

POTTER

LP 3500 Chain Printer

JUL 31 1972

Outstanding Print Quality, Reliability and Versatility

FEATURES

- Up to 1500 Lines Per Minute
With 48 or 64 Character Sets
- Excellent Print Quality
- Up to 128 Characters—132 Columns
- Changeable Character Fonts
- Up to 6 Copies
- Ease of Operation
- High Reliability—Minimum Maintenance

The LP 3500 Chain Printer incorporates advanced developments in printing technology to produce a highly reliable design. The unit attains its high speed by using extremely stable, high energy free-flight hammers impacting a removable, encased, multi-character chain module.

Many mechanical adjustments have been simplified to provide ease of operation. Acoustic noise levels have been reduced. Immediate access is provided to all internal components for faster maintenance. Simplicity and reliability summarize the LP 3500's construction.

Versatility is built-in. Operators may change forms, ribbons and even character fonts in minutes. They may route forms out of the printer's top for immediate access, or out the back for stacking. Adjustments can be made quickly, since all operator controls are conveniently accessible. Human engineering is inherent in the design.

The LP 3500 is ideal for all computer and data processing systems requiring high speed, high quality printout.



A FULL LINE IS PRINTED in a single print cycle. Data, representing the columns, is abstracted serially by character, parallel by bit from the buffer and then compared to the chain position counter. When coincidence takes place, the appropriate hammer is energized. When the number of energized hammers in a line equals the number of printable characters loaded into the buffer (not including blanks) the print cycle is terminated and the printer advances the paper. The printer then becomes ready to accept the next line of data. This "adaptive control" technique allows the printer to move to the next line as soon as the buffer is empty, instead of continuing to read the blank spaces that constitute the rest of the line. It provides a 10 to 15% increase in throughput when printing less than 100% page density.

THE PRINT MECHANISM consists of 132 high-energy, free-flight hammers (one hammer for each column of printout) impacting a character chain moving horizontally at 230 inches per second.

The hammers are solenoid actuated for high energy, and are driven by constant current solid-state drive circuitry. Print density is operator adjustable.

The character chain is enclosed within an operator interchangeable module, which may be exchanged with another module in less than 3 minutes. It consists of case-hardened character slugs mounted on a fiberglass reinforced neoprene belt. Each field-replaceable slug contains 2 characters spaced 0.150 inches apart.

