

IBM System/360 Character Set(s)

This reference card presents the character sets used by IBM System/360 programming languages, chain and train printers, and typewriter-printers. It also includes the character sets used by some current-system equipment for cases in which such equipment is used with, or as part of, a transition to System/360.



SYSTEM/360 PROGRAMMING LANGUAGE CHARACTER SETS

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PROGRAM LANGUAGE	ACCEPTABLE SOURCE LANGUAGE CHARACTERS				COMMENTS (1)
	TOTAL	ALPHA	NUMERIC	SPECIAL	
Assembler(2)	51	A-Z	0-9	\$ * @ + , - . ' () / &	Any EBCDIC character
Basic Assembler(2)	45	A-Z	0-9	+ , - . ' () / &	Any EBCDIC character
COBOL(3)	51	A-Z	0-9	\$ * @ + , - . ' () / &	Any EBCDIC character
FORTRAN (E)	48	A-Z, \$ (4)	0-9	+ , - . ' () / &	Any EBCDIC character
FORTRAN (H)	49	A-Z, \$ (4)	0-9	+ , - . ' () / &	Any EBCDIC character
PL/I (60-char.)	60	A-Z, \$ (4)	0-9	+ , - . ' () / &	Any EBCDIC character
PL/I (48-char.) (5)	48	A-Z, \$	0-9	+ , - . ' () / &	Any EBCDIC character

NOTES:

- Acceptable characters in comments are those in the source language plus those in this column, provided the I/O device is capable of handling these characters.
- Character constants and character self-defining terms may be represented by any EBCDIC character.
- In a non-numeric literal in System/360 COBOL, any EBCDIC character except the quotation mark may be used. (However, such characters may not be acceptable to other COBOL Compilers). The EBCDIC codes for \$ and # may be used for alphabetic characters in foreign-language COBOL for overseas use.
- In both levels of System/360 FORTRAN, \$ is an optional alphabetic character.
- The following character(s) and/or operator(s) available in the 60-character set of PL/I are replaced as follows in the 48-character set:

PL/I (60-character set) ->	:	;	%	>	>=	=	<=	<	~		&	
PL/I (48-character set) ->	..	.	//	GT	GE	NE	LE	LT	NOT	OR	AND	CAT

← \$, " missing from EBCDIC → PC/1

26 alpha
10 non
1 space
27 spec.
64

CHARACTER SETS FOR IBM 29 CARD PUNCH AND IBM 59 VERIFIER

EXPANDED KEYBOARD MODELS

The IBM 29 Card Punch, Models A12, A22, B12 and B22, and the IBM 59 Verifier, Model 2, have an expanded character set. Each character can be punched or verified with one key depression. For printing versions of the IBM 29, each character is printed as well as punched with the single key depression. These expanded keyboard models have 64 characters consisting of 26 alphabetic (A-Z), 10 numeric (0-9), a space bar (no punches), and the following 27 special characters:

Card Code ->	12	12-8-3	12-8-4	11	11-8-3	11-8-4	0-8-3	0-8-4	0-1	8-3	8-4	12-8-2	12-8-5	12-8-6	12-8-7	11-8-2	11-8-5	11-8-6	11-8-7	0-8-2	0-8-5	0-8-6	0-8-7	8-2	8-5	8-6	8-7
Character ->	&	*	^	<	\$	%	/	#	@	^	()	+	,	-	.	'	()	;	:	>	?	!	"	"	"

The 64-character set of expanded keyboard models may be replaced by any one of the 48-character sets A-K shown on reverse side. The keyboard is still a 64-character keyboard, but only 48 characters have identified keytops (and only 48 characters can be printed). When duplicating, all 64 characters can be punched, and only these 64 characters should be duplicated to avoid damage to the code plate.

NUMERIC KEYBOARD MODELS

The IBM 29 Card Punch, Models A11, A21, B11 and B21, and the IBM 59 Verifier, Model 1, have a numeric keyboard with 12 keys. The numerics 0-9 and only those special characters with "12" or "11" punch coding can be punched (and printed on the printing version) or verified with a single keystroke. Other characters require depression of the multipunch key. All 64-characters mentioned above can be punched when duplicating.

