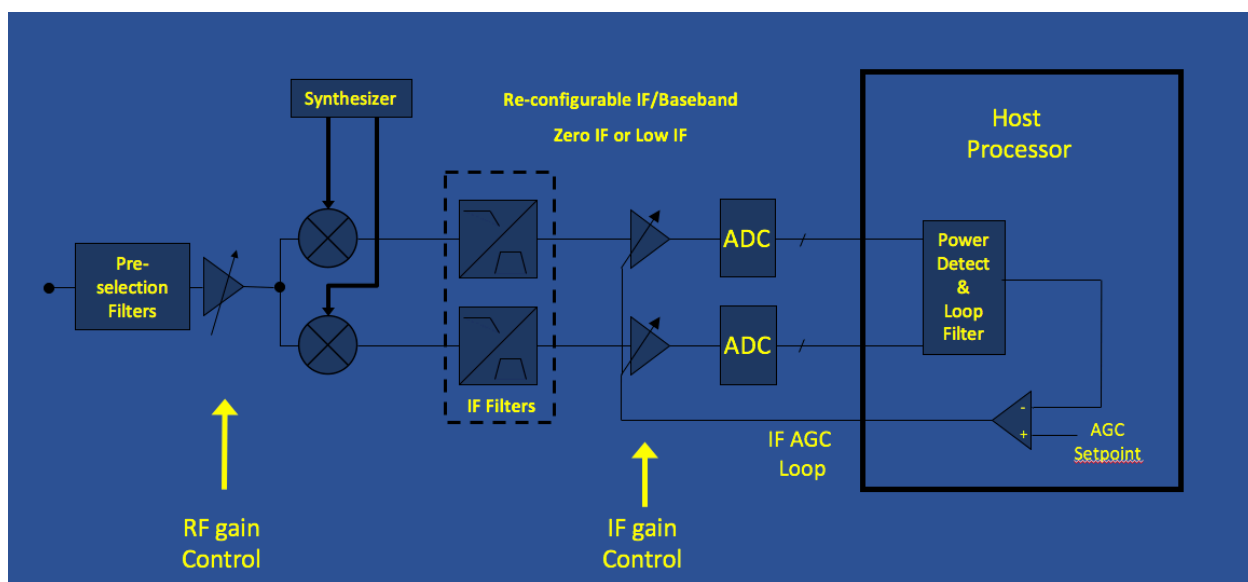


Gain and AGC Settings in SDRuno

This is a basic introduction to correct use of the Gain and AGC settings in SDRuno

