



## Waterfall Feature Operation Manual

### 1. Introduction

The Waterfall Feature is available for the USDS100 scanner. It covers a user-selectable span or band of the radio spectrum to show you graphically the radio transmissions that are present. The Waterfall feature quickly shows you how active a span or band of the spectrum is. When you see a transmission displayed, you can navigate to it to listen to it.

Since all transmissions occurring in the selected span will display at the same time, you'll be able to see possible relationships between transmissions. For example, you might see simultaneous repeater transmissions on multiple frequencies or find a repeater input frequency associated with the repeater output frequency. The strength of signals will provide clues about the nature of the transmissions or how far or near the transmitters are. Alternatively, they will tell you the relative strengths of transmitters. These observations will enable you to gain a quick understanding of unfamiliar radio systems or of a new location.

### 2. Installation

Go to [uniden.com.au](http://uniden.com.au) and Download the latest version of Sentinel.

Use Sentinel to download the most current firmware for your scanner model.

Purchase a License Key for the Waterfall Feature from [uniden.com.au](http://uniden.com.au) or from your scanner store.

On the scanner press **Menu->Settings->Upgrade** and select **Upgrade Waterfall**.

Enter the entire License Key, including the dashes. This is done by rotating the PUSH/FUNC knob to select characters and the arrow soft keys to advance the cursor. Do not press E (Enter) until the last character is entered. If entered successfully, the Waterfall Feature will be available for use.

### 3. Starting Waterfall

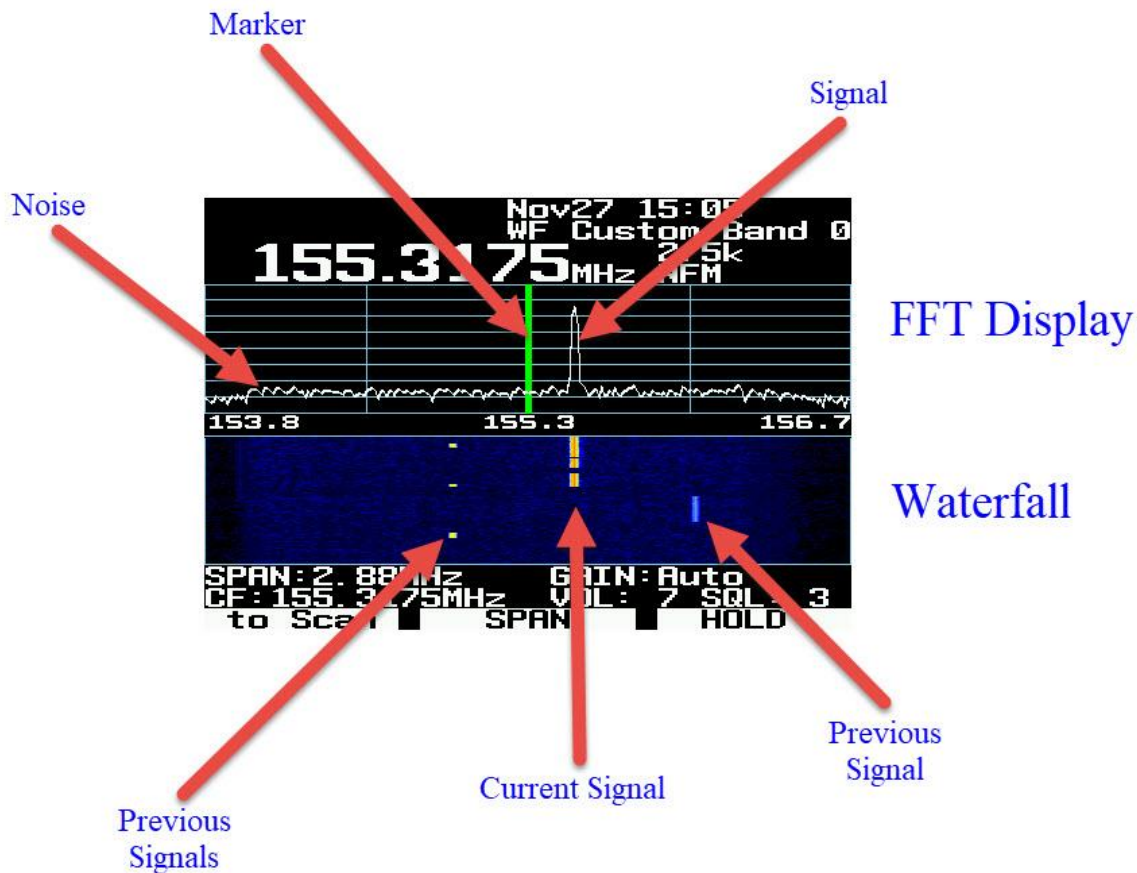
To start the Waterfall function, press **Menu** and use the knob to scroll backwards to select **Waterfall** and press **E**. You will see a display headed by “Waterfall” that shows several options for starting it as well as for adjusting various settings.

