33 KEYBOARD

GENERAL DESCRIPTION AND PRINCIPLES OF OPERATION

CONTENTS

1. GENERAL

1.01 This section provides general description and principles of operation for the 33 keyboard. It is reissued to include keyboards for the 3300 Series Coded Sets and for Computer Input/Output (I/O) Sets, to include the numeric keyboard, and to incorporate engineering changes. Marginal arrows indicate changes and additions. However, marginal arrows have been omitted from Parts 6 and 7 because all information in these two parts is new.

1.02 Both the nonparity (Figure 1) and parity keyboards (Figure 2) are covered in this section.

1.03 The 33 nonparity and parity keyboards are electromechanical apparatus used to mechanically select and electrically transmit ASCII (American National Standard Code for Information Interchange).

1.04 The functional difference between the nonparity and parity keyboards is in the control of the eighth level pulse:

(a) With nonparity keyboards the eighth pulse is always marking.

(b) With parity keyboards the eighth pulse changes so that an even number of marking pulses is transmitted for every character.

Note: For further details on ASCII and transmission principles refer to Section 574-122-100TC covering the 33 Typing Unit.

1.05 References to left, right, front, rear, etc consider the keyboard as viewed by the operator.

1.06 In the illustrations fixed pivots are solid black, and floating pivots — those mounted on parts that move — are crosshatched.

CAUTION: DISCONNECT ALL POWER FROM THE KEYBOARD PRIOR TO INSPECTION.

2. TECHNICAL DATA

Note: This equipment is intended to be operated in a room environment within the temperature range of 40°F to 110°F. Serious damage to it could result if this range is exceeded. In this connection, particular caution should be exercised in using acoustical and other enclosures.

