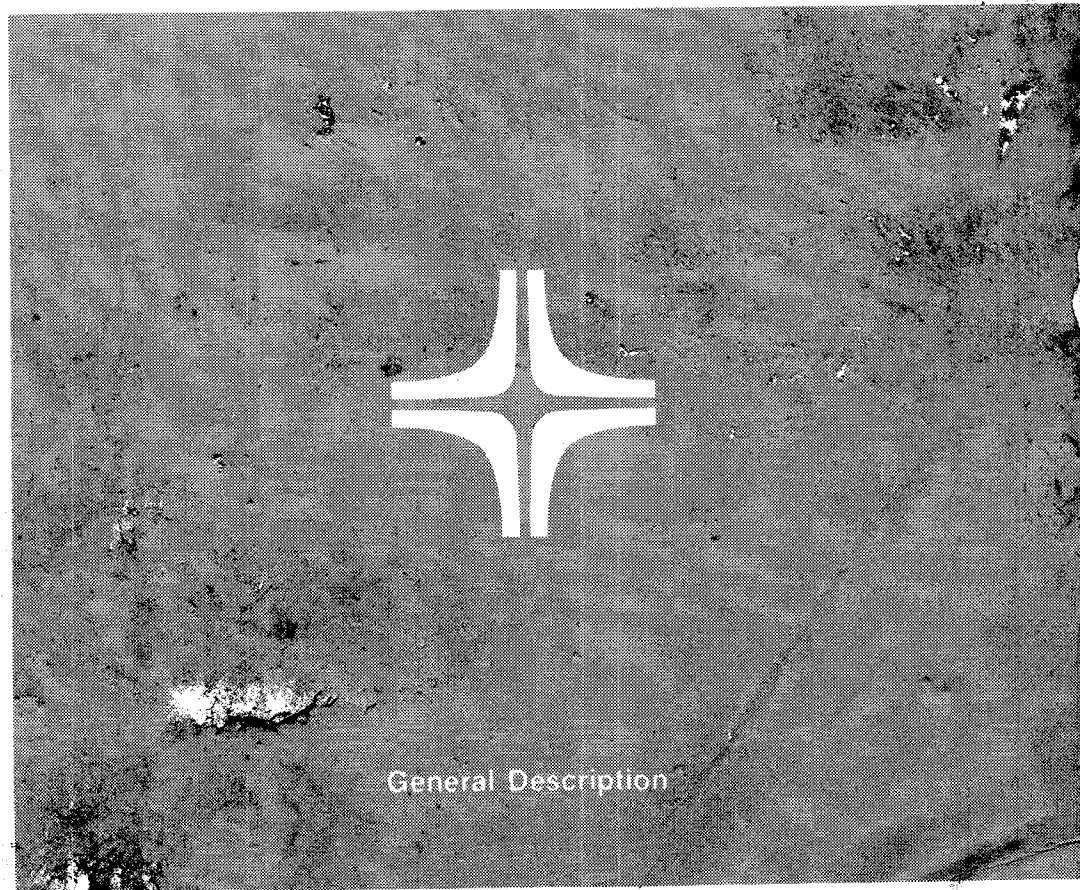


0776 Printer



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1. Introduction

The SPERRY UNIVAC 0776 Printer Subsystem, shown in Figure 1—1, is a freestanding, impact-type, print cartridge (print band) printer designed for connection to a processor selector or multiplexer I/O channel.

The advanced design of this printer provides excellent print quality, because the print characters are on a metal band that travels in a continuous horizontal direction across the front of a printed form. This technological achievement provides perfect horizontal print alignment.

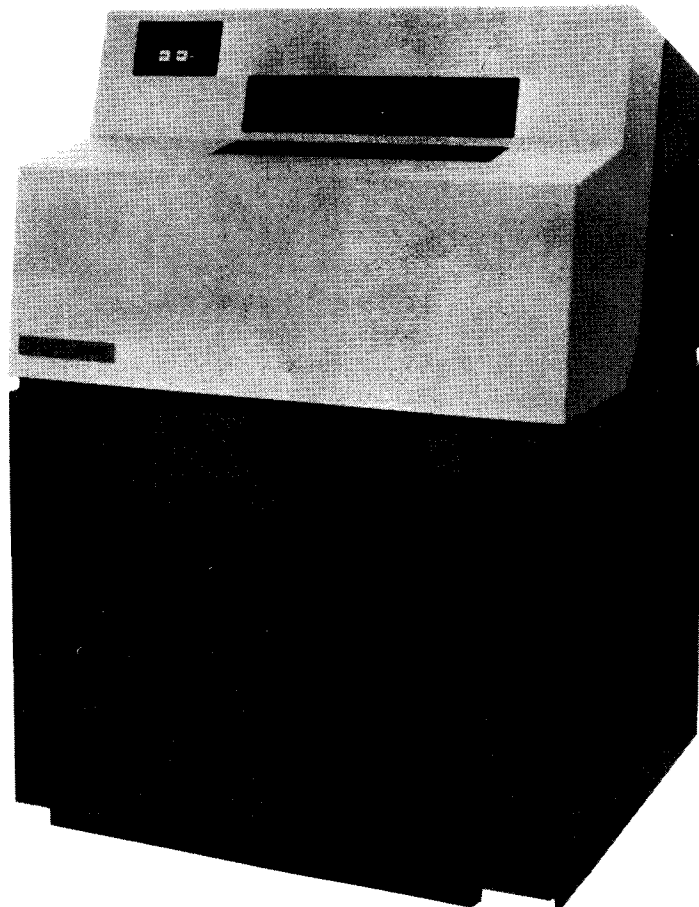


Figure 1—1. 0776 Printer Subsystem

2. Functional Description

2.1. GENERAL

The 0776 printer operates at throughput rates of approximately 115 lines per minute (lpm) to 1250 lpm, depending on the type font configuration used. (See Appendix A for available type font configurations.)

The 760-lpm printer operates at a throughput rate of approximately 115 lpm to 1090 lpm, depending on the character type font configured. A minimum of 760 lpm is the specified rate for a standard 48-character set.

The 940/900-lpm printer operates at a throughput rate of approximately 145 lpm to 1250 lpm, depending on the character type font configured. A minimum of 940 lpm or 900 lpm is the specified rate for a standard 48-character set.

The 1200-lpm printer operates at a throughput rate of approximately 210 lpm to 1250 lpm, depending on the character type font configured. A minimum of 1200 lpm is the specified rate for a standard 48-character set.

The 0776 printer is of the impact type; that is, the print hammers impact the rear of the forms pack, forcing the forms pack into contact with an inked ribbon and etched characters on a moving print band. Printing occurs asynchronously (not being dependent on an initial position of the characters on the moving print band) when a selected character aligns with a selected column position. The print band consists of a flexible, horizontal-moving metallic band with etched characters that are mounted in an interchangeable cartridge assembly on a swing-out carriage for operator accessibility. In addition to the print band, the printer also contains:

- a print mechanism;
- actuator drive electronics;
- an actuator drive;
- power supply;
- paper forms feed control;
- interface electronics;
- power-up control;
- operator control panel; and
- frame and casework.

The printer subsystem contains full buffering. A 136-character print line buffer is provided to store character codes during the printing operation. A vertical format buffer is also provided that permits the retention of vertical stop codes loaded by the program. Additionally, a load code buffer is provided to permit the loading of 6-, 7-, or 8-bit code for each character of the print band. This provides an ability to use various sequences on a given printer and permits programs to be run where data is coded in any 6-, 7-, or 8-bit code. Printing of a line begins as soon as the print line buffer has been filled and forms advance has been completed.

The following list is a summary of the outstanding characteristics of the 0776 printer:

- Control of print registration by a metallic print band moving continuously in a horizontal direction
- Programmable vertical format buffer
- Extensive assortment of print cartridges spanning a worldwide range of printing requirements
- Expanded character set feature accommodating large character sets including both uppercase and lowercase characters
- Print line containing 136 characters permitting throughput by way of 2-up and 3-up forms
- Accuracy checks, including:
 - Parity check
 - Invalid command check
 - Load code buffer check
 - Vertical format buffer check
 - Forms low check
 - Forms check
 - Forms overflow code
 - Device check
 - Print actuator check
 - Print overrun check
 - Stacker full check (1200-lpm printer only)

2.2. CONFIGURATION

The 0776 printer configurator is shown in Figure 2—1. The print cartridges shown are offered as standard features, but special print bands can be configured for your requirements.

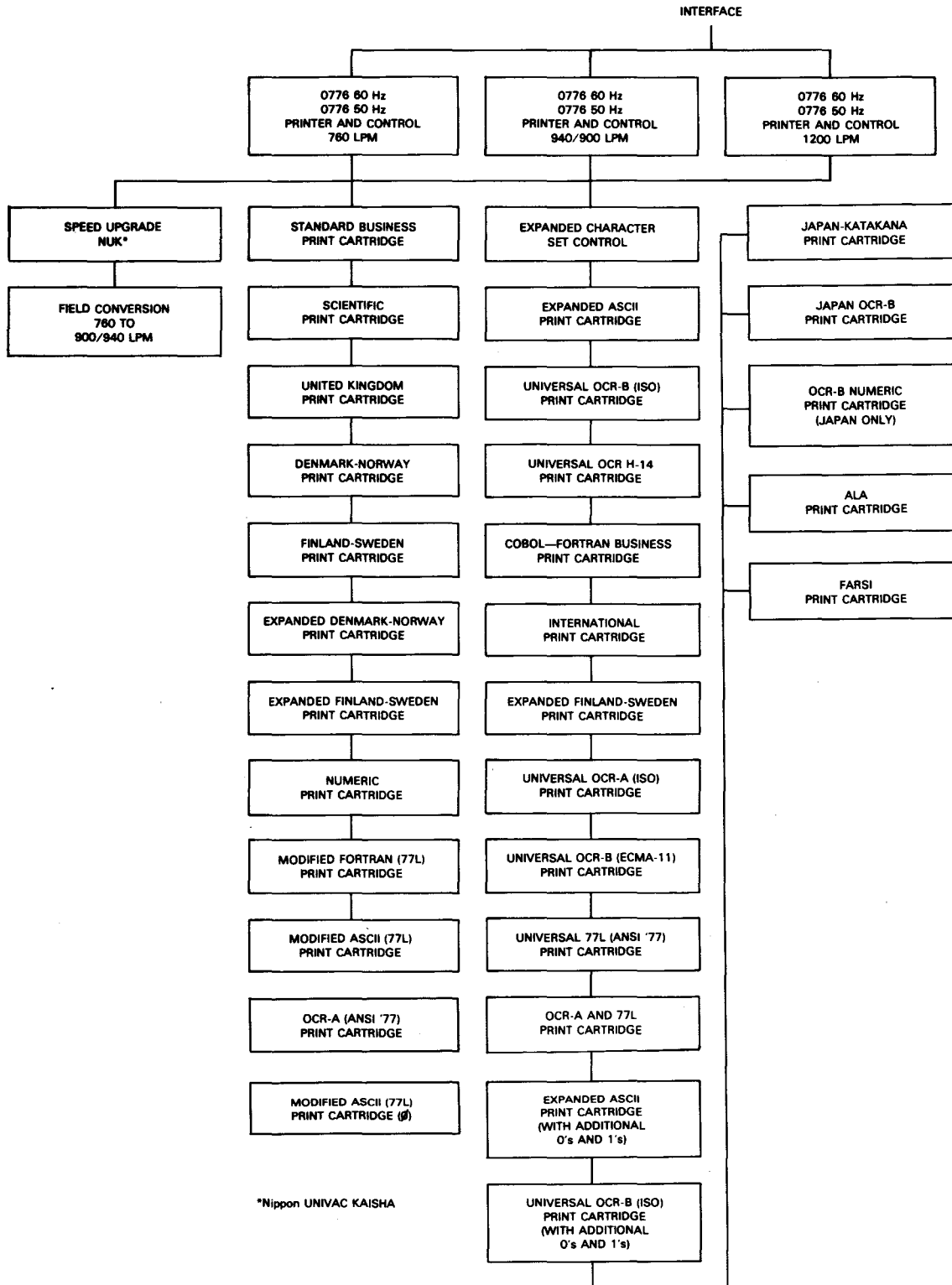


Figure 2—1. 0776 Printer Subsystem Configurator

2.3. PERFORMANCE

The performance of the 0776 printer is measured by the print rate, line spacing, forms advance time and rate, print positions, and character specifications and sets. Vertical forms control for such functions as home position, intermediate stop positions, forms overflow, and end of forms are established by the program.

2.3.1. Print Rate

The print throughput rate is dependent on the number of lines spaced and/or skipped, and the arrangement of the characters on the character type band. Table 2-1 shows the relationship between print rates and character fonts with single line spacing (for spacing at 6 lines per inch (lpi)) for the 760-, 940/900-, and 1200-lpm printers.

To ensure minimum maintenance, if no print or paper feed operation occurs after approximately 7 minutes, the printer control shuts off power to the print band drive motor. After an interruption and reapplication of power to the print band drive motor, an interval of 5 seconds elapses before printing begins, to ensure that the print band has reached its operating speed.

Table 2-1. Print Rates for 0776 Printer (6 lpi)

Length of Array (characters)	Number of Arrays Per Band	Specified Print Rate (lpm)				Time to Print and Advance One Line (milliseconds maximum)			
		760-lpm Printer (50/60 Hz)	940-lpm Printer (60 Hz)	900-lpm Printer (50 Hz)	1200-lpm Printer (50/60 Hz)	760-lpm Printer (50/60 Hz)	940-lpm Printer (60 Hz)	900-lpm Printer (50 Hz)	1200-lpm Printer (50/60 Hz)
384	1	115	150	145	210	520	400	414	288
192	2	225	290	280	395	266	207	215	152
128	3	325	420	400	560	184	142	148	107
96	4	420	540	520	710	143	111	115	84
64	6	600	750	730	980	100	80	82	61
48	8	760	940	900	1200	79	64	66	50
32	12	1030	1250**	1220	1250**	58	48**	49	48**
24	16	1090*	1250**	1250**	1250**	55*	48**	48**	48**

* As result of the duty cycle, time between starts of consecutive line feeds is limited to 55 milliseconds (ms) minimum.

**As result of the duty cycle, time between starts of consecutive line feeds is limited to 48 milliseconds (ms) minimum.

NOTE:

These print rates assume no repeated characters in the array. Optimized character sets make possible increased throughput.

2.3.2. Line Spacing

Line spacing is software selected and can be 6 or 8 lpi; 6-lpi operation has a line spacing of 0.167 inch (0.424 centimeter (cm)), and 8-lpi operation has 0.125-inch (0.318 cm) spacing.

2.3.3. Forms Advance Time

Table 2—2 shows the maximum times required to advance forms (either space or skip) the indicated number of lines. Time includes paper forms stabilization.

Table 2—2. Forms Advance Time

	Advance Distance in Lines	Time (milliseconds)	
		6 lpi	8 lpi
760-lpm and 940/900-lpm printers	1	16.0	14.2
	2	23.6	19.9
	3	31.2	25.6
	4	38.8	31.3
	5	46.4	37.0
	(n+1)	$16.0 + 7.6 n$	$14.2 + 5.7 n$
1200-lpm printer	1	16.7	14.1
	2	24.6	20.9
	3	30.9	25.9
	4	35.0	30.9
	5	38.9	34.1
	6	42.6	37.1
	7	45.9	39.9
	8	49.3	42.6
	Each additional line (t)*	3.33	2.50

*For forms advanced in excess of eight lines on the 1200-lpm printer use the formula:

$$T = T_8 + t(n-8)$$

where:

T_8

Is the time required to advance eight lines.

t

Is the additional line time for one line.

n

Is the number of lines advanced.

2.3.4. Forms Advance Rate (Slew Rate)

The forms advance rate for the 760-lpm and the 940/900-lpm printers is 22 inches (55.88 cm) per second (+15,-0%). For the 1200-lpm printer, the forms advance rate is 50 inches (127 cm) per second (+10,-5%). Forms advance for any single command is limited to a maximum of 1.2 seconds of slew.

2.3.5. Print Positions

The printer contains 136 print positions providing 136 print columns.

2.3.6. Character Specifications and Sets

Standard printed characters are 0.108 inch (0.274 cm) high and 0.069 inch (0.175 cm) wide, with other sizes available for special applications. Character horizontal pitch is 10 per inch (3.94 per cm). Any number of characters up to 384 can be provided in a set or array. Duplicated character sets make up the 384 total number of characters per band.

Data codes are Extended Binary Coded Decimal Interchange Code (EBCDIC), American Standard Code for Information Interchange (ASCII), or any compatible 6-, 7-, or 8-bit code.

2.3.7. Character Dualing

Dualing provides a means of assigning more than one code to a character. The use of any of the assigned codes as print line data codes causes a character to be printed. In addition, dualing permits a character to be selected for printing in positions where data check characters occur.

2.4. FORMS, RIBBON, AND PRINT BANDS

2.4.1. Forms

The printer is capable of accepting up to a 6-part multipart form having 136 print positions with a pack thickness of up to 0.018 inch (0.046 cm). Multipart forms containing more than six parts can be printed with the possibility of reduced print quality.

Optimum performance is produced on single-part 20-pound bond stock. Satisfactory performance can be realized on 18-pound bond, provided the relative humidity does not drop below 40 percent, and the forms tension lever (located in the stacker) has been properly set. Forms handling problems may increase when forms are made of less than 18-pound paper or recycled paper is used. These problems can be minimized by avoiding multiline skips or paper advances whenever possible.

Forms width can range from 4 to 18.75 inches (10.16 to 47.625 cm). The printer casework is designed to accommodate forms up to 17 inches (43.18 cm) in length; however, for the 760-lpm and the 940/900-lpm printers, forms with a maximum length of 24 inches (60.96 cm) can be used if the casework door is left open. The maximum form length for the 1200-lpm printer is 18 inches, due to limitations of the form stacker.

The printer can accept continuously sprocketed card stock forms of weights typically used for punch cards, post cards, or offset masters. The printer will accommodate "no carbon required" forms, but customer print tests on forms constructions beyond four parts are recommended. The use of forms other than those recommended may result in some degradation of print quality. Forms must have sprocket holes on 0.50-inch centers.

2.4.2. Ribbon

Print ink ribbons are of two general types, fabric and plastic film. The latter generally provides the better character definition especially on single-part forms. Plastic film ribbon has a shorter life than the fabric ribbon, and is not normally required. A fabric ribbon 4 mils thick and 25 yards long is recommended for most customer applications. Thicknesses of 3 mils and 5 mils are available also. The 3-mil ribbon is provided for applications requiring improved print quality at a sacrifice of shorter ribbon life. The 5-mil ribbon has an increased ribbon life, but a degradation in character definition can be expected. A life of 750,000 print lines is projected for these ribbons after initial wear-in of the print band.

Ribbon replacement is easily accomplished and does not require that the ribbon in the printer be fully wound onto one of the two spools.

2.4.3. Print Bands

Various print bands are available as a feature. You select the cartridge or cartridges required for your particular application (Appendix A). Bands are mounted in individual cartridge assemblies for easy interchangeability. Cartridges are identified by a unique machine-readable identification code located along the top front surface of each print band. This code verifies that the proper cartridge and load code are being used in the printer. See Figure 2—2.

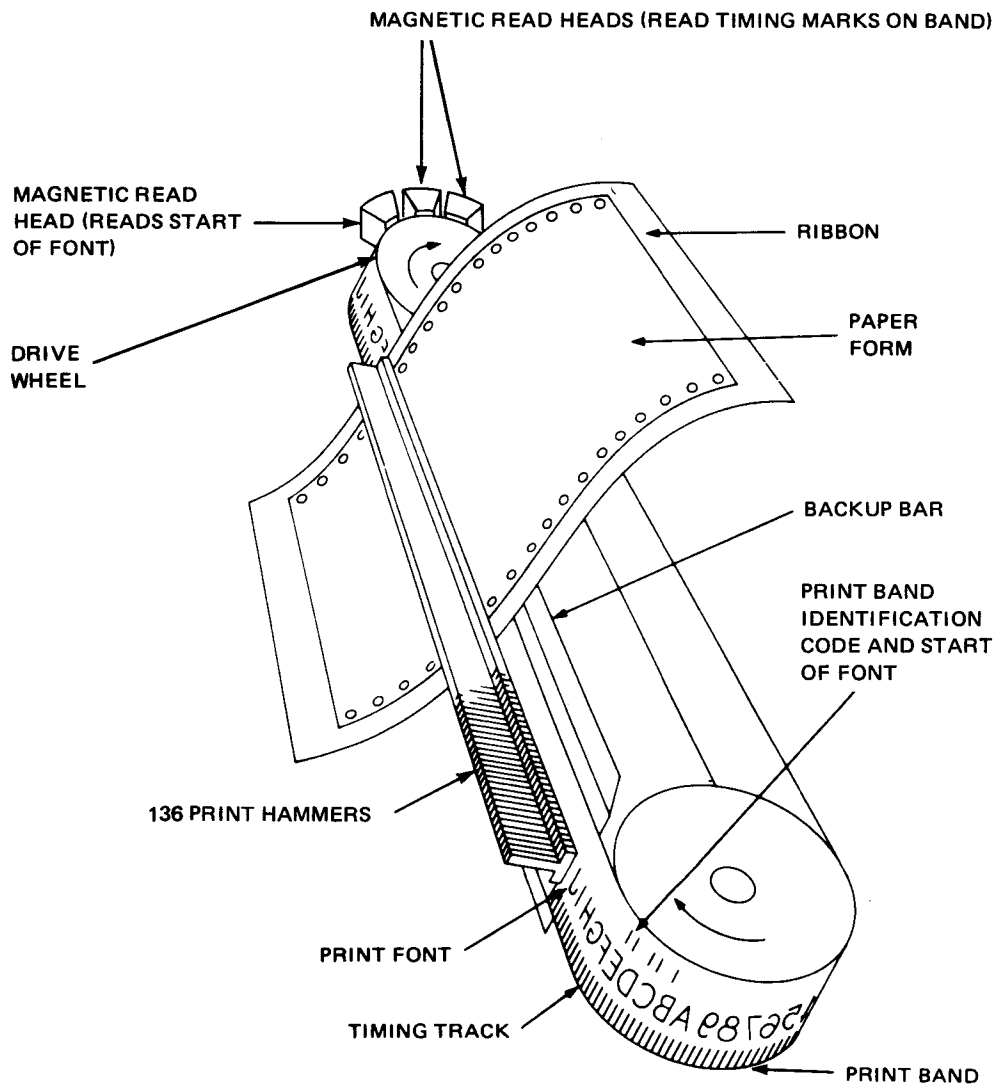
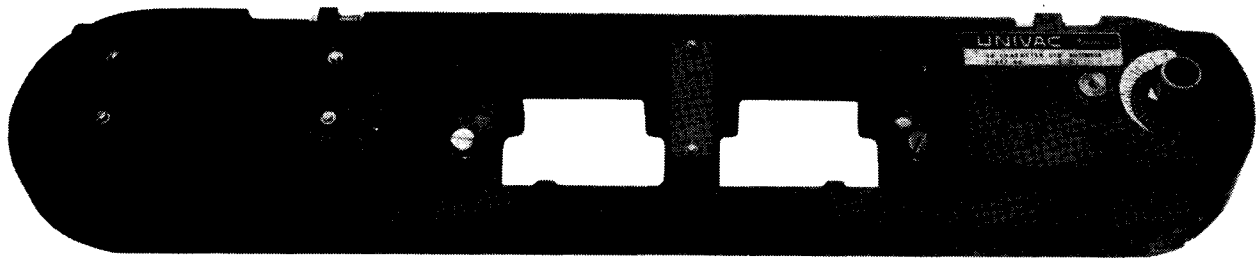


Figure 2—2. Print Band Cartridge

2.5. PRINT QUALITY

The printer provides, on multipart forms, printed copy exhibiting a write-through capability with freedom from ghosting, smear, character cut-off, and print hammer framing. Lines of print have extremely uniform horizontal and vertical character location and line spacing. Print quality acceptable for optical character recognition (OCR) applications can be obtained by using the appropriate OCR print cartridge. Sample printout of a multipart form is shown in Figure 2-3.

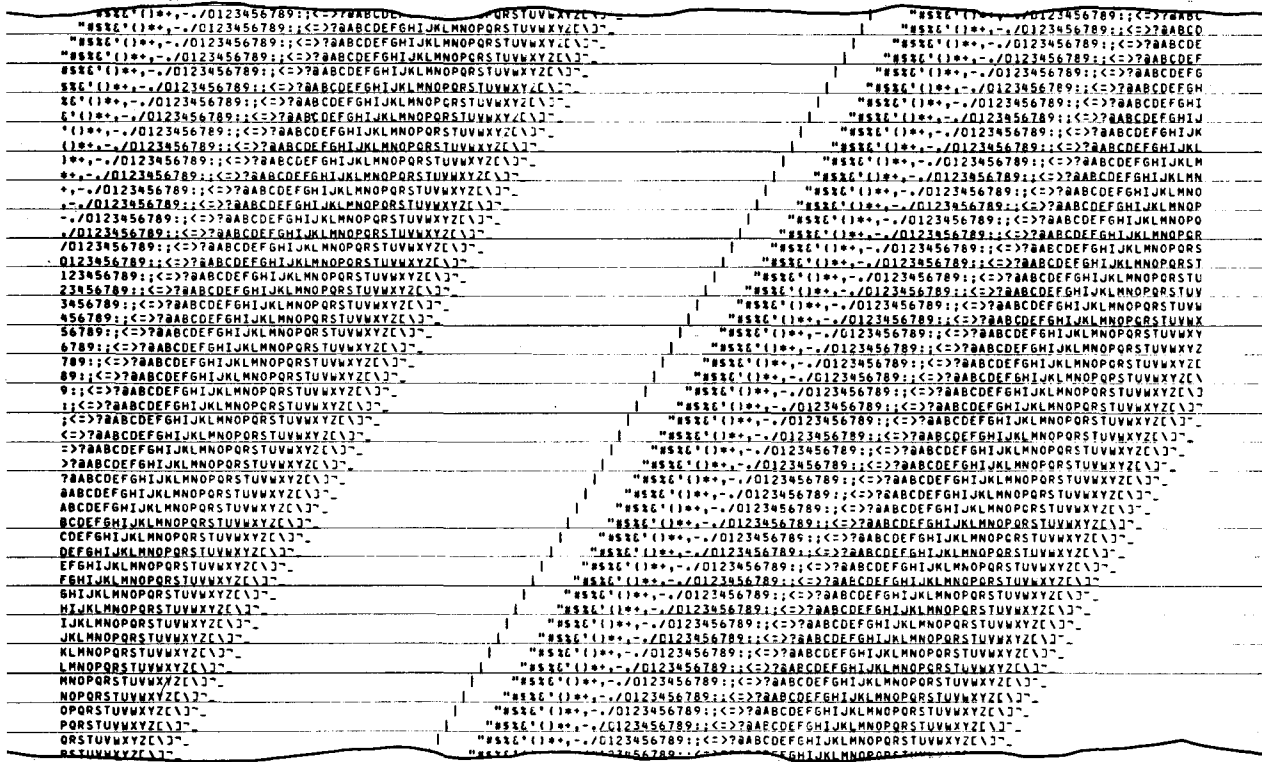


Figure 2-3. Printed Multipart Form

2.6. FUNCTIONAL HARDWARE ELEMENTS

The major hardware elements for the 0776 printer include the print mechanism, ribbon feed mechanism, forms mechanism, and control electronics. See Figure 2-4.

