Surround Master Involve Proper - QS Decode? Part 2

Four Channel Continuous Sinusoidal Signals Decode Test

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Equipment/Software:

- Audacity 2.0.3 (Digital Audio Editor Program)
- ACER "Aspire 5741G" (laptop computer)
- Wavetek "5 MHz Sweep Generator", Model 184
- Troneer "Audio Generator", TAG-101
- Pioneer "Compact Disc Player", PD – S705

Testing Method: Each of the four Surround Master Encoder input channels was given a continuous sinusoidal signal of 1 V RMS in amplitude and individually inputted to each channel. The signal frequencies were over a 200 Hz to 5 kHz range and allocated to channels as follows:

Table 1 Surround Master Encoder Channel Frequency Allocation.

Channel:	Signal Frequency (Hz)
Front Left	200
Front Right	1500
Rear Left	5000
Rear Right	600

The signal from each of the four output channels of Surround Master and Sansui QSD-1 decoders was the analysed individually via Fourier Transform using the Audacity 2.0.3 digital audio editor/analyser software package to produce the frequency spectrums shown in the results section.

Note: as in previous tests only the left front & rear output channels of the Sansui QSD-1 decoder could be tested due to faults in the right front & rear output channels.

Following these tests the direct output of the signal generators was measured and analysed in the same manner in order to distinguish between any visible distortion/noise due to the signal generators themselves from any distortion produced by the encoder and decoder units.

Results:

Surround Master Front Left Output

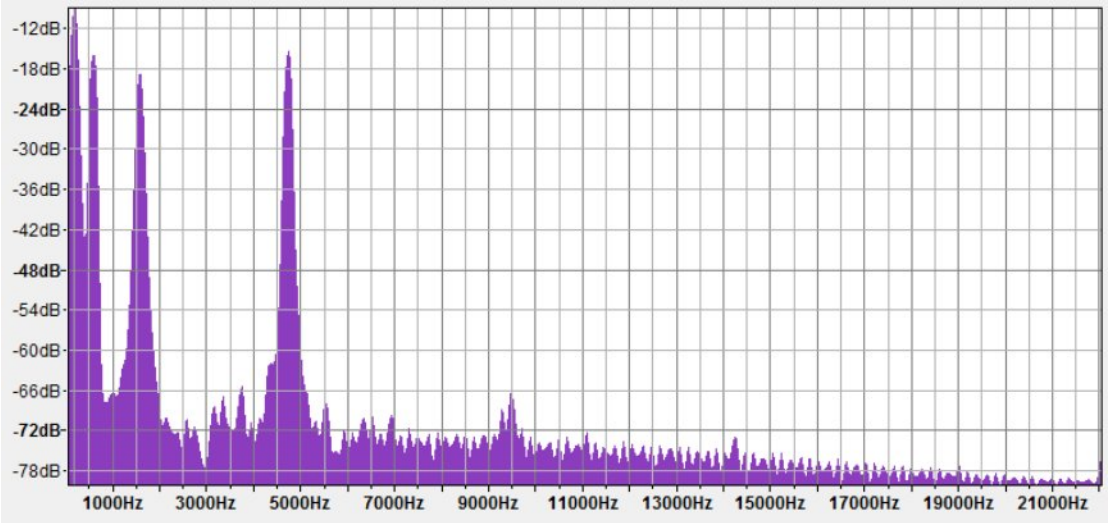

Figure 1 Surround Master Front Left output, input channel frequencies: front left is 200 Hz, front right is 1.5 kHz, rear left is 5 kHz & rear right 600 kHz. All input amplitudes at 1 V RMS. Peaks: 204 Hz = -8.7 dB, 621 Hz = - 16 dB, 1593 Hz = -18 dB & 4760 Hz = -15.4 dB.

Table 2 Surround Master Front Left output.

Channel:	Frequency (Hz)	Amplitude (dB)	Output Amplitude Separation (dB)
FL	204	-8.7	0
FR	1593	-18	9.3
RL	4760	-15.4	6.7
RR	621	-16	7.3

