

**INFORMATION FOR OPERATORS
MODEL 6002
PRINTING ROBOT**

VIATRON

SYSTEM 21

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Section I Introduction

The Model 6002 Printing Robot is a solenoid-driven device designed to accept the output of a System 21 Terminal, from either Data Channel 1 (DC1) or Data Channel 2 (DC2), and to provide hard copy of that output at the rate of 12 characters per second. The Printing Robot consists of a solenoid deck which fits over the keyboard of the user's 13" or 15" IBM Selectric® typewriter, a cable which connects the Printing Robot to the Terminal's microprocessor, and a control panel on the Terminal. When not in use, the Printing Robot can be removed from the keyboard of the Selectric® to permit independent operation of the typewriter.



Figure 1-1. The Printing Robot.

The Printing Robot provides hard copy, formatted or unformatted. When equipped with Feature Code 601, Record Transfer Buffer, input and printing can be simultaneous. For example, the microprocessor will accept keyboard data entry while the Robot is printing the previous output from the microprocessor.

The Printing Robot contains 50 solenoids which, upon receipt of character codes from the microprocessor, drive the keys of the Selectric® typewriter. There are solenoids for operating each of the alphanumeric keys as well as the keys used for format control. Thus, when there are *control characters* in the record, the Printing Robot can tabulate, backspace, carriage return, and index. When the Printing Robot is mounted on the Selectric® keyboard, the operator still has manual access to the typewriter TAB, CLR/SET, MAR REL, and ON/OFF keys. In addition, there are pushbuttons on the top of the Printing Robot for CARRIAGE RETURN, BACKSPACE, FORWARD SPACE, TAB, and INDEX, giving the operator external control of the corresponding Selectric® keys.



Figure 1-2. Pushbuttons for external control of Selectric® Keys.

Section II Modes of Operation

As shown in Figure 2-1, the Printing Robot has three modes of operation, selectable by a switch on the control panel: LIST, EXECUTE A, and EXECUTE B. In the LIST mode of operation, each output from a Terminal microprocessor is printed as a single line of eighty characters or less, depending upon the record size, and is followed by an automatic carriage return/line feed. Tabulation may be preset by the operator anywhere within an 80-character record. In the two EXECUTE modes of operation, carriage return, backspace, tabulation, and index are performed automatically whenever the appropriate command appears in the Microprocessor output data stream.

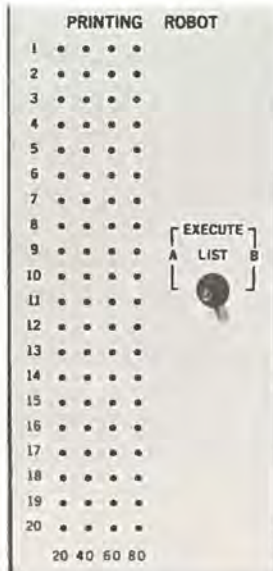


Figure 2-1. Printing Robot Control Panel.

LIST MODE

In the LIST mode, the Printing Robot accepts data at the rate of 12 characters per second and prints that data in a single line of up to 80 characters, depending upon record size. At the end of each record input to the Robot, there is an automatic carriage return/line feed.

The operator may preset tabulation by using the tabulation controller located on the Terminal control panel. The tabulation controller is a matrix, or pinboard, of 80 holes, arranged to correspond to the 80 positions in a data record. Tabulation is preset by inserting diode pins, supplied with the Printing Robot, into the holes that correspond to the positions in a record where a tabulation begin is desired.

The tabulation pin performs the same function as pressing the typewriter TAB key. Each time the Printing Robot detects a pin in the matrix, it tabs the Selectric® to the next preset typewriter tab stop, and printing continues from there. For example, if a pin has been inserted in position 10, the Printing Robot will print the characters in the first 9 positions, move to the next typewriter tab stop set on the Selectric®, and then continue printing.