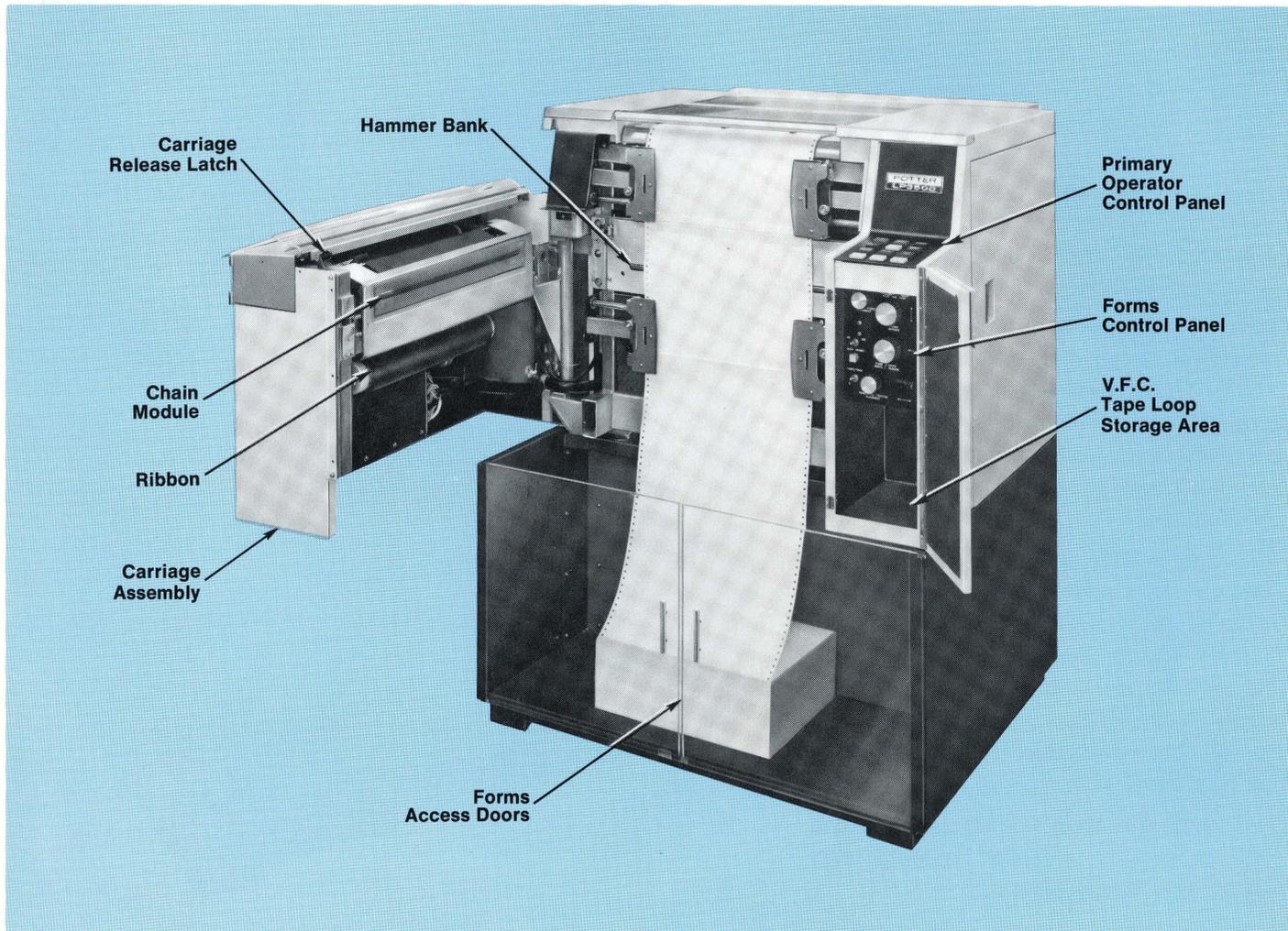
Character timing signals are generated as the teeth from a rotating

