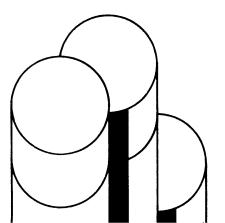
## **Reference Summary**

# IBM 3380 Direct Access Storage

GX26-1678-0





## 3380 Device Characteristics

Physical Characteristics					
Head and Disk Assemblies					
per Unit	2				
Access Mechanisms per					
Head and Disk Assembly	2				
Heads per Access Mechanism	15	data			
		and			
	1	servo			
Cylinders per Access Mechanism					
Data	885				
Alternate	1				
Customer Engineer	1				
Data Tracks per Cylinder	15				
Tracks per Access Mechanism					
Data	13,275				
Alternates	15				
Maximum Data Capacity					
per Track	47,476	bytes			
per Cylinder	712,140	bytes			
per Access Mechanism	630.2	MB			
per Head and Disk Assembly	1.26	GB			
per Unit	2.52				
per String	10.08	GB			

## **Performance Characteristics**

Seek Time <sup>1</sup>		
Minimum	3.0	ms
Average	16.0	ms
Maximum	30.0	ms
Rotational Delay Time <sup>2</sup>	8.3	ms
Data Rate <sup>3</sup>	3.0	MB/sec

#### Notes:

- Seek time, or access motion time, is the time required to position the access mechanism at the track (cylinder). The average seek time is for one third of the cylinders. If the mechanism is already at the correct track (cylinder), there is no access motion and seek time is zero.
- 2. Rotational delay time, or rotational latency time, is the average time required for the specified record to rotate to the read and write head so that the data transfer can begin. It is one-half the disk rotation time.
- 3. **Data rate** is the instantaneous speed at which bytes are transferred.

## **Space Calculation Formula**

Space calculations are determined for physical records.

All data on a 3380 is written in 32-byte increments.

The number of equal length physical records per track can be calculated as follows. Track overhead for the home address, track descriptor record (R0), and skip defect allowance has already been accounted for.

Equal length records per track = 
$$\frac{1499}{C + K + E}$$

- 1499 is the number of 32-byte increments per track available for user data records.
- C is the number of 32-byte increments used by the record overhead including gaps and the count area.
- K is the number of 32-byte increments used by the key area.
- D is the number of 32-byte increments used by the data area.
- KL is the key length in bytes.
- DL is the data length in bytes.

where 
$$C = 15 \text{ if } KL = 0$$
  
 $C = 22 \text{ if } KL \neq 0$   
 $K = 0 \text{ if } KL = 0$   
 $K^{\dagger} = \frac{KL + 12}{32} \text{ if } KL \neq 0$   
 $D^{\dagger} = \frac{DL + 12}{32}$ 

† These values are rounded up to the next integer. KL and DL each must have 12 added and each must be rounded up to a multiple of 32.

## **Space Calculation Tables**

The following tables give the number of equal length records of given byte sizes that can be placed on a track and cylinder. Also given are the total number of bytes used on the track and cylinder for the particular number of records.

One table gives the calculations for records without keys. The size of the record is the data length (DL). The other table gives the calculations for records with keys. The size of the record is the data length (DL) + the key length (KL). DL and KL are both rounded up to multiples of 32 - 12.

For example, for records without keys, data lengths from 7,477 to 9,076 bytes allow 5 records per track and 75 records per cylinder. Five records of 9,076 bytes use a total of 45,380 bytes of the capacity of a track.

