I/O

an efficient print out device for computers and similar equipment...

IBM INPUT-OUTPUT WRITER, MODEL B

The IBM Model B Input-Output Writer is designed to fill the need for a relatively low-cost printing unit to be used with modern data processing systems. This device combines a proven, dependable IBM typewriter with a principle of automatic operation, enabling it to receive and/or transmit data.

This versatile electric typewriter automatically types at a rate of 120 WPM, and can be used in conjunction with computers, as well as measuring and recording instruments, scales, meters, in applications such as engineering testing, liquid flow through pipe lines, production control, wind tunnel research, and wherever a visual record is required.

As an Input Writer, the IBM typewriter transmits electrical impulses to a computer or similar equipment. The basic purpose of this device is to provide a low-cost auxiliary keyboard for equipment requiring manual input.

As an Output Writer, the typewriter is operated by electrical impulses which automatically actuate type bars and keyboard functions including carriage return, spacing, tabulation, ribbon color control and others. Its basic purpose is to provide a low-cost printing unit.

A power supply of 42-48 volts DC is required to operate the magnet and solenoid units.

IBM Model B
Input-Output Writer

Models 31 and 32

The rapid development of various types of data processing systems in the expanding field of automation justifies the need for a typebar printing unit that can automatically receive and/or transmit information.

The I B M Input-Output Writer is an I B M Model B Electric Typewriter equipped with the necessary electrical components which will enable the typewriter to type out information automatically from a computer or device (output) and/or feed information to a computer or device (input) while providing a typewritten record of the information fed into the device.

Output Writer

12 Position Output Magnetic Actuating Unit

The majority of Output applications require remote activation of the numeric and functional keys only. Therefore, this basic magnet unit is designed to provide Output activation for positions 3, 7, 11, 15, 19, 23, 27, 31, 35, 39, 32, 36, Carriage Return, Tab, and Space Bar. (Figure 1, page 7, and Schematic, page 11.)

42 or 44 Position Output Magnetic Actuating Unit

A complete unit consisting of 42 or 44 magnet controlled typing positions in addition to the Tab, Carriage Return, and the Space Bar available for those applications requiring additional typing positions.

Description

The Output magnet actuating unit is compactly mounted under the typewriter keyboard and is composed of print magnets and solenoids which, when impulsed, activate the character keys, Space Bar, Carriage Return, and Tab functions. The typewriter keyboard may also be operated in the normal manner to type additional information. A special adaptor ring increases the height of the typewriter about 1 3/4" to provide additional space necessary to mount the actuating mechanism. All other external dimensions remain the same as the I B M Model B Typewriter.

Specifications

1. A power supply of 42-48 volts DC is required to operate the Output magnet and solenoid units. This power supply must be provided by the purchaser. Units with other voltage ratings can be provided at additional cost.

2. Operation of magnet actuated typewriters is controlled by the electrical impulses received from the purchaser's equipment. However, the over-all impulse receiving rate can be no faster than the slowest typing combination. This combination is the repeat operation of any one typing character, the maximum speed of which is 10 to 12 characters per second.

3. The electrical impulses which activate the Output typewriter must be timed so as not to exceed the maximum typing rate and to allow for completion of typewriter functions. To provide this timing, the typewriter is equipped with an electrical inter-lock consisting of (a), a normally closed contact which is opened during a typing or Space Bar function, and (b), normally closed contacts which are open during the Carriage Return and Tabular operations.

4. The magnet unit coils which activate the typing keys operate on a 25 millisecond minimum pulse. Provision must be made to prevent the continuous energizing of the Carriage Return, Space Bar, and Tab Coils. (Figure 2, page 7.)

5. The solenoids which activate the operations of the Carriage Return, Space Bar, and Tab are designed to operate on a normal pulse of 39 milliseconds. The required mini-mum pulse is 25 milliseconds.

