

Reference Manual
IBM 56 Card Verifier



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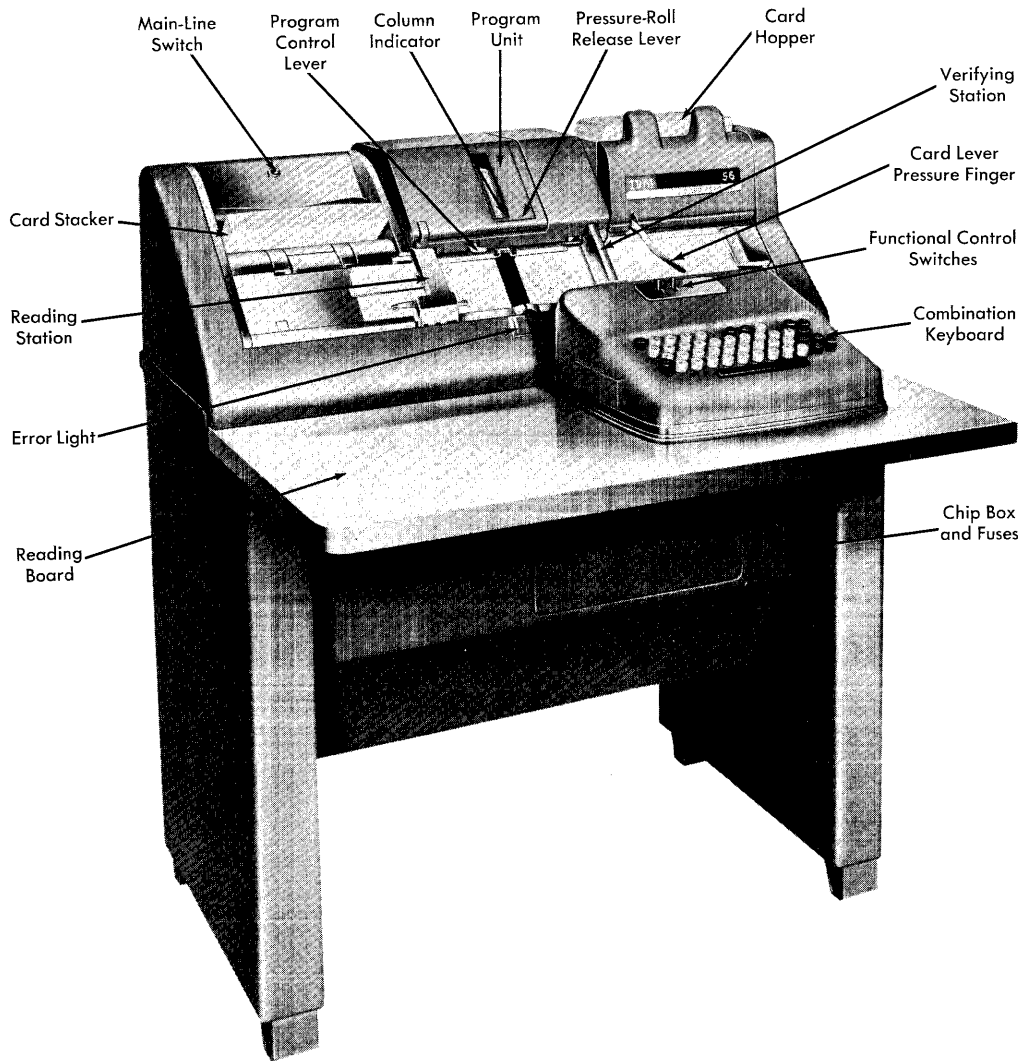
This edition, A24-1018-1, obsoletes A24-1018-0 and all earlier editions. Changes have been made throughout the manual. The most significant change is the revised *Special Features* section.

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IBM 56 CARD VERIFIER

IBM 56 Card Verifier

THE BASIC operating unit in IBM Accounting is the IBM card. IBM cards containing original data in the form of punched holes actuate the IBM machines which perform automatically the various operations essential to record keeping.

The cards are usually verified, in some manner, immediately after they are punched. One of the best ways of verifying is by use of an IBM card verifying machine. This manual explains the operation of one of these machines, the IBM 56 Card Verifier (frontispiece). This machine is used to verify alphabetic, numerical, or special character punching and is the same in design and features as the IBM 24 Card Punch.

The machine is attractive and easy to operate. One of its most important features is the simple means of setting it up quickly for control of skipping or automatic verifying operations. Each set-up, or program, is made by simply 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 verifying operation.

Under program control, automatic verification of duplicated fields proceeds at the rate of 20 columns per second and automatic skipping at 80 columns per second. After one card is verified in column 80, the next card is fed into position for verifying column 1 in one-fourth of a second.

The almost complete visibility of the card in the card bed facilitates the design and verification of dual cards. Direct access to all parts of the card bed also permits easy manual insertion and removal of cards when necessary.

The keyboard has the light touch, short depression, and small climb characteristic of the IBM Electric Typewriter keyboard and is equally easy to operate. It can be moved anywhere on the reading board, for the operator's greatest convenience and comfort. A combination keyboard utilizes a novel principle to facilitate the verifying of cards containing both alphabetic and numerical fields. A group of the right-hand typewriter keys serves for verifying 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 verify an alphabetic field with both hands, and then, without shifting from the "home" position, to verify a numerical field with the right hand only. Use of the right hand alone for numerical verification frees the left hand for document handling.

A complete description of the operating features and methods of operation is contained in the following pages. Under *Operations* each function is described in detail when it is first used in a typical situation. All functions and the combination keyboard are summarized under *Keyboard Summary*.

Operating Principle

ON THE IBM 56 Verifier, punched cards are verified manually or automatically. In manual verification, the operator depresses the keys in the same manner as for the original punching. In automatic verification, the punching is verified in a manner similar to a gang punch verification type of operation — that is, after the field in the first card has been key verified, the same field in the second card is compared automatically with the first card, the third with the second, etc.

When a card is verified as correct, a notch is cut in the right end of the card between the 0 and 1 rows (Figure 1). Every field of the card must be either verified or programmed to skip, in order for the final OK notch to be punched. The card is not notched if it is released. Therefore, if a card is to be verified without program control, each column must be keyed, spaced, or automatically verified to obtain the OK notch.

ERROR DETECTION

AN ERROR is detected by a discrepancy between the digit punched and either the key depressed or the digit in the preceding card. At this time the error light turns on and the keyboard becomes

inoperative. The latter is readily distinguishable by touch because more pressure is required to depress a key.

Provision is made for three trials in the verification of a column so that if the operator makes the error she has two more chances to strike the correct key. The visual reference method should be used to determine which position is in error and must be re-keyed. This method consists of reading the punched holes in a few of the columns preceding the error column and relating them to the source material. The card and the source document can easily be associated in this way because all columns preceding the error column are visible. In Figure 2, for example, columns 1-13 were visible when the error was signalled in column 14, so that the operator could see that the overtime rate field (punched 0750) had been completed. Therefore, by reference to the source document she could readily determine that the first position of part or account number had signalled the error and had to be re-keyed. Similarly, when the error was signalled in column 27, the operator could see that the first digit (punched 2) of order number had been verified and the second had to be rekeyed.

