

3DY4 Project - Custom Settings for Group 15

For audio processing (both mono and stereo) the four modes of operation are defined in terms of: the front-end (input) sample rate (RF Fs) used to acquire the raw I/Q samples from the RF dongle; the intermediate frequency sample rate (IF Fs) used at the input/output of the FM demodulator - note, the three processing paths (mono/stereo/RDS) receive data from the FM demodulator at the IF Fs; and the audio (output) sample rate (Audio Fs) used to output the audio samples from your SDR software into an audio player. In the project spec for your group 15 the following values apply to RF Fs, IF Fs and Audio Fs in the four different modes of operation.

Settings for group 15	Mode 0	Mode 1	Mode 2	Mode 3
RF Fs (Ksamples/sec)	2400	960	2400	1440
IF Fs (Ksamples/sec)	240	240	240	360
Audio Fs (Ksamples/sec)	48	48	44.1	44.1

As it can be implied from the above table, mode 0 has the same sample rate values as the ones used in lab 3. The combination of settings for modes 1, 2 and 3 is unique to your group 15. Hence, the values used by the descriptions for mode 1 from the project document need to be replaced with the values given in the above table.

The RDS processing path can be ignored when your SDR software is run in modes 1 and 3; in other words, when operating in modes 1 and 3 you can print a simple message that confirms that RDS is not supported in these two modes of operation when your SDR software should be focused exclusively on audio processing (both mono and stereo processing paths). However, in modes 0 and 2 your SDR software must support all the processing paths (mono, stereo and RDS). As it can be implied from the table above, in both modes 0 and 2 the IF Fs equals 240Ksamples/sec at the input of the RDS path. Since audio Fs will not be used by the RDS path, the custom settings for RDS for modes 0 and 2 involve changing the number of samples per symbol (SPS) to be used by the clock and data recovery module. The project spec for your group 15 will have to support the following two custom (and unique) values for SPS.

Settings for group 15	Mode 0	Mode 2
Samples per symbol (SPS)	19	42

Note, depending on the mode of operation, the RDS symbol rate (in terms of samples/sec) at the output of the rational resampler from the RDS demodulator (see Figure 11 from the project document) will be the SPS value from the above table multiplied by 2375.