

Computer Speeds From Instruction Mixes pre-1960 to 1971

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Note

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Description

Before standard benchmarks were available, average speed rating of computers was based on calculations for a mix of instructions with the result given in Kilo Instructions Per Second (KIPS). This document contains results produced by the UK Government Central Computer & Telecommunications Agency (CCTA). This organisation was formed in 1957, initially as HM Treasury Technical Support Unit (TSU) and later Central Computer Agency (CCA). This document was produced by **Roy Longbottom** (CCTA 1960 to 1993).

The most famous, the Gibson Mix, was produced by J Gibson of IBM for scientific applications. This had the following weighting for the variation used here:

Fixed Point Add/Subtract	0.330
Fixed Point Multiply	0.006
Fixed Point Divide	0.002
Branch	0.065
Compare	0.040
Transfer 8 characters	0.175
Shift	0.046
Logical	0.017
Modification	0.190
Floating Point Add	0.073
Floating Point Multiply	0.040
Floating Point Divide	0.016

The second one used is an ADP Mix produced by TSU and based on a number of user applications:

Fixed Point Add/Subtract	0.310
Fixed Point Multiply	0.013
Fixed Point Divide	0.006
Branch	0.350
Compare	0.062
Transfer 8 characters	0.205
Logical	0.054

The KIPS are calculated as 1000 / weighted average instructions time in microseconds. This is then multiplied by a factor of between 1.0 and 2.0 to adjust for different architecture, mainly 1.0 where instructions relate to a single address and an accumulator and 1.25 with 1 address and multiple registers.

Memory speed is given as cycle time in microseconds and memory size is given in KC (characters, probably 6 bits), KB (bytes) or KW (words).

Not all available results are shown but they are for IBM and the mainframe BUNCH - Burroughs, Univac, NCR, CDC, Honeywell, plus most, but not all variations, for the UK company ICL.

Some dates are from:

http://www.crowl.org/Lawrence/history/computer_list
<http://www.ourcomputerheritage.org/CCSprop6.pdf>

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Burroughs	CDC	Data General	DEC	Elliot
English Electric	EMI	Ferranti	GEIS	HP
Honeywell	IBM	ICL	Lyons	NCR
RCA	UNIVAC	XDS		

