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IBM

Reference Manual

IBM 24 Card Punch

IBM 26 Printing Card Punch



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Minor Revision, October 1965

This edition, A24-0520-3, replaces A24-0520-2. The only significant changes are Figure 17, page 21, and the note added to *Alphabetic Field-Limit Feature*, page 26.

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Figure 1. IBM 26 Printing Card Punch

IBM 24 Card Punch IBM 26 Printing Card Punch

The basic operating unit in IBM accounting is the punched card. Punched cards, containing original data in the form of punched holes, actuate the IBM machines to perform automatically the various operations essential to recordkeeping.

Transcribing original data to punched cards is accomplished by any of several types of IBM card punches. This manual explains the operation of two of these machines, the IBM 24 Card Punch and the IBM 26 Printing Card Punch (Figure 1).

These two machines are essentially alike in design, features, and operation. The major difference is that the printing mechanism of the IBM 26 prints the characters on the cards as they are punched.

The machines are easy to operate, quiet, and attractive. One of their most important features is the simple means of setting them up quickly for automatic control of skipping, or duplicating operations. Each setup, or program, is made by punching a card and mounting it on a program drum, which is inserted in the machine. The same program card can be used repeatedly for a routine punching operation.

The card punch duplicates common information from any card into the following card in a gangpunch operation. The duplication can be automatic or through the keyboard. This method of duplicating avoids much card handling and consequently increases production.

The duplicating feature greatly facilitates error correction during keypunching. When an error is made, the operator need not re-punch the whole card manually. Instead, without any card handling, the operator duplicates into the next card all correctly punched fields and re-keys only the field in error. The program control permits such duplication, field by field, without concern about column numbers.

Duplication under program control proceeds at a rate of 20 columns per second on the IBM 24, and 18 columns per second on the IBM 26. Skipping and card release proceed at a rate of 80 columns per second. After one card is punched in column 80, the next card feeds into the column-1 position in one-fourth of a second.

Note: Where two speeds are indicated in this publication, the lower speed refers to the IBM 26 and the higher speed to the IBM 24.

The almost complete visibility of the cards in the card bed facilitates the design and punching of dual

cards and the identification of prepunched cards into which more data must be punched. Direct access to all parts of the card bed also permits easy manual insertion and removal of cards when necessary.

The keyboards can be moved anywhere on the reading board, for the operator's greatest convenience and comfort. A combined alphabetic and numeric keyboard utilizes a novel principle to facilitate the punching of cards containing both alphabetic and numeric fields. A group of the right-hand typewriter keys serves for punching digits as well as letters, with the shift from one function to the other normally made automatically by the program card. This permits the operator to punch an alphabetic field with both hands and then, without shifting from the *home* position, to punch a numeric field with the right hand only. Use of the right hand alone for numeric punching frees the left hand for document handling.

This publication contains a complete description of the operating features and methods of operation. Under *Operations*, each function is described in detail as it is first used in a typical situation. All functions and the combination keyboard are summarized under *Combination Keyboard Summary*.

More information on these machines appears in these publications:

IBM 357 Data Collection System Installation Manual—Physical Planning	A24-1032
IBM 1001 Data Transmission System Systems Reference Library Publication	A24-1029
IBM 26, Model 21 Interpreting Card Punch Bulletin	G24-1060

Card Punching

Eighty columns on the card can be punched, as shown in Figure 2.

Each column has twelve punching positions; one each for the *digits* 1 to 9, and one each for the *zones* 0, 11, and 12. The 11-zone punch is sometimes referred to as X. As illustrated, digits are recorded by punching a single hole in the corresponding digit or zero position of the desired column.

A letter is a combination of one zone-punch and one digit-punch in the desired column. For example, A is the 12-zone and digit-1 punches, N is the 11-zone (X)

and digit-5 punches, and Z is the 0-zone (zero) and digit-9 punches. Some machines have special-character keys.

A special character is one, two, or three holes in the desired column as shown in Figure 2. Punching of two or three holes in one column for a letter or special character is automatic when the corresponding key is pressed.

A maximum of four punches can be duplicated into a single column on the IBM 24 Card Punch. However, duplicating in a single column on the IBM 26 Printing Card Punch must be limited to multiple punches that make up a printable character, regardless of the setting of the print switch. This eliminates possible damage to the printing mechanism.

Punched cards are usually designed so that each item (or field) of information recorded in the card can be readily identified. Figure 3 shows a card de-

signed for use in a sales accounting application, and a typical invoice from which the card was punched. The card contains, in punched-hole form, descriptive information such as customer name, customer number, and location printed in the heading of the invoice, and quantitative data for the first commodity printed in the body of the invoice. The fields on the card are in the same sequence as the corresponding items of information on the invoice. This simplifies the reading of the original document as the information is being punched.

The card form also illustrates other operations characteristic of many card-punching jobs. For example, columns 1 through 17 are always skipped; columns 18 through 56 are punched in the first card for an invoice; and columns 74 to 80 (invoice amount) may be punched in some cards and skipped in others.

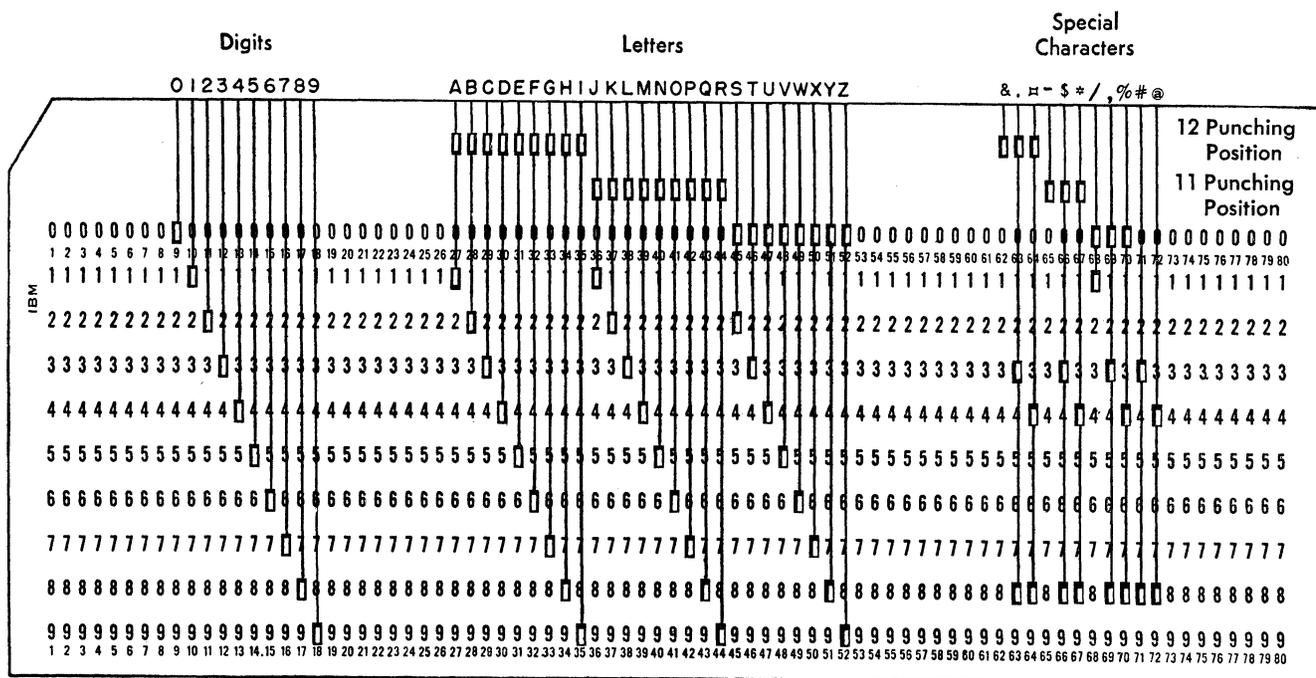


Figure 2. Punching Positions in Card

Operating Features

Figure 4 indicates the operating features described here.

Card Hopper

The card hopper, with a capacity of approximately 500 cards, is on the upper right side of the machine. Place cards in the hopper face forward, 9's down. A sliding pressure plate ensures uniform feeding.

When the cards are in the hopper and the pressure plate is in position, the top portion of the card above the zero row is visible from the left edge of the card through column 9, from column 29 through column 52, and from column 72 to the right edge of the card (Figure 5). Because cards feed from the front of the hopper, any markings in these three sections on the next card to be fed can be seen while the card is still in the hopper. This feature is most advantageous in punching serially numbered cards or cards that are partially punched and interpreted.

A card feeds from the hopper to the card bed automatically or when the operator presses the feed key.

The first two cards to be punched must be fed by key, but all other cards in the hopper can be fed automatically, under switch control.

Punching Station

Punching is performed at the first of two stations in the card bed through which the cards pass from right to left. Usually, to start an operation, two cards are fed into the card bed at the right of the punching station. As the second card is fed in, the first card is automatically registered for punching—that is, it is positioned at the punching station. While the first card is being punched, the second card is at the right in the card bed. When column 80 of the first card passes the punching station, the second card is registered at the punching station, and the next card in the hopper is fed into the right of the card bed. This method of card feeding minimizes the time required for feeding and ejecting.

