WANG

2221
HIGH-SPEED PRINTER
REFERENCE MANUAL

SYSTEM 2200

2221
High-Speed Printer

Reference Manual

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HOW TO USE THIS MANUAL

This manual provides quick answers to questions concerning the operation of the 2221 High-Speed Printer. It is designed for users who are already familiar with the 2200 and its BASIC language instruction set.

For users who are not familiar with the operation of the 2200, it is recommended that the 2200 BASIC Programming Manual be read before proceeding with this manual.

This manual has been divided into six sections covering all the operational features of the High-Speed Printer.

2221 HIGH-SPEED PRINTER

TABLE OF CONTENTS

Section I
General Information

INTRODUCTION

UNPACKING AND INSPECTION

INSTALLATION

2200 TURN ON PROCEDURE

2221 TURN ON PROCEDURE

PAPER RECOMMENDED FOR HIGH-SPEED PRINTER

POINTS TO BE CHECKED

SPECIAL CHARACTER

THINGS TO DO AND NOT TO DO

TO REPLACE RIBBON

FUSES

A typical Wang System 2200 configuration.

SECTION I GENERAL INFORMATION

INTRODUCTION

This manual provides the user with a quick and easy reference to the operational features of the 2221 High-Speed Printer. Arranging the manual into six sections is designed to assist you in answering your questions quickly and efficiently.

Section I – Introduces you to the High-Speed Printer along with unpacking, installation, and turn-on procedures necessary to prepare the system for use.

Section II – Explains the SELECT statement as it pertains to the High-Speed Printer.

Section III – Describes printing on the High-Speed Printer.

Section IV – Describes the Hexadecimal Function along with Special Codes.

Section V – Discusses the Vertical Format Paper Tape.

Section VI – Contains a list of HEX Codes and specifications for the High-Speed Printer.

UNPACKING AND INSPECTION

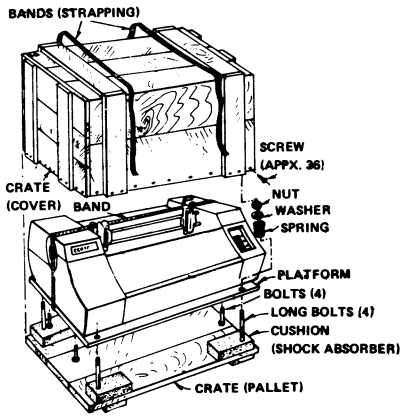
(Call your Wang Service Representative if there are any problems with your system.)

Carefully unpack your equipment and inspect all units for shipping damage. If damage is noticed, do not proceed. Notify the shipping agency. Check equipment received against the purchase order. Decals specifying model numbers can be found on all Wang equipment, usually on the back of each unit.

The tools necessary to remove the High-Speed Printer from the packing crate are:

Phillips head screwdriver
slotted head screwdriver
adjustable wrench
scissors (or knife)

1. Set crate right-side up.
2. Cut the two bands (strapping) around crate.
3. Remove screws (approximately 6) around base of crate.
4. Lift crate straight-up off of platform.
5. Remove nuts, washers, springs, from long bolts (4).
6. Cut band from printer.
7. Remove bolts from bottom of platform (4).
8. Remove tape from ribbon spools (left and right sides).
9. Untie head assembly.

