TECHNICAL MANUAL

for

PERFORATOR-READER

MODEL RTKY-1

(TT-477/FRR-72)

THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, N.Y. OTTAWA, ONTARIO

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FOREWORD

When using the Royal McBee Corporation Reader and Punch service manual and parts catalog, refer to READER AND PUNCH, MODEL 590.

PERFORATOR-READER, Model RTKY-1 is a semi-automatic feed tape or card perforator and reader unit.

The PERFORATOR-READER, Model RTKY-1 (hereafter referred to as the RTKY-1) provides synchronous operation to 50 characters per second. Both reader and perforator include reverse feed, accommodating 1 inch, 7/8 inch or 11/16 inch standard tape with 5, 6, 7 or 8 level code structure. A manual index control is provided on perforate and a tape feed control, permitting blank or delete feeding between messages is also provided. Provisions for punched-card feeding is also provided.

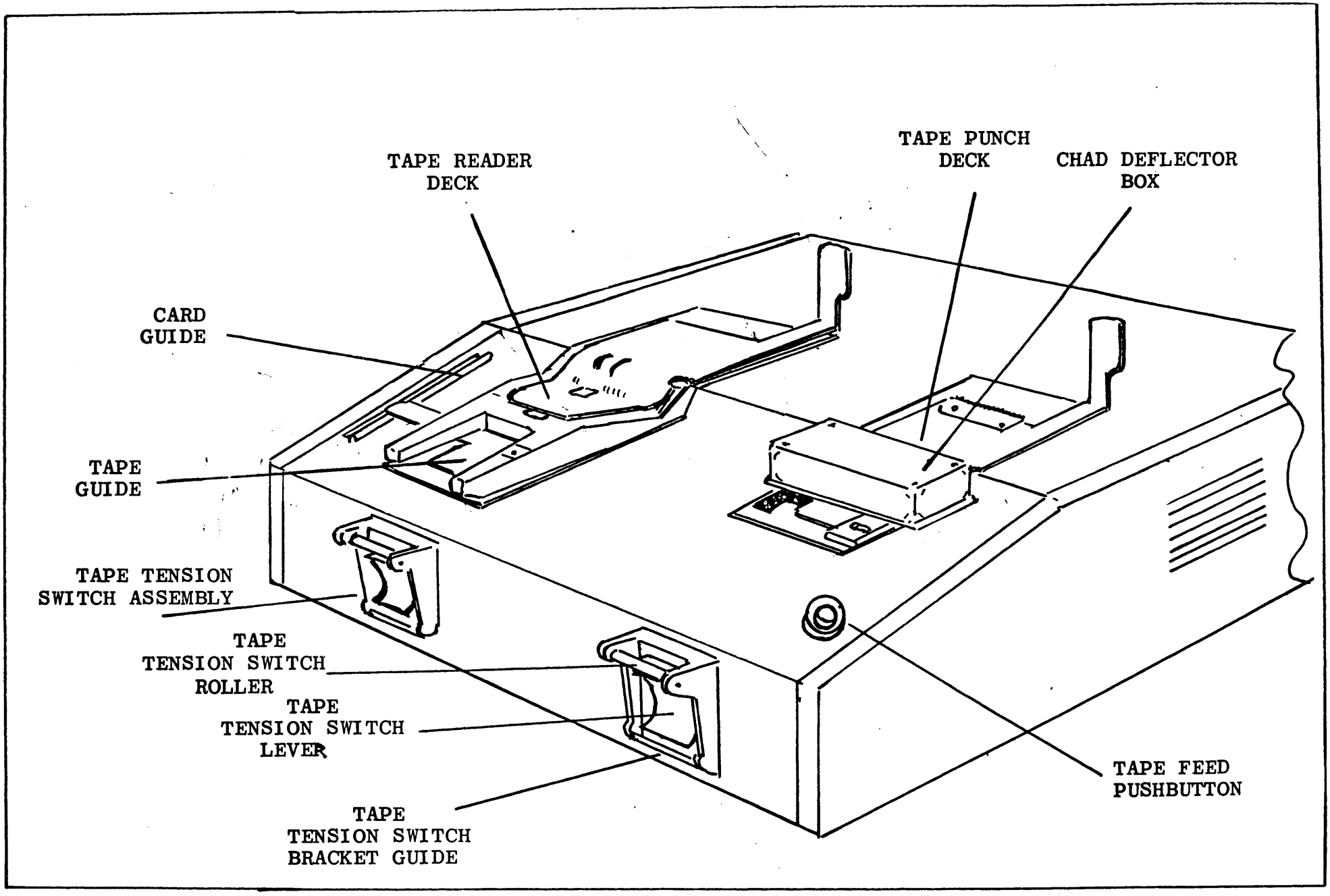
The RTKY-1 is housed in a metal case measuring 12 inches long by 10-1/2 inches wide by 6-1/2 inches high. A tape reader deck and a tape perforator deck, each with independent tape tension switches, are located on the front portion of the case for greater accessibility. A tape feed switch is also provided for the punch deck.

PERFORATOR-READER RTKY-1, OPERATING CONTROLS

CONTROL (See figure 1)	FUNCTION
Tape Reader Deck	Accepts a pre-punched, 5, 6, 7 or 8 level code structure, 1 inch, 7/8 inch or 11/16 inch standard tape or pre-punched card. See figure A and B.
Tape Punch Deck	Punches any 1 inch, 7/8 inch or 11/16 inch standard tape to 5, 6, 7 or 8 level code structure. Cards may also be punched. See figures C and D.
Card Guide	Used to guide a punched-card through the tape reader deck. See figure B.
Tape Guide	Used to guide a tape into the reader or tape punch deck. Tape is to be placed over the tape quide. A card is placed over the tape guide. A card is placed under the tape guide.
Tape Tension Switch Assembly	Used to guide the tape from the tape supply to the tape reader or tape punch deck. Tape is threaded through the tape tension switch which starts and stops threading when tape tension switch lever is pulled out or pushed in. See figure A.
Tape Tension Switch Roller	Tape is threaded over the tape tension switch roller for smooth and straight tape feeding to the tape reader or tape punch deck. See figure A.
Tape Tension Switch Lever	This lever acts as an ON/OFF switch, acting under tape pressure or manually activated. Tape is to be threaded behind the tape tension switch lever for proper operation.

PERFORATOR-READER RTKY-1, OPERATING CONTROLS (CONT)

CONTROL (See figure 1)	FUNCTION
Tape Tension Switch Lever (cont)	Pull tape tension switch lever out to deenergize tape reader or tape punch deck. Push in for activation. See figure A.
Tape Feed Bracket Guide	Tape is threaded from the tape supply equipment, under and behind the tape tension switch bracket guide. See figure A.
Tape Feed Pushbutton	When pressed, allows card or tape to be drawn through the tape punch deck. Also used to advance tape or card through tape punch deck during punch process, to permit blank or delete feeding between messages. See figure C and D.
Chad Deflector Box	Used to deflect chad is deflected down through unit, emptying through a port at the bottom of the RTKY-1.
Tape Release	Press Down for Release of Tape



PERFORATOR-READER, MODEL RTKY-1.

TAPE READER OPERATING PROCEDURES

PUNCHED-TAPE READ - See figure A.

1. Pull tape tension switch lever (1) out.
2. Slide tape under the tape tension switch bracket guide (2).
3. Slide tape behind the tape tension switch lever (1) up and over the tape tension switch roller (3).
4. Place leading edge of tape over the metal tape guide (4) of the tape reader deck.
5. Push tape tension switch lever (1) in.
6. Push tape into tape reader deck until tape reader energizes, drawing tape through reading process.

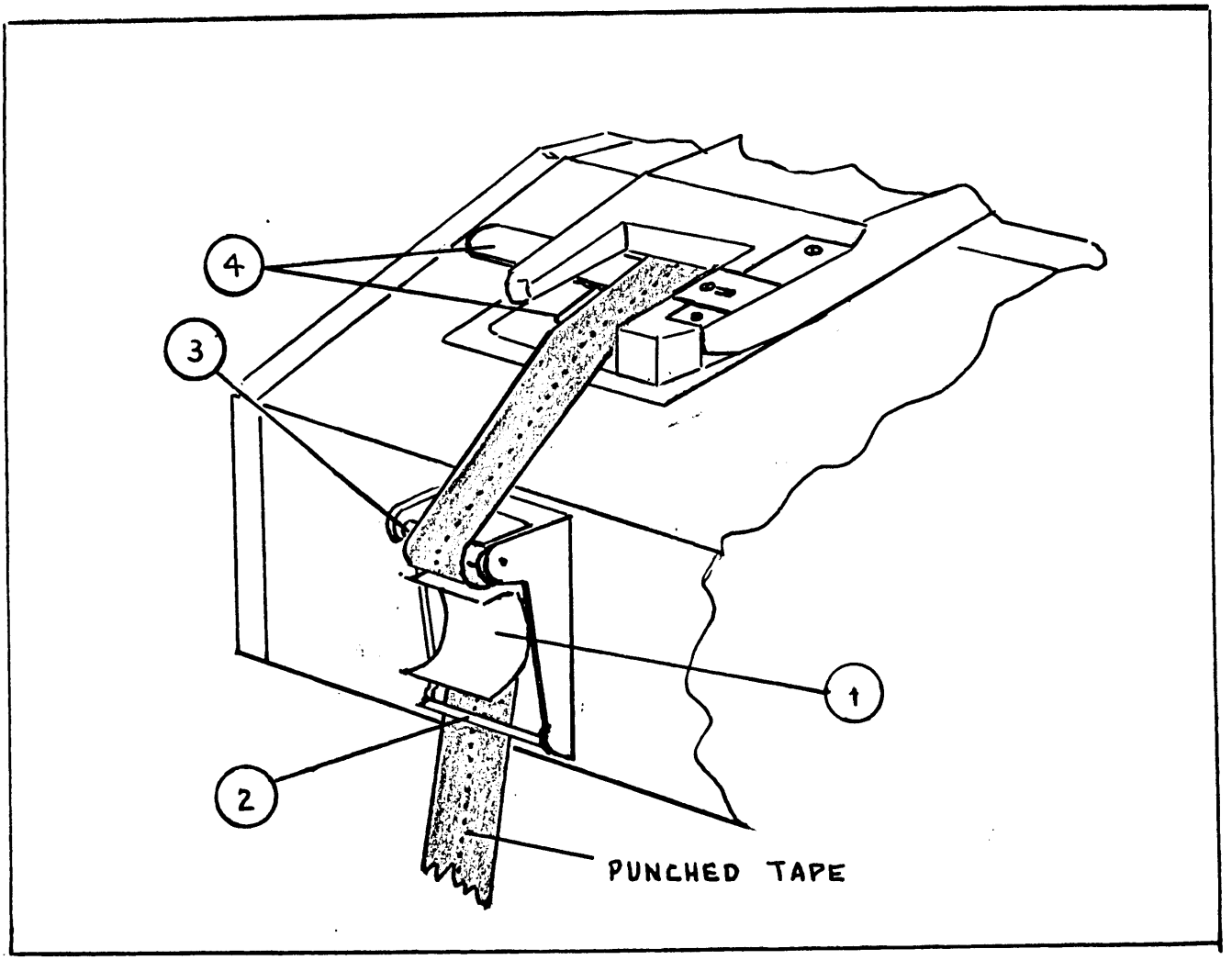


Figure A

PUNCHED-CARD READ - See figure B.

1. Pull tape tension switch lever (1) out.
2. Position punched-card so that the left edge is guided by the card guide (5) .
3. Slide punched-card under the metal tape guide (4) .
4. Push tape tension switch lever (1) in.
5. Push card into tape reader deck until tape reader energizes, drawing card through reading process.

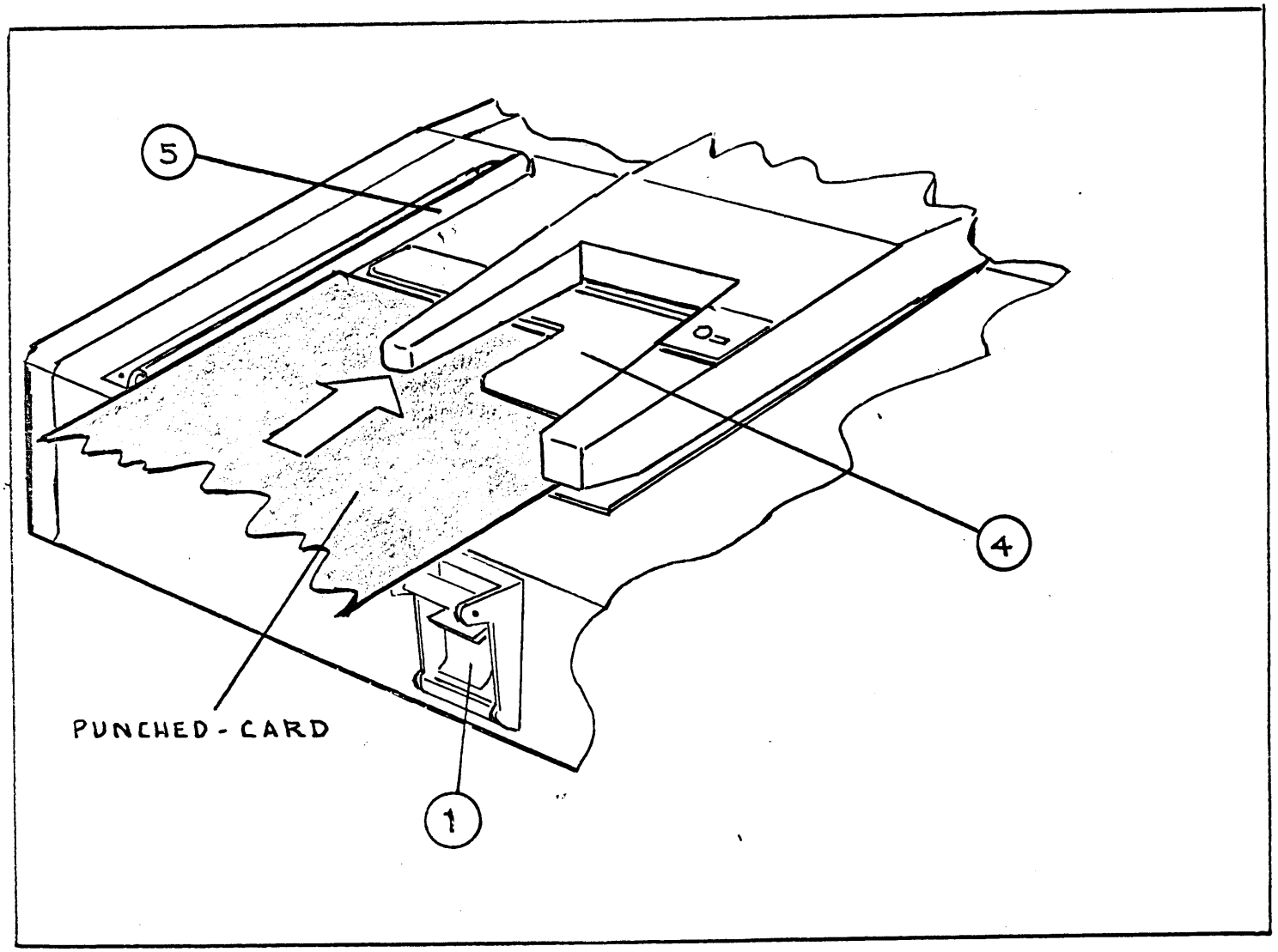


Figure B

TAPE PUNCH OPERATING PROCEDURE

TAPE PUNCH - See figure C.

1. Pull tape tension switch lever (1) out.
2. Slide tape under tape tension switch bracket guide (2).
3. Slide tape behind the tape tension switch lever (1) up and over the tape tension switch roller (3).
4. Place leading edge of tape over the metal tape guide (4) of the tape punch deck.
5. Push tape tension switch lever (1) in.
6. Push tape into tape punch deck and press tape feed push-button (5) to start punching process.

NOTE

When using tape feed pushbutton (5) to advance tape through punch deck, hold tape tension switch lever (1) in, to prevent the rapid tape advance from tripping tape tension switch lever.

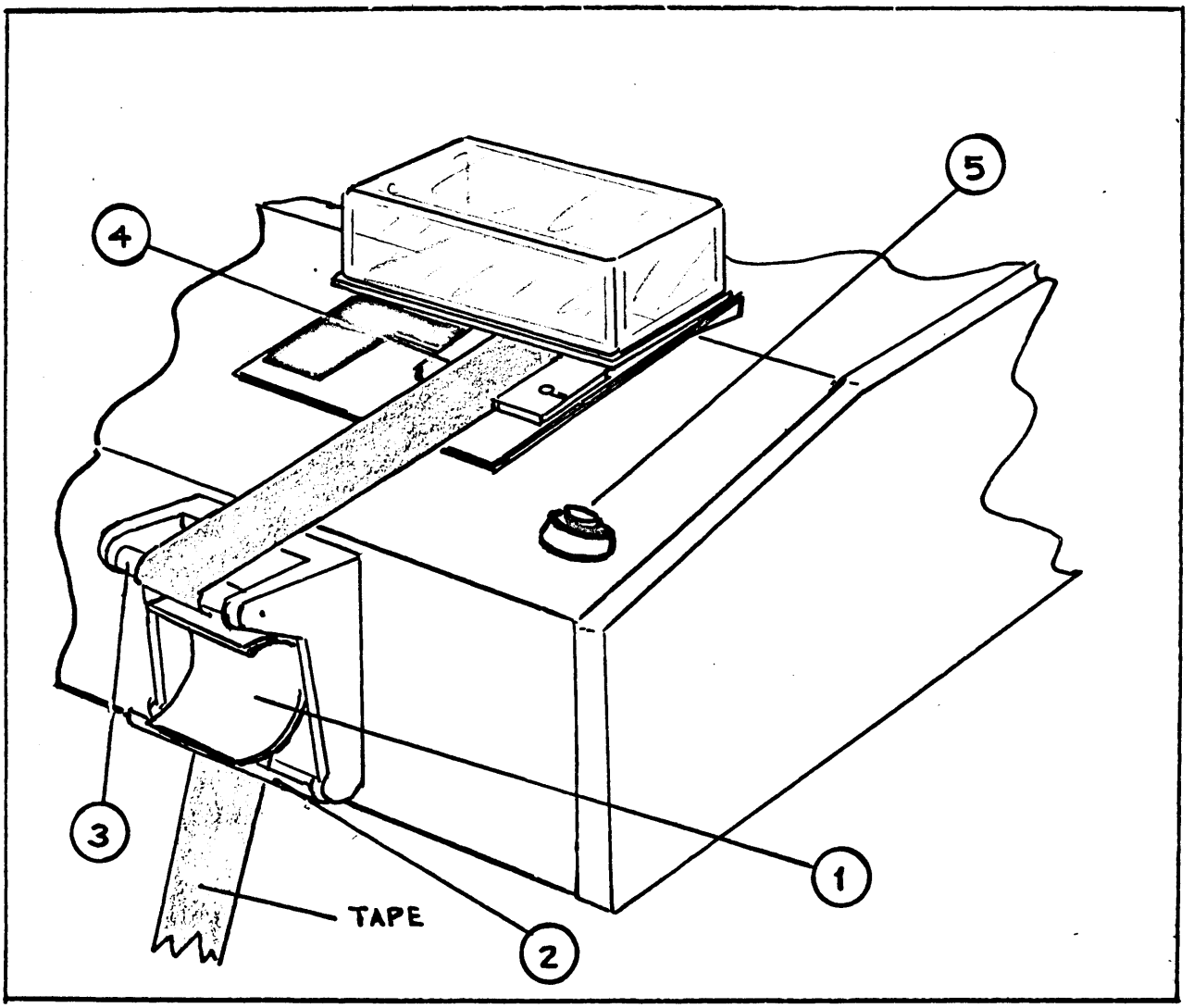


Figure C

TAPE PUNCH OPERATING PROCEDURE

CARD PUNCH - See figure D.

1. Pull tape tension switch lever (1) out.

2. Position card so that the left edge is guided by the tape reader deck as shown in figure D.

3. Slide card under the metal tape guide (2) .

4. Push tape tension switch lever (1) in.

5. Push card forward and press tape feed pushbutton (3) for tape punch activation.

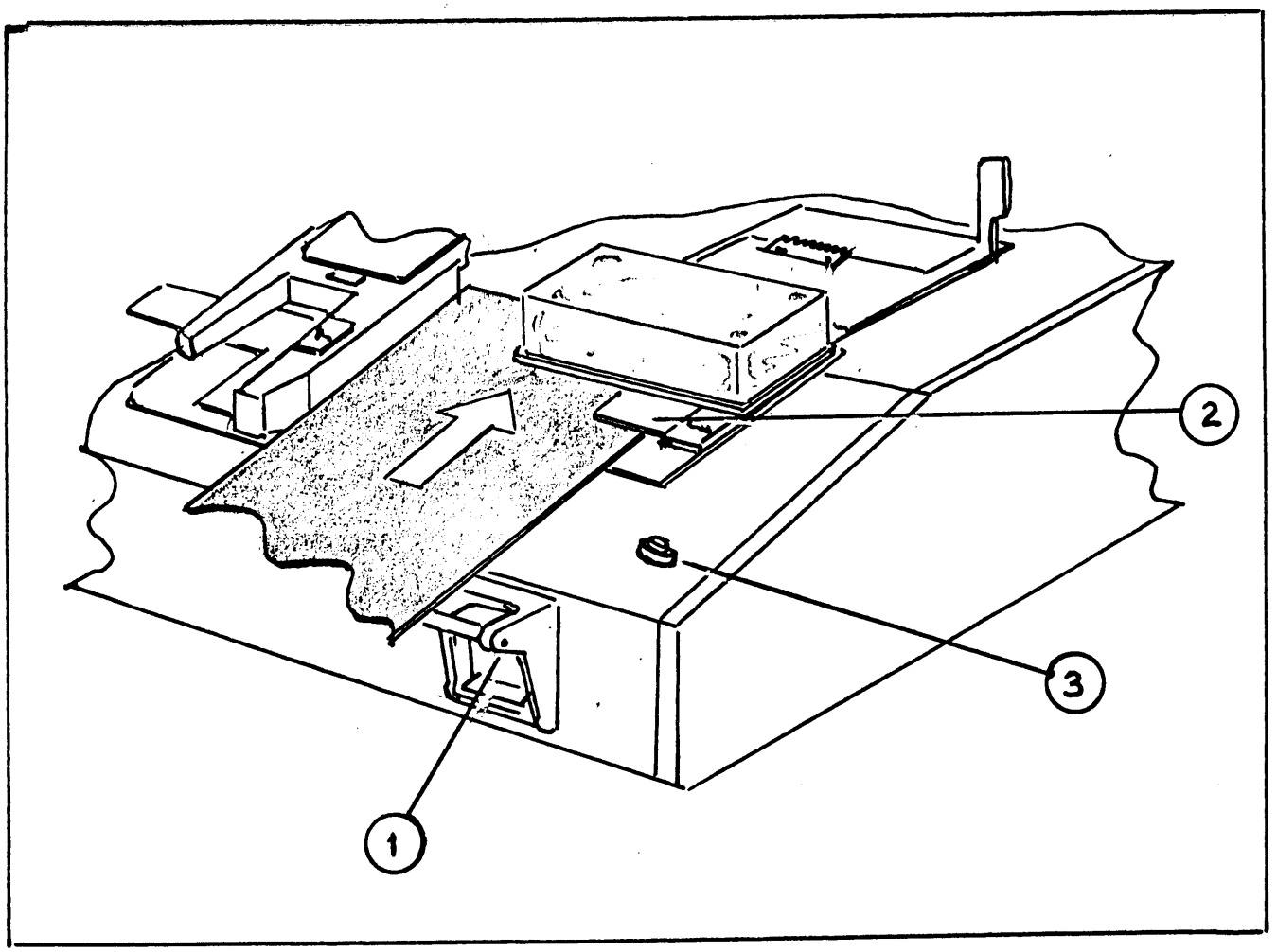


Figure D

SERVICE MANUAL & PARTS CATALOG

READER AND PUNCH 500 SERIES

ROYAL®

REVISED JANUARY 1964

Royal McBee Corporation

New York, N. Y.

CUSTOMER SERVICE

TECHNICAL SERVICE PUBLICATIONS DEPARTMENT

HARTFORD, CONNECTICUT 06106

INTRODUCTION

ROYAL MCBEE 500 SERIES READER AND PUNCH

The Royal McBee Corporation is pleased to present this Service Manual covering the complete servicing of the 500 Series Reader and Punch Units.

The 500 Series is a unique low-cost punched Tape Reader and Perforator designed to serve Data Processing peripheral equipment needs.

Available in seven models, the 500 Series offer complete flexibility of input-output plus higher operating speeds and precision accuracy.

The punched Paper Tape Reader is ideally suited to message relaying, data collection, business machine and computer input, or machine tool and plotter control.

Reading 5 to 8 channel tape, in either direction, the unit is designed to operate at a speed of 50 characters per second and incorporates an automatic tape insertion feature that reduces tape handling time.

The punched Tape Perforator makes use of a new principle that uses the holding power of small efficient electromagnets in combination with off-center springs to engage the selected punches.

This Service Manual covers all sixteen models of the 500 Series Reader and Punch. Information relating to the individual models may be found by consulting the Index.

CUSTOMER SERVICE -

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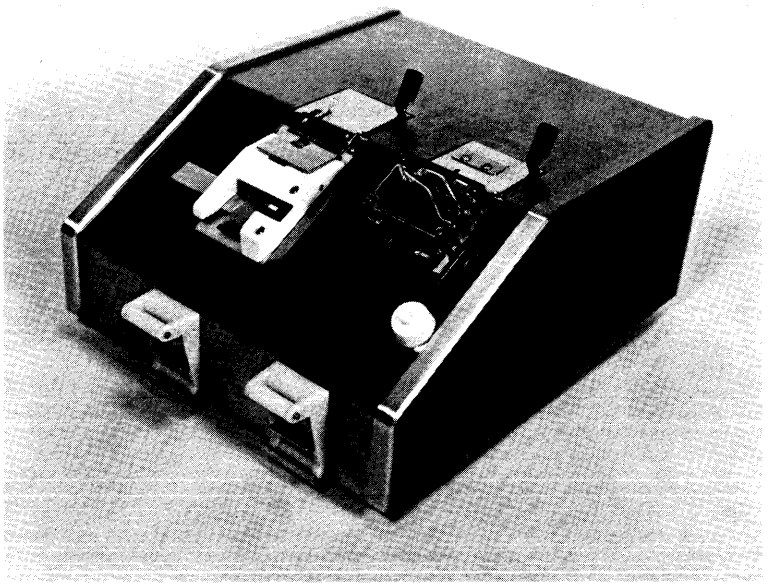

MODELS 580, 581, 590 and 591 READER AND PUNCH

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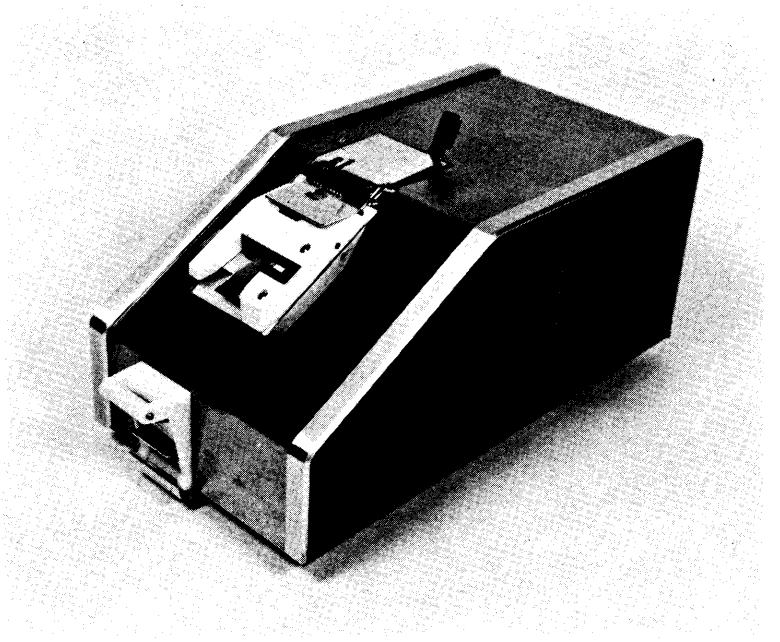
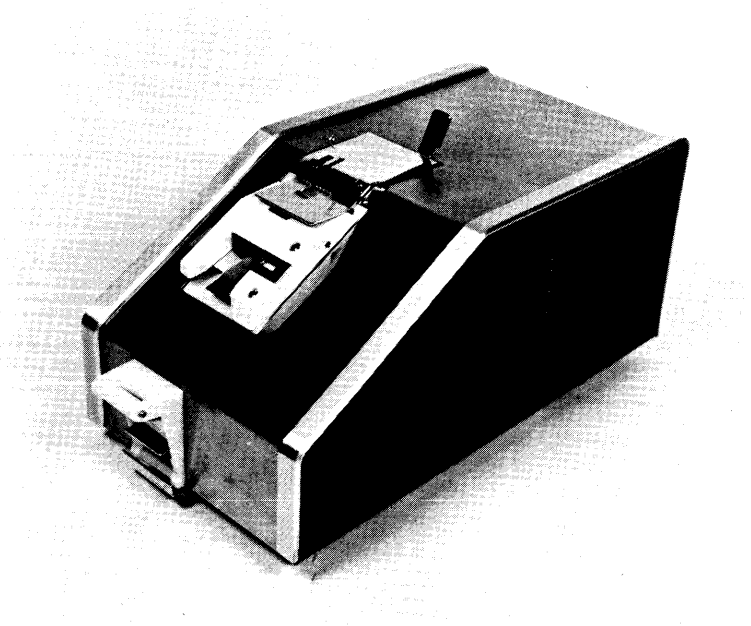
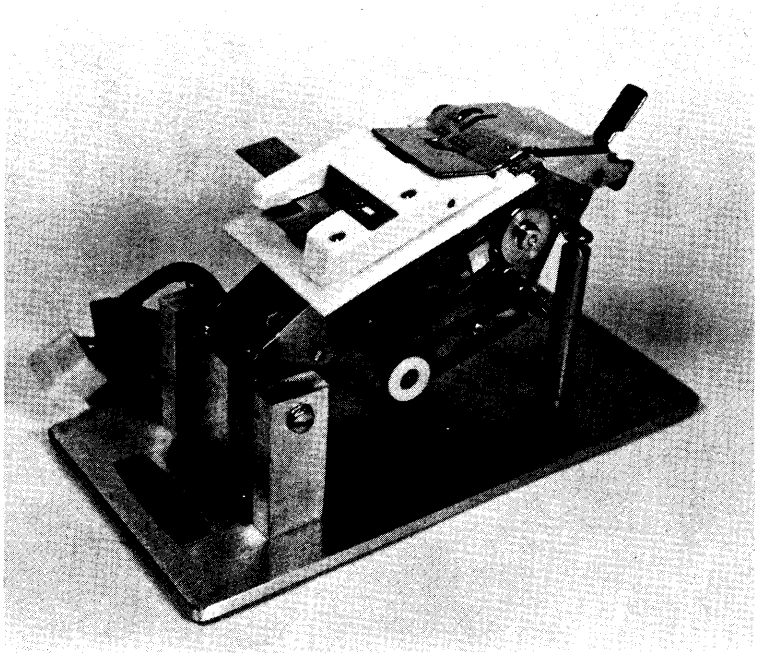


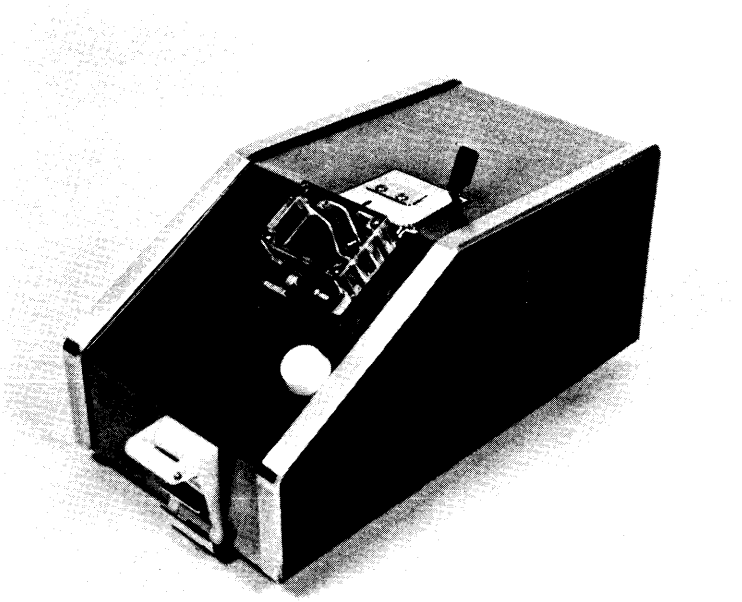
MODELS 570 and 571 READER WITH ELECTRONIC COMPONENTS AND MOTOR



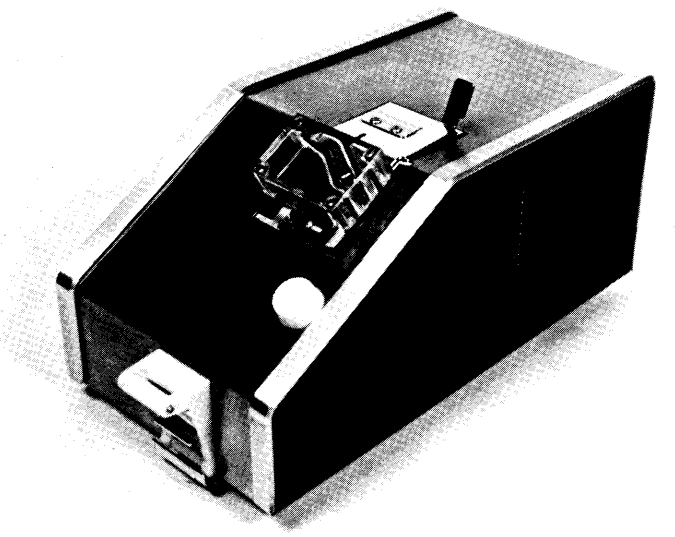
MODELS 560 and 561 READER WITH MOTOR



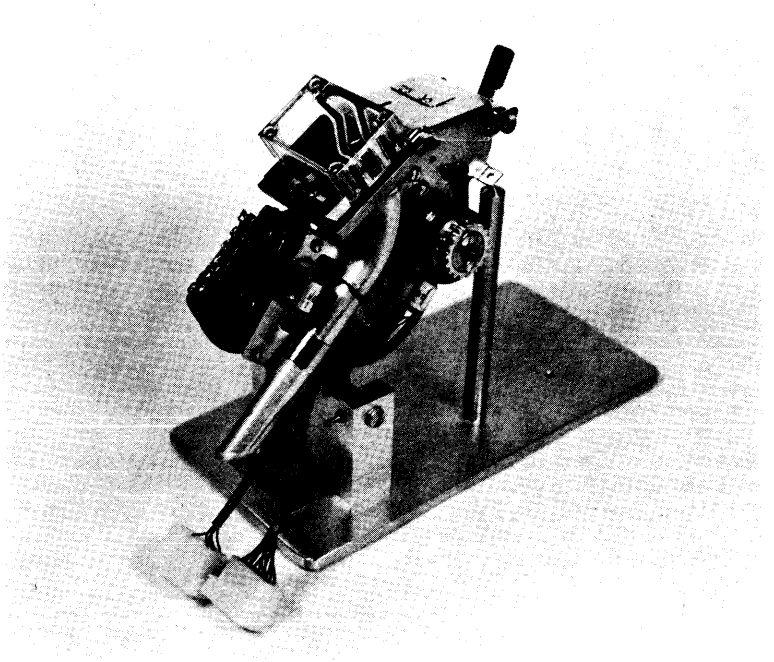
MODELS 550 and 551 READER - BASIC MECHANISM



MODELS 520 and 521 PUNCH WITH ELECTRONIC COMPONENTS AND MOTOR



MODELS 510 and 511 PUNCH WITH MOTOR



MODELS 500 and 501 PUNCH - BASIC MECHANISM

NOTES

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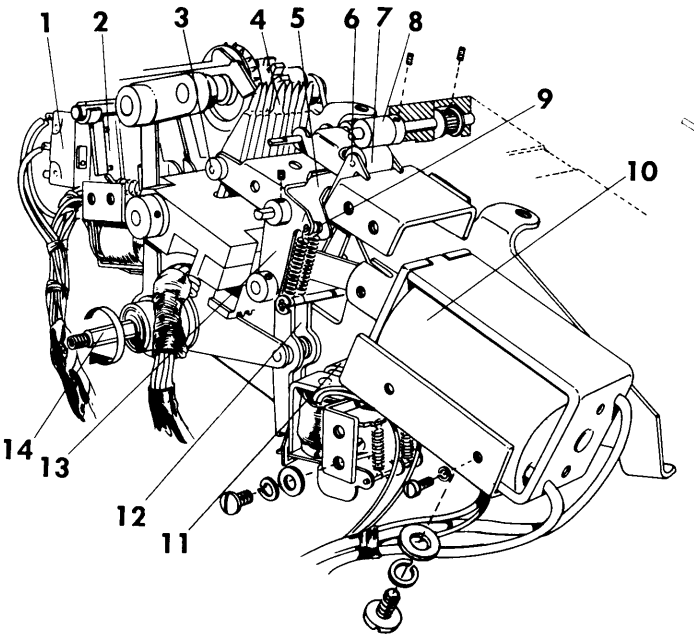
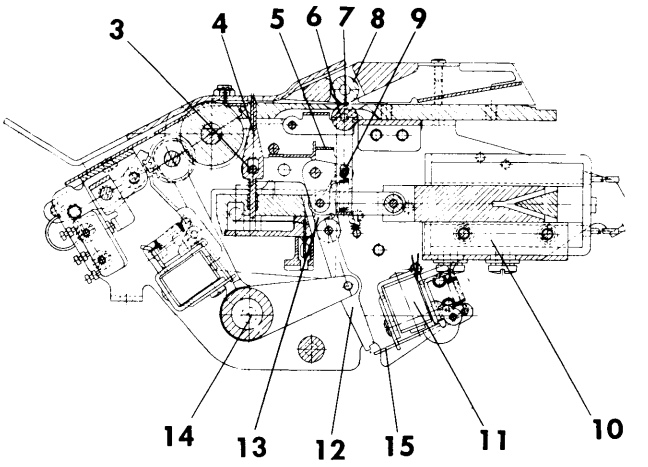
MECHANICAL SECTION
500 SERIES





READER - FUNCTION AND OPERATION

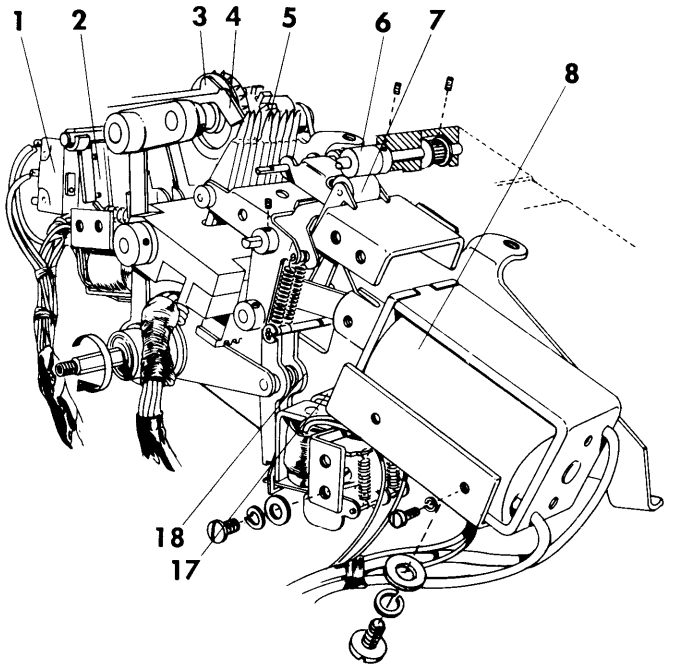
Prior to inserting Tape in the Reader Unit, Auto-Feed Switch (1) and Paper In Position Switch (2) form a closed circuit to Forward Retract Magnet (11) and Tape Roll Solenoid (10).

