

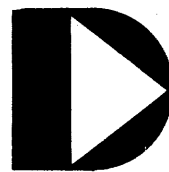
SERVO PRINTER (CONSOLE)	2200-250
SERVO PRINTER (FREESTAND)	2200-251
220 VAC, 50 HZ OPTION	2200-252
12' TOP OF FORM	2200-253

Product Specification

November 18, 1974

Model Code No. 60223

DATAPOINT CORPORATION



**The Leader in
Dispersed Data Processing**

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PRODUCT SPECIFICATION

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1.0 GENERAL DESCRIPTION

The Datapoint 2200-250 Servo Printer is intended for applications requiring a quiet, medium-speed printer with high-print quality. The 2200-250 prints at an average speed of 30 characters per second and has a 132 column print line. A seven bit ASCII code is used to select the 96 characters available for printing.

The Datapoint 2200-250 can use either tractor-feed forms or ordinary typewriter paper. In addition, the Datapoint 2200-250 Printer can print forward or backward, superscripts or subscripts, and proportional spacing under software control.

2.0 SYSTEM REQUIREMENTS

The Datapoint 2200-250 Printer can be used with any size memory capacity Version I or II Datapoint 2200.

3.0 TECHNICAL SPECIFICATIONS

3.1 Physical Characteristics:

(See Figures 1 and 2 for outline drawing)

3.2 Power Requirements:

110 VAC 60 Cycle 150 Watts
220 VAC 50 Cycle 150 Watts

3.3 Environmental Requirements:

Temperature Range: 5° c to 48° c Ambient
Humidity: 10% to 95% Relative Humidity
Non-Condensing

3.4 Print Characteristics:

Printing Technique - Impact, Rotating Printwheel

Printing Rate - 30 characters per second average

Characters per Printwheel - 96, three printwheels available:

<u>PRINT WHEEL</u>	<u>DATAPoint PART NO.</u>
COURIER 10	94-117
PICA 10	94-104
ELITE 12	94-105
COURIER 72	94-132

Character Spacing - 10 characters per inch nominal, variable in 1/60 inch increments.

Carriage Return Time - 400 msec. maximum

Line Spacing - 6 lines per inch nominal, variable in 1/48 inch increments.

Ink System - Cartridge Ribbon, cloth or one-time, one or two color.

3.5 Paper Requirements:

Overall Width - 2.0 inches (min.) to 14.875 inches (max.)

Length - Platten or Pin Feed with single or continuous form. Form control based upon 11" form length.

Length Option - Though the 11" form control is standard, a 12" form control is available under the model code number 2200-253.

Sprocket Hole Dimensions - $0.155 + 0.005 - 0.0$ inch in diameter; spaced $0.250 + 0.010$ inch from hole center to vertical edge of form; $0.50 + 0.010$ inch from hole center to hole center.

Paper Stock and Weight - Single-part forms:

Single-part forms - 16 lb. bond minimal;
20 lb. recommended.

Multi-part forms - 0.0155 inch maximum pack thickness

Multi-Part Capability - Original and 5 carbon copies. 3-part "No-Carbon Required".

3.6 Operator Controls:

Line Feed key
Form Feed key
Platen Knob for forms adjustment
Forms Thickness adjustment

4.0 SOFTWARE CHARACTERISTICS

4.1 Printer Address - Address is normally 132₈

4.2 Status Word - The Datapoint 2200-250 does not have a DATA MODE. It is always in the STATUS MODE when addressed.

7	6	5	4	3	2	1	0
---	---	---	---	---	---	---	---

- S7 - TOP OF FORM
- S6 - PRINTER READY
- S5 - PAPER OUT
- S4 - CHECK
- S3 - NOT USED
- S2 - PAPER FEED READY
- S1 - CARRIAGE READY
- S0 - CHARACTER READY

TOP OF FORM: Status bit S7 is a "1" when the paper is at the top of form position.

PRINTER READY: The PRINTER READY status bit indicates that the printer is connected and power is applied.

PAPER OUT: The PAPER OUT status bit indicates that the printer has only 1 form left.

CHECK: The CHECK bit will be set to a "1" if a machine malfunction, or physical interference prevents the printer from executing a command, or if the Form Feed Key on the printer cover is depressed. When a check occurs, PAPER FEED READY, CARRIAGE READY, and CHARACTER READY will go 'false' and the printer will not accept anything but a RESTORE COMMAND. If a RESTORE COMMAND will not clear the CHECK, operator intervention is required.

