



## QS1R VERB Application Note: AN080003

February 29, 2008

### Description of QS1RServer Configuration File

The QS1RServer is responsible for control of the QS1R VERB as well as the DSP functions for the radio instance. SDRMAXII communicates to the QS1RServer via UDP over a socket interface. The QS1RServer uses a configuration file called: **QS1RServer.xml**

This application note describes the format of the QS1RServer.xml file.

```
<?xml version="1.0" encoding="utf-8"?>
<ServerConfiguration xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <EncodeClockFrequency>1.25E+08</EncodeClockFrequency>
  <DDCDecimationFactor>650</DDCDecimationFactor>
  <DSPSampleRate>192307.7</DSPSampleRate>
  <AudioSampleRate>48000</AudioSampleRate>
  <DSPBlockSize>1024</DSPBlockSize>
  <AudioBlockSize>64</AudioBlockSize>
  <CP_PORT_NUMBER>55667</CP_PORT_NUMBER>
  <MP_PORT_NUMBER>55668</MP_PORT_NUMBER>
  <SP_PORT_NUMBER>55669</SP_PORT_NUMBER>
  <MeterUpdatesPerSecond>10</MeterUpdatesPerSecond>
  <SpectrumUpdatesPerSecond>15</SpectrumUpdatesPerSecond>
  <RingBufferSize>16384</RingBufferSize>
  <LoaderDelayMS>2000</LoaderDelayMS>
  <FirmwareFile>qs1r_rev_c_firmware_02032008.hex</FirmwareFile>
  <FPGAFile>qs1r_fpga_02032008_192.rbf</FPGAFile>
  <QS1RVID>65534</QS1RVID>
  <QS1RPID>8</QS1RPID>
  <QS1RPGASetting>true</QS1RPGASetting>
  <QS1RRandomSetting>true</QS1RRandomSetting>
  <QS1RDitherSetting>false</QS1RDitherSetting>
```