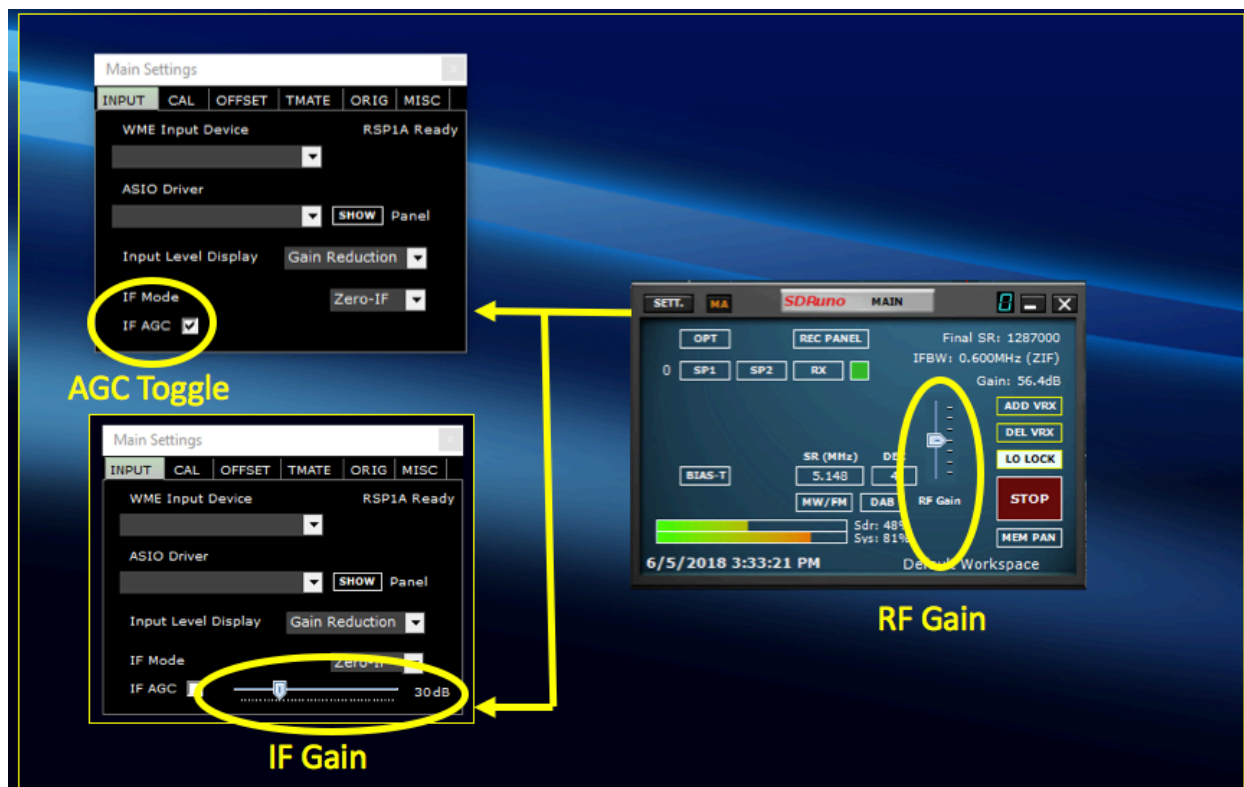
1. Simplified architectural diagram



- Signals from the antenna first pass through the preselection filters and then into the RF gain stage.
- Next signals pass into the downconverting mixer stage where they are converted to IF or baseband depending on whether the LowIF or ZeroIF mode is selected.
- These signals now pass through another gain stage, IF Gain and are amplified before going in to the Analog to Digital Converters (ADCs).
- The IF Gain can be controlled by an AGC loop which will optimize the level going into the ADC. A larger signal is desired but not so large as to cause distortion.

Note: This diagram applies to the RSP1a, RSP2, RSP2pro and RSPduo. The RSP1 does not have a variable RF gain stage, instead it has a fixed 20dB gain LNA which can be turned on or off.

