

INSTRUCTION MANUAL

Model 750 Printer

WARRANTY

We warrant each of our products to be free from defects in material and workmanship. Our obligation under this warranty is to repair or replace any instrument or part thereof which, within a year after shipment, proves defective upon examination. We will pay local domestic surface freight costs.

To exercise this warranty, write or call your local Keithley representative, or contact Keithley headquarters in Cleveland, Ohio. You will be given prompt assistance and shipping instructions.

REPAIRS AND CALIBRATION

Keithley Instruments maintains a complete repair and calibration service as well as a standards laboratory in Cleveland, Ohio.

A Keithley service facility at our Munich, Germany office is available for our customers throughout Europe. Service in the United Kingdom can be handled at our office in Reading. Additionally, Keithley representatives in most countries maintain service and calibration facilities.

To insure prompt repair or recalibration service, please contact your local field representative or Keithley headquarters directly before returning the instrument. Estimates for repairs, normal recalibrations and calibrations traceable to the National Bureau of Standards are available upon request.

KEITHLEY
The measurement engineers.

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INSTRUCTION MANUAL

Model 750 Printer

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Model 750 Printer

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SPECIFICATIONS

guaranteed for 1 year

- COLUMNS:** 18 (see Drum Diagram).
- DECIMAL POINT:** 13 decimal points; 9 are floating and print to right of number (columns 6 through 10, 12 through 15).
- FRONT PANEL CONTROLS:** Power; Run; Manual Print; Paper Feed; Print Interval.
- PRINT RATE:** Print Interval control provides intervals from 1 sec./line to 10 sec./line, continuously adjustable. In the External position, up to 2½ print commands/sec. are accepted.
- DATA INPUT:** Parallel BCD (8421) high true (low true with removal of jumper). Floating decimal points are low true only.
- Compatible Logic:** TTL, DTL or open collector; inputs are 2 TTL loads (floating decimal points, 1 TTL load).
- CONTROL INPUTS:** External Print; Red Print; Motor Off; Remote Standby; Continuous Print; Inhibit.
- Compatible Logic:** TTL, DTL or open collector; inputs are 2 TTL loads (External Print and Continuous Print, 3 TTL loads). Inputs are low true, except External Print requires low-to-high transition.
- CONTROL OUTPUT:** Printer-in-Cycle (PIC); End-of-Print Data Hold; Manual Print; Print Twice.
- Output Logic:** TTL; can drive 8 TTL loads (PIC, 4 TTL loads). Outputs are high true; except End-of-Print is 3ms pulse, Printer-in-Cycle and Data Hold are low true.
- INPUT/OUTPUT (I/O) CONNECTIONS:** Two 50-pin recessed card-edge connectors; I/O A for data input, columns 1 through 10; I/O B for accessories and/or additional data, columns 11 through 18 (see Drum Diagram).
- ISOLATION:** Input Lo to chassis ground greater than 10⁷ ohms. Lo may be floated up to 350 volts peak with respect to chassis ground.
- PAPER:** 2¼ in. fan-fold or roll.
- RIBBON:** Black/red, ½ in. wide.
- ENVIRONMENT:** 0°C to 50°C, 0% to 80% relative humidity at up to 35°C.
- POWER:** 90-110, 105-125, 200-240 volts (switch selected), 50-60 Hz, 30 watts (40 watts with accessories).
- DIMENSIONS, WEIGHT:** Style 0, 7 in. half-rack, overall bench size 7½ in. high x 8½ in. wide x 15¼ in. deep (190 x 220 x 390 mm). Net Weight, 16 pounds (7 kg).
- ACCESSORIES FURNISHED:** One ribbon (installed), one pack fanfold paper.

SECTION 1. GENERAL INFORMATION

1-1. **INTRODUCTION.** The Keithley Model 750 Printer is a medium speed, ink impression, line printer designed for use with Keithley digital measuring instruments and other digital instrumentation.

a. Printing Capabilities. The Model 750 records up to 18 columns of data per line. Columns 3 through 18 print numeric data, while columns 1 and 2 of the printer are reserved for measurement units and contain no numeric characters. Columns 3, 4, 5 can print certain measurement units (see Table 3-5 on page 3-7). Columns 6 through 10 and 12 through 15 contain a floating decimal point which can be printed to the right of any one of the numeric data columns, without deleting numerical data in that column. Either adding machine roll paper (2-1/4 inch width) or fan-fold paper can be used.

b. Accessory printer Input Interfaces are available for use with Keithley digital measuring instruments. The factory-wired interfaces are plug-to-plug compatible so that installation is very simple to perform. All data is properly encoded and formatted for printout of data, decimal point, range, and units of measurement (where available at the digital output). See ACCESSORIES Section 4 for more detailed information regarding accessory interfaces for Keithley instruments as well as for general purpose applications.

1-2. **WARRANTY INFORMATION.** The warranty is given in the Keithley general catalog. If there is a need for service, contact your Keithley representative or authorized repair facility as given in our catalog.

1-3. **CHANGE NOTICE.** Improvements or changes to the instrument not incorporated into the manual will be explained on separate instruction manual addenda sheets.

CAUTION

Since input Lo can float to 350 volts peak with respect to chassis ground, care should be exercised when making connections to either I/O "A" or "B". Turn off power to all instruments connected before plug-in cards are installed or removed, or cable connections are made. If I/O "B" is not used, make certain the cover plate is installed to prevent the possibility of electrical shock.

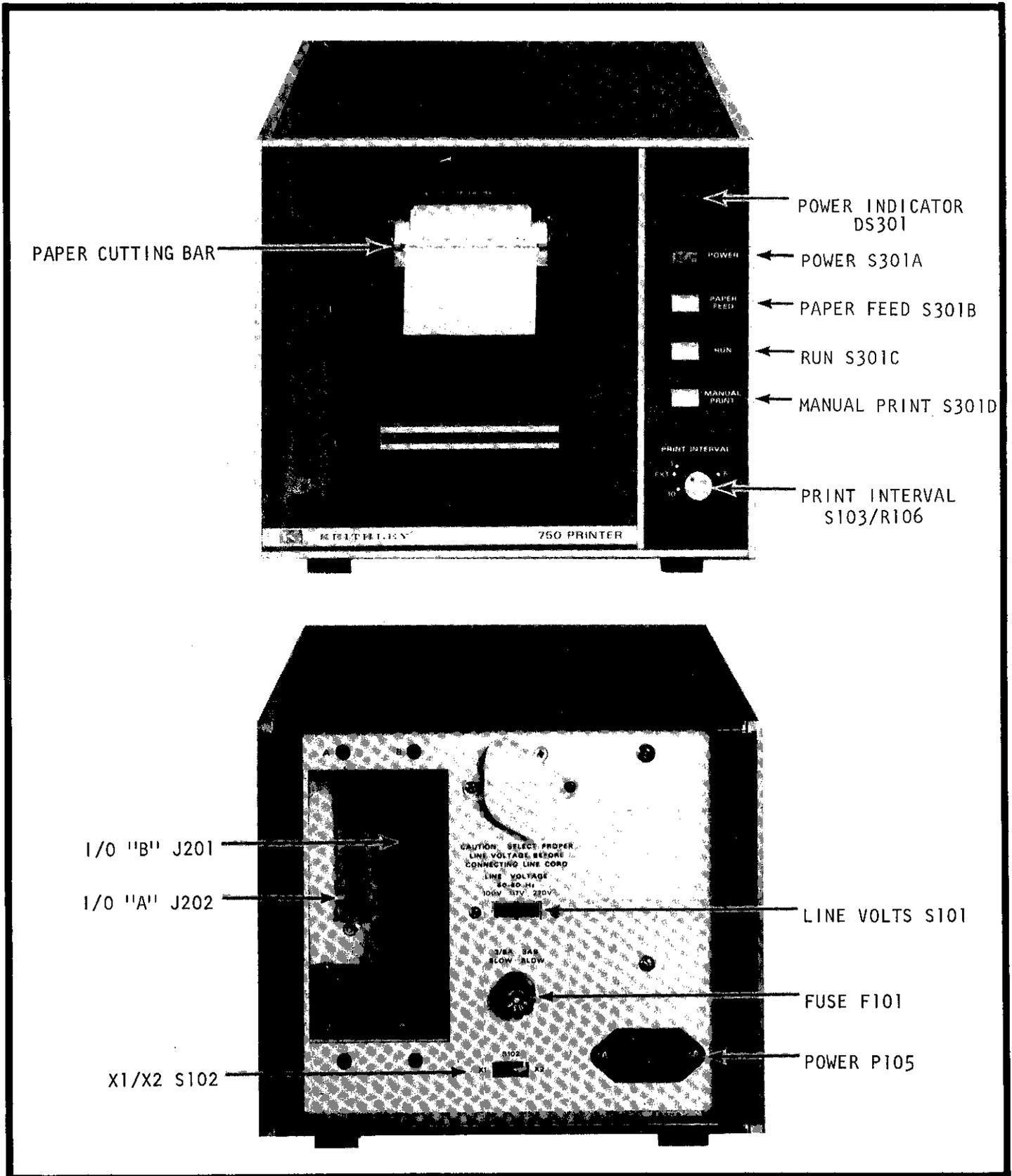


FIGURE 1. Front and Rear Views of Model 750.

SECTION 2. INITIAL PREPARATION

2-1. GENERAL. This section provides information needed for incoming inspection and preparation for use.

2-2. INSPECTION. The Model 750 was carefully inspected both mechanically and electrically before shipment. Upon receiving the instrument, check for any obvious damage which may have occurred during transit. Report any damages to the shipping agent. To verify the electrical specifications, follow the procedures in Section 5.

2-3. PREPARATION FOR USE.

a. How to Set the Line Switch. The rear panel LINE Switch should be set to the appropriate nominal setting as shown in Table 2-1. For example, if the line voltage to be used is 120 volts, set the LINE Switch to "117". If the line voltage to be used is within 105 and 110V, then either range (100 V or 117 V) may be selected.

TABLE 2-1.

Voltage Ranges Useable With Model 750

Range of Voltage	Appropriate Setting	Fuse Rating
90 - 110V	100V	3/4A
105 - 125V	117V	3/4A
200 - 240V	220V	3/8A

b. Line Fuse Requirements. The Model 750 uses a 3AB or 3AG Slow-Blow fuse with rating shown in Table 2-1. The line fuse is located on the rear panel as shown in Figure 1.

c. Line Power Connections. An accessory line cord is furnished with the Model 750. The 3-wire, 8 foot (244 cm) line cord mates with the rear panel receptacle P101. An extra line cord can be ordered from Keithley by specifying Keithley Part No. C0-7.

2-4. HOW TO INSTALL ACCESSORY PLUG-IN CARDS.

a. Model 7501 Printer Input Interface Cards. These cards have card-edge connectors which mate with I/O "A" receptacle on the Model 750 chassis. Before installing a card, remove the cover plate at I/O "A" by pulling the two plastic buttons. To install the card align the card-edge to mate with grooved tracks on the chassis as shown in Figure 2. The "component side" should face the users right hand when viewing the rear panel as illustrated. The two plastic buttons should be pulled out (unlocked). After the card is installed, lock the card in place by pushing in the buttons on the rear panel. The Model 7501 can not be inserted in I/O "B".

b. Models 7502, 7503, and 7504 Plug-In Cards. These cards have card-edge connectors which mate with I/O "B" receptacle on the Model 750 chassis. Before installing a card, remove the cover plate at I/O "B" by pulling the two plastic buttons. To install the card align the card-edge to mate with grooved tracks on the chassis as shown in Figure 2. The "component side" should face the users right hand when viewing the rear panel as

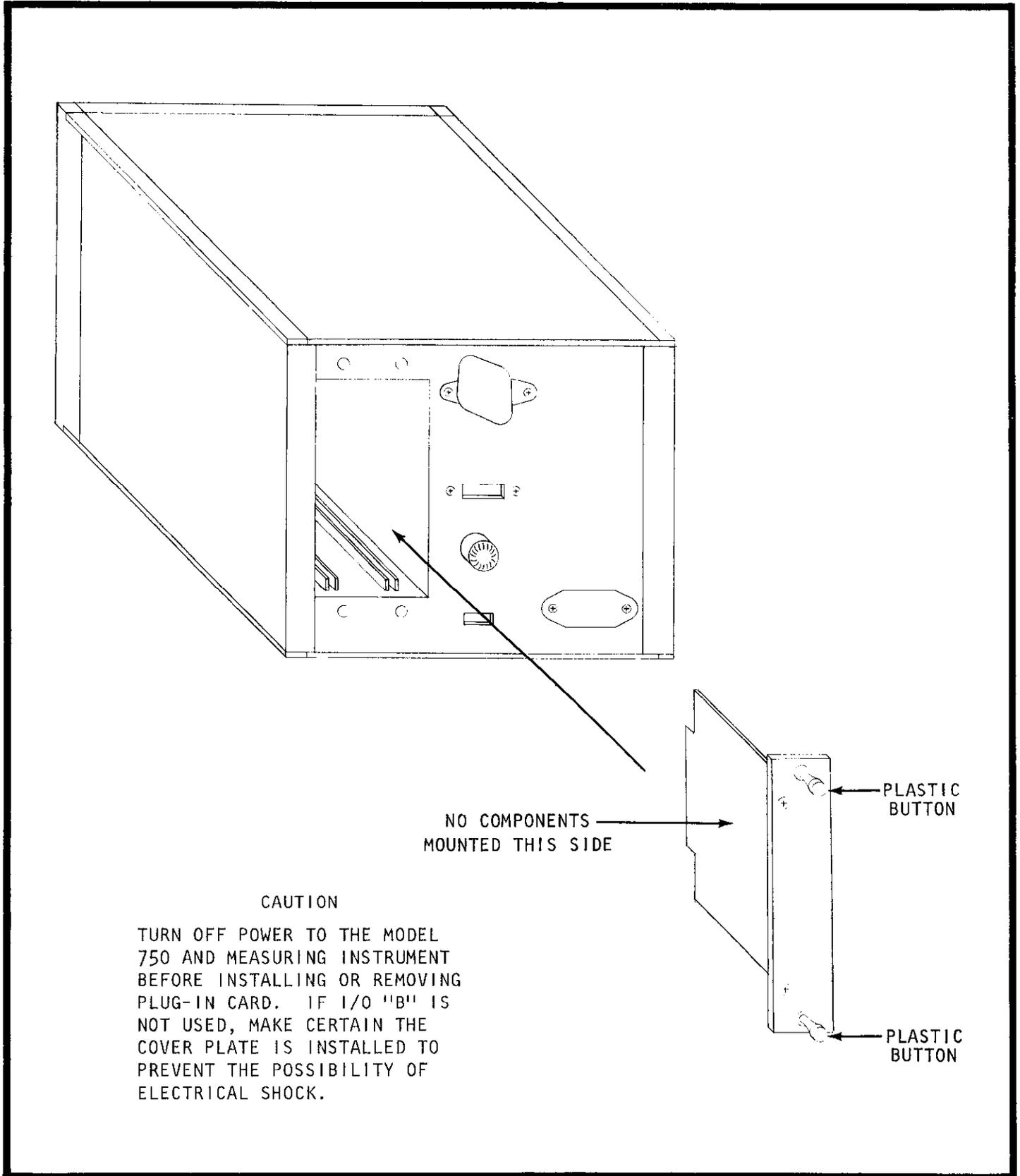


FIGURE 2. Installation of Accessory Plug-in Cards.

illustrated. After the card is installed, lock the card in place by pushing in the buttons on the rear panel. I/O 'B' has a polarizing pin to prevent insertion of Model 7501 cards. The Model 7502 may be installed in either I/O 'A' or I/O 'B'. Models 7503 and 7504 must be installed in I/O 'B' as they will not operate in I/O 'A'.

2-5. HOW TO INSTALL PRINT PAPER (FAN-FOLD OR ROLL). Standard 2-1/4 inch adding machine tape can be used as a recording medium for the Model 750 Printer. A package of fan-fold paper is shipped with the printer and is more convenient to install than roll paper. However, the printer will accommodate either paper type. Use the following procedure for installing printer paper. (Extra fan-fold paper may be ordered from Keithley by specifying Model 7505. See ACCESSORIES section.)

a. How to Install Fan-Fold Paper.

1. Pull out front panel by grasping handle on front panel. Panel swings open as shown in Figure 3.
2. Pull out paper tray.
3. Place stack of fan-fold paper in pull-out tray as shown in Figure 4. Be certain the tray is aligned so that the metal tab is in the front.
4. Lift and fold-out the top two layers of paper. This provides a leader for loading the tape in the print mechanism.
5. Hold the pack so that the leader is pointing away from the printer and slide the tray into the tape drawer. When properly installed, the front end of the paper tray should be just behind the front panel.
6. Proceed to Paper Feed Instructions in paragraph c.

b. How to Install Roll-Type Paper.

NOTE

Roll should not exceed 2-3/4 inches in diameter.

1. Remove the top cover by unscrewing the four Phillips head screws.
2. Install the roll paper on the roller pin located as shown in Figure 10
3. Pull out front panel by grasping handle on front panel. Panel swings open as shown in Figure 3.
4. Grasp the paper roll in one hand and pull out a twelve inch leader.
5. Point the leader toward the front panel on the printer and, position the paper roll so that the leader is being pulled off the bottom of the roll.
6. Slide the paper roll into the roll fixture as shown in Figure 10.
7. Feed the free end of paper under mechanism until it protrudes at the front panel (see Figure 4).
8. Replace the top cover.
9. Proceed to Paper Feed Instructions in paragraph c.

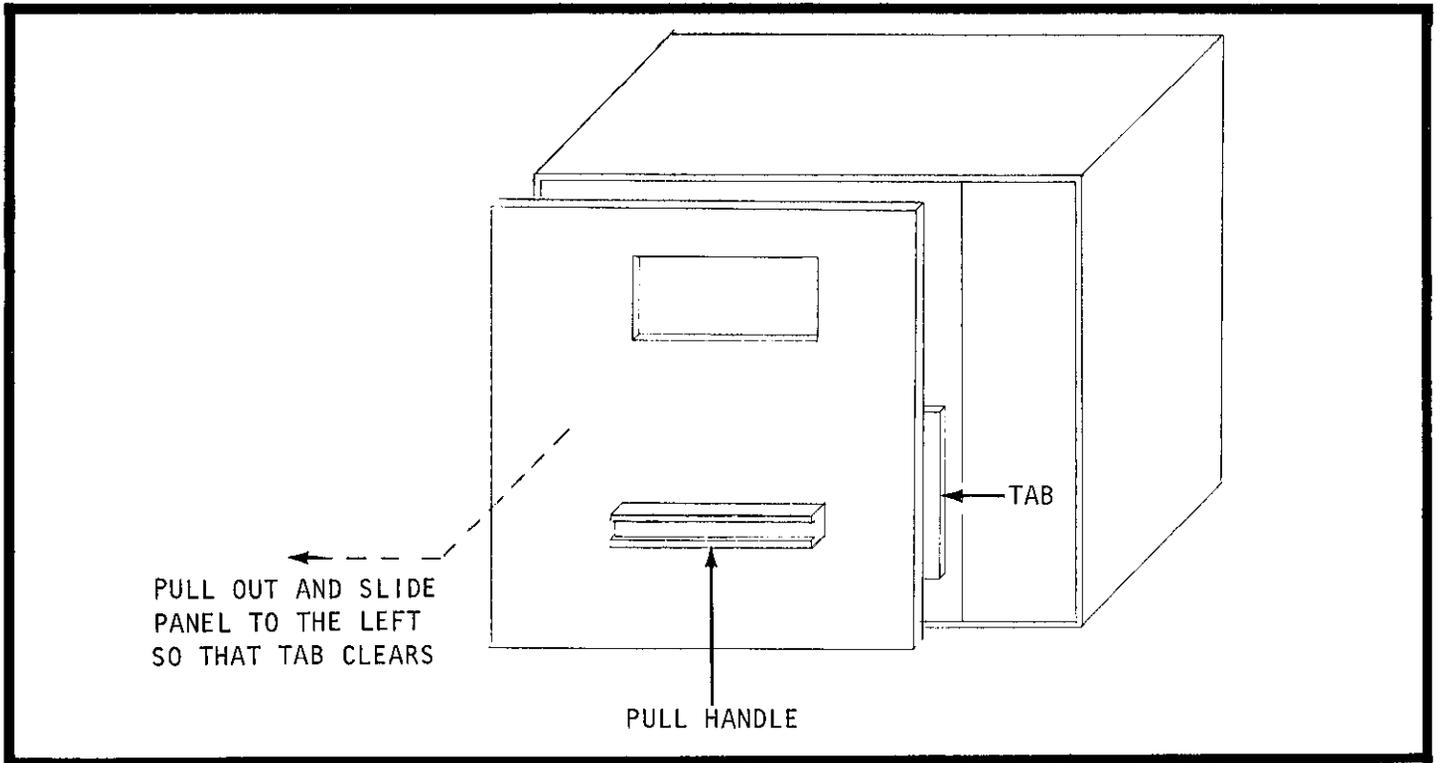


FIGURE 3. How to Open the Front Panel to Access the Mechanism.

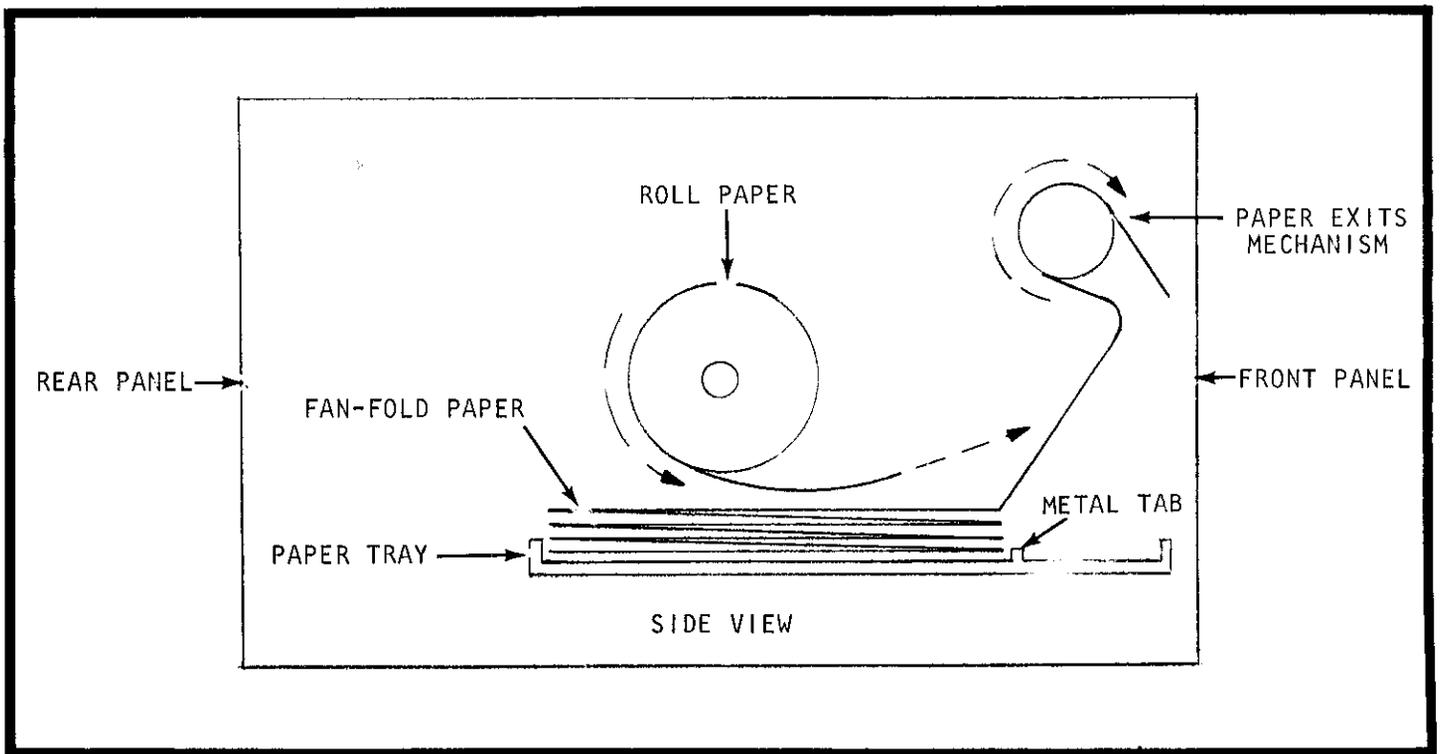


FIGURE 4. How to Install Fan-Fold or Roll Paper.

c. Paper Feed Instructions.

1. Release the RUN pushbutton to place the Model 750 in "Standby".
2. Apply power to the instrument by depressing the front panel POWER pushbutton.
3. Install paper (either fan-fold or roll-type as in preceding paragraphs).
4. Locate the arrow on the front of printer mechanism.
5. Feed paper under the clip, over the arrow, and into printer mechanism as shown in Figure 5.
6. Depress PAPER FEED pushbutton until printer begins to pull paper through mechanism.
7. As the paper appears at the top of printer, guide the paper under the cutting bar.
8. Allow about 2 extra inches of paper to feed, then release PAPER FEED button.
9. Tear off paper flush with cutting bar.
10. Replace front panel by inserting right side and snapping into place.
11. Test for smooth paper advance by depressing PAPER FEED button until a few inches of paper are advanced.

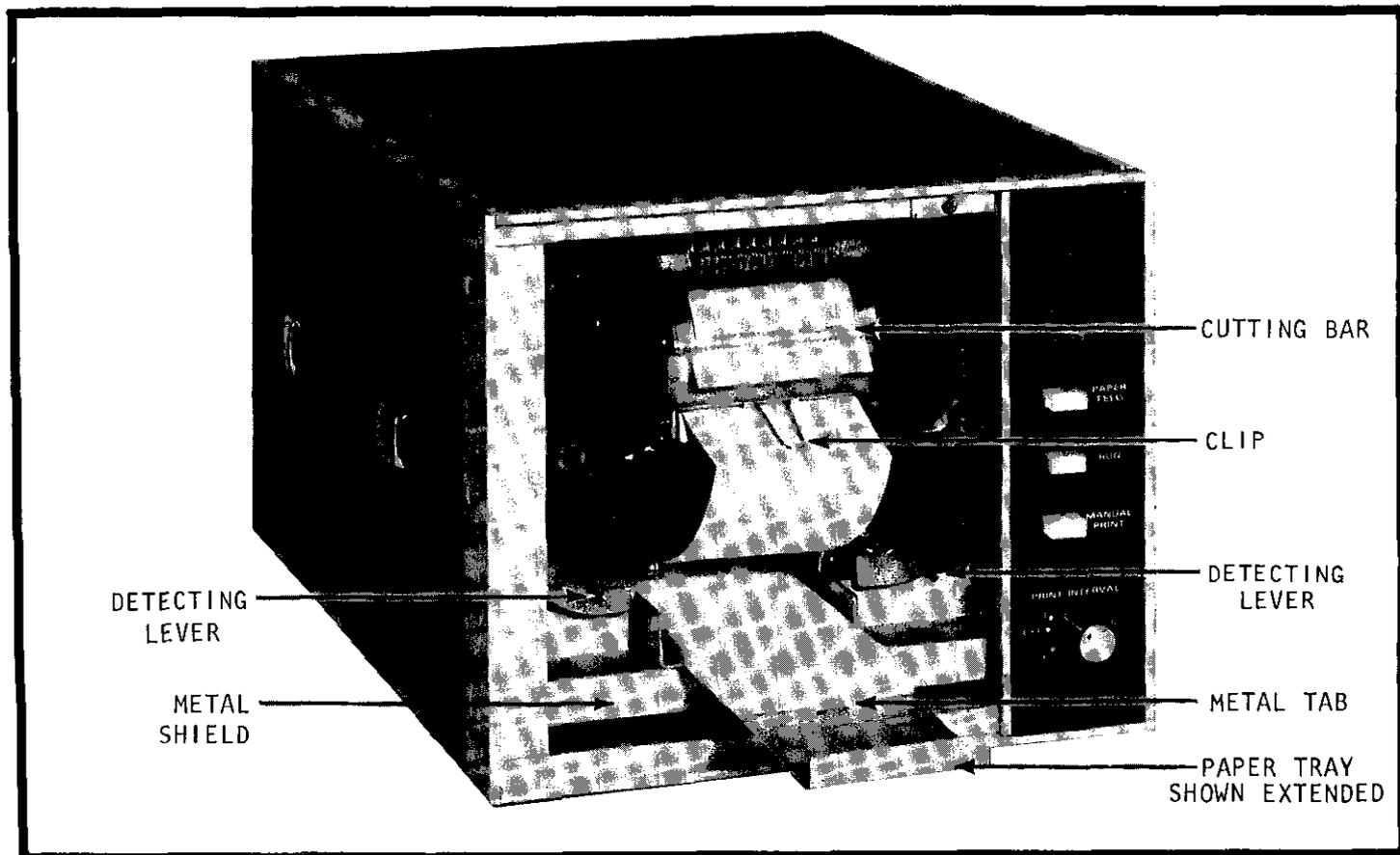


FIGURE 5. View of Paper Feed Mechanism.

2-6. HOW TO INSTALL RIBBON. The Model 750 is shipped with a ribbon installed. Use the following procedure for replacing a ribbon. (Extra ribbons may be ordered from Keithley by specifying Model 7506. See ACCESSORIES section.)

- a. Pull out front panel by grasping handle on front panel.
- b. On the printer mechanism, locate and push down the Detecting Lever of both spool shafts (see Figure 5).
- c. Carefully remove old ribbon spools from shafts.
- d. Remove old ribbon from feed guides and from under hammer.
- e. Separate the new ribbon spools and lay them on a flat surface with their "finger" side down.
- f. Refer to Figure 6 and ensure that the new ribbon is properly threaded on the spools.
- g. On the printer mechanism, locate and push down the Detecting Lever on left hand spool shaft, slide the spool onto the shaft making note of the proper threading direction shown in Figure 6.
- h. Unwind 6 or 8 inches of ribbon from the remaining spool, if necessary, and position the ribbon over the feed guides as shown in Figure 6.
- i. Depress the detecting lever on the empty spool shaft and slip the second spool onto the shaft. Make sure that there are no twists in the ribbon.

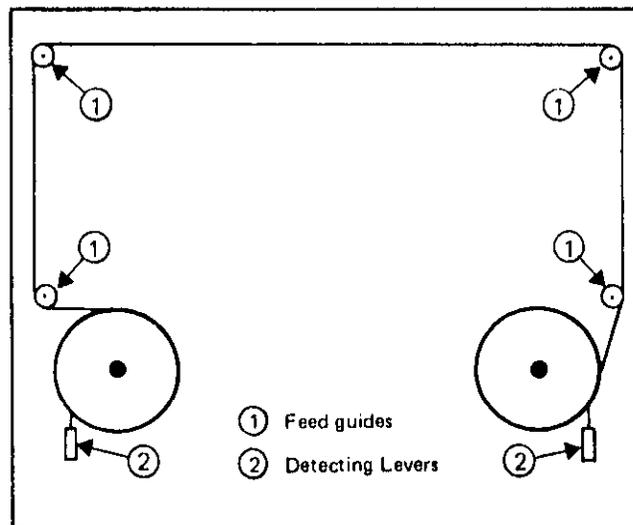


FIGURE 6. How to Replace Ribbon.

SECTION 3. OPERATING INSTRUCTIONS

3-1. GENERAL. This section provides information to operate the Model 750 with a variety of Keithley and other digital measuring instruments. Information on specific models can be found in the appropriate Interface manual.

3-2. HOW TO USE FRONT PANEL CONTROLS.

a. How to Apply Power. The POWER switch is a "push-push" switch. Depress to apply power to the instrument. When the switch is released power is off. The Power Indicator is lighted when power is on.

b. How to Feed Paper. The PAPER FEED Switch is a "momentary push" switch. In the depressed position it advances paper through the printer mechanism. The switch is used for loading paper tape or for advancing printed data past the cutting bar.

c. How to Set Printer to RUN Mode. The RUN pushbutton is a "push-push" switch. Depress to allow the printer to be activated by a print command from either of two sources:

1. Internal print interval.
2. External Source.

When the switch is released, the printer can be activated only by MANUAL PRINT.

d. How to Activate the Printer Manually. The MANUAL PRINT Switch is a "momentary push" switch. Depress to activate a single line of data. If the switch is depressed and held in this position, the printer will print data at a rate determined by the PRINT INTERVAL control. Minimum interval is 1 second. The external source does not affect the print interval when MANUAL PRINT is used.

e. How to Set Print Interval. The PRINT INTERVAL control is continuously adjustable and sets the internal print interval from a minimum of 1 second to a maximum of 10 seconds (approximate). The PRINT INTERVAL control also has an EXTERNAL position. In EXTERNAL the print interval is determined by external print commands.

3-3. HOW TO OPERATE THE PRINTER.

- a. Release POWER Switch (power off).
- b. Release RUN Switch (i.e., set to STANDBY mode).
- c. Check LINE switch setting as in paragraph 2-3a.
- d. Install Model 7501 Printer Input Interface Plug-In Card and/or other accessory plug-in card as appropriate.

- e. Set PRINT INTERVAL control to the appropriate settings.
 - 1. If an external print interval is to be used, set the PRINT INTERVAL control to EXT.
 - 2. If the internal print interval is to be used, set the PRINT INTERVAL control to the desired position.
- f. Connect the line cord.
- g. Depress the POWER Switch. Power indicator should be lighted.
- h. Check operation of the Model 750 in STANDBY mode. (Depress MANUAL PRINT switch momentarily to cause the Model 750 to print one line.)
- i. Depress RUN. This action will cause the Model 750 to initiate printing at intervals determined by the position of the PRINT INTERVAL control.
- j. To halt further printing, release RUN switch.
- k. To advance paper through the print mechanism, depress PAPER FEED.
- l. Tear off the printed information by pulling the paper tape along the "cutting bar".

3-4. INTERFACING THROUGH I/O "A".

a. General. The Model 750 provides a 50-pin Card-edge connector for I/O "A". This connector may be used with Model 7501 or Model 7502 Plug-In Cards. Special interfacing situations where non-Keithley instruments are used may require custom-designed interface circuitry. Contact your Keithley representative for more information on availability of interfaces. Do not install Model 7503 or 7504 cards into I/O "A".

TABLE 3-1.

Logic Definitions for Input Signals

Logic "0"	Logic "1"
0 to +0.5V applied while sinking current as listed. See text	Open input or +2.4V to +5.5V applied while supplying $\leq 250\mu\text{A}$

b. Input Signals at I/O "A".