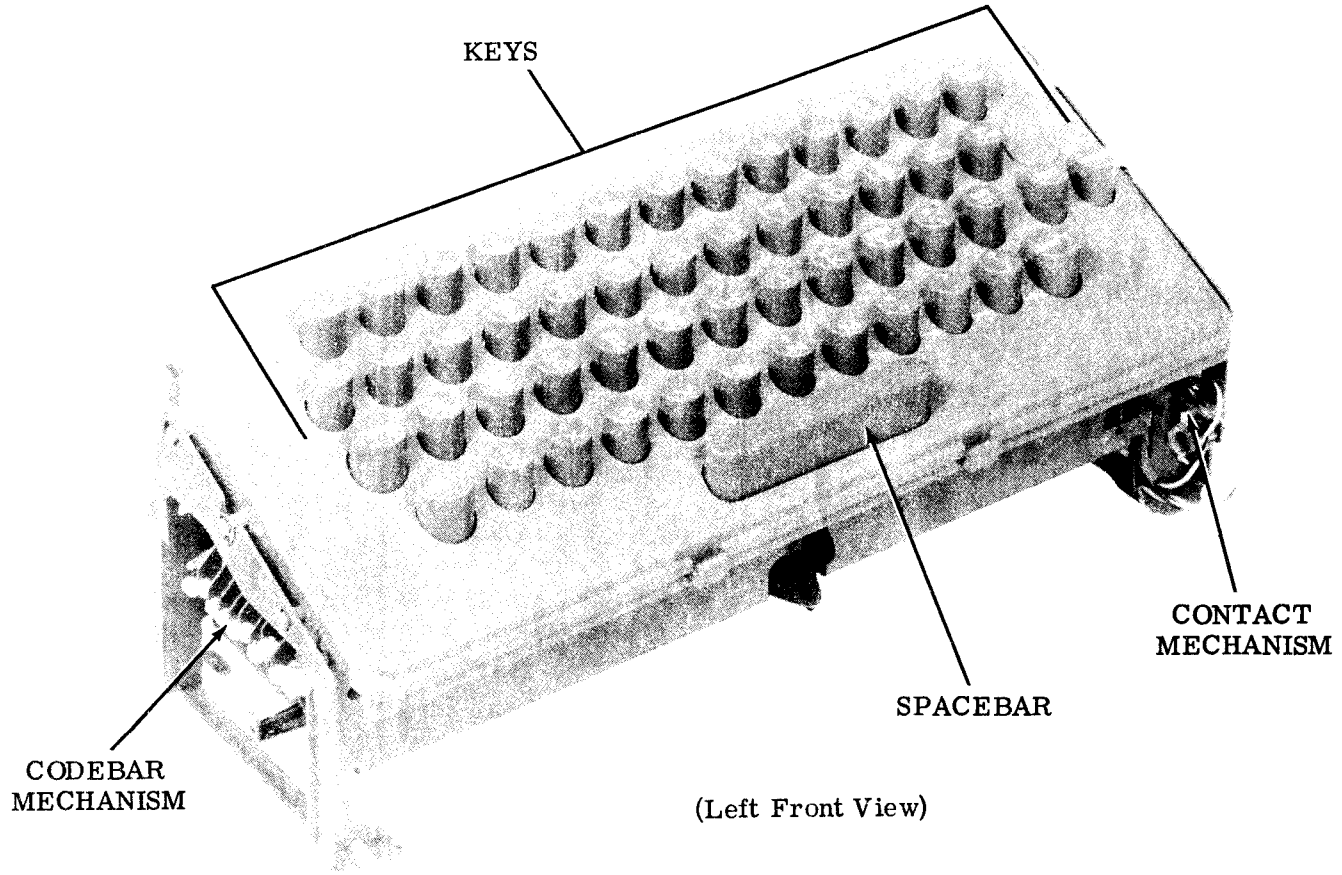


Figure 1 - Nonparity Keyboard

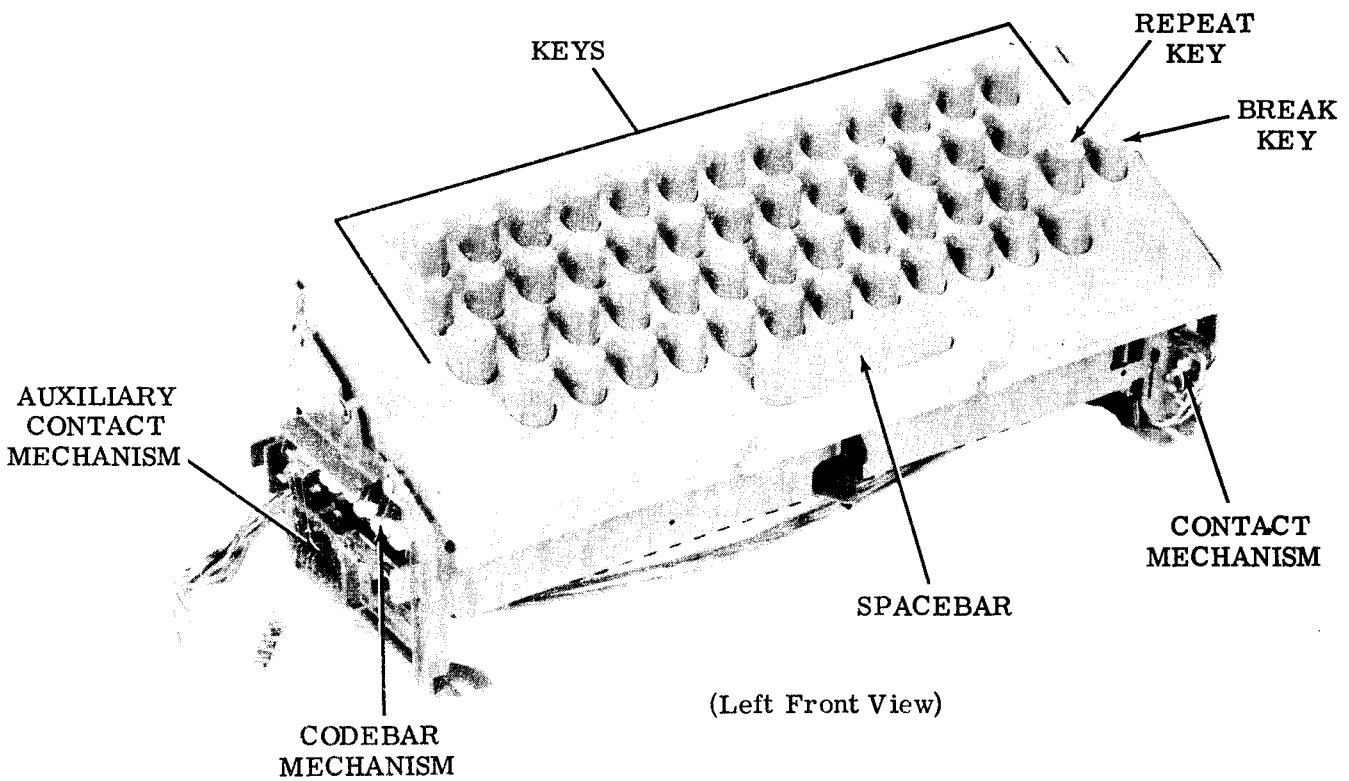


Figure 2 - Parity Keyboard

	b7	0	0	0	0	1	1	1	1
	b6	0	0	1	1	0	0	1	1
	b5	0	1	0	1	0	1	0	1
b4	b3	b2	b1							
0	0	0	0	NUL	DLE	SP	0	@	P		
0	0	0	1	SOH	DC1	!	1	A	Q		
0	0	1	0	STX	DC2	"	2	B	R		
0	0	1	1	ETX	DC3	#	3	C	S		
0	1	0	0	EOT	DC4	$	4	D	T		
0	1	0	1	ENQ	NAK	%	5	E	U		
0	1	1	0	ACK	SYN	&	6	F	V		
0	1	1	1	BEL	ETB	'	7	G	W		
1	0	0	0	BS	CAN	(	8	H	X		
1	0	0	1	HT	EM	)	9	I	Y		
1	0	1	0	LF	SUB	*	:	J	Z		
1	0	1	1	VT	ESC Note 6	+	;	K	[		
1	1	0	0	FF	FS	,	<	L	\		! Note 2
1	1	0	1	CR	GS	-	=	M	]		Note 5
1	1	1	0	SO	RS	.	>	N	^		Note 7
1	1	1	1	SI	US	/	?	O	—		DEL

NUL - Null
SOH - Start of Heading
STX - Start of Text
ETX - End of Text
EOT - End of Transmission
ENQ - Enquiry
ACK - Acknowledge
BEL - Bell
BS - Backspace
HT - Horizontal Tabulation
LF - Line Feed
VT - Vertical Tabulation
FF - Form Feed
CR - Carriage Return
SO - Shift Out
SI - Shift In
DLE - Data Link Escape
DC - Device Control
NAK - Negative Acknowledge
SYN - Synchronous Idle
ETB - End of Transmission Block
CAN - Cancel
EM - End of Medium
SUB - Substitute
ESC - Escape
FS - File Separator
GS - Group Separator
RS - Record Separator
US - Unit Separator
SP - Space
DEL - Delete

LOCKED OUT BY CONTROL

NOT APPLICABLE TO 33 EQUIPMENT

SHIFT CHARACTERS ⌋5 ⌋8

CONTROL CHARACTERS -7 ⌋8

LOCKED OUT BY SHIFT

Note 1: 1 = Mark, 0 = Space.

Note 2: Cannot be generated from keyboard.

Note 3: Blocks not indicating SHIFT or CTRL characters contain primary key characters.

Note 4: Filled-in corners or blocks indicate 8th pulse marking (in nonparity units, 8th pulse is always marking).

Note 5: This code can be generated on model 33 nonparity keyboards by depressing the ALT MODE key.

Note 6: The ESC control function may be generated by depressing the ESC key or by simultaneously depressing the K, SHIFT, and CTRL keys.

Note 7: One keyboard generates ESC for this code combination.

Figure 3 - 33 Application of ASCII

2.01 Dimensions and Weight (Approximate)

Height	5 inches
Width	12-1/2 inches
Depth	5 inches
Weight	4-1/2 pounds

2.02 Electrical

Long loops	0.015 to 0.070 ampere, 48 to 240 volts dc inductive
Short loops (local operation)	0.058 to 0.072 ampere, 16 to 22 volts dc resistive

2.03 Transmission Code

Level	8

3. ASCII

3.01 The 33 keyboard operates according to ASCII. Figure 3 shows the 1968 version of the code used in 33 keyboards. The SHIFT and CONTROL characters, their associated keytop operation lockouts, and parity operation are also illustrated.

4. OUTLINE OF OPERATION

4.01 Transmission of messages is accomplished by an operator selectively depressing the keys and spacebar of the keyboard in the same manner as in typing. The downward movement of each key or the spacebar is translated by a codebar mechanism into a mechanical arrangement corresponding to the code combination representing the character on the keytop. The mechanical arrangements set up the code combinations in a set of keyboard contacts, and, by parallel output, the code combinations are transmitted to a distributor mechanism. A universal mechanism trips a distributor clutch, and a distributor mechanism then translates the parallel output from the keyboard contacts into corresponding start-stop signal for application to the transmission facilities.

5. DETAILED OPERATION

A. Codebar Mechanism

5.01 The codebar mechanism is illustrated in Figure 4.

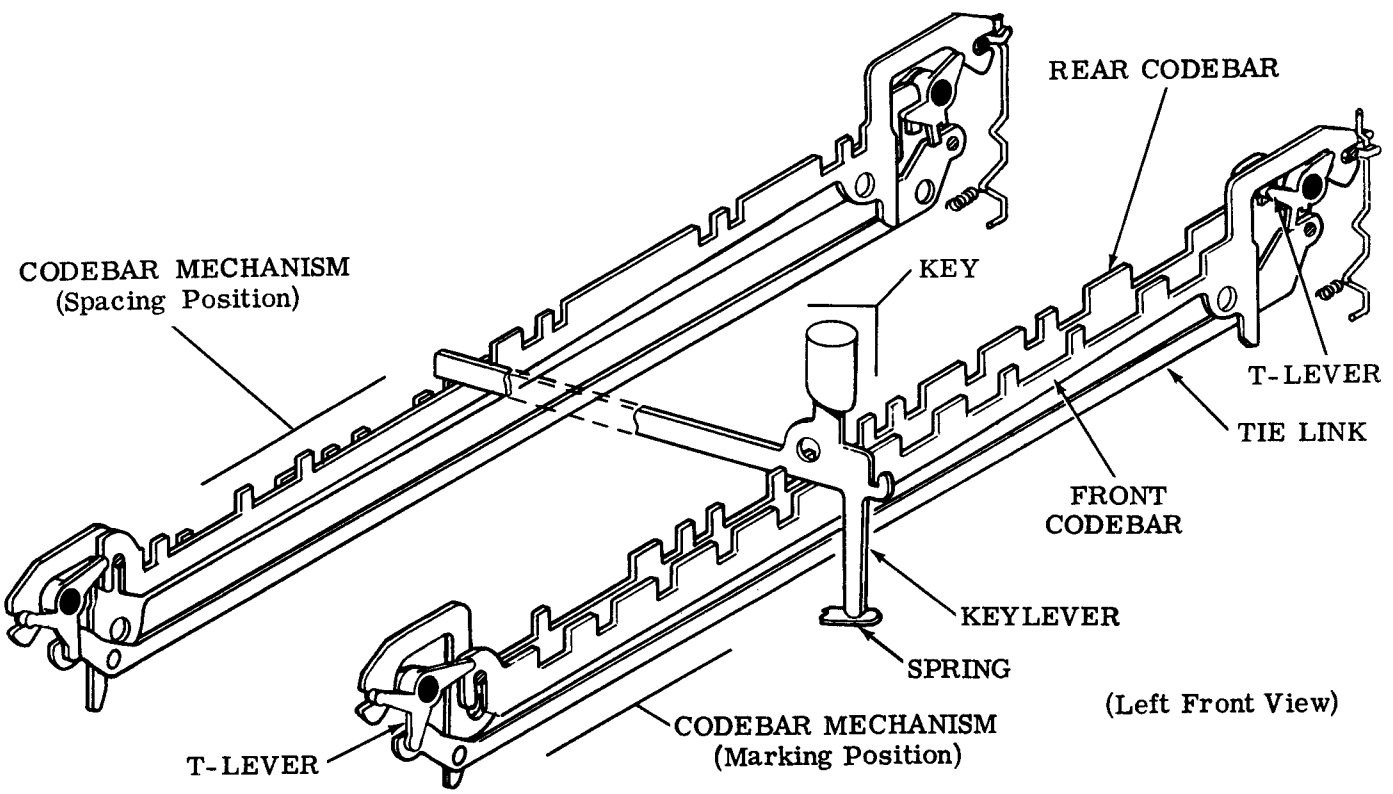


Figure 4 - Codebar Mechanism

5.02 For each level in the code there is a codebar mechanism which consists of a front codebar, a rear codebar, a tie link, and two T-levers. Thus in the 33 keyboard there are 8 pairs of codebars whose function is to set up 8 pairs of contacts in a coded arrangement representing the key depressed. The codebar mechanism also contains a shift mechanism (Figure 8) which consists of a front and rear codebar, a tie link, and two (three in parity keyboards) T-levers. Both the parity and nonparity keyboards contain a control blocking mechanism operated by the CTRL key. It consists of a tie link and two T-levers. The order in which the codebar mechanism is arranged varies, but the following may be considered typical. Thus from front to rear:

