Research & Performance Testing

Davy Avenue, Knowlhill, Milton Keynes, MK5 8NL
Tel: +44 (0) 1908 857777
Email: sales-rpt@intertek.com

TECHNICAL REPORT

CLIENT: Jim Martin
Labs Editor
Dennis Publishing Limited
30 Cleveland Street
London
W1T 4JD

AUTHORISED FOR ISSUE: ..... Vanessa Lelliott
Electronic Products Manager

DATE: March 2005

REPORT AUTHOR: Natalie Pickering

62706 Issue 1

PC Pro - Noise Testing and Power Measurements of PCs

1.0 Summary

Intertek Research and Performance Testing were asked to carry out noise testing for PC Pro on eleven samples of PC. Power measurements of the PCs were also taken.

Overall, the following observations have been made:

- The loudest PC at any instant was the Holly SFA2S which measured 47.1dBA from the front, while spinning a DVD
- The loudest PC overall was the Mesh Matrix Prestige Pro which measured between 42.5dBA and 45dBA
- The quietest PC in this group was the Watford Aries Performa 9220 in all cases, which measured between 27.6 and 32dBA. This would only be audible if you were close to it.
- The PC which consumed the most power whilst idle was the Mesh Matrix Prestige Pro, measured to be 133W.
- The Watford Aries Performa 9220 and the B-Tech Chimp 530J consumed the least power whilst idle, which was measured to be 87W.

2.0 Introduction

Sound pressure levels for eleven samples of PC were measured to see how they compared. The PCs were measured both from the front and from the side. The power consumption of the PCs was measured whilst in three different states.

3.0 Measurement Method

3.1 Sound Pressure Measurements

The measurements were carried out in the laboratory's listening room, designed according to IEC standard (268-13). This room had a low background noise and represented a domestic listening environment.

The sound levels were measured using the 01dB Symphonie sound measurement system. This was used with a ½ " Bruel and Kjaer microphone and pre-amp, where the microphone was positioned at 0.5m from the edge of the device under test. The microphone was placed at this distance, as it represented how far away the user would typically be from the machine. The system was calibrated before use.

The sample under test was placed on a table, with a reflecting surface behind. The reflecting surface caused noises that were emitted from the rear of the device to be reflected back again in a random manner. This simulated the PC being positioned close to a wall and meant that the PC only needed to be measured from the front and the side, rather than all four sides of the device.

The recorded measurements were averaged over 10 seconds between the frequencies of 80Hz to 20kHz.

3.2 Power Consumption

The power consumption of the PCs was also recorded. The measurements were made in three different states:

- 'HARD OFF' - with the switch at the back of the PC power supply switched off
- 'SOFT OFF' - when the PC has been shut down
- 'SOFT OFF AVE. 60 SECONDS' - fluctuating result so an average reading over 60 seconds has been taken
- 'ON IDLE' - with windows fully loaded, no other programs running

4.0 Results

4.1 Sound Pressure Measurements

The results are given in dBA, which means that the A-weighting correction has been applied to the measurement. The A-weighting is designed to simulate the response of the human ear, so gives a more meaningful result in terms of perceived loudness.

The Background Noise was measured three times during the measurement period. The results are given in the table below.

BGN (dBA)	26.7
	26.9
	26.8
Average	**26.8**

The average background noise level has been used to calculate the correction factors for all the measured results. A correction factor needs to be applied when the measured noise is within 10dB of the background noise level. This correction factor attempts to remove the effects that the background noise has on the result. The results are shown in the following table.

Table 4.1.1 £399 PCs

			Overall Measured Level (dBA)	Corrected level due to BGN (dBA)
B-Tech Chimp 530J	Front	idle	32.4	**30.9**
		DVD	38.6	**38.6**
	Side	idle	33.2	**32.0**
		DVD	40.9	**40.9**
PC Nextday Zoostorm P3.0GHz Versatile PC	Front	idle	35.6	**35.0**
		DVD	37.8	**37.8**
	Side	idle	36.5	**36.0**
		DVD	38.5	**38.5**
Watford Aries Performa 9220	Front	idle	30.3	**27.7**
		DVD	33.2	**32.0**
	Side	idle	30.3	**27.6**
		DVD	31.1	**29.0**

