

Lab Worksheet – Digital Audio > Digital Audio Sampling Rate, Bit Depth, File Size, and File Transfer Time¹

Objectives:

1. To be able to determine the size of a digital audio file based on sampling rate and bit depth.
2. To be able to determine the time to download a digital audio file based on sampling rate, bit depth, and network connection type.

Format	Sampling Rate	Bit Depth	Uncompressed File Size in Bytes for One Minute of Audio	Download Time on 56Kb/s modem*	Download Time on 1.5Mb/s cable modem
speech (telephone)	8000 KHz	8 bits	480,000	1 minute 8 seconds	2.56 sec
CD stereo	44.1 KHz	16 bits per channel	5,292,000 (multiply by n for n-channel stereo)	> 25 minutes (assuming 2-channels)	> 9 min
DAT (digital audio tape)	48 KHz	16 bits per channel	5,760,000 (multiply by n for n-channel stereo)	> 27 minutes (assuming 2-channels)	> 10 min
DVD	96 KHz	24 bits per channel	17,280,000 (multiply by n for n-channel stereo)	> 82 minutes (assuming 2-channels)	> 30 min

*The values for 56K modem are underestimate, since in reality you don't get a full 56Kb/s.

Verify the values in columns 5 and 6 of the table above based on sampling rate, bit depth, and network type. Show your work.

1. speech file size in bytes
2. speech download time on 56 Kb/s modem
3. speech download time on 1.5 Mb/s cable modem

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4. CD 2-channel stereo file size in bytes
5. CD 2-channel stereo download time on 56 Kb/s modem
6. CD 2-channel stereo download time on 1.5 Mb/s cable modem
7. DAT 2-channel stereo file size in bytes
8. DAT 2-channel stereo download time on 56 Kb/s modem
9. DAT 2-channel stereo download time on 1.5 Mb/s cable modem
10. DVD 2-channel stereo file size in bytes
11. DVD 2-channel stereo download time on 56 Kb/s modem
12. DVD 2-channel stereo download time on 1.5 Mb/s cable modem