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APPENDIX A

CHARACTER CODES

A.1 -ASCII CHARACTER SET

EVEN PARITY BIT	7-BIT OCTAL CODE	CHARACTER	REMARKS
0	000	NUL	NULL, TAPE FEED, CONTROL/SHIFT/P.
1	001	SOH	START OF HEADING: ALSO SOM, START OF MESSAGE, CONTROL/A.
1	002	STX	START OF TEXT: ALSO EOA, END OF ADDRESS, CONTROL/B.
0	003	ETX	END OF TEXT: ALSO EOM, END OF MESSAGE, CONTROL/C.
1	004	EOT	END OF TRANSMISSION (END); SHUTS OFF TWX MACHINES, CONTROL/D.
0	005	ENQ	ENQUIRY (ENQRY); ALSO WRU, CONTROL/E.
0	006	ACK	ACKNOWLEDGE; ALSO RU, CONTROL/F.
1	007	BEL	RINGS THE BELL. CONTROL/G.
1	010	BS	BACKSPACE; ALSO FEO, FORMAT EFFECTOR. BACKSPACES SOME MACHINES, CONTROL/H.
0	011	HT	HORIZONTAL TAB. CONTROL/I.
0	012	LF	LINE FEED OR LINE SPACE (NEW LINE); ADVANCES PAPER TO NEXT LINE, DUPLICATED BY CONTROL/J.
1	013	VT	VERTICAL TAB (VTAB). CONTROL/K.
0	014	FF	FORM FEED TO TOP OF NEXT PAGE (PAGE) CONTROL/L.
1	015	CR	CARRIAGE RETURN TO BEGINNING OF LINE. DUPLICATED BY CONTROL/M.
1	016	SO	SHIFT OUT; CHANGES RIBBON COLOR TO RED. CONTROL/N.
0	017	SI	SHIFT IN; CHANGES RIBBON COLOR TO BLACK. CONTROL/O.
1	020	DLE	DATA LINK ESCAPE. CONTROL/P (DC0).
0	021	DC1	DEVICE CONTROL 1, TURNS TRANSMITTER (READER) ON, CONTROL/Q (X ON).
0	022	DC2	DEVICE CONTROL 2, TURNS PUNCH OR AUX ON. CONTROL/R (TAPE, AUX ON).
1	023	DC3	DEVICE CONTROL 3, TURNS TRANSMITTER (READER) OFF, CONTROL/S (X OFF).
0	024	DC4	DEVICE CONTROL 4, TURNS PUNCH OR AUX OFF. CONTROL/T (AUX OFF).
1	025	NAK	NEGATIVE ACKNOWLEDGE; ALSO ERR, ERROR. CONTROL/U.
1	026	SYN	SYNCHRONOUS FILE (SYNC). CONTROL/V.
0	027	ETB	END OF TRANSMISSION BLOCK; ALSO LEM, LOGICAL END OF MEDIUM. CONTROL/W.
0	030	CAN	CANCEL (CANCL). CONTROL/X.
1	031	EM	END OF MEDIUM. CONTROL/Y.
1	032	SUB	SUBSTITUTE. CONTROL/Z.
0	033	ESC	ESCAPE. PREFIX. CONTROL/SHIFT/K.
1	034	FS	FILE SEPARATOR. CONTROL/SHIFT/L.
0	035	GS	GROUP SEPARATOR. CONTROL/SHIFT/M.

EVEN PARITY BIT	7-BIT OCTAL CODE	CHARACTER	REMARKS
0	036	RS	RECORD SEPARATOR. CONTROL/SHIFT/N.
1	037	US	
1	040	SP	UNIT SEPARATOR. CONTROL/SHIFT/O.
0	041	!	SPACE.
0	042	"	
1	043	#	
0	044	\$	
1	045	%	
1	046	&	
0	047	'	APOSTROPHE.
0	050	(
1	051)	
1	052	*	
0	053	+	
1	054	,	
0	055	-	
0	056	.	
1	057	/	
0	060	0	
1	061	1	
1	062	2	
0	063	3	
1	064	4	
0	065	5	
0	066	6	
1	067	7	
1	070	8	
0	071	9	
0	072	:	
1	073	;	
0	074	<	
1	075	=	
1	076	>	
0	077	?	
1	100	@	
0	101	A	
0	102	B	
1	103	C	
0	104	D	
1	105	E	
1	106	F	
0	107	G	
0	110	H	
1	111	I	
1	112	J	
0	113	K	
1	114	L	
0	115	M	
0	116	N	
1	117	O	
0	120	P	
1	121	Q	
1	122	R	
0	123	S	
1	124	T	
0	125	U	
0	126	V	
1	127	W	

