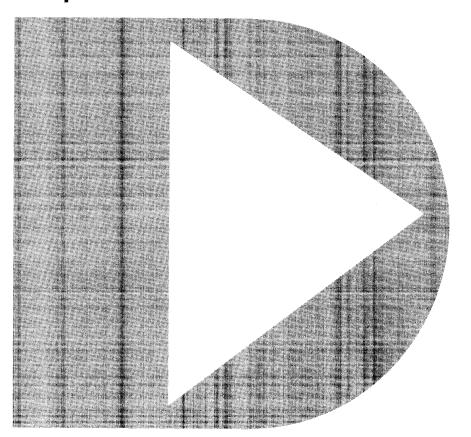
SERIAL PRINTER (CONSOLE) 2200-200 SERIAL PRINTER (FREE-STANDING) 2200-201 JUNE 10, 1972

# atapoint

## Product Specification



#### DATAPOINT CORPORATION

#### PRODUCT SPECIFICATION

#### 6/10/72

SERIAL PR	INTER (CONSOLE)
SERIAL PR	INTER (FREE-STANDING)
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2200-200 2200-201

#### 1.0 GENERAL DESCRIPTION

The Datapoint 2200-200/201 is designed to serve as a low speed, asynchronous, hard-copy impact printer with multi-part capability. The simple printing system consists of a rotating helical print wheel, an impregnated ink roll and a single print hammer. It responds to parallel data in the form of standard 64-character USASCII subset. Capable of operating at a maximum rate of 30 characters per second, the printer produces from one to six hard copies on forms up to 14.875 inches wide and 132 characters long.

The Datapoint 2200-200/201 is turned on and off by the console power switch located on the upper left side of the paper tub. In addition to operating the AC power, this switch also operates one of the two power outlets mounted at the rear of the console. The Datapoint 2200 can be plugged into either outlet depending on whether or not it is to be switched on and off with the printer with its own integral power switch.

#### 2.0 SYSTEM REQUIREMENTS

#### 2.1 Installation

Interconnection between the 2200 and the printer is made by the 50-wire I/O cable from the 2200 and Jl of the printer. Interconnection between the printer and the Communications Adaptor (if installed) is made between J2 of the printer and Jl of the Communications Adaptor. This pattern of connecting the I/O cable from the output of the 2200 to Jl of an external device and from J2 of that external device to Jl of the next external device is standard for Computer Terminal equipment.

The 2200 AC power cord connection has two possible configurations. The first configuration specifies that the 2200 power cord be plugged into the "switched" outlet on the electronic sub-assembly. This will cause the 2200 to be turned off and on by the console power switch. In this configuration the 2200 integral power switch should be placed in the "on" position.

The second configuration specifies that the 2200 power cord be plugged into the "unswitched" outlet. In this configuration, the 2200 is not effected by the console power switch but by its own power switch.

#### 2.2 Software

Computer Terminal Corporation offers several programs which use the Datapoint 2200-200/201 as an output device. Some of these programs are the Assembler, Lister, and Print\$. Proper responses to those programs which have interactive sections are "local" printer and printer speed of "2400". The "local" printer option sends data to the device at external address 0303 (as opposed to the "remote" printer option which sends serial data through the Communications Adaptor at address 03228). Although "2400" refers to a baud rate and is not relevant for parallel data on the I/O bus, it is necessary to supply the programs with a convenient non-zero answer to receive print-out.

#### 2.3 Forms Insertion

It is not necessary to turn the console power switch off when renewing the paper supply or inserting the paper. For the safety and convenience of the operator, interlock switches which turn off the printer motor and high-speed parts are activated when either the printer cover or the paper tub door is open.

Before inserting forms assure that the paper feed mechanism is initialized by activating the formfeed switch. To insert the forms open the paper tub door and the cover. Loosen the right-hand tractor adjustment knob. This allows the tractor to slide horizontally and accomodate varying paper widths. Swing open the paper pressure clamps on the left and right-hand tractors.

With one hand below the printer slip the form up from the tub and through the opening between the printer wheel and the print hammer. With the other hand pull the paper up until the top edge has cleared the print wheel assembly. Place the form over the sprockets and close the pressure clamps. Rotate the platen knob to check that the paper has seated in the sprocket properly. While applying pressure to the right-hand tractor, fasten the tractor adjustment knob. Too little tension across the form will cause the form to be crumpled during a carriage return while too much tension will cause the form to gradually slip out of the tractors. For ll inch long forms, the first line to be printed can be positioned behind the print wheel with the platen knob. Before closing the paper tub door, make sure the forms are feeding straight out of the tub into the printer without any kinks in the left or right edges and without any obstruction. Close the door and cover. With the linefeed button or with the platen knob, turn the paper up until it has cleared the paper feed slot in the cover.