After the operator has determined which position has signalled the error, that column can be re-verified as follows:

KNO	DATE		RATES		PART OR ACCOUNT NO.	PIECES	DEPT. CHRG.	ORDER NO.	OPER. NO.	MACHINE GROUP	EMPLOYEE NO.		HOURS	AMOUNT
	MO.	DAY	REG.	O.T.							DEPT. CLOCK			
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
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	00	01	02	03	04	05
06	07	08	09	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	00	01	02	03	04	05	06	07	08	09	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	00
01	02	03	04	05	06	07	08	09	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	00	01	02	03	04	05
06	07	08	09	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	00	01	02	03	04	05	06	07	08	09	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	00

FIGURE 1. CORRECT CARD

Final OK Notch

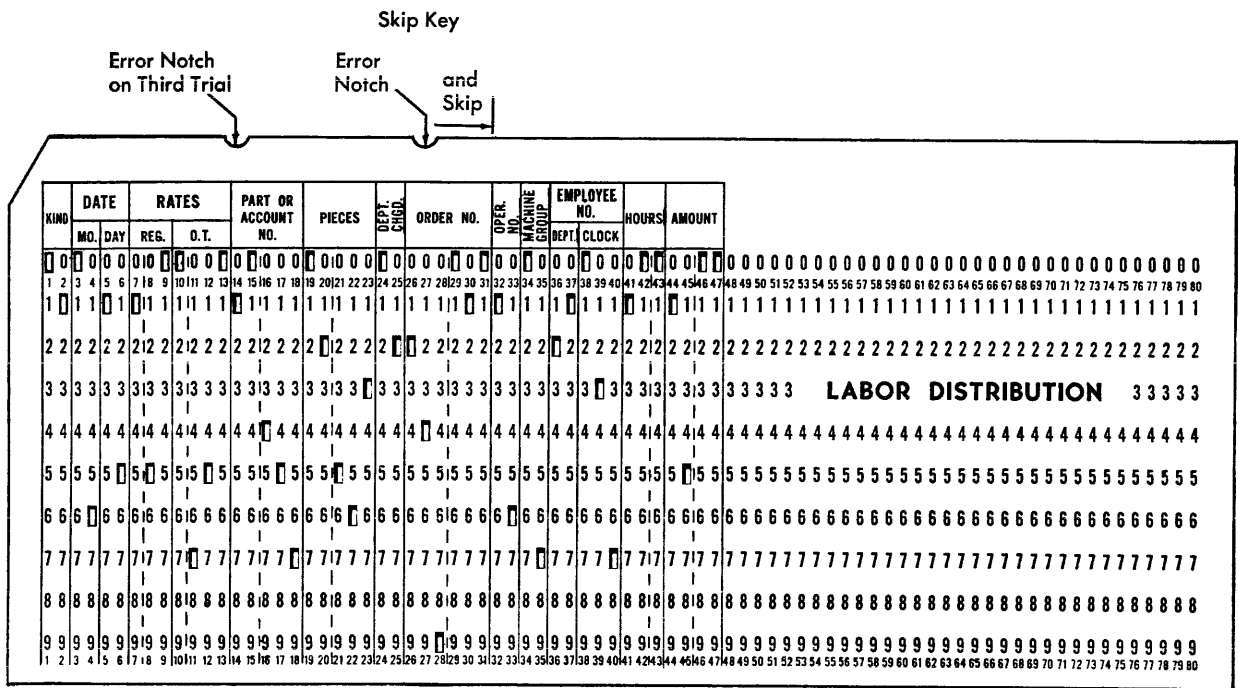


FIGURE 2. ERROR CARD

1. Depress error release key to free keyboard.
2. Make a second attempt to verify the column. If this trial is correct, the light turns off and verification can be continued in the next column. If it is incorrect, the error light remains on and the keyboard becomes inoperative again.
3. Depress the error release key to free the keyboard again.
4. Make a third attempt to verify the column. At this time the light turns off and verification can be continued in the next column regardless of whether or not this third attempt is correct. If it is incorrect, the column is error-notched (Figure 2). The sound of notching is easily distinguishable above the sound of normal verifying.

When an error notch is cut in one or more columns of a card, the final OK notch in the right end of the card is omitted and automatic feeding is suppressed. The card stops, completely visible, between the reading and verifying stations. This permits the operator to note the correction on the card before it is registered at the reading station. The next card is fed by depressing the feed key.

The skip key can be depressed in lieu of the second or third attempt to verify the error column. When this is done, the column is notched (if

it is a punched column), the error light turns off and the rest of the field is skipped (Figure 2); verification can be continued in the first column of the following field. This method of handling an error is especially advantageous when it becomes evident, after error-notching two or three columns of a long field, that a character has been omitted and the rest of the punching is off one column. This type of error is frequently made in alphabetic fields.

An error signal occurring in a field programmed for automatic verification normally indicates that the first card of a new group, with a change in the common information, is at the verifying station. The error release key should be depressed so that the field can be key verified. Depression of the correct key turns off the error light and permits verification of the rest of the field.

If an error is signalled while either of the shift keys is depressed, the keyboard remains in that shift for the second and third trials even though the key is no longer held down. If depression of the shift key was in itself an error, it can be corrected by depressing the opposite shift key when the next attempt at verification is made.

Operating Features

THE OPERATING features, shown in the frontispiece, are described below.

Card Hopper

The card hopper, which holds approximately 500 cards, is located on the upper right side of the machine. The cards are placed in the hopper face forward, 9's down, and are fed front card first. A sliding pressure plate insures 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 3). Since 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.

A card is fed from the hopper to the card bed automatically or by depression of a card feed key. The first two cards to be verified must be fed by key depression, but all other cards in the hopper may be fed automatically, under the control of a switch.

Verifying Station

Verification is performed at the first of two stations in the card bed through which the cards pass from right to left. Normally, to start an operation, two cards are fed into the card bed at the right of the verifying station. As the second card is fed in, the first card is automatically registered for verification - that is, it is positioned at the verifying station. While the first card is being verified the second card waits at the right of the card bed. When column 80 of the first card passes the verifying station, the second card is registered at the verifying station, and the next card in the hopper is fed into the right of the card bed. This method of card feeding reduces to a minimum the time required for feeding and ejecting.

A single card may be placed in the card bed by hand, and registered in verifying position by key depression.

The whole card is visible before it is registered and at least 72 columns are visible after verification has started. For example, when column 15 is to be verified (Figure 4), columns 1-13 and columns 22-80 are visible. This feature simplifies