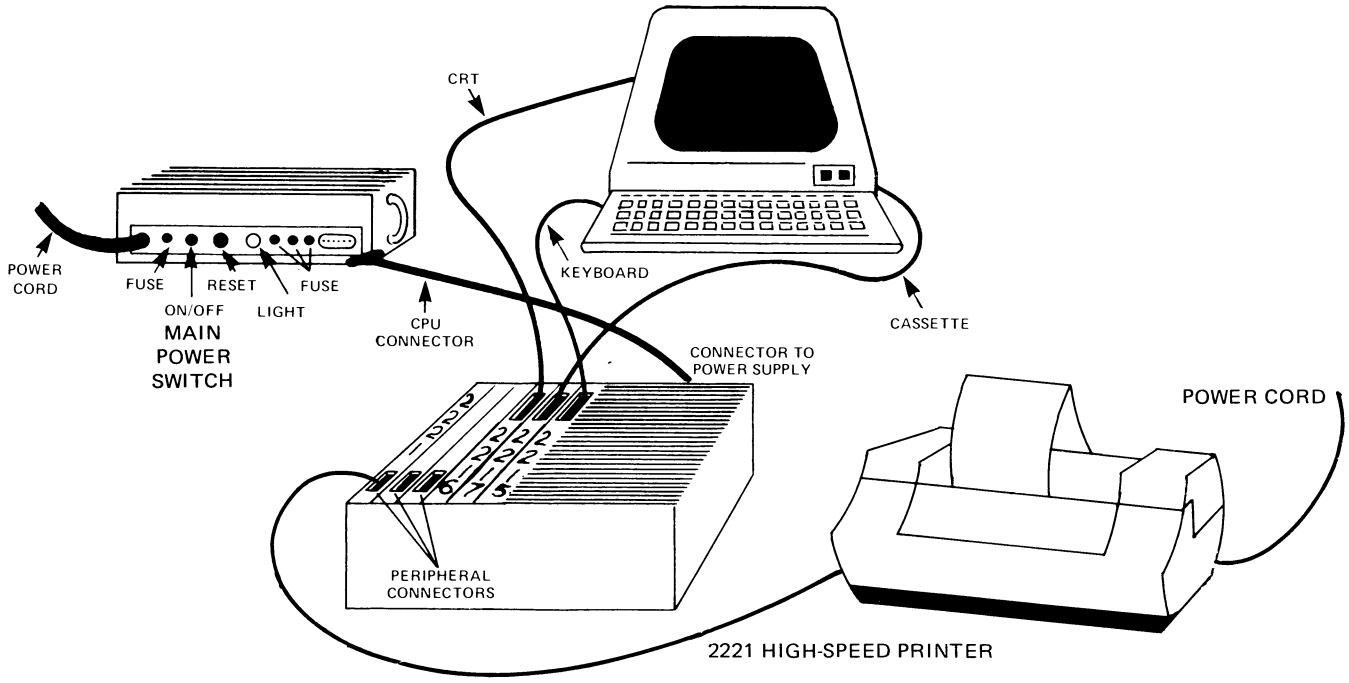


SECTION I GENERAL INFORMATION

INSTALLATION

To install your 2221, use the following procedure:

1. Plug the High-Speed Printer into CPU chassis. The peripheral connector on the CPU is labeled for the High-Speed Printer. After attaching the cord, make sure the lock clips are snapped into place at the CPU connection.
2. Plug the High-Speed Printer power cord into a wall outlet.
3. Plug the main power cord of the CPU chassis into the Power Supply Unit; plug the Power Supply Unit into a wall outlet.



2200 TURN-ON PROCEDURE

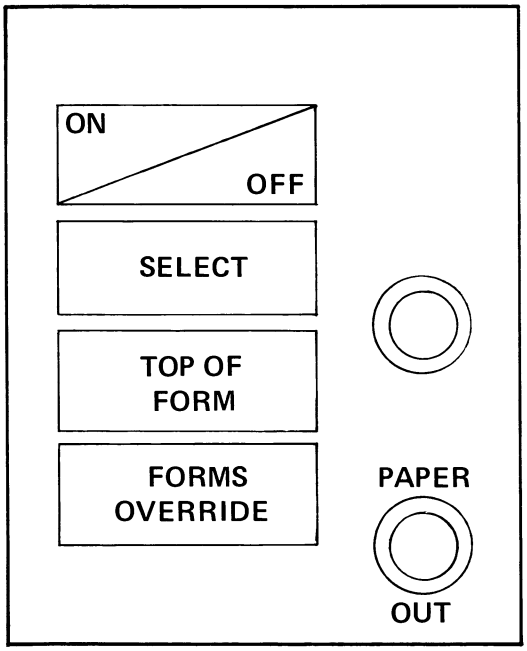
1. Turn power ON switches on all peripherals (including CRT).
2. Move the main power switch on Power Supply Unit to the ON position (light on Power Supply Unit goes on). This Master Initializes the system.
3. The CRT display appears as illustrated below.

```
READY
:_ .
```

4. Turn ON the High-Speed Printer. A description of the operator's control panel is continued in the next section, 2221 TURN ON PROCEDURE.

2221 TURN-ON PROCEDURE

On the right-hand side of the 2221 High-Speed Printer are a number of switches, buttons and light indicators for controlling the manual operations of the printer:



POWER ON/OFF SWITCH:

A single depression of this switch turns the power on and also illuminates the switch. A second depression of the switch turns the power off and also turns the light off.

SELECT SWITCH:

After the printer is turned on, touch the SELECT switch. By depressing this switch, the printer is placed in the ready position to receive data; the switch light is turned on to remind you that the printer is ready. This switch also primes (or clears) the contents of the buffer.

TOP OF FORM:

After the printer is turned on and the SELECT switch is activated, the first sheet of paper is advanced by touching this key.

FORMS OVERRIDE SWITCH:

When out of paper, the printer automatically stops and the PAPER OUT indicator light goes on. If this occurs before a line is completely printed, depress the FORMS OVERRIDE switch to complete the printout of the line.

NOTE:

If the PAPER OUT indicator light is on, the FORMS OVERRIDE switch must be depressed and held down during the print operation.

PAPER OUT:

This indicates that the paper supply rack is empty. When this occurs, the system stops and an audible signal is automatically turned on.

PAPER RECOMMENDED FOR THE HIGH-SPEED PRINTER

1. 15 lb. white sulphite bond, 9 lb. carbon paper.
2. Continuous tabulating card stock, 15 to 125 lb.
3. For copies 2 through 8, use 4 to 12 lb., 9lb. carbon.

Registered or equivalent stock form can be used.