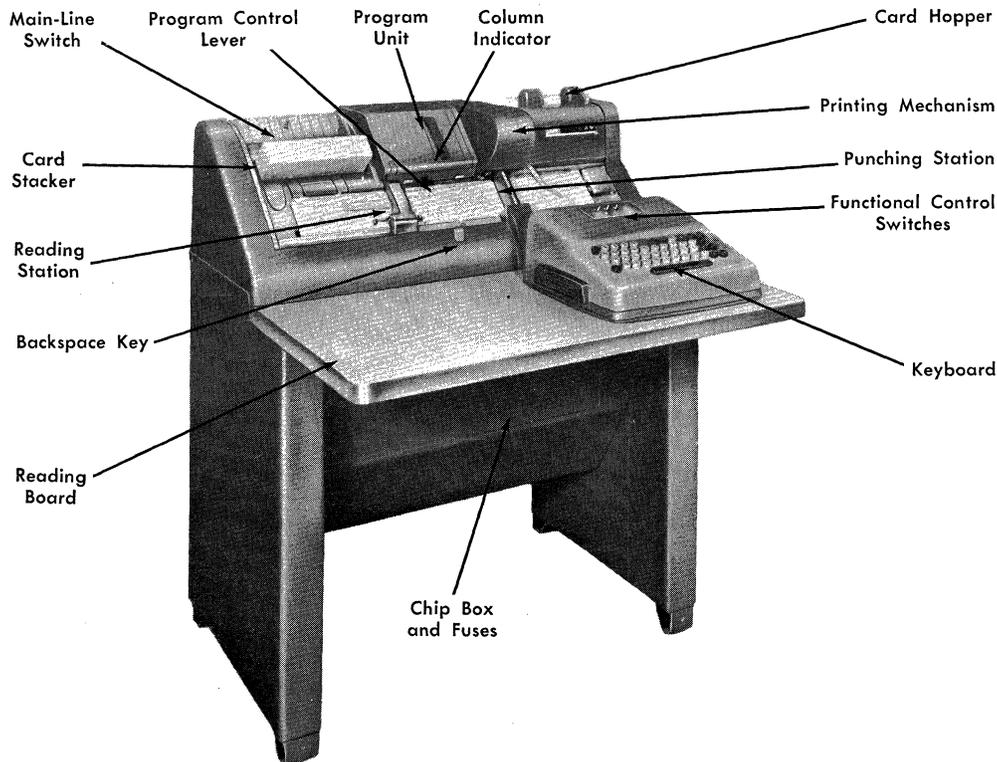


Figure 4. IBM 26 Operating Features

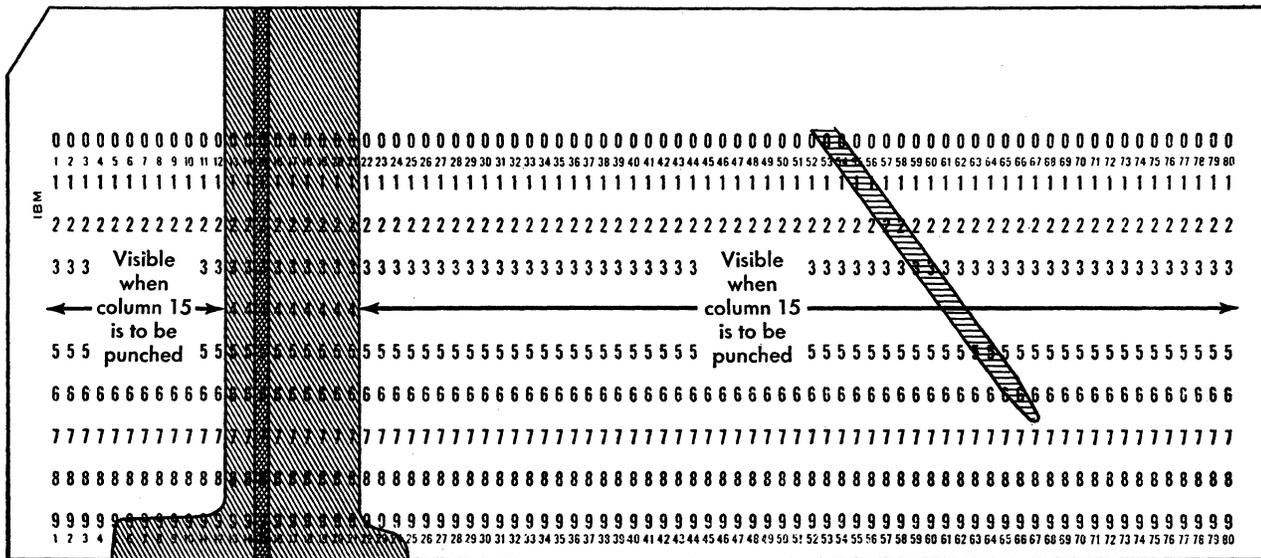


Figure 6. Card Visibility at the Punching Station

the program card is at column 1 and that any card at the punching station is released.

Reading Board

A reading board provides ample space for source documents from which the cards are punched. If extra space is required, a larger reading board extending about ten inches to the left of the standard board is available.

Backspace Key

This key is below the card bed, between the reading and punching stations. As long as it is held down, the cards at the punching and reading stations backspace continuously until column 1 is reached. At the same time the program card, which controls skipping and duplicating, also backspaces. Backspacing should not be attempted after column 78 is passed without first removing the card from the card bed at the right.

The backspace key can also be used to release the keyboard after it has been locked (described in *Keyboard Locking*) on IBM 24 punches with serial numbers higher than 23639 or IBM 26 punches with serial numbers higher than 12260.

Program Unit

The program unit controls automatic skipping, automatic duplicating, and shifting from numeric to alphabetic punching and *vice versa*. Each of these operations is designated by a specific code recorded in a program card. The operator fastens the program card around a program drum and inserts it in the machine,

where it is read by a sensing mechanism. The drum revolves in step with the movement of the cards past the punching and reading stations so that the program codes control the operations, column by column. Thus, the program unit affords a highly flexible means of controlling automatic operations.

The program unit also controls printing functions as described under *IBM 26 Printing Features*.

Program Control Lever

The program control lever, located below the program unit, controls operation of the program unit. Turn on this lever to lower the program sensing mechanism so that it rests on the program drum, and the codes punched in the program card control the various automatic operations. Turn off the lever to raise the program sensing mechanism so that the program drum can be easily removed or inserted. Turn this lever to the OFF position whenever a program card is not in the machine.

Column Indicator

The indicator, located at the base of the program-drum holder, indicates the next column to be punched. Refer to this indicator as a guide for spacing or backspacing to a particular column.

Pressure-Roll Release Lever

The pressure-roll release lever is next to the column indicator. Press this lever to permit the manual removal of a card from the punching or reading station.

Normally, a card can be removed in one piece if it is pulled out with care. If torn pieces are caught at either station, push them out with another card or a smooth-edged metal blade while holding down the pressure-roll release lever. Do *not* use *saw-edged* metal blades.

Chip Box and Fuses

The chip box is under the reading board. When it is removed, the fuses for the machine are accessible.

Printing Mechanism

This feature is available only on the IBM 26 Printing Card Punch.

Keyboards

Specify any one of two types of cable-connected keyboards: Figure 7 shows the numeric keyboard only (two special characters: — and &).

Figure 8 shows the combination alphabetic and numeric keyboard (four additional special character keys—11 special characters in all).

On all keyboards, the punching keys are gray with blue lettering and the control keys are blue with white lettering. The *home* keys are more concave than the other keys to facilitate accurate touch operation. The keyboards are so interlocked that no two character keys can be completely pressed at the same time, but it is not necessary to wait for one key to rise before pressing another. This design permits *rolling* of keys. To punch multiple digits manually in one column, hold down the MULT PCH (multiple punch) key while pressing the keys one at a time. If the punch is not equipped with a multiple punch key, use the space bar.

The combination keyboards have the best features of both a typewriter and a numeric keypunch. The letter keys are arranged for operation by the standard typewriter touch system, while the digit keys are placed so that a rapid 3-finger touch system can be used. The usual numeric keys on a typewriter have been eliminated; instead, a group of dual-purpose keys at the right serves for digit punching as well as letter punching. This permits numeric punching with the right hand from the normal home position for alphabetic punching. The touch system for the ten numeric keys is: index finger for digits 1, 4 and 7; middle finger for digits 2, 5, and 8; and ring finger for digits 0, 3, 6 and 9. The punching of a digit or a letter with any of the combination keys depends on the shift of the keyboard. For example, pressing the 4-J key punches a 4 when the keyboard is in numeric shift, but a J when in alphabetic shift. This shifting is similar to upper or lower case shifting on a standard typewriter and may be controlled automatically by the program unit or manually by key. The section containing the combination keys is readily distinguishable by the blue area of the key plate. On the combination keyboard, the fourth row of keys contains four special-character keys at the left. These keys punch eight characters as shown on the key tops; four in numeric and four in alphabetic shift.

The blue keys, which control functions of the machine, are explained under *Operations*.

The green correction key is explained under *Special Features*.

