

● WITH KEYS

BYTES PER RECORD		RECORDS PER			TRANSMISSION TIME IN MS PER RECORD	
MINIMUM	MAXIMUM	TRACK	CYLINDER	MODULE	MINIMUM	MAXIMUM
1721	3605	1	10	2000	11.03	23.11
1112	1720	2	20	4000	7.13	11.03
812	1111	3	30	6000	5.21	7.12
633	811	4	40	8000	4.06	5.20
513	632	5	50	10000	3.29	4.05
429	512	6	60	12000	2.75	3.28
365	428	7	70	14000	2.34	2.74
316	364	8	80	16000	2.03	2.33
276	315	9	90	18000	1.77	2.02
245	275	10	100	20000	1.57	1.76
218	244	11	110	22000	1.40	1.56
195	217	12	120	24000	1.25	1.39
175	194	13	130	26000	1.12	1.24
159	174	14	140	28000	1.02	1.12
144	158	15	150	30000	0.92	1.01
131	143	16	160	32000	0.84	0.92
120	130	17	170	34000	0.77	0.83
109	119	18	180	36000	0.70	0.76
100	108	19	190	38000	0.64	0.69
91	99	20	200	40000	0.58	0.63
83	90	21	210	42000	0.53	0.58
77	82	22	220	44000	0.49	0.53
70	76	23	230	46000	0.45	0.49
64	69	24	240	48000	0.41	0.44
59	63	25	250	50000	0.38	0.40
54	58	26	260	52000	0.35	0.37
49	53	27	270	54000	0.31	0.34
45	48	28	280	56000	0.29	0.31
41	44	29	290	58000	0.26	0.28
37	40	30	300	60000	0.24	0.26
34	36	31	310	62000	0.22	0.23
30	33	32	320	64000	0.19	0.21
27	29	33	330	66000	0.17	0.19
24	26	34	340	68000	0.15	0.17
21	23	35	350	70000	0.13	0.15
19	20	36	360	72000	0.12	0.13
17	18	37	370	74000	0.11	0.12
14	16	38	380	76000	0.09	0.10
12	13	39	390	78000	0.08	0.08
9	11	40	400	80000	0.06	0.07
7	8	41	410	82000	0.04	0.05
5	6	42	420	84000	0.03	0.04

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# IBM System/360 Reference Data

2311 Model 1

Disk  
Storage  
Drive

## DASD Capacity and Transmission Time

Average Access Time 75 ms  
Average Rotational Delay 12.5 ms

The formulas used to determine capacity and transmission time assume the use of programming systems developed and supported by IBM and are in agreement with Systems Reference Library A26-5988.

These systems use eight bytes of the first record on each track. The formulas are:

- a. Bytes per record, except last record on track:

$$\left[ \frac{537(KL+DL)}{512} \right]^* + C + 61$$

- b. Bytes per record, last record on track only:  
KL+DL+C

- c. Capacity per track in bytes:  
3625

- d. Records per track:

$$\left[ \frac{c-b}{a} \right]^* + 1$$

- e. Data rate (ms per byte):  
0.0064103

- f. Transmission time (ms per record):  
(bytes per record) x (data rate)

KL = Key Length  
DL = Data Length  
C = 0 when KL = 0  
C = 20 when KL ≠ 0

\*Truncate any fraction

Average Access Time 75 ms  
 Average Rotational Delay 12.5 ms

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Some examples of how this card may be used follow.  
 A record is considered to be the information recorded  
 between two gaps.

Example 1. Determining the effect of the record length  
 on the number of records that can be  
 stored on the device.

Assuming that 78-byte records, without keys, are  
 required, the table indicates that 25 records can be  
 placed on each track. Reducing the record length by  
 1 byte permits 26 records per track, an increase of  
 2,000 records per module. Alternatively, the record  
 length can be increased 4 bytes without decreasing the  
 number of records on the module.

Example 2. Determination of read/write time.

Assuming that the key length (KL) is equal to zero  
 and the data length (DL) is 82 bytes, the table  
 indicates that 25 records can be stored on each  
 track using a blocking factor of 1 (that is, a  
 gap after each 82-byte record). The chart also  
 indicates a transmission time of 0.53 ms per  
 record. Average read/write time is the sum  
 (88.03 ms) of the average access time (75 ms) plus  
 average rotational delay time (12.5 ms) plus  
 record transmission time (0.53 ms).

Example 3. Effect of blocked records.

Assuming 1600 storage locations available for a  
 common input/output area, no keys, and a data  
 length (DL) of 80 bytes, a maximum blocking  
 factor of 20 can be established using 1600-byte  
 records. The table indicates that 2 records of  
 this length can be written on each track for  
 a total of 40 80-byte logical records. The  
 transmission time for each disk record of the 20  
 logical records is 10.26 ms (by interpolation).

BYTES PER RECORD		RECORDS PER			TRANSMISSION TIME IN MS PER RECORD	
MINIMUM	MAXIMUM	TRACK	CYLINDER	MODULE	MINIMUM	MAXIMUM
1741	3625	1	10	2000	11.16	23.24
1132	1740	2	20	4000	7.26	11.15
831	1131	3	30	6000	5.33	7.25
652	830	4	40	8000	4.18	5.32
533	651	5	50	10000	3.42	4.17
448	532	6	60	12000	2.87	3.41
385	447	7	70	14000	2.47	2.87
335	384	8	80	16000	2.15	2.46
296	334	9	90	18000	1.90	2.14
264	295	10	100	20000	1.69	1.89
237	263	11	110	22000	1.52	1.69
214	236	12	120	24000	1.37	1.51
194	213	13	130	26000	1.24	1.37
178	193	14	140	28000	1.14	1.24
163	177	15	150	30000	1.04	1.13
150	162	16	160	32000	0.96	1.04
139	149	17	170	34000	0.89	0.96
128	138	18	180	36000	0.82	0.88
119	127	19	190	38000	0.76	0.81
110	118	20	200	40000	0.71	0.76
103	109	21	210	42000	0.66	0.70
96	102	22	220	44000	0.62	0.65
89	95	23	230	46000	0.57	0.61
83	88	24	240	48000	0.53	0.56
78	82	25	250	50000	0.50	0.53
73	77	26	260	52000	0.47	0.49
68	72	27	270	54000	0.44	0.46
64	67	28	280	56000	0.41	0.43
60	63	29	290	58000	0.38	0.40
56	59	30	300	60000	0.36	0.38
53	55	31	310	62000	0.34	0.35
49	52	32	320	64000	0.31	0.33
46	48	33	330	66000	0.29	0.31
43	45	34	340	68000	0.28	0.29
41	42	35	350	70000	0.26	0.27
38	40	36	360	72000	0.24	0.26
36	37	37	370	74000	0.23	0.24
33	35	38	380	76000	0.21	0.22
31	32	39	390	78000	0.20	0.21
28	30	40	400	80000	0.18	0.19
26	27	41	410	82000	0.17	0.17
24	25	42	420	84000	0.15	0.16
22	23	43	430	86000	0.14	0.15
21	21	44	440	88000	0.13	0.13
20	20	45	450	90000	0.13	0.13
18	19	46	460	92000	0.12	0.12
16	17	47	470	94000	0.10	0.11
15	15	48	480	96000	0.10	0.10
13	14	49	490	98000	0.08	0.09
12	12	50	500	100000	0.08	0.08
10	11	51	510	102000	0.06	0.07
9	9	52	520	104000	0.06	0.06
8	8	53	530	106000	0.05	0.05
7	7	54	540	108000	0.04	0.04
5	6	55	550	110000	0.03	0.04

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