6. Current drain of each typing magnet unit is 204 milliamps at 48 volts DC. Coil resistance is 235 ohms.

7. Current drain of each functional key solenoid (Carriage Return, Tab, Space Bar) is 246 milliamps at 48 volts DC. Coil resistance is 195 ohms.

8. Typewriters equipped with the basic Output magnet unit of 12 positions, Carriage Return, Tab, and Space Bar and with any or none of the optional features will be provided with a single 3-foot cable and Elco connector. (Mating connectors also provided).

9. Typewriters equipped with the complete Output magnet unit of 42 or 44 positions with any or none of the optional features will be provided with *two* 3-foot cables and two Elco connectors. (Mating connectors also provided).

Remote Ribbon Color Control

Remote Ribbon Color Control is available as an optional feature and provides a means of remotely changing ribbon position from black to red to indicate a change in the typed information. (Available *only* as an *Output* feature.)

Specifications

1. The ribbon color "Shift" is controlled by two magnet actuators; one to change the ribbon to the "red" position and one to restore to the "black" position.

2. These magnets operate on a normal pulse of 40 milliseconds and a minimum of 30 milliseconds.

3. The magnet coils are not designed for continuous duty.

4. Approximately 30 milliseconds are required to automatically change the ribbon to the other position.

Remote Shift

This feature provides for remote operation of the Shift by the energizing of a continuous duty solenoid (upper and lower case type basket Shift).

Specifications

1. Shift solenoid should remain energized for as long as upper case is required. (Available *only* on an *Output* feature.)

2. Shift time "down" (to upper case) is 90 milliseconds.

3. Shift time "up" (to lower case) is 115 milliseconds.

4. The Remote Shift is included in the electrical interlock circuitry.

Input
Writer

42 or 44 Position Input Selector Unit

This device provides a single normally open contact for each typing position.

84 or 88 Position on Input Selector Unit

This unit provides two normally open contacts for each typing position (Figure 3).

Description

The Input Selector Unit is mounted beneath the typewriter keyboard directly in front of the cam levers. A special adaptor ring is required which increases the height of the typewriter approximately $1^3/_4$" to provide clearance for the additional wiring.

Specifications

1. The Input Selector contacts that are activated by the typing keys operate in conjunction with a common circuit breaker contact to prevent arcing and insure maximum contact life. The selector contacts are made of silver and will safely carry 1 amp in steady state (with the tungsten points breaking and making the circuit). The tungsten circuit breaker points will carry 3 amps and make and break 1 amp for a pure resistive load or RL load which is properly arc-suppressed. With no arc-suppression these tungsten points should carry .250 to .400 amp RL load (make-break) . (All above values are approximate.)

Note: The characteristics of tungsten contacts are such that a minimum of 48 V DC at 200 MA, or over, is recommended in the interlock circuits. Circuit failure may otherwise occur due to oxidation and dirt collection on the contact surfaces. Where solid state components require use of relatively "dry" circuits, it is possible to provide silver contacts on special request, at additional cost. If necessary, these contacts can be designed in Form C for use in conjunction with multi-vibrator or similar control circuitry to overcome the effects of contact bounce.

2. The Input Selector contacts remain closed for approximately 40-60 milliseconds and the circuit breaker contact for approximately $22^1/_2$-$42^1/_2$. (But will always be less than selector contact.)   (Can be varied by adjustment.)

3. The Input contacts activated by the Carriage Return, Tab, and Space Bar are normally open but remain closed during operation.

4. Recommended power supply is 42-48 volts DC.

5. 84 and 88 character typewriters equipped with 42 or 44 position Input Selector Units are provided with *two* 3-foot cables and Elco connectors. (plus mating connectors).

6. Typewriters having 84 or 88 contact Input Selector Units are provided with *three* 3-foot cables and Elco connectors. (Plus mating connectors.)

General Specifications

1. Typewriters equipped with more than one of the Input-Output Writer features will be supplied with the cables listed for *each* feature.