Table 4.1.2 £699 PCs

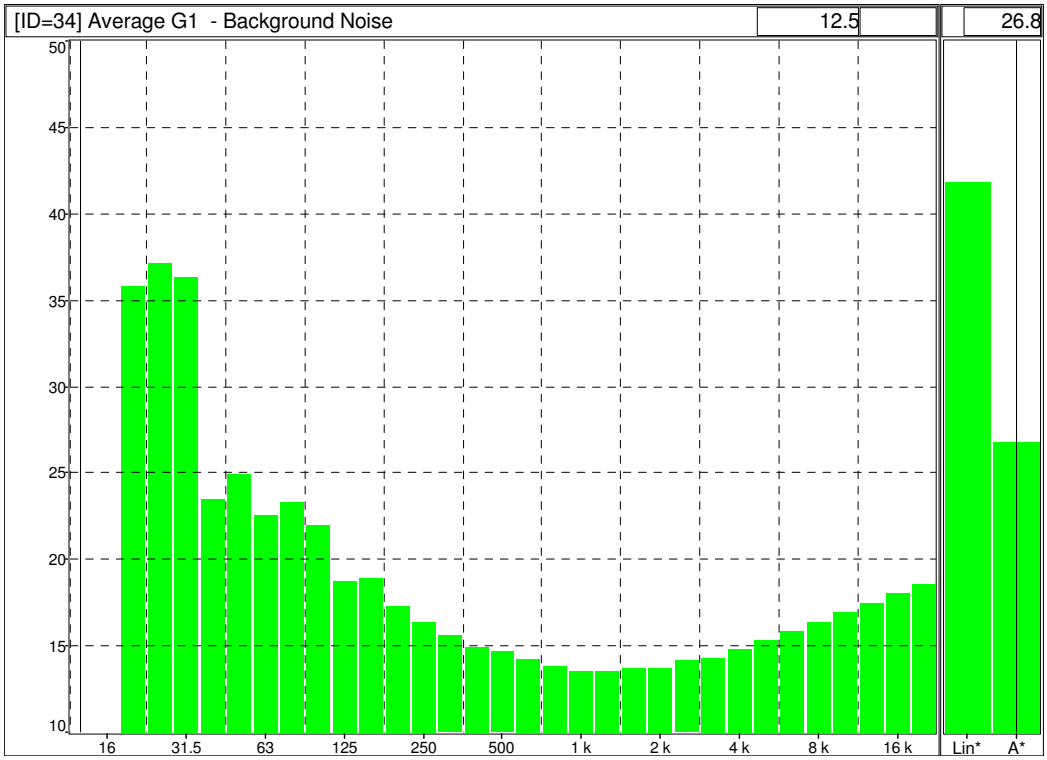
			Overall Measured Level (dBA)	Corrected level due to BGN (dBA)
Aria ZPC 3100 Pro	Front	idle	38.3	**38.3**
	Side	idle	44.3	**44.3**
Evesham Axis SB	Front	idle	44.1	**44.1**
		DVD-ROM	44.2	**44.2**
		DVD-RW	44.2	**44.2**
	Side	idle	42.6	**42.6**
		DVD-ROM	41.5	**41.5**
		DVD-RW	41.7	**41.7**
Holly SFA2S	Front	idle	41.4	**41.4**
		DVD	47.1	**47.1**
	Side	idle	38.4	**38.4**
		DVD	42.4	**42.4**
Packard Bell iMedia 601 CTX	Front	idle	35.5	**34.9**
		DVD-ROM	35	**34.2**
		DVD-RW	38.7	**38.7**
	Side	idle	32.5	**31.0**
		DVD-ROM	33.9	**32.9**
		DVD-RW	35.7	**35.1**