PAPER FEED READY: The PAPER FEED READY bit indicates that the printer will accept a PAPER FEED COMMAND (EX COM4). If a PAPER FEED COMMAND is issued when PAPER FEED READY is 'false' the PAPER FEED COMMAND will be ignored.

CARRIAGE READY: The CARRIAGE READY status bit indicates that the printer will accept a CARRIAGE MOTION STROBE (EX COM3). The printer will ignore any CARRIAGE MOTION STROBES issued while CARRIAGE READY is 'false'.

CHARACTER READY: The CHARACTER READY status bit indicates the printer will accept a CHARACTER STROBE (EX COM2). The printer will ignore CHARACTER STROBES while CHARACTER READY is 'false'.

4.3 Data Lines

The 11 Data Lines to the printer are loaded into the printer interface in two bytes. The First byte is loaded in from the "A" register when an EX WRITE is issued by the Datapoint 2200. The second byte is loaded into the interface when an EX COM1 is issued.

EX COM1							
7	6	5	4	3	2	1	0

EX WRITE							
7	6	5	4	3	2	1	0

C7 - RIBBON LIFT
 C6 - NOT USED
 C5 - NOT USED
 C4 - NOT USED
 C3 - NOT USED
 C2 - DATA 1024
 C1 - DATA 512
 C0 - DATA 256

D7 - DATA 128
 D6 - DATA 64
 D5 - DATA 32
 D4 - DATA 16
 D3 - DATA 8
 D2 - DATA 4
 D1 - DATA 2
 D0 - DATA 1

4.4 Command Strobes

CARRIAGE MOTION STROBE (EX COM3):

When a CARRIAGE MOTION STROBE is issued by the Datapoint 2200 the printer will move the carriage according to the 11 bit data word. If Data 1024 is a "0" the carriage will move to the right, and if Data 1024 is a "1" the carriage will move to the left. Each increment of carriage movement is 1/60 inch. To make a normal ten character per inch space would require a binary value of six on the Data Lines.

The printer logic does not keep track of carriage position, it only increments or decrements from the current position. This means that the software must keep track of the carriage position to prevent running off the end and to facilitate returning the carriage to the starting position.

When the CARRIAGE MOTION STROBE is received by the printer, the CARRIAGE READY status bit will go 'false' until the carriage has been positioned according to the 11 bit Data Word. If the 11 bit Data Word would cause the carriage to be positioned to the right of column 132 or to the left

of column 0 a "check" will occur. See the section under CHECK for a description of this condition.

PAPER FEED STROBE (EX COM4)

The Datapoint 2200 should not generate a PAPER FEED STROBE without first checking that PAPER FEED READY = 1. When a PAPER FEED STROBE is issued by the Datapoint 2200, the printer will feed the paper according to the binary value in the 11 bit Data Word. A "0" in Data 1024 will cause the paper to feed upwards, a "1" will cause it to feed downwards. Each increment of paper motion is 1/48 inch, so to print at 6 lines per inch a binary value of eight should be placed on the Data Lines. To double space, a binary value of sixteen would be used. When the PAPER FEED STROBE is received, the PAPER FEED READY status line will go 'false' until the printer has completed the PAPER FEED operation.

PRINT STROBE (EX COM2)

Before generating a PRINT STROBE, the Datapoint 2200 should first sample the CHARACTER READY status bit and verify that it is a "1". When the PRINT STROBE is received by the printer, it will position the printwheel to the character represented by the lower seven bits (0-6) of the first Data Byte. The remaining bits (except RIBBON LIFT) should be at 0 when the PRINT STROBE is issued. The High-Order bit of Data Byte 2 is used for RIBBON CONTROL. If single color ribbon is used, this bit should always be a "0" whenever a print strobe is issued. If two color ribbon is being used, a "1" in the RIBBON LIFT bit, at the time a print strobe is issued, will cause the printer to use the lower ribbon color.

The CHARACTER READY status bit will go 'false' as soon as the PRINT STROBE is issued and will return 'true' at the completion of the print cycle.

FORM FEED (EX DATA)

A FORM FEED COMMAND should be issued only if the printer paper feed status is a "1". If the printer paper is not currently at top of form, the printer will feed paper until the paper is positioned at top of form. CHARACTER READY will go 'false' until the paper has been positioned to top of form.