2.6.1. Printing Mechanism

The printing mechanism consists of the print hammer/actuator assembly and the print carriage.

2.6.1.1. Print Hammer/Actuator Assembly

The print hammer/actuator assembly is located behind the paper forms and contains the electromechanical actuators and hammers, one hammer/actuator for each column. These hammers strike the rear face of the paper forms driving the forms against the printer ribbon and the print band character being printed. The assembly contains 136 actuators and hammers. The print hammers and actuators are adjustable from the rear of the printer and are easily removed if necessary. The print cartridge and card library both swing out for easy access.

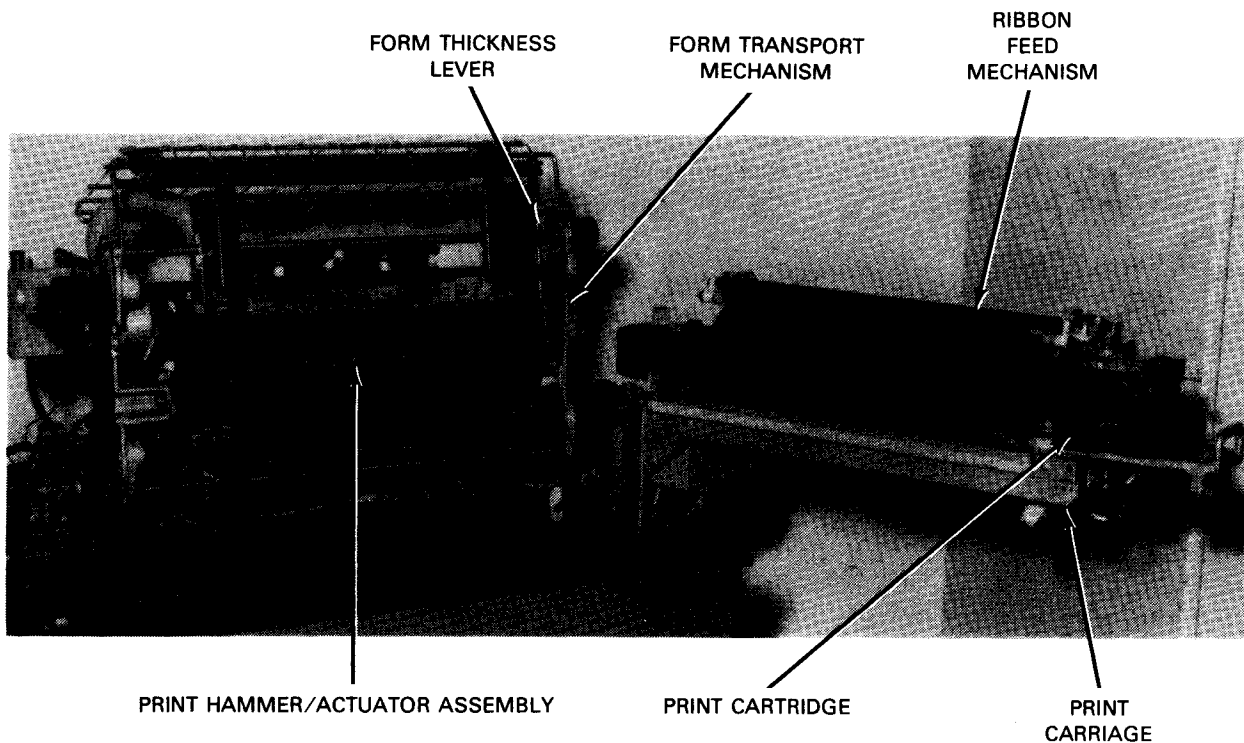


Figure 2—4. Major Printer Hardware Elements

2.6.1.2. Print Carriage

The print carriage is located at the front of the printer, immediately forward of the paper forms. The print carriage contains both the interchangeable type media and the ribbon feeding mechanism. The print carriage is mounted in such a manner that the operator can swing it away from its normal position to gain clear access for changing the forms and ribbon.

2.6.2. Ribbon Feed Mechanism

The ribbon feed mechanism is located within the print carriage and provides the mounting and driving of the printer ribbon. Automatic control is provided to ensure an even winding of the ribbon onto the spools. Automatic reversal of the ribbon direction when the ribbon is depleted from a spool is provided.

2.6.3. Forms Handling

Access to the forms area of the printer is gained by swinging out the print carriage. The forms are supported and driven by four pin-feed tractors: two above and two below the print line. The tractors are manually adjusted to accommodate forms ranging from 4 inches (10.16 cm) to 18.75 inches (47.63 cm) in width. The tractors may be positioned anywhere within the print area of a form 17.2 inches (43.69 cm) wide to print a full line of 136 characters (13.6 inches, 34.54 cm). The column 1 position is fixed for the 136-column printer at a position approximately 7.2 inches (18.29 cm) left of center of the total print head. Manual control is provided to move the tractors up and down to align the form with the first line of printing. A forms-alignment guide is provided that extends over the forms at the print line. This device enables the operator to easily align the forms for printing in the proper column and line position. A horizontal line on the print head baffle plate is provided to aid the operator in adjusting the tractor location. Forms with a maximum width of 18.75 inches (47.63 cm) and a length of 17 inches (43.18 cm) can be contained within the subsystem casework. Forms with a maximum length of 24 inches (60.96 cm) for the 760-lpm and 940/900-lpm printers and 18 inches (45.72 cm) for the 1200-lpm printer can be used; however, the printer must be operated with the casework door open.

During the printing operation, forms are advanced by means of the forms tractors and driving motor. Print commands either contain line spacing instructions or may indicate a skip to a specific line position on the form. The vertical format control provides the capability of skipping to program-selected line positions. Included is an end-of-paper detection device that generates a forms-low signal when approximately 8 inches (20.32 cm) of paper remains below the print line.

The following forms controls are provided:

- Forms thickness gap adjustment
- Line positioning (forms position)
- Tractor adjustment
- Forms tension

A powered forms stacker is provided with the 1200-lpm printer to facilitate stacking of forms at the rear of the printer. To ensure uniform stacking, the top of the stack of forms is maintained at a constant height under the stacker power rollers. The stacker accommodates a maximum form length of 18 inches (45.72 cm).

2.6.4. Control Electronics

The electronics required for control and interfacing of the printer is contained on pluggable printed circuit boards located in the card module. The control electronics consists of the following major circuits:

- internal electronics that include the power drivers and sensor amplifiers;
- mechanism control logic that provides sequencing, control, and fault detection; and
- interface logic that handles channel operation requirements and staticizing.

2.6.4.1. Character Control

Character control, part of the mechanism for the control logic, controls the timing of the print hammers. The hammers are actuated at the proper time so that the correct character is printed in the desired print location. The timing signals generated provide the information to determine the position of the band at any given time. This section of logic contains a load code buffer where the character codes are program-loaded in the sequence appearing on the print band. The load code buffer permits any 6-, 7-, or 8-bit code to be assigned to the graphic characters. A print line buffer is also part of this section into which are loaded character codes for the line to be printed. The load code buffer codes, representing the characters to be printed, are compared to the character codes in the print line buffer to ascertain when a hammer is to be actuated. When positive comparisons have been completed for all of the 136 positions of the print line buffer containing printable character codes or spaces, printing of the line is terminated.

To maximize the character print-band life, band motion automatically stops after approximately 7 minutes have elapsed from the last print-advance command.

2.6.4.2. Vertical Format Control

This section of the mechanism control logic controls the advance of the forms. Forms may be advanced up to 15 lines or may be skipped to line positions specified in the program-loaded vertical format buffer. Selected codes are loaded in the buffer in positions corresponding to the stop position desired on the form. The vertical format buffer accommodates 192 stop positions, which is equivalent to 8 lpi on a 24-inch (60.96 cm) form. An end-of-forms code is entered in the position to indicate the length of the forms being run. When a command is received containing a skip code, paper is advanced until the first line position containing that code is reached. The vertical format buffer is incremented synchronously with the movement of the forms. The initial position in the buffer (home position) corresponds to the set-up line on the form.

2.7. PRINTER CONTROL

Printer control provides storage (buffers) for printing and forms control, and transfers data to and from the buffers on command. The channel sends command codes and data to the control. The control sends status and sense information, and data (buffer contents) to the channel.

The three main buffer storage areas provided are:

- Print line buffer - 136 locations
- Vertical format buffer - 192 locations
- Load code buffer - 64 locations expandable to 384 locations with the expanded character set control feature.

2.7.1. Print Line Buffer

The print line buffer is loaded by way of the print-advance or the diagnostic-write command with the appropriate data to be printed. An entire print line is loaded before printing. Each buffer location contains 10 bits: a parity bit, a print bit, and an 8-bit character code. The print line buffer codes are compared to the load code buffer codes for match conditions. When a match occurs, a print operation takes place.

2.7.2. Vertical Format Buffer

Printer forms may be advanced up to 15 lines or may be moved to line positions specified in the program-loaded vertical format buffer (VFB) by way of the advance or print-advance commands. Selected codes are loaded into the VFB locations corresponding to the stop positions desired on the form. Print form information in the VFB must consist of the home-paper and end-of-forms codes and may also consist of forms overflow and stop/skip codes. If a command is received specifying a print-advance or advance command and the VFB is not loaded, the command is rejected with unit check, and the vertical format request sense bit is set.

2.7.3. Load Code Buffer

The load code buffer allows the printer to define character codes in sequence corresponding to the character set (array) on the installed character print band. The load code buffer, therefore, permits any code to be assigned to the character set on the band that corresponds to the code in the print line buffer. When comparison takes place, it results in the printing of the selected character.

It is possible to accommodate character sets other than those already specified. The characters may be arranged in any array of up to 384 different print characters on the band. The band may contain repeated arrays or groups of different print characters, or high usage characters may be repeated within an array. The load code buffer must be loaded with character codes in the proper sequence required for the array before any printing can be initiated.

2.8. STANDARD AND SPECIAL FEATURES

Table 2-3 lists the standard and special features available with the 0776 printer.

Features are either factory or field installable. Print cartridge character sets that are available are listed in character sequence in Appendix A.

Table 2—3. Printer Types and Optional Features (Part 1 of 3)

Item	Description
Printer Types	
0776 printer and control, 760 lpm (60 Hz)	<p>Prints a 48-character set at 760 lpm using an operator-changeable type cartridge. Contains 136 print positions per line. Provides a power forms pullout roller assembly to facilitate movement of forms through the printer</p> <p>Vertical spacing is 6 or 8 lines per inch at 22 inches per second (ips) (55.9 centimeters per second (cmps)). A minimum of one type cartridge must be ordered. Additional type cartridges are available on a feature or special order basis. Features are factory or field installable. Operates from 60-Hz power source</p>
0776 printer and control, 760 lpm (50 Hz)	Same as 0776 printer and control, 760 lpm (60 Hz), except that it operates from 50-Hz power source
0776 printer and control, 940 lpm (60 Hz)	Same as 0776 printer and control, 760 lpm (60 Hz), except that it prints at 940 lpm
0776 printer and control, 900 lpm (50 Hz)	Same as 0776 printer and control, 760 lpm (60 Hz), except that it operates from a 50-Hz power source and prints at 900 lpm
0776 printer and control, 1200 lpm (60 Hz)	Same as 0776 printer and control, 760 lpm (60 Hz), except that it prints at 1200 lpm and spaces at 50 ips (127 cmps). Also, instead of powered forms pullout roller assembly, the 1200-lpm printer provides a powered forms stacker.
0776 printer and control, 1200 lpm (50 Hz)	Same as 0776 printer and control, 760 lpm (60 Hz), except that it operates from a 50-Hz power source and prints at 1200 lpm and spaces at 50 ips (127 cmps). Also, instead of the powered forms pullout roller assembly, the 1200-lpm printer provides a powered forms stacker.
Optional Features	
Expanded character set control	Provides expanded main storage capability to handle cartridges containing character set arrays greater than 64. Required for all cartridges with more than a 64-character font size.
Standard business print cartridge	Contains a 48-character alphanumeric business character print set
Scientific print cartridge	Contains a 48-character alphanumeric scientific print set
United Kingdom print cartridge	Contains a 48-character United Kingdom business print set
Denmark-Norway print cartridge	Contains a 48-character alphanumeric Denmark/Norway business print set
Expanded Denmark-Norway print cartridge	Contains a 64-character alphanumeric Denmark/Norway business print set
Finland-Sweden print cartridge	Contains a 48-character alphanumeric Finland/Sweden business print set
Expanded Finland-Sweden print cartridge	Contains a 64-character alphanumeric Finland/Sweden business print set
Expanded Finland-Sweden print cartridge	Provides 96-character Finland/Sweden business print set
International print cartridge	Provides 384-character international print set

Table 2—3. Printer Types and Optional Features (Part 2 of 3)

Item	Description
Optional Features (cont)	
Numeric print cartridge	Contains a 24-character numeric print set
Modified FORTRAN (77L) print cartridge	Contains a 64-character modern FORTRAN-77L* print set
COBOL-FORTRAN business print cartridge	Provides a 192-character COBOL-FORTRAN business print set
Modified ASCII (77L) print cartridge	Contains a 64-character modern ASCII-77L* print set
Expanded ASCII print cartridge	Provides 96-character ASCII print set
Expanded ASCII print cartridge (with additional 0's and 1's)	Provides 192-character print set, including 96-character ASCII print set identical to expanded ASCII print cartridge, plus additional 0's and 1's to minimize character wear
Universal OCR-B (ISO) print cartridge	Provides 128-character universal optical character recognition (OCR-B) International Organization for Standardization (ISO) print set
Universal OCR-B (ISO) print cartridge (with additional 0's and 1's)	Provides 128-character OCR-B (ISO) print set. Contains the same characters as the universal OCR-B (ISO) print cartridge, except that additional 0's and 1's have been added to minimize character wear
Universal OCR H-14 print cartridge	Provides a 128-character universal OCR H-14 print set
Universal OCR-A (ISO) print cartridge	Provides 128-character universal OCR-A print set
OCR-A and 77L (ANSI '77) print cartridge	Provides 128-character universal OCR-A 77L* print set
Universal OCR-B (ECMA-11) print cartridge	Provides 128-character ANSI OCR-B (ECMA-11) print set
Universal 77L print cartridge	Provides 128-character universal 77L print set
OCR-A (ANSI '77) print cartridge	Provides basic 48-character OCR-A ANSI print set
Modified ASCII (77L) print cartridge (Ø)	Provides 64-character ASCII-77L* print set
Japan-Katakana print cartridge	Provides 128-character Japan-Katakana print set
Japan OCR-B print cartridge	Provides 128-character Japan OCR-B print set
OCR-B Numeric print cartridge	Provides 28-character print set for use in Japan only
ALA print cartridge	Provides 384-character American Library Association print set

Table 2—3. Printer Types and Optional Features (Part 1 of 3)

Item	Description
Optional Features (cont)	
Farsi print cartridge	Provides 192-character Farsi print set
Speed upgrade	Allows 760-lpm 50/60-Hz printers to increase throughput rate for Japanese 128-character sets to 525 lpm. Maximum throughput rate remains 850 lpm for 64-character sets or less.
Field conversion to 940 lpm	Permits a 0776, 760-lpm, 60-Hz printer to be converted in the field to a 0776, 940-lpm, 60-Hz printer
Field conversion to 900 lpm	Permits a 0776, 760-lpm, 50-Hz printer to be converted in the field to a 0776, 900-lpm, 50-Hz printer

*Sperry Univac character style

3. Printer Commands

Table 3—1 lists the control commands used by the printer to perform program-directed printouts.

Table 3—1. Printer Command Repertoire (Part 1 of 2)

Command	Operation Performed
Print advance	Transfers data to the print line buffer (PLB) and prints data from PLB; then advances forms
Diagnostic write	Transfers data to PLB
Read print line buffer	Transfers data from PLB
Load code buffer	Transfers data to load code buffer (LCB)
Read load code buffer	Transfers data from LCB
Load vertical format buffer	Transfers data to the vertical format buffer (VFB)
Read vertical format buffer	Transfers data from the VFB
Advance	Initiates a form advance
Fold	Permits folding of LCB and PLB data
Unfold	Resets the fold mode
Inhibit data check	Blocks set of data check SB04
Allow data check	Resets inhibit data check mode
No op	Allows initial selection status

Table 3—1. Printer Command Repertoire (Part 2 of 2)

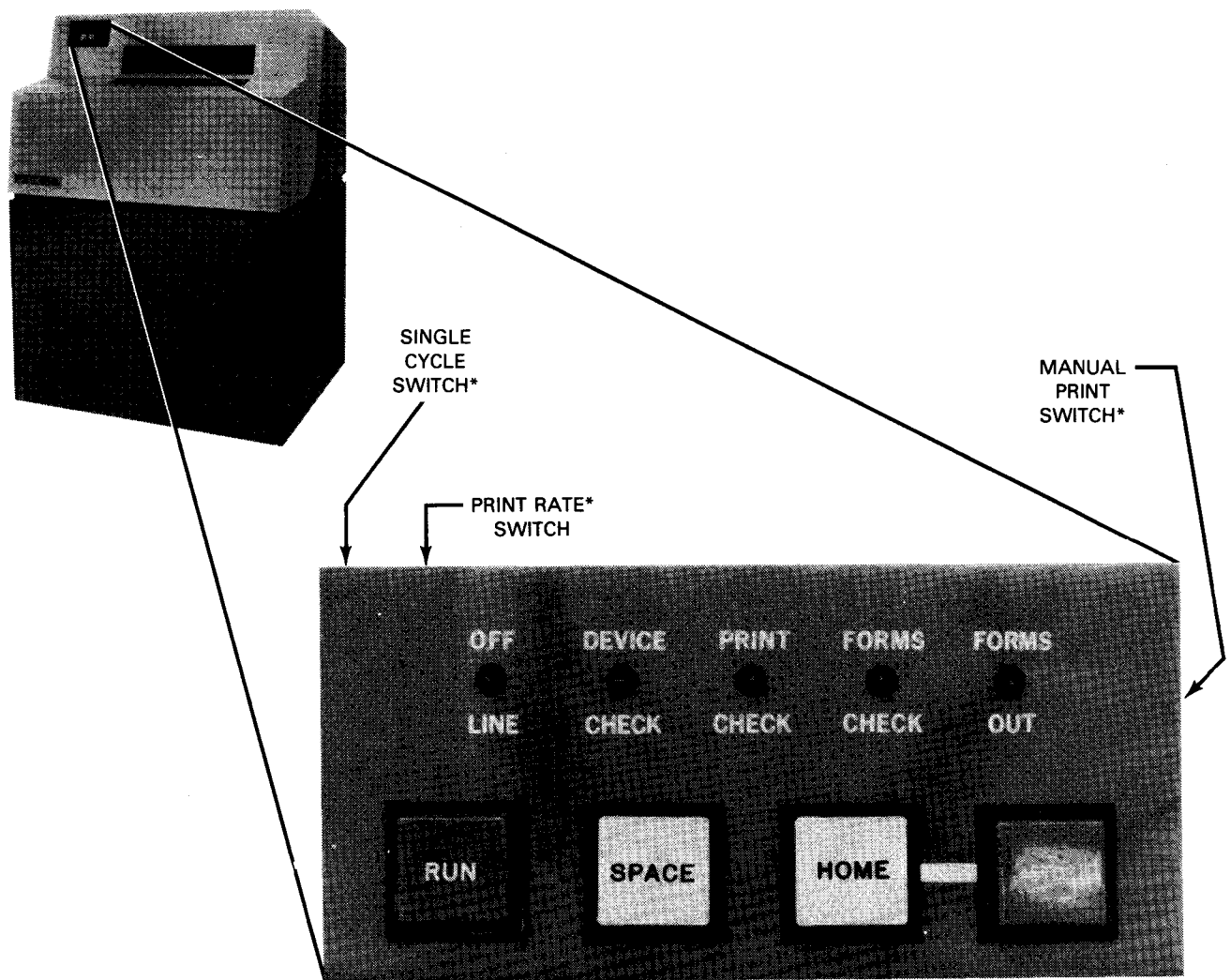
Command	Operation Performed
Test I/O*	Transmits status byte to channel
Set inhibit status*	Prevents status sequence from being initiated
Reset inhibit status*	Processed as a test I/O command and prevents new status from being generated
Sense I/O	Transfers sense data from sense registers

*Interface control commands

4. Operational Controls

4.1. OPERATOR CONTROLS AND INDICATORS

The operator controls and indicators for the 0776 printer are conveniently located on the operator control panel. This panel, shown in Figure 4—1, is located on the top left portion of the printer cabinet. Table 4—1 lists each control with its description.



*Behind Panel

Figure 4—1. Operator Control Panel

Table 4—1. Operator Controls and Indicators (Part 1 of 2)

Control/Indicator	Description
OFF LINE indicator	Indicates that the ON LINE/OFF LINE switch located on the maintenance panel in the electronics module is in the OFF LINE position. The subsystem does not respond to any commands addressed to it, acting as if power were off. Commands addressed to it are propagated down the signal bus.
DEVICE CHECK indicator	Indicates one or both of the following conditions: <ul style="list-style-type: none"> ■ Carriage open ■ Air flow through module blower or forms advance motor blower has slowed below an adequate volume for proper cooling (may indicate a dirty filter or blower malfunction)
PRINT CHECK indicator	Indicates one or more of the following conditions: <ul style="list-style-type: none"> ■ Actuator circuit malfunction ■ Broken or slowed print band ■ Print line or load code buffer parity error
FORMS CHECK indicator	Indicates one or more of the following conditions: <ul style="list-style-type: none"> ■ Continuously fed forms for over 1.2 seconds with no intervening stop ■ Forms feeding mechanism required too much time to accelerate to running speed (may indicate a forms jam). ■ Forms feeding mechanism required too much time to decelerate to stop. ■ Forms jam or torn paper. The forms LED sensor did not detect either the presence of forms (torn paper) or paper motion (jam) for the equivalent of 8-print lines at 6 lpi (11 lines at 8 lpi). ■ Vertical format buffer parity error
FORMS OUT indicator	Indicates 8 inches (20.32 cm) or less of forms remain below print line.
RUN switch/indicator	<p>Momentary pushbutton switch; when operated during stop state (STOP indicator lit) and control is not active, initiates following sequence:</p> <ol style="list-style-type: none"> 1. When pressed, clears all check conditions except those that are activated by an interlock switch or forms low, requiring operator intervention. 2. When released, if all check conditions clear, RUN indicator lights and STOP indicator extinguishes. 3. Attention status generated. The program is notified by way of its status that control is ready to accept all commands. <p>Pressing and releasing this switch with printer in RUN state results in no action. Pressing and releasing this switch with printer in stop state and all check conditions fail to clear results in:</p> <ol style="list-style-type: none"> 1. No attention status generated 2. Partial clearing of check condition 3. Printer remains in stop state

Table 4—1. Operator Controls and Indicators (Part 2 of 2)

Control/Indicator	Description
Audible alarm	Forms stacker full; alarm remains on until forms are removed and stacker tray is raised (applies to the 1200-lpm printer only).
SPACE switch	Momentary pushbutton switch. For operator use only during stop state. Forms advance one line each time this switch is momentarily pressed. Holding switch pressed causes forms to continue to advance until switch is released.
HOME switch/indicator	Momentary pushbutton switch. For operator use only during stop state. Forms advance under control of the vertical format buffer (VFB) to the next home (or set up) position in the VFB. If the VFB and load code buffer are not loaded, forms do not advance. The HOME indicator lights to signify the VFB is in home position.
	Pressing this switch while the STOP switch is pressed initializes the VFB to the home paper position without advancing the forms. The VFB address register is cleared to its initial position.
STOP switch/indicator	<p>Momentary pushbutton switch. Pressing this switch when printer is in the run state causes printer to stop. A control that is executing a command, or holding pending status, delays entry to the stop state until completion of the command and the transfer of status to the channel.</p> <p>Printer can be placed in stop state by any of the following conditions:</p> <ul style="list-style-type: none"> ■ Forms out ■ Form check ■ Carriage open ■ Actuator check ■ Loss of cooling air ■ Type speed check ■ Single cycle mode (advance complete) ■ Stacker full (1200-lpm printer only) <p>Lamp test is performed by pressing the STOP switch with printer in stop state. All indicator lamps on the operator panel light.</p>
Print rate switch	An interlock switch that allows the printer to operate at one-half speed when printer front top hood is raised to reduce acoustic noise level.
Manual print switch	Causes a full line of characters to be printed and advances forms one line to check print actuators and print alignment prior to a print run.
Single cycle print switch	In up position, subsequent commands are executed until the next paper feed advance completes, at which time the machine assumes the stop mode. Each time RUN switch is pressed, the printer executes the next command, then, following any paper advance, returns to stop mode.

4.2. POWER CONTROL

Power to the printer can be controlled either by the operator at the printer or remotely by the processor using two switches, POWER ON/OFF and LOCAL/REMOTE, located on the printer maintenance panel.

4.3. FORMS STACKER TRAY CONTROL

The forms stacker tray can be lowered for ease in removing forms. The switch is located on the acoustic hood at the rear of the printer. The tray is easily raised manually by the operator.