Manufacturer	Model	Word Size bits	Memory Max	Memory Cycle Time	Gibson Mix KIPS	ADP Mix KIPS	Intro Year
Burroughs	160/170/180	24	4.8 KC	10	-	2.8	1964
Burroughs	260/270	36	4.8 KC	10	-	3.2	1962
Burroughs	263/273	36	4.8 KC	6	-	5.4	1964
Burroughs	280	36	4.8 KC	10	-	3.2	1962
Burroughs	283	36	19 KC	6	-	5.4	
Burroughs	300	36	19 KC	6	-	5.4	
Burroughs	3500	16	500 KW	1	34	63	1967
Burroughs	5000	48	32 KW	6	60	56	1962
Burroughs	5500	48	32 KW	4	144	181	1964
Burroughs	6712	48	1049 KW	1.2	430	368	1971
Burroughs	6714	48	1049 KW	1.2	518	446	
Burroughs	6504	48	524 KW	1.2	576	724	1969
Burroughs	6506	48	524 KW	0.6	864	1086	
Burroughs	6722	48	1049 KW	1.2	774	662	
Burroughs	6724	48	1049 KW	1.2	932	803	
Burroughs	6734	48	1049 KW	1.2	1399	1204	
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Manufacturer	Model	Word Size bits	Memory Max	Memory Cycle Time	Gibson Mix KIPS	ADP Mix KIPS	Intro Year
CDC	160	12	4 KW	6.4	0.81	11	1960
CDC	160A	12	32 KW	6.4	4.3	12	1961
CDC	1604A	48	32 KW	6.4	81	76	
CDC	1774	48	32 KW	1.5	16	137	1966
CDC	3100	24	32 KW	1.75	22	121	1965
CDC	3130	24	256 KW	1.75	129	131	
CDC	3200	24	32 KW	1.25	197	253	1964
CDC	3300	24	256 KW	1.25	152	158	1963
CDC	3600	48	256 KW	1.5	337	326	1963
CDC	6600	60	128 KW	1.0	2190		1964
CDC	7600	60	64 KW	0.275	7000		1969
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Manufacturer	Model	Word Size bits	Memory Max	Memory Cycle Time	Gibson Mix KIPS	ADP Mix KIPS	Intro Year
Data General	Nova	16	32 KW	0.8	18.9	66.8	1969
Data General	Nova 800	16	32 KW	0.8	83.5	243.6	1970
Data General	Nova 1200	16	32 KW	1.2	49.3	115.4	1970
Data General	SuperNova	16	32 KW	0.8	83.6	245.8	1970
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Manufacturer	Model	Word Size bits	Memory Max	Memory Cycle Time	Gibson Mix KIPS	ADP Mix KIPS	Intro Year
DEC	PDP7	18	32 KW	1.75	60	14	
DEC	PDP8	12	32 KW	1.5			1965
DEC	PDP 8E	12	32 KW	1.2	10	81	1968
DEC	PDP8 EAU	12	32 KW	1.2	8	124	
DEC	PDP 8S	12	32 KW	8.0	0.96	4.4	1966
DEC	PDP9 EAU	18	32 KW	1.0	48	201	
DEC	PDP10	36	256 KW	1.0	363	526	1967
DEC	PDP11	16	32 KW	1.2	15.4	106.2	1970
DEC	PDP11 EAE	16	32 KW	1.2	39.9	287.1	
DEC	PDP 15 EAE	16	128 KW	0.8	156	40	1970
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Manufacturer	Model	Word Size bits	Memory Max	Memory Cycle Time	Gibson Mix KIPS	ADP Mix KIPS	Intro Year
Honeywell (GEIS)	215	20	8 KW	26	-	5.7	1963
Honeywell (GEIS)	225	20	16 KW	18	6.9	11	1961
Honeywell (GEIS)	235	20	16 KW	6	36	3.6	1964
Honeywell (GEIS)	415	24	32 KW	5.8	33	33	1964
Honeywell (GEIS)	423	24	32 KW	3.9	47	48	
Honeywell (GEIS)	435	24	32 KW	2.7	64	66	1964
Honeywell (GEIS)	615	36	128 KW	1	157	157	1969
Honeywell (GEIS)	625	36	256 KW	2	294	314	1965
Honeywell (GEIS)	635	36	256 KW	1	379	433	1965
Honeywell	110		16 KC	4	2	10	1968
Honeywell	120		32 KC	3	3	13	1966
Honeywell	125		32 KC	2.5	3.5	15	
Honeywell	200		64 KC	2	7.4	16	1964
Honeywell	200 SU		64 KC	2	43	36	
Honeywell	1200/1250		256 KC	1.5	10	54	1966
Honeywell	1200/1250 SU		256 KC	1.5	62	54	1968