2. Remote operation of the Backspace can be provided at additional cost.

3. Typewriter dimensions are those of the Model B with the exception of over-all height which is approximately $1^3/_4$" greater.

4. Timing chart for various Output functions follows:

Functional Timing Chart

	For a typical Typebar	For a Space Bar Operation	For a Carriage Return	For a Tab Operation	For a Shift to Capital Letters	For a Shift back to Lower Case
T_1	35ms	35ms	35ms	40ms	50ms	80ms
T_2	70ms	60ms			100ms ***	130ms
T_3	100ms	100ms	**	**	85ms ***	115ms

T_0 —0—Start of pulse to coil.
T_1 —Actuation of associated interlock contact.
T_2 —Deactuation of interlock contact.
T_3 —Completion of operation.

* —Time between T_1 and T_2 will vary with the length of carriage return and length of tab.
** —Approximately 100ms after T_2.
***—On either shift to capital or return to lower case the type basket has actually completed its motion slightly before the interlock contact has returned to normal.

For a typebar T_3 is considered to be the time at which the typebar returns to rest in the type basket. For a space bar T_3 is the time at which the carriage comes to rest in the new position escapement. For carriage return and tab T_3 is the time when the carriage actually comes to rest after its rebound.

All of these times are with normal adjustments on the output writer. They are theoretical and will vary from one machine to another.

Model B
Output
Writer

Figure 1 Magnet Units (Typebar operations)
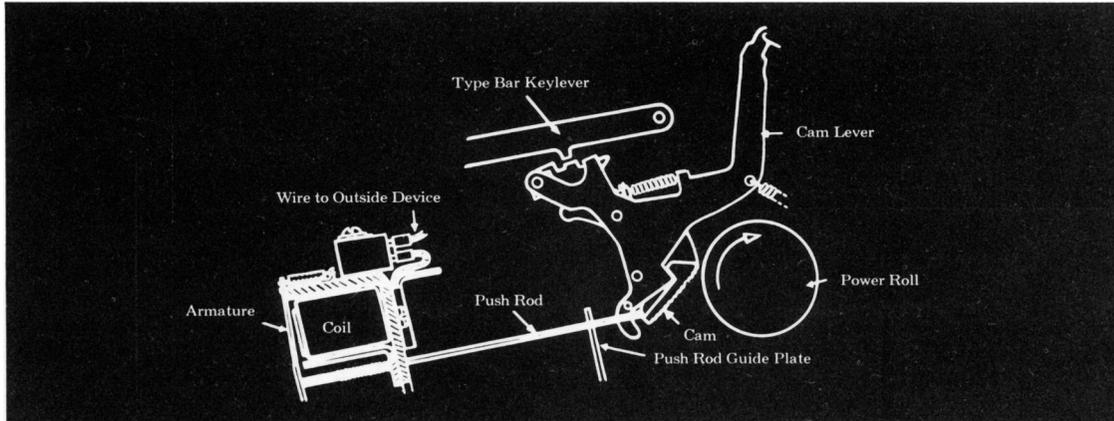
Sequence of Operation

A. Pulse received through wires from outside device.
B. Pulse energizes coil.
C. Armature is pulled against coil.
D. Movement of Armature causes Push Rod to force Cam to contact Power Roll and the Typebar prints.

Functional Solenoids

(Carriage Return, Space Bar, Tab, and Shift)