Nonparity Keyboard	UNIV, 1, SHIFT, 2, 3, 4, 5, 6, 7, CTRL
Parity Keyboard	UNIV, 1, 8, 2, 3, 4, 5, 6, 7, SHIFT, CTRL

5.03 The codebars have slots in their top edges which codes them so they are selectively depressed by the keys' keylevers. Each mechanism has a marking and a spacing position. In the marking position, the front codebar is down, the rear codebar is up, and the right T-lever is in the clockwise position. The spacing position is the opposite: front codebar up, rear codebar down, and right T-lever in counterclockwise position.

5.04 The two codebars in each mechanism are coded so that where one has a slot the other is solid. When a character key is depressed, it is returned to its up position by a leaf spring on the underside of the keyboard. However, the code combination set up in the codebars is retained until another key is depressed. When another key is depressed, only the mechanism whose code elements differ from those of the preceding combination are operated.

5.05 As an example assume that the letter E has been transmitted. The E code combination 1-3---78 remains in the codebar mechanisms. Now assume that the I (1--4--78) key is depressed. Its keylever encounters a slot in the rear codebar of the no. 1, 7, and 8 codebar mechanisms. Thus these mechanisms remain marking. In the case of the no. 2, 5, and 6 codebar mechanisms, the keylever encounters a slot in the front codebar, and they remain spacing. In the case of the no. 3 codebar mechanism, the keylever encounters the solid portion of the rear codebar and shifts it to its spacing position. In a similar manner, the keylever encounters the solid portion of the front codebar of the no. 4 codebar mechanism and shifts it to the marking position.

5.06 Since each code combination is different and is locked in the codebar mechanisms, the complementary coding of the codebars serves as an interlock for the keylevers. When one keylever is depressed, another cannot be depressed because it will be blocked by the solid portion of one or more codebars.

B. Universal Codebar Mechanism

5.07 The universal codebar mechanism is illustrated in Figure 5.

5.08 As a keylever nears the bottom of its travel, it depresses a codebar which is part of the universal codebar mechanism. The codebar, in turn, causes associated T-levers to pivot and a tie link to move to the left. After some free movement, the tie link encounters a tab on a nonrepeat lever and pivots the latter to the left. The tab, in turn, pivots a latchlever which releases a universal lever. Under spring pressure, the universal lever moves up and lifts the nonrepeat lever so that its tab is moved from between the universal tie link and the latchlever. Under spring pressure, the latchlever and nonrepeat lever move back to the right to their unoperated position.

5.09 In its up position, the universal lever locks the right intelligence T-levers in the positions set up by the keylever, permits a contact bail to pivot to its down position and, through a trip linkage, trips the distributor clutch. Near the end of the distributor cycle, the trip linkage moves the universal lever back to its down position where it is latched by the latchlever.

5.10 Should the keylever remain depressed beyond the end of the distributor cycle, when the universal lever moves to its down position, the nonrepeat lever under spring tension moves down until it hangs up on the top of the universal tie link which is still in its left position. When the keylever is finally released, the tie link moves back to the right and permits the nonrepeat lever to move all the way down so that its tab is again between the tie link and the latchlever. The trip mechanism operates in this way to prevent the distributor clutch from being retripped when a keylever is held down.

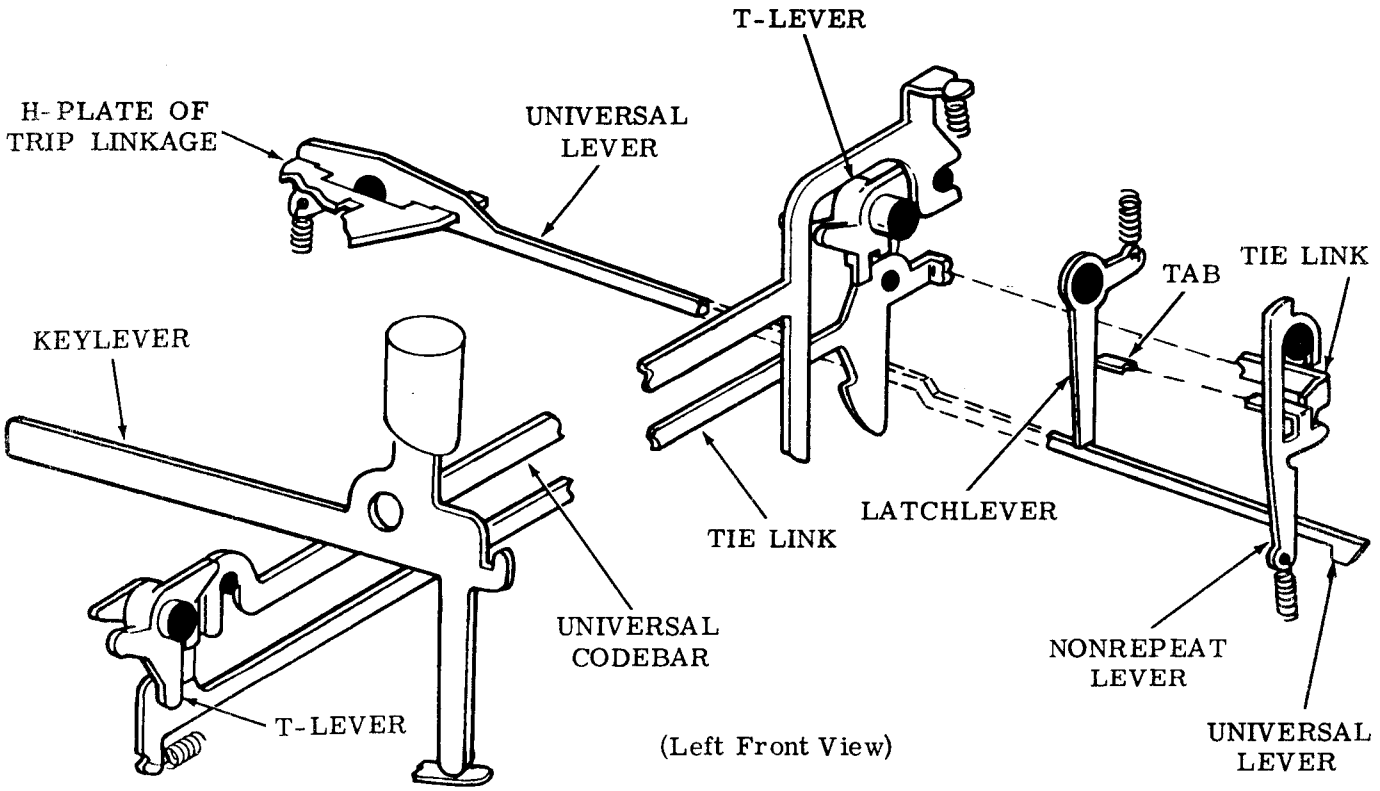


Figure 5 - Universal Codebar Mechanism

C. Keyboard Contact Mechanism

5.11 The keyboard contact mechanism is illustrated in Figure 6.

5.12 The codebar mechanisms set up the code combinations in a set of keyboard contacts. A contact wire is associated with each right T-lever, excluding the universal. In the stop condition of the keyboard, a contact bail is held in its up position by the universal lever. The contact bail holds the contact wires to the right, away from the T-levers.