Honeywell	2015		256 KC	1.35	73	80	
Honeywell	2200		256 KC	1	15	76	1965
Honeywell	2200 SU		256 KC	1	89	76	
Honeywell	3200		512 KC	1	106	128	1969
Honeywell	4200		512 KC		178	156	1967
Honeywell	8200				809	831	1968
Honeywell	800	48	28 KW	6	68	88	1960
Honeywell	1400	48	32 KW	6.5	13	26	1963
Honeywell	1800	48	64 KW	2	295	310	1963
Honeywell	DDP124	24	32 KW	1.75	49	183	
Honeywell	632	32	128 KW	0.85	347	336	1967
Honeywell	6030/6040	36	128 KW	0.6	161-252	157-273	1972
Honeywell	6050/6060	36	256 KW	0.6	240-551	211-480	1972
Honeywell	6070/6080	36	256 KW	0.25	551-894	480-830	1972
Honeywell	H316	16	32 KW	1.6	10.9	93	1969
Honeywell	H316 HS	16	32 KW	1.6	16.2	184	
Honeywell	DDP516	16	64 KW	0.96	18	119	
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Manufacturer	Model	Word Size bits	Memory Max	Memory Cycle Time	Gibson Mix KIPS	ADP Mix KIPS	Intro Year
HP	2116B		32 K	1.6	8.4	86.6	1969
HP	2116B EAU		32 K	1.6	12.6	123.4	
HP	2100		32 K	0.98	24	126	
HP	2100 FLP		32 K	0.98	99	200	
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Manufacturer	Model	Word Size bits	Memory Max	Memory Cycle Time	Gibson Mix KIPS	ADP Mix KIPS	Intro Year
IBM	650				0.063	0.09	1954
IBM	705 1&2				0.5	2.8	1956
IBM	705 3				0.38	2.1	
IBM	709		32 K		21	25	1958
IBM	7044		32 K	2	109	126	1963
IBM	7090	36	32 KW	2.18	139	186	1959
IBM	7094/2	36	32 KW	1.4	257	308	1964
IBM	1130	16	8 KW	3.6	14	86	1966
IBM	1401		18 KC	11.5	1.2	6.2	1960
IBM	1410		80 KC	4.5	2.2	11	1961
IBM	1620 2		60 KC	10	4.6	8.1	1962
IBM	1800	16	32 KW	2	24	120	1966
IBM	1800	16	32 KW	4	12	60	
IBM	360/20	32	16 KB	3.6	2	2.6	1965
IBM	360/25	32	48 KB	1.8	9.7	25	1969
IBM	360/30	32	64 KB	1.5	10.2	29	1965
IBM	360/40	32	256 KB	2.5	40	75	1965
IBM	360/44	32	64 KB	1	118	185	1965
IBM	360/44 SR	32	64 KB	1	152	314	1965
IBM	360/50	32	256 KB	2	133	169	1965
IBM	360/65 G	32	1024 KB	0.75	543	542	1965
IBM	360/65 H, I, J	32	1024 KB	0.75	563	567	1965
IBM	360/75	32	1024 KB	0.75	940	670	1965
IBM	360/85	32	4 MB	0.96	3245	3418	1969
IBM	360/91	32	4 MB	0.96	1900	1800	1967
IBM	370/135	32	256 KB	0.75	113	171	1971
IBM	370/145	32	512 KB	0.61	178	330	1971
IBM	370/155	32	2 MB	2.1	470	678	1971
IBM	370/165	32	3 MB	2	3068	3102	1971
IBM	System 3		48 KB	1.52	-	28.4	1970
IBM	System 7		16 KB	0.4	13.6	354	1970
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Manufacturer	Model	Word Size bits	Memory Max	Memory Cycle Time	Gibson Mix KIPS	ADP Mix KIPS	Intro Year
ICL (Ferranti)	ATLAS 1	48	256 K	2	350	-	1962
ICL (EE)	KDF9	48	32 KW	6	170	198	1963
ICL (Lyons)	LEO II	19	2K		1	1.1	1957
ICL	LEO III	42	16 KW	14	6.2	14	1962
ICL	LEO 326	42	32 KW	2.5	66	116	1965
ICL	LEO 360	42	32 KW	6	34	45	1965
ICL (EMI)	1100	36		12	2.6	8	1959
ICL (EMI)	2400		8 K	4	16	57	1961
ICL	1202	40			0.06	0.09	1954
ICL	1301	48			3.2	15	1961
ICL (EE)	DEUCE I & 2	32	8 KW		1.2	10	1955
ICL (Elliot)	803	39	8 KW	288	0.82	0.94	1960
ICL (Elliot)	503	39	8 KW	3.6	66	78	1963
ICL (Elliot)	905		128 KB	1	19	190	1969
ICL	4120/2	24	32 KW	2	25	95	1965
ICL	4130/2	24	64 KW	2	112	164	1966