Function Control Switches

Two ON-OFF switches, controlling automatic functions, are explained under *Operations*. A third switch, to con-



Figure 7. Numeric Keyboard



Figure 8. Combination Alphabetic and Numeric Keyboard

trol printing, is explained under *IBM 26 Printing Features*. These three switches are:

AUTO FEED
AUTO SKIP AND AUTO DUP
PRINT

Program Card

A program card, which is a basic part of the program unit, is prepared for each punching application and can be used repeatedly. Proper punching in this program card controls the automatic operations for the corresponding columns of the cards being punched.

The control punching required in the program card depends on the functions to be controlled, that is, skipping, duplicating, and alphabetic punching. Each row in the program card serves a specific purpose in this respect.

Field Definition (12)

Punch a 12 in every column except the first (left-hand position) of every field to be skipped, duplicated, or manually punched. These 12's serve to continue to the end of a field, any skip or duplication started within that field. Treat as a single field several consecutive fields to be automatically skipped or duplicated as one field. Don't program a single-column field with a 12 code.

The 12's punched in the program card for manually punched fields permit occasional skipping or duplicating. This skipping or duplicating is started by key and is carried across the field by the 12's. This type of skipping is similar to an X-level skip on other IBM card punches; the occasional duplicating may be desired in the case of two or more cards with the same information, or in the duplication of the correct fields of an error card.

Automatic Skip (11)

An 11 punched in the first column of any field automatically starts a skip, which is continued over that field by the 12's punched in the remaining columns of the field. If a single column is to be automatically skipped, punch it with an 11. This coding operates with the automatic-skip-and-duplicate switch, which must be on to start the skipping automatically.

Automatic Duplication (0)

A zero punched in the first column of any field automatically starts duplication, which is continued over that field by the 12's punched in the remaining columns of the field. If a single column is to be automatically duplicated, punch it with a zero. This coding operates

with the automatic-skip-and-duplicate switch, which must be on to start the duplicating automatically.

Alphabetic Shift (1)

When the program card is in the machine, the combination keyboard is normally in numeric shift, and pressing any one of the 2-purpose keys causes a figure to be punched. To punch a letter, the combination keyboard must be shifted for alphabetic punching. This shifting is performed automatically by a 1 in the program card in each column of the alphabetic field. During duplication of alphabetic information, the 1's permit automatic spacing over blank columns and prevent X-skipping caused by letters containing X-punches (J through R).

On a numeric machine, the only function of the 1's is to permit automatic spacing over blank columns when duplicating.

Program Card Codes

The four basic program codes are summarized here and are illustrated in Figure 9. Two additional codes, which control printing features of the IBM 26, are also listed here and are explained under *IBM 26 Printing Features*.

Code	Function
12	Field Definition
11	Start Automatic Skip
0	Start Automatic Duplication
1	Alphabetic Shift
2	Left Zero Print
3	Print Suppression

The other digit rows, in the program card, control functions with the alternate program feature. (See *Special Features*.)

Program Drum

The program card is mounted on a program drum for insertion in the machine. The program drum has a clamping strip to hold the card, and a handle on the top to tighten or release the strip. To fasten a card around the drum (Figure 10):

1. Hold the drum in a horizontal position with the handle to the right. Turn the handle away (counterclockwise direction) as far as it will go. This loosens the smooth edge of the clamping strip.
2. Insert the column-80 edge of the card under the smooth edge of the clamping strip. Two alignment check holes in the clamping strip make it possible to see that the card is flush with the metal edge under the strip. The card should be positioned so that the 9's edge is against the rim of the drum.

keyboard is in alphabetic shift (—), pressing this key punches an 11, but does not cause skipping. The 11-hole can be used for special character (—) printing.

Numeric fields skipped with this key can be duplicated later in card correction because the duplication of the X causes the rest of the field to be skipped.

DUPLICATE KEY

Use this key to duplicate any information manually punched in one card and common to one or more successive cards. Pressing this key at the beginning of a field starts duplication, and the 12's punched in the program card continue the duplication for the rest of the field.

With program control, duplication is at the rate of 18 or 20 columns per second; without program control, duplication is at the rate of 9 or 10 columns per second and occurs only as long as the key is held down. This latter type of duplication permits the operator to have precise column control and is used in re-punching damaged cards or correcting errors found during a verifying operation.

Pressing this key for the duplication of blank columns in a field programmed for numeric punching should not be attempted because it locks the keyboard. Unlock the keyboard by pressing the backspace key or the alphabetic-shift key on a combination keyboard.

With the IBM 26 Printing Card Punch, do not duplicate multiple-punched columns that deviate from standard alphabetic or special-character punching.

Procedure for Alphabetic and Numeric Punching with Program Control

Figure 13 shows the program card for this procedure:

1. Place a deck of unpunched cards in the card hopper, and press the feed key twice to feed two cards.
2. The card punch automatically skips columns 1-5 (program card punched with an 11 in column 1 and 12's in columns 2-5). The automatic skip and duplicate switch must be on.
3. Punch columns 6-26 with customer name, address, or carrier name (program card punched with 1's in columns 6-26). The 1's automatically shift the keyboard from numeric to alphabetic punching. When figures are to be punched in this field, press the numeric-shift key.
4. Press the skip key at the end of the alphabetic punching to skip over the rest of the field (program card punched with 12's in columns 7-26).
5. Columns 27-56 are skipped automatically (program card punched with an 11 in column 27 and 12's in columns 28-56).

6. Keypunch carrier code in columns 57 and 58 (program card punched with a 12 in column 58).
7. Columns 59-69 are skipped automatically (program card punched with an 11 in column 59 and 12's in columns 60-69).
8. Keypunch customer number in columns 70-73 (program card punched with 12's in columns 71-73).
9. Column 74 is skipped automatically (program card punched with an 11).
10. The trading-area field in columns 75-77 is coded in the program card for manual numeric punching (blank in column 75 and 12's in columns 76 and 77). Optional X-skipping of the field is controlled by pressing the dash-skip key, which also punches an 11 in column 75.
11. Keypunch columns 78 and 79. Salesman number is frequently the same for several successive cards. After keypunching the first card, duplicate the following ones by pressing the duplicate key in column 78.
12. Keypunch column 80, after which the next card feeds automatically. The automatic-feed switch must be on.

Error Correction

Errors in punching are often noticed and corrected by the operator at the time they are made. Usually this involves re-keying a large portion of the card. This card punch reduces re-keying to a minimum, requires no concern about the precise column in which the error occurred, minimizes the possibility of making another error while correcting the first, and practically eliminates card handling. As an example, the correction of an error in the pieces field of the labor distribution card (Figure 14) is made as follows:

1. Press the release key immediately upon detecting the error. This advances the card without punching the fields coded for manual punching, but allows duplication of the fields programmed for automatic duplication beyond the point of release. Therefore, columns 34 and 35 are duplicated into the error card as it is being released. This retains the common information for duplication into the following cards. The three cards in the card bed advance to their proper stations and a new card feeds from the hopper.
2. Duplicate the kind field by pressing the duplicate key once.
3. Columns 3-6 are programmed to duplicate automatically, as shown in Figure 12.
4. Manually duplicate the regular rate, overtime rate, and part of account-number fields by pressing the

IBM 26 Printing Features

With the IBM 26 Printing Card Punch, characters can be printed as they are punched. Each character prints above the column punched (Figure 16), thus providing for full interpretation of the card. To permit this printing, turn on the print switch. Zero printing or suppression of printing in an individual column or field is controlled by program-card coding.

With program control, zeros to the left of the first significant digit in a numeric field are automatically suppressed, that is, 00025 is printed 25. This zero suppression is determined by the 12-punching in the program card to define the fields. For example, the program card for Figure 16 would be punched with 12 in columns 77 and 79, but blank in 76 and 78, to print *month* and *day* as shown.

Left Zero Print (2)

To print zeros to the left in a field, as in Social Security Number, punch a 2 in each column of the field in the

program card. For example, the program card for Figure 16 would be punched with 2's in columns 1-5 and 21-29. A zero in the units position of a field always prints, unless all printing is suppressed.

Like zeros, the dash (—) and the ampersand (&) are normally suppressed when they occur to the left of a significant digit in a field; they can be forced to print by the program 2 code.

Print Suppression (3)

The print suppression feature provides an extremely flexible control of printing. That is, even though the print switch is on, printing can be prevented for one or more columns of the card. Print suppression for a column is controlled by a 3 punched in the program card. To suppress printing for a field, punch a 3 for each column of the field. For example, the program card for Figure 16 would be punched with 3's in columns 34-40.

EMPLOYEE NO.	NAME	SOC. SEC. NO.	TAX CODE	OCC. CODE	RATES		DATE HIRED		
DEPT.	CLOCK				REG.	O.T.	MO.	DAY	Y.
01008P	F JONES	077016922	2	1			2	5	9
0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9

Figure 16. Character Printing

the card is registered, depending on the normal program coding in column 1. If column 1 of the normal program is coded for manual punching, the key may be pressed after the card is registered. If column 1 of the normal program is coded for automatic skipping or duplicating, however, this key must be pressed *before* the card is registered. In this case, the automatic-feed switch must be turned off before the preceding card is completely punched. Then pressing the alternate program key, after the preceding card is released, causes transfer to the alternate program and card feeding.

If the first part of a card is punched under normal program control and the remainder is punched under alternate program control, press this key when the alternate program is to be effective.

Pressing the alternate program key makes programming from the alternate program effective for the remainder of that card. When the following card feeds, the normal program again becomes effective.