5.13 When a keylever is depressed, a code combination is set up in the codebar mechanisms. The universal lever moves to its up position and permits the contact bail to pivot under spring tension to its down position. The contact wires associated with the T-levers that are in the marking (clockwise) position are permitted, under spring tension, to move to the left against a common terminal. Those associated with the T-levers that are in the spacing (counterclockwise) position are held to the right

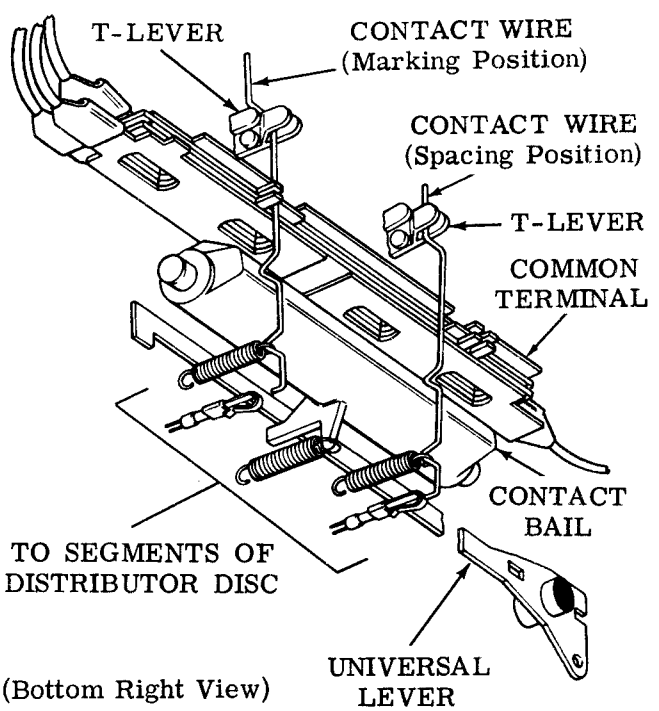


Figure 6 - Keyboard Contact Mechanism

away from the terminal. For example, if the I code combination (1--4--78) is set up in the code-bar mechanism, the no. 1, 4, 7, and 8 contact wires are against the common terminal. Similarly the no. 2, 3, 5, and 6 contact wires are away from the common terminal.

Note: When the universal lever is at the peak of its upward travel, it locks the T-levers in their assumed positions (Figure 7). This eliminates the possible loss of a marking or spacing pulse as a result of blocking T-levers repositioning during keyboard transmission.

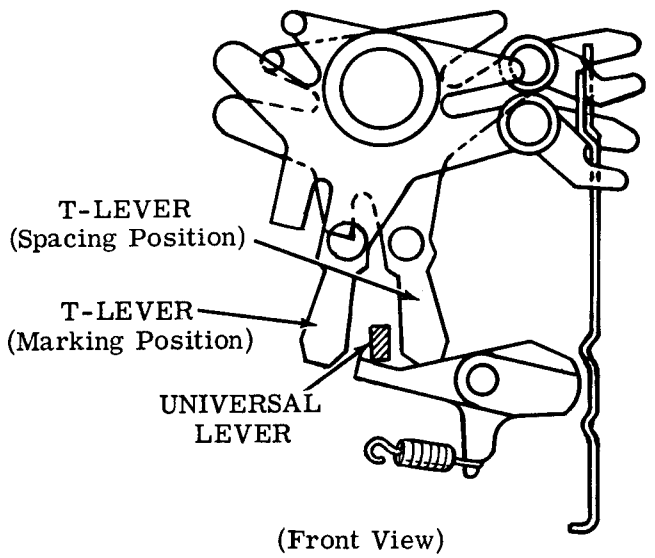


Figure 7 - T-Lever Positioning

5.14 The distributor mechanism converts these positions to start-stop signals. Near the end of the distributor cycle, the universal lever moves back to its down position and pivots the bail to its up position. The bail in turn cams the contact wires back to the right and holds them there in the stop position.

D. Line Break

5.15 When the BREAK key is depressed, it pivots a T-lever which opens the break contact. This action opens the signal line until the BREAK key is released.

E. Repeat

5.16 To repeat the transmission of a character, its keylever is held down along with the REPT keylever. The latter holds the nonrepeat lever down where its tab remains between the tie link and the latchlever (Figure 5). The latchlever is held in its left position and does not latch the universal lever at the end of the cycle. The universal lever thus moves up and trips the distributor clutch causing the character to be retransmitted as long as the REPT key is depressed.

F. HERE IS

5.17 When the HERE IS key is depressed, its keylever pivots linkages in the typing unit which in turn activate the local answer-back.

G. Keyboard — Typing Unit Interface

5.18 The H-plate (Figure 5) serves as the mechanical interface between the keyboard and the typing unit.

5.19 After a key is depressed and the keyboard contacts are positioned, the universal lever moves to its up position. This upward movement is transferred by the H-plate to the distributor clutch linkage, to trip the distributor clutch. Near the end of the distributor cycle the trip linkage, through the H-plate, resets the universal lever back to its lower position.

H. Nonparity Operation

5.20 Figure 9 is a simplified schematic of the signal wiring for the nonparity keyboard.

5.21 Intelligence transmitted from the nonparity keyboard is that of the ASCII system. The keyboard contains two SHIFT keys and one CTRL (Control) key (Figure 8). The control key, utilizing a tie link and T-levers, operates a contact wire in the contact mechanism. The SHIFT key is used to generate the code combinations for printing characters appearing on the upper keytop (eg $ above the 4). The CTRL key is used to generate the codes for the nonprinting control characters appearing on the upper keytops (eg EOT above the D). Simultaneous use of both CTRL and SHIFT keys allows access to special control functions, such as NULL. In every case, the SHIFT and/or CTRL keys must be held down while the appropriate character key is depressed.

5.22 The SHIFT key inverts the no. 5 code element on all 33 keyboards. If the element is normally marking, it makes it spacing; if the element is normally spacing, it makes it

