4°F to $+140^{\circ}\text{F}$ (-20°C to $+60^{\circ}\text{C}$) DR-1XE: -20°C to $+55^{\circ}\text{C}$ |
| Dimensions | : 19" (W) \times 3.5" (H) \times 15" (D) (482 \times 88 \times 380 mm) w/o knob, connector, handle |
| 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 144 MHz Band/430 MHz Band) BER 1 % 0.2 μV (FM 144 MHz Band/430 MHz Band) 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) |

● Symbols placed on the equipment

 Direct current

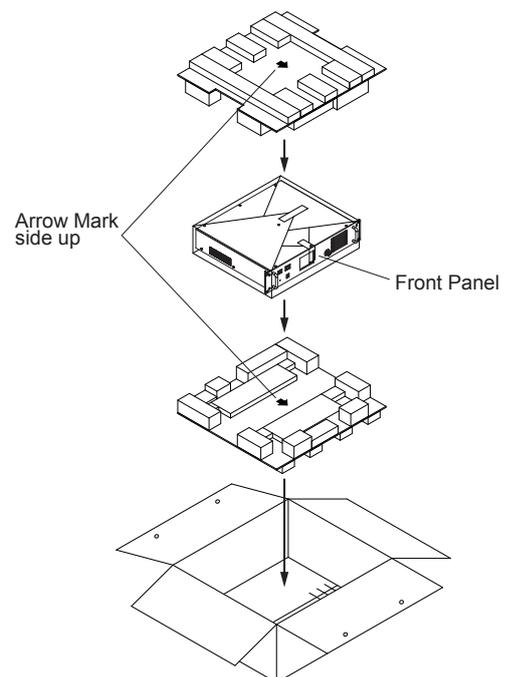


- Rated values are at normal temperature and pressure.
- Ratings and specifications are subject to change without notice for product improvement reasons.

16. After-market Services

Contact Yaesu Service Center for non-warranty repairs

Repairs will be made at the user's expense if normal functions can be maintained after the repair. Please check with the retail store or Yaesu service center for more information.



YAESU LIMITED WARRANTY

Limited Warranty is valid only in the country/region where this product was originally purchased.

On-line Warranty Registration:

Thank you for buying YAESU products! We are confident your new radio will serve your needs for many years! Please register your product at www.yaesu.com - Owner's Corner

Warranty Terms:

Subject to the Limitations of the Warranty and the Warranty Procedures described below, YAESU MUSEN hereby warrants this product to be free of defects in materials and workmanship in normal use during the "Warranty Period." (the "Limited Warranty").

Limitations of Warranty:

- A. YAESU MUSEN is not liable for any express warranties except the Limited Warranty described above.
- B. The Limited Warranty is extended only to the original end-use purchaser or the person receiving this product as a gift, and shall not be extended to any other person or transferee.
- C. Unless a different warranty period is stated with this YAESU product, the Warranty Period is three years from the date of retail purchase by the original end-use purchaser.
- D. The Limited Warranty is valid only in the country/region where this product was originally purchased.
- E. During the Warranty Period, YAESU MUSEN will, at its sole option, repair or replace (using new or refurbished replacement parts) any defective parts within a reasonable period of time and free of charge.
- F. The Limited Warranty does not cover shipping cost (including transportation and insurance) from you to us, or any import fees, duties or taxes.
- G. The Limited Warranty does not cover any impairment caused by tampering, misuse, failure to follow instructions supplied with the product, unauthorized modifications, or damage to this product for any reasons, such as: accident; excess moisture; lightning; power surges; connection to improper voltage supply; damage caused by inadequate packing or shipping procedures; loss of, damage to or corruption of stored data; product modification to enable operation in another country/purpose other than the country/purpose for which it was designed, manufactured, approved and/or authorized; or the repair of products damaged by these modifications.
- H. The Limited Warranty applies only to the product as it existed at the time of the original purchase, by the original retail purchaser, and shall not preclude YAESU MUSEN from later making any changes in design, adding to, or otherwise improving subsequent versions of this product, or impose upon YAESU MUSEN any obligation to modify or alter this product to conform to such changes, or improvements.
- I. YAESU MUSEN assumes no responsibility for any consequential damages caused by, or arising out of, any such defect in materials or workmanship.
- J. TO THE FULLEST EXTENT PERMITTED BY LAW, YAESU MUSEN SHALL NOT BE RESPONSIBLE FOR ANY IMPLIED WARRANTY WITH RESPECT TO THIS PRODUCT.
- K. If the original retail purchaser timely complies with the Warranty Procedures described below, and YAESU MUSEN elects to send the purchaser a replacement product rather than repair the "original product", then the Limited Warranty shall apply to the replacement product only for the remainder of the original product Warranty Period.
- L. Warranty statutes vary from state to state, or country to country, so some of the above limitations may not apply to your location.

