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# ASCII Chart

**ASCII** - The **A**merican **S**tandard **C**ode for **I**nformation **I**nterchange is a standard seven-bit code that was proposed by [ANSI](#) in 1963, and finalized in 1968. Other sources also credit much of the work on ASCII to work done in 1965 by Robert W. Bemer ([www.bobbemer.com](#)). ASCII was established to achieve compatibility between various types of data processing equipment. Later-day standards that document ASCII include ISO-14962-1997 and ANSI-X3.4-1986(R1997).

ASCII, pronounced "ask-key", is the common code for microcomputer equipment. The standard ASCII character set consists of 128 decimal numbers ranging from zero through 127 assigned to letters, numbers, punctuation marks, and the most common special characters. The Extended ASCII Character Set also consists of 128 decimal numbers and ranges from 128 through 255 representing additional special, mathematical, graphic, and foreign characters.

Every now and again, I've wished that I had an ASCII chart handy, so I made one and stuck it on this page so that I could find it in a hurry. One thing led to another, and folks started asking me questions about ASCII and other character representations, so I've tried to update this page a bit to answer some of the most [common questions](#). Also, I've added additional info,such as [IBM PC Keyboard Scan Codes](#), and a list of [other references](#).

## My ASCII Chart

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	SOH	STX	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
1	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
2	SP	!	"	#	\$	%	&	'	(	)	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{		}	~	DEL

Here's a link to a [decimal-to-ASCII](#) chart.

You may also want to read the Q & A, below.

## ASCII Q & A

Every now and then, I get questions about ASCII. Here are a few:

**Q:** What does ASCII stand for?

**A:** ASCII stands for American Standard Code for Information Interchange.

**Q:** What do CR, LF, SO, and so forth mean?

**A:** A more detailed description of the first 32 characters can be found [here](#).

**Q:** Someone wants me to send my resume (or some other file) to them in ASCII, so what do I do?

**A:** In general, if somebody asks for your resume or another document "in ASCII", what they really want is a copy of your resume (or whatever the document is) in electronic form, but without any formatting. Save your resume (or other document) from the word processor you're using (such as Microsoft Word®) as plain text, and then paste it into an e-mail (or copy it to a floppy disk) and send it to whoever wanted it.

**Q:** OK, fine, but how do I save a Microsoft Word® document as plain text?

**A:** Here are some simple instructions for saving a document as plain text in Microsoft Word® '97. The procedure is similar for other word processors.

1. Click on "File".
2. Select "Save As".
3. In the box marked "Save as type:", select "Text Only (\*.txt)" or "Text Only with Line Breaks (\*.txt)".
4. In the box marked "File name:", enter the file name (a different name than the one that you had been using).
5. Click on the button marked "Save".

If you get a warning indicating that formatting will be lost, don't be alarmed. The whole point of the process is to remove the formatting from the document before you send it.

**Q:** I'm writing a program that directly interfaces with the keyboard of an IBM PC, and I need to accept keystrokes for F1, F2, and other keys. What are the IBM PC keyboard codes for F1, F2, and ALT-A, etc?

**A:** See [IBM PC Keyboard Scan Codes](#), below

**A:** Also, if you're trying to enter CTRL-ALT-DEL, you might want to try one of my [reboot utilities](#).

**Q:** What are the ASCII codes for things like the degrees symbol (°), the trademark symbol, solid blocks and other special symbols?

**A:** The answer is "it depends". There's really not an ASCII character for most of the special characters (other than those shown in the [table](#) at the top of this page. However, there are different extended ASCII sets that include a lot more special characters. (See [IBM PC Extended ASCII](#), below.) Also, for information about

including special symbols on a web page, you might look at some of the [other charts](#) and [references](#), below.

**Q:** How do I generate extended ASCII characters from the keyboard?

**A:** DOS will allow you to enter extended ASCII characters into many programs. Here's how you do it:

1. Make sure NumLock is enabled on your keyboard.
2. Press and hold the ALT key.
3. While holding down the ALT key, enter the 3-digit decimal code for the extended ASCII character you want to generate.
4. Release the ALT key.

The trick to this, of course, is knowing the decimal equivalent of the ASCII characters that you want to generate. Since the [extended ASCII Chart](#) is in hex, you probably want a [guide for to converting hex to decimal](#).