EVEN PARITY BIT	7-BIT OCTAL CODE	CHARACTER	REMARKS
1	130	X	
0	131	Y	
0	132	Z	
1	133	[	SHIFT/K.
0	134	\	SHIFT/L.
1	135	]	SHIFT/M.
1	136	↑	appears as ^ on some machines.
0	137	+	appears as _ (underscore) on some machines.
0	140	`	ACCENT, GRAVE
1	141	a	
1	142	b	
0	143	c	
1	144	d	
0	145	e	
0	146	f	
1	147	g	
1	150	h	
0	151	i	
0	152	j	
1	153	k	
0	154	l	
1	155	m	
1	156	n	
0	157	o	
1	160	p	
0	161	q	
0	162	r	
1	163	s	
0	164	t	
1	165	u	
1	166	v	
0	167	w	
0	170	x	
1	171	y	
1	172	z	
0	173	{	
1	174	|	
0	175	}	
0	176	~	THIS CODE GENERATED BY ALTMODE
1	177	DEL	THIS CODE GENERATED BY ESC KEY (IF PRESENT) DELETE, RUB OUT

NOTES

1. Teleprinters manufactured by Teletype Corporation, Skokie, Illinois, have used codes 175 (ALT) and 176 for ESC. Programs may forgo the use of } (175) and ~ (176) in order to use these codes as ESC on older teleprinters.
2. ASCII is a seven bit character code with an optional odd parity bit (200) added for many devices. Programs normally use just seven bits internally; the 200 bit is either stripped or added so the program will operate with either parity or non-parity generating devices.

ISO Recommendation R646 and CCITT Recommendation V.3 (International Alphabet No. 5) is identical to ASCII except that number sign (043) is represented as £ instead of # and certain characters are reserved for national use.

TABLE A-1
ASCII CARD CODES

ASCII CHARACTER	OCTAL CODE	CARD PUNCHES	ASCII CHARACTER	OCTAL CODE	CARD PUNCHES
NULL	00	12-0-9-8-1	!	41	12-8-7
CTRL-A	01	12-9-1	"	42	8-7
CTRL-B	02	12-0-2	#	43	8-3
CTRL-C	03	12-9-3	\$	44	11-8-3
CTRL-D	04	9-7	%	45	0-8-4
CTRL-E	05	0-9-8-5	&	46	12
CTRL-F	06	0-9-8-6	'	47	8-5
CTRL-G	07	0-9-8-7	(	50	12-8-5
CTRL-H	10	11-9-6	)	51	11-8-5
TAB	11	12-9-5	*	52	11-8-4
LF	12	0-9-5	+	53	12-8-6
VT	13	12-9-8-3	,	54	0-8-3
FF	14	12-9-8-4	-	55	11
CR	15	12-9-8-5	.	56	12-8-3
CTRL-N	16	12-9-8-6	/	57	0-1
CTRL-O	17	12-9-8-7	0	60	0
CTRL-P	20	12-11-9-8-1	1	61	1
CTRL-Q	21	11-9-1	2	62	2
CTRL-R	22	11-9-2	3	63	3
CTRL-S	23	11-9-3	4	64	4
CTRL-T	24	9-8-4	5	65	5
CTRL-U	25	9-8-5	6	66	6
CTRL-V	26	9-2	7	67	7
CTRL-W	27	0-9-6	8	70	8
CTRL-X	30	11-9-8	9	71	9
CTRL-Y	31	11-9-8-1	:	72	8-2
CTRL-Z	32	9-8-7	;	73	11-8-6
ESCAPE	33	0-9-7	<	74	12-8-4
CTRL-\	34	11-9-8-4	=	75	8-6
CTRL-]	35	11-9-8-5	>	76	0-8-6
CTRL-^	36	11-9-8-6	?	77	0-8-7
CTRL-~	37	11-9-8-7			
SPACE	40				

NOTE: The ASCII character ESCAPE (octal 33) is also CTRL - on a terminal.

