

Operating Manual
SWL IR Remote Control for JRC NRD-545
For
Firmware Version 1.43

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Overview

Thank you for purchasing the SWL IR Remote. We are confident that you will get many hours of listening pleasure from your NRD-545 using the remote. Don't hesitate to contact us at support@swl-remotes.com if you have any problems or questions. We want your experience with our products to be as positive and enjoyable as possible. We also appreciate any comments on how we can make our products better.

The SWL IR Remote is a microcontroller-based device that decodes the Infrared pulse stream from a Universal Remote control and converts it into the remote commands for shortwave receivers and transceivers. Several versions of the SWL IR Remote are available for different models of Receivers and Transceivers.

The SWL IR Remote is connected to the NRD-545 receiver using a standard null modem RS-232C (DB9 female to DB25 male) cable to connect from the SWL IR Remote to the 25 pin RS-232C connector on the NRD-545.

Power for the SWL IR Remote is provided by the included wall power supply. Alternatively, 9-12Volts DC at 100ma max can be supplied to the power connector. The center pin of the coax power connector is positive. There is a blocking diode in the circuit, so reverse polarity will not harm the SWL IR Remote control unit. Customers in Europe receive a DC cable that connects to the coax power jack on the SWL IR Remote control unit and has pig tail leads on the other end for connecting to a DC power supply.

All keys on the Universal Remote are indicated in this manual with bold type. The keys used for radio control are the digits **0, 1, 2, 3, 4, 5, 6, 7, 8, 9, Mute, Power, Enter**, and **Last** or **Previous**. All references to the **Last** key also refers to the **Previous** key on the remotes that have that key.

Any Universal Remote control should operate the SWL IR Remote. Follow the instructions in the remote manual to set the remote to operate a Sony TV. The remote needs digit keys, **Power, Enter**, and **Last** or **Previous** buttons. The remote should be in TV mode to operate properly. Make sure you do not have Cable or VCR modes selected. The codes from the keys when in Cable or VCR mode are different and will not operate the SWL IR Remote.

None of the settings are changed in the radio with the exception of memories that you write with the remote. All settings are temporary in the remote control. You can go back at any time to using your NRD-545 from the front panel.

Keep the Quick Commands Reference sheet by your remote as reference on the SWL IR Remote operation.

Connection to Radio

The NRD-545 uses a null modem RS-232C cable to connect the SWL IR Remote to the RS-232C connector on the radio. The proper cable is included.

Plug in the wall power supply and plug into the back of the SWL IR Remote control box. The power connector is located on the back left hand side of the control unit. The SWL IR Remote draws very little power and does not include or need a power switch.

Note: The radio Power switch must be on to control the radio with the remote. The remote can power the radio on and off while the Power switch is on. When the NRD-545 is being controlled by the remote, the front panel controls are inoperative. You can return control to the front panel from the remote, and then restore remote control of the radio without going through a power cycle.

Remote Control Operation

Description

The following describes the operation of the remote control. Refer to the Universal Remote Commands tables, or the Commands Quick Reference guides for specific features.

Once you begin to use the remote you will get very comfortable with the operation. There is a lot of functionality achieved by just a few remote buttons. You can stick with the basic operations of the remote (volume, frequency, and memory) and still achieve a lot of control over your radio. The biggest problem you will have in the operation of the remote is the **Enter** key. If you do not enter the codes exactly you will end up trying to enter a direct frequency. Direct frequency entry can occur in either VFO or memory modes.

Power

The front panel on the NRD-545 is disabled when the remote is in control of the radio. All of the front panel controls are disabled. The analog controls are controlled by the SWL IR Remote and cannot be changed from the front panel while the SWL IR Remote has control of the radio. The Power switch on the radio must be in the on position before the SWL IR Remote will operate the NRD-545. The REMOTE indicator on the front panel will be on when the SWL IR Remote is in control of the radio. You can return to front panel control using **0 Power** and then re-enable SWL IR Remote operation by pressing **Power**. This will take the receiver out of remote operation, but will not cycle power on the receiver.

Note: Analog controls will return to the front panel settings when the NRD-545 is taken out of remote operation. All analog controls will be revert to the front panel settings when remote operation is continued.

When the radio is turned off with the remote, certain status is saved to non-volatile memory and restored when power is turned back on with the remote. The current memory selection, current tuning step, Volume, and the VFO/memory mode are stored in non-volatile memory. The last frequency entered is kept in volatile memory and will be lost when power is removed from the control unit.