Sequence of Operation

A. Pulse received from outside device.
B. Solenoid Plunger is pulled down by the magnetic field of the solenoid winding.
C. Key Lever is pulled down by the Connecting Spring and the Cam is released to complete the functional operation.
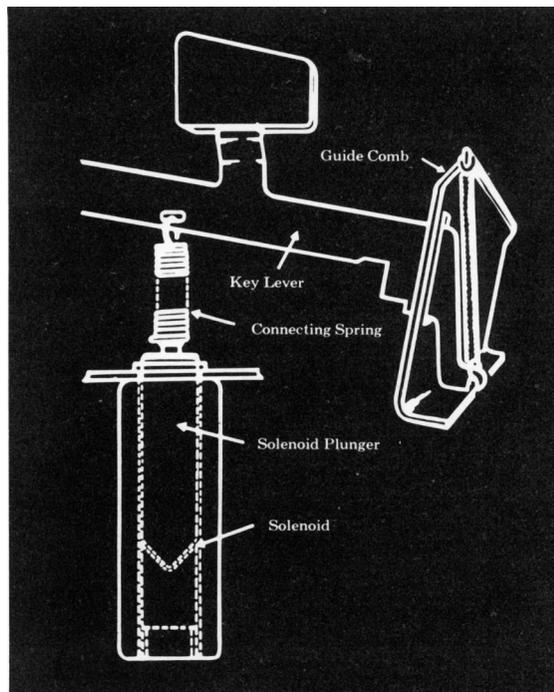
Figure 2

Model B
Input Writer

Contact Assembly
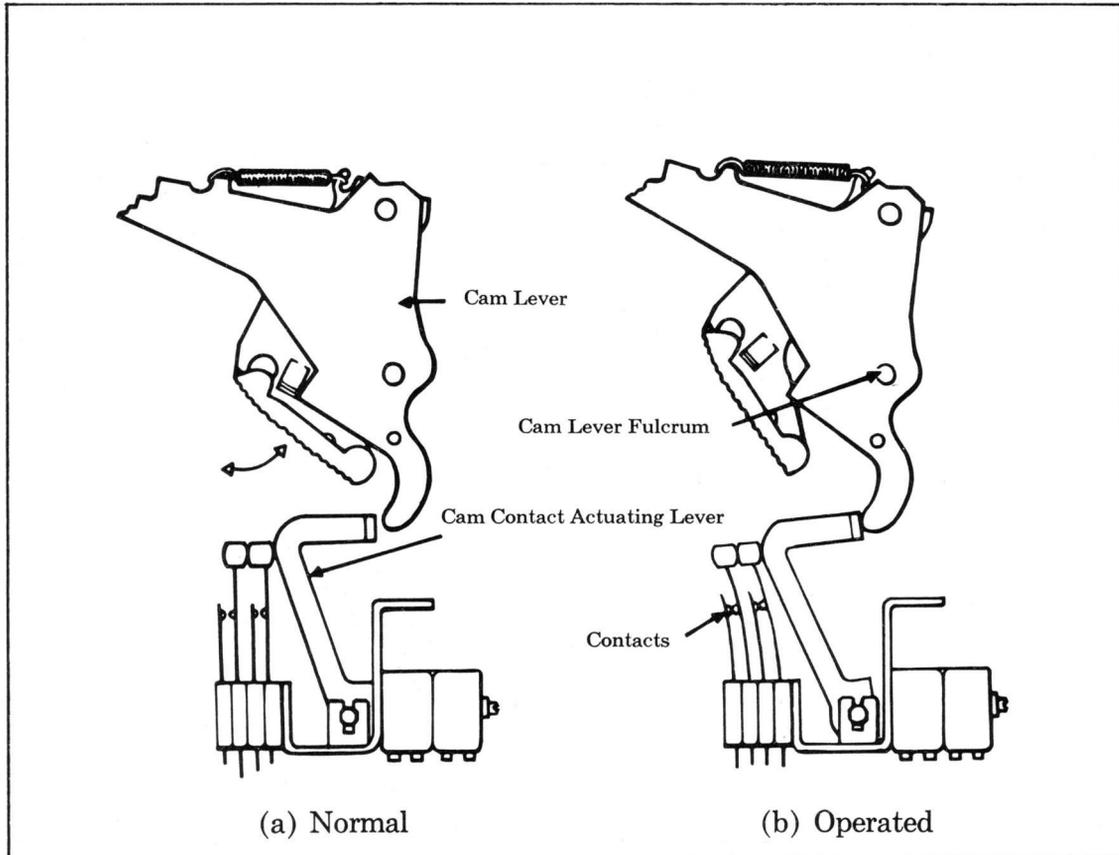
Figure 3

Operation

Pressing a keybutton causes a letter Cam to operate and the selected character to print. At the same time, the Cam moves an actuating lever which causes a set of contacts to close, completing a connection from the power supply to the receiving computer or device.

