

Technical Reference

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General Information

ASCII Character Code Charts

Figure 1 lists ASCII control character values. Figure 2 shows the IBM extended ASCII line-drawing characters in an easy-to-use format. I frequently use these extended ASCII line-drawing characters for visual enhancement in documents I create.

DEC	HEX	CHAR	NAME		CONTROL CODE
0	00		Ctrl-@	NUL	Null
1	01	☺	Ctrl-A	SOH	Start of Heading
2	02	●	Ctrl-B	STX	Start of Text
3	03	♥	Ctrl-C	ETX	End of Text
4	04	♦	Ctrl-D	EOT	End of Transit
5	05	♣	Ctrl-E	ENQ	Enquiry
6	06	♠	Ctrl-F	ACK	Acknowledge
7	07	•	Ctrl-G	BEL	Bell
8	08	▣	Ctrl-H	BS	Back Space
9	09	◦	Ctrl-I	HT	Horizontal Tab
10	0A	▣	Ctrl-J	LF	Line Feed
11	0B	♂	Ctrl-K	VT	Vertical Tab
12	0C		Ctrl-L	FF	Form Feed
13	0D	♪	Ctrl-M	CR	Carriage Return
14	0E	♪	Ctrl-N	SO	Shift Out
15	0F	✱	Ctrl-O	SI	Shift In
16	10	▶	Ctrl-P	DLE	Data Line Escape
17	11	◀	Ctrl-Q	DC1	Device Control 1
18	12	↕	Ctrl-R	DC2	Device Control 2
19	13	!!	Ctrl-S	DC3	Device Control 3
20	14	¶	Ctrl-T	DC4	Device Control 4
21	15	§	Ctrl-U	NAK	Negative Acknowledge
22	16	■	Ctrl-V	SYN	Synchronous Idle
23	17	↕	Ctrl-W	ETB	End of Transmit Block
24	18	↑	Ctrl-X	CAN	Cancel
25	19	↓	Ctrl-Y	EM	End of Medium
26	1A	↶	Ctrl-Z	SUB	Substitute
27	1B	→	Ctrl-[	ESC	Escape
28	1C	└	Ctrl-\	FS	File Separator
29	1D	↔	Ctrl-]	GS	Group Separator
30	1E	▲	Ctrl-^	RS	Record Separator
31	1FA	▼	Ctrl-_	US	Unit Separator

Figure 1 ASCII control codes.

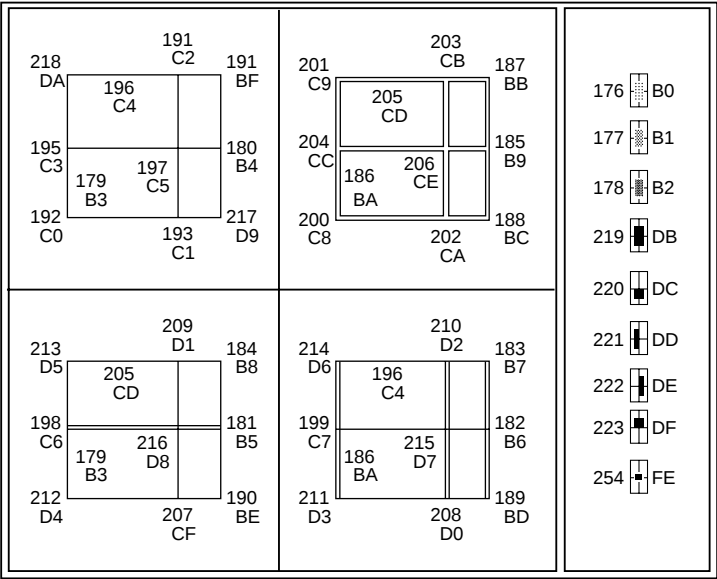


Figure 2 Extended ASCII line-drawing characters.

Hexadecimal/ASCII Conversions

Table 1 Hexadecimal/ASCII Conversions

Dec	Hex	Octal	Binary	Name	Character
0	00	000	0000 0000	blank	
1	01	001	0000 0001	happy face	☺
2	02	002	0000 0010	inverse happy face	☹
3	03	003	0000 0011	heart	♥
4	04	004	0000 0100	diamond	♦
5	05	005	0000 0101	club	♣
6	06	006	0000 0110	spade	♠
7	07	007	0000 0111	bullet	•
8	08	010	0000 1000	inverse bullet	◼
9	09	011	0000 1001	circle	○
10	0A	012	0000 1010	inverse circle	◊
11	0B	013	0000 1011	male sign	♂
12	0C	014	0000 1100	female sign	♀
13	0D	015	0000 1101	single note	♪
14	0E	016	0000 1110	double note	♫
15	0F	017	0000 1111	sun	☼
16	10	020	0001 0000	right triangle	▸
17	11	021	0001 0001	left triangle	▹
18	12	022	0001 0010	up / down arrow	↕