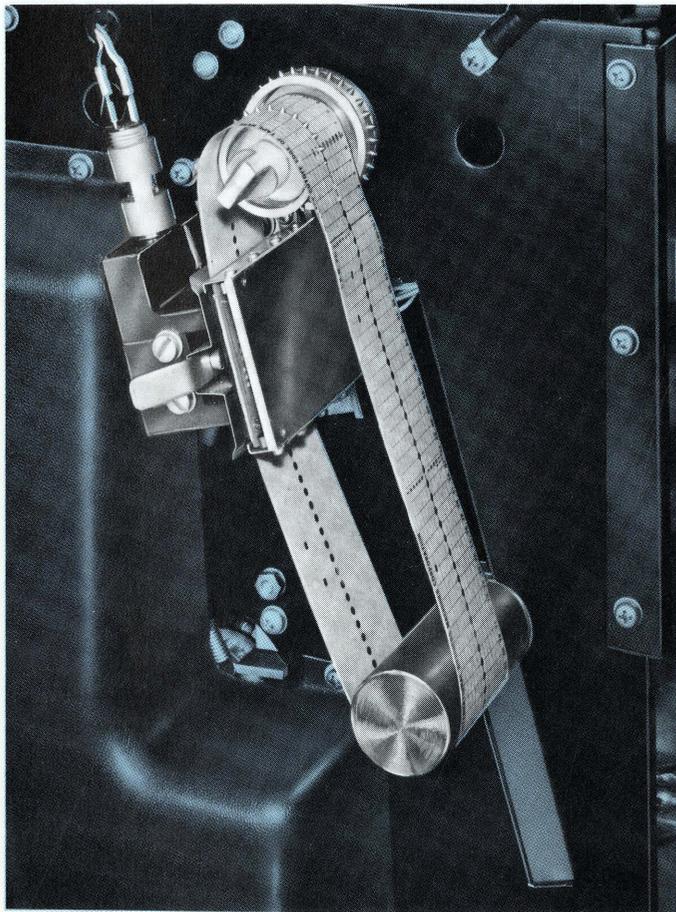
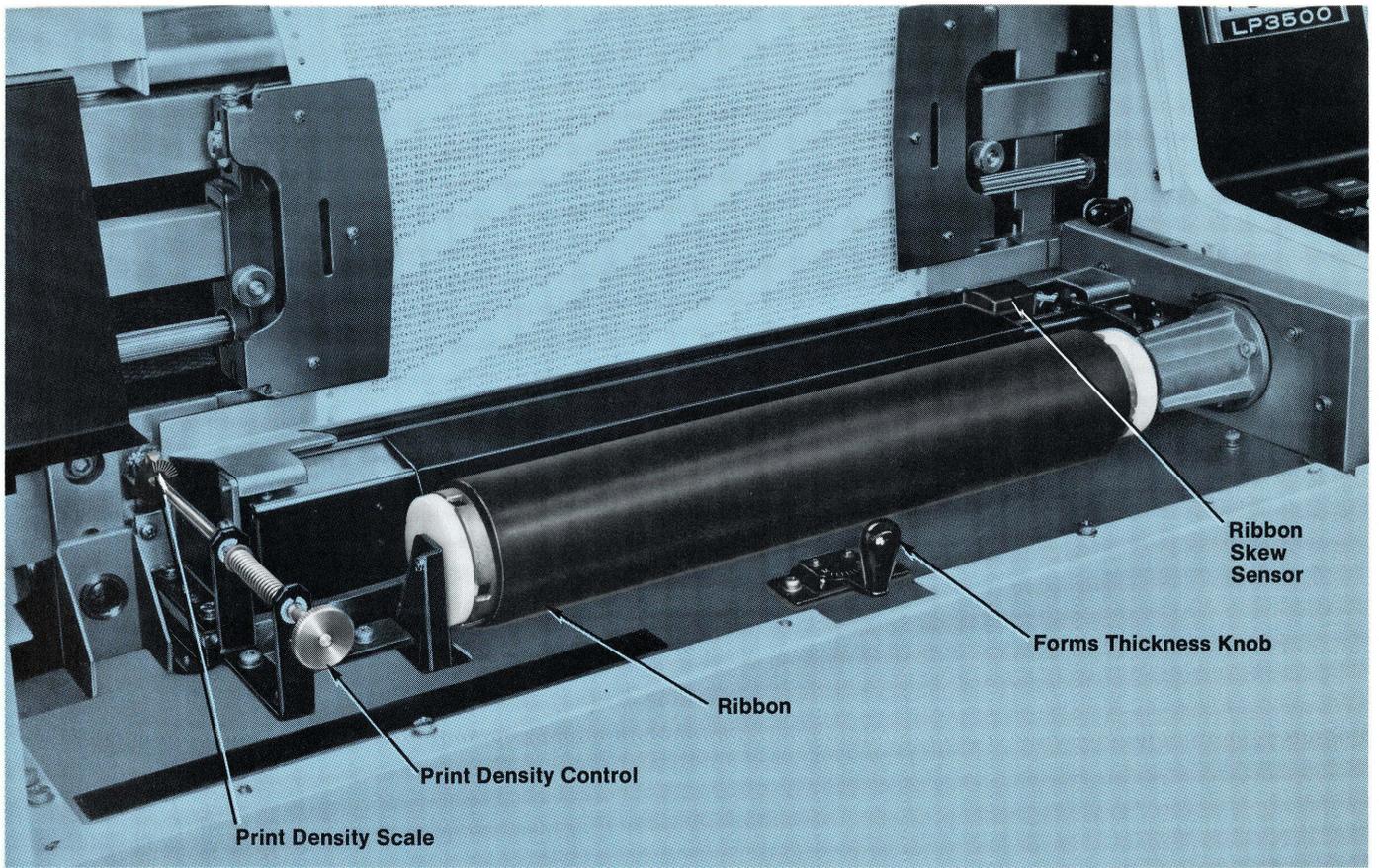
wheel revolve past a magnetic transducer. Character timing is unaffected by dirt or dust. Reliability is increased.

STANDARD CHARACTER SETS contain 48, 64, 96 or 128 characters, ASCII or EBCDIC coded. Special character sets and codes are optionally available.