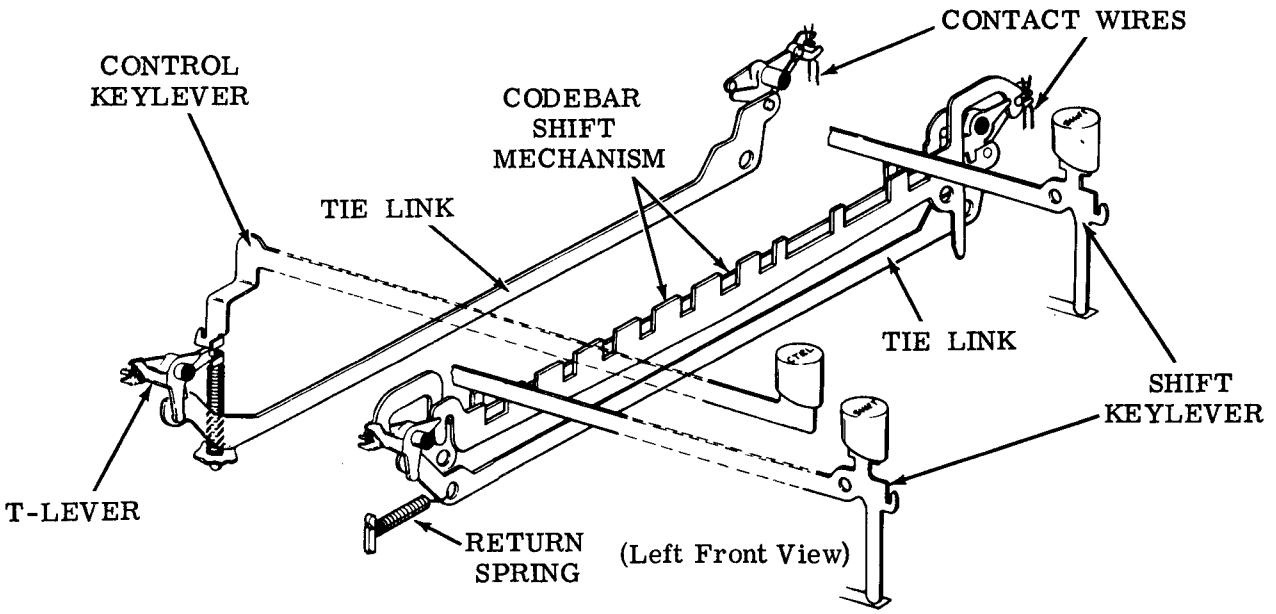
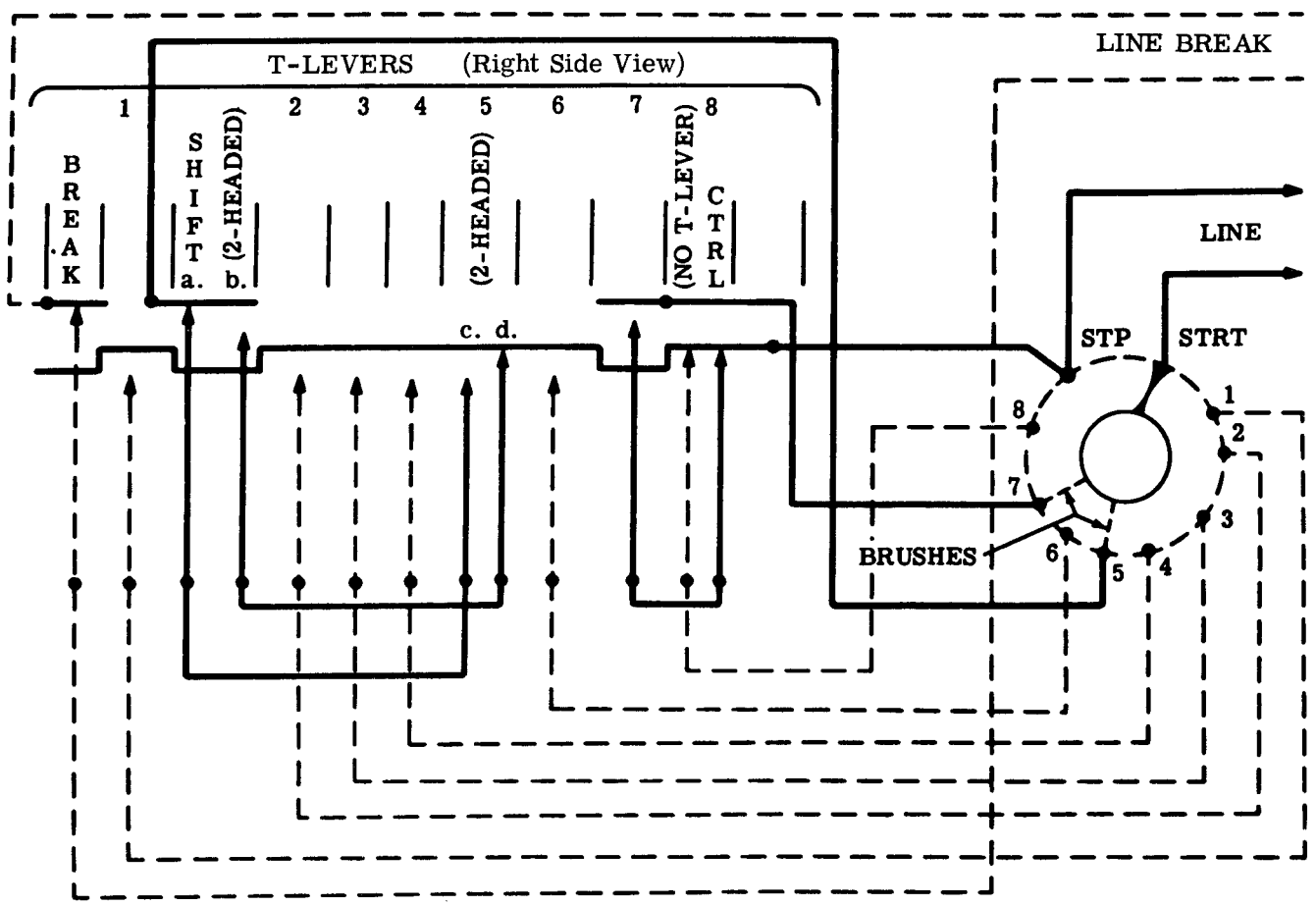


Figure 8 - SHIFT and CTRL Mechanisms — Nonparity Keyboard



Note: Intelligence contacts shown in spacing position.
Shift contacts shown in unoperated position.

Figure 9 - Contact Schematic — Nonparity Keyboard

marking. It does this by two 2-headed T-levers, one at the shift position, and one at the no. 5 position, each of which operates two contact wires, alternately opening one and closing the other. As shown in Figure 9, in the spacing condition, the "c" contact associated with the no. 5 T-lever is open, and the "d" contact is closed. In its unoperated position, the "a" contact associated with the SHIFT T-lever is closed, and the "b" contact is open. For example, if the "4" key alone is depressed, the code combination for "4" (--3-56-8) is set up in the keyboard contacts and subsequently transmitted. In this case, the 2-headed no. 5 T-lever holds the "c" contact closed and the "d" contact open, resulting in a marking no. 5 code element. (The signal path is through the stop distributor disc segment, the common terminal, the closed "c" contact, the closed "a" contact, the no. 5 distributor disc segment, the brushes, the inner distributor disc, and the start distributor disc segment, as shown in Figure 9.)

5.23 If the "4" key is depressed with the SHIFT key, the same condition is set up in the keyboard contacts, except that the 2-headed shift T-lever holds the "a" contact open and the "b" contact closed and thus opens the signal circuit. This results in the no. 5 code element being spacing rather than marking, and the code combination for "$" (--3--6-8) being transmitted.

5.24 If the "N" key alone is depressed, the code combination for "N" (-234--78) is set by the codebars and subsequently transmitted to the line. In this case, the 2-headed no. 5 T-lever holds the "c" contact open and the "d" contact closed. On the other hand, if the "N" key is depressed with the SHIFT key, the same condition is set up in the keyboard contacts as before, except that the SHIFT key opens the "a" contact and closes the "b" contact and thus closes the signal circuit. This results in the no. 5 code element being marking rather than spacing and the code combination for ∧ (-2345-78) being transmitted.

5.25 The CTRL key converts the no. 7 code element from marking to spacing. For example, if the "E" key alone is depressed, the "E" code combination (1-3---78) is set up in the keyboard contacts and subsequently transmitted. (The path of the current for the marking no. 7 code element is through the stop distributor disc segment, the common terminal, the closed control contact, the closed no. 7 contact, the no. 7 distributor disc segment, the brushes, the inner distributor disc, and the start distributor disc segment.) If the "E" key is held down with the CTRL key, the same condition as before is set up in the contacts, except that the control T-lever opens the control contact and thus breaks the signal circuit. This results in the no. 7 code element being spacing and the code combination for "ENQ" (1-3----8) being transmitted.

I. Parity Operation

5.26 The parity keyboard facilities are similar to those of the nonparity keyboard. The functional difference between parity and nonparity keyboards is in the control of the 8th level pulse.

5.27 These differences include the adding of a codebar mechanism to generate binary information for the eighth intelligence element. In addition, the SHIFT key operates an expanded shift codebar mechanism (Figure 10) which operates three 2-headed T-levers, two 2-headed T-levers control contact wires at the contact mechanism, and one 2-headed T-lever controls contact wires at an added auxiliary contact mechanism (Figure 10). Also, the CTRL key directly operates a 2-headed T-lever which controls contact wires at the auxiliary contact mechanism.

5.28 Figure 10 illustrates how the CTRL key acts to mechanically block all keys which normally have the no. 6 code element marking. When the CTRL key is depressed, a tab on the keylever engages the rear codebar of the no. 6 codebar mechanism and forces it into its spacing position. Simultaneously, the front codebar moves up, and the solid portions on it block the keylevers of all characters which normally have their no. 6 code element marking. This blocking action will prevent false characters from being transmitted.

Note: Keyboard lockout (keylever downward travel blocked by codebar mechanism) may occur if SHIFT or CTRL keytops are only partially depressed when the universal codebar mechanism is activated. To clear the lockout, again depress and release the SHIFT or CTRL keytops and, if necessary, also depress and release the specific primary keytop with which the lockout occurred.