#### 3.0 TECHNICAL DESCRIPTION

#### 3.1 Specifications

A summary of specifications for the printer is given in TABLE 3-1.

#### 3.2 Media Requirements

The Datapoint 2200-200/201 can be adjusted to accept form widths from 3.625 inches minimum to 14.875 inches maximum. The margins are 0.8875 inch measured from either vertical edge of the form to the middle of the first character at the left margin and to the middle of the last character at the right margin. The right margin is defined at the Nth permissable character position. The Right Limit signal is activated at the N+1 character position.

To compute the line length for a particular form in inches and in character positions, the formula is:

At ten characters per inch, the formula gives line lengths of 132 characters and 26 characters, respectively.

The form must be continuously sprocketed at both the left and right edges. The sprocket holes must be 0.155 + 0.005 - 0.0 inch in diameter;  $0.50 \pm 0.010$  inch from center to center; and  $0.250 \pm 0.010$  inch from the vertical edge of the form to the sprocket hole centers.

#### TABLE 3-1

#### DATAPOINT 2200-200/201 PRINTER SPECIFICATIONS

#### Power Requirements (Exclusive of 2200)

	Standard	Optional
Voltage: Current: Phase: Frequency	120VAC + 10% 6 Amps Maximum Single 60HZ + 2%	
Environmental Requirements		
	Operating	Storage & Transit
Temperature Humidity	50°F to 90°F 10% to 90% (non cond	
Physical Characteristics	2200-200	2200-201
Size: Height Width Depth Weight:	28 inches 56-1/4 inches 29-1/2 inches (including 175 lbs.	29-1/2 inches paper tray)
Printing System		

Technique:

Impact from rear of paper with a single hammer toward a rotating, helical print wheel.

Operation Rates:

30 characters/second synchronous. Asynchronous speed is up to 30 characters/second average. Asynchronous operation occurs when information is given to the printer at a lower rate than synchronous speed.

Carriage return time is 385 msec. maximum for 132 character line.

#### TABLE 3-1 (continued)

Characters:

Sixty-three plus space from standard

USASCII code.

Size:

.067 inch wide X .096 inch high

nonimal.

Spacing:

10 per inch horizontal. 6 per inch vertical.

132 per line maximum.

Ink System:

Direct inking of print wheel by direct supply ink roller.

For good print quality with single-part forms, 16-pound bond is the minimum weight but 20-pound is recommended. When multi-part forms are used, the maximum that can be produced is the original and five carbon copies. The multi-part pack thickness should not exceed 0.0155 inch (1/64 inch).

Figure 3.1 illustrates the various dimensional requirements.

#### 3.3 Software Characteristics

#### 3.3.1 Perspective in the 2200 System

The Datapoint 2200-200/201 is categorized as an external device which is connected to the 2200 Input/Output and Command System Bus. It responds to parallel USASCII code transferred from the basic processor. The reader should refer to the Datapoint 2200 Reference Manual, Part 2, BASIC PROCESSOR, Figure 2-1, for the organization of the I/O system; and Part 4, INPUT/OUTPUT OPERATIONS, for general information on using all Datapoint 2200 external devices.

This section will explain all pertinent aspects of the Datapoint 2200-200/201 operation which will aid the programmer in efficiently using the printer.

#### 3.3.2 Data Transfer Operation

Data transfer to the Datapoint 2200-200/201 involves three main concepts which pertain to all external devices. First, the device status word is inspected for the desired contents. When the correct status word is present, the Arregister is loaded with the data to be transferred. Finally, an EXTERNAL WRITE command transfers the data from the processor to the selected external device.

Since the printer can accept data at its printing speed of 30 characters per second, while the processor can send data at much faster rates, the key to data transfer is a status-checking subroutine. The subroutine can use all the information present in the status word or only the "device ready" bit which in all external devices is the least significant bit. It is advisable to inspect all the bits available in the status word since the subroutine can correct certain faults or alert the operator to appropriate action.