The location of the tabulation pins in the tabulation controller depends upon the particular application. The following example shows how pin locations could be determined in a typical subscription list.

1	N	2	A	3	M	4	E	5		6		7		8		9		10		11		12		13		14		15		16		17		18		19		20	
21	S	22	T	23	R	24	E	25	E	26	T	27		28	A	29	N	30	D	31		32	N	33	U	34	M	35	B	36	E	37	R	38		39		40	
41	C	42	I	43	T	44	Y	45		46		47		48		49		50		51		52		53		54		55		56	S	57	T	58	A	59	T	60	E
61	S	62	U	63	B	64	S	65	C	66	R	67	I	68	P	69	T	70	I	71	O	72	N	73		74	N	75	U	76	M	77	B	78	E	79	R	80	

Figure 2-2. Sample MASTER record for a subscription application.

Columns will be set up for each of the five field headings indicated in the Figure 2-2 MASTER record. Five spaces will be skipped between the end of the spaces allotted for one field and the beginning of the next field. Tabulation pins should be inserted, therefore, in the tabulation controller in positions 21, 41, 56, and 61, as shown in Figure 2-3 below.



Figure 2-3. Tabulation controller with pins set for subscription list example.

Next the tabs must be set on the Selectric®. If the Selectric® left-hand margin is set at 10, printing will begin at position 10 on the Selectric® scale. The first tab should be set at the Selectric® scale position of 35 (10 left margin positions, 20 positions allotted for the name, and 5 positions to be skipped between the end of the "Name" field and the beginning of the "Street and number" field).

Printing of the "Street and number" field will begin at Selectric® scale position 35 and continue for the 20 allotted positions to scale position 55. Five positions will then be skipped before the "City" field. Therefore, the second tab on the typewriter should be set at scale position 60. Typing of the "City" field will begin at Selectric® scale position 60 and will continue to position 75. Five locations will be skipped before the "State" field, requiring that the tab for "State" will be set at scale position 80. Since the "State" field is five spaces long and followed by 5 positions to be skipped, the next tab stop should be set at scale position 90, where printing of the subscription number will begin. Figure 2-4 provides an example of a printout of the subscription list.

JOHN MARTIN	137 PARK STREET	ACTON	MASS	72890
PETER JOHNSON	57 SCHOOL STREET	EPPING	NH	72891
MARTHA ROBBINS	382 HIGHLAND ROAD	COLORADO SPRINGS	COL	72892
ARTHUR GOSS	83 OAK AVENUE	BARRE	VT	72893

Figure 2-4. Example of printout of subscription list.

In the LIST mode, all data characters generated at the keyboard in conjunction with the SHIFT Y key are printed in lower case. All other characters are printed as they appear on the display.

EXECUTE MODES

In the Execute Modes the Printing Robot automatically performs tabulation operations, as well as the backspace, carriage return, and index functions. When data is being prepared at the keyboard for output to the Printing Robot, a special control character must be entered for each function desired in the record position where the operation is to be performed. Then, with the three-position switch set to either EXECUTE A or EXECUTE B, when the record is output to the Printing Robot, each time a control character is detected in the data stream, the Printing Robot will automatically perform the specified operation. The keys pressed to generate the control characters are given in Table 2-1.

Typewriter Operation	Key(s) pressed to generate control character	Character displayed	Designation
Backspace	SHIFT X and "H"	(Left parenthesis
Tabulate	SHIFT X and "I")	Right parenthesis
Index	(SHIFT UPPER and) CR/LF	*	Asterisk
Carriage return	(SHIFT LOWER and) CR/LF	-	Hyphen

Table 2-1. Control Characters for Performing Automatic Operations.