A separate set of contacts is provided for each typebar and functional position of the keyboard.

Input-Output Writer
Features

The IBM Input-Output Writer is available in Model B 84 and 88 character models only. All Standard Type Faces, Keyboard Arrangements, Pitches and Carriage Lengths may be ordered. These features are factory installed on new machines only.

Features

The features of the Input-Output Writer are listed below and any or all of these features may be ordered for a single machine.

Prices will be quoted on request. Branch offices must submit "Special Engineering Request" (SER) form to Sales Engineering, Lexington Plant.

Output Writer

Feature	
12 position Output magnet actuating unit	Provides for remote actuating of 12 typing positions, (see specifications) Carriage Return, Tab, and Space Bar.
42 or 44 position Output magnet actuating unit	Provides for remote actuating of all typing positions, Carriage Return, Tab, and Space Bar.
* Remote Ribbon Color Control	Provides a means of remotely changing ribbon position from black to red to indicate a change in typed information.
* Remote Shift	Provides for remote operation of the Shift.

Input Writer

42 or 44 position Input Selector Unit	Provides a means of transmitting a single pulse each time a typing position, Carriage Return, Tab, or Space Bar is operated.
84 or 88 position Input Selector Unit	Provides a means of transmitting two separate simultaneous pulses each time a typing position is operated, and a single impulse from the Carriage Return, Tab, and Space Bar Operations.

* Available for use only on machines equipped with a magnet actuating unit.

Output Writer 42-44 Unit

Character
Type Position

Character
Type Position

Tab Interlock Contact
Character Interlock
Space Bar Contact
Shift Interlock Contact
Carriage Return Contact

