qIQ Tools File Formats
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This note describes some of the file formats that can be used with qIQ Tools applications.

All of the binary data in the files are written or read in little endian format.

iqbin

The iqbin file format is a simple binary format developed by QIQ Systems.

Here are a few lines from the C++ code that handles iqbin files.

```
typedefstruct
{
	int version;
	intnum_points;
	doublesample_rate;
	doublestart_time;
	doublecenter_freq;
} HeaderV1;

#defineHEADER_EXTRA_V2_SIZE 1024
```

All iqbin files start with a HeaderV1. If the version number is 1, then all the file has, is a HeaderV1 at the start. If the version number is 2, then there is a 1024 Byte buffer after the HeaderV1. We use that to store metadata about the contents of the file. We do not document the details of that metadata, so that it can change over time.

The num_points in the header is the number of complex samples in the data. The sample rate of the data is in the sample_rate field. The start_time is normally 0.0, but this can be used as an offset to the data. The start_time units are seconds. The center frequency of the IQ data is center_freq. The units for center_freq are Hz.

If you are creating an iqbin file with version 2, just set the contents of the 1kB buffer to all 0's. Or, you can create a version 1, and not worry about the buffer.

qIQ Tools applications currently saveiqbin files as version 2, so the data starts after the HeaderV1 and the 1 kB buffer. The data is interleaved I and Q as float32's. The units for I and Q are volts into 50 Ohms.

iqtxt

The iqtxt file format is a simple text format developed by QIQ Systems.

Here is the beginning of an iqtxt file

```
IQTxt v1
NumSamples      10000
SampleRate 40000000.000
CenterFreq 0.000
3.241661e-01 3.105271e-01
3.275839e-01 2.409543e-01
3.005354e-01 1.129532e-01
…
```

At present all iqtxt file are v1, there is no v2 or higher. The header contains a file version identifier, the number of complex samples, the sample rate, and the center frequency of the IQ data. The data is two columns, the first is I and the second is Q. The units are volts into 50 Ohms.

mat

qIQ Tools applications can create Matlab files. At present, reading of mat files is not supported.

The output mat file has three items in it. The SampleRate variable contains the sample rate of the data. The NumSamples variable contains the number of complex samples. The IQData array contains the I and Q data. The units for I and Q are volts into 50 Ohms.

siqd

The siq data format is a Tektronix format. It consists of two files, an siqh header file, and an siqd data file. Documentation of this file format is available from Tektronix.

wvd

The wv data format is a Rohde&Schwarz format. It consists of two files, a wvh header file, and a wvd data file. Documentation of this file format is available from Rohde&Schwarz.

cfirtxt

The cfirtxt file format is a text format developed by QIQ Systems for storing real and complex FIR filter coefficients.

Here is the beginning of a cfirtxt file

```
CFIRTxt v1
NumTaps 33
Format rlimflt
0.000030 -0.000033
-0.000104 -0.000100
0.000228 0.000496
-0.000091 -0.000346
…
```

At present all cfirtxt file are v1, there is no v2 or higher. The header contains a file version identifier, the number of tap coefficients, and the format of the coefficients. The format is described in the table below. The data is in either one or two columns. The first column is the real value, and the second column,if present, is the imaginary value.

Format string	Complex or Real	float or 16-bit integer
rlimflt	Complex	float
realflt	Real	float
rlimint16	Complex	16-bit integer
realint16	Real	16-bit integer