Surround Master Front Right Output

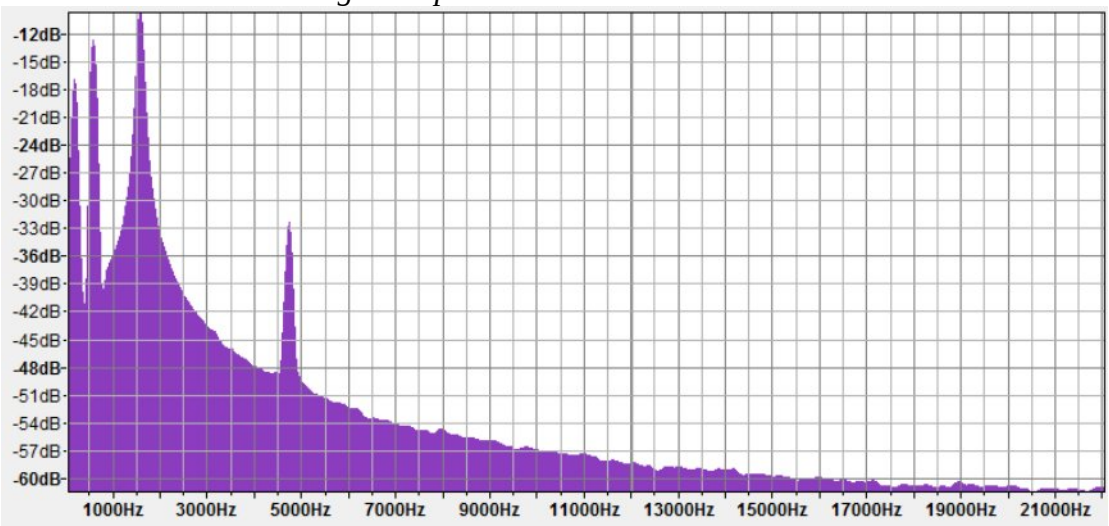

Figure 2 Surround Master Front Right output, input channel frequencies: front left is 200 Hz, front right is 1.5 kHz, rear left is 5 kHz & rear right 600 kHz. All input amplitudes at 1 V RMS. Peaks: 202 Hz = -16.9 dB, 601 Hz = - 12.8 dB, 1592 Hz = -8.6 dB & 4748 Hz = -32.2 dB.

Table 3 Surround Master Front Right output.

Channel:	Frequency (Hz)	Amplitude (dB)	Output Amplitude Separation (dB)
FL	202	-16.9	8.3
FR	1592	-8.6	0
RL	4748	-32.2	23.6
RR	601	-12.8	4.2

Surround Master Rear Left Output

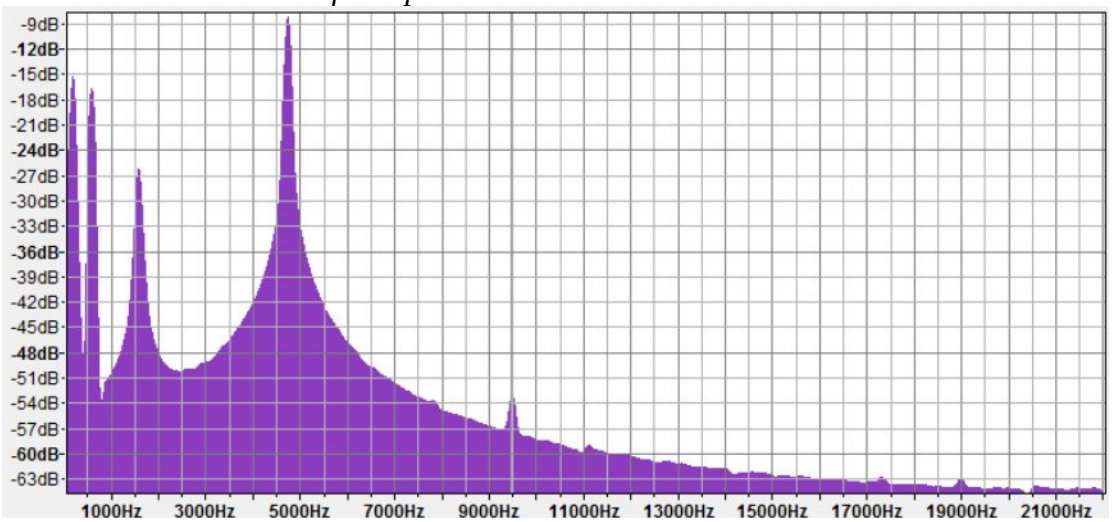

Figure 3 Surround Master Rear Left output, input channel frequencies: front left is 200 Hz, front right is 1.5 kHz, rear left is 5 kHz & rear right 600 kHz. All input amplitudes at 1 V RMS. Peaks: 204 Hz = -15.2 dB, 611 Hz = - 16.9 dB, 1592 Hz = -25.5 dB & 4752 Hz = -8.2 dB.

Table 4 Surround Master Rear Left output.