TABLE A-1 (CONT)

ASCII CARD CODES

ASCII CHARACTER	OCTAL CODE	CARD PUNCHES	ASCII CHARACTER	OCTAL CODE	CARD PUNCHES
@	100	8-4	a	141	12-0-1
A	101	12-1	b	142	12-0-2
B	102	12-2	c	143	12-0-3
C	103	12-3	d	144	12-0-4
D	104	12-4	e	145	12-0-5
E	105	12-5	f	146	12-0-6
F	106	12-6	g	147	12-0-7
G	107	12-7	h	150	12-0-8
H	110	12-8	i	151	12-0-9
I	111	12-9	j	152	12-11-1
J	112	11-1	k	153	12-11-2
K	113	11-2	l	154	12-11-3
L	114	11-3	m	155	12-11-4
M	115	11-4	n	156	12-11-5
N	116	11-5	o	157	12-11-6
O	117	11-6	p	160	12-11-7
P	120	11-7	q	161	12-11-8
Q	121	11-8	r	162	12-11-9
R	122	11-9	s	163	11-0-2
S	123	0-2	t	164	11-0-3
T	124	0-3	u	165	11-0-4
U	125	0-4	v	166	11-0-5
V	126	0-5	w	167	11-0-6
W	127	0-6	x	170	11-0-7
X	130	0-7	y	171	11-0-8
Y	131	0-8	z	172	11-0-9
Z	132	0-9	{	173	12-0
[	133	12-8-2	|	174	12-11
\	134	0-8-2	}	175	11-0
]	135	11-8-2	~	176	11-0-1
↑	136	11-8-7	DEL	177	12-9-7
+	137	0-8-5			
,	140	8-1			

NOTE: The ASCII characters and (octal 175 and 176) are treated by the Monitor as ALTmode which is often considered to be the same as ESCAPE.

TABLE A-2
DEC-Ø29 CARD CODES

CHARACTER	OCTAL CODE	CARD PUNCHES	CHARACTER	OCTAL CODE	CARD PUNCHES
SPACE	4Ø		@	1ØØ	8-4
!	41	11-8-2	A	1Ø1	12-1
"	42	8-7	B	1Ø2	12-2
#	43	8-3	C	1Ø3	12-3
\$	44	11-8-3	D	1Ø4	12-4
%	45	Ø-8-4	E	1Ø5	12-5
&	46	12	F	1Ø6	12-6
'	47	8-5	G	1Ø7	12-7
(	5Ø	12-8-5	H	11Ø	12-8
)	51	11-8-5	I	111	12-9
*	52	11-8-4	J	112	11-1
+	53	12-8-6	K	113	11-2
,	54	Ø-8-3	L	114	11-3
-	55	11	M	115	11-4
.	56	12-8-3	N	116	11-5
/	57	Ø-1	O	117	11-6
Ø	6Ø	Ø	P	12Ø	11-7
1	61	1	Q	121	11-8
2	62	2	R	122	11-9
3	63	3	S	123	Ø-2
4	64	4	T	124	Ø-3
5	65	5	U	125	Ø-4
6	66	6	V	126	Ø-5
7	67	7	W	127	Ø-6
8	7Ø	8	X	13Ø	Ø-7
9	71	9	Y	131	Ø-8
:	72	8-2	Z	132	Ø-9
;	73	11-8-6	[	133	12-8-2
<	74	12-8-4	\	134	11-8-7
=	75	8-6	]	135	Ø-8-2
>	76	Ø-8-6	†	136	12-8-7
?	77	Ø-8-7	+	137	Ø-8-5