4.4. INTERNAL CONTROLS

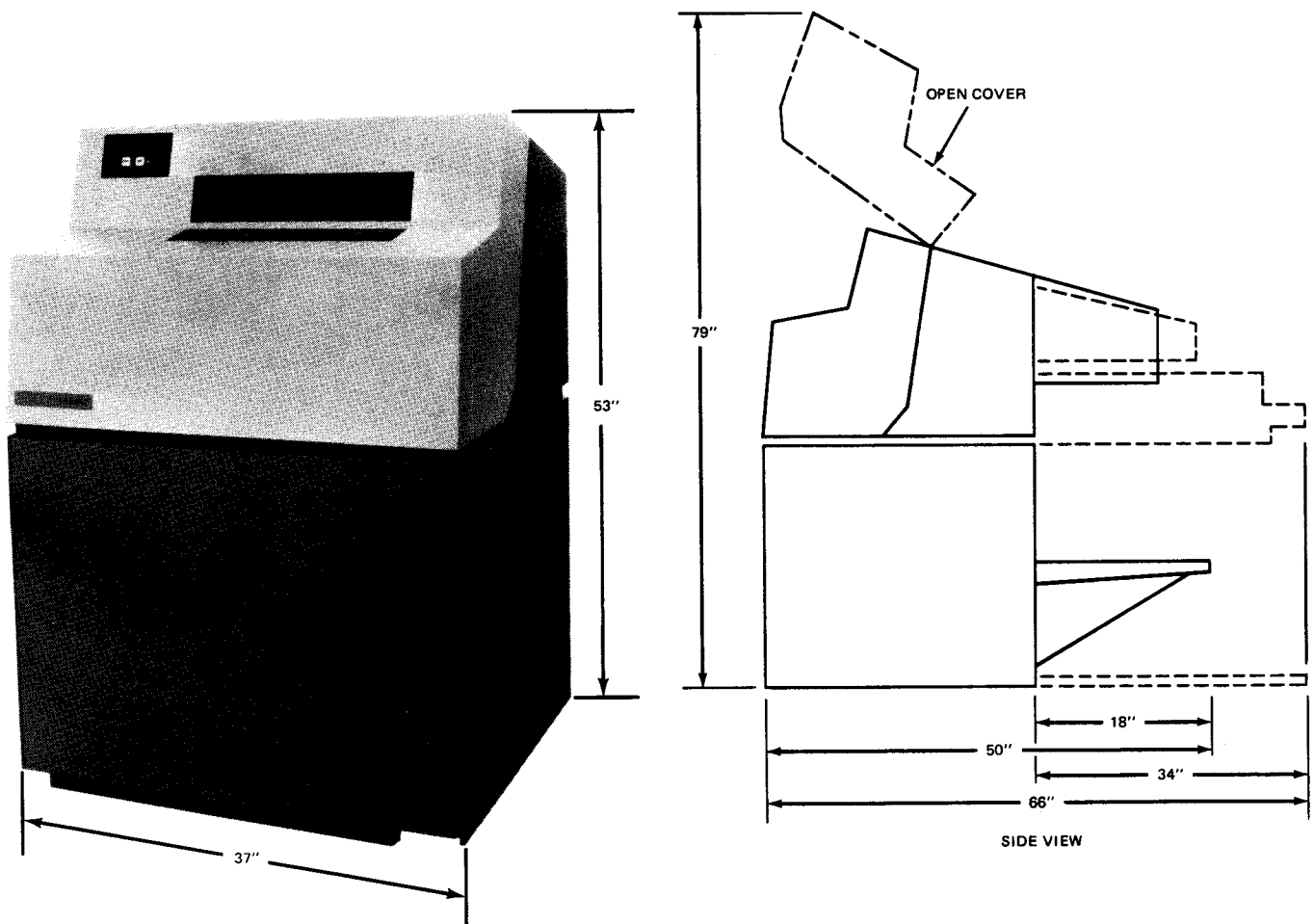
Internal controls for the printer are operator controls accessible when the top cover is raised. The controls are generally mechanical adjustments to permit various types of forms to be used with the printer. They are intended to be used during initial forms setup procedure. These controls are:

- Gap adjustment - Adjusts for different forms thickness
- Line positioning - Forms advance adjustment
- Print phasing - Hammer timing adjustment
- Tractor adjustment - Individually adjusted to each side of forms
- Horizontal forms adjustment - Adjusts all tractors simultaneously
- Forms tension - Increases or decreases tension on forms
- Print band speed (1200-lpm printer only) - Reduces print band speed for optimum print quality.
- Line phasing - Allows paper line position adjustment ($\pm 1/2$ line)

5. Physical Characteristics

5.1. DIMENSIONS

Figure 5—1 shows the general packaging and approximate size of the 0776 printer.



NOTE:

Dashed lines (---) represent the 1200-lpm printer.

Figure 5—1. General Packaging of the 0776 Printer

5.2. WEIGHT

The weight of the printer, including optional features, is approximately 760 pounds (344.7 kilograms) for the 760-lpm and 940/900-lpm printers and 900 pounds (409.09 kilograms) for the 1200-lpm printer and forms stacker.

5.3. ENVIRONMENTAL REQUIREMENTS

The environmental requirements of the printer are:

- Shipping and storage range
 - Up to 72 hours
Temperature: 40° F (4.4° C) to 140° F (60° C)
Humidity: 1 to 80%
 - From 72 hours
Temperature: 0° F (−17.8°C) to 110° F (43.3° C)
Humidity: 1 to 70%
- Working range
 - Nominal
Temperature: 60° F (15.6° C) to 81° F (27.2° C)
Humidity: 20 to 85%
 - Maximum
Temperature: 94° F (34.4° C)
Humidity: 20%

5.4. HEAT DISSIPATION

The printer dissipates a maximum of 7000 Btu per hour.

5.5. COOLING

No external cooling is required. The intake for cooling is beneath the printer and open to room air, requiring air flow at 350 cubic feet per minute (9.91 cubic meters per minute).

5.6. POWER REQUIREMENTS

Power requirements for the printer include:

- Nominal voltage
 - 60 Hz 200/208/240 Vac @ 16* amperes
 - 50 Hz 200/220/240 Vac @ 16* amperes

* Worst case

- Phase and lines

Single-phase, 3-wire (2 wires plus ground)

- Nominal load

2.7 kVA

5.7. NOISE SUPPRESSION

The printer casework incorporates the latest acoustical design to provide maximum noise suppression in compliance with national standard NC60.

Appendix A. Print Cartridge Character Sets

Tables A-1 through A-29 list the character symbols appearing in each print cartridge used on the 0776 printer. The programmer assigns a separate code, from sets such as ASCII, EBCDIC, or Fielddata, to each different character on the print band. Suggested hexadecimal character codes are included in the tables in this appendix; however, different codes may be assigned if the user wishes.

The tables also provide useful information on array size and symbols per array that can be applied to estimating minimum print rates.

The graphics listed in the following tables are not necessarily of the same style as those printed by the printer; they are provided only for informational purposes.

Table A—1. Standard Business Print Cartridge, 48 Characters

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
50	D7	1	P	Uppercase P	1
4F	D6	2	O	Uppercase O	1
4E	D5	3	N	Uppercase N	1
4D	D4	4	M	Uppercase M	1
4C	D3	5	L	Uppercase L	1
4B	D2	6	K	Uppercase K	1
4A	D1	7	J	Uppercase J	1
49	C9	8	I	Uppercase I	1
48	C8	9	H	Uppercase H	1
47	C7	10	G	Uppercase G	1
46	C6	11	F	Uppercase F	1
45	C5	12	E	Uppercase E	1
44	C4	13	D	Uppercase D	1
43	C3	14	C	Uppercase C	1
42	C2	15	B	Uppercase B	1
41	C1	16	A	Uppercase A	1
39	F9	17	9	Numeric nine	1
38	F8	18	8	Numeric eight	1
37	F7	19	7	Numeric seven	1
36	F6	20	6	Numeric six	1
35	F5	21	5	Numeric five	1
34	F4	22	4	Numeric four	1
33	F3	23	3	Numeric three	1
32	F2	24	2	Numeric two	1
31	F1	25	1	Numeric one	1
30	F0	26	0	Numeric zero	1
2D	60	27	-	Hyphen (minus)	1
2F	61	28	/	Slant (solidus)	1
40	7C	29	@	Commercial at	1
23	7B	30	#	Number sign	1
24	5B	31	\$	Dollar sign	1
2C	6B	32	,	Comma	1
2B	4E	33	+	Plus	1
3C	4C	34	<	Less than	1
2A	5C	35	*	Asterisk	1
25	6C	36	%	Percent	1
26	50	37	&	Ampersand	1
2E	4B	38	.	Period (full stop)	1

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
5A	E9	39	Z	Uppercase Z	1
59	E8	40	Y	Uppercase Y	1
58	E7	41	X	Uppercase X	1
57	E6	42	W	Uppercase W	1
56	E5	43	V	Uppercase V	1
55	E4	44	U	Uppercase U	1
54	E3	45	T	Uppercase T	1
53	E2	46	S	Uppercase S	1
52	D9	47	R	Uppercase R	1
51	D8	48	Q	Uppercase Q	1
Array size					48

Table A—2. Scientific Print Cartridge, 48 Characters

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
50	D7	1	P	Uppercase P	1
4F	D6	2	O	Uppercase O	1
4E	D5	3	N	Uppercase N	1
4D	D4	4	M	Uppercase M	1
4C	D3	5	L	Uppercase L	1
4B	D2	6	K	Uppercase K	1
4A	D1	7	J	Uppercase J	1
49	C9	8	I	Uppercase I	1
48	C8	9	H	Uppercase H	1
47	C7	10	G	Uppercase G	1
46	C6	11	F	Uppercase F	1
45	C5	12	E	Uppercase E	1
44	C4	13	D	Uppercase D	1
43	C3	14	C	Uppercase C	1
42	C2	15	B	Uppercase B	1
41	C1	16	A	Uppercase A	1
39	F9	17	9	Numeric nine	1
38	F8	18	8	Numeric eight	1
37	F7	19	7	Numeric seven	1
36	F6	20	6	Numeric six	1
35	F5	21	5	Numeric five	1
34	F4	22	4	Numeric four	1
33	F3	23	3	Numeric three	1
32	F2	24	2	Numeric two	1
31	F1	25	1	Numeric one	1
30	F0	26	0	Numeric zero	1
2D	60	27	-	Hyphen (minus)	1
28	4D	28	(	Left parenthesis	1
29	5D	29	)	Right parenthesis	1
26	50	30	&	Ampersand	1
24	5B	31	\$	Dollar sign	1
2C	6B	32	,	Comma	1
2B	4E	33	+	Plus	1
27	7D	34	'	Apostrophe	1
2A	5C	35	*	Asterisk	1
3D	7E	36	=	Equals	1
2E	4B	37	.	Period (full stop)	1
2F	61	38	/	Slant (solidus)	1

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
5A	E9	39	Z	Uppercase Z	1
59	E8	40	Y	Uppercase Y	1
58	E7	41	X	Uppercase X	1
57	E6	42	W	Uppercase W	1
56	E5	43	V	Uppercase V	1
55	E4	44	U	Uppercase U	1
54	E3	45	T	Uppercase T	1
53	E2	46	S	Uppercase S	1
52	D9	47	R	Uppercase R	1
51	D8	48	Q	Uppercase Q	1
Array size					48

Table A-3. United Kingdom Print Cartridge, 48 Characters

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
50	D7	1	P	Uppercase P	1
4F	D6	2	O	Uppercase O	1
4E	D5	3	N	Uppercase N	1
4D	D4	4	M	Uppercase M	1
4C	D3	5	L	Uppercase L	1
4B	D2	6	K	Uppercase K	1
4A	D1	7	J	Uppercase J	1
49	C9	8	I	Uppercase I	1
48	C8	9	H	Uppercase H	1
47	C7	10	G	Uppercase G	1
46	C6	11	F	Uppercase F	1
45	C5	12	E	Uppercase E	1
44	C4	13	D	Uppercase D	1
43	C3	14	C	Uppercase C	1
42	C2	15	B	Uppercase B	1
41	C1	16	A	Uppercase A	1
39	F9	17	9	Numeric nine	1
38	F8	18	8	Numeric eight	1
37	F7	19	7	Numeric seven	1
36	F6	20	6	Numeric six	1
35	F5	21	5	Numeric five	1
34	F4	22	4	Numeric four	1
33	F3	23	3	Numeric three	1
32	F2	24	2	Numeric two	1
31	F1	25	1	Numeric one	1
30	F0	26	0	Numeric zero	1
2D	60	27	-	Hyphen (minus)	1
2F	61	28	/	Slant (solidus)	1
40	7C	29	@	Commercial at	1
23	7B	30	£	Pound sterling sign	1
24	5B	31	\$	Dollar sign	1
2C	6B	32	,	Comma	1
2B	4E	33	+	Plus	1
27	7D	34	'	Apostrophe	1
2A	5C	35	*	Asterisk	1
25	6C	36	%	Percent	1
26	50	37	&	Ampersand	1
2E	4B	38	.	Period (full stop)	1

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
5A	E9	39	Z	Uppercase Z	1
59	E8	40	Y	Uppercase Y	1
58	E7	41	X	Uppercase X	1
57	E6	42	W	Uppercase W	1
56	E5	43	V	Uppercase V	1
55	E4	44	U	Uppercase U	1
54	E3	45	T	Uppercase T	1
53	E2	46	S	Uppercase S	1
52	D9	47	R	Uppercase R	1
51	D8	48	Q	Uppercase Q	1
Array size					48

Table A—4. Denmark-Norway Print Cartridge, 48 Characters

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
4D	D4	1	M	Uppercase M	1
4C	D3	2	L	Uppercase L	1
4B	D2	3	K	Uppercase K	1
4A	D1	4	J	Uppercase J	1
49	C9	5	I	Uppercase I	1
48	C8	6	H	Uppercase H	1
47	C7	7	G	Uppercase G	1
46	C6	8	F	Uppercase F	1
45	C5	9	E	Uppercase E	1
44	C4	10	D	Uppercase D	1
43	C3	11	C	Uppercase C	1
42	C2	12	B	Uppercase B	1
41	C1	13	A	Uppercase A	1
E5	BD	14	É	Uppercase E with acute accent	1
5B	4A	15	Æ	Uppercase AE diphthong	1
5C	E0	16	Ø	Uppercase O with slant	1
5D	5A	17	Å	Uppercase A with circle	1
D9	B1	18	Ü	Uppercase U diaeresis	1
39	F9	19	9	Numeric nine	1
38	F8	20	8	Numeric eight	1
37	F7	21	7	Numeric seven	1
36	F6	22	6	Numeric six	1
35	F5	23	5	Numeric five	1
34	F4	24	4	Numeric four	1
33	F3	25	3	Numeric three	1
32	F2	26	2	Numeric two	1
31	F1	27	1	Numeric one	1
30	F0	28	0	Numeric zero	1
2E	4B	29	.	Period (full stop)	1
2F	61	30	/	Slant	1
26	50	31	&	Ampersand	1
2C	6B	32	,	Comma	1
2B	4E	33	+	Plus	1
2A	5C	34	*	Asterisk	1
2D	60	35	-	Hyphen (minus)	1

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
5A	E9	36	Z	Uppercase Z	1
59	E8	37	Y	Uppercase Y	1
58	E7	38	X	Uppercase X	1
57	E6	39	W	Uppercase W	1
56	E5	40	V	Uppercase V	1
55	E4	41	U	Uppercase U	1
54	E3	42	T	Uppercase T	1
53	E2	43	S	Uppercase S	1
52	D9	44	R	Uppercase R	1
51	D8	45	Q	Uppercase Q	1
50	D7	46	P	Uppercase P	1
4F	D6	47	O	Uppercase O	1
4E	D5	48	N	Uppercase N	1
Array size					48

Table A—5. Finland-Sweden Print Cartridge, 48 Characters

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
4D	D4	1	M	Uppercase M	1
4C	D3	2	L	Uppercase L	1
4B	D2	3	K	Uppercase K	1
4A	D1	4	J	Uppercase J	1
49	C9	5	I	Uppercase I	1
48	C8	6	H	Uppercase H	1
47	C7	7	G	Uppercase G	1
46	C6	8	F	Uppercase F	1
45	C5	9	E	Uppercase E	1
44	C4	10	D	Uppercase D	1
43	C3	11	C	Uppercase C	1
42	C2	12	B	Uppercase B	1
41	C1	13	A	Uppercase A	1
E5	BD	14	É	Uppercase E with acute accent	1
5B	4A	15	Ä	Uppercase A with diaeresis	1
5C	E0	16	Ö	Uppercase O with diaeresis	1
5D	5A	17	Å	Uppercase A with circle	1
5E	5F	18	Û	Uppercase U with diaeresis	1
39	F9	19	9	Numeric nine	1
38	F8	20	8	Numeric eight	1
37	F7	21	7	Numeric seven	1
36	F6	22	6	Numeric six	1
35	F5	23	5	Numeric five	1
34	F4	24	4	Numeric four	1
33	F3	25	3	Numeric three	1
32	F2	26	2	Numeric two	1
31	F1	27	1	Numeric one	1
30	F0	28	0	Numeric zero	1
2E	4B	29	.	Period (full stop)	1
2F	61	30	/	Slant (solidus)	1
26	50	31	&	Ampersand	1
2C	6B	32	,	Comma	1
2B	4E	33	+	Plus	1
2A	5C	34	=	Asterisk	1
2D	60	35	-	Hyphen (minus)	1

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
5A	E9	36	Z	Uppercase Z	1
59	E8	37	Y	Uppercase Y	1
58	E7	38	X	Uppercase X	1
57	E6	39	W	Uppercase W	1
56	E5	40	V	Uppercase V	1
55	E4	41	U	Uppercase U	1
54	E3	42	T	Uppercase T	1
53	E2	43	S	Uppercase S	1
52	D9	44	R	Uppercase R	1
51	D8	45	Q	Uppercase Q	1
50	D7	46	P	Uppercase P	1
4F	D6	47	O	Uppercase O	1
4E	D5	48	N	Uppercase N	1
Array size					48

Table A—6. Expanded Denmark-Norway Print Cartridge, 64 Characters

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
2B	4E	1	+	Plus	1
28	4D	2	(	Left parenthesis	1
29	5D	3	)	Right parenthesis	1
23	7B	4	#	Number sign	1
3D	7E	5	=	Equals	1
25	6C	6	%	Percent	1
2A	5C	7	*	Asterisk	1
3E	6E	8	>	Greater than	1
3C	4C	9	<	Less than	1
5A	E9	10	Z	Uppercase Z	1
59	E8	11	Y	Uppercase Y	1
58	E7	12	X	Uppercase X	1
57	E6	13	W	Uppercase W	1
56	E5	14	V	Uppercase V	1
55	E4	15	U	Uppercase U	1
54	E3	16	T	Uppercase T	1
53	E2	17	S	Uppercase S	1
52	D9	18	R	Uppercase R	1
30	F0	19	0	Numeric zero	2
51	D8	20	Q	Uppercase Q	1
50	D7	21	P	Uppercase P	1
4F	D6	22	O	Uppercase O	1
4E	D5	23	N	Uppercase N	1
4D	D4	24	M	Uppercase M	1
4C	D3	25	L	Uppercase L	1
4B	D2	26	K	Uppercase K	1
4A	D1	27	J	Uppercase J	1
49	C9	28	I	Uppercase I	1
48	C8	29	H	Uppercase H	1
47	C7	30	G	Uppercase G	1
46	C6	31	F	Uppercase F	1
45	C5	32	E	Uppercase E	1
44	C4	33	D	Uppercase D	1
43	C3	34	C	Uppercase C	1
42	C2	35	B	Uppercase B	1
41	C1	36	A	Uppercase A	1
E5	BD	37	E	Uppercase E with acute accent	1
5B	4A	38	AE	Uppercase AE diphthong	1
5C	ED	39	O	Uppercase O with slant	1
5D	5A	40	Å	Uppercase A with circle	1
D9	B1	41	Ü	Uppercase U with diaeresis	1
39	F9	42	9	Numeric nine	1
38	F8	43	8	Numeric eight	1
37	F7	44	7	Numeric seven	1
36	F6	45	6	Numeric six	1
35	F5	46	5	Numeric five	1

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
34	F4	47	4	Numeric four	1
33	F3	48	3	Numeric three	1
32	F2	49	2	Numeric two	1
31	F1	50	1	Numeric one	1
30	F0	51	0	Numeric zero	2
2E	4B	52	.	Period (full stop)	1
2D	60	53	-	Hyphen (minus)	1
2F	61	54	/	Slant (solidus)	1
24	5B	55	\$	Dollar sign	1
3B	5E	56	;	Semicolon	1
3A	7A	57	:	Colon	1
3F	6F	58	?	Question	1
26	50	59	&	Ampersand	1
5F	6D	60	—	Discontinuous underline	1
21	4F	61	!	Exclamation	1
27	7D	62	'	Apostrophe	1
22	7F	63	"	Quotation	1
2C	6B	64	,	Comma	1
Array size					64

Table A—7. Expanded Finland-Sweden Print Cartridge, 64 Characters

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
2B	4E	1	+	Plus	1
28	4D	2	(	Left parenthesis	1
29	5D	3	)	Right parenthesis	1
23	7B	4	#	Number sign	1
3D	7E	5	=	Equals	1
25	6C	6	%	Percent	1
2A	5C	7	*	Asterisk	1
3E	6E	8	>	Greater than	1
3C	4C	9	<	Less than	1
5A	E9	10	Z	Uppercase Z	1
59	E8	11	Y	Uppercase Y	1
58	E7	12	X	Uppercase X	1
57	E6	13	W	Uppercase W	1
56	E5	14	V	Uppercase V	1
55	E4	15	U	Uppercase U	1
54	E3	16	T	Uppercase T	1
53	E2	17	S	Uppercase S	1
52	D9	18	R	Uppercase R	1
30	F0	19	0	Numeric zero	1
51	D8	20	Q	Uppercase Q	1
50	D7	21	P	Uppercase P	1
4F	D6	22	O	Uppercase O	1
4E	D5	23	N	Uppercase N	1
4D	D4	24	M	Uppercase M	1
4C	D3	25	L	Uppercase L	1
4B	D2	26	K	Uppercase K	1
4A	D1	27	J	Uppercase J	1
49	C9	28	I	Uppercase I	1
48	C8	29	H	Uppercase H	1
47	C7	30	G	Uppercase G	1
46	C6	31	F	Uppercase F	1
45	C5	32	E	Uppercase E	1
44	C4	33	D	Uppercase D	1
43	C3	34	C	Uppercase C	1
42	C2	35	B	Uppercase B	1
41	C1	36	A	Uppercase A	1
40	7C	37	É	Uppercase E with acute accent	1
5B	4A	38	Ä	Uppercase A with diaeresis	1
5C	E0	39	Ö	Uppercase O with diaeresis	1
5D	5A	40	Å	Uppercase A with circle	1
5E	5F	41	Ü	Uppercase U with diaeresis	1
39	F9	42	9	Numeric nine	1
38	F8	43	8	Numeric eight	1
37	F7	44	7	Numeric seven	1
36	F6	45	6	Numeric six	1
35	F5	46	5	Numeric five	1

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
34	F4	47	4	Numeric four	1
33	F3	48	3	Numeric three	1
32	F2	49	2	Numeric two	1
31	F1	50	1	Numeric one	1
30	F0	51	0	Numeric zero	2
2E	4B	52	.	Period (full stop)	1
2D	60	53	-	Hyphen (minus)	1
2F	61	54	/	Slant (solidus)	1
24	5B	55	\$	Dollar sign	1
3B	5E	56	;	Semicolon	1
3A	7A	57	:	Colon	1
3F	6F	58	?	Question	1
26	50	59	&	Ampersand	1
5F	6D	60	—	Discontinuous underline	1
21	4F	61	!	Exclamation	1
27	7D	62	'	Apostrophe	1
22	7F	63	"	Quotation	1
2C	6B	64	,	Comma	1
Array size					64

Table A—8. Numeric Print Cartridge, 24 Characters

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
2D	60	1	-	Hyphen (minus)	1
2F	61	2	/	Slant (solidus)	1
3E	6E	3	>	Greater than	1
3C	4C	4	<	Less than	1
3D	7E	5	=	Equals	1
23	7B	6	#	Number sign	1
24	5B	7	\$	Dollar sign	1
2C	6B	8	,	Comma	1
2B	4E	9	+	Plus	1
28	4D	10	(	Left parenthesis	1
29	5D	11	)	Right parenthesis	1
2A	5C	12	*	Asterisk	1
25	6C	13	%	Percent	1
2E	4B	14	.	Period (full stop)	1
39	F9	15	9	Numeric nine	1
38	F8	16	8	Numeric eight	1
37	F7	17	7	Numeric seven	1
36	F6	18	6	Numeric six	1
35	F5	19	5	Numeric five	1
34	F4	20	4	Numeric four	1
33	F3	21	3	Numeric three	1
32	F2	22	2	Numeric two	1
31	F1	23	1	Numeric one	1
30	F0	24	0	Numeric zero	1
Array size					24

Table A—9. Modified FORTRAN (77L) Print Cartridge, 64 Characters

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
2B	4E	1	+	Plus	1
28	4D	2	(	Left parenthesis	1
29	5D	3	)	Right parenthesis	1
23	7B	4	#	Number sign	1
32	7E	5	=	Equals	1
25	6C	6	%	Percent	1
2A	5C	7	*	Asterisk	1
3E	6E	8	>	Greater than	1
3C	4C	9	<	Less than	1
5A	E9	10	Z	Uppercase Z	1
59	E8	11	Y	Uppercase Y	1
58	E7	12	X	Uppercase X	1
57	E6	13	W	Uppercase W	1
56	E5	14	V	Uppercase V	1
55	E4	15	U	Uppercase U	1
54	E3	16	T	Uppercase T	1
53	E2	17	S	Uppercase S	1
52	D9	18	R	Uppercase R	1
30	F0	19	0	Numeric zero	2
51	D8	20	Q	Uppercase Q	1
50	D7	21	P	Uppercase P	1
4F	D6	22	O	Uppercase O	1
4E	D5	23	N	Uppercase N	1
4D	D4	24	M	Uppercase M	1
4C	D3	25	L	Uppercase L	1
4B	D2	26	K	Uppercase K	1
4A	D1	27	J	Uppercase J	1
49	C9	28	I	Uppercase I	1
48	C8	29	H	Uppercase H	1
47	C7	30	G	Uppercase G	1
46	C6	31	F	Uppercase F	1
45	C5	32	E	Uppercase E	1
44	C4	33	D	Uppercase D	1
43	C3	34	C	Uppercase C	1
42	C2	35	B	Uppercase B	1
41	C1	36	A	Uppercase A	1
5B	4A	37	[	Left square bracket	1
5D	5A	38	]	Right square bracket	1
5E	5F	39	△	Delta	1
5C	E0	40	\	Reverse slant (reverse solidus)	1
5F	6D	41	≠	Unequal sign	1
39	F9	42	9	Numeric nine	1
38	F8	43	8	Numeric eight	1
37	F7	44	7	Numeric seven	1
36	F6	45	6	Numeric six	1
35	F5	46	5	Numeric five	1