POINTS TO BE CHECKED

1. Check that the Flexible Cable Finger Board is firmly seated in Driver Board Connector.
2. Check that the limit switch is down.
3. Connect appropriate interface.
4. Plug Printer into Power Source.
5. Prepare and install paper tape into Tape Reader.
6. Insert paper using Rapid Advance Lever and place in Pin Feed mechanism.
7. Turn power ON (from control panel).
8. Check that video lamp is lit (located beneath cable clamp bracket).
9. Ensure printer is de-selected (lamp out SELECT switch).
10. Register TOP OF FORM (from control panel).
11. Adjust platen knob to position form.
12. Press SELECT switch to enable printer to receive data (from control panel).
13. Penetration Control Knob is presently set at 5. Adjust the print head inward by loosening lock knob first, turn the Penetration Control Knob until acceptable print quality is obtained. Tighten lock knob.

The numbers on the Penetration Control Knob do not correspond to the number of copies being used.

NOTE:

To achieve proper penetration, the left hand locking knob should be loosened, and the right hand penetration knob turned clockwise until a slight smudging of the ribbon occurs when the head is manually moved across the paper. The knob should then be turned counterclockwise until the smudging disappears. The locking knob should be firmly secured to ensure the adjustment does not change.

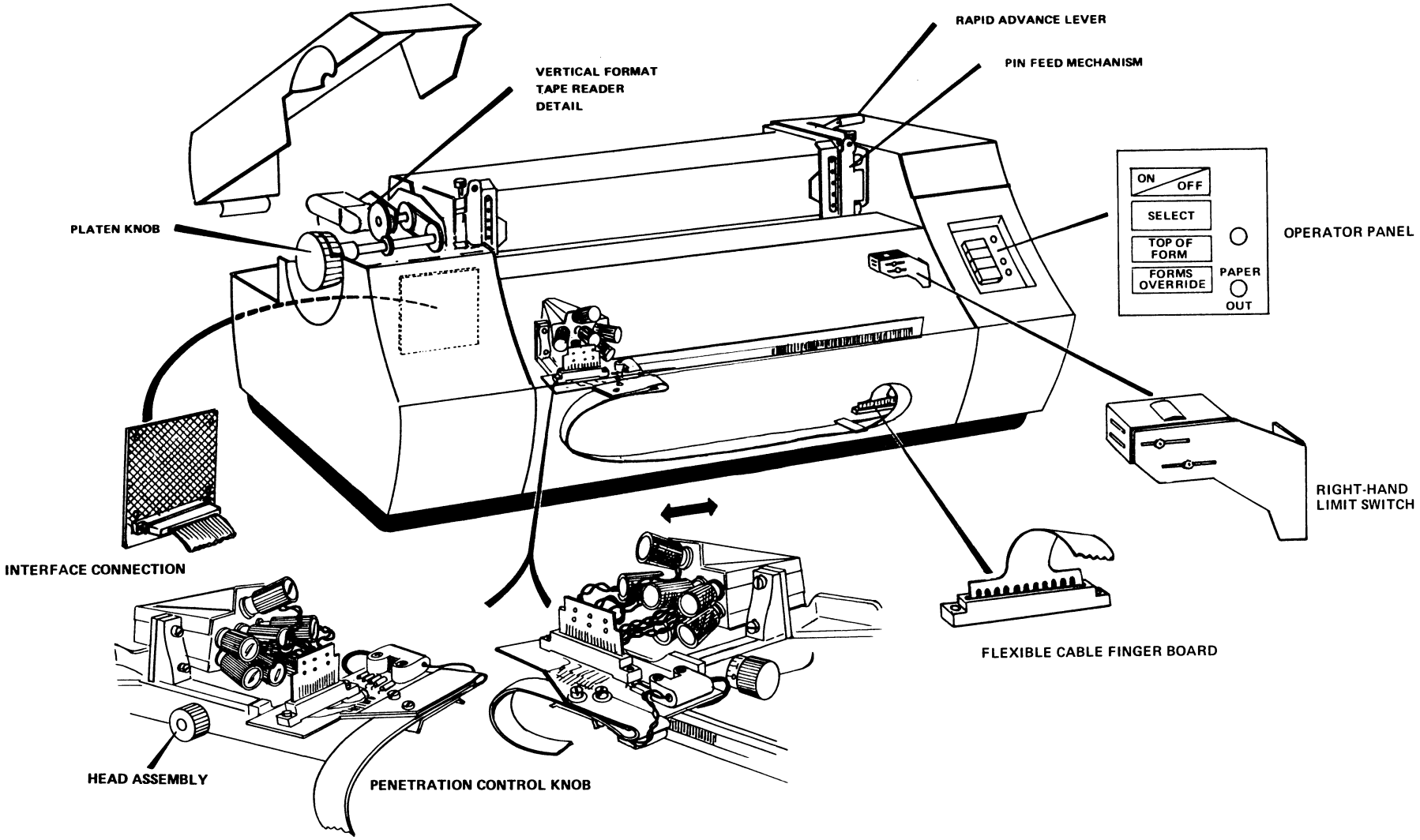
Your 2200 System is now ready to use.

If a system failure should occur, try to restore operation by touching the RESET button on the keyboard, or power supply unit. If normal operation is not restored, master initialize the system by turning the power OFF, then ON again (power ON/OFF switch is on the power supply unit). If the system is still non-functional repeat the installation procedure, then call your Wang Service Representative.