If the paper is currently positioned at top of form, the FORM FEED COMMAND will be ignored.

RESTORE (EX STATUS)

The RESTORE COMMAND takes priority over all other printer commands. When a RESTORE COMMAND is issued, the carriage is positioned to the left-most column, the printwheel is resynchronized to the control logic and all control flip-flops in the printer are reset. During the RESTORE operation, CHARACTER READY, PAPER FEED READY, and CARRIAGE READY STATUS will be 'false'.

"Restore" is not to be used for the carriage return function. It absorbs several seconds of time and is to be considered an initialization function only.

4.5 PROGRAMMING CONSIDERATIONS

Carriage motion in the Datapoint 2200-250 printer is relative; that is, the carriage cannot be commanded to move to a specified column directly. The carriage must be moved n columns (or fraction of a column) to position the carriage to the desired column. This means that the program operating the printer must keep track of the current carriage position. For example, if the carriage is presently at column 20 and it is to be repositioned to column 43, then the carriage needs to be commanded to move 23 columns to the right (column 43 - present position). If a carriage return (position to column 0) is desired it would then be necessary to command the carriage to move 43 columns to the left.

Since the knowledge of the carriage's present position is so important, the programmer should always issue a RESTORE command the first time the printer is addressed to position the printer carriage to column 0. If this is not done, the programmer has no assurance that he really knows where the carriage is. The RESTORE should not be used for a carriage return, however, because it is very time consuming compared to commanding the carriage to move N (N= present column number) columns to the left.

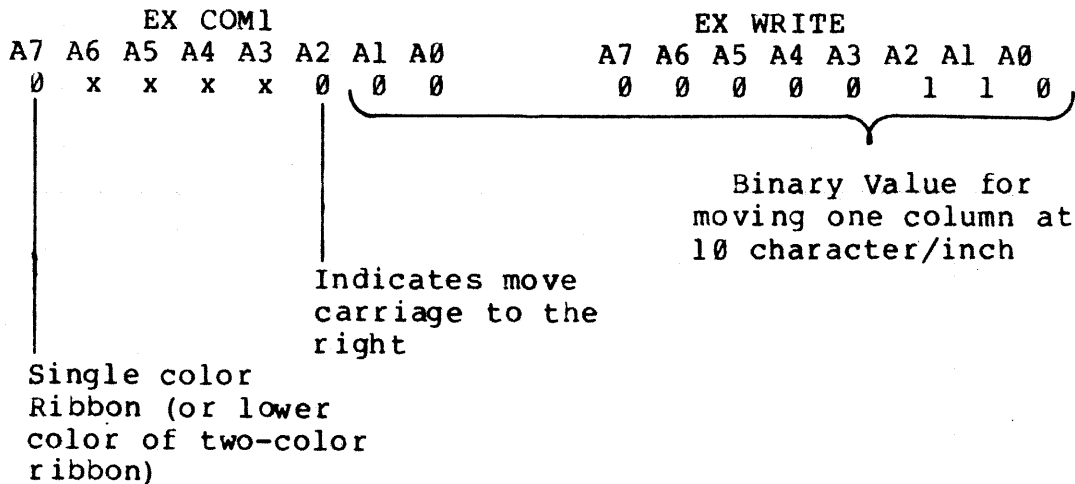
4.5.1 TO MOVE THE CARRIAGE: (Interface is already addressed)

1. Wait on CARRIAGE READY bit to come true.
2. Assemble the distance the carriage is to be moved into a 10 bit binary word. (Note that a binary 1 moves the carriage 1/6 of a character at 10 characters per inch).
3. Load the lower 8 bits into the "A" REGISTER and

execute an EX WRITE command.

4. Load the remaining 2 bits into A0 and A1 of the A REGISTER. If the carriage is to move to the right load a "0" in A2, if to the left load a "1" into A2. If single color ribbon or if the lower color of the ribbon is desired load a "0" into A7. If the upper color of two-color ribbon is desired, load a "1" into A7. Execute an EX COM1 to load the contents of the "A" REGISTER into the printer interface.
5. Execute an EX COM3 (CARRIAGE MOTION STROBE) to instruct the printer to move the carriage according to the information loaded into the interface in steps 3 and 4. The CARRIAGE READY STATUS bit will go false until the printer has finished moving the carriage.