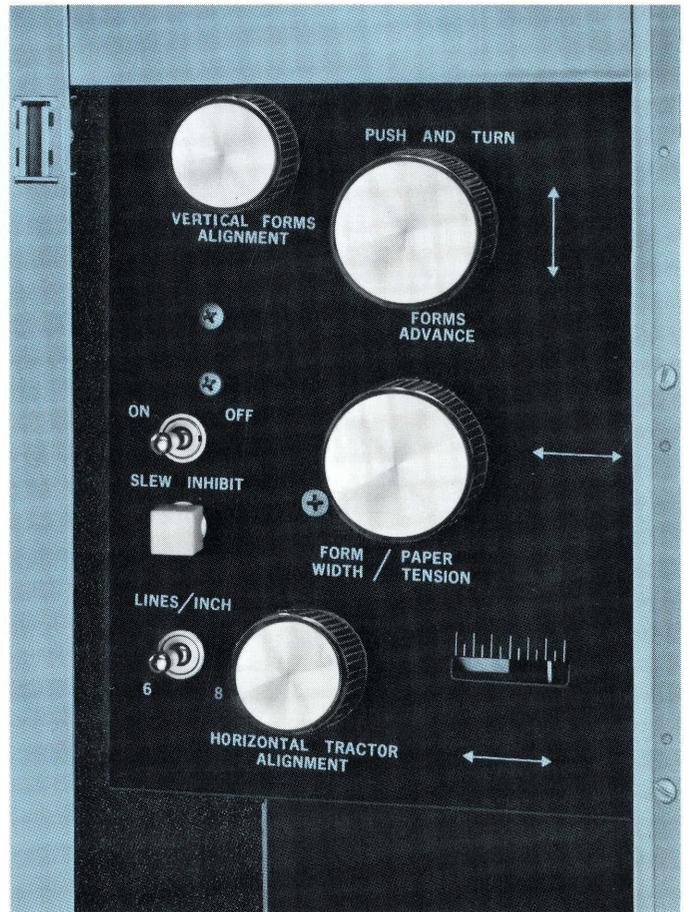
The 48 and 96 character sets are composed of six fonts of 48 or three fonts of 96 characters, for a total of 288 characters per chain. The 64 and 128 character sets are composed of four fonts of 64 characters or two fonts of 128 characters, for a total of 256 characters per chain.

Character chains with the same number of character positions may be freely exchanged by an operator within 3 minutes. Larger type fonts required for special printing jobs are available.





VERTICAL FORMAT CONTROL UNIT



FORMS CONTROL PANEL

SPECIFICATIONS

Mechanical

Print Speed	
Minimum	1020 LPM with a 64 character set 1240 LPM with a 48 character set
Maximum	1500 LPM
Character Sets	48, 64, 96, or 128 ASCII or EBCDIC
Chain Size	256 or 288 characters
Chain Speed	230 ips (5,8 m/s)
Column Capacity	132
Horizontal Spacing	10 columns per inch
Line Spacing	6 or 8 lines per inch, switch selectable
Print Registration	
Horizontal	± .005" (± .013 cm)
Vertical	± .005" (± .013 cm)
Paper Feed System	
Form Width	4" (10 cm) to 18½" (47 cm)
Number of Copies	Up to 6, fan-fold.
Form Length	22" (56 cm) Max.
Paper	
Type	Pin Feed, Fan-fold
Weight	
Single Part	15 lb. min.
Multiple Part	12-10-15 lbs.
Single Line Advance	17 ms @ 15 ips (0.4 m/s)
2 to 7 Line Advance	30 ips (0.8 m/s)
Greater Than 7 Line Advance	75 ips (1.9 m/s)
Vertical Format Control (Optional)	12 Channel optical tape reader, IBM-compatible.
Ribbon	
Width	14" (36 cm)
Length	20 yards scroll type (16.2 m)

Electrical

Buffer Storage	Full Line
Data Input Rate	1 character per microsecond (max)
Interface Levels	Logic "0" = +5V Logic "1" = 0V
Line Voltage	208/230V + 10%, 60 Hz, Three Phase, Optional, 195/220/235/380/408V ± 10%, 50 Hz, Three Phase
Power Consumption	9 Amp Max. per Phase at 208V

Environment

Ambient Temperature	Operating 50°F (10°C) to 105°F (40°C) Storage -50°F (-46°C) to 150°F (65°C)
Humidity	Operating 10% to 90%, no condensation Storage 5% to 95%, no condensation

Physical

Size	37" W (, 9 m) x 46½" H (1, 2 m) x 30" D (, 8 m)
Weight	750 lbs. (341 kg)

THE PAPER FEED SYSTEM consists of two sets of tractor assemblies adjustable to paper widths from 4" to 18½". Forms can be loaded and removed in seconds. The tractors are driven by a high torque, low inertia PC motor. There are no mechanical brake/clutch systems, no mechanical adjustments.