SPECIAL CHARACTER

There is a certain character that is different on the CRT than on the High-Speed Printer:

CRT	HIGH-SPEED PRINTER
↑	⌒



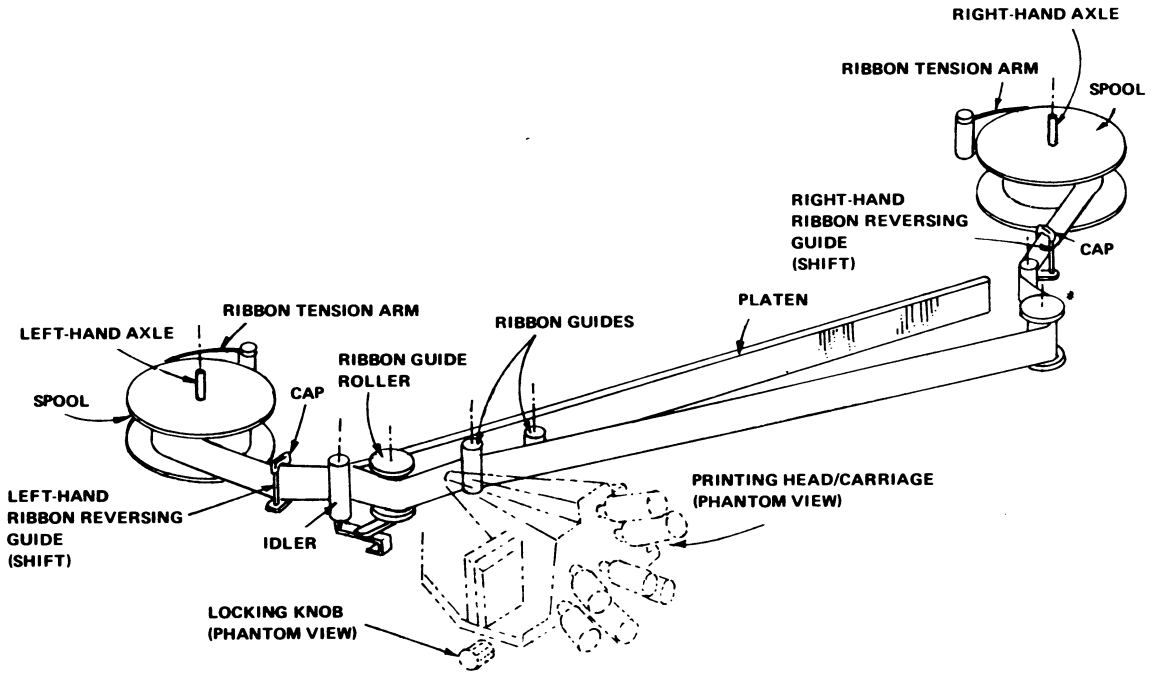
2221 HIGH-SPEED PRINTER

THINGS TO DO AND NOT TO DO

1. The printer should always be plugged into a 3-wired grounded outlet.
2. Do not exceed paper thickness of more than five sheets. Total thickness cannot exceed 0.040 inches.
3. Never operate Printer without paper.
4. Ensure that all covers are closed and secured during operation.
5. If malfunction occurs, notify qualified service personnel.

TO REPLACE RIBBON:

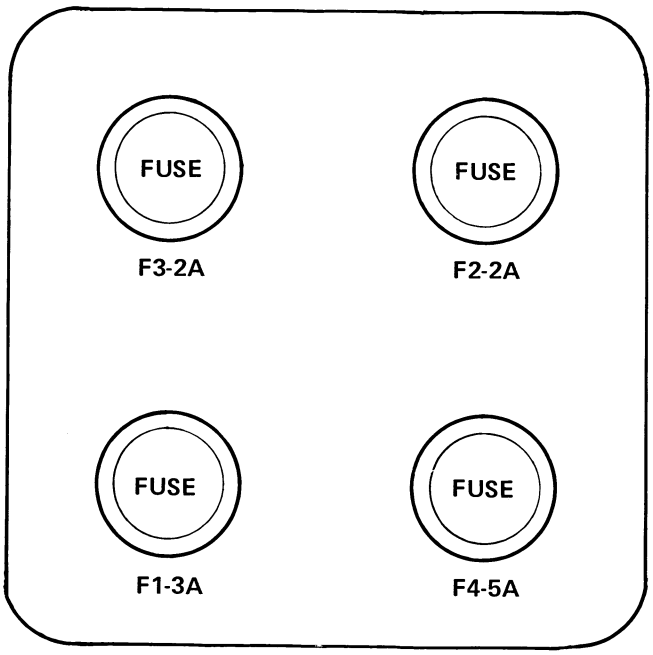
Loosen penetration control locking knob. Set head adjustment knob to 5. Lift left-hand and right-hand covers. Remove caps from ribbon reversing guides (Shifts). Swing ribbon tension arms clear of spools. Lift spools from axles. Place empty spool (partially wound) on right-hand axle. Insert ribbon through right-hand reversing guide and thread through idlers and ribbon guides. Place full spool on left-hand axle, assuring that ribbon is inserted in left-hand ribbon reversing guide. Replace ribbon reversing guide caps. Replace left-hand and right-hand covers.