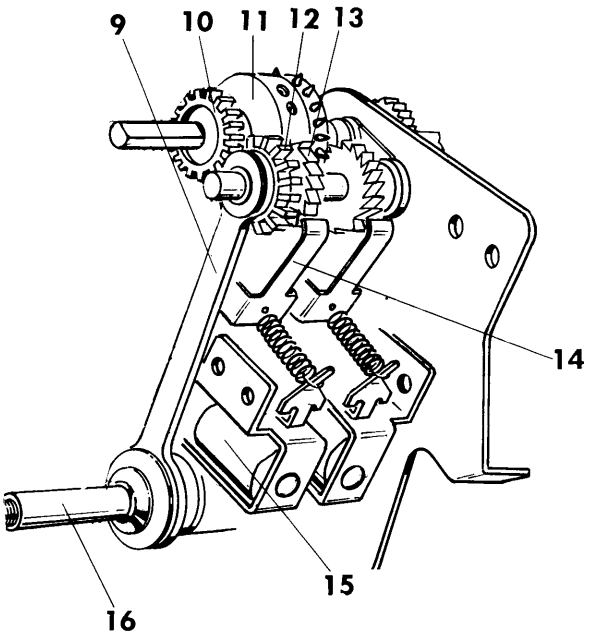
Eccentric Shaft (14), rotating in the direction indicated, imparts motion to Interposer Arm (12). The lower portion of Arm (12) swings free until Retract Magnet (11) is energized by the previously described condition. This brings Interposer (15) into the path of Arm (12).

The lower portion of Arm (12) is now restricted in its movement and Eccentric Shaft (14), continuing its movement, transfers motion to the upper part of Arm (12). Pin Carrier Bracket (13), through connection with Arm (12), moves to the front of the Unit and the opposite end of Bracket (13) moves down against Shaft (3) to retract Sensing Pins (4).

Tape Roll Solenoid (10), being energized by Switches (1) and (2), will pull back Tape Feed and Pin Retract Arm (5) and hold Pin Carrier Bracket (13) and Shaft (3) down, preventing Pins (4) from protruding above the Reader Platen.

Simultaneously, when Retract Arm (5) contacts and holds Pin Carrier Bracket (13) down, Pin (9) is raised sufficiently to allow Spring-loaded Tape Feed Roll Link (6) to raise Tape Roll (7) into contact with the revolving Tape Feed Roll (8).





READER - FUNCTION AND OPERATION - Continued

With Rolls (6) and (7) in contact, Tape is fed between the Rolls, over the retracted Pins (5) and up to the Auto-Feed Switch Blade (4); transferring Switch (1).

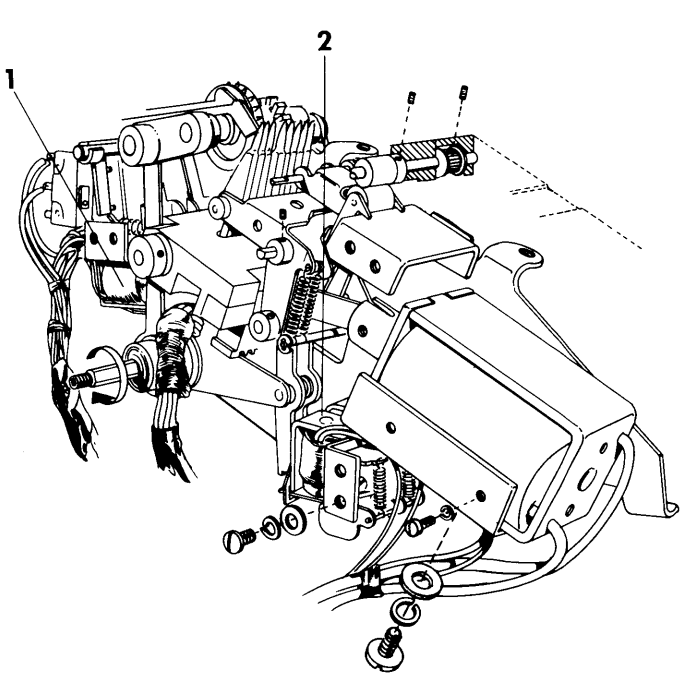
NOTE: When feeding Tape to Rolls (6) and (7), the Tape must be held parallel to and directly in line with the Tape Guide in order to properly engage Index Holes with Sprocket Pins.

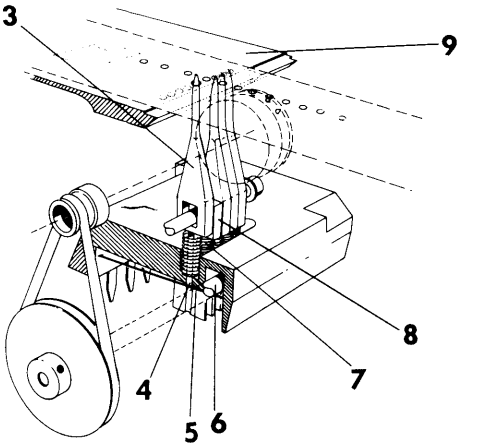
When Switch (1) is transferred by the Tape, through internal or external circuitry, Forward Feed Magnet (15) is energized, bringing Interposer (14) into contact with Forward Tape Feed Ratchet (13).

Index Link (9), connected to Eccentric Shaft (16), continuously rolls Gear (12) over Gear (10); however, when Interposer (14) contacts Ratchet (13) and prevents Gear (12) from rotating, the downward motion of Link (9) is transmitted to Gear (10) advancing Gear (10) and Sprocket (11) one space.

The Tape, after being advanced a few spaces, contacts Paper In Position Switch Blade (3), causing it to transfer Paper In Position Switch (2). When transferred by the Tape, through internal or external circuitry, Switch (2) de-energizes Tape Roll Solenoid (8), allowing Pins (5) to raise and simultaneously retracting Pressure Roll (7) from Feed Roll (6).

Forward Retract Magnet (17) is also de-energized when Switch (2) is transferred, allowing Arm (18) to move freely, preventing further movement of Pins (5). Simultaneously, Forward Feed Magnet (15) is de-energized and Interposer (14) returns, by spring tension, to the inactive position, allowing Gear (12) to roll freely over Gear (10), stopping the feeding of the Tape.





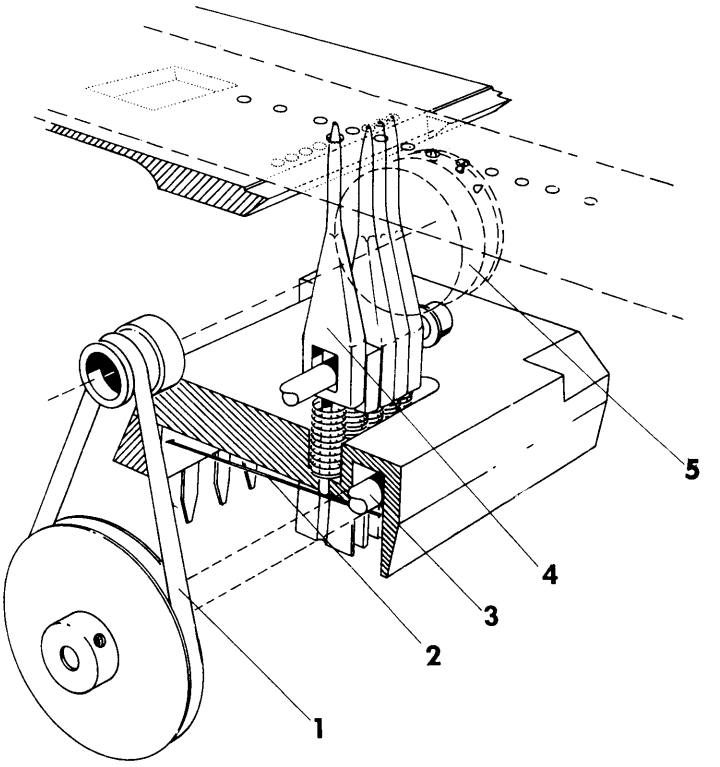
READER - FUNCTION AND OPERATION - Continued

The Tape is now in position and may be advanced and read by an external source. Refer to Circuit Description, Pages 2-5, 6, 7 of the Electronic Section. The Tape direction can be reversed by energizing Reverse Feed Magnet (1) and Reverse Retract Magnet (2). The Forward and Reverse Feed operations are identical with the exception of Tape direction and Timing. Refer to Timing Chart, Page 2-29.

The Timing of the Unit determines that the Tape is fed only when Pins (3) are below Platen (9).

When Pins (3) are below Platen (9), Extension (4) holds Contacts (5) out of contact with Common Roller (6). As the Tape finishes its movement, Pins (3) begin to raise to the Platen level. Once the Tape has stopped moving, Pins (3) begin to enter the perforations in the Tape. If a perforation is present, the corresponding Pin will be allowed to continue its upward movement through the Tape until it reaches its maximum height, where its Sensing Contact will make contact with Roller (6). This contact completes the circuit to be interpreted by external equipment.

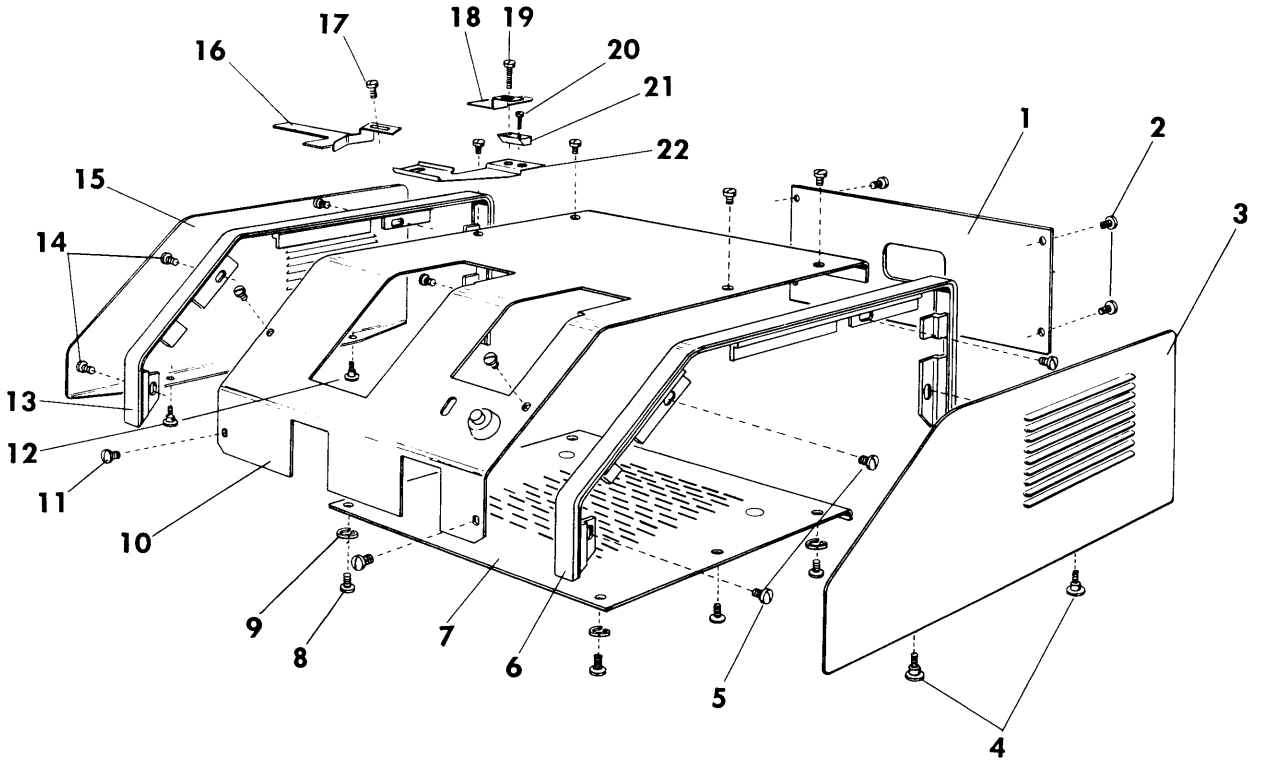
If a perforation is not present, the corresponding Pin will be stopped against the Tape, preventing its Sensing Contact from contacting Roller (6). All Pins function in the same manner except Interrogate Pin (8). Extension (7) of Interrogate Pin (8) is .005 longer than the other Pins and will always allow the Interrogate Sensing Contact to make contact after the other Sensing Contacts have contacted Roller (6) and to break before the other Sensing Contacts break.



READER - FUNCTION AND OPERATION - Continued

The rotating Eccentric Shaft lowers Pins (4) and advances the Tape as previously described. As the Eccentric Shaft continues to turn, the entire feeding and reading operations are repeated.

When Sprocket (5) rotates, Belt (1) turns Roller (3) so each succeeding sensing operation will contact a different point on Roller (3) to insure greater life to Roller (3) and Sensing Contacts (2).



COVERS AND PANELS - REMOVAL

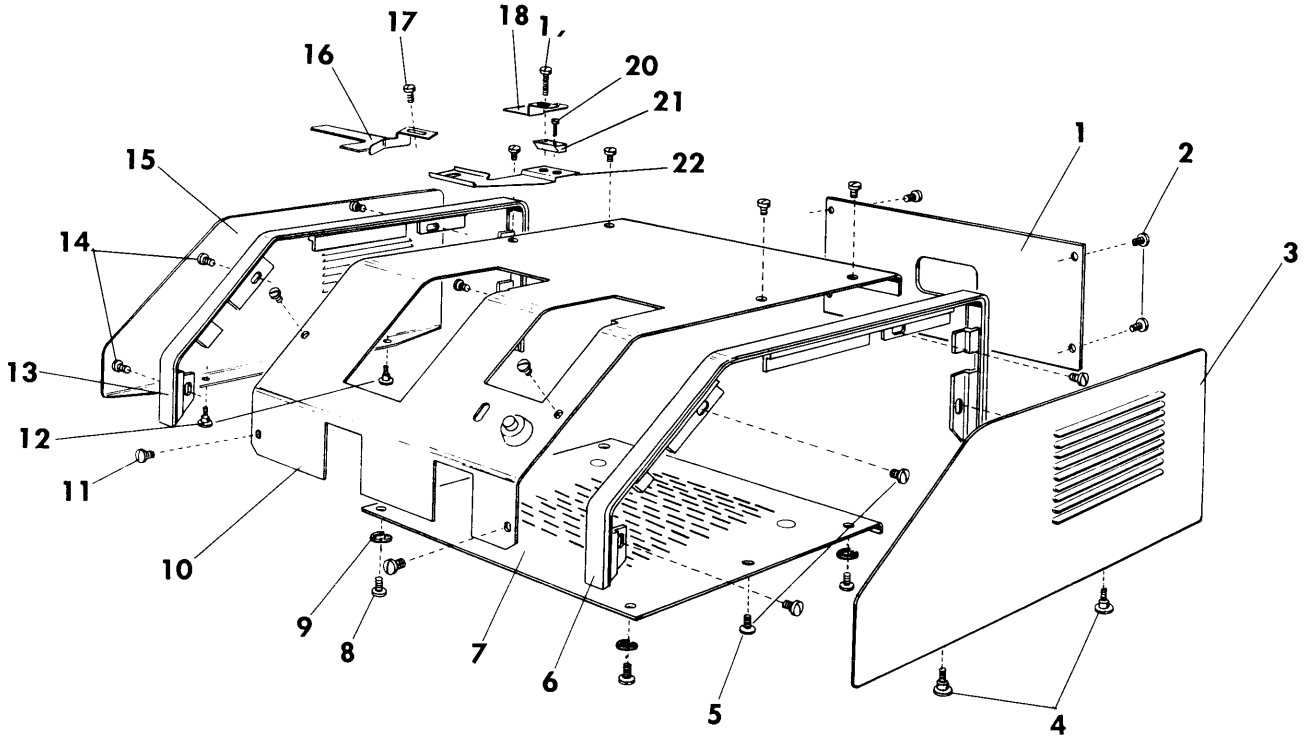
Side Covers (3) and (15)
Remove Binding Screws (4) and (12) and slide Covers (3) and (15) down out of Bezels (6) and (13).

Bottom Panel (7)
Remove four Binding Screws (8) and Lock Washers (9) to remove Panel (7).

Bezels (6) and (13)
Remove four Binding Screws (5) and (14) to remove Bezels (6) and (13).

Rear Panel (1)
Remove Side Covers (3) and (15) and Bezels (6) and (13) as previously described. Remove Four Binding Screws (2) to remove Panel (1).

Top Cover (10)
Side Covers (3) and (15) and Bezels (6) and (13) must be removed to enable removal of Top Cover (10). Remove Screw (17) and Reader Tape Guide (16). Remove Screw (19), Punch Tape Guide (18), Screw (20), Spacing Block (21) and Punch Out of Tape Switch Hold Down (22) (if applicable). Remove eight Binding Screws (11) and lift Cover (10) up and slightly to the rear to clear the Tape Deflector Extensions.



COVERS AND PANELS - REPLACEMENT

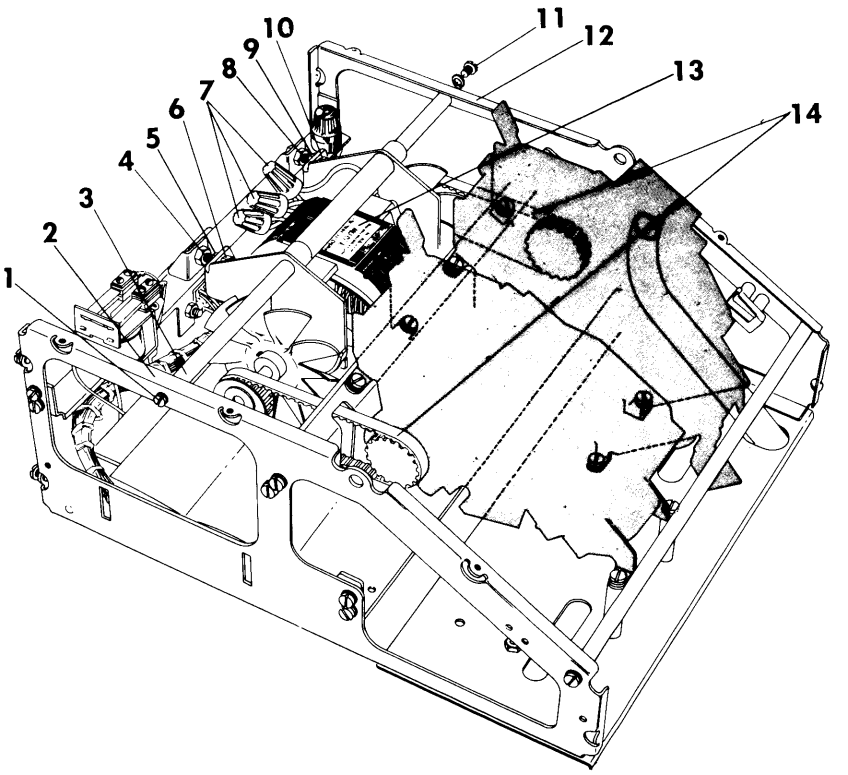
Top Cover (10)
Position Top Cover (10) over Unit. Install and tighten eight Binding Screws (11). Install Punch Out of Tape Switch Hold Down (22) under Spacing Block (21) (if applicable). Secure Spacing Block (21) to the Punch Unit with Screw (20). Install and adjust Tape Guides (16) and (18) with Screws (17) and (19). Adjust the Tape Guides to conform to the width of the Tape.

Rear Panel (1)
Hold Rear Panel against Unit and secure in place with four Binding Screws (2).

Bezels (6) and (13)
Secure Bezels (6) and (13) to Base Sides with Binding Screws (5) and (14).

Bottom Panel (7)
Secure Bottom Panel to Unit with Lock Washers (9) and Binding Screws (8).

Side Covers (3) and (15)
Slide Side Covers into slotted Bezels (6) and (13). Install and tighten Binding Screws (4) and (12).



MOTOR - REMOVAL - INSTALLATION AND ADJUSTMENTS

Removal

Remove Side Covers, Bezels and Top Cover as described on Page 1-6.

Remove Connectors (7) and disconnect the wires to Motor (13). To facilitate installation, the wires are color coded as follows: Yellow-to-Yellow, Green-to-White and Black-to-Black.

Remove Nuts (6) and (10) and loosen Screws (1) and (11). Gently push Motor (13) to the front of the Unit and disconnect Belts (14).

Remove Screws (1) and (11) and guide Motor (13) to the front of the Unit to clear Screws (4) and (8). Gently guide the left end of Motor Mounting Shaft (3) through the opening in Base Side Left (2). Pull the right end of Shaft (3) up to remove Motor (13) and Shaft (3) from the Unit.

CAUTION: Do not press the Motor Fans or other parts of the Motor Assembly against the Reader and/or Punch Circuit Cards.

Installation

Hold the Motor and Shaft Assembly at an angle placing the left end of Shaft (3) through Base Side Left (2). Position the right end of Shaft (3) in alignment with its hole in Base Side Right (12). Guide the Motor and Bracket Assembly to the rear of the Unit over Screws (4) and (8).

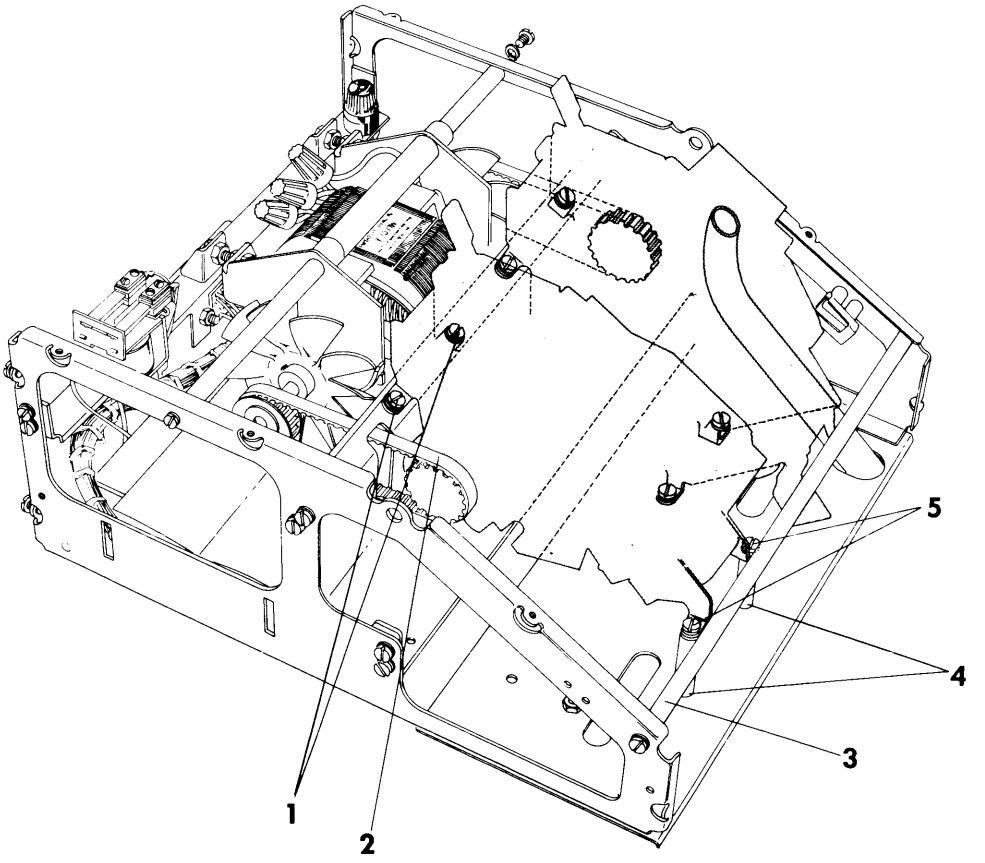
Install but do not tighten Screws (1) and (11). Install Belts (14) and Nuts (6) and (10). Using Connectors (7), connect the Motor Wires as previously described. The Motor is adjusted for proper Belt tension as follows:

Adjustments

With Screws (1) and (11) loose, move Motor (13) forward or rearward by turning Nuts (5), (6), (9) and (10) so there is approximately 1/4" depression of Belts (14). Securely tighten Nuts (5), (6), (9) and (10) and Screws (1) and (11) when proper Belt tension is obtained.

Install the Top Cover, Bezels and Side Plates.

NOTE: When replacing Belts (14) on the 590 or 591 Models, it will be necessary to time the Units in phase as described on Page 1-30.



READER MECHANISM - REMOVAL AND REPLACEMENT

Removal

Remove Side Covers, Bezels and Top Cover as described on Page 1-6.

Disconnect both Connectors and cut the Tie holding the Harness to Spacer (3). Disconnect Belt (2) and raise Tape Deflector to remove Binding Screws (1). Remove Screws (5) and lift Reader mechanism from the Unit. Remove Spacers (4).

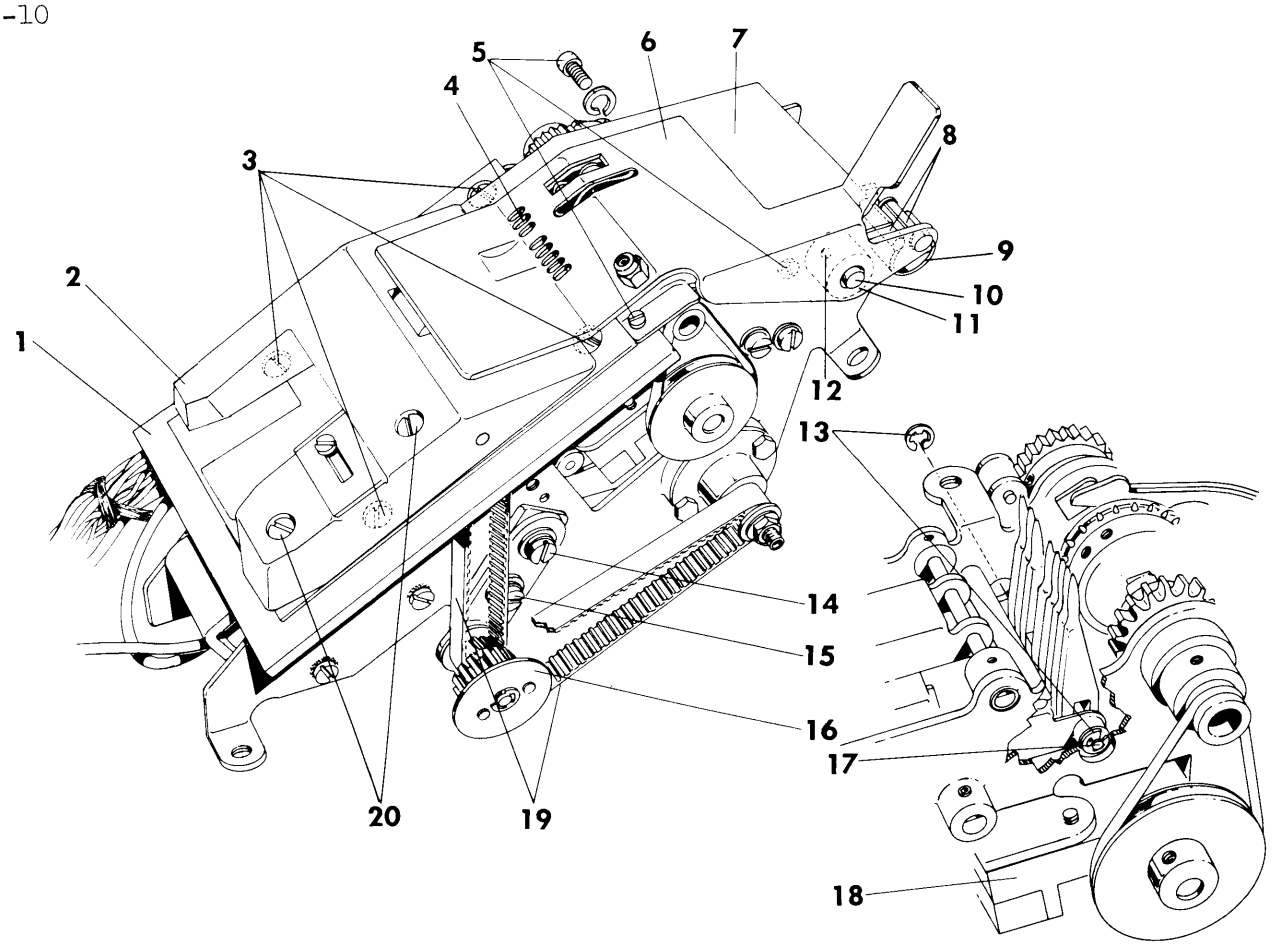
Replacement

Position Reader mechanism and Spacers (4) into Unit and secure in place with Binding Screws (5) and (1). Connect Belt (2) and both Connectors. Retie the Harness to Spacer (3).

To facilitate reconnection, the Connectors are color coded black and white. Replace Covers as described on Page 1-7.

NOTE: When removing Reader from 590 or 591, it will be necessary upon replacement to time the Reader and Punch together as described on Page 1-30.

There are no adjustments to the position of the Reader mechanism in the Unit.



SENSING PIN - REMOVAL AND REPLACEMENT

Removal

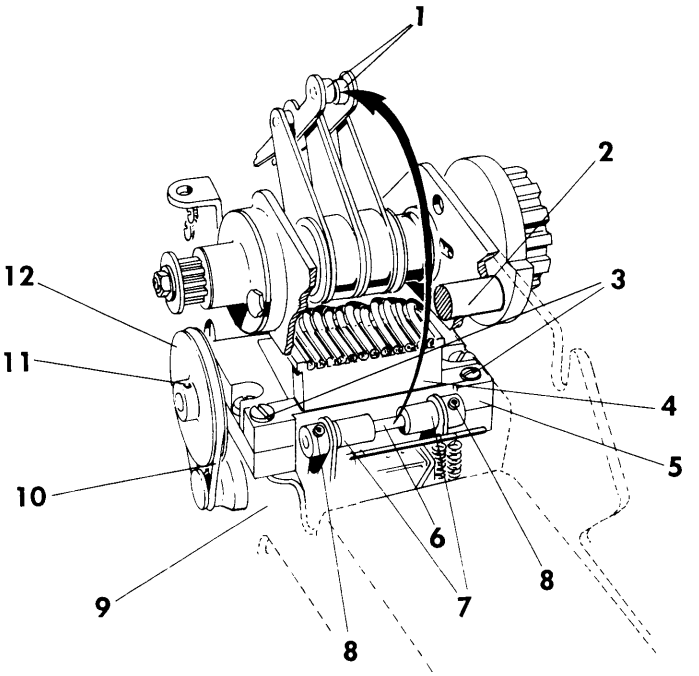
Remove the Basic Mechanism from the Unit. Loosen Screw (14) and remove Screw (15). Pulley (16) can now be moved to enable removal of Belts (19). Remove Screws (20) and Tape Guide Plate (2). Remove Tape Deflector (6) by loosening Set Screw (12) and pushing Shaft (10) to the left. Return Shaft (10) to its original position to avoid loss of Auto-Feed and In Position Switch Blades. Remove Screws (5) and Platen (7). Remove Screws (3) and Tape Guide Support (1). Note if there are shims under Support (1). Remove Retainers (13). Slide Shaft (17) out through the hole in the Side Plate and remove Sensing Pins (4) and Springs.