Do not duplicate program cards punched with both normal and alternate program codes.

Interspersed Gangpunch Feature

This feature recognizes master cards with an upper left or right corner cut. Detail cards must not have the same corner cut as the master cards (and cannot have a lower left cut). Punching is from master card to detail card, or detail card to detail card, never from detail to master or master to master.

When the switch on the keyboard is off, the feature is inoperative. When the switch is on, the feature determines whether a card is a master or a detail depending on the presence or absence of the specified master corner cut. Normal use of the feature requires that the automatic-feed and automatic-duplicating switch be turned on.

Because the feature does not begin to operate until after one card has fed from the feed hopper to the card bed, the first card in the machine is considered a detail card. To feed the first card into position, press the feed key twice as in standard feed operation, and then press the release key once to position a card at the reading station so that duplicating can begin.

Because the purpose of the feature is to suspend punching for a corner-cut master card, programming is the same for detail cards as in any normal card punching operation.

Once duplicating has started, normal operation under control of the program card continues until the feature recognizes a master card. At this time the card preceding the master is at the punching station. The master card stays at the right of the card bed while the

preceding card is duplicated. On the next card-feed cycle, the master card passes the punching station at release speed, and all punching and programming is suspended. A master card requires approximately 1.25 seconds to pass to the reading station. If the next card is also a master, the process is repeated. When a detail card feeds, it is under normal control of the program drum, and punching is duplicated from the preceding card.

If required, an additional feature, controlled by a toggle switch, may be installed with the interspersed gangpunch feature. This additional feature allows manual selection of either upper left or right corner-cut master cards in any interspersed gangpunch operation, but not both in the same operation. The switch on the keyboard for the interspersed gangpunching must also be ON for this device to operate.

Card Correction Feature

The card correction procedure for operator-detected keying errors can require considerable additional decision-making and keying by the operator. The IBM card correction feature speeds the correction procedure for operator-detected keying errors on the IBM 24-26 Card Punch.

Upon detecting an error and before keying the next column of information, the operator merely presses the correction key on the keyboard. Essentially, this action moves the error card to the read station and reproduces the information (up to the error column) into a new card at the punch station. The operator then keys in the correct information and resumes normal operation.

When the correction (CORR) key is pressed (see Figure 26), the actual sequence of automatic operation is:

1. An error code (12-11) is punched in the error column. Therefore, when the card correction feature is used, the 12-11 coding cannot be used to designate a special character, or a portion of any such character.
2. The error card is released at 80 columns per second to the read station, and a new card registers at the punch station.

Note: Any columns programmed for automatic duplication are duplicated at 18 or 20 columns per second during this release operation.

3. The information manually punched into the error card is then automatically reproduced into the new card (up to the error column) at the rate of 9 or 10 columns per second.

Note: Any columns programmed for automatic duplication are duplicated at 18 or 20 columns per

Standard Program

- 12—Field Definition
- 11—Automatic Skip
- 0—Automatic Duplication
- 8—Manual Field: The 8-punch *must* appear in each column of *all manual fields* programmed for standard mode. This punch *should not* be used in any field programmed for *automatic duplication* because this would force half-speed duplication of this field during error-correction routines.

Alternate Program

- 4—Field Definition
- 5—Automatic Skip
- 2—Manual Field: The 2-punch *must* appear in each column of *all manual fields* programmed for alternate mode. This punch *should not* be used in any field programmed for *automatic duplication* because this would force half-speed duplication of this field during error-correction routines.

Card Insertion Feature

The card insertion feature simplifies the manual insertion of a master duplicating card in front of a group of cards to be punched, or the insertion of a blank or prepunched trailer card at the end of a group of punched cards.

To insert a new master card in front of a group:

1. Set the card insertion feature switch to INSERT.
2. While punching the card preceding the master card to be inserted, press the MC (master card) key. When the card being punched is completed, it is released through the reading station, but stops before it is stacked. There is no card at the reading station and the next card is registered for punching.
3. Manually insert the new master card in the reading station.
4. Press the feed key to register both the master card at the reading station and the next detail card at the punching station.
5. Resume normal operation. Any fields programmed for duplication are duplicated from the new master card.

To insert a new master card (or trailer card) behind a group of cards that have been punched:

1. Set the switch to STACK.
2. While punching the card preceding the master, press the MC key. When the card being punched is completed, it is released through the reading station and stacked. There is no card at the reading station. The next card is registered at the punching station ready to be punched.
3. Manually insert the master (trailer) card behind the cards in the stacker.
4. Resume normal operation.

Note: The card insertion feature can be installed on any 24 or 26 with the card correction feature. How-

ever, once the MC key is pressed, the correction key cannot be used until the master card function is completed.

Self-Checking Number Feature

This feature is described in IBM 24, 26 Card Punch Bulletin Self-Checking Number Feature, Form G24-1057.

High-Speed Skip Feature

The high-speed skip feature provides the greatest advantage for those applications that require skipping of 55 or more consecutive columns of the card. It is available for factory or field installation on the 24 or 26.

This is a program-controlled high-speed skip operating with standard skipping. High-speed skipping is accomplished at the rate of approximately three times the standard skip speed and results in a saving of eight milliseconds per column skipped at high speed. In the example (Figure 19) if 66 columns are skipped, 62 columns are skipped at high speed with a saving of a half-second per card. The sensing mechanism is positioned in such a way that five columns at the end of the field have to be reserved for drop-out. The controlling 9 not punched in the last five columns of the program card disengages (drops out) the high-speed skip and slows down the skip for the remainder of the card. This is necessary because the high skipping speed must be slowed down to obtain proper registration of the card for punching.

When this feature is installed on machines with the variable-length card feed feature, card output is also increased. The missing portion of these cards, for example, columns 51-76, or 60-76, are skipped at high speed. The last four columns are skipped at a slower speed.

When this feature is used with alternate programming, programmed print suppression is eliminated.

OPERATION

To use the high-speed skip feature, an 11-punch initiates the skip, the 9-punches control high-speed skipping, and the 12-punches define the remainder of the field. For high-speed skipping, punch the program card with:

- an 11 and a 9 in the first column of the high-speed skip field
- nines in all the other columns of the high-speed skip field, except the last five columns
- twelves in all the columns of the high-speed skip field, except the first column.

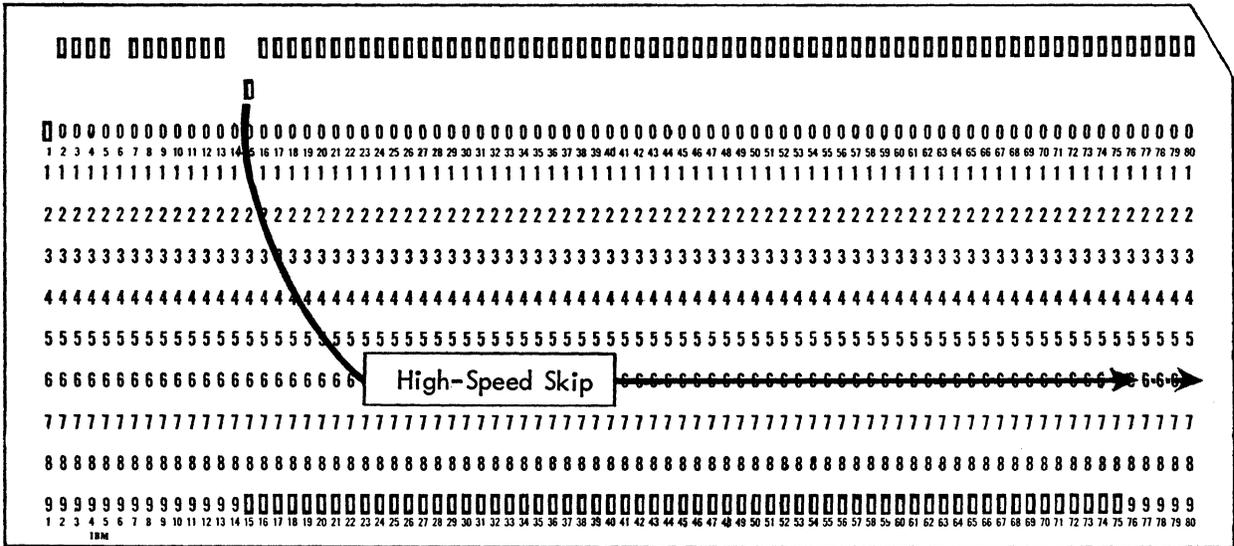


Figure 19. Program Card Showing High-Speed Skip Punching

On machines equipped with the alternate program feature, 9-punches become the non-alternate or normal program, and the 3-punch is used to control the alternate-program high-speed skip.

This feature requires the operator to press the feed key three times to register the first card from the hopper at the punch station. The second card is at the preregistration station; a third card, hidden from sight, has just left the hopper. If at any time during the operation it is necessary to turn the auto-feed switch off to clear the machine of cards, press the release and register keys three times to remove the cards from the punching and reading stations. Also, remove manually the last card, which was hidden, from the preregistration station after the second release.

This feature prevents backspacing the last 16 columns of the card, because the backspaced card pushes against the following card and interferes with registration.

Postcard Stock Feed Feature

This special feature facilitates the use of postcard stock in the IBM 24/26. The feature can be for postcard stock only (0.009 inch thick) or can be interchangeable to accept standard (0.007 inch thick) and postcard stock.