[ D. D	Track Capacity		Cylinder Capacity	
DL Bytes (Max)	Records	Bytes	Records	Bytes
47,476 23,476	1 2	47,476 46,952	15 30	712,140 704,280
15,476	3	46,428	45	696,420
11,476	4	45,904	60	688,560
9,076	5	45,380	75	680,700
7,476	6	44,856	90	672,840
6,356	7	44,492	105	667,380
5,492	8	43,936	120	659,040
4,820	9	43,380	135	650,700
4,276 3,860	10 11	42,760 42,460	150 165	641,400 636,900
3,476	12	41,712	180	625,680
3,188	13	41,444	195	621,660
2,932	14	41,048	210	615,720
2,676	15	40,140	225	602,100
2,484	16	39,744	240	596,160
2,324	17	39,508	255	592,620
2,164 2,004	18 19	38,952 38,076	270	584,280 571,140
1.876	20	37,520	285 300	562,800
1,780	21	37,320	315	560,700
1,684	22	37,048	330	555,720
1,588	23	36,524	345	547,860
1,492	24	35,808	360	537,120
1,396	25	34,900	375	523,500
1,332 1,268	26 27	34,632	390	519,480
1,206	28	34,236 33,712	405 420	513,540 505,680
1,140	29	33,060	435	495,900
1,076	30	32,280	450	484,200
1,044	31	32,364	465	485,460
980	32	31,360	480	470,400
948	33	31,284	495	469,260
916 852	34 35	31,144 29,820	510 525	467,160 447,300
820	36	29,520	540	442,800
788	37	29,156	555	437,340
756	38	28,728	570	430,920
724	39	28,236	585	423,540
692	40	27,680	600	415,200
660	41	27,060	615	405,900
628 596	42 44	26,376	630	395,640 393,360
564	45	26,224 25,380	660 675	380,700
532	46	24,472	690	367,080
500	48	24,000	720	360,000
468	49	22,932	735	343,980
436	51	22,236	765	333,540
404	53	21,412	795	321,180
372	55 57	20,460	825	306,900
340	57 59	19,380 18,172	855 885	290,700 272,580
276	62	17,112	930	256,680
244	65	15,860	975	237,900
212	68	14,416	1,020	216,240
180	71	12,780	1,065	191,700
148	74	10,952	1,110	164,280
116	78 93	9,048	1,170	135,720
84 52	83 88	6,972 4,576	1,245 1,320	104,580 68,640
20	93	1,860	1,320	27,900
	L	1 ,,300	L.,,,,,,,	1 21,300