Replacement

Place the Springs and Pins (4) in position in Sensing Contact Assembly (18) and slide Shaft (17) through the Pins. Install Retainers (13).

CAUTION: When Pins (4) are assembled in the Sensing Contact Assembly, do not bear down on the Pins. This will overstress and damage the Sensing Contacts.

Place Tape Guide Support (1) in position over Pins (4) with Shims in position between Support (1) and the Sides of the Unit if required. Install and tighten Screws (3). Place Platen (7) in position between Side Plates and install and tighten Screws (5). While holding Spring (9) and Tape Deflector (6) with Spring (9) between Pins (8), as illustrated, slide Shaft (10) into Bushing (11). Tighten Set Screw (12). Place Tape Guide Plate (2) on Support (1) and install and tighten Screws (20). Place Belts (19) around Pulley (16) and install Screw (15). Move Pulley (16) to the point where both Belts (19) have approximately 1/8" depression. Tighten Screws (14) and (15).



READER SENSING CONTACTS - REMOVAL AND REPLACEMENT

Removal

Remove the Basic Mechanism from the Frame. Working from the bottom of the Reader, remove Spacer (2) and loosen Set Screws (8) and pull Shaft (6) to the left to free Arms (1). Move Arms (1) up and to the rear of the Unit as illustrated and return Shaft (6) to its original position to prevent the loss of Collars (7).

Remove Connector (4) and Screws (3). It may be necessary to loosen the Pulse Generator to gain access to Screws (3). Remove Belt (10) and loosen Set Screw (11) to remove Pulley (12). Sensing Contact Assembly (5) can now be removed through the opening in Side Plate (9).

Replacement

Carefully slide Sensing Contact Assembly through the opening in Side Plate (9) making sure the Contacts are properly located under their respective Sensing Pins.

Install Screws (3), Pulley (12) by tightening Screw (11), Belt (10) and Connector (4). Pull Shaft (6) to the left and reposition Arms (1) between Collars (7). Push Shaft (6) through the Collars and Arms (1) and tighten Set Screws (8) on the flat sections of Shaft (6). Install Spacer (2).

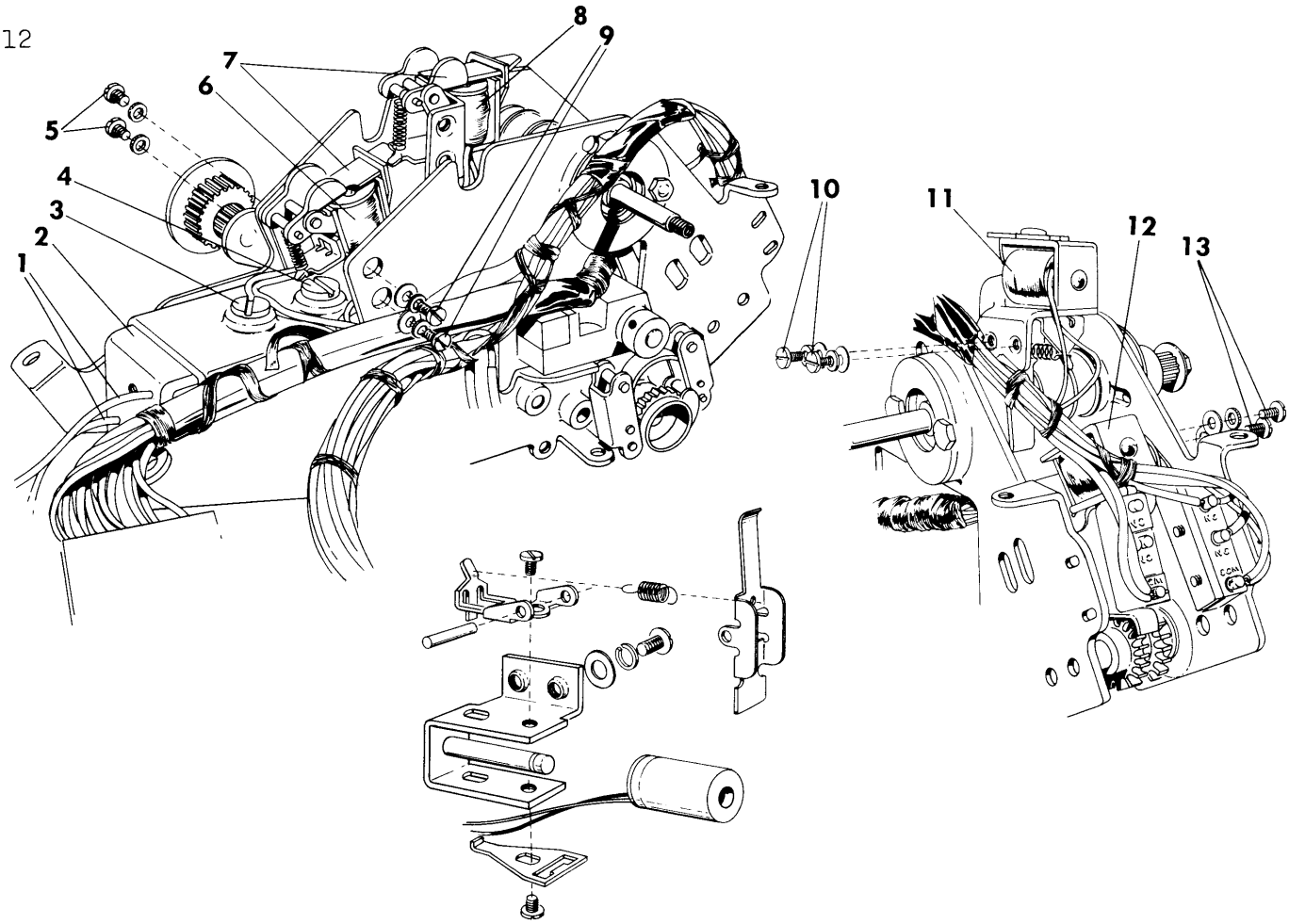
Install the Basic Mechanism in the Frame and perform a functional and Timing check of the Unit.

NOTE:
On late style Units, Connector (4) has been eliminated. The Sensing Contact Assembly is removed by unlacing the Wires to the Contact Assembly and removing the Pulse Generator and Pulse Generator Disc. Remove Screws (3) and slide the Sensing Contacts with attached Wires out of the Unit through the Left Side Plate.

Remove Wires and Pins from Positions 9 and 12 in the white Amp. Connector (see Connector Pin Identification on Reader Interconnections and Schematics).

Install the replacement Sensing Contact Assembly using the reverse procedure and install Wires and Pins from Positions 9 and 12 in the Connector supplied with the replacement Sensing Contact Assembly.

Relace the loose Wires, replace and adjust the Pulse Generator and Disc. Perform a functional check of the Unit.



READER TAPE ROLL, RETRACT AND INDEX MAGNET - REMOVAL AND REPLACEMENT

Tape Roll Solenoid Removal

Remove Screws (9) and Retract Magnet (8). Disconnect Leads (1) and remove Screw (3). Turn Screw (4) counter-clockwise until Solenoid (2) is free and can be removed through the rear of the Unit.

Replacement

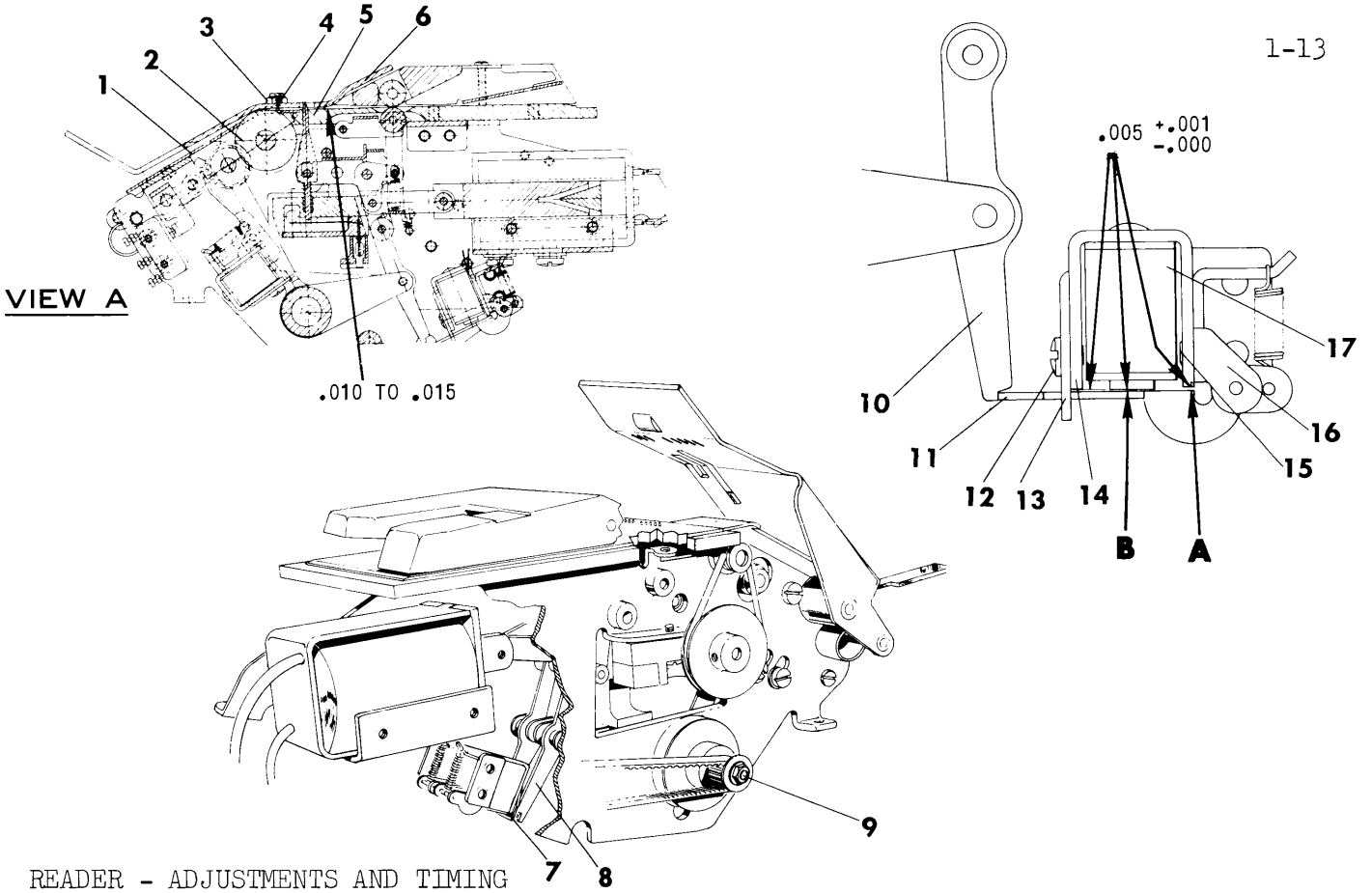
Place Solenoid (2) into the Unit and secure in place with Screws (3) and (4). Before tightening Screws (3) and (4), adjust Solenoid (2) as described on Page 1-14. Secure Retract Magnet (8) with Screws (9) and adjust this Magnet as described on Page 1-14.

Retract Magnet Removal and Replacement

Forward Retract Magnet (8) and Reverse Magnet (6) can be replaced by removing Screws (9) or (5) and disconnecting the respective Leads. When installing a new Magnet or Interposer (7), it will be necessary to adjust the Magnet and Interposer Assembly as described on Page 1-14 before tightening Screws (9) or (5).

Index Magnet Removal and Replacement

Forward Index Magnet (11) and Reverse Index Magnet (12) are easily replaced by removing Screws (10) or (13) and disconnecting the respective Leads. The Index Magnets can now be removed through the bottom of the Unit, and dismantled as illustrated for individual part replacement purposes. When installing a new Index Magnet, it will be necessary to adjust the Magnet and Interposer Assembly as described on Page 1-16 before tightening Screws (10) or (13).



READER - ADJUSTMENTS AND TIMING

Reader Tape Deflector Adjustment View A

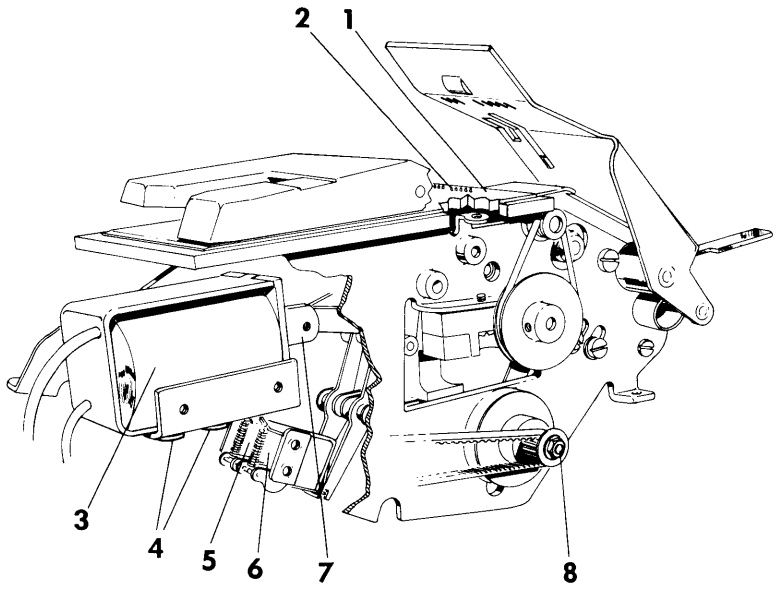
Loosen Nut (3) and turn Screw (4) in or out to obtain .010 to .015 clearance between Tape Deflector (6) and Support (5). Tighten Nut (3) and recheck the adjustment. Tape Deflector (6) may be formed to obtain the correct clearance on Both Sides of the Tape Deflector. Once this adjustment is made, check for .010 to .015 clearance between Tape Deflector (6) and Platen (1) at points adjacent to and on Sprocket Wheel (2). Readjust Screw (4) if necessary.

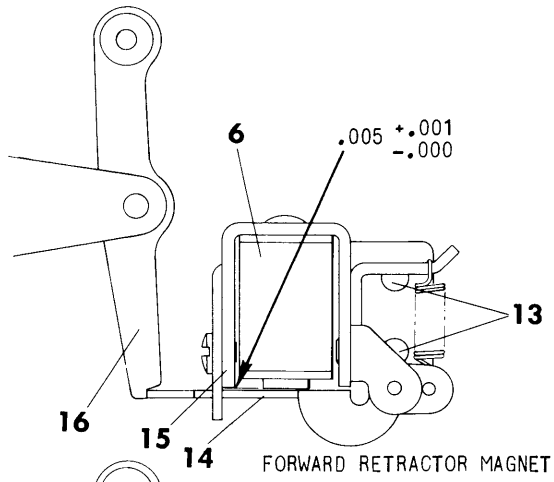
Calibrating Timing Dial to Main Shaft

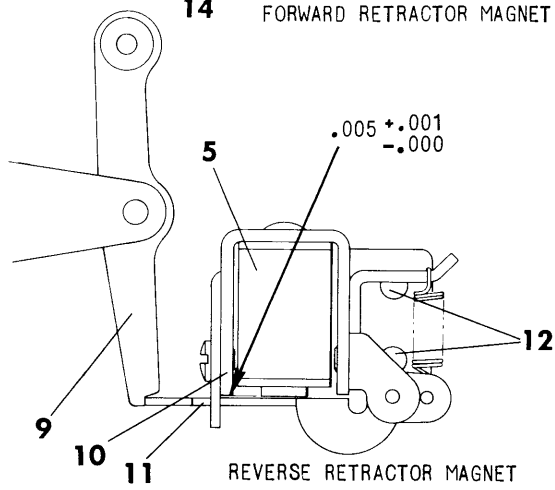
Remove Input Shaft Pulley and Pulley Hub to expose the Timing Dial. Secure the Leads of an Ohmeter to Pins 11 and 3 of Connector D (see Electronic Section Page 2-15). Slowly rotate Shaft (9) clockwise, facing left side of Unit, with Forward Pin Retractor Magnet Interposer (7) engaged with Arm (8), until continuity is interrupted between the Common Contact and the Code Contact. Note the reading on the Timing Dial, referenced to the center of the Pulse Generator Pole. Rotate Shaft (9) further until continuity is obtained between the Common Contact and the restored Code Contact. Calculate the difference between the first reading and the reading of the Timing Dial when continuity is restored. Divide the difference by two and add it to the first reading. Rotate Shaft (9) until the Timing Dial reads this total figure, referenced to the same point. At this point, the Sensing Pins are in the fully retracted position and the Timing Dial must be loosened and adjusted to read 205°. CAUTION: Do not rotate Shaft (9) during this final stage of Timing Dial Calibration.

Forward Pin Retractor Magnet Adjustments View B

With Forward Retractor Magnet (17) removed from the Basic Mechanism, hold Interposer (11) in the operated position and loosen Screw (12) to adjust Plate (13) for .005 + .001 - .000 clearance between Interposer (11) and Solenoid Bracket (14). Loosen Screw (15) and adjust Bracket (16) to obtain .005 + .001 - .000 clearance between Interposer (11) and Solenoid Bracket (14) at Point A. Check for .005 + .001 - .000 clearance at Point B.







READER - ADJUSTMENT AND TIMING - Continued

Forward Pin Retractor Magnet Adjustments-Continued

Consult the Electronic Section for the specifications regarding "pick time" (3.5 millisecond maximum at 20.4 VDC) and "drop time" (8.5 millisecond maximum at 27.6 VDC). Install Magnet Assembly in the Unit. Set the previously calibrated Timing Dial at 75° + 5° - 0°. Loosen Screws (13) and move Retractor Magnet (6) to limit the movement of Arm (16) and to bottom with approximately .005 clearance on Arm (16) simultaneously with the bottoming of Interposer (14) against Stop (15). Tighten Screws (13). Set the Timing Dial at 152°. Pins (2) must now be flush with Platen (1).

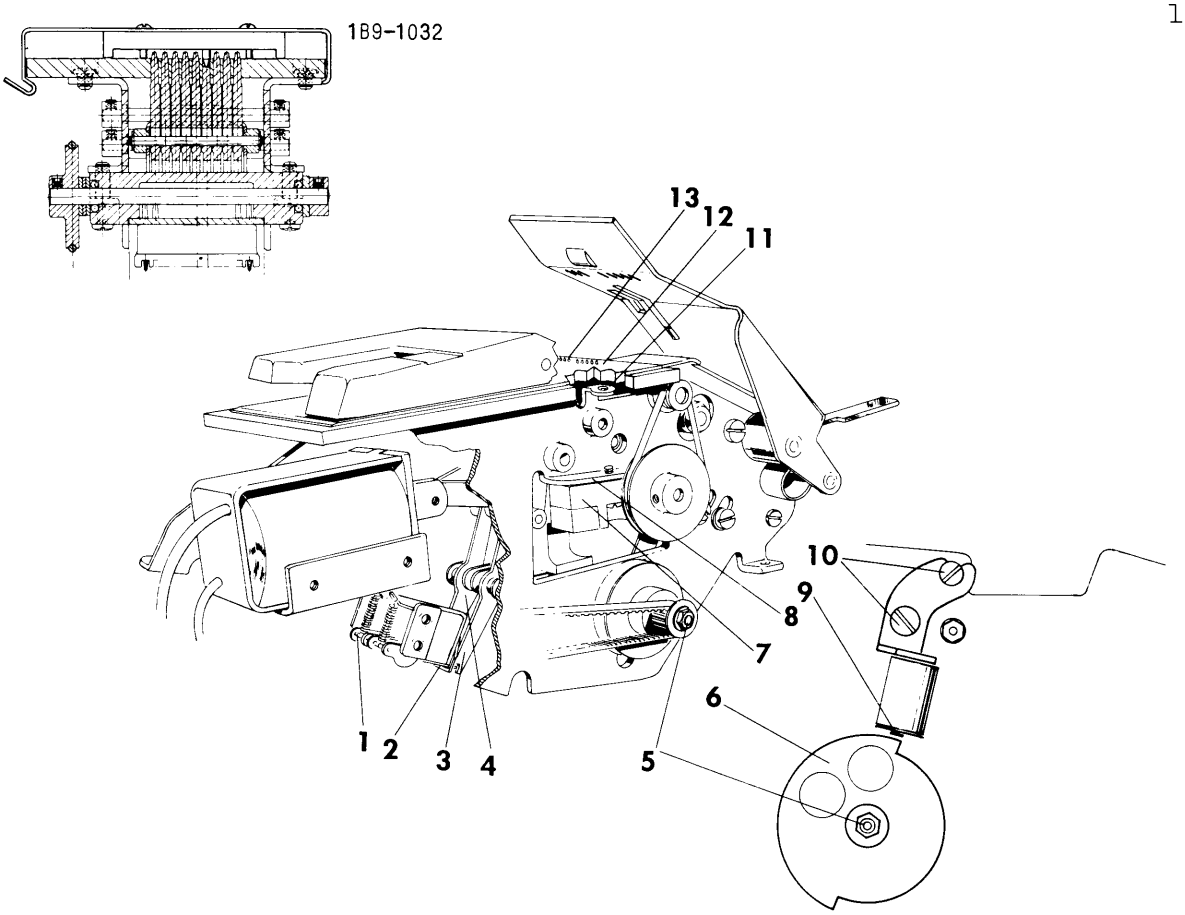
Tape Roll Solenoid Adjustments

With the Reverse Retractor Magnet removed from the Unit, operate the Forward Retractor Magnet (6) and turn Eccentric Shaft (8) until Pins (2) are fully retracted (205°). Loosen Screws (4) and while holding Plunger (7) and linkage to the front of the Unit, to remove all play, move Solenoid Assembly (3) to bottom against Plunger (7). Tighten Screws (4) and install the Reverse Retractor Magnet.

After the above adjustment is correctly made, apply -24 VDC to the Tape Roll Solenoid and note that Pins (2) are held retracted after Forward Retractor Magnet (6) is no longer engaged with Arm (16).

Reverse Retractor Magnet Adjustments

Reverse Retractor Magnet (5), when out of the Unit, is adjusted identically to the Forward Pin Retractor Magnet. Set the previously calibrated Timing Dial at 255° + 5° - 0°. Loosen Binding Screws (12) and move Retractor Magnet (5) and Interposer (11) to limit the movement of Arm (9) and to bottom on Arm (9) simultaneously with the bottoming of Interposer (11) against Stop (10). Tighten Screws (12). Rotate the Main Shaft so the Timing Dial reads 332°. The Pins must now be flush with Platen (1). When necessary, readjust Retractor Magnet (5).



READER - ADJUSTMENTS AND TIMING - Continued

Sensing Pin to Brush Assembly Adjustments

Pins (13) must raise .062 above Support (12). To adjust, place Shims between Support (12) and Ear (11), on both sides of the Support.

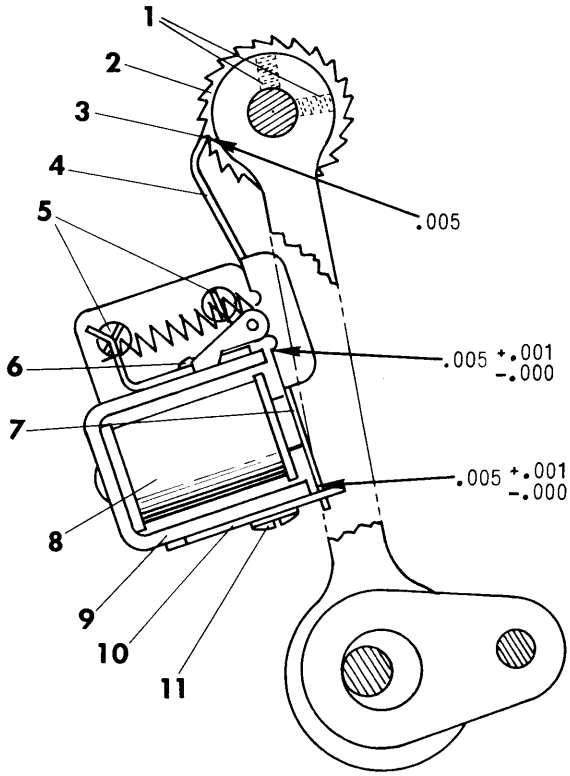
With Interposer (2) engaged with Arm (3), rotate Shaft (5) until continuity is obtained between Code Sensing Contacts and the Common Contacts. Pins (13) must now protrude .032 ± .002 above Support (12). When Pins (13) raise higher than .032 before continuity is obtained, it will be necessary to place Shims between Sensing Contact Assembly (7) and Extensions (8) on both sides of the Unit to lower the Brush Assembly. If Pins (13) protrude below .032 when continuity is obtained, it will be necessary to raise the Brush Assembly by removing the Shims. Check the adjustment with Gauge 1B9-1032 as illustrated.

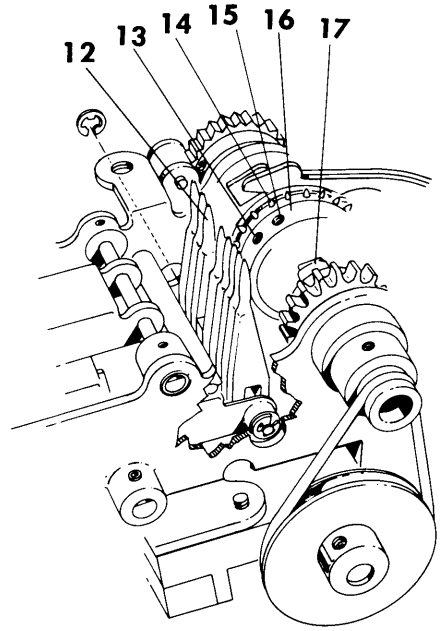
Sensing Contact Timing Inspection

As a final check of Contact Timing, rotate Shaft (5) with Interposer (2) engaging Arm (3). The Contacts must make contact with the Roller at 297° and break at 112°. Engage Interposer (1) with Arm (4). The Contacts must make contact with the Roller at 117° and break at 292°. When required, readjust the Retract Magnet pertinent to the Reverse or Forward mode. When the Contacts are properly adjusted, the Interrogate Contacts will automatically be timed to the Code Contacts, Negative Pulse in the Forward mode and Positive Pulse in the Reverse mode. Refer to the Timing Chart on Page 2-29 of the Electronic Section.

Pulse Generator Adjustments

Rotate Shaft (5) to the point where the gap between Center Pole (9) and Disc (6) is decreased as illustrated. Loosen Screws (10) and move Center Pole (9) to within .006 to .010 of Disc (6). Check this adjustment on several points of Disc (6).





READER - ADJUSTMENTS AND TIMING - Continued

Forward and Reverse Index Magnet Armature Adjustments

Armature (7) when operated must have .005 + .001 - .000 gap between Magnet Shell (9) and Armature (7). It is essential that this gap never be below .005. Adjustment is made by loosening Binding Screws (6) and (11) and repositioning either Armature Assembly (7) or Plate (10).

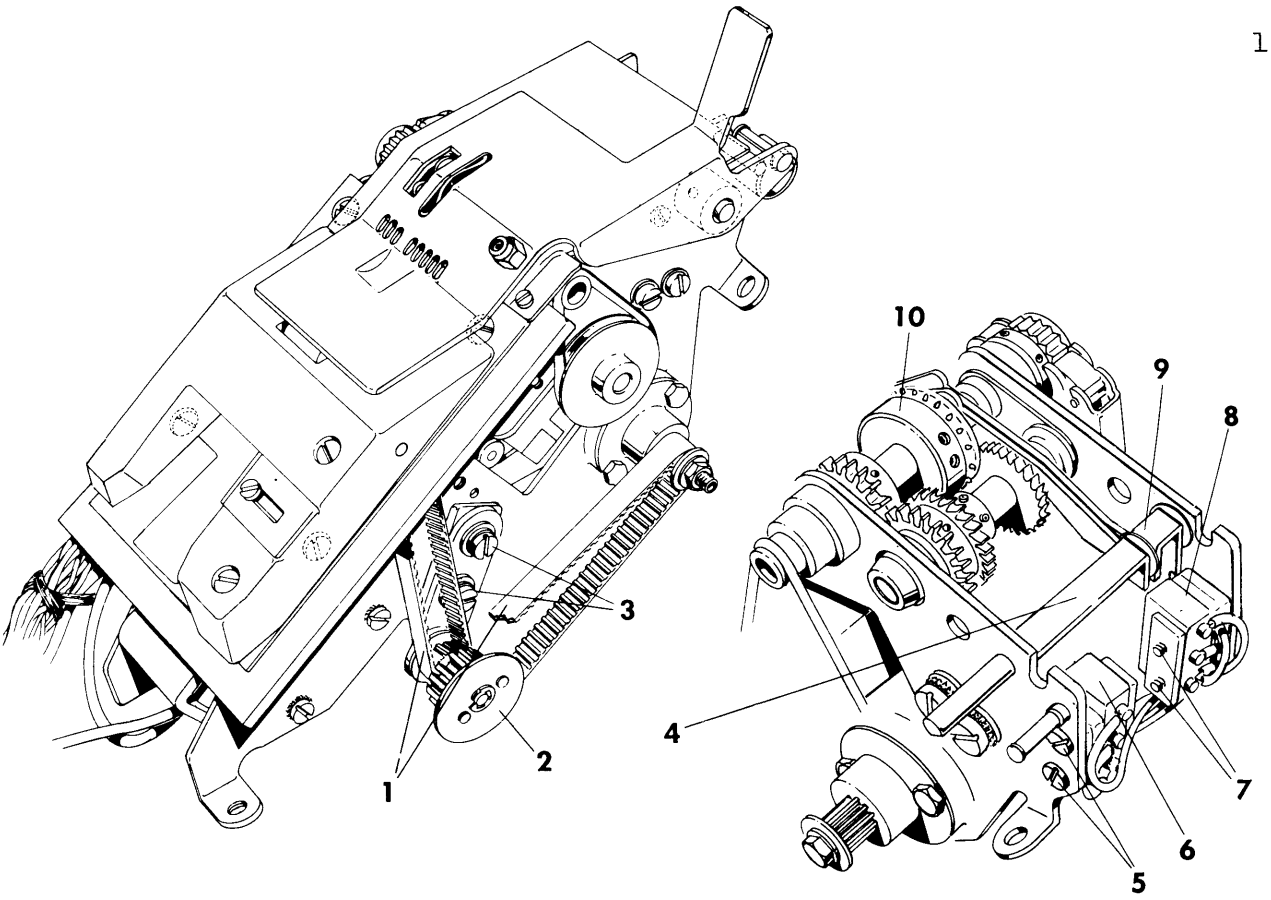
Consult Electronic Section for the specifications regarding "pick time" (6.0 millisecond maximum at -20.4 VDC) and "drop time" (9.5 millisecond at -27.6 VDC).

Index Magnets (8) when operated, must bring Interposer (4) to within .005 of the bottom of the Forward or Reverse Ratchets (2). To adjust, loosen Binding Screws (5) and move Magnet and Interposer Assembly to the desired .005 clearance. Rotate the Timing Dial to 255° and operate Forward Interposer (4). Interposer (4) must contact Ratchet (2) with no play between the top of Interposer (4) and Ratchet Tooth (3). If adjustment is necessary, loosen Set Screws (1) and reposition Ratchet (2). Check this adjustment on all teeth of the Ratchet. NOTE: The Reverse Feed adjustment is identical to the Forward Feed; however, the Timing Dial is set at 75° when making the adjustment.

Sprocket Wheel Adjustments

Pin (14) of Sprocket Wheel (16) must be positioned .500 away from the center of Pins (12). To adjust Sprocket (16), loosen Set Screw (13) and tighten Set Screw (15) to move Sprocket Pin (14) closer to Pins (12). Loosen Set Screw (15) and tighten Set Screw (13) to move Sprocket Pin (14) further from Pins (12). Set Screws (13) and (15) must be located on the flat of Shaft (17) when performing the previously described adjustment. Check the adjustment with a section of the Tape to be read.

On Units equipped with an advanced Feed Hole, (models 551, 561, 571, 581, 591) Pin (14) of Sprocket Wheel (16), must be positioned .513 away from the center of Pins (12).



READER - ADJUSTMENTS AND TIMING - Continued

Auto-Feed Switch Adjustments

Loosen Binding Screws (7) and move Switch (8) in or out so Switch (8) transfers when the Tape depresses Switch Lever (9) approximately 2/3. When adjusting Switch (8) do not limit the movement of Switch Lever (9) below the Platen.

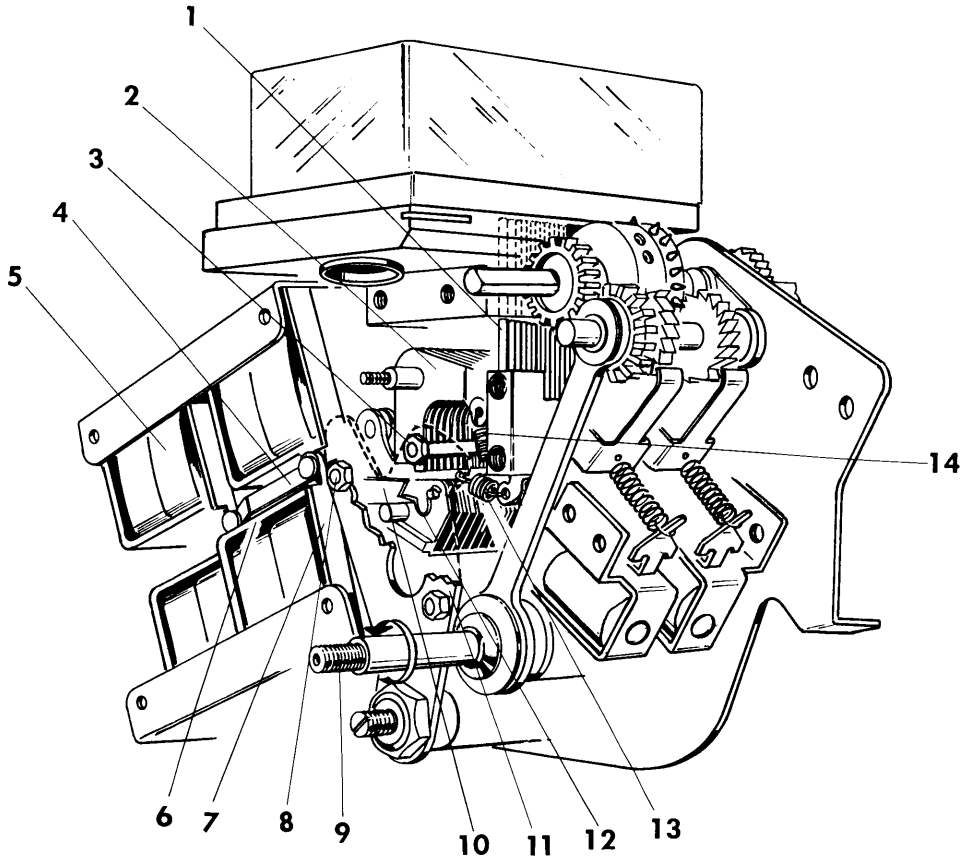
Paper In Position Switch Adjustments

Loosen Binding Screws (5) and move Switch (6) in or out so Switch (6) transfers when the Tape depresses Switch Lever (4), approximately 2/3. When adjusting Switch (6) do not limit the movement of Switch Lever (4) below the top of Sprocket (10).