RIBBON REPLACEMENT MECHANISM

FUSES

The 2221 High-Speed Printer has four fuses located on the rear panel. These fuses can be replaced by twisting the bad fuse out of the socket, then replacing it with a new fuse.



FUSE DIAGRAM

Fuse 4 is the main fuse and is a 5 amp fuse. Fuse 1 controls the light indicators and is 3 amps. Fuses 2 and 3 control the carriage of the Printer and are 2 amps each.

NOTE:

The following sections give detailed instructions, with examples, how to address and use the 2221 High-Speed Printer. Refer to the 2200 Reference Manual for a more detailed description of PRINT, LIST, and SELECT commands.

Section II
Device Selection

DEVICE CODES

THE SELECT STATEMENT

LINE LENGTH

COMBINED PARAMETERS

DESELECTING THE HIGH-SPEED PRINTER

SECTION II DEVICE SELECTION

DEVICE CODES

A three character device code is assigned to each High-Speed Printer that is attached to the 2200. This code is used when selecting the High-Speed Printer for output. The Device Code is a three character HEX Code (XYY). The first character is the Device Type, and the last two characters of the code are the Device Address. The Device Address for the first High-Speed Printer on the system is 15, the address for a second High-Speed Printer if desired, is 16. The Device Address can be only 15 or 16 (with special ordering instructions).

There are two one-digit Device Types available for the High-Speed Printer:

Type 0 - This Device Type addresses devices that are not normally indexed to the next line when a carriage return is executed. For these devices, the 2200 automatically adds a line feed after each carriage return. The High-Speed Printer automatically executes a line feed when a carriage return is executed. Therefore, if the Device Codes of 015 or 016 are used for the High-Speed Printer, all output is double spaced.

Type 2 - This Device Type addresses devices that normally perform a line feed when a carriage return is executed. Therefore, if the Device Codes of 215 or 216 are used with the High-Speed Printer, all output is single spaced.

THE SELECT STATEMENT

The SELECT statement (see 2200 Reference Manual) selects the High-Speed Printer for output. The High-Speed Printer may be selected for three distinct types of output by using the SELECT parameters PRINT, LIST, and CO. The SELECT statement can be keyed in either in an immediate mode statement or as part of a program.

```
:SELECT PRINT 215
```

The above SELECT PRINT statement selects the High-Speed Printer with the Device Address code 215 for all program output resulting from the execution of PRINT or PRINTUSING statements. Printout resulting from PRINT statements entered in the immediate mode appear on the CRT unless the High-Speed Printer is selected for CO (see SELECT CO 215).

Example:

```
:10 SELECT PRINT 215
:20 PRINT "X", "X↑2"
:30 FOR X=1 TO 5
:40 PRINT X, X↑2
:50 NEXT X
:RUN
```

OR

```
:SELECT PRINT 215
:20 PRINT "X", "X↑2"
:30 FOR X=1 TO 5
:40 PRINT X, X↑2
:50 NEXT X
:RUN
```

RESULTANT PRINTOUT:

```
 X            X^2
 1             1
 2             4
 3             9
 4             16
 5             25
```

```
:SELECT LIST 215
```

The above SELECT LIST statement selects the High-Speed Printer with the Device Address Code 215 for all program listing.

Example:

To list the program in the above example on the High-Speed Printer:

```
:SELECT LIST 215
:LIST
```

RESULTANT PRINTOUT:

```
10 SELECT PRINT 215
20 PRINT "X","X^2"
30 FOR X=1TO 5
40 PRINT X,X^2
50 NEXT X
```

```
:SELECT CO 215
```

The above SELECT CO statement selects the High-Speed Printer with the Device Address Code 215 for all console output. This includes all system information, such as the READY message, output from the STOP and END statements, any information keyed into the 2200 system, and all output from immediate mode operations, TRACE statements, and error messages.

Key: SELECT CO 215 EXECUTE

Key: RESET

RESULTANT PRINTOUT

```
READY
```

All information keyed into the 2200 is now printed on the High-Speed Printer.

NOTE:

A line of characters is not printed until a CR/LF command is given, either under program control or in the immediate mode.

When PRINT statements are executed in the immediate mode, they are always printed on the device selected for CONSOLE OUTPUT (CO).

LINE LENGTH

The maximum number of characters allowed on the 2221 is 132. To accommodate various paper widths and special forms, the length of the output line may be specified by enclosing the desired carriage width in parentheses following the Device Address Code in the SELECT statement. For example:

SELECT PRINT 215 (132)
SELECT LIST 216 (80)
SELECT CO 215 (100)

If a carriage width is not specified for PRINT, LIST, or CO, the last carriage widths selected for these operations regardless of device used. Master Initialization sets these carriage widths to a length of 64 characters.