Channel:	Frequency (Hz)	Amplitude (dB)	Output Amplitude Separation (%)
FL	204	-15.2	7
FR	1592	-25.5	17.3
RL	4752	-8.2	0
RR	611	-16.9	8.7

Surround Master Rear Right Output

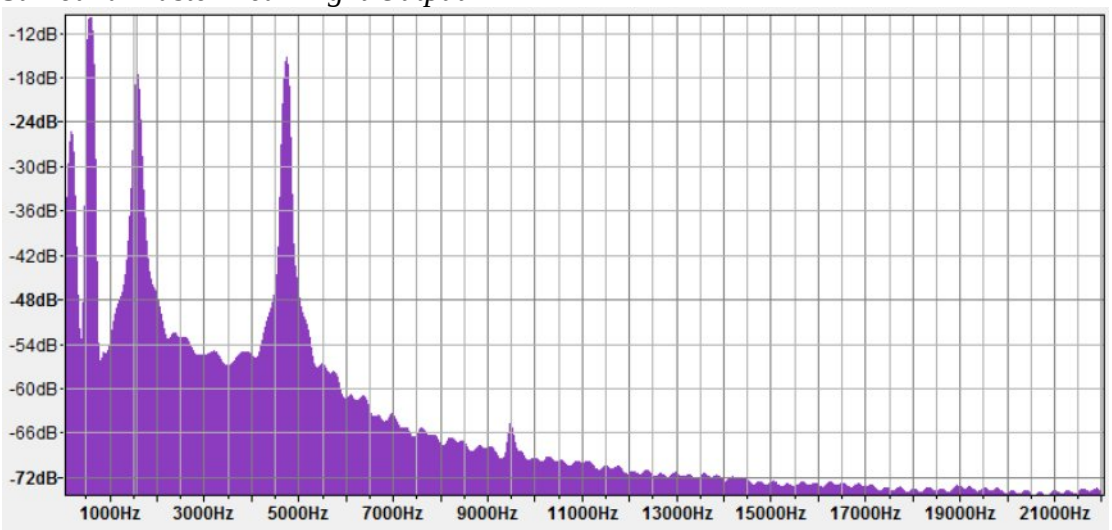

Figure 4 Surround Master Rear Right output, input channel frequencies: front left is 200 Hz, front right is 1.5 kHz, rear left is 5 kHz & rear right 600 kHz. All input amplitudes at 1 V RMS. Peaks: 204 Hz = -25.3 dB, 619 Hz = - 10 dB, 1592 Hz = -16.3 dB & 4757 Hz = -15.3 dB.

Table 5 Surround Master Rear Right output.

Channel:	Frequency (Hz)	Amplitude (dB)	Output Amplitude Separation (%)
FL	204	-25.3	15.3
FR	1592	-16.3	6.3
RL	4757	-15.3	5.3
RR	619	-10	0

Sansui QSD-1 Front Left Output

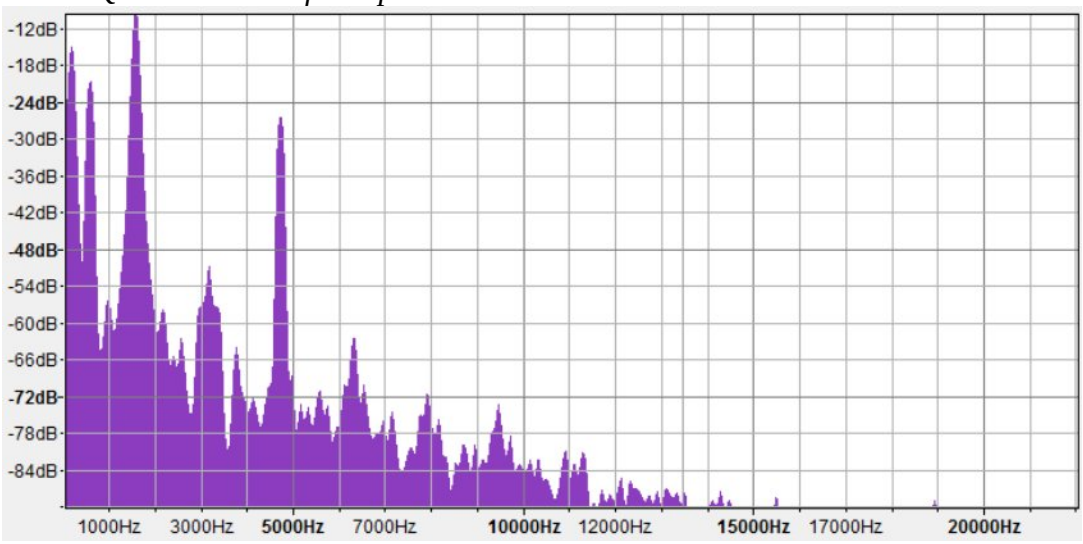

Figure 5 Sansui QSD-1 Front Left output, input channel frequencies: front left is 200 Hz, front right is 1.5 kHz, rear left is 5 kHz & rear right 600 kHz. All input amplitudes at 1 V RMS. Peaks: 204 Hz = -15 dB, 616 Hz = - 20.8 dB, 1593 Hz = -8.7 dB & 4754 Hz = -26.6 dB.