Bytes (Max)         Records         Bytes         Records         Bytes           47,240         1         47,240         15         708,600           23,240         2         46,480         30         697,200           15,240         3         45,720         45         685,800           11,240         4         44,960         60         674,400           8,840         5         44,200         75         663,000           7,240         6         43,440         90         651,600           6,120         7         42,840         105         642,600           5,256         8         42,048         120         630,720           4,584         9         41,256         135         618,844           4,040         10         40,400         150         606,000           3,624         11         39,864         165         597,966           3,240         12         38,880         180         583,200           2,952         13         37,744         210         566,166           2,440         15         36,600         225         549,000           2,248         16 <td< th=""><th>KL+DL</th><th>Track C</th><th>apacity</th><th>Cylinder</th><th>Capacity</th></td<>	KL+DL	Track C	apacity	Cylinder	Capacity
23,240         2         46,480         30         697,200           15,240         3         45,720         45         685,800           11,240         4         44,960         60         674,400           8,840         5         44,200         75         663,000           7,240         6         43,440         90         651,600           6,120         7         42,840         105         642,600           5,256         8         42,048         120         630,720           4,584         9         41,256         135         618,840           4,040         10         40,400         150         606,000           3,240         12         38,880         180         583,200           2,952         13         38,376         195         575,640           2,440         15         36,600         225         549,000           2,248         16         35,968         240         539,524           1,928         18         34,704         270         520,560           1,640         20         32,800         300         492,000           1,544         21         32,424 <th></th> <th>Records</th> <th>Bytes</th> <th>Records</th> <th>Bytes</th>		Records	Bytes	Records	Bytes
23,240         2         46,480         30         697,200           15,240         3         45,720         45         685,800           11,240         4         44,960         60         674,400           8,840         5         44,200         75         663,000           7,240         6         43,440         90         661,600           5,256         8         42,048         120         630,720           4,584         9         41,256         135         618,844           4,040         10         40,400         150         606,000           3,624         11         39,864         165         597,964           3,240         12         38,880         180         583,200           2,952         13         38,376         195         575,644           2,440         15         36,600         225         549,000           2,248         16         35,968         240         539,524           1,928         18         34,704         270         520,566           1,640         20         32,800         300         492,000           1,544         21         32,424 <td>47,240</td> <td>1</td> <td>47,240</td> <td>15</td> <td>708,600</td>	47,240	1	47,240	15	708,600
11,240         4         44,960         60         674,400           8,840         5         44,200         75         663,000           7,240         6         43,440         90         651,600           6,120         7         42,840         105         642,600           5,256         8         42,048         120         630,720           4,584         9         41,256         135         618,844           4,040         10         40,400         150         606,000           3,624         11         39,864         165         597,960           3,240         12         38,880         180         583,200           2,952         13         38,376         195         575,644           2,440         15         36,600         225         549,000           2,248         16         35,968         240         539,520           2,248         16         35,968         240         539,520           1,768         19         33,592         285         532,444           1,928         18         34,704         270         520,566           1,640         20         32,800 </td <td></td> <td>2</td> <td>46,480</td> <td>30</td> <td>697,200</td>		2	46,480	30	697,200
8,840         5         44,200         75         663,000           7,240         6         43,440         90         651,600           6,120         7         42,840         105         642,600           5,256         8         42,048         120         630,720           4,584         9         41,256         135         618,840           4,040         10         40,400         150         606,000           3,624         11         39,864         165         597,960           3,240         12         38,880         180         583,200           2,952         13         38,376         195         575,641           2,696         14         37,744         210         566,160           2,248         16         35,968         240         539,524           2,088         17         35,496         255         532,444           1,928         18         34,704         270         520,560           1,768         19         33,592         285         503,880           1,640         20         32,800         300         492,000           1,544         21         32,424<	15,240	3	45,720	45	685,800
7,240         6         43,440         90         651,600           6,120         7         42,840         105         642,600           5,256         8         42,048         120         630,720           4,584         9         41,256         135         618,844           4,040         10         40,400         150         606,000           3,624         11         39,864         165         597,964           3,240         12         38,880         180         583,200           2,952         13         38,376         195         575,644           2,696         14         37,744         210         566,16           2,248         16         35,968         240         539,520           2,248         16         35,968         240         539,520           1,768         19         33,592         285         503,880           1,928         18         34,704         270         520,560           1,768         19         33,592         285         503,880           1,640         20         32,800         300         492,000           1,544         21         32,424	11,240	4	44,960	60	674,400
6,120         7         42,840         105         642,600           5,256         8         42,048         120         630,720           4,584         9         41,256         135         618,844           4,040         10         40,400         150         606,000           3,624         11         39,864         165         597,960           3,240         12         38,880         180         583,200           2,952         13         38,376         195         575,644           2,696         14         37,744         210         566,166           2,248         16         35,968         240         539,520           2,248         16         35,968         240         539,520           2,088         17         35,496         255         532,444           1,928         18         34,704         270         520,560           1,768         19         33,592         285         503,880           1,640         20         32,800         300         492,000           1,544         21         32,424         315         486,360           1,256         24         30,	8,840	5	44,200	75	663,000