COMBINED PARAMETERS

More than one parameter can be combined in a SELECT statement. For example:

SELECT PRINT 215 (132), LIST 215 (80), CO 215 (105)

DESELECTING THE HIGH-SPEED PRINTER

The High-Speed Printer may be deselected by:

1. Selecting another device for PRINT, LIST, or CO.
2. Master Initialization (turning ON/OFF switch OFF, then ON) — The primary console device is automatically selected for all I/O operations.
3. Entering a CLEAR command with no parameters selects the LIST and PRINT functions to the current Console Output Device. Thus, if the High-Speed Printer is selected for CO (CONSOLE OUTPUT), either method 1 or method 2 must be used to deselect the printer.

Section III
Formatting Output

PRINT AND PRINTUSING STATEMENTS

THE TAB(FUNCTION

THE EXPANDED PRINT

SECTION III FORMATTING OUTPUT

PRINT AND PRINTUSING STATEMENTS

The PRINT and PRINTUSING statements are used in the same manner with the High-Speed Printer as they are used with the CRT. The only difference is the maximum number of zones available. The carriage width of all output devices is divided into as many zones of 16 characters as possible.

The 2221 has a carriage width of 132 characters, divided into eight zones of 16 characters each, and one zone of 4 characters. The zones constitute columns 0-15, 16-31, 32-47, 48-63, 64-79, 80-95, 96-111, 112-127, and 128-131 respectively.

If commas separate elements in a PRINT statement, then each element begins at the start of a new zone. If semicolons separate elements in a PRINT statement, the zoned format is ignored, and the output appears in packed format. (See 2200 Reference Manual for discussion of zoned and packed format.)

NOTE:

A blank PRINT statement is ignored on the High-Speed Printer.

THE TAB(FUNCTION

The TAB(function is also used in the same manner with the High-Speed Printer as it is used with the CRT. When a PRINT statement containing a TAB(function is executed, the High-Speed Printer prints at the column specified by the integer portion of the TAB(expression.

Example:

```
:SELECT PRINT 215 (80)
:10  PRINT TAB(30); "NAME"
:RUN
```

Executing the above example causes the High-Speed Printer to print NAME at column 30. If the carriage has already passed the specified column, the TAB is ignored. Values of TAB expressions greater than 132 are illegal. If the value of the expression is greater than the maximum value, the High-Speed Printer moves to the next line.

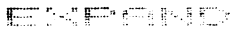
EXPANDED PRINT

There is a method available to print expanded characters on the High-Speed Printer. This method uses a HEX code (see Section IV for a more detailed discussion of HEX codes). To set a line of expanded characters, the proper code is HEX(0E).

Example:

```
:SELECT PRINT 215
:10  PRINT HEX (0E), "EXPAND"
:RUN
```

Executing the above example causes the following to appear on the High-Speed Printer:



The PRINT HEX (0E) command expands the print for only one line.

The printer performs an automatic CR/LF after 66 elongated characters although the 132-character buffer is only half full. If more characters are sent they are stored in the buffer but are never printed and are erased upon completion of the line.

Section IV
The Hex Function

HEX CODES

SECTION IV THE HEX FUNCTION

HEX CODES

The Hexadecimal function (HEX) is a form of literal string that enables a user to use any 8-bit codes in a BASIC program; the HEX function can be used wherever literal strings enclosed in double quotes can be used. The HEX function can be used to output characters that do not appear on the 2215 or 2222 keyboards. It can also be used to output control commands to the High-Speed Printer, such as line feed and expanded print.

General Form:	HEX (hexdigit hexdigit [hexdigit hexdigit...])
Where:	hexdigit = a digit 0-9, or a letter A-F.

The more useful HEX command codes for the High-Speed Printer are shown in the following table:

HEX (07) – ALARM
HEX (0B) – VERTICAL TAB
HEX (0A) – LINE FEED
HEX (0C) – FORM FEED
HEX (0D) – CARRIAGE RETURN/LINE FEED
HEX (0E) – EXPANDED PRINT

A complete list of HEX Codes pertaining to the High-Speed Printer is given in Appendix A.

Example:

```
:SELECT PRINT 215
:10  PRINT "FIRST"
:20  PRINT HEX(0A)
:30  PRINT "SECOND"
:RUN
```

Executing these statements causes the following to print on the High-Speed Printer:

```
FIRST

SECOND
```

NOTE:

HEX Codes can be combined. For example

```
:20  PRINT HEX (0D0A)
```

This statement skips two lines.