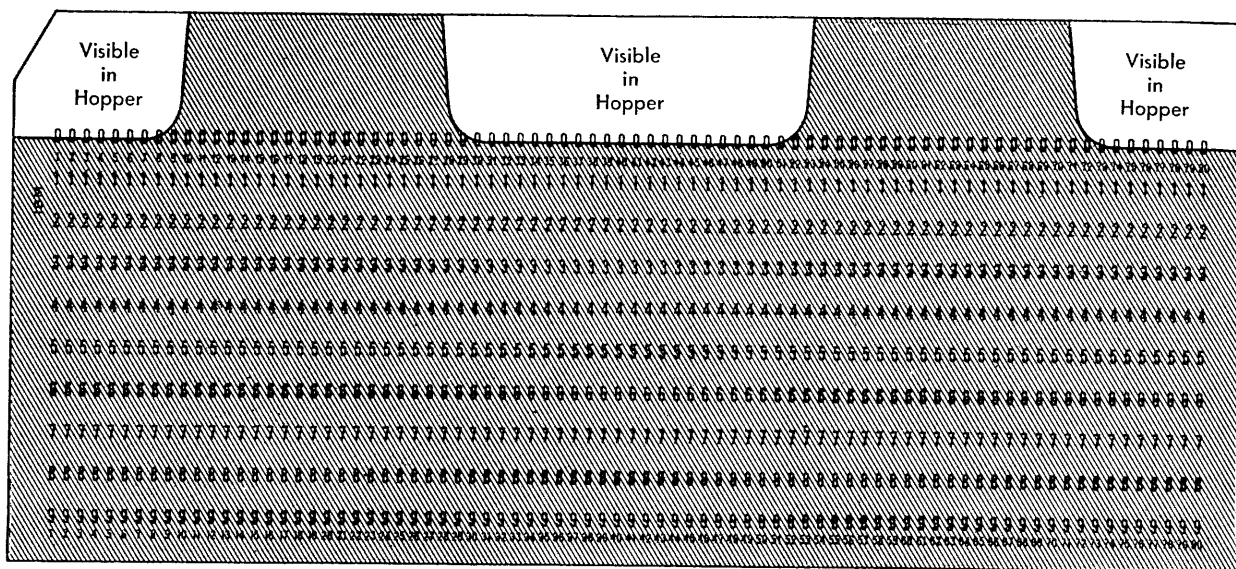


FIGURE 3. CARD VISIBILITY IN THE HOPPER

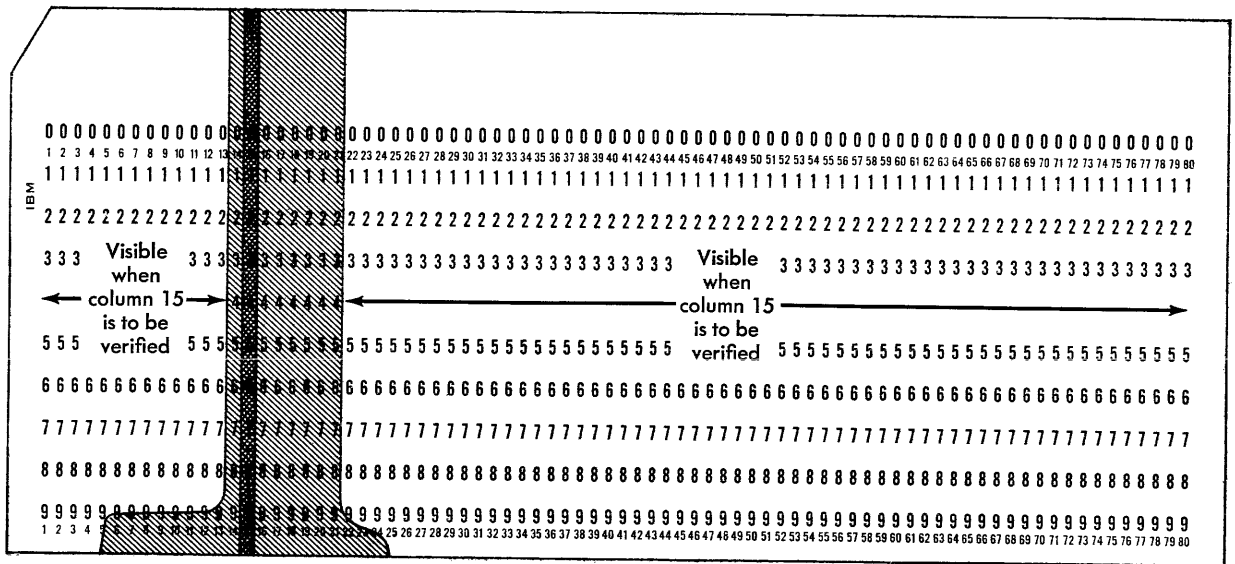


FIGURE 4. NORMAL CARD VISIBILITY AT THE VERIFYING STATION

the design of dual cards because information can be recorded anywhere on the card other than the one column to the left or six columns to the right of the punched column which is to be verified. When an error has been detected, however, all columns preceding the error column are visible. Therefore, if an error has been signalled in column 15, columns 1-14 and 23-80 can be seen. This facilitates association of the punched columns with the source document, for re-verification. *Cards with certain lower corner cuts cannot be fed satisfactorily through the card bed. (See Corner Cuts.)*

Digits 12-9 are inscribed on the left side of the cover over the verifying station. These numbers correspond to the punching positions of the card and aid the operator in reading the punching in cards on which the numbers are not printed.

Reading Station

The reading station, where the cards are read for automatic verification, is located approximately the distance of one card to the left of the verifying station. Consequently, each card that has been verified passes through the reading station as the next card is being verified. The two cards move

in synchronism, column by column, and the punches in the same column of both cards can be compared automatically. The principle of this type of verification is similar to gang punch verification and is usually used in the verification of fields which were duplicated in the original punching operation. The operation can be controlled, field by field, so that only the desired information is automatically verified.

The whole card is visible before it is registered, and at least 68 columns are visible after reading has started. For example, when column 15 is being read, columns 1-8 above the 7 row and columns 21-80 are visible.

Card Stacker

The card stacker, which holds approximately 500 cards, is located on the upper left side of the machine on a level with the hopper. After each card passes the reading station, it is fed automatically into the stacker. Cards are stacked at an angle, 12's down, face back, and are held in position by a pressure plate. When the cards are removed from the stacker, they are in their original sequence.

Main Line Switch

The main line switch is located at the rear of the stacker. Operation of the machine may be started approximately one-half minute after the main line switch is turned on, to allow sufficient time for the electronic tubes to heat. When the stacker becomes filled to capacity, the switch is automatically turned off.

When the main line switch is turned on, the release key should be depressed before operation is started. This will insure that the program card is located at column one and that any card at the verifying station is released.

Reading Board

A reading board provides ample space for source documents from which the cards are verified. If extra space is required, however, a larger reading board, which extends about ten inches to the left of the standard board, can be specified.

Error Light

When an error is detected, the error light turns on. The light turns off if the second attempt at verification is correct; if not, it turns off when the third attempt is made. If the skip key is depressed in lieu of a second or third try at verification, the light turns off.

Program Unit

Automatic skipping, automatic verifying, and changing from numerical to alphabetical shift and *vice versa* are controlled by the program unit. Each of these operations is designated by a specific code which is recorded in a program card. The program card is then fastened around a program drum and inserted in the machine where it is read by a sensing mechanism. The drum revolves in step with the movement of the cards past the verifying 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.

Program Control Lever

Operation of the program unit is controlled by the program control lever, located below the program unit. When this lever is turned on, the program sensing mechanism is lowered so that it rests on the program drum, and the codes punched in the program card control the various automatic operations. When the program lever is turned off, the program sensing mechanism is raised so that the program drum can be easily removed or inserted. This lever should be turned to the OFF position whenever a program card is not in the machine.

Column Indicator

The indicator is located at the base of the program drum holder and always points to the column to be verified (or re-verified).

Pressure Roll Release Lever

The pressure roll release lever is located next to the column indicator. Depression of this lever permits the manual removal of a card from the verifying 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, however, they can be pushed out with another card or a smooth-edged metal blade while the pressure roll release lever is held down. *Saw-edged* metal blades should *not* be used.

Chip Box and Fuses

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

Keyboards

Either of two cable-connected keyboards may be specified, a numerical keyboard (Figure 5) or a combination alphabetic and numerical keyboard (Figure 6).

On both keyboards, the verifying keys are gray with blue lettering and the functional 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



FIGURE 5. NUMERICAL KEYBOARD



FIGURE 6. COMBINATION ALPHABETIC AND NUMERICAL KEYBOARD

that no two character keys can be depressed at the same time, but it is not necessary to wait for one key to rise before depressing another. This design permits "rolling" of keys.

Multiple digits may be verified manually in one column, by holding the multiple punch (MP-ER) key down while the digit keys are depressed one at a time.

The combination keyboard has the best features of both a typewriter keyboard and a numerical verifier keyboard. The letter keys are arranged for operation by the standard typewriter touch system, while the digit keys are placed so that a rapid three-finger touch system can be used. The usual numerical keys on a typewriter have been eliminated; instead, a group of dual-purpose keys at the right serves for digit as well as letter verification. This permits depression of the numerical keys with the right hand, from the normal home position of the standard alphabetic keyboard. The touch system for the ten numerical 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. Verification of a digit or a letter with any of the combination keys depends upon whether the keyboard is in numerical or alphabetic shift.

For example, depression of the 4-J key verifies a 4 when the keyboard is in numerical 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 depression. 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 verify eight characters as shown on the keytops – four in numerical and four in alphabetic shift. The keys are installed on all combination keyboards but are operative only if so specified.

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

A plate is mounted on the right side of the keyboard for use in joggling cards before they are placed in the hopper.

Function Control Switches

Two ON-OFF switches which control automatic functions are explained under *Operations*. These two switches are:

Auto Feed

Auto Skip and Auto Verify

Alphabetic Shift (1)

When the program card is in the machine, the combination keyboard is normally in numerical shift, and depression of any one of the two-purpose keys causes a figure to be verified. In order to verify a letter, the combination keyboard must be shifted for alphabetic verification. This shifting is performed automatically by a 1 in the program card in each column of the alphabetic field.

Program Card Codes

The four basic program codes are summarized below and illustrated in Figure 7.

<u>CODE</u>	<u>FUNCTION</u>
12	Field Definition
11	Start Automatic Skip
0	Start Automatic Verification
1	Alphabetic Shift

The other digit rows in the program card control functions which are explained under *Special Features*.

3. Turn the handle to the center position. This tightens the smooth edge of the clamping strip and loosens the toothed edge.

4. Wrap the card tightly around the drum and insert the column 1 edge under the toothed edge of the clamping strip.

5. Turn the handle toward you (clockwise direction) as far as it will go. This fastens the toothed edge of the clamping strip. The drum is now ready to be inserted in the machine.

To remove a card from the drum, the above procedure should be followed in the reverse order.

With the program sensing mechanism raised, the drum is placed on the spindle under the center cover of the punch, positioned so that the aligning pin falls in the aligning hole in the column indicator dial. The program control lever is turned on to lower the reading star wheels onto the program card, and the release key is depressed to engage the reading mechanism fully. Whenever the drum is to be removed, the program control lever must first be turned off to raise the star wheels.

In order to keep the program card for each verifying application on a drum ready for insertion in the machine, extra drums may be ordered.

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 8), the following steps should be taken:

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.