5,256         8         42,048         120         630,720           4,584         9         41,256         135         618,844           4,040         10         40,400         150         606,000           3,624         11         39,864         165         597,966           3,240         12         38,880         180         583,200           2,952         13         38,376         195         575,646           2,696         14         37,744         210         566,160           2,440         15         36,600         225         549,000           2,248         16         35,968         240         539,520           2,088         17         35,496         255         532,440           1,768         19         33,592         285         503,880           1,640         20         32,800         300         492,000           1,544         21         32,424         315         486,364           1,352         23         31,096         345         466,440           1,352         23         31,096         345         466,464           1,256         24         30	7,240	6	43,440	90	651,600
4,584         9         41,256         135         618,844           4,040         10         40,400         150         606,000           3,624         11         39,864         165         597,964           3,240         12         38,880         180         583,200           2,952         13         38,376         195         575,641           2,696         14         37,744         210         566,161           2,440         15         36,600         225         549,000           2,248         16         35,968         240         539,521           2,088         17         35,496         255         532,444           1,928         18         34,704         270         520,560           1,768         19         33,592         285         503,886           1,640         20         32,800         300         492,000           1,544         21         32,424         315         486,360           1,256         24         30,144         360         452,161           1,600         25         29,000         375         435,000           1,096         26         2	6,120	7	42,840	105	642,600
4,040         10         40,400         150         606,000           3,624         11         39,864         165         597,966           3,240         12         38,880         180         583,200           2,952         13         38,376         195         575,641           2,696         14         37,744         210         566,160           2,440         15         36,600         225         549,000           2,248         16         35,968         240         539,520           2,088         17         35,496         255         532,440           1,928         18         34,704         270         520,566           1,768         19         33,592         285         503,880           1,640         20         32,800         300         492,000           1,544         21         32,424         315         486,366           1,352         23         31,096         345         466,440           1,352         23         31,096         345         466,440           1,096         26         28,496         390         427,440           1,096         26	5,256	8	42,048	120	630,720
3,624         11         39,864         165         597,966           3,240         12         38,880         180         583,200           2,952         13         38,376         195         575,644           2,696         14         37,744         210         566,166           2,248         16         35,968         240         539,524           2,088         17         35,496         255         532,444           1,928         18         34,704         270         520,566           1,768         19         33,592         285         503,886           1,640         20         32,800         300         492,000           1,544         21         32,424         315         486,360           1,352         23         31,096         345         466,446           1,352         23         31,096         345         466,446           1,032         27         27,864         405         417,960           1,032         27         27,864         405         417,960           904         29         26,216         435         393,244           840         30         25,2		l .	ł .	135	618,840
3,240         12         38,880         180         583,200           2,952         13         38,376         195         575,644           2,696         14         37,744         210         566,16           2,440         15         36,600         225         549,000           2,248         16         35,968         240         539,520           2,088         17         35,496         255         532,444           1,928         18         34,704         270         520,560           1,768         19         33,592         285         503,880           1,640         20         32,800         300         492,000           1,544         21         32,424         315         486,360           1,352         23         31,096         345         466,444           1,256         24         30,144         360         452,160           1,032         27         27,864         405         417,960           968         28         27,104         420         406,566           904         29         26,216         435         393,244           840         30         25,200<			ŀ	i	
2,952         13         38,376         195         575,644           2,696         14         37,744         210         566,166           2,440         15         36,600         225         549,000           2,248         16         35,968         240         539,520           2,088         17         35,496         255         532,444           1,928         18         34,704         270         520,566           1,768         19         33,592         285         503,880           1,640         20         32,800         300         492,000           1,544         21         32,424         315         486,364           1,448         22         31,856         330         477,840           1,352         23         31,096         345         466,441           1,600         25         29,000         375         435,000           1,096         26         28,496         390         427,446           1,032         27         27,864         405         417,960           968         28         27,104         420         406,560           904         29         26,2	, ·			l	597,960
2,696         14         37,744         210         566,166           2,440         15         36,600         225         549,000           2,248         16         35,968         240         539,526           2,088         17         35,496         255         532,444           1,928         18         34,704         270         520,566           1,768         19         33,592         285         503,880           1,640         20         32,800         300         492,000           1,544         21         32,424         315         486,364           1,352         23         31,096         345         466,440           1,352         23         31,096         345         466,440           1,160         25         29,000         375         435,000           1,096         26         28,496         390         427,440           1,032         27         27,864         405         417,960           968         28         27,104         420         406,560           904         29         26,216         435         393,240           808         31         25,048				l	
2,440         15         36,600         225         549,000           2,248         16         35,968         240         539,521           2,088         17         35,496         255         532,440           1,928         18         34,704         270         520,560           1,768         19         33,592         285         503,886           1,640         20         32,800         300         492,000           1,544         21         32,424         315         486,360           1,448         22         31,856         330         477,840           1,352         23         31,096         345         466,440           1,160         25         29,000         375         435,000           1,096         26         28,496         390         427,440           1,032         27         27,864         405         417,960           968         28         27,104         420         406,560           904         29         26,216         435         393,240           840         30         25,200         450         378,000           808         31         25,048 </td <td></td> <td></td> <td>1</td> <td></td> <td></td>			1		
