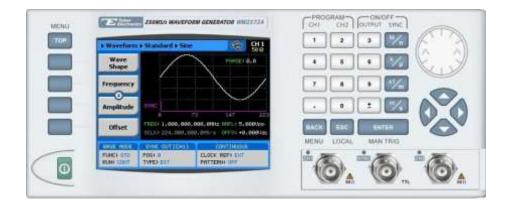# How to Simply Generate a Frequency Hop Modulation

Frequency Hop Modulation is a method of transmitting radio signals by rapidly switching a carrier wave over a series of distinct frequency channels.   Frequency hop modulation causes the output waveform to "hop" from frequency to frequency in a table-defined sequence. Tabor Arbitrary Waveform Generators (AWGs) allow you to easily generate a frequency hop modulation.   This document will quickly guide you through the definition process as shown on a WW2572A.
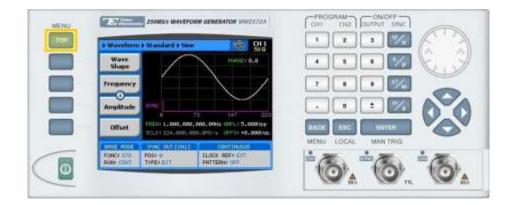

NOTE

You can also generate an **Amplitude Hop Modulation** by following steps similar to those described in this document.
These modulations are available in the WW2571/2A, WS8101/2 and the PM8571/2A

The front panel of the AWG is depicted below.

➔   **To generate a Frequency Hop Modulation using the front panel:**
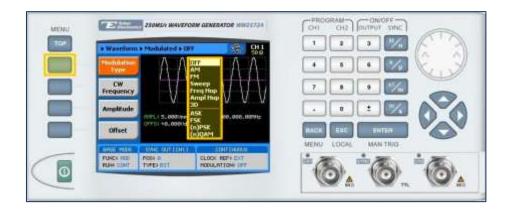
1.   Press the **TOP** menu button.

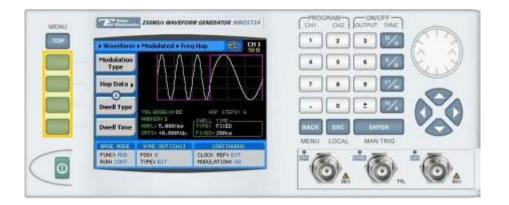2. Press the **Waveform** button.

3. Press the **Modulated** button.

4. Press the **Modulation Type** menu button. A list of modulation types appears on the screen. By default, the modulation type is set to "OFF".

5. Select the **Freq Hop** modulation type from the list box using the arrow keys, and press **ENTER**.

6. Following your selection, you will be able to configure the characteristics of the modulation with the modulation-type specific menu buttons that appear on the left-hand side of the panel.

TIP

Whenever the ⊠ icon is displayed there are more attribute menu buttons to be shown below. Simply scroll down using the dial or cursor key.

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7. Choose the menu buttons on the left-hand side of the screen to modify any of the following attributes:

- **Hop Data**. Create a table of frequency hops (see step 8).

- **Dwell Type**. Select a **Fixed** or **Variable** dwell type.

- **Dwell Time**. The time interval during which the frequency remains stable before hopping to the next frequency.

- **Marker**. Defines an index point in the frequency hop sequence at which the Sync Output generates a marker pulse.

- **Trigger Baseline.** The idle state of the frequency hop modulation output when placed in trigger mode, with the following two options:

- **Carrier.** The carrier option generates carrier waveforms until triggered. When triggered, it generates the frequency hop modulation, and then resumes the carrier waveform output.

- **DC.** The DC option generates a static DC level until triggered. When triggered, it generates the frequency hop modulation, and then resumes the DC level output.

- **Amplitude**. The amplitude of the carrier wave (in Volts peak-to-peak).

- **Offset**. The amplitude (in VDC) offset with reference to zero-level amplitude.

8. Press the **Hop Data** menu button to program a sequence of frequency hops, as shown below.

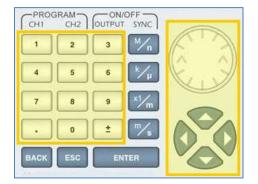Each row in the table includes the following parameters:

- **Line.** The index number of the hop.

- **Frequency.** The frequency of the hop.

- **Dwell Time.** The dwell time of the hop. The dwell times in the table will be used *only* if a variable dwell time is specified in the **Dwell Type** attribute (see step 7.

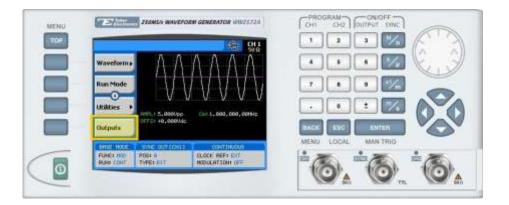The following operations can be performed on the table:

- **Edit Line.** To edit an existing row.

- **Insert Line.** To add a new row to the table.

- **Delete Line.** To delete an existing row from the table.

- **Load DEMO Table.** To restore the factory-set demo values to the table.

- **Delete Table.** To delete the entire table.

- **Apply Changes.** Applies all the changes made to the table.

9. When selecting a numeric attribute for modification, modify the displayed value either by using the dial or the cursor keys, or by entering the value using the numeric keypad. Press **ENTER** to save the modified parameter value.

10. Press the **TOP** menu button to return to the main menu.

11. Press the **Outputs** button to configure the output settings.

12. Define the channels in the **Outputs** section as being **ON** or **OFF**, modifying the settings using the dial or the cursor keys:

   - To scroll between the fields, use the cursor keys.

   - To edit a field, select the field, and press **ENTER. Use** the keypad to enter the chosen value.

   - To toggle between **ON** and **OFF**, select the field and press **ENTER**. Use the cursor keys to choose the selected option.

   - Press **ENTER** again to exit the edit mode, and save the value.

TIP

You can quickly modify the output settings by selecting **CH1** or **CH2** on the keypad, and toggling the **OUTPUT** key to turn the channel on or off.

For More Information

To learn more about Tabor's solutions or to schedule a demo, please contact your local Tabor representative or email your request to info@tabor.co.il. More information can be found at our website at www.taborelec.com

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