(continues)

Table 1 Continued

Dec	Hex	Octal	Binary	Name	Character
19	13	023	0001 0011	double exclamation	!!
20	14	024	0001 0100	paragraph sign	¶
21	15	025	0001 0101	section sign	§
22	16	026	0001 0110	rectangular bullet	■
23	17	027	0001 0111	up / down to line	‡
24	18	030	0001 1000	up arrow	↑
25	19	031	0001 1001	down arrow	↓
26	1A	032	0001 1010	right arrow	→
27	1B	033	0001 1011	left arrow	←
28	1C	034	0001 1100	lower left box	⌞
29	1D	035	0001 1101	left / right arrow	↔
30	1E	036	0001 1110	up triangle	▲
31	1F	037	0001 1111	down triangle	▼
32	20	040	0010 0000	space	Space
33	21	041	0010 0001	exclamation point	!
34	22	042	0010 0010	quotation mark	"
35	23	043	0010 0011	number sign	#
36	24	044	0010 0100	dollar sign	\$
37	25	045	0010 0101	percent sign	%
38	26	046	0010 0110	ampersand	&
39	27	047	0010 0111	apostrophe	'
40	28	050	0010 1000	opening parenthesis	(
41	29	051	0010 1001	closing parenthesis	)
42	2A	052	0010 1010	asterisk	*
43	2B	053	0010 1011	plus sign	+
44	2C	054	0010 1100	comma	,
45	2D	055	0010 1101	hyphen or minus sign	-
46	2E	056	0010 1110	period	.
47	2F	057	0010 1111	slash	/
48	30	060	0011 0000	zero	0
49	31	061	0011 0001	one	1
50	32	062	0011 0010	two	2
51	33	063	0011 0011	three	3
52	34	064	0011 0100	four	4
53	35	065	0011 0101	five	5
54	36	066	0011 0110	six	6
55	37	067	0011 0111	seven	7
56	38	070	0011 1000	eight	8
57	39	071	0011 1001	nine	9
58	3A	072	0011 1010	colon	:
59	3B	073	0011 1011	semicolon	;
60	3C	074	0011 1100	less-than sign	<
61	3D	075	0011 1101	equal sign	=

Dec	Hex	Octal	Binary	Name	Character
62	3E	076	0011 1110	greater-than sign	>
63	3F	077	0011 1111	question mark	?
64	40	100	0100 0000	at sign	@
65	41	101	0100 0001	capital A	A
66	42	102	0100 0010	capital B	B
67	43	103	0100 0011	capital C	C
68	44	104	0100 0100	capital D	D
69	45	105	0100 0101	capital E	E
70	46	106	0100 0110	capital F	F
71	47	107	0100 0111	capital G	G
72	48	110	0100 1000	capital H	H
73	49	111	0100 1001	capital I	I
74	4A	112	0100 1010	capital J	J
75	4B	113	0100 1011	capital K	K
76	4C	114	0100 1100	capital L	L
77	4D	115	0100 1101	capital M	M
78	4E	116	0100 1110	capital N	N
79	4F	117	0100 1111	capital O	O
80	50	120	0101 0000	capital P	P
81	51	121	0101 0001	capital Q	Q
82	52	122	0101 0010	capital R	R
83	53	123	0101 0011	capital S	S
84	54	124	0101 0100	capital T	T
85	55	125	0101 0101	capital U	U
86	56	126	0101 0110	capital V	V
87	57	127	0101 0111	capital W	W
88	58	130	0101 1000	capital X	X
89	59	131	0101 1001	capital Y	Y
90	5A	132	0101 1010	capital Z	Z
91	5B	133	0101 1011	opening bracket	[
92	5C	134	0101 1100	backward slash	\
93	5D	135	0101 1101	closing bracket	]
94	5E	136	0101 1110	caret	^
95	5F	137	0101 1111	underscore	_
96	60	140	0110 0000	grave	`
97	61	141	0110 0001	lowercase A	a
98	62	142	0110 0010	lowercase B	b
99	63	143	0110 0011	lowercase C	c
100	64	144	0110 0100	lowercase D	d
101	65	145	0110 0101	lowercase E	e
102	66	146	0110 0110	lowercase F	f
103	67	147	0110 0111	lowercase G	g
104	68	150	0110 1000	lowercase H	h