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
34	F4	47	4	Numeric four	1
33	F3	48	3	Numeric three	1
32	F2	49	2	Numeric two	1
31	F1	50	1	Numeric one	1
30	F0	51	0	Numeric zero	2
2E	4B	52	.	Period (full stop)	1
2D	60	53	-	Hyphen (minus)	1
2F	61	54	/	Slant (solidus)	1
24	5B	55	\$	Dollar sign	1
3B	5E	56	;	Semicolon	1
3A	7A	57	:	Colon	1
3F	6F	58	?	Question	1
26	50	59	&	Ampersand	1
A4	45	60	□	Lozenge	1
7C	6A	61	|	Vertical line	1
27	7D	62	'	Apostrophe	1
40	7C	63	@	Commercial at	1
2C	6B	64	,	Comma	1
Array size					64

Table A—10. Modified ASCII (77L) Print Cartridge, 64 Characters

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
2B	4E	1	+	Plus	1
28	4D	2	(	Left parenthesis	1
29	5D	3	)	Right parenthesis	1
23	7B	4	#	Number sign	1
3D	7E	5	=	Equals	1
25	6C	6	%	Percent	1
2A	5C	7	*	Asterisk	1
3E	6E	8	>	Greater than	1
3C	4C	9	<	Less than	1
5A	E9	10	Z	Uppercase Z	1
59	E8	11	Y	Uppercase Y	1
58	E7	12	X	Uppercase X	1
57	E6	13	W	Uppercase W	1
56	E5	14	V	Uppercase V	1
55	E4	15	U	Uppercase U	1
54	E3	16	T	Uppercase T	1
53	E2	17	S	Uppercase S	1
52	D9	18	R	Uppercase R	1
30	F0	19	0	Numeric zero	2
51	D8	20	Q	Uppercase Q	1
50	D7	21	P	Uppercase P	1
4F	D6	22	O	Uppercase O	1
4E	D5	23	N	Uppercase N	1
4D	D4	24	M	Uppercase M	1
4C	D3	25	L	Uppercase L	1
4B	D2	26	K	Uppercase K	1
40	D1	27	J	Uppercase J	1
49	C9	28	I	Uppercase I	1
48	C8	29	H	Uppercase H	1
47	C7	30	G	Uppercase G	1
46	C6	31	F	Uppercase F	1
45	C5	32	E	Uppercase E	1
44	C4	33	D	Uppercase D	1
43	C3	34	C	Uppercase C	1
42	C2	35	B	Uppercase B	1
41	C1	36	A	Uppercase A	1
5B	4A	37	[	Left square bracket	1
5D	5A	38	]	Right square bracket	1
21	4F	39	|	Vertical line	1
5E	5F	40	¬	Logical not	1
5C	E0	41	\	Reverse slant (reverse solidus)	1
39	F9	42	9	Numeric nine	1
38	F8	43	8	Numeric eight	1
37	F7	44	7	Numeric seven	1
36	F6	45	6	Numeric six	1
35	F5	46	5	Numeric five	1

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
34	F4	47	4	Numeric four	1
33	F3	48	3	Numeric three	1
32	F2	49	2	Numeric two	1
31	F1	50	1	Numeric one	1
30	F0	51	0	Numeric zero	2
2E	4B	52	.	Period (full stop)	1
2D	60	53	-	Hyphen (minus)	1
2F	61	54	/	Slant (solidus)	1
24	5B	55	\$	Dollar sign	1
3B	5E	56	;	Semicolon	1
3A	7A	57	:	Colon	1
3F	6F	58	?	Question	1
26	50	59	&	Ampersand	1
5F	6D	60	_	Underline (discontinuous)	1
40	7C	61	@	Commercial at	1
27	7D	62	'	Apostrophe	1
22	7F	63	"	Quotation	1
2C	6B	64	,	Comma	1
Array size					64

Table A-11. Expanded ASCII Print Cartridge, 96 Characters (Part 1 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
63	83	1	c	Lowercase c	1
62	82	2	b	Lowercase b	1
61	81	3	a	Lowercase a	1
39	F9	4	9	Numeric nine	1
38	F8	5	8	Numeric eight	1
37	F7	6	7	Numeric seven	1
36	F6	7	6	Numeric six	1
35	F5	8	5	Numeric five	1
34	F4	9	4	Numeric four	1
33	F3	10	3	Numeric three	1
32	F2	11	2	Numeric two	1
31	F1	12	1	Numeric one	1
30	F0	13	0	Numeric zero	2
A4	45	14	☉	International currency sign	1
7C	6A	15	|	Vertical line	1
5B	4A	16	[	Left square bracket	1
5D	5A	17	]	Right square bracket	1
7B	C0	18	{	Left brace bracket	1
7D	D0	19	}	Right brace bracket	1
2E	4B	20	.	Period (full stop)	1
2D	60	21	-	Hyphen (minus)	1
2F	61	22	/	Slant (solidus)	1
24	5B	23	\$	Dollar sign	1
3B	5E	24	;	Semicolon	1
3A	7A	25	:	Colon	1
3F	6F	26	?	Question	1
26	50	27	&	Ampersand	1
5F	6D	28	—	Discontinuous underline	1
21	4F	29	!	Exclamation	1
27	7D	30	'	Acute accent (apostrophe)	1
22	7F	31	"	Quotation	1
2C	6B	32	,	Comma	1
2B	4E	33	+	Plus	1
28	4D	34	(	Left parenthesis	1
29	5D	35	)	Right parenthesis	1
23	7B	36	#	Number sign	1
3D	7E	37	=	Equals	1
25	6C	38	%	Percent	1
2A	5C	39	*	Asterisk	1
3E	6E	40	>	Greater than	1
3C	4C	41	<	Less than	1
5E	5F	42	^	Circumflex	1
5C	E0	43	\	Reverse slant (reverse solidus)	1
7E	A1	44	~	Tilde (overline)	1
60	79	45	`	Grave accent	1
40	7C	46	@	Commercial at	1

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
5A	E9	47	Z	Uppercase Z	1
59	E8	48	Y	Uppercase Y	1
58	E7	49	X	Uppercase X	1
57	E6	50	W	Uppercase W	1
30	F0	51	0	Numeric zero	2
56	E5	52	V	Uppercase V	1
55	E4	53	U	Uppercase U	1
54	E3	54	T	Uppercase T	1
53	E2	55	S	Uppercase S	1
52	D9	56	R	Uppercase R	1
51	D8	57	Q	Uppercase Q	1
50	D7	58	P	Uppercase P	1
4F	D6	59	O	Uppercase O	1
4E	D5	60	N	Uppercase N	1
4D	D4	61	M	Uppercase M	1
4C	D3	62	L	Uppercase L	1
4B	D2	63	K	Uppercase K	1
4A	D1	64	J	Uppercase J	1
49	C9	65	I	Uppercase I	1
48	C8	66	H	Uppercase H	1
47	C7	67	G	Uppercase G	1

Table A—11. Expanded ASCII Print Cartridge, 96 Characters (Part 2 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
46	C6	68	F	Uppercase F	1
45	C5	69	E	Uppercase E	1
44	C4	70	D	Uppercase D	1
43	C3	71	C	Uppercase C	1
42	C2	72	B	Uppercase B	1
41	C1	73	A	Uppercase A	1
7A	A9	74	z	Lowercase z	1
79	A8	75	y	Lowercase y	1
78	A7	76	x	Lowercase x	1
77	A6	77	w	Lowercase w	1
76	A5	78	v	Lowercase v	1
75	A4	79	u	Lowercase u	1
74	A3	80	t	Lowercase t	1
73	A2	81	s	Lowercase s	1
72	99	82	r	Lowercase r	1
71	98	83	q	Lowercase q	1
70	97	84	p	Lowercase p	1
6F	96	85	o	Lowercase o	1
6E	95	86	n	Lowercase n	1
6D	94	87	m	Lowercase m	1
6C	93	88	l	Lowercase l	1
6B	92	89	k	Lowercase k	1
6A	91	90	j	Lowercase j	1
69	89	91	i	Lowercase i	1
68	88	92	h	Lowercase h	1
67	87	93	g	Lowercase g	1
66	86	94	f	Lowercase f	1
65	85	95	e	Lowercase e	1
64	84	96	d	Lowercase d	1
Array size					96

Table A—12. Expanded Finland-Sweden Print Cartridge, 96 Characters

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
63	83	1	c	Lowercase c	1
62	82	2	b	Lowercase b	1
61	81	3	a	Lowercase a	1
39	F9	4	9	Numeric nine	1
38	F8	5	8	Numeric eight	1
37	F7	6	7	Numeric seven	1
36	F6	7	6	Numeric six	1
35	F5	8	5	Numeric five	1
34	F4	9	4	Numeric four	1
33	F3	10	3	Numeric three	1
32	F2	11	2	Numeric two	1
31	F1	12	1	Numeric one	1
30	F0	13	0	Numeric zero	2
A4	45	14	☉	International currency sign	1
60	79	15	é	Lowercase e with acute accent	1
7B	C0	16	ä	Lowercase a with diaeresis	1
7C	6A	17	ö	Lowercase o with diaeresis	1
7D	D0	18	å	Lowercase a with circle	1
7E	A1	19	ü	Lowercase u with diaeresis	1
2E	48	20	.	Period (full stop)	1
2D	60	21	-	Hyphen (minus)	1
2F	61	22	/	Slant (solidus)	1
24	5B	23	\$	Dollar sign	1
3B	5E	24	;	Semicolon	1
3A	7A	25	:	Colon	1
3F	6F	26	?	Question	1
26	50	27	&	Ampersand	1
5F	6D	28	—	Discontinuous underline	1
21	4F	29	!	Exclamation	1
27	7D	30	'	Apostrophe	1
22	7F	31	"	Quotation	1
2C	6B	32	,	Comma	1
2B	4E	33	+	Plus	1
28	4D	34	(	Left parenthesis	1
29	5D	35	)	Right parenthesis	1
23	7B	36	#	Number sign	1
3D	7E	37	=	Equals	1
25	6C	38	%	Percent	1
2A	5C	39	*	Asterisk	1
3E	6E	40	>	Greater than	1
3C	4C	41	<	Less than	1
40	7C	42	É	Uppercase E with acute accent	1
5B	E2	43	Ä	Uppercase A with diaeresis	1
5C	E0	44	Ö	Uppercase O with diaeresis	1
5D	5A	45	Å	Uppercase A with circle	1
5E	5F	46	Ü	Uppercase U with diaeresis	1
5A	E9	47	Z	Uppercase Z	1
59	E8	48	Y	Uppercase Y	1
58	E7	49	X	Uppercase X	1

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
57	E6	50	W	Uppercase W	1
30	F0	51	0	Numeric zero	2
56	E5	52	V	Uppercase V	1
55	E4	53	U	Uppercase U	1
54	E3	54	T	Uppercase T	1
53	E2	55	S	Uppercase S	1
52	D9	56	R	Uppercase R	1
51	D8	57	Q	Uppercase Q	1
50	D7	58	P	Uppercase P	1
4F	D6	59	O	Uppercase O	1
4E	D5	60	N	Uppercase N	1
4D	D4	61	M	Uppercase M	1
4C	D3	62	L	Uppercase L	1
4B	D2	63	K	Uppercase K	1
4A	D1	64	J	Uppercase J	1
49	C9	65	I	Uppercase I	1
48	C8	66	H	Uppercase H	1
47	C7	67	G	Uppercase G	1
46	C6	68	F	Uppercase F	1
45	C5	69	E	Uppercase E	1
44	C4	70	D	Uppercase D	1
43	C3	71	C	Uppercase C	1
42	C2	72	B	Uppercase B	1
41	C1	73	A	Uppercase A	1
7A	A9	74	z	Lowercase z	1
79	A8	75	y	Lowercase y	1
78	A7	76	x	Lowercase x	1
77	A6	77	w	Lowercase w	1
76	A5	78	v	Lowercase v	1
75	A4	79	u	Lowercase u	1
74	A3	80	t	Lowercase t	1
73	A2	81	s	Lowercase s	1
72	99	82	r	Lowercase r	1
71	98	83	q	Lowercase q	1
70	97	84	p	Lowercase p	1
6F	96	85	o	Lowercase o	1
6E	95	86	n	Lowercase n	1
6D	94	87	m	Lowercase m	1
6C	93	88	l	Lowercase l	1
6B	92	89	k	Lowercase k	1
6A	91	90	j	Lowercase j	1
69	89	91	i	Lowercase i	1
68	88	92	h	Lowercase h	1
67	87	93	g	Lowercase g	1
66	86	94	f	Lowercase f	1
65	85	95	e	Lowercase e	1
64	84	96	d	Lowercase d	1
Array size					96

Table A—13. Universal OCR-B (ISO) Print Cartridge, 128 Characters (Part 1 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
32	F2	1	2	Numeric two	3
31	F1	2	1	Numeric one	3
30	F0	3	0	Numeric zero	3
27	7D	4	'	Apostrophe	2
28	4D	5	(	Left parenthesis	2
29	5D	6	)	Right parenthesis	2
23	7B	7	#	Number sign	2
3D	7E	8	=	Equals	2
25	6C	9	%	Percent	2
2F	61	10	/	Slant (solidus)	2
5A	E9	11	Z	Uppercase Z	1
59	E8	12	Y	Uppercase Y	2
58	E7	13	X	Uppercase X	2
57	E6	14	W	Uppercase W	2
2E	4B	15	.	Period (full stop)	3
2D	60	16	-	Hyphen (minus)	3
2A	5C	17	*	Asterisk	3
2C	6B	18	,	Comma	3
5F	6D	19	_	Discontinuous underline	1
A3	44	20	£	Pound sterling sign	1
7C	6A	21	|	Vertical line	1
5B	4A	22	[	Left square bracket	1
5D	5A	23	]	Right square bracket	1
DC	B4	24	¥	Yen sign	1
56	E5	25	V	Uppercase V	2
55	E4	26	U	Uppercase U	2
54	E3	27	T	Uppercase T	2
53	E2	28	S	Uppercase S	2
52	D9	29	R	Uppercase R	2
51	D8	30	Q	Uppercase Q	2
50	D7	31	P	Uppercase P	2
4F	D6	32	O	Uppercase O	2
4E	D5	33	N	Uppercase N	2
4D	D4	34	M	Uppercase M	2
4C	D3	35	L	Uppercase L	2
DE	B6	36	¬	Logical not	1
39	F9	37	9	Numeric nine	3
38	F8	38	8	Numeric eight	3
37	F7	39	7	Numeric seven	3
36	F6	40	6	Numeric six	3
35	F5	41	5	Numeric five	3
34	F4	42	4	Numeric four	3
33	F3	43	3	Numeric three	3
32	F2	44	2	Numeric two	3
31	F1	45	1	Numeric one	3
30	F0	46	0	Numeric zero	3
4B	D2	47	K	Uppercase K	2

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
4A	D1	48	J	Uppercase J	2
49	C9	49	I	Uppercase I	2
48	C8	50	H	Uppercase H	2
47	C7	51	G	Uppercase G	2
46	C6	52	F	Uppercase F	2
45	C5	53	E	Uppercase E	2
44	C4	54	D	Uppercase D	2
43	C3	55	C	Uppercase C	2
42	C2	56	B	Uppercase B	2
41	C1	57	A	Uppercase A	2
2E	4B	58	.	Period (full stop)	3
2D	60	59	-	Hyphen (minus)	3
2A	5C	60	*	Asterisk	3
2C	6B	61	,	Comma	3
40	7C	62	@	Commercial at	1
26	50	63	&	Ampersand	1
3A	7A	64	:	Colon	1
3B	5E	65	;	Semicolon	1
3E	6E	66	>	Greater than	1
3C	4C	67	<	Less than	1
27	7D	68	'	Apostrophe	2
28	4D	69	(	Left parenthesis	2
29	5D	70	)	Right parenthesis	2
23	7B	71	#	Number sign	2
3D	7E	72	=	Equals	2
25	6C	73	%	Percent	2
2F	61	74	/	Slant (solidus)	2
3F	6F	75	?	Question	1
59	E8	76	Y	Uppercase Y	2
58	E7	77	X	Uppercase X	2
57	E6	78	W	Uppercase W	2
39	F9	79	9	Numeric nine	3
38	F8	80	8	Numeric eight	3
37	F7	81	7	Numeric seven	3
36	F6	82	6	Numeric six	3
35	F5	83	5	Numeric five	3
34	F4	84	4	Numeric four	3
33	F3	85	3	Numeric three	3
32	F2	86	2	Numeric two	3
31	F1	87	1	Numeric one	3
30	F0	88	0	Numeric zero	3
56	E5	89	V	Uppercase V	2
55	E4	90	U	Uppercase U	2
54	E3	91	T	Uppercase T	2
53	E2	92	S	Uppercase S	2
52	D9	93	R	Uppercase R	2
51	D8	94	Q	Uppercase Q	2

Table A—13. Universal OCR-B (ISO) Print Cartridge, 128 Characters (Part 2 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
50	D7	95	P	Uppercase P	2
4F	D6	96	O	Uppercase O	2
4E	D5	97	N	Uppercase N	2
4D	D4	98	M	Uppercase M	2
4C	D3	99	L	Uppercase L	2
2E	4B	100	.	Period (full stop)	3
2D	60	101	-	Hyphen (minus)	3
2A	5C	102	*	Asterisk	3
2C	6B	103	,	Comma	3
A4	45	104	⌘	International currency sign	1
21	4F	105	!	Exclamation	1
2B	4E	106	+	Plus	1
24	5B	107	\$	Dollar sign	1
5E	5F	108	^	Circumflex	1
22	7F	109	"	Quotation	1
5C	E0	110	\	Reverse slant (reverse solidus)	1
4B	D2	111	K	Uppercase K	2
4A	D1	112	J	Uppercase J	2
49	C9	113	I	Uppercase I	2
48	C8	114	H	Uppercase H	2
47	C7	115	G	Uppercase G	2
46	C6	116	F	Uppercase F	2
45	C5	117	E	Uppercase E	2
44	C4	118	D	Uppercase D	2
43	C3	119	C	Uppercase C	2
42	C2	120	B	Uppercase B	2
41	C1	121	A	Uppercase A	2
39	F9	122	9	Numeric nine	3
38	F8	123	8	Numeric eight	3
37	F7	124	7	Numeric seven	3
36	F6	125	6	Numeric six	3
35	F5	126	5	Numeric five	3
34	F4	127	4	Numeric four	3
33	F3	128	3	Numeric three	3
Array size					128

Table A—14. Universal OCR H-14 Print Cartridge, 128 Characters (Part 1 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
32	F2	1	2	Numeric two	3
31	F1	2	1	Numeric one	3
30	F0	3	0	Numeric zero	3
27	7D	4	'	Apostrophe	2
28	4D	5	.(	Left parenthesis	2
29	5D	6	)	Right parenthesis	2
23	7B	7	#	Number sign	2
3D	7E	8	=	Equals	2
25	6C	9	%	Percent	2
2F	61	10	/	Slant (solidus)	2
5A	E9	11	Z	Uppercase Z	1
59	E8	12	Y	Uppercase Y	2
58	E7	13	X	Uppercase X	2
57	E6	14	W	Uppercase W	2
2E	4B	15	.	Period (full stop)	3
2D	60	16	-	Hyphen (minus)	3
2A	5C	17	*	Asterisk	3
2C	6B	18	,	Comma	3
5F	6D	19	_	Discontinuous underline	1
A3	44	20	£	Pound sterling sign	1
7C	6A	21	|	Vertical line	1
5B	4A	22	[	Left square bracket	1
5D	5A	23	]	Right square bracket	1
DC	B4	24	¥	Yen sign	1
56	E5	25	V	Uppercase V	2
55	E4	26	U	Uppercase U	2
54	E3	27	T	Uppercase T	2
53	E2	28	S	Uppercase S	2
52	D9	29	R	Uppercase R	2
51	D8	30	Q	Uppercase Q	2
50	D7	31	P	Uppercase P	2
4F	D6	32	O	Uppercase O	2
4E	D5	33	N	Uppercase N	2
4D	D4	34	M	Uppercase M	2
4C	D3	35	L	Uppercase L	2
DE	B6	36	¬	Logical not	1
39	F9	37	9	Numeric nine	3
38	F8	38	8	Numeric eight	3
37	F7	39	7	Numeric seven	3
36	F6	40	6	Numeric six	3
35	F5	41	5	Numeric five	3
34	F4	42	4	Numeric four	3
33	F3	43	3	Numeric three	3
32	F2	44	2	Numeric two	3
31	F1	45	1	Numeric one	3
30	F0	46	0	Numeric zero	3

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
4B	D2	47	K	Uppercase K	2
4A	D1	48	J	Uppercase J	2
49	C9	49	I	Uppercase I	2
48	C8	50	H	Uppercase H	2
47	C7	51	G	Uppercase G	2
46	C6	52	F	Uppercase F	2
45	C5	53	E	Uppercase E	2
44	C4	54	D	Uppercase D	2
43	C3	55	C	Uppercase C	2
42	C2	56	B	Uppercase B	2
41	C1	57	A	Uppercase A	2
2E	4B	58	.	Period (full stop)	3
2D	60	59	-	Hyphen (minus)	3
2A	5C	60	*	Asterisk	3
2C	6B	61	,	Comma	3
40	7C	62	@	Commercial at	1
26	50	63	&	Ampersand	1
3A	7A	64	:	Colon	1
3B	5E	65	;	Semicolon	1
3E	6E	66	>	Greater than	1
2C	4C	67	<	Less than	1
27	7D	68	'	Apostrophe	2
28	4D	69	(	Left parenthesis	2
29	5D	70	)	Right parenthesis	2
23	7B	71	#	Number sign	2
3D	7E	72	=	Equals	2
25	6C	73	%	Percent	2
2F	61	74	/	Slant (solidus)	2
3F	6F	75	?	Question	1
59	E8	76	Y	Uppercase Y	2
58	E7	77	X	Uppercase X	2
57	E6	78	W	Uppercase W	2
39	F9	79	9	Numeric nine	3
38	F8	80	8	Numeric eight	3
37	F7	81	7	Numeric seven	3
36	F6	82	6	Numeric six	3
35	F5	83	5	Numeric five	3
34	F4	84	4	Numeric four	3
33	F3	85	3	Numeric three	3
32	F2	86	2	Numeric two	3
31	F1	87	1	Numeric one	3
30	F0	88	0	Numeric zero	3
56	E5	89	V	Uppercase V	2
55	E4	90	U	Uppercase U	2
54	E3	91	T	Uppercase T	2
53	E2	92	S	Uppercase S	2

Table A—14. Universal OCR H-14 Print Cartridge, 128 Characters (Part 2 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
52	D9	93	R	Uppercase R	2
51	D8	94	Q	Uppercase Q	2
50	D7	95	P	Uppercase P	2
4F	D6	96	O	Uppercase O	2
4E	D5	97	N	Uppercase N	2
4D	D4	98	M	Uppercase M	2
4C	D3	99	L	Uppercase L	2
2E	4B	100	.	Period (full stop)	3
2D	60	101	-	Hyphen (minus)	3
2A	5C	102	*	Asterisk	3
2C	6B	103	,	Comma	3
A4	45	104	₪	International currency sign	1
21	4F	105	!	Exclamation	1
2B	4E	106	+	Plus	1
24	5B	107	\$	Dollar sign	1
5E	5F	108	^	Circumflex	1
22	7F	109	"	Quotation	1
5C	E0	110	\	Reverse slant (reverse solidus)	1
4B	D2	111	K	Uppercase K	2
4A	D1	112	J	Uppercase J	2
49	C9	113	I	Uppercase I	2
48	C8	114	H	Uppercase H	2
47	C7	115	G	Uppercase G	2
46	C6	116	F	Uppercase F	2
45	C5	117	E	Uppercase E	2
44	C4	118	D	Uppercase D	2
43	C3	119	C	Uppercase C	2
42	C2	120	B	Uppercase B	2
41	C1	121	A	Uppercase A	2
39	F9	122	9	Numeric nine	3
38	F8	123	8	Numeric eight	3
37	F7	124	7	Numeric seven	3
36	F6	125	6	Numeric six	3
35	F5	126	5	Numeric five	3
34	F4	127	4	Numeric four	3
33	F3	128	3	Numeric three	3
Array size					128

NOTE:

The Universal OCR H-14 print cartridge (Table A—14) uses the same character types as the Universal OCR-B (ISO) print cartridge (Table A—13), except that character sizes are smaller on the OCR H-14 print cartridge, as required for printing at 8 lpi (3.17 mm per line).