EXECUTE A Mode

When the EXECUTE A mode has been selected, the control characters are interpreted and their functions performed by the Printing Robot in the positions in which they appear in the record being printed. In other words, when the Robot detects the backspace character (SHIFT X "H"), it will press the Selectric® BACKSPACE key and continue printing at the new location. When the tabulate character (SHIFT X "I"), is detected, the Robot will tabulate the Selectric® to the next preset tab stop and then continue printing. Carriage return (LOWER SHIFT CR/LF) commands the Printing Robot to perform a carriage return and continue printing at the left margin of the new line. Upon detecting the index character (UPPER SHIFT CR/LF) the Robot will advance the Selectric® to the next line, without moving from the previous Selectric® scale position, and continue printing from that point.

Only two SHIFT X communication control characters, backspace (SHIFT X "H") and tabulate (SHIFT X "I") are acted upon by the Printing Robot in the EXECUTE A mode. Whenever the Printing Robot detects any other SHIFT X communication control character, there is no typewriter movement. Instead, the Printing Robot will wait until the next data character or Robot control character appears in the data stream and then typewriter movement will continue. In addition, each time the Printing Robot detects a data character entered in conjunction with the SHIFT Y key, the typewriter will move forward one space, without printing.

For example, with the addition of Printing Robot control characters, the sample subscription listing data given above can be used to print address labels. The label could be printed in four lines, one each for name, street and number, city and state, and subscription number. In addition, there could be a tabulation between the end of city and the beginning of state.

In the Figure 2-2 sample MASTER record, there are 15 positions allotted for city. If the left margin is set at 10 on the typewriter scale, to allow 5 spaces between city and state, the tab stop should be set at typewriter scale position 30 (10 left margin positions, 15 positions for city, and 5 positions for the tab). Then, as data is being prepared at the Terminal keyboard for output to the Printing Robot, the operator should enter one carriage return control character (LOWER SHIFT CR/LF) in the 20th, 40th, 60th, 79th, and 80th positions, and the tabulation control character (SHIFT X "I") in the 55th position.

When the completed record is output to the Printing Robot, the Robot will print the name, space to the 20th position if all positions in the name field have not been filled, carriage return, print the street and number, carriage return upon reaching the 40th position, print the city, space to the 55th position if the field is not filled, tab to typewriter scale position 30, print the state, carriage return, print the subscription number, space to the 79th position, and carriage return twice.

When preparing data at the Terminal keyboard for an application, such as the subscription list, in which the same control characters will appear in the same positions for a number of records, the efficiency of the operation can be increased by operating the Terminal under program control. Data entry could then be performed using a control program with instructions for duplicating the Printing Robot control characters from the previous record or from the MASTER record (master duplication) into the record in which the operator is currently entering data.

EXECUTE B Mode

The EXECUTE B mode accomplishes all of the formatting functions of the EXECUTE A mode, in exactly the same manner. In addition, when the EXECUTE B mode is selected for operation, the Printing Robot has the capability for providing lower case printout.

To obtain lower case printout, the data must be coded as it is being entered at the keyboard. Coding is accomplished by pressing the SHIFT Y key in conjunction with the key for each alphabetic character to be printed in lower case. If the Terminal is equipped with a black and white display, Model 3001 with Feature Code 301, the data entered in conjunction with the SHIFT Y key will appear on the display as upper case, or capital, letters. The Printing Robot, however, will recognize the coded characters and print them in lower case.

When the terminal is equipped with a color display, Model 3001 with Feature Code 304, the operator should set the COLOR switch to the B position. Then, as data is entered, the SHIFT Y-coded characters, which will be printed in lower case, will appear on the display as green capital letters. All other alphabetic characters, which will be printed in upper case, appear on the display as aqua capital letters. Numbers and symbols will be displayed in yellow and communication control characters, entered in conjunction with the SHIFT X key, in red.

In the EXECUTE B mode all SHIFT Y-coded characters will be printed in lower case. As in the EXECUTE A mode, SHIFT X "H" and SHIFT X "I", backspace and tabulate, respectively, are Robot control characters, and for all other SHIFT X communication control characters there is no typewriter movement.