Typewriter
Elco
Typewriter
Elco

Carriage Return
Shift
Tabular
Space Bar
Color Control
Color Control

Black   Red
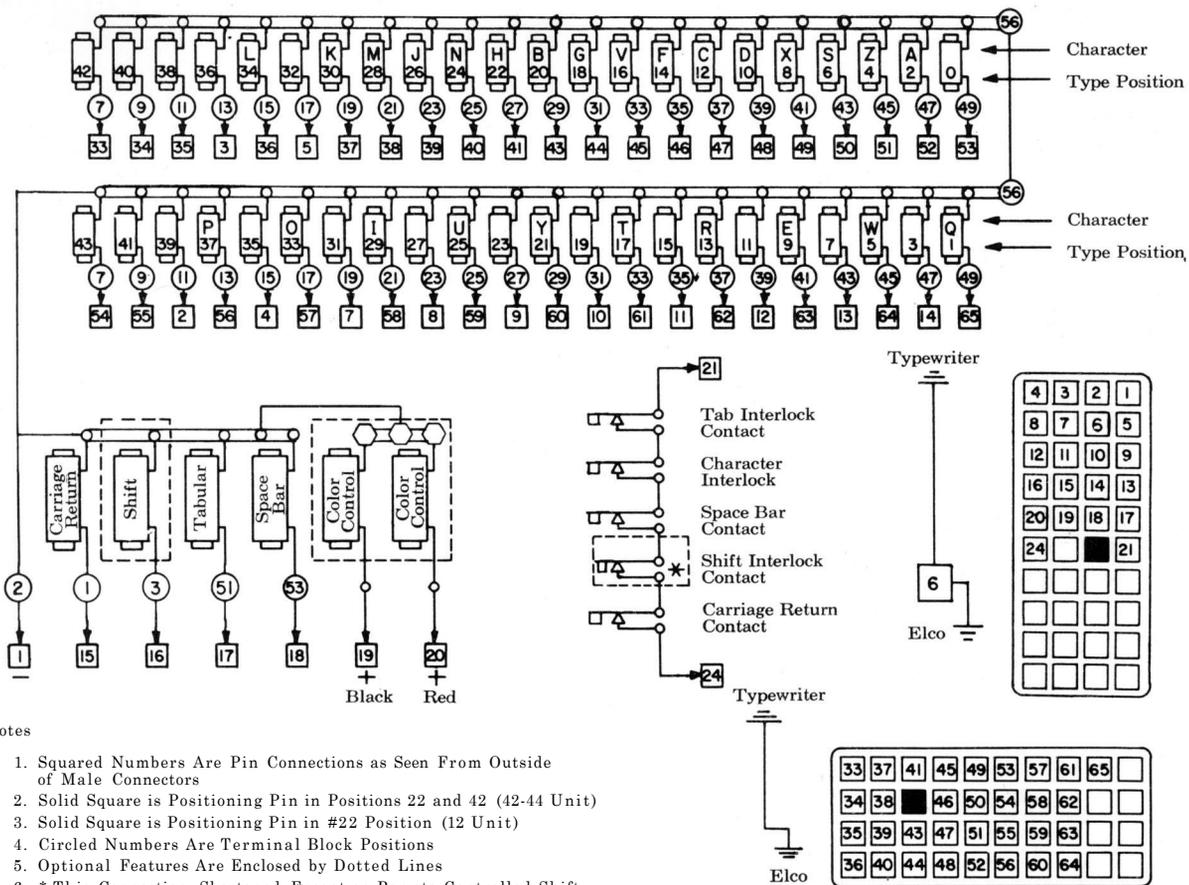
Notes

1. Squared Numbers Are Pin Connections as Seen From Outside of Male Connectors
2. Solid Square is Positioning Pin in Positions 22 and 42 (42-44 Unit)
3. Solid Square is Positioning Pin in #22 Position (12 Unit)
4. Circled Numbers Are Terminal Block Positions
5. Optional Features Are Enclosed by Dotted Lines
6. * This Connection Shortened Except on Remote Controlled Shift
7. Hex Represents Small Color Control Terminal Block Positions