Paper incrementing is controlled by a positional encoding disc detected by an electro-optical reader. No mechanical linkages are used. A "top of form" mechanism activates during each cycle of 66 lines. It allows the user to slew to top of form.

When flexible vertical formatting is desired, an optional IBM-compatible 12 channel punched tape Vertical Format Unit is available. Coupled to the paper feed tractors, it provides line feed spacing under the control of a vertical format loop.

THE FORMS POWER FEED UNIT assists in providing smooth, effortless exiting of forms from the printer into the forms basket. Paper is driven by a motorized feed roller and directed into the forms basket. Horizontal forms tension is operator adjustable. Paper flow is unrestricted; tearing and smudging is prevented. The user has the choice of exiting forms from the top front of the printer for immediate access, or out of the back for stacking.

THE AUTOMATICALLY REVERSING RIBBON MECHANISM utilizes two permanent magnet synchronous stepping motors. Motion from the drive motors to the ribbon drive spindles is transferred by heavy-duty fiberglass reinforced timing belts. Ribbon skew is corrected by an automatic motor



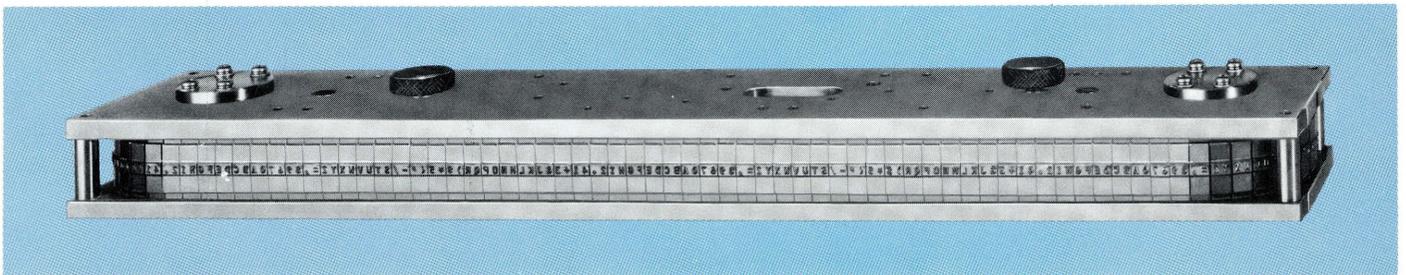
driven correction mechanism; uneven winding and wear distribution is eliminated. The ribbon drive mechanism has no clutches, and requires no mechanical adjustments. It uses industry-standard 14" wide by 20 yard long scroll-type ribbon. Ribbons may be changed by operators in less than 60 seconds.

LOGIC AND CONTROL ELECTRONICS are housed inside a hinge-mounted, fan-cooled card cage, which swings out for easy access. Integrated circuitry, packaged on plug-in printed circuit modules, are used to provide maximum reliability. Test points are provided wherever required to facilitate routine servicing. The power supply is mounted on extension slides in the base of the printer. Throughout the LP 3500 total circuitry accessibility ensures simplified, faster maintenance.

A SOUND ABSORBING ENCLOSURE houses printing mechanisms and associated electronics, with ample

room left for customer or Potter control unit electronics. Welded heavy-gauge sheet metal construction yields increased mechanical stability with decreased size and weight. Snap-off or swing-open panels provide immediate access to all internal components. Casters ensure easy movement. Standard cabinet colors are Armorphide No. U-1768 textured white for top panels; Armorphide No. U-1068 textured gray for base panels, and Armorphide No. U-1067 textured blue for the carriage top and interior panels. Special colors are optionally available.