(continues)

Table 1 Continued

Dec	Hex	Octal	Binary	Name	Character
105	69	151	0110 1001	lowercase I	i
106	6A	152	0110 1010	lowercase J	j
107	6B	153	0110 1011	lowercase K	k
108	6C	154	0110 1100	lowercase L	l
109	6D	155	0110 1101	lowercase M	m
110	6E	156	0110 1110	lowercase N	n
111	6F	157	0110 1111	lowercase O	o
112	70	160	0111 0000	lowercase P	p
113	71	161	0111 0001	lowercase Q	q
114	72	162	0111 0010	lowercase R	r
115	73	163	0111 0011	lowercase S	s
116	74	164	0111 0100	lowercase T	t
117	75	165	0111 0101	lowercase U	u
118	76	166	0111 0110	lowercase V	v
119	77	167	0111 0111	lowercase W	w
120	78	170	0111 1000	lowercase X	x
121	79	171	0111 1001	lowercase Y	y
122	7A	172	0111 1010	lowercase Z	z
123	7B	173	0111 1011	opening brace	{
124	7C	174	0111 1100	vertical line	
125	7D	175	0111 1101	closing brace	}
126	7E	176	0111 1110	tilde	~
127	7F	177	0111 1111	small house	Δ
128	80	200	1000 0000	C cedilla	Ç
129	81	201	1000 0001	u umlaut	ü
130	82	202	1000 0010	e acute	é
131	83	203	1000 0011	a circumflex	â
132	84	204	1000 0100	a umlaut	ä
133	85	205	1000 0101	a grave	à
134	86	206	1000 0110	a ring	å
135	87	207	1000 0111	c cedilla	ç
136	88	210	1000 1000	e circumflex	ê
137	89	211	1000 1001	e umlaut	ë
138	8A	212	1000 1010	e grave	è
139	8B	213	1000 1011	I umlaut	ï
140	8C	214	1000 1100	I circumflex	î
141	8D	215	1000 1101	I grave	ì
142	8E	216	1000 1110	A umlaut	Ä
143	8F	217	1000 1111	A ring	Å
144	90	220	1001 0000	E acute	É
145	91	221	1001 0001	ae ligature	æ
146	92	222	1001 0010	AE ligature	Æ
147	93	223	1001 0011	o circumflex	ô

Dec	Hex	Octal	Binary	Name	Character
148	94	224	1001 0100	o umlaut	ö
149	95	225	1001 0101	o grave	ò
150	96	226	1001 0110	u circumflex	û
151	97	227	1001 0111	u grave	ù
152	98	230	1001 1000	y umlaut	ÿ
153	99	231	1001 1001	O umlaut	Ö
154	9A	232	1001 1010	U umlaut	Ü
155	9B	233	1001 1011	cent sign	¢
156	9C	234	1001 1100	pound sign	£
157	9D	235	1001 1101	yen sign	¥
158	9E	236	1001 1110	Pt	₤
159	9F	237	1001 1111	function	ƒ
160	A0	240	1010 0000	a acute	á
161	A1	241	1010 0001	l acute	í
162	A2	242	1010 0010	o acute	ó
163	A3	243	1010 0011	u acute	ú
164	A4	244	1010 0100	n tilde	ñ
165	A5	245	1010 0101	N tilde	Ñ
166	A6	246	1010 0110	a macron	ā
167	A7	247	1010 0111	o macron	ō
168	A8	250	1010 1000	opening question mark	¿
169	A9	251	1010 1001	upper-left box	␣
170	AA	252	1010 1010	upper-right box	␤
171	AB	253	1010 1011	1 / 2	½
172	AC	254	1010 1100	1 / 4	¼
173	AD	255	1010 1101	opening exclamation	¡
174	AE	256	1010 1110	opening guillemets	«
175	AF	257	1010 1111	closing guillemets	»
176	B0	260	1011 0000	light block	░
177	B1	261	1011 0001	medium block	▒
178	B2	262	1011 0010	dark block	▓
179	B3	263	1011 0011	single vertical	
180	B4	264	1011 0100	single right junction	└
181	B5	265	1011 0101	2 to 1 right junction	┘
182	B6	266	1011 0110	1 to 2 right junction	┐
183	B7	267	1011 0111	1 to 2 upper-right	┌
184	B8	270	1011 1000	2 to 1 upper-right	┐
185	B9	271	1011 1001	double right junction	┘
186	BA	272	1011 1010	double vertical	
187	BB	273	1011 1011	double upper-right	┌
188	BC	274	1011 1100	double lower-right	┐
189	BD	275	1011 1101	1 to 2 lower-right	┘
190	BE	276	1011 1110	2 to 1 lower-right	└
191	BF	277	1011 1111	single upper-right	┐