Table A—15. Universal OCR-A (ISO) Print Cartridge, 128 Characters (Part 1 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
32	F2	1	2	Numeric two	3
31	F1	2	1	Numeric one	3
30	F0	3	0	Numeric zero	3
27	7D	4	'	Apostrophe	2
28	4D	5	(	Left parenthesis	2
29	5D	6	)	Right parenthesis	2
23	7B	7	#	Number sign	2
3D	7E	8	=	Equals	1
25	6C	9	%	Percent	1
2F	61	10	/	Slant (solidus)	1
5A	E9	11	Z	Uppercase Z	1
59	E8	12	Y	Uppercase Y	2
58	E7	13	X	Uppercase X	2
57	E6	14	W	Uppercase W	2
2E	4B	15	.	Period (full stop)	3
2D	60	16	-	Hyphen (minus)	3
2A	5C	17	*	Asterisk	3
2C	6B	18	,	Comma	3
5F	6D	19	_	Discontinuous underline	1
A3	44	20	£	Pound sterling sign	1
7C	6A	21	|	Vertical line	1
5B	4A	22	[	Left square bracket	1
5D	5A	23	]	Right square bracket	1
DC	B4	24	¥	Yen sign	1
56	E5	25	V	Uppercase V	2
55	E4	26	U	Uppercase U	2
54	E3	27	T	Uppercase T	2
53	E2	28	S	Uppercase S	2
52	D9	29	R	Uppercase R	2
51	D8	30	Q	Uppercase Q	2
50	D7	31	P	Uppercase P	2
4F	D6	32	O	Uppercase O	2
4E	D5	33	N	Uppercase N	2
4D	D4	34	M	Uppercase M	2
4C	D3	35	L	Uppercase L	2
DE	B6	36	¬	Logical not	1
39	F9	37	9	Numeric nine	3
38	F8	38	8	Numeric eight	3
37	F7	39	7	Numeric seven	3
36	F6	40	6	Numeric six	3
35	F5	41	5	Numeric five	3
34	F4	42	4	Numeric four	3
33	F3	43	3	Numeric three	3
32	F2	44	2	Numeric two	3
31	F1	45	1	Numeric one	3
30	F0	46	0	Numeric zero	3
4B	D2	47	K	Uppercase K	2

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
4A	D1	48	J	Uppercase J	2
49	C9	49	I	Uppercase I	2
48	C8	50	H	Uppercase H	2
47	C7	51	G	Uppercase G	2
46	C6	52	F	Uppercase F	2
45	C5	53	E	Uppercase E	2
44	C4	54	D	Uppercase D	2
43	C3	55	C	Uppercase C	2
42	C2	56	B	Uppercase B	2
41	C1	57	A	Uppercase A	2
2E	4B	58	.	Period (full stop)	3
2D	60	59	-	Hyphen (minus)	3
2A	5C	60	*	Asterisk	3
2C	6B	61	,	Comma	3
40	7C	62	@	Commercial at	1
26	50	63	&	Ampersand	1
3A	7A	64	:	Colon	1
3B	5E	65	;	Semicolon	1
3E	6E	66	>	Greater than	1
3C	4C	67	<	Less than	1
27	7D	68	'	Apostrophe	2
28	4D	69	(	Left parenthesis	2
29	5D	70	)	Right parenthesis	2
23	7B	71	#	Number sign	2
DF	B7	72	Ɔ	Fork	2
FE	FE	73	⸏	Hook	1
E0	B8	74	⸐	Chair	1
3F	6F	75	?	Question	1
59	E8	76	Y	Uppercase Y	2
58	E7	77	X	Uppercase X	2
57	E6	78	W	Uppercase W	2
39	F9	79	9	Numeric nine	3
38	F8	80	8	Numeric eight	3
37	F7	81	7	Numeric seven	3
36	F6	82	6	Numeric six	3
35	F5	83	5	Numeric five	3
34	F4	84	4	Numeric four	3
33	F3	85	3	Numeric three	3
32	F2	86	2	Numeric two	3
31	F1	87	1	Numeric one	3
30	F0	88	0	Numeric zero	3
56	E5	89	V	Uppercase V	2
55	E4	90	U	Uppercase U	2
54	E3	91	T	Uppercase T	2
53	E2	92	S	Uppercase S	2
52	D9	93	R	Uppercase R	2
51	D8	94	Q	Uppercase Q	2

Table A—15. Universal OCR-A (ISO) Print Cartridge, 128 Characters (Part 2 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
50	D7	95	P	Uppercase P	2
4F	D6	96	O	Uppercase O	2
4E	D5	97	N	Uppercase N	2
4D	D4	98	M	Uppercase M	2
4C	D3	99	L	Uppercase L	2
2E	4B	100	.	Period (full stop)	3
2D	60	101	-	Hyphen (minus)	3
2A	5C	102	*	Asterisk	3
2C	6B	103	,	Comma	3
A4	45	104	₪	International currency sign	1
21	4F	105	!	Exclamation	1
2B	4E	106	+	Plus	1
24	5B	107	\$	Dollar sign	1
5E	5F	108	^	Circumflex	1
22	7F	109	"	Quotation	1
5C	E0	110	\	Reverse slant (reverse solidus)	1
4B	D2	111	K	Uppercase K	2
4A	D1	112	J	Uppercase J	2
49	C9	113	I	Uppercase I	2
48	C8	114	H	Uppercase H	2
47	C7	115	G	Uppercase G	2
46	C6	116	F	Uppercase F	2
45	C5	117	E	Uppercase E	2
44	C4	118	D	Uppercase D	2
43	C3	119	C	Uppercase C	2
42	C2	120	B	Uppercase B	2
41	C1	121	A	Uppercase A	2
39	F9	122	9	Numeric nine	3
38	F8	123	8	Numeric eight	3
37	F7	124	7	Numeric seven	3
36	F6	125	6	Numeric six	3
35	F5	126	5	Numeric five	3
34	F4	127	4	Numeric four	3
33	F3	128	3	Numeric three	3
Array size					128

Table A-16. Universal OCR-B (ECMA-11) Print Cartridge, 128 Characters (Part 1 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
32	F2	1	2	Numeric two	3
31	F1	2	1	Numeric one	3
30	F0	3	0	Numeric zero	3
27	7D	4	'	Apostrophe	2
28	4D	5	(	Left parenthesis	2
29	5D	6	)	Right parenthesis	2
23	7B	7	#	Number sign	2
3D	7E	8	=	Equals	2
25	6C	9	%	Percent	2
2F	61	10	/	Slant (solidus)	2
5A	E9	11	Z	Uppercase Z	1
59	E8	12	Y	Uppercase Y	2
58	E7	13	X	Uppercase X	2
57	E6	14	W	Uppercase W	2
2E	4B	15	.	Period (full stop)	3
2D	60	16	-	Hyphen (minus)	3
2A	5C	17	*	Asterisk	3
2C	6B	18	,	Comma	3
5F	6D	19	_	Discontinuous underline	1
A3	44	20	£	Pound sterling sign	1
7C	6A	21	|	Vertical line	1
5B	4A	22	[	Left square bracket	1
5D	5A	23	]	Right square bracket	1
DC	B4	24	¥	Yen sign	1
56	E5	25	V	Uppercase V	2
55	E4	26	U	Uppercase U	2
54	E3	27	T	Uppercase T	2
53	E2	28	S	Uppercase S	2
52	D9	29	R	Uppercase R	2
51	D8	30	Q	Uppercase Q	2
50	D7	31	P	Uppercase P	2
4F	D6	32	O	Uppercase O	2
4E	D5	33	N	Uppercase N	2
4D	D4	34	M	Uppercase M	2
4C	D3	35	L	Uppercase L	2
DE	B6	36	¬	Logical not	1
39	F9	37	9	Numeric nine	3
38	F8	38	8	Numeric eight	3
37	F7	39	7	Numeric seven	3
36	F6	40	6	Numeric six	3
35	F5	41	5	Numeric five	3
34	F4	42	4	Numeric four	3
33	F3	43	3	Numeric three	3
32	F2	44	2	Numeric two	3
31	F1	45	1	Numeric one	3
30	F0	46	0	Numeric zero	3
4B	D2	47	K	Uppercase K	2

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
4A	D1	48	J	Uppercase J	2
49	C9	49	I	Uppercase I	2
48	C8	50	H	Uppercase H	2
47	C7	51	G	Uppercase G	2
46	C6	52	F	Uppercase F	2
45	C5	53	E	Uppercase E	2
44	C4	54	D	Uppercase D	2
43	C3	55	C	Uppercase C	2
42	C2	56	B	Uppercase B	2
41	C1	57	A	Uppercase A	2
2E	4B	58	.	Period (full stop)	3
2D	60	59	-	Hyphen (minus)	3
2A	5C	60	*	Asterisk	3
2C	6B	61	,	Comma	3
40	7C	62	@	Commercial at	1
26	50	63	&	Ampersand	1
3A	7A	64	:	Colon	1
3B	5E	65	;	Semicolon	1
3E	6E	66	>	Greater than	1
3C	4C	67	<	Less than	1
27	7D	68	'	Apostrophe	2
28	4D	69	(	Left parenthesis	2
29	5D	70	)	Right parenthesis	2
23	7B	71	#	Number sign	2
3D	7E	72	=	Equals	2
25	6C	73	%	Percent	2
2F	61	74	/	Slant (solidus)	2
3F	6F	75	?	Question	1
59	E8	76	Y	Uppercase Y	2
58	E7	77	X	Uppercase X	2
57	E6	78	W	Uppercase W	2
39	F9	79	9	Numeric nine	3
38	F8	80	8	Numeric eight	3
37	F7	81	7	Numeric seven	3
36	F6	82	6	Numeric six	3
35	F5	83	5	Numeric five	3
34	F4	84	4	Numeric four	3
33	F3	85	3	Numeric three	3
32	F2	86	2	Numeric two	3
31	F1	87	1	Numeric one	3
30	F0	88	0	Numeric zero	3
56	E5	89	V	Uppercase V	2
55	E4	90	U	Uppercase U	2
54	E3	91	T	Uppercase T	2
53	E2	92	S	Uppercase S	2
52	D9	93	R	Uppercase R	2
51	D8	94	Q	Uppercase Q	2

Table A—16. Universal OCR-B (ECMA-11) Print Cartridge, 128 Characters (Part 2 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
50	D7	95	P	Uppercase P	2
4F	D6	96	O	Uppercase O	2
4E	D5	97	N	Uppercase N	2
4D	D4	98	M	Uppercase M	2
4C	D3	99	L	Uppercase L	2
2E	4B	100	.	Period (full stop)	3
2D	60	101	-	Hyphen (minus)	3
2A	5C	102	*	Asterisk	3
2C	6B	103	,	Comma	3
A4	45	104	⌘	International currency sign	1
21	4F	105	!	Exclamation	1
2B	4E	106	+	Plus	1
24	5B	107	\$	Dollar sign	1
5E	5F	108	^	Circumflex	1
22	7F	109	"	Quotation	1
5C	E0	110	\	Reverse slant (reverse solidus)	1
4B	D2	111	K	Uppercase K	2
4A	D1	112	J	Uppercase J	2
49	C9	113	I	Uppercase I	2
48	C8	114	H	Uppercase H	2
47	C7	115	G	Uppercase G	2
46	C6	116	F	Uppercase F	2
45	C5	117	E	Uppercase E	2
44	C4	118	D	Uppercase D	2
43	C3	119	C	Uppercase C	2
42	C2	120	B	Uppercase B	2
41	C1	121	A	Uppercase A	2
39	F9	122	9	Numeric nine	3
38	F8	123	8	Numeric eight	3
37	F7	124	7	Numeric seven	3
36	F6	125	6	Numeric six	3
35	F5	126	5	Numeric five	3
34	F4	127	4	Numeric four	3
33	F3	128	3	Numeric three	3
Array size					128

Table A—17. Universal 77L Print Cartridge, 128 Characters (Part 1 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
32	F2	1	2	Numeric two	3
31	F1	2	1	Numeric one	3
30	F0	3	0	Numeric zero	3
27	7D	4	'	Apostrophe	2
28	4D	5	(	Left parenthesis	2
29	5D	6	)	Right parenthesis	2
23	7B	7	#	Number sign	2
3D	7E	8	=	Equals	2
25	6C	9	%	Percent	2
2F	61	10	/	Slant (solidus)	2
5A	E9	11	Z	Uppercase Z	1
59	E8	12	Y	Uppercase Y	2
58	E7	13	X	Uppercase X	2
57	E6	14	W	Uppercase W	2
2E	4B	15	.	Period (full stop)	3
2D	60	16	-	Hyphen (minus)	3
2A	5C	17	*	Asterisk	3
2C	6B	18	,	Comma	3
5F	6D	19	—	Discontinuous underline	1
A3	44	20	£	Pound sterling sign	1
7C	6A	21	|	Vertical line	1
5B	4A	22	[	Left square bracket	1
5D	5A	23	]	Right square bracket	1
DC	B4	24	¥	Yen sign	1
56	E5	25	V	Uppercase V	2
55	E4	26	U	Uppercase U	2
54	E3	27	T	Uppercase T	2
53	E2	28	S	Uppercase S	2
52	D9	29	R	Uppercase R	2
51	D8	30	Q	Uppercase Q	2
50	D7	31	P	Uppercase P	2
4F	D6	32	O	Uppercase O	2
4E	D5	33	N	Uppercase N	2
4D	D4	34	M	Uppercase M	2
4C	D3	35	L	Uppercase L	2
DE	B6	36	¬	Logical not	1
39	F9	37	9	Numeric nine	3
38	F8	38	8	Numeric eight	3
37	F7	39	7	Numeric seven	3
36	F6	40	6	Numeric six	3
35	F5	41	5	Numeric five	3
34	F4	42	4	Numeric four	3
33	F3	43	3	Numeric three	3
32	F2	44	2	Numeric two	3
31	F1	45	1	Numeric one	3
30	F0	46	0	Numeric zero	3
4B	D2	47	K	Uppercase K	2

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
4A	D1	48	J	Uppercase J	2
49	C9	49	I	Uppercase I	2
48	C8	50	H	Uppercase H	2
47	C7	51	G	Uppercase G	2
46	C6	52	F	Uppercase F	2
45	C5	53	E	Uppercase E	2
44	C4	54	D	Uppercase D	2
43	C3	55	C	Uppercase C	2
42	C2	56	B	Uppercase B	2
41	C1	57	A	Uppercase A	2
2E	4B	58	.	Period (full stop)	3
2D	60	59	-	Hyphen (minus)	3
2A	5C	60	*	Asterisk	3
2C	6B	61	,	Comma	3
40	7C	62	@	Commercial at	1
26	50	63	&	Ampersand	1
3A	7A	64	:	Colon	1
3B	5E	65	;	Semicolon	1
3E	6E	66	>	Greater than	1
3C	4C	67	<	Less than	1
27	7D	68	'	Apostrophe	2
28	4D	69	(	Left parenthesis	2
29	5D	70	)	Right parenthesis	2
23	7B	71	#	Number sign	2
3D	7E	72	=	Equals	2
25	6C	73	%	Percent	2
2F	61	74	/	Slant (solidus)	2
3F	6F	75	?	Question	1
59	E8	76	Y	Uppercase Y	2
58	E7	77	X	Uppercase X	2
57	E6	78	W	Uppercase W	2
39	F9	79	9	Numeric nine	3
38	F8	80	8	Numeric eight	3
37	F7	81	7	Numeric seven	3
36	F6	82	6	Numeric six	3
35	F5	83	5	Numeric five	3
34	F4	84	4	Numeric four	3
33	F3	85	3	Numeric three	3
32	F2	86	2	Numeric two	3
31	F1	87	1	Numeric one	3
30	F0	88	0	Numeric zero	3
56	E5	89	V	Uppercase V	2
55	E4	90	U	Uppercase U	2
54	E3	91	T	Uppercase T	2
53	E2	92	S	Uppercase S	2
52	D9	93	R	Uppercase R	2
51	D8	94	Q	Uppercase Q	2

Table A—17. Universal 77L Print Cartridge, 128 Characters (Part 2 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
50	D7	95	P	Uppercase P	2
4F	D6	96	O	Uppercase O	2
4E	D5	97	N	Uppercase N	2
4D	D4	98	M	Uppercase M	2
4C	D3	99	L	Uppercase L	2
2E	4B	100	.	Period (full stop)	3
2D	60	101	-	Hyphen (minus)	3
2A	5C	102	*	Asterisk	3
2C	6B	103	,	Comma	3
A4	45	104	₪	International currency sign	1
21	4F	105	!	Exclamation	1
2B	4E	106	+	Plus	1
24	5B	107	\$	Dollar sign	1
5E	5F	108	^	Circumflex	1
22	7F	109	"	Quotation	1
5C	E0	110	\	Reverse slant (reverse solidus)	1
4B	D2	111	K	Uppercase K	2
4A	D1	112	J	Uppercase J	2
49	C9	113	I	Uppercase I	2
48	C8	114	H	Uppercase H	2
47	C7	115	G	Uppercase G	2
46	C6	116	F	Uppercase F	2
45	C5	117	E	Uppercase E	2
44	C4	118	D	Uppercase D	2
43	C3	119	C	Uppercase C	2
42	C2	120	B	Uppercase B	2
41	C1	121	A	Uppercase A	2
39	F9	122	9	Numeric nine	3
38	F8	123	8	Numeric eight	3
37	F7	124	7	Numeric seven	3
36	F6	125	6	Numeric six	3
35	F5	126	5	Numeric five	3
34	F4	127	4	Numeric four	3
33	F3	128	3	Numeric three	3
Array size					128

Table A—18. COBOL-FORTRAN Business Print Cartridge, 192 Characters (Part 1 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
55	E4	1	U	Uppercase U	4
54	E3	2	T	Uppercase T	4
53	E2	3	S	Uppercase S	4
51	D8	4	Q	Uppercase Q	3
2E	4B	5	.	Period (full stop)	3
2C	6B	6	,	Comma	3
2A	5C	7	*	Asterisk	3
40	7C	8	@	Commercial at	3
52	D9	9	R	Uppercase R	4
50	D7	10	P	Uppercase P	4
4F	D6	11	O	Uppercase O	4
4E	D5	12	N	Uppercase N	4
4D	D4	13	M	Uppercase M	4
4C	D3	14	L	Uppercase L	4
4B	D2	15	K	Uppercase K	4
4A	D1	16	J	Uppercase J	4
28	4D	17	(	Left parenthesis	2
29	5D	18	)	Right parenthesis	2
49	C9	19	I	Uppercase I	4
48	C8	20	H	Uppercase H	4
47	C7	21	G	Uppercase G	4
46	C6	22	F	Uppercase F	4
45	C5	23	E	Uppercase E	4
44	C4	24	D	Uppercase D	4
43	C3	25	C	Uppercase C	4
42	C2	26	B	Uppercase B	4
41	C1	27	A	Uppercase A	4
3E	6E	28	>	Greater than	2
3C	4C	29	<	Less than	2
27	7D	30	'	Apostrophe	2
3B	5E	31	;	Semicolon	2
2F	61	32	/	Slant (solidus)	3
2B	4E	33	+	Plus	3
24	5B	34	\$	Dollar sign	3
22	7F	35	"	Quotation	2
3D	7E	36	=	Equals	3
A3	44	37	£	Pound sterling	3
39	F9	38	9	Numeric nine	4
38	F8	39	8	Numeric eight	4
37	F7	40	7	Numeric seven	4
36	F6	41	6	Numeric six	4
35	F5	42	5	Numeric five	4
34	F4	43	4	Numeric four	4
33	F3	44	3	Numeric three	4
32	F2	45	2	Numeric two	4
31	F1	46	1	Numeric one	4
30	F0	47	0	Numeric zero	4
59	E8	48	Y	Uppercase Y	4

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
58	E7	49	X	Uppercase X	4
26	50	50	&	Ampersand	1
5C	E0	51	¥	Yen sign	3
2D	60	52	-	Hyphen (minus)	3
5A	E9	53	Z	Uppercase Z	2
57	E6	54	W	Uppercase W	4
56	E5	55	V	Uppercase V	4
55	E4	56	U	Uppercase U	4
54	E3	57	T	Uppercase T	4
53	E2	58	S	Uppercase S	4
52	D9	59	R	Uppercase R	4
50	D7	60	P	Uppercase P	4
4F	D6	61	O	Uppercase O	4
4E	D5	62	N	Uppercase N	4
4D	D4	63	M	Uppercase M	4
4C	D3	64	L	Uppercase L	4
4B	D2	65	K	Uppercase K	4
4A	D1	66	J	Uppercase J	4
49	C9	67	I	Uppercase I	4
48	C8	68	H	Uppercase H	4
51	D8	69	Q	Uppercase Q	3
2E	4B	70	.	Period (full stop)	3
2C	6B	71	,	Comma	3
2A	5C	72	*	Asterisk	3
40	7C	73	@	Commercial at	3
47	C7	74	G	Uppercase G	4
46	C6	75	F	Uppercase F	4
45	C5	76	E	Uppercase E	4
44	C4	77	D	Uppercase D	4
43	C3	78	C	Uppercase C	4
42	C2	79	B	Uppercase B	4
41	C1	80	A	Uppercase A	4
39	F9	81	9	Numeric nine	4
38	F8	82	8	Numeric eight	4
37	F7	83	7	Numeric seven	4
36	F6	84	6	Numeric six	4
35	F5	85	5	Numeric five	4
34	F4	86	4	Numeric four	4
33	F3	87	3	Numeric three	4
32	F2	88	2	Numeric two	4
31	F1	89	1	Numeric one	4
30	F0	90	0	Numeric zero	4
59	E8	91	Y	Uppercase Y	4
58	E7	92	X	Uppercase X	4
57	E6	93	W	Uppercase W	4
56	E5	94	V	Uppercase V	4
55	E4	95	U	Uppercase U	4
2F	61	96	/	Slant (solidus)	3

Table A—18. COBOL-FORTRAN Business Print Cartridge, 192 Characters (Part 2 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
2B	4E	97	+	Plus	3
24	5B	98	\$	Dollar sign	3
3D	7E	99	=	Equals	3
A3	44	100	£	Pound sterling	3
54	E6	101	T	Uppercase T	4
53	E2	102	S	Uppercase S	4
52	D9	103	R	Uppercase R	4
50	D7	104	P	Uppercase P	4
4F	D6	105	O	Uppercase O	4
4E	D5	106	N	Uppercase N	4
4D	D4	107	M	Uppercase M	4
4C	D3	108	L	Uppercase L	4
4B	D2	109	K	Uppercase K	4
4A	D1	110	J	Uppercase J	4
49	C9	111	I	Uppercase I	4
48	C8	112	H	Uppercase H	4
28	4D	113	(	Left parenthesis	2
29	5D	114	)	Right parenthesis	2
5C	E0	115	¥	Yen sign	3
2D	60	116	-	Hyphen (minus)	3
47	C7	117	G	Uppercase G	4
46	C6	118	F	Uppercase F	4
45	C5	119	E	Uppercase E	4
44	C4	120	D	Uppercase D	4
43	C3	121	C	Uppercase C	4
42	C2	122	B	Uppercase B	4
41	C1	123	A	Uppercase A	4
3E	6E	124	>	Greater than	2
3C	4C	125	<	Less than	2
23	7B	126	#	Number sign	1
25	6C	127	%	Percent sign	1
27	7D	128	'	Apostrophe	2
3B	5E	129	;	Semicolon	2
A4	45	130	₹	International currency sign	1
22	7F	131	"	Quotation	2
51	D8	132	Q	Uppercase Q	3
2E	4B	133	.	Period (full stop)	3
2C	6B	134	,	Comma	3
2A	5C	135	*	Asterisk	3
40	7C	136	@	Commercial at	3
39	F9	137	9	Numeric nine	4
38	F8	138	8	Numeric eight	4
37	F7	139	7	Numeric seven	4
36	F6	140	6	Numeric six	4
35	F5	141	5	Numeric five	4
34	F4	142	4	Numeric four	4
33	F3	143	3	Numeric three	4
32	F2	144	2	Numeric two	4
31	F1	145	1	Numeric one	4

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
30	F0	146	0	Numeric zero	4
5A	E9	147	Z	Uppercase Z	2
59	E8	148	Y	Uppercase Y	4
58	E7	149	X	Uppercase X	4
57	E6	150	W	Uppercase W	4
56	E5	151	V	Uppercase V	4
55	E4	152	U	Uppercase U	4
54	E3	153	T	Uppercase T	4
53	E2	154	S	Uppercase S	4
52	D9	155	R	Uppercase R	4
50	D7	156	P	Uppercase P	4
4F	D6	157	O	Uppercase O	4
4E	D5	158	N	Uppercase N	4
4D	D4	159	M	Uppercase M	4
4C	D3	160	L	Uppercase L	4
2F	61	161	/	Slant (solidus)	3
2B	4E	162	+	Plus	3
24	5B	163	\$	Dollar sign	3
3D	7E	164	=	Equals	3
A3	44	165	£	Pound sterling sign	3
4B	D2	166	K	Uppercase K	4
4A	D1	167	J	Uppercase J	4
49	C9	168	I	Uppercase I	4
48	C8	169	H	Uppercase H	4
47	C7	170	G	Uppercase G	4
46	C6	171	F	Uppercase F	4
45	C5	172	E	Uppercase E	4
44	C4	173	D	Uppercase D	4
43	C3	174	C	Uppercase C	4
42	C2	175	B	Uppercase B	4
41	C1	176	A	Uppercase A	4
5C	E0	177	¥	Yen sign	3
2D	60	178	-	Hyphen (minus)	3
39	F9	179	9	Numeric nine	4
38	F8	180	8	Numeric eight	4
37	F7	181	7	Numeric seven	4
36	F6	182	6	Numeric six	4
35	F5	183	5	Numeric five	4
34	F4	184	4	Numeric four	4
33	F3	185	3	Numeric three	4
32	F2	186	2	Numeric two	4
31	F1	187	1	Numeric one	4
30	F0	188	0	Numeric zero	4
59	E8	189	Y	Uppercase Y	4
58	E7	190	X	Uppercase X	4
57	E6	191	W	Uppercase W	4
56	E5	192	V	Uppercase V	4
Array size					192

Table A—19. International Print Cartridge, 384 Characters (Part 1 of 4)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
79	A8	1	y	Lowercase y	2
78	A7	2	x	Lowercase x	2
77	A6	3	w	Lowercase w	2
76	A5	4	v	Lowercase v	2
75	A4	5	u	Lowercase u	2
74	A3	6	t	Lowercase t	2
73	A2	7	s	Lowercase s	2
72	99	8	r	Lowercase r	2
71	98	9	q	Lowercase q	2
70	97	10	p	Lowercase p	2
6F	96	11	o	Lowercase o	2
6E	95	12	n	Lowercase n	2
6D	94	13	m	Lowercase m	2
6C	93	14	l	Lowercase l	2
6B	92	15	k	Lowercase k	2
6A	91	16	j	Lowercase j	2
69	89	17	i	Lowercase i	2
68	88	18	h	Lowercase h	2
67	87	19	g	Lowercase g	2
66	86	20	f	Lowercase f	2
65	85	21	e	Lowercase e	2
64	84	22	d	Lowercase d	2
63	83	23	c	Lowercase c	2
62	82	24	b	Lowercase b	2
61	81	25	a	Lowercase a	2
40	7C	26	@	Commercial at	2
E8	CA	27	ö	Lowercase o with diaeresis	2
F9	EF	28	ü	Lowercase u with diaeresis	2
A3	44	29	£	Pound sterling sign	4
D3	AB	30	č	Uppercase C with acute accent	1
D4	AC	31	č̣	Uppercase C with hacek	1
3A	7A	32	:	Colon	4
BB	71	33	°	Angstrom	1
D6	AE	34	İ	Uppercase I with dot	1
3F	6F	35	?	Question	2
24	5B	36	\$	Dollar sign	4
23	7B	37	#	Number sign	4
3D	7E	38	=	Equals	4
39	F9	39	9	Numeric nine	4
38	F8	40	8	Numeric eight	4
37	F7	41	7	Numeric seven	4
36	F6	42	6	Numeric six	4
35	F5	43	5	Numeric five	4
34	F4	44	4	Numeric four	4
33	F3	45	3	Numeric three	4
32	F2	46	2	Numeric two	4
31	F1	47	1	Numeric one	4
30	F0	48	0	Numeric zero	4