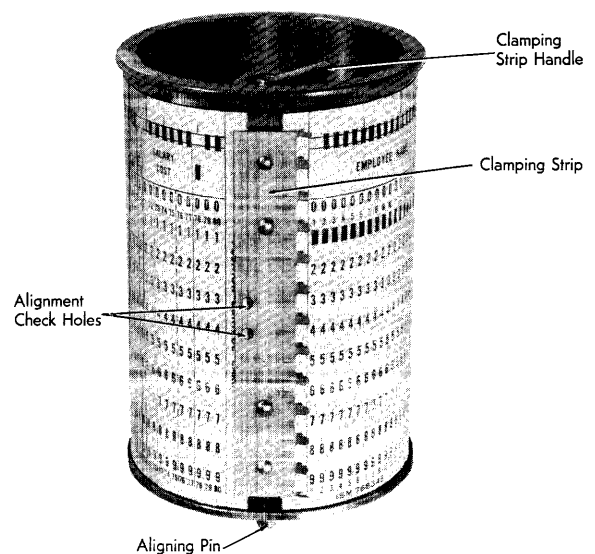


FIGURE 8. PROGRAM DRUM

Operations

INSERTING CARDS MANUALLY

IN CERTAIN instances it is desirable to insert cards manually, one at a time, and verify them without program control. Cards are frequently handled in this manner when only a very few of the same design are to be verified at one time. A card can be manually inserted in the card bed to the right of either the verifying station or the reading station. A single card should not be inserted in the hopper.

In this illustration (Figure 9), customer name cards are to be verified. The cards are punched with letters, numbers, and special characters and all 80 columns are to be verified.

Register Key. A card placed in the card bed at the right must be advanced into position, or "registered," before verifying can be started. This is accomplished by depression of the register key. Similarly, a card to the right of the reading station is registered for reading by depression of this key. The key depression also

stacks a card from the left of the card bed, but does *not* feed a card from the hopper. Therefore, the register key is used whenever cards are inserted manually.

Numerical Shift Key; Alphabetic Shift Key. When a combination keyboard is installed and the verifier is operated without program control, the keyboard is in alphabetic shift. When the program control lever is turned on, the keyboard is in numerical shift for all columns except those programmed with the alphabetic field coding in the program card. If it is necessary to verify occasional digits with the program off or in an otherwise alphabetic field (such as "216 Wysor Bldg"), the numerical shift key is held down while the digit keys are depressed. Similarly, when it is necessary to verify some letters in an otherwise numerical field (such as 1234B6), the alphabetic shift key is held down while the letter keys are depressed.

These are non-locking keys and must be held depressed when used. If an error is detected

CUSTOMER NUMBER		CITY	COUNTY	STATE	CUSTOMER NAME		STREET ADDRESS		CITY - STATE		BRANCH SALES-MAN	FILE
00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
11111	11111	11111	11111	11111	11111	11111	11111	11111	11111	11111	11111	11111
22222	22222	22222	22222	22222	22222	22222	22222	22222	22222	22222	22222	22222
33333	33333	33333	33333	33333	33333	33333	33333	33333	33333	33333	33333	33333
44444	44444	44444	44444	44444	44444	44444	44444	44444	44444	44444	44444	44444
55555	55555	55555	55555	55555	55555	55555	55555	55555	55555	55555	55555	55555
66666	66666	66666	66666	66666	66666	66666	66666	66666	66666	66666	66666	66666
77777	77777	77777	77777	77777	77777	77777	77777	77777	77777	77777	77777	77777
88888	88888	88888	88888	88888	88888	88888	88888	88888	88888	88888	88888	88888
99999	99999	99999	99999	99999	99999	99999	99999	99999	99999	99999	99999	99999

FIGURE 9. INSERTING CARDS MANUALLY

(with program control on) while one of these keys is depressed, however, the keyboard remains in that shift for the second and third trials even though the key is no longer held down. If the depression of the shift key was in itself an error, it can be corrected by depressing the opposite shift key when the next attempt at verification is made.

Release Key. Depression of the release key advances the cards past the verifying and reading stations. With program control on, fields programmed for automatic verification after the point of release are verified.

Whenever a card is released, the final OK notch in the right end of the card is omitted. Therefore, cards are normally released only when an error has been detected and the procedure requires that the rest of the card be verified after the correction is made.

Procedure for Inserting Cards Manually (Figure 9)

1. Place a card in the card bed to the right of the verifying station.
2. Depress the register key to advance the card into verifying position.
3. Verify all 80 columns of the card, holding the numerical shift key depressed for the numerical fields, the street number, and the special characters shown on the upper half of the keytops. Depress the space bar to advance the card past the unpunched columns in the name, street address, and city-state fields. Depression of the space bar verifies that the columns are not punched. If a column is error-notched, verification can be continued or the card can be released.
4. Insert the next card in the card bed to the right of the verifying station and depress the register key. This registers the first card at the reading station and the new card at the verifying station. The first card moves to the left of the reading station when the second card moves from the verifying station, and it moves into the stacker when the third card is registered.

NUMERICAL VERIFICATION WITH PROGRAM CONTROL

NORMALLY, in a verifying operation, the cards are placed in the card hopper and fed into the card bed automatically. Also, as the cards are verified, certain functions, such as automatic skipping and automatic verifying, are controlled by the program card.

In this illustration, labor distribution cards, punched with numerical information as shown by the field headings (Figure 10), are to be verified. Figure 10 also shows how the card is punched to serve as a program card, indicating the type of operation to be performed in each field. Columns 3-6 and 34-35 are to be automatically verified; columns 48-80 are to be automatically skipped; all other fields are to be key verified.

Feed Key. The feed key, when depressed, performs four functions:

1. Feeds a card from the hopper to the card bed.
2. Registers a card at the verifying station.
3. Registers a card at the reading station.
4. Stacks a card.

In an automatic feeding operation, this key is normally used only at the beginning in order to feed the first two cards from the hopper into the card bed. The key is depressed twice at this time. The first depression feeds the first card from the hopper; the second depression registers the first card at the verifying station and feeds the second card into the card bed underneath the right end of the first card.

The feed key is normally inoperative when a card is registered at the verifying station.

Automatic Skip and Verify Switch. When this switch is turned on, the program punching for automatic skipping and automatic verification is effective. When this switch is turned off, the 11 (start automatic skip) and 0 (start automatic verification) codes in the program card are nullified. Automatic skipping proceeds at the rate of 80 columns per second; automatic verifying at 20 columns per second.

ALPHABETIC AND NUMERICAL VERIFICATION WITH PROGRAM CONTROL

ALTHOUGH THE keyboard is normally in numerical shift when the program is turned on, alphabetic information can be verified by changing to alphabetic shift. This is done either manually by depression of the shift key or automatically by coding in the program card. Columns 6-26 of Figure 11 illustrate the "1" coding for automatically shifting to alphabetic position. If a field punched with both alphabetic and numerical characters is to be verified, it should be programmed for whichever are more frequent; if there are about an equal number of each, the field should be programmed for alphabetic verification.

In verifying alphabetic names or descriptions which vary in length, it is usually desirable to skip over that part of the field at the right which is not punched. In this illustration, a portion of the name field will need to be skipped on most cards. Since the starting point of this skipping varies from card to card, it must be controlled manually by depression of the skip key.

Another type of skipping which must be controlled manually by key depression is illustrated in the trading area field which has been punched for some customers but not for others. In the latter case, column 75 was X-punched, to indicate that no trading area code was supplied, and the rest of the field was skipped.

When a field is occasionally punched with the same information in two or more successive cards, only the first card needs to be key verified; the field in the following cards can be verified by a *single* key depression. In this illustration, salesman number in columns 78-79 may be the same for several consecutive cards and can be semi-automatically verified.

Skip Key. The purpose of this key is to skip any field that is coded with 12's in the program card. Depression of the key starts the skip and the 12's, in succeeding columns of the field, continue the skip for the rest of the field. The key must be depressed in an unpunched column; if it is depressed when a punched column is at the verifying station, an error is signalled. The primary use of the key is the skipping of the

unused right-hand portion of an alphabetic field.

When an error has been signalled, the skip key can be used, in lieu of a second or third attempt at verification, to skip the rest of the field. When the key is depressed with the error light on, it also causes notching of the error column, if the column is punched. This use of the skip key is especially advantageous in the verification of an alphabetic field in which a letter has been omitted and the rest of the field is therefore off one column. After error-notching two or three columns, the operator can merely skip the rest of the field rather than notch each subsequent column.