(continues)

Table 1 Continued

Dec	Hex	Octal	Binary	Name	Character
192	C0	300	1100 0000	single lower-left	└
193	C1	301	1100 0001	single lower junction	┴
194	C2	302	1100 0010	single upper junction	┐
195	C3	303	1100 0011	single left junction	┌
196	C4	304	1100 0100	single horizontal	—
197	C5	305	1100 0101	single intersection	⋈
198	C6	306	1100 0110	2 to 1 left junction	┐┌
199	C7	307	1100 0111	1 to 2 left junction	┌┌
200	C8	310	1100 1000	double lower-left	└└
201	C9	311	1100 1001	double upper-left	┐┐
202	CA	312	1100 1010	double lower junction	┴┴
203	CB	313	1100 1011	double upper junction	┐┐
204	CC	314	1100 1100	double left junction	┌┌
205	CD	315	1100 1101	double horizontal	=
206	CE	316	1100 1110	double intersection	⋈⋈
207	CF	317	1100 1111	1 to 2 lower junction	┴┴
208	D0	320	1101 0000	2 to 1 lower junction	└└
209	D1	321	1101 0001	1 to 2 upper junction	┐┐
210	D2	322	1101 0010	2 to 1 upper junction	┐┐
211	D3	323	1101 0011	1 to 2 lower-left	└└
212	D4	324	1101 0100	2 to 1 lower-left	└└
213	D5	325	1101 0101	2 to 1 upper-left	┐┐
214	D6	326	1101 0110	1 to 2 upper-left	┐┐
215	D7	327	1101 0111	2 to 1 intersection	⋈
216	D8	330	1101 1000	1 to 2 intersection	⋈
217	D9	331	1101 1001	single lower-right	┘
218	DA	332	1101 1010	single upper-right	┐
219	DB	333	1101 1011	inverse space	■
220	DC	334	1101 1100	lower inverse	■
221	DD	335	1101 1101	left inverse	┌
222	DE	336	1101 1110	right inverse	┐
223	DF	337	1101 1111	upper inverse	■
224	E0	340	1110 0000	alpha	α
225	E1	341	1110 0001	beta	β
226	E2	342	1110 0010	Gamma	Γ
227	E3	343	1110 0011	pi	π
228	E4	344	1110 0100	Sigma	Σ
229	E5	345	1110 0101	sigma	σ
230	E6	346	1110 0110	mu	μ
231	E7	347	1110 0111	tau	τ
232	E8	350	1110 1000	Phi	Φ
233	E9	351	1110 1001	theta	θ
234	EA	352	1110 1010	Omega	Ω

Dec	Hex	Octal	Binary	Name	Character
235	EB	353	1110 1011	delta	δ
236	EC	354	1110 1100	infinity	∞
237	ED	355	1110 1101	phi	φ
238	EE	356	1110 1110	epsilon	ε
239	EF	357	1110 1111	intersection of sets	∩
240	F0	360	1111 0000	is identical to	≡
241	F1	361	1111 0001	plus / minus sign	±
242	F2	362	1111 0010	greater / equal sign	≥
243	F3	363	1111 0011	less / equal sign	≤
244	F4	364	1111 0100	top half integral	∫
245	F5	365	1111 0101	lower half integral	∫
246	F6	366	1111 0110	division sign	÷
247	F7	367	1111 0111	approximately	≈
248	F8	370	1111 1000	degree	°
249	F9	371	1111 1001	filled-in degree	•
250	FA	372	1111 1010	small bullet	•
251	FB	373	1111 1011	square root	√
252	FC	374	1111 1100	superscript n	ⁿ
253	FD	375	1111 1101	superscript 2	²
254	FE	376	1111 1110	box	■
255	FF	377	1111 1111	phantom space	␣

Extended ASCII Keycodes for ANSI.SYS

Table 2 Extended ASCII Keycodes for ANSI.SYS

Code	Keystroke	Code	Keystroke
0;1	Alt+Esc	0;28	Alt+Enter
0;3	Null Character	0;30	Alt+A
0;14	Alt+Backspace	0;31	Alt+S
0;15	Shift+Tab	0;32	Alt+D
0;16	Alt+Q	0;33	Alt+F
0;17	Alt+W	0;34	Alt+G
0;18	Alt+E	0;35	Alt+H
0;19	Alt+R	0;36	Alt+J
0;20	Alt+T	0;37	Alt+K
0;21	Alt+Y	0;38	Alt+L
0;22	Alt+U	0;39	Alt+;
0;23	Alt+I	0;40	Alt+'
0;24	Alt+O	0;41	Alt+'
0;25	Alt+P	0;43	Alt+ \
0;26	Alt+[	0;44	Alt+Z
0;27	Alt+]	0;45	Alt+X