Table 4.1.3 £999 PCs

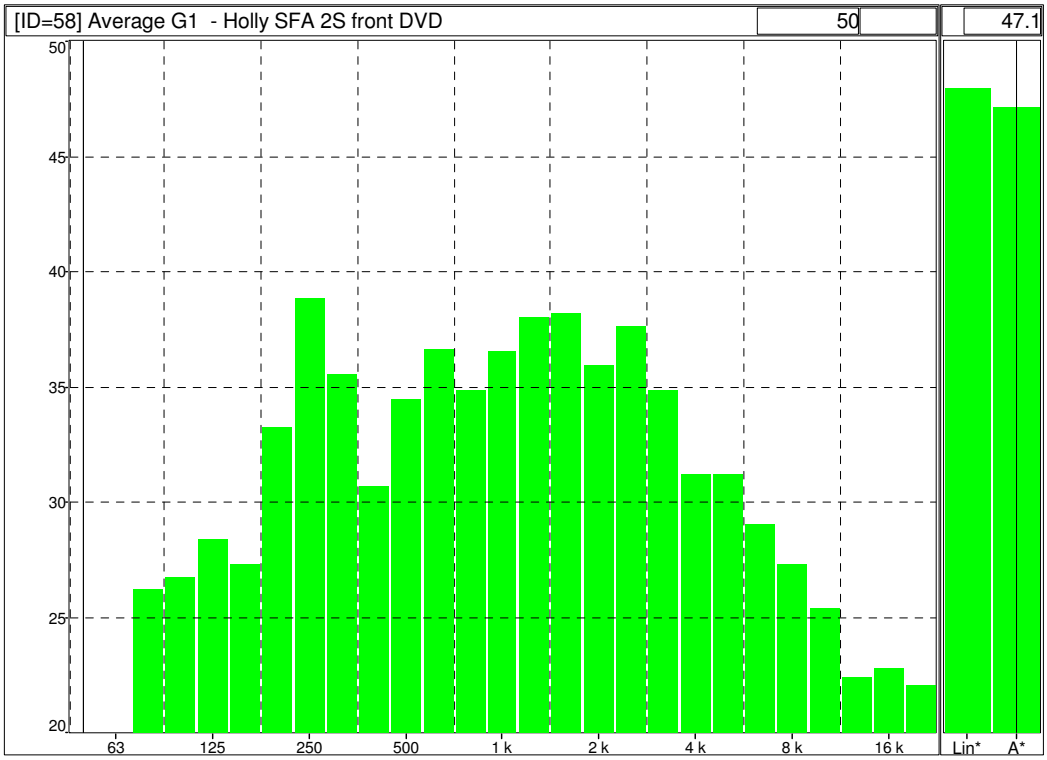
			Overall Measured Level (dBA)	Corrected level due to BGN (dBA)
Mesh Matrix Prestige Pro	Front	idle	43.6	**43.6**
		DVD-ROM	43.6	**43.6**
		DVD-RW	45	**45**
	Side	idle	43.6	**43.6**
		DVD-ROM	42.5	**42.5**
		DVD-RW	43.5	**43.5**
NEC PowerMate i-Select D3410	Front	idle	43.6	**43.6**
		DVD-ROM	41.2	**41.2**
		DVD-RW	43.9	**43.9**
	Side	idle	43.6	**43.6**
		DVD-ROM	37.9	**37.9**
		DVD-RW	41.1	**41.1**
NetHighStreet Net Pro SLI 999	Front	idle	36.8	**36.8**
		idle, fan disconnected	37	**37.0**
		DVD-ROM	41.2	**41.2**
		DVD-RW	43.9	**43.9**
	Side	idle	34.9	**34.1**
		idle, fan disconnected	35.1	**34.4**
		DVD-ROM	37.9	**37.9**
		DVD-RW	41.1	**41.1**
Scan 3XS AMD SLI Special	Front	idle	38.9	**38.9**
		DVD	41.9	**41.9**
	Side	idle	38.9	**38.9**
		DVD	38.5	**38.5**

The following graphs show the frequency content of the measured background noise, the loudest laptop, and the loudest and quietest hard disks. The graph of the background noise is very useful when comparing with the graphs of sample measurements as it indicates which frequencies are due to the sample noise and which were already present due to the background noise.