NOTE: Switches (6) and (8) may easily be replaced by removing Binding Screws (5) or (7) and disconnecting the respective Leads.

Belt Tension Adjustment

Loosen Binding Screws (3) and move Pulley (2) into a position where Belts (1) have approximately 1/8" depression. Tighten Screws (3) when properly adjusted.



PUNCH - FUNCTION AND OPERATION

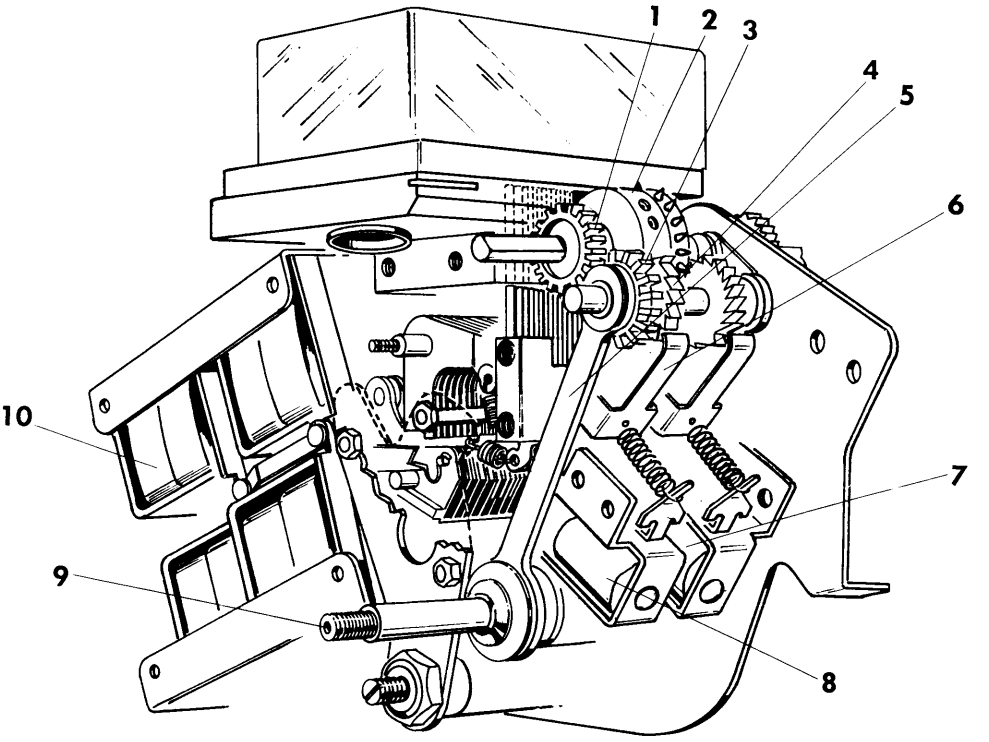
Input Eccentric Shaft (9) rotating in the direction indicated, imparts motion to Punch Pawl Yoke (11).

When a Punch Magnet (5) is energized while Punch Yoke (11) is moving to the rear of the Unit, the pulling action against Link (4) causes Punch Pawl (10) to pivot about Shaft (8). The end of the Punch Pawl moves up, against the tension of Over-Centering Spring (12). Once Pawl (10) is past center of Spring (12), the spring tension pushes Pawl (10) into contact with Punch Driver Arm (2).

As Yoke (11) and Pawl (10) continue to move rearward, Punch Driver Arms (2) pivot up and drive Punches (1) through the Tape to produce the perforated code. Shaft (9) continues to rotate. Yoke (11) and Pawls (10) move to the front of the Unit and allow Springs (14) to pull Driver Arms (2) and Punches (1) out of the Tape.

Just before Yoke (11) is fully to the front of the Unit, Armature (7) contacts Magnet Shell (6) and as Yoke (11) moves to its full forward position, the force from Armature (7) contacting Shell (6) through connecting Link (4), pushes Pawl (10) against Over-Centering Spring (12) until Pawl (10) is past center and the tension of Spring (12) returns Pawl (10) to its inactive position. Positive Retractor (3) insures the retraction of Punches (1) should Springs (14) fail to pull the Punches from the Tape. Subsequent rotation of Shaft (9) and energizing of Magnets (5) will repeat the punching operation.

Spring (13) eliminates excessive chatter during high speed movement of Yoke (11).



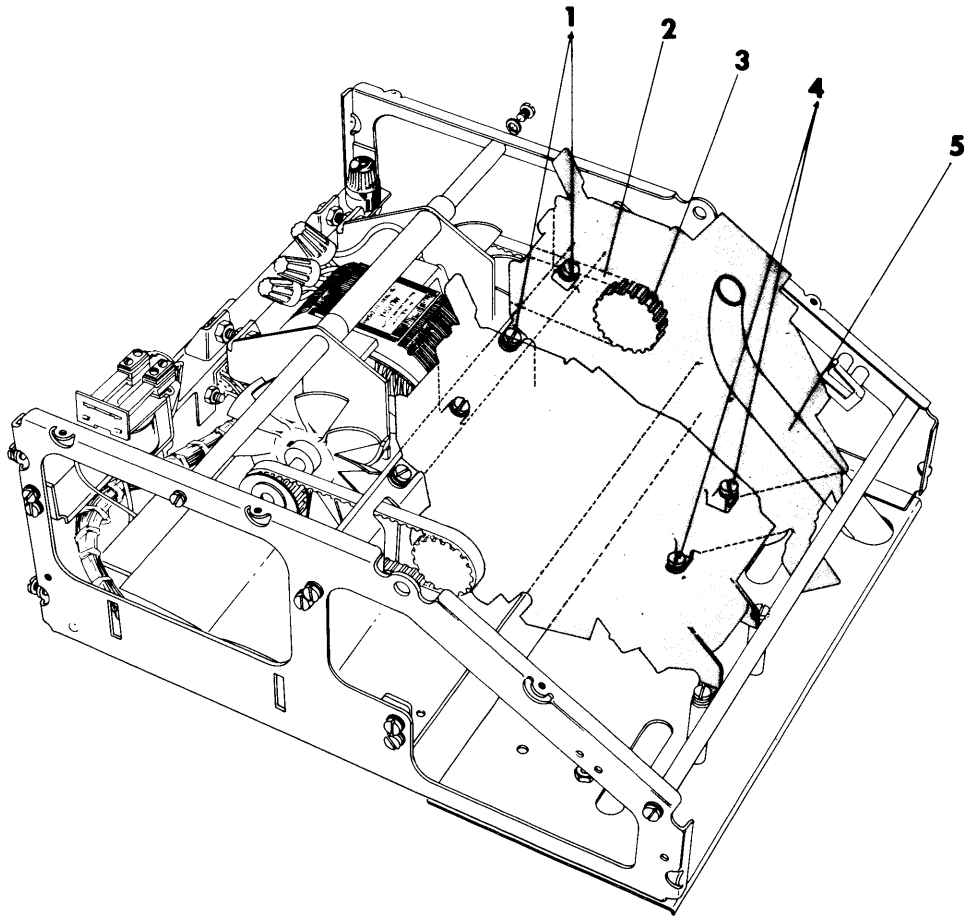
PUNCH - FUNCTION AND OPERATION - Continued

During the rotation of Eccentric Shaft (9), Index Link (5) moves up and down rolling Gear (3) over Gear (1). When the Punches are below the Platen Level, Index Link (5) is at its highest point and Forward Index Magnet (8), when energized, brings Interposer (6) into contact with Ratchet (4).

Once Interposer (6) has stopped Ratchet (4) and Gear (3) from turning, the downward motion of Link (5) is transmitted to Gear (1) turning Gear (1) and Sprocket (2) one space.

When the Sprocket is fully advanced, Index Magnet (8) is de-energized and Interposer (6) returns by Spring tension to its inactive position. The rotation of Shaft (9) raises Link (5) to its highest point to repeat the preceding operation.

The Tape can be fed in the reverse direction by energizing Reverse Magnet (7). The Tape will feed the same way as described in Forward Feeding; however, the feeding occurs during the upward movement of Link (5). The Punching operation occurs at this time and it is, therefore, essential that Punch Magnets (10) are not energized during the Reverse Feed mode.



PUNCH MECHANISM - REMOVAL AND REPLACEMENT

Removal

Remove Side Covers, Bezels and Top Cover as described on Page 1-6.

Disconnect the Connectors and remove Belt (2) from Pulley (3). Remove Binding Screws (1) and (4) and lift Punch mechanism from Unit.

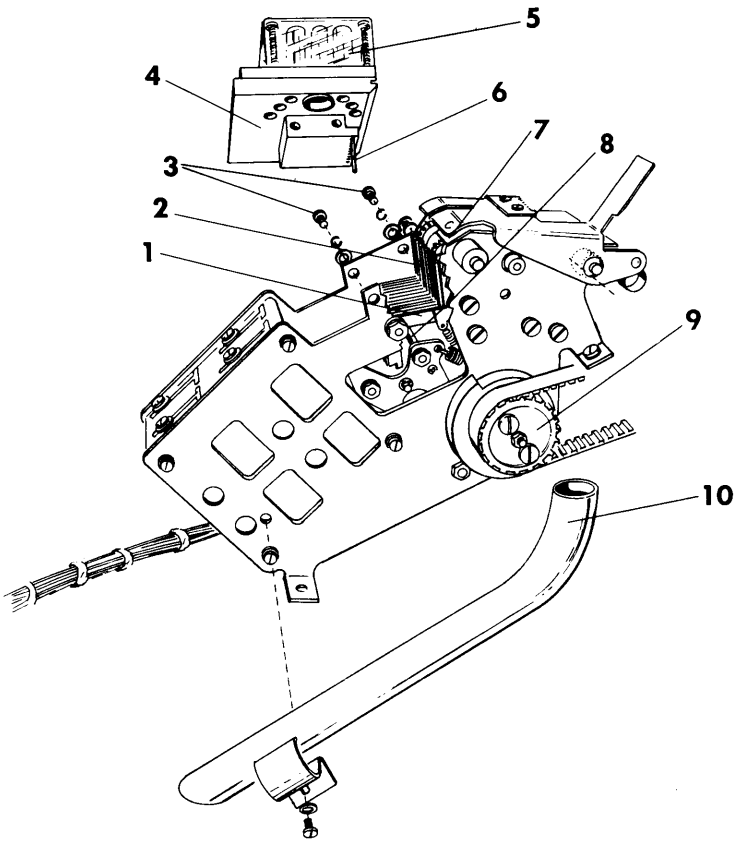
Replacement

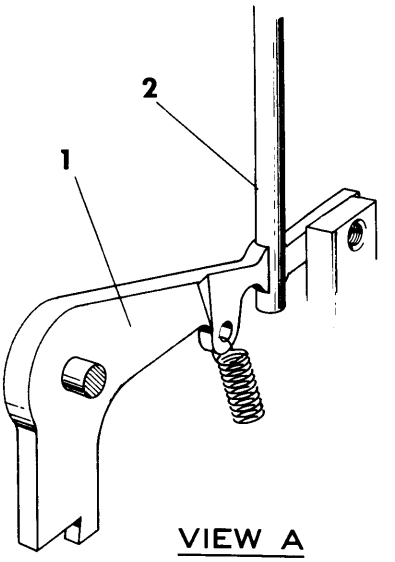
Position Punch mechanism in Unit and secure in place with Binding Screws (1) and (4). Connect Belt (2) and the Connectors. To facilitate reconnection, Connectors may be identified by the number of wires entering the Connector.

Be sure Chad Tube (5) is correctly located and free of obstructions to discharge Chad through the Base of the Unit and replace Covers as described on Page 1-7.

NOTE: When removing Punch mechanism from Models 590 or 591, it will be necessary upon replacement to time the Reader and Punch together as described on Page 1-30.

There are no adjustments to the position of the Punch mechanism in the Unit.





VIEW A

INDIVIDUAL PUNCH - REMOVAL AND REPLACEMENT

Removal

With the basic mechanism removed from the Unit, remove Chad Tube (10). Remove the four Punch Die Assembly Binding Screws (3) and carefully pull Punch Die Assembly (4) forward to clear Platen (7). Remove Punch Die Assembly from Unit.

End Punch (6) does not have an arm adjacent to it and will fall from the Unit when the Punch Die Assembly (4) is removed.

The remaining Punches (2) may be removed by turning Pulley (9) until Positive Retractor (8) is as far rearward as possible. Raise Punch Driver Arms (1) and pull the Punches off the front of Arms (1).

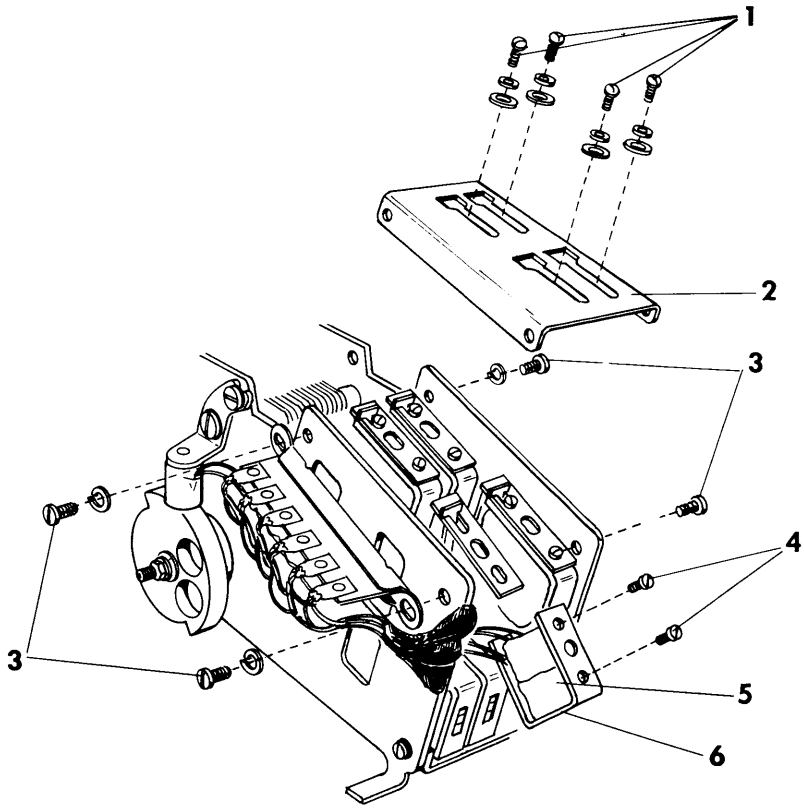
Replacement

With Positive Retractor (8) fully rearward raise Punch Driver Arm (1) and slide Punch (2) into position on Driver Arm (1) as illustrated in View A.

Place End Punch (6) into Punch Die Assembly (4), as illustrated, with the Punch Slot in the proper relation to its Driver Arm.

Position Punches (2) into Punch Die Assembly (4). Lower Punch Die Assembly into Unit, push End Punch (6) down into position over its Driver Arm.

Press the Punch Die Assembly into the Unit and slide it forward to engage Platen (7) into the Slot in Punch Die Assembly (4). Install Screws (3) and check Punches for freedom of movement. Install Chad Tube (10) and install the basic mechanism in the Unit.



PUNCH MAGNET - REMOVAL AND REPLACEMENT

Removal

Disconnect Leads to the Winding to be replaced. Remove Binding Screws (1) and (3) and slide Plate (2) out of Unit. Punch Magnets (6) will now lie loose in the Unit and Windings (5) may be removed by removing Binding Screws (4).

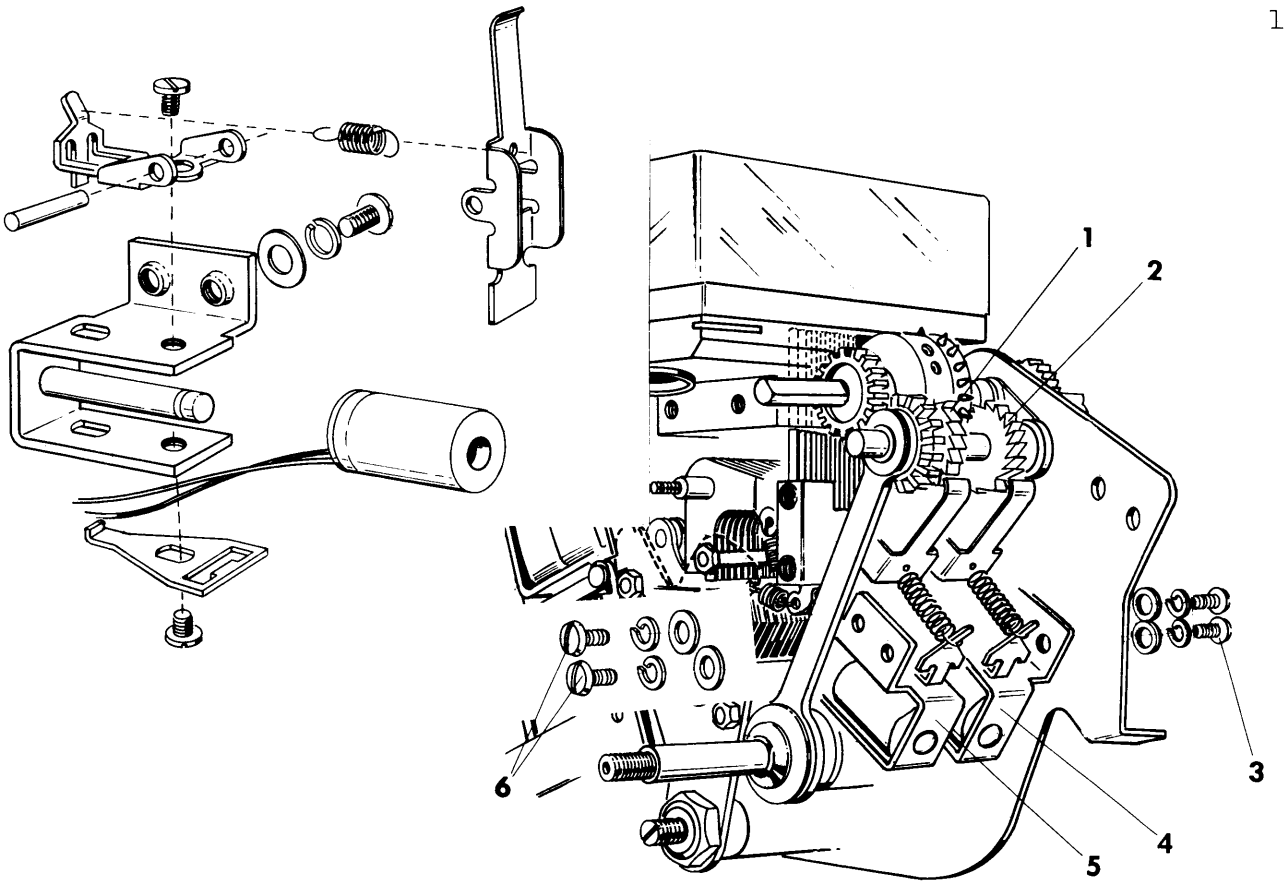
Replacement

Place replacement Winding on the Pole and install but do not tighten Binding Screws (4). Adjust the Punch Magnet Armature as described on Page 1-26 and tighten Screws (4).

Reconnect the Leads. Refer to Schematic Wiring Diagram that applies to the particular Model in the Electronic Section.

Install Plate (2) and secure with Binding Screws (3). Install but do not tighten Binding Screws (1). Adjust the Air Gap of the Punch Magnets as described on Page 1-26 and tighten Binding Screws (1).

Removal and replacement of Punch Magnet Windings, on the bottom of the Punch Unit, is identical to the above description.



INDEX MAGNET - REMOVAL AND REPLACEMENT

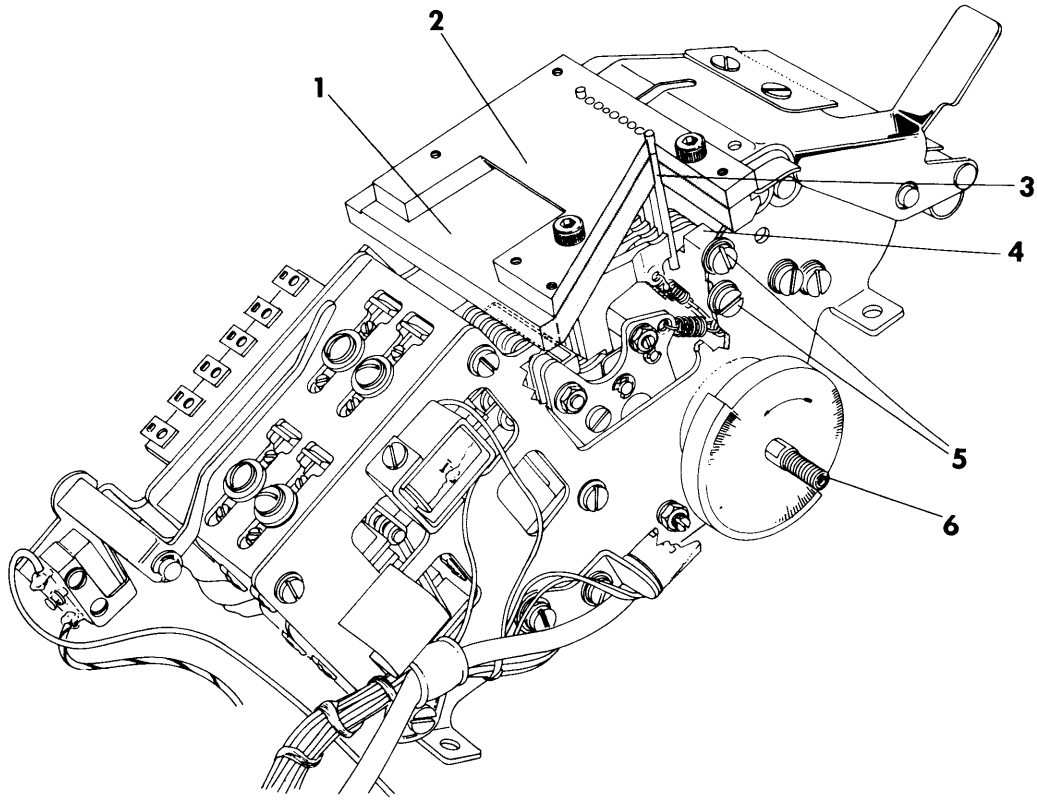
The Forward or Reverse Index Magnets (5) or (4) may be removed by removing Binding Screws (3) or (6) and disconnecting the respective Leads.

Once removed from the Unit, the Magnet Assemblies can be further dismantled as illustrated, for individual part replacement purposes.

Replacement

Position the Assembled Index Magnet in the Unit, in alignment with Feed Ratchets (1) or (2) and Base Side Holes. Install Binding Screws (3) or (6) and connect the Leads.

Adjust Index Magnets as described on Page 1-27 and tighten the Mounting Screws upon completion of the adjustment.



PUNCH - ADJUSTMENTS AND TIMING

Punch Position at Rest

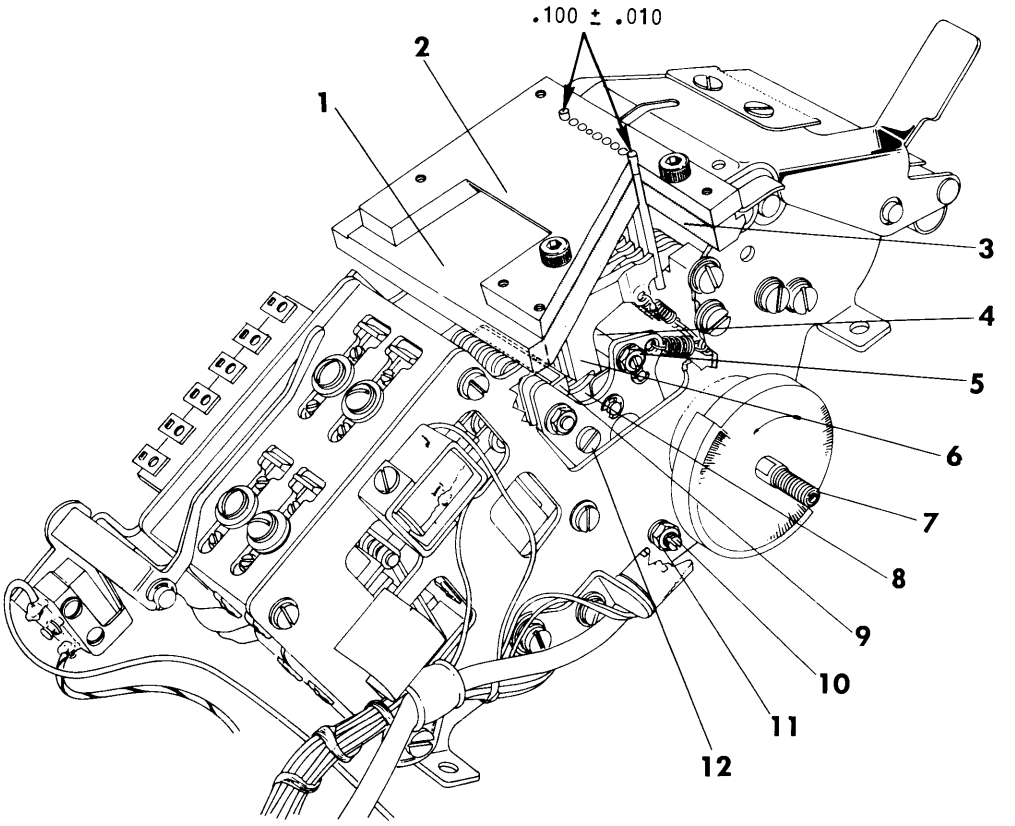
Remove the Lucite Punch Cover and remove all Chad from Plate (2). Insert two Punch Pin Set Gauges 1B9-1031 in the number 1 and number 8 Die Plate Holes. Loosen Screws (5) on both sides of the Unit, and move Punch Driver Arm Guide (4) up or down until the pins in the number 1 and 8 holes are flush with the surface of Plate (2) and secure Screws (5).

Calibration of the Timing Dial to the Main Shaft

Rotate Main Shaft (6) counter-clockwise while driving a selected Punch (3) to the Platen Level. To check that the Punch is at the Platen Level, insert a feeler gauge between the Die Punch Assembly (1) that is the same dimensions as the Slot. When the Punch reaches the Platen Level, the feeler gauge will bind.

When Punch (3) is at the Platen Level, note the reading of the Timing Dial referenced to the center of the Pulse Generator Pole. Remove the feeler gauge and continue to rotate Main Shaft (6) until the Selected Punch has reached its maximum throw and has returned to the Platen Level. At this point, calculate the difference between this reading and the previous reading. Divide this difference by two and add the result to the first reading. Rotate Main Shaft (6) until the Timing Dial reads this total figure. The Timing Dial must now be loosened and adjusted to read 307°.

CAUTION: Do not rotate Main Shaft (6) during this final stage of Timing Dial Calibration.



PUNCH - ADJUSTMENTS AND TIMING - Continued

Punch Pawl Limit Adjustments

Loosen Screws (12) and move Punch Pawl Limit (9) so it limits the movement of the actuated Pawls (8) .002" before bottoming against Driver Arms (6).

Punch Drive Adjustment

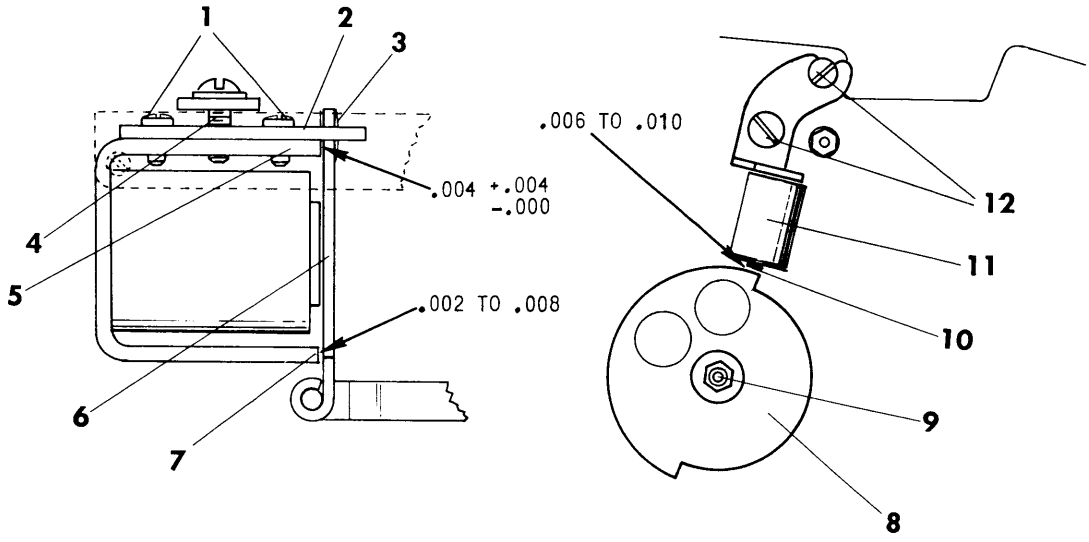
Remove the Lucite Punch Cover and install Gauges 1B9-1031 in the Number 1 and 8 Holes in the Die Assembly (1). Select the Number 1 and 8 Punches and rotate Main Shaft (7) until the high point of Shaft (7) is fully rearward (307° on the Timing Dial). The previously inserted Pins must raise .100 ± .010 above the surface of Plate (2).

When adjustment is required, loosen Lock Nuts (11) on both sides of the Unit and turn Pawl Carrier Eccentric Shaft (10) to increase or decrease the amount of movement imparted to the Punches.

Positive Retraction Adjustments

Rotate Shaft (7) until Punch Stripper Rod (4) is fully forward (127° on the Timing Dial). Punch Driver Arms (6) must now have .005 clearance between Driver Arm (6) and Stripper Rod (4). To adjust Stripper Rod (4), loosen Lock Nuts (5) and turn Stripper Rod (4) to obtain the desired .005 clearance.

Turn Main Shaft (7) to 80°. There should be a slight amount of play between Punch Driver Arms (6) and Stripper Rod (4), but Driver Arms (6) when held against Stripper Rod (4) must not allow the Punches to raise above Plate (3) of Assembly (1). Loosen Lock Nuts (5) and readjust Stripper Rod (4) if necessary. Tighten Nuts (5).



PUNCH - ADJUSTMENTS AND TIMING - Continued

Punch Magnet Adjustments

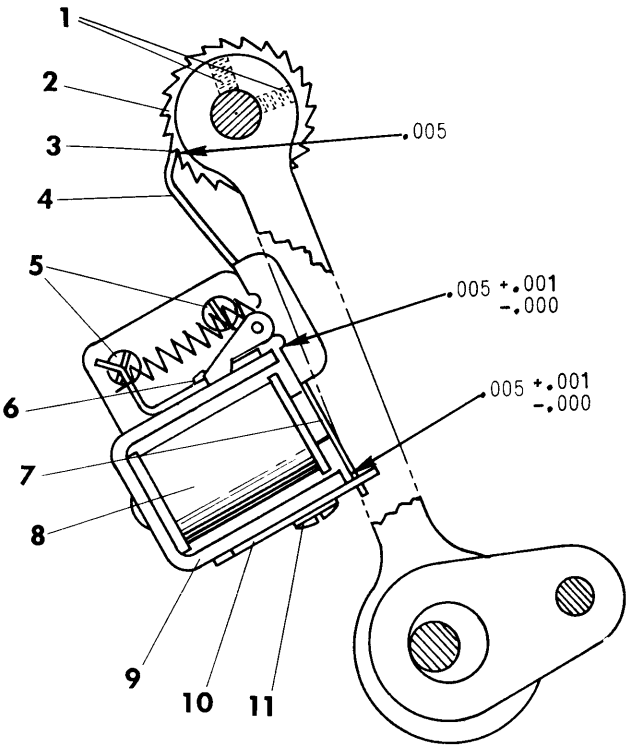
Loosen Binding Screws (1) and move Plate (2) so there is .004 + .004 - .000 clearance between Armature (6) and Shell (5) as indicated with Bowed Spring (3) in the position shown.

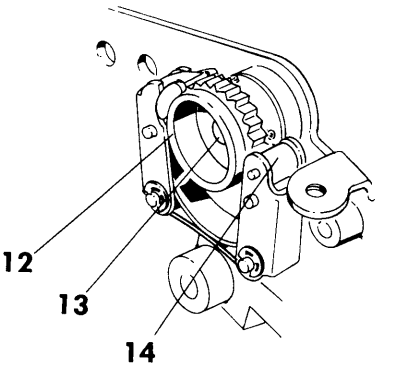
Set the Timing Dial at 127°. There must be .002 to .008 air gap between Armature (6) and Point (7) of Shell (5). When required, loosen Screw (4) and move Magnet forward or rearward to obtain the aforementioned clearance.

Pulse Generator Adjustments

Rotate Main Shaft (9) until Pulse Generator Disc (8) is at the point where the gap between the Pulse Generator Center Pole (10) and the Pulse Generator Disc is decreased.

Loosen Screws (12) and move Pulse Generator (11) to within .006 to .010 of Generator Disc (8) as indicated.





PUNCH - ADJUSTMENTS AND TIMING - Continued

Forward and Reverse Index Magnet Armature Adjustments

Armature Assembly (7), when operated, must have .005 + .001 - .000 gap between Magnet Shell (9) and Armature (7). It is essential that this gap never be below .005 and adjustment may be made by loosening Binding Screws (6) and (11) and repositioning either Armature Assembly (7) or Plate (10).