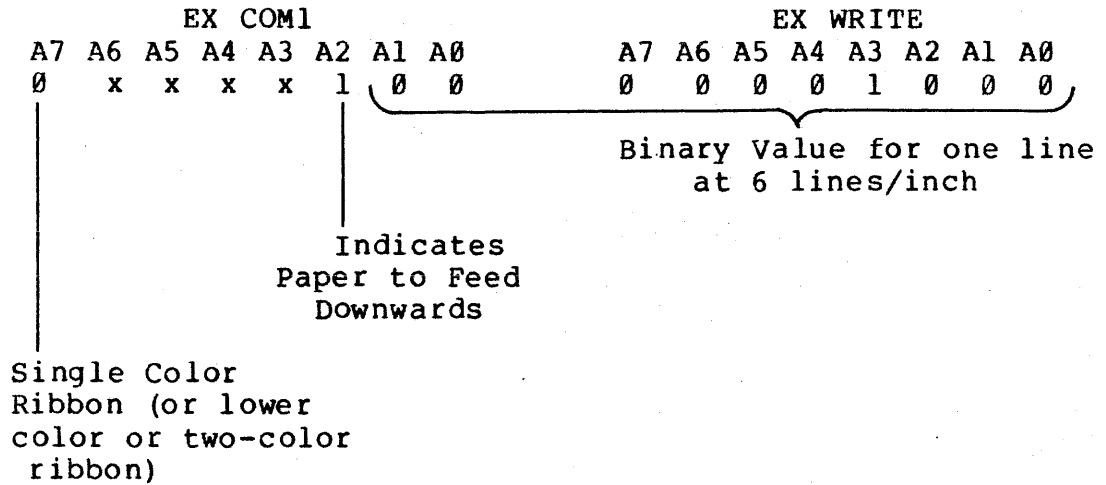
EXAMPLE:



4.5.2 TO FEED PAPER

1. Wait on the PAPER FEED READY status bit to come true.
2. Assemble the number of lines of paper movement desired into a 10 bit binary word (binary value of 8= one line at 6 lines per inch).
3. Load the lower 8 bits of this word into the "A" REGISTER. Execute an EX WRITE command.
4. Load the remaining 2 bits into A0 and A1 of the A REGISTER. If it is desired to feed paper upwards set bit A2 to a 0, for downwards paper motion set A2 to a 1. Set the RIBBON LIFT bit (A7) as described in 4.5.1 part 4.
5. Execute an EX COM4 (PAPER FEED STROBE). The PAPER positioned the paper.

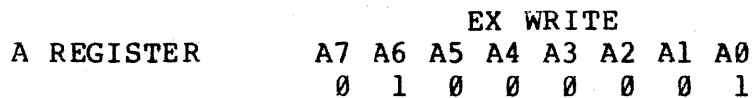
Example:



4.5.3 TO PRINT A CHARACTER

1. Wait on CHARACTER READY status to be a one.
2. Load the character to be printed into the "A" REGISTER (see figure 2, 3). Execute an EX WRITE to load the character into the interface.
3. Execute an EX COM2 (PRINT STROBE) and the printer CHARACTER READY status will go false until the printer completes printing the character.

Example:



Value for an upper case "A"

SERVO PRINTER CHARACTER SET (COURIER 72)				b7	0	0	1	1	1	1
				b6	1	1	0	0	1	1
				b5	0	1	0	1	0	1
b4	b3	b2	b1							
0	0	0	0	Ç	0	@	P	`	p	
0	0	0	1	!	1	A	Q	a	q	
0	0	1	0	"	2	B	R	b	r	
0	0	1	1	#	3	C	S	c	s	
0	1	0	0	\$	4	D	T	d	t	
0	1	0	1	%	5	E	U	e	u	
0	1	1	0	&	6	F	V	f	v	
0	1	1	1	'	7	G	W	g	w	
1	0	0	0	(	8	H	X	h	x
1	0	0	1	)	9	I	Y	i	y
1	0	1	0	*	:	J	Z	j	z	
1	0	1	1	+	;	K	[	k	{
1	1	0	0	,	<	L	\	l	|	
1	1	0	1	-	=	M	]	m	}
1	1	1	0	.	>	N	^	n	~	
1	1	1	1	/	?	O	_	o	~	