ICL	4/30	32	64 KB	1.5	7	39	1967
ICL	4/40	32	128 KB	1.5	47	77	1969
ICL	4/50-52	32	256 KB	1.4	55	114	1967
ICL	4/70	32	1024 KB	1	368	410	1968
ICL	4/72	32	1024 KB	0.5	426	479	1971
ICL	4/75	32	1024 KB	0.9	356	395	1968
ICL	4/77	32	1024 KB	0.5	410	452	1971
ICL	1901	24	16 KW	6	1.4	8.1	1966
ICL	1901S +	24	16 KW	6	22	23.6	1967
ICL	1902S +	24	64 KW	3	59.8	95	1971
ICL	1903S +	24	32 KW	2	59	106.3	1967
ICL	1903A +	24	128 KW	1.5	113.7	189.6	1968
ICL	1904	24	256 KW	1.5	13.3	112.1	1965
ICL	1904E +	24	256 KW	1.8	16.9	181	1967
ICL	1904F	24	256 KW	0.75	22.4	225	1968
ICL	1904A +	24	256 KW	0.75	261	276	1969
ICL	1904S +	24	256 KW	0.3	355	424	1973
ICL	1905	24	32 KW	2	104	112	1965
ICL	1905E +	24	256 KW	1.8	144	181	1967
ICL	1905F +	24	256 KW	0.75	169	172	1968
ICL	1906	24	256 KW	1	38.7	320	1967
ICL	1906E +	24	256 KW	1.8	30.4	326	
ICL	1906F	24	256 KW	0.75	40.3	405	1968
ICL	1906A	24	512 KW	0.65	866	907	1970
ICL	1906S	24	512 KW	0.3	1150	1125	1973
ICL	1907	24	256 KW	1.1	255	294	1967
ICL	1907E +	24	256 KW	1.8	259	326	
ICL	1907F	24	256 KW	0.75	353	405	1968
ICL	1909	24	256 KW	6	46	43.7	
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Manufacturer	Model	Word Size bits	Memory Max	Memory Cycle Time	Gibson Mix KIPS	ADP Mix KIPS	Intro Year
NCR	315	12	40 KW	6	3.4	15	1962
NCR	315 RMC	12	80 KW	0.8	45	116	1965
NCR	Century 100		32 K	0.8	2	9	1968
NCR	Century 200		32 K	0.8	65.9	69	1969
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Manufacturer	Model	Word Size bits	Memory Max	Memory Cycle Time	Gibson Mix KIPS	ADP Mix KIPS	Intro Year
RCA	301		40 K	7	12	13	1961
RCA	3301		160 K	1.93	174	174	1964
RCA	Spectra 70/25	32	64 KB	1.5	25	39	1965
RCA	Spectra 70/45	32	256 KB	1.44	55	114	1966
RCA	Spectra 70/55	32	256 KB	0.94	174	314	1966
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Manufacturer	Model	Word Size bits	Memory Max	Memory Cycle Time	Gibson Mix KIPS	ADP Mix KIPS	Intro Year
UNIVAC	SS 80/90/1				2.77	2.27	1960
UNIVAC	SS 80/90/2				2.9	2.4	1961
UNIVAC	III				118.8	87.2	1962
UNIVAC	418 II	18		4	26	165	
UNIVAC	418 III	18	132 K	0.75	354	440	1969
UNIVAC	490	30		6	15	50	1961
UNIVAC	494	30	128 K	0.75	665	836	1966
UNIVAC	1050				28.6	25.5	1963
UNIVAC	1107	36		4	131	121	1962
UNIVAC	1106	36	256 K	1.5	517	492	1969
UNIVAC	1108	36		0.75	932	866	1965
UNIVAC	9200		32 KB	1.2	0.3	13	1967
UNIVAC	9300		32 KB	0.6	0.6	26	1967
UNIVAC	9380		128 KB	0.3	11	69	
UNIVAC	9400		128 KB	0.3	23	138	1969
UNIVAC	9700		1024 KB	0.15	345	466	
			To Index				
Manufacturer	Model	Word Size bits	Memory Max	Memory Cycle Time	Gibson Mix KIPS	ADP Mix KIPS	Intro Year
XDS	Sigma 2	16	16 KW	0.9	100	238	1966
XDS	Sigma 3	16	64 KW	1	23	146	1969
XDS	Sigma 5	32	128 KW	0.85	272	400	1967
XDS	Sigma 7	32	128 KW	0.85	361	385	1966
XDS	Sigma 9	32	256 KW	0.9	972	1251	1971
XDS	90/2				-	82	
XDS	90/10	24	16 KW	8	5.9	26	1964
XDS	90/20	24	16 KW	8	12	30	
XDS	90/25	24	16 KW	1.75	50	116	
XDS	90/30	24	32 KW	1.75	70	143	
XDS	90/300	24	16 KW	1.75	195	208	
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