CHARACTER ARRANGEMENTS for System/360 Printers

ARRANGEMENT	NOMINAL SPEED (LPM)	SOURCE CHARACTERS				APPLICABLE MACHINES
		TOTAL	ALPHA	NUMERIC	SPECIAL CHARACTERS(5)	
Standard Chains, Trains	1403-1403-2, 7, 3, N1 1404-2					CHAINS 1403 Models 2, 7; All S/360 Models
AN	600 1100	48	A-Z	0-9	/ @ # \$ % & ' () * + , - . ' () / &	1404 Model 2; S/360 Models 30, 40 and 50 Only
HN	600 1100	48	A-Z	0-9	/' =) . + * \$ - (, &	
Universal Character Set (7)	1403-1403-2 2					TRAINS 1403 Model 3; All S/360 Models except 20 and 67
PCS-AN	600 1100	48	A-Z	0-9	/ @ # \$ % & ' () * + , - . ' () / &	1403 Model N1; All S/360 Models
PCS-HN	600 1100	48	A-Z	0-9	/' =) . + * \$ - (, &	
PN and QN (8)	500(8) 950	60	A-Z	0-9	/' =) . + * \$ - (, & " - : > ? # % @ < ; ~	
RN (8)	500(8) 950	52	A-Z	0-9	/' =) . + * \$ - (, & # % @ < ; ~	
SN (8)	392 770	84	A-Z	0-9	/' =) . + * \$ - (, & " - : > ? # % @ < ; ~	
TN	273 570	120	A-Z a-z	0-9	/' =) . + * \$ - (, & " - : > ? # % @ < ; ~	
XN (Chain Only)	592	40	A-Z	0-9	. * \$;	1443 Model N1; All S/360 Models except 20 and 67
YN (Train Only) (8)	1250	42	A-Z	0-9	# . * \$ - ;	
IBM 1443 Sets	Model N1					
13-Char. Set	600	13	-	0-9	. * \$ -	
39-Char. Set	300	39	A-Z	0-9	. * \$ -	
52-Char. Set (Std.)	240	52	A-Z	0-9	/ @ # \$ % & ' () * + , - . ' () / &	
63-Char. Set	200	63	A-Z	0-9	/ @ # \$ % & ' () * + , - . ' () / &	
IBM 1445 Sets	Model N1					1445 Model N1; S/360 Model 30 Only
14-Char. Set	525	14	-	0-9	. * \$ -	
42-Char. Set	240	42	A-Z	0-9	/	
56-Char. Set (Std.)	190	56	A-Z	0-9	/	
IBM 2203-AI Sets						2203 Model A1; S/360 Model 20 Only
13-Char. Set	750	13	-	0-9	. * \$ -	
39-Char. Set	425	39	A-Z	0-9	. * \$ -	
52-Char. Set	350	52	A-Z	0-9	/ @ # \$ % & ' () * + , - . ' () / &	
63-Char. Set	300	63	A-Z	0-9	/ @ # \$ % & ' () * + , - . ' () / &	

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NOTES:

- The codes that cause these characters to print are the EBCDIC codes of System/360; each character has its own internal and card codes; that is, there are no dual characters. For example, in non-System/360 the dual characters % and (have the same card code (0-8-4) and the same internal code (A84); in System/360 % is represented by card code 0-8-4 and by the internal code HEX 6C, whereas (is represented by card code 12-8-5 and by the internal code HEX 4D.
- The Universal Character Set (UCS) feature for the 1403 Models 2, 3, and N1 provides printing of any set of graphics up to a maximum of 240. The 1403 must be attached to the IBM 2321 Control Unit (or a 2020 processing unit) to use this feature. The chain/train arrangements shown above are the standard UCS chains and trains. In addition, the user can design chains or trains tailored to his own needs. The printing speeds attainable with the UCS feature are dependent on the chain/train design, format, spacing, etc. The speeds shown above for the standard arrangements are nominal speeds for the various character sets, with continuous printing and single-line spacing. The speeds are for full representation of the character sets. Speed for preferred arrangements (see Note 3) will be somewhat higher. Also, the UCS feature uses an "End-of-Print Line" concept that permits intermediate carriage movement when a printed line is complete. Thus, printing speed is variable and can be in excess of the nominal speeds given in the table. The SRL manual for the 2621 Control Unit (A24-3312-1) provides more information on the UCS feature.
- The QN Chain and Train (for use with PL/I) consists of 60 graphics with 45 preferred. The EN Chain and Train (for use with COBOL) consists of 52 graphics with 47 preferred. The SN Chain and Train (for text printing) consists of 84 graphics with 78 preferred. The YN Train (high-speed alphanumeric printing) consists of 42 graphics with 39 preferred.

Printing speeds for preferred arrangements will approach those that would be possible if only the preferred set were on the chain or train. For example, the speed for the HN Train on the 1403 Models 3 and N1 will approach 1100 lpm, which is the speed of the 48-character PCS-AN Train.

CHARACTER ARRANGEMENTS for System/360 Typewriter-Printers (PTTC/EBCDIC)

ARRANGEMENT	SOURCE CHARACTERS			SPECIAL	APPLICABLE TYPEWRITER-PRINTERS
	TOTAL	ALPHA	NUMERIC		
PTTC/EBCDIC ⁽⁹⁾ for 1052 Models 1-6 and 1053, 2740/2741 Upshift Downshift	44 44	A-Z a-z	0-9	= ; % > *) < : ' (" ? φ - ! + ~ # / @ , - \$ & .	1052 Models 1-6 1053 2740/2741
PTTC/EBCDIC ⁽¹⁰⁾ for 1052 Model 7 only Upshift Downshift	44 44	A-Z a-z	0-9	(<) * ' φ + ~ ; " = - ? : > ! % # / - , & \$ @ .	1052 Model 7

← 1050 EBCDIC ball (963)
12741

loggy 2

NOTES:

- (9) For 1052 Models 1-6, 1053, 2740/2741 — Non-System/360 PTTC/BCD codes are compatible with System/360 PTTC/EBCDIC for BCD assignments except for characters > < " | ~
- (10) This element provides 20 graphic changes from the Standard Dual Case Element used in a non-System/360 typewriter. It is for the 1052 Printer-Keyboard, Model 7, only as a reading board console typewriter (input/output) in a System/360 Model 40, 50, or 65 --- or as a stand-alone console typewriter (input/output) in a System/360 Model 65 or 75. No 1051 is required for these attachments.

