

Operating Manual
SWL IR Remote Control for Yaesu FRG-100
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 Yaesu FRG-100 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 FRG-100 receiver using a 1/8in (3.5 mm) audio type cable with a 6-pin DIN male connector connected from the SWL IR Remote to the 6-pin DIN CAT port on the receiver.

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 FRG-100 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 FRG-100 from the front panel.

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

Connection to Radio

Connect the 1/8in (3.5mm) audio type plug on the cable into the back of the SWL IR Remote and the 6-pin DIN connector on the radio jack marked CAT. You do not need to use a FIF-RS-232C Level Converter with the SWL IR Remote. The baud rate is fixed at 4800 and cannot be changed.

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 power button on the FRG-100 must be pushed in for the CAT interface (and the SWL IR Remote) to work properly. Once the power button is pressed in, you can use the remote to power the radio on and off.

Level Converter Option

Plug the DB9 cable from your computer into the back of the SWL IR Remote if you have the SWL IR Remote version with the Level Converter option. The default baud rate for the Level Converter option is fixed at 4800 baud and cannot be changed.

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 (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

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, 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.

Sleep Timer

You can set the Sleep Timer for the FRG-100 with the remote.

The Sleep Timer cannot be started or stopped with CAT commands, so you must start and stop the Sleep Timer with the TIMER button on the front panel.

Direct Frequency Entry

When entering frequencies directly, be sure to press a digit key before the first decimal point. The **Mute** button functions 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. 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 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. 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.

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. 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.

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 FRG-100 version tracks memories because the interface provides the current memory channel selected. 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. 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.

Universal Remote Commands

Radio Power

Power Radio power on /off.

Sleep Timer (When power is on)

h m m Power Enable the sleep timer and set to **h** hours and **mm** minutes (0:0-1 – 2:00).
Leading zeroes are not required.

To start Sleep Timer press TIMER on the front panel.

0 Power Disable the sleep timer.

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.

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.

- 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)

Enter Commands – Toggles/Selects radio features

Enter VFO/Memory mode.

6 Enter FM mode.

7 Enter AM, AM/N modes.

8 Enter LSB, or USB modes.

9 Enter CW/CWN modes.

0 Enter Dim/Brighten display backlight.

Memory management

- x x Last** Select Memory Channel xx. Used for channels 10 – 50.
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 0 0 Last Write VFO Frequency and mode to currently selected memory channel. This will only work when in the VFO mode.

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
- 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 **ffff**, 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. The FRG-100 is not a true handshaking protocol, but the implementation of the CAT interface with the SWL IR Remote will query the FRG-100 for status before any command is issued. If the status is not returned, the LED will blink slowly to indicate a communications problem. 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 the FRG-100 does not return a status. 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.

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.

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.

RS-232C Level Converter

Description

The RS-232C Level Converter option connects to a computer through the DB9 connector on the back of the SWL IR Remote unit. Just plug your computer into the SWL IR Remote and you can use any software program that can communicate with your receiver. The FRG-100 Level Converter is fixed at 4800 baud and cannot be changed.

Operation

The Level Converter takes in characters from a computer and sends them on to the radio, then waits for return characters from the radio if the communications gets a response. Most Level Converters just convert the electrical signals from RS-232C to TTL as required by the radio. The SWL IR Remote has two serial channels (called a UART). One connects to the radio using TTL level signals and the other channel is converted to RS-232C level signals and connects to a computer. Going through the SWL IR Remote controller permits control over the flow of traffic to and from the radio. IR commands can be interjected into the time between the computer commands permitting operation by the computer and the Universal Remote.

There is a delay of about one character time when using the Level Converter. This is not enough of a delay to cause any problems with most computer software. There is a normal turn around time in the communications and the software, if properly implemented, should handle this delay.

Troubleshooting

Nothing happens when using the Universal Remote.

- Make sure the radio is powered. The power button on the front panel must be pressed in (power on) for the remote to work with the CAT interface.
- 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 (pressed in) for the CAT or ACC interface commands to work. If the power button is out, the interface will not work.
- Check that the CAT indicator blinks when a remote function is performed. The CAT indicator will blink on the display even if the power button on the FRG-100 is out.

Operation is erratic and the LED on the remote control unit blinks slowly.

- If some remote functions work but not others, the pacing may be set too high. Some computer programs will set the pacing for their particular needs. The pacing command tells the FRG-100 to slow down characters from the radio to the remote. This can be too long a time delay for the SWL IR Remote. The character pacing can be reset by switching modes from VFO to Memory or Memory to VFO with the **Enter** key. The character pacing will be reset by the SWL IR Remote for the fastest response.

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.