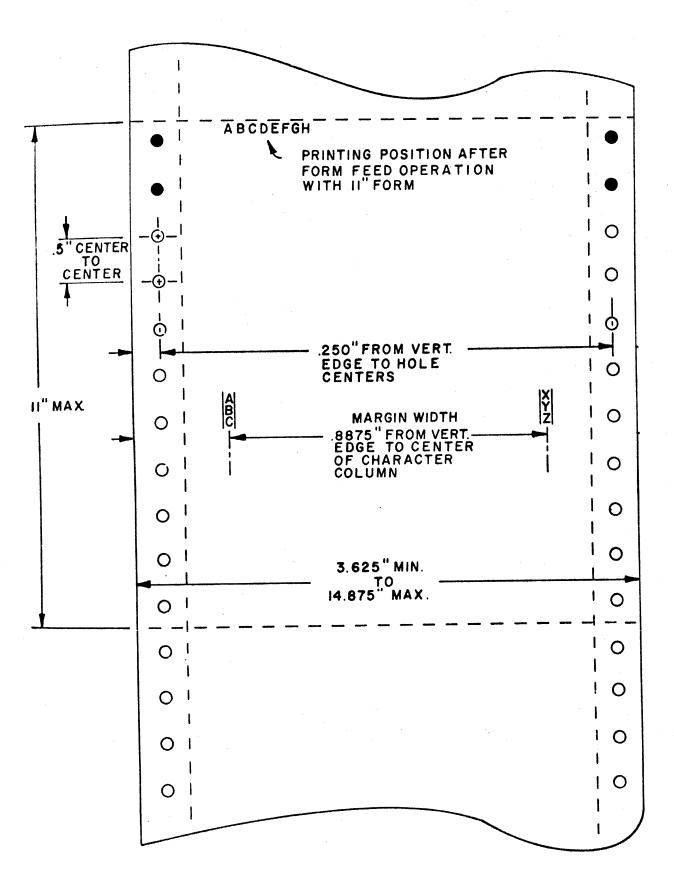


FIGURE 3.1 MEDIA REQUIRMENTS

#### 3.3.3 Automatic Turn-Off Feature

If the printer is addressed, the execution of either an Input or Write command resets a binary counter which, if allowed to count without being reset, will remove AC power from the printer motor. This will not cause any spurious printing or carriage movement. Printing can be resumed without any undesired interruption in the printing format. Issuing another input strobe will turn it on again. This feature is designed to reduce mechanical wear, to lengthen the life of the ink roll, and to allow the printer to be turned on by the 2200 in the absence of an operator.

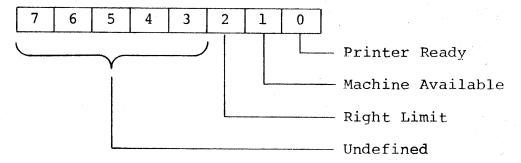
The time period of the counter is approximately 30 seconds.

#### 3.3.4 Status Word Definition

It is not necessary to send an EXTERNAL STATUS command to the Datapoint 2200-200/201. Addressing the printer automatically connects the status word to the I/O bus. The printer will stay addressed until another device is addressed.

The printer status word is defined for the 3 last significant bits only:

DATAPOINT 2200P STATUS WORD



a) Printer Ready is a logic "1" when the printer is in the correct status to receive data. When the data is

transferred, this bit goes to logic "0" for approximately 33 milliseconds, the period which limits data transfer and printing speed to 30 characters per second. Printer Ready will be absent for a longer period during carriage returns and formfeeds and when Machine Available is logic "0".

- b) Machine Available is a function of several faults or conditions which prohibit printing. Any of the following will make Machine Available logic "0".
  - 1) Printer not addressed.
  - 2) AC motor off because:
    - [a] interlock switch activated by paper tub door open.
    - [b] interlock switch activated by printer cover open.
    - [c] turned off by 30 second counter.
    - [d] turned off by end-of-text command.
  - 3) Out of paper switch.
  - 4) Delay when motor is turned on.

The delay is triggered every time the AC motor is turned on to allow time for the motor speed and mechanical operation to stabilize.

c) Right Limit is a logic "l" in normal operation until the carriage movement activates the Right Limit switch, causing this bit to go to logic "0". When the Right Limit condition is active, Printer Ready is also logic "0". The Right Limit fault can be removed under program control by using this signal to initiate an automatic carriage return and linefeed. This will allow the remainder of the line to be printed at the left margin of the next line. Note that the last character of the line is lost if the carriage return/linefeed sequence is activated by a Right Limit signal.

If the right paper tractor is adjusted to allow N printable positions, the Right Limit switch will be activated as the (N + 1) character is printed.

#### 3.3.5 Sample Datapoint 2200P Status Subroutine

The following subroutine is a general purpose Datapoint 2200-200/201 status-checking subroutine. It executes an audible beep when the right limit is activated to let the operator know that the right limit was hit and automatically does a carriage return and linefeed. If the right limit bit

is logic "l" but Machine Available is a logic "0", the subroutine executes a continuous beep to alert the operator that a fault or condition exists which prohibits printing. As soon as the situation is corrected, it resumes operation. It does not return to the main program until Printer Ready is a logic "l".