Skipping is at the rate of 80 columns per second.

Dash Skip (or) Dash Key. When the keyboard is in numerical shift (- Skip), depression of this key verifies an 11 punch and causes skipping, at 80 columns per second, for the rest of the field as determined by the successive columns punched 12 in the program card. When the keyboard is in alphabetic shift (-), depression of this key verifies an 11 punch but does not cause skipping. This key is normally used in the verification of fields which were X-skipped in the original punching operation.

Verify Duplication Key. Any field which was duplicated with the same information in consecutive cards can be verified by a semi-automatic type of operation. Semi-automatic verification, like automatic verification, utilizes the reading station, comparing the card at the verifying station with the one at the reading station. As long as the two cards agree, the card is verified as correct. The comparison is started by depression of the verify duplication key and continued across the field by the 12's in the program card.

With a program card in the machine, semi-automatic as well as automatic verification is at the rate of 20 columns per second. Without a program card in the machine, verification by depression of the verify duplication key is at the rate of 10 columns per second and occurs only as long as the key is held down.

Special Features

THE FOLLOWING features of the IBM 56 Card Verifier are available as special features.

Auxiliary Verification

Auxiliary verification is performed by comparing the card with a master card, rather than the card at the reading station. The master card is fastened around an auxiliary drum that is inserted in the machine on a spindle in back of the program drum.

Auxiliary verification is controlled manually by pressing an auxiliary verify key. The field to be verified is punched in the program card with the field definition code, and one pressing of the key causes the entire field to be verified.

Auxiliary verification should be used for fields that were punched by use of the auxiliary duplication feature of the punch. Auxiliary duplication and verification are advantageous whenever common information is required for certain cards but not for others, when major-minor duplication is performed, or when prepunched master cards are inserted during the punching operation. In the case of major-minor verification, the major data may be dropped when the automatic skip and verify switch is turned off for a change of information in the minor field. When prepunched master cards are used in the punching operation, information common to all detail cards, such as date, is dropped when the master card is fed. In either case, the common information can readily be verified in the first detail card of each group, with one key pressing and without reference to the source document, by use of the auxiliary verification feature.

0-9, 11-12 Elimination

This feature splits the column between 0 and 11 so that either the 11 and 12 punches or the 0-9 punches are verified, while the remaining punches are eliminated from verification. This feature operates with program-card coding and can therefore be applied to only the desired columns. Code 3 in a column of the program card eliminates the necessity of verifying the 0-9 punching, or any specified portion of the numerical digits, but requires the verification of the 11 or 12 punching.

Alternate Program Unit

An alternate program unit can be installed in the machine as a special feature so that two program setups can be punched in one program card. The coding for the alternate program consists of the 4-9 codes used in the same manner as the 12-3 codes for the normal program. All program codes are summarized:

NORMAL CODE	PROGRAM FUNCTION	ALTERNATE CODE
12	Field Definition	4
11	Start Auto Skip	5
0	Start Auto Verification	6
1	Alphabetic Shift	7
2	11-12 Elimination	8
3	0-9 Elimination	9

This feature is especially advantageous in those cases where an occasional card requires a different program control. The card may be of a different design or may be a partially prepunched master. The transfer from the normal program to the alternate program is controlled by the operator by pressing an alternate program key.

To use the alternate program feature for a complete card, this key may be pressed either before or after the card is registered, depending upon the normal program coding in column 1. If column 1 of the normal program is coded for manual verification, the key may be pressed after the card is registered. If column 1 of the normal program is coded for automatic skipping or verifying, 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 registered. Also, the automatic feed switch must be turned off before the preceding card is completely verified. Pressing the alternate program key, after the preceding card is released, causes transfer to the alternate program and card feeding.

When the first part of a card is verified under normal program control and the remainder is verified under alternate program control, this key may be pressed at any time the alternate program is to be effective.

When the alternate program key is pressed, programming from the alternate program is effective for the remainder of that card. When the following card is fed, the normal program again becomes effective.

When high-speed skip is installed on a machine with alternate program, the 0-9 eliminate function is inoperable.

Card Insertion

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

To insert a new master card in front of a group, proceed as follows:

1. Set the card insertion device switch to **INSERT**.
2. Press the **MC** (master card) key while verifying the card preceding the master card to be inserted. When the card being verified 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 not registered for verification.
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 verifying station.
5. Resume normal operation. Fields programmed for automatic verification are automatically verified from the new master card.

To insert a new master card (or trailer card) behind a group of cards that have been verified, proceed as follows:

1. Set the switch to **STACK**.
2. Press the **MC** key while verifying the card preceding the master. When the card being verified 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 verifying station.

3. Manually insert the master (trailer) card behind the cards in the stacker.
4. Resume normal operation.

The card insertion feature cannot be installed on a machine with either high-speed skip or variable-length feed.

High-Speed Skip

The high-speed skip feature is intended to provide the greatest advantage for those applications that require skipping of at least 55 or more consecutive columns of the card. It is available for factory or field installation on the 56. Also, this feature can be installed on the IBM 56 machines that have variable-length card feed.

This is the program-controlled high-speed skip that operates in conjunction with standard skipping. High-speed skipping is accomplished at the rate of approximately 3 times the standard skip speed and results in a saving of 8 milliseconds per column skipped at high speed. In the example (Figure 12), 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 lack of the 9 punch 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.

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.

Machines with the card insertion feature cannot have the high-speed skip feature.

When high-speed skip is installed on a machine with alternate program, the 0-9 eliminate function is inoperable.

OPERATION

To use the high-speed skip feature, an 11 punch initiates the skip, the 9 punches control high-speed

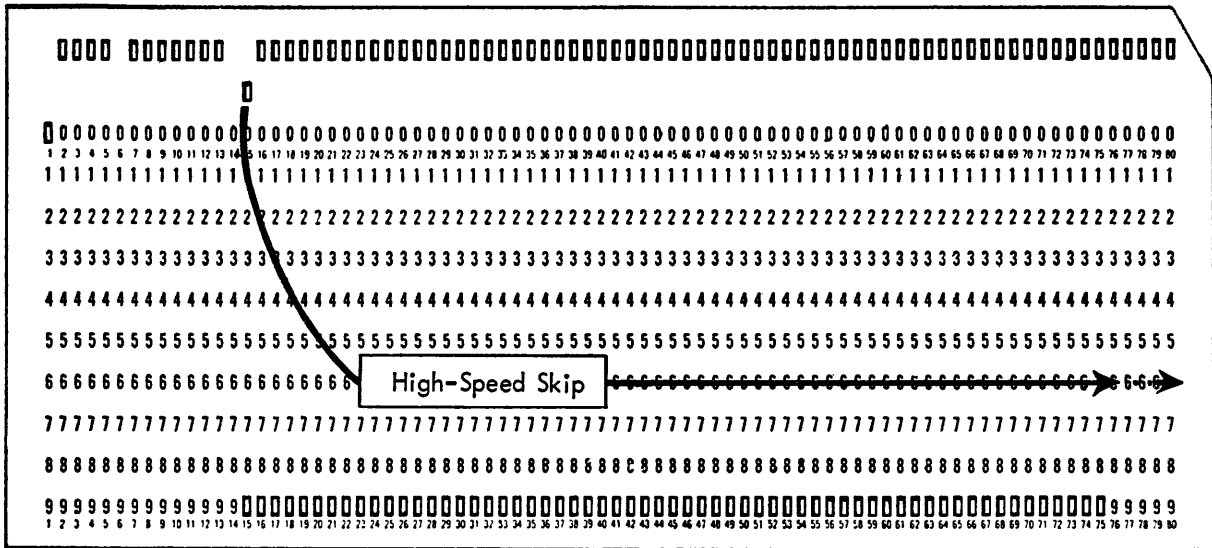


FIGURE 12. PROGRAM CARD SHOWING HIGH-SPEED SKIP PUNCHING

skipping, and the 12 punches define the remainder of the field. For high-speed skipping, punch the program card with:

1. An 11 and a 9 in the first column of the high-speed skip field.
2. Nines in all the other columns of the high-speed skip field except the last five columns.
3. Twelves in all the columns of the high-speed skip field except the first column.