Direct Frequency Entry

When entering frequencies directly, be sure to press a digit key before the first decimal point. The **Mute** button functions to mute the radio, as a decimal point when entering frequencies, and as a clear to abort any key entry to that point. When using the **Mute** button as a clear, be sure to press it enough times to get the LED to blink twice, or for the volume to mute. This is confirmation that the clear command has been accepted. When entering frequencies directly, the **Mute** key will operate as a decimal point only after a digit key has been pressed before the first decimal point. As an example, you can enter **0 Mute 3 Enter** for 300KHz. Pressing the **Mute** a second time during direct frequency entry will then enter 100Hz values. To enter 15.235.500 you would enter **1 5 Mute 2 3 5 Mute 5 Enter**. Zeroes are assumed when not entered. You can enter 15.235.500 by pressing **1 5 2 3 5 Mute 5 Enter**. You can enter the frequency without any decimal places, but you need to enter all the zeros so the frequency is not misunderstood. To enter 15.235.500 without using the decimal key, enter **1 5 2 3 5 5 0 0 Enter**.

The SWL IR Remote assumes that you are entering frequencies in kHz. Any frequency in kHz can be entered directly. 9565kHz would be entered as **9 5 6 5 Enter**. The decimal place (**Mute**) is not necessary in this case. The decimal place is only needed to save zero entries or optionally when entering a frequency less than 1MHz. When entering frequencies below 1MHz, press a leading zero before the frequency and then **Enter**. For example: **0 7 0 0 Enter** for 700kHz. Or use the **Mute** key as a decimal place before or after the frequency entry. For example: **7 0 0 Mute Enter** for 700kHz or **0 Mute 7 Enter** for 700 kHz.

After a frequency has been entered, you can then use the **CH+/-** to step the frequency in the VFO mode. Frequency steps of 1Hz, 10Hz, 100Hz, 1kHz, 5kHz, 9kHz, 10kHz, 100kHz, and 1MHz can be used to adjust an entered frequency very quickly or step through stations with set frequency spacing. You can set User Defined Tuning Steps for tuning CW and SSB below 1kHz. Press a numeric key corresponding to the frequency step desired (see commands below), and then the **CH+/-** and the step frequency will be used. The step frequency is kept and used again the next time the **CH+/-** keys are used. The step is permanently kept when the radio is powered off and back on with the remote **Power** button. The **CH+/-** keys will change the frequency when in the VFO mode, and change memories up and down when in memory mode.

Frequency pacing is the rate at which the frequency is increased or decreased when the **CH+/-** keys are held down. The pacing is a configurable parameter that can be set by the user. You can speed up or slow down the rate at which the frequency changes by setting the frequency pacing.

The **CH+/-** keys are used to step the frequency up and down when in VFO mode. The first press of the **CH+/-** in this mode will be slightly delayed. If the key is held down it will then begin stepping the frequency at the current slewing rate. Use single presses of the **CH+/-** keys to move slowly up or down in frequency. Hold the keys down continuously to step the frequency very quickly.

If the Wideband converter (CHE-199) is installed in the NRD-545, and the Wideband converter is enabled in the SWL IR Remote, you will be able to enter and step through frequencies in the range of 30MHz to 1,999MHz. The WFM mode will also become a selection if the optional FM mode selection is enabled.

Direct frequency entry is the same for the Wideband converter as in HF operation. You will need to enter one more **Mute** for the additional decimal point when entering frequencies above 100 MHz, and another for frequencies above 1 GHz.

Last Frequency Recall

The last directly entered frequency can be recalled. Use this when looking for other frequencies being used by a shortwave broadcaster. You can set a frequency directly, enter another frequency, and return to the original frequency. You can then enter another frequency and return, etc. The last frequency entered is lost if power is removed from the remote control unit. It is kept if the radio is powered off.

Tuning Steps

Pre-set Tuning Steps can be selected by entering a single digit before using the **CH+/-** keys on the remote. The tuning step stays until changed again by the user.