THE OPERATOR CONTROL PANEL consists of 4 indicator lamps, 4 push-button switches, and 4 indicator/pushbutton switches. To facilitate maintenance, a service control panel is located in the rear of the printer. It consists of a START indicator/pushbutton switch, a STOP pushbutton switch and a RESTORE pushbutton switch. The function of these rear controls are identical to those found on the front operator control panel.



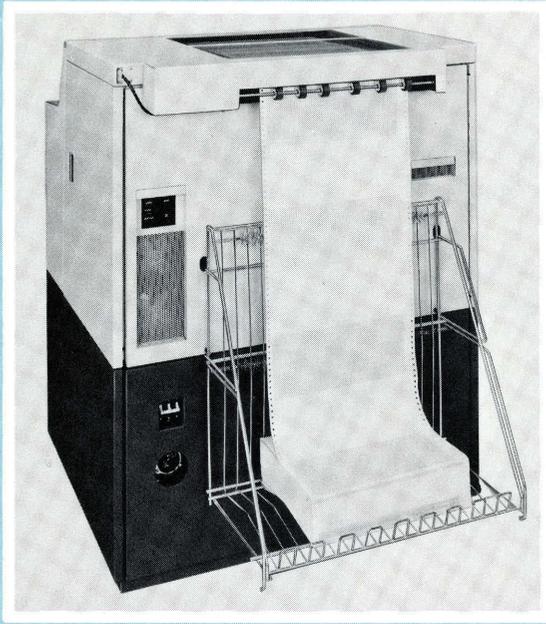
INTERCHANGEABLE CHAIN MODULE

FRONT OPERATOR CONTROL PANEL

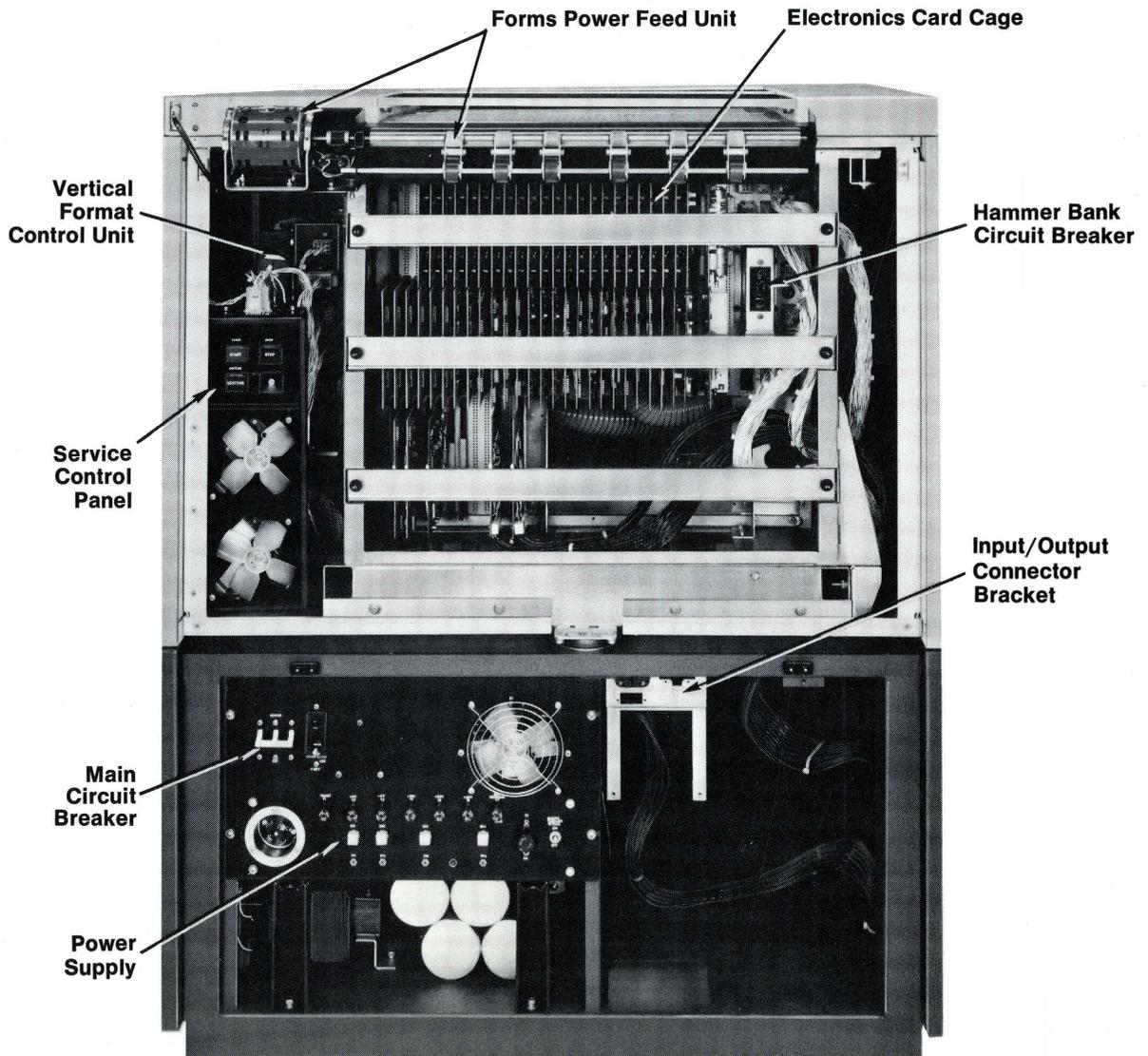
CONTROL/INDICATOR	TYPE	FUNCTION
POWER	Indicator Lamp	Illuminates when printer receives AC power
READY	Indicator Lamp	Illuminates when printer is ready to be placed on line
INTERLOCK	Indicator Lamp	Illuminates when inoperative condition exists
END-OF-FORM	Indicator Lamp	Illuminates when end-of-form is reached
STOP	Pushbutton Switch	Switches printer from Start to Ready
SPACE	Pushbutton Switch	Advances paper 1 line
RESTORE	Pushbutton Switch	Advances paper to top-of-form
PRINT TEST	Pushbutton Switch	Prints out pre-determined character
START	Indicator/Pushbutton	Places printer on-line
PRINT ERROR/RESET	Indicator/Pushbutton	Detects sync or parity error — Resets error
THERMAL	Indicator/Pushbutton	Indicates overheated chain or hammer bank — Resets printer when cool
SINGLE CYCLE	Indicator/Pushbutton	Enables operator to print one line per pushbutton actuation after end-of-form, until top-of-form is reached