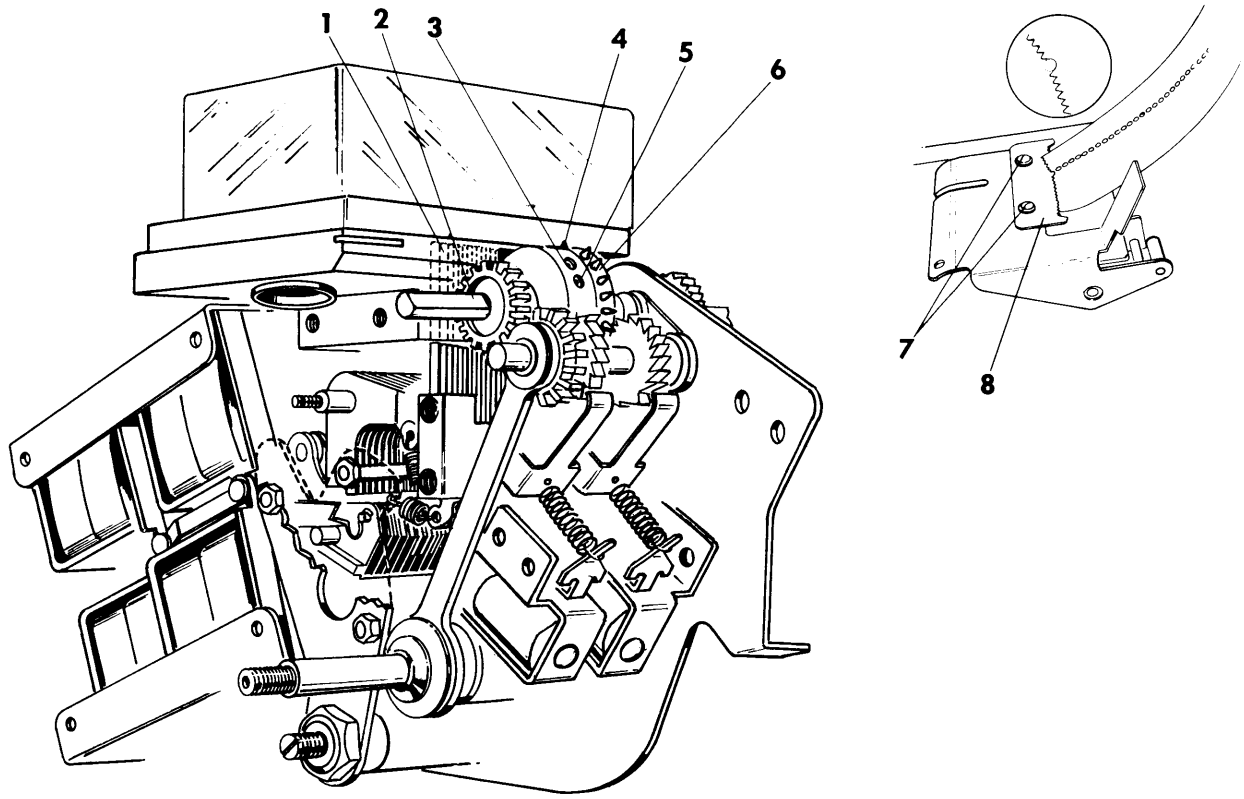
Consult Electronic Section for the specifications regarding "pick time" (4.5 milliseconds maximum at -20.4 VDC and "drop time" (9.5 milliseconds maximum at -27.6 VDC), for both Index Magnets.

Prior to performing the adjustments to the Indexing Ratchets, Detent Wheel (12) must be secure on Shaft (13) and Detent Roll (14) must be located in a Tooth of Detent Wheel (12).

Index Magnet (8), when called, must bring Interposer (4) to within .005 of the bottom of Forward or Reverse Feed Ratchets (2). To adjust the Index Magnets, loosen Binding Screws (5) and move Magnet and Interposer Assembly to obtain the above clearance.

Rotate the Timing Dial to 205° and operate the Forward Interposer (4). Interposer (4) must contact Ratchet (2) with no play between the top of Interposer (4) and Ratchet Tooth (3). If adjustment is necessary, loosen Set Screws (1) and reposition Ratchet (2). Check this adjustment on all Teeth of the Ratchet.

NOTE: The Backward Feed is identical to the Forward Feed; however, the Timing Dial is set at 25° when making the adjustment.



PUNCH - ADJUSTMENTS AND TIMING - Continued

Sprocket Wheel Adjustments

Before adjustments can be made to Sprocket Wheel (6), it is essential to tighten all Screws on Sprocket Shaft (2).

The uppermost Pin (4) of Sprocket Wheel (6) must be positioned .500 away from the center of Punches (1). To adjust Sprocket (6), loosen Set Screw (3) and tighten Set Screw (5) to move Pin (4) closer to Punches (1). Loosen Set Screw (5) and tighten Set Screw (3) to move Pin (4) further away from Punches (1).

On Units equipped with an advanced Feed Hole, (models 501, 511, 521, 581, 591) Pin (4) of Sprocket Wheel (6) must be positioned .513 away from the center of Punches (1).

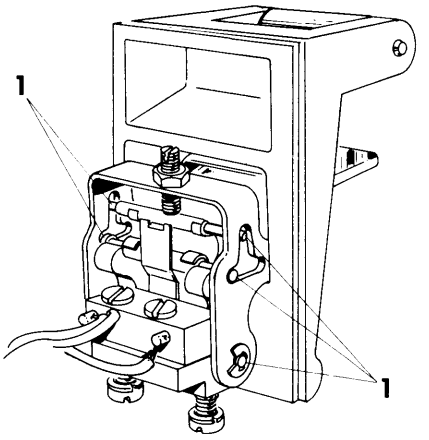
Final Sprocket Adjustment

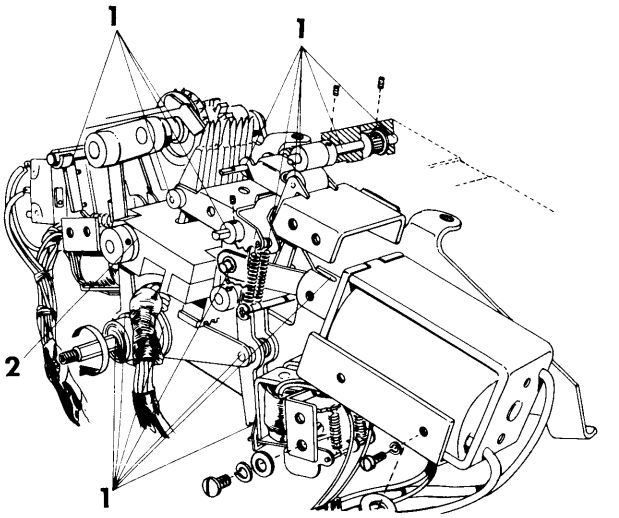
Adjust Set Screws (3) and (5) as previously described so the Tape Registration will conform to the Tape Gauge.

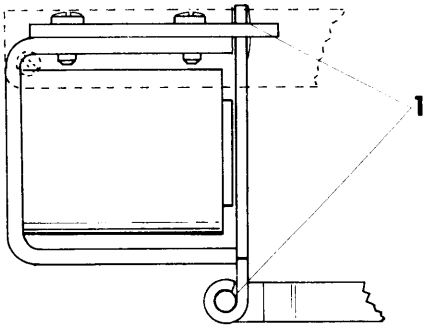
Tape Tear Plate

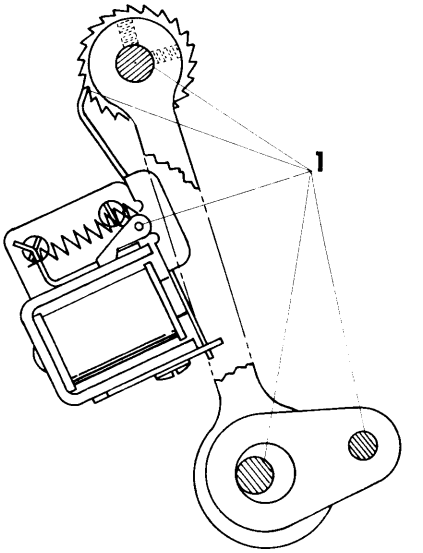
Tape Tear Plate (8) must be adjusted so the operator can tear the Tape directly through the center of an Index Hole, as illustrated. To adjust, loosen Binding Screws (7) and move Tear Plate (8) to the correct position as described.

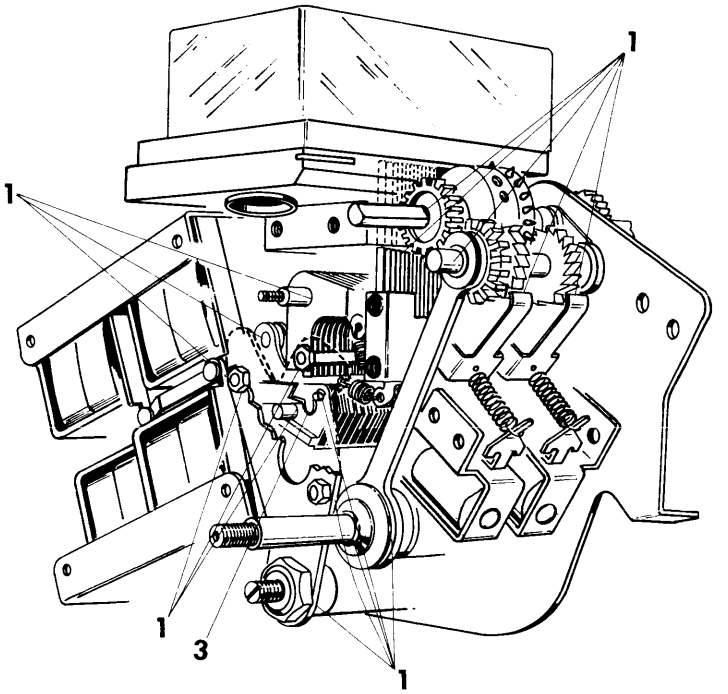
500 READER PUNCH LUBRICATION

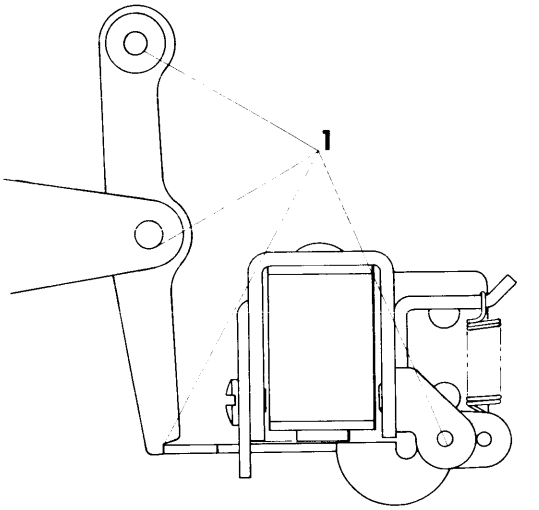






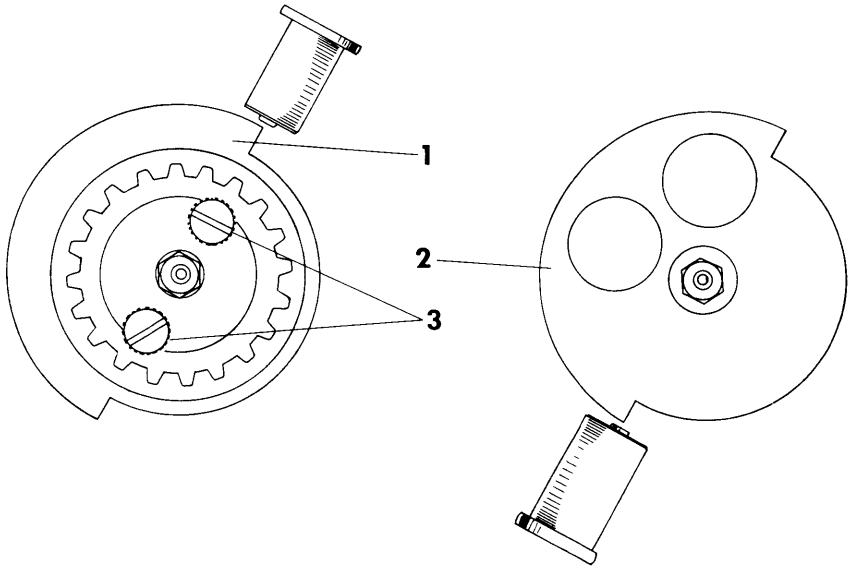






NOTE:
1. Do not immerse unit in Cleaning Solvents or Ultrasonic Cleaners.
2. Where lubrication is required on Shafts, lubricate the areas indicated on both sides of the unit.

KEY:
1. BFL-2 Grease
2. Lightly lubricate both ends of Shaft after assembly (use BFL-2 Grease)
3. Overcentering Springs are packed with BFL-2 Grease.



MODELS 580, 581, 590 and 591 - READER TO PUNCH TIMING

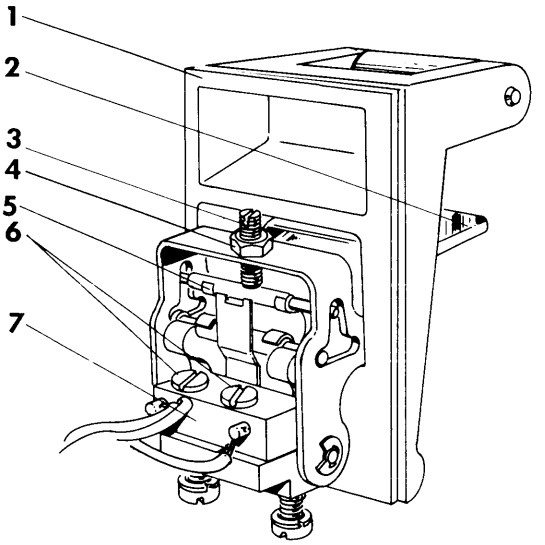
When adjustments or part replacements are made that will disturb the timing of either the Punch or Reader mechanism, it is essential to retime the Reader to the Punch so the functions of each will occur at the precise moment as indicated by the Timing Chart, Page 2-29 of the Electronic Section. This timing will make regenerative punching possible without misinterpretation.

As indicated on the Timing Chart on Page 2-29 the Negative Pulse of the Punch Pulse Generator occurs simultaneously with the Negative Pulse of the Reader Pulse Generator.

To time the Reader to the Punch, loosen Pulley Binding Screws (3). Rotate Punch Pulse Generator Disc (2) to coincide with Reader Pulse Generator Disc (1).

While holding Disc (2) in this position, rotate the Reader Pulse Generator Disc (1) to the start of the Reader Positive Pulse, as illustrated. Secure the timing adjustment with Binding Screws (3).

NOTE: A negative Pulse is produced when the gap between the Pulse Generator Disc and the Electromagnet is suddenly increased.



TAPE TENSION SWITCH - ADJUSTMENTS

The purpose of Tape Tension Switch (1) is to stop the Reading or Punching operation should the dispensing of the Tape bind. This is a safety feature that eliminates elongation of the Index Holes, over-punching or misinterpretation due to momentary tension of the Tape.

Tension Switch (1) should be adjusted to open with 4 to 6 ounces of drag on the Tape, by loosening Lock Nut (4) and turning Adjusting Screw (3) in to increase tension or out to decrease tension.

Tighten Lock Nut (4) upon completion of the adjustment.

Switch (7) must be adjusted to transfer only after Switch Lever (2) is fully committed to its forward travel by Over-centering Spring (5).

Loosen Screws (6) and move Switch (7) in or out to effect the correct adjustment.

PREVENTIVE MAINTENANCE

Preventive Maintenance should be performed at approximately every 50 million cycles of operation.

This preventive maintenance should consist of the following:

1. Remove the basic mechanism from its housing.

2. Use a soft cleaning brush to brush dirt and/or lint from the Unit. A blower may be used cautiously to blow dirt and/or lint from the Unit.

3. Use a lint free cleaning cloth and remove excessive and/or dried lubricants.

4. Lubricate the Unit as described and illustrated on Page 1-29. NOTE: It may be necessary to remove some parts in order to properly effect lubrication.

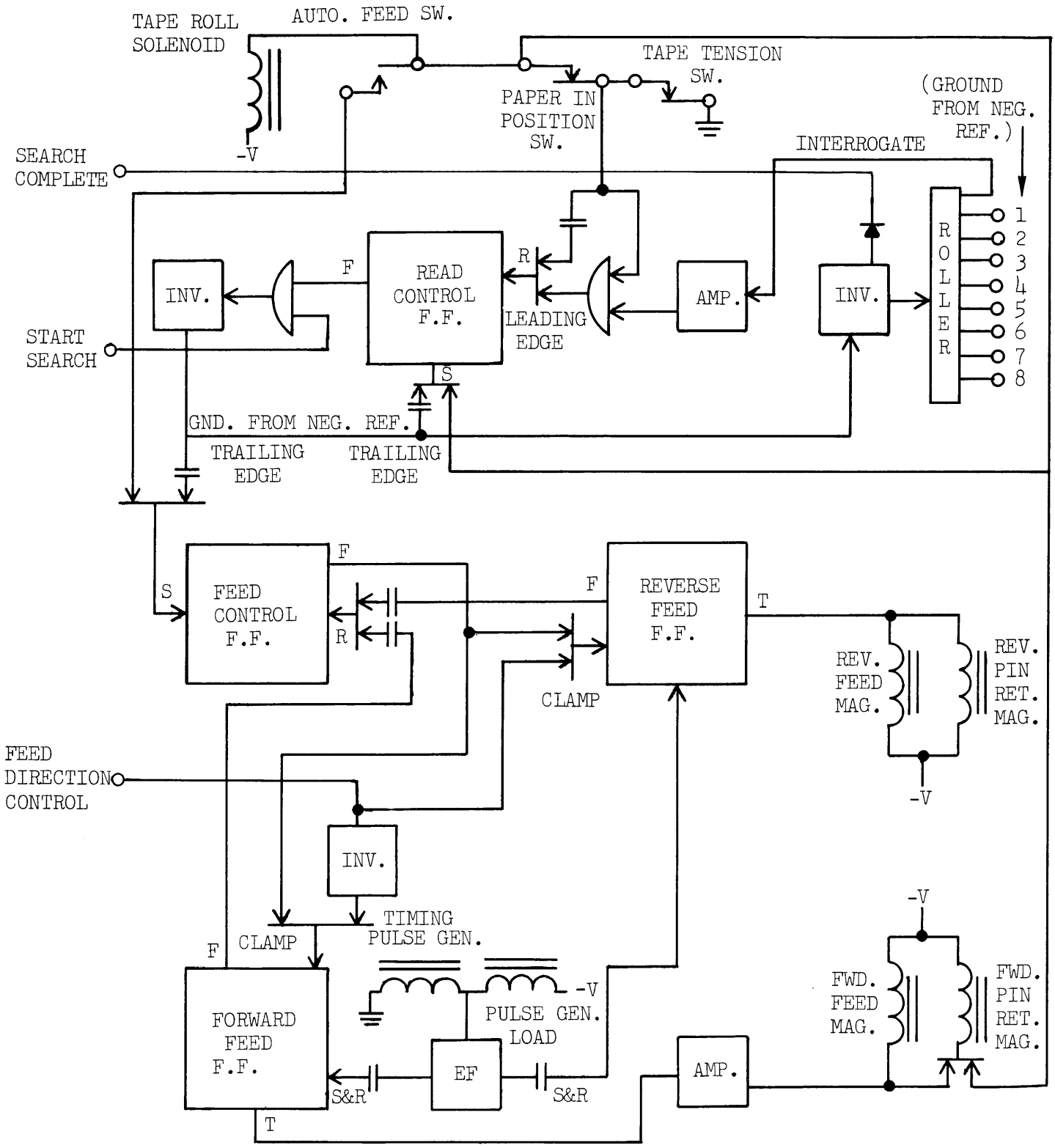
5. CAUTION: Do not allow lubricants to come in contact with Solenoid Cores or Armature Surfaces since lubricants at these points accumulate lint, dust, etc., causing an adhesive condition which may adversely affect proper function.

6. During preventive maintenance procedures as previously described, inspect all pivot points, bearing surfaces and moving parts for wear and freedom of movement. If excessive wear is evident, check related adjustments and timing described in this section. Adjust and/or replace worn parts as necessary.

7. After completion of preventive maintenance, reassemble the basic mechanism in its housing and perform a functional check of the Unit.

ELECTRONIC SECTION
500 SERIES

READER LOGIC



READER LOGIC
(see Page 2-2)

GENERAL

The Basic 5,6,7 or 8 Level Tape Reader is a 50 Character per second, Pin Sensing, Free-running device. It reads perforated Tape in either the Forward or Reverse direction. The Reader has a unique semi-automatic Tape Loading Feature. It is also furnished with a Tape Tension Switch.

Theory of Operation Reading And Feeding

The Reader Control Circuitry consists of four Bi-Stable Flip-Flops, AND and OR Gates and necessary Amplifiers and Inverters. Control of the Reader involves three lines between Reader and user's equipment. These are (1) the Start Search Line, (2) the Search Complete Line and (3) the Feed Direction Control Line. Referring to Page 2-2, the four Flip-Flops are shown as:

(1) Read Control Flip-Flop (set by the trailing edge of the Gated Start Search Signal and reset by the leading edge of the Interrogate Switch closure).
(2) Feed Control Flip-Flop (set by the trailing edge of the Gated Start Search Signal or Auto-Feed Signal and reset by the resetting of the Forward or Reverse Feed Flip-Flop). (3) Forward Feed Flip-Flop clamped in the reset state by the Feed Control Flip-Flop or the Reverse Signal from the Feed Direction Control. When unclamped, the Forward Feed Flip-Flop is set and reset by the Pulse Generator. (4) Reverse Feed Flip-Flop clamped in the reset state by the Feed Control Flip-Flop or the Forward Signal from the Feed Direction Control. When unclamped, the Reverse Feed Flip-Flop is set and reset by the Pulse Generator.

In the static state with Tape in the read station, all the Flip-Flops are in the reset state. Start Search Line is grounded from a negative reference. To activate the Reader, the Start Search is ANDed with the Conducting Leg (reset condition) of the Read Control Flip-Flop, inverted twice and GROUNDS the common of the Code Contacts. Ground will be on Outputs 1 through 8 depending on the character code. At the same time, this signal appears on the Common Switch, it also appears as Search Complete for strobing purposes.

The trailing edge of Start Search sets the Feed Control Flip-Flop as well as the Read Control Flip-Flop (the Start Search Signal must remain as an Input for 3 milliseconds nominally after the leading edge of Search Complete, to read at the rate of 50 characters per second). Assuming a Forward condition, the Forward Feed Flip-Flop will then be set and reset by the output of the Pulse Generator coupled through an Emitter Follower. The Forward Feed Flip-Flop is set by the first Negative Signal from the Generator and is reset 10 Milliseconds later by the Positive Signal.

During this set condition of the Forward Feed Flip-Flop, the Output is inverted and applied to the Forward Feed and Forward Pin Retract Magnets. This Logic synchronizes the Electrical Input Signal to the Mechanical Timing of the machine so the Pins may be retracted below the Tape Level and the Tape indexed one position forward. The Pins are retracted and then released by the resetting of the Forward Feed Flip-Flop as explained above to position themselves in the new code.

The Interrogate Contact follows the same motion except it closes slightly later and opens sooner than the Code Contacts. The reclosing of the Interrogate Contact resets the Read Control Flip-Flop. Should a Start Search Signal have appeared before this time the AND Gate would have been cut off because the Read Control Flip-Flop is in the set state. With the resetting of the Read Control Flip-Flop and a Start Search Command, the cycle is repeated. Reverse is the same operation as above except for the polarity of the Reverse Line and the synchronization to the Mechanical Cycle is now displaced 180° from the Forward Feed cycle.

READER LOGIC - Continued
(see Page 2-2)

Theory of Operation of Semi-Automatic Load

Two Switches are used to control the advance of the Tape (no reading at this time) to the Reading position. The Logic Diagram shows the condition of the Tape Tension, Paper In Position and Auto-Feed Switches with no Tape in the machine. With the exception of the Read Control Flip-Flop, all Flip-Flops are in their set state. Following the ground from the Tape Tension Switch through the Paper In Position Switch, it can be seen that the Tape Roll Solenoid and Forward Pin Retract Magnet are energized and the Read Control Flip-Flop is held in the set condition. As Tape is manually inserted into the Input Guide, it comes in contact with the Solenoid-Actuated "Friction" Feed Roller. As the "Friction" Drive Roller contacts the paper, it propells it through the Auto-Feed Switch to the Paper In Position Switch. When the Auto Feed Switch is transferred, it sets the Feed Control Flip-Flop to allow the Forward Feed Flip-Flop to be set and reset by the pulses of the Pulse Generator and thereby indexing the Tape at a rate of 50 characters per second. When the Paper In Position Switch is transferred, it removes the ground from both the Feed and Read Control Flip-Flops and de-energizes the Tape Roll Solenoid and Forward Pin Retract Magnet. The Read Control Flip-Flop is then reset by the Interrogate Contact and the Feed Control Flip-Flop is reset by the Forward Feed Flip-Flop which was reset by the Positive Pulse of the Pulse Generator.

Theory of Operation of Tape Tension Switch

The Tape Tension Switch, as shown on the logic Diagram, is in the No Tension position and applies ground to the Read Control Flip-Flop reset AND Gate. In this state, the Interrogate Contact is allowed to reset the Flip-Flop. Should the Tension Switch transfer, it will not allow the reset of the Read Control Flip-Flop, therefore, not allowing start Search to start a new cycle. When the Tension Switch is reclosed, it resets the Read Control Flip-Flop through the Reset OR Gate allowing further Read-feed cycling if Start Search is active.

READER STATIC CONDITIONS (With Power On, No Tape or Start Search)
(see 570 & 590 Reader Schematic Drawings)

Switches
Tape Tension Switch - 4 and 5 closed.
Paper In Position Switch - 3 and 4 closed.
Auto-Feed Switch - 4 and 5 open.

Flip-Flops
Reverse - TR2 On, clamped to the Reset state (ground on collector of TR2)
Forward - TR4 On, clamped to the Reset state (ground on collector of TR4)
Feed Control - TR6 On (Reset state)
Read Control - TR11 On clamped to the Set State (Ground on collector of TR11)

Inverters
TR8 - Off
TR9 - On

Amplifiers
TR7 - Off
TR12 - Off (Interrogate contact open)

Emitter Followers
TR13 - Continuously conducting Positive and Negative Pulses.

Magnets
Forward Retract - Energized
All others de-energized

Specifications
Forward and Reverse Feed Magnets:
"Pick Time" - 6.0 milliseconds max. at 20.4 VDC.
"Drop Time" - 9.5 milliseconds max. at 27.6 VDC.
Forward and Reverse Pin Retract Magnets:
"Pick Time" - 3.5 milliseconds max. at 20.4 VDC.
"Drop Time" - 8.5 milliseconds max. at 27.6 VDC.

Solenoid
Tape Roll Solenoid (Sec. 6A) - Energized

Start Search (Sec. 6B)
The Start Search Signal (GND), when present, forms one leg of an AND Gate. Its purpose, when the other leg is satisfied is to turn off TR9. With TR9 off, TR8 will conduct which will put GND on the roll (common) to be read by the contacts when holes appear in the tape. When the Start Search Signal (GND) is not present, -6 volts will be at the junction of CR6 and R29 which will keep TR9 On.

Feed Direction Control (Sec. 6D)
Ground, present at the junction of CR12 and CR10 clamps the Reverse Flip-Flop and unclamps the Forward Flip-Flop, permitting the next negative pulse from the Pulse Generator to turn On TR3 cutting Off TR4. TR7 is now turned On energizing the Forward Feed Magnet.

The Reverse Signal (-6 volts) when present at the junction of CR12-CR10 (Sec. 6D) keeps the Forward Control Flip-Flop in its reset state keeping the Tape from being fed forward. At the same time, the absence of a GND signal removes the Clamp from the Reverse Flip-Flop so when the next Positive Signal from the Pulse Generator appears at the Base of TR2, TR1 will conduct. This will energize the Reverse Feed Magnet and the Tape will be fed in reverse.

Search Complete (Sec. 9A)
The Search Complete Signal (GND) is present at the output connector when TR8 conducts. It is an output signal used for strobing purposes.

Eject (Sec. 6C)
Input for feeding out Tape without Start Search.

Eject Complete (Sec. 7A)
Eject complete signal is used in conjunction with Eject. Ground will appear at this output as long as there is Tape in position. When the ejection of Tape is complete, ground will be removed from this point.

READER DYNAMIC STATE

With Tape inserted in the machine and the Tape Tension Switch Lever closed, the Tape will be friction fed through the Auto-Feed Switch to the Paper In Position Switch. This friction feeding is accomplished by having the Tape Roll Solenoid energized in its static state. When the power was turned On, a current flowed from GND (Sec. 8A) through S8, S11, L16 to -24 volts. This same GND through S8, S11 to CR35 (Sec. 9E) allows the Forward Retract Magnet (Sec. 10D) to be energized, retracting the Sensing Pins.

The Tape Roll Solenoid will latch the retracted Pins and allow the Pressure Roll to come in contact with the Feed Roll commencing friction feeding of the Tape. This same GND is also fed to the collector of TR11, clamping it in its conductive state preventing a Start Search Signal from taking action. All these conditions exist before the Tape has reached the Auto-Feed Switch. With the Auto-Feed Switch (S-9) transferred, GND is fed to the Feed Control Flip-Flop through CR4 (Sec. 7C) setting the Flip-Flop.

The Feed Control Flip-Flop functions as a clamp for the Forward and Reverse Flip-Flops when it is in its reset state. A ground is fed through CR11 and CR13 (Sec. 7C) from the collector of TR6 to the collectors of TR2 (Sec. 8C), and TR4 (Sec. 6E), clamping both transistors in a conducting state. Once this clamp is removed, either the Reverse or Forward Flip-Flop can be set by the Pulse Generator (Sec. 8D) depending upon the Feed Direction Control Signal (Sec. 6D).

TR7 (Sec. 9E) is non-conductive until the Forward Flip-Flop is set. Once the clamp from the Feed Control Flip-Flop is removed and GND (Feed Direction Control) signal appears at the junction of CR10 and CR12, the next negative pulse from the Pulse Generator will set the Forward Flip-Flop.

TR7 will now conduct energizing the Forward Feed Magnet and provide an additional ground return for the Forward Retract Magnet. The Sprocket will now revolve allowing the Sprocket Pins to engage with the Index holes in the Tape, and transport the Tape through the Paper In Position Switch.

The Paper In Position Switch transfers, de-energizing the Tape Roll Solenoid, stopping the friction feed and in addition unclamps the Read Control and Feed Control Flip-Flops allowing them to be reset as subsequently described.

The transferring of the Paper In Position Switch also removes its ground from the Forward Retract Magnet. However, since TR7 is in its conductive state, the Forward Retract Magnet will remain energized as explained above.

The Tape Roll Solenoid being de-energized allows the Sensing Pins to unlatch and be under the control of the Forward Retract Magnet. The Tape will continue to move through the action of the Sprocket until the Forward Feed Flip-Flop is reset.

READER DYNAMIC STATE - Continued

The next Positive Signal received at the Base of TR3 (Sec. 7E) from the Pulse Generator, will reset the Forward Flip-Flop. When TR4 (Sec. 6E) converts from non-conducting to conducting state, it generates a pulse to the Base of TR5 through C4 and CR17 (Sec. 7C), and the Feed Control Flip-Flop will be reset, again clamping the Forward and Reverse Flip-Flop in their reset states. The Forward Feed and Retract Magnets will be de-energized with the Forward Flip-Flop in its reset state.

As the Pins move up, the Interrogate Contact closes and since TR8 (Sec. 9B) is non-conducting, a minus voltage will appear at R90 (Sec. 8B) causing TR12 (Sec. 8B) to conduct. A positive pulse is generated by this action, through C7 and CR30 (Sec. 8B) and is applied to the Base of TR11 (Sec. 7B), cutting TR11 off. TR10 (Sec. 7B) now conducts, applying ground to CR8 (Sec. 6A) to satisfy one leg of the AND Gate (CR8-CR6).

With the application of Start Search Signal (ground) the other Leg of the AND Gate (CR6) is satisfied, allowing ground to appear at R50 (Sec. 6A) cutting off TR9 (Sec. 6A).

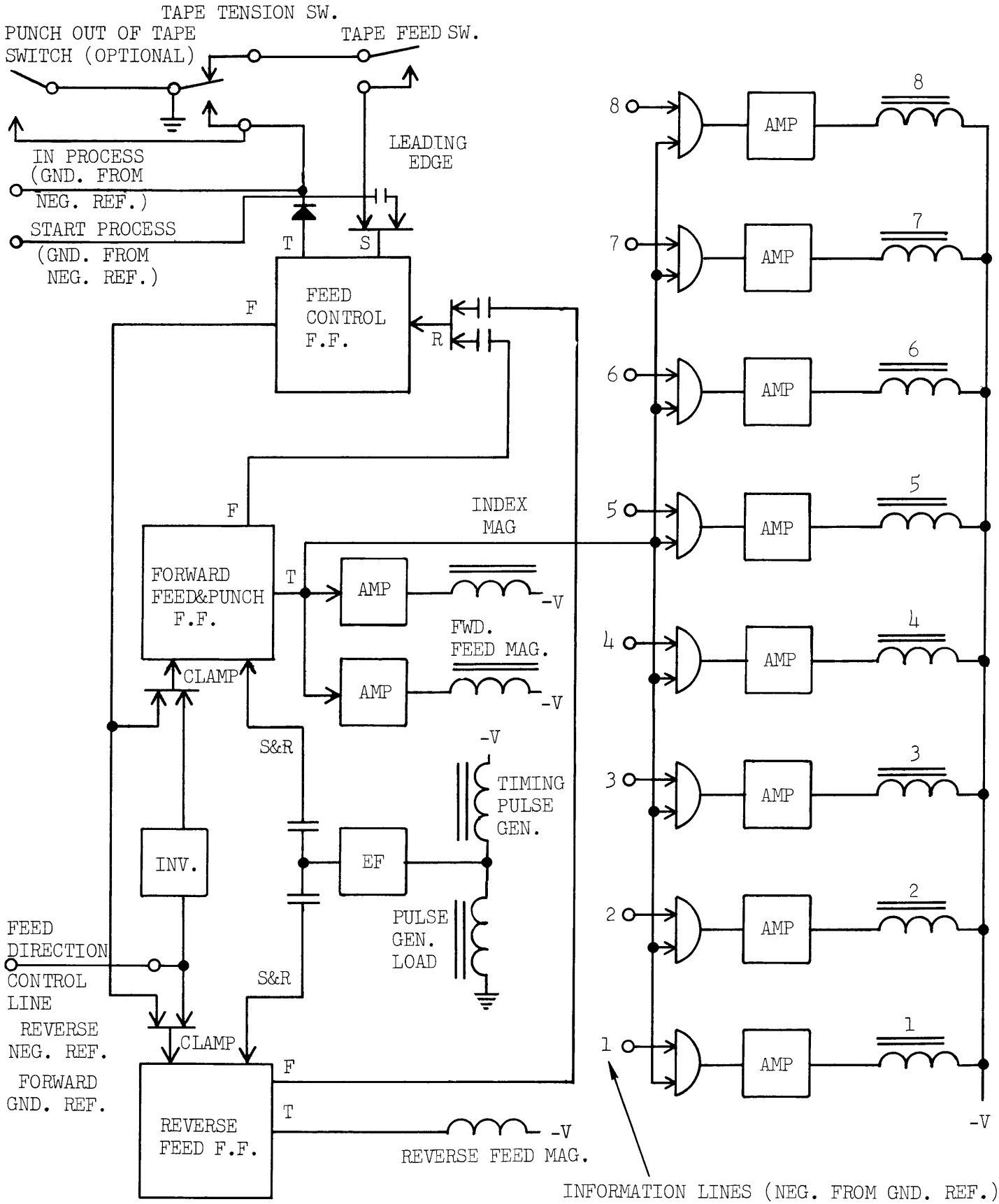
With TR9 in the Off condition, TR8 (Sec. 9B) will now conduct and send out a Search Complete Signal (GND). This will inform any outside source that the unit is reading. Also, the Roller will be at GND potential. Any holes that appear in the Tape will allow the Sensing Pins to protrude through, and the Contacts will contact the Roll. A code (GND) will be sent out consistent with the holes that the Pins sensed in the Tape.

When the Start Search Signal is removed (ground to -6V), TR9 is once again allowed to conduct. With TR9 conducting, TR8 will stop conducting -- which will remove the GND from the Roll. The coded GND outputs, sensed by the Contacts, will be removed. The Feed Control and Read Control Flip-Flops will be set through C8 (Sec. 6C) and C5 (Sec. 7B) respectively. Once again, the clamp that keeps the Forward and Reverse Flip-Flops from being set is removed so another feed cycle can occur. Simultaneously the Read Control Flip-Flop being set, prevents a Start Search Signal from taking action.