Use of the Microprocessor Short Record Adapter

When the Terminal is equipped with the SHORT RECORD Feature, Feature Code 103 or Feature Code 106, carriage return (CR) or index (LF), respectively, can be interpreted by the Microprocessor as the end of the data record. When the Microprocessor SHORT REC switch is in the ON position, data which appears after the short record symbol will not be transmitted in an output from the Microprocessor. The Robot will print all the data before the short record symbol and then print the symbol in the LIST mode or perform its function in one of the EXECUTE modes. When the SHORT REC switch is in the OFF position, all data in the record will be transmitted to the Printing Robot.

PRINTOUT OF THE SAME RECORD IN THE THREE MODES OF OPERATION

The following example is provided to show how the Printing Robot would print the same pair of records in each of the three modes of operation, LIST, EXECUTE A and EXECUTE B. For purposes of the example, the symbols) and - are used as Printing Robot control characters. It should be assumed also that a tab stop has been set on the Selectric® where required for the example. Shading is used in Figure 2-5 to indicate the alphabetic keys pressed in conjunction with the SHIFT Y key.

Section III Installation and Removal of the Printing Robot

The following illustrations show the sequence of steps to be followed when installing the Printing Robot on the Selectric® typewriter.



Figure 3-1. Place the clip provided with Printing Robot on the Selectric®SHIFT key.



Figure 3-2. Lift the cover of the Selectric, then lift both margin stops.

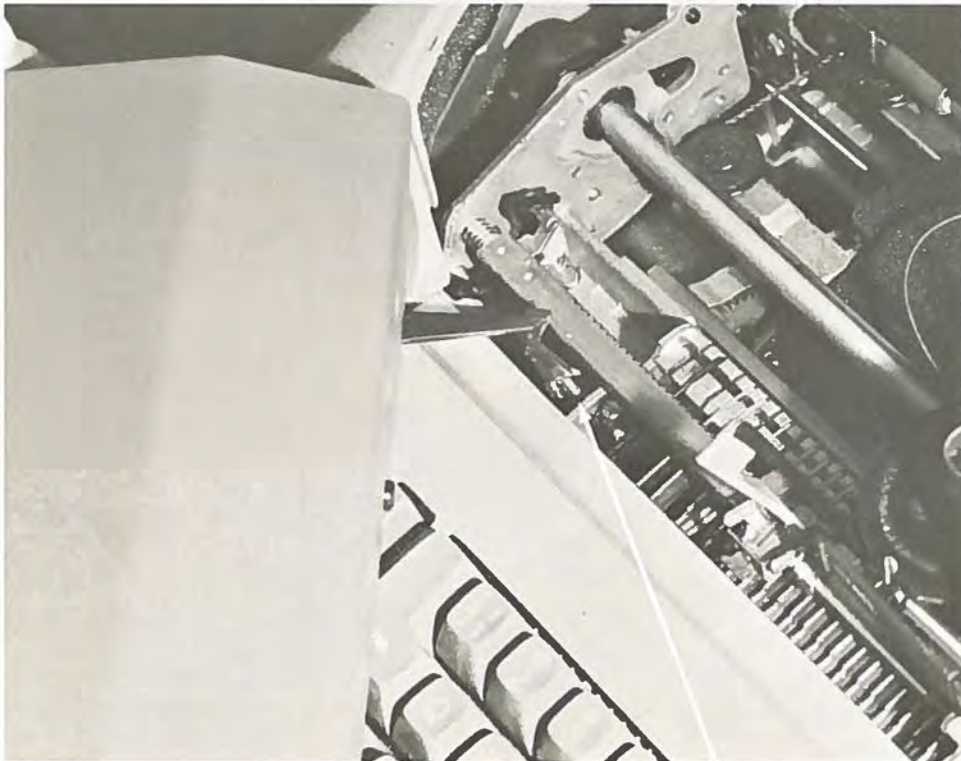


Figure 3-3. Position the hook on the bar.