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```

<InitialFrequency>5000000</InitialFrequency>
<InitialMode>AM</InitialMode>
<InitialFilterHi>4000</InitialFilterHi>
<InitialFilterLo>-4000</InitialFilterLo>
<SMeterCorrection>-13</SMeterCorrection>
<PanadapterCorrection>-22</PanadapterCorrection>
<UseDefaultAudio>true</UseDefaultAudio>
<AudioHost>Windows DirectSound</AudioHost>
<AudioInDevice>???</AudioInDevice>
<AudioOutDevice>???</AudioOutDevice>
</ServerConfiguration>

```

The QS1RServer.xml file is a XML file that sets initial values for some of the QS1RServer configuration on startup.

The various sections are described below:

- <EncodeClockFrequency>**1.25E+08**</EncodeClockFrequency>

The value for this setting is in **bold** above. EncodeClockFrequency is the clock frequency in Hz of the LTC2208 clock. 1.25E+08 represents 125,000,000 Hz or 125 MHz. Normally you will not have to change this setting unless you change the encode clock frequency.

- <DDCDecimationFactor>**650**</DDCDecimationFactor>

This is the current decimation factor used in the FPGA DDC. Since the clock frequency is 125 MHz the output rate is  $125e6/650$  or ~192,307 Hz. Changing this number in the configuration file has no effect since the decimation factor is determined by the FPGA configuration file loaded. This is mainly for informational purposes and will be overwritten by the software if it is changed.

- <DSPSampleRate>**192307.7**</DSPSampleRate>

This is the actual sampling rate that the DSP is running at. Normally this setting is automatic and will be updated by the software.

- <AudioSampleRate>**48000**</AudioSampleRate>

This setting determines the sampling rate that the sound card runs at for audio output.

- <DSPBlockSize>**1024**</DSPBlockSize>

This setting determines the block size that the DSP processor uses. A larger block size increases latency while increasing frequency resolution.

- `<AudioBlockSize>64</AudioBlockSize>`

This is the block size used for audio output. A lower setting means lower latency.

- `<CP_PORT_NUMBER>55667</CP_PORT_NUMBER>`

This is the port number that the command channel uses. SDRMAXII sends commands to this port on the server.

- `<MP_PORT_NUMBER>55668</MP_PORT_NUMBER>`

This is the port number that the meter channel uses. SDRMAXII receives the S meter data on this port from the server.

- `<SP_PORT_NUMBER>55669</SP_PORT_NUMBER>`

This is the port number that the spectrum data channel uses. SDRMAXII receives the spectrum data on this port from the server.

- `<MeterUpdatesPerSecond>10</MeterUpdatesPerSecond>`

This setting determines the update rate in updates per second for the S meter data. The S meter in SDRMAXII updates at this rate.

- `<SpectrumUpdatesPerSecond>15</SpectrumUpdatesPerSecond>`

This setting determines the update rate in updates per second for the spectrum data. The Panoramic Display in SDRMAXII updates at this rate.

- `<RingBufferSize>16384</RingBufferSize>`

This is the size in bytes of the resampler ring buffer. The data from the DSP process is downsampled to the set audio rate (usually 48 kHz) and stored in the ring buffer for audio output.

- `<LoaderDelayMS>2000</LoaderDelayMS>`

This setting sets the delay in milliseconds between the firmware load of QS1R and the beginning of the FPGA load. This allows the QS1R to renumerate on the USB bus after the

firmware restarts and allows the microprocessor to properly load the FPGA configuration file.

- `<FirmwareFile>qs1r_rev firmware_02032008.hex</FirmwareFile>`

This is the name of the firmware file that gets loaded into the QS1R FX2 microprocessor. This file resides in the same folder as the QS1RServer.exe application.

- `<FPGAFile>qs1r_fpga_02032008_192.rbf</FPGAFile>`

This is the default FPGA configuration file that gets loaded when the QS1RServer starts. This file resides in the same folder as the QS1RServer.exe application.

- `<QS1RVID>65534</QS1RVID>`

This is the VID of the QS1R board. In hex it is 0xFFFe.

- `<QS1RPID>8</QS1RPID>`

This is the PID of the QS1R board. In hex it is 0x8

- `<QS1RPGASetting>true</QS1RPGASetting>`

This setting determines whether the PGA in the LTC2208 ADC is turned on or not at QS1RServer startup.

- `<QS1RRandomSetting>true</QS1RRandomSetting>`

This setting determines whether the randomizer in the LTC2208 is enabled on start up of the QS1RServer.

- `<QS1RDitherSetting>>false</QS1RDitherSetting>`

This setting determines whether the dither feature of the LTC2208 ADC is enabled on start up of the QS1RServer.

- `<InitialFrequency>5000000</InitialFrequency>`

This is the initial frequency in Hz that the QS1RServer sets the QS1R VERB to on start up.

- `<InitialMode>AM</InitialMode>`

This determines the initial mode that the QS1RServer starts up in.

- `<InitialFilterHi>4000</InitialFilterHi>`

This sets the initial high frequency of the filter when QS1RServer starts up.

- `<InitialFilterLo>-4000</InitialFilterLo>`

This sets the initial low frequency of the filter when the QS1RServer starts up.

- `<SMeterCorrection>-13</SMeterCorrection>`

This is the correction factor in dB applied to the S meter reading.

- `<PanadapterCorrection>-22</PanadapterCorrection>`

This is the correction factor in dB applied to the Panoramic Display scale.

- `<UseDefaultAudio>true</UseDefaultAudio>`

Setting this value to true causes QS1RServer to use the default audio configuration on your PC. This will cause QS1RServer to use the highest latency setting and is not optimal. It does allow the QS1RServer to start up and work without having to know exactly what sound hardware is installed on your system.

- `<AudioHost>Windows DirectSound</AudioHost>`

If UseDefaultAudio is set to false, the server will use the specified audio host for audio output.

- `<AudioInDevice>???`

This is the name of the audio input device to use on your system. It is only used when UseDefaultAudio is set to false and the host in the AudioHost setting is found and is valid.

- `<AudioOutDevice>???`

This is the name of the audio output device to use on your system. It is only used when UseDefaultAudio is set to false and the host in the AudioHost setting is found and is valid.

*See application note AN08xxxx for information on how to determine the proper audio host, audio in device, and audio out device for your system for the lowest latency.*