5.29 The SHIFT key inverts the no. 5 and no. 8 code elements on the parity keyboard. If either element is normally marking, it makes it

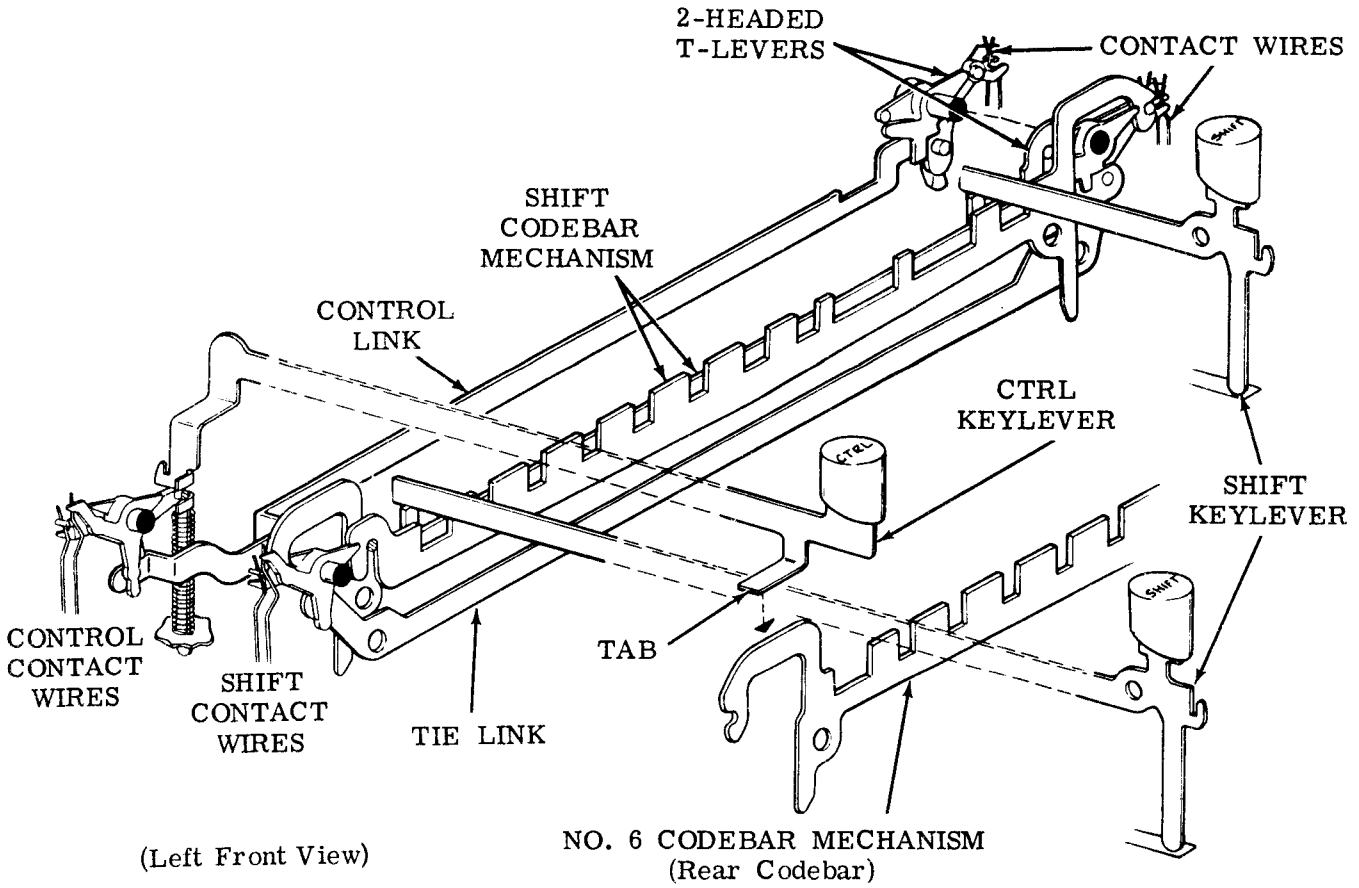
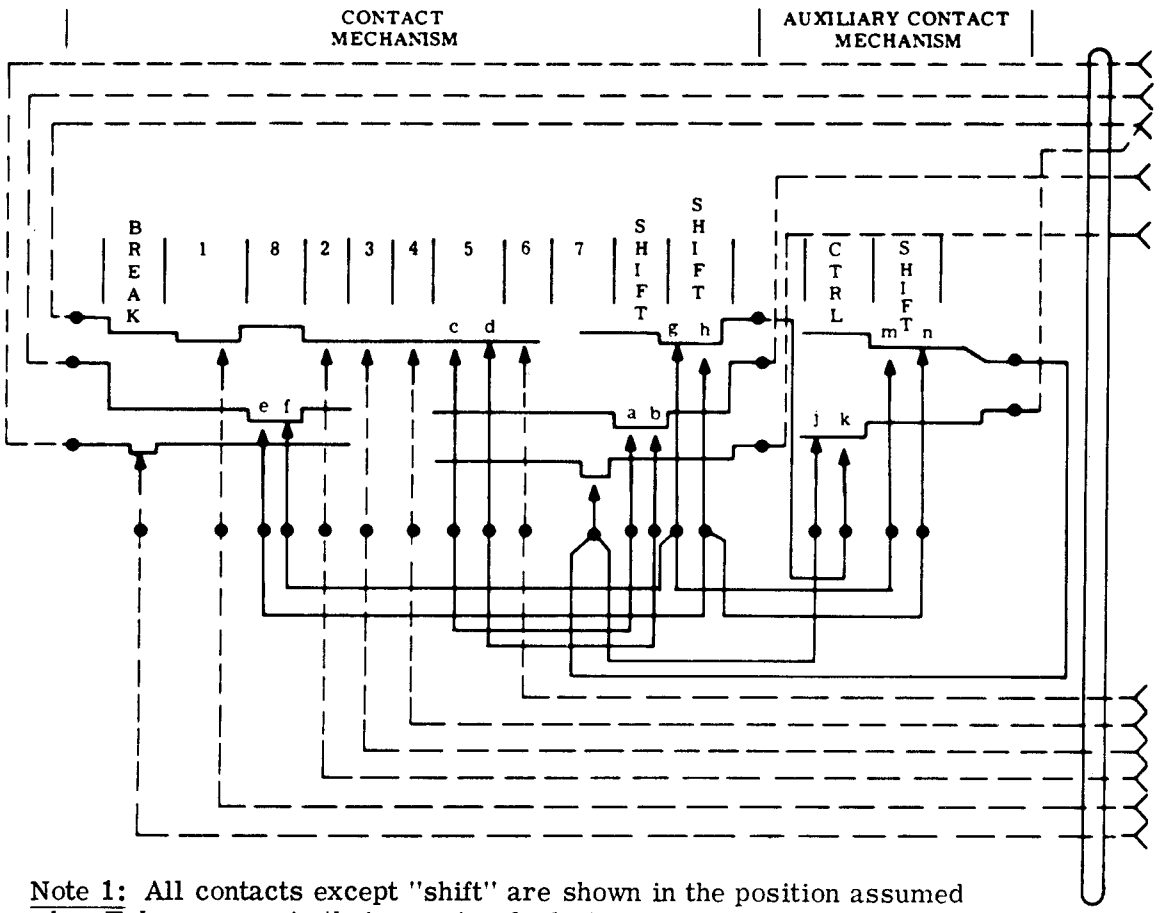


Figure 10 - SHIFT and CTRL Key Operation — Parity Keyboard

spacing; if either element is spacing, it makes it marking. This is accomplished by several 2-headed T-levers — one at the no. 5 position, two at the shift position on the contact mechanism, and one at the shift position on the auxiliary contact mechanism. Each 2-headed T-lever operates two contact wires, alternately opening one and closing the other. As shown in Figure 11 in the spacing condition, the "c" contact associated with the no. 5 T-lever and the "e" contact associated with the no. 8 T-lever are open, and the "d" and "f" contacts, respectively, are closed. In their unoperated positions, with the universal lever latched, the "b", "h", and "m" contacts associated with shift T-levers are open, while the "g" and "n" contacts are closed.

Note: The "a" contact is open on early design units equipped with the TP180043 shift marking contact wires and closed on late design units equipped with the TP186417 marking contact wires.

When the universal lever is tripped and the contact bail is pivoted, the "a" contact will be in the closed condition unless the SHIFT key is depressed, which will open the "a" contact and close the "b" contact. In addition, the "h" and "m" contacts will close and the "g" and "n" contacts will open. For example, if the "4" key alone is depressed, the code combination for "4" (--3-56-8) is set up in the keyboard contacts and subsequently transmitted. In this case, the 2-headed no. 5 T-lever holds the "c" contact closed and the "d" contact open, resulting in a marking no. 5 code element. The current path is from the connector, through the common terminal, the closed "c" contact, the closed "a" contact and terminal, and back to the connector. Since the no. 8 code element is to be marking, the 2-headed no. 8 T-lever holds the "e" contact closed and the "f" contact open. The current path is from the connector, through a terminal and the "e" contact, through the closed "n" contact and terminal, through the closed "j" contact and terminal, and back to the connector.