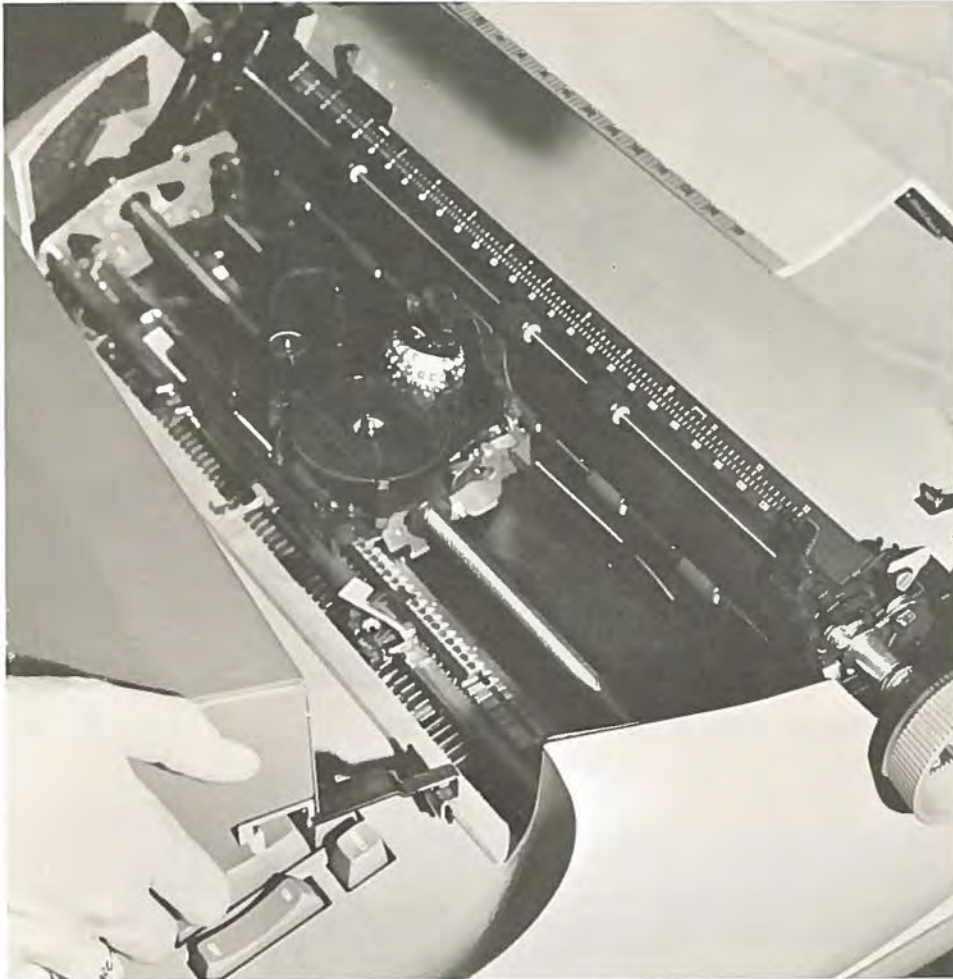
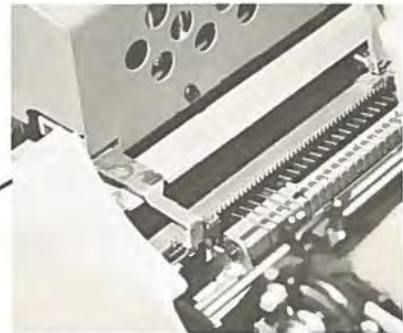
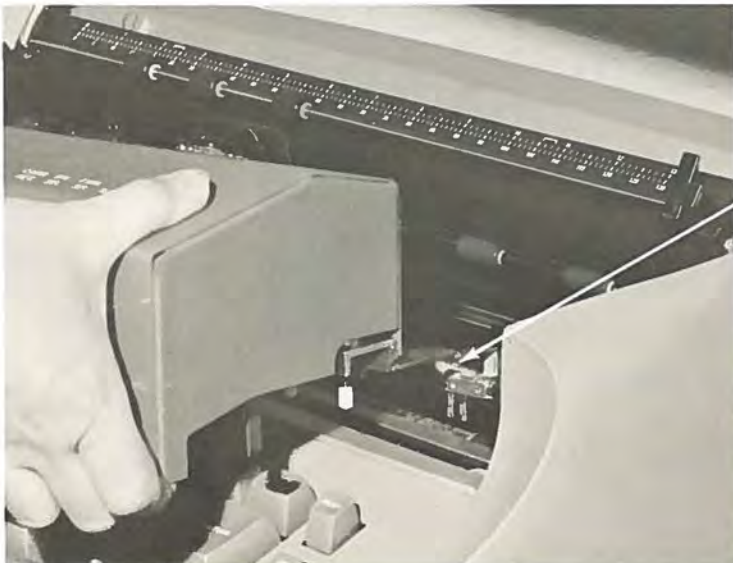