Section V
The Vertical Format Paper Tape

ADDITIONAL VERTICAL FORMAT TAPES

FORM FEED MECHANISM FOR VERTICAL FORMAT TAPE READER

TO SPLICE PREPARED TAPE

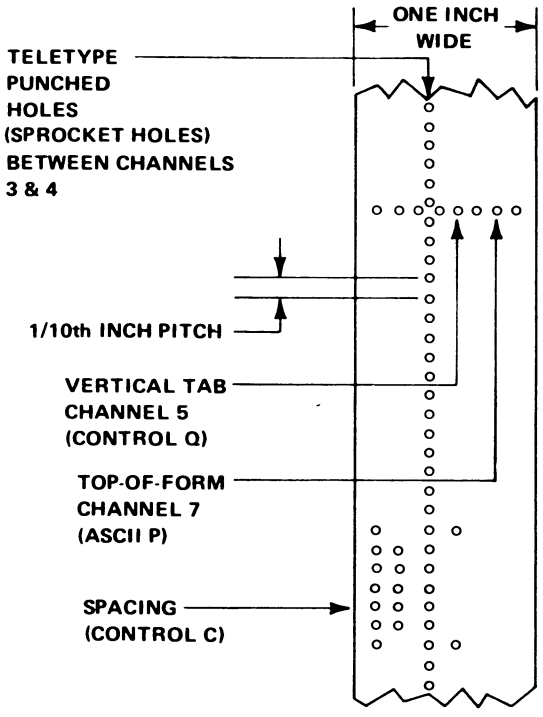
SECTION V THE VERTICAL FORMAT PAPER TAPE

ADDITIONAL VERTICAL FORMAT TAPES

The High-Speed Printer uses a standard one-inch wide, eight channeled black opaque paper tape with 1/10th inch pitch sprocket holes located between channels 3 and 4. If a tape is desired other than normally supplied, it can be generated via a Teletype paper tape punch.

Channel 5 is used for Vertical Tab, Channel 7 is used for Top of Form, and all other channels are not recognized. The supplied particular tape is punched with Top of Form holes set for standard 66 line paper. To produce more of the same type tape, insert original tape into a teletype. If you do not wish to duplicate the editing tape but want to make a new tape (without using a programmed computer), press ASCII "P" to generate Top of Form registration holes.

To get Vertical Tab, press the Control "Q" key and for spaces in between Top of Form and Vertical Tab, press the Control "C" key. The punch in the Teletype perforates the sprocket holes used in the High-Speed Printer Vertical Format Tape Reader.



VERTICAL FORMAT TAPE

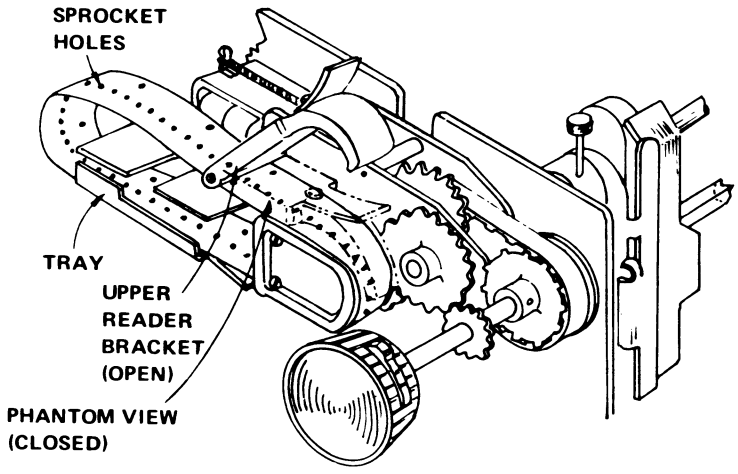
Vertical Tab and Top of Form is controlled by the number of sprocket holes. Each sprocket hole represents one line.

SECTION V THE VERTICAL FORMAT PAPER TAPE

FORM FEED MECHANISM FOR VERTICAL FORMAT TAPE READER

This is the control mechanism for Top of Form and Vertical Tabulation settings.

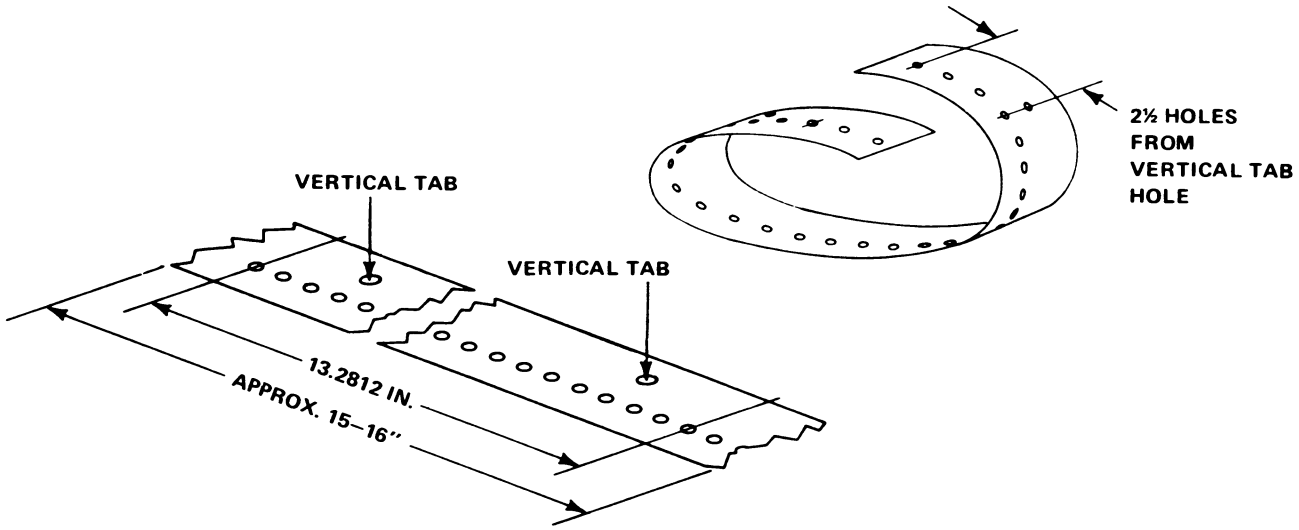
To replace Vertical Format Tape, remove the left-hand cover to gain access to the Tape Reader. Lift upper Reader Bracket and install tape in tray provided, assuring that the sprocket teeth protrude through the paper tape. Close Upper Reader Bracket.