Note 1: All contacts except "shift" are shown in the position assumed when T-levers are in their counterclockwise position with universal lever latched.

Note 2: The "a" contact is open on early design units equipped with the TP180043 shift marking contact wires and closed on late design units equipped with the TP186417 marking contact wires.

Figure 11 - Contact Schematic — Parity Keyboard

5.30 If the "4" key is depressed with the SHIFT key, the same condition is set up in the keyboard contacts, except 2-headed T-levers hold the "a", "g", and "n" contacts open and the "b", "h", and "m" contacts closed. Thus, the current paths for the no. 5 and no. 8 code elements are open. This results in the no. 5 and no. 8 code elements being spacing rather than marking, and the code combination for $ (--3--6--) is transmitted.

5.31 If the "N" key alone is depressed, the code combination for "N" (-234--7-) is set up by the codebars and subsequently transmitted to the line. In this case, 2-headed T-levers at the no. 5 and no. 8 positions, respectively, hold the "c" and "e" contacts open and the "d" and "f" contacts closed. On the other hand, if the "N" key is depressed with the SHIFT key, the same condition is set up in the keyboard contacts as before, except that T-levers associated with the shift position open the "a", "g", and "n" contacts and close the "b", "h", and "m" contacts. Thus current paths for the no. 5 and no. 8 code elements are closed. This results in the no. 5 and no. 8 code elements being marking rather than spacing, and the code combination for ∧ (-2345-78) is transmitted.

5.32 The CTRL key converts the no. 7 code elements from marking to spacing and inverts the no. 8 code element. When the CTRL

key is operated, the no. 7 code element will always be spacing. Also, the no. 8 code element will be made spacing if it is normally marking; it will be made marking if it is normally spacing. For example, if the "D" key alone is depressed, the code combination (--3---7-) is set up in the keyboard contacts and subsequently transmitted. The current path for the marking no. 7 code element is from the connector, through the terminal and the closed no. 7 contact, through the closed "j" contact and terminal, and to the connector. Since the no. 8 code element is to be spacing, the 2-headed no. 8 T-lever holds the "e" contact open and the "f" contact closed, and there is no current path. If the "D" key is held down with the CTRL key, the same condition as before is setup in the contacts, except the 2-headed control T-lever opens the "j" contact and closes the "k" contact. This breaks the current path through the no. 7 contact, but closes the path through the "f" contact of the 2-headed no. 8 T-lever. The current path for the no. 8 code element is from the connector, through the terminal and closed "f" contact, through the closed "g" contact and terminal, through the closed "k" contact and terminal, and to the connector. This operation results in the no. 7 code element spacing and the no. 8 code element being marking. Thus, the code combination for "EOT" (--3----8) is transmitted.

6. KEYBOARDS FOR 3300 SERIES CODED SETS AND COMPUTER INPUT/OUTPUT SETS

KEYBOARDS FOR 3300 SERIES CODED SETS

6.01 A typical keyboard arrangement for the 3300 Series Coded Sets is shown in Figure 12. Keyboards for these sets are shipped from the factory with even parity installed. The customer may:

(a) Retain even parity, or

(b) Wire the keyboard for the 8th bit always marking, or

(c) Wire the keyboard for the 8th bit always spacing.

6.02 These wiring options are implemented by connecting wires to terminals at the right front of the keyboard, and at the left contact block. The options and the corresponding wiring are shown in Keyboard Wiring Options Table.

KEYBOARD WIRING OPTIONS TABLE

OPTION	LEAD 1	LEAD 2	LEAD 3	LEAD 4
Even parity	ON	OFF	OFF	ON
8th bit always mark	OFF	ON	ON	ON
8th bit always space	Either LEAD 1 or LEAD 2 ON or both OFF.		ON or OFF	OFF

Note: Refer to 9334WD for identification of leads.

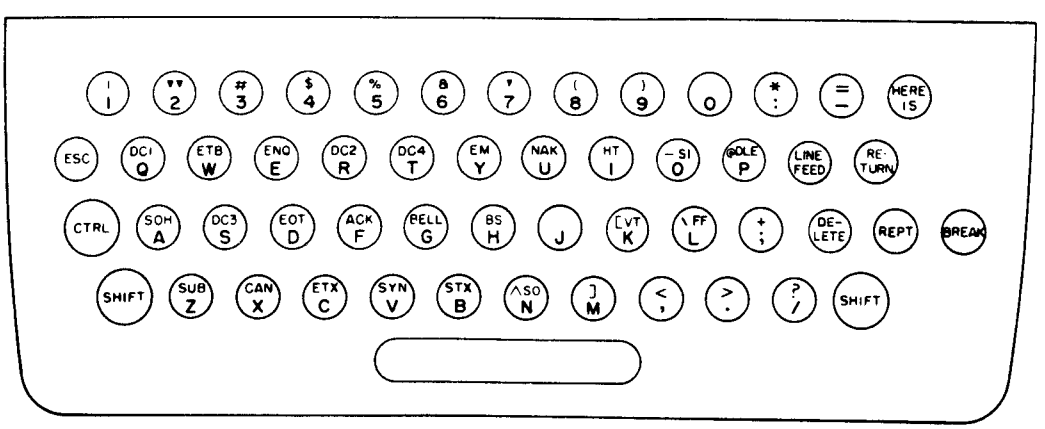


Figure 12 - Typical Keyboard Arrangement for 3300 Series Coded Sets

KEYBOARDS FOR COMPUTER INPUT/OUTPUT SETS

6.03 The keyboard for Computer I/O Sets is an even parity keyboard similar to the keyboard described in Part 5 except that a lock mechanism is added. The keyboard arrangement is shown in Figure 13. Refer to Part 5 for details on the operation of the various mechanisms of the keyboard. Subsequent paragraphs describe the locking mechanism.

6.04 The function of the locking mechanism is to block the universal lever in its latched position, thus preventing tripping the distributor clutch in the typing unit (Figure 14).

6.05 The locking mechanism consists of a solenoid, which, thru a cam shaft assembly, operates a trip cam which blocks the universal lever, preventing it from being tripped. When the solenoid is energized, the solenoid plunger is pulled causing the cam shaft assem-