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
BF	75	49	¿	Inverted question mark	1
2C	6B	50	,	Comma	4
2D	60	51	-	Hyphen (minus)	4
59	E8	52	Y	Uppercase Y	4
58	E7	53	X	Uppercase X	4
57	E6	54	W	Uppercase W	4
56	E5	55	V	Uppercase V	4
55	E4	56	U	Uppercase U	4
54	E3	57	T	Uppercase T	4
53	E2	58	S	Uppercase S	4
52	D9	59	R	Uppercase R	4
50	D7	60	P	Uppercase P	4
4F	D6	61	O	Uppercase O	4
4E	D5	62	N	Uppercase N	4
4D	D4	63	M	Uppercase M	4
4C	D3	64	L	Uppercase L	4
3B	5E	65	;	Semicolon	3
4B	D2	66	K	Uppercase K	4
25	6C	67	%	Percent	3
4A	D1	68	J	Uppercase J	4
49	C9	69	I	Uppercase I	4
48	C8	70	H	Uppercase H	4
47	C7	71	G	Uppercase G	4
46	C6	72	F	Uppercase F	4
45	C5	73	E	Uppercase E	4
44	C4	74	D	Uppercase D	4
43	C3	75	C	Uppercase C	4
42	C2	76	B	Uppercase B	4
41	C1	77	A	Uppercase A	4
2A	5C	78	*	Asterisk	4
2E	4B	79	.	Period (full stop)	4
2B	4E	80	+	Plus	4
2F	61	81	/	Slant (solidus)	4
28	4D	82	(	Left parenthesis	4
29	5D	83	)	Right parenthesis	4
26	50	84	&	Ampersand	3
D5	AD	85	ì	Lowercase i with grave accent	1
3E	6E	86	>	Greater than	4
3C	4C	87	<	Less than	4
27	7D	88	'	Acute accent (apostrophe)	4
BE	74	89	آ	Alif	1
5F	6D	90	—	Discontinuous underline	4
21	4F	91	!	Exclamation	4
22	7F	92	"	Quotation	4
D0	9F	93	Á	Uppercase A with acute accent	1
D1	A0	94	À	Uppercase A with grave accent	1
C2	78	95	Ã	Uppercase A with tilde	1

Table A—19. International Print Cartridge, 384 Characters (Part 2 of 4)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
C3	80	96	Ç	Uppercase C with cedilla	1
C4	8A	97	Ð	Uppercase D with cross	1
CC	9B	98	Ł	Uppercase L with slant (Poland)	1
A7	48	99	ˆ	Double acute accent	1
CD	9C	100	Û	Uppercase M with tilde	1
EA	CC	101	Û	Lowercase u with grave accent	1
C7	8D	102	Ø	Uppercase O with slant	1
C9	8F	103	Œ	Uppercase OE diphthong	1
F0	DC	104	á	Lowercase a with acute accent	1
F1	DD	105	à	Lowercase a with grave accent	1
F2	DE	106	æ	Lowercase ae diphthong	1
E4	BC	107	đ	Lowercase d with cross	1
E5	BD	108	é	Lowercase e with acute accent	1
AC	54	109	,	High comma (centered)	1
B3	63	110	®	Registration mark	1
A1	42	111	¡	Inverted exclamation	1
E6	BE	112	ij	Lowercase ij (Holland)	1
F8	EE	113	ò	Lowercase o with grave accent	1
F7	ED	114	õ	Lowercase o with tilde	1
E7	BF	115	ø	Lowercase o with slant	1
51	D8	116	Q	Uppercase Q	3
5A	E9	117	Z	Uppercase Z	3
E9	CB	118	œ	Lowercase oe diphthong	1
EF	DB	119	þ	Lowercase thorn (Iceland)	1
5E	5F	120	^	Circumflex	1
D9	B1	121	Ü	Uppercase U with diaeresis	2
C8	8E	122	Û	Uppercase O with diaeresis	2
60	79	123	˘	Grave accent	2
DA	B2	124	Ź	Uppercase Z with hacek	1
A3	44	125	£	Pound sterling sign	4
5B	4A	126	[	Left square bracket	2
5D	5A	127	]	Right square bracket	2
3A	7A	128	:	Colon	4
E0	B8	129	|	Vertical line—broken	1
A4	45	130	⌘	International currency sign	2
AB	53	131	±	Plus or minus	1
24	5B	132	\$	Dollar sign	4
23	7B	133	#	Number sign	4
3D	7E	134	=	Equals	4
39	F9	135	9	Numeric nine	4
38	F8	136	8	Numeric eight	4
37	F7	137	7	Numeric seven	4
36	F6	138	6	Numeric six	4
35	F5	139	5	Numeric five	4
34	F4	140	4	Numeric four	4
33	F3	141	3	Numeric three	4
32	F2	142	2	Numeric two	4

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
31	F1	143	1	Numeric one	4
30	F0	144	0	Numeric zero	4
FB	FB	145	š	Lowercase s with hacek	1
2C	6B	146	,	Comma	4
2D	60	147	-	Hyphen (minus)	4
A5	46	148	¥	Yen sign	1
59	E8	149	Y	Uppercase Y	4
58	E7	150	X	Uppercase X	4
57	E6	151	W	Uppercase W	4
56	E5	152	V	Uppercase V	4
55	E4	153	U	Uppercase U	4
54	E3	154	T	Uppercase T	4
53	E2	155	S	Uppercase S	4
52	D9	156	R	Uppercase R	4
50	D7	157	P	Uppercase P	4
4F	D6	158	O	Uppercase O	4
4E	D5	159	N	Uppercase N	4
4D	D4	160	M	Uppercase M	4
4C	D3	161	L	Uppercase L	4
4B	D2	162	K	Uppercase K	4
3F	6F	163	?	Question	2
4A	D1	164	J	Uppercase J	4
49	C9	165	I	Uppercase I	4
48	C8	166	H	Uppercase H	4
47	C7	167	G	Uppercase G	4
46	C6	168	F	Uppercase F	4
45	C5	169	E	Uppercase E	4
44	C4	170	D	Uppercase D	4
43	C3	171	C	Uppercase C	4
42	C2	172	B	Uppercase B	4
41	C1	173	A	Uppercase A	4
2A	5C	174	*	Asterisk	4
2E	4B	175	.	Period (full stop)	4
2B	4E	176	+	Plus	4
2F	61	177	/	Slant (solidus)	4
28	4D	178	(	Left parenthesis	4
29	5D	179	)	Right parenthesis	4
DE	B6	180	¬	Logical not	1
BC	72	181	˘	Breve	1
3E	6E	182	>	Greater than	4
3C	4C	183	<	Less than	4
27	7D	184	'	Acute accent (apostrophe)	4
5F	6D	185	—	Discontinuous underline	4
21	4F	186	!	Exclamation	4
22	7F	187	"	Quotation	4
CB	9A	188	Š	Uppercase S with cedilla	1
DB	B3	189	š	Uppercase S with hacek	1

Table A—19. International Print Cartridge, 384 Characters (Part 3 of 4)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
7A	A9	190	z	Lowercase z	2
79	A8	191	y	Lowercase y	2
78	A7	192	x	Lowercase x	2
3B	5E	193	;	Semicolon	3
77	A6	194	w	Lowercase w	2
25	6C	195	%	Percent	3
76	A5	196	v	Lowercase v	2
75	A4	197	u	Lowercase u	2
74	A3	198	t	Lowercase t	2
73	A2	199	s	Lowercase s	2
72	99	200	r	Lowercase r	2
71	98	201	q	Lowercase q	2
70	97	202	p	Lowercase p	2
6F	96	203	o	Lowercase o	2
6E	95	204	n	Lowercase n	2
6D	94	205	m	Lowercase m	2
6C	93	206	l	Lowercase l	2
6B	92	207	k	Lowercase k	2
6A	91	208	j	Lowercase j	2
69	89	209	i	Lowercase i	2
68	88	210	h	Lowercase h	2
67	87	211	g	Lowercase g	2
26	50	212	&	Ampersand	3
66	86	213	f	Lowercase f	2
65	85	214	e	Lowercase e	2
64	84	215	d	Lowercase d	2
63	83	216	c	Lowercase c	2
62	82	217	b	Lowercase b	2
61	81	218	a	Lowercase a	2
40	7C	219	@	Commercial at	2
E8	CA	220	ö	Lowercase o with diaeresis	2
F9	EF	221	ü	Lowercase u with diaeresis	2
A3	44	222	£	Pound sterling sign	4
F4	EA	223	ç	Lowercase c with hacek	1
E3	BB	224	ç	Lowercase c with cedilla	1
3A	7A	225	:	Colon	4
0F	0F	226	ć	Lowercase c with acute accent	1
DD	B5	227	ǧ	Lowercase g with hacek	1
24	5B	228	\$	Dollar sign	4
23	7B	229	#	Number sign	4
3D	7E	230	=	Equals	4
39	F9	231	9	Numeric nine	4
38	F8	232	8	Numeric eight	4
37	F7	233	7	Numeric seven	4
36	F6	234	6	Numeric six	4
35	F5	235	5	Numeric five	4
34	F4	236	4	Numeric four	4
33	F3	237	3	Numeric three	4

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
32	F2	238	2	Numeric two	4
31	F1	239	1	Numeric one	4
30	F0	240	0	Numeric zero	4
EB	CD	241	š	Lowercase s with cedilla	1
2C	6B	242	,	Comma	4
2D	60	243	-	Hyphen (minus)	4
51	D8	244	Q	Uppercase Q	3
5A	E9	245	Z	Uppercase Z	3
59	E8	246	Y	Uppercase Y	4
58	E7	247	X	Uppercase X	4
57	E6	248	W	Uppercase W	4
56	E5	249	V	Uppercase V	4
55	E4	250	U	Uppercase U	4
54	E3	251	T	Uppercase T	4
53	E2	252	S	Uppercase S	4
52	D9	253	R	Uppercase R	4
50	D7	254	P	Uppercase P	4
4F	D6	255	O	Uppercase O	4
4E	D5	256	N	Uppercase N	4
4D	D4	257	M	Uppercase M	4
4C	D3	258	L	Uppercase L	4
4B	D2	259	K	Uppercase K	4
4A	D1	260	J	Uppercase J	4
49	C9	261	I	Uppercase I	4
48	C8	262	H	Uppercase H	4
47	C7	263	G	Uppercase G	4
46	C6	264	F	Uppercase F	4
45	C5	265	E	Uppercase E	4
44	C4	266	D	Uppercase D	4
43	C3	267	C	Uppercase C	4
42	C2	268	B	Uppercase B	4
41	C1	269	A	Uppercase A	4
2A	5C	270	*	Asterisk	4
2E	4B	271	.	Period (full stop)	4
2B	4E	272	+	Plus	4
2F	61	273	/	Slant (solidus)	4
28	4D	274	(	Left parenthesis	4
29	5D	275	)	Right parenthesis	4
FE	FE	276	—	Discontinuous overline	1
AA	52	277	‡	Double dagger	1
3E	6E	278	>	Greater than	4
3C	4C	279	<	Less than	4
27	7D	280	'	Acute accent (apostrophe)	4
FA	FA	281	ž	Lowercase z with hacek	1
5F	6D	282	—	Discontinuous underline	4
21	4F	283	!	Exclamation	4
22	7F	284	"	Quotation	4
C0	76	285	Ä	Uppercase A with diaeresis	2
C1	77	286	Å	Uppercase A with circle	2

Table A—19. International Print Cartridge, 384 Characters (Part 4 of 4)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
D2	AA	287	AE	Uppercase AE diphthong	1
C5	8B	288	É	Uppercase E with acute accent	1
C6	8C	289	IJ	Uppercase IJ (Holland)	1
CE	9D	290	Ñ	Uppercase N with tilde	1
3F	6F	291	?	Question	1
D8	80	292	Ô	Uppercase O with acute accent	1
D7	AF	293	Õ	Uppercase O with tilde	1
DC	84	294	ß	Double S (German)	1
B3	63	295	"	Left double quotes	1
B2	62	296	"	Right double quotes	1
F5	EB	297	è	Lowercase e with grave accent	1
CF	9E	298	Þ	Uppercase thorn (Iceland)	1
AE	56	299	☐	Conjunctive symbol	1
BD	73	300	©	Copyright	1
B4	64	301	¢	Ayn	1
E2	BA	302	ã	Lowercase a with tilde	1
9F	E1	303	ä	Lowercase a with diaeresis	1
E1	B9	304	å	Lowercase a with a circle	1
DF	B7	305	æ	ETH (Iceland)	1
B0	58	306	§	Section	1
EA	CC	307	ı	Lowercase i (Turkey)	1
ED	CF	308	ñ	Lowercase m with tilde	1
BA	70	309	¨	Diaeresis (umlaut)	1
EE	DA	310	ñ	Lowercase n with tilde	1
EC	CE	311	ł	Lowercase l with cross (Poland)	1
7C	6A	312	|	Vertical line	1
D9	BI	313	Û	Uppercase U with diaeresis	2
C8	8E	314	Ö	Uppercase O with diaeresis	2
60	79	315	`	Grave accent	2
5C	E0	316	\	Reverse slant (reverse solidus)	1
A3	44	317	£	Pound sterling sign	4
5B	4A	318	[	Left square bracket	2
5D	5A	319	]	Right square bracket	2
3A	7A	320	:	Colon	4
3B	5E	321	;	Semicolon	3
A4	45	322	¤	International currency sign	2
25	6C	323	%	Percent	3
24	5B	324	\$	Dollar sign	4
23	7B	325	#	Number sign	4
3D	7E	326	=	Equals	4
39	F9	327	9	Numeric nine	4
38	F8	328	8	Numeric eight	4
37	F7	329	7	Numeric seven	4
36	F6	330	6	Numeric six	4
35	F5	331	5	Numeric five	4
34	F4	332	4	Numeric four	4
33	F3	333	3	Numeric three	4
32	F2	334	2	Numeric two	4
31	F1	335	1	Numeric one	4

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
30	F0	336	0	Numeric zero	4
A8	49	337	<<	Quote (France)	1
2C	6B	338	,	Comma	4
2D	60	339	-	Hyphen (minus)	4
26	50	340	&	Ampersand	3
7E	A1	341	~	Tilde	1
59	E8	342	Y	Uppercase Y	4
58	E7	343	X	Uppercase X	4
57	E6	344	W	Uppercase W	4
56	E5	345	V	Uppercase V	4
55	E4	346	U	Uppercase U	4
54	E3	347	T	Uppercase T	4
53	E2	348	S	Uppercase S	4
52	D9	349	R	Uppercase R	4
50	D7	350	P	Uppercase P	4
4F	D6	351	O	Uppercase O	4
4E	D5	352	N	Uppercase N	4
4D	D4	353	M	Uppercase M	4
4C	D3	354	L	Uppercase L	4
4B	D2	355	K	Uppercase K	4
4A	D1	356	J	Uppercase J	4
49	C9	357	I	Uppercase I	4
48	C8	358	H	Uppercase H	4
47	C7	359	G	Uppercase G	4
46	C6	360	F	Uppercase F	4
45	C5	361	E	Uppercase E	4
44	C4	362	D	Uppercase D	4
43	C3	363	C	Uppercase C	4
42	C2	364	B	Uppercase B	4
41	C1	365	A	Uppercase A	4
2A	5C	366	*	Asterisk	4
2E	4B	367	.	Period (full stop)	4
2B	4E	368	+	Plus	4
2F	61	369	/	Slant (solidus)	4
28	4D	370	(	Left parenthesis	4
29	5D	371	)	Right parenthesis	4
51	D8	372	Q	Uppercase Q	3
5A	E9	373	Z	Uppercase Z	3
3E	6E	374	>	Greater than	4
3C	4C	375	<	Less than	4
27	7D	376	'	Acute accent (apostrophe)	4
A9	51	377	>>	Unquote (France)	1
5F	6D	378	—	Discontinuous underline	4
21	4F	379	!	Exclamation	4
22	7F	380	"	Quotation	4
7B	C0	381	{	Left brace bracket	1
7D	D0	382	}	Right brace bracket	1
DB	B3	383	b	Musical flat	1
7A	A9	384	z	Lowercase z	2
Array size					384

Table A—20. OCR-A and 77L (ANSI '77) Print Cartridge, 128 Characters (Part 1 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
32	F2	1	2	Numeric two	3
31	F1	2	1	Numeric one	3
30	F0	3	0	Numeric zero	3
27	7D	4	▸	OCR-A apostrophe	2
7B	C0	5	{	Left brace bracket	1
7D	D0	6	}	Right brace bracket	1
23	7B	7	#	Number sign	2
3D	7E	8	=	Equals	1
25	6C	9	%	Percent	1
2F	61	10	/	Slant (solidus)	1
5A	E9	11	Z	Uppercase Z	1
59	E8	12	Y	Uppercase Y	2
58	E7	13	X	Uppercase X	2
57	E6	14	W	Uppercase W	2
2E	4B	15	■	OCR-A period	3
2D	60	16	-	Hyphen (minus)	3
2A	5C	17	*	Asterisk	3
2C	6B	18	⌈	OCR-A comma	3
5F	6D	19	—	Discontinuous underline	1
A3	44	20	£	Pound sterling sign	1
7C	6A	21	|	Vertical line	1
5B	4A	22	[	OCR-A left bracket	1
5D	5A	23	]	OCR-A right bracket	1
DC	B4	24	¥	Yen sign	1
56	E5	25	V	Uppercase V	2
55	E4	26	U	Uppercase U	2
54	E3	27	T	Uppercase T	2
53	E2	28	S	Uppercase S	2
52	D9	29	R	Uppercase R	2
51	D8	30	Q	Uppercase Q	2
50	D7	31	P	Uppercase P	2
4F	D6	32	O	Uppercase O	2
4E	D5	33	N	Uppercase N	2
4D	D4	34	M	Uppercase M	2
4C	D3	35	L	Uppercase L	2
DE	B6	36	¬	Logical not	1
39	F9	37	9	Numeric nine	3
38	F8	38	8	Numeric eight	3
37	F7	39	7	Numeric seven	3
36	F6	40	6	Numeric six	3
35	F5	41	5	Numeric five	3
34	F4	42	4	Numeric four	3
33	F3	43	3	Numeric three	3
32	F2	44	2	Numeric two	3
31	F1	45	1	Numeric one	3
30	F0	46	0	Numeric zero	3
4B	D2	47	K	Uppercase K	2

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
4A	D1	48	J	Uppercase J	2
49	C9	49	I	Uppercase I	2
48	C8	50	H	Uppercase H	2
47	C7	51	G	Uppercase G	2
46	C6	52	F	Uppercase F	2
45	C5	53	E	Uppercase E	2
44	C4	54	D	Uppercase D	2
43	C3	55	C	Uppercase C	2
42	C2	56	B	Uppercase B	2
41	C1	57	A	Uppercase A	2
2E	4B	58	■	OCR-A period	3
2D	60	59	-	Hyphen (minus)	3
2A	5C	60	*	Asterisk	3
2C	6B	61	⌈	OCR-A comma	3
40	7C	62	@	Commerical at	1
26	50	63	&	Ampersand	1
3A	7A	64	⋮	OCR-A colon	1
3B	5E	65	⋮	OCR-A semicolon	1
3E	6E	66	>	Greater than	1
3C	4C	67	<	Less than	1
27	7D	68	▸	OCR-A apostrophe	2
28	4D	69	(	OCR-A left parenthesis	1
29	5D	70	)	OCR-A right parenthesis	1
23	7B	71	#	Number sign	2
DF	B7	72	V	Fork	1
FE	FE	73	⌋	Hook	1
E0	B8	74	⌋	Chair	1
3F	6F	75	?	Question	1
59	E8	76	Y	Uppercase Y	2
58	E7	77	X	Uppercase X	2
57	E6	78	W	Uppercase W	2
39	F9	79	9	Numeric nine	3
38	F8	80	8	Numeric eight	3
37	F7	81	7	Numeric seven	3
36	F6	82	6	Numeric six	3
35	F5	83	5	Numeric five	3
34	F4	84	4	Numeric four	3
33	F3	85	3	Numeric three	3
32	F2	86	2	Numeric two	3
31	F1	87	1	Numeric one	3
30	F0	88	0	Numeric zero	3
56	E5	89	V	Uppercase V	2
55	E4	90	U	Uppercase U	2
54	E3	91	T	Uppercase T	2
53	E2	92	S	Uppercase S	2
52	D9	93	R	Uppercase R	2
51	D8	94	Q	Uppercase Q	2

Table A—20. OCR-A and 77L (ANSI '77) Print Cartridge, 128 Characters (Part 2 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
50	D7	95	P	Uppercase P	2
4F	D6	96	O	Uppercase O	2
4E	D5	97	N	Uppercase N	2
4D	D4	98	M	Uppercase M	2
4C	D3	99	L	Uppercase L	2
2E	4B	100	.	OCR-A period	3
2D	60	101	-	Hyphen (minus)	3
2A	5C	102	*	Asterisk	3
2C	6B	103	,	OCR-A comma	3
A4	45	104	⌘	International currency sign	1
21	4F	105	!	Exclamation	1
2B	4E	106	+	Plus	1
24	5B	107	\$	Dollar sign	1
5E	5F	108	^	Circumflex	1
22	7F	109	“	OCR-A quotation mark	1
5C	E0	110	\	Reverse slant (reverse solidus)	1
4B	D2	111	K	Uppercase K	2
4A	D1	112	J	Uppercase J	2
49	C9	113	I	Uppercase I	2
48	C8	114	H	Uppercase H	2
47	C7	115	G	Uppercase G	2
46	C6	116	F	Uppercase F	2
45	C5	117	E	Uppercase E	2
44	C4	118	D	Uppercase D	2
43	C3	119	C	Uppercase C	2
42	C2	120	B	Uppercase B	2
41	C1	121	A	Uppercase A	2
39	F9	122	9	Numeric nine	3
38	F8	123	8	Numeric eight	3
37	F7	124	7	Numeric seven	3
36	F6	125	6	Numeric six	3
35	F5	126	5	Numeric five	3
34	F4	127	4	Numeric four	3
33	F3	128	3	Numeric three	3
Array size					128

Table A—21. Expanded ASCII Print Cartridge (with Additional 0's and 1's), 192 Characters (Part 1 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
41	C1	1	A	Uppercase A	2
42	C2	2	B	Uppercase B	2
43	C3	3	C	Uppercase C	2
44	C4	4	D	Uppercase D	2
46	C6	5	F	Uppercase F	2
47	C7	6	G	Uppercase G	2
48	C8	7	H	Uppercase H	2
49	C9	8	I	Uppercase I	2
4B	D2	9	K	Uppercase K	2
4C	D3	10	L	Uppercase L	2
4D	D4	11	M	Uppercase M	2
4E	D5	12	N	Uppercase N	2
4F	D6	13	O	Uppercase O	2
30	F0	14	0	Numeric zero	9
50	D7	15	P	Uppercase P	2
52	D9	16	R	Uppercase R	2
53	E2	17	S	Uppercase S	2
54	E3	18	T	Uppercase T	2
55	E4	19	U	Uppercase U	2
56	E5	20	V	Uppercase V	2
57	E6	21	W	Uppercase W	2
58	E7	22	X	Uppercase X	2
59	E8	23	Y	Uppercase Y	2
32	F2	24	2	Numeric two	3
31	F1	25	1	Numeric one	7
33	F3	26	3	Numeric three	3
34	F4	27	4	Numeric four	3
35	F5	28	5	Numeric five	3
36	F6	29	6	Numeric six	3
37	F7	30	7	Numeric seven	3
38	F8	31	8	Numeric eight	3
39	F9	32	9	Numeric nine	3
2D	60	33	-	Hyphen (minus)	3
2E	4B	34	.	Period (full stop)	3
2A	5C	35	*	Asterisk	3
30	F0	36	0	Numeric zero	9
45	C5	37	E	Uppercase E	3
4A	D1	38	J	Uppercase J	2
51	D8	39	Q	Uppercase Q	2
5A	E9	40	Z	Uppercase Z	1
28	4D	41	(	Left parenthesis	2
2C	6B	42	,	Comma	2
29	5D	43	)	Right parenthesis	2
24	5B	44	\$	Dollar sign	2
40	7C	45	@	Commercial at	2
2B	4E	46	+	Plus	2
2F	61	47	/	Slant (solidus)	2
3D	7E	48	=	Equals	2

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
3B	5E	49	;	Semicolon	2
3A	7A	50	:	Colon	2
27	7D	51	'	Acute accent (apostrophe)	2
31	F1	52	1	Numeric one	7
5B	4A	53	[	Left square bracket	1
7C	6A	54	|	Vertical line	1
5D	5A	55	]	Right square bracket	1
7B	C0	56	{	Left brace bracket	1
30	F0	57	0	Numeric zero	7
7D	D0	58	}	Right brace bracket	1
6A	91	59	j	Lowercase j	1
71	98	60	q	Lowercase q	1
7A	A9	61	z	Lowercase z	2
61	81	62	a	Lowercase a	2
62	82	63	b	Lowercase b	2
63	83	64	c	Lowercase c	2
64	84	65	d	Lowercase d	2
65	85	66	e	Lowercase e	2
66	86	67	f	Lowercase f	2
67	87	68	g	Lowercase g	2
68	88	69	h	Lowercase h	2
69	89	70	i	Lowercase i	2
6B	92	71	k	Lowercase k	2
6C	93	72	l	Lowercase l	2
6D	94	73	m	Lowercase m	2
6E	95	74	n	Lowercase n	2
6F	96	75	o	Lowercase o	2
70	97	76	p	Lowercase p	2
72	99	77	r	Lowercase r	2
30	F0	78	0	Numeric zero	9
31	F1	79	1	Numeric one	7
73	A2	80	s	Lowercase s	2
74	A3	81	t	Lowercase t	2
75	A4	82	u	Lowercase u	2
76	A5	83	v	Lowercase v	2
77	A6	84	w	Lowercase w	2
78	A7	85	x	Lowercase x	2
79	A8	86	y	Lowercase y	2
32	F2	87	2	Numeric two	3
33	F3	88	3	Numeric three	3
34	F4	89	4	Numeric four	3
35	F5	90	5	Numeric five	3
36	F6	91	6	Numeric six	3
37	F7	92	7	Numeric seven	3
38	F8	93	8	Numeric eight	3
39	F9	94	9	Numeric nine	3
2D	60	95	-	Hyphen (minus)	3
2E	4B	96	.	Period (full stop)	3