1. Data Columns. (Pins 1-40) Each data column requires a parallel entry, 4-bit binary coded decimal (BCD) input. The Model 750 is factory wired for "positive true". The Model 750 may be altered by the user to permit "low true" logic by removing jumper W101 shown in Figure 37. Floating decimal points are low true only. Sinking current for Logic "0" is 3.2 milliamperes per line. These lines are identified as follows:

- 1-1 = column 1, bit 1
 - 1-2 = column 1, bit 2
 - 1-4 = column 1, bit 4
 - 1-8 = column 1, bit 8
- Typical for columns
1 through 10

2. Floating decimal lines (\overline{DP}). This input requires a Logic '0' to cause a decimal point to be printed in the specified column. This input has a sink current rating of 1.6 milliamperes. The lines are coded as follows:

- (Pin 49) 10-DP = decimal point in column 10
- (Pin 47) 9-DP = decimal point in column 9
- (Pin 45) 8-DP = decimal point in column 8
- (Pin 43) 7-DP = decimal point in column 7
- (Pin 41) 6-DP = decimal point in column 6

4. EXTERNAL PRINT Command (Pin 42). An input transition from Logic '0' to Logic '1' causes a print command in the Model 750. Sinking current for Logic '0' is 4.2 milliamperes. See Figure 7 for timing considerations.

3. \overline{RED} . (Pin 44) This input requires a Logic '0' to cause the Model 750 to print in "red". This feature may be used to indicate an overload condition on the digital measuring instrument. The RED input is level sensitive with a minimum duration of 25 milliseconds at Logic '0' from the start of PRINT cycle. See Figure 8 for timing considerations. Sinking current for Logic '0' is 2.6 milliamperes.

TABLE 3-2.

Pin Identification at "CONNECTOR A"

Pin No.	Function	Pin No.	Function
1	1-1	26	8-1
2	2-1	27	7-2
3	1-2	28	8-2
4	2-2	29	7-4
5	1-4	30	8-4
6	2-4	31	7-8
7	1-8	32	8-8
8	2-8	33	9-1
9	3-1	34	10-1
10	4-1	35	9-2
11	3-2	36	10-2
12	4-2	37	9-4
13	3-4	38	10-4
14	4-4	39	9-8
15	3-8	40	10-8
16	4-8	41	6-DP
17	5-1	42	EXTERNAL PRINT
18	6-1	43	7-DP
19	5-2	44	RED PRINT
20	6-2	45	8-DP
21	5-4	46	COMMON
22	6-4	47	9-DP
23	5-8	48	+5V
24	6-8	49	10-DP
25	7-1	50	DATA HOLD

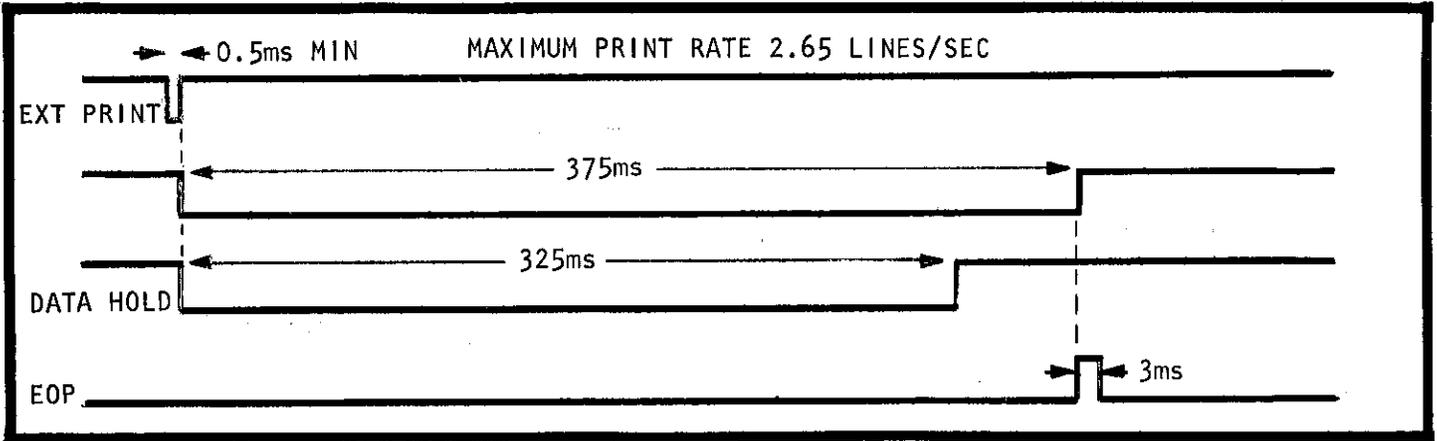


FIGURE 7. Timing For External Print Command.

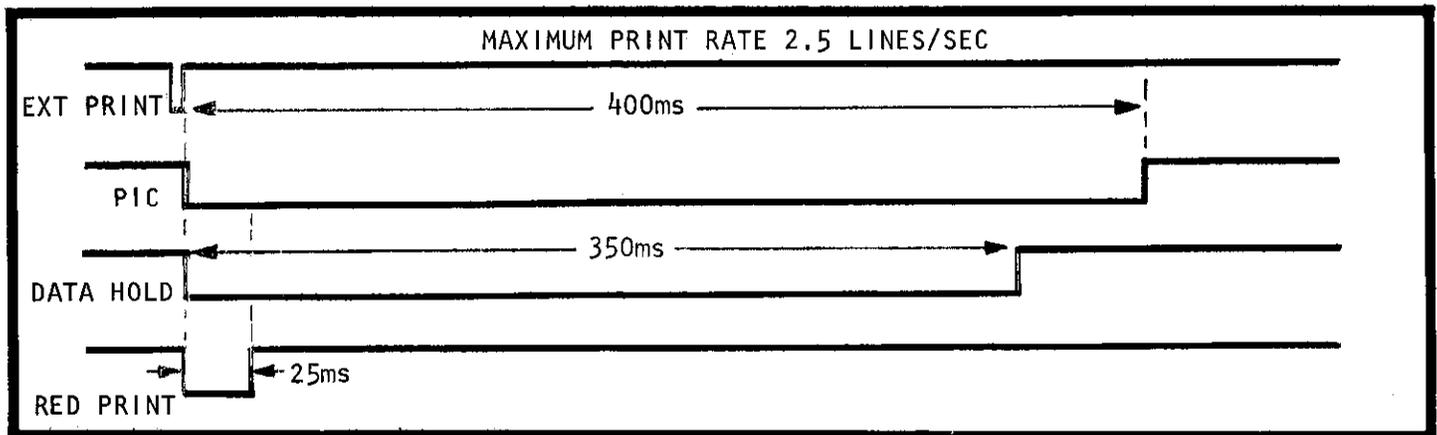


FIGURE 8. Timing For Red Print.

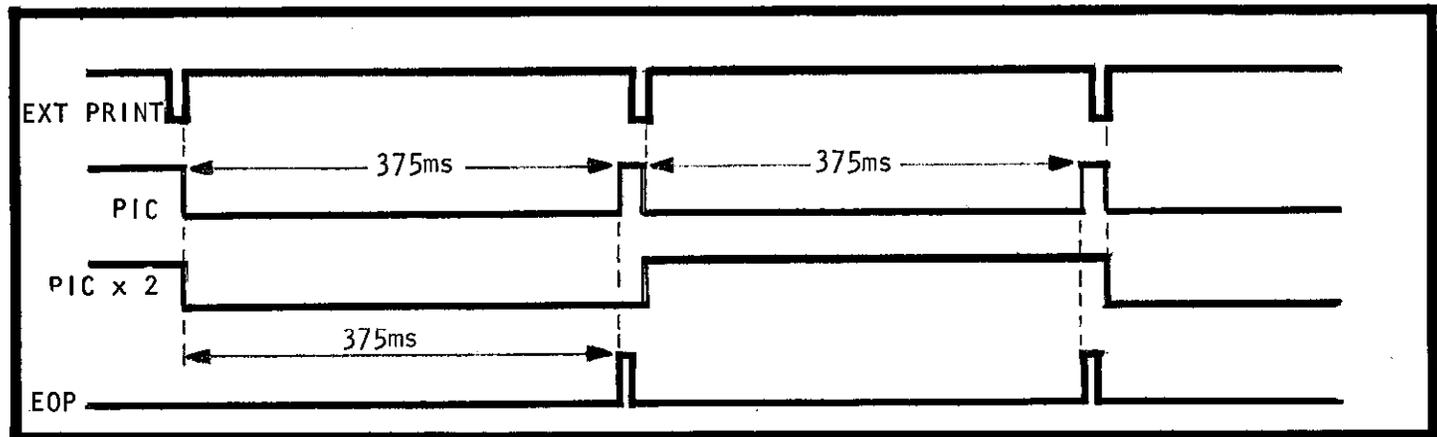


FIGURE 9. Timing For PIC x 2.

c. Output Signals at I/O 'A'.

TABLE 3-3.

Logic Definitions for Output Signals.

Logic '0'	Logic '1'
≤ 0.5 V while driving up to the maximum TTL loads given in text.	2.4V to 5.5V while supplying $\leq 250\mu\text{A}$ from Model 750.

1. DATA HOLD (Pin 50). Logic '1' to a Logic '0' occurs at the start of a print cycle in synchronism with PIC. The Logic '0' remains for 325 milliseconds (black print) or 350 milliseconds (red print) while data is being printed. This output has a loading factor of 8 TTL inputs.

2. +5V (Pin 48). This output furnishes +5V \pm 0.15V at up to 200 milliamperes for the Model 7501 or 7502 Accessory Card.

3. COMMON (Pin 46). Logic circuit low.

3-5. INTERFACING THROUGH I/O 'B'.

a. General. The Model 750 provides a 50-pin card-edge connector for I/O 'B'. This connector may be used with Models 7502, 7503, or 7504. A polarizing pin is installed to prevent installation of Model 7501 cards.

b. Input Signals at I/O 'B'. (See Table 3-4.)

1. INHIBIT (Pin 4). This input requires a Logic '0' to inhibit printing of data columns 15 through 18. Sinking current for Logic '0' is 2.6 milliamperes.

2. CONTINUOUS PRINT (Pin 9). This input requires a Logic '0' to cause the Model 750 to print at the maximum mechanism printing rate of 2.5 lines per second (0.4 second interval). Sinking current for Logic '0' is 4.2 milliamperes.

3. MOTOR OFF. (Pin 10). This input requires a Logic '0' to turn off the printer motor. Sinking current for Logic '0' is 2.6 milliamperes. Motor start-up time is approximately 1 second after Logic '1' is applied.

4. REMOTE STANDBY (Pin 12). This input requires a Logic '0' to cause the Model 750 to go into STANDBY mode. Sinking current for Logic '0' is 2.6 milliamperes.

5. Data Columns. (Pins 19-50). Similar to I/O 'A'; see 3-4b1. (Columns 11 through 18).

6. Floating Decimal Lines (\overline{DP}). Same as I/O 'A'; see 3-4b2. Coding is as follows:

- (Pin 11) 12-DP = decimal point in column 12
- (Pin 13) 13-DP = decimal point in column 13
- (Pin 15) 14-DP = decimal point in column 14
- (Pin 17) 15-DP = decimal point in column 15

c. Output Signals at I/O "B". (See Table 3-3)

1. EOP (End of Print, Pin 16). This output provides a Logic "1" for a duration of 3 millisecond. The timing for this output is shown in Figure 7. This output has a loading factor of 8 TTL inputs.
2. $\overline{\text{PIC}}$ (Print in Cycle, Pin 18). This output provides a Logic "1" to Logic "0" transition at the start of a printing cycle. The timing for this output is shown in Figure 15. This output has a loading factor of 4 TTL inputs.
3. MANUAL PRINT (Pin 14). This output provides a Logic "0" to Logic "1" transition when MANUAL PRINT pushbutton is depressed. This output has a loading factor of 8 TTL inputs.
4. +15V (Pin 1). This output provides filtered +15V (+20V at no load) at up to 300 milliamperes.
5. COMMON (Pin 5). Logic circuit low.

TABLE 3-4.

Pin Identification for "CONNECTOR B".

Pin No.	Function	Pin No.	Function
1	+15 V	26	15-1
2	PIC x 2	27	17-1
3	50/60 Hz	28	14-1
4	$\overline{\text{INHIBIT}}$	29	17-2
5	COMMON	30	14-2
6	DELAY PRINT	31	18-8
7	TIME SET	32	15-8
8	DELAY ALLOW	33	18-4
9	CONT PRINT	34	15-4
10	MOTOR OFF	35	17-4
11	12-DP	36	14-4
12	REMOTE STANDBY	37	17-8
13	13-DP	38	14-8
14	MAN PRINT	39	13-1
15	14-DP	40	13-2
16	EOP	41	13-4
17	15-DP	42	13-8
18	$\overline{\text{PIC}}$	43	12-1
19	16-8	44	12-2
20	16-2	45	12-4
21	16-4	46	12-8
22	16-1	47	11-1
23	18-2	48	11-2
24	15-2	49	11-4
25	18-1	50	11-8

d. Signals Used on Model 7503 Printer Clock.

1. 50/60 Hz (Pin 3). This output is connected to the Model 750 power transformer secondary. It is used exclusively for a timing reference for the Model 7503.

2. DELAY PRINT (Pin 6)

3. TIME SET (Pin 7)

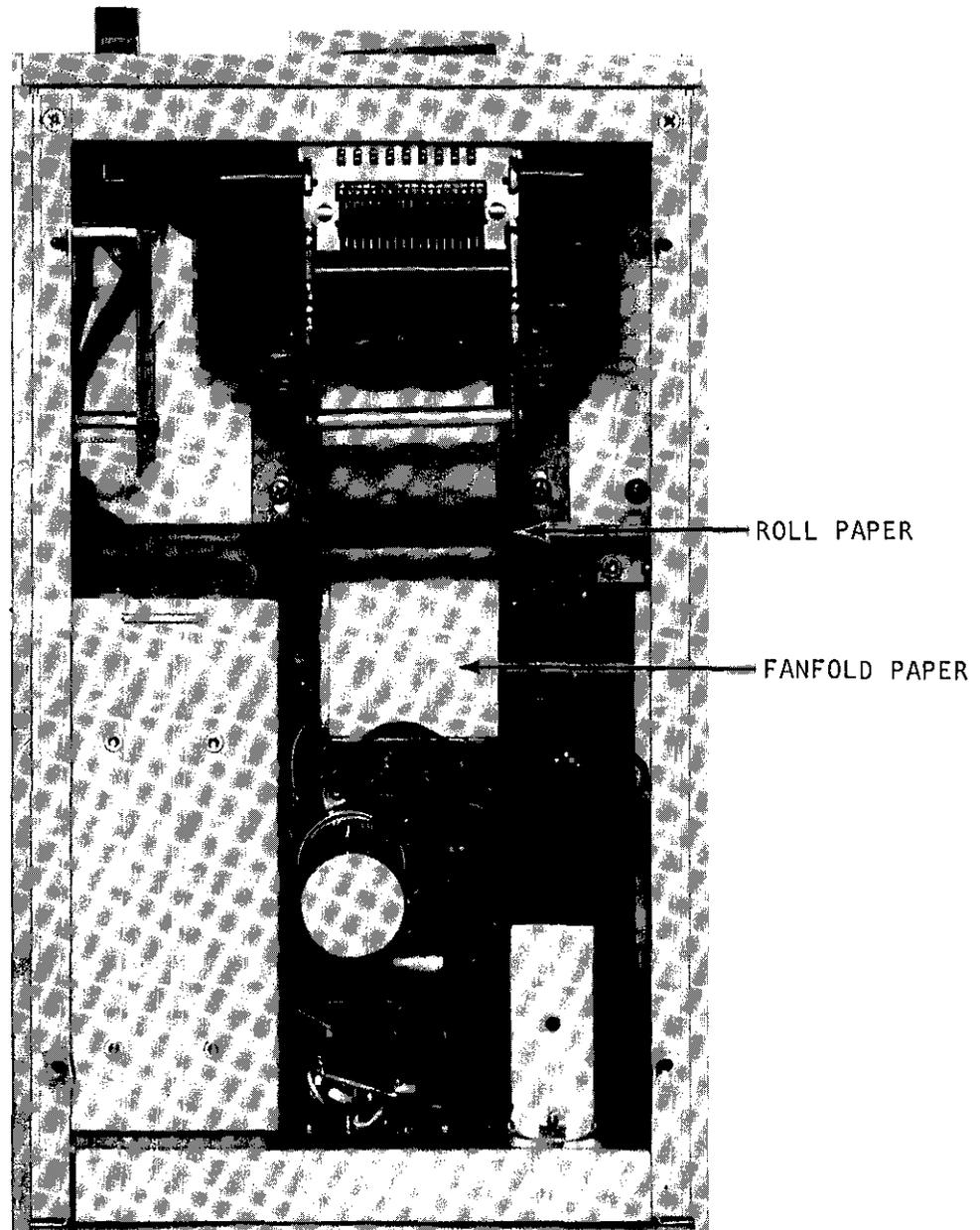
4. DELAY ALLOW (Pin 8)

Refer to Appendix A

5. PIC x 2 (Pin 2). This output depends on the setting of the PIC switch (S102). The timing for this output is shown in Figure 9.

TABLE 3-5.
 Characters on Keithley Custom Printer Drum.

Code 8-4-2-1	Column Number																	
	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Ω
0001	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	A
0010	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	C
0011	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	°	V
0100	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	m	F
0101	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	μ	Hz
0110	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	n	K
0111	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	p	H
1000	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	k	s
1001	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	M	W
1010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	DC	G
1011	.	.	.	.	.	.	.	.	.	.	.	.	.	m	R	AC	dB	g
1100	+	+	:	+	+	:	+	+	+	+	+	+	+	+	+	P	%	m



CAUTION

LINE VOLTAGE IS A SHOCK HAZARD
WHEN TOP COVER IS REMOVED.

FIGURE 10. Top View of Chassis Showing Roll and Fanfold Paper Installed.

SECTION 4. ACCESSORIES.

4-1. PRINTER INPUT INTERFACES. These accessory plug-ins provide interfacing between the Model 750 and Keithley digital measuring instruments.

TABLE 4-1.

Summary of Printer Input Interfaces

Model	Used With	Remarks
7501-160/1602	Model 160/1602 Digital Multimeter with digital output installed. Model 164/1602 Digital Multimeter with digital output installed.	3-1/2 digits
7501-160B/1602B	Model 160B/1602B Digital Multimeter with digital output installed.	3-1/2 digits
7501-171/1712	Model 171/1712 Digital Multimeter with digital output installed.	4-1/2 digits
7501-18-/1802	Model 180/1802 Digital Nanovoltmeter with digital output installed.	4-1/2 digits
7501-190	Model 190 Digital Multimeter.	5-1/2 digits
7501-616/6162	Model 616 Digital Electrometer Model 6162 Isolated Output/Control	3-1/2 digits
7502	General purpose.	

4-2. MODEL 7503 PRINTER CLOCK. This accessory plug in is a real-time digital clock that prints the time in 24 hour format in the left five columns (14, 15, 16, 17, 18). The Model 7503 is factory wired to print hours and minutes HH:MM, however it may be re-wired in the field to print minutes and seconds MM:SS. The Model 7503 must be installed at I/O "B" only. See Figure 11.

4-3. MODEL 7504 SEQUENCE COUNTER. This accessory plug-in is a four digit counter which numbers successive printer cycles from 0000 to 9999. Switches on the plug-in board may be preset for a specific total count. A Reset pushbutton resets the counter to 0000. An Inhibit toggle switch inhibits the counter operation. See Figure 12.

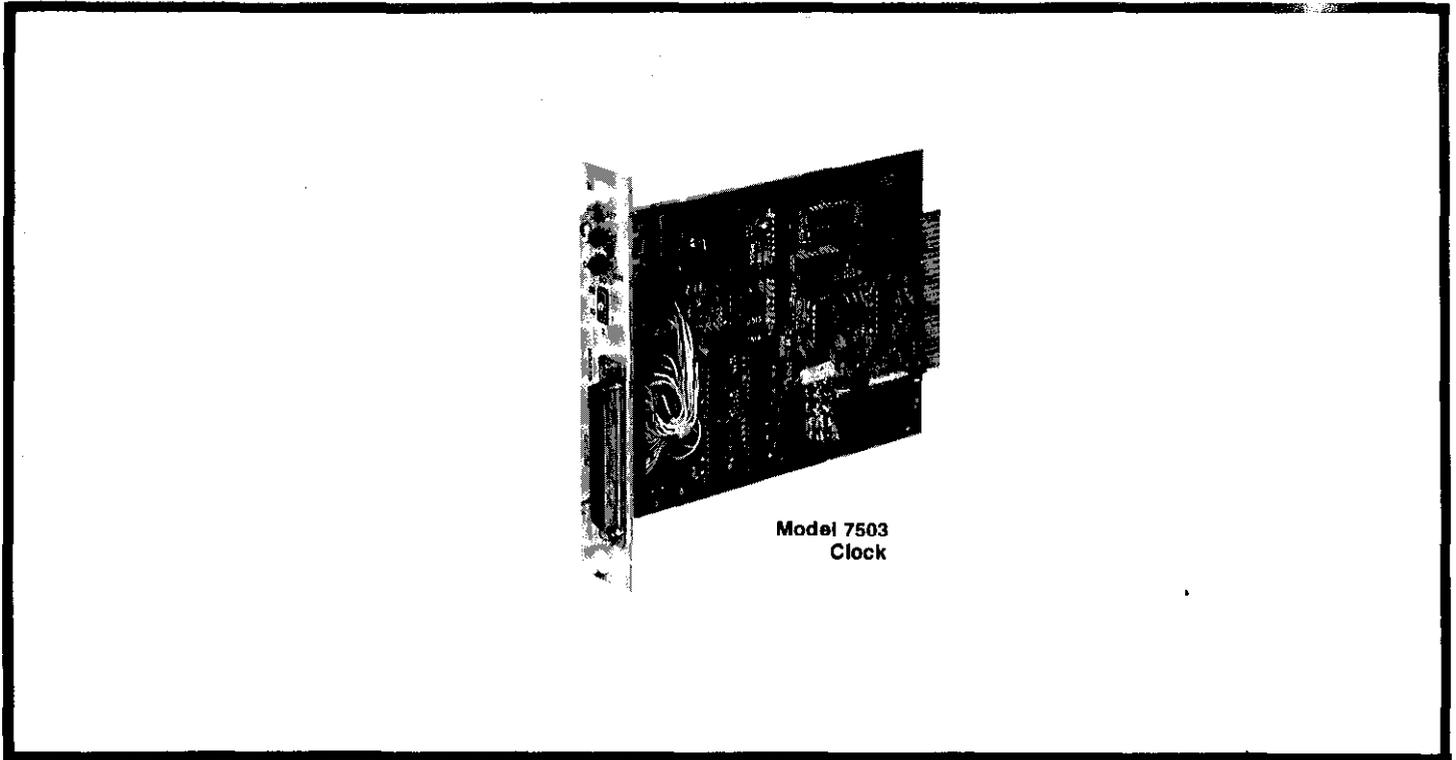


FIGURE 11. Model 7503 Clock.

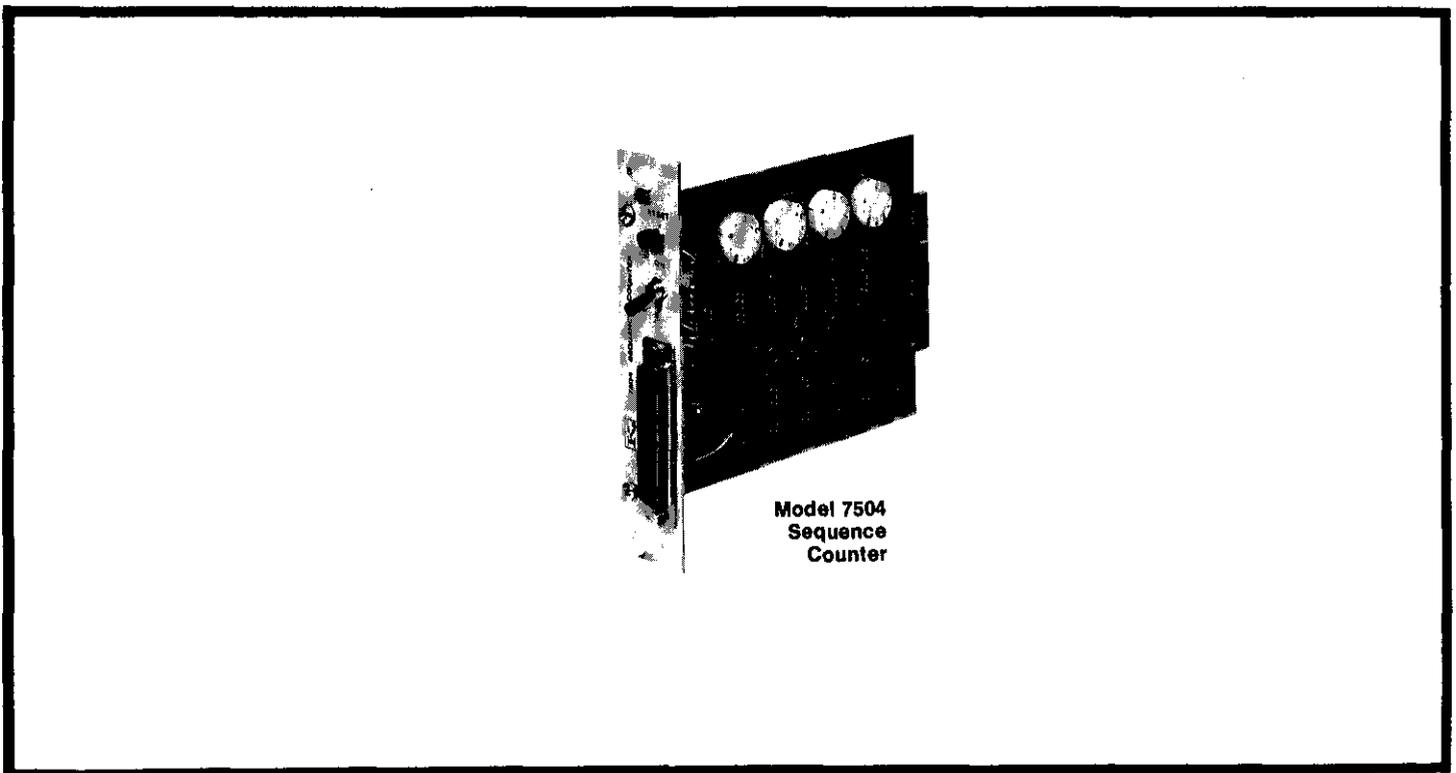


FIGURE 12. Model 7504 Sequence Counter.

SECTION 5. THEORY OF OPERATION

5-1. INTRODUCTION. This section of the manual contains an overall functional description utilizing block diagrams, timing diagrams, and partial schematics, to analyze the basic operation of the Model 750. For detailed Theory of Operation on the printer head, refer to SEIKO Model 102 Printer Head Instruction Manual. This manual is available from Keithley Instruments.

5-2. OVERALL FUNCTIONAL DESCRIPTION.

a. The Model 750 is a medium speed, ink impression, line printer designed as a recording peripheral for use with digital type instruments. The printer records up to 18 columns of information at a rate of 2.65 lines per second for black print and 2.5 lines per second for red print. Each column contains 13 characters plus a space (blank). A decimal may be printed on the right of the characters in eight of the columns. Printing of the floating decimal is independent of the numerical data presented to the column input and therefore, does not delete the column data.

b. A simplified block diagram of the 750 Printer is given in Figure 13. The operation of all columns is the same, therefore, column input data represents any one of the 18 columns available.

5-3. PRINT SEQUENCE DESCRIPTION.

a. A print command is applied to the print command locator. The locator in turn, sets the print in cycle (PIC) and columns busy logic. (DATA HOLD)

b. The PIC logic will enable the $\div 15$ counter after passing through the ribbon shift logic. If red print is enabled, the PIC will be delayed by 25 milliseconds, while the ribbon shift changes the ribbon color, before enabling the $\div 15$ counter.

c. The $\div 15$ counter is synchronized with the character location counter. This ensures that the output level from the $\div 15$ counter, the print enable line, will enable the column strobe logic at the proper time with respect to the character location.

d. Once the column strobe logic is enabled, 13 strobe pulses will be transferred to the 4 bit comparator. When strobe the comparator looks for coincidence between the column input data lines and the BCD output from the character location counter. When coincidence is reached, the comparator enables the hammer driver, which in turn causes the hammer to strike and print.

e. At the end of the 12th column enable pulse the $\div 15$ counter applies a 25 millisecond logic level change to the paper drive logic. The paper drive begins the paper feed cycle, which takes 75 milliseconds to actually feed paper through the mechanism.

f. At the end of the 13th column enable pulse the $\div 15$ counter's print enable output is inhibited, disabling the column strobe logic and resetting the columns busy logic. At this time, the instrument's digital outputs are released and the instrument may update its outputs.

g. At the end of the 15th column enable pulse the $\div 15$ counter activates the end of print (EOP) logic which generates a 3 millisecond pulse that resets the PIC logic. The printer is ready to accept another print command and begin a new print cycle.

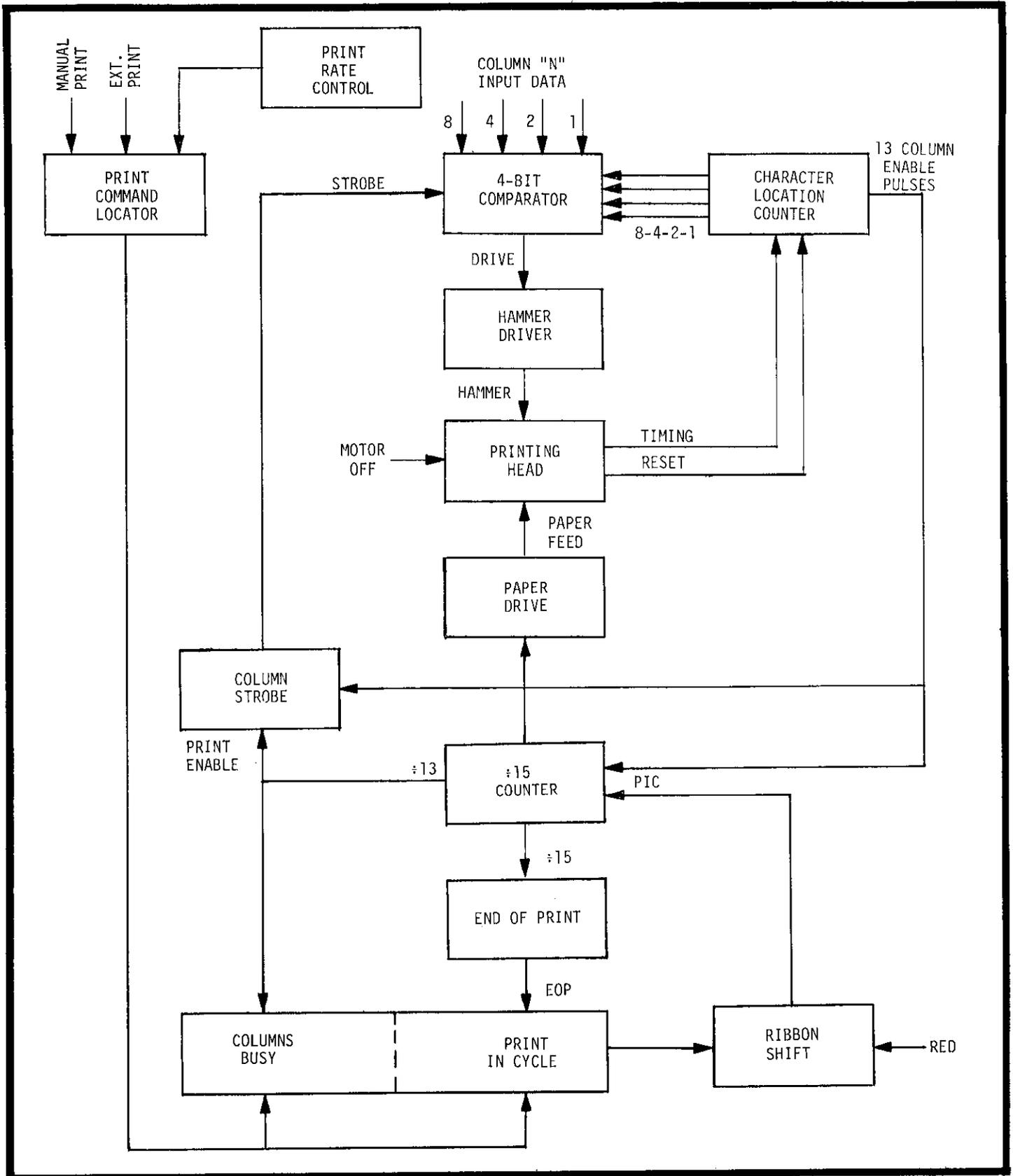


FIGURE 13. Simplified Block Diagram.

SECTION 6. MAINTENANCE

6-1. GENERAL. This section contains information necessary to verify performance of the entire instrument, perform simple maintenance on the printer mechanism, troubleshoot and repair the control electronics and switching. Extensive maintenance and repair procedures are available separately in the *Seiko Instruction Manual for the Model 102 Printer Mechanism*. No calibration of electronic circuitry is required.

6-2. MECHANISM - SIMPLE MAINTENANCE PROCEDURES.

a. Paper Replacement.

1. How to Install Fan-Fold Paper.

- a) Pull out front panel by grasping handle on front panel. Panel swings open as shown in Figure 3.
- b) Pull out paper tray.
- c) Place stack of fan-fold paper in pull-out tray as shown in Figure 4. Be certain the tray is aligned so that the metal tab is in the front.
- d) Lift and fold-out the top two layers of paper. This provides a leader for loading the tape in the print mechanism.
- e) Hold the pack so that the leader is pointing away from the printer and slide the tray into the tape drawer. When properly installed, the front end of the paper tray should be just behind the front panel.
- f) Proceed to Paper Feed Instructions in paragraph a3.

2. How to Install Roll-Type Paper.

NOTE

Roll should not exceed 2-3/4 inches in diameter.

- a) Remove top cover by unscrewing the four Phillips head screws.
- b) Install the roll paper on the roller pin located as shown in Figure 10.
- c) Pull out front panel by grasping handle on front panel. Panel swings open as shown in Figure 3.
- d) Grasp the paper roll in one hand and pull out a twelve inch leader.
- e) Point the leader toward the front panel on the printer and, position the paper roll so that the leader is being pulled off the bottom of the roll.
- f) Slide the paper roll into the roll fixture as shown in Figure 10.
- g) Feed the free end of paper under mechanism until it protrudes at the front panel. (See Figure 4.)
- h) Replace the top cover.
- i) Proceed to Paper Feed Instructions in paragraph a3.