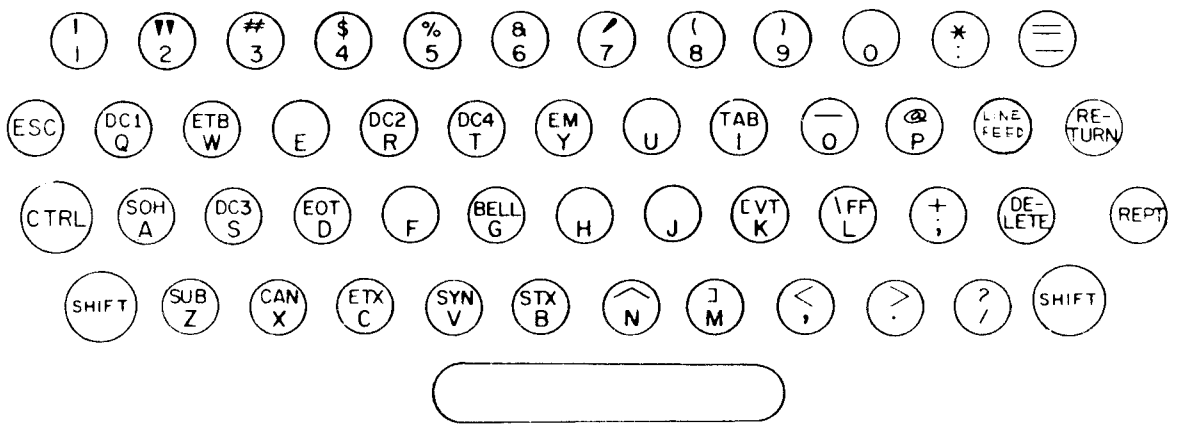


Figure 13 - Keyboard Arrangement for Computer I/O Sets

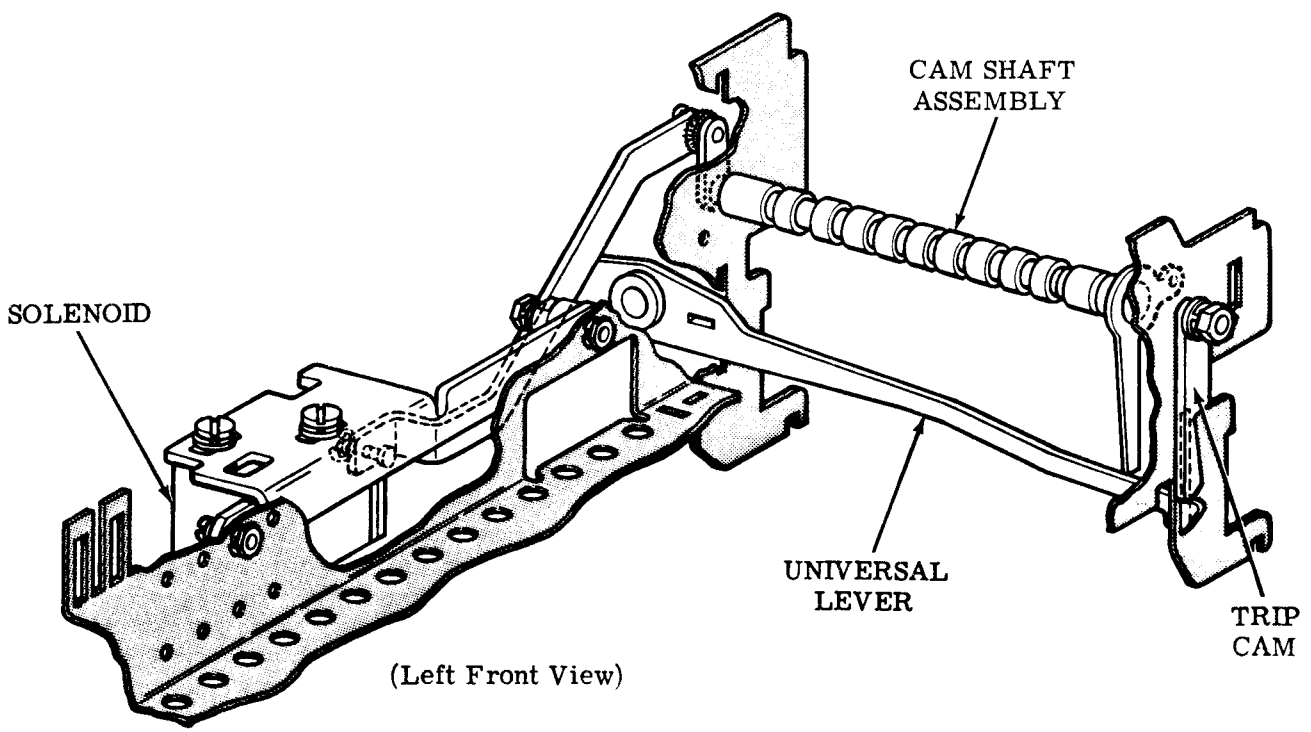
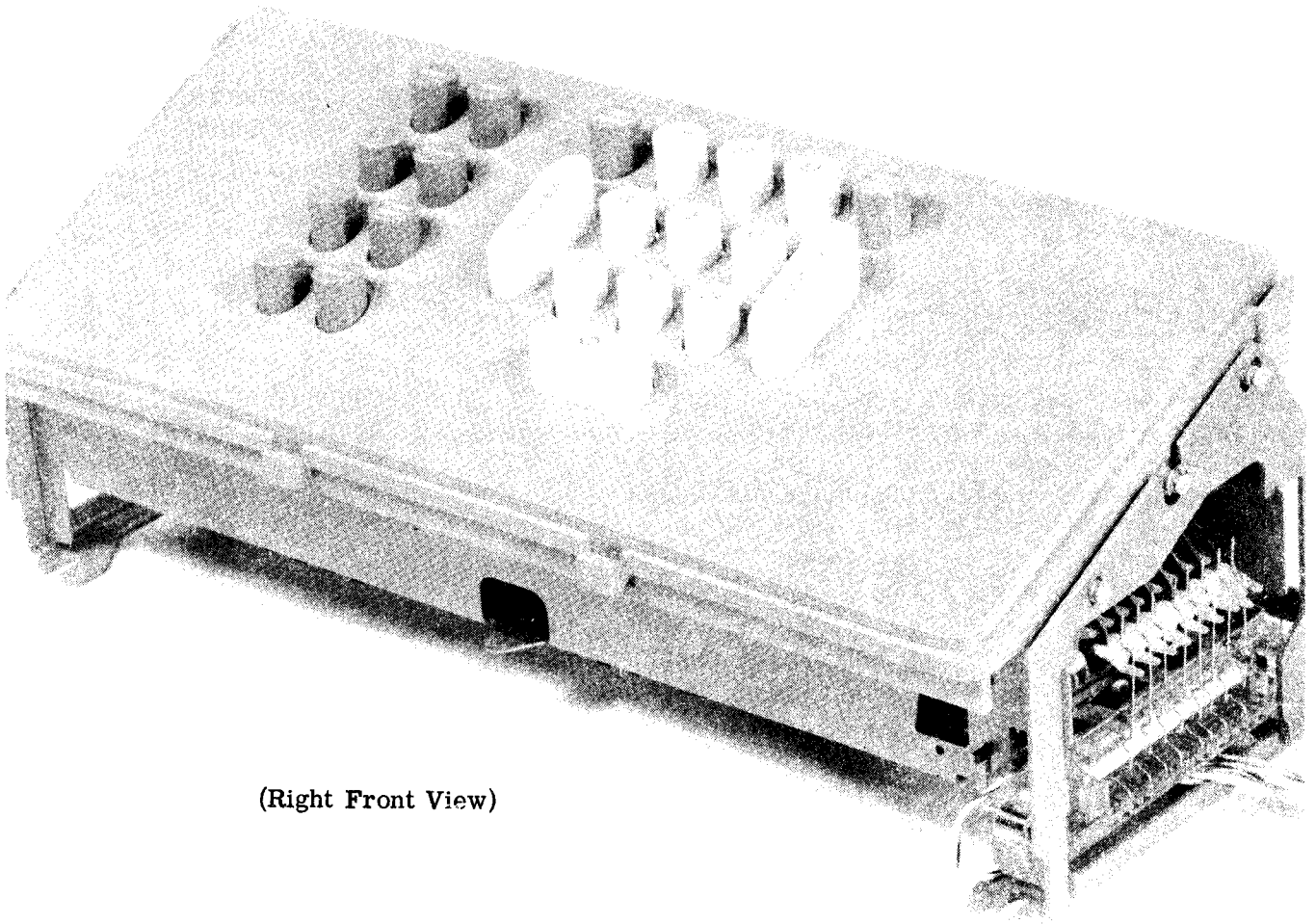


Figure 14 - Keyboard Locking Mechanism for Computer I/O Sets



(Right Front View)

Figure 15 - Numeric Keyboard

bly to rotate. Rotation of the cam assembly causes the trip cam to drive the universal lever (which is in the latched, down, position) further down and blocks it.

6.06 This lock mechanism operates only when the universal lever is latched (down position). If the set is turned off and the keyboard is tripped, the lock mechanism will not operate.

6.07 This mechanism locks the entire keyboard, with the exception of the HERE IS key which trips the answer-back mechanism directly.

7. NUMERIC KEYBOARD

7.01 The numeric keyboard is shown in Figure 15. Like the alphanumeric keyboard, the numeric keyboard utilizes the eight level ASCII at 100 words per minute. In some applications the numeric keyboard, when used as part of an ASR set, is used for off-line tape perforations of basically numeric information, for use in later transmission.

7.02 Numerics transmitted are 0 through 9; nonprint functions utilized are EOT, SPACE, RUBOUT, RETURN, and LINE FEED. A repeat key is also located on the keyboard. The HERE IS keylever hole has been plugged for optional field installation. On some numeric keyboards, there is a plugged keylever hole for optional installation of the FORM-FEED keylever, and the codebars are coded for FORM-FEED. Depending on the keyboard, it contains FS, GS, RS, and US keys or variations of these keys.

7.03 The operation of the numeric keyboard is similar to the alphanumeric keyboard as described in Part 5.