On machines equipped with 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 three pressings of the feed key to register the first card from the hopper at the verify station. The second card is at the pre-registration station; a third card, which is 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, three pressings of the release and register keys would be needed to remove the cards from the verifying and reading stations. In addition to the release and

register cycles, the last card, which was hidden, must be removed manually from the pre-registration station after the second release.

Variable-Length Card

This feature makes possible the processing of cards with 51, 60, and 66 columns, as well as the standard 80-column card. All settings needed to change card lengths are easily made by the operator. Only one length of cards can be processed at one time. For each length of card, a card guide is raised on the hopper bed to form a right-hand guide. The operator performs the following 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 13). 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 (Figure

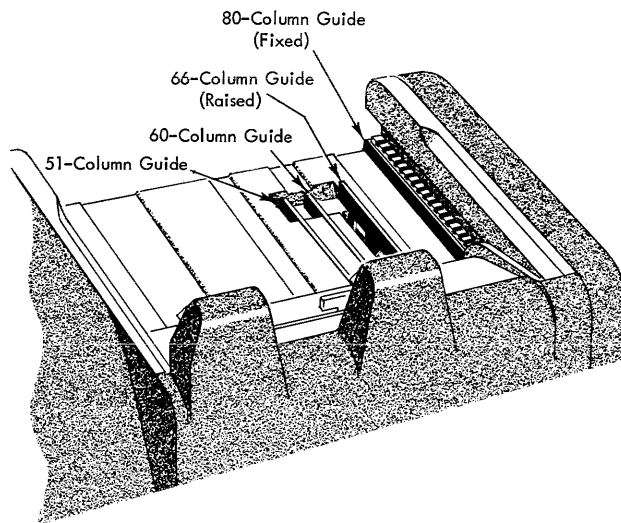


FIGURE 13. HOPPER CARD GUIDES

14). 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. 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 star wheels and lift the drum off its shaft (Figure 15). 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 recess and move in this sequence:

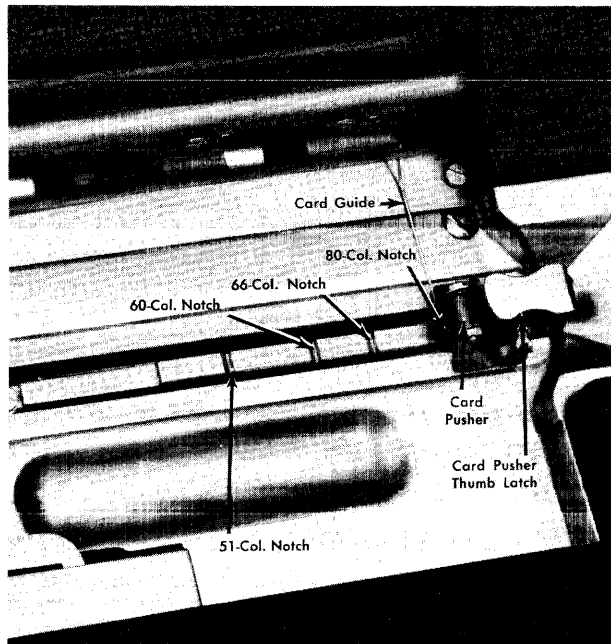


FIGURE 14. LATCH-TYPE CARD PUSHER

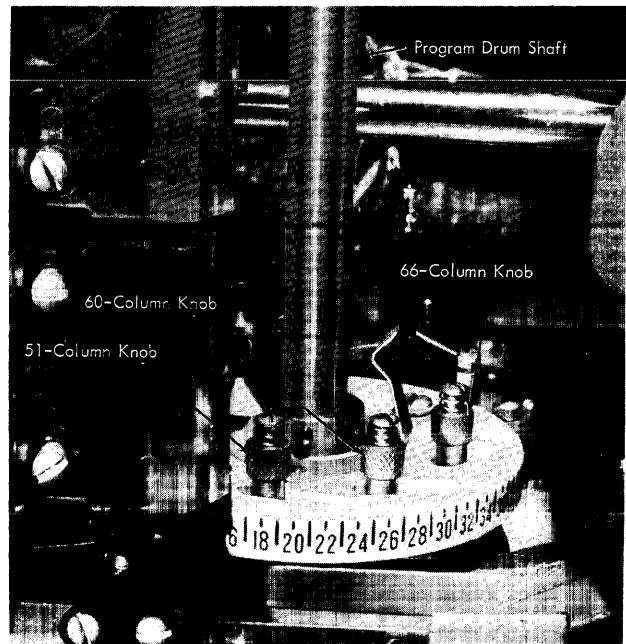


FIGURE 15. PROGRAM CAM EXTENSION KNOBS (80-COLUMN CARD SETTING)

- a. To change to a longer card, move each knob in ascending numerical 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 numerical 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.

To prevent machine damage, program cards for punching short cards must be punched for only

skip and high-speed skip, beyond the last column of the short card.

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

Special-Character Arrangements

The arrangements in Figure 16 are available for the punching (and printing) of special characters. Card punches with a numerical keyboard punch (and print) the characters corresponding to the 12 and 11 coding only. Other special characters require use of the multiple punch control key. Machines with an alphabetic keyboard, punch (and print) all 11 special characters when punching or duplicating.

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 16. IBM 24, 26 SPECIAL-CHARACTER PUNCHING AND PRINTING ARRANGEMENTS

Program Card Preparation

WHEN a program card is to be prepared for a particular verifying application, the card design should be carefully analyzed in order to code the program card for maximum efficiency. Proper use of the various features of the card verifier will reduce operator time and effort to a minimum.

Normal Program

If the verifier with no special features is used, the cards should be analyzed for:

1. Field definition coding, which is the determination of the length of each field. Each column except the first (left-hand) of every field should be punched with the field definition 12's regardless of the type of operation to be performed in that field. The 12's are used in skipped or automatically verified fields to carry the skip or verification across the field, once it is started.

Occasionally it is necessary to split a field by eliminating the 12 punching in one or more columns. When an X is to be key verified in a numerical field but skipping must not occur, elimination of this 12 prevents the skipping of the rest of the field (see *Operating Suggestions — X Verifying and Skipping*).

2. Automatic skipping for each field that is not to be verified at this time. If several successive fields are to be skipped on every card, they should be programmed as one large field with the X in the first column and 12's in all successive columns.

3. Automatic verification of each field that is punched with the same data for a group of cards. If several successive fields are to be automatically verified on every card, they should be programmed 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 verified, it should be coded with 1's and the numerical shift key used for occasional figure verification.

After the program is planned for these operations, the codes can be punched 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 verified. When two codes are to be punched in one column, the proper letter or special character key on the combination keyboard can be used (e.g., A for a 12 code and a 1 code, or the / symbol for a 0 code and a 1 code) or each code may be punched individually in conjunction with the multiple punch key, if desired.

Verification Elimination

In addition to the basic functions described above, the cards should be analyzed for the following if the optional verification elimination features are installed:

1. 11-12 elimination, which makes it unnecessary to verify an 11 or 12 punch in a column. In some applications these punches do not need to be key verified, although the 0-9 underpunching in the same column must be verified. This is the case if, for example, an 11 is gang punched into all cards and sight-checked before the numerical data is keyed. Although the verifier normally requires the verification of every punch in a column in order to consider that column correct, only the 0-9 punches need to be verified if this feature is used. Code 2 punched in a column of the program card makes this feature operative for that column. Thus, it is possible to require the verification of an 11 or 12 in some columns but not in others in one verifying operation.

2. 0-9 elimination, which makes it unnecessary to verify the 0-9 punching, or some specified portion of the numerical digits, in a column. In some applications certain digits may not need to be key verified, but any other punching in the same column must be verified. For example, if the 9-8 portion of an MLP code is gang punched, only the 1, 2, or 3 portion needs to be key punched and key verified. Although the verifier normally requires the verification of every punch in a column, only the 11-12 or the specified part of the numerical digits needs to be verified if this feature is used. Code 3 punched in a column of the program card makes this feature operative for that column, while all other columns are verified in the normal manner.