Reverse Feeding of the Tape goes through the same conditions as explained for Forward Feeding, the only exception being the Feed Direction Control Signal. A -6 volt signal is required at this point to initiate a reversal of the Tape.

When the Tape is under excessive tension, the Tape Tension Switch transfers. The GND that was present at junction of R41-C9 (Sec. 8A) will now be replaced by -24 volts by way of R49 (Sec. 8A). When the Interrogate Contact closes on the next cycle and turns On TR12, the Read Control Flip-Flop cannot be reset since R41 is at -24 V instead of ground. With TR10 not conducting, a Start Search Signal cannot initiate a read cycle.

When the Tape tension is reset, Ground is applied through C9 and CR33 (Sec. 8A&B) to cut Off TR11 and allow TR10 (Sec. 7B) to conduct. If a Start Search Signal now appears, the Read Cycle will commence.


TAPE TENSION SW.
PUNCH OUT OF TAPE SWITCH (OPTIONAL)
TAPE FEED SW.
LEADING EDGE
IN PROCESS (GND. FROM NEG. REF.)
START PROCESS (GND. FROM NEG. REF.)
T
S
F
FEED CONTROL F.F.
R
F
INDEX MAG
FORWARD FEED&PUNCH F.F.
T
AMP
-V
FWD. FEED MAG.
AMP
-V
CLAMP
S&R
-V
TIMING PULSE GEN.
INV.
EF
PULSE GEN. LOAD
FEED DIRECTION CONTROL LINE
REVERSE NEG. REF.
FORWARD GND. REF.
S&R
CLAMP
F
T
REVERSE FEED F.F.
-V
REVERSE FEED MAG.
8
AMP
8
7
AMP
7
6
AMP
6
5
AMP
5
4
AMP
4
3
AMP
3
2
AMP
2
1
AMP
1
-V
INFORMATION LINES (NEG. FROM GND. REF.)

PUNCH LOGIC
(see Page 2-8)

GENERAL

This unit is a 50-Character per second Punch Unit for punching 5,6,7 or 8 channel Tape. The signal requirements from the controlling source are the Coded Bits, the Feed Direction Control and the Start Process Control. Immediately after the Controlling signals are received, the unit will emit an In Process Signal for the necessary portion of the Feed Punch cycle.

Theory of Operation of Punching and Feeding

The circuitry consists of three Control Bi-Stable Flip-Flops, a manually operated Tape Feed Switch, a Tape Tension Switch, an optional Punch out of Tape Switch and the necessary Gates and Amplifiers. The three Bi-Stables are: (1) Feed Control Flip-Flop (set by the Start Process Signal or Tape Feed and reset by the Forward or Reverse Feed Flip-Flops). (2) Forward Feed Flip-Flop (clamped by the Feed Control Flip-Flop or Reverse Signal, from the Feed Direction Control and when not clamped, set and reset by the Pulse Generator). (3) Reverse Feed Flip-Flop (clamped by the Feed Control Flip-Flop or the Forward Signal from the Feed Direction Control and when not clamped, set and reset by the Pulse Generator). The Switches are shown on Page 2-8, indicating the presence of Tape and no Tape tension. The Feed-Punch cycle is as follows:

The Reverse Feed (negative) or Forward Feed (ground) Signal, and the selected information bits (1 through 8), must appear on the lines on/or before the leading edge of the Start Process Signal. The Start Process Signal sets the Feed Control Flip-Flop, removing the clamp from one leg of the Forward and Reverse Feed Flip-Flops or Gates and provides an In Process Signal (ground). Assuming Forward Feed and Punching are required, the Forward Feed Flip-Flop is now free to be set and reset by the Pulse Generator.

The Output from the Forward Feed Flip-Flop, when set, is coupled to one leg of the Punch Magnet Amplifier Input AND Gates, to the Forward Feed Magnet Amplifier and to the Index Punch Magnet Amplifier. These signals now appear at the proper timing with the mechanical cycle of the machine such that it feeds the Tape one position forward and punches the selected bit holes. When the Forward Feed Flip-Flop is reset by the Pulse Generator, it removes the signal from the AND Gates and Amplifiers, and resets the Feed Control Flip-Flop which removes the In Process Signal.

It is a requirement for proper operation that the selected bits be stored by the source for a period of 10 Milliseconds, minimum, and 30 Milliseconds, maximum, depending upon the machine phasing at the time of call. The In Process Signal indicates the storage time requirement.

In the case of reverse, the Reverse Feed Flip-Flop OR Gate is unclamped and is set and reset by the opposite polarity of the Pulse Generator, such that the timing is displaced 180° from the Forward Feeding and Punching timing. In Reverse, Punching is not possible.

Theory of Operation of Tape Tension, Tape Feed and Out of Tape Switches

The Switches are shown assuming the Tape is not in tension. The Tape Tension Switch must be in this condition to satisfy the Not In Process state. When the Tape Feed Switch is depressed, the ground signal clamps and sets the Feed Control Flip-Flop. This Flip-Flop will remain set as long as this switch is closed and will also remove the clamp from the Forward Feed Flip-Flop. This satisfies the conditions of the Feed-Punch cycle and the Index Hole will be punched at 50 per second, providing information bits are not selected. When the Switch is opened, it removes the clamp from the Feed Control Flip-Flop, allowing a reset by the Pulse Generator through the Forward Feed Flip-Flop. If the Tension Switch should transfer, it removes the ground from the Tape Feed Switch, and couples ground to the In Process Line.

PUNCH STATIC CONDITIONS (With Power on and no Tape)

Switches
Tape Tension Switch - 4 and 5 closed.
Tape Feed Switch - 4 and 5 open.
Punch out of Tape Switch - 3 and 4 closed.

Flip-Flops
Reverse (Sec. 6D) TR13 ON clamped to the reset state (ground on Collector TR13)
Forward (Sec. 6B) TR15 ON clamped to the Reset state (ground on Collector TR15)
Feed Control (Sec. 7A) TR18 ON (Reset state)

Emitter Follower
TR11 (Sec. 7C) Continuously conducting Positive and Negative Pulses.

Amplifiers
TR1 thru 8 (Sec.9A-E) Off
TR9 (Sec. 8B) Off
TR10 (Sec. 8C) Off

Magnets
L1 thru 11 De-energized (Sec. 8 & 10 A-E)

Index Magnet Specifications
"Pick Time" - 4.5 Milliseconds max. at -20.4 VDC
"Drop Time" - 9.5 Milliseconds max. at -27.6 VDC

Start Process (Sec. 6B)
The "Start Process Signal" (when grounded) will set the Feed Control Flip-Flop and will initiate a Feed-Punch cycle.

Feed Direction Control (Sec. 6C)
If -6 volts is present at the junction of CR27 and CR31 (Sec. 6C) it will clamp the Forward Flip-Flop in its reset state. If the clamp from the Feed Control Flip-Flop is released, and the next positive signal is generated from the Pulse Generator, the Reverse Flip-Flop will be set.

If GND is present at the junction of CR27 and CR31, the Reverse Flip-Flop will be clamped in its reset state and when the next Negative Signal is received from the Pulse Generator, the Forward Flip-Flop will be set, provided the clamp from the Feed Control Flip-Flop is removed.

In-Process (Sec. 8A)
A ground signal is fed out of the unit to the outside source by either depressing the "Tape Feed Switch", transferring the Tape Tension Switch or when the Feed Control Flip-Flop is in its set state. The signal informs the outside source that the Punch is performing an operation, or the Tape is under excessive tension.

PUNCH DYNAMIC STATE

With the Tape Tension Switch closed (Tape not under tension) and the Tape Feed Switch closed (manually), GND will be at the collector of TR17 (Sec. 8A). The Feed Control Flip-Flop will be set, removing the GND clamp from the Forward and Reverse Flip-Flop by way of CR24 and CR25 (Sec. 6B&D) and the collector of TR18. With these GND clamps removed, the Feed Direction Control Signal designates Forward or Reverse direction. A GND at the junction of CR27-CR31 (Sec. 6C) will keep the Reverse Flip-Flop clamped in its reset state.

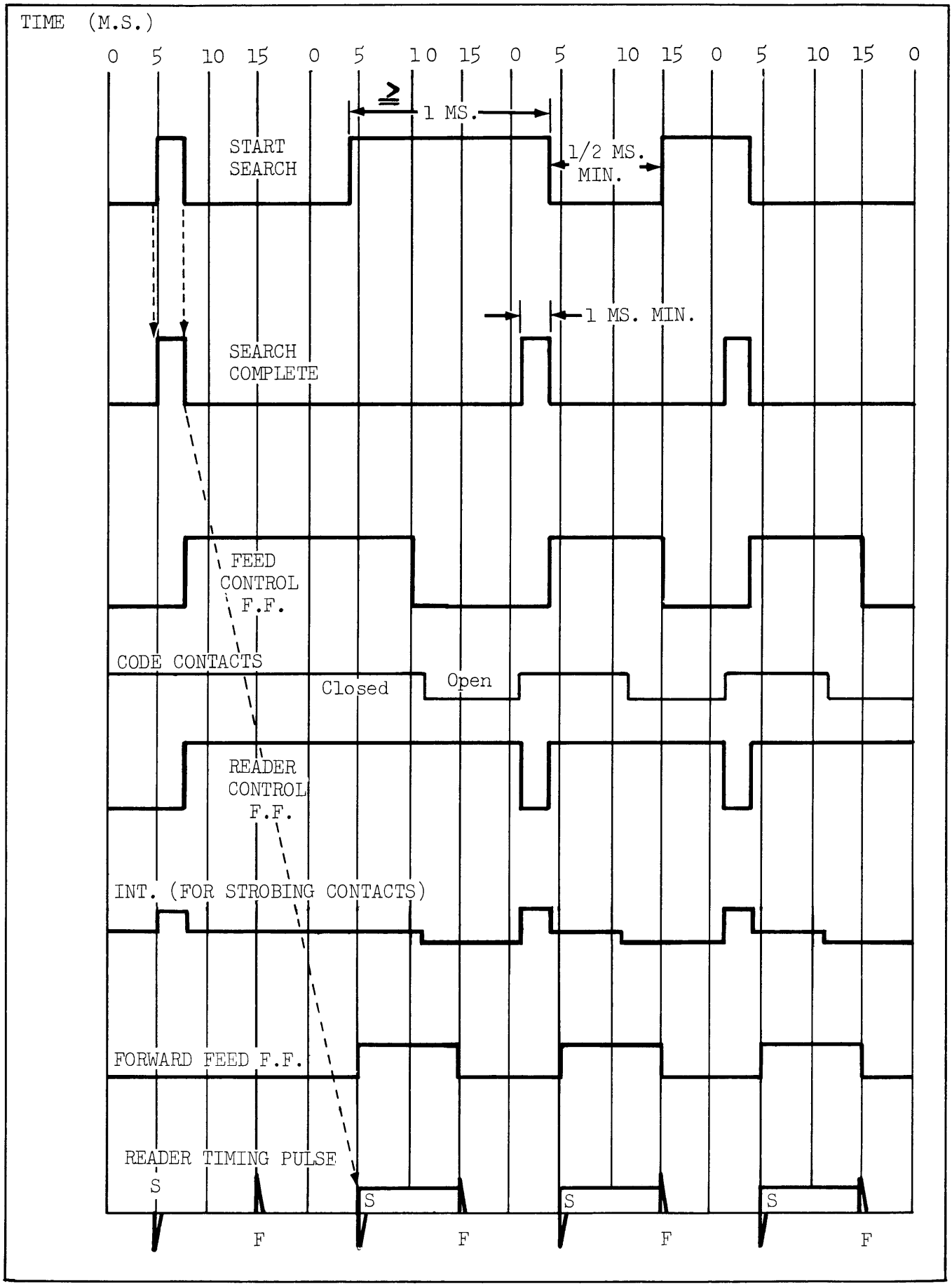
By having a GND signal at this point instead of -6 volts, the Forward Flip-Flop is allowed to be set when the next negative signal is received at the Base of TR14, from the Pulse Generator. With the Forward Flip-Flop in its set state, the GND that was present at the collector of TR15, when it was in its reset state, is now removed.

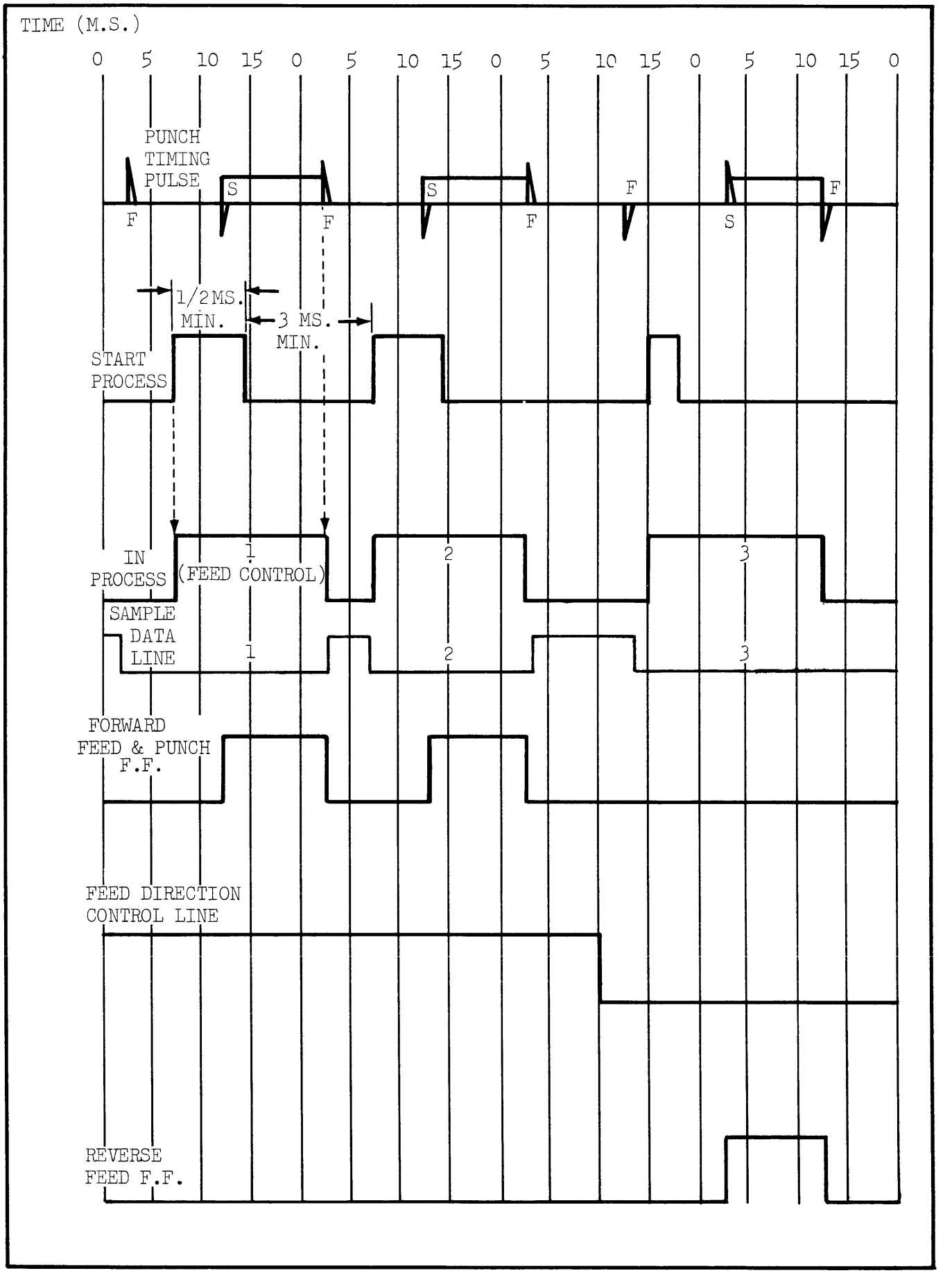
A current path is formed from -18VD (Sec. 6B) through R41, R24, base-emitter of TR9 (Sec. 8B) also R26, base-emitter of TR10 (Sec. 8C). With TR9 and TR10 conducting, an Index Hole will be punched in the tape and it will be fed forward one position. Also, TR10 supplies a GND from its collector to the emitters of TR1 thru 8 (Sec. 9A-E). This allows any or all of TR1-TR8 to conduct depending upon which of the transistors received an input code (-6 volts) on their bases from the outside source. In this case, (Tape Feed) we are assuming the Input sources are at ground potential and that only the Index hole will be punched.

When the Tape Feed Button is released, ground is removed from TR17 collector and the Feed Control Flip-Flop is allowed to be reset. The resetting action is accomplished by the next positive pulse from the Pulse Generator, resetting the Forward Feed Flip-Flop and applying ground from the collector of TR15 through C3 and CR28 to the Base of TR17 cutting it off, resetting the Feed Control Flip-Flop and removing the ground from the In-Process line indicating to the outside source that the punch is ready to receive a Start Process signal.

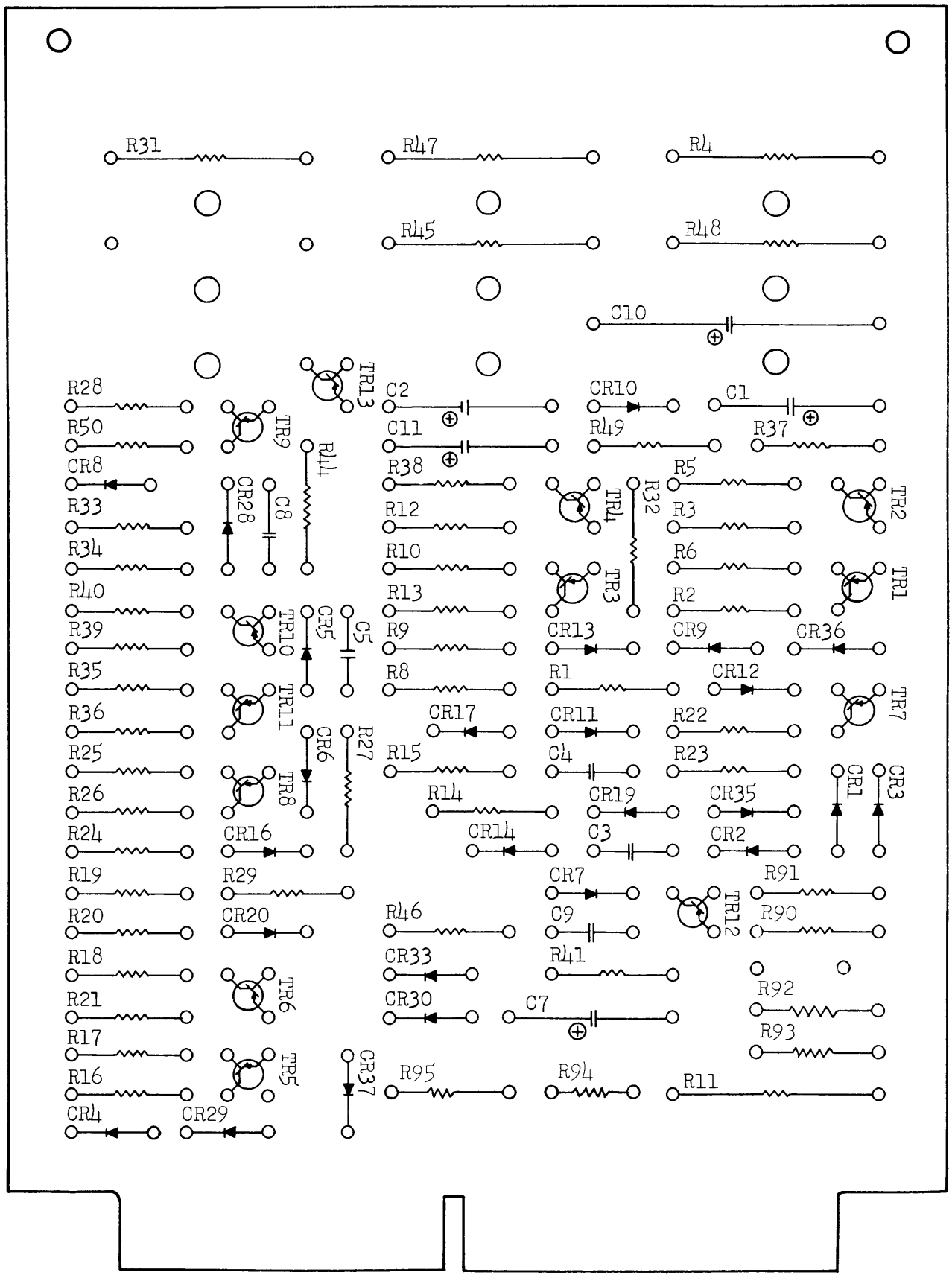
In operations other than Tape Feed, the Start Process Signal (GND) (Sec. 6B) sets the Feed Control Flip-Flop. At this time an In Process signal is generated to the outside source indicating that the Punch is in operation and a normal Feed and Punch operation will occur as described above.

READER TIMING




TIME (M.S.)
0 5 10 15 0 5 10 15 0 5 10 15 0 5 10 15 0
PUNCH TIMING PULSE
S
F
1/2MS. MIN.
3 MS. MIN.
START PROCESS
IN PROCESS
(FEED CONTROL)
1
2
3
SAMPLE DATA LINE
FORWARD FEED & PUNCH F.F.
FEED DIRECTION CONTROL LINE
REVERSE FEED F.F.

READER CARD COMPONENT LOCATION



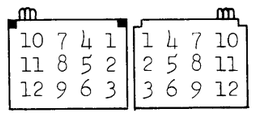
MODELS 590 & 591 READER INTERCONNECTIONS AND SCHEMATIC

CONNECTOR N

1 2 3 4 5 6 7 8 9 10 11

Com 0 1 2 3 Int 4 5 6 7 8 Com

CONNECTORS C & D PIN IDENTIFICATION



CONNECTOR IDENTIFICATION

A-READER CARD CONNECTOR
C-AMP. CONNECTOR (BLACK)
D-AMP. CONNECTOR (WHITE)
E-34 PIN GORN CONNECTOR
N-SENSING CONTACT CONNECTOR

CONNECTOR A

Component Side

C7	A	1	C9
C8	B	2	
	C	3	
C2	D	4	EC
C11	E	5	C6
-24V *B4	F	6	C1
D10	H	7	
C5	J	8	
	K	9	
S8-5	L	10	
D12	M	11	
	N	12	Pol. Plg.
*B6	P	13	
+6V	R	14	
EA	S	15	
EB	T	16	
D11	U	17	
S8-4	V	18	EN
GND. C10	W	19	
Chassis	X	20	D9
C4	Y	21	B8*
-18V *B19	Z	22	

CONNECTOR C

A6	1	L18-1(10D)
AD	2	L18-2(10D)
S8-5 (8A)	3	S11-4(7A)
AY	4	L17-1(8D)
AJ	5	S9-4(7A)
A5	6	L14-1(9D) L15-1(9D)
AA	7	L14-2(9D)
AB	8	L15-2(9C) L19-2(10C)
A1	9	L17-2(8D) L20-1(7D)
AW	10	L20-2(7D)
AE	11	L16-1(6A)
EP	12	S11-5(7A)

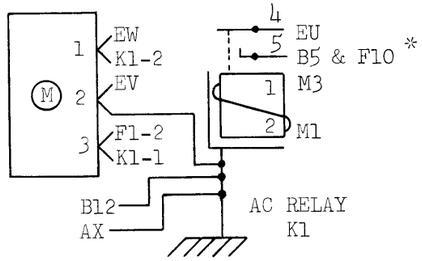
CONNECTOR D

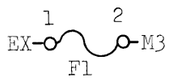
ED	1	N2(10A)
EE	2	N3(10A)
EF	3	N4(10B)
EH	4	N6(10B)
EJ	5	N7(10B)
EK	6	N8(10B)
EL	7	N9(10B)
EM	8	N10(10B)
A20	9	S9-5(7A)
AH	10	N5(10A)
AU	11	N1&11 (10A&B)
AM	12	L19-1(10C)

CONNECTOR E

Note 1	A	AS(6B)
Note 2	B	AT(9A)
Note 3	C	A4(6D)
S C 1	D	D1
E O 2	E	D2
N N 3	F	D3
S T 4	H	D4
I A 5	J	D5
N C 6	K	D6
G T 7	L	D7
S 8	M	D8
Note 4	N	A18
Note 5	P	C12
+6VDC	R	Note 6
-18VDC	S	Note 7
-18VDC (Delayed)	T	Note 8
-24VDC	U	K1-4
Ground(Grn)	V	M2
117VAC(Wht)	W	M1
117VAC(Blk)	X	F1-1
	Y	
	Z	
	a	
	b	
	c	
	d	
	f	
	g	
	h	
	i	
	j	
	k	
	m	
	n	

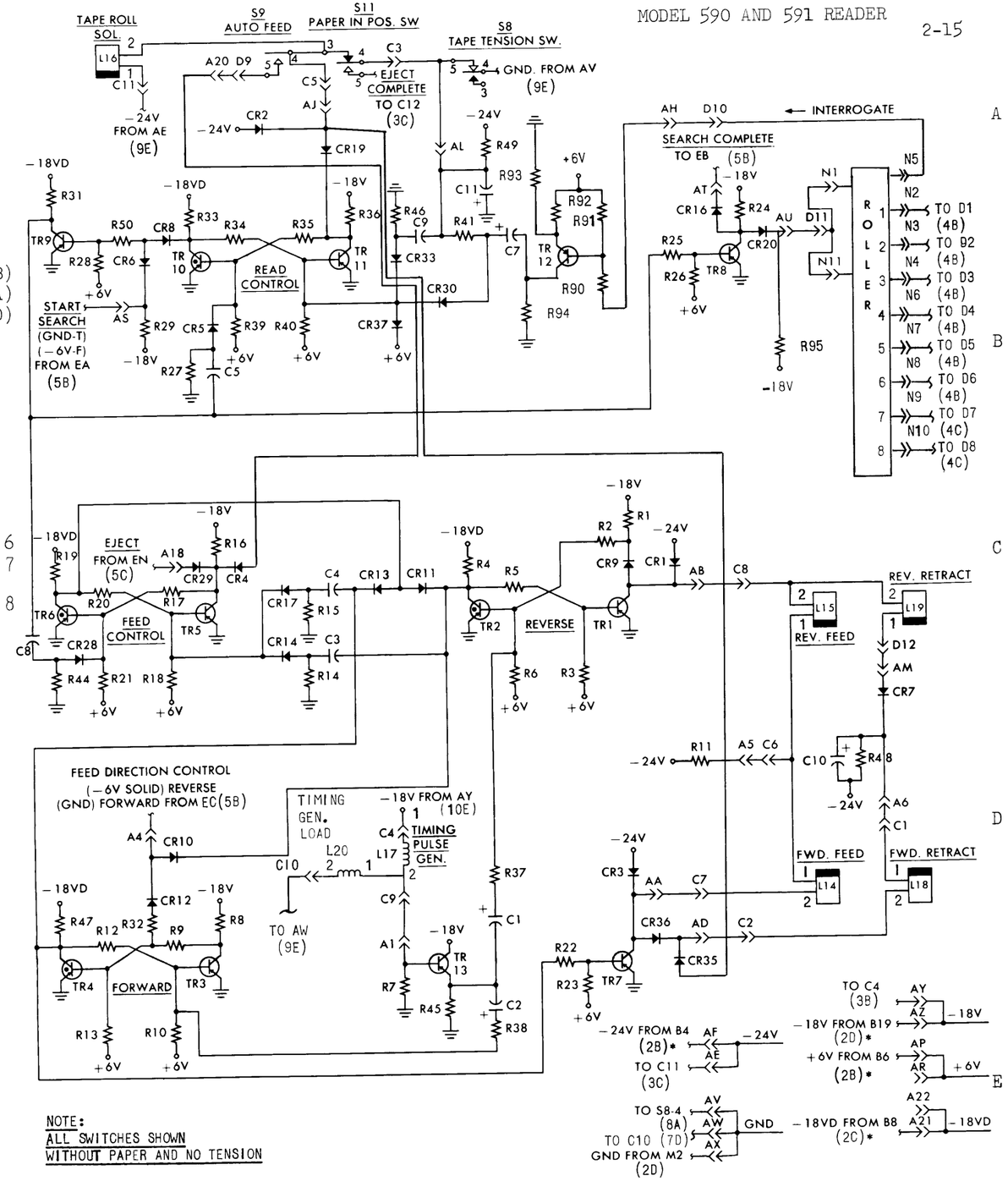
* See Punch Schematic Drawing Page 2-23





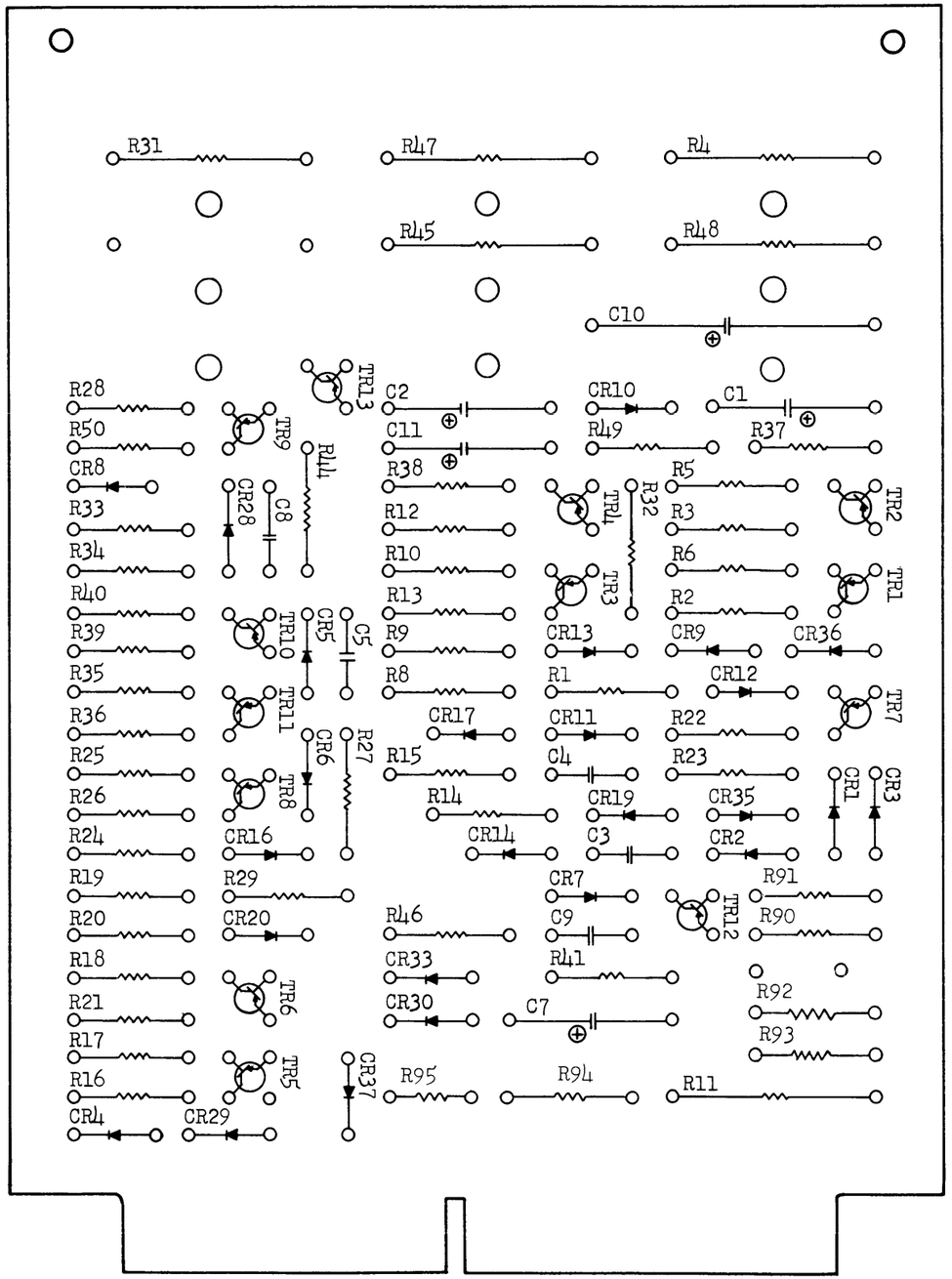
NOTES:

1. Start Search Signal (Ground referenced from -6VDC)
2. Search Complete (Ground)
3. Feed Direction Control (Ground Fwd.) (-6VDC Rev.)
4. Eject (Ground)
5. Eject Complete
6. +6VDC to Connector B7* and B6* then to AP(10E)
7. -18VDC to Connector B20*, B19* and B18* then to AZ(10E)
8. -18VDC (Delayed) to Connector B9*, B8* then to A21(10E)



MODELS 580 & 581 READER AND PUNCH INTERCONNECTIONS AND SCHEMATIC

READER CARD COMPONENT LOCATION



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CONNECTOR N

1 2 3 4 5 6 7 8 9 10 11

C				I						C
o	1	2	3	n	4	5	6	7	8	o
m				t						m

CONNECTOR C

ERS	1	L18-1(8D)
ERT	2	L18-2(8D)
S8-5(8C)	3	S11-4(9C)
F9	4	L17-1(9D)
ERa	5	S9-4(10C)
ERg	6	L15-1&L14-1(6&7D)
ERN	7	L14-2(6D)
ERP	8	L19-2&L15-2(7D)
ERc	9	L17-2&L20-1(9D)
G3	10	L20-2(9D)
K1-5(3D)	11	L16-1(9D)
ERZ	12	S11-5(9C)

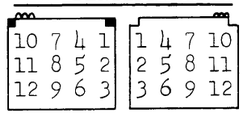
CONNECTOR D

ERA	1	N2
ERB	2	N3
ERC	3	N4
ERD	4	N6
ERE	5	N7
ERF	6	N8
ERH	7	N9
ERJ	8	N10
ERM	9	S9-5(10C)
ERK	10	N5
ERL	11	N1&11
ERU	12	L19-1(7D)

CONNECTOR F

EPA	1	L1-2(6B)
EPB	2	L2-2(6B)
EPC	3	L3-1(6B)
EPD	4	L4-1(7B)
EPE	5	L5-1(7B)
EPF	6	L6-2(7B)
EPH	7	L7-2(8B)
EPJ	8	L8-2(8B)
EPY&C4	9	L12-1(9B)
K1-5(3D)	10	H5
EPK	11	L11-1(9B)
EPT	12	L12-2&L13-1(9A&B)

CONNECTORS C,D,F,G PIN IDENTIFICATION



CONNECTOR IDENTIFICATION

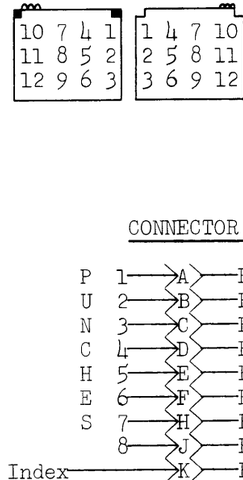
C-AMP. CONNECTOR READER (BLACK)
D-AMP. CONNECTOR READER (WHITE)
ER-GORN CONNECTOR READER
EP-GORN CONNECTOR PUNCH
F-AMP. CONNECTOR PUNCH (WHITE)
G-AMP. CONNECTOR PUNCH (BLACK)
H-SOLDER STRIP ON PUNCH

CONNECTOR EP

P U N C H E S	1	F1
	2	F2
	3	F3
	4	F4
	5	F5
	6	F6
	7	F7
	8	F8
Index	K	F11
Rev. Feed	L	G1
Fwd. Feed	M	G7
Fwd.&Rev. Common	N	G2
Note 2	P	S2-4(6A)
Note 2	R	S2-3(6A)
Tape Feed	S	S6-5(7A)
Timing Pulse	T	F12
-24VDC	U	K1-4
Ground (Grn)	V	M2
117VAC (Wht)	W	M1
117VAC (Blk)	X	F1-1
Neg. To Gen.	Y	F9
Pos. To Gen.	Z	G3

CONNECTOR ER

S C E O N N S T I A N C G T	1	D1
	2	D2
	3	D3
	4	D4
	5	D5
	6	D6
	7	D7
	8	D8
Interrogate	K	D10
Common	L	D11
Auto Feed	M	D9
Fwd. Feed	N	C7
Rev. Feed	P	C8
	R	
Pin Fwd.	S	C1
Pin Fwd.	T	C2
Pin Rev.	U	D12
	V	
	W	
	X	
	Y	
Eject Comp.	Z	C12
Paper-in-Pos.	a	C5
	b	
Timing Pulse	c	C9
Tape Tension	d	S8-5(8C)
Tape Tension	f	S8-4(8C)
Fwd.&Rev. Common	g	C6

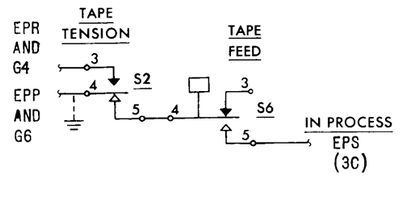


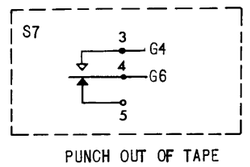
CONNECTOR G

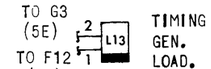
EPL	1	L10-2(9B)
ERN	2	L9-1&L10-1(8&9B)
EPZ&C10	3	L13-2(9A)
S2-3	4	S7-3(8A)
	5	
S2-4	6	S7-4(8A)
EPM	7	L9-2(8B)

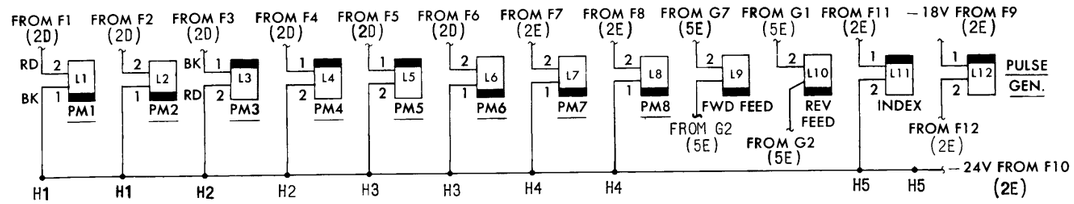
NOTES:

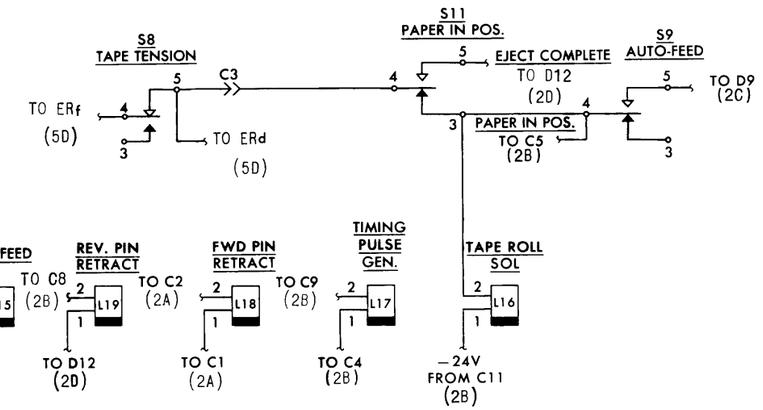
1. Bit is Ground, No Bit is open circuit.
2. Tape Tension and optional Punch out of Tape Switch.