Table A—21. Expanded ASCII Print Cartridge (with Additional O's and 1's), 192 Characters (Part 2 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
2A	5C	97	*	Asterisk	3
45	C5	98	E	Uppercase E	3
30	F0	99	0	Numeric zero	9
41	C1	100	A	Uppercase A	2
42	C2	101	B	Uppercase B	2
43	C3	102	C	Uppercase C	2
44	C4	103	D	Uppercase D	2
46	C6	104	F	Uppercase F	2
47	C7	105	G	Uppercase G	2
31	F1	106	1	Numeric one	7
48	C8	107	H	Uppercase H	2
49	C9	108	I	Uppercase I	2
4B	D2	109	K	Uppercase K	2
4C	D3	110	L	Uppercase L	2
4D	D4	111	M	Uppercase M	2
4E	D5	112	N	Uppercase N	2
4F	D6	113	O	Uppercase O	2
50	D7	114	P	Uppercase P	2
52	D9	115	R	Uppercase R	2
53	E2	116	S	Uppercase S	2
54	E3	117	T	Uppercase T	2
55	E4	118	U	Uppercase U	2
56	E5	119	V	Uppercase V	2
57	E6	120	W	Uppercase W	2
30	F0	121	0	Numeric zero	9
58	E7	122	X	Uppercase X	2
59	E8	123	Y	Uppercase Y	2
23	7B	124	#	Number sign	1
21	4F	125	!	Exclamation	1
3C	4C	126	<	Less than	1
22	7F	127	"	Quotation	1
7E	A1	128	~	Tilde (overline)	1
60	79	129	`	Grave accent	1
5E	5F	130	^	Circumflex	1
25	6C	131	%	Percent	1
3E	6E	132	>	Greater than	1
26	50	133	&	Ampersand	1
31	F1	134	1	Numeric one	7
4A	D1	135	J	Uppercase J	2
51	D8	136	Q	Uppercase Q	2
7A	A9	137	z	Lowercase z	2
28	4D	138	(	Left parenthesis	2
2C	6B	139	,	Comma	2
29	5D	140	)	Right parenthesis	2
24	5B	141	\$	Dollar sign	2
30	F0	142	0	Numeric zero	9
40	7C	143	@	Commercial at	2
2B	4E	144	+	Plus	2

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
2F	61	145	/	Slant (solidus)	2
3D	7E	146	=	Equals	2
3B	5E	147	;	Semicolon	2
3A	7A	148	:	Colon	2
27	7D	149	'	Acute accent (apostrophe)	2
A4	45	150	⌘	International currency sign	1
32	F2	151	2	Numeric two	3
33	F3	152	3	Numeric three	3
34	F4	153	4	Numeric four	3
35	F5	154	5	Numeric five	3
36	F6	155	6	Numeric six	3
37	F7	156	7	Numeric seven	3
38	F8	157	8	Numeric eight	3
39	F9	158	9	Numeric nine	3
2D	60	159	-	Hyphen (minus)	3
2E	4B	160	.	Period (full stop)	3
2A	5C	161	*	Asterisk	3
31	F1	162	1	Numeric one	7
45	C5	163	E	Uppercase E	3
30	F0	164	0	Numeric zero	9
5C	E0	165	\	Reverse slant (reverse solidus)	1
61	81	166	a	Lowercase a	2
62	82	167	b	Lowercase b	2
63	83	168	c	Lowercase c	2
64	84	169	d	Lowercase d	2
65	85	170	e	Lowercase e	2
66	86	171	f	Lowercase f	2
67	87	172	g	Lowercase g	2
68	88	173	h	Lowercase h	2
69	89	174	i	Lowercase i	2
6B	92	175	k	Lowercase k	2
6C	93	176	l	Lowercase l	2
6D	94	177	m	Lowercase m	2
6E	95	178	n	Lowercase n	2
6F	96	179	o	Lowercase o	2
70	97	180	p	Lowercase p	2
72	99	181	r	Lowercase r	2
73	A2	182	s	Lowercase s	2
74	A3	183	t	Lowercase t	2
75	A4	184	u	Lowercase u	2
30	F0	185	0	Numeric zero	9
76	A5	186	v	Lowercase v	2
77	A6	187	w	Lowercase w	2
78	A7	188	x	Lowercase x	2
79	A8	189	y	Lowercase y	2
31	F1	190	1	Numeric one	7
5F	6D	191	_	Discontinuous underline	1
3F	6F	192	?	Question	1
Array size					192

Table A—22. Universal OCR-B (ISO) Print Cartridge (with Additional O's and 1's), 128 Characters (Part 1 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
3C	4C	1	<	Less than	1
3E	6E	2	>	Greater than	1
3B	5E	3	;	Semicolon	1
26	50	4	&	Ampersand	1
24	5B	5	\$	Dollar sign	2
2F	61	6	/	Slant (solidus)	2
2B	4E	7	+	Plus	2
3D	7E	8	=	Equals	2
28	4D	9	(	Left parenthesis	2
2C	6B	10	,	Comma	2
29	5D	11	)	Right parenthesis	2
30	F0	12	0	Numeric zero	8
5A	E9	13	Z	Uppercase Z	2
51	D8	14	Q	Uppercase Q	2
4A	D1	15	J	Uppercase J	2
31	F1	16	1	Numeric one	4
3F	6F	17	?	Question	1
40	7C	18	@	Commercial at	1
23	7B	19	#	Number sign	1
27	7D	20	'	Acute accent (apostrophe)	2
5F	6D	21	_	Discontinuous underline	1
32	F2	22	2	Numeric two	2
33	F3	23	3	Numeric three	2
34	F4	24	4	Numeric four	2
35	F5	25	5	Numeric five	2
36	F6	26	6	Numeric six	2
37	F7	27	7	Numeric seven	2
30	F0	28	0	Numeric zero	8
38	F8	29	8	Numeric eight	2
39	F9	30	9	Numeric nine	2
3A	7A	31	:	Colon	2
41	C1	32	A	Uppercase A	2
42	C2	33	B	Uppercase B	2
43	C3	34	C	Uppercase C	2
44	C4	35	D	Uppercase D	2
46	C6	36	F	Uppercase F	2
47	C7	37	G	Uppercase G	2
2A	5C	38	*	Asterisk	3
2D	60	39	-	Hyphen (minus)	3
2E	4B	40	.	Period (full stop)	3
48	C8	41	H	Uppercase H	2
45	C5	42	E	Uppercase E	3
49	C9	43	I	Uppercase I	2
30	F0	44	0	Numeric zero	8
4C	D3	45	L	Uppercase L	2
4D	D4	46	M	Uppercase M	2
4B	D2	47	K	Uppercase K	2

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
31	F1	48	1	Numeric one	4
4E	D5	49	N	Uppercase N	2
4F	D6	50	O	Uppercase O	2
50	D7	51	P	Uppercase P	2
52	D9	52	R	Uppercase R	2
53	E2	53	S	Uppercase S	2
54	E3	54	T	Uppercase T	2
55	E4	55	U	Uppercase U	2
56	E5	56	V	Uppercase V	2
57	E6	57	W	Uppercase W	2
58	E7	58	X	Uppercase X	2
59	E8	59	Y	Uppercase Y	2
30	F0	60	0	Numeric zero	8
7C	6A	61	|	Vertical line	1
A3	44	62	£	Pound sterling sign	1
DE	B6	63	¬	Logical not	1
22	7F	64	"	Quotation	1
5E	5F	65	^	Circumflex	1
DC	B4	66	¥	Yen sign	1
A4	45	67	¤	International currency sign	1
5C	E0	68	\	Reverse slant (reverse solidus)	1
24	5B	69	\$	Dollar sign	2
2F	61	70	/	Slant (solidus)	2
2B	4E	71	+	Plus	2
3D	7E	72	=	Equals	2
28	4D	73	(	Left parenthesis	2
2C	6B	74	,	Comma	2
29	5D	75	)	Right parenthesis	2
30	F0	76	0	Numeric zero	8
5A	E9	77	Z	Uppercase Z	2
51	D8	78	Q	Uppercase Q	2
4A	D1	79	J	Uppercase J	2
31	F1	80	1	Numeric one	4
2A	5C	81	*	Asterisk	3
2D	60	82	-	Hyphen (minus)	3
2E	4B	83	.	Period (full stop)	3
27	7D	84	'	Acute accent (apostrophe)	2
45	C5	85	E	Uppercase E	3
32	F2	86	2	Numeric two	2
33	F3	87	3	Numeric three	2
34	F4	88	4	Numeric four	2
35	F5	89	5	Numeric five	2
36	F6	90	6	Numeric six	2
37	F7	91	7	Numeric seven	2
30	F0	92	0	Numeric zero	8
38	F8	93	8	Numeric eight	2
39	F9	94	9	Numeric nine	2

Table A—22. Universal OCR-B (ISO) Print Cartridge (with Additional 0's and 1's), 128 Characters (Part 2 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
3A	7A	95	:	Colon	2
41	C1	96	A	Uppercase A	2
42	C2	97	B	Uppercase B	2
43	C3	98	C	Uppercase C	2
44	C4	99	D	Uppercase D	2
46	C6	100	F	Uppercase F	2
47	C7	101	G	Uppercase G	2
21	4F	102	!	Exclamation	1
5B	4A	103	[	Left square bracket	1
5D	5A	104	]	Right square bracket	1
48	C8	105	H	Uppercase H	2
25	6C	106	%	Percent	1
49	C9	107	I	Uppercase I	2
30	F0	108	0	Numeric zero	8
4C	D3	109	L	Uppercase L	2
4D	D4	110	M	Uppercase M	2
4B	D2	111	K	Uppercase K	2
31	F1	112	1	Numeric one	4
4E	D5	113	N	Uppercase N	2
4F	D6	114	O	Uppercase O	2
50	D7	115	P	Uppercase P	2
52	D9	116	R	Uppercase R	2
53	E2	117	S	Uppercase S	2
54	E3	118	T	Uppercase T	2
55	E4	119	U	Uppercase U	2
56	E5	120	V	Uppercase V	2
57	E6	121	W	Uppercase W	2
58	E7	122	X	Uppercase X	2
59	E8	123	Y	Uppercase Y	2
30	F0	124	0	Numeric zero	8
2D	60	125	-	Hyphen (minus)	3
2E	4B	126	.	Period (full stop)	3
2A	5C	127	*	Asterisk	3
45	C5	128	E	Uppercase E	3
Array size					128

Table A—23. OCR-A (ANSI '77) Print Cartridge, 48 Characters

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
50	D7	1	P	Uppercase P	1
4F	D6	2	O	Uppercase O	1
4E	D5	3	N	Uppercase N	1
4D	D4	4	M	Uppercase M	1
4C	D3	5	L	Uppercase L	1
4B	D2	6	K	Uppercase K	1
4A	D1	7	J	Uppercase J	1
49	C9	8	I	Uppercase I	1
48	C8	9	H	Uppercase H	1
47	C7	10	G	Uppercase G	1
46	C6	11	F	Uppercase F	1
45	C5	12	E	Uppercase E	1
44	C4	13	D	Uppercase D	1
43	C3	14	C	Uppercase C	1
42	C2	15	B	Uppercase B	1
41	C1	16	A	Uppercase A	1
39	F9	17	9	Numeric nine	1
38	F8	18	8	Numeric eight	1
37	F7	19	7	Numeric seven	1
36	F6	20	6	Numeric six	1
35	F5	21	5	Numeric five	1
34	F4	22	4	Numeric four	1
33	F3	23	3	Numeric three	1
32	F2	24	2	Numeric two	1
31	F1	25	1	Numeric one	1
30	F0	26	0	Numeric zero	1
2D	60	27	-	Hyphen (minus)	1
2F	61	28	/	Slant (solidus)	1
22	7F	29	▼▼	OCR-A quotation mark	1
3A	7A	30	■	OCR-A colon	1
24	5B	31	⌘	Dollar sign	1
2C	6B	32	,	Comma	1
2B	4E	33	+	Plus	1
3E	6E	34	>	Greater than	1
2A	5C	35	*	Asterisk	1
3D	7E	36	=	Equals	1
26	50	37	&	Ampersand	1
2E	4B	38	■	OCR-A period	1
5A	E9	39	Z	Uppercase Z	1
59	E8	40	Y	Uppercase Y	1
58	E7	41	X	Uppercase X	1
57	E6	42	W	Uppercase W	1

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
56	E5	43	V	Uppercase V	1
55	E4	44	U	Uppercase U	1
54	E3	45	T	Uppercase T	1
53	E2	46	S	Uppercase S	1
52	D9	47	R	Uppercase R	1
51	D8	48	Q	Uppercase Q	1
				Array size	48

Table A—24. Modified ASCII (77L) Print Cartridge, 64 Characters (Ø)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
2B	4E	1	+	Plus	1
28	4D	2	(	Left parenthesis	1
29	5D	3	)	Right parenthesis	1
23	7B	4	#	Number sign	1
3D	7E	5	=	Equals	1
25	6C	6	%	Percent	1
2A	5C	7	*	Asterisk	1
3E	6E	8	>	Greater than	1
3C	4C	9	<	Less than	1
5A	E9	10	Z	Uppercase Z	1
59	E8	11	Y	Uppercase Y	1
58	E7	12	X	Uppercase X	1
57	E6	13	W	Uppercase W	1
56	E5	14	V	Uppercase V	1
55	E4	15	U	Uppercase U	1
54	E3	16	T	Uppercase T	1
53	E2	17	S	Uppercase S	1
52	D9	18	R	Uppercase R	1
30	F0	19	Ø	Numeric zero with slash	2
51	D8	20	Q	Uppercase Q	1
50	D7	21	P	Uppercase P	1
4F	D6	22	O	Uppercase O	1
4E	D5	23	N	Uppercase N	1
4D	D4	24	M	Uppercase M	1
4C	D3	25	L	Uppercase L	1
4B	D2	26	K	Uppercase K	1
40	D1	27	J	Uppercase J	1
49	C9	28	I	Uppercase I	1
48	C8	29	H	Uppercase H	1
47	C7	30	G	Uppercase G	1
46	C6	31	F	Uppercase F	1
45	C5	32	E	Uppercase E	1
44	C4	33	D	Uppercase D	1
43	C3	34	C	Uppercase C	1
42	C2	35	B	Uppercase B	1
41	C1	36	A	Uppercase A	1
5B	4A	37	[	Left square bracket	1
5D	5A	38	]	Right square bracket	1
21	4F	39	!	Exclamation point	1
5E	5F	40	^	Circumflex	1
5C	E0	41	\	Reverse slant (reverse solidus)	1
39	F9	42	9	Numeric nine	1
38	F8	43	8	Numeric eight	1
37	F7	44	7	Numeric seven	1
36	F6	45	6	Numeric six	1
35	F5	46	5	Numeric five	1

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
34	F4	47	4	Numeric four	1
33	F3	48	3	Numeric three	1
32	F2	49	2	Numeric two	1
31	F1	50	1	Numeric one	1
30	F0	51	Ø	Numeric zero with slash	2
2E	4B	52	.	Period (full stop)	1
2D	60	53	-	Hyphen (minus)	1
2F	61	54	/	Slant (solidus)	1
24	5B	55	\$	Dollar sign	1
3B	5E	56	;	Semicolon	1
3A	7A	57	:	Colon	1
3F	6F	58	?	Question	1
26	50	59	&	Ampersand	1
5F	6D	60	_	Underline (discontinuous)	1
40	7C	61	@	Commercial at	1
27	7D	62	'	Apostrophe	1
22	7F	63	"	Quotation	1
2C	6B	64	,	Comma	1
Array size					64

Table A—25. Japan-Katakana Print Cartridge, 128 Characters (Part 1 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
—	81	1	ア	Katakana (A)	1
—	82	2	イ	Katakana (I)	1
—	83	3	ウ	Katakana (U)	1
—	84	4	エ	Katakana (E)	1
—	85	5	オ	Katakana (O)	1
—	86	6	カ	Katakana (KA)	1
—	87	7	キ	Katakana (KI)	1
—	88	8	ク	Katakana (KU)	1
—	89	9	ケ	Katakana (KE)	1
—	8A	10	コ	Katakana (KO)	1
—	8C	11	サ	Katakana (SA)	1
—	8D	12	シ	Katakana (SHI)	1
31	F1	13	1	Numeric One	6
30	F0	14	0	Numeric Zero	6
—	90	15	ソ	Katakana (SO)	1
—	91	16	タ	Katakana (TA)	1
—	92	17	チ	Katakana (CHI)	1
—	93	18	ツ	Katakana (TSU)	1
—	94	19	テ	Katakana (TE)	1
—	95	20	ト	Katakana (TO)	1
—	96	21	ナ	Katakana (NA)	1
—	97	22	ニ	Katakana (NI)	1
—	98	23	ヌ	Katakana (NU)	1
—	99	24	ネ	Katakana (NE)	1
—	9A	25	ノ	Katakana (NO)	1
—	9D	26	ハ	Katakana (HA)	1
—	9E	27	ヒ	Katakana (HI)	1
—	9F	28	フ	Katakana (FU)	1
—	A2	29	ヘ	Katakana (HE)	1
—	A3	30	ホ	Katakana (HO)	1
—	A4	31	マ	Katakana (MA)	1
—	A5	32	ミ	Katakana (MI)	1
—	A6	33	ム	Katakana (MU)	1
—	A7	34	メ	Katakana (ME)	1
31	F1	35	1	Numeric one	6
30	F0	36	0	Numeric Zero	6
—	AA	37	1	Katakana (TU)	1
—	AC	38	3	Katakana (YO)	1
—	AD	39	ラ	Katakana (RA)	1
—	AE	40	リ	Katakana (RI)	1
—	AF	41	ル	Katakana (RU)	1
—	BA	42	レ	Katakana (RE)	1
—	BB	43	ロ	Katakana (RO)	1
—	BC	44	ワ	Katakana (WA)	1
—	BD	45	ン	Katakana (N)	1
—	BE	46	ゝ	Vorced Sound Symbol	1

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
—	BF	47	◦	Semivorced Sound Symbol	1
39	F9	48	9	Numeric nine	2
38	F8	49	8	Numeric eight	2
37	F7	50	7	Numeric seven	2
36	F6	51	6	Numeric six	2
35	F5	52	5	Numeric five	2
34	F4	53	4	Numeric four	2
33	F3	54	3	Numeric three	2
32	F2	55	2	Numeric two	2
31	F1	56	1	Numeric one	6
30	F0	57	0	Numeric zero	6
2E	4B	58	.	Period	2
—	A8	59	モ	Katakana (MO)	1
—	A9	60	ヤ	Katakana (YA)	1
57	E6	61	W	Uppercase W	1
26	50	62	&	Ampersand	1
56	E5	63	V	Uppercase V	1
2C	6B	64	,	Comma	2
2B	4E	65	+	Plus sign	1
28	4D	66	(	Left parenthesis	1
29	5D	67	)	Right parenthesis	1
3D	7E	68	=	Equal sign	1
21	4F	69	!	Exclamation point	1
2F	61	70	/	Slant (solidus)	1
5C	E0	71	\	Reverse slant (reverse solidus)	1
3E	6E	72	>	Greater than	1
3C	4C	73	<	Less than	1
5A	E9	74	Z	Uppercase Z	1
59	EB	75	Y	Uppercase Y	1
58	E7	76	X	Uppercase X	1
31	F1	77	1	Numeric one	6
30	F0	78	0	Numeric zero	6
55	E4	79	U	Uppercase U	1
54	E3	80	T	Uppercase T	1
53	E2	81	S	Uppercase S	1
52	D9	82	R	Uppercase R	1
51	D8	83	Q	Uppercase Q	1
50	D7	84	P	Uppercase P	1
4F	D6	85	O	Uppercase O	1
4E	D5	86	N	Uppercase N	1
4D	D4	87	M	Uppercase M	1
4C	D3	88	L	Uppercase L	1
4B	D2	89	K	Uppercase K	1
4A	D1	90	J	Uppercase J	1
49	C9	91	I	Uppercase I	1
48	C8	92	H	Uppercase H	1

Table A—25. Japan-Katakana Print Cartridge, 128 Characters (Part 2 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
47	C7	93	G	Uppercase G	1
46	C6	94	F	Uppercase F	1
45	C5	95	E	Uppercase E	1
44	C4	96	D	Uppercase D	1
43	C3	97	C	Uppercase C	1
42	C2	98	B	Uppercase B	1
31	F1	99	1	Numeric one	6
30	F0	100	0	Numeric zero	6
25	6C	101	%	Percent	1
40	7C	102	@	Commercial at symbol	1
5F	6D	103	_	Underline	1
27	7D	104	'	Apostrophe	1
3A	7A	105	:	Colon	1
3B	5E	106	;	Semicolon	1
3F	6F	107	?	Question mark	1
7C	6A	108	|	Vertical line	1
23	7B	109	#	Number sign	1
41	C1	110	A	Uppercase A	1
DC	B4	111	¥	Yen sign	1
39	F9	112	9	Numeric nine	2
38	F8	113	8	Numeric eight	2
37	F7	114	7	Numeric seven	2
36	F6	115	6	Numeric six	2
35	F5	116	5	Numeric five	2
34	F4	117	4	Numeric four	2
33	F3	118	3	Numeric three	2
32	F2	119	2	Numeric two	2
31	F1	120	1	Numeric one	6
30	F0	121	0	Numeric zero	6
2E	4B	122	.	Period	2
2D	60	123	-	Hyphen (minus)	1
2A	5C	124	*	Asterisk	1
22	7F	125	"	Quotation mark	1
—	8E	126	ㇿ	Katakana (SU)	1
—	8F	127	ㇾ	Katakana (SE)	1
—	6B	128	,	Katakana comma	1
				Array size	128

Table A—26. Japan OCR-B Print Cartridge, 128 Characters (Part 1 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
2A	5C	1	*	Asterisk	3
2C	6B	2	,	Comma	3
26	50	3	&	Ampersand	1
2B	4E	4	+	Plus sign	2
DC	B4	5	¥	Yen sign	2
5A	E9	6	Z	Uppercase Z	2
59	E8	7	Y	Uppercase Y	2
31	F1	8	1	Numeric one	9
30	F0	9	0	Numeric zero	8
58	E7	10	X	Uppercase X	2
57	E6	11	W	Uppercase W	2
56	E5	12	V	Uppercase V	2
55	E4	13	U	Uppercase U	2
54	E3	14	T	Uppercase T	2
53	E2	15	S	Uppercase S	2
52	D9	16	R	Uppercase R	2
51	D8	17	Q	Uppercase Q	2
50	D7	18	P	Uppercase P	2
4F	D6	19	O	Uppercase O	2
5C	E0	20	\	Reverse slant (reverse solidus)	1
5F	6D	21	_	Underline	1
31	F1	22	1	Numeric one	9
3A	7A	23	:	Colon	1
31	F1	24	1	Numeric one	9
30	F0	25	0	Numeric zero	8
4E	D5	26	N	Uppercase N	2
4D	D4	27	M	Uppercase M	2
4C	D3	28	L	Uppercase L	2
4B	D2	29	K	Uppercase K	2
4A	D1	30	J	Uppercase J	2
49	C9	31	I	Uppercase I	2
48	C8	32	H	Uppercase H	2
47	C7	33	G	Uppercase G	2
46	C6	34	F	Uppercase F	2
45	C5	35	E	Uppercase E	2
44	C4	36	D	Uppercase D	2
43	C3	37	C	Uppercase C	2
42	C2	38	B	Uppercase B	2
41	C1	39	A	Uppercase A	2
31	F1	40	1	Numeric one	9
30	F0	41	0	Numeric zero	8
2E	4B	42	.	Period	3
2D	60	43	-	Hyphen (minus)	3
2A	5C	44	*	Asterisk	3
2C	6B	45	,	Comma	3

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
27	7D	46	'	Apostrophe	2
29	5D	47	)	Right parenthesis	2
39	F9	48	9	Numeric nine	2
38	F8	49	8	Numeric eight	2
37	F7	50	7	Numeric seven	2
36	F6	51	6	Numeric six	2
35	F5	52	5	Numeric five	2
34	74	53	4	Numeric four	2
33	F3	54	3	Numeric three	2
32	F2	55	2	Numeric two	2
31	F1	56	1	Numeric one	9
30	F0	57	0	Numeric zero	8
28	4D	58	(	Left parenthesis	2
23	7B	59	#	Number sign	2
3D	7E	60	=	Equal sign	2
40	7C	61	@	Commercial at symbol	2
2F	61	62	/	Slant (solidus)	2
3E	6E	63	>	Greater than	1
DE	B6	64	¬	Logical NOT	1
		65	¢	Cent sign	1
3C	4C	66	<	Less than	1
25	6C	67	%	Percent sign	1
2B	4E	68	+	Plus sign	2
DC	B4	69	¥	Yen sign	2
5A	E9	70	Z	Uppercase Z	2
59	E8	71	Y	Uppercase Y	2
31	F1	72	1	Numeric one	9
30	F0	73	0	Numeric zero	8
58	E7	74	X	Uppercase X	2
57	E6	75	W	Uppercase W	2
56	E5	76	V	Uppercase V	2
55	E4	77	U	Uppercase U	2
54	E3	78	T	Uppercase T	2
53	E2	79	S	Uppercase S	2
52	D9	80	R	Uppercase R	2
51	D8	81	Q	Uppercase Q	2
50	D7	82	P	Uppercase P	2
4F	D6	83	O	Uppercase O	2
2E	4B	84	.	Period	3
2D	60	85	-	Hyphen (minus)	3
2A	5C	86	*	Asterisk	3
2C	6B	87	,	Comma	3
31	F1	88	1	Numeric one	9
30	F0	89	0	Numeric zero	8
4E	D5	90	N	Uppercase N	2