3. Paper Feed Instructions.

- a) Release the RUN pushbutton to place the Model 750 in "Standby".

- b) Apply power to the instrument by depressing the front panel POWER pushbutton.
- c) Install paper (either fan-fold or roll-type as in preceding paragraphs).
- d) Locate the arrow on the front of printer mechanism.
- e) Feed paper under the clip, over the arrow, and into printer mechanism as shown in Figure 5.
- f) Depress PAPER FEED pushbutton until printer begins to pull paper through mechanism.
- g) As the paper appears at the top of printer, guide the paper under the cutting bar.
- h) Allow about 2 extra inches of paper to feed, then release PAPER FEED button.
- i) Tear off paper flush with cutting bar.
- j) Replace front panel by inserting right side and snapping into place.
- k) Test for smooth paper advance by depressing PAPER FEED button until a few inches of paper are advanced.

b. Ribbon Replacement.

1. Pull out front panel by grasping handle on front panel.
2. On the printer mechanism, locate and push down the Detecting Lever of both spool shafts (see Figure 5).
3. Carefully remove old ribbon spools from shafts.
4. Remove old ribbon from feed guides and from under hammer.
5. Separate the new ribbon spools and lay them on a flat surface with their "finger" side down.
6. Refer to Figure 6 and ensure that the new ribbon is properly threaded on the spools.
7. On the printer mechanism, locate and push down the Detecting Lever on left hand spool shaft, slide the spool onto the shaft making note of the proper threading direction shown in Figure 6.
8. Unwind 6 or 8 inches of ribbon from the remaining spool, if necessary, and position the ribbon over the feed guides as shown in Figure 6.
9. Depress the detecting lever on the empty spool shaft and slip the second spool onto the shaft. Make sure that there are no twists in the ribbon.

c. Cleaning of Paper-Feed Compartment. Periodic cleaning of Paper-feed compartment is recommended to remove paper cuttings which may accumulate. Suggested cleaning interval is after printing 10 rolls or 20 fan-fold packs or every 90 days.

1. Apply a slight downward pressure on the cutting bar to unlock, then pull down.
2. Remove the plate behind the cutting bar to gain access to the printer drum and paper feed mechanism.
3. Clean mechanism using brush.
4. Replace plate.
5. Snap cutting bar back into place.

d. Removal of Mechanism for Extensive Maintenance.

NOTE

Before an attempt is made to repair the printer mechanism, the *Seiko Instruction Manual for the Model 102* should be read and understood. Unauthorized alterations or repairs to the Mechanism will void the Keithley Warranty on the Model 750.

1. Disconnect the Model 750 line cord.
2. Remove top and bottom covers and front panel.
3. Disconnect the card-edge connector (J203) from the Mother Board, PC-378
4. Loosen and remove four Phillips Head screws located on the base of the roll-paper holder as shown in Figure 14.
5. Temporarily slide the printer mechanism to the rear to provide clearance at the front. (Do not attempt to lift the mechanism out as yet.)
6. Loosen and remove two small Phillips Head screws holding down the metal shield as shown in Figure 5.
7. Remove the metal shield through the front panel opening.
8. Remove printer mechanism through top of instrument.

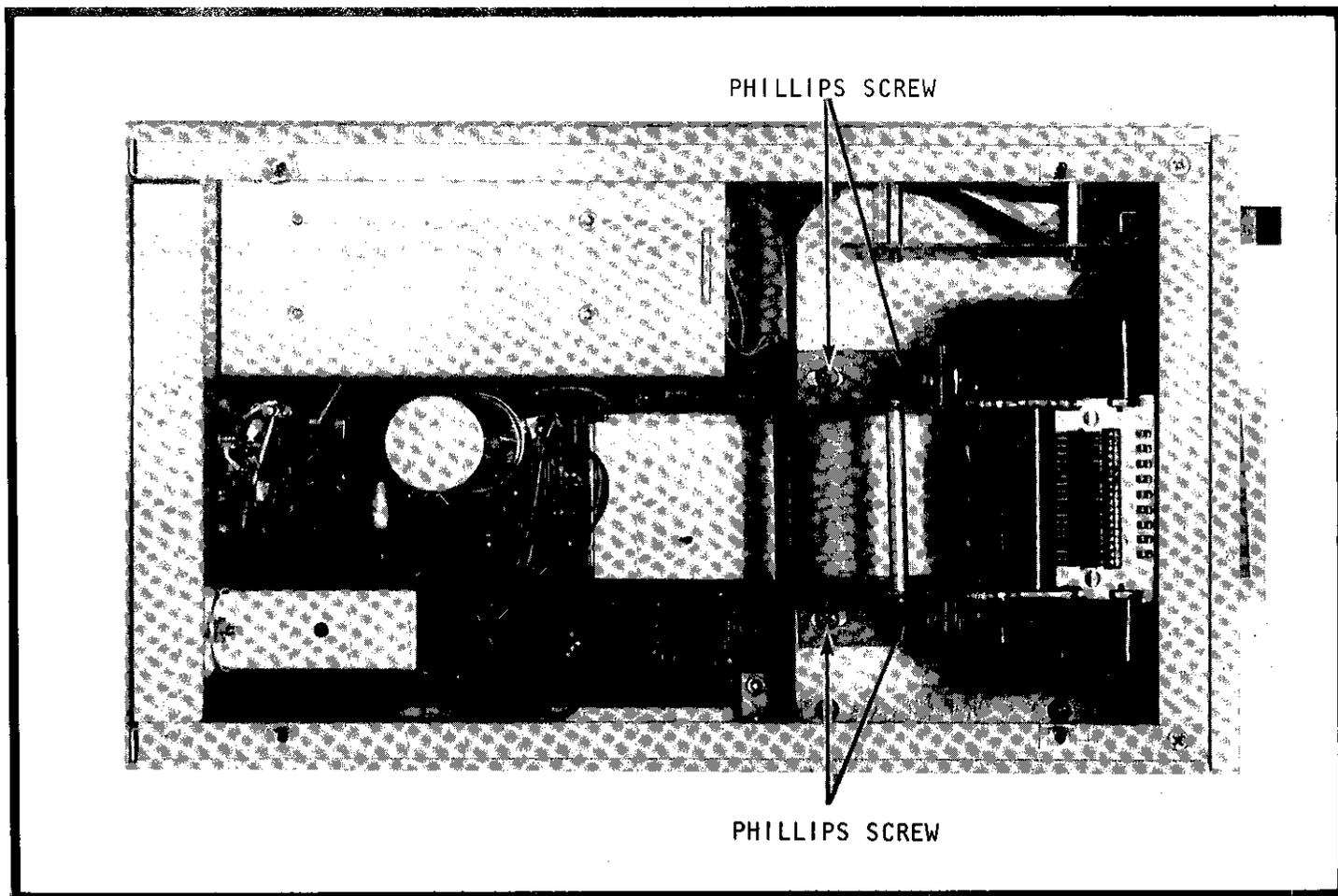


FIGURE 14. Top View of Printer With Cover Removed.

e. Cleaning of Mechanism.

1. Use a small brush, vacuum cleaning device, or air pressure line to remove dust and paper particles from the hammers, springs, and solenoid ratchets.
2. Use alcohol to remove grease from metal parts of the mechanism.

CAUTION

Care should be taken if other solvents are used on the plastic parts, since solvents such as tri-chloroethylene and ketone may cause damage.

6-3. ELECTRONIC CIRCUITRY.

a. How to Access the Mother Board.

1. Place the instrument on its side so that the handle faces up.
2. Remove bottom cover by unscrewing four screws.
3. Remove the six Phillips screws holding the Mother Board (PC-378).
4. Move the Mother Board towards the front panel to allow clearance for Line Switch on the rear panel.
5. Remove the Mother Board and lay flat as shown in Figure 16. (There should be enough slack in all interconnecting cables to allow the connections to remain intact.)
6. To completely remove the Mother board detach all connectors from the board (see figure 17).
7. Remove two screws holding the I/O "A" and I/O "B" connectors (J201 and J202) and slide out the connector plate with connectors attached as shown in Figure 18.

IMPORTANT

When the Mother board is re-installed, ensure that the 50-conductor ribbon cables are routed above the pc board mounting bracket otherwise damage to the cable may result.

b. Servicing the Mother Board.

1. If it is necessary to troubleshoot the circuitry on the Mother board, make certain that the board is resting on an insulated surface so that short circuits cannot occur.

CAUTION

Care should be taken when servicing the instrument since line power is present at various points in the power supply circuitry and is a potential shock hazard.

2. Place the Model 750 in STANDBY mode.
3. Connect the line cord.
4. Depress POWER ON.

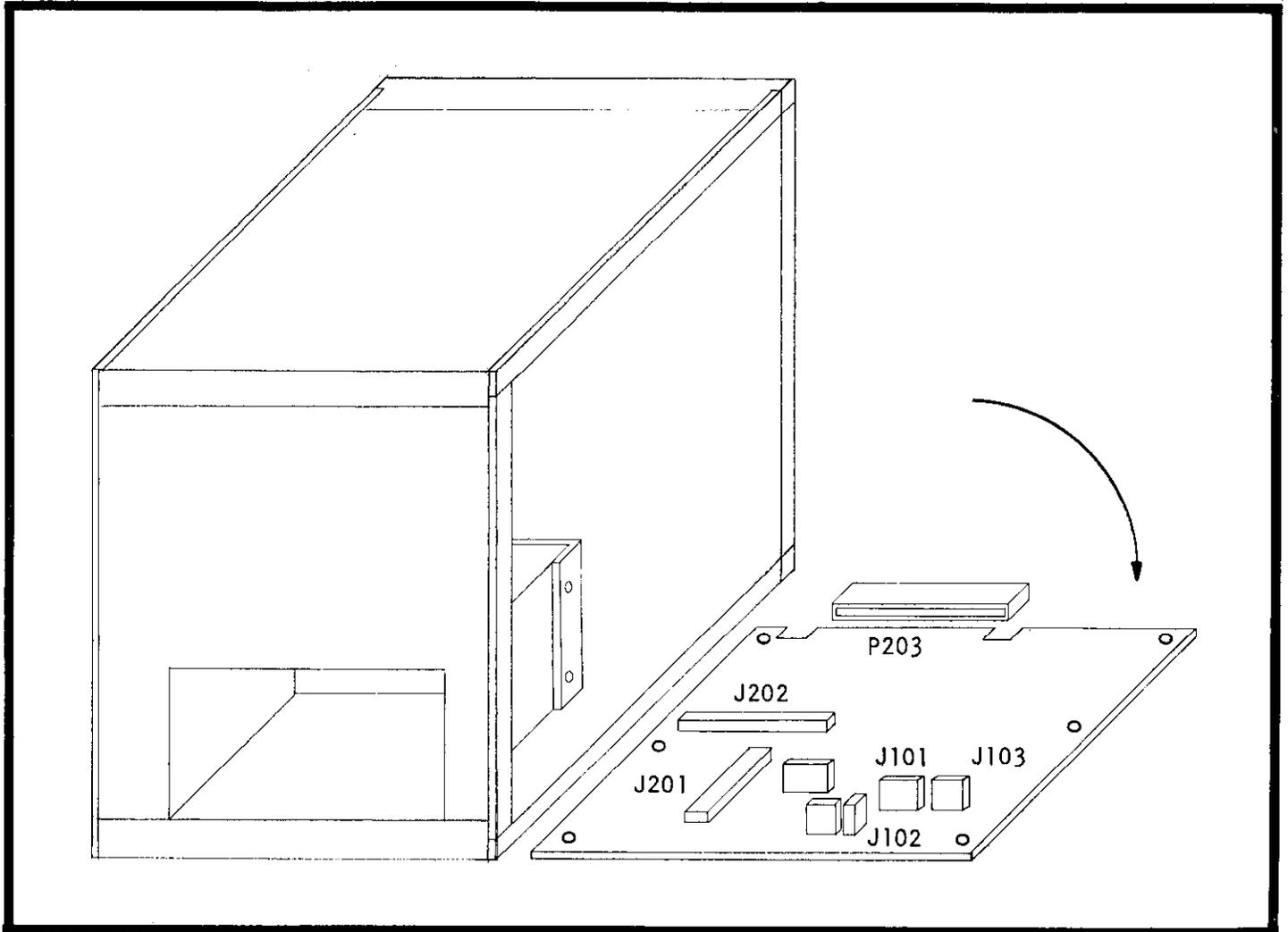


FIGURE 15. Assembly of Chassis.

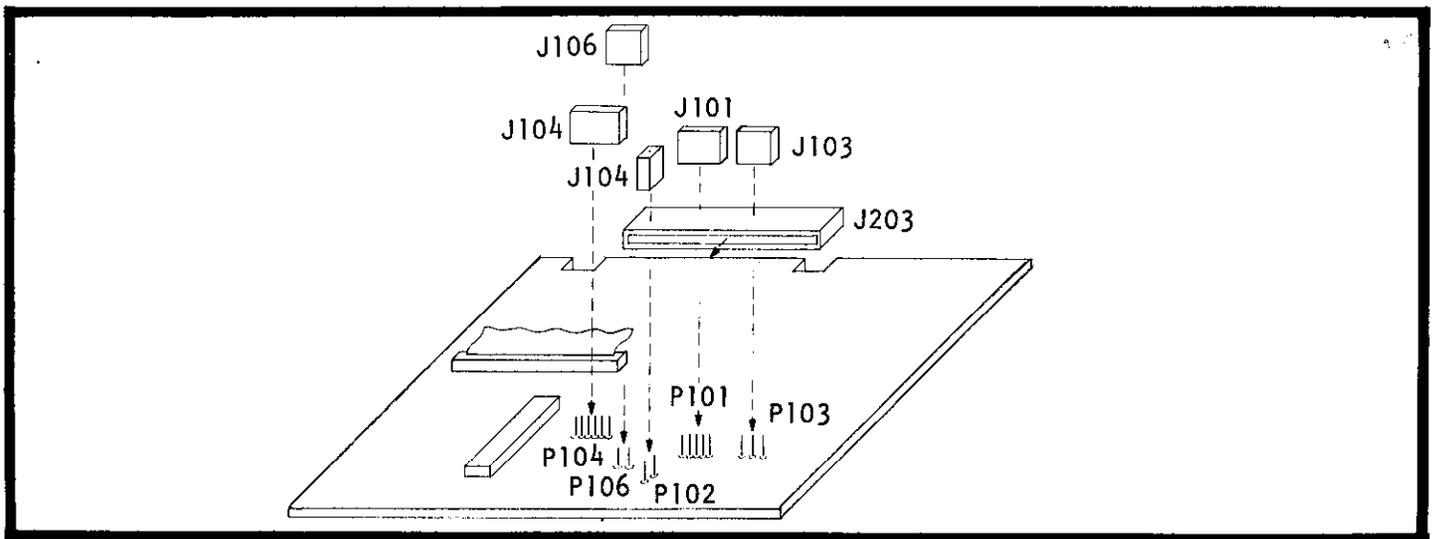


FIGURE 16. Mother Board Assembly.

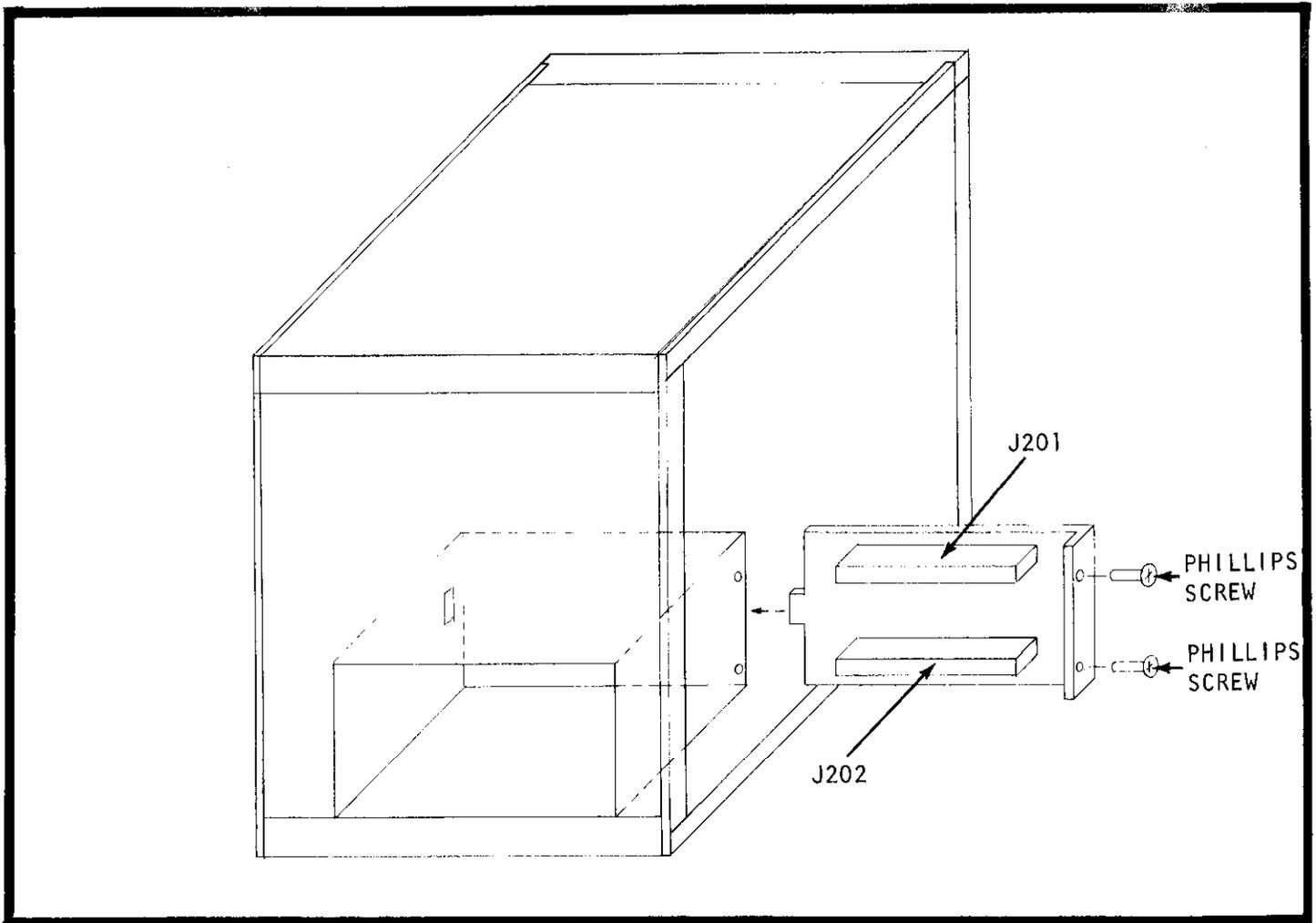


FIGURE 17. Assembly of Connector Board.

c. Troubleshooting Procedures. The following information is designed to aid in locating problems within the electronic circuitry. Extensive repairs should be performed only by authorized factory repair facilities.

1. Set the Line Voltage switch to the appropriate position.
2. Check the fuse for proper rating.
3. Set the Model 750 to STANDBY mode.
4. Partially remove the Mother board as described in paragraph 6-3a.
5. Connect the line cord.
6. Depress POWER ON.
7. Set Print Interval control to EXT.
8. Follow the troubleshooting procedure given in Table 6-2.

NOTE

Test point A should be used as a common reference point for all measurements.

TABLE 6-1.
 Recommended Test Equipment

Item	Description	Specification	Mfr.	Model
A	Digital Multimeter	0.1V - 1000V DC, $\pm 0.1\%$	KI	168
B	Oscilloscope	DC coupled, 100 μ s sweep	Tektronix	560

TABLE 6-2.
 Troubleshooting Guide For Model 750 Circuitry.

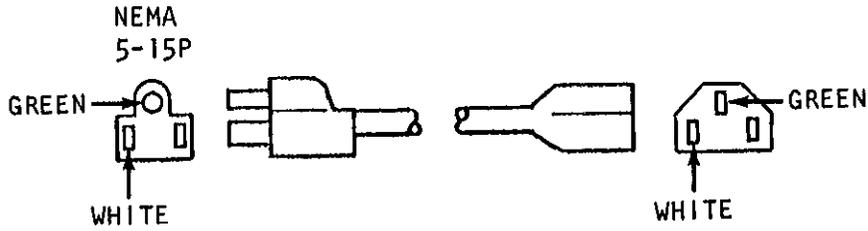
TROUBLE	CHECK	OPERATION	RESULT	PROBLEM
Not Printing	Test Point B	STANDBY	+15V	Rectifiers open
	Test Point C	STANDBY	+5V	Regulator faulty
	Test Point D	STANDBY	5ms low going pulse .1s interval	Rate Control U102 faulty
	Test Point E	DEPRESS & HOLD MANUAL PRINT	10ms low going pulse 1s interval	U104 or U103 faulty
	Test Point F	STANDBY	.3ms low going pulse 375ms interval	Reset or Timing Pulse shaper circuit faulty
	Test Point G	STANDBY	18ms high, 7ms low pulse train	U113 faulty, timing pulse shaper circuit faulty
	Test Point H	DEPRESS PRINT	Above Pulse Train for 375ms	U122 faulty
	Test Point J (PTC)	DEPRESS PRINT	375ms low going level	If held lo EOP generat- or faulty. If held high U111 faulty
	Test Point K (EOP)	DEPRESS PRINT	3ms low going pulse .1s interval	EOP generator faulty (U108, U125, or U124)
	Test Point L	DEPRESS PRINT	Pulse train 325ms	U120 or U116 faulty
	Test Point M	DEPRESS PRINT	Pulse train 325ms	U110 or U120 faulty
	Test Point N	DEPRESS PRINT	Pulse train 325ms	U118 faulty
	No Paper Feed	Test Point P	DEPRESS FEED	25ms low pulse 100ms time interval	U119 faulty
		DEPRESS PRINT	25ms low pulse 1s interval	U106, U116 or U124 faulty

NOTE

Test point locations can be found
 in Figure 38 in Appendix F.

CAUTION

To ensure the integrity of the chassis to earth ground connection only a Keithley part number C0-7 line cord should be used for replacement. If a different line cord is used ensure that the wiring polarity is the same as shown in the following diagram.



SECTION 7. REPLACEABLE PARTS

7-1. GENERAL. This section contains information for ordering replacement parts. The parts list is arranged in alphabetical order of their Circuit Designations.

7-2. ORDERING INFORMATION. To place an order or to obtain information concerning replacement parts, contact your Keithley representative or the factory. See the inside front cover of the catalog for addresses. When ordering, include the following information.

- a. Instrument Model Number
- b. Instrument Serial Number
- c. Part Description
- d. Circuit Designation (if applicable)
- e. Keithley Part Number

7-3. SCHEMATICS.

- a. No. 27226E: Logic and Power Supply (PC-378). Describes the printer controls, logic, and power supply.
- b. No. 27227E: Multiplex/Driver circuit (PC-378). Describes the printer driver circuits and the I/O connector pinout.
- c. No. 27243B: Describes the pushbutton switching assembly (PC-380).
- d. No. 27245E: 7503 Digital Clock. Describes accessory Clock plug-in.
- e. No. 27246D: 7504 Sequence Counter. Describes the accessory Sequence Counter.
- f. No. 27244D: 7502 General Purpose Plug-In.

7-4. REPLACEABLE PARTS LIST. The following parts list includes the Model 750, 7503, and 7504.

- a. Model 750: Parts are located on PC-378 and PC-380.
- b. Model 7503: Parts are located on PC-374.
- c. Model 7504: Parts are located on PC-385.

CAPACITORS
Schematic 27226E, Logic and Power Supply (PC-378)

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.	Qty.
C101	1.0 μ F, 20V, ETT.	COMPI	TSD120105A	C-204-1.0M	3
C102	5.6 μ F, 20V, 10%, ETT.	COMPI	TD502056620	C-179-5.6M	1
C103	1.0 μ F, 20V, 10%, ETT.	COMPI	TSD120105A	C-204-1.0M	..
C104	10 μ F, 20V, 10%, ETT.	COMPI	TSD120105A	C-204-10M	..
C105	3300 pF, 500V, 20%, CerD.	ERIE	801-Z5U0-332M	C-22-3300P	2
C106	22 μ F, 20V, ETT.	COMPI	TD12022620	C-179-22M	1
C107	10 μ F, 20V, 10%, ETT.	COMPI	TSD120106A	C-204-10M	2
C108	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	35
C109	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C110	10 μ F, 20V, 10%, ETT.	COMPI	TSD120106A	C-204-10M	1
C111	1.0 μ F, 16V, CerD.	CENLB	TSD120105A	C-204-1.0M	..
C112	4.7 μ F, 20V, ETT.	COMPI	TD1-20-475-20	C-179-4.7M	1
C113	0.047 μ F, 250V, MtF.	AMPRX	C280AE/P47K	C-178-0.047M	6
C114	0.047 μ F, 250V, MtF.	AMPRX	C280AE/P47K	C-178-0.047M	..
C115	0.047 μ F, 250V, MtF.	AMPRX	C280AE/P47K	C-178-0.047M	..
C116	0.047 μ F, 250V, MtF.	AMPRX	C280AE/P47K	C-178-0.047M	..
C117	2.2 μ F, 20V, ETT.	COMPI	TD1-20-225-20	C-179-2.2M	1
C118	0.047 μ F, 250V, MtF.	AMPRX	C280AE/P47K	C-178-0.047M	..
C119	0.1 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.1M	..
C120	0.047 μ F, 250V, MtF.	AMPRX	C280AE/P47K	C-178-0.047M	..
C121	1000 μ F, 25V, EMC.	AMPRX	ET120X025A03	C-160-1000M	1
C122	780 μ F, 30V, EAL.	GE	86F-148L	C-263-7800M	1
C123	1.0 μ F, 35V, ETT.	KEMET	K1E35	C-170-1.0M	1
C124	10 μ F, 20V, 10%, ETT.	COMPI	TSD120106A	C-204-10M	1
C125	3300 pF, 500V, 20%, CerD.	ERIE	801-Z5U0-332M	C-22-3300P	..
C126	1.0 μ F, 50V, CerF.	ERIE	8131050651-105M	C-237-1.0M	1
C127	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C128	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C129	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C130	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C131	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C132	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C133	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C134	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C135	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C136	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C137	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C138	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..

CAPACITORS
Schematic 27227E, Multiplex/Driver Circuit (PC-278)

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.	Qty.
C201	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C202	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C203	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C204	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C205	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C206	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C207	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C208	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C209	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C210	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C211	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C212	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C213	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C214	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C215	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C216	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C217	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C218	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C219	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C220	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..
C221	0.01 μ F, 16V, CerD.	CENLB	UK16-104	C-238-0.01M	..

DIODES
Schematic 27226E, Logic & Power Supply (PC-378)

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.	Qty.
CR101	Rectifier, 6A, 100V	MOT	MR751	RF-42	..
CR102	Rectifier, 6A, 100V	MOT	MR751	RF-42	..
CR103	Rectifier, 6A, 100V	MOT	MR751	RF-42	..
CR104	Rectifier, 6A, 100V	MOT	MR751	RF-42	..
CR105	Rectifier, 1.0A, 800V	MOT	1N4006	RF-38	..
CR106	Rectifier, 75mA, 75V.	TEXAS	1N914	RF-28	..
CR107	Rectifier, 75mA, 75V.	TEXAS	1N914	RF-28	..
CR108	Rectifier, 75mA, 75V.	TEXAS	1N914	RF-28	..
CR109	Rectifier, 75mA, 75V.	TEXAS	1N914	RF-28	..
CR110	Rectifier, 75mA, 75V.	TEXAS	1N914	RF-28	..
CR111	Rectifier, 75mA, 75V.	TEXAS	1N914	RF-28	..
CR112	Rectifier, 75mA, 75V.	TEXAS	1N914	RF-28	..
CR113	Rectifier, 75mA, 75V.	TEXAS	1N914	RF-28	..
CR114	Rectifier, 75mA, 75V.	TEXAS	1N914	RF-28	..

FUSES

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.	Qty.
F101	(220V) Fuse, Slo-Blo, 3/8A, 250V	FUSE	MDL-3/8A	FU-18	1
--	(100-117V) Fuse, Slo-Blo, 3/4A, 250V.	FUSE	MDL-3/4A	FU-19	1

CONNECTORS

Schematic 27226E, Logic & Power Supply (PC-378)

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.	Qty.
J101	5-pins.	MOLEX	2139-5	CS-287-5	1
J102	4-pins.	MOLEX	2139-4	CS-287-4	1
J103	3-pins.	MOLEX	2139-3	CS-287-3	1
P101	5-pin	MOLEX	A-2391-5A	CS-288-5	1
P102	4-pin	MOLEX	A-2391-4A	CS-288-4	2
P103	3-pin	MOLEX	A-2391-3A	CS-288-3	1
P104	4-pin	MOLEX	A-2391-4A	CS-288-4	..
P105	Power Receptacle.	S-C	EAC-301	CS-254	1
P106	2-pin	MOLEX	A-2391-2A	CS-288-2	1

CONNECTORS

Schematic 27227E, Multiplex/Driver Circuit (PC-378)

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.	Qty.
J201	Cable	KI	--	750-24B(set of 2)	1
J202	Cable	KI	--	--	-
J203	Part of printer mechanism	--	--	--	-
J301	4-pin	MOLEX	2139-4	CS-287-4	1
J302	2-pin	MOLEX	2139-2	CS-275	1
P201	Not Used.	--	--	--	-
P202	Not Used.	--	--	--	-
P203	Part of PC-378.	--	--	--	-

TRANSISTORS

Schematic 27226E, Logic & Power Supply (PC-378)

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.	Qty.
Q101	NPN Silicon, T0-92 Case	FAIR	2N3903	TG-49	3
Q102	NPN Silicon, T0-92 Case	FAIR	2N3903	TG-49	..
Q103	NPN Silicon, T0-92 Case	FAIR	2N3903	TG-49	..
Q104	NPN Silicon, T0-5 Case.	RCA	40317	TG-43	3
Q105	NPN Silicon, T0-5 Case.	RCA	40317	TG-43	..
Q106	NPN, T0-92 Case	MOT	2N3904	TG-47	1
Q107	NPN, T0-92 Case	MOT	2N5089	TG-62	1
Q108	NPN, Power Type, T0-220 Case.	MOT	2N5190	TG-108	1
Q109	NPN Silicon, T0-5 Case.	RCA	40317	TG-43	1

TRANSISTORS

Schematic 27227E, Multiplex/Driver Circuit (PC-378)

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.	Qty.
Q201	PNP, Power Type, Plastic Case T0-220 40W, 4A	MOT	2N5193	TG-107	1
Q202	Transistor NPN, T0-92 Case.	MOT	2N3904	TG-47	1
Q301	Transistor, NPN, Case T0-106.	FAIR	2N3565	TG-39	1

RESISTORS
Schematic 27226C, Logic & Power Supply (PC-378)

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.	Qty.
R101	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	40
R102	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R103	8.2kΩ, 10%, 0.25W, Comp	A-B	CB-822-10%	R-76-8.2K	2
R104	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R105	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R106	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R107	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R108	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R109	261kΩ, 1%, 1/8W, MtF.	IRC	CEA-T0-261K	R-88-261K	1
R110	845Ω, 1%, 1/8W, MtF.	IRC	CEA-T0-100	R-88-845	1
R111	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R112	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R113	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R114	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R115	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R116	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R117	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R118	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R119	8.2kΩ, 10%, 0.25W, Comp	A-B	CB-822-10%	R-76-8.2K	..
R120	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R121	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R122	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R123	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R124	1kΩ, 10%, 0.25W, Comp	A-B	CB-102-10%	R-76-1K	2
R125	100Ω, 10%, 0.25W, Comp.	A-B	CB-101-10%	R-76-100	1
R126	12kΩ, 10%, 0.25W, Comp.	A-B	CB-123-10%	R-76-12K	..
R127	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R128	22kΩ, 10%, 0.25W, Comp.	A-B	CB-223-10%	R-76-22K	2
R129	100kΩ, 10%, 0.25W, Comp	A-B	CB-104-10%	R-76-100K	1
R130	150Ω, 10%, 0.12W, Comp.	A-B	BB-151-10%	R-143-150	2
R131	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R132	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R133	180Ω, 10%, 0.25W, Comp.	A-B	CB-181-10%	R-76-180	2
R134	180Ω, 10%, 0.25W, Comp.	A-B	CB-181-10%	R-76-180	..
R135	150Ω, 10%, 0.12W, Comp.	A-B	BB-151-10%	R-143-150	..
R136	Not Used.	--	--	--	-
R137	3.9kΩ, 10%, 0.25W, Comp	A-B	CB-392-10%	R-76-3.9K	1
R138	18.2kΩ, 10%, 0.25W, Comp.	A-B	CEA-T0-18.2K	R-88-18.2K	..
R139	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R140	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R141	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R142	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R143	1.2kΩ, 10%, 0.25W, Comp	A-B	CB-122-10%	R-76-1.2K	5
R144	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R145	4.7kΩ, 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..

RESISTORS (Cont'd)

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.	Qty.
R146	4.7k Ω , 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R147	4.7k Ω , 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R148	82k Ω , 10%, 0.25W, Comp.	A-B	CB-823-10%	R-76-82K	1
R149	22k Ω , 10%, 0.25W, Comp.	A-B	CB-223-10%	R-76-22K	..
R150	10k Ω , 10%, 0.25W, Comp.	A-B	CB-103-10%	R-76-10K	3
R151	4.7k Ω , 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R152	4.7k Ω , 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R153	1.2k Ω , 10%, 0.25W, Comp	A-B	CB-122-10%	R-76-1.2K	..
R154	1.2k Ω , 10%, 0.25W, Comp	A-B	CB-122-10%	R-76-1.2K	..
R155	1.2k Ω , 10%, 0.25W, Comp	A-B	CB-122-10%	R-76-1.2K	..
R156	1.2k Ω , 10%, 0.25W, Comp	A-B	CB-122-10%	R-76-1.2K	..
R157	1k Ω , 10%, 0.25W, Comp	A-B	CB-102-10%	R-76-1K	..
R158	4.7k Ω , 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R159	47 Ω , 5%, 5W, WW	DALE	RS-5-47 Ω	R-4A-47	1
R160	2.5M Ω , 30%, 0.25W, Var.	CTS	VF-T450	RP-112	1
R161	4.7k Ω , 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R162	4.7k Ω , 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R163	4.7k Ω , 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R164	10k Ω , 10%, 0.25W, Comp.	A-B	CB-103-10%	R-76-10K	..
R165	4.7k Ω , 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R166	150 Ω , 10%, 0.25W, Comp.	A-B	CB-151-10%	R-76-150	1
R167	10k Ω , 10%, 0.25W, Comp.	A-B	CB-103-10%	R-76-10K	..
R168	4.7k Ω , 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R169	4.7k Ω , 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R170	4.7k Ω , 10%, 0.25W, Comp	A-B	CB-472-10%	R-76-4.7K	..
R171	1.5 Ω , 5%, 10W, WW	OHM	FR-10-1.5 Ω	R-5-1.5	1
R172	150 Ω , 5%, 5W, WW.	DALE	RS-5-150 Ω	R-4A-150	1
R173	330 Ω , 10%, 0.25W, Comp.	A-B	CB-331-10%	R-76-330	2
R174	330 Ω , 10%, 0.25W, Comp.	A-B	CB-331-10%	R-76-330	..