2,248         16         35,968         240         539,526           2,088         17         35,496         255         532,446           1,928         18         34,704         270         520,566           1,768         19         33,592         285         503,886           1,640         20         32,800         300         492,000           1,544         21         32,424         315         486,361           1,448         22         31,856         330         477,840           1,352         23         31,096         345         466,440           1,256         24         30,144         360         452,160           1,096         26         28,496         390         427,440           1,096         26         28,496         390         427,440           1,032         27         27,864         405         417,966           904         29         26,216         435         393,240           840         30         25,200         450         378,000           808         31         25,048         465         375,720           744         32         23,808 </td <td></td> <td></td> <td></td> <td></td> <td></td>					
2,088         17         35,496         255         532,444           1,928         18         34,704         270         520,566           1,768         19         33,592         285         503,886           1,640         20         32,800         300         492,000           1,544         21         32,424         315         486,360           1,352         23         31,096         345         466,440           1,352         23         31,096         345         466,440           1,256         24         30,144         360         452,160           1,096         26         28,496         390         427,440           1,032         27         27,864         405         417,960           968         28         27,104         420         406,560           904         29         26,216         435         393,240           808         31         25,048         465         375,720           744         32         23,808         480         357,120           712         33         23,496         495         352,446           616         35         21,560					
1,928         18         34,704         270         520,566           1,768         19         33,592         285         503,886           1,640         20         32,800         300         492,000           1,544         21         32,424         315         486,360           1,352         23         31,096         345         466,440           1,256         24         30,144         360         452,160           1,096         26         28,496         390         427,440           1,032         27         27,864         405         417,960           968         28         27,104         420         406,566           904         29         26,216         435         393,240           840         30         25,200         450         378,000           808         31         25,048         465         375,720           744         32         23,808         480         357,120           712         33         23,496         495         352,440           680         34         23,120         510         346,800           584         36         21,560	1 '	i e		1	
1,768         19         33,592         285         503,886           1,640         20         32,800         300         492,000           1,544         21         32,424         315         486,364           1,448         22         31,856         330         477,846           1,352         23         31,096         345         466,444           1,256         24         30,144         360         452,166           1,160         25         29,000         375         435,000           1,096         26         28,496         390         427,446           1,032         27         27,864         405         417,960           968         28         27,104         420         406,560           904         29         26,216         435         393,244           840         30         25,200         450         378,000           808         31         25,048         465         375,720           712         33         23,496         495         352,440           680         34         23,120         510         346,800           584         36         21,560	1 '				1
1,640         20         32,800         300         492,000           1,544         21         32,424         315         486,364           1,448         22         31,856         330         477,840           1,352         23         31,096         345         466,444           1,256         24         30,144         360         452,160           1,160         25         29,000         375         435,000           1,096         26         28,496         390         427,440           1,032         27         27,864         405         417,960           968         28         27,104         420         406,560           904         29         26,216         435         393,244           840         30         25,200         450         378,000           808         31         25,048         465         375,720           744         32         23,808         480         357,120           712         33         23,496         495         352,440           680         34         23,120         510         346,800           584         36         21,560					1
1,544         21         32,424         315         486,366           1,448         22         31,856         330         477,846           1,352         23         31,096         345         466,446           1,256         24         30,144         360         452,166           1,160         25         29,000         375         435,000           1,096         26         28,496         390         427,446           1,032         27         27,864         405         417,960           968         28         27,104         420         406,560           904         29         26,216         435         393,244           840         30         25,200         450         378,000           808         31         25,048         465         375,720           344         32         23,808         480         357,120           712         33         23,496         495         352,440           680         34         23,120         510         346,800           552         37         20,424         540         315,360           552         37         20,424	1 '			l	1
1,448         22         31,856         330         477,840           1,352         23         31,096         345         466,440           1,256         24         30,144         360         452,160           1,160         25         29,000         375         435,000           1,096         26         28,496         390         427,440           1,032         27         27,864         405         417,966           968         28         27,104         420         406,560           904         29         26,216         435         393,240           840         30         25,200         450         378,000           808         31         25,048         465         375,720           744         32         23,808         480         357,120           744         32         23,808         480         357,120           744         32         23,808         480         357,120           712         33         23,496         495         352,440           680         34         23,120         510         346,800           584         36         21,024	1 '			i .	
1,352         23         31,096         345         466,446           1,256         24         30,144         360         452,166           1,160         25         29,000         375         435,000           1,096         26         28,496         390         427,446           1,032         27         27,864         405         417,966           968         28         27,104         420         406,566           904         29         26,216         435         393,240           840         30         25,200         450         378,000           808         31         25,048         465         375,720           744         32         23,808         480         357,120           712         33         23,496         495         352,400           680         34         23,120         510         346,800           584         36         21,560         525         323,400           584         36         21,024         540         315,360           552         37         20,424         555         306,360           488         39         19,032 <t< td=""><td></td><td></td><td></td><td>i</td><td></td></t<>				i	