CHARACTER ARRANGEMENTS for Non-System/360 Typewriter-Printers (PTTC/BCD)

ARRANGEMENT	SOURCE CHARACTERS			SPECIAL	APPLICABLE TYPEWRITER-PRINTERS	
	TOTAL	ALPHA	NUMERIC		Dual Case	Mono Case
					1052/1053 2740/2741	1052/1053 1033 2740/2741
Std. Dual Case Element Upshift Downshift	44 44	A-Z a-z	0-9	= ; % " *) □ : ' (± ? φ , - ! + . # / @ , - \$ & .	X	
Std. Mono Case Element Upshift Downshift	44 44	A-Z A-Z	0-9	= ; % " *) □ : ' (± ? φ , - ! + . # / @ , - \$ & .		X X
Arrangement A Upshift Downshift	44 44	A-Z (11)	0-9	> ; % " *) □ □ φ : [# ? Δ , \ ! < . # / @ , - \$ & .	X	X
Arrangement E Upshift Downshift	44 44	A-Z a-z	0-9	= ; % " *) < : ' (± ? φ , - ! + . # & > , / - .		X
Arrangement H Upshift Downshift	44 44	A-Z (11)	0-9	> ; (" *) □ φ : [# ? Δ , \ ! < . = / ' , - \$ + .	X	X X
Typewriter Option Upshift Downshift	44 44	A-Z (11)	0-9	± # % & *) @ \$ φ (" ? φ , - ! + . ' / φ , - ; & .	X	X
Slashed Zero ⁽¹²⁾ Upshift Downshift	44 44	A-Z (11)	0-9	= ; % " *) □ : ' (± ? φ , - ! + . φ # / @ , - & .	X	X

← present 1050/2741
EBCDIC ball

Note: In this table φ is not a character; rather it indicates a blank space

NOTES:

- (11) The downshift alpha characters depend upon the case of the element. For Mono case, downshift characters are capitals A-Z; for dual case, downshift characters are lowercase a-z.
- (12) This arrangement is identical to the standard arrangements except that zero (0) is replaced by slashed zero(φ).

IBM EQUIPMENT (Non-System/360) CHARACTER SETS

SPECIAL CHARACTER ARRANGEMENTS (48-character, including A-Z, 0-9 and the following special characters)
Card Code → 12 12-8-3 12-8-4 11 11-8-3 11-8-4 0-8-2 0-8-3 0-8-4 0-1 8-3 8-4

Arrangement	&	.	□	-	\$	*	blank	,	%	/	#	@
A	.	.	□	-	\$	*	blank	,	%	/	#	@
B	/	.	□	-	\$	*	blank	,	%	0	#	@
C	&	.	□	-	\$	*	blank	,	%	/	#	@
D	-	.	□	-	\$	*	blank	,	%	/	#	@
E	.	.	<	/	.	.	blank	,	%	&	#	>
F	+	blank	,	(/	=	-
G	+	.	□	-	\$	*	blank	,	%	/	+	-
H	+	.	□	-	\$	*	blank	,	(/	=	-
J	+	.	□	-	\$	*	blank	,	(/	#	@
K	+	.	□	-	\$	*	blank	,	(/	#	@

APPLICABLE EQUIPMENT
24, 26, 29 (Expanded Keyboard Model)
56, 59 (Expanded Keyboard Model)
370, 380, 381 — Only arrangements A, B, and D.
407, 408, 409, 716, 7400
557
824, 826 — Only arrangements A, B, and D.
838, 7900 — Only arrangements A, B, and D.
1058 — Has its own PTTC/BCD code print plate.
A-K arrangements are available as substitutes for part of 1058 arrangement; however, only 55 characters (total) may then be used. Also, card codes 8-1, 0-8-1, 12-11-2, 12-11-3, 12-11-4, 12-11-5, 12-11-6, 12-11-7, and 12-8-1 must not be used to avoid plate damage due to overdrive.
1403 Models 1, 2, 4, 5 & 6
1404 Model 2
1403 Model 3 (1416) — Only arrangements A & H

The blank space (0-8-2) uses the multipunch key and results in a φ character on the 1403 printer.

- Note: Numerical chain for 1403, Models 1 and 2 only, consists of the numerics 0-9 and the six special characters □ . * \$ - ,
- Note: The 1403, Models 2 and 3, and 1404, Model 2, may also be used with S/360, but with different arrangements (shown on reverse side)



International Business Machines Corporation
Data Processing Division
112 East Post Road, White Plains, New York 10601

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