RESISTORS

Schematic 27227E, Multiplex/Driver Circuit (PC-378)

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.	Qty.
R201	2.7k Ω , 10%, 0.25W, Comp.	A-B	CB-272-10%	R-76-2.7K	1
R202	560 Ω , 10%, 1W, Comp	A-B	GB-XXX-10%	R-2-560	1
R203	10K Ω , 10%, 1/4W, Comp	A-B	CB-103-10%	R-76-10K	..
R204	10K Ω , 10%, 1/4W, Comp	A-B	CB-103-10%	R-76-10K	..
R205	10K Ω , 10%, 1/4W, Comp	A-B	CB-103-10%	R-76-10K	..
R206	10K Ω , 10%, 1/4W, Comp.	A-B	CB-103-10%	R-76-10K	..
R207	Thick Film 14-Pin DIP	BEC	899-1-R-2K	TF-19-10K	..
R208	Thick Film 14-Pin DIP	BEC	899-1-R-2K	TF-19-10K	..
R209	Thick Film 14-Pin DIP	BEC	899-1-R-2K	TF-19-10K	..
R210	Thick Film 14-Pin DIP	BEC	899-1-R-2K	TF-19-10K	..
R211	Thick Film 14-Pin DIP	BEC	899-1-R-2K	TF-19-10K	..
R212	Thick Film 14-Pin DIP	BEC	899-1-R-2K	TF-19-10K	..
R301	680 Ω , 10%, 1/2W, Comp	A-B	EB-XXX-10%	R-1-680	1
R302	22K Ω , 10%, 1/4W, Comp	A-B	CB-100-10%	R-76-22K	1

SWITCHES

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.	Qty.
S101	Slide Switch	S-C	110-1139	SW-273	1
S102	Switch, Slide, DPDT.	C-W	GG350PCDPDT	SW-318	1
S103	Switch (Part of R160).	--	--	--	-
S301	Pushbutton type, 2 pole DT	CENLB	PB-20	SW-383	1

TRANSFORMER

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.	Qty.
T101	Power type	KI	--	TR-160	1

INTEGRATED CIRCUITS

Schematic 27226E, Logic & Power Supply (PC-378)

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.	Qty.
U101	Hex Inverter, 14-pin DIP	TEXAS	SN7406	IC-62	2
U102	Timing Logic, 8-pin DIP.	SIG	NE555V	IC-71	2
U103	Positive NAND Gates, Quad 2-Input 14-pin DIP.	TEXAS	SN7400N	IC-38	5
U104	Hex Inverter, 14-pin DIP	TEXAS	SN7406	IC-62	..
U105	Quad 2-Input OR, 14-pin DIP.	SIG	N7432A	IC-115	4
U106	Quad 2-Input NAND, 14-pin DIP.	TEXAS	SN7401	IC-47	1
U107	Quad 2-Input Pos-AND (Totem-pole output) 14-pin DIP	TEXAS	SN7408N	IC-94	2
U108	Dual 4-Input NAND gate, 14-pin DIP	TEXAS	SN7420N	IC-48	1
U109	Positive NAND Gates, Quad 2-Input 14-pin DIP.	TEXAS	SN7400N	IC-38	..
U110	Hex Buffer/Driver, 14-pin DIP.	TEXAS	SN7417N	IC-101	1
U111	Hex Inverters, 14-pin DIP.	TEXAS	SN7405N	IC-45	3
U112	Positive NAND Gates, Quad 2-Input 14-pin DIP.	TEXAS	SN7400N	IC-38	..
U113	Dual J-K Flip-Flop, 14-pin DIP	TEXAS	SN7473	IC-54	1
U114	Hex Inverters, 14-pin DIP.	TEXAS	SN7405N	IC-45	..
U115	4-Bit Binary Counter (TTL)	SIG	N7493A	IC-117	1
U116	Positive NAND Gates, Quad 2-Input 14-pin DIP.	TEXAS	SN7400N	IC-38	..
U117	Quad Excl. OR, 14-pin DIP	TEXAS	SN7486N	IC-116	1
U118	Quad 2-Input Pos-AND (Totem-pole output) 14-pin DIP	TEXAS	SN7408N	IC-94	..
U119	Timing, 8-pin DIP.	SIG	NE555V	IC-71	1
U120	Hex Inverters, 14-pin DIP.	TEXAS	SN7405N	IC-45	..
U121	Positive NAND Gates, Quad 2-Input 14-pin DIP.	TEXAS	SN7400N	IC-38	..
U122	Positive NOR Gates, 14-pin DIP	TEXAS	SN7402N	IC-32	4
U123	Dual Positive NAND Driver, TTL Compatible.	TEXAS	SN75452BP	IC-114	1
U124	4-Bit Binary Counter (TTL)	SIG	N7493A	IC-117	..
U125	Multivibrator, 14-pin DIP.	TEXAS	SN74L122N	IC-83	1

INTEGRATED CIRCUITS
Schematic 27227E, Multiplex/Driver (PC-378)

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.	Qty.
U201	Dual 4-Bit Comparator (TTL)	MOT	MC4022P	IC-113	9
U202	Dual 4-Bit Comparator (TTL)	MOT	MC4022P	IC-113	..
U203	Dual 4-Bit Comparator (TTL)	MOT	MC4022P	IC-113	..
U204	Dual 4-Bit Comparator (TTL)	MOT	MC4022P	IC-113	..
U205	Dual 4-Bit Comparator (TTL)	MOT	MC4022P	IC-113	..
U206	Dual 4-Bit Comparator (TTL)	MOT	MC4022P	IC-113	..
U207	Dual 4-Bit Comparator (TTL)	MOT	MC4022P	IC-113	..
U208	Dual 4-Bit Comparator (TTL)	MOT	MC4022P	IC-113	..
U209	Dual 4-Bit Comparator (TTL)	MOT	MC4022P	IC-113	..
U210	Positive NOR Gates, 14-pin DIP	TEXAS	SN7402N	IC-32	..
U211	Positive NOR Gates, 14-pin DIP	TEXAS	SN7402N	IC-32	..
U212	Positive NOR Gates, 14-pin DIP	TEXAS	SN7402N	IC-32	..
U213	Quad 2-Input OR Gate (TTL)	SIG	N7432A	IC-115	..
U214	Quad 2-Input OR Gate (TTL)	SIG	N7432A	IC-115	..
U215	Quad 2-Input OR Gate (TTL)	SIG	N7432A	IC-115	..
U216	Dual Pos NAND Driver (TTL), 8-pin DIP	TEXAS	SN75452BP	IC-114	9
U217	Dual Pos NAND Driver (TTL), 8-pin DIP	TEXAS	SN75452BP	IC-114	..
U218	Dual Pos NAND Driver (TTL), 8-pin DIP	TEXAS	SN75452BP	IC-114	..
U219	Dual Pos NAND Driver (TTL), 8-pin DIP	TEXAS	SN75452BP	IC-114	..
U220	Dual Pos NAND Driver (TTL), 8-pin DIP	TEXAS	SN75452BP	IC-114	..
U221	Dual Pos NAND Driver (TTL), 8-pin DIP	TEXAS	SN75452BP	IC-114	..
U222	Dual Pos NAND Driver (TTL), 8-pin DIP	TEXAS	SN75452BP	IC-114	..
U223	Dual Pos NAND Driver (TTL), 8-pin DIP	TEXAS	SN75452BP	IC-114	..
U224	Dual Pos NAND Driver (TTL), 8-pin DIP	TEXAS	SN75452BP	IC-114	..

REGULATING DEVICES

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.	Qty.
VR101	Regulator, 5 Volt, T0-3 Case	NAT	LM309K	IC-98	1
VR102	Zener diode, 15V, 1/2W	FAIR	1N5245B	DZ-53	1
VR103	Zener diode, 2.6V, 1/4W.	TEXAS	1N702A	DZ-33	2
VR104	Zener diode, 2.6V, 1/4W.	TEXAS	1N702A	DZ-33	..

MISCELLANEOUS

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.	Qty.
DS301	Displays, Pilot light emitting diode	MON	MV5253	PL-62	1
W101	Jumper, circuit.	ERIE	333	J-3	2
W102	Jumper, circuit.	ERIE	333	J-3	..
--	Line Cord.	BELD	Special	C0-7	1

Schematic 27227E Multiplex/Driver Circuit (PC-378)

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.	Qty.
A201	Printer Mechanism.	SEIKO	102	MM-1	1

Model 7503
 Replaceable Parts List (PC-374)

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.
CAPACITORS				
C501	0.001 μ F, 1000V, Ceramic Disc.	ERIE	808000Z5R0102K	C-64-.001M
C502	0.01 μ F, 16V, CerD	CENLB	UK16-103	C-238-.01M
C503	0.001 μ F, 1000V, Ceramic Disc.	ERIE	808000Z5R0102K	C-64-.001M
C504	0.001 μ F, 1000V, Ceramic Disc.	ERIE	808000Z5R0102K	C-64-.001M
C505	0.001 μ F, 1000V, Ceramic Disc.	ERIE	808000Z5R0102K	C-64-.001M
C506	0.001 μ F, 1000V, Ceramic Disc.	ERIE	808000Z5R0102K	C-64-.001M
C507	0.001 μ F, 1000V, Ceramic Disc.	ERIE	808000Z5R0102K	C-64-.001M
C508	0.33 μ F, 50V, Ceramic Film	ERIE	8131050651334M	C-237-.33M
C509	10 μ F, 20V, 10%, ETT	COMP	TSD120106A	C-204-10M
C510	0.01 μ F, 16V, CerD	CENLB	UK16-103	C-238-.01M
C511	0.01 μ F, 16V, CerD	CENLB	UK16-103	C-238-.01M
C512	0.01 μ F, 16V, CerD	CENLB	UK16-103	C-238-.01M
C513	0.01 μ F, 16V, CerD	CENLB	UK16-103	C-238-.01M
C514	0.01 μ F, 16V, CerD	CENLB	UK16-103	C-238-.01M
C515	0.0047 μ F, 500V, Ceramic Disc.	ERIE	801Z5U0472M	C-22-.0047M
C516	0.0047 μ F, 500V, Ceramic Disc.	ERIE	801Z5U0472M	C-22-.0047M
C517	0.0047 μ F, 500V, Ceramic Disc.	ERIE	801Z5U0472M	C-22-.0047M
C518	0.0047 μ F, 500V, Ceramic Disc.	ERIE	801Z5U0472M	C-22-.0047M
C519	0.1 μ F, 16V, CerD.	CENLB	UK16-104	C-238-.1M
C520	10 μ F, 20V, 10%, ETT	COMP	TSD120106A	C-204-10M
C521	0.1 μ F, 50V, Ceramic Film.	ERIE	8121050651104M	C-237-.1M
DIODES				
CR501	Rectifier, 75mA, 75V	TEXAS	1N914	RF-28
CR502	Rectifier, 75mA, 75V	TEXAS	1N914	RF-28
CR503	Rectifier, 75mA, 75V	TEXAS	1N914	RF-28
CR504	Rectifier, 75mA, 75V	TEXAS	1N914	RF-28
CR505	Rectifier, 75mA, 75V	TEXAS	1N914	RF-28
CONNECTORS				
J501	NOT USED	--	--	--
J502	Receptacle, 50 pins - Mates with CS-271.	AMP	205211-1	CS-269
J503	Socket (16-pin).	TEXAS	SN7541	S0-65
TRANSISTORS				
Q501	Transistor array, 14-pin DIP	RCA	CA3086	IC-53
Q502	Transistor array, 14-pin DIP	RCA	CA3086	IC-53
Q503	NPN Silicon, TO-92 Case.	MOT	2N3903	TG-49
Q504	PNP Silicon, TO-92 Case.	MOT	2N3905	TG-53
Q505	NPN Silicon, TO-92 Case.	MOT	2N3903	TG-49
Q506	NPN Silicon, TO-92 Case.	MOT	2N3903	TG-49

Model 7503
Replaceable Parts List (Continued)

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.
RESISTORS				
R501	100 K Ω , 10%, 1/4W, Comp	A-B	CB-103-10%	R-76-100K
R502	10 K Ω , 10%, 1/4W, Comp	A-B	CB-103-10%	R-76-10K
R503	10 K Ω , 10%, 1/4W, Comp	A-B	CB-103-10%	R-76-10K
R504	180 K Ω , 10%, 1/4W, Comp	A-B	CB-183-10%	R-76-180K
R505	180 K Ω , 10%, 1/4W, Comp	A-B	CB-183-10%	R-76-180K
R506	10 K Ω , 10%, 1/4W, Comp	A-B	CB-103-10%	R-76-10K
R507	10 K Ω , 10%, 1/4W, Comp	A-B	CB-103-10%	R-76-10K
R508	150 K Ω , 10%, 1/4W, Comp	A-B	CB-153-10%	R-76-150K
R509	150 K Ω , 10%, 1/4W, Comp	A-B	CB-153-10%	R-76-150K
R510	150 K Ω , 10%, 1/4W, Comp	A-B	CB-153-10%	R-76-150K
R511	150 K Ω , 10%, 1/4W, Comp	A-B	CB-153-10%	R-76-150K
R512	10 M Ω , 10%, 1/4W, Comp	A-B	CB-106-10%	R-76-10M
R513	10 K Ω , 10%, 1/4W, Comp	A-B	CB-103-10%	R-76-10K
R514	10 K Ω , 10%, 1/4W, Comp	A-B	CB-103-10%	R-76-10K
R515	10 K Ω , 10%, 1/4W, Comp	A-B	CB-103-10%	R-76-10K
R516	10 K Ω , 10%, 1/4W, Comp	A-B	CB-103-10%	R-76-10K
R517	4.7 K Ω , 10%, 1/4W, Comp	A-B	CB-472-10%	R-76-4.7K
R518	4.7 K Ω , 10%, 1/4W, Comp	A-B	CB-472-10%	R-76-4.7K
R519	4.7 K Ω , 10%, 1/4W, Comp	A-B	CB-472-10%	R-76-4.7K
R520	4.7 K Ω , 10%, 1/4W, Comp	A-B	CB-472-10%	R-76-4.7K
R521	22 K Ω , 10%, 1/4W, Comp	A-B	CB-223-10%	R-76-22K
R522	22 K Ω , 10%, 1/4W, Comp	A-B	CB-223-10%	R-76-22K
R523	22 K Ω , 10%, 1/4W, Comp	A-B	CB-223-10%	R-76-22K
R524	22 K Ω , 10%, 1/4W, Comp	A-B	CB-223-10%	R-76-22K
R525	22 K Ω , 10%, 1/4W, Comp	A-B	CB-223-10%	R-76-22K
R526	4.7 K Ω , 10%, 1/4W, Comp	A-B	CB-472-10%	R-76-4.7K
R527	10 K Ω , 10%, 1/4W, Comp	A-B	CB-103-10%	R-76-10K
R528	4.7 K Ω , 10%, 1/4W, Comp	A-B	CB-472-10%	R-76-4.7K
R529	4.7 K Ω , 10%, 1/4W, Comp	A-B	CB-472-10%	R-76-4.7K
R530	4.7 K Ω , 10%, 1/4W, Comp	A-B	CB-472-10%	R-76-4.7K
R531	4.7 K Ω , 10%, 1/4W, Comp	A-B	CB-472-10%	R-76-4.7K
R532	10 K Ω , 10%, 1/4W, Comp	A-B	CB-103-10%	R-76-10K
R533	4.7 K Ω , 10%, 1/4W, Comp	A-B	CB-472-10%	R-76-4.7K
R534	4.7 K Ω , 10%, 1/4W, Comp	A-B	CB-472-10%	R-76-4.7K
R535	220 Ω , 10%, 1/4W, Comp	A-B	CB-220-10%	R-76-220
R536	100 K Ω , 10%, 1/4W, Comp	A-B	CB-103-10%	R-76-100K
R537	10 K Ω , 10%, 1/4W, Comp	A-B	CB-103-10%	R-76-10K
R538	4.7 K Ω , 10%, 1/4W, Comp	A-B	CB-472-10%	R-76-4.7K
R539	1 K Ω , 10%, 1/4W, Comp	A-B	CB-102-10%	R-76-1K
R540	22 K Ω , 10%, 1/4W, Comp	A-B	CB-223-10%	R-76-22K

Model 7503
Replaceable Parts List (Continued)

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.
RESISTORS (Continued)				
R541	47 Ω , 10%, 1/4W, Comp.	A-B	CB-470-10%	R-76-47
R542	4.7 K Ω , 10%, 1/4W, Comp.	A-B	CB-472-10%	R-76-4.7K
R543	470 Ω , 10%, 1/4W, Comp.	A-B	CB-471-10%	R-76-470
R544	10 K Ω , 10%, 1/4W, Comp.	A-B	CB-103-10%	R-76-10K
R545	15 Ω , 3%, 3W, WW	OHM	4400-15 Ω	R-92-15
R546	150 Ω , 10%, 1/4W, Comp.	A-B	CB-151-10%	R-76-150
SWITCHES AND TEST POINTS				
S501	Switch, pushbutton	CUT	SA1BV20	SW-380
S502	Switch, pushbutton	CUT	SA1BV20	SW-380
S503	Switch, Rotary Selector.	DAVEN	1111-A-A	SW-391
TP501	Test Point	KI	--	24249A
INTEGRATED CIRCUITS				
U501	Digital Clock, 28-pin DIP.	NAT	MM5309N	IC-124
U502	Quad Exclusive OR Gate (TTL), 14-pin DIP	NAT	DM7486N	IC-116
U503	Hex Inverters TTL, 14-pin DIP.	TEXAS	SN7404N	IC-33
U504	Quad 2-Input, Pos AND, 14-pin DIP. . . .	TEXAS	SN7408N	IC-94
U505	Quad 2-Input OR Gate (TTL), 14-pin DIP .	NAT	DM7432N	IC-115
U506	Bistable Latches, 16-pin DIP	TEXAS	SN7475N	IC-36
U507	Bistable Latches, 16-pin DIP	TEXAS	SN7475N	IC-36
U508	Bistable Latches, 16-pin DIP	TEXAS	SN7475N	IC-36
U509	Bistable Latches, 16-pin DIP	TEXAS	SN7475N	IC-36
U510	Positive NAND Gates.	TEXAS	SN7401	IC-47
U511	Dual Flip-Flop, 14-pin DIP	TEXAS	SN7474N	IC-31
U512	Hex Inverters, 14-pin DIP.	TEXAS	SN7405N	IC-45
U513	Positive NAND Gates, Quad 2-Input, 14-pin DIP	TEXAS	SN7400N	IC-38
U514	Positive NAND Gates, Quad 2-Input, 14-pin DIP	TEXAS	SN7400N	IC-38
U515	Positive NAND Gates, Quad 2-Input, 14-pin DIP	TEXAS	SN7400N	IC-38
U516	Positive NAND Gates, Quad 2-Input, 14-pin DIP	TEXAS	SN7400N	IC-38
VR501	Voltage Regulator, +5V, Case T0-220. . .	FAIR	UGH7805393	IC-93

Model 7504
Replaceable Parts List (PC-385)

CAPACITORS

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.
C601	0.01 μ F, 16V, CerD.	CENLB	UK16-103	C-238-.01M
C602	0.01 μ F, 16V, CerD.	CENLB	UK16-103	C-238-.01M
C603	0.01 μ F, 16V, CerD.	CENLB	UK16-103	C-238-.01M
C604	0.01 μ F, 16V, CerD.	CENLB	UK16-103	C-238-.01M
C605	0.01 μ F, 16V, CerD.	CENLB	UK16-103	C-238-.01M
C606	0.01 μ F, 16V, CerD.	CENLB	UK16-103	C-238-.01M
C607	10 μ F, 20V, 10%, ETT.	COMP	TSD120106A	C-204-10M
C608	0.33 μ F, 50V, Ceramic Film.	ERIE	8131050651334M	C-237-.33M
C609	0.01 μ F, 16V, CerD.	CENLB	UK16-103	C-238-.01M
C610	0.01 μ F, 16V, CerD.	CENLB	UK16-103	C-238-.01M

DIODES

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.
CR601	Rectifier, 75mA, 75V.	TEXAS	1N914	RF-28
CR602	Rectifier, 75mA, 75V.	TEXAS	1N914	RF-28

CONNECTORS

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.
J601	Not Used	--	--	--
J602	Receptacle, 50-pins - Mates with CS-271 .	AMP	205211-1	CS-269
P601	Card-edge, part of PC-385	--	--	--
P602	Not Used	--	--	--

RESISTORS

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.
R601	10 K Ω , 10%, 1/4W, Comp.	A-B	CB-103-10%	R-76-10K
R602	10 K Ω , 10%, 1/4W, Comp.	A-B	CB-103-10%	R-76-10K
R603	10 K Ω , 10%, 1/4W, Comp.	A-B	CB-103-10%	R-76-10K
R604	10 K Ω , 10%, 1/4W, Comp.	A-B	CB-103-10%	R-76-10K
R605	10 K Ω , 10%, 1/4W, Comp.	A-B	CB-103-10%	R-76-10K
R606	10 K Ω , 10%, 1/4W, Comp.	A-B	CB-103-10%	R-76-10K
R607	10 K Ω , 10%, 1/4W, Comp.	A-B	CB-103-10%	R-76-10K
R608	10 K Ω , 10%, 1/4W, Comp.	A-B	CB-103-10%	R-76-10K
R609	10 K Ω , 10%, 1/4W, Comp.	A-B	CB-103-10%	R-76-10K
R610	10 K Ω , 10%, 1/4W, Comp.	A-B	CB-103-10%	R-76-10K
R611	10 K Ω , 10%, 1/4W, Comp.	A-B	CB-103-10%	R-76-10K
R612	10 K Ω , 10%, 1/4W, Comp.	A-B	CB-103-10%	R-76-10K
R613	10 K Ω , 10%, 1/4W, Comp.	A-B	CB-103-10%	R-76-10K
R614	10 K Ω , 10%, 1/4W, Comp.	A-B	CB-103-10%	R-76-10K
R615	10 K Ω , 10%, 1/4W, Comp.	A-B	CB-103-10%	R-76-10K

Model 7504
Replaceable Parts List (Continued)

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.
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RESISTORS (Cont'd)

R616	10 K Ω , 10%, 1/4W, Comp.	A-B	CB-103-10%	R-76-10K
R617	10 K Ω , 10%, 1/4W, Comp.	A-B	CB-103-10%	R-76-10K
R618	10 K Ω , 10%, 1/4W, Comp.	A-B	CB-103-10%	R-76-10K

SWITCHES

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.
S601	Switch, Toggle, SPDT.	ALCO	MST-105D	SW-236
S602	Switch, pushbutton.	CUT	SA1BV20	SW-380
S603	Switch, Rotary (Range).	AMP	435123-1	SW-387
S604	Switch, Rotary (Range).	AMP	435123-1	SW-387
S605	Switch, Rotary (Range).	AMP	435123-1	SW-387
S606	Switch, Rotary (Range).	AMP	435123-1	SW-387

INTEGRATED CIRCUITS

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.
U601	Positive NAND Gates, Quad 2-Input, 14- pin DIP	TEXAS	SN7400N	IC-38
U602	Decade Counters, 14-Pin DIP	TEXAS	SN7490N	IC-37
U603	Decade Counters, 14-Pin DIP	TEXAS	SN7490N	IC-37
U604	Decade Counters, 14-Pin DIP	TEXAS	SN7490N	IC-37
U605	Decade Counters, 14-Pin DIP	TEXAS	SN7490N	IC-37
U606	Positive NOR Gates, 14-Pin DIP.	TEXAS	SN7402N	IC-32
U607	Positive NOR Gates, 14-Pin DIP.	TEXAS	SN7402N	IC-32
U608	Positive NOR Gates, 14-Pin DIP.	TEXAS	SN7402N	IC-32
U609	Positive NOR Gates, 14-Pin DIP.	TEXAS	SN7402N	IC-32
U610	Positive NOR Gates, 14-Pin DIP.	TEXAS	SN7402N	IC-32
U611	Positive NOR Gates, 14-Pin DIP.	TEXAS	SN7402N	IC-32
U612	8-Input Positive NAND Gate.	MOT	MC7430P	IC-126

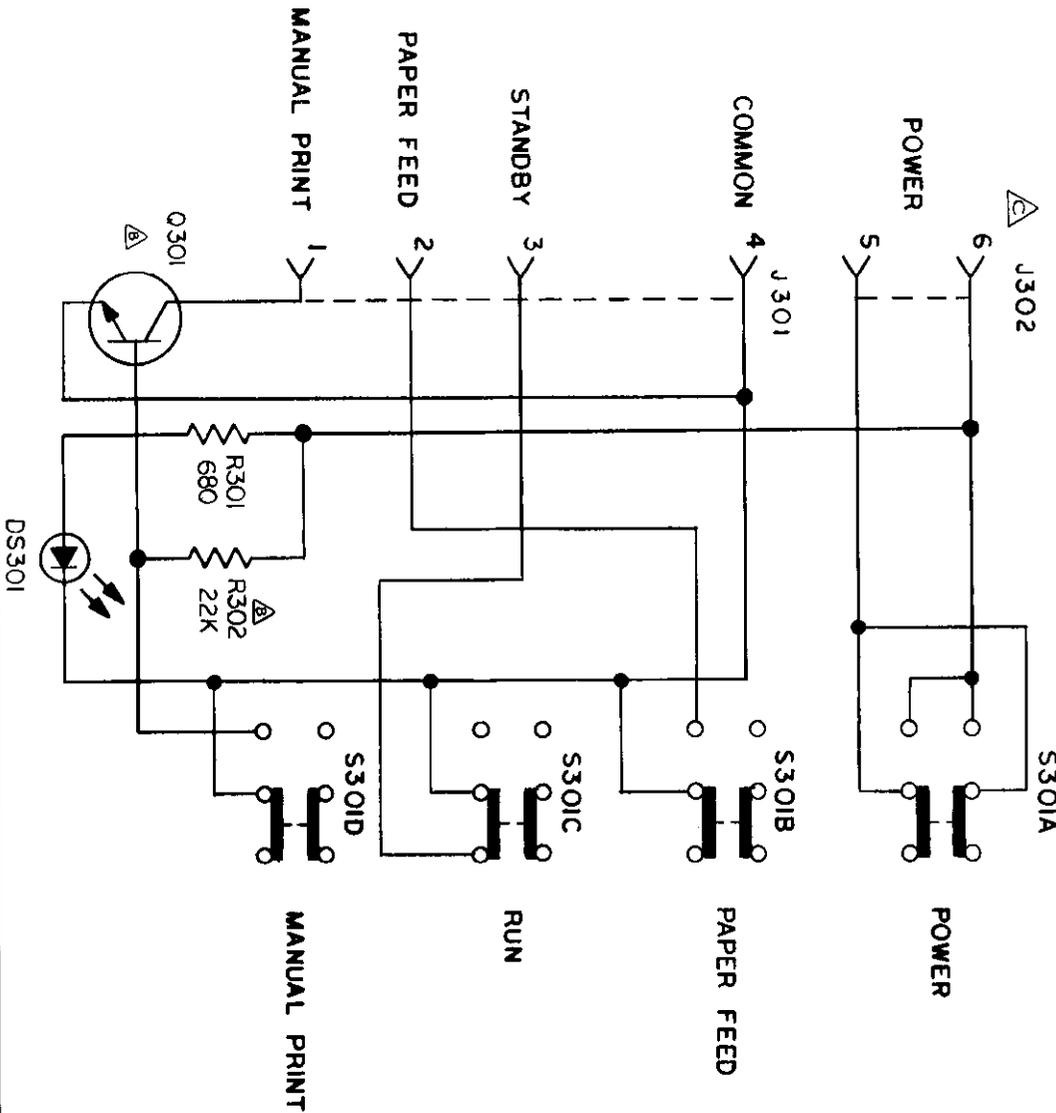
REGULATOR

Circuit Desig.	Description	Mfr. Code	Mfr. Desig.	Keithley Part No.
VR601	Voltage Regulator, +5V, Case T0-220 . . .	FAIR	UGH7805393	IC-93

TABLE 7-1.
Cross-Reference of Manufacturers

ABREV	NAME AND ADDRESS	ABREV	NAME AND ADDRESS
A-B	Allen-Bradley Corp. Milwaukee, WI 53204	FUSE	Bussman Mfg. (Fusetron) St. Louis, MO 63107
ALCO	Alco Electronic Products Inc. North Andover, MA 01845	GE	General Electric Company Syracuse, NY 13201
AMP	Amp Inc. Harrisburg, PA 17105	KEMET	Union Carbide/Cmpnts Dept G/KEMET Div. Greenville, SC 29606
AMPRX	Amperex Elk Grove Village, IL 60007	KI	Keithley Instruments, Inc. Cleveland, OH 44139
C-W	Continental-Wirt Electronics Corp. Warminster, PA 18974	MOLEX	Molex Downers Grove, IL 60515
CENLB	Centralab Division Milwaukee, WI 53201	MON	Monsanto Elec. Instruments West Caldwell, NJ 07006
COMP1	Components, Inc. Beddeford, ME 04005	MOT	Motorola Semiconductor Products Phoenix, AZ 85008
CTS	CTS Corporation Elkhart, IN 46514	NAT	National Semiconductor Corp. Santa Clara, CA 95051
CUT	Cutler-Hammer Milwaukee, WI 53216	OHM	Ohmite Mfg. Skokie, IL 60076
DALE	Dale Electronics Columbus, NE 68601	RCA	RCA Corporation Moorestown, NJ 08050
DAVEN	McGraw Edison Co., Elecs Div. Manchester, NH 03103	S-C	Switchcraft, Inc. Chicago, IL 60630
ERIE	Erie Technological Products, Inc. Erie, PA 16512	SEIKO	C. Itoh Electronics, Inc. New York, NY 10017
FAIR	Fairchild Camera & Instrument Corp. Mountain View, CA 94043	SIG	Signetics Corp. Sunnyvale, CA 94086
		TEXAS	Texas Instruments, Inc. Dallas, TX 75231

27243B
NO.



- NOTES:
1. ALL RESISTOR VALUES ARE IN OHMS.
 2. ALL PUSH-BUTTON SWITCH CONTACTS ARE SHOWN IN THE PUSH-BUTTON OUT POSITION.

HIGHEST SCHEMATIC DESIGNATIONS USED		
J302	S301	DS301
R302	Q301	

SCHEMATIC DESIGNATIONS NOT USED		

LTR.	ECCO NO.	REVISION	DATE
A	4669	RELEASED	2-18-75
B	4790	ADDED Q301 & R302	4-14-75
C	4976	ADDED J302	9-8-75

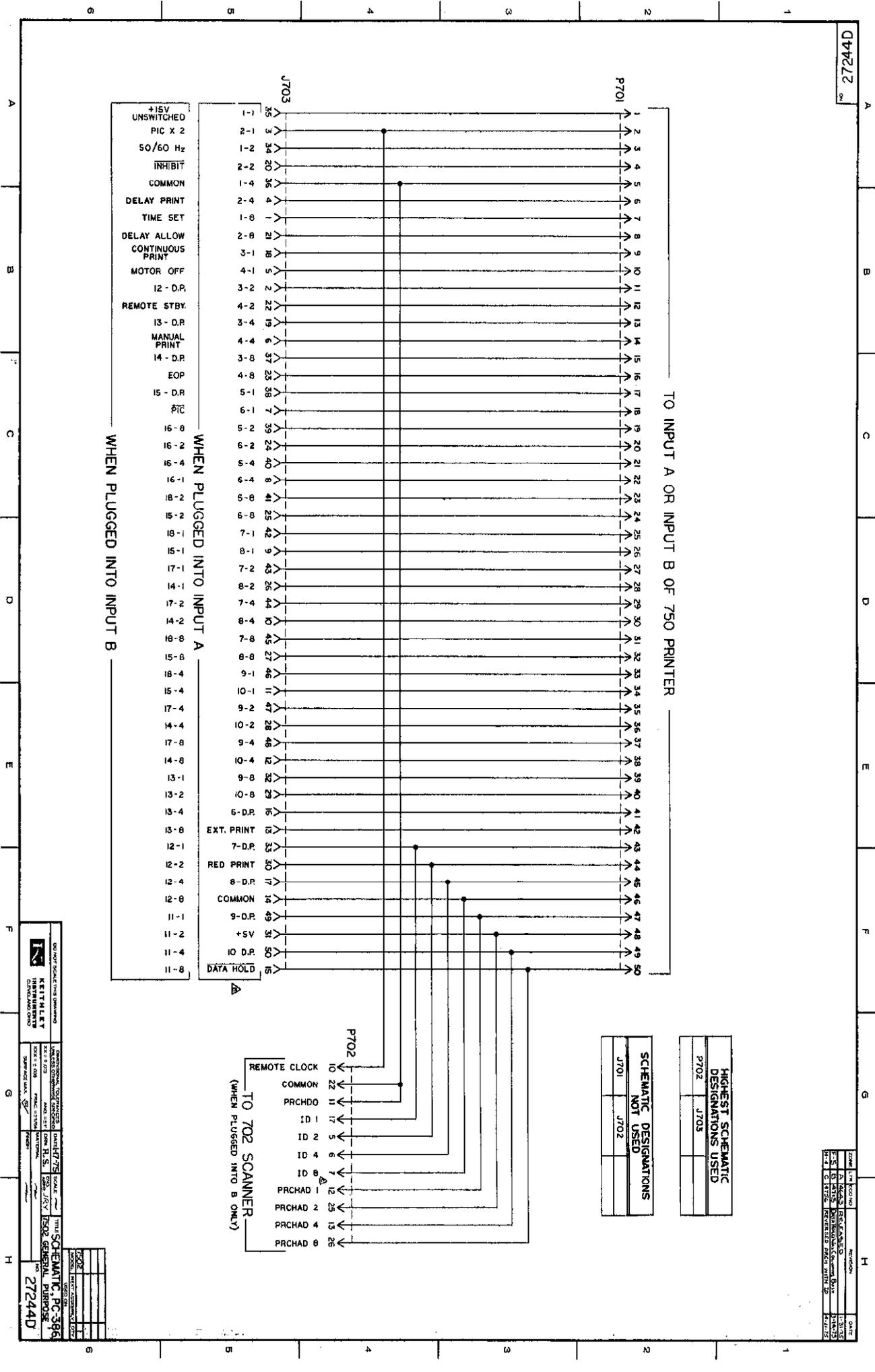
DO NOT SCALE THIS DRAWING

KEITHLEY INSTRUMENTS
CLEVELAND, OHIO

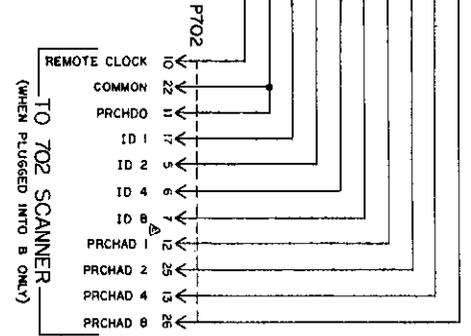
DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED
 XX = ± 0.015 ANG. = ± 1°
 XXX = ± 0.005 FRAC. = ± 1/64
 SURFACE MAX.