**Q:** Does this work in Windows?

**A:** A better way to enter special symbols in Windows applications (such as Word), is to take advantage of the symbols in the fonts provided by Windows. For example, in Word, use the following steps:

1. Click on "Insert" (in the menu at the top of the page)
2. From the drop-down menu, select "Symbol". A chart of special symbols will appear
3. From the chart, you can select a symbol to insert into your document by highlighting the symbol, and clicking on the word "Insert" at the bottom of the chart.

**Q:** What's the ASCII code for CTRL-ALT-DEL, and how do I put it in a DOS batch file?

**A:** There's not an easy way to get CTRL-ALT-DEL into a batch file, per se. However, I've created several PC reboot utilities (for both DOS and Windows) that you can try. You can find them on my [shareware page](#).

**Q:** What's the ASCII code for CTRL-A, or CTRL-Z?

**A:** The value for CTRL-A (^A) is 01. The value for CTRL-Z (^Z), which is often used as an end-of-file marker in DOS is 26 (decimal). All the other CTRL-B through CTRL-Y characters fall in between. (CTRL-B is 2, CTRL-C is 3, and so forth.)

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## Control Codes

The following is a more detailed description of the first 32 ASCII characters, often referred to as control codes.

NUL (null)  
SOH (start of heading)  
STX (start of text)  
ETX (end of text)  
EOT (end of transmission) - Not the same as ETB

ENQ (enquiry)  
 ACK (acknowledge)  
 BEL (bell) - Caused teletype machines to ring a bell. Causes a beep in many common terminals and terminal emulation programs.  
 BS (backspace) - Moves the cursor (or print head) move backwards (left) one space.  
 TAB (horizontal tab) - Moves the cursor (or print head) right to the next tab stop. The spacing of tab stops is dependent on the output device, but is often either 8 or 10.  
 LF (NL line feed, new line) - Moves the cursor (or print head) to a new line. On Unix systems, moves to a new line AND all the way to the left.  
 VT (vertical tab)  
 FF (form feed) - Advances paper to the top of the next page (if the output device is a printer).  
 CR (carriage return) - Moves the cursor all the way to the left, but does not advance to the next line.  
 SO (shift out) - Switches output device to alternate character set.  
 SI (shift in) - Switches output device back to default character set.  
 DLE (data link escape)  
 DC1 (device control 1)  
 DC2 (device control 2)  
 DC3 (device control 3)  
 DC4 (device control 4)  
 NAK (negative acknowledge)  
 SYN (synchronous idle)  
 ETB (end of transmission block) - Not the same as EOT  
 CAN (cancel)  
 EM (end of medium)  
 SUB (substitute)  
 ESC (escape)  
 FS (file separator)  
 GS (group separator)  
 RS (record separator)  
 US (unit separator)

## IBM PC Keyboard Scan Codes

For many of the special key combinations such as ALT-A, F1, PgUp, and so forth, the IBM PC uses a special two-character escape sequence. Depending on the programming language being used and the level at which the keyboard is being accessed, the escape character is either ESC (27, 0x1B), or NUL (0). Here are some common sequences:

Char.	Decimal Pair	Hex Pair	Char.	Decimal Pair	Hex Pair
ALT-A	(00,30)	(0x00,0x1e)	ALT-B	(00,48)	(0x00,0x30)
ALT-C	(00,46)	(0x00,0x2e)	ALT-D	(00,32)	(0x00,0x20)
ALT-E	(00,18)	(0x00,0x12)	ALT-F	(00,33)	(0x00,0x21)
ALT-G	(00,34)	(0x00,0x22)	ALT-H	(00,35)	(0x00,0x23)
ALT-I	(00,23)	(0x00,0x17)	ALT-J	(00,36)	(0x00,0x24)
ALT-K	(00,37)	(0x00,0x25)	ALT-L	(00,38)	(0x00,0x26)
ALT-M	(00,50)	(0x00,0x32)	ALT-N	(00,49)	(0x00,0x31)
ALT-O	(00,24)	(0x00,0x18)	ALT-P	(00,25)	(0x00,0x19)
ALT-Q	(00,16)	(0x00,0x10)	ALT-R	(00,19)	(0x00,0x13)
ALT-S	(00,31)	(0x00,0x1a)	ALT-T	(00,20)	(0x00,0x14)
ALT-U	(00,22)	(0x00,0x16)	ALT-V	(00,47)	(0x00,0x2f)
ALT-W	(00,17)	(0x00,0x11)	ALT-X	(00,45)	(0x00,0x2d)
ALT-Y	(00,21)	(0x00,0x15)	ALT-Z	(00,44)	(0x00,0x2c)
PgUp	(00,73)	(0x00,0x49)	PgDn	(00,81)	(0x00,0x51)

