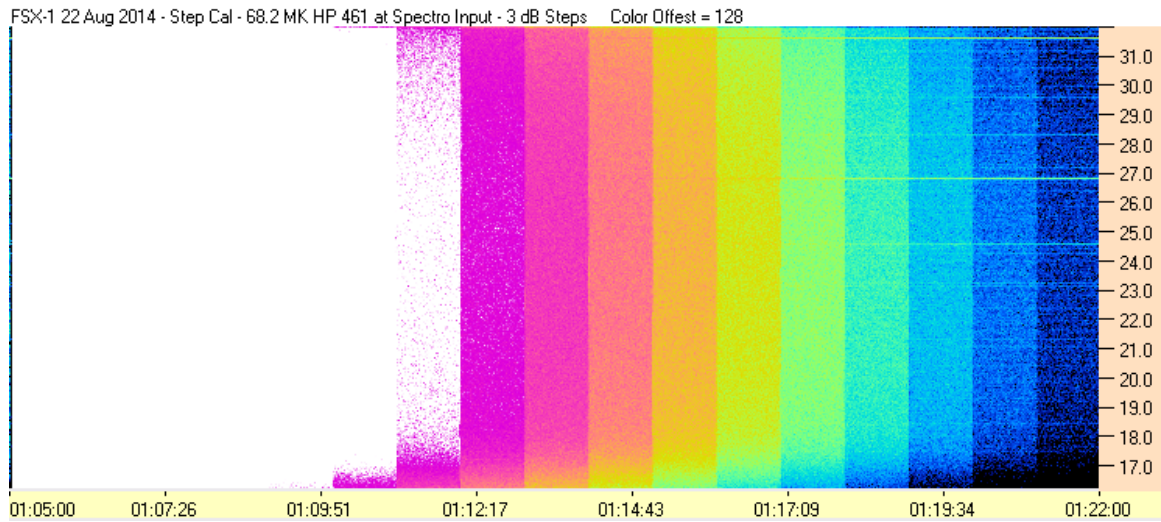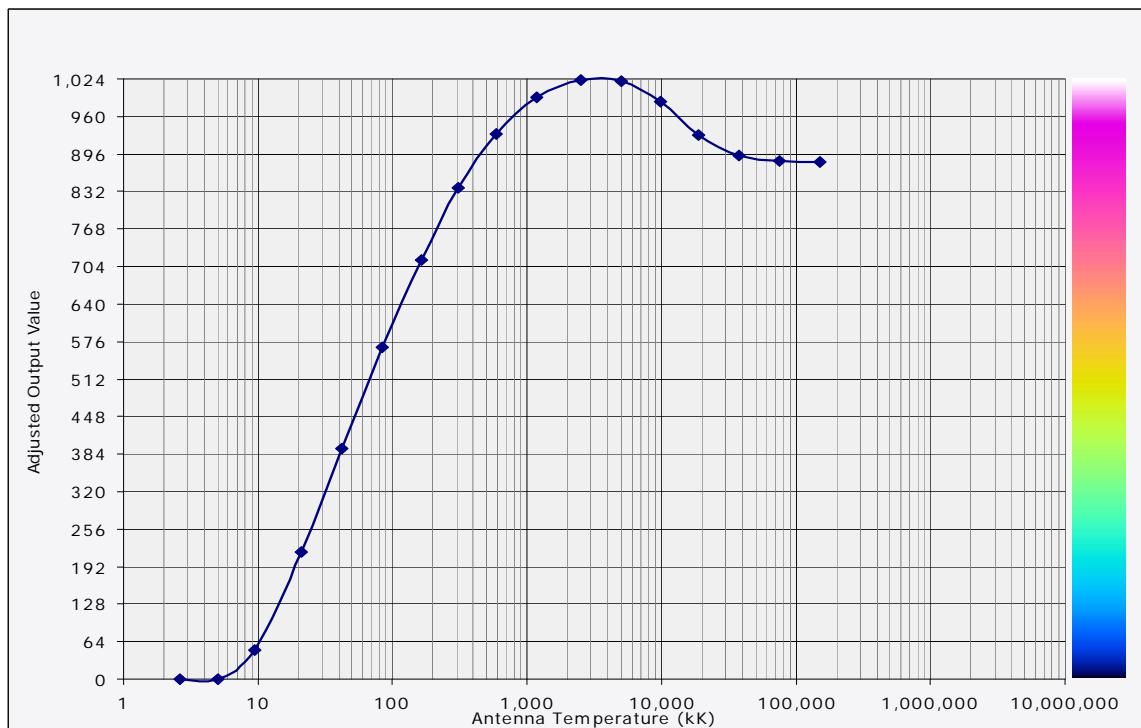# Non-Linear Multiply — How Does It Really Work?

Dave Typinski, October, 2014

Step cal viewed with non-linear multiply engaged, RSS v 2.2.25

Using the raw ADC output values from the SPS file, and processing with the equation shown in the RSS online help (shown on page 3), this is what the response should be. But it does not match what the spectrogram looks like.

RSS Color Menu Items

It will help to refer to Figure 1. The Color menu contains items which control the way in which RSS displays the data coming from a spectrograph or the data contained in a spectrograph data file (these have the file extension ".sps").