DATE: 2/20/75	SCALE:	TITLE: SCHEMATIC, PC-380
DRN: R.S.	ENG: JRY	MODEL: 750
MATERIAL:	FINISH:	NO. USED ON: 1
		NEXT ASSEMBLY QTY: 1

NO. 27243B



- UNSWITCHED
- PIC X 2
- 50/60 Hz
- INHIBIT
- COMMON
- DELAY PRINT
- TIME SET
- DELAY ALLOW
- CONTINUOUS PRINT
- MOTOR OFF
- 12 - D.P.
- REMOTE STBY.
- 13 - D.P.
- MANUAL PRINT
- 14 - D.P.
- EOP
- 15 - D.P.
- PIC
- EXT. PRINT
- RED PRINT
- COMMON
- 9 - D.P.
- 10 D.P.
- DATA HOLD



HIGHEST SCHEMATIC DESIGNATIONS USED

P702	J705
P701	J702

SCHEMATIC DESIGNATIONS NOT USED

J701	J702
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DO NOT SCALE THIS DRAWING

KEITH H. LEY
INSTRUMENTS
CLEVELAND, OHIO

AMERICAN SCHEMATIC SYSTEMS
1000 EAST 12TH STREET
CLEVELAND, OHIO 44115

DATE: 11/15/75
DRAWN BY: J.S.
CHECKED BY: J.S.
SCALE: AS SHOWN

NO. 27244D

ZONE	DATE	REVISION
1	11/15/75	1
2	11/15/75	2
3	11/15/75	3
4	11/15/75	4
5	11/15/75	5

INSTRUCTION MANUAL

Model 750 Printer

APPENDIX A. MODEL 7503 PRINTER CLOCK.

Description: The Model 7503 is an accessory plug-in for the Model 750, that prints the time in 24 hour format in the left five columns (14, 15, 16, 17, 18). The Model 7503 is factory wired to print hours and minutes HH:MM, however it may be rewired in the field to print minutes and seconds MM:SS. The Model 7503 must be installed in I/O "B" only.

Initial Switch Settings: The Control-Min. Switch (S503) has six positions: 1, 2, 10, 20, 60, and 120. These positions represent the time interval between Time Printout as shown in Table A-1.

TABLE A-1.
Time Printout Versus Setting of Control-Min.

Position of S503	Time Printout Jumpers W501 through W504 installed	Time Printout Jumpers W505 through W508 installed
1	Once per minute	Once per second
2	Once every even minute	Once every even second
10	Once every 10 minutes	Once every 10 seconds
20	Once every 20 minutes	Once every 20 seconds
60	Once every 60 minutes	Once every 60 seconds
120	Once every 120 minutes	Once every 120 seconds

NOTE

See Figure 18 for locations of jumpers W501 through W504 and W505 through W508.

Clock Control Feature: The Model 7503 can be set to enable the Print Command on the Model 750 at specific intervals. When the Control-Min Switch (S503) is set to 1 the printer will operate independent of time printout (see Figure 18). Other settings of S503 will enable the Print Command on the Model 750 as shown in Table A-2. If jumper "B" is installed, between pin 50 and pin 43 on J502, the printer will operate independent of time printout. If jumper "A" is installed between pin 49 and pin 43 on J502, the printer is Enabled once every minute when S503 is set to 1.

TABLE A-2.
Print Command Enable

Position of S503	Print Command Enabled (Jumpers "A" and "B" not installed)	Print Command Enabled (Jumper "A" installed)	Print Command Enabled (Jumper "B" installed)
1	Independent of time printout	Once every 1 minute	Independent of time printout
2	Once every even minute	Once every even minute	Independent of time printout
10	Once every 10 minutes	Once every 10 minutes	Independent of time printout
20	Once every 20 minutes	Once every 20 minutes	Independent of time printout
60	Once every 60 minutes	Once every 60 minutes	Independent of time printout
120	Once every 120 minutes	Once every 120 minutes	Independent of time printout

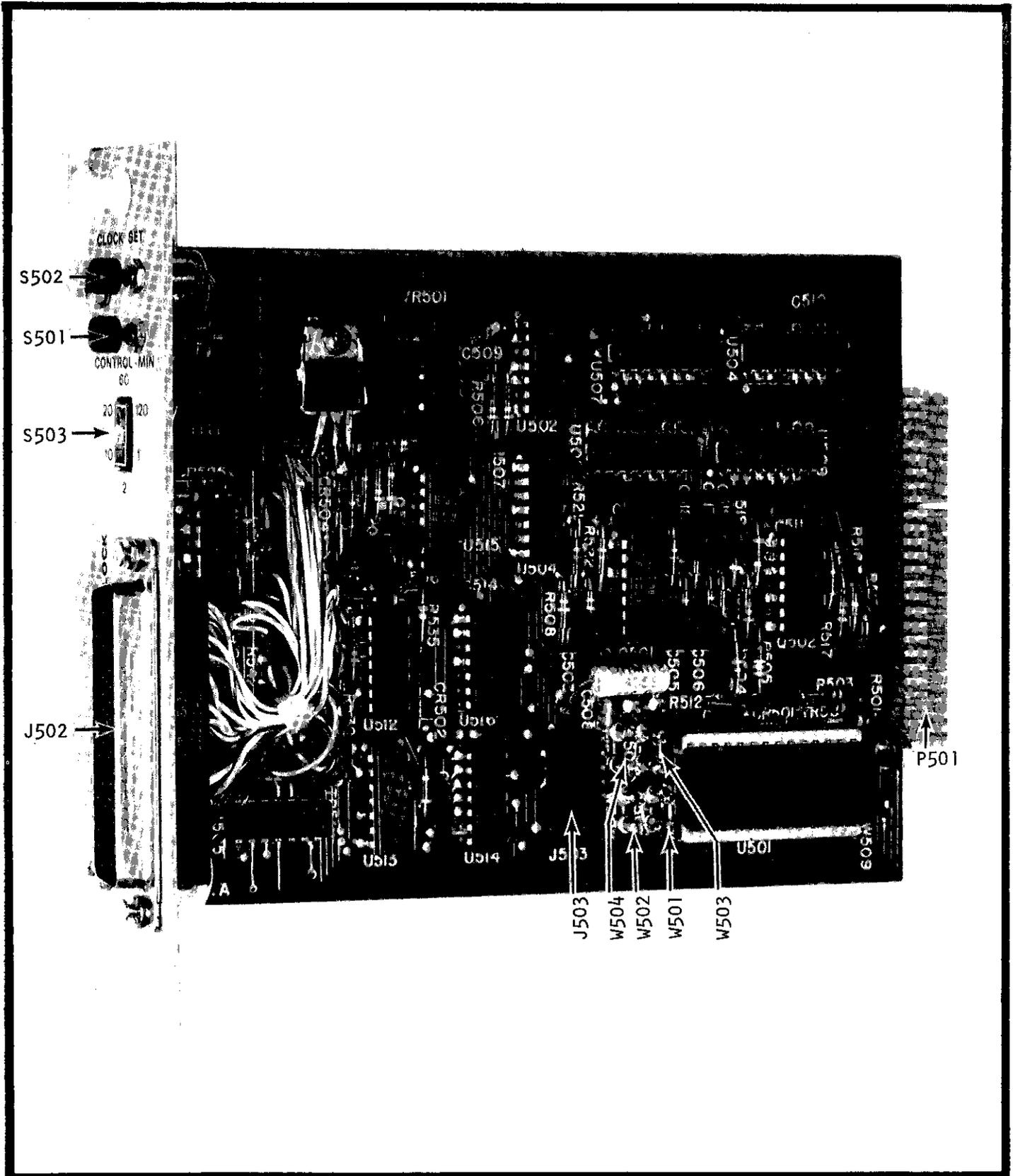


FIGURE 18. Controls and Modifications to Model 7503.

INSTRUCTION MANUAL
Model 750 Printer

Example Operation of Model 750 with Model 7503.

a. How to Set the Time.

1. Release the RUN switch on the Model 750 (to place the Model 750 in Standby Mode).
2. Depress Clock Set "HRS" pushbutton. When "HRS" is depressed the printer will print at a rate of approximately one line per second (advances 1 hour per sec). Observe the time that is printed out. Release the "HRS" pushbutton when the print out is approximately 1 hour before the actual time.
3. Depress and release MANUAL PRINT to obtain a printout of the time. (If the time print out runs past the actual time to be set, continue to depress "HRS" until the clock goes through another 24 hour cycle.)
4. If it is necessary to advance the clock further to obtain the actual time, momentarily depress "MIN". When "MIN" is depressed the printer will print at a rate of approximately one line per second (advances one minute per second).
5. Depress and release MANUAL PRINT to obtain a printout of the time.

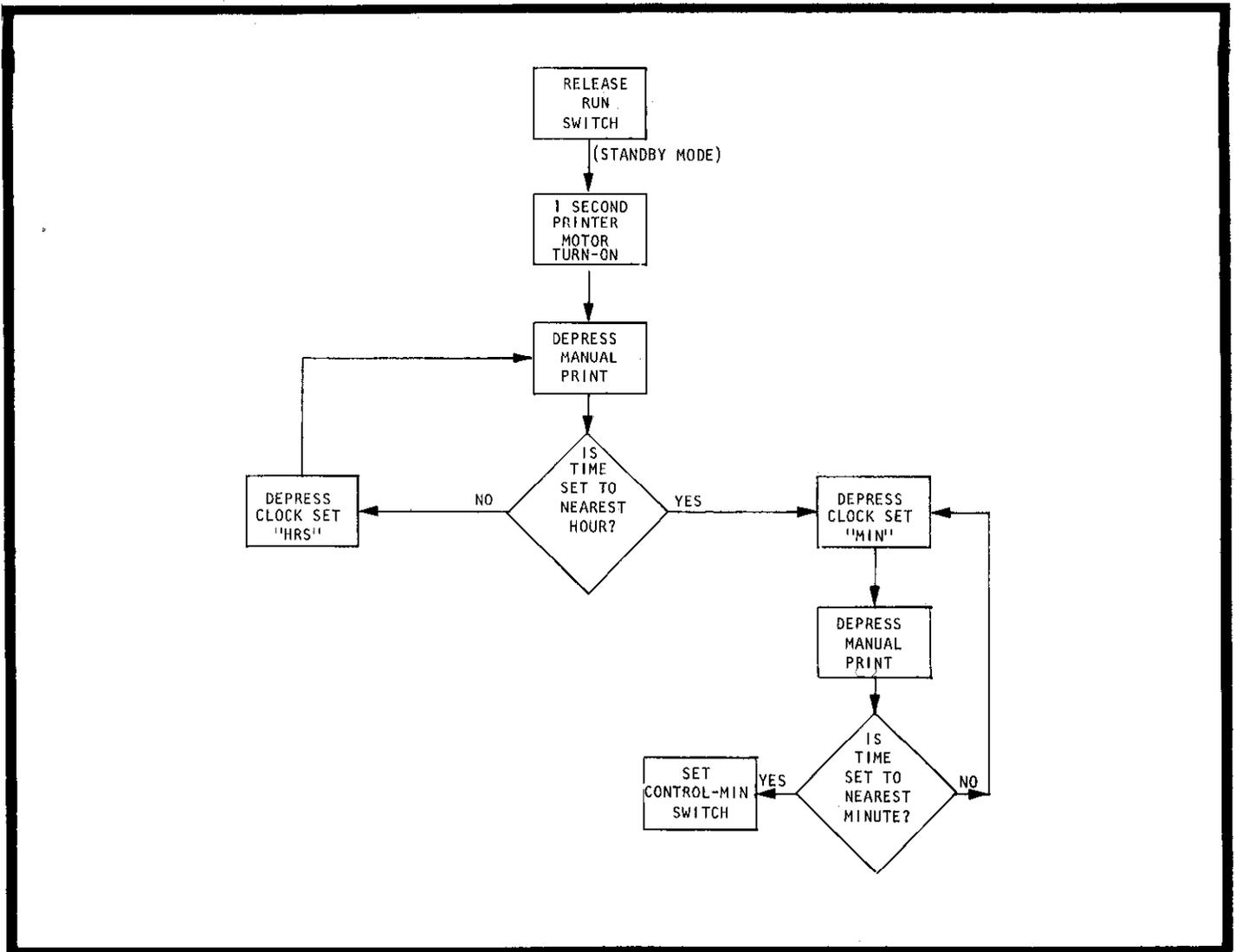


FIGURE 19. Diagram of Time Set For Model 7503.

b. How to Print the Time and Data Every 10 Minutes.

1. Release the RUN switch on the Model 750.
2. Set the Model 750 Print Interval Control to the desired Print Interval.
3. Set the Control-Min. Switch on the Model 7503 to 10. (This procedure assumes that neither jumpers "A" or "B" are installed.)
4. Set the time as described in the preceding paragraph a.
5. Depress RUN.

NOTE

The Model 750 will print the time (HH:MM) and data (up to 50 channels if the Model 750 is used in a 50 channel Datalogger system), every 10 minutes. The Model 750 printer motor is turned off between printouts. However, at any time when the MANUAL PRINT pushbutton is depressed the Model 750 printer motor will turn on and a single print command (prints time, channel and data) will be enabled. If the RUN switch is released, the Model 750 printer motor will turn on and remain on as long as RUN is released.

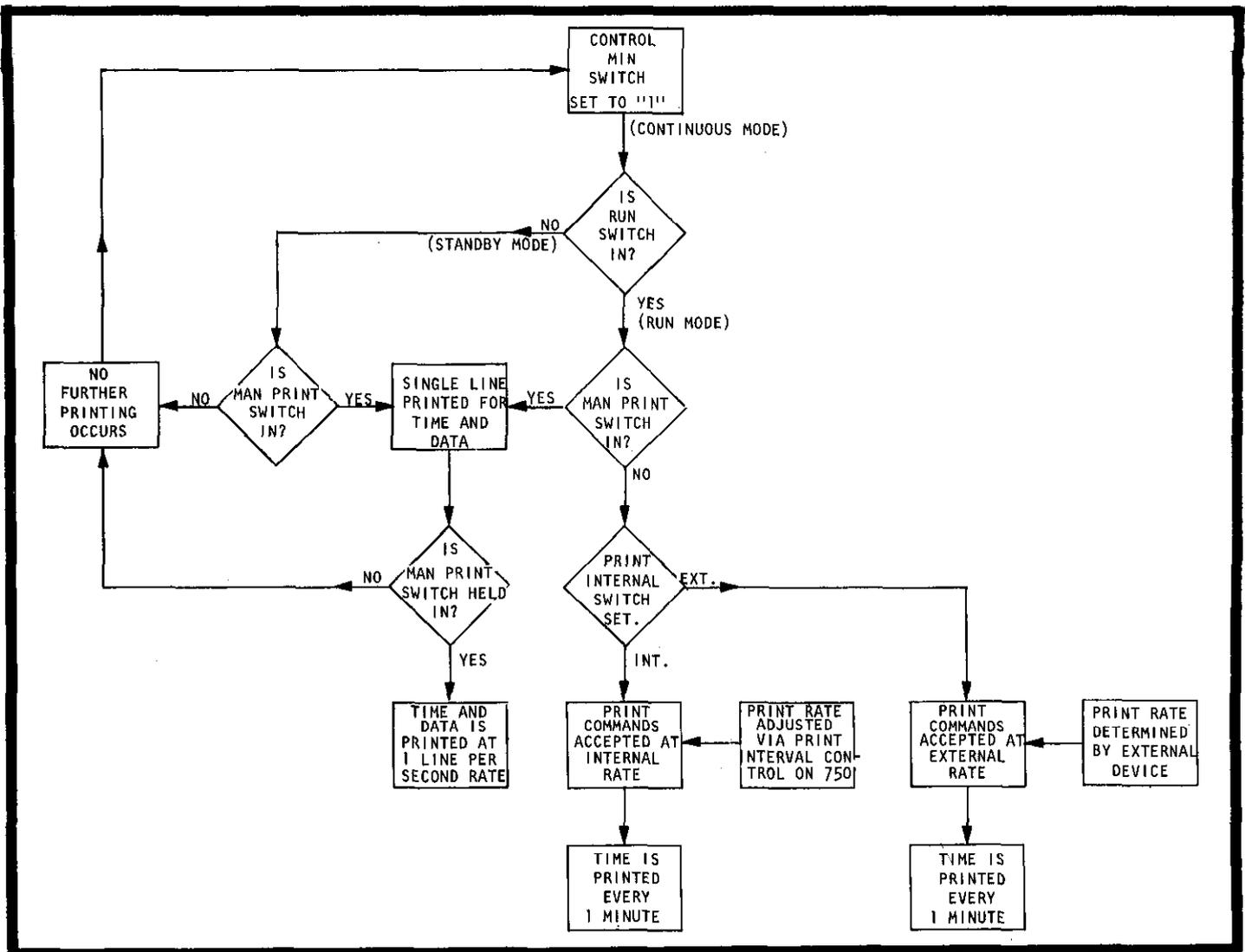


FIGURE 20. Diagram of Model 750/7503 Operation.

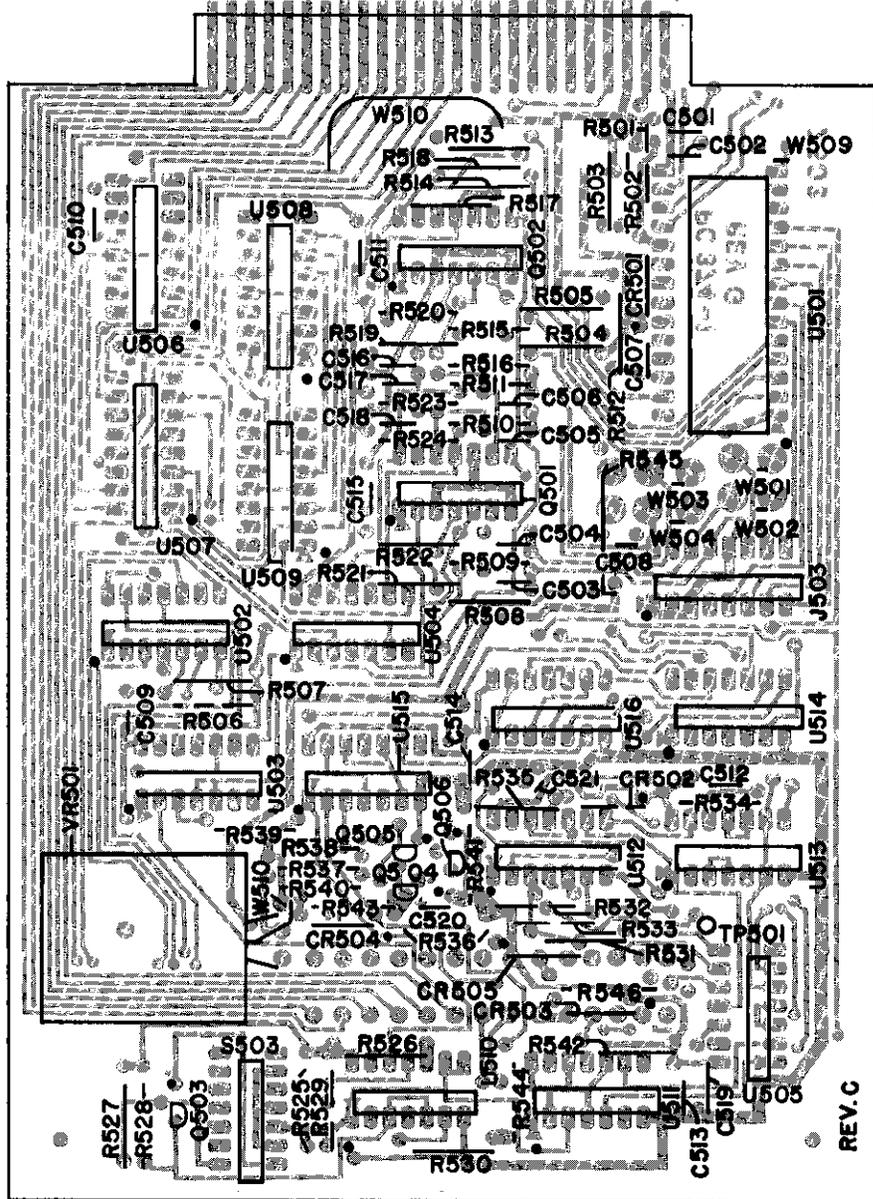


FIGURE 21. Component Layout of PC-374.

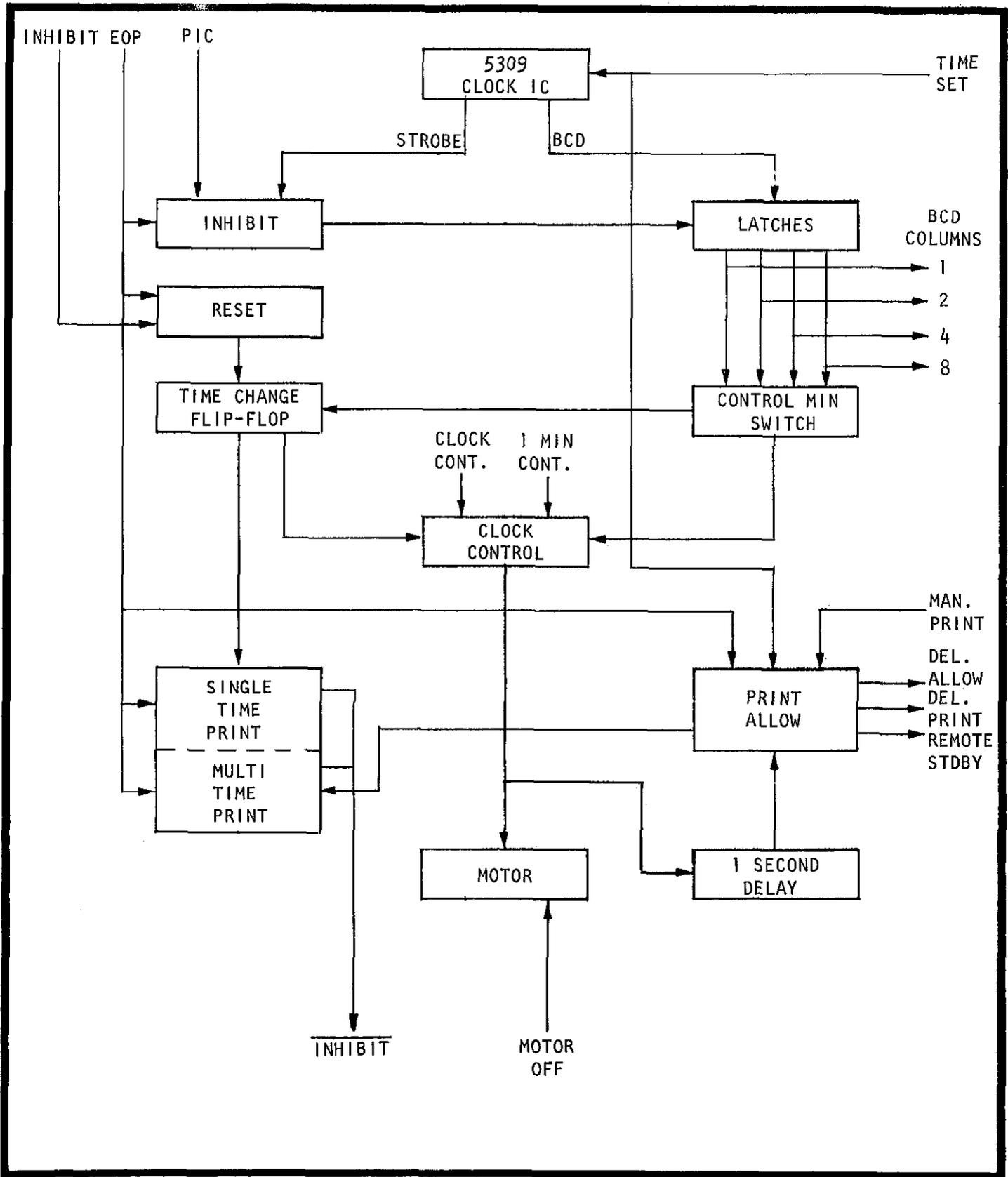


FIGURE 22. Block Diagram of Model 7503.

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Model 750 Printer

Circuit Operation:

The type 5309 Clock's BCD outputs are multiplexed into the BCD latches. The outputs of the latches are presented to columns 14, 15, 17, and 18 for time printing. The outputs of the latches are also monitored for desired changes in time with the Control-Min rotary switch.

The Clock will place the 750 in Standby and turn the 750 motor off, until the selected time increment occurs. The time increment is selected with the Control-Min rotary switch. Increments of 1, 2, 10, 20, 60, and 120 minutes may be selected.

In the 1 minute position the Clock operates normally, printing the time at every change in 1 minute time. When the Control-Min switch is set to the 2 minute position or higher, the Clock Control Block is enabled. This will turn the motor off and place the 750 in Remote Standby and set the Delay Print and Allow outputs.

When in the 1 minute position and a change in time occurs, a Flip-Flop is set which then allows the time to be printed. At the end of the print cycle, the Flip-Flop is reset. The Flip-Flop output sets the Single-Time Print Block which allows the time to be printed at the next print cycle. PIC and EOP are applied to the Inhibit Block which holds the last time data at the BCD outputs of the latches until the Clock Logic is reset. The EOP pulse resets the Time Change F/F and the Single-Time Print Block. This resets the Clock logic and readies the logic for the next change in time.

When Manual Print or Clock Set is operated, the Print Allow Block sets the Multi-Time Print Block and the time will be printed with every print cycle. The EOP signal will reset the Multi-Time Print Block after the Manual Print or Clock Set pushbuttons are released.

When in the 2 minute position or higher (Clock Control mode), and a time change occurs that coincides with the Control-Min. Switch setting, the F/F sets the Single-Time Print Block and also sets the Clock Control Block, which allows the motor to start up and enables the 1 Sec. Delay Block. The 1 second delay is to ensure that the motor comes up to speed prior to release of Remote Standby. When Remote Standby is released, the 750 will accept the next Print Command from an internal or external source.

At the end of the Print Cycle, the EOP pulse will reset the Time Change F/F and Single-Time Print Block. It will also reset the Remote Standby output, and return the 750 to Standby Mode.

If the Inhibit Line is enabled, the EOP pulse will reset the Single-Time Print Block, but will not reset the Time Change F/F. The 750 motor will remain on and the 750 will continue to accept print commands. When the Inhibit Line is released, the next EOP pulse will reset the Time Change F/F, turn the motor off, and place the 750 in Standby mode.

When the Control-Min. switch is set to the 1 minute position, the 750 may be placed in Clock Control by connecting "1 Min. Cont." (pin 49) to Common (pin 43).

When the Control-Min switch is set to the 2 minute or higher position, the Clock Control mode may be inhibited and the Clock allowed to operate normally by connecting Clock Control (pin 50) to Common (pin 43).

When in Clock Control, print commands are inhibited and if Manual Print is depressed, one line of data will be printed. If Run is released, the motor will turn on to allow paper advance.

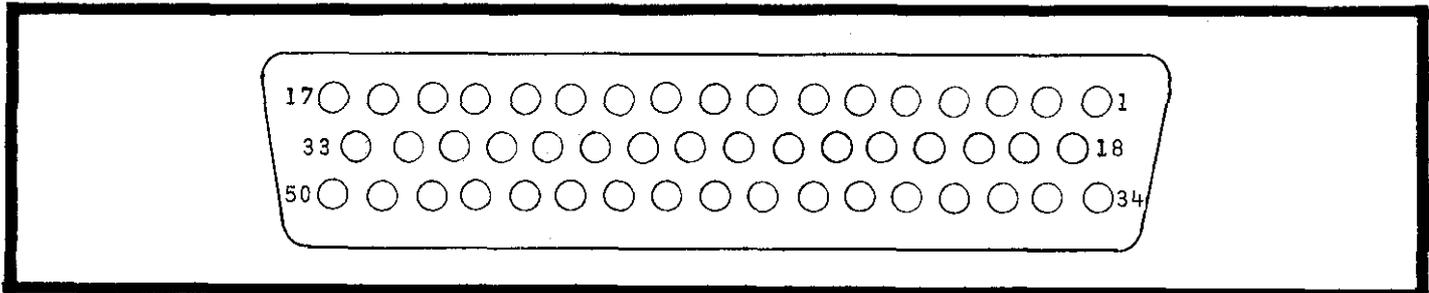


FIGURE 23. Pin Identification for Connector J502.

DIGITAL OUTPUT CONNECTOR:

Clock Control Inputs, Printer Control outputs and Data Columns are available on rear panel miniature "D" type connector on rear panel. (See Figure 23.)

TABLE A-3
Pin Identification For J502.

Pin #	FUNCT.	Pin #	FUNCT.
1	N/C	26	N/C
2	N/C	27	N/C
3	INHIBIT 2	28	INHIBIT 1
4	N/C	29	11-2
5	12-2	30	11-8
6	12-4	31	RESET
7	12-8	32	HRS SET
8	N/C	33	MIN SET
9	N/C	34	PIC
10	PIC X2	35	EOP
11	COM	36	+5
12	11-1	37	MOTOR OFF
13	11-4	38	N/C
14	13-1	39	N/C
15	13-4	40	N/C
16	13-8	41	N/C
17	13-2	42	N/C
18	N/C	43	COM
19	N/C	44	N/C
20	N/C	45	N/C
21	12-1	46	N/C
22	COM	47	N/C
23	N/C	48	REMOTE STANDBY
24	N/C	49	T MIN CON
25	N/C	50	CLOCK CONTROL

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Model 750 Printer

DIGITAL OUTPUTS.

COMMON (Pins 11, 22, 43) Logic Circuit Low

+5V (Pin 36) This output furnishes +5V \pm .15V at up to 100 mA.

PIC (Pin 34) Same as 750 (3 TTL loads).

EOP (Pin 35) Same as 750 (3 TTL loads).

PIC X2 (Pin 10) Same as 750 (same loads).

DIGITAL INPUTS.

HRS SET (Pin 32) - Logic "0" causes time to be advanced at a rate of 1 hr. per second (1.6 mA sink current).

MINS SET (Pin 33) Logic "0" causes time to be advanced at a rate of 1 minute per second (1.6 mA sink current).

MOTOR OFF (Pin 37). This input requires a Logic "0" to cause the Model 750 motor to turn off. Thus eliminating unnecessary wear on the unit. Sinking current for Logic "0" is 2.6 mA. Motor start up time is approximately 1 sec. after Logic "1" is applied.

INHIBIT 1 (Pin 8). Logic "0" causes time change F/F from being reset. When in Clock Control this will inhibit the shut down at the end of a single Print Cycle. The Printer will operate normally until this line is released, at which time the F/F will reset and the Clock Control Cycle will operate again. While inhibit 1 is at a logic low, time changes will not be passed on to the Printer. Only after the F/F is reset and set again will the time be printed. This input is not compatible with standard TTL outputs. Instantaneous sink current is 33 mA, due to input R.C.

INHIBIT 2 (Pin 3). Performs the same as INHIBIT 1, only in the inverted mode. INHIBIT 2 is functional only when INHIBIT 1 is held at a Logic "0", otherwise INHIBIT 2 itself is clamped at a Logic "0". (2.1 mA sink current). This input is TTL compatible.

RESET (Pin 31). Logic "0" causes clock to be reset to 00:00. Clock will not advance until this line is returned to a Logic "1" (.1 mA sink current).

REMOTE STDBY (Pin 48). Logic "1" causes the Printer to be placed in the STANDBY Mode. (Source current 2 mA.)

1 MIN CONTROL (Pin 49). Logic "0" enables Clock Control operation in the 1 min. switch position. Sink Current - 2.6 mA.

CLOCK CONTROL (Pin 50). Logic "0" Inhibits Clock Control operation for all switch settings. (2.6 mA sink current.)

DATA COLUMNS

11-1	Pin 12	12-1	Pin 21	13-1	Pin 14
11-2	Pin 29	12-2	Pin 5	13-2	Pin 17
11-4	Pin 13	12-4	Pin 6	13-4	Pin 15
11-8	Pin 30	12-8	Pin 7	13-8	Pin 16

Columns 11 and 12 are used with the Model 702 Scanner for Channel Data.

Column 13 is uncommitted. Sink current = 3.2 mA per input.

Optional Clock Display Output: The Model 7503 provides a 16-pin output connector (J503) for connection to a seven-segment LED display (not furnished). The connector is a 16-pin DIP receptacle. The mating connector is a 16-pin DIP plug*. (See Figure 18.)

*This part is manufactured by Circuit Assembly Corp., 3169 Red Hill Ave., Costa Mesa, CA 92626. Order by manufacturer's part number CA-16P-04NW.

APPENDIX B. MODEL 7504 SEQUENCE COUNTER

Description: The Model 7504 is an accessory plug-in for the Model 750 that numbers successive printer cycles from 0000 to 9999. Switches on the plug-in board may be pre-set for a specific total count. A Reset pushbutton resets the counter to 0000. An Inhibit toggle switch inhibits the counter operation. The Model 7504 must be installed in I/O "B" only.

Initial Switch Settings:

1. Set the Toggle switch (S601) to off (down position). (See Figure 24)
2. Set the rotary switches S603, S604, S605, and S606 to the desired total count.

NOTE

If all rotary switches are set to 0 (or a total count of 0000), the Model 750 will be in Remote Standby mode (the same effect as when the RUN switch is released).