Five User Tuning Steps can be defined for special tuning requirements. Set these tuning steps to half the value of your filters. Tuning off frequency by half the filter bandwidth will improve audio response without degrading the signal or losing synch lock. For example if you have a 2.4kHz filter, set User Tuning Step 1 to 1.2kHz and then tune off frequency when the 2.4kHz filter is selected. This procedure is similar to using a PBT control, but you can see on the display how much off frequency you are tuned. You could also set a User Tuning Step to a small value and use it to quickly zero-beat the frequency in SSB mode.

User tuning steps can also be used to enter additional steps for the Wideband converter. For example, you may want to set a User Tuning step to 2.5kHz for tuning in the higher frequencies.

Memory Operation

When moving through the memories, you can directly select a memory channel using the **x (x) (x) Last** key sequence. For example, to select channel 23 you would press **2 3 Last**. You can select a memory channel in VFO or memory mode. You can also write the VFO to the currently selected memory. Once the channel is selected, you can move the memory to the VFO using **0 Last**, or move through the channels one at a time using the **CH+/-** keys. The **CH+/-** will change the memory channel when in memory mode only.

The NRD-545 memories are numbered from 0 to 999. The 0 memory channel cannot be directly accessed with the SWL IR Remote. The **0 Last** key sequence is used for moving a memory to the VFO.

At times the memory may seem to be off of where you expect it to be. Just directly select a memory, or move through memories until you have the memory desired. The remote will do the best job it can to track the current memory. When the radio is powered off with the **Power** key on the remote, the current memory channel is put into semi-permanent memory so it can be restored even after the remote control unit is powered off.

Mute Operation

There is a lot of functionality in the **Mute** key. The **Mute** key is used during frequency entry as a decimal point. Any time a digit key is pressed before the **Mute**, the control unit then understands the **Mute** to be a decimal point. At any time you can press the **Mute** key to clear any keys pressed. The **Mute** may have to be pressed several times to get the LED to blink twice, indicating that the keys have been cleared. If the radio mutes then you can be sure that the sequence is cleared. The remote needs to know whether the **Mute** is being used for a decimal or it is intended to be a clear. A clear function is interpreted by the remote control by multiple presses of the **Mute** key.

Analog Controls

Press a numeric key to select the control before pressing the **VOL+/-** to adjust an analog control. The RF Gain, Squelch, Notch, NB, PBS, BWC, and Tone controls can be adjusted from full CW (clockwise) with **VOL+** to full CCW (counterclockwise) with **VOL-**. Center is default for the Notch, PBS, BWC, and Tone. When the Squelch and NB are full CCW, the LED will go out and the control movement will cease. When the PBS, Notch, and Tone are centered, the LED will go out and the control movement will cease. When the RF Gain is full CW the LED will go out and movement will cease. Release the **VOL+/-** key and press **VOL+/-** to continue in the same or the opposite direction. The LED will give you feedback that the control is at the default position of

the control. To exit this mode, press **0** and then one of the volume keys, or press the **Mute** key. When you press the **Mute** key to return to normal operation, the LED will blink twice and the current analog settings will be kept. Analog control will return to Volume.

The analog controls can be returned to the default (or off) position by pressing **0** then **VOL+/-**. The default for the Notch, PBS, and Tone is centered. The default for NB Level, and Squelch is full CCW. The default for RF Gain is full CW. The default position on the BWC depends on the current filter setting.

You can quickly position the individual analog controls to their default, minimum, and maximum positions. For example: you can move the PBS control to full CW by pressing the key sequence **6 9 VOL+/-**, and then move in the CCW direction with the **VOL-** key.

Universal Remote Commands

Radio Power

Power Radio power on /off. Return remote communications to remote if the NRD-545 is already powered.

Return control to front panel

0 Power Take radio out of remote communications – returns front panel control.

Direct Entry of Frequencies (Examples)

0 8 3 0 Enter 830kHz
0 Mute 7 Enter 700kHz
5 0 0 Mute Enter 500kHz
3 Mute 2 5 9 Enter 3259kHz
1 5 Mute Enter 15000kHz
1 5 Mute 2 3 Mute 5 Enter 15230.5kHz
1 5 2 3 5 Enter 15235kHz
9 5 6 5 Enter 9565kHz
3 Mute 5 Enter 3500kHz
Mute (Mute) (Mute) Clear key entry during numeric entry. LED will blink twice.

Direct Entry of VHF Frequencies (Examples)

4 6 Mute 4 2 46.42MHz
1 6 2 Mute 5 5 Mute 162.55MHz *

* Note: additional **Mute** required for frequencies above 100MHz.