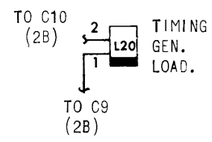


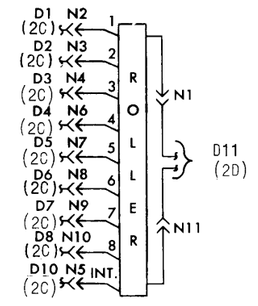








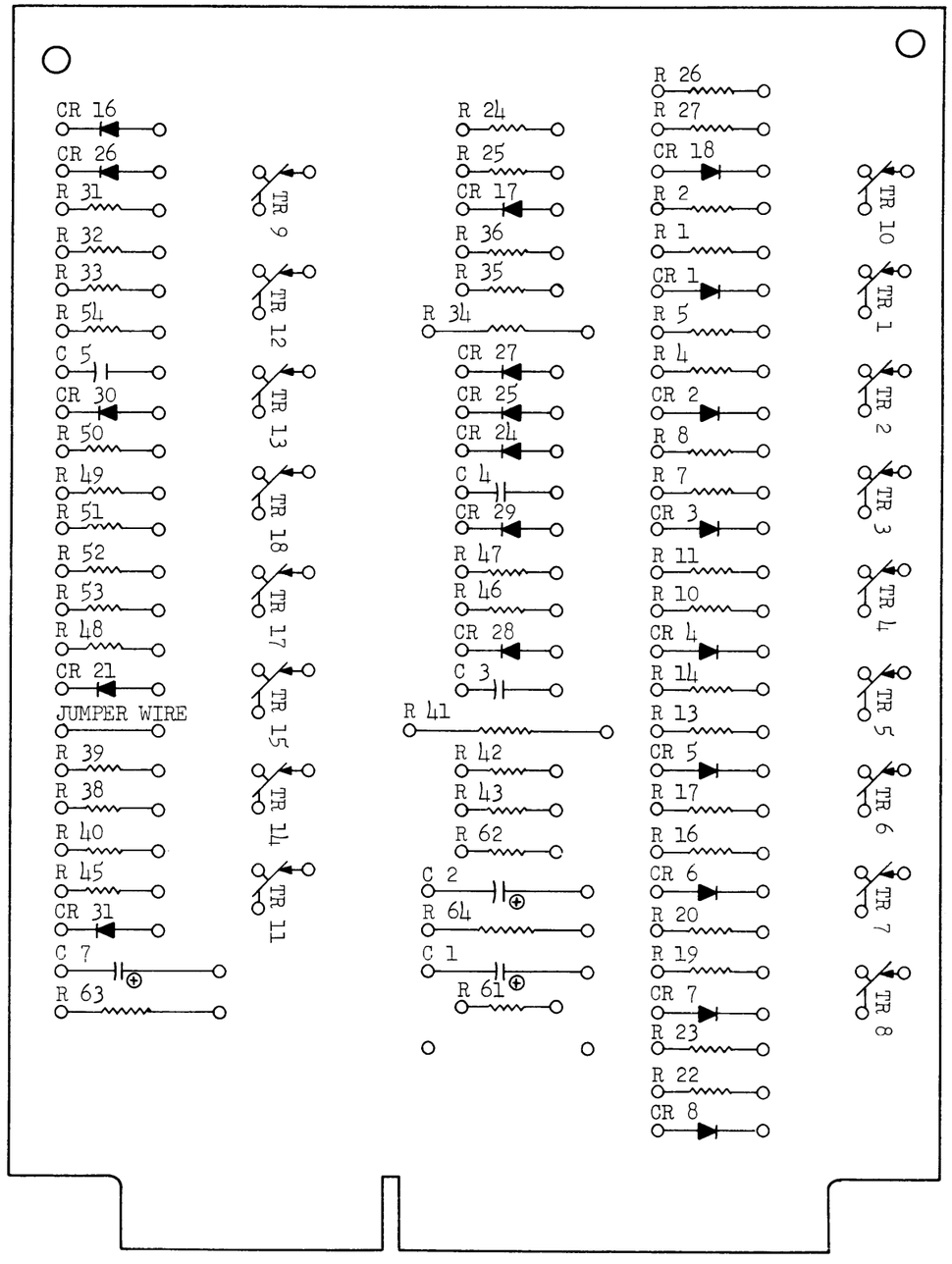




NOTE:
PULSE GENERATOR BIAS REQUIREMENTS
-18 VDC (OR 15MA) PER SET OF (2) COILS. POLARITY MUST BE AS SHOWN TO GENERATE A TIMING PULSE OF POLARITY AND AMPLITUDE AS PER MECHANICAL TIMING CHART. REVERSE POLARITY TIMING MAY BE GENERATED BY REVERSING BIAS POLARITY.

MODELS 590 & 591 PUNCH
INTERCONNECTIONS AND SCHEMATIC

PUNCH CARD COMPONENT LOCATION



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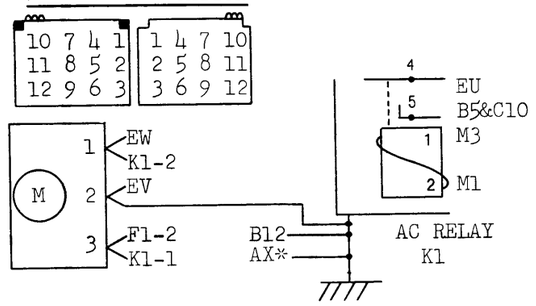
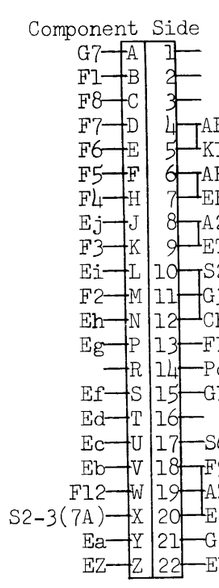
CONNECTORS F & G
PIN IDENTIFICATION



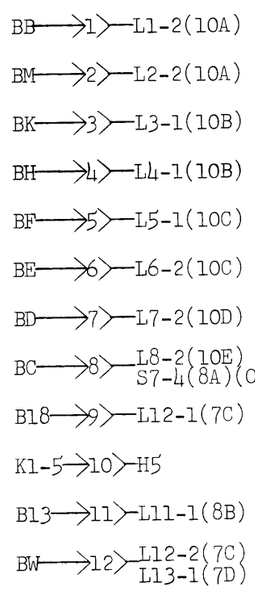
CONNECTOR IDENTIFICATION

B-PUNCH CARD CONNECTOR
E-34 PIN GORN CONNECTOR
F-AMP. CONNECTOR (WHITE)
G-AMP. CONNECTOR (BLACK)
H-SOLDER STRIP ON PUNCH

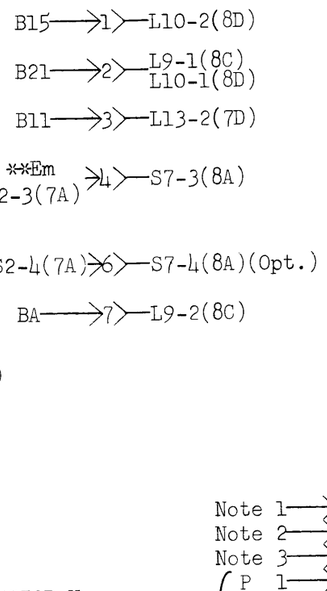
CONNECTOR B



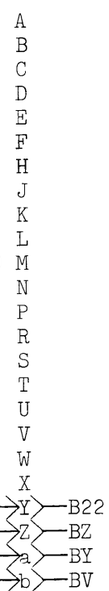
CONNECTOR F



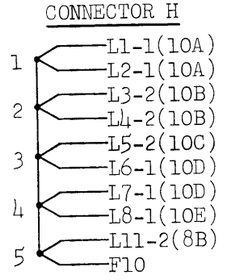
CONNECTOR G



CONNECTOR E



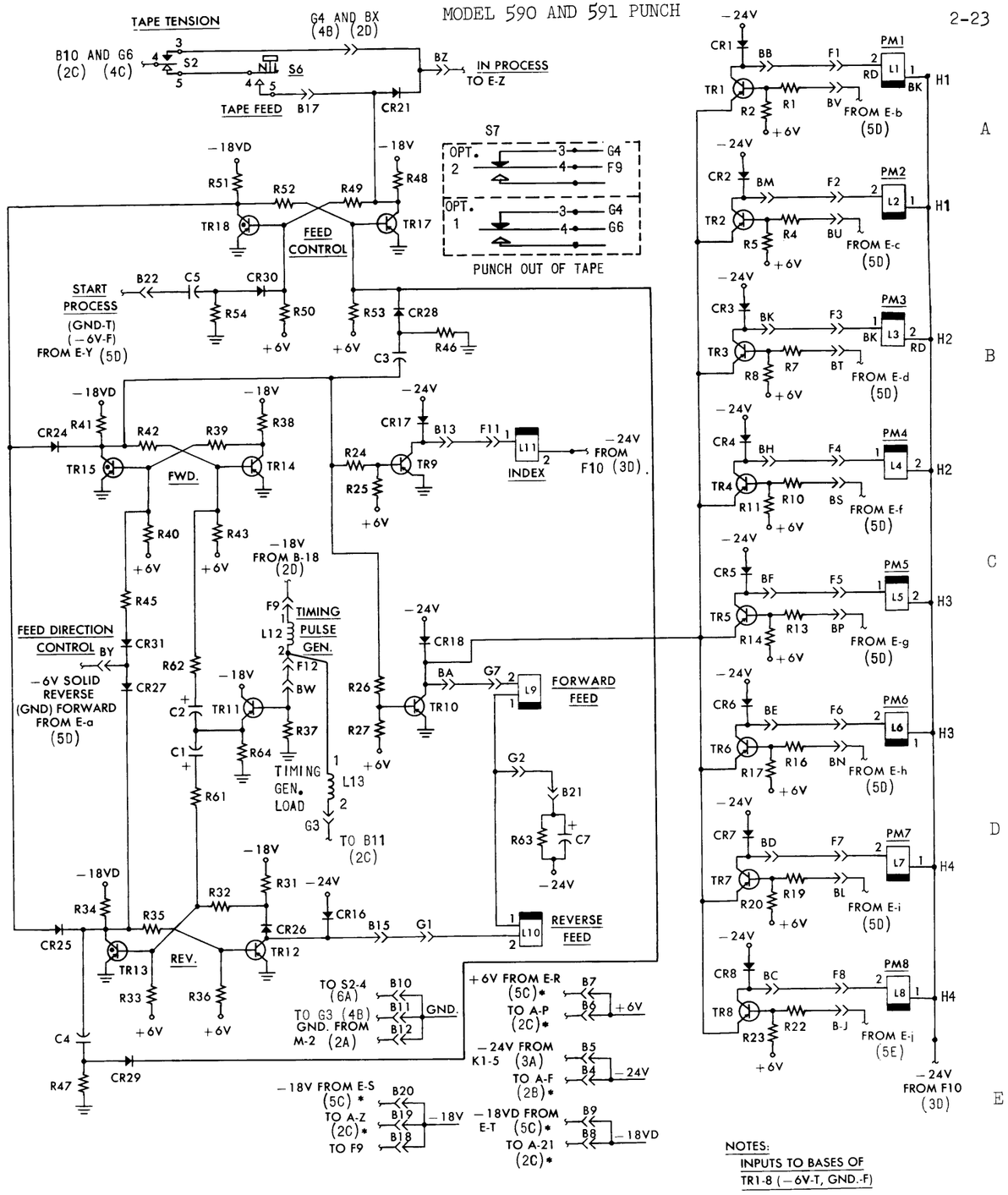
CONNECTOR H



NOTES:

1. Start Process
2. In Process
3. Feed Direction Control
4. Punch out of Tape Switch
5. Bit is -6VDC, No Bit is Ground

* See Reader Schematic Drawing Page 2-15
** Em for Option #2, S2-3 for Option #1



MODELS 570 & 571 READER INTERCONNECTIONS AND SCHEMATIC

CONNECTOR N

1 2 3 4 5 6 7 8 9 10 11

C			I							C
o	1	2	3	n	4	5	6	7	8	o
m				t						m

CONNECTORS C & D PIN IDENTIFICATION

10	7	4	1
11	8	5	2
12	9	6	3

1	4	7	10
2	5	8	11
3	6	9	12

CONNECTOR IDENTIFICATION

A-READER CARD CONNECTOR
C-AMP. CONNECTOR (BLACK)
D-AMP. CONNECTOR (WHITE)
E-34 PIN GORN CONNECTOR
N-SENSING CONTACT CONNECTOR

CONNECTOR A

Component Side

C7	A	1	C9
C8	B	2	
	C	3	
C2	D	4	EC
C11	E	5	C6
K1-5	F	6	C1
D10	H	7	
C5	J	8	
	K	9	
S8-5	L	10	
D12	M	11	
	N	12	Pol. Plg.
ER	P	13	
	R	14	
EA	S	15	
EB	T	16	
D11	U	17	
S8-4	V	18	EN
C10	W	19	
Chassis	X	20	D9
C4	Y	21	ET
ES	Z	22	

-24V (B)
+6V (C)
GND.
-18V (C)

CONNECTOR C

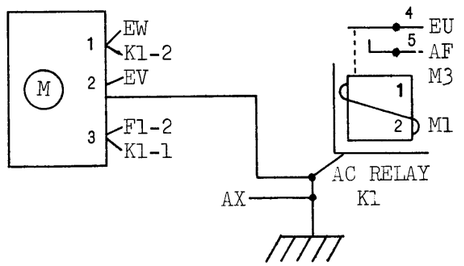
A6	1	L18-1(10D)
AD	2	L18-2(10D)
S8-5 (8A)	3	S11-4(7A)
AY	4	L17-1(8D)
AJ	5	S9-4(7A)
A5	6	L14-1(10D) L15-1(10C)
AA	7	L14-2(10D)
AB	8	L15-2(10C) L19-2(10C)
A1	9	L17-2(8D) L20-1(7D)
AW	10	L20-2(7D)
AE	11	L16-1(6A)
EP	12	S11-5(7A)

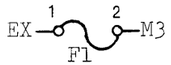
CONNECTOR D

ED	1	N2(10A)
EE	2	N3(10B)
EF	3	N4(10B)
EH	4	N6(10B)
EJ	5	N7(10B)
EK	6	N8(10B)
EL	7	N9(10B)
EM	8	N10(10B)
A20	9	S9-5(7A)
AH	10	N5(10A)
AU	11	N1&11 (10A&B)
AM	12	L19-1(10C)

CONNECTOR E

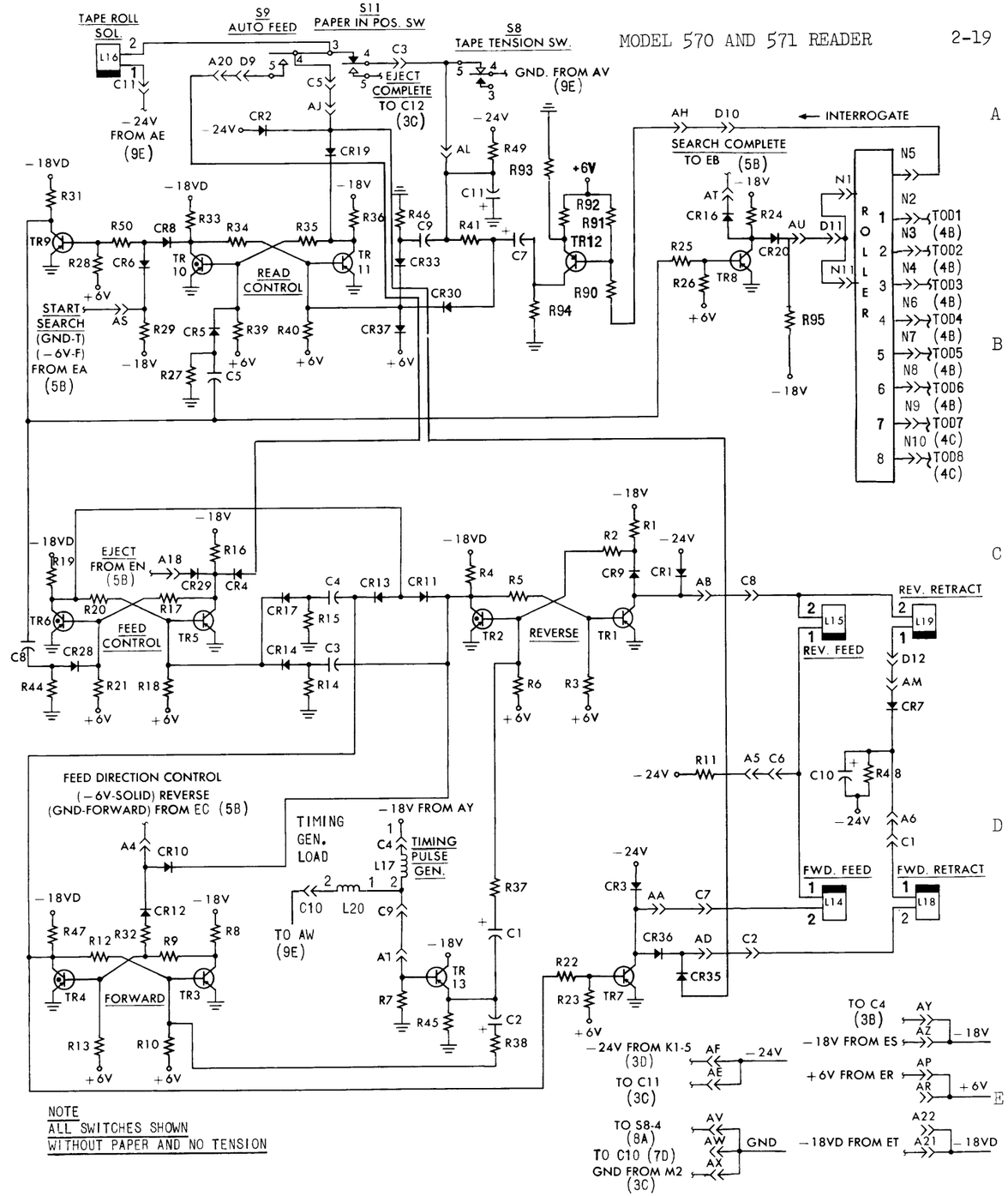
Note 1	A	AS(6B)
Note 2	B	AT(9A)
Note 3	C	A4(6D)
S C 1	D	D1
E O 2	E	D2
N N 3	F	D3
S T 4	H	D4
I A 5	J	D5
N C 6	K	D6
G T 7	L	D7
S 8	M	D8
Note 4	N	A18
Note 5	P	C12
+6VDC	R	AP
-18VDC	S	AZ
-18VDC Delayed	T	A21
-24VDC	U	K1-4(3D)
Ground(Grn)	V	M2(2D)
117VAC(Wht)	W	M1(2D)
117VAC(Blk)	X	F1-1(4D)





NOTES:

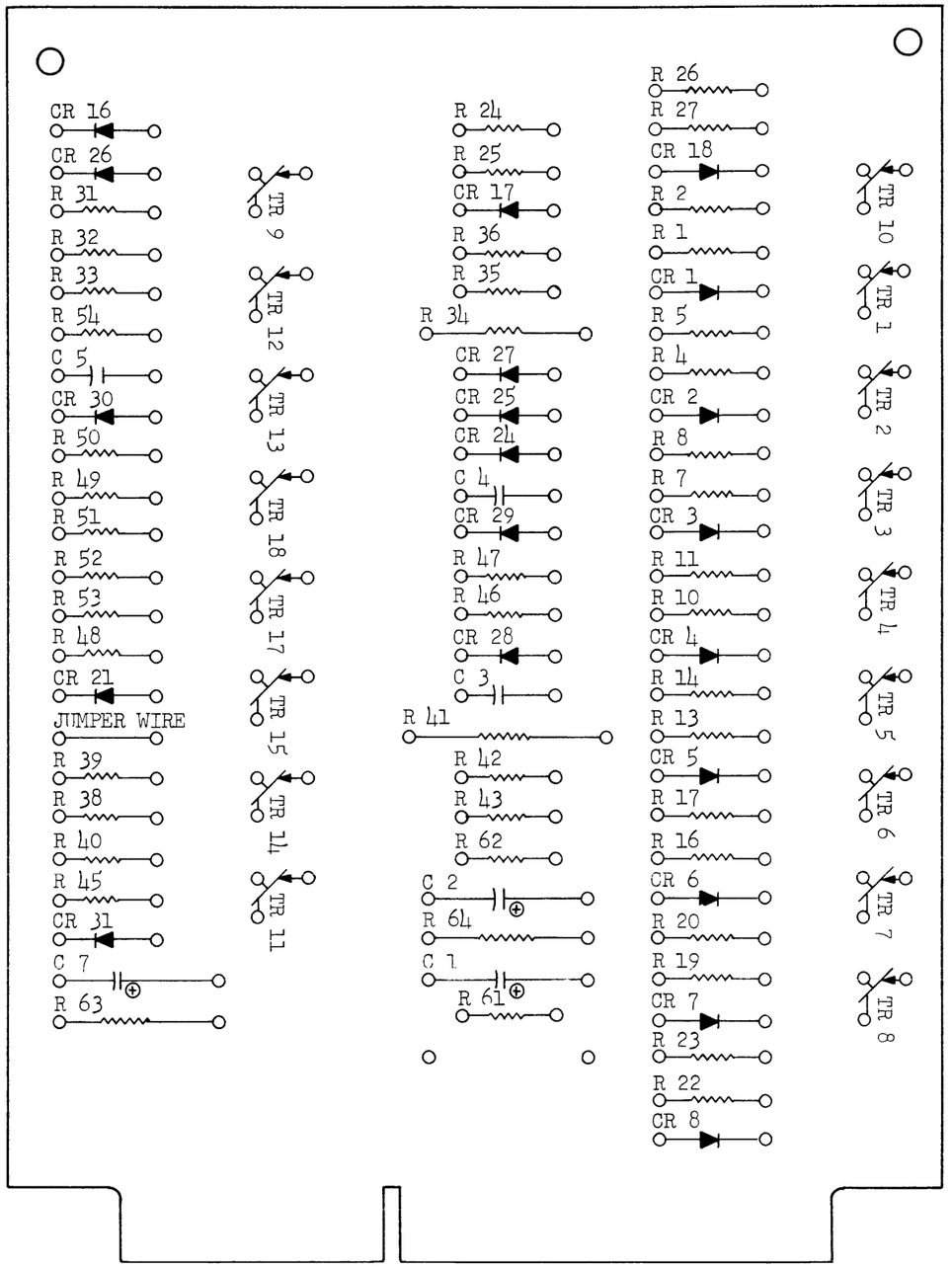
1. Start Search Signal (Ground)
2. Search Complete (Ground)
3. Feed Direction Control (Ground Fwd.) (-6VDC Rev.)
4. Eject (Ground)
5. Eject Complete



NOTE
ALL SWITCHES SHOWN
WITHOUT PAPER AND NO TENSION

MODELS 560, 561, 550 & 551 READER INTERCONNECTIONS AND SCHEMATIC

PUNCH CARD COMPONENT LOCATION



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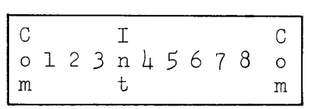
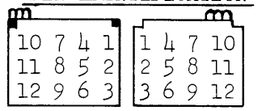
CONNECTOR N



CONNECTORS C & D
PIN IDENTIFICATION



CONNECTOR
IDENTIFICATION

A--READER CARD CONNECTOR
C--AMP. CONNECTOR (BLACK)
D--AMP. CONNECTOR (WHITE)
E--34 PIN GORN CONNECTOR
N--SENSING CONTACT CONNECTOR

CONNECTOR C

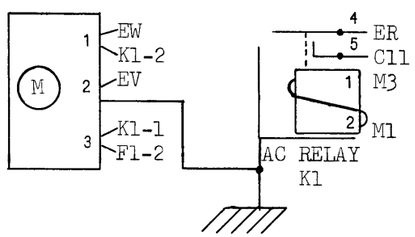
ES	1	L18-1(8B)
ET	2	L18-2(8B)
S8-5 (8A)	3	S11-4(8A)
Eb	4	L17-1(8B)
Ea	5	S9-4(9A)
Eg	6	L14-1(6B) L15-1(7B)
EN	7	L14-2(6B)
EP	8	L15-2(7B) L19-2(7B)
Ec	9	L17-2(8B) L20-1(8B)
Eh	10	L20-2(8B)
K1-5	11	L16-1(9B)
EZ	12	S11-5(9A)

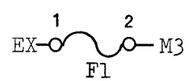
CONNECTOR D

EA	1	N2(9B)
EB	2	N3(9B)
EC	3	N4(9B)
ED	4	N6(9B)
EE	5	N7(9B)
EF	6	N8(9B)
EH	7	N9(9B)
EJ	8	N10(9C)
EM	9	S9-5(10A)
EK	10	N5(9C)
EL	11	N1&11(10B)
EU	12	L19-1(7B)

CONNECTOR E

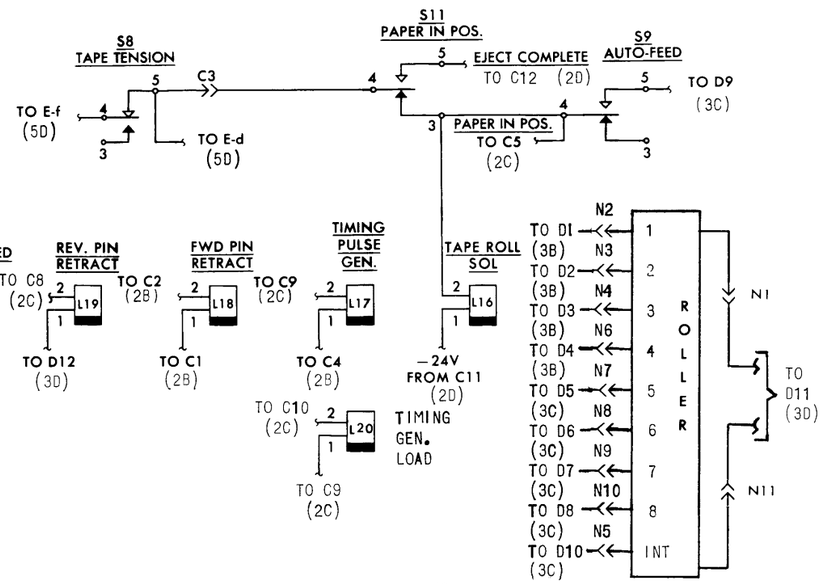
S C 1	A	D1
E O 2	B	D2
N N 3	C	D3
S T 4	D	D4
I A 5	E	D5
N C 6	F	D6
G T 7	H	D7
S 8	J	D8
Interrogate	K	D10
Common	L	D11
Auto. Feed	M	D9
Forward Feed	N	C7
Reverse Feed	P	C8
-24VDC	R	K1-4
Pin Fwd. (1)	S	C1
Pin Fwd. (2)	T	C2
Pin Rev.	U	D12
Ground	V	M2
117VAC(Wht)	W	M1
117VAC(Blk)	X	F1-1
	Y	
Note 1	Z	C12
Note 2	a	C5
Note 3	b	C4
Note 4	c	C9
Tape Tension	d	S8-5(8A)
Tape Tension	f	S8-4(7A)
Note 5	g	C6
Note 6	h	C10





NOTES:

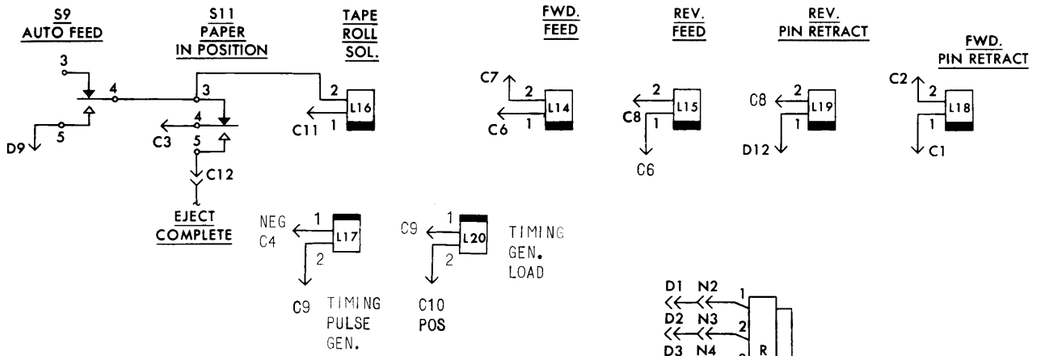
1. Eject Complete (Ground)
2. Paper in Position
3. Negative to Generator
4. Timing Pulse (Output)
5. Forward and Reverse Feed
6. Positive to Generator



NOTE:
ALL SWITCHES SHOWN
WITHOUT TAPE AND NO TENSION

MODEL 550 AND 551 READER

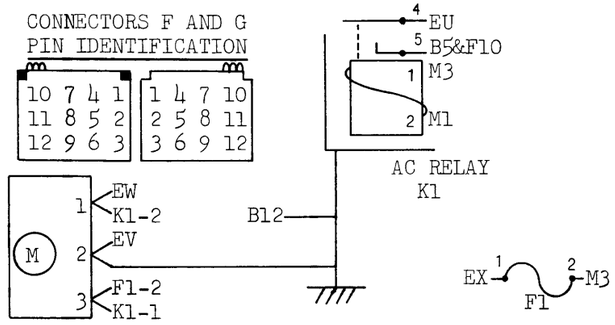
NOTE:
PULSE GENERATOR BIAS REQUIREMENTS
-18 VDC (OR 15MA) PER SET OF (2) COILS. POLARITY MUST BE AS SHOWN TO GENERATE A TIMING PULSE OF POLARITY AND AMPLITUDE AS PER MECHANICAL TIMING CHART. REVERSE POLARITY TIMING MAY BE GENERATED BY REVERSING BIAS POLARITY.



NOTE:
SEE CONNECTORS C & D PIN IDENTIFICATION FOR PIN LOCATION OF COMPONENTS.