Datapoint 2200-200/201 General Purpose Status Subroutine

.Registers Used: A, B

.External Subroutines Used: None

.CALL Depth: 0

.External/Internal Data References: None

.Internal Labels Used: PRSTAT
BIT0
BIT1
RLEXIT
CRWAIT
ALERT

.Lines: 31 .Bytes: 55

PRSTAT LA 0303 Address the printer. EXADR IN Get the status word. Store it in B. LBA Check Right Limit BIT2. ND 4 If is logic "0", jump to Right JTZ RLEXIT Exit subroutine BITL LAB Get the status word from B. ND 2 Check Machine Available BIT1. If it is logic "O", jump to JTZ ALERT operator alert subroutine. BIT0 LAB Get the status word. ND 1 Check Printer Ready BITO. RFZ Return to main program if it is logic "l". **JMP** PRSTAT If not, stay in Printer Status subroutine.

#### .RIGHT LIMIT EXIT SUBROUTINE

ALEXIT	EX	BEEP	Alert the operator that the right limit was hit.
	LA EX	015 WRITE	Send a carriage return.

CRWAIT	LA	0303	Wait for the carriage to return.
	$\mathbf{E}\mathbf{X}$	ADR	
	IN		
	ND	1	
	$\mathtt{JTZ}$	CRWAIT	
	LA	012	Then send a linefeed.
	EX	WRITE	
	JMP	PRSTAT	Make sure the Printer is ready.

#### .OPERATOR ALERT SUBROUTINE

•			
ALERT	LA	0303	Keep checking the Machine Available BITl.
	EX	ADR	
	IN		
	ND	2	
	JFZ	PRSTAT	If it is logic "l", make sure the printer is ready.
	EX	BEEP	If it is still not logic "l",
	JMP	ALERT	keep alerting the operator. Stay in the alert loop.

#### 3.3.6 Description of USASCII Subset

The Datapoint 2200-200/201 prints the full 64-character subset and sequence from columns 2 through 5 of the USASCII chart (see Figure 3.3.6). It also responds to the control codes for linefeed, carriage return, formfeed, and end-of-text.

As a convenience, the USASCII chart is reproduced in Figure 3.3.6 and the printer subset is highlighted.

				·								
	BI	rs		<sup>b</sup> 7 <sup>b</sup> 6 <sup>b</sup> 5	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
b <sub>4</sub>	<sub>p</sub> 3	b <sub>2</sub>	b <sub>1</sub>	Column	0	1	2	3	4	5	6	7
0	0	0	0	0	NUL	DLE	SP	0	@	Р		р
0	0	0	1	1	SOH	DC1	!	1	А	a	а	q
0	0	1	0	2	STX	DC2	,,	2	В	R	b	r
0	0	1	1	3	ETX	DC3	#	3	С	S	С	s
0	1	0	0	4	EOT	DC4	\$	4	D	Т	d	t
0	1	0	1	5	ENQ	NAK	%	5	E	U	е	u
0	1	1	0	6	ACK	SYN	. &	6	F	·V	f	v
0	1	1	1	7	BEL	ETB	•	7	G	w	g	w
1	0	0	0	8	BS	CAN	(	8	н	Х	h	×
1	0	0	1	9	нт	EM	)	9	ı	Υ	i	У
1	0	1	0	10	LF	SUB	*	:	J	Z	j	Z
1	0	1	1	. 11	VT	ESC	+	;	К	[ .	k	{
1	1	0	0	12	FF	FS		<	L	\	ı	-
1	1	0	1	13	CR	GS	_	=	М	]	m	}
1	1	1	0	14	so	RS		>	N	Λ.	n ·	~
1	1	1	1	15	SI	us	/	?	0		0	DEL

USASCII CHART

FIGURE 3.3.6

#### 3.3.7 Explanation and Use of Control Codes (Figure 3.3.7)

- a. A backspace command moves the print wheel and carriage back one character space. Printer Ready should be at a logic "1" before sending a backspace command.
- b. A linefeed advances the paper one line. Its execution time is the same as for a printable character and therefore can be repeated at a maximum rate of 30 lines per second. Printer Ready should be at logic "1" before sending a linefeed command. Printer Ready goes to a logic "0" until the linefeed action is completed.
- c. A carriage return moves the carriage to the first character column at the left margin. Execution time is variable and dependent on the position from which it is initiated, although it should not take a maximum of more than 400 milliseconds from column 132. It is not necessary to have Printer Ready at a logic "1" before executing a carriage return. This enables: a program to exit "forcefully" from a Right Limit fault condition. Printer Ready is a logic "0" until the carriage reaches the left margin position.
- d. A formfeed is useful only when ll" long forms are used. A formfeed will move the print position to the top line (first line below perforation) of the next form at a feed rate of 72 lines per second. Printer Ready goes to logic "0" until the formfeed is complete. A formfeed cannot be exeucted if the print position is already indexed to the top line. This implies that two consecutive formfeed commands must be separated by a linefeed command to advance the paper to the second line after the first formfeed.
- e. The end-of-text control character turns the printer motor off in the same manner as the 30-second automatic turn-off. Machine Available and Printer Ready go to logic "0". Addressing the printer and issuing an Input strobe turns the motor on again. This function allows the program to control precisely and to minimize the printer operation time.