Example Operation: (See Figure 26)

1. Set the Toggle switch (S601) to ON (up position).
2. Momentarily depress RESET (S602).

NOTE

Each time a print command occurs, the Model 7504 counter circuit advances by one count. When the counter circuit total equals the preset total as set by the rotary switches, the Model 750 is placed in Remote Standby. In Remote Standby, neither an external nor internal print command will have an effect on the Model 750. However, if MANUAL PRINT is depressed the Model 750 will be taken out of Remote Standby and the Model 750 will respond to external or internal print commands.

Automatic Reset Modification: To enable the Model 7504 to reset automatically to 0000 and initiate a new count cycle automatically, place a jumper between connector J602, pins 43 (EOC) and 40 (REMOTE RESET).

TABLE B-1.
Rear Connector Inputs/Outputs/Functions

11-1	(Pin 12)	12-1	(Pin 21)
11-2	(Pin 29)	12-2	(Pin 5)
11-4	(Pin 13)	12-4	(Pin 6)
11-8	(Pin 30)	12-8	(Pin 7)
13-1	(Pin 14)	14-1	(Pin 45)
13-2	(Pin 17)	14-2	(Pin 47)
13-4	(Pin 15)	14-4	(Pin 44)
13-8	(Pin 16)	14-8	(Pin 46)
NOTE: Columns 11 and 12 are used to Print Scanner Box and channel information. Columns 13 and 14 are uncommitted.			

Floating Decimals 1.6 mA/input line

12-DP (Pin 42) 13-DP (Pin 41) 14-DP (Pin 39)

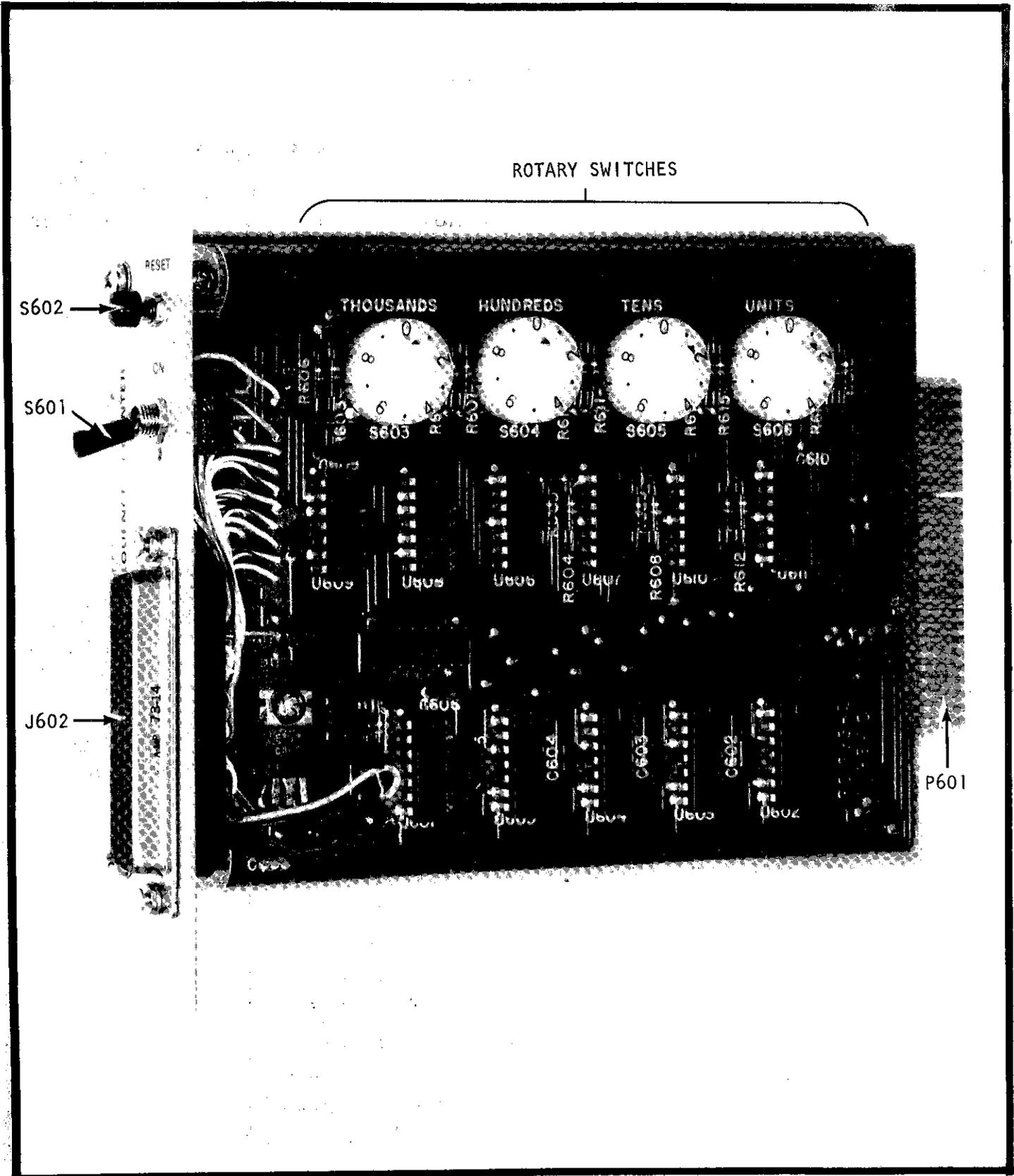


FIGURE 24. Model 7504 Controls and Connectors.

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Model 750 Printer

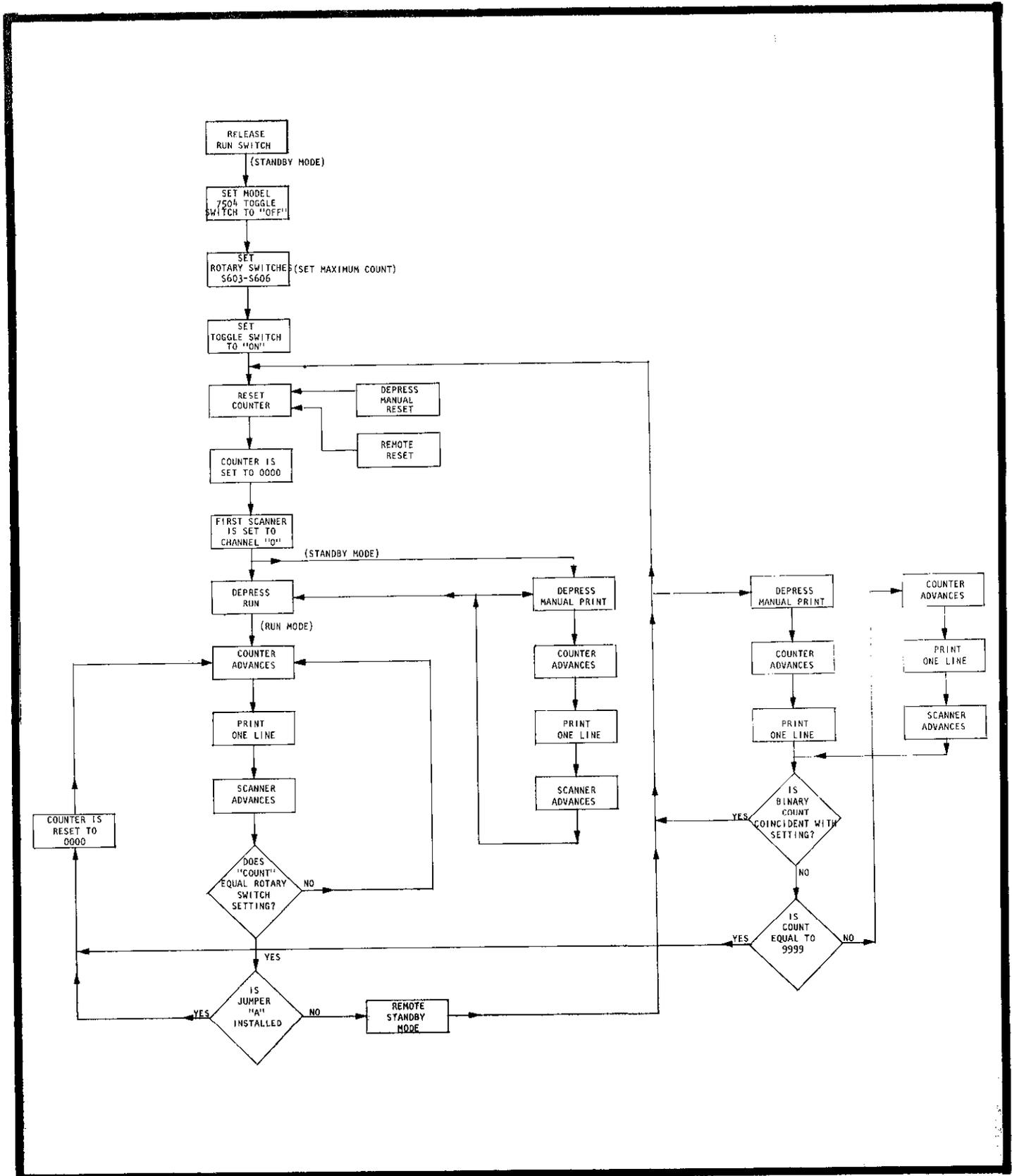


FIGURE 25. Diagram of Model 750/7504 Operation.

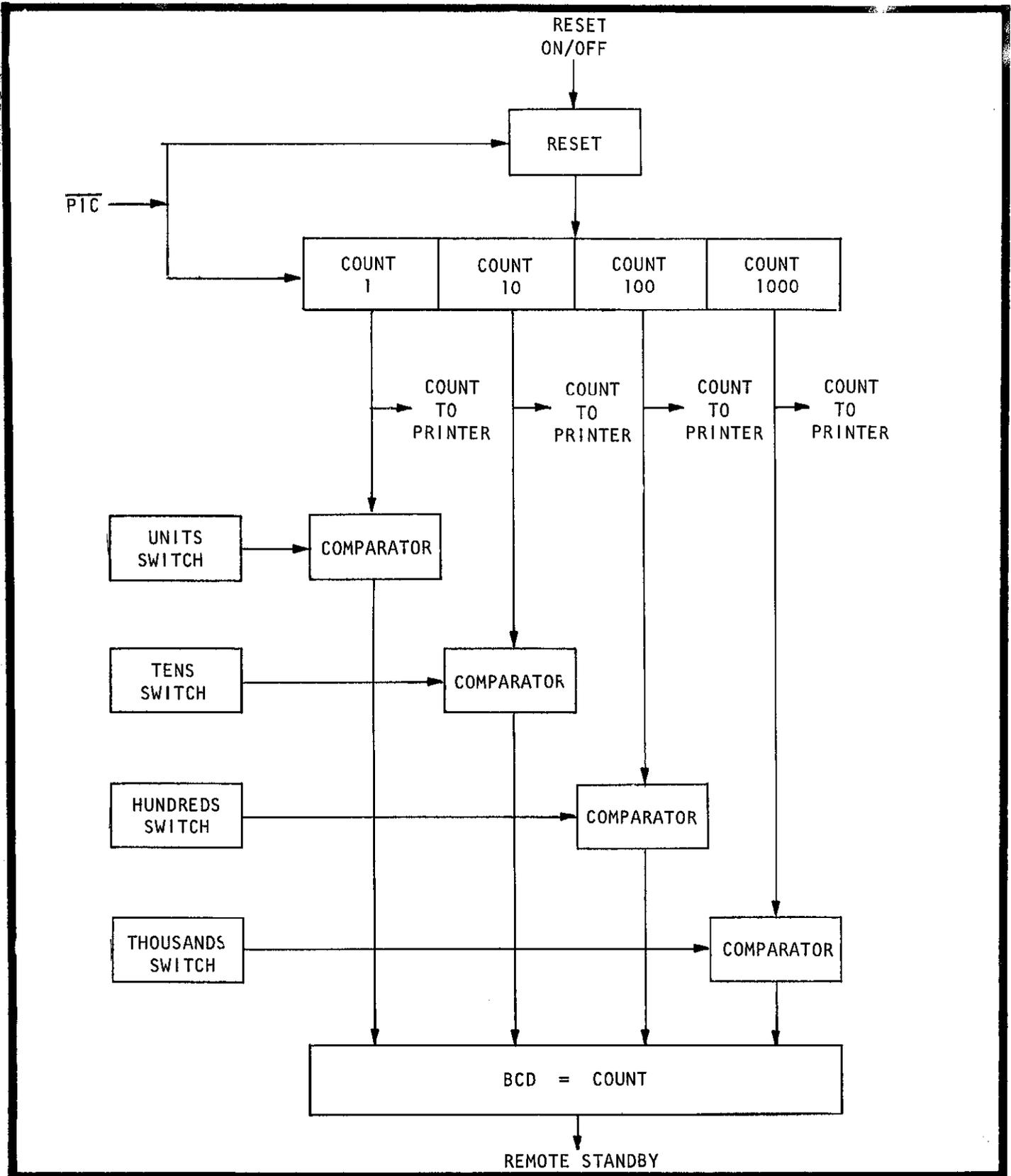


FIGURE 26. Block Diagram of the Model 7504.

INSTRUCTION MANUAL

Model 750 Printer

Counter Inputs:

INHIBIT/RESET (Pin 20). To common resets counter to 0000. If held to common the counter will be inhibited. 2.1 mA sink current.

Counter Outputs:

END OF COUNT (EOC Pin 38). When preset count sequence number is reached this line goes to a Logic "1". (9 TTL loads)

EOC (Pin 40). Same as Pin 38 except this line goes to a Logic "0". This line may be tied to the reset input to cause Printer to automatically recycle continuously. (8 TTL loads)

Printer Controls:

MOTOR OFF (Pin 37). To common causes motor voltages to be removed and the motor to stop. (Release of the front panel run switch supersedes motor off and turns the motor on.) (2.6 mA sink)

PTC (Pin 34). 375 ms low time during which the Printer is recording data. 400 ms for Red Print. (2 TTL loads)

EOP (Pin 35). 3 ms high pulse which denotes Print Cycle is finished and resets Printer for new cycle. (9 TTL loads)

COM (Pin 11, 22, 43)

+5V @ 100 mA (Pin 36)

Circuit Operation: (See Figure 26)

Printer in Cycle (PIC) are applied to the first of 4 binary counters, Count 1. The output of Count 1 is applied to the input of Count 10, etc., up to 1000. The PIC is also applied to the Reset Block which will insure that if a Reset or Command is applied, during a Print Cycle the counters will not reset until the count sequence number is printed.

The 4 BCD switches and Count Blocks are applied to 4 comparator Blocks when the 4 count inputs are equal to the Switch settings the "BCD = COUNT" Block will enable an End of Count Signal.*

The End of Count will then inhibit the Printer via the Remote Standby input.

*NOTE

The Model 7504 comparators enable the End of Count Signal when the COUNT total is equivalent to the BCD rotary switch settings. For example if the rotary switches are set to 0005 the BCD equivalent for this setting is 0101. Therefore, the End of Count Signal will be enabled when the COUNT has a logical "1" in the 4 (base 2) and 1 (base 2) positions.

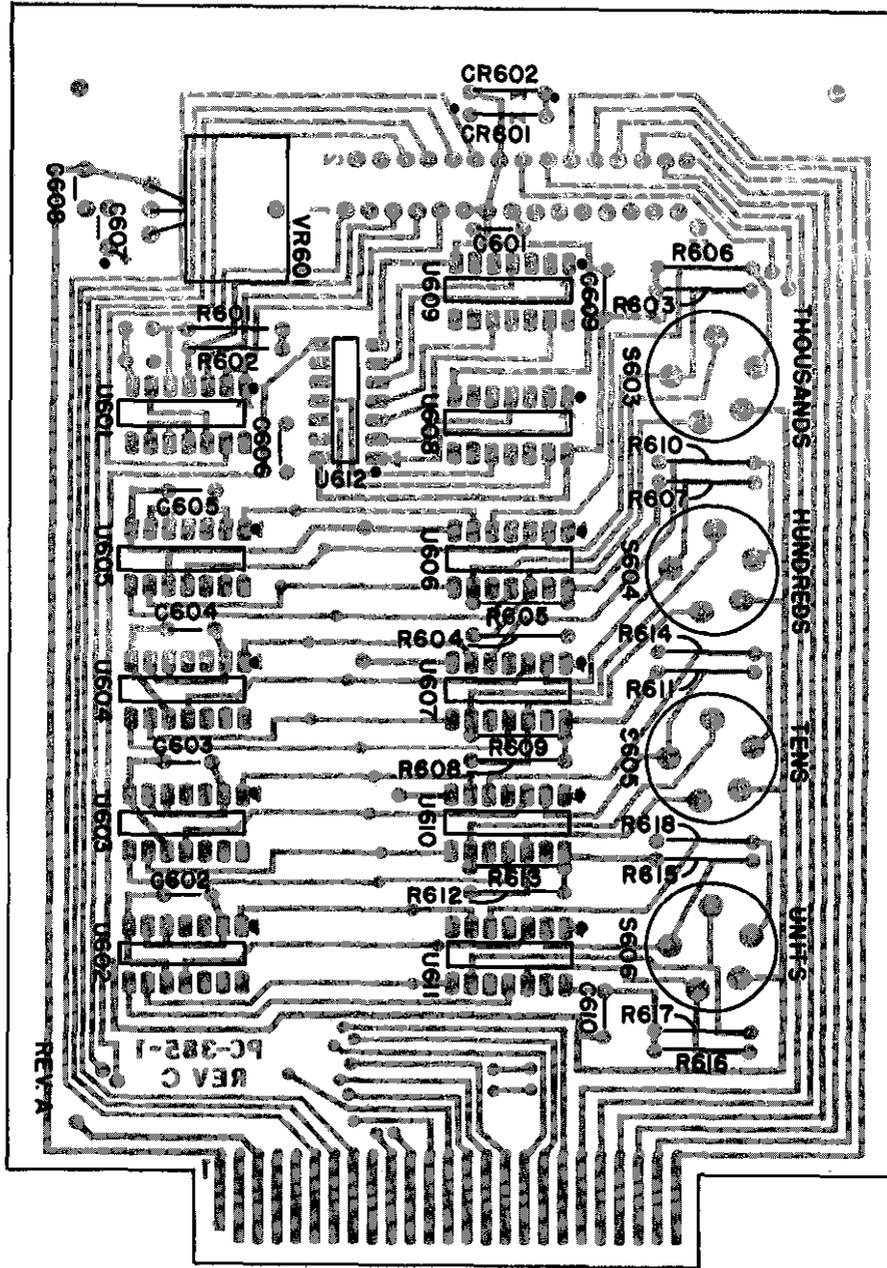


FIGURE 27. Component Layout of Model 7504 (PC-385).

APPENDIX C. MODEL 7502 PRINTER INPUT INTERFACE

Description: The Model 7502 is a general purpose Printer Input Interface. The Model 7502 may be plugged into either I/O "A" or I/O "B" on the Model 750 rear panel.

Connections to Model 7502. The Model 7502 provides two types of external connections; a SCANNER interface and a PRINTER interface. (See schematic 27244D.)

a. PRINTER Interface. This connector is a 50-pin AMP type 205211-1. The mating connector is a Keithley Part No. CS-271. The connector is designated as J703.

b. SCANNER Interface. This connector is a 26-pin 3M Electro Products Division Part No. 3429. Pin 4 has been removed to admit a "polarizing key" on mating System Interconnect Cables (Model 7021-2 or 7021-10). This connector is useful for Scanner/Printer data logging applications. The connector is designated as P702.

Printer Interface Signals When Installed at I/O "A". When the Model 7502 is installed at I/O "A" the signals at the PRINTER Interface connector are as shown in Table C-1. The SCANNER Interface connector cannot be used when the Model 7502 is installed at I/O "A".

TABLE C-1.
 PRINTER Interface Signals (For I/O "A")

Pin	Function	Pin	Function
1	1-8	26	8-2
2	3-2	27	8-8
3	2-1	28	10-2
4	2-4	29	10-8
5	4-2	30	RED PRINT
6	4-4	31	+5V
7	6-1	32	9-8
8	6-4	33	7-DP
9	8-1	34	1-2
10	8-4	35	1-1
11	10-1	36	1-4
12	10-4	37	3-8
13	EXTERNAL PRINT	38	5-1
14	COMMON	39	5-2
15	DATA HOLD	40	5-4
16	6-DP	41	5-8
17	8-DP	42	7-1
18	3-1	43	7-2
19	3-4	44	7-4
20	2-2	45	7-8
21	2-8	46	9-1
22	4-2	47	9-2
23	4-8	48	9-4
24	6-2	49	9-DP
25	6-8	50	10-DP

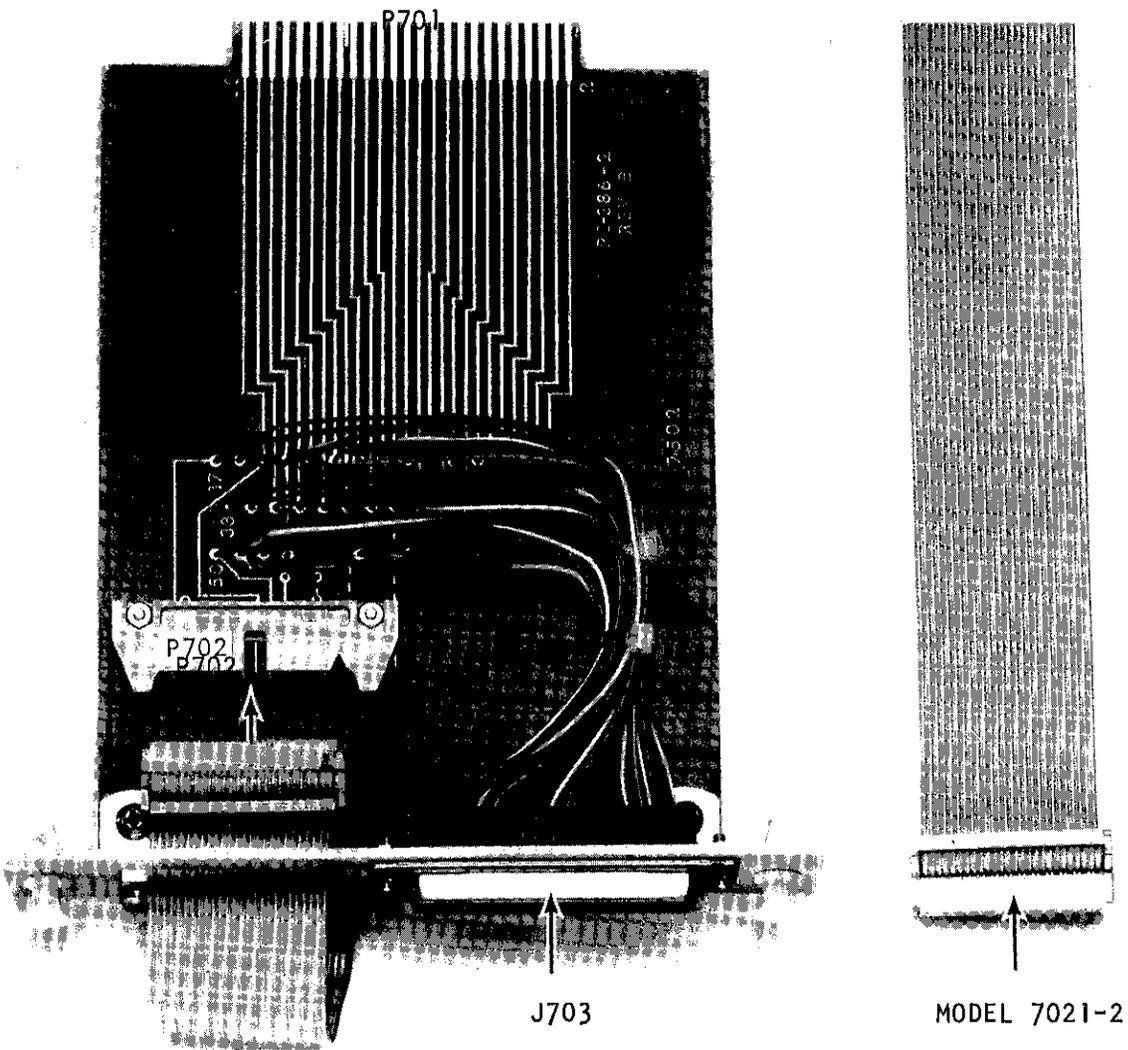


FIGURE 28. Model 7502 General Purpose Printer Input Interface.

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Printer Interface Signals When Installed at I/O "B". When the Model 7502 is installed at I/O "B" the signals at the PRINTER Interface connector are as shown in Table C-2. The SCANNER Interface connector may also be used to connect the Model 750 to a single scanner or multiple scanner system. The signals for the SCANNER Interface connector are as shown in Table C-3.

TABLE C-2.
PRINTER Interface Signals (For I/O "B")

Pin	Function	Pin	Function
1	TIME SET	26	14-1
2	12-DP	27	15-8
3	PIC X 2	28	14-4
4	DELAY PRINT	29	13-2
5	MOTOR OFF	30	12-2
6	MAN PRINT	31	11-2
7	PIC	32	13-1
8	16-1	33	12-1
9	15-1	34	50/60 Hz
10	14-2	35	+15V
11	15-4	36	COMMON
12	14-8	37	14-DP
13	13-8	38	15-DP
14	12-8	39	16-8
15	11-8	40	16-4
16	13-4	41	18-2
17	12-4	42	18-1
18	CONT PRINT	43	17-1
19	13-DP	44	17-2
20	INHIBIT	45	18-8
21	DELAY ALLOW	46	18-4
22	REMOTE STANDBY	47	17-4
23	EOP	48	17-8
24	16-2	49	11-1
25	15-2	50	11-4

TABLE C-3.
SCANNER Interface Signals (For I/O "B" only)

Pin No.	Name	Column	Remarks
1	N.C.	--	No Connection
2	N.C.	--	
3	N.C.	--	
4	N.C.	--	
5	ID 2	11-2	Identification of Scanner Unit
6	ID 4	11-4	Identification of Scanner Unit
7	ID 8	11-8	Identification of Scanner Unit
8	N.C.	--	
9	N.C.	--	
10	REMOTE CLOCK	PIC X2	Output to scanner REMOTE CLOCK
11	PRCHDO	COM	Enables "PRCHAD" Lines
12	PRCHAD 1	12-1	PResent CHannel Address-BCD
13	PRCHAD 4	12-4	PResent CHannel Address-BCD
14	N.C.	--	
15	N.C.	--	
16	N.C.	--	
17	ID 1	11-1	Identification of Scanner Unit
18	N.C.	--	
19	N.C.	--	
20	N.C.	--	
21	N.C.	--	
22	COMMON	COM	Digital Common
23	N.C.	--	
24	N.C.	--	
25	PRCHAD 2	12-2	PResent CHannel Address-BCD
26	PRCHAD 8	12-8	PResent CHannel Address-BCD

APPENDIX D. CHASSIS REPLACEABLE PARTS

TABLE D-1.
 Chassis Replaceable Parts

Description	Qty. Per Assembly	Keithley Part No.
Front Door (not stocked as assembled unit)	1	750-16B
... Panel, less handle	1	26682B
... Overlay, screened	1	26683B
... Handle (less color strip)	1	26695A
... Color Strip (for handle)	1	27235A
Control Panel (extrusion)	1	26671B
Overlay (for control panel)	1	26672A
Top Cover	1	26686C
Bottom Cover (assembly)	1	26706B
Cover (less tilt bail)	1	26685C
Foot Molding	4	24322B
Rubber Foot	4	FE-6
Left Side (extrusion)	1	26700C
Left Side Dress Panel	1	26687C
Handle	1	HH-18
... Hardware for handle	-	--
... Screw, phillips 6-32 x 3/8	4	--
... Kep nut, 6-32	4	--
Right Side (extrusion)	1	26701C
Right Side Dress Panel	1	26683C
Paper Tray (with glide)	1	26690B

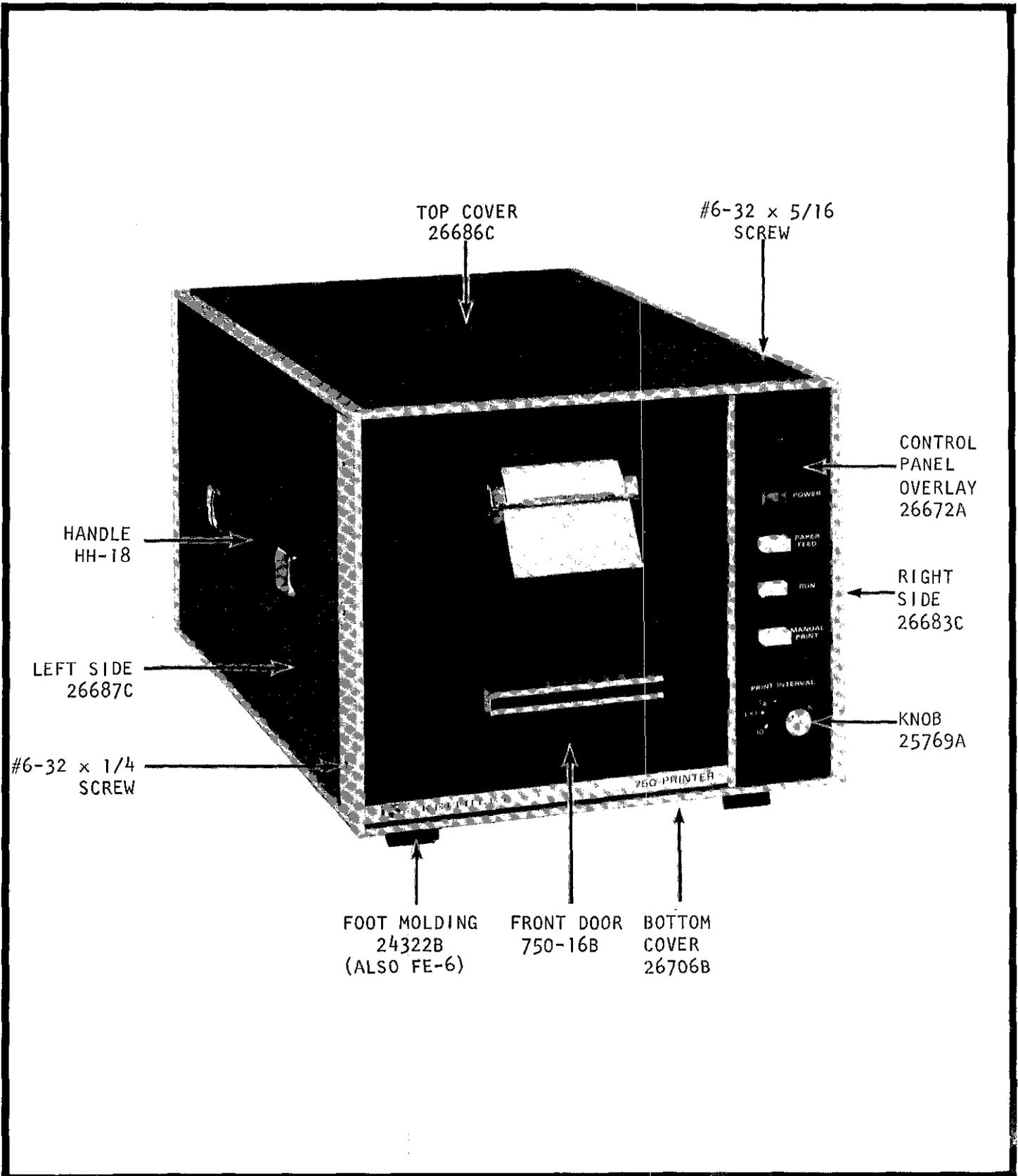


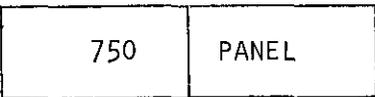
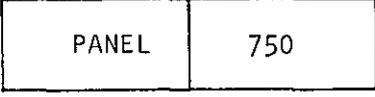
FIGURE 29. Chassis Parts Identification.

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APPENDIX E. RACK MOUNTING INSTRUCTIONS

General: The Model 750 may be rack mounted in various combinations with other instruments through the use of an appropriate Keithley rack mounting kit. The Model 750 chassis is designated as style "0" with a nominal 7" height.

TABLE E-1.
 Summary of Rack Mounting Configurations

Pictorial View	Configuration	Model No.
	750 + Panel (Figure 31)	1011
	Panel + 750 (Figure 31)	1011
	750 + 750 (Figure 32)	1012
	750 + 5-1/4" Instrument + Panel (Figure 34)	1015
	750 + 3-1/2" Instrument + Panel (Figure 33)	1014
	750 + two 3-1/2" Instruments (Figure 35)	1016

Assembly Instructions Common to All Configurations:

1. Before assembling the rack kit, determine the position of each instrument. Since the Model 750 can be mounted either on the right or the left, the instrument's position should be determined by the user's measurement and cabling considerations.
2. The "side dress" panels on both sides of the Model 750 must be removed. The left side (with handle) must be partially disassembled before the side dress can be removed.
3. Pry up the metal caps in two places on the handle to gain access to Phillips head screws holding the handle to the chassis.
4. Loosen and remove the screws to detach the handle.
5. Next, loosen (but do not remove) the three #10-32 Phillips head screws holding the side dress panels near the front of the instrument.
6. Slide the side dress panel (left side) toward the rear of the instrument to remove.
7. Loosen the three #10-32 Phillips head screws on the right side of the Model 750.
8. Slide the side dress panel (right side) toward the rear of the instrument to remove.
9. Remove the feet assembly and tilt bail from the bottom panel. The rubber feet must be pryed up to gain access to the Phillips screw holding each foot assembly to the chassis.
10. The original hardware, side dress panels, feet and tilt bail assemblies should be retained for future conversion back to bench mounting.
11. Proceed with the instructions for the specific rack mounting kit to be used.