The starting options are as follows:

STARTING OPTION	STARTS WATERFALL USING:
Start Waterfall	Current Settings – a default band and settings that you can define.
Start Preset Waterfall	One of several named bands and settings that are pre-defined for you by Uniden.
Start Custom Waterfall	One of several named bands and settings that you can define.

### 4. Understanding the Display

The scanner’s display is divided into two panes. The upper pane is called the FFT Display and the lower pane is called the Waterfall Display.



## 4.1 FFT Display

The FFT Display shows a real-time graph of the strength of radio signals and background RF noise. Grid lines on the horizontal axis depict frequencies, and grid lines on the vertical axis depict signal strength levels.

The signals or noise being received across the selected span are plotted in white.

## 4.2 The Marker

In the center of the graph, a vertical line (defaulting to green) is displayed. This line represents the frequency that the scanner is currently tuned to and is called the Marker.

The current frequency can be changed either by entering a frequency from the keyboard and pressing the Enter key or by turning the knob.

When using the knob, the frequency changes by the current value of the Step with each knob click. This works well for small frequency changes but is probably too slow to move to a more distant active frequency. If you press Function before turning the knob, the frequency will change by a much larger amount, allowing you to quickly move to the area of the more distant frequency. When you get closer to the desired frequency, press Function again to revert to movement by Steps to fine tune to the exact desired frequency. You can also quickly move the marker back to the center by pressing the Menu key twice.

To Quick Save a frequency, press E (Enter).

When the user changes the current frequency, depending on the setting of parameter **Set Marker->Marker Position**, the Marker will either move (**Position Adjustable**) or will remain centered in the display (**Fixed in Center Screen**). **Position Adjustable** is the default.

In the Position Adjustable mode, the marker moves (and the receive frequency changes) but the lower and upper limits of the span remain fixed.

In the Fixed in Center Screen mode, when you change the receive frequency, the marker stays put in the center but span shifts accordingly, so the lower and upper span limits change.

## 4.3 Other Information Displayed

The area above the FFT graph displays the following information:

Line 1:

- Data about a transmission being received, for example "P25"
- Current date (month and day)
- Current time (hours and minutes).

Line 2:

- The name of Band being received. This is either one of the pre-programmed bands that can be selected or a user-defined band name.

Line 3:

- Current frequency being received in large numbers
- Step size
- Modulation Type

#### 4.4 Waterfall Display

The Waterfall Display is a continuous display of transmissions and noise levels. It shows you a rolling 10-second window of activity. The most current, most recent observation is at the top and the oldest observation is at the bottom. Because the Waterfall Display color-codes the strength of signals or noise received and because observations move downward in time, the display resembles a waterfall, and hence this feature's name.

Transmissions appear as lines whose lengths reflect the length of the transmissions. Signal strengths are shown by the color of the lines. Each color represents a particular range of signal strength and there are 5 signal ranges and 5 colors. The feature's default colors are adequate for most purposes, but the user can customize them.

#### 4.5 Other Information Displayed

Line 1:

The **Span** size  
The current setting for **Gain**

Line 2:

- The **Current Frequency** that the scanner is tuned to
- The current volume setting
- The current squelch setting

## 4.6 Soft Keys

MODE	SOFT KEY 1	SOFT KEY 2	SOFT KEY 3
default	<b>To Scan</b>	<b>Span</b>	<b>Hold</b>
	Scanner exits the Waterfall feature and resumes scanning.	Changes the value of the frequency Span of the band being observed.  <b>IMPORTANT:</b>  At span size settings above 2.88 MHz, the scanner cannot receive a transmission unless the Hold soft key is pressed first.	Freezes the display, allowing user to tune to a frequency before displayed transmission disappears from the display. User can unfreeze display by pressing this key again (Sweep).
Function key pressed	<b>Step</b>	<b>Max Hold</b>	<b>MF-&gt;CF</b>
	Change the value of frequency step size or select Auto. Each time this key is pressed, the value of the step changes.	Signals displayed in the FFT Display remain displayed after transmission stops so you can observe all peaks over a period of time. Pressing the function key and this key again returns display to real-time mode.	Moves the Marker (and frequency being received) to the Center Frequency of the display.