Home	(00,71)	(0x00,0x47)	End	(00,79)	(0x00,0x4f)
UpArrw	(00,72)	(0x00,0x48)	DnArrw	(00,80)	(0x00,0x50)
LftArrw	(00,75)	(0x00,0x4b)	RtArrw	(00,77)	(0x00,0x4d)
F1	(00,59)	(0x00,0x3b)	F2	(00,60)	(0x00,0x3c)
F3	(00,61)	(0x00,0x3d)	F4	(00,62)	(0x00,0x3e)
F5	(00,63)	(0x00,0x3f)	F6	(00,64)	(0x00,0x40)
F7	(00,65)	(0x00,0x41)	F8	(00,66)	(0x00,0x42)
F9	(00,67)	(0x00,0x43)	F10	(00,68)	(0x00,0x44)
F11	(00,133)	(0x00,0x85)	F12	(00,134)	(0x00,0x86)
ALT-F1	(00,104)	(0x00,0x68)	ALT-F2	(00,105)	(0x00,0x69)
ALT-F3	(00,106)	(0x00,0x6a)	ALT-F4	(00,107)	(0x00,0x6b)
ALT-F5	(00,108)	(0x00,0x6c)	ALT-F6	(00,109)	(0x00,0x6d)
ALT-F7	(00,110)	(0x00,0x6e)	ALT-F8	(00,111)	(0x00,0x6f)
ALT-F9	(00,112)	(0x00,0x70)	ALT-F10	(00,113)	(0x00,0x71)
ALT-F11	(00,139)	(0x00,0x8b)	ALT-F12	(00,140)	(0x00,0x8c)

Hint - If you look at how the keys are laid out on the keyboard, you'll probably see the pattern.

## IBM PC Extended ASCII Display Characters

Strictly speaking, the ASCII character set only includes values up to 127 decimal (7F hex). However, when the IBM PC was developed, the video card contained one byte for each character in the 80x25 character display. Gee...what to do with that extra bit per character? Why not invent 128 new characters, for line-drawing and special symbols? The result, of course, was the extended ASCII character set for the IBM PC. The chart below shows (most of) the characters that can be generated by the display in the original IBM PC.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		␣	␤	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣
1	▶	◀	↑	!!	¶	§	␣	␣	↑	↓	→	←	␣	␣	␣	␣
2		!	"	#	\$	%	&	'	<	>	*	+	␣	-	␣	/
3	␣	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	␣	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	␣	q	r	s	t	u	v	w	x	y	z	{		}	~	␣
8	␣	ü	é	â	ä	à	â	ç	ê	ë	ï	î	ï	ì	ñ	␣
9	␣	é	æ	œ	ô	ö	ò	û	ü	ö	ü	ç	é	ê	ë	␣
A	␣	á	í	ó	ú	ñ	ñ	ñ	ñ	ñ	ñ	ñ	ñ	ñ	ñ	ñ
B	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣
C	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣
D	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣
E	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣
F	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣	␣

Microsoft Windows ® has a different notion about what the high-order (upper 128) characters are, as shown in the table below.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■



Here's a link to a [decimal-to-Extended ASCII](#) chart.

## Converting Hex to Decimal

Here's a chart that shows the conversion between hex and decimal.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F.
0	000	001	002	003	004	005	006	007	008	009	010	011	012	013	014	015
1	016	017	018	019	020	021	022	023	024	025	026	027	028	029	030	031
2	032	033	034	035	036	037	038	039	040	041	042	043	044	045	046	047
3	048	049	050	051	052	053	054	055	056	057	058	059	060	061	062	063
4	064	065	066	067	068	069	070	071	072	073	074	075	076	077	078	079
5	080	081	082	083	084	085	086	087	088	089	090	091	092	093	094	095
6	096	097	098	099	100	101	102	103	104	105	106	107	108	109	110	111
7	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
8	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143
9	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
A	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
B	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191
C	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207
D	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223
E	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239
F	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255

If you're having trouble getting the hang of the above chart, here's a hint.  
Hex 41 (written as 0x41 in the programing language C) is equivalent to decimal 65.