To be mailed at minimum rates, card size must satisfy U. S. postal regulations:

- Maximum— $3\frac{3}{16}$ inches \times $5\frac{1}{16}$ inches
- Minimum— $2\frac{3}{4}$ inches \times 4 inches

To be processed in IBM equipment, they must be of standard punched-card dimensions and 0.009-inch

thick (plus or minus 0.0005 inch). Other factors to be considered in designing cards for postal use include location of punching, scoring, content, and corner cut.

Note: Approval must be secured from local postal authorities for specific card designs.

Alphabetic Field-Limit Feature

The alphabetic field-limit feature defines the limits of a programmed alphabetic field to prevent accidental punching beyond that field.

A 2-punch in the program card controls this feature. This program card is coded in the normal manner for alphabetic punching: a 1-punch in each column and a 12-punch in all but the first column. Punch the 2-punch in the next to the last column of the limited field.

Machine operation is normal until this column is reached. As the last column of the limited field is punched, the keyboard locks, thus indicating to the operator that the allotted columns for that field have been completely filled. To continue operation, press the release key. If the card must be repunched to abbreviate or to condense the alphabetic information within the limits of a field, press the release key again to release the card from the punching station. If the alphabetic field-limit code column is passed by duplicating, skipping, or releasing, the feature is inoperative.

The duplication key is inoperative in the next-to-last and the last column of an alphabetic field programmed for field limit. On the 26, if the programmed, limited alphabetic field is also programmed for print suppression, printing is not suppressed in the last column

of the field unless it is followed by another alphabetic field. The use of the left zero print feature is not compatible within an alphabetic field. Pressing the numerical shift key when punching the next-to-last column makes the feature inoperative.

Note: On IBM 26 Card Punches equipped with alternate program feature, when program codes 2 and 8 are used for the control of Alphabetic Field Limit feature, the left zero print control feature is not available.

Variable-Length Card Feed Feature

The variable-length card feed feature on the 24 or 26 allows the processing of 51-, 60-, 66-, and 80-column cards (Figure 20). Special features that apply to the 24 or 26 can be used with this feature.

MACHINE SETTINGS

The operator can easily make all settings to change card lengths. Only one length of cards may be processed at one time. For each length of card there is a card guide which is raised on the hopper bed to form a right-hand guide. The operator performs these preliminary steps to process each length of card.

1. Select the proper card guide in the hopper and lift it forward into position. For any selected card length, all card guides for cards of shorter length must rest in the hopper bed (Figure 21). Note that the 80-column card guide is fixed at the right side of the hopper. The sliding pressure plate in the hopper is notched to pass over the raised card guides.
2. Lift the thumb latch and move the card pusher to the proper card-column notch (see Figure 20). A spring guides each card under the card pusher for correct feeding position.
3. Align 51- and 60-column cards to the stacker drum by pulling the stacker stop operating lever toward the front of the machine (see Figure 20). For 66- and 80-column cards, push the lever back.

4. The following settings are necessary whether or not a program drum is used. To set program cam extension knobs, lift the program drum cover forward, turn the program control lever to raise the program drum starwheels, and lift the drum off its shaft (Figure 22). Space to column 16 on the column indicator and turn off the main line switch.

Caution: These program cam extension knobs are interlocked and will bind if moved in any sequence but the one given here. To adjust the knobs, lift them out of their countersunk recesses and move in this sequence:

- a. To change to a longer card, move each knob in ascending numeric sequence to the countersunk recess at the left end of each slot. For example, to change from 51-column cards to 80-column cards, first move the 51-column knob, then the 60-column knob, and then the 66-column knob.
- b. To change to a shorter card, move each knob in descending numeric sequence to the countersunk recess at the right end of each slot. For example, to change from 80-column cards to 51-column cards, first move the 66-column knob to the right, then the 60-column knob, and then the 51-column knob.

These steps are summarized on a decal inside the program drum cover.

OPERATION

Program cards must only be punched, starting at column 1, with the same number of columns that are in the cards to be processed. However, if the machine is equipped with a high-speed skip feature, high-speed skip can be programmed beyond the number of col-

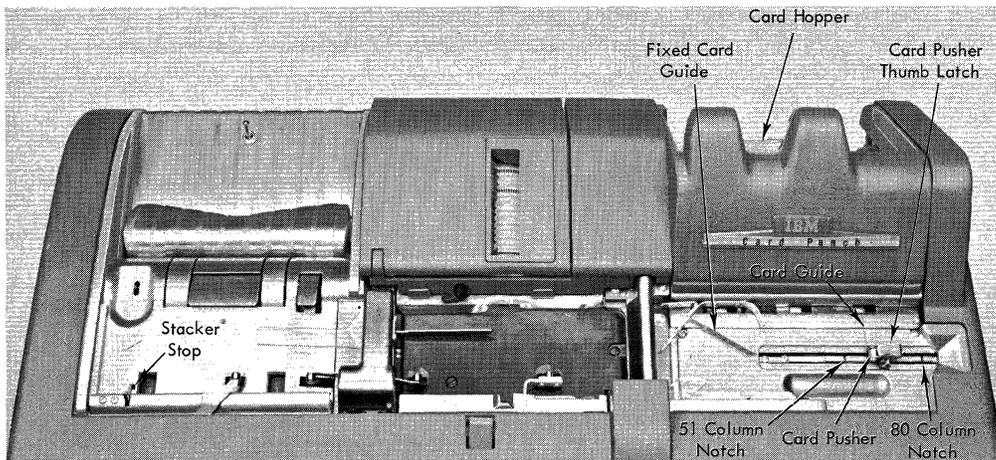


Figure 20. Variable-Length Card Feed Device

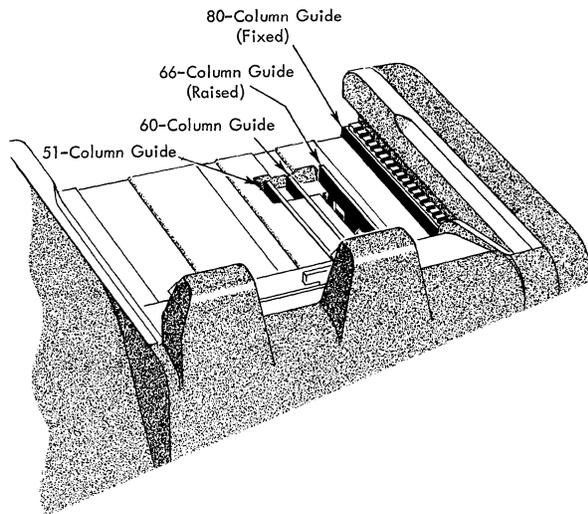


Figure 21. Hopper Card Guides

umns in the cards being processed to obtain the maximum benefits of this feature. Otherwise, program card preparation is the same as for 80-column cards.

Any length card can be manually inserted if the card pusher is positioned for that length. The right end of each card must rest against the card pusher.

Do not backspace within the last 16 columns of all cards, because the backspace card would push against the following card and interfere with registration.

Special-Character Arrangements

The arrangements in Figure 23 are available for the punching (and printing) of special characters. Card

punches with a numeric keyboard punch (and print) the characters corresponding to 12 and 11 coding only. Other special characters require use of the multiple punch control key. All 11 special characters can be punched (and printed) when duplicating on the IBM 24 and 26. Machines with an alphabetic keyboard, punch (and print) all 11 special characters when punching or duplicating.

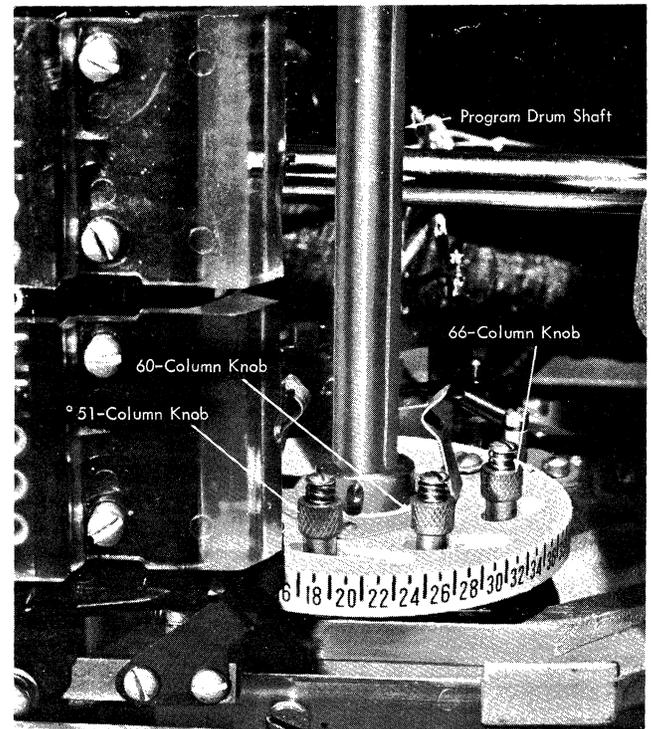


Figure 22. Program Cam Extension Knobs (80-Column Card Setting)

Arrangement	IBM Card Code										
	12	12-3-8	12-4-8	11	11-3-8	11-4-8	0-3-8	0-4-8	0-1	3-8	4-8
A	&	.	□	-	\$	*	,	%	/	#	@
B	/	.	□	-	\$	*	,	%	&	#	@
C	&	.	□	-	\$	*	,	%	0	#	@
D	-	.	□	-	\$	*	,	%	/	#	@
E	-	.	<	/	.	*	,	%	&	#	>
F	+	.)	-	\$	*	,	(/	=	-
G	+	.	□	-	\$	*	,	%	/	+	-
H	+	.)	-	\$	*	,	(/	=	(Prime Sign)
J	+	.	□	-	\$	*	,	%	/	#	@
K	+	.)	-	\$	*	,	(/	=	@

Figure 23. IBM 24, 26—Special-Character Punching and Printing Arrangements

Program Card Preparation

When a program card is to be prepared for a particular punching application, the card design should be carefully analyzed to code the program card for maximum punching efficiency. Proper use of the various features of the card punch reduces operator time and effort to a minimum.