(continues)

Table 2 Continued

Code	Keystroke	Code	Keystroke
0;46	Alt+C	0;95	Ctrl+F2
0;47	Alt+V	0;96	Ctrl+F3
0;48	Alt+B	0;97	Ctrl+F4
0;49	Alt+N	0;98	Ctrl+F5
0;50	Alt+M	0;99	Ctrl+F6
0;51	Alt+,	0;100	Ctrl+F7
0;52	Alt+.	0;101	Ctrl+F8
0;53	Alt+ /	0;102	Ctrl+F9
0;55	Alt+Keypad *	0;103	Ctrl+F10
0;59	F1	0;104	Alt+F1
0;60	F2	0;105	Alt+F2
0;61	F3	0;106	Alt+F3
0;62	F4	0;107	Alt+F4
0;63	F5	0;108	Alt+F5
0;64	F6	0;109	Alt+F6
0;65	F7	0;110	Alt+F7
0;66	F8	0;111	Alt+F8
0;67	F9	0;112	Alt+F9
0;68	F10	0;113	Alt+F10
0;71	Home	0;114	Ctrl+Print Screen
0;72	Up Arrow	0;115	Ctrl+Left Arrow
0;73	Page Up	0;116	Ctrl+Right Arrow
0;74	Alt+Keypad -	0;117	Ctrl+End
0;75	Left Arrow	0;118	Ctrl+Page Down
0;76	Keypad 5	0;119	Ctrl+Home
0;77	Right Arrow	0;120	Alt+1
0;78	Alt+Keypad +	0;121	Alt+2
0;79	End	0;122	Alt+3
0;80	Down Arrow	0;123	Alt+4
0;81	Page Down	0;124	Alt+5
0;82	Insert	0;125	Alt+6
0;83	Delete	0;126	Alt+7
0;84	Shift+F1	0;127	Alt+8
0;85	Shift+F2	0;128	Alt+9
0;86	Shift+F3	0;129	Alt+0
0;87	Shift+F4	0;130	Alt+-
0;88	Shift+F5	0;131	<Alt+=
0;89	Shift+F6	0;132	<Ctrl+Page Up
0;90	Shift+F7	0;133	F11
0;91	Shift+F8	0;134	F12
0;92	Shift+F9	0;135	Shift+F11
0;93	Shift+F10	0;136	Shift+F12
0;94	Ctrl+F1	0;137	Ctrl+F11

Code	Keystroke	Code	Keystroke
0;138	Ctrl+F12	0;151	Alt+Home
0;139	Alt+F11	0;152	Alt+Up Arrow
0;140	Alt+F12	0;153	Alt+Page Up
0;141	Ctrl+Up Arrow	0;155	Alt+Left Arrow
0;142	Ctrl+Keypad -	0;157	Alt+Right Arrow
0;143	Ctrl+Keypad 5	0;159	Alt+End
0;144	Ctrl+Keypad +	0;160	Alt+Down Arrow
0;145	Ctrl+Down Arrow	0;161	Alt+Page Down
0;146	Ctrl+Insert	0;162	Alt+Insert
0;147	Ctrl+Delete	0;163	Alt+Delete
0;148	Ctrl+Tab	0;164	Alt+Keypad /
0;149	Ctrl+Keypad /	0;165	Alt+Tab
0;150	Ctrl+Keypad *	0;166	Alt+Keypad Enter

EBCDIC Character Codes

Table 3 EBCDIC Character Codes

Dec	Hex	Octal	Binary	Name	Character
0	00	000	0000 0000	NUL	
1	01	001	0000 0001	SOH	
2	02	002	0000 0010	STX	
3	03	003	0000 0011	ETX	
4	04	004	0000 0100	SEL	
5	05	005	0000 0101	HT	
6	06	006	0000 0110	RNL	
7	07	007	0000 0111	DEL	
8	08	010	0000 1000	GE	
9	09	011	0000 1001	SPS	
10	0A	012	0000 1010	RPT	
11	0B	013	0000 1011	VT	
12	0C	014	0000 1100	FF	
13	0D	015	0000 1101	CR	
14	0E	016	0000 1110	SO	
15	0F	017	0000 1111	SI	
16	10	020	0001 0000	DLE	
17	11	021	0001 0001	DC1	
18	12	022	0001 0010	DC2	
19	13	023	0001 0011	DC3	
20	14	024	0001 0100	RES / ENP	
21	15	025	0001 0101	NL	
22	16	026	0001 0110	BS	
23	17	027	0001 0111	POC	