Warranty Procedures:

1. To find the Authorized YAESU Service Center in your country/region, visit www.yaesu.com. Contact the YAESU Service Center for specific return and shipping instructions, or contact an authorized YAESU dealer/distributor from whom the product was originally purchased.
2. Include proof of original purchase from an authorized YAESU dealer/distributor, and ship the product, freight prepaid, to the address provided by the YAESU Service Center in your country/ region.
3. Upon receipt of this product, returned in accordance with the procedures described above, by the YAESU Authorized Service Center, all reasonable efforts will be expended by YAESU MUSEN to cause this product to conform to its original specifications. YAESU MUSEN will return the repaired product (or a replacement product) free of charge to the original purchaser. The decision to repair or replace this product is the sole discretion of YAESU MUSEN.

Other conditions:

YAESU MUSEN'S MAXIMUM LIABILITY SHALL NOT EXCEED THE ACTUAL PURCHASE PRICE PAID FOR THE PRODUCT. IN NO EVENT SHALL YAESU MUSEN BE LIABLE FOR LOSS OF, DAMAGE TO OR CORRUPTION OF STORED DATA, OR FOR SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR INDIRECT DAMAGES, HOW EVER CAUSED; INCLUDING WITHOUT LIMITATION TO THE REPLACEMENT OF EQUIPMENT AND PROPERTY, AND ANY COSTS OF RECOVERING, PROGRAMMING OR REPRODUCING ANY PROGRAM OR DATA STORED IN OR USED WITH THE YAESU PRODUCT.

Some Countries in Europe and some States of the USA do not allow the exclusion or limitation of incidental or consequential damages, or a limitation on how long an implied warranty lasts, so the above limitation or exclusions may not apply. This warranty provides specific rights, there may be other rights available which may vary between countries in Europe or from state to state within the USA.

This Limited Warranty is void if the label bearing the serial number has been removed or defaced.

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:

- Reorient or relocate the receiving antenna.
- 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.

EU Declaration of Conformity

We, Yaesu Musen Co. Ltd of Tokyo, Japan, hereby declare that this radio equipment DR-1XE is in full compliance with EU Radio Equipment Directive 2014/53/EU. The full text of the Declaration of Conformity for this product is available to view at <http://www.yaesu.com/jp/red>

ATTENTION – Conditions of usage

This transceiver works on frequencies that are regulated and not permitted to be used without authorisation in the EU countries shown in this table. Users of this equipment should check with their local spectrum management authority for licensing conditions applicable for this equipment.

| | | | | | |
|---|----|----|----|----|----|
|  | | | | | |
| AT | BE | BG | CY | CZ | DE |
| DK | ES | EE | FI | FR | UK |
| GR | HR | HU | IE | IT | LT |
| LU | LV | MT | NL | PL | PT |
| RO | SK | SI | SE | CH | IS |
| LI | NO | - | - | - | - |

Disposal of Electronic and Electrical Equipment

Products with the symbol (crossed-out wheeled bin) cannot be disposed as household waste. Electronic and Electrical Equipment should be recycled at a facility capable of handling these items and their waste by-products. Please contact a local equipment supplier representative or service center for information about the waste collection system in your country.



YAESU

The radio

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YAESU MUSEN CO., LTD.

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