Frequency and Memory Channel stepping

	<u>VFO Mode</u>	<u>Memory Mode</u>
CH+	Freq+ by tuning step	Memory+
CH-	Freq- by tuning step	Memory-

Tuning Steps

x before **CH+/-** to set a tuning step. It stays until changed again.

1	1Hz
2	10Hz
3	100Hz
4	1kHz
5	5kHz
6	10kHz
7	100kHz
8	1MHz
9	9kHz

User Tuning Steps

0 before **CH+/-** Last Used User Tuning Step
0 x before **CH+/-** User Tuning Step (**x**=1, 2, 3, 4, 5)

RF Gain Control

1 before **VOL+/-** to adjust the RF Gain control. The LED will go out when the RF Gain is full CW.

SQL Control

2 before **VOL+/-** to adjust the Squelch control. The LED will go out when the Squelch is full CCW.

Notch Control

3 before **VOL+/-** to adjust the Notch control. The LED will go out when the Notch is centered.

NB Control

4 before **VOL+/-** to adjust the Noise Blanker control. The LED will go out when the NB is full CCW.

PBS Control

6 before **VOL+/-** to adjust the PBS control. The LED will go out when the PBS is centered.

BWC Control

7 before **VOL+/-** to adjust the BWC control.

Tone Control

8 before **VOL+/-** to adjust the Tone Control. The LED will go out when the Tone is centered.

Default, Min, and Max on BWC and PBS

Default, Min, and Max on RF Gain, SQL, Notch, NB, PBS, BWC, and Tone

- x 0** before **VOL+/-** Default - RF Gain (**x=1**) max, SQL (**x=2**) min; Notch (**x=3**), NB (**x=4**), PBS (**x=6**), BWC(**x=7**), or Tone (**x=8**) - centered
- x 1** before **VOL+/-** Min - RF Gain (**x=1**), SQL (**x=2**), Notch (**x=3**), NB (**x=4**), PBS (**x=6**), BWC (**x=7**), or Tone (**x=8**) – Full CCW
- x 5** before **VOL+/-** Notch (**x=3**), PBS (**x=6**), BWC (**x=7**), or Tone (**x=8**) - centered
- x 9** before **VOL+/-** Max - RF Gain (**x=1**), SQL (**x=2**), Notch (**x=3**), NB (**x=4**), PBS (**x=6**), BWC (**x=7**), or Tone (**x=8**) – Full CW

Enter Commands – Toggles/Selects radio features

- Enter** VFO/Memory mode.
- 1 Enter** NR, BC, or off.
- 2 Enter** Attenuator on/off.
- 3 Enter** Notch off/on, Notch Tracking on.
- 4 Enter** NB1, NB2, or NB off.
- 5 Enter** ECSS – LSB, or ECSS – USB mode.
- 6 Enter** AGC slow, fast, or off (configurable).
- 7 Enter** AM, AMS, FM (configurable), WFM (configurable), and CW (configurable).
- 8 Enter** LSB, or USB mode.
- 9 Enter** Wide, Inter, or Narrow bandwidth.
- 0 Enter** Cycle through Tuning Rate.
- 0 0 Enter** Dim/Brighten display.
- 0 1 Enter** Turn on/off AGC display.
- 0 2 Enter** Turn on/off BWC display.

Memory management

x x x Last Select Memory Channel xxx. Used for channels 100-199.

x x Last Select Memory Channel xx. Used for channels 10 – 99.

or

x Last Select Memory Channel x. Used for channels 1 – 9.

0 Last Memory to VFO. Frequency and mode are transferred from memory to VFO and VFO mode is selected.

0 0 Last Recall last directly entered frequency and select VFO mode

1 x x x Last Write VFO Frequency and mode to memory channel xxx.