Figure 3-4. Move the Printing Robot until it is nearly parallel with keyboard.



(Back view, Hook in position on bar.)

Figure 3-5. Bring the Printing Robot down and toward the keyboard, so that the right hand hook fits over the bar. Then lower the Printing Robot onto the keyboard.

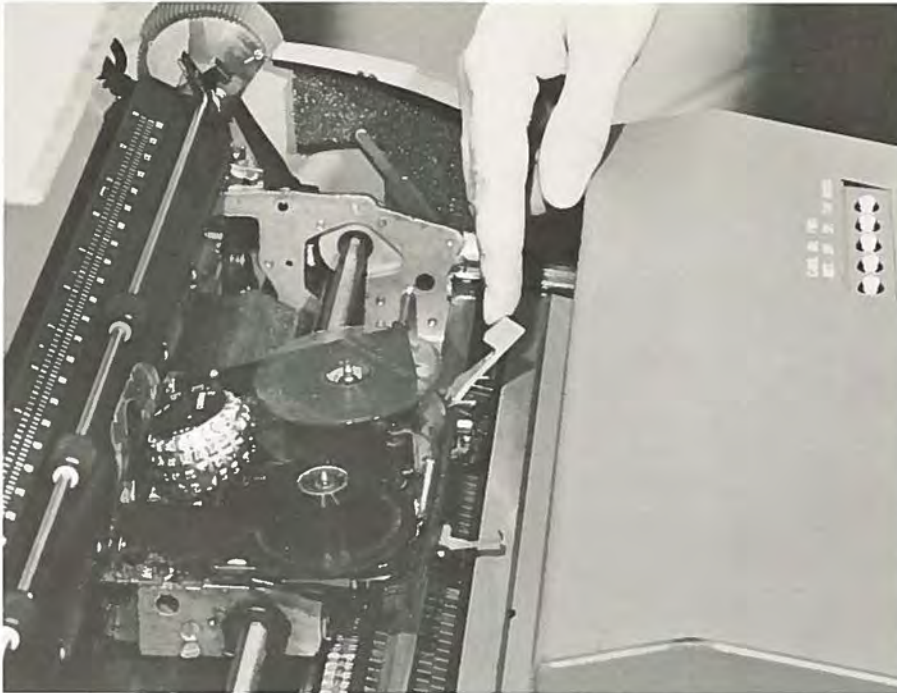


Figure 3-6. Return the margin stops to their original position.



Figure 3-7. Close the cover of the Selectric.

To remove the Printing Robot, reverse the procedure.

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SYSTEMS
CORPORATION

Route 62, Bedford, Massachusetts 01730 • (617) 275-6100