IBM 24, Normal Program

If an IBM 24 Card Punch with no special features is used, the cards should be analyzed for:

1. *field-definition coding*, which determines the length of each field. Punch a field-definition 12 in each column except the first (left-hand) of every field regardless of the type of operation to be performed in that field. The 12's are used in skipped or duplicated fields to carry the skip or duplication across the field, once it is started. They are used in fields programmed for manual punching to make full use of the feature provided for the correction of errors made while punching. With the fields defined as to length, each correct *field* can be duplicated by a single pressing of the duplicate key, and only the *field* containing the error must be re-keyed.

Occasionally it is necessary to split a field by eliminating the 12-punching in one or more columns. When an X is to be punched (keyed or duplicated) in a numeric field, but skipping must not occur, eliminating this 12 prevents the skipping of the rest of the field (see *X-Punching and Skipping* under *Operating Suggestions*).

2. *automatic skipping* for each field that is not to be punched at this time. If several successive fields are to be skipped on every card, program them as one large field with the X in the first column and 12's in all successive columns.
3. *automatic duplication* of each field that is punched with the same data for a group of cards. If several successive fields are to be duplicated on every card, program them as one large field with the 0 in the first column and 12's in all successive columns.
4. *alphabetic coding* to shift the keyboard when letters are to be keyed. If all, or most, of a field is to be alphabetically punched, code it with 1's and use the numeric shift key for occasional figure punching. In the duplication of alphabetic punching, the 1's permit duplication of blank columns and prevent skipping caused by the X's in the letters J through R.

After the program is planned for these operations, punch the codes directly into a single card to serve as the program card. It is desirable to prepare the program card in a card of the same design as those to be punched. When punching the program card, punch all codes across the card from column 1 through column 80 without backspacing, to maintain accurate registration. When two codes are to be punched in one column, use the proper letter or special character key on the combination keyboard (A for a 12-code and a 1-code, or the / symbol for a 0-code and a 1-code).

Printing Features

If the IBM 26 Printing Card Punch is used, the cards should be analyzed for zero printing and print suppression in addition to the basic functions discussed in the preceding paragraphs.

1. Zeros, dashes, and ampersands to the left of a significant digit in a field are automatically suppressed. This suppression depends on the field-definition coding of 12's in every column *except* the first. Therefore, if several successive fields are to be programmed for automatic duplication but zero suppression is desired, program each field independently for automatic duplication, rather than as one large field as described before.

Note: A zero always prints in the units position of a field that does not have a significant digit (field with all zeros) unless the units position is programmed for print suppression.

If zeros (dashes or ampersands) are desired to the left in a field, such as social security number, they must be forced by punching the program card with code 2 in each column in which such printing is to occur.

2. To suppress all printing in a column or columns, punch a 3 in each column of the program card.

Alternate Program

If the alternate program is used to handle two types of cards in one punching operation, analyze all the preceding functions for the alternate program, and punch the proper codes (4-9). Consider the time in the card cycle when the change to the alternate program is to be made. The change can be made at the beginning of the card or whenever in the card cycle it is desirable for the alternate coding to become effective. Once the

alternate program key is pressed, the alternate program codes are read for the rest of the card; it is not possible to return to the normal program in the same card cycle. However, when the next card is fed, the normal program coding automatically becomes effective. If the whole card is to be controlled by the alternate program codes, code the first column of the normal program for manual operation to give the operator time to press the alternate program key without interrupting automatic feeding.

Multiple Functions

When printing or alternate program functions are used in addition to the basic program functions, the program card may require several codes in a column (Figure 24). In this case, punch a master deck of cards for the preparation of the program card. This deck consists of a maximum of 12 cards, one for each punching row: one card punched with all the required 12-codes, a second card with all the required 11-codes, a third card with all the required 0-codes, and so on. After the cards of the master deck are punched, duplicate each card, one at a time, into a single card which then becomes the program card. This method of preparing a program card facilitates the preparation of slightly changed or duplicate program cards, because multiple punches other than standard may not be duplicated on the punch.

Program Planning Card

A program planning card, X24-8605, is an aid in the preparation of program cards. This card has 12 rows

of column numbers, each row located in a punching position (Figure 25). The program codes, with the function of each, are on the back of the card for reference, and a place is provided for any special notes pertinent to the individual program-card design.

When analyzing the cards to be punched, mark the planning card for the functions to be performed in each column. For example, if column 10 is to be punched with an alphabetic character under normal program control, draw a mark through column 10 in the 1-row; if columns 59-80 are to be automatically skipped under normal program control, draw a mark through column 59 in the 11-row and columns 60-80 in the 12-row. Punch the program card, or the individual cards of the master deck, by reference to the planning card. After the program card is punched, check it by laying it over the planning card. The markings on the planning card should be visible through the punches in the program card.

This chart illustrates the program card coding necessary to perform card-punching operations in normal or alternate program control.

Operation	Normal Code		Alternate Code	
	First column	Rest of field	First column	Rest of field
Punch Numeric	space	12	space	4
Punch Alphabetic	1	A	7	7 + 4
Duplicate Numeric	0	12	6	4
Duplicate Alphabetic	0 + 1	A	6 + 7	7 + 4
Skip Automatically	X	12	5	4
Left Zero Print	2	B	8	8 + 4
Suppress Printing	3	C	9	9 + 4

The form is a grid with 12 rows and multiple columns. The columns are labeled as follows: SOCIAL SECURITY NO. (1-12), EMPLOYEE NAME (13-28), SEX (29), TAX ELISE (30), HIRE DATE (31-33), EMPLOYEE NUMBER (34-40), DEPT. CLOCK (41-42), BASE RATE (43-44), DATE (45-47), DEDUCTIONS (48-58), and various codes (59-80). The grid contains numerical data and some text like 'Payroll Master and Deduction Card'. On the right side, there is a vertical label 'REPRESENTATIVE COMPANY'. At the bottom, there are labels for 'EMPLOYEE NAME', 'EMPLOYEE NO. DEPT. CLOCK', 'MISC. DEDUCTION CARD', and 'DEDUCTION NAME MISC. DEDUCTION AMOUNT EFFECTIVE DATE'. The bottom left corner has 'IBM'.

Figure 24. Program Card—Multiple Functions

PROGRAM PLANNING												CARD OR JOB IDENTIFICATION: <i>Payroll Master & Deduction</i>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
12	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221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<u>Columns</u>	<u>Field Heading</u>	<u>Normal Program</u>	<u>Alternate Program</u>
1-9	Social Security No.	Manual punch; print zeros to the left	Automatic skip
10-27	Employee Name	Manual punch, alphabetic	Automatic duplicate, alphabetic
28	Sex	Manual punch	Automatic skip
29	Tax Class	Manual punch	
30-35	Date Hired	Automatic duplicate	
36-40	Employee Number	Manual punch (Dept. and Clock coded as separate fields for error correction and zero suppression)	Automatic duplicate (Dept. and Clock coded as separate fields for zero suppression)
41-42	Occup. Code or Ded. Code	Manual punch; print zeros to the left	Manual punch; print zeros to the left
43-46	Base Rate	Manual punch, suppress printing	Automatic skip
47-52	Rate Change Date	Automatic duplicate	
53-58	Fixed Deductions	Manual punch (Insurance and Hospitalization coded as separate fields for error correction and zero suppression)	
59-68	Deduction Name	Automatic skip	Manual punch, alphabetic
69-74	Misc. Ded. Amt.		Manual punch
75-80	Effective Date		Manual punch

Month and day in each date field are coded as separate fields for zero suppression

Figure 26. Table for Program Example

Operating Suggestions

These suggestions are given as an aid to most efficient operation of the IBM 24 and 26 Card Punches.

Starting a Punching Operation

When a new job is started, the release key should be pressed (but need not be held) after the main-line switch is turned on. After a short delay, a release cycle occurs, indicating that operation can be started. Then, press the feed key twice to register the first card if the automatic feed switch is off. If the switch is on, press the feed key only once. If a prepunched master card is to be inserted, place it in the center of the card bed after the first feed cycle.

When master information for automatic duplication is to be keyed in the first card of the group, turn off the automatic skip and duplicate switch before the first card is registered, and leave it OFF until the master information is keyed. On this first card, use the skip key to skip the fields programmed for automatic skipping.