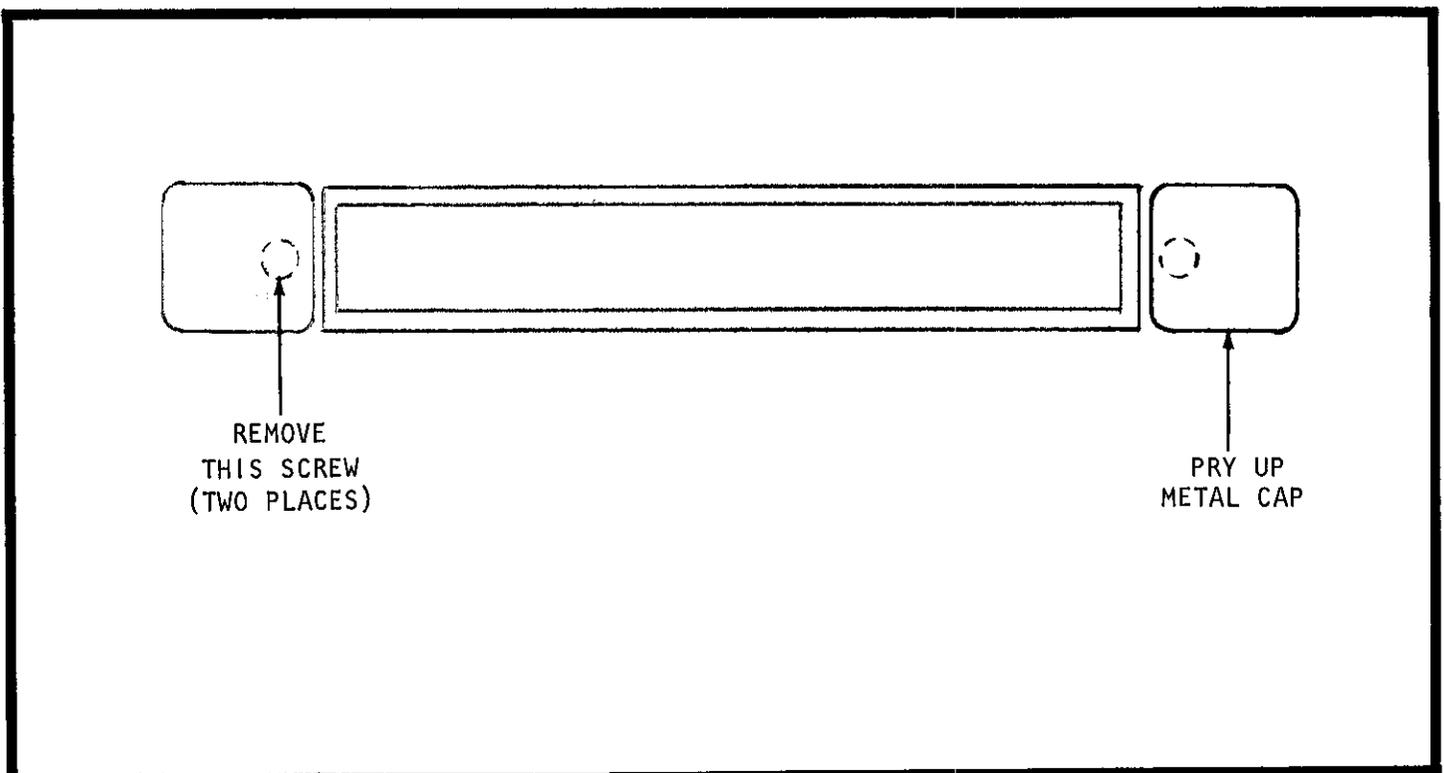


FIGURE 30. Handle Assembly For Model 750.

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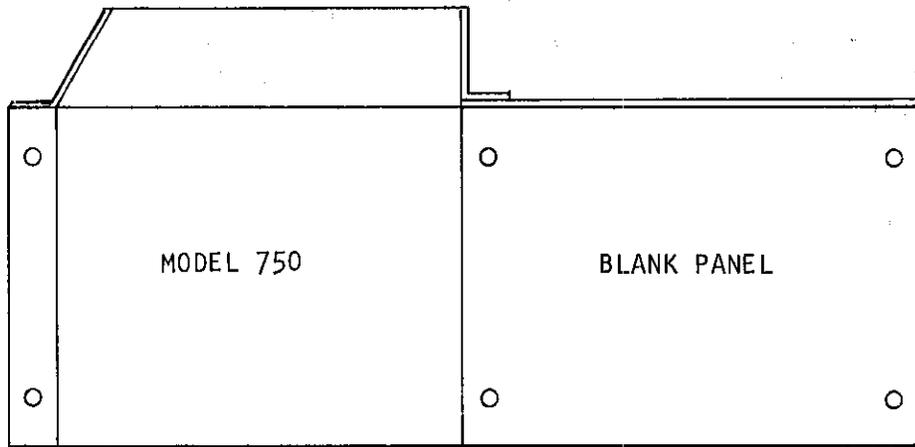
MODEL 1011 RACK MOUNTING KIT.

Description:

The Model 1011 is a single rack mounting kit with overall dimensions 7" high and 19" wide. The hardware included in this kit consists of two angle brackets, a blank panel, and other miscellaneous hardware.

Application:

The Model 1011 converts any half-rack style 10" instrument from bench mounting to rack mounting in a standard 19-inch rack. The Model 1011 can be used to mount instruments of 11" or 14" depth.



Parts List:

Item No.	Description	Qty. Req'd	Keithley Part No.	Illustration
22	Angle Bracket	1	26795C	
23	Angle Bracket (with staked nuts)	1	26763C	
24	Screw, #6-32 x 1/2, Phillips	4	--	
25	Screw, #6-32 x 5/8, Phillips	4	--	
26	Kep Nut, #6-32	4	--	
27	Screw, #8-32 x 5/8, Phillips	6	--	
28	Screw, #10-32 x 3/8, Socket	2	--	
29	Blank Panel	1	26765B	

Assembly Instructions:

1. Before assembling the rack kit, determine the position of the instrument. Since the instrument may be mounted on either the left or right side, its position should be determined by the user's measurement. The following instructions refer to the instrument mounted on the left side as shown in the illustration.
2. Remove the "side dress" panels on both sides of the instrument. For the Keithley Model 750, the handle which is mounted on the left side must be removed from the chassis before the side dress panel can be removed. The two metal caps which cover the handle screws must be pried up using a screwdriver blade or other similar tool. Then loosen and remove the two screws holding the handle to the chassis.
3. Loosen and remove three screws on each side of the instrument, near the front panel.
4. Slide the side dress panels on both sides toward the rear of the instrument to remove.
5. Attach an "angle bracket" (Item 22) to the left side of the instrument. Use three #8-32 Phillips screws (Item 27) in place of the original hardware. For 14" long instruments fasten the angle bracket using two #6-32 x 1/2" Phillips screws (Item 24). For 11" long instruments use two #6-32 x 5/8" Phillips (Item 25) screws and two #6-32 Kep nuts (Item 26).
6. Attach the remaining "angle bracket" (Item 23) to the right side using the same hardware as in step 5.
7. Attach the "blank panel" (Item 29) to the angle bracket using two #10-32 x 3/8 Socket screws (Item 28).
8. The feet and tilt bail assemblies may be removed from the bottom panel of the instrument if necessary. The rubber foot should be pried up to gain access to the screw holding the foot assembly.
9. The original hardware, side dress panels, feet and tilt bail assemblies should be retained for future conversion back to bench mounting.

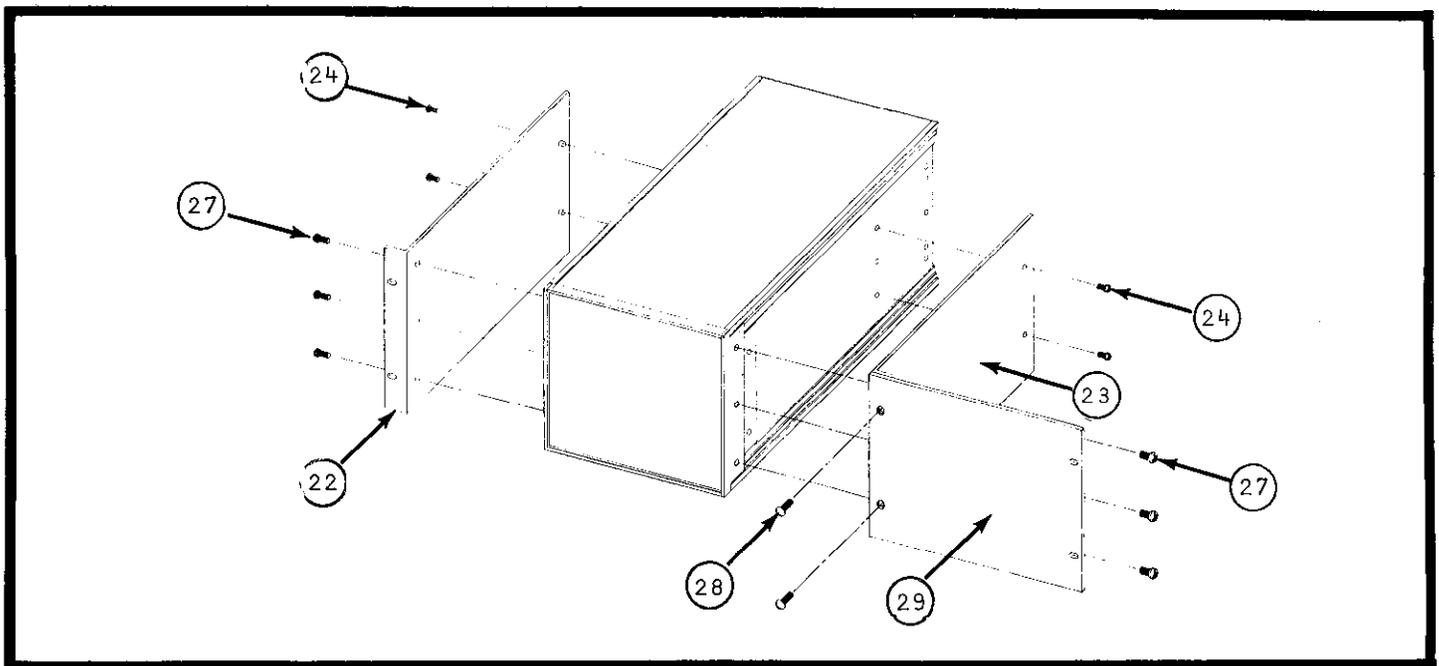


FIGURE 31. Model 1011 Rack Mounting Kit.

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MODEL 1012 DUAL RACK MOUNTING KIT

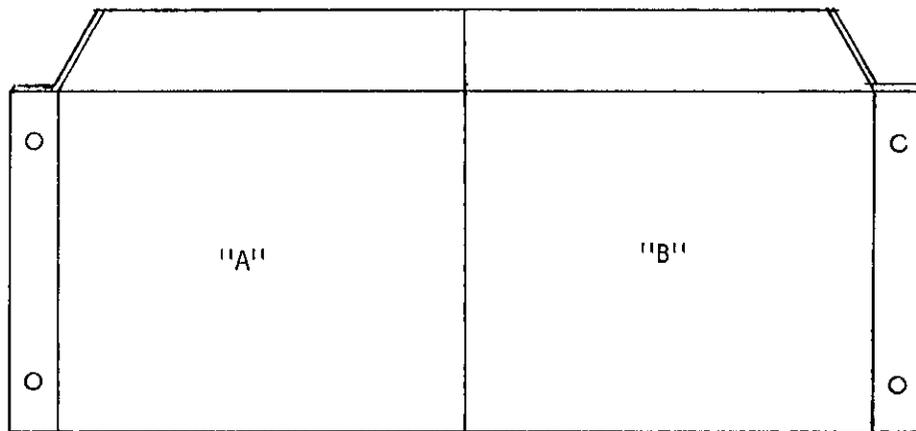
Description:

The Model 1012 is a dual rack mounting kit with overall dimensions 7 inches (178 mm) high and 19 inches (483 mm) wide. The hardware included in this kit consists of two Angle Brackets, and other miscellaneous hardware.

The Model 1012 Rack Mounting Kit can be used to mount instruments of 11 inch (279 mm) or 14 inch (356 mm) depth. The user should decide the position of the instrument to be rack mounted. The Assembly Instructions refer to instruments positioned as below and identified as instrument "A" and "B".

Application:

The Model 1012 converts any half-rack style 0 instrument from bench mounting to rack mounting in a standard 19-inch rack. The kit may also be used for rack mounting 19-inch full rack width instruments.



Item No.	Description	Qty Req'd	Keithley Part No.	Illustration
22	Angle Bracket	2	26795C	
23	Mounting Plate	1	26769A	
24	Screw, #6-32 x 1/2, Phillips, pan head	4	--	
25	Screw, #6-32 x 5/8, Phillips, pan head	4	--	
26	Screw, #6-32 x 7/8, Phillips, pan head	2	--	
27	Screw, #6-32 x 1, Phillips, pan head	2	--	
28	Kep Nut, #6-32	6	--	
29	Screw, #8-32 x 3/8, Phillips, flat head	3	--	
30	Screw, #8-32 x 5/8, Phillips, pan head	6	--	
31	Spindle	3	26760A	
32	Spacer	2	27409A	

Assembly Instructions:

1. Before assembling the rack kit, determine the position of each instrument. Since the instruments can be mounted in either of two locations, their position should be determined by the user's measurement. The following instructions refer to instruments "A" and "B" positioned as shown.
2. Remove the "side dress" panels on both sides of each instrument. Removal is accomplished by loosening the screws (Item 8) in three places on each side of the instrument. Slide the "side dress" panels to the rear of the instrument to remove.
3. Remove 3 screws (Item 8) on instrument "A" and temporarily remove "side plate".
4. Fasten 3 spindles (Item 31) to "side plate" (Item 21) using three #8-32 x 3/8, Phillips flat head screws (Item 29).
5. Reinstall the "side plate" on instrument "A" using original screws.
6. Remove 3 screws (Item 8) on instrument "B", remove the "side plate" and install the "mounting plate" (Item 23) behind the "corner plate". Reinstall the 3 screws.
7. Position the two instruments so that the slots in the "mounting plate" engage the three spindles.
8. When mounting instruments having the same depth, two screws (Item 27), two spacers (Item 32), and two kep nuts (Item 28) are required to secure the two instruments together. When mounting instruments of different depth, do not use the kep nuts (Item 28) but substitute shorter screws (Item 26).
9. Attach an "angle bracket" (Item 22) on each instrument using hardware (Item 30) in place of the original hardware (Item 8). For 14" long instruments fasten angle brackets using #6-32 x 1/2 Phillips screws (Item 24). For 11" long instruments use #6-32 x 5/8 Phillips screw (Item 25) with #6-32 kep nut (Item 28).

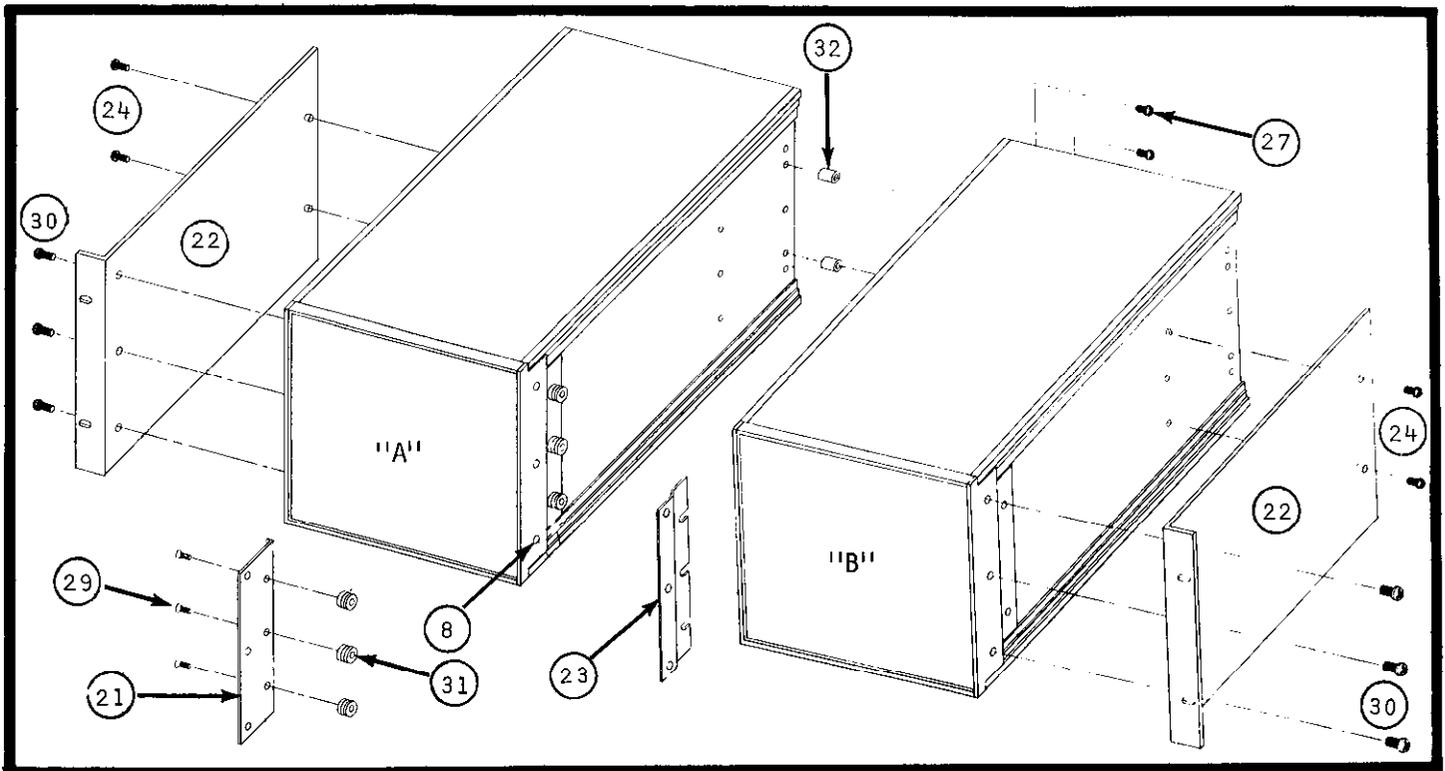


FIGURE 32. Model 1012 Rack Mounting Kit.

INSTRUCTION MANUAL
Model 750 Printer

MODEL 1014 RACK MOUNTING KIT

Description:

The Model 1014 is a combination rack mounting kit with overall dimensions 7 inches high (178 mm) and 19 inches wide (483 mm). The hardware included in this kit consists of two angle brackets, a blank panel, and other miscellaneous hardware.

Application:

The Model 1014 converts one half-rack style "O" instrument for rack mounting with one half-rack style "M" instrument in a standard 19-inch rack. If two style "M" instruments are used, extra hardware included with the Model 1016 Rack Mounting Kit is needed.

The Model 1014 Rack Mounting Kit can be used to mount instruments of 11 inch (279 mm) or 14 inch (356 mm) depth. The user should decide the position of the instrument to be rack mounted. The Assembly Instructions refer to instruments positioned as shown in Figure 33 and identified as instrument "A" and "B".

Item No.	Description	Qty Req'd	Keithley Part No.	Illustration
22	Angle Bracket (7 inch)	1	26795C	
23	Angle Bracket (3-1/2 inch)	1	27410B	
24	Blank Panel (3-1/2 inch)	1	24781B	
25	Small Angle (3-1/2 inch)	1	26781A	
26	Mounting Plate	1	26769A	
27	Spindle	1	26760A	
28	Spacer	1	27409A	
29	Screw, #6-32 x 1/2 Phillips, pan head	3	--	
30	Screw, #6-32 x 5/8 Phillips, pan head	5	--	
31	Screw, #6-32 x 7/8 Phillips, pan head	1	--	
32	Screw, #6-32 x 1, Phillips, pan head	1	--	
33	Screw, #8-32 x 3/8 Phillips, flat head	1	--	
34	Screw, #8-32 x 5/8 Phillips, pan head	4	--	
35	Screw, #10-32 x 3/8, Socket, button head	2	--	
36	Kep Nut, #6-32	4	--	
37	Side Plate (3-1/2 inch)	1	26827A	

Assembly Instructions:

1. Before assembling the rack kit, determine the position of each instrument. Since the instruments can be mounted in either of two locations, their position should be determined by the user's measurement. The following instructions refer to instruments "A" and "B" positioned as shown.
2. Remove the "side dress" panels on both sides of each instrument. Removal is accomplished by loosening the screws (Item 8) in three places on each side of instrument "A". Slide the "side dress" panels to the rear of the instrument to remove. Two screws must be loosened on each side of instrument "B".
3. Remove 3 screws (Item 8) on instrument "A", remove the "side plate" and install the "mounting plate" (Item 26) behind the "corner plate". Reinstall the 3 screws.
4. Fasten a spindle (Item 27) to the "side plate" (Item 37) using one #8-32 x 3/8 Phillips flat head screw (Item 33).
5. Remove 2 screws (Item 8) on instrument "B".
6. Install the "side plate" on instrument "B" using original screws.
7. Position the two instruments so that the mounting plate engages the spindle.
8. When mounting instruments having the same depth, one screw (Item 32), one spacer (Item 28), and one kep nut (Item 36) are required to secure the two instruments together. When mounting instruments of different depth, do not use the kep nut, but substitute a shorter screw (Item 31).
9. Attach the "blank panel" (Item 24) to the "small angle" (Item 25) using two #10-32 x 3/8 socket head screws (Item 35).
10. Attach the panel assembly to instrument "A" by removing the top screw (original hardware) and installing a #8-32 x 5/8 Phillips screw (Item 34).
11. Attach an "angle bracket" (Item 22) on instrument "A" using three #8-32 x 5/8 Phillips screws in place of original hardware. For 14 inch long instruments fasten angle bracket using two #6-32 x 1/2 Phillips screws (Item 29). For 11 inch long instruments use two #6-32 x 5/8 Phillips screws (Item 30) with two #6-32 kep nuts (Item 36). Attach the remaining "angle bracket" (Item 23) to instrument "B" using similar hardware as described for instrument "A".
12. The feet and tilt bail assemblies may be removed from the bottom panel of each instrument if necessary. The rubber foot should be pried up to gain access to the screw holding the foot assembly.
13. The original hardware, side dress panels, feet, and tilt bail assemblies should be retained for future conversion back to bench mounting.

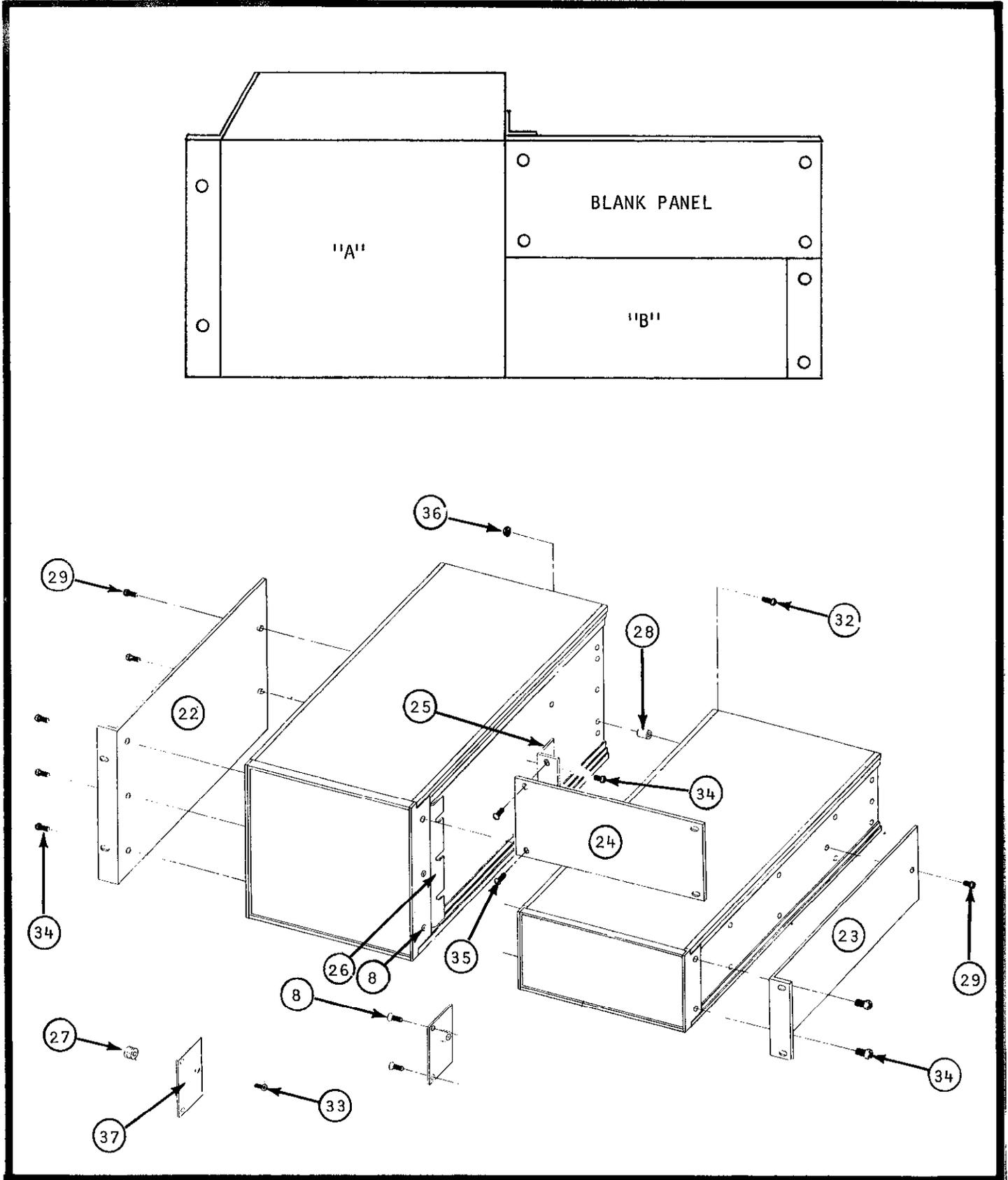


FIGURE 33. Model 1014 Rack Mounting Kit.

MODEL 1015 RACK MOUNTING KIT

Description:

The Model 1015 is a rack mounting kit with overall dimensions 7 inches (178 mm) high and 19 inches (483 mm) wide. The hardware included in this kit consists of two Angle Brackets, and other miscellaneous hardware.

Application:

The Model 1015 converts one half-rack style "O" instrument for rack mounting with one style "N" instrument in a standard 19-inch rack.

The Model 1015 Rack Mounting Kit can be used to mount instruments of 11 inch (279 mm) or 14 inch (356 mm) depth. The user should decide the position of the instrument to be rack mounted. The Assembly Instructions refer to instruments positioned as shown in Figure 34 and identified as instrument "A" and "B".

Item No.	Description	Qty Req'd	Keithley Part No.	Illustration
22	Angle Bracket (7 inch)	1	26795C	
23	Angle Bracket (5-1/2 inch)	1	26794C	
24	Mounting Plate	1	26769A	
25	Screw, #6-32 x 1/2, Phillips, pan head	4	--	
26	Screw, #6-32 x 5/8, Phillips, pan head	4	--	
27	Screw, #6-32 x 7/8, Phillips, pan head	2	--	
28	Screw, #6-32 x 1, Phillips, pan head	2	--	
29	Kep Nut, #6-32	6	--	
30	Screw, #8-32 x 3/8, Phillips, flat head	2	--	
31	Screw, #8-32 x 5/8, Phillips, pan head	7	--	
32	Screw, #10-32 x 3/8, Socket head	2	--	
33	Spindle	3	26760A	
34	Spacer	2	27409A	
35	Blank Panel (1-3/4 inch)	1	26790B	
36	Small Angle	1	26775A	

INSTRUCTION MANUAL

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Assembly Instructions:

1. Before assembling the rack kit, determine the position of each instrument. Since the instruments can be mounted in either of two locations, their position should be determined by the user's measurement. The following instructions refer to instruments "A" and "B" positioned as shown.
2. Remove the "side dress" panels on both sides of each instrument. Removal is accomplished by loosening the screws (Item 8) in three places on each side of the instrument. Slide the "side dress" panels to the rear of the instrument to remove.
3. Remove 3 screws (Item 8) on instrument "A", remove the "side plate", and install the "mounting plate" (Item 24) behind the "corner plate". Reinstall the 3 screws.
4. Remove 3 screws (Item 8) on instrument "B", remove the "side plate" (Item 21).
5. Fasten 3 spindles (Item 33) to "side plate" (Item 21) using three #8-32 x 3/8, Phillips flat head screws (Item 30).
6. Reinstall the "side plate" on instrument "B".
7. Position the two instruments so that the slots in the "mounting plate" engage the three spindles.
8. When mounting instruments having the same depth, two screws (Item 28), two spacers (Item 34), and two kep nuts (Item 29) are required to secure the two instruments together. When mounting instruments of different depth, do not use the kep nuts (Item 29) but substitute shorter screws (Item 27).
9. Attach an "angle bracket" (Item 22) on instrument "A" using hardware (Item 31) in place of the original hardware (Item 8). For 14" long instruments fasten angle brackets using #6-32 x 1/2 Phillips screws (Item 25). For 11" long instruments use #6-32 x 5/8 Phillips screw (Item 26) with #6-32 kep nut (Item 29). Attach "angle bracket" (Item 23) on instrument "B" using same hardware.

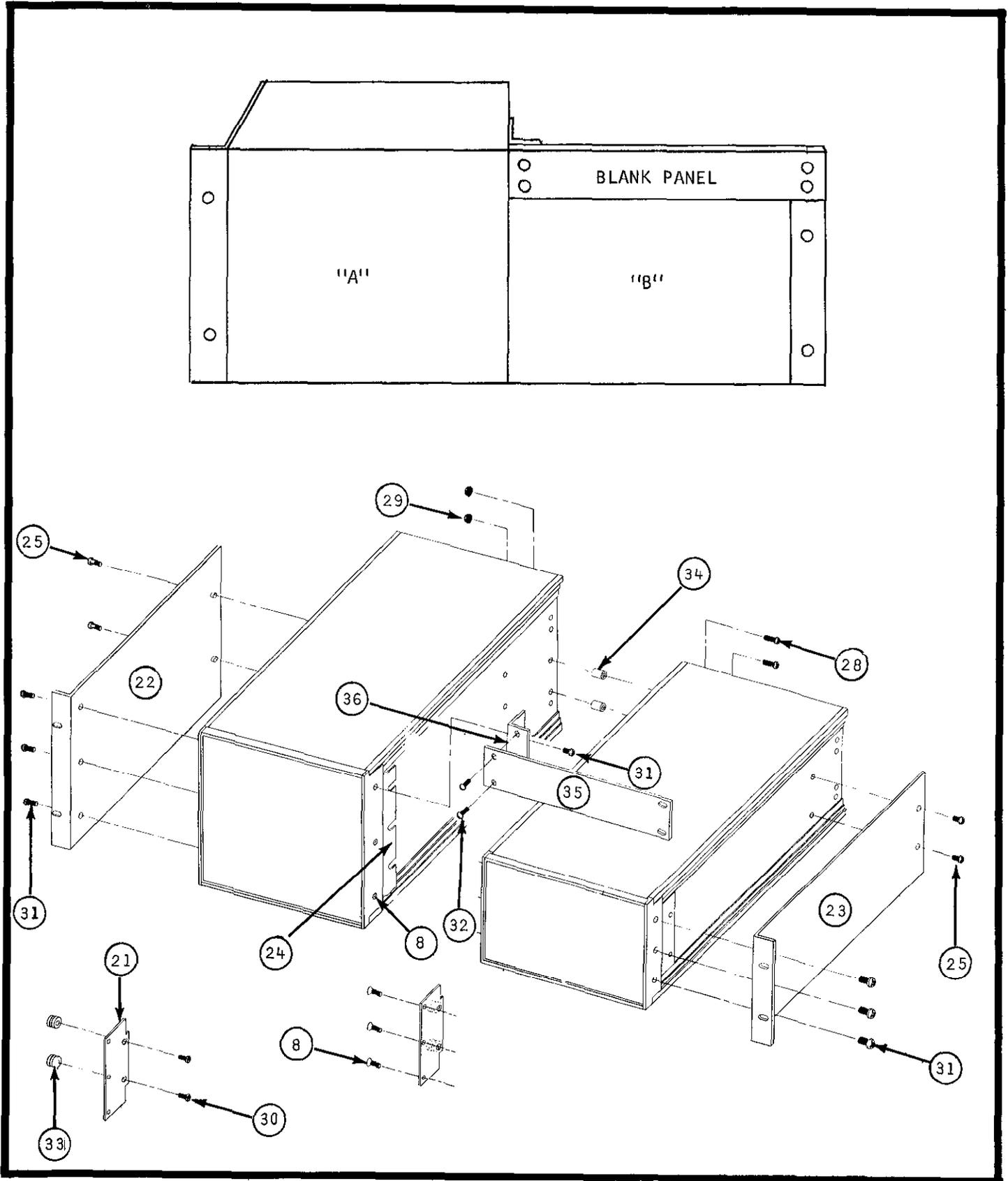


FIGURE 34. Model 1015 Rack Mounting Kit.

INSTRUCTION MANUAL
Model 750 Printer

MODEL 1016 RACK MOUNTING KIT

Description:

The Model 1016 is a combination rack mounting kit with overall dimensions 7 inches high (178 mm) and 19 inches wide (483 mm). The hardware included in this kit consists of three angle brackets, and other miscellaneous hardware.

The Model 1016 Rack Mounting Kit can be used to mount instruments of 11 inch (279 mm) or 14 inch (356 mm) depth. The user should decide the position of the instrument to be rack mounted. The Assembly instructions refer to instruments positioned as shown in Figure 35 and identified as instruments "A", "B" and "C".

Application:

The Model 1016 converts one half-rack style "O" instrument for rack mounting with two half-rack style "M" instruments in a standard 19-inch rack.