## Converting Hex to Octal

Here's a chart that shows the conversion between hex and octal.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F.
0	000	001	002	003	004	005	006	007	010	011	012	013	014	015	016	017
1	020	021	022	023	024	025	026	027	030	031	032	033	034	035	036	037
2	040	041	042	043	044	045	046	047	050	051	052	053	054	055	056	057
3	060	061	062	063	064	065	066	067	070	071	072	073	074	075	076	077
4	100	101	102	103	104	105	106	107	110	111	112	113	114	115	116	117
5	120	121	122	123	134	125	126	127	130	131	132	133	134	135	136	137
6	140	141	142	143	144	145	146	147	150	151	152	153	154	155	156	157
7	160	161	162	163	164	165	166	167	170	171	172	173	174	175	176	177
8	200	201	202	203	204	205	206	207	210	211	212	213	214	215	216	217
9	220	221	222	223	224	225	226	227	230	231	232	233	234	235	236	237
A	240	241	242	243	244	245	246	247	250	251	252	253	254	255	256	257
B	260	261	262	263	264	265	266	267	270	271	272	273	274	275	276	277
C	300	301	302	303	304	305	306	307	310	311	312	313	314	315	316	317
D	320	321	322	323	324	325	326	327	330	331	332	333	334	335	336	337

E	340	341	342	343	344	345	346	347	350	351	352	353	354	355	356	357
F	360	361	362	363	364	365	366	367	370	371	372	373	374	375	376	377

If you're having trouble getting the hang of the above chart, here's a hint.  
Hex 41 (written as 0x41 in the programming language C) is equivalent to octal 101.

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## Other ASCII Charts

Here are some other folks' ASCII charts, and other interesting ASCII-related references.

- [ISO 646](#)
- [ASCII Table.Com](#) - The Q and A looks familiar, doesn't it?
- [ASCII - ISO 8859-1 with HTML 3.0 Entities Table](#)
- [ASCII Character Set Revised, ANSI X3.110-1983](#)
- [ASCII Character Set, ANSI X3.4-1968](#)
- [ASCII Symbol Table - with HTML codes](#)
- [Decimal ASCII for HTML](#)
- [EBCDIC Character Set](#) - Not ASCII at all
- [BAUDOT](#) - Another Set of Character Codes
- [More on BAUDOT](#)
- [Brief History of Character Codes](#) - Good reference material!
- [Braille Chart](#) **NEW!** - A really neat resource.
- [Mac OS Character Representations](#) **NEW!** - For all you Mac programmers.

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## Other Things You May Want to Know

- [What's its format?](#) - Almost every file format around.
- [Official US Time](#) - Current time, timezones, history, etc.
- [Connector Reference](#) - From NullModem.Com - DB-25, DB-9, Null Modem, more!
- [Common Terms](#) - From NullModem.Com - Ever-growing glossary of computer and electronics terms
- [Traversix](#) **NEW!** - Remote communication ports (including serial) with firewall traversal.  
Connect to your serial devices over the Internet!!!
- [Wavetrix](#) **NEW!** - Richardson-based electronic product design firm.
- [Pro Sound References](#) - Info about pro sound, vintage consoles, cart machines and more!
- [Protocols.Com](#) - A good reference of protocols.
- [Lakeview Research](#) - Jan Axelson's reference site. **NEW!**
- [Area Code Finder](#)
- [Area Code Decoder](#)

- [555-1212](#) - Phone numbers and addresses for everyone!
  - [KnowX.Com](#) - Great people-finder!
  - [Currency Rates](#) - From Rubicon International
  - [International Couriers](#)
  - [Periodic Table of the Elements](#) **NEW!**
  - [Basic Dictionary of ASL Terms](#) **NEW!** - American Sign Language info
  - [Modem Command Sets](#) **NEW!** - Good reference on AT command sets.
  - [Well-known IP Port Numbers](#)
  - [Barcode Info](#)
  - [BarcodeIsland.Com](#) - Lots of barcode info
  - [Barcode Primer](#)
  - [Barcode Formats](#)
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