Table A—26. Japan OCR-B Print Cartridge, 128 Characters (Part 2 of 2)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
4D	D4	91	M	Uppercase M	2
4C	D3	92	L	Uppercase L	2
4B	DC	93	K	Uppercase K	2
4A	D1	94	J	Uppercase J	2
49	C9	95	I	Uppercase I	2
48	C8	96	H	Uppercase H	2
47	C7	97	G	Uppercase G	2
46	36	98	F	Uppercase F	2
45	C5	99	E	Uppercase E	2
44	C4	100	D	Uppercase D	2
43	C3	101	C	Uppercase C	2
42	C2	102	B	Uppercase B	2
41	C1	103	A	Uppercase A	2
31	F1	104	1	Numeric one	9
30	F0	105	0	Numeric zero	8
3B	5E	106	;	Semi colon	1
3F	6F	107	?	Question mark	1
21	4F	108	!	Exclamation point	1
22	7F	109	"	Quotation mark	1
27	7D	110	'	Apostrophe	2
29	5D	111	)	Right parenthesis	2
39	F9	112	9	Numeric nine	2
38	F8	113	8	Numeric eight	2
37	F7	114	7	Numeric seven	2
36	F6	115	6	Numeric six	2
35	F5	116	5	Numeric five	2
34	74	117	4	Numeric four	2
33	F3	118	3	Numeric three	2
32	F2	119	2	Numeric two	2
31	F1	120	1	Numeric one	9
30	F0	121	0	Numeric zero	8
28	4D	122	{	Left parenthesis	2
23	7B	123	#	Number sign	2
3D	7E	124	=	Equal sign	2
40	7C	125	@	Commercial at sign	2
2F	61	126	/	Slant (solidus)	2
2E	4B	127	.	Period	3
2D	60	128	—	Hyphen (minus)	3
				Array size	128

Table A—27. OCR-B Numeric Print Cartridge, 24 Characters

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
2D	60	1	-	Hyphen (minus)	1
2F	61	2	/	Slant (solidus)	1
3E	6E	3	>	Greater than	1
2C	4C	4	<	Less than	1
3D	7E	5	=	Equals	1
23	7B	6	#	Number sign	1
24	5B	7	\$	Dollar sign	1
2C	6B	8	,	Comma	1
2B	4E	9	+	Plus	1
28	4D	10	(	Left parenthesis	1
29	5D	11	)	Right parenthesis	1
2A	5C	12	*	Asterisk	1
25	6C	13	%	Percent	
2E	4B	14	.	Period	1
39	F9	15	9	Numeric nine	1
38	F8	16	8	Numeric eight	1
37	F7	17	7	Numeric seven	1
36	F6	18	6	Numeric six	1
35	F5	19	5	Numeric five	1
34	F5	20	4	Numeric four	1
33	F3	21	3	Numeric three	1
32	F2	22	2	Numeric two	1
31	F1	23	1	Numeric one	1
30	F0	24	0	Numeric zero	1
				Array size	24

Table A—28. American Library Association Print Cartridge, 384 Characters (Part 1 of 5)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
E9	C8	1	œ	Lowercase digraph oe	2
F2	DE	2	æ	Lowercase digraph ae	2
7A	A9	3	z	Lowercase z	2
79	A8	4	y	Lowercase y	2
78	A7	5	x	Lowercase x	2
77	A6	6	w	Lowercase w	2
76	A5	7	v	Lowercase v	2
75	A4	8	u	Lowercase u	2
74	A3	9	t	Lowercase t	2
73	A2	10	s	Lowercase s	2
3F	6F	11	?	Question mark	2
72	99	12	r	Lowercase r	2
71	78	13	q	Lowercase q	2
70	97	14	p	Lowercase p	2
6F	96	15	o	Lowercase o	2
6E	95	16	n	Lowercase n	2
6D	94	17	m	Lowercase m	2
6C	93	18	l	Lowercase l	2
5B	92	19	k	Lowercase k	2
6A	91	20	j	Lowercase j	2
69	89	21	i	Lowercase i	2
68	88	22	h	Lowercase h	2
67	87	23	g	Lowercase g	2
66	86	24	f	Lowercase f	2
65	85	25	e	Lowercase e	2
64	84	26	d	Lowercase d	2
63	83	27	c	Lowercase c	2
62	82	28	b	Lowercase b	2
61	81	29	a	Lowercase a	2
		30	ˆ	Ayn	2
		31	✓	Left hook	2
		32	¨	Double acute	2
		33	˘	Breve	2
BA	70	34	¨	Diaeresis	2
27	7D	35	´	Acute	2
		36	¸	Tail	1
		37	?	Pseudo question mark	2
		38	.	Dot in middle of A-L-A	2
AA	52	39	‡	Double dagger	2
5C	EO	40	\	Reverse slant (reverse solidus)	2
30	F0	41	0	Numeric zero	3
39	F9	42	9	Numeric nine	3
38	F8	43	8	Numeric eight	3
37	F7	44	7	Numeric seven	3
36	F6	45	6	Numeric six	3
35	F5	46	5	Numeric five	3

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
34	F4	47	4	Numeric four	3
27	7D	48	'	Apostrophe	2
2C	6B	49	,	Comma	3
2E	4B	50	.	Period	3
3A	7A	51	:	Colon	2
22	7F	52	"	Quotation	2
2D	60	53	-	Hyphen (minus)	2
21	4F	54	!	Exclamation	2
5D	5A	55	]	Right square bracket	2
5B	4A	56	[	Left square bracket	2
CF	9E	57	Þ	Upper case thorn	2
C9	8F	58	Œ	Uppercase digraph OE	2
D2	AA	59	Æ	Uppercase digraph AE	2
5A	E9	60	Z	Uppercase Z	2
59	E8	61	Y	Uppercase Y	3
58	E7	62	X	Uppercase X	3
57	E6	63	W	Uppercase W	3
56	E5	64	V	Uppercase V	3
55	E4	65	U	Uppercase U	3
54	E3	66	T	Uppercase T	3
53	E2	67	S	Uppercase S	3
2F	61	68	/	Slant (solidus)	2
52	D9	69	R	Uppercase R	3
51	D8	70	Q	Uppercase Q	2
50	D7	71	P	Uppercase P	3
4F	D6	72	O	Uppercase O	3
4E	D5	73	N	Uppercase N	3
4D	D4	74	M	Uppercase M	3
4C	D3	75	L	Uppercase L	3
4B	D2	76	K	Uppercase K	3
4A	D1	77	J	Uppercase J	3
49	C9	78	I	Uppercase I	3
48	C8	79	H	Uppercase H	3
47	C7	80	G	Uppercase G	3
46	C6	81	F	Uppercase F	3
45	C5	82	E	Uppercase E	3
44	C4	83	D	Uppercase D	3
43	C3	84	C	Uppercase C	3
42	C2	85	B	Uppercase B	3
41	C1	86	A	Uppercase A	3
33	F3	87	3	Numeric three	3
32	F2	88	2	Numeric two	3
31	F1	89	1	Numeric one	3
79	A8	90	y	Lowercase y	1
78	A7	91	x	Lowercase x	1
77	A6	92	w	Lowercase w	1

Table A—28. American Library Association Print Cartridge, 384 Characters (Part 2 of 5)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
76	A5	93	v	Lowercase v	1
75	A4	94	u	Lowercase u	1
74	A3	95	t	Lowercase t	1
73	A2	96	s	Lowercase s	1
72	99	97	r	Lowercase r	1
70	97	98	p	Lowercase p	1
6F	96	99	o	Lowercase o	1
6E	95	100	n	Lowercase n	1
6D	94	101	m	Lowercase m	1
6C	93	102	l	Lowercase l	1
6B	92	103	k	Lowercase k	1
6A	91	104	j	Lowercase j	1
69	89	105	i	Lowercase i	1
68	88	106	h	Lowercase h	1
67	87	107	g	Lowercase g	1
66	86	108	f	Lowercase f	1
65	85	109	e	Lowercase e	1
64	84	110	d	Lowercase d	1
63	83	111	c	Lowercase c	1
62	82	112	b	Lowercase b	1
61	81	113	a	Lowercase a	1
7E	A1	114	~	Tilde	2
		115	°	Circle above	2
		116	•	Dot above	2
2B	4E	117	+	Plus sign	2
3C	4C	118	<	Less than	2
3E	6E	119	>	Greater than	2
		120	(	Superscript left parenthesis	2
		121	)	Superscript right parenthesis	2
		122	J	Tail	1
		123	+	Superscript plus sign	2
		124	-	Superscript minus sign	2
		125	0	Superscript numeric zero	2
		126	9	Superscript numeric nine	2
		127	8	Superscript numeric eight	2
		128	7	Superscript numeric seven	2
		129	6	Superscript numeric six	2
		130	5	Superscript numeric five	2
		131	4	Superscript numeric four	2
		132	3	Superscript numeric three	2
		133	2	Superscript numeric two	2
		134	1	Superscript numeric one	2
24	5B	135	\$	Dollar sign	2
40	7C	136	@	Commercial at sign	2
24	5C	137	*	Asterisk	2
A3	44	138	£	Pound sterling sign	2

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
DB	B3	139	b	Musical flat	2
		140	®	Subscript patent sign	2
		141	x	Lowercase Polish L	2
		142	ø	Lowercase Scandinavian O	2
E4	BC	143	đ	Lowercase D crossbar	2
3D	7E	144	=	Equals	2
		145	İ	Turkish I	2
		146	⌋	Right ligature	2
		147	⌌	Left ligature	2
		148	—	Macron	2
		149	ˇ	Hacek	2
5E	5F	150	ˆ	Circumflex	2
60	79	151	˘	Grave	2
23	7B	152	#	Number sign	2
		153	Ł	Uppercase Polish L	2
		154	Ō	Uppercase Scandinavian O	2
C4	8A	155	Đ	Uppercase D crossbar	2
		156	≡	Double underscore	2
		157	̣	Candrabindu	2
		158	—	Underline	2
		159	◌̰	Circle below	2
		160	◌̱	Double dot below	2
		161	◌̲	Dot below	2
		162	(	Subscript left parenthesis	2
		163	)	Subscript right parenthesis	2
		164	⌋	Right hook	2
		165	+	Subscript plus sign	2
		166	-	Subscript minus sign	2
		167	0	Subscript numeric zero	2
		168	9	Subscript numeric nine	2
		169	8	Subscript numeric eight	2
		170	7	Subscript numeric seven	2
		171	6	Subscript numeric six	2
		172	5	Subscript numeric five	2
		173	4	Subscript numeric four	2
		174	3	Subscript numeric three	2
		175	2	Subscript numeric two	2
		176	1	Subscript numeric one	2
3B	5E	177	;	Semicolon	2
28	4D	178	(	Left parenthesis	2
29	5D	179	)	Right parenthesis	2
26	50	180	/	Ampersand	2
AB	53	181	±	Plus or minus sign	2
25	6C	182	%	Percent sign	2
		183	γ	Gamma	2
		184	β	Beta	2

Table A—28. American Library Association Print Cartridge, 384 Characters (Part 3 of 5)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
		185	α	Alpha	2
EF	DB	186	þ	Lowercase thorn	2
E9	C8	187	œ	Lowercase digraph oe	2
F2	DE	188	æ	Lowercase digraph ae	2
7A	A9	189	z	Lowercase z	2
79	A8	190	y	Lowercase y	2
78	A7	191	x	Lowercase x	2
77	A6	192	w	Lowercase w	2
76	A5	193	v	Lowercase v	2
75	A4	194	u	Lowercase u	2
74	A3	195	t	Lowercase t	2
73	A2	196	s	Lowercase s	2
3F	6F	197	?	Question mark	2
72	99	198	r	Lowercase r	2
71	98	199	q	Lowercase q	2
70	97	200	p	Lowercase p	2
6F	96	201	o	Lowercase o	2
6E	95	202	n	Lowercase n	2
6D	94	203	m	Lowercase m	2
6C	93	204	l	Lowercase l	2
5B	92	205	k	Lowercase k	2
6A	91	206	j	Lowercase j	2
69	89	207	i	Lowercase i	2
68	88	208	h	Lowercase h	2
67	87	209	g	Lowercase g	2
66	86	210	f	Lowercase f	2
65	85	211	e	Lowercase e	2
64	84	212	d	Lowercase d	2
63	83	213	c	Lowercase c	2
62	82	214	b	Lowercase b	2
61	81	215	a	Lowercase a	2
		216	◌̣	Ayn	2
		217	◌̣̣	Left hook	2
		218	◌̣̣̣	Double acute	2
		219	◌̣̣̣̣	Breve	2
BA	70	220	◌̣̣̣̣̣	Diaeresis	2
27	7D	221	◌̣̣̣̣̣̣	Acute	2
		222	◌̣̣̣̣̣̣̣	Alif high comma	2
		223	◌̣̣̣̣̣̣̣̣	Pseudo question mark	2
		224	◌̣̣̣̣̣̣̣̣̣	Dot in middle A·L·A	2
AA	52	225	‡	Double dagger	2
5C	E0	226	↖	Reverse slant (reverse solidus)	2
30	F0	227	0	Numeric zero	3
39	F9	228	9	Numeric nine	3
38	F8	229	8	Numeric eight	3
37	F7	230	7	Numeric seven	3

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
36	F6	231	6	Numeric six	3
35	F5	232	5	Numeric five	3
34	F4	233	4	Numeric four	3
27	7D	234	'	Apostrophe	2
2C	6B	235	,	Comma	3
2E	4B	236	.	Period	3
3A	7A	237	:	Colon	2
22	7F	238	"	Quotation	2
2D	60	239	-	Hyphen (minus)	2
21	4F	240	!	Exclamation	2
5D	5A	241	]	Right square bracket	2
5B	4A	242	[	Left square bracket	2
CF	9E	243	Ɔ	Uppercase thorn	2
C9	8F	244	Œ	Uppercase digraph OE	2
D2	AA	245	Æ	Uppercase digraph AE	2
5A	E9	246	Z	Uppercase Z	2
59	E8	247	Y	Uppercase Y	3
58	E7	248	X	Uppercase X	3
57	E6	249	W	Uppercase W	3
56	E5	250	V	Uppercase V	3
55	E4	251	U	Uppercase U	3
54	E3	252	T	Uppercase T	3
53	E2	253	S	Uppercase S	3
2F	61	254	/	Slant (solidus)	2
52	D9	255	R	Uppercase R	3
51	D8	256	Q	Uppercase Q	2
50	D7	257	P	Uppercase P	3
4F	D6	258	O	Uppercase O	3
4E	D5	259	N	Uppercase N	3
4D	D4	260	M	Uppercase M	3
4C	D3	261	L	Uppercase L	3
4B	D2	262	K	Uppercase K	3
4A	D1	263	J	Uppercase J	3
49	C9	264	I	Uppercase I	3
48	C8	265	H	Uppercase H	3
47	C7	266	G	Uppercase G	3
46	C6	267	F	Uppercase F	3
45	C5	268	E	Uppercase E	3
44	C4	269	D	Uppercase D	3
43	C3	270	C	Uppercase C	3
42	C2	271	B	Uppercase B	3
41	C1	272	A	Uppercase A	3
33	F3	273	3	Numeric three	3
32	F2	274	2	Numeric two	3
31	F1	275	1	Numeric one	3
59	E8	276	Y	Uppercase Y	3

Table A—28. American Library Association Print Cartridge, 384 Characters (Part 4 of 5)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array	ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
58	E7	277	X	Uppercase X	3			322	-	Superscript minus sign	2
57	E6	278	W	Uppercase W	3			323	°	Superscript numeric zero	2
56	E5	279	V	Uppercase V	3			324	⁹	Superscript numeric nine	2
55	E4	280	U	Uppercase U	3			325	⁸	Superscript numeric eight	2
54	E3	281	T	Uppercase T	3			326	⁷	Superscript numeric seven	2
53	E2	282	S	Uppercase S	3			327	⁶	Superscript numeric six	2
52	D9	283	R	Uppercase R	3			328	⁵	Superscript numeric five	2
50	D7	284	P	Uppercase P	3			329	⁴	Superscript numeric four	2
4F	D6	285	O	Uppercase O	3			330	³	Superscript numeric three	2
4E	D5	286	N	Uppercase N	3			331	²	Superscript numeric two	2
4D	D4	287	M	Uppercase M	3			332	¹	Superscript numeric one	2
4C	D3	288	L	Uppercase L	3	24	5B	333	\$	Dollar sign	2
4B	D2	289	K	Uppercase K	3	40	7C	334	@	Commercial at sign	2
4A	D1	290	J	Uppercase J	3	24	5C	335	*	Asterisk	2
49	C9	291	I	Uppercase I	3	A3	44	336	£	Pound sterling sign	2
48	C8	292	H	Uppercase H	3	DB	B3	337	b	Musical flat	2
47	C7	293	G	Uppercase G	3			338	®	Subscript patent sign	2
46	C6	294	F	Uppercase F	3			339	ł	Lowercase Polish L	2
45	C5	295	E	Uppercase E	3			340	ø	Lowercase Scandinavian O	2
44	C4	296	D	Uppercase D	3	E4	BC	341	đ	Lowercase D crossbar	2
43	C3	297	C	Uppercase C	3	3D	7E	342	=	Equal sign	2
42	C2	298	B	Uppercase B	3			343	İ	Turkish I	2
41	C1	299	A	Uppercase A	3			344	—	Right ligature	2
2C	6B	300	,	Comma	3			345	—	Left ligature	2
2E	4B	301	.	Period	3			346	—	Macron	2
30	F0	302	0	Numeric zero	3			347	<	Hacek	2
39	F9	303	9	Numeric nine	3	5E	5F	348	<	Circumflex	2
38	F8	304	8	Numeric eight	3	60	79	349	'	Grave	2
37	F7	305	7	Numeric seven	3	23	7B	350	#	Number sign	2
36	F6	306	6	Numeric six	3			351	Ł	Uppercase Polish L	2
35	F5	307	5	Numeric five	3			352	Ø	Uppercase Scandinavian O	2
34	F4	308	4	Numeric four	3	C4	8A	353	D	Uppercase D crossbar	2
33	F3	309	3	Numeric three	3			354	==	Double underscore	2
32	F2	310	2	Numeric two	3			355	̣	Candrabindu	2
31	F1	311	1	Numeric one	3			356	—	Underline	2
7E	A1	312	~	Tilde	2			357	°	Circle below	2
		313	°	Circle above	2			358	..	Double dot below	2
		314	·	Dot above	2			359	.	Dot below	2
2B	4E	315	+	Plus sign	2			360	(	Subscript left parenthesis	2
3C	4C	316	<	Less than	2			361	)	Subscript right parenthesis	2
3E	6E	317	>	Greater than	2			362	↘	Right hook	2
		318	(	Subscript left parenthesis	2			363	+	Subscript plus sign	2
		319	)	Subscript right parenthesis	2			364	-	Subscript minus sign	2
		320	·	Alif high comma	2			365	°	Subscript numeric zero	2
		321	+	Superscript plus sign	2			366	⁹	Subscript numeric nine	2

Table A—28. American Library Association Print Cartridge, 384 Characters (Part 5 of 5)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
		367	₈	Subscript numeric eight	2
		368	₇	Subscript numeric seven	2
		369	₆	Subscript numeric six	2
		370	₅	Subscript numeric five	2
		371	₄	Subscript numeric four	2
		372	₃	Subscript numeric three	2
		373	₂	Subscript numeric two	2
		374	₁	Subscript numeric one	2
3B	5E	375	:	Semicolon	2
28	4D	376	(	Left parenthesis	2
29	5D	377	)	Right parenthesis	2
26	50	378	&	Ampersand	2
AB	53	379	±	Plus or minus sign	2
25	6C	380	%	Percent sign	2
		381	γ	Gamma	2
		382	β	Beta	2
		383	α	Alpha	2
EF	DB	384	þ	Lowercase thorn	2
				Array size	384

Table A-29. FARSI Print Cartridge, 192 Characters (Part 1 of 3)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
		1	ا	Farsi	1
		2	آ	Farsi	1
		3	آ	Farsi	1
		4	آ	Farsi	1
		5	آ	Farsi	1
		6	آ	Farsi	1
		7	آ	Farsi	1
		8	آ	Farsi	1
		9	آ	Farsi	1
		10	آ	Farsi	1
		11	آ	Farsi	1
		12	آ	Farsi	1
		13	آ	Farsi	1
		14	آ	Farsi	1
		15	آ	Farsi	1
		16	آ	Farsi	1
		17	آ	Farsi	1
		18	آ	Farsi	1
		19	آ	Farsi	1
		20	آ	Farsi	1
		21	آ	Farsi	1
		22	آ	Farsi	1
		23	آ	Farsi	1
		24	آ	Farsi	1
		25	آ	Farsi	1
		26	آ	Farsi	1
		27	آ	Farsi	1
		28	آ	Farsi	1
		29	آ	Farsi	1
		30	آ	Farsi	1
		31	آ	Farsi	1
		32	آ	Farsi	1
		33	آ	Farsi	1
		34	آ	Farsi	1
		35	آ	Farsi	1
		36	آ	Farsi	1
		37	آ	Farsi	1
		38	آ	Farsi	1
		39	آ	Farsi	1
		40	آ	Farsi	1
		41	آ	Farsi	1
		42	آ	Farsi	1
		43	آ	Farsi	1
		44	آ	Farsi	1
		45	آ	Farsi	1
		46	آ	Farsi	1

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
		47	آ	Farsi	1
		48	آ	Farsi	1
		49	آ	Farsi	1
		50	آ	Farsi	1
		51	آ	Farsi	1
		52	آ	Farsi	1
		53	آ	Farsi	1
		54	آ	Farsi	1
		55	آ	Farsi	1
		56	آ	Farsi	1
		57	آ	Farsi	1
		58	آ	Farsi	1
		59	آ	Farsi	1
		60	آ	Farsi	1
		61	آ	Farsi	1
		62	آ	Farsi	1
		63	آ	Farsi	1
		64	آ	Farsi	1
		65	آ	Farsi	1
		66	آ	Farsi	1
		67	آ	Farsi	1
		68	آ	Farsi	1
		69	آ	Farsi	1
		70	آ	Farsi	1
		71	آ	Farsi	1
		72	آ	Farsi	1
		73	آ	Farsi	1
		74	آ	Farsi	1
		75	آ	Farsi	1
		76	آ	Farsi	1
		77	آ	Farsi	1
		78	آ	Farsi	1
		79	آ	Farsi	1
		80	آ	Farsi	1
		81	آ	Farsi	1
		82	آ	Farsi	1
		83	آ	Farsi	1
		84	آ	Farsi	1
		85	آ	Farsi	1
		86	آ	Farsi	1
		87	آ	Farsi	1
		88	آ	Farsi	1
		89	آ	Farsi	1
		90	آ	Farsi	1
		91	آ	Farsi	1
		92	آ	Farsi	1

Table A-29. FARSI Print Cartridge, 192 Characters (Part 2 of 3)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
		93	و	Farsi	1
		94	ط	Farsi	1
		95	ز	Farsi	1
		96	چ	Farsi	1
		97	د	Farsi	1
		98	ا	Farsi	1
		99	ل	Farsi	1
		100	پ	Farsi	1
		101	ر	Farsi	1
		102	و	Farsi	1
		103	ک	Farsi	1
		104	ن	Farsi	1
		105	ق	Farsi	1
49	C9	106	I	Uppercase I	1
48	C8	107	H	Uppercase H	1
47	C7	108	G	Uppercase G	1
46	C6	109	F	Uppercase F	1
45	C5	110	E	Uppercase E	1
44	C4	111	D	Uppercase D	1
43	C3	112	C	Uppercase C	1
42	C2	113	B	Uppercase B	1
41	C1	114	A	Uppercase A	1
39	F9	115	9	Numeric nine	1
38	F8	116	8	Numeric eight	1
37	F7	117	7	Numeric seven	1
36	F6	118	6	Numeric six	1
35	F5	119	5	Numeric five	1
34	F4	120	4	Numeric four	1
33	F3	121	3	Numeric three	1
32	F2	122	2	Numeric two	1
31	F1	123	1	Numeric one	1
30	F0	124	0	Numeric zero	1
2D	60	125	-	Hyphen (minus)	1
28	4D	126	(	Left parenthesis	1
29	5D	127	)	Right parenthesis	1
2C	6B	128	,	Comma	1
2B	4E	129	+	Plus sign	1
2A	5C	130	*	Asterisk	1
3D	7E	131	=	Equal sign	1
2F	61	132	/	Slant (solidus)	1
		133	•	Farsi	1
5A	E9	134	Z	Uppercase Z	1
59	E8	135	Y	Uppercase Y	1
58	E7	136	X	Uppercase X	1
57	E6	137	W	Uppercase W	1

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
56	E5	138	V	Uppercase V	1
55	E4	139	U	Uppercase U	1
54	E3	140	T	Uppercase T	1
53	E2	141	S	Uppercase S	1
52	D9	142	R	Uppercase R	1
51	D8	143	Q	Uppercase Q	1
50	D7	144	P	Uppercase P	1
4F	D6	145	O	Uppercase O	1
4E	D5	146	N	Uppercase N	1
4D	D4	147	M	Uppercase M	1
4C	D3	148	L	Uppercase L	1
4B	DC	149	K	Uppercase K	1
4A	D1	150	J	Uppercase J	1
		151	ل	Farsi	1
		152	پ	Farsi	1
		153	ر	Farsi	1
		154	د	Farsi	1
		155	و	Farsi	1
		156	•	Farsi	1
		157	و	Farsi	1
		158	ب	Farsi	1
		159	ل	Farsi	1
		160	ر	Farsi	1
		161	ک	Farsi	1
		162	ز	Farsi	1
		163	ن	Farsi	1
		164	و	Farsi	1
		165	ز	Farsi	1
		166	ا	Farsi	1
		167	ب	Farsi	1
		168	ی	Farsi	1
		169	ب	Farsi	1
		170	چ	Farsi	1
		171	ج	Farsi	1
		172	آ	Farsi	1
		173	ز	Farsi	1
		174	ط	Farsi	1
		175	ع	Farsi	1
		176	ع	Farsi	1
		177	ل	Farsi	1
		178	م	Farsi	1
		179	ن	Farsi	1
		180	ه	Farsi	1
		181	ی	Farsi	1
		182	لا	Farsi	1

Table A—29. FARSI Print Cartridge, 192 Characters (Part 3 of 3)

ASCII (Hex)	EBCDIC (Hex)	Loading Sequence	Symbol	Symbol Description	Symbols per Array
		183	۱	Farsi	1
		184	۲	Farsi	1
		185	۳	Farsi	1
		186	۴	Farsi	1
		187	۵	Farsi	1
		188	۶	Farsi	1
		189	۷	Farsi	1
		190	۸	Farsi	1
		191	۹	Farsi	1
		192	۰	Farsi	1
				Array size	192