Engaging the Program Reading Mechanism

Turning the program control lever to lower the star-wheels may not fully engage the reading mechanism. Therefore, it is necessary also to press the release key. For this reason, once the program is turned on leave it ON, and whenever possible any temporary changes or interruptions in the punching routine should be handled by the functional switches and keys.

Stopping a Punching Operation

When an operation is to be stopped and the main-line switch is to be turned off before a batch of work is completed (as at a lunch hour), the card at the punching station should first be completely punched and released. Before the card is released, however, turn off the automatic feed switch. This permits restarting the job without additional card handling.

When one batch of work is to be followed by another batch using the same master information and program control, a blank card should follow the last card of the batch through the punching station. The blank card can be released past the punching station as the last card is released past the reading station. This causes the blank card to be automatically punched with the master information for duplication into the first card of the next batch, and thus eliminates the

necessity of re-keying the master information. The automatic feed switch should be off when the cards are released.

Clearing the Card Bed

When the card bed is to be completely cleared at the end of a punching operation without feeding more cards from the hopper, turn off the automatic feed switch during the punching of the next-to-last card. The last card is then registered for punching by pressing the register key. After the last card is punched and moved to the center of the card bed, it is moved on to the stacker by pressing the register key, the release key, and then the register key again.

If the automatic feed switch is turned off after the last card to be punched is completed, press the release and register keys alternately three times. In this case, two blank cards stack behind the last punched card in the stacker.

Removing a Card from the Center of the Card Bed

To remove a card from the center of the card bed without affecting the following cards, manually move it into the reading station and press the release key. This moves it to the left of the card bed where it can be lifted out.

Removing a Card from the Left of the Card Bed

When a card has been released from the reading station but not stacked, it is in the left of the card bed. For easy manual removal, move the card to the extreme left by pressing down on the arm that extends from the reading station.

Removing a Card from the Punching or Reading Station

If for any reason a card must be removed manually from the punching or reading station, hold down the pressure roll release lever while pulling out the card. If a card at the punching station does not move easily, press all the numeric keys. Then, while holding down the lever, pull out the card without tearing it.

Spacing over Columns

Without program control, the duplicate key may be used to space over columns, if the same columns are unpunched in the preceding card or if there is no

card immediately ahead. This operation is faster than using the space bar.

Multiple-Punched Columns

Punch two or more digits in one column by holding down the multiple-punch key while punching the digit keys one at a time. If the machine is not equipped with a multiple-punch key, hold down the space bar for this operation. The keyboard is automatically shifted to numeric position when the multiple punch key or the space bar is pressed.

On the IBM 26 Printing Card Punch, do *not* duplicate multiple-punched columns other than standard alphabetic or special character punching. The IBM 24 Card Punch can duplicate any combination of two, three, or four punches.

X-Punching and Skipping

The punching of an X in a numeric field normally causes skipping, but in an alphabetic field it does not. If a control X (such as a credit X or a date X) is to be punched in a numeric field but skipping must not occur, consider these factors:

1. If the X is punched (keyed or duplicated) *alone* in a column, skipping to the beginning of the next field occurs. This skipping can be prevented by coding the single column of the field with a 1 in the program card (on an alphabetic machine) or by eliminating the program 12-code in the column following the X-punching. In the first method, if a figure instead of the X is keyed, hold down the numeric shift key. In the second method, punch the program card with a 0 in the following column if automatic duplication is performed; or press the duplicate key a second time, or hold it down over the blank column, if manual duplication is performed.
2. If a control X is to be *keyed over* a digit, press the multiple-punch key to key the two digits in one column. (On machines not equipped with the multiple-punch key, use the space bar.) This prevents the X-skipping and no provision need be made in the program card.
3. If the control X and a digit are *duplicated*, skipping to the end of the field occurs. This can be prevented by coding the column with a 1 in the program card (on an alphabetic machine) or by eliminating the program 12-code in the following column. In the first method, if the column is keyed at any time press the multiple-punch key (or space bar). This shifts the keyboard into numeric position and prevents skipping. In the second method, punch the program card with a 0 in the following column if automatic duplication is being performed; or press

the duplicate key a second time, or hold it down over the blank column, if manual duplication is being performed.

Corner Cuts

Cards can have a normal upper left or upper right corner cut. A special corner cut (C3) must be used when designing a card with a lower left or lower right corner cut. This should be kept in mind especially when designing tumble cards, because an upper corner cut becomes a lower cut when the card is tumbled.

Single-Card Feeding

When the cards are to be fed manually, one at a time, place them directly in the card bed, to the right for punching or in the center for reading. Do not insert single cards in the card hopper. When placing a card in the center of the card bed, position it so that the column-1 edge is between the feed rolls at the right of the reading station. If the card is pushed in too far, improper feeding and duplicating may result.

Keyboard Locking

The keyboard locks under any of these conditions:

1. The main-line switch is turned off and then on while a card is registered at the punching station. Press the release key to unlock the keyboard.
2. On the combination keyboard, an alphabetic key is pressed in a field programmed for numeric punching. Unlock the keyboard by pressing the backspace key (then space to the next column), the release key (the card is released without punching), or the alphabetic shift key (the letter is punched).
3. A blank column is duplicated in a field programmed for numeric punching. This serves as a blank-column detection device to ensure that a digit is punched in every column of a numeric field that is being duplicated. Unlock the keyboard by pressing the backspace key or the alphabetic shift key on the combination keyboard.
4. A card is not registered at the punching station. This feature makes it impossible to do any punching or spacing unless a card is in position to be punched. To move a card into punching position, press the register feed, or release (with the automatic feed switch ON) key.
5. The register key or the feed key is pressed when a card is registered at the punching station. Press the release key to unlock the keyboard.

Suspending Automatic Duplication on First Card

Master information in the first card of each new group must be keyed. Automatic duplication must, therefore, be suspended for that card by turning off the auto-

matic skip and duplicate switch. Because this requires the manual setting of the automatic skip-duplicate switch each time master information changes, consideration should be given to proper card design as an aid to most efficient operation.

Here are several recommended procedures for punching the *first card of each group*. The procedures vary depending on conditions brought about by differences in card design.

1. Whenever possible, program the first field in a card for manual operation. This gives the operator a chance to turn the automatic skip-duplicate switch off before starting to punch the first card of a new group.
 - a. When the first card of a new group is registered at column 1, turn the automatic skip-duplicate switch off.
 - b. Keypunch the complete card.
 - c. When the second card of the group is registered at column 1, turn the automatic skip-duplicate switch on. (The switch could have been turned on after the master information was keypunched).
2. Automatic duplication should not immediately follow an automatic skip. Design a manually operated field between the two automatic operations if possible.
 - a. Keypunch the first field.
 - b. Automatically skip the second field (automatic skip-duplicate switch on).
 - c. Turn off the automatic skip-duplicate switch. Keypunch the third field.
 - d. Keypunch the fourth field. Turn on the automatic skip-duplicate switch.
3. Sometimes other factors in the use of the cards make it necessary for automatic duplication to follow an automatic skip. In such a case, study the possible procedures and follow the best one. Two procedures are outlined here.

Long-Skip Field

- a. Keypunch the first field.
- b. Automatically skip the second field. During the skip, turn off the automatic skip-duplicate switch to prevent automatic duplication in the following field. This can be done if the skip is fairly long.
- c. Keypunch the third field and turn on the automatic skip-duplicate switch.

Short-Skip Field

- a. Turn off the automatic skip-duplicate switch when the card is registered at column 1.
 - b. Keypunch the first field.
 - c. Skip the second field by use of the skip key.
 - d. Keypunch the third field and turn on the automatic skip-duplicate switch.
4. When automatic duplication is immediately followed by an automatic skip, the first card is punched as outlined here:
 - a. Turn off the automatic skip-duplicate switch when the card is registered at column 1.
 - b. Keypunch the first field.
 - c. Keypunch the second field. Either during, or at the end of, this field, turn on the automatic skip-duplicate switch, so that the following field can be automatically skipped.
 - d. Automatically skip the third field.
 5. If an automatic skip must come first in a card immediately followed by automatic duplication, the procedure for handling the punching is similar to that outlined in number 3 and is described here:

Long-Skip Field

- a. Automatically skip the first field. During the skip, turn off the automatic skip-duplicate switch to prevent automatic duplication in the second field. This can be done if the skip is fairly long.
- b. Keypunch the second field and turn on the automatic skip-duplicate switch.
- c. Keypunch the third field.

Short-Skip Field

- a. Turn off the automatic skip-duplicate switch before the last card of a group is punched in column 80.
 - b. Press the skip key to skip the first field of the first card of the following group.
 - c. Keypunch the second field and turn on the automatic skip-duplicate switch.
 - d. Keypunch the third field.
6. When an automatic skip field comes between two fields programmed for automatic duplication, the first card is punched as outlined here:
 - a. Turn off the automatic skip-duplicate switch when the card is registered at column 1.
 - b. Keypunch the first and second fields.
 - c. Skip the third field by use of the skip key.
 - d. Keypunch the fourth field and turn on the automatic skip-duplicate switch.