Table 6 Sansui QSD-1 Front Left output.

Channel:	Frequency (Hz)	Amplitude (dB)	Output Amplitude Separation (dB)
FL	204	-15	0
FR	1593	-8.7	-6.3
RL	4754	-26.6	11.6
RR	616	-20.8	5.8

Sansui QSD-1 Front Left Output

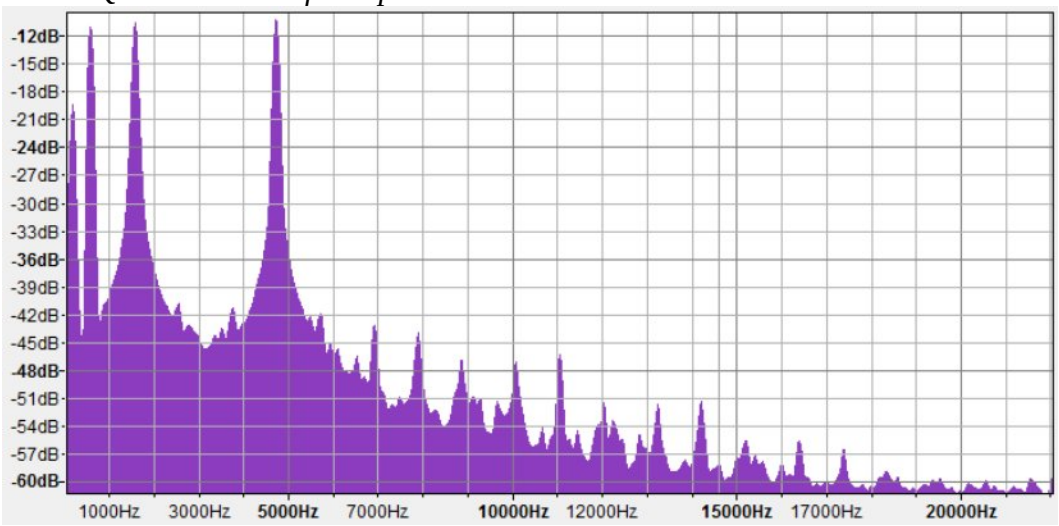

Figure 6 Sansui QSD-1 Rear Left output, input channel frequencies: front left is 200 Hz, front right is 1.5 kHz, rear left is 5 kHz & rear right 600 kHz. All input amplitudes at 1 V RMS. Peaks: 203 Hz = -19.4 dB, 606 Hz = - 11.2 dB, 1593 Hz = -10.6 dB & 4735 Hz = -10.1 dB.

Table 7 Sansui QSD-1 Rear Left output.

Channel:	Frequency (Hz)	Amplitude (dB)	Output Amplitude Separation (dB)
FL	203	-19.4	9.3
FR	1593	-10.6	0.5
RL	4735	-10.1	0
RR	606	-11.2	1.1

