## Appendix A

Table A1
Historical storage devices' performance data in information storage

| Year | Handwriting | | Printing | | Punch card | | Tape | | Hard disk | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mbits/cc | Mbits/$ | Mbits/cc | Mbits/$ | Mbits/cc | Mbits/$ | Mbits/cc | Mbits/$ | Mbits/cc | Mbits/$ |
| 1890 | 3.0E− 4[27, 28, 29, 30] | | 7.0E− 4[27, 28, 29, 30] | | 6.3E− 05[31] | | | | | |
| 1900 | 3.0E− 4[27, 28, 29, 30] | | 8.0E− 4[27, 28, 29, 30] | | | | | | | |
| 1910 | | 2.187[27, 30] | | 5.945[27,29,30] | | | | | | |
| 1919 | | | | | | 2.97E− 07[32] | | | | |
| 1920 | | | | | 1.0E− 04[7,10] | | | | | |
| 1922 | | 2.312[27, 30] | | 6.250[27,29,30] | | | | | | |
| 1923 | | 2.045[27, 30] | | 5.530[27,29,30] | | | | | | |
| 1924 | | 1.982[27, 30] | | 5.360[27,29,30] | | | | | | |
| 1929 | | 2.786[27, 30] | | 7.562[27,29,30] | | | | | | |
| 1932 | | 2.258[27, 30] | | 6.104[27,29,30] | 2.0E− 04[7,10] | 1.57E− 06[32] | | | | |
| 1941 | | 2.993[27, 30] | | 8.099[27,29,30] | | | | | | |
| 1943 | | 4.334[27, 30] | | 11.745[27,29,30] | | | | | | |
| 1945 | | 4.052[27, 30] | | 10.981[27,29,30] | | | | | | |
| 1952 | 4.0E− 4[27, 28, 29, 30] | 0.909[27, 30] | 0.001[27, 28, 29, 30] | 2.466[27,29,30] | | | 0.172[15,16] | 2.38E− 03[15,16] | | |
| 1955 | 4.0E− 4[27, 28, 29, 30] | 0.817[27,28, 31] | 0.001[27, 28, 29, 30] | 2.217[27,29,30] | | | 0.343[15,16] | 0.006[15,16] | | |
| 1956 | 4.0E− 4[33, 28, 29, 30] | | 0.001[27, 28, 29, 30] | | | | | | 1.2E− 03[11,14] | 4.86E− 0 |
| 1958 | | 0.793[27, 28, 31, 36] | | 2.152[27,29,30] | | | 0.954[15,16] | 0.005[15,16] | | |
| 1960 | | 0.963[27, 28, 31, 36] | | 2.614[27,29,30] | | | | | | |
| 1961 | | | | | | | | | | |
| 1962 | | | | | | | 1.373[15,16] | 0.008[15,16] | | |
| 1963 | | | | | | | | | 0.061[11,14] | |
| 1964 | | | | | | | | | | |
| 1965 | | 1.135[27, 28, 31, 36] | | 3.073[27,29,30,33] | | | | | 0.159[11,14] | 0.013[1] |
| 1966 | | | | | | | 2.746[15,16] | 0.013[15,16] | 0.281[11,14] | |
| 1968 | | 0.992[27, 28, 31, 36] | | 2.686[27,29,30,33] | | | | | | |
| 1970 | | 0.961[27, 28, 31, 36] | | 2.601[27,29,30,33] | | | | | 1.111[11,14] | |
| 1971 | | | | | | | 2.746[15,16] | 0.011[15,16] | | 0.075[1] |
| 1973 | | 0.835[27, 28, 31, 36] | | 2.260[27,29,30,33] | | | 10.727[15] | 0.032[15,16] | | |
| 1974 | | | | | | | | | 1.627[11,14] | |
| 1975 | 3.0E− 4[33, 28, 29, 30] | 0.841[27, 28, 31, 36] | 9.0E− 4[27,28,29,30] | 2.275[27,29,30,33] | | | 12.498[17] | | 2.848[11,14] | |
| 1979 | | | | | | | | | | |
| 1980 | | 1.402[27, 28, 31, 36] | | 3.801[27,29,30,33] | | | | | 6.509[11,14] | |
| 1981 | | | | | | | | | | |
| 1983 | 3.0E− 4[27, 28, 29, 30] | 1.335[27, 28, 31, 36] | 9.0E− 4[27,28,29,30] | 3.617[27,29,30,33] | | | | | 22.146[11] | |
| 1984 | | | | | | | | 0.100[25] | | |
| 1985 | | 1.196[27,28,31,36] | | 3.240[27,29,30,33] | | | | | 22.782[11] | 0.236[11] |
| 1986 | | | | | | | 36.614[17] | | | 0.459[11] |
| 1987 | | | | | | | | | | |
| 1988 | 4.0E− 4[27,28,29,30] | 1.074[27,28,31,36] | 1.1E− 3[27,28,29,30] | 2.910[27,29,30,33] | | | | | 49.213[11] | 1.595[11] |
| 1990 | | 1.018[27,28,31,36] | | 2.758[27,29,30,33] | | | | | 86.122[11] | 1.763[1] |
| 1991 | 4.0E− 4[27,28,29,30] | | 0.001[27,28,29,30] | | | | | 0.156[25] | | 2.019[11] |
| 1992 | | | | | | | 64.075[17] | | 118.110[11] | 5.864[11] |

Table A1 (*continued*)

| Year | Handwriting | | Printing | | Punch card | | Tape | | Hard disk | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mbits/cc | Mbits/$ | Mbits/cc | Mbits/$ | Mbits/cc | Mbits/$ | Mbits/cc | Mbits/$ | Mbits/cc | Mbits/$ |
| 1993 | | | | | | | | | 246.063[11] | 7.824[1] |
| 1994 | | | | | | | | 6.997[25] | 369.095[11] | |
| 1995 | | 0.901[27,28,31,36] | | 2.443[27,29,30,33] | | | | | 615.159[11] | 32.463[1] |
| 1996 | 4.0E− 4[27,28,29,30] | | 1.1E− 3[27,28,29,30] | | | | | | 1107.286[11] | 17.217[11] |
| 1997 | | | | | | | | 10.797[25] | 1414.865[11] | 65.900[11] |
| 1998 | | | | | | | | 342.976[25] | 4921.270[11] | 206.299[1] |
| 1999 | | 0.764[27,28,31,36] | | 2.072[27,29,30,33] | | | 9153.562[17] | | 7381.902[11] | 605.785[1] |
| 2000 | 4.0E− 4[27,28,29,30] | | 1.2E− 3[27,28,29,30] | | | | | | 12,303.174[11] | 973.911[11] |
| 2001 | | | | | | | | | 34,448.886[11] | |
| 2002 | 5.0E− 4[27,28,29,30] | 0.720[27,28,31,36] | 1.5E− 3[27,28,29,30] | 1.952[27,29,30,33] | | | 36,614.246[17] | | 44,291.430[11] | 2854.493 |
| 2003 | 7.0E− 4[27,28,29,30] | 0.701[27,28,31,36] | 0.002[27,28,29,30] | 1.901[27,29,30,33] | | | 61,023.744[17] | 1138.561[25] | 86,122.200[11] | 5558.450 |
| 2004 | 1.5E− 3[27,28,29,30] | 0.673[27,28,31,36] | 0.004[27,28,29,30] | 1.824[27,29,30,33] | | | 93,001.628[33] | 5155.834[33] | 3290.556[35] | 1269.841 |

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