## 5. Adjusting Display Screen Space Allocation

While the waterfall feature is running, you can conveniently change the amount of screen space dedicated to each type of display (FFT and Waterfall) by pressing **Function** followed by the nine ("9") key on the keypad, which is labeled "**9 DISP**". To return to the waterfall, simply press "**E**" after making your selection.

Available choices are:

FFT: 25% / WF: 75%  
 FFT: 50% / WF: 50%  
 FFT: 75% / WF: 25%  
 FFT: 100%

## 6. Assignment to Search Key

For convenience, you can optionally assign the waterfall function to one of the three search keys on digits 1-3 on the keypad. These are labeled SRCH1, SRCH2, and SRCH3. This is done by pressing:

Menu->Search for->Set Search Key->Search Key *n*->Waterfall

Where “*n*” is a number 1 through 3.

Once this is done, when the scanner is held on a channel, you can start the waterfall feature, using the Current Settings, by pressing **Function** and the **SRCH*n*** key that you assigned to waterfall.

## 7. RF Gain

The scanner’s RF Gain defaults to the recommended value of Automatic. This setting is preferred and adequate in most cases. The user can adjust the RF gain by selecting one of 16 available gain levels, numbered 0 through 15, or can choose **Auto**.

In an area with nothing but weak signals, the user may increase the RF gain in order to receive more signals. In an area with very strong signals, the user may decrease the RF gain to compensate. Be aware that changing the gain simultaneously affects the strength of the background noise as well as signals.

**NOTE:** If you increase the gain too much in a strong signal or noisy environment, the display will saturate and distort, making it impossible to obtain correct information.

To change the **RF Gain** setting, press the **Function** key and press the zero (“0”) key on the keypad, which is marked **0 LVL**. The setting is changed by turning the knob.

## 8. Options

OPTION NAME	DESCRIPTION	SELECTIONS / NOTES
Start Waterfall	Restarts the last waterfall session used.	
Start Preset Waterfall	Select and start a waterfall session for a pre-defined band.	Aircraft CB Radio(AU) CB Radio(NZ) FM Broadcast HamRadio 10m HamRadio 6m HamRadio 2m HamRadio 70cm HamRadio 33cm Marine Railroad(AU) Railroad(NZ) UHF CB Radio
Start Custom Waterfall	Select and start a waterfall session for one of ten user-defined (and named) bands.	
Program WF Custom Band	Define a custom band. Up to 10 custom bands can be defined.	Edit Name Set Center Frequency Set Modulation Set Step Set Span
Edit Current	Edit certain parameters of the current FFT Display.	Set Center Frequency Set Modulation Set Step Set Span
Set Signal (FFT) Display	Change the amount of screen space dedicated to each type of display (FFT and Waterfall).	FFT: 25% / WF: 75% FFT: 50% / WF: 50% (the default) FFT: 75% / WF: 25% FFT: 100%
Set Signal (FFT) Type	Choose the method used to represent signals in the FFT Display.	<b>Line:</b> Shows signal strength levels as one continuous plot line (the default) <b>Bar:</b> Shows signal strength levels as solidly filled bars.
Set Max Hold	Turn Max Hold on or off	On Off (the default)
Set Max Hold Time	Set the amount of time that display is held when the user presses Hold.	3 sec 10 sec Infinite (the default)

OPTION NAME	DESCRIPTION	SELECTIONS / NOTES
Set Marker	Adjust Marker position and width.	<p><b>Marker Position:</b> Position Adjustable or Fixed in Center Screen</p> <p><b>Set Marker Width:</b> Narrow, Default, or Wide</p>
Set Color	<p>Customize the colors used to depict signal strength ranges in the Waterfall Display.</p> <p>Customize the Marker color.</p> <p>See a demo of your selected color settings.</p> <p>Reset Waterfall Display to factory settings.</p>	<p><b>NOTE:</b></p> <p>There are 5 signal strength ranges available, numbered 1 through 5 in increasing order of strength.</p>

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