OPERATOR MECHANICAL CONTROLS

CONTROL	LOCATION	FUNCTION
FORMS THICKNESS KNOB	Center of carriage behind hinged panel	Adjusts distance between hammer bank and chain for different form thicknesses
PRINT DENSITY CONTROL	Left side of carriage behind hinged panel	Controls print density
HORIZ. TRACTOR ALIGNMENT—COARSE	On left forms tractor	Adjusts left tractors to 1 of 7 positions at 1" increments
HORIZ. TRACTOR ALIGNMENT—VERNIER	Right side of printer behind hinged front panel	Simultaneously moves right and left tractors $\pm .5"$ (Printer may be operated during use of this control)
FORM WIDTH/PAPER TENSION	Right side of printer behind hinged front panel	Adjusts right tractors for form width and properly tensions forms
ADVANCE KNOB	Right side of printer behind hinged front panel	Disengages VFU from feed mechanism — Allows manual feeding of forms
VERTICAL FORMS ALIGNMENT KNOB	Right side of printer behind hinged front panel	Adjusts forms $\pm 2\frac{1}{2}$ lines in relation to the vertical format loop (Printer may be operated during use of this control)
VERTICAL FORMAT CONTROL UNIT	Right side of printer behind side door	12 channel IBM compatible VFU, unloaded from side of unit
6/8 LPI SELECT	Right side of printer behind hinged front panel	Sets line to line spacing at 6 or 8 LPI
HIGH SPEED SLEW INHIBIT SWITCH	Right side of printer behind front panel	Reduces paper slew from 75 ips to 15 ips for problem forms
FORMS POSITION INDICATOR	Left side of hammer bank	Indicates position of form's printed column and line



Easy accessibility to all internal components and assemblies ensures rapid maintenance, and therefore minimum downtime. The rear covers lift off in seconds. The electronics card cage swings out on heavy-duty hinges and the power supply, mounted on ball bearing slides, pulls out for immediate access. A rear service control panel further illustrates the ease-of-maintenance design which is prevalent throughout the printer's construction.



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