FIGURE 3

SERVO PRINTER CHARACTER SET (ELITE)				b7	0	0	1	1	1	1
				b6	1	1	0	0	1	1
				b5	0	1	0	1	0	1
b4	b3	b2	b1							
0	0	0	0	¢	0	@	P	`	p	
0	0	0	1	!	1	A	Q	a	q	
0	0	1	0	"	2	B	R	b	r	
0	0	1	1	#	3	C	S	c	s	
0	1	0	0	\$	4	D	T	d	t	
0	1	0	1	%	5	E	U	e	u	
0	1	1	0	&	6	F	V	f	v	
0	1	1	1	'	7	G	W	g	w	
1	0	0	0	(	8	H	X	h	x
1	0	0	1	)	9	I	Y	i	y
1	0	1	0	*	:	J	Z	j	z	
1	0	1	1	+	;	K	Ä	k	ä	
1	1	0	0	,	<	L	Ö	l	ö	
1	1	0	1	-	=	M	Å	m	å	
1	1	1	0	.	>	N	^	n	~	
1	1	1	1	/	?	O	_	o	~	

FIGURE 4

SERVO PRINTER CHARACTER SET (COURIER 10)				b7	0	0	1	1	1	1
				b6	1	1	0	0	1	1
				b5	0	1	0	1	0	1
b4	b3	b2	b1							
0	0	0	0	£	0	@	P	'	p	
0	0	0	1	!	1	A	Q	a	q	
0	0	1	0	"	2	B	R	b	r	
0	0	1	1	#	3	C	S	c	s	
0	1	0	0	\$	4	D	T	d	t	
0	1	0	1	%	5	E	U	e	u	
0	1	1	0	&	6	F	V	f	v	
0	1	1	1	'	7	G	W	g	w	
1	0	0	0	(	8	H	X	h	x
1	0	0	1	)	9	I	Y	i	y
1	0	1	0	*	:	J	Z	j	z	
1	0	1	1	+	;	K	[	k	{
1	1	0	0	,	<	L	\	l	|	
1	1	0	1	-	=	M	]	m	}
1	1	1	0	.	>	N	^	n	~	
1	1	1	1	/	?	O	_	o	~	

FIGURE 5

SERVO PRINTER CHARACTER SET (PICA 10)				b7	0	0	1	1	1	1
				b6	1	1	0	0	1	1
				b5	0	1	0	1	0	1
b4	b3	b2	b1							
0	0	0	0	¢	0	@	P	`	p	
0	0	0	1	!	1	A	Q	a	q	
0	0	1	0	"	2	B	R	b	r	
0	0	1	1	#	3	C	S	c	s	
0	1	0	0	\$	4	D	T	d	t	
0	1	0	1	%	5	E	U	e	u	
0	1	1	0	&	6	F	V	f	v	
0	1	1	1	'	7	G	W	g	w	
1	0	0	0	(	8	H	X	h	x	
1	0	0	1	)	9	I	Y	i	y	
1	0	1	0	*	:	J	Z	j	z	
1	0	1	1	+	;	K	[	k	{	
1	1	0	0	,	<	L	\	l	|	
1	1	0	1	-	=	M	]	m	}	
1	1	1	0	.	>	N	^	n	~	
1	1	1	1	/	?	O	_	o	⌋	

FIGURE 6

5.0 OPERATOR CONTROLS

5.1 Form Feed Switch

The FORM FEED SWITCH, located on the top cover, may be used to manually position the paper to top of form. In addition to positioning the paper to top of form, depressing the FORM FEED SWITCH will cause a RESTORE operation to occur, and the CHECK status bit will be set to a "1" to alert the programmer that the carriage has been moved to column 0.

5.2 Line Feed Switch

The LINE FEED SWITCH, also located on the top cover, can be used to manually advance the paper one line at a time. (For 6 lines per inch only.) The LINE FEED SWITCH will not function when the printer is in a "CHECK" condition.

5.3 Cover Interlock

The top cover of the Datapoint 2200-250 Printer is provided with an interlock switch so that whenever the top cover is not in the closed position, CHARACTER READY, CARRIAGE READY, and PAPER FEED status bits will go 'false' until the cover is returned to the closed position.

6.0 PARTS LIST

The following items are included in the Datapoint 2200-250 Printer:

1. 2200-160 I/O Cable (1)
2. Paper Guide (1)
3. Paper Tray (1)
4. Tractor Feed Mechanism (1)
5. Ribbon (1)
6. Test Program

DIABLO PARTS LIST

<u>QUANTITY</u>	<u>DESCRIPTION</u>
1	Tractor Feed Mechanism
1	Paper Tray
1	Paper Guide
1	Test Program