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1,160         25         29,000         375         435,000           1,096         26         28,496         390         427,444           1,032         27         27,864         405         417,960           968         28         27,104         420         406,560           904         29         26,216         435         393,244           840         30         25,200         450         378,000           808         31         25,048         465         375,720           744         32         23,808         480         357,120           712         33         23,496         495         352,440           680         34         23,120         510         346,800           616         35         21,560         525         323,400           584         36         21,024         540         315,360           552         37         20,424         555         306,360           552         37         20,424         555         306,360           488         39         19,032         585         285,480           456         40         18,240         60				1	
1,096         26         28,496         390         427,446           1,032         27         27,864         405         417,960           968         28         27,104         420         406,566           904         29         26,216         435         393,244           840         30         25,200         450         378,000           808         31         25,048         465         375,720           744         32         23,808         480         357,172           680         34         23,120         510         346,800           616         35         21,560         525         323,400           584         36         21,024         540         315,360           552         37         20,424         555         306,360           552         38         19,760         570         296,400           488         39         19,032         585         285,480           456         40         18,240         600         273,600           424         41         17,384         615         260,760           392         42         16,464         630<			1		1
1,032         27         27,864         405         417,960           968         28         27,104         420         406,566           904         29         26,216         435         393,244           840         30         25,200         450         378,000           808         31         25,048         465         375,720           744         32         23,808         480         357,120           712         33         23,496         495         352,440           680         34         23,120         510         346,800           616         35         21,560         525         323,400           584         36         21,024         540         315,360           552         37         20,424         555         306,360           552         38         19,760         570         296,400           488         39         19,032         585         285,480           456         40         18,240         600         273,600           424         41         17,384         615         260,760           392         42         16,464         630 <td></td> <td>i</td> <td></td> <td></td> <td></td>		i			
968         28         27,104         420         406,560           904         29         26,216         435         393,240           840         30         25,200         450         378,000           808         31         25,048         465         375,720           744         32         23,808         480         357,120           712         33         23,496         495         352,440           680         34         23,120         510         346,800           616         35         21,560         525         323,400           584         36         21,024         540         315,360           552         37         20,424         555         306,360           520         38         19,760         570         296,400           488         39         19,032         585         285,480           456         40         18,240         600         273,600           424         41         17,384         615         260,760           392         42         16,464         630         246,960           328         45         14,760         675			•		417,960
904         29         26,216         435         393,240           840         30         25,200         450         378,000           808         31         25,048         465         375,720           744         32         23,808         480         357,120           712         33         23,496         495         352,440           680         34         23,120         510         346,800           616         35         21,560         525         323,400           584         36         21,024         540         315,360           552         37         20,424         555         306,360           550         38         19,760         570         296,400           488         39         19,032         585         285,480           456         40         18,240         600         273,600           424         41         17,384         615         260,760           392         42         16,464         630         246,960           360         44         15,840         660         237,600           328         45         14,760         675			1	1	406,560
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744         32         23,808         480         357,120           712         33         23,496         495         352,440           680         34         23,120         510         346,800           616         35         21,560         525         323,400           584         36         21,024         540         315,360           552         37         20,424         555         306,360           520         38         19,760         570         296,400           488         39         19,032         585         285,486           456         40         18,240         600         273,600           424         41         17,384         615         260,760           392         42         16,464         630         246,960           360         44         15,840         660         237,600           328         45         14,760         675         221,400           296         46         13,616         690         204,240           264         48         12,672         720         190,080           232         49         11,368         735	840	30	25,200	450	378,000
712         33         23,496         495         352,446           680         34         23,120         510         346,800           616         35         21,560         525         323,400           584         36         21,024         540         315,360           552         37         20,424         555         306,360           520         38         19,760         570         296,400           488         39         19,032         585         285,480           456         40         18,240         600         273,600           424         41         17,384         615         260,760           392         42         16,464         630         246,960           360         44         15,840         660         237,600           328         45         14,760         675         221,400           296         46         13,616         690         204,240           264         48         12,672         720         190,080           232         49         11,368         735         170,520           200         51         10,200         765	808	31	25,048	465	375,720