#### 3.3.8 Multi-Printer Configuration

The primary address of the printer as assigned in the Datapoint 2200 Reference Manual, Table -42, is 3038. This is the address at which the printer is addressed by Computer Terminal software. It is possible to design a system in which a single Datapoint 2200 is served by more than one Datapoint Printer. Secondary printers can be assigned addresses from the "unassigned" section of Table 4-2, Data-

### OCTAL CODE FOR DATAPOINT 2200-200/201 ASCII SUBSET

: · · · · · · · · · · · · · · · · · · ·						
end of text	-	004				A - 101
back space	-	010				B - 102
linefeed		012				C - 103
formfeed	-	014				D - 104
carriage return		015				E - 105
						F - 106
space	_	040			•	G - 107
<u> </u>	_	041				н - 110
· · · · · · · · · · · · · · · · · · ·		042				I - 111
#		043				J - 112
\$	_	044				K - 113
8		045				L - 114
&		046				M - 115
1		047				N - 116
(	_	050				0 - 117
)	_	051				P - 120
*		052				Q - 121
+		053				R - 122
	_	054				
•	_					
·	-	055				T - 124
•		056				U - 125
	-	057				V - 126
•		0.60				W - 127
0	-	060				x - 130
1	-	061				Y - 131
2		062				Z - 132
3	-	063				
4	-					[-133]
5	7	065				\ - 134
6		066				] - 135
7		067	•			Λ - 136
8	_	070				- 137
9	_	071				
:	_	0.72				
;	_	073			٠.	
·	_	074				
=	_	075				
>	_	076				
,	_	077				
@	_	100				
<u>u</u>		$\tau \sigma \sigma$				

FIGURE 3.3.7

point 2200 Reference Manual. This requires a simple hardware modification which can be performed upon request by qualified Computer Terminal Corporation personnel.

#### 3.4 Operator Controls

The operator has two controls, a formfeed and linefeed switch. These switches are mounted on the top cover and are only enabled when the printer is not busy printing and when both the front door and printer cover are closed. Multiple formfeeds must be separated by linefeeds as explained in section 3.3.7.

#### 4.0 PHYSICAL DESCRIPTION

The physical dimensions and weight of both the 2200-200 and 2200-201 is given in Table 3.1. An illustration of each model is shown in Figure 4.1 and 4.2.

#### 5.0 INTERFACE REQUIREMENTS

The only interface required is the 50 pin I/O cable to the Datapoint 2200. A typical multiple I/O device configuration interface connection is shown in Figure 5.1.

#### 6.0 PARTS LIST

The following separate items are part of the 2200-200 and 2200-201 Printer and are included in each shipment.

Quantity Description CTC	P/N
3 2200-202 Black Ink Roll 179-	42
1 50-Wire I/O Cable 344-	10
4 Floor Glides with Nuts 141-	42
4 $4-40 \times 1/4$ " Pan Head Screws	
4 4-40 nuts	
2 10-32 x 1-1/8" Pan Head	
Screws	
2 Paper Tray Standoff 390-	20
4 $10-32 \times 1/2$ " Flat Head	
Screw	
2 10-32 x 3/4" Pan Head	
Screw	
No. 10 Lock Washer	
6 No. 10-32 Nut	

Quantity	Description	CTC P/N
1	Paper Tray	387-20
1	Paper Tray Support	(-1) 388-20
1	Paper Tray Support	(-2) 389-20
1	2200P Reference Manual	1-88
1	P00065 Final System/	1-89
	Installation Test Tape	
10	Cable Wraps	111-42
10	Cable Clips, Stick-On	146-42
1	*2200 I/O Connector Cover	393-20
1	2200-223 Singe Part Paper	
	(20 lb. paper, box of 3000	1)
1	S00027 Tape (PRINT\$)	
1	S00027 Listing (PRINT\$)	
1	P00011 FOXER	

Note: The 2200 I/O Connector Cover is included in shipments of 2200-200 only.