MODELS 520 & 521 PUNCH
INTERCONNECTIONS AND SCHEMATIC

CONNECTORS F AND G
PIN IDENTIFICATION



CONNECTOR
IDENTIFICATION

B-PUNCH CARD CONNECTOR
E-34 PIN GORN CONNECTOR
F-AMP. CONNECTOR (WHITE)
G-AMP. CONNECTOR (BLACK)
H-SOLDER STRIP ON PUNCH

CONNECTOR B

Component Side

G7	A	1	
F1	B	2	
F8	C	3	
F7	D	4	
F6	E	5	K1-5
F5	F	6	
F4	H	7	ER
Ej	J	8	
F3	K	9	ET
Ei	L	10	S2-4(6A)
F2	M	11	G3
Eh	N	12	Chassis
Eg	P	13	F11
	R	14	Pol.Plg.
Ef	S	15	G1
Ed	T	16	
Ec	U	17	S6-5(7A)
Eb	V	18	F9
F12	W	19	
S2-3(7A)	X	20	ES
Ea	Y	21	G2
EZ	Z	22	EY

CONNECTOR F

BB	1	L1-2(10A)
BM	2	L2-2(10A)
BK	3	L3-1(10B)
BH	4	L4-1(10B)
BF	5	L5-1(10C)
BE	6	L6-2(10D)
BD	7	L7-2(10D)
BC	8	L8-2(10E)
B18	9	L12-1(7C)
K1-5	10	H5
B13	11	L11-1(8B)
BW	12	L12-2(7C) L13-1(7D)

CONNECTOR G

B15	1	L10-2(8D)
B21	2	L9-1(8C) L10-1(8D)
B11	3	L13-2(7D)
S2-3 (7A)	4	S7-3(8A)
S2-4 (7A)	6	S7-4(8A)
BA	7	L9-2(8C)

CONNECTOR E

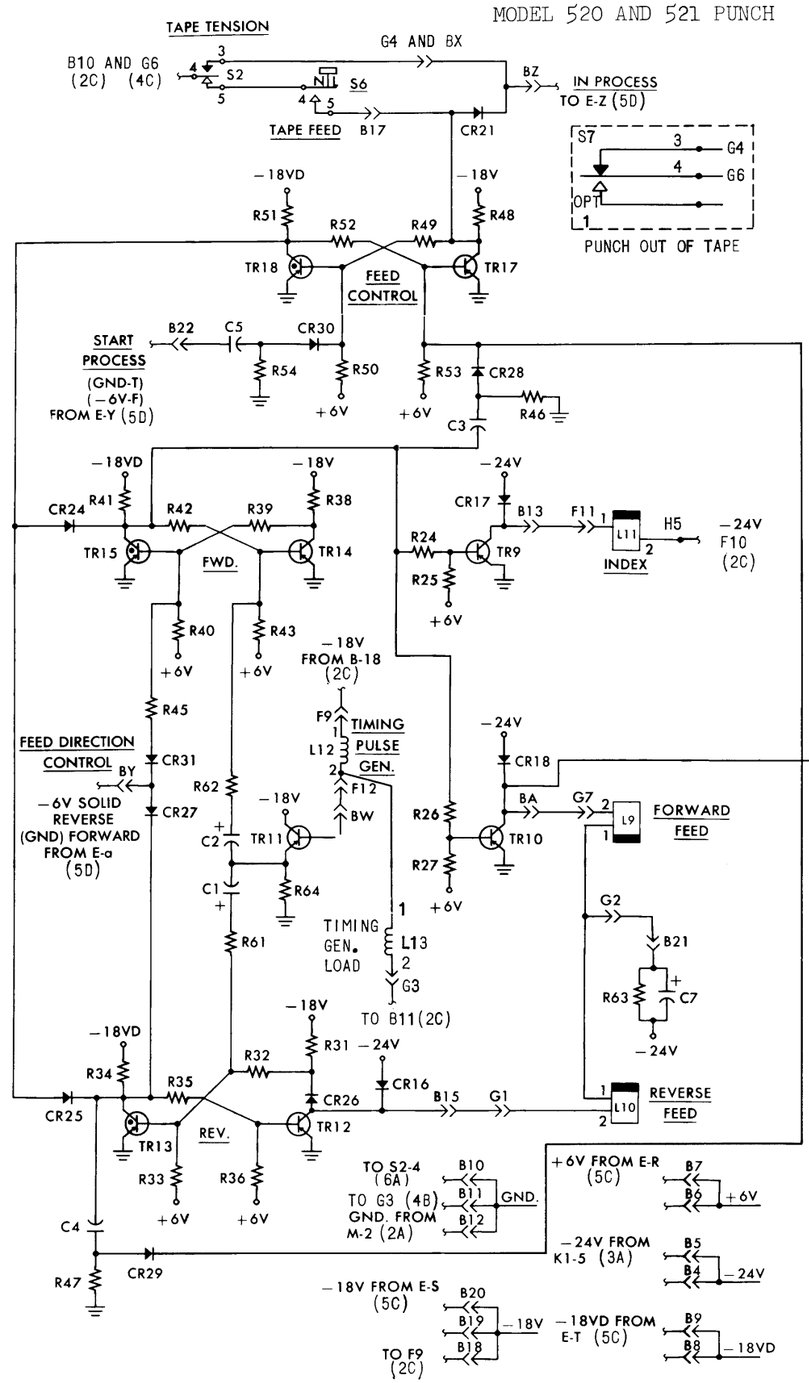
	A	
	B	
	C	
	D	
	E	
	F	
	H	
	J	
	K	
	L	
	M	
	N	
	P	
+6VDC	R	B7
-18VDC	S	B20
-18VDC (Delayed)	T	B9
-24VDC	U	K1-4
GND(Grn)	V	M2
117VAC(Wht)	W	M1
117VAC(Blk)	X	F1-1
Note 1	Y	B22
Note 2	Z	BZ
Note 3	a	BY
Note 4 P	b	BV
U	c	BU
N	d	BT
C	f	BS
H	g	BP
E	h	BN
S	i	BL
	j	BJ

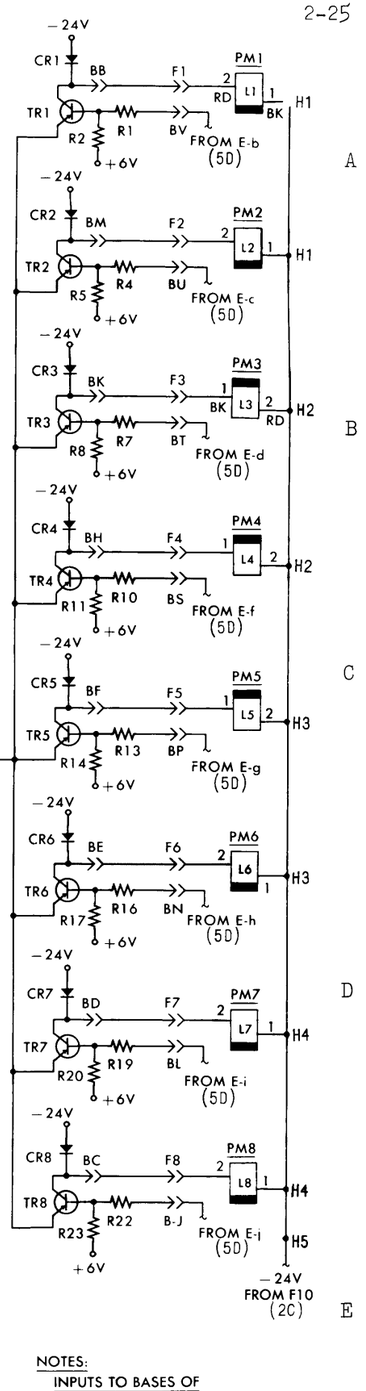
CONNECTOR H

1	L1-1(10A)
	L2-1(10A)
2	L3-2(10B)
	L4-2(10B)
3	L5-2(10C)
	L6-1(10D)
4	L7-1(10D)
	L8-1(10E)
5	L11-2(8B)
	F10

NOTES:

1. Start Process
2. In Process
3. Feed Direction Control
4. Bit is -6VDC, No Bit is Ground

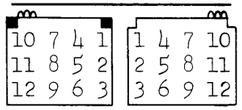


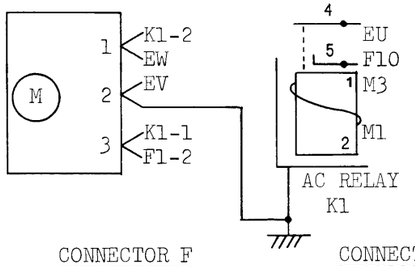


NOTES:
INPUTS TO BASES OF
TR1-8 (-6V-T, GND.-F)

MODELS 510, 511, 500 & 501 PUNCH INTERCONNECTIONS AND SCHEMATIC

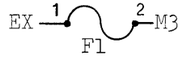
CONNECTORS F AND G PIN IDENTIFICATION





CONNECTOR IDENTIFICATION

E-34 PIN GORN CONNECTOR
F-AMP. CONNECTOR (WHITE)
G-AMP. CONNECTOR (BLACK)
H-SOLDER STRIP ON PUNCH



CONNECTOR F

EA → 1 → L1-2(6B)
EB → 2 → L2-2(6B)
EC → 3 → L3-1(6B)
ED → 4 → L4-1(7B)
EE → 5 → L5-1(7B)
EF → 6 → L6-2(7B)
EH → 7 → L7-2(8B)
EJ → 8 → L8-2(8B)
EY → 9 → L12-1(9B)
K1-5 → 10 → H5(9C)
EK → 11 → L11-1(9B)
ET → 12 → L12-2(9B), L13-1(9A)

CONNECTOR G

EL → 1 → L10-2(9B)
EN → 2 → L9-1(8B), L10-1(9B)
EZ → 3 → L13-2(9A)
S2-3 → 4 → S7-3(8A) (6A)
S2-4 → 6 → S7-4(8A) (6A)
EM → 7 → L9-2(8B)

CONNECTOR E

Note 2:
P 1 → A → F1
U 2 → B → F2
N 3 → C → F3
C 4 → D → F4
H 5 → E → F5
E 6 → F → F6
S 7 → H → F7
8 → J → F8
Index → K → F11
Reverse Feed → L → G1
Forward Feed → M → G7
Fwd.&Rev. Common → N → G2
Note 1 → P → S2-4
Note 1 → R → S2-3
Tape Feed → S → S6-5
Timing Pulse → T → F12
-24VDC → U → K1-4
GND(Grn) → V → M2
117VAC(Wht) → W → M1
117VAC(Blk) → X → F1-1
Neg. to Gen. → Y → F9
Pos. to Gen. → Z → G3

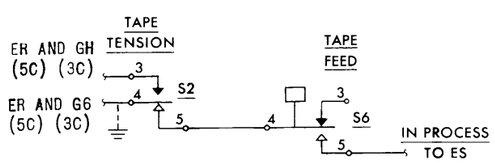
CONNECTOR H

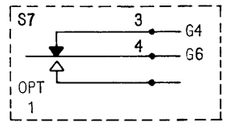
1: L1-1(6B), L2-1(6B)
2: L3-2(6B), L4-2(7B)
3: L5-2(7B), L6-1(7B)
4: L7-1(8B), L8-1(8B)
5: L11-2(9B), F10

NOTES:

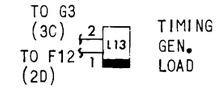
1. Tape Tension and Optional Punch out of Tape Switch.
2. Bit is Ground, No Bit is open circuit

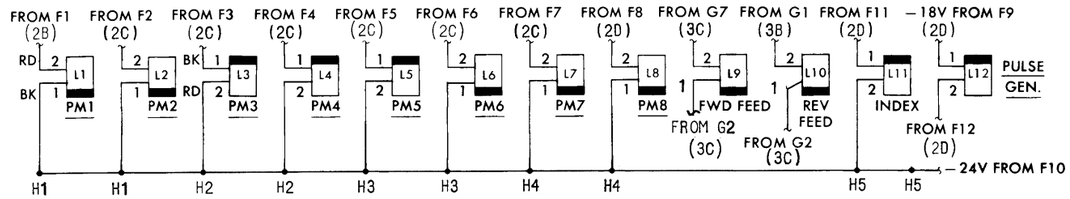
MODEL 510 AND 511 PUNCH





PUNCH OUT OF TAPE

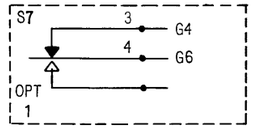




NOTE:

PULSE GENERATOR BIAS REQUIREMENTS:
-18 VDC (OR 15MA) PER SET OF (2) COILS. POLARITY MUST BE AS SHOWN TO GENERATE A TIMING PULSE OF POLARITY AND AMPLITUDE AS PER MECHANICAL TIMING CHART. REVERSE POLARITY TIMING MAY BE GENERATED BY REVERSING BIAS POLARITY.

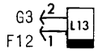
MODEL 500 AND 501 PUNCH

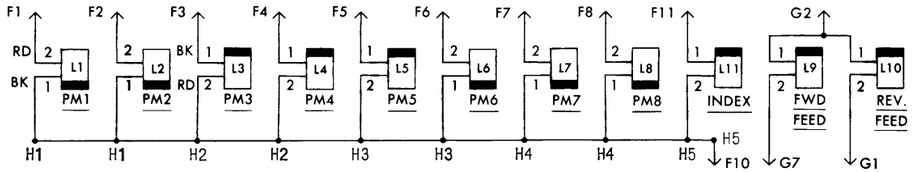


PUNCH OUT OF TAPE

TIMING PULSE GEN.

TIMING GEN. LOAD

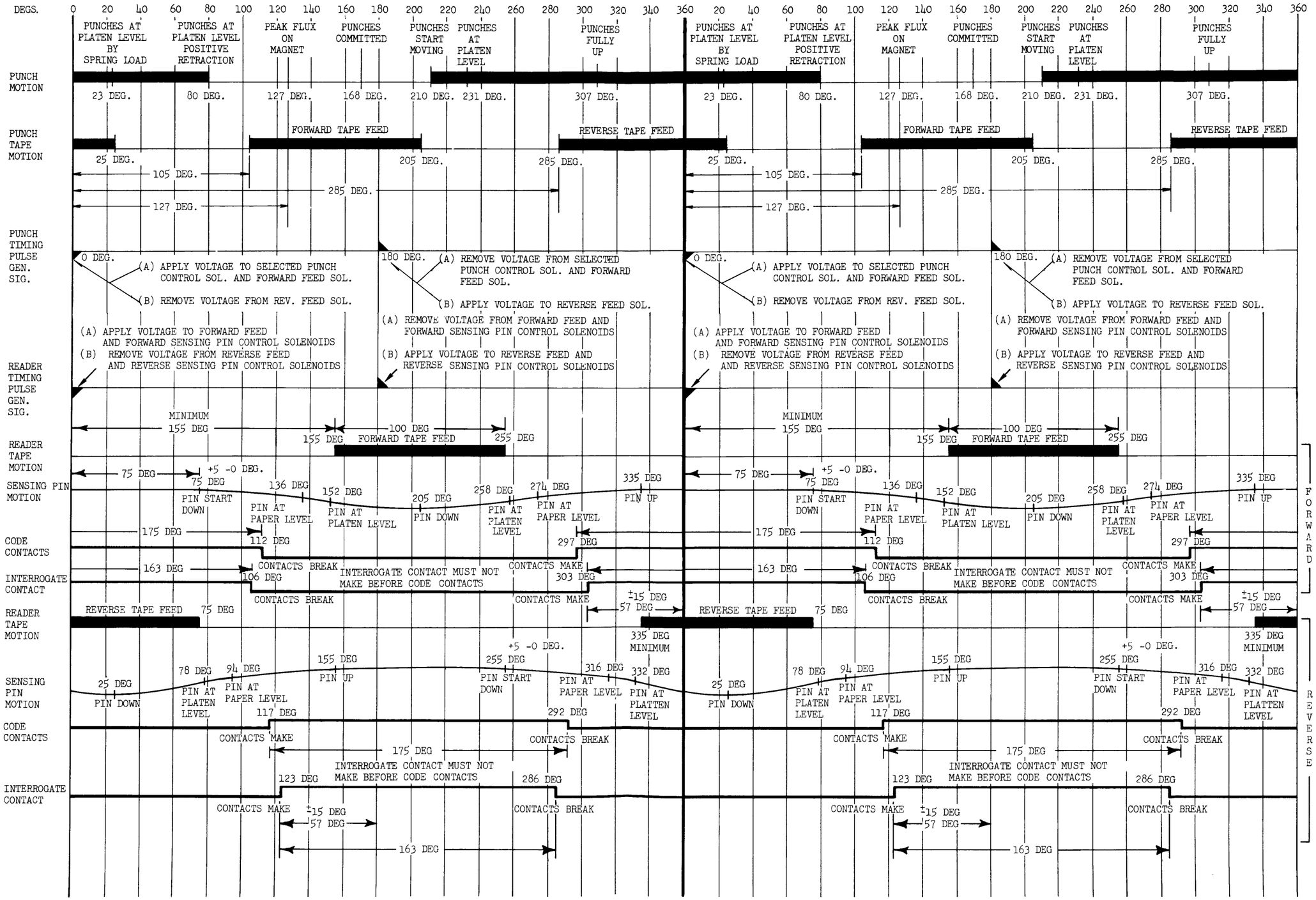




NOTE:
SEE CONNECTORS F AND G PIN IDENTIFICATION FOR PIN LOCATION OF COMPONENTS

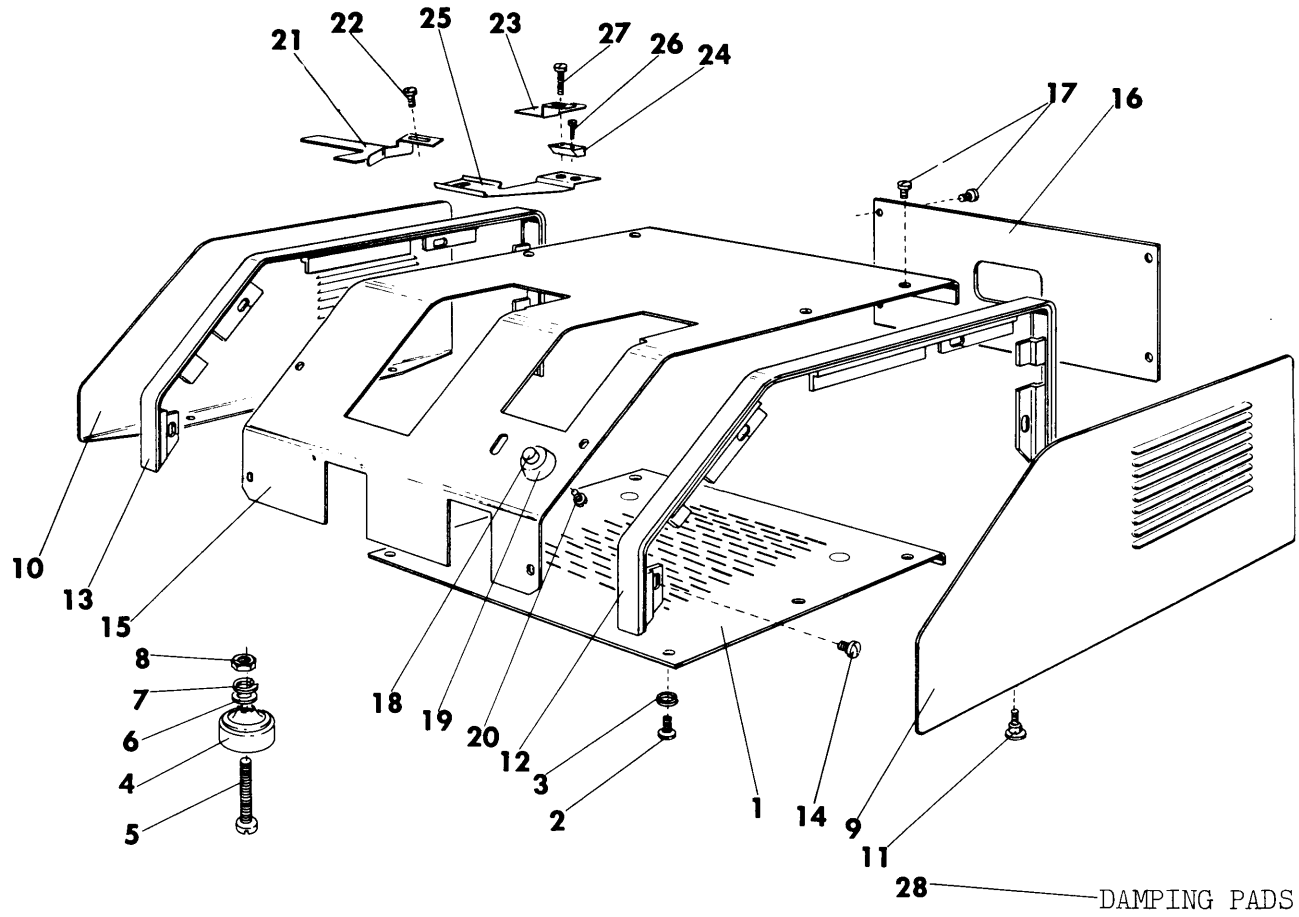
MECHANICAL TIMING CHART

MECHANICAL TIMING CHART



PARTS CATALOG SECTION
500 SERIES

COVER AND PANEL PARTS



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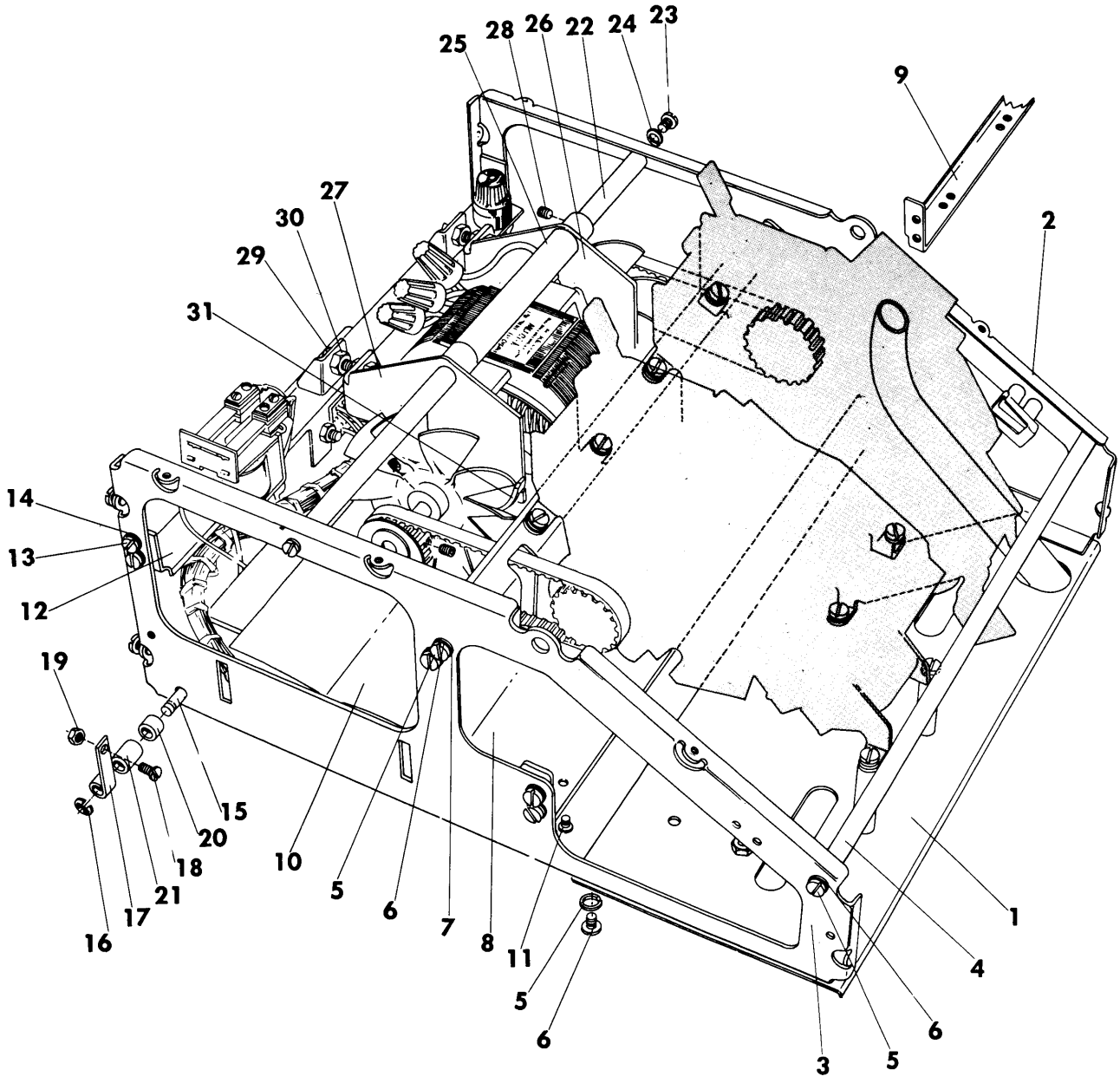
COVER AND PANEL PARTS

Ref. No.	Part No.	Name	Models
(1)	1621-10040	Reader & Punch Base (Rear)	580-590 #
	1633-10040	Reader & Punch Base (Rear)	510-520-560-570 #
(2)	Z4240	Reader & Punch Base (Rear) Screw (6-40)	510-520-560-570-580-590 #
(3)	P11064	Reader & Punch Base (Rear) Screw Lock Washer	510-520-560-570-580-590 #
(4)	1634-10010	Rubber Foot Assembly	510-520-560-570-580-590 #
(5)	4555A	Rubber Foot Binding Screw (8-36)	510-520-560-570-580-590 #
(6)	9E1008	Rubber Foot Assembly Washer	510-520-560-570-580-590 #
(7)	1A6-1041	Rubber Foot Binding Screw Nut Lock Washer	510-520-560-570-580-590 #
(8)	Z4453	Rubber Foot Binding Screw Nut (8-36)	510-520-560-570-580-590 #
(9)	1621-10010	Side Cover (Right)	510-520-560-570-580-590 #
(10)	1621-10020	Side Cover (Left)	510-520-560-570-580-590 #
(11)	3071-03400	Side Cover (Right & Left) Binding Screw (6-40)	510-520-560-570-580-590 #
(12)	1621-10081	Reader & Punch Bezel (Right)	510-520-560-570-580-590 #
(13)	1621-10091	Reader & Punch Bezel (Left)	510-520-560-570-580-590 #
(14)	Z4263	Reader & Punch Bezel (Right & Left) Binding Screw (6-40)	510-520-560-570-580-590 #
(15)	1621-10120	Reader & Punch Top Cover	580-590 #
	1642-10020	Reader Top Cover	560-570 #
	1652-10020	Punch Top Cover	510-520 #
	1621-10150	Reader & Punch Top Cover (Out of Tape Switch) (Optional)	590 #
	1652-10050	Punch Top Cover (Out of Tape Switch)(Optional)	510-520 #
(16)	1621-10030	Reader & Punch Panel (Rear)	590 #
	1622-10030	Reader & Punch Panel (Rear)	580 #
	1633-10050	Reader & Punch Panel (Rear)	510-520-560-570 #
(17)	Z4129	Top Cover Binding Screw (6-40)	510-520-560-570-580-590 #
		Rear Panel Binding Screw	510-520-560-570-580-590 #
(18)	1632-10160	Punch Switch Button	510-520-580-590 #
(19)	1632-10350	Punch Switch Button Guide	510-520-580-590 #
(20)	4508	Punch Switch Button Guide Binding Screw (Self Tapping)	510-520-580-590 #
(21)	1611-10472	Reader Tape Chute	550-590 #
	1641-10010	Reader Tape Chute	560-570 #
(22)	4508	Reader Tape Chute Binding Screw (Self Tapping)	550-560-570-590 #
(23)	1601-10650	Punch Tape Chute	500-510-520-590 #
(24)	1601-10661	Punch Tape Chute Spacer	500-510-520-590 #
	1601-10800	Punch Tape Chute Spacer (Out of Tape Switch) (Optional)	500-510-520-590 #
(25)	1601-10790	Out of Tape Switch Hold Down (Punch)(Optional)	500-510-520-590 #
(26)	4295	Punch Tape Chute Spacer Binding Screw (3-56)	500-510-520-590 #
(27)	1A1-1051	Punch Tape Chute Binding Screw (3-56)	500-510-520-590 #
		Out of Tape Switch Hold Down Screw (Optional)	500-510-520-590 #
(28)	1621-10240	Damping Pad (9" x 1")	510-520-560-570-580-590 #
	1634-10021	Damping Pad (3" x 1")	510-520-560-570-580-590 #
	1634-10170	Damping Pad (5" x 4 1/2")	510-520-560-570 #
	1634-10180	Damping Pad (9" x 5")	580-590 #

NOTE: These Parts are also used on corresponding Advance Feed Hole Models 501, 511, 521, 551, 561, 571, 581, 591.

BASE AND MOTOR PARTS



BASE AND MOTOR PARTS

Ref. No.	Part No.	Name	Models
(1)	1621-10131	Reader & Punch Base Front	580-590 #
	1642-10011	Reader Base Front	560-570 #
	1652-10032	Punch Base Front	510-520 #
(2)	1621-10103	Reader & Punch Base Side Right	510-520-560-570-580-590 #
(3)	1621-10113	Reader & Punch Base Side Left	510-520-560-570-580-590 #
(4)	1621-10050	Reader & Punch Base Side Spacer	580-590 #
	1633-10070	Reader & Punch Base Side Spacer	510-520-560-570 #
(5)	Z4240	Base Side Spacer Binding Screw (6-40)	510-520-560-570-580-590 #
		Base Front Binding Screw	510-520-560-570-580-590 #
		Unit Mounting Bracket Binding Screw	580-590 #
		Support Channel Binding Screw	510-520-560-570 #
(6)	P11064	Base Side Spacer Binding Screw Lock Washer	510-520-560-570-580-590 #
		Base Front Binding Screw Lock Washer	510-520-560-570-580-590 #
		Unit Mounting Brkt. Binding Screw Lock Washer	580-590 #
		Support Channel Binding Screw Lock Washer	510-520-560-570 #
(7)	PY3561	Unit Mounting Brkt. Binding Screw Washer	580-590 #
		Support Channel Binding Screw Washer	510-520-560-570 #
(8)	1632-10450	Unit Mounting Bracket	580-590 #
(9)	1633-10020	Unit Support Channel	510-520-560-570 #
(10)	1632-10390	Paper Card Insulator	520-570-590 #
(11)	Z4263	Paper Card Insulator Binding Screw (6-40)	520-570-580-590 #
(12)	1632-00071	Connector Bracket & Motor Holder Assembly	590 #
	1633-00041	Connector Bracket & Motor Holder Assembly	510-520-560-570 #
	1622-00010	Connector Bracket & Motor Holder Assembly	580 #
(13)	Z4240	Connector Brkt. & Motor Holder Screw (6-40)	510-520-560-570-580-590 #
(14)	P11064	Connector Brkt. & Motor Holder Screw Lock Washer	510-520-560-570-580-590 #
(15)	1632-10290	Amp Leaf Multiple Edge Connector Brkt. Shaft	590 #
	1633-10060	Amp Leaf Multiple Edge Connector Brkt. Shaft	520-570 #
(16)	2812	Amp Leaf Multiple Edge Connector Brkt. Shaft Retaining Ring	520-570-580-590 #
(17)	1632-10370	Amp Leaf Multiple Edge Connector Bracket	520-570-590 #
(18)	1A1-1277	Amp Leaf Multiple Edge Connector Brkt. Screw (6-40)	520-570-580-590 #
(19)	9E4451	Amp Leaf Multiple Edge Connector Brkt. Screw Nut (6-40)	520-570-580-590 #
(20)	1A6-1271	Connector Bracket Shaft Spacer (Sides)	520-570 #
(21)	21374	Connector Bracket Shaft Spacer (Center)	580-590 #
(22)	1632-10500	Motor Mounting Shaft	580-590 #
	1633-10170	Motor Mounting Shaft	510-520-560-570 #
(23)	Z4240	Motor Mounting Shaft Binding Screw (6-40)	510-520-560-570-580-590 #
(24)	P11064	Motor Mounting Shaft Binding Screw Washer	510-520-560-570-580-590 #
(25)	1634-10080	Adjustable Motor Mounting Spacer	510-520-560-570-580-590 #
(26)	1633-00031	Motor Mounting Brkt. Assembly (Right)	510-520-560-570 #
(27)	1634-00011	Motor Mounting Brkt. Assembly (Right & Left)	580-590 #
		Motor Mounting Brkt. Assembly (Left)	510-520-560-570 #
(28)	1A1-1031	Motor Mounting Brkt. Set Screw (6-40)	510-520-560-570-580-590 #
(29)	1A1-1298	Connector & Motor Mounting Brkt. Adjusting Screw (10-32)	510-520-560-570-580-590 #
(30)	4425	Connector & Motor Mounting Brkt. Adjusting Screw Nut (10-32)	510-520-560-570-580-590 #
(31)	1A8-1622	Motor Clamp Set Complete w/Screw & Nut	510-520-560-570-580-590 #

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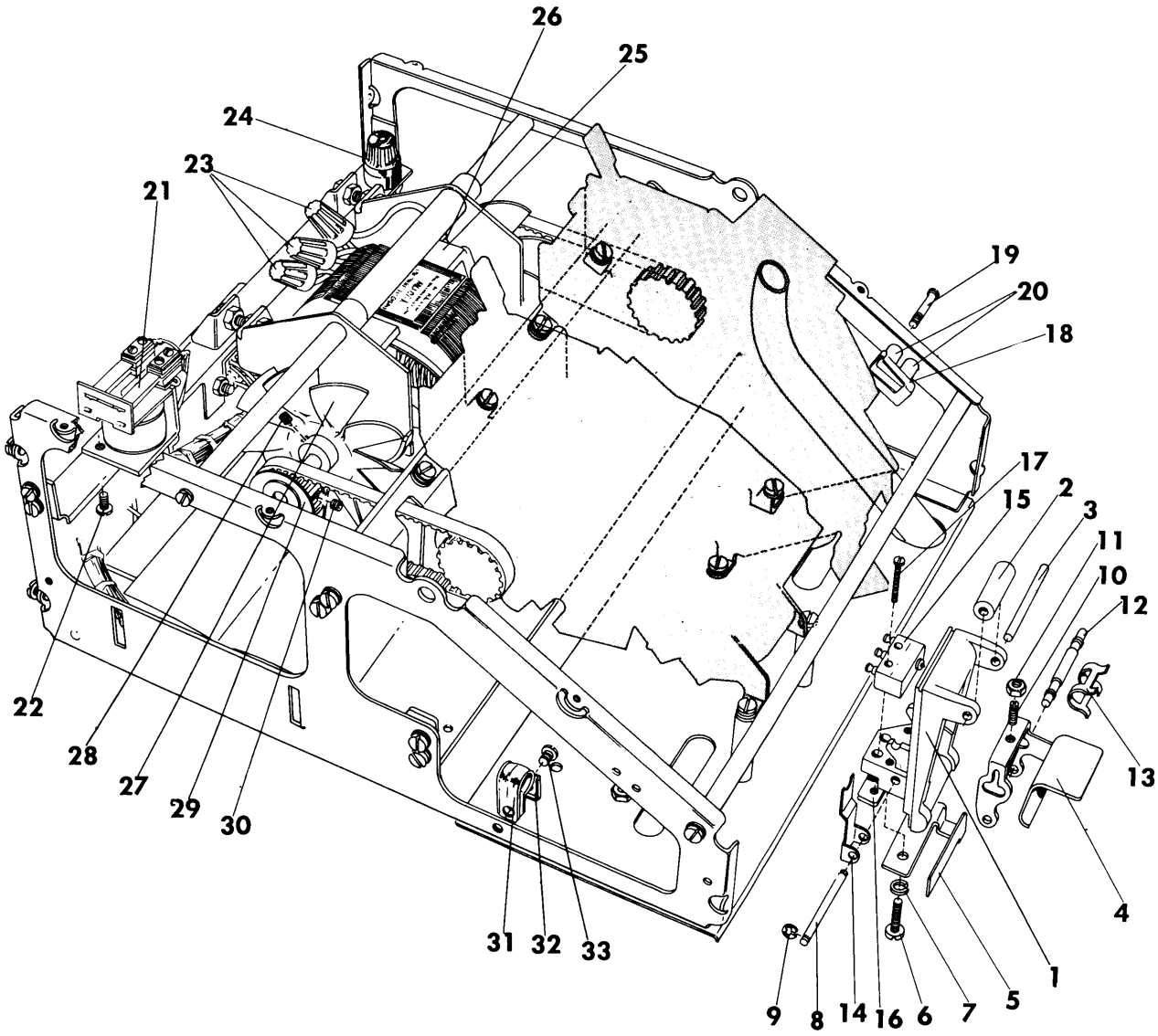
BASE AND SWITCH PARTS