TAPE READER

TO SPLICE PREPARED TAPE

Cut a piece of one-inch black opaque paper tape at least 15 inches long. Measure two and one half sprocket holes from either side of last Vertical Tab holes, mark holes, then overlay and double cut them. Now fasten together with splicing tape (similar to splicing movie film).



SPLICING PREPARED TAPE

Section VI
Appendices

APPENDIX A

HEXADECIMAL CODES

APPENDIX B

SPECIFICATIONS FOR THE 2221 HIGH-SPEED PRINTER

APPENDIX A HEXADECIMAL CODES

HEX CODE	HIGH-SPEED PRINTER CHARACTER		CRT CHARACTER	
HEX(01)	Not Available	*	Cursor home	
HEX(03)	Not Available	*	Clears screen and cursor home	
HEX(07)	Alarm	*	Not Available	
HEX(08)	Not Available	*	Backspace	
HEX(0A)	Line Feed	*	Cursor down (line feed)	
HEX(0B)	Vertical Tab	*	Not Available	
HEX(0C)	Form Feed	*	Cursor up (reverse index)	
HEX(0D)	CR/LF		CR/LF	
HEX(0E)	Expanded Print	*	Not Available	
HEX(20)	Space		Space	
HEX(21)	!		!	
HEX(22)	"		"	
HEX(23)	#		#	
HEX(24)	$		$	
HEX(25)	%		%	
HEX(26)	&		&	
HEX(27)	'		'	(apostrophe)
HEX(28)	(		(	
HEX(29)	)		)	
HEX(2A)	*		*	
HEX(2B)	+		+	
HEX(2C)	,		,	(comma)
HEX(2D)	-		-	(minus)
HEX(2E)	.		.	
HEX(2F)	/		/	
HEX(30)	0		0	
HEX(31)	1		1	
HEX(32)	2		2	
HEX(33)	3		3	
HEX(34)	4		4	
HEX(35)	5		5	
HEX(36)	6		6	
HEX(37)	7		7	
HEX(38)	8		8	
HEX(39)	9		9	

APPENDIX A HEXADECIMAL CODES

HEX CODE	HIGH-SPEED PRINTER CHARACTER	CRT CHARACTER
HEX(3A)	:	:
HEX(3B)	;	;
HEX(3C)	<	<
HEX(3D)	=	=
HEX(3E)	>	>
HEX(3F)	?	?
HEX(40)	@	@
HEX(41)	A	A
HEX(42)	B	B
HEX(43)	C	C
HEX(44)	D	D
HEX(45)	E	E
HEX(46)	F	F
HEX(47)	G	G
HEX(48)	H	H
HEX(49)	I	I
HEX(4A)	J	J
HEX(4B)	K	K
HEX(4C)	L	L
HEX(4D)	M	M
HEX(4E)	N	N
HEX(4F)	O	O
HEX(50)	P	P
HEX(51)	Q	Q
HEX(52)	R	R
HEX(53)	S	S
HEX(54)	T	T
HEX(55)	U	U
HEX(56)	V	V
HEX(57)	W	W
HEX(58)	X	X
HEX(59)	Y	Y
HEX(5A)	Z	Z
HEX(5B)	[	[
HEX(5C)	/	/
HEX(5D)	]	]
HEX(5F)	⌒ *	↑
HEX(5G)	Not Available*	←

*Designates codes that are different on the CRT than on the High-Speed Printer.

APPENDIX B SPECIFICATIONS FOR THE 2221 HIGH-SPEED PRINTER

Paper Size	Standard 14.5 inch, (36.8 cm), pin feed. Width is continuously adjustable to a minimum of 4 inches (10.2 cm)
Print-out Speed	150 characters per second (60-200 lines per minute, dependent on line length)
Character Configuration	Dot Matrix: 5(wide) X 7(high)- normal 10(wide) X 7(high)- expanded
Line Width	132 characters (max)
Character Set	Full alphanumeric
Character Size	2 sizes, selectable one line at a time. .10"(high) X .084"(.25cm X .21cm) or .10"(high) X .168"(.25cm X .43cm)
Duplicate Copies	The printer can generate a maximum of 8 duplicate copies in addition to the original.
Size: Width	27.5 inches (69.9 cm)
Depth	19.5 inches (49.5 cm)
Height	1' inches (27.9 cm)
Weight	200 lbs. (90.9 kg)
Power Requirements	115 or 230 VAC ± 10% 50 or 60 Hz
Cable	12 ft. (3.66 m) cable with connector for the calculator output plug jack.
Operating Environment	50° F to 95° F (10° C to 35° C), 20% to 80% relative humidity

INDEX

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