(continues)

Table 3 Continued

Dec	Hex	Octal	Binary	Name	Character
24	18	030	0001 1000	CAN	
25	19	031	0001 1001	EM	
26	1A	032	0001 1010	UBS	
27	1B	033	0001 1011	CU1	
28	1C	034	0001 1100	IFS	
29	1D	035	0001 1101	IGS	
30	1E	036	0001 1110	IRS	
31	1F	037	0001 1111	IUS/ITB	
32	20	040	0010 0000	DS	
33	21	041	0010 0001	SOS	
34	22	042	0010 0010	FS	
35	23	043	0010 0011	WUS	
36	24	044	0010 0100	BYP/INP	
37	25	045	0010 0101	LF	
38	26	046	0010 0110	ETB	
39	27	047	0010 0111	ESC	
40	28	050	0010 1000	SA	
41	29	051	0010 1001	SFE	
42	2A	052	0010 1010	SM/SW	
43	2B	053	0010 1011	CSP	
44	2C	054	0010 1100	MFA	
45	2D	055	0010 1101	ENQ	
46	2E	056	0010 1110	ACK	
47	2F	057	0010 1111	BEL	
48	30	060	0011 0000		
49	31	061	0011 0001		
50	32	062	0011 0010	SYN	
51	33	063	0011 0011	IR	
52	34	064	0011 0100	PP	
53	35	065	0011 0101	TRN	
54	36	066	0011 0110	NBS	
55	37	067	0011 0111	EOT	
56	38	070	0011 1000	SBS	
57	39	071	0011 1001	IT	
58	3A	072	0011 1010	RFF	
59	3B	073	0011 1011	CU3	
60	3C	074	0011 1100	DC4	
61	3D	075	0011 1101	NAK	
62	3E	076	0011 1110		
63	3F	077	0011 1111	SUB	
64	40	100	0100 0000	SP	
65	41	101	0100 0001	RSP	
66	42	102	0100 0010		

Dec	Hex	Octal	Binary	Name	Character
67	43	103	0100 0011		
68	44	104	0100 0100		
69	45	105	0100 0101		
70	46	106	0100 0110		
71	47	107	0100 0111		
72	48	110	0100 1000		
73	49	111	0100 1001		
74	4A	112	0100 1010		¢
75	4B	113	0100 1011		.
76	4C	114	0100 1100		<
77	4D	115	0100 1101		(
78	4E	116	0100 1110		+
79	4F	117	0100 1111		
80	50	120	0101 0000		&
81	51	121	0101 0001		
82	52	122	0101 0010		
83	53	123	0101 0011		
84	54	124	0101 0100		
85	55	125	0101 0101		
86	56	126	0101 0110		
87	57	127	0101 0111		
88	58	130	0101 1000		
89	59	131	0101 1001		
90	5A	132	0101 1010		!
91	5B	133	0101 1011		\$
92	5C	134	0101 1100		*
93	5D	135	0101 1101		)
94	5E	136	0101 1110		;
95	5F	137	0101 1111		ø
96	60	140	0110 0000		-
97	61	141	0110 0001		/
98	62	142	0110 0010		
99	63	143	0110 0011		
100	64	144	0110 0100		
101	65	145	0110 0101		
102	66	146	0110 0110		
103	67	147	0110 0111		
104	68	150	0110 1000		
105	69	151	0110 1001		
106	6A	152	0110 1010		
107	6B	153	0110 1011		,
108	6C	154	0110 1100		%
109	6D	155	0110 1101		-
110	6E	156	0110 1110		>

(continues)