PROGRAM PLANNING												CARD OR JOB IDENTIFICATION: <i>Verify Payroll Master & Deductions</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	12
11	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	11
0	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	0
1	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	1
2	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	2
3	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	3
4	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	4
5	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	5
6	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	6
7	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	7
8	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	8
9	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	9

FIGURE 18. PROGRAM PLANNING CARD

<u>COLUMNS</u>	<u>FIELD HEADING</u>	<u>NORMAL PROGRAM</u>	<u>ALTERNATE PROGRAM</u>
1-9	Social Security No.	Key verify	Automatic skip
10-27	Employee Name	Key verify, alphabetic	Automatic verify
28	Sex	Key verify	Automatic skip
29	Tax Class	Key verify	
30-35	Date Hired	Automatic verify	
36-40	Employee Number	Key verify	Automatic verify
41-42	Occup. Code or Ded. Code	Key verify	Key verify
43-46	Base Rate	Key verify; 11-12 elimination in col. 44	Automatic skip
47-52	Rate Change Date	Automatic verify	
53-58	Fixed Deductions	Key verify (Insurance and Hospitalization coded as separate fields)	
59-68	Deduction Name	Automatic skip	Key verify, alphabetic
69-74	Misc. Ded. Amt.		Key verify; 11-12 elimination in col. 74
75-80	Effective Date		Key verify

FIGURE 19. TABLE FOR PROGRAM EXAMPLE

As the cards to be verified are analyzed, the planning card is marked for the functions to be performed in each column. For example, if an alphabetic character is to be verified in column 10 under normal program control, a mark is drawn through column number 10 in the 1 row; if columns 59-80 are to be automatically skipped under normal program control, a mark is drawn through column number 59 in the 11 row and column numbers 60-80 in the 12 row. The program card, or the individual cards of the master deck, can then be punched by reference to the planning card. After the program card is punched it can be checked by laying it over the planning card; the markings on the planning card should be seen through the punches in the program card.

Program Example

The functions marked on the card in Figure 18 constitute the program plan for the Payroll Master

and Deduction card in Figure 17. The field headings for the Payroll Master part of the card are located at the top of the card; the headings for the Deduction part are located between the 7 and 8 punching rows. A payroll master card is prepared for each new employee and is to be verified under normal program coding; miscellaneous deduction cards are punched for only those new employees who have deductions other than the fixed deductions, and are to be verified under alternate program coding. Wherever possible, common information is automatically verified in the deduction cards. The cards are punched in groups by date hired, and the rate change date for a new employee is the same as the date hired. All payroll master cards were prepunched with an X and sight-checked in column 44; all miscellaneous deduction cards were prepunched with an X and sight-checked in column 74. The program card is planned and punched as described in Figure 19.

Operating Suggestions

THE FOLLOWING suggestions are given as an aid to most efficient operation of the 56 Card Verifier.

Starting a Verifying Operation

When a new job is started, the release key should be depressed (but need not be held) after the main line switch is turned on. After a short time delay, a release cycle will occur indicating that operation can be started. The feed key should then be depressed twice to register the first card.

When master information for automatic verification is to be key verified in the first card of the group, the automatic skip and verify switch should be off. Various procedures for handling the verification of the first card of each group when an automatic verify field is included are explained on the following page.

Stopping a Verifying Operation

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

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 depress the release key. For this reason, once the program is turned on it should be left on, and whenever possible any temporary changes or interruptions in the verifying routine should be handled by the functional switches and keys.

Spacing Over Blank Columns

Without program control, the verify duplication key may be used to space over unpunched 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.

Corner Cuts

Cards can be designed with 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 corner cut when the card is tumbled.

Removing a Card from the Center of the Card Bed

A card may be removed from the center of the card bed without affecting the following cards by manually moving it into the reading station and depressing 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 positioned in the left of the card bed. For easy manual removal, the card can be moved to the extreme left by pressing down on the arm that extends from the reading station.

Removing a Card from the Verifying or Reading Station

If for any reason a card must be removed manually from the verifying or reading station, the pressure roll release lever should be held down while the card is pulled out.

Multiple-Punched Columns

Two or more digits may be verified in one column by holding the multiple punch key down while the digit keys are depressed one at a time. All punches in a column must be verified unless one of the verification elimination features is used.

Single Card Feeding

When cards are to be fed manually, one at a time, they should be placed directly in the card bed, to the right for verifying or in the center for reading. Single cards should not be inserted in the card hopper.

X Verifying and Skipping

Key verification of an X punched alone in a column of a numerical field normally causes skipping, but in an alphabetic field it does not. If this skipping is not desired, it 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. In the first method, if a figure instead of the X is ever keyed, the numerical shift key must be held down; in the second method, if the field is ever verified by use of the verify duplication key, the key must be depressed a second time or held over the blank column.

Key verification of an X and a digit punched in a column of a numerical field requires the use of the mutiple punch key, and depression of this key prevents the X skipping. Verification of an X automatically or by use of the verify duplication key does not cause skipping.

Keyboard Locking

If the operator depresses a key that does not correspond to the hole punched in the card, it is normal for the keyboard to become locked. When the operator senses that the keyboard is locked she can determine the digit to be re-verified by the visual reference method of associating the preceding punched columns with the source document. Before re-verification, the keyboard must be unlocked by depressing the error release key.

Other locking of the keyboard may be caused by any one of the following reasons:

1. The main line switch is turned off and then on while a card is registered at the verifying station. The keyboard may be unlocked by depressing the release key.
2. A card is registered at the verifying station and the register key is depressed unnecessarily. This causes the feed and release keys to lock. They are unlocked upon depression of a character key, the space bar, or the error release key.
3. A card is registered at the verifying station and the feed key is depressed unnecessarily.

This causes the register and release keys to lock. They are unlocked upon depression of a character key, the space bar, or the error release key.

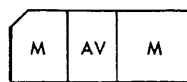
Suspending Automatic Verification on First Card

Master information in the first card of each new group must always be key verified. Automatic verification must, therefore, be suspended for that card by turning off the automatic skip-verify switch. Since this requires the manual setting of the automatic skip-verify switch each time master information changes, consideration should be given to proper card design as an aid to most efficient operation.

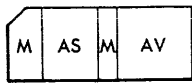
Below are several procedures for verifying the *first card of each group*. The procedures vary depending upon conditions brought about by differences in card design.

The abbreviations used in the card illustrations are:

- M—Manual key verification
- AS—Automatic Skip
- AV—Automatic Verify



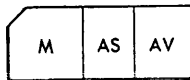
1. Whenever possible, the first field in a card should be programmed for manual operation. This gives the operator a chance to turn the automatic skip-verify switch off before she starts verifying the first card of a new group.
 - a. When the first card of a new group is registered at column 1, turn off the automatic skip-verify switch.
 - b. Key verify the complete card.
 - c. When the second card of the group is registered at column 1, turn on the automatic skip-verify switch. (The switch could have been turned on after the master information was key verified.)



2. An automatic verify field should not immediately follow an automatic skip field. Design a manually operated field between them if possible.

- Key verify the first field.
- Automatically skip the second field (automatic skip-verify switch on).
- Turn the automatic skip-verify switch off. Key verify the third field.
- Key verify the fourth field. Turn the automatic skip-verify switch on.

3. Sometimes other factors in the use of the cards make it necessary that an automatic verify field follow an automatic skip field. In such a case, the punching and verifying procedures should be studied and the best procedure followed. Three possible procedures are outlined below.



LONG SKIP FIELD

- Key verify the first field.
- Automatically skip the second field. During the skip, turn off the automatic skip-verify switch to prevent automatic verification in the following field. This can be done if the skip is fairly long.
- Key verify the third field and turn the automatic skip-verify switch on.

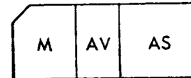
SHORT SKIP FIELD, UNPUNCHED

- Turn the automatic skip-verify switch off when the card is registered at column 1.
- Key verify the first field.
- Skip the second field by use of the skip key.
- Key verify the third field and turn the automatic skip-verify switch on.

SHORT SKIP FIELD, PUNCHED

- Key verify the first field.
- Automatically skip the second field.

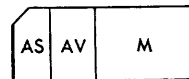
- When the first column of the third field containing a change in master information is reached, operation will stop and an error will be indicated. Depress the error release key to unlock the keyboard. Key verify the new information.



4. When an automatic verify field is immediately followed by an automatic skip field, the first card is verified as outlined below.

- Turn the automatic skip-verify switch off when the card is registered at column 1.
- Key verify the first field.
- Key verify the second field. Either during or at the end of this field, turn the automatic skip-verify switch on, so that the following field can be automatically skipped.
- Automatically skip the third field.

5. If an automatic skip field must come first in a card, immediately followed by an automatic verify field, the procedure for handling the verification is similar to that outlined in number 3 and is described below.