Output Writer 12 Unit
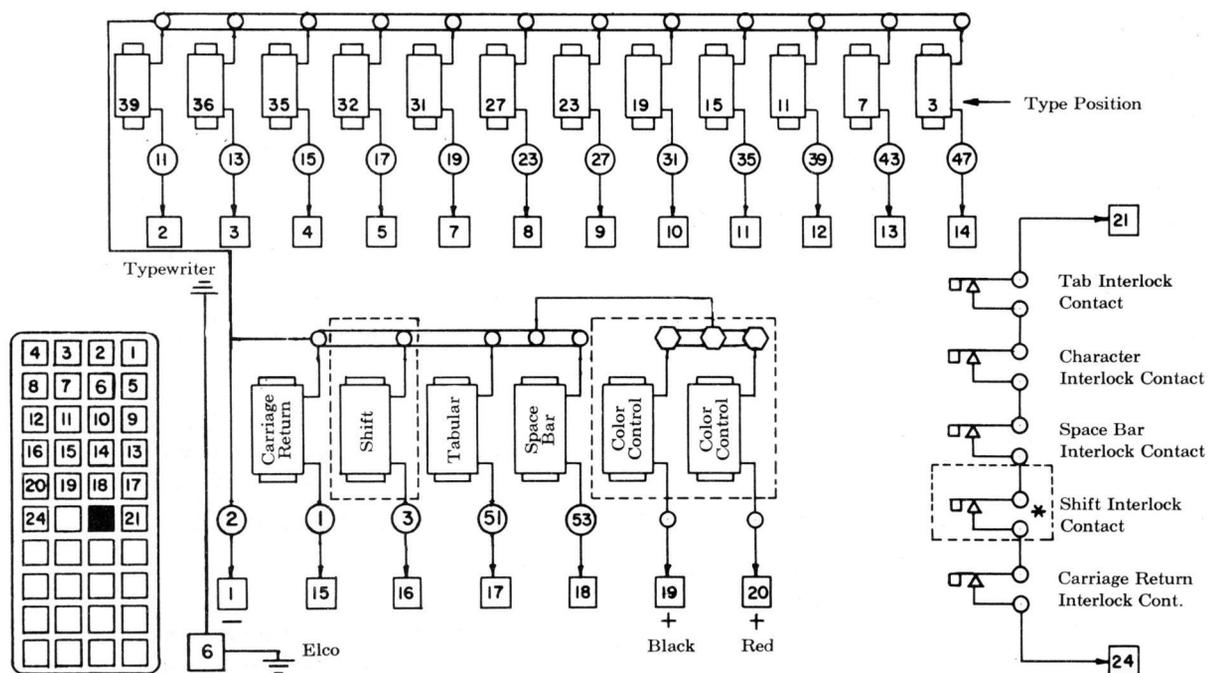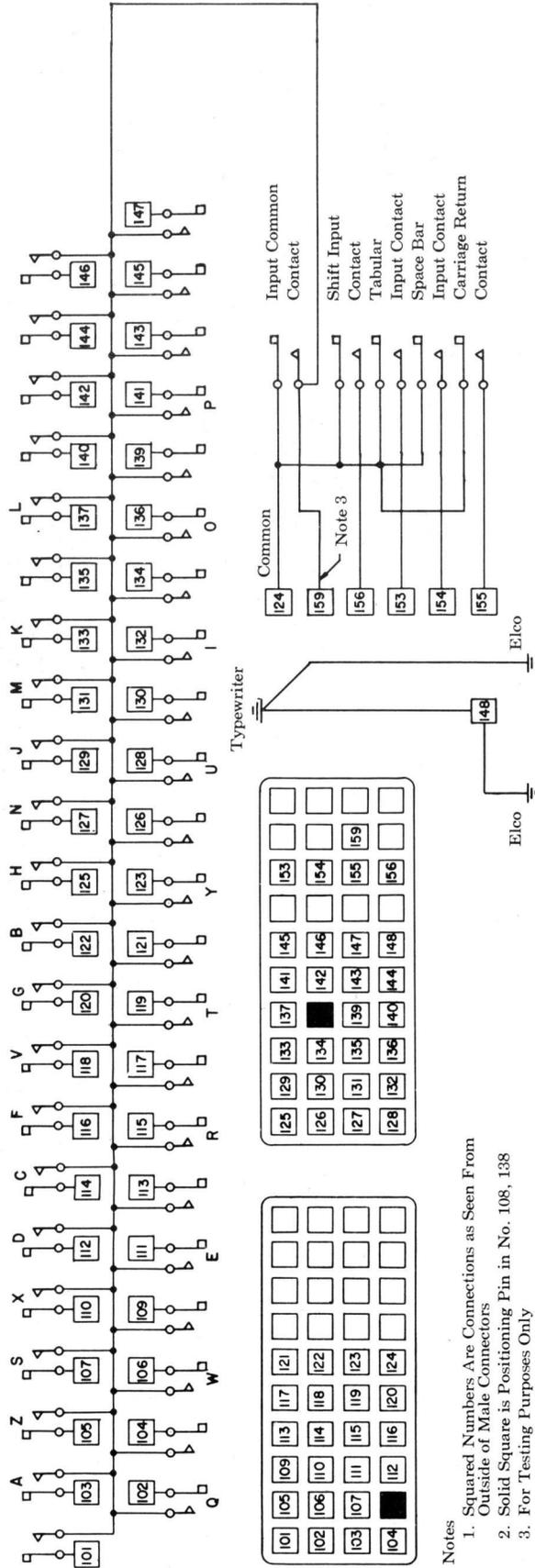
Type Position

Typewriter

Tab Interlock Contact
Character Interlock Contact
Space Bar Interlock Contact
Shift Interlock Contact
Carriage Return Interlock Cont.