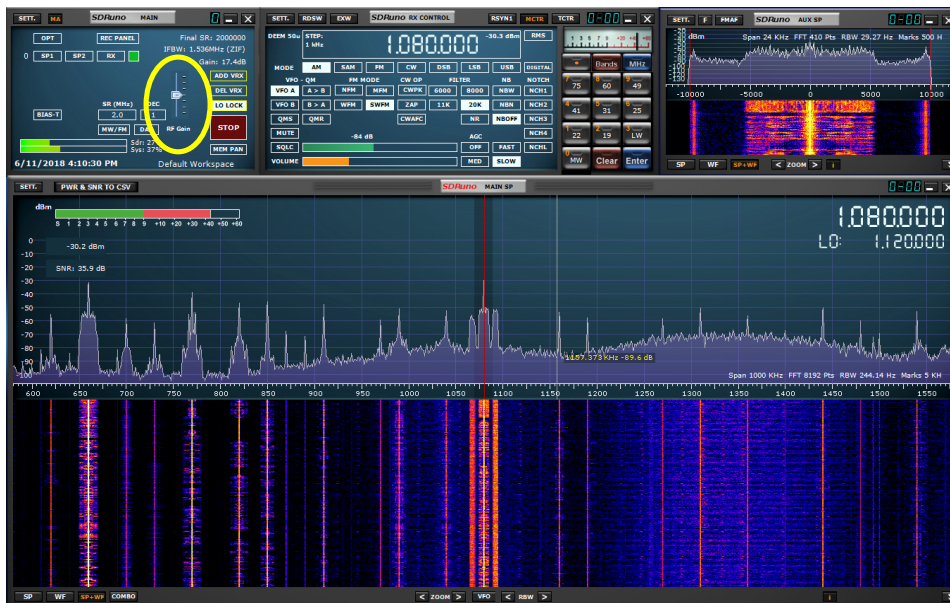
2. SDRuno Settings



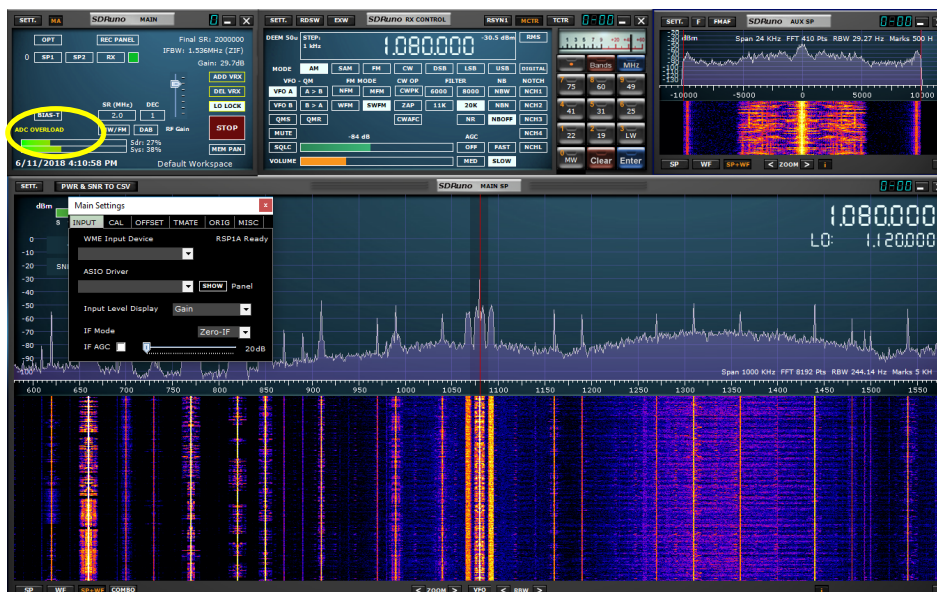
- The RF Gain slider is prominently displayed in the SDRuno Main Window (This slider can also be configured to display “Gain Reduction”, or in later versions of SDRuno, “Attenuation”)
- The IF Gain is controlled from the Main Settings window. By default the AGC is turned on as indicated by the checkbox.
- If the box is unchecked and IF Gain adjustment slider appears allowing manual control of the IF gain.
- The combined gain of both the RF- and IF-Gain stages can be seen in the Main window towards the upper right.

Note: When IF AGC is turned on the overall gain will not vary much with RF Gain adjustments as the IF gain will tend to compensate to maintain an optimum level to the ADC.

3. Using in practice



- Starting with the gain slider at midrange, the gain can be increased until the ADC overload warning appears in the Main window (the exact position may vary with the particular revision of SDRuno in use)



- You will notice that with the AGC turned off you can see that the IF gain is at its lowest setting but the ADC is still overloaded
- Simply reduce the gain until the ADC Overload indicator goes out.

4. Ham bands

- When we move to the ham bands there is generally less energy received at the antenna terminal so we can often increase the gain much higher before ADC Overload occurs. Feel free to increase the gain unless the ADC Overload warning returns, or you see signs of spurious signals in band.

5. Summary

- The RF Gain is the primary gain setting for the RSP. Since it affects a fairly broad bandwidth of signals, limited only by the pre-select filters, reducing the gain here can help eliminate strong interfering signals which may cause signal overload or spurious mixing products which appear in band.
- The IF gain is primarily used to optimize input signal levels to the ADCs.
- Although the IF gain can also be adjusted manually we recommend using the RF Gain slider and allow the AGC to optimize input signal levels to the ADCs.

Note: The AGC discussed here applies to IF Gain only. The audio AGC which is accessed from the RX Control window is completely separate, and operates the same way as the AGC circuit on a conventional rig.

6. Video

There is a video illustrating the concepts outlined in this application note on our YouTube channel:

<https://youtu.be/bGHwY8JWaGE>

For more information about SDRplay, the RSP family of receivers, other application notes, and further technical information please visit our website at www.sdrplay.com

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