LONG SKIP FIELD

- Automatically skip the first field. During the skip, turn off the automatic skip-verify switch to prevent automatic verification in the second field. This can be done if the skip is fairly long.
- Key verify the second field. Turn the automatic skip-verify switch on.
- Key verify the third field.

SHORT SKIP FIELD

- Turn the automatic skip-verify switch off before the last card of a group is verified in column 80.
- Depress the skip key to skip the first field of the first card of the following group if that

field is blank. If the field is punched, follow the third procedure under illustration 3 above.

- c. Key verify the second field. Turn the automatic skip-verify switch on.
- d. Key verify the third field.



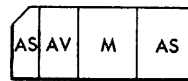
6. When automatic skip is programmed for the last field of a card and automatic verify is programmed for the first field, either of two procedures can be used between the last card of one group and the first card of the following group.

LONG SKIP FIELD

- a. As the last field of the last card of a group is being skipped, turn off the automatic skip-verify switch.
- b. Key verify the first field of the first card of the following group and turn on the automatic skip-verify switch.
- c. Key verify the second field and automatically skip the last.

SHORT SKIP FIELD

- a. Before the last card of a group is skipped out, turn off the automatic feed switch. This will stop automatic operations between the last card of one group and the first card of the following group.
- b. Turn off the automatic skip-verify switch.
- c. Depress the feed key.
- d. Key verify the first field of the first card of the new group and turn on both the automatic feed and automatic skip-verify switches.
- e. Key verify the second field and automatically skip the third.



7. When automatic skipping is programmed for the last and first fields of cards and automatic verifying for the second field, one of three procedures can be used between the last card of one group and the first of the following.

LONG SKIP IN FIRST FIELD

- a. Automatically skip the first field. During the skip turn off the automatic skip-verify switch. This is possible if the skip is fairly long, and will permit key verification of the second field.
- b. Key verify the second field. Turn on the automatic skip-verify switch.
- c. Key verify the third field and automatically skip the fourth.

SHORT SKIP IN FIRST FIELD, UNPUNCHED

- a. Before the last card of a group is skipped out, turn off the automatic feed switch.
- b. Turn off the automatic skip-verify switch.
- c. Depress the feed key.
- d. Skip the first field of the first card of the following group with the skip key.
- e. Key verify the second field. Turn on the automatic feed and automatic skip-verify switches.
- f. Key verify the third field and automatically skip the fourth.

SHORT SKIP IN FIRST FIELD, PUNCHED

- a. Automatically skip the first field.
- b. When the first column of the second field is reached, an error will be indicated and the operation will stop. Depress the error release key to unlock the keyboard. Key verify the new information.
- c. Key verify the third field and automatically skip the fourth.

Combination Keyboard Summary

ON THE keyboard chart (Figure 20) each key is numbered for purposes of description in the following summary.

Verifying Keys

Keys 1-18 can be depressed only when the keyboard is in alphabetic shift to verify the letters indicated.

Combination keys 19-29 can be depressed when the keyboard is in either numerical or alphabetic shift to verify the characters indicated below:

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

Keys 40-43, which are operative if so specified, verify multiple digits for eight special characters. They can be depressed when the keyboard is in either numerical or alphabetic shift to verify the characters shown below:

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 depressed at any time to cause spacing over an unpunched column of the card. This depression verifies that the column is blank; if it is punched, an error is signalled.

Functional Keys

30. NUM (numerical shift) shifts the combination keyboard into numerical position as long as it is held down. It is normally used to verify numbers in an otherwise alphabetic field.

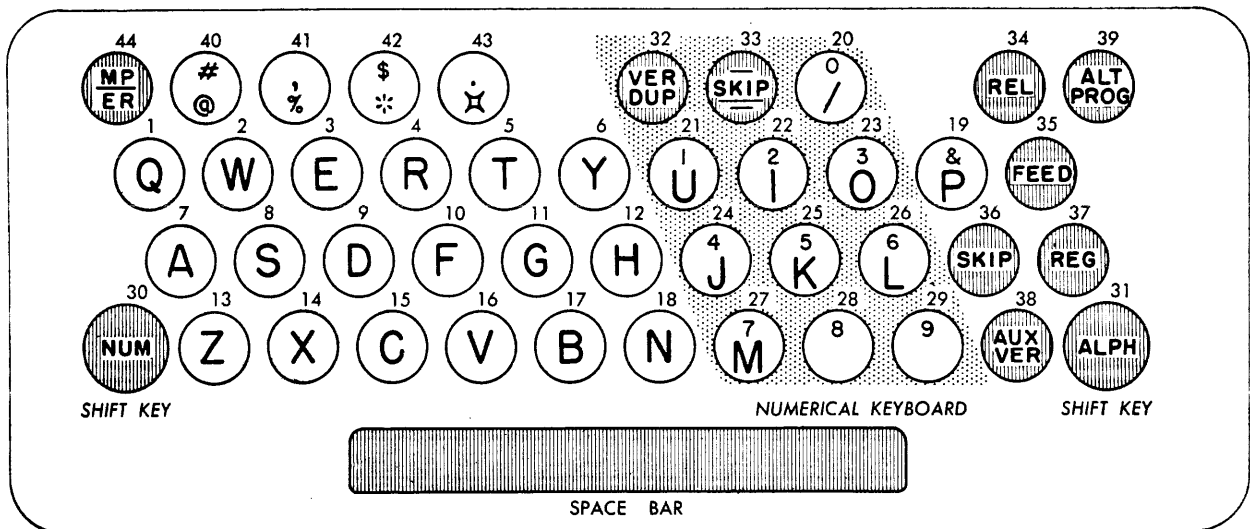


FIGURE 20. COMBINATION KEYBOARD CHART

If an error is detected while the numerical shift key is depressed in an alphabetically programmed field, the keyboard will stay in numerical shift for the second and third trials even though this key is no longer held down. If depression of the numerical shift key was in itself an error, the alphabetic shift key should be depressed when another attempt at verification is made.

31. ALPH (alphabetic shift) shifts the combination keyboard into alphabetic position as long as it is held down. It is normally used to verify letters in an otherwise numerical field.

If an error is detected while the alphabetic shift key is depressed in a numerical field, the keyboard will stay in alphabetic shift for the second and third trials even though this key is no longer held down. If depression of the alphabetic shift key was in itself an error, the numerical shift key should be depressed when another attempt at verification is made.

32. VER DUP (verify duplication) causes verification of the field in the card at the verifying station by comparing it with the preceding card.

With program control: a single depression causes verification of the *field* for which it is depressed, at the rate of 20 columns per second.

Without program control: causes verification only as long as the key is held depressed at the rate of 10 columns per second.

33. -SKIP (OR) -.

-SKIP *in numerical shift:* verifies an 11 (-) punch and causes skipping of the field for which it is depressed.

- *in alphabetic shift:* verifies an 11 (-).

34. REL (release) causes the cards at the verifying and reading stations to be advanced completely past those stations. Fields programmed for automatic verification beyond the point of release are verified before release is completed. Whenever a card is released, the final OK notch in the right end of the card is omitted.

35. FEED (card feed) causes a card feed cycle.

1. Feeds a card from the hopper.
2. Registers the cards at the verifying and reading stations.

3. Stacks the card from the left of the card bed.

36. SKIP causes skipping of the field for which it is depressed. It is normally used to skip the unused right-hand portion of an alphabetic field. This key verifies the column in which it is depressed as blank; if the column is punched, an error is signalled.

The skip key can be depressed, in lieu of a second or third attempt at verification of an error column, to skip the rest of the field. In this case the error column is notched if it is punched.

37. REG (card register) is used primarily when inserting cards manually:

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

38. AUX VER (auxiliary verify) is operative only when the machine is equipped with the auxiliary verification feature. It causes verification by comparison with a master card on an auxiliary drum. Under program control, one depression of the key verifies an entire field; without program control, one depression verifies one column.

39. ALT PROG (alternate program) is operative only when the machine is equipped with the alternate program feature. This key is depressed, either at the beginning or during the card cycle, for each card requiring alternate instead of normal program control. If the key is depressed when a card is *not* registered at the verifying station, it also causes a feed cycle.

44. MP-ER (multiple punch-error release) is a dual-purpose key: (1) it prevents normal spacing of the card as long as it is held depressed, thus permitting the verification of two or more punches in one column; or (2) it releases the keyboard whenever it becomes locked for any reason during a verifying operation. The keyboard is in numerical shift when the key is depressed for the verification of multiple digits in a column.

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