Item No.	Description	Qty Req'd	Keithley Part No.	Illustration
22	Angle Bracket (7 inch)	1	26795C	
23	Angle Bracket (3-1/2 inch)	2	27410B	
24	Mounting Plate	1	26768A	
25	Spindle	2	26760A	
26	Spacer	2	27409A	
27	Screw, #6-32 x 1/2 Phillips, pan head	4	--	
28	Screw, #6-32 x 5/8 Phillips, pan head	8	--	
29	Screw, #6-32 x 7/8 Phillips, pan head	2	--	
30	Screw, #6-32 x 1, Phillips, pan head	2	--	
31	Screw, #8-32 x 3/8 Phillips, flat head	2	--	
32	Screw, #8-32 x 5/8 Phillips, pan head	3	--	
33	Kep Nut, #6-32	6	--	
34	Side Plate	2	26827A	

Assembly Instructions:

1. Before assembling the rack kit, determine the position of each instrument. Since the instruments can be mounted in either of two locations, their position should be determined by the user's measurement. The following instructions refer to instruments "A", "B" and "C" positioned as shown.
2. Remove the "side dress" panels on both sides of each instrument. Removal is accomplished by loosening the screws (Item 8) in three places on each side of instrument "A". Slide the "side dress" panels to the rear of the instrument to remove. Two screws must be loosened on each side of instruments "B" and "C".
3. Remove 3 screws (Item 8) on instrument "A", remove the "side plate" and install the "mounting plate" (Item 24) behind the "corner plate". Reinstall the 3 screws.
4. Fasten one spindle (Item 25) to each "side plate" (Item 34) using one #8-32 x 3/8 Phillips flat head screw (Item 31).
5. Remove 2 screws (Item 8) on instrument "B" and "C" (on left side as shown).
6. Install one "side plate" on instrument "B" and "C" using original screws.
7. Position the instruments "A" and "B" so that the mounting plate engages the spindle.
8. When mounting instruments having the same depth, one screw (Item 30), one spacer (Item 26), and one kep nut (Item 33) are required to secure the two instruments together. When mounting instruments of different depth, do not use the kep nut, but substitute a shorter screw (Item 29).
9. Repeat steps 7 and 8 for instruments "A" and "C".
10. Attach an "angle bracket" (Item 22) on instrument "A" using three #8-32 x 5/8 Phillips screws in place of original hardware. For 14 inch long instruments fasten angle bracket using two #6-32 x 1/2 Phillips screws (Item 27). For 11 inch long instruments use two #6-32 x 5/8 Phillips screws (Item 28) with two #6-32 kep nuts (Item 33). Attach the remaining "angle brackets" (Item 23) to instruments "B" and "C" using similar hardware as described for instrument "A".
11. The feet and tilt bail assemblies may be removed from the bottom panel of each instrument if necessary. The rubber foot should be pried up to gain access to the screw holding the foot assembly.
12. The original hardware, side dress panels, feet, and tilt bail assemblies should be retained for future conversion back to bench mounting.

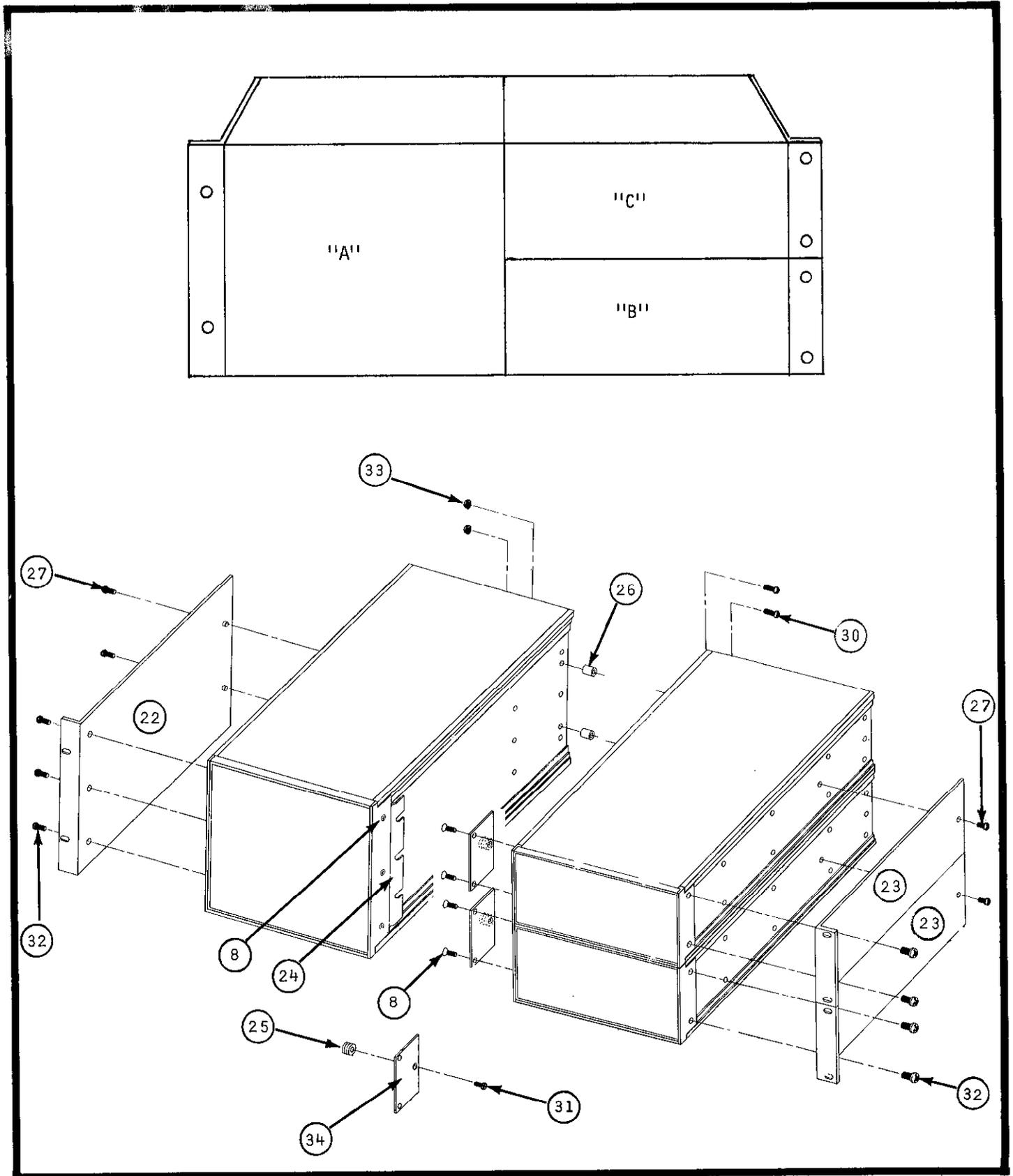


FIGURE 35. Model 1016 Rack Mounting Kit

End of Appendix E
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APPENDIX F. COMPONENT LAYOUTS

TABLE 7-1.
 Components Located on PC-380

Circuit Designations
DS301
J301
J302
Q301
R301
R302
S301

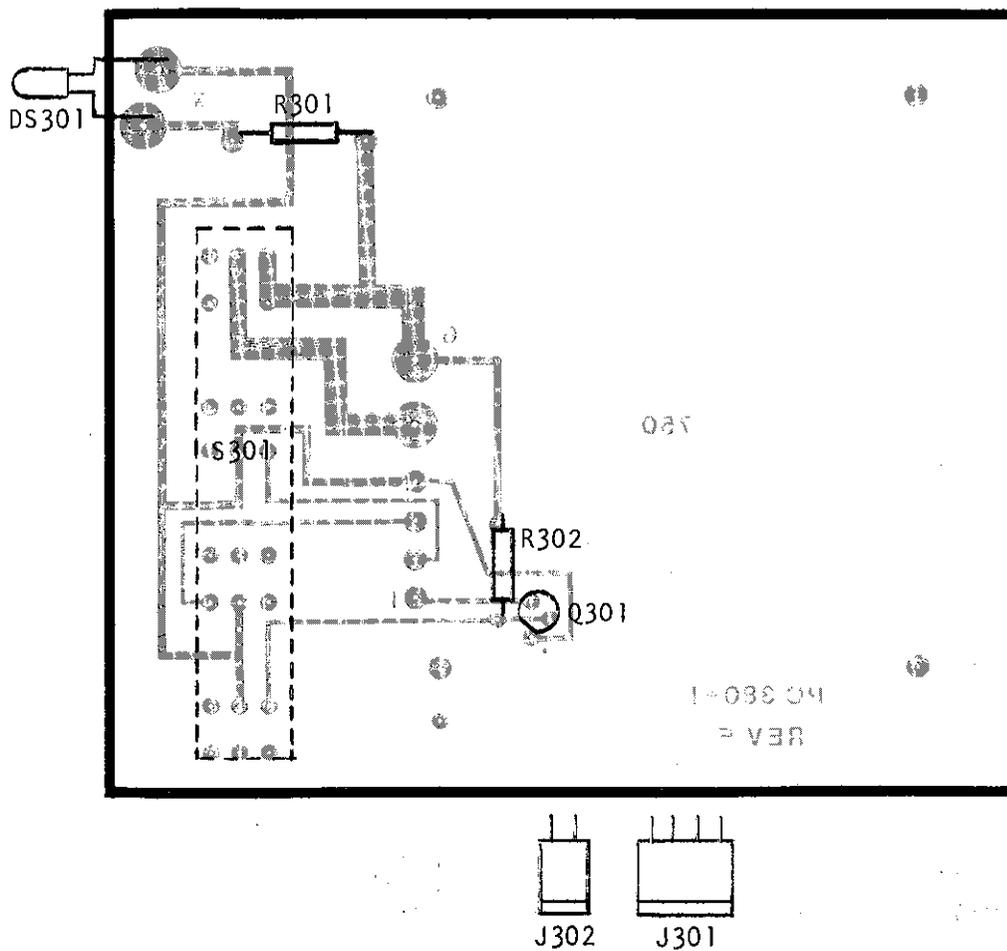


FIGURE 36. Component Layout, PC-380.

TABLE F-2.
Components Located on PC-378

Circuit Desig.	Location Code	Circuit Desig.	Location Code	Circuit Desig.	Location Code	Circuit Desig.	Location Code	Circuit Desig.	Location Code
C101	D-7	C208	L-3	Q109	A-6	R143	K-4	U112	F-7
C102	B-6	C209	K-3	Q201	L-7	R144	L-5	U113	K-6
C103	E-7	C210	K-2	Q202	L-7	R145	K-4	U114	K-5
C104	**	C211	K-2	R101	C-7	R146	K-4	U115	K-6
C105	G-6	C212	L-2	R102	D-6	R147	K-7	U116	K-7
C106	F-6	C213	K-2	R103	D-7	R148	L-6	U117	J-6
C107	H-6	C214	K-2	R104	D-6	R149	L-6	U118	J-5
C108	L-4	C215	K-2	R105	C-6	R150	L-5	U119	H-6
C109	L-4	C216	L-2	R106	E-5	R151	K-7	U120	J-6
C110	F-7	C217	K-2	R107	D-6	R152	K-5	U121	G-6
C111	H-6	C218	K-1	R108	E-5	R153	H-5	U122	J-7
C112	L-5	C219	K-1	R109	B-6	R154	H-5	U123	K-4
C113	L-5	C220	L-1	R110	C-5	R155	H-5	U124	H-7
C114	K-5	C221	K-1	R111	D-6	R156	H-5	U125	H-6
C115	K-5	CR101	B-7	R112	F-6	R157	G-6	U201	E-4
C116	L-6	CR102	B-6	R113	E-6	R158	K-5	U202	E-4
C117	L-4	CR103	B-7	R114	E-6	R159	*	U203	F-4
C118	L-6	CR104	A-7	R115	C-7	R160	D-7	U204	G-4
C119	**	CR105	A-3	R116	D-5	R161	D-7	U205	H-4
C120	L-6	CR106	C-2	R117	E-6	R162	C-5	U206	H-3
C121	B-4	CR107	C-2	R118	E-6	R163	L-7	U207	H-2
C122	C-4	CR108	C-2	R119	E-7	R164	A-3	U208	H-2
C123	*	CR109	C-2	R120	E-6	R165	J-1	U209	H-1
C124	*	CR110	G-6	R121	F-6	R166	F-7	U210	J-4
C125	E-6	CR111	D-7	R122	C-6	R167	H-6	U211	J-3
C126	C-7	CR112	E-7	R123	D-6	R168	C-6	U212	J-2
C127	C-6	CR113	G-6	R124	G-6	R169	H-7	U213	J-4
C128	D-6	CR114	J-7	R125	G-7	R170	H-6	U214	J-3
C129	E-6	J201	D-3	R126	H-6	R171	*	U215	J-2
C130	G-7	J202	G-3	R127	H-6	R172	A-5	U216	L-4
C131	G-6	J203	*	R128	G-6	R173	A-5	U217	K-3
C132	D-6	P101	B-6	R129	F-6	R174	A-5	U218	L-3
C133	J-7	P102	B-6	R130	D-7	R201	L-7	U219	K-3
C134	J-6	P103	B-7	R131	F-6	R202	L-7	U220	L-2
C135	J-6	P104	D-4	R132	J-7	U101	D-6	U221	K-2
C136	K-7	P105	*	R133	K-4	U102	B-6	U222	L-2
C137	K-6	P106	B-5	R134	J-4	U103	D-7	U223	K-1
C138	K-4	Q101	K-5	R135	E-7	U104	E-6	U224	K-1
C201	J-4	Q102	L-6	R136	**	U105	E-6	VR101	*
C202	J-3	Q103	L-5	R137	F-7	U106	D-6	VR102	A-5
C203	J-2	Q104	L-4	R138	G-7	U107	F-6	VR103	K-4
C204	L-4	Q105	L-5	R139	J-6	U108	G-7	VR104	L-5
C205	K-3	Q106	G-6	R140	J-6	U109	E-7	W101	G-6
C206	K-3	Q107	F-7	R141	J-7	U110	J-5	W102	A-3
C207	K-3	Q108	A-7	R142	C-7	U111	F-6		

* Part is located elsewhere on the chassis.
** Not Used.

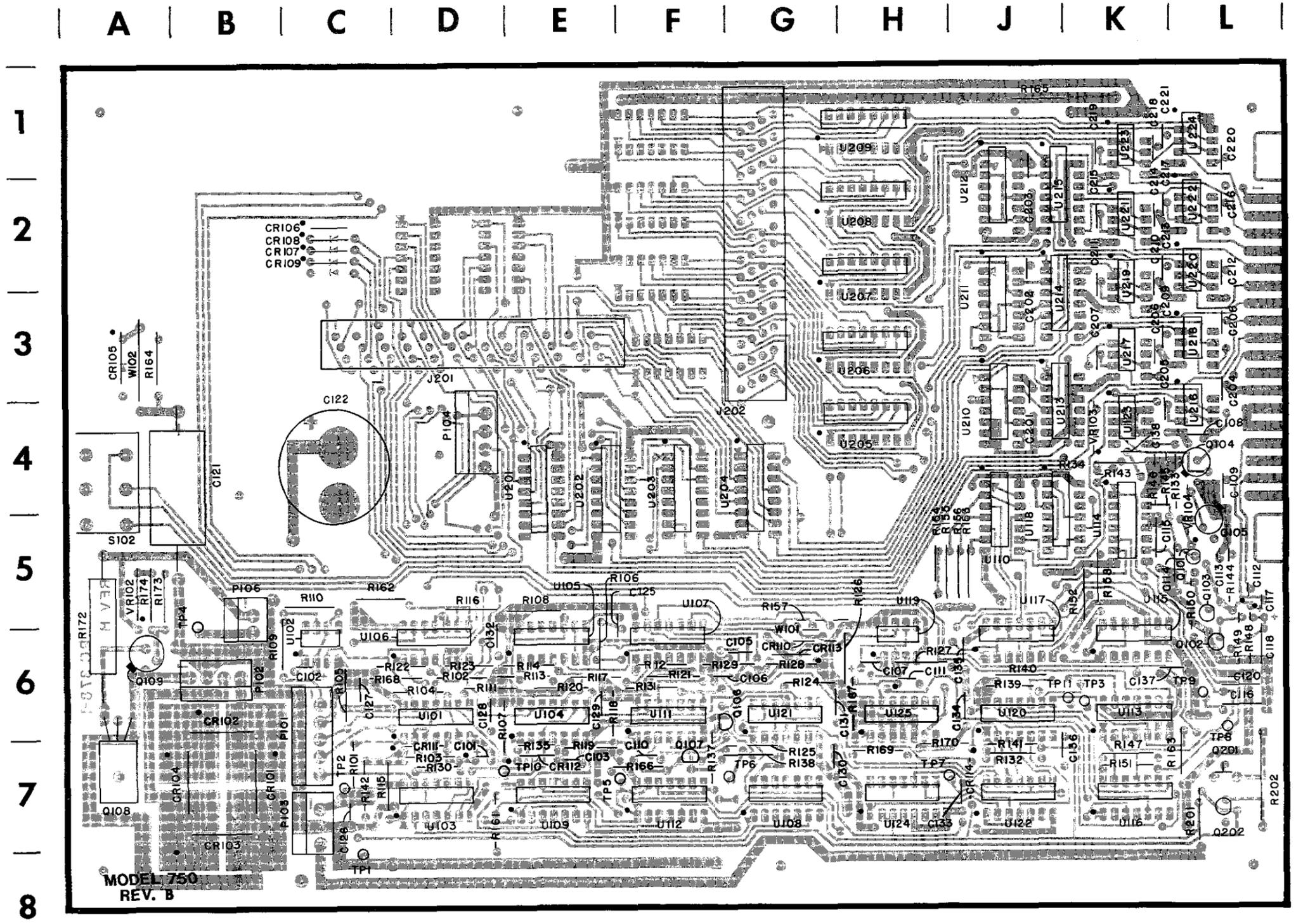


FIGURE 37. Component Layout, PC-378.

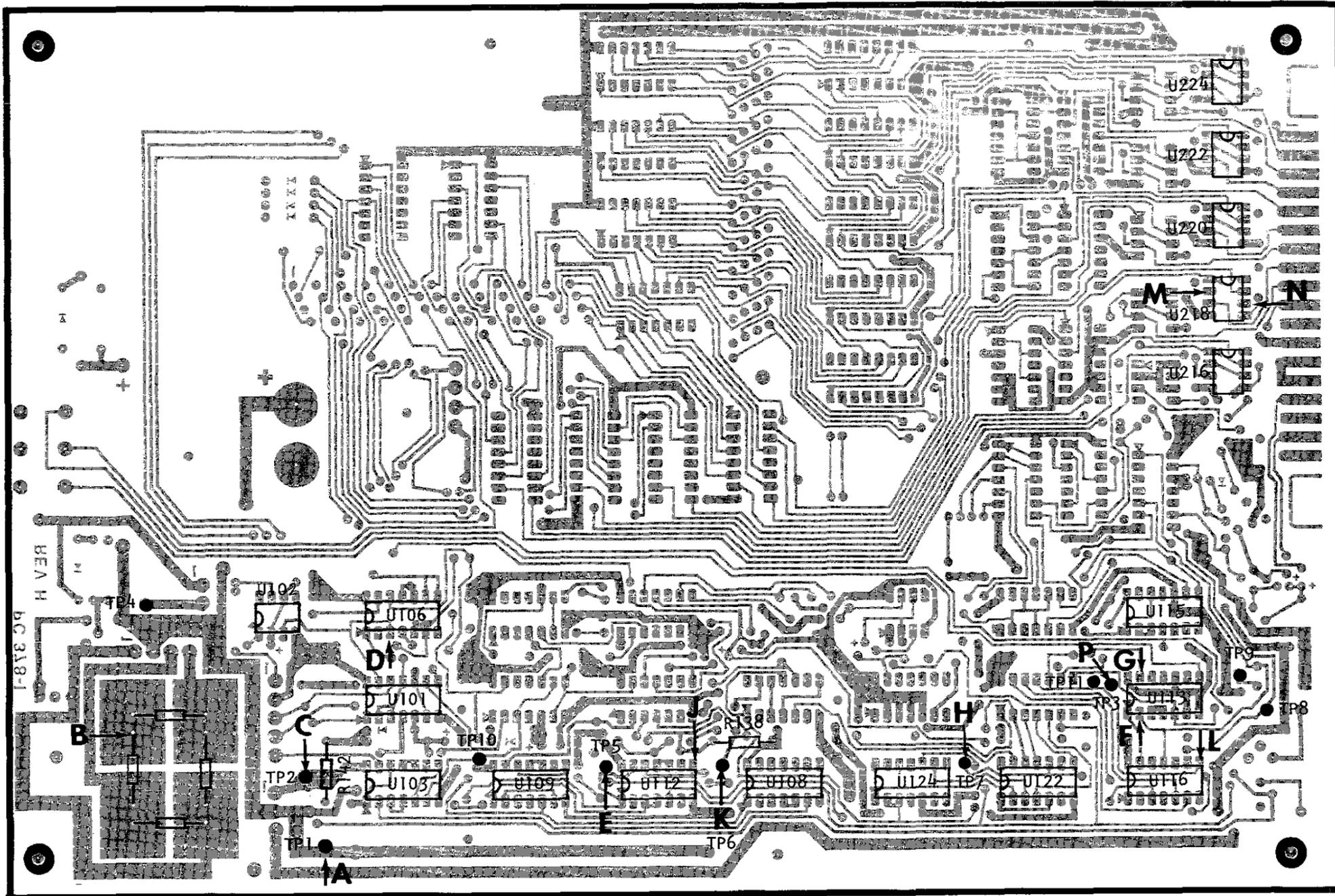


FIGURE 38. Location of Test Points Described in Section 5.

REV	DATE	BY	CHKD
1	12-15-52	W.S.M.	
2	1-15-53	W.S.M.	
3	2-15-53	W.S.M.	
4	3-15-53	W.S.M.	
5	4-15-53	W.S.M.	
6	5-15-53	W.S.M.	
7	6-15-53	W.S.M.	
8	7-15-53	W.S.M.	

REV	DATE	BY	CHKD
1	12-15-52	W.S.M.	
2	1-15-53	W.S.M.	
3	2-15-53	W.S.M.	
4	3-15-53	W.S.M.	
5	4-15-53	W.S.M.	
6	5-15-53	W.S.M.	
7	6-15-53	W.S.M.	
8	7-15-53	W.S.M.	

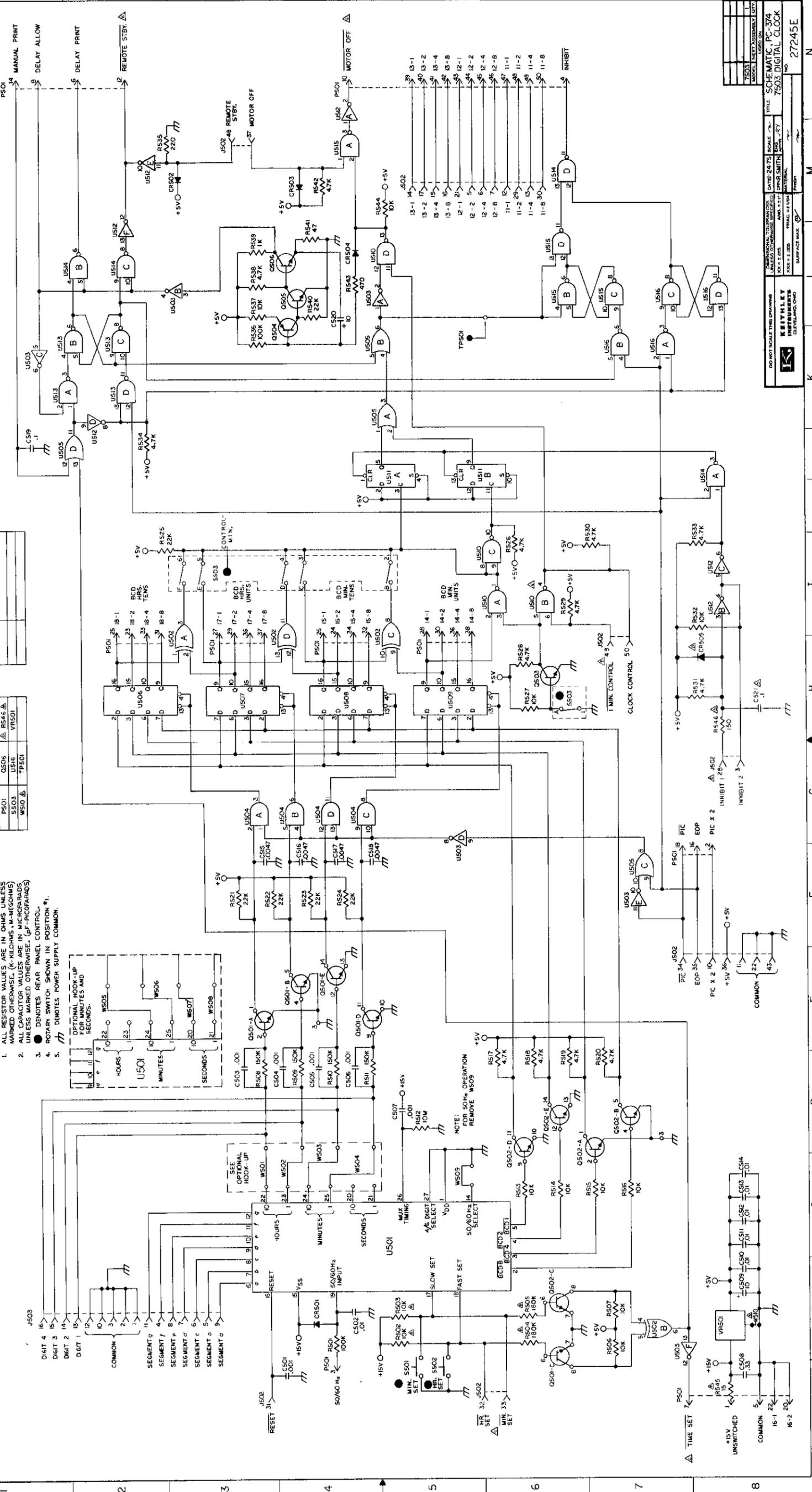
REV	DATE	BY	CHKD
1	12-15-52	W.S.M.	
2	1-15-53	W.S.M.	
3	2-15-53	W.S.M.	
4	3-15-53	W.S.M.	
5	4-15-53	W.S.M.	
6	5-15-53	W.S.M.	
7	6-15-53	W.S.M.	
8	7-15-53	W.S.M.	

REV	DATE	BY	CHKD
1	12-15-52	W.S.M.	
2	1-15-53	W.S.M.	
3	2-15-53	W.S.M.	
4	3-15-53	W.S.M.	
5	4-15-53	W.S.M.	
6	5-15-53	W.S.M.	
7	6-15-53	W.S.M.	
8	7-15-53	W.S.M.	

REV	DATE	BY	CHKD
1	12-15-52	W.S.M.	
2	1-15-53	W.S.M.	
3	2-15-53	W.S.M.	
4	3-15-53	W.S.M.	
5	4-15-53	W.S.M.	
6	5-15-53	W.S.M.	
7	6-15-53	W.S.M.	
8	7-15-53	W.S.M.	

REV	DATE	BY	CHKD
1	12-15-52	W.S.M.	
2	1-15-53	W.S.M.	
3	2-15-53	W.S.M.	
4	3-15-53	W.S.M.	
5	4-15-53	W.S.M.	
6	5-15-53	W.S.M.	
7	6-15-53	W.S.M.	
8	7-15-53	W.S.M.	

REV	DATE	BY	CHKD
1	12-15-52	W.S.M.	
2	1-15-53	W.S.M.	
3	2-15-53	W.S.M.	
4	3-15-53	W.S.M.	
5	4-15-53	W.S.M.	
6	5-15-53	W.S.M.	
7	6-15-53	W.S.M.	
8	7-15-53	W.S.M.	



- NOTES:
1. ALL RESISTOR VALUES ARE IN OHMS UNLESS MARKED OTHERWISE. (K=KILOHMS, M=MEGAS, ALL CAPACITORS UNLESS OTHERWISE MARKED.)
 2. ALL CAPACITORS UNLESS OTHERWISE MARKED.
 3. DENOTES REAR PANEL CONTROL.
 4. ROTARY SWITCH SHOWN IN POSITION #1.
 5. DENOTES POWER SUPPLY COMMON.

HIGHEST SCHEMATIC DESIGNATIONS USED

CS2	Δ	CS02	Δ	US03				
PS01	Δ	QS05	Δ	RS44	Δ	RS45	Δ	VS01
WS03	Δ	US16	Δ	VS01				
WS10	Δ	VS01	Δ	VS01				

SCHEMATIC DESIGNATIONS NOT USED

US01

DO NOT SCALE THIS DRAWING

DATE: 2-15-53

SCALE: 1" = 1"

DESIGNED BY: W.S.M.

CHECKED BY: W.S.M.

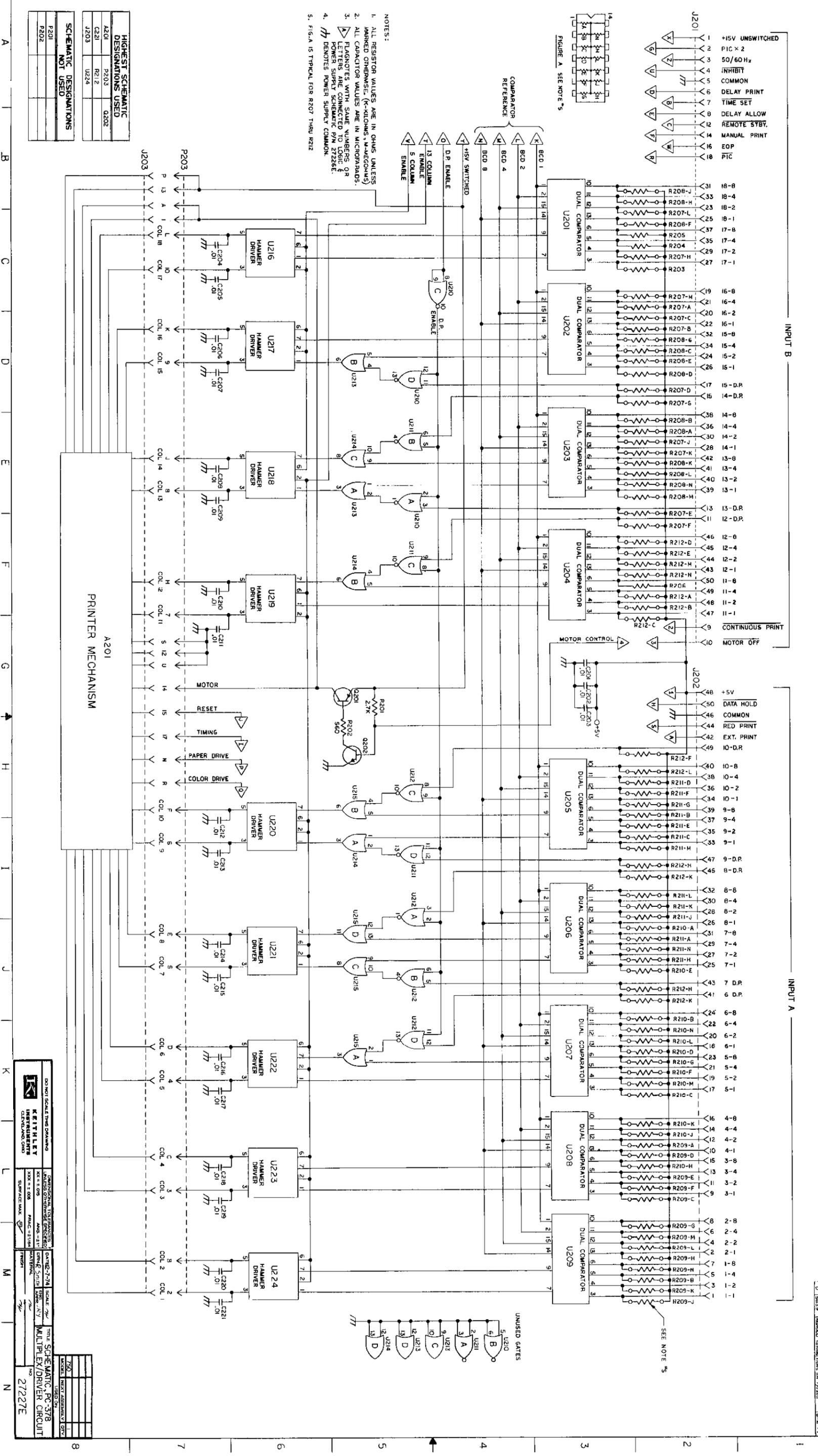
APPROVED BY: W.S.M.

PROJECT: SURFACE MOUNT

NO. 27245E

KEYHOLE INSTRUMENTS CLEVELAND, OHIO

312227E



- NOTES:
1. ALL RESISTOR VALUES ARE IN OHMS UNLESS MARKED OTHERWISE. (K-KILOHMS, M-MEGOHMS)
 2. ALL CAPACITOR VALUES ARE IN MICROFARADS.
 3. FLAGNOTES WITH SAME NUMBERS OR LETTERS ARE CONNECTED TO LOGIC & POWER SUPPLY SCHEMATIC P/N 272256.
 4. ∇ DENOTES POWER SUPPLY COMMON.
 5. FIG. A IS TYPICAL FOR R207 THRU R212

HIGHEST SCHEMATIC DESIGNATIONS USED

A201	P203	Q202
C201	R212	
U203	U224	

SCHEMATIC DESIGNATIONS NOT USED

P201	
R202	

DO NOT SCALE THIS DRAWING

KEYTELETYPE INSTRUMENTS

UNIVERSAL INSTRUMENTS DIVISION

400 WEST 34TH STREET, NEW YORK, N.Y. 10018

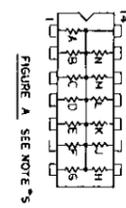
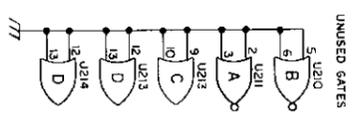
DATE: 10/27/74

SCALE: 1/8" = 1"

PROJECT: MULTIPLEX/DRIVER CIRCUIT

27227E

REV	DESCRIPTION	DATE
1	INITIAL DESIGN	10/27/74
2	REVISION	11/15/74
3	REVISION	12/10/74
4	REVISION	1/15/75
5	REVISION	2/10/75
6	REVISION	3/10/75
7	REVISION	4/10/75
8	REVISION	5/10/75
9	REVISION	6/10/75
10	REVISION	7/10/75
11	REVISION	8/10/75
12	REVISION	9/10/75
13	REVISION	10/10/75
14	REVISION	11/10/75
15	REVISION	12/10/75



A B C D E F G H I J K L M N

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

KEITHLEY INSTRUMENTS, INC.
28775 AURORA ROAD
CLEVELAND, OHIO 44139
SERVICE FORM

MODEL NO. _____ SERIAL NO. _____ P.O. NO. _____ DATE _____ R-

NAME _____ PHONE _____

COMPANY _____

ADDRESS _____ CITY _____ STATE _____ ZIP _____

1. Describe problem and symptoms using quantitative data whenever possible (enclose readings, chart recordings, etc.) _____

_____ (Attach additional sheets as necessary).

2. Show a block diagram of your measurement system including all instruments connected (whether power is turned on or not). Also describe signal source.

3. List the positions of all controls and switches on both front and rear panels of the instrument. _____

4. Describe input signal source levels, frequencies, etc. _____

5. List and describe all cables used in the experiment (length, shielding, etc.).

6. List and describe all other equipment used in the experiment. Give control settings for each. _____

7. Environment:
Where is the measurement being performed? (Factory, controlled laboratory, out-of-doors, etc.) _____
What power line voltage is used? _____ Variation? _____ Frequency? _____
Ambient temperature? _____°F. Variation? _____°F. Rel. Humidity? _____
Other _____

8. Additional Information. (If special modifications have been made by the user, please describe below.) _____