Table 3 Continued

Dec	Hex	Octal	Binary	Name	Character
111	6F	157	0110 1111		?
112	70	160	0111 0000		
113	71	161	0111 0001		
114	72	162	0111 0010		
115	73	163	0111 0011		
116	74	164	0111 0100		
117	75	165	0111 0101		
118	76	166	0111 0110		
119	77	167	0111 0111		
120	78	170	0111 1000		
121	79	171	0111 1001		'
122	7A	172	0111 1010		:
123	7B	173	0111 1011		#
124	7C	174	0111 1100		@
125	7D	175	0111 1101		'
126	7E	176	0111 1110		=
127	7F	177	0111 1111		"
128	80	200	1000 0000		
129	81	201	1000 0001		a
130	82	202	1000 0010		b
131	83	203	1000 0011		c
132	84	204	1000 0100		d
133	85	205	1000 0101		e
134	86	206	1000 0110		f
135	87	207	1000 0111		g
136	88	210	1000 1000		h
137	89	211	1000 1001		i
138	8A	212	1000 1010		
139	8B	213	1000 1011		
140	8C	214	1000 1100		
141	8D	215	1000 1101		
142	8E	216	1000 1110		
143	8F	217	1000 1111		
144	90	220	1001 0000		
145	91	221	1001 0001		j
146	92	222	1001 0010		k
147	93	223	1001 0011		l
148	94	224	1001 0100		m
149	95	225	1001 0101		n
150	96	226	1001 0110		o
151	97	227	1001 0111		p
152	98	230	1001 1000		q
153	99	231	1001 1001		r

Dec	Hex	Octal	Binary	Name	Character
154	9A	232	1001 1010		
155	9B	233	1001 1011		
156	9C	234	1001 1100		
157	9D	235	1001 1101		
158	9E	236	1001 1110		
159	9F	237	1001 1111		
160	A0	240	1010 0000		
161	A1	241	1010 0001		~
162	A2	242	1010 0010		s
163	A3	243	1010 0011		t
164	A4	244	1010 0100		u
165	A5	245	1010 0101		v
166	A6	246	1010 0110		w
167	A7	247	1010 0111		x
168	A8	250	1010 1000		y
169	A9	251	1010 1001		z
170	AA	252	1010 1010		
171	AB	253	1010 1011		
172	AC	254	1010 1100		
173	AD	255	1010 1101		
174	AE	256	1010 1110		
175	AF	257	1010 1111		
176	B0	260	1011 0000		
177	B1	261	1011 0001		
178	B2	262	1011 0010		
179	B3	263	1011 0011		
180	B4	264	1011 0100		
181	B5	265	1011 0101		
182	B6	266	1011 0110		
183	B7	267	1011 0111		
184	B8	270	1011 1000		
185	B9	271	1011 1001		
186	BA	272	1011 1010		
187	BB	273	1011 1011		
188	BC	274	1011 1100		
189	BD	275	1011 1101		
190	BE	276	1011 1110		
191	BF	277	1011 1111		
192	C0	300	1100 0000		{
193	C1	301	1100 0001		A
194	C2	302	1100 0010		B
195	C3	303	1100 0011		C
196	C4	304	1100 0100		D
197	C5	305	1100 0101		E

(continues)

Table 3 Continued

Dec	Hex	Octal	Binary	Name	Character
198	C6	306	1100 0110		F
199	C7	307	1100 0111		G
200	C8	310	1100 1000		H
201	C9	311	1100 1001		I
202	CA	312	1100 1010	SHY	
203	CB	313	1100 1011		
204	CC	314	1100 1100		
205	CD	315	1100 1101		
206	CE	316	1100 1110		
207	CF	317	1100 1111		
208	D0	320	1101 0000		}
209	D1	321	1101 0001		J
210	D2	322	1101 0010		K
211	D3	323	1101 0011		L
212	D4	324	1101 0100		M
213	D5	325	1101 0101		N
214	D6	326	1101 0110		O
215	D7	327	1101 0111		P
216	D8	330	1101 1000		Q
217	D9	331	1101 1001		R
218	DA	332	1101 1010		
219	DB	333	1101 1011		
220	DC	334	1101 1100		
221	DD	335	1101 1101		
222	DE	336	1101 1110		
223	DF	337	1101 1111		
224	E0	340	1110 0000		\
225	E1	341	1110 0001	NSP	
226	E2	342	1110 0010		S
227	E3	343	1110 0011		T
228	E4	344	1110 0100		U
229	E5	345	1110 0101		V
230	E6	346	1110 0110		W
231	E7	347	1110 0111		X
232	E8	350	1110 1000		Y
233	E9	351	1110 1001		Z
234	EA	352	1110 1010		
235	EB	353	1110 1011		
236	EC	354	1110 1100		
237	ED	355	1110 1101		
238	EE	356	1110 1110		
239	EF	357	1110 1111		

