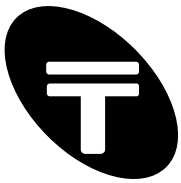
Advanced Data Capture and Control Systems



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ASCII / Serial Port Crib Sheets

Handy basic ASCII, serial / RS232 port information and decimal/hexadecimal conversion chart

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ASCII Chart

ASCII, the American Standard Code for Information Interchange, was developed in the 1960's as a standard 7-bit code for identifying letters, numbers, symbols, and special characters in the English language. It was later expanded (as Extended ASCII) to include additional symbols and foreign language characters. Standard ASCII consists of 128 characters, ranging from 0 to 127 which can be broken down into the following subgroups:

0 to 31, 127: Control codes (includes null, backspace, line feed and others)
32 to 47, 58 to 64, 81 to 86, 123 to 126: Punctuation marks, mathematical (and other) symbols
48 to 57: Numbers 0 through 9
65 to 80: Capital letters A through Z
87 to 122: Lower case letters a through z

Standard ASCII Chart

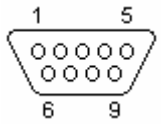
The standard chart includes the ASCII character or control and their related decimal and hexadecimal values. Also shown are the control key sequences for the control codes. Note, to obtain codes 0 to 31, console Control Key is pressed while simultaneously pressing a Letter Key, e.g. ^J is the line feed character. Control Key subtracts decimal 64 (40h) from Letter Key pressed.

Dec	Hex	^Key	ASCII	Dec	Hex	ASCII	Dec	Hex	ASCII	Dec	Hex	ASCII
0	0	^@	NUL (Null)	32	20	(Space)	64	40	@	96	60	`
1	1	^A	SOH (Start of Heading)	33	21	!	65	41	A	97	61	a
2	2	^B	STX (Start of Text)	34	22	"	66	42	B	98	62	b
3	3	^C	ETX (End of Text)	35	23	#	67	43	C	99	63	c
4	4	^D	EOT (End of Transmission)	36	24	$	68	44	D	100	64	d
5	5	^E	ENQ (Enquiry)	37	25	%	69	45	E	101	65	e
6	6	^F	ACK (Acknowledgement)	38	26	&	70	46	F	102	66	f
7	7	^G	BEL (Bell)	39	27	'	71	47	G	103	67	g
8	8	^H	BS (Backspace)	40	28	(	72	48	H	104	68	h
9	9	^I	HT (Horizontal Tab)	41	29	)	73	49	I	105	69	i
10	A	^J	LF (Line Feed)	42	2A	*	74	4A	J	106	6A	j
11	B	^K	VT (Vertical Tab)	43	2B	+	75	4B	K	107	6B	k
12	C	^L	FF (Form Feed)	44	2C	,	76	4C	L	108	6C	l
13	D	^M	CR (Carriage Return)	45	2D	-	77	4D	M	109	6D	m
14	E	^N	SO (Shift Out)	46	2E	.	78	4E	N	110	6E	n
15	F	^O	SI (Shift In	47	2F	/	79	4F	O	111	6F	o
16	10	^P	DLE (Data Line Escape)	48	30	0	80	50	P	112	70	p
17	11	^Q	DC1 (Device Control 1)	49	31	1	81	51	Q	113	71	q
18	12	^R	DC2 (Device Control 2)	50	32	2	82	52	R	114	72	r
19	13	^S	DC3 (Device Control 3)	51	33	3	83	53	S	115	73	s
20	14	^T	DC4 (Device Control 4)	52	34	4	84	54	T	116	74	t
21	15	^U	NAK (Negative Ack.)	53	35	5	85	55	U	117	75	u
22	16	^V	SYN (Synchronous Idle)	54	36	6	86	56	V	118	76	v
23	17	^W	ETB (End of Transmit Block)	55	37	7	87	57	W	119	77	w
24	18	^X	CAN (Cancel)	56	38	8	88	58	X	120	78	x
25	19	^Y	EM (End of Medium)	57	39	9	89	59	Y	121	79	y
26	1A	^Z	SUB (Substitute)	58	3A	:	90	5A	Z	122	7A	z
27	1B	^[	ESC (Escape)	59	3B	;	91	5B	[	123	7B	{
28	1C	^\	FS (File Separator)	60	3C	<	92	5C	\	124	7C	|
29	1D	^]	GS (Group Separator)	61	3D	=	93	5D	]	125	7D	}
30	1E	^^	RS (Record Separator)	62	3E	>	94	5E	^	126	7E	~
31	1F	^_	US (Unit Separator)	63	3F	?	95	5F	_	127	7F	(Delete)

Legend: ^*Key* - Control Key + Letter Key combination except 30 (1E hex) = Control +caret.

Pinout and Signals for the PC RS232 Connector

DB9 RS232 Port (IBM PC XT/AT)

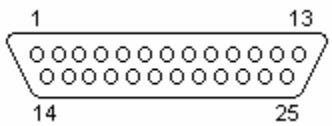


DB9 pin D-SUB male

Pin	Signal Name	Direction (DTE ← DCE)
1	CD (Carrier Detect)	←
2	RXD (Receive Data)	←
3	TXD (Transmit Data)	→
4	DTR (Data Terminal Ready)	→
5	GND (System Ground)	-
6	DSR (Data Set Ready)	←
7	RTS (Request to Send)	→
8	CTS (Clear to Send)	←
9	RI (Ring Indicator)	←

Note: a) Signal names are with respect to the computer/PC. b) Direction is from peripheral/modem (DCE) to the computer (DTE) e.g. RXD is the computer's input pin.

DB25 RS232 Port



DB25 pin D-SUB male

Pin	Signal Name	Direction (DTE ← DCE)
1	SHIELD (Shield/Protective Ground)	-
2	TXD (Transmit Data)	→
3	RXD (Receive Data)	←
4	RTS (Request to Send)	→
5	CTS (Clear to Send)	←
6	DSR (Data Set Ready)	←
7	GND (System Ground)	-
8	CD (Carrier Detect)	←
9	n/c	-
10	n/c	-
11	n/c	-
12	n/c	-
13	n/c	-
14	n/c	-
15	n/c	-
16	n/c	-
17	n/c	-
18	n/c	-
19	n/c	-
20	DTR (Data Terminal Ready)	→
21	n/c	-
22	RI (Ring Indicator)	←
23	n/c	-
24	n/c	-
25	n/c	-

Note: a) Signal names are with respect to the computer/PC. b) Direction is from peripheral/modem (DCE) to the computer (DTE) e.g. RXD is the computer's input pin.
c) Do not connect SHIELD(1) to GND(7).

Decimal - Hexadecimal Conversion Chart

This chart shows the conversion between decimal and hexadecimal and vice versa.

	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

Usage example:
Hex 31 is equivalent to decimal 49. Alternatively decimal 255 is equivalent to hex FF.