1.5 kHz Signal Generator Distortion

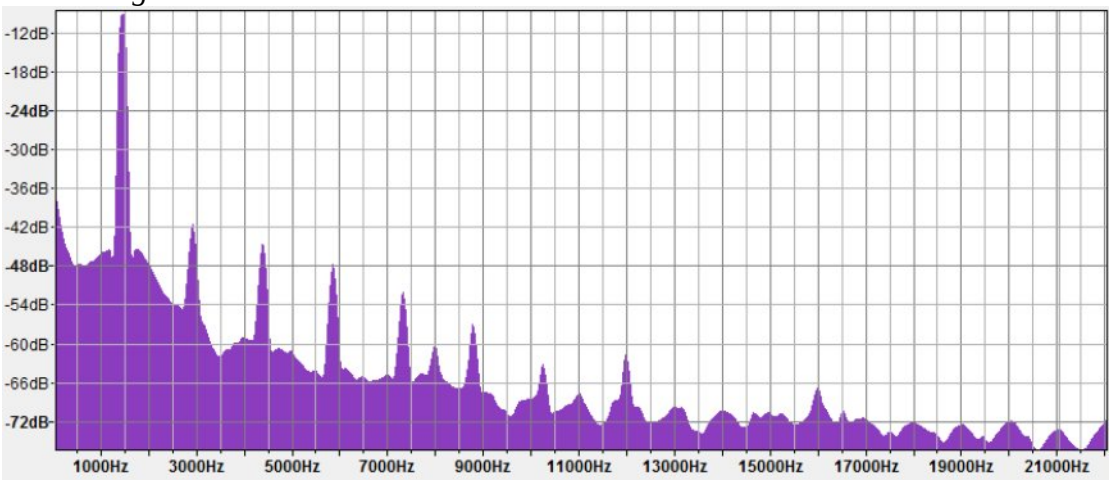

Figure 7 1.5 kHz signal generator distortion. Peaks: 1480 Hz = -9 dB, 2924 Hz = -41.4 dB, 4393 Hz = -44.3 dB, 5861 Hz = -47.7 dB, 7324 Hz = -51.7 dB, 8788 Hz = -56.8 dB, 10246 Hz = -62.8 dB & 11992 Hz = -61.5 dB.

5 kHz Signal Generator Distortion

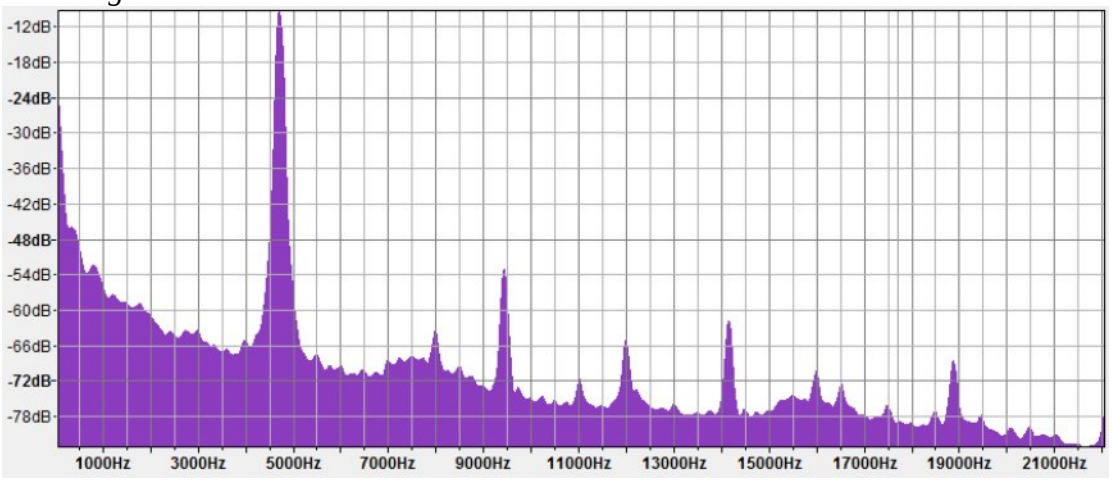

Figure 8 5 kHz signal generator distortion. Peaks: 4726 Hz = -9.8 dB, 9457 Hz = -54.1 dB, 11993 Hz = -64.9 dB, 14166 Hz = -61.5 dB.

Results Summary

Table 8 averages of the amplitude separation between the appropriate frequency and other channels frequencies for all output channels of both Surround Master and Sansui QSD-1 decoders. Average Surround Master Separation is 10 dB and average Sansui QSD-1 separation is 3.7 dB.

Decoder:	Output Channel:	Average Amplitude Separation (dB)
Surround Master	FL	7.8
Surround Master	FR	12
Surround Master	RL	11
Surround Master	RR	9
Sansui QSD-1	FL	3.7
Sansui QSD-2	FR	FAULTY
Sansui QSD-3	RL	3.6
Sansui QSD-4	RR	FAULTY

Personal Interpretation of Results: From the test results it is clear that the Surround Master Decoder unit provides far more separation of the appropriate frequency for the channel than the Sansui QSD-1 Decoder. Also the Surround master was more reliable at determining which frequency to separate as the appropriate one for the channel where as the Sansui QSD-1 did not. Identifying the wrong frequency as being appropriate (and then boosted it 6.3 dB above the appropriate frequency's amplitude) for the front left channel and failing to separate frequencies by a significant amount for the rear light channel (only separating inappropriate frequencies from the correct one by 0.5 & 1.1 dB).

However two output channels of the Sansui QSD-1 Decoder are faulty meaning that the average frequency separation of the Sansui unit could only be derived from the average of two channels where as the Surround Master average was derived from four. So the final comparison of average amplitude separation was not entirely fair but regardless of this it is clear that the Surround Master Decoder unit provides significantly more amplitude separation for continuous sinusoidal signals.