Ribbon Replacement

The ribbon on the IBM 26 Printing Card Punch feeds between two spools, through ribbon guides, and under the punch die (Figure 27). The old ribbon is removed and a new one is inserted as follows:

1. Turn off the main-line switch.
2. Remove the ribbon-spool retaining clamp.
3. Cut or break the old ribbon.
4. Remove both spools from their spindles and pull out the two pieces of ribbon. Empty one of the spools.
5. Place the spool of new ribbon on the right-hand spindle, positioning it so that the ribbon feeds from the top of the spool toward the front of the machine. Lift the right end of the ribbon-reversing arm, if it is not already up, and unroll about a foot and a half of ribbon; then push down the right end of the ribbon-reversing arm to hold the spool steady.
6. Feed the metal leading-end of the ribbon between the punch die and the card bed, sliding it through the groove in the center of the card bed (between the 3 and 4 punching position). The groove permits the extra thickness of the metal end and the reversing eyelet to pass between the punch die and the card bed. Be sure to keep the ribbon straight, with the *top* side up at all times.
7. Hook the metal leading-end of the ribbon in the slot in the center of the empty spool and wind the ribbon onto the spool until the reversing eyelet is on the spool.
8. Place the spool on the left spindle, positioning it so that the ribbon feeds onto the spool over the top. Be sure that the ribbon is not twisted and that the *top* side of the ribbon is still up.
9. Hook the ribbon around the right and left wire ribbon guides, and slide it through the right and left ends of the reversing arm and over the rollers in front of the ribbon spools.
10. Slide the ribbon up under the punch die so that it is in the upper groove provided for it in card-printing position (above the 12-punching position), and take up the slack.
11. Replace the ribbon-spool retaining clamp.

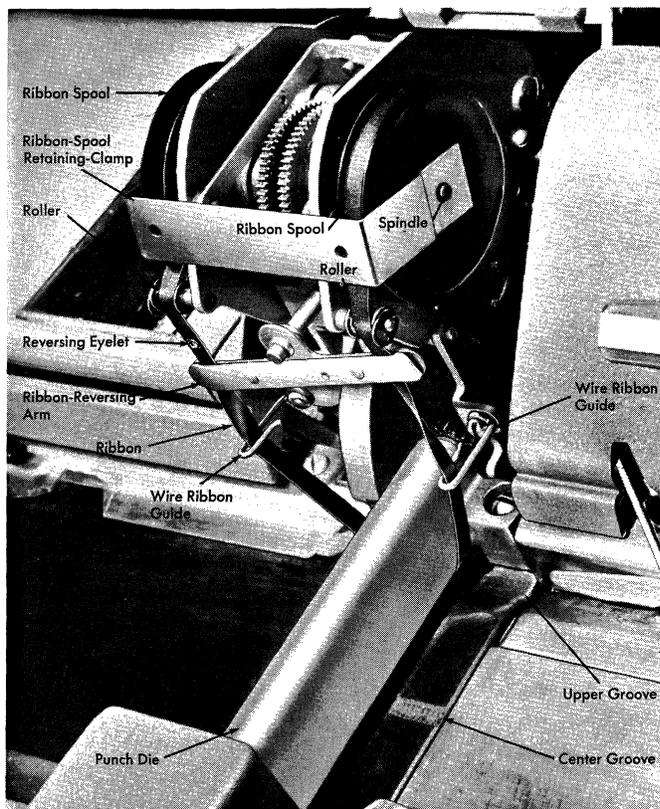


Figure 27. Ribbon Replacement

Combination Keyboard Summary

On the keyboard chart (Figure 28) each key is numbered for purposes of description in the following summary.

Punching Keys

Keys 1-18 can be pressed only when the keyboard is in alphabetic shift to punch the letters indicated. If one of these keys is pressed while the keyboard is in numeric shift, the machine locks. To resume operation release the card, or press the alphabetic shift key, which causes the letter to be punched.

Combination keys 19-29 can be pressed when the keyboard is in either numeric or alphabetic shift to punch these characters:

Key	Numerical Shift	Alphabetic Shift
19	& (12)	P
20	0	/ (0, 1)
21	1	U
22	2	I
23	3	O
24	4	J
25	5	K
26	6	L
27	7	M
28	8	8
29	9	9

On the combination keyboard, keys 40-43 punch multiple digits for eight special characters. They can be pressed when the keyboard is in either numeric or alphabetic shift to punch these characters:

Key	Numerical Shift	Alphabetic Shift
40	# (3, 8)	@ (4, 8)
41	, (0, 3, 8)	% (0, 4, 8)
42	\$ (11, 3, 8)	* (11, 4, 8)
43	• (12, 3, 8)	□ (12, 4, 8)

Space Bar

The space bar can be pressed at any time in a manual field to cause spacing over one column of the card. If a machine is not equipped with a multiple-punch key, hold down the space bar to permit multiple punching in the same column.

Functional Keys

30. NUM (NUMERIC SHIFT)

This shifts the combination keyboard into numeric position as long as it is held down. It is normally used to permit the punching of numbers in an otherwise alphabetic field.

31. ALPH (ALPHABETIC SHIFT)

This shifts the combination keyboard into alphabetic position as long as it is held down. It is normally used

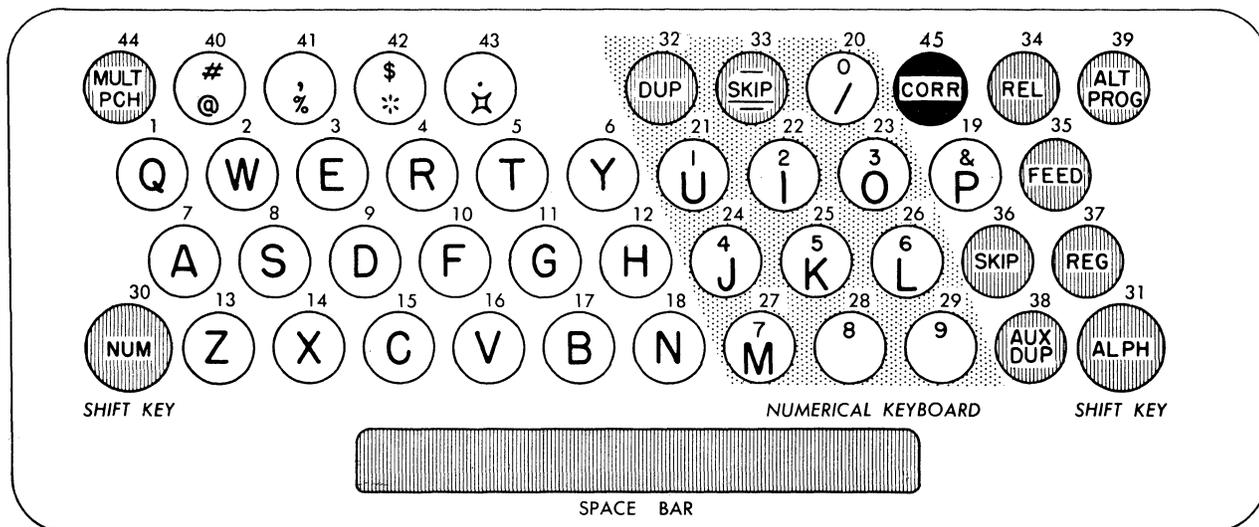


Figure 28. Combination Keyboard Chart

to permit the punching of letters in an otherwise numeric field. When duplication is being performed, this key permits automatic spacing over blank columns and prevents skipping caused by X-punching.

32. DUP (DUPLICATE)

This key causes punching by reading from the preceding card.

With Program Control. Pressing this key once causes duplication of the *field* for which it is pressed, at the rate of 20 columns per second.

Without Program Control. Causes duplication only as long as the key is held down, at the rate of 10 columns per second.

33. —SKIP (OR)—

—SKIP *in Numeric Shift.* Punches an 11 (—) and causes skipping of the field for which it is pressed.

—in *Alphabetic Shift.* Punches an 11 (—).

34. REL (RELEASE)

Causes the cards at the punching and reading stations to be advanced completely past those stations. Fields programmed for automatic duplication beyond the point of release are punched in the card before release is completed.

35. FEED (CARD FEED)

This key causes a card-feed cycle:

1. Feeds a card from the hopper.
2. Registers the cards at the punching and reading stations.
3. Stacks the card from the left of the card bed.

36. SKIP

This causes skipping of the field for which it is pressed. It is normally used for skipping the unused right-hand portion of an alphabetic field.

37. REG (CARD REGISTER)

This key is used primarily when inserting cards manually:

1. Registers the cards at the punching and reading stations.
2. Stacks the cards from the left of the card bed.

38. AUX DUP (AUXILIARY DUPLICATE)

This is supplied only when the machine has the auxiliary duplication feature. It causes duplication from the master card on the auxiliary duplicating drum. Under program control, pressing the key once duplicates the entire field from the master card; without program control, pressing it once duplicates one column from the master card.

39. ALT PROG (ALTERNATE PROGRAM)

Supplied only when the machine has the alternate program feature. Press this key, either at the beginning or during the card cycle, for each card requiring alternate instead of normal program control. If the key is pressed when a card is *not* registered at the punching station, it also causes a feed cycle.

44. MULT PCH (MULTIPLE PUNCH)

This is held down to permit the punching of more than one digit in a column. The keyboard is in numeric shift when this key is pressed.

45. CORR (CARD CORRECTION)

Supplied only when the machine has the card correction feature. Press this key upon detecting an error and before keying the next column of information. This action moves the error card to the read station and reproduces the information (up to the error column) into a new card at the punch station. Then, key in the correct information and resume operation.

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