It should be noted that the settings associated with the Color menu do *not* affect the raw spectrograph data that is being or has been written to disk. The color settings only change the way the data is displayed. This way the same data can be displayed as many times as needed, each time with different color settings.

The first three items in the Color menu are mutually exclusive. That is, one and only one of the top three items can be selected.

Multiply – Enables the color gain slider control and multiplies the post-offset data value by the color gain setting.

Non-Linear Multiply – Disables the color gain slider and performs a multiplication on the post-offset data value as described in Fig 1.

No Multiplication – Disables the color gain slider and performs no multiplication on the post-offset data.

Load Color File – Opens a dialog box in which the user can specify the color mapping lookup table (in text file format) to be used to convert the post-offset, post-gain adjusted data value into a pixel color specified in RGB format.

Apply Fixed Color Offset – Allows the user to enter a value for the color offset. This offset is applied identically to all frequency channels. Same function as moving the color offset slider, or right-clicking on the color offset slider and entering a number in the pop-over box, then pressing the Enter key.

Reset Color Offset to Zero – resets the color offset to zero. Same function as moving the color offset slider all the way to the left, or right-clicking on the color offset slider and entering 0 in the pop-over box, then pressing the Enter key.
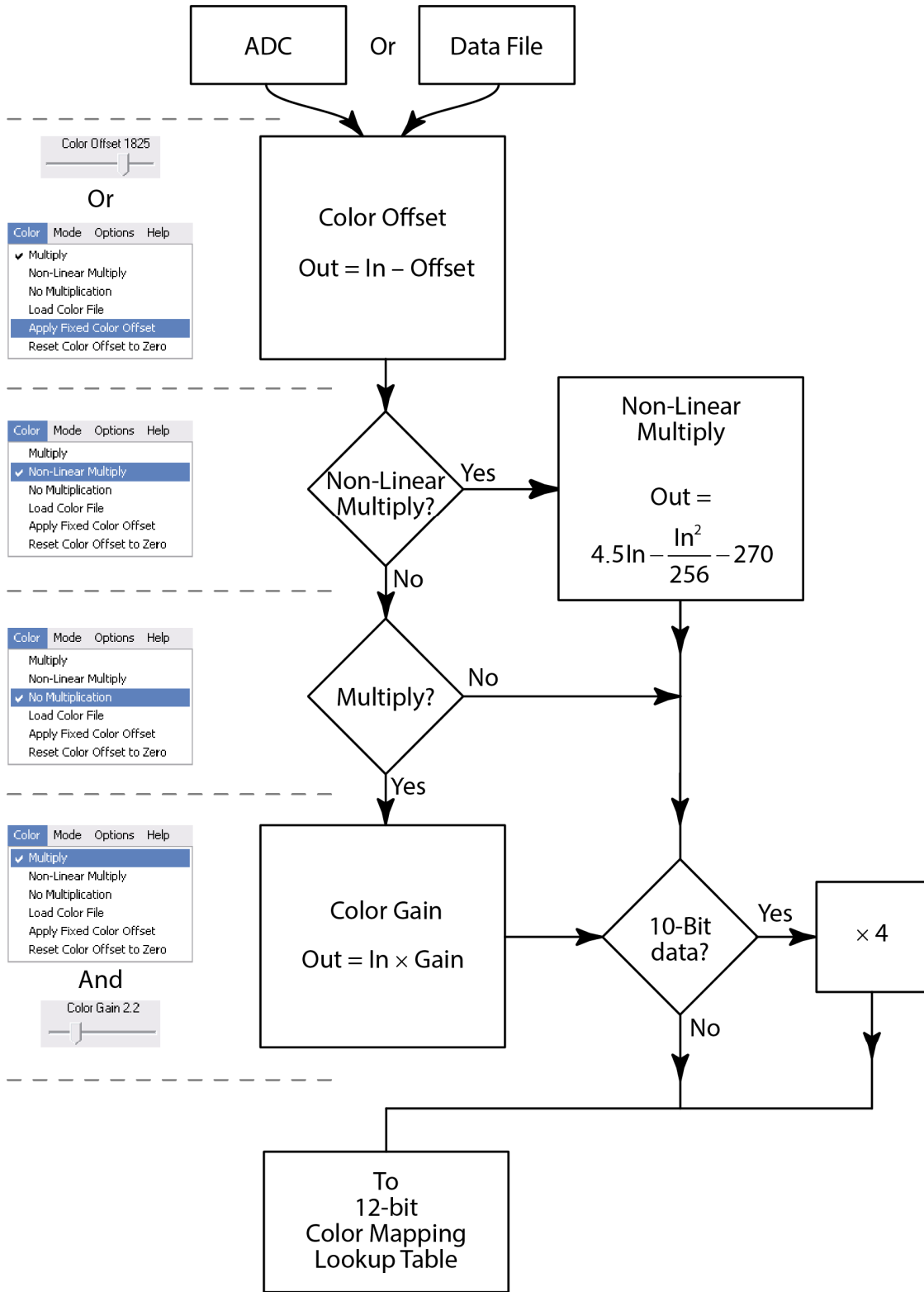
Figure 1 – RSS color offset and gain algorithm.