Carriage Return
Shift
Tabular
Space Bar
Color Control
Color Control

Elco

Black   Red

Input Single Contacts

Input Double Contacts

Input Common Contact

Shift Input Contact

Tabular Input Contact

Space Bar Input Contact

Carriage Return Contact

Notes
1. Squared Numbers Are Connections as Seen From Outside of Male Connectors
2. Solid Square is Positioning Pin in No. 108, 138
3. For Testing Purposes Only
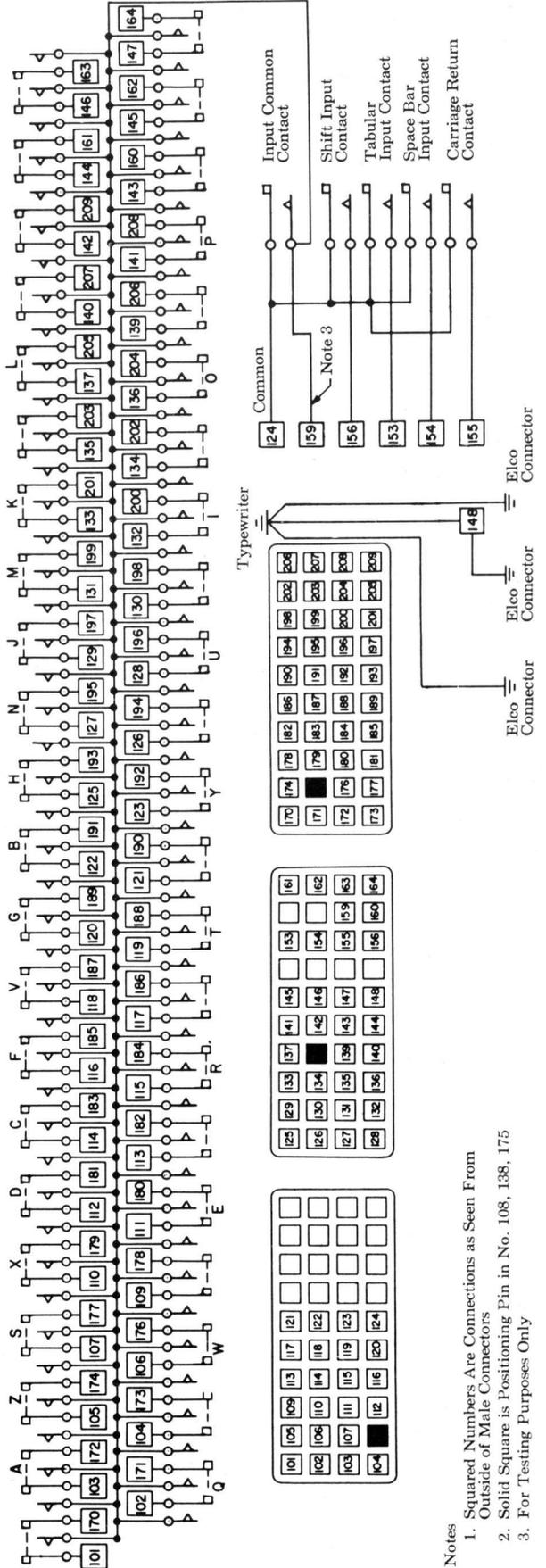
Notes
1. Squared Numbers Are Connections as Seen From Outside of Male Connectors
2. Solid Square is Positioning Pin in No. 108, 138, 175
3. For Testing Purposes Only

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International Business Machines Corporation, 545 Madison Avenue, New York 22, New York