Dec	Hex	Octal	Binary	Name	Character
240	F0	360	1111 0000		0
241	F1	361	1111 0001		1
242	F2	362	1111 0010		2
243	F3	363	1111 0011		3
244	F4	364	1111 0100		4
245	F5	365	1111 0101		5
246	F6	366	1111 0110		6
247	F7	367	1111 0111		7
248	F8	370	1111 1000		8
249	F9	371	1111 1001		9
250	FA	372	1111 1010		
251	FB	373	1111 1011		
252	FC	374	1111 1100		
253	FD	375	1111 1101		
254	FE	376	1111 1110		
255	FF	377	1111 1111	EO	

Metric System (SI) Prefixes

Table 4 Metric System Prefixes

Multiplier	Exponent Form	Prefix	SI Symbol
1 000 000 000 000 000 000 000 000	10 ²⁴	yotta	Y
1 000 000 000 000 000 000 000 000	10 ²¹	zetta	Z
1 000 000 000 000 000 000 000	10 ¹⁸	exa	E
1 000 000 000 000 000 000	10 ¹⁵	peta	P
1 000 000 000 000 000	10 ¹²	tera	T
1 000 000 000	10 ⁹	giga	G
1 000 000	10 ⁶	mega	M
1 000	10 ³	kilo	k
100	10 ²	hecto	h
10	10 ¹	deca	da
0.1	10 ⁻¹	deci	d
0.01	10 ⁻²	centi	c
0.001	10 ⁻³	milli	m
0.000 001	10 ⁻⁶	micro	μ
0.000 000 001	10 ⁻⁹	nano	n
0.000 000 000 001	10 ⁻¹²	pico	p
0.000 000 000 000 001	10 ⁻¹⁵	femto	f
0.000 000 000 000 000 001	10 ⁻¹⁸	atto	a
0.000 000 000 000 000 000 001	10 ⁻²¹	zepto	z
0.000 000 000 000 000 000 000 001	10 ⁻²⁴	yocto	y

U.S.—Metric Units of Length Conversions

Table 5 Conversions from U.S. to Metric

1 inch = 2.54 centimeters = 25.4 millimeters
1 foot = 30.48 centimeters = .3048 meter
1 yard = .914 meter
1 mile = 1.609 kilometers

Table 6 Conversions from Metric to U.S.

1 millimeter = .03937 inch
1 centimeter = .3937 inch
1 meter = 3.2808 feet = 1.0936 yards = 39.37 inches
1 kilometer = .621 mile

Powers of 2

Table 7 Powers of 2

n	2 ⁿ	Hexadecimal
0	1	1
1	2	2
2	4	4
3	8	8
4	16	10
5	32	20
6	64	40
7	128	80
8	256	100
9	512	200
10	1,024	400
11	2,048	800
12	4,096	1000
13	8,192	2000
14	16,384	4000
15	32,768	8000
16	65,536	10000
17	131,072	20000
18	262,144	40000
19	524,288	80000
20	1,048,576	100000
21	2,097,152	200000
22	4,194,304	400000

n	2ⁿ	Hexadecimal
23	8,388,608	800000
24	16,777,216	1000000
25	33,554,432	2000000
26	67,108,864	4000000
27	134,217,728	8000000
28	268,435,456	10000000
29	536,870,912	20000000
30	1,073,741,824	40000000
31	2,147,483,648	80000000
32	4,294,967,296	100000000
33	8,589,934,592	200000000
34	17,179,869,184	400000000
35	34,359,738,368	800000000
36	68,719,476,736	1000000000
37	137,438,953,472	2000000000
38	274,877,906,944	4000000000
39	549,755,813,888	8000000000
40	1,099,511,627,776	10000000000
41	2,199,023,255,552	20000000000
42	4,398,046,511,104	40000000000
43	8,796,093,022,208	80000000000
44	17,592,186,044,416	100000000000
45	35,184,372,088,832	200000000000
46	70,368,744,177,664	400000000000
47	140,737,488,355,328	800000000000
48	281,474,976,710,656	1000000000000
49	562,949,953,421,312	2000000000000
50	1,125,899,906,842,624	4000000000000
51	2,251,799,813,685,248	8000000000000
52	4,503,599,627,370,496	10000000000000
53	9,007,199,254,740,992	20000000000000
54	18,014,398,509,481,984	40000000000000
55	36,028,797,018,963,968	80000000000000
56	72,057,594,037,927,936	100000000000000
57	144,115,188,075,855,872	200000000000000
58	288,230,376,151,711,744	400000000000000
59	576,460,752,303,423,488	800000000000000
60	1,152,921,504,606,846,976	1000000000000000
61	2,305,843,009,213,693,952	2000000000000000
62	4,611,686,018,427,387,904	4000000000000000
63	9,223,372,036,854,775,808	8000000000000000
64	18,446,744,073,709,551,616	10000000000000000