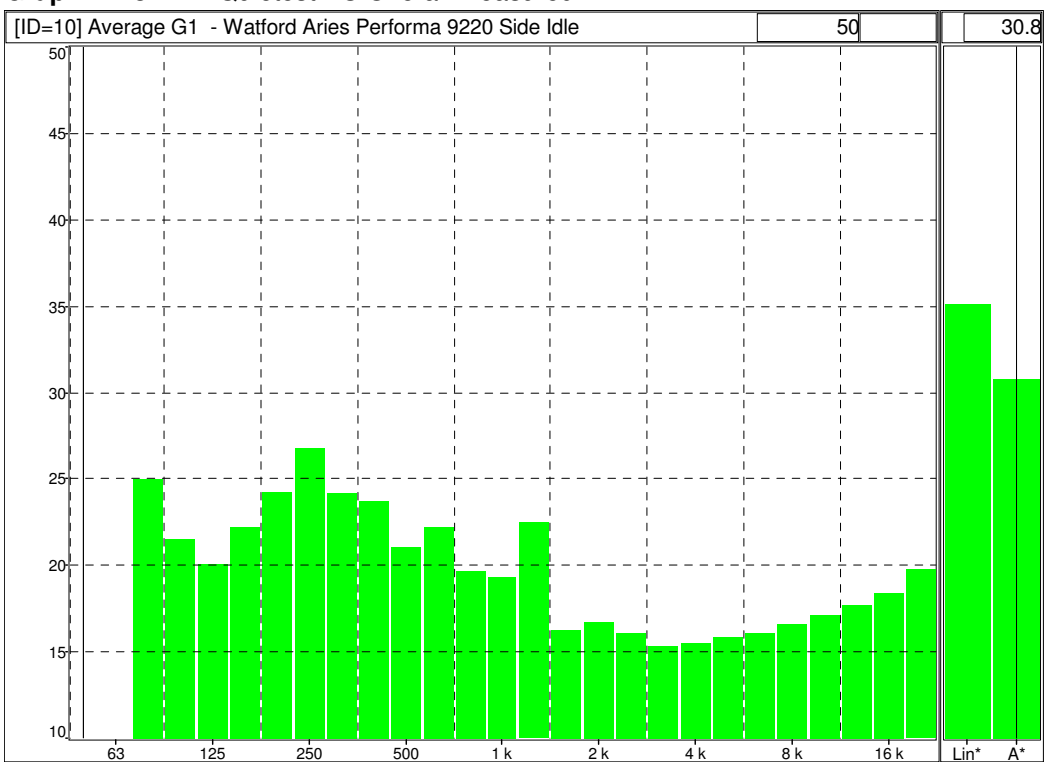
Graph 4.1.1 Background Noise Measurement



Graph 4.1.2 Loudest Measurement



Graph 4.1.3 Quietest PC Overall Measured



4.2 Power Consumption

Table 4.2.1 £399 PCs

PC TYPE	HARD OFF W	SOFT OFF W	SOFT OFF Ave. 60 Secs.	ON IDLE Ave. W
B-Tech Chimp 530J	0.3	5.5	-	87
PC Nextday Zoostorm P3.0GHz Versatile PC	N/A (no switch)	4.9	-	106
Watford Aries Performa 9220	0.12	3.4	-	87

Table 4.2.2 £699 PCs

PC TYPE	HARD OFF W	SOFT OFF W	SOFT OFF Ave. 60 Secs.	ON IDLE Ave. W
Aria ZPC 3100 Pro	Not Tested	Not tested	Not tested	Not tested
Evesham Axis SB	0.16	5.6	-	102
Holly SFA 2S	0.12	-	1.9	102
Packard Bell iMedia 601 CTX	N/A (no switch)	1.6	-	100

Table 4.2.3 £999 PCs

PC TYPE	HARD OFF W	SOFT OFF W	SOFT OFF Ave. 60 Secs.	ON IDLE Ave. W
Mesh Matrix Prestige Pro	0.18	2.8	-	133
NEC PowerMate i-Select D3410	N/A (no switch)	1.6	-	124
NetHighStreet Net Pro SLI 999	0.12	-	1.1	125
Scan 3XS AMD SLI Special	0.15	-	2.1	116

5.0 Conclusions

The loudest PC at any instant was the Holly SFA2S which measured 47.1dBA from the front, while spinning a DVD. The loudest PC overall was the Mesh Matrix Prestige Pro which measured between 42.5dBA and 45dBA.

The quietest PC in this group was the Watford Aries Performa 9220 in all cases, which measured between 27.6 and 32dBA.

For better accuracy whilst measuring the quieter PCs (below 29.8dBA) a quieter listening environment would need to be used. The results quoted below this level are within 3dB of the background noise and so are of a reduced level of accuracy. However, measurements in the listening room represent a realistic domestic environment and arguably it may not be necessary to achieve this greater degree of accuracy.

The overall noise level of the device may not actually indicate how annoying that noise is. For example the noise from a large fan is constant and typically of a low frequency so may be less annoying than the noise from small fans. The ‘annoyance’ factor can only really be found from subjective assessment, though the frequency graphs of the measured noise may help to pinpoint the annoying part of the noise.

The Mesh Matrix Prestige Pro consumed the most power (133W) whilst idle and the B-Tech Chimp 530J and the Watford Aries Performa 9220 consumed the least power (87W) whilst idle.

The EU recommendation for standby power of electronic products is below 2 Watts and ideally below 1 Watt. Only two codes meet this recommendation (soft off). However even these will ony be effective if the user sets up this ‘energy saving’ mode to change to this state after a reasonable period of non-use.