Configuration Parameters

- 0 9 4 Enter** Set Frequency Pacing
x x Enter Value from 1 to 99 to control pacing. 1 is the fastest and 99 is the slowest.
- 0 9 5 Enter** Set Configuration Parameters to Factory Defaults.
Enter Reset Configuration Parameters to Factory Default.
Frequency Pacing 30
Optional Modes/AGC Disabled
Wideband operation Disabled
- 0 9 6 Enter** Enable/Disable Optional Mode Selections
0 Enter Disable FM and CW modes in selections.
(Factory default)
1 Enter Enable FM and WFM (Wideband only) mode in selections.
2 Enter Enable CW mode in selections.
3 Enter Enable both FM (plus WFM in Wideband) and CW in mode selections.
4 Enter Disable AGC off (Factory default).
5 Enter Enable AGC off in AGC selections.
6 Enter Disable Wideband operation (Factory default).
7 Enter Enable Wideband operation (CHE-199 option must be installed).
- 0 9 7 Enter** Define User Tuning Steps
x Mute f f f f Enter
The User Tuning step x (1, 2, 3, 4, or 5) is defined as frequency **fff**, converted to f.fffkHz. You must enter all digits, even zeroes; e.g. define Tuning Step 2 with a value of 1.4kHz would be **2 Mute 1 4 0 0 Enter**. The display on the radio will show the value as 2.140.000Hz when you are done to confirm the entered value. It is best to set these tuning steps with the receiver on and in the VFO mode. These steps are saved in non-volatile memory and are never changed except using this configuration mode.

LED Operation

The LED provides feedback on the mode and operation of the SWL IR Remote. The LED blinks slowly whenever there is a communications error or the communications has timed out waiting for a response when a response is expected. This can also occur if the radio is powered off and you try to initiate commands.

Communications Error

The LED blinks continuously at a slow rate when the communication times out from the radio, or a command gets no response. If the radio power is off and you try to initiate any command but power on, the radio will NAK all commands and the LED will indicate a communications error. If this occurs on every function and the radio is powered on and not responding, check the cable connection to the radio.

Clear Input

After the **Mute** is used to clear key entries the LED will blink twice. The LED will also blink twice when returning to normal operation on the NRD-545.

Confirmation of Command

After a valid command has been issued and acknowledged the LED will blink once and go out. The LED will appear to be on continuously when the **CH+/-** is held in the frequency mode because the commands repeat and the LED doesn't always time out.

When using the analog controls, the LED will be on continuously when the controls are being adjusted, but will extinguish when they are in the default position.

Configuration Mode

When you enter the parameter configuration mode, the LED will blink continuously at a fast rate until the configuration operation is completed or canceled.

Troubleshooting

Nothing happens when using the Universal Remote.

- The NRD-545 must be powered on for the remote to operate, and the REMOTE indicator lit on the front panel.
- Verify that the Universal Remote is in the TV mode. Check that the remote control box is connected to the wall power supply and that the wall power supply is connected to the AC supply.
- Check the batteries in the Universal Remote and change if necessary.
- Verify that the TV mode of the Universal Remote is set for a Sony TV.

The LED on the remote control unit blinks slowly.

- If no remote operations function, check cable connection to the radio.
- The Power button should be on for the remote commands to be recognized by the radio.
- Be sure the REMOTE indicator is lit on the front panel. If it is not, then press the Power button. The REMOTE indicator should turn on.

The LED on the remote control unit blinks fast.

- The configuration mode has been selected and the operation needs to be completed. Push **Mute** to cancel the operation or **x x Enter** to complete the operation. See chart above on the configuration command parameters.

Some buttons on the control work, and some don't.

- Verify that the Universal Remote TV mode is selected. If CABLE or VCR modes are selected, only a few buttons will work. The power and mute will work in both modes. None of the other keys will work in cable or VCR mode.
- Operate the buttons with more time between button presses. There is a 100 msec delay between key presses so the remote control unit can tell if the button on the remote is held continuously or has been released and pressed again. Each press of the remote will cause a continuous stream of IR pulses to be sent (the LED on the Universal Remote will be lit continuously). The remote control unit knows that the button has been released if the IR pulse stream stops for 100 msec or longer.

Erratic Operation of the remote

- Check the batteries in the Universal Remote and replace if necessary.
- Be sure to aim the Universal Remote at the front panel of the control unit. The IR sensor is behind the front lens to the left of the LED. This is more critical the further you are away from the remote control box.
- Confirm that the interface cable is connected securely to the radio and the SWL IR Remote control box.
- Check the power connection to the back of the SWL IR Remote control box.

Memory on the radio and the SWL IR Remote are not synchronized.

- If the memories are changed in any fashion other than the Universal Remote, the SWL IR Remote can lose track of the currently selected memory. Use the SWL IR Remote to perform memory operations, or select the memory channel directly with the SWL IR Remote to synchronize the current memory channel after making memory changes other than by using the remote.