TABLE A-3
DEC-Ø26 CARD CODES

CHARACTER	OCTAL CODE	CARD PUNCHES	CHARACTER	OCTAL CODE	CARD PUNCHES
SPACE	4Ø		@	1ØØ	8-4
!	41	12-8-7	A	1Ø1	12-1
"	42	Ø-8-5	B	1Ø2	12-2
#	43	Ø-8-6	C	1Ø3	12-3
\$	44	11-8-3	D	1Ø4	12-4
%	45	Ø-8-7	E	1Ø5	12-5
&	46	11-8-7	F	1Ø6	12-6
'	47	8-6	G	1Ø7	12-7
(	5Ø	Ø-8-4	H	11Ø	12-8
)	51	12-8-4	I	111	12-9
*	52	11-8-4	J	112	11-1
+	53	12	K	113	11-2
,	54	Ø-8-3	L	114	11-3
-	55	11	M	115	11-4
.	56	12-8-3	N	116	11-5
/	57	Ø-1	O	117	11-6
Ø	6Ø	Ø	P	12Ø	11-7
1	61	1	Q	121	11-8
2	62	2	R	122	11-9
3	63	3	S	123	Ø-2
4	64	4	T	124	Ø-3
5	65	5	U	125	Ø-4
6	66	6	V	126	Ø-5
7	67	7	W	127	Ø-6
8	7Ø	8	X	13Ø	Ø-7
9	71	9	Y	131	Ø-8
:	72	11-8-2/11-Ø	Z	132	Ø-9
;	73	Ø-8-2	[	133	11-8-5
<	74	12-8-6	\	134	8-7
=	75	8-3	]	135	12-8-5
>	76	11-8-6	†	136	8-5
?	77	12-8-2/12-Ø	+	137	8-2

A.2 Radix-50 Character Set

<u>Character</u>	<u>ASCII Octal Equivalent</u>	<u>Radix-50 Equivalent</u>
space	40	0
A-Z	101-132	1-32
\$	44	33
:	56	34
unused		35
0-9	60-71	36-47

The maximum Radix-50 value:

$$47*50^2 + 47*50 + 47 = 174777$$

Table A-4 provides a convenient means of translating between the ASCII character set and its Radix-50 equivalents. For example, given the ASCII string X2B, the Radix-50 equivalent follows (arithmetic is performed in octal).

X=113000
 2=002400
 B=000002
 X2B=115402

TABLE A-4
 Radix-50 Character Set

Single Char. or First Char.		Second Character		Third Character	
A	003100	A	000050	A	000001
B	006200	B	000120	B	000002
C	011300	C	000170	C	000003
D	014400	D	000240	D	000004
E	017500	E	000310	E	000005
F	022600	F	000360	F	000006
G	025700	G	000430	G	000007
H	031000	H	000500	H	000010
I	034100	I	000550	I	000011
J	037200	J	000620	J	000012
K	042300	K	000670	K	000013
L	045400	L	000740	L	000014
M	050500	M	001010	M	000015
N	053600	N	001060	N	000016
O	056700	O	001130	O	000017
P	062000	P	001200	P	000020
Q	065100	Q	001250	Q	000021
R	070200	R	001320	R	000022
S	073300	S	001370	S	000023

Table A-4 (CONT)
Radix-50 Character Set

Single Char. or First Char.	Second Character	Third Character
T 076400	T 001440	T 000024
U 101500	U 001510	U 000025
V 104600	V 001560	V 000026
W 107700	W 001630	W 000027
X 113000	X 001700	X 000030
Y 116100	Y 001750	Y 000031
Z 121200	Z 002020	Z 000032
\$ 124300	\$ 002070	\$ 000033
. 127400	. 002140	. 000034
unused 132500	unused 002210	unused 000035
0 135600	0 002260	0 000036
1 140700	1 002330	1 000037
2 144000	2 002400	2 000040
3 147100	3 002450	3 000041
4 152200	4 002520	4 000042
5 155300	5 002570	5 000043
6 160400	6 002640	6 000044
7 163500	7 002710	7 000045
8 166600	8 002760	8 000046
9 171700	9 003030	9 000047