680         34         23,120         510         346,800           616         35         21,560         525         323,400           584         36         21,024         540         315,360           552         37         20,424         555         306,360           520         38         19,760         570         296,400           488         39         19,032         585         285,480           456         40         18,240         600         273,600           424         41         17,384         615         260,760           392         42         16,464         630         246,960           360         44         15,840         660         237,600           328         45         14,760         675         221,400           296         46         13,616         690         204,240           264         48         12,672         720         190,080           232         49         11,368         735         170,520           200         51         10,200         765         153,000           168         53         8,904         795	744	32	23,808	480	357,120
616         35         21,560         525         323,400           584         36         21,024         540         315,360           552         37         20,424         555         306,360           520         38         19,760         570         296,400           488         39         19,032         585         285,480           456         40         18,240         600         273,600           424         41         17,384         615         260,760           392         42         16,464         630         246,960           360         44         15,840         660         237,600           328         45         14,760         675         221,400           296         46         13,616         690         204,240           264         48         12,672         720         190,080           232         49         11,368         735         170,520           200         51         10,200         765         153,000           168         53         8,904         795         133,560	712	33	23,496	495	352,440
584         36         21,024         540         315,360           552         37         20,424         555         306,360           520         38         19,760         570         296,400           488         39         19,032         585         285,480           456         40         18,240         600         273,600           424         41         17,384         615         260,760           392         42         16,464         630         246,960           360         44         15,840         660         237,600           328         45         14,760         675         221,400           296         46         13,616         690         204,240           264         48         12,672         720         190,080           232         49         11,368         735         170,520           200         51         10,200         765         153,000           168         53         8,904         795         133,560	680	34	23,120	510	346,800
552         37         20,424         555         306,360           520         38         19,760         570         296,400           488         39         19,032         585         285,480           456         40         18,240         600         273,600           424         41         17,384         615         260,760           392         42         16,464         630         246,960           360         44         15,840         660         237,600           328         45         14,760         675         221,400           296         46         13,616         690         204,240           264         48         12,672         720         190,080           232         49         11,368         735         170,520           200         51         10,200         765         153,000           168         53         8,904         795         133,560	616	35	21,560	ŀ	323,400
520         38         19,760         570         296,400           488         39         19,032         585         285,480           456         40         18,240         600         273,600           424         41         17,384         615         260,760           392         42         16,464         630         246,960           360         44         15,840         660         237,600           328         45         14,760         675         221,400           296         46         13,616         690         204,240           264         48         12,672         720         190,080           232         49         11,368         735         170,520           200         51         10,200         765         153,000           168         53         8,904         795         133,560				1	315,360
488         39         19,032         585         285,480           456         40         18,240         600         273,600           424         41         17,384         615         260,760           392         42         16,464         630         246,960           360         44         15,840         660         237,600           328         45         14,760         675         221,400           296         46         13,616         690         204,240           264         48         12,672         720         190,080           232         49         11,368         735         170,520           200         51         10,200         765         153,000           168         53         8,904         795         133,560	552	37	20,424	555	306,360
456         40         18,240         600         273,600           424         41         17,384         615         260,760           392         42         16,464         630         246,960           360         44         15,840         660         237,600           328         45         14,760         675         221,400           296         46         13,616         690         204,240           264         48         12,672         720         190,080           232         49         11,368         735         170,520           200         51         10,200         765         153,000           168         53         8,904         795         133,560	520	38	19,760	570	296,400
424         41         17,384         615         260,760           392         42         16,464         630         246,960           360         44         15,840         660         237,600           328         45         14,760         675         221,400           296         46         13,616         690         204,240           264         48         12,672         720         190,080           232         49         11,368         735         170,520           200         51         10,200         765         153,000           168         53         8,904         795         133,560		39		585	285,480
392         42         16,464         630         246,960           360         44         15,840         660         237,600           328         45         14,760         675         221,400           296         46         13,616         690         204,240           264         48         12,672         720         190,080           232         49         11,368         735         170,520           200         51         10,200         765         153,000           168         53         8,904         795         133,560	1			•	273,600
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328         45         14,760         675         221,400           296         46         13,616         690         204,240           264         48         12,672         720         190,080           232         49         11,368         735         170,520           200         51         10,200         765         153,000           168         53         8,904         795         133,560	1				246,960
296         46         13,616         690         204,240           264         48         12,672         720         190,080           232         49         11,368         735         170,520           200         51         10,200         765         153,000           168         53         8,904         795         133,560			1	i i	
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## **Notes**

#### First Edition (February 1983)

This reference summary is based on information in the *IBM* 3380 Direct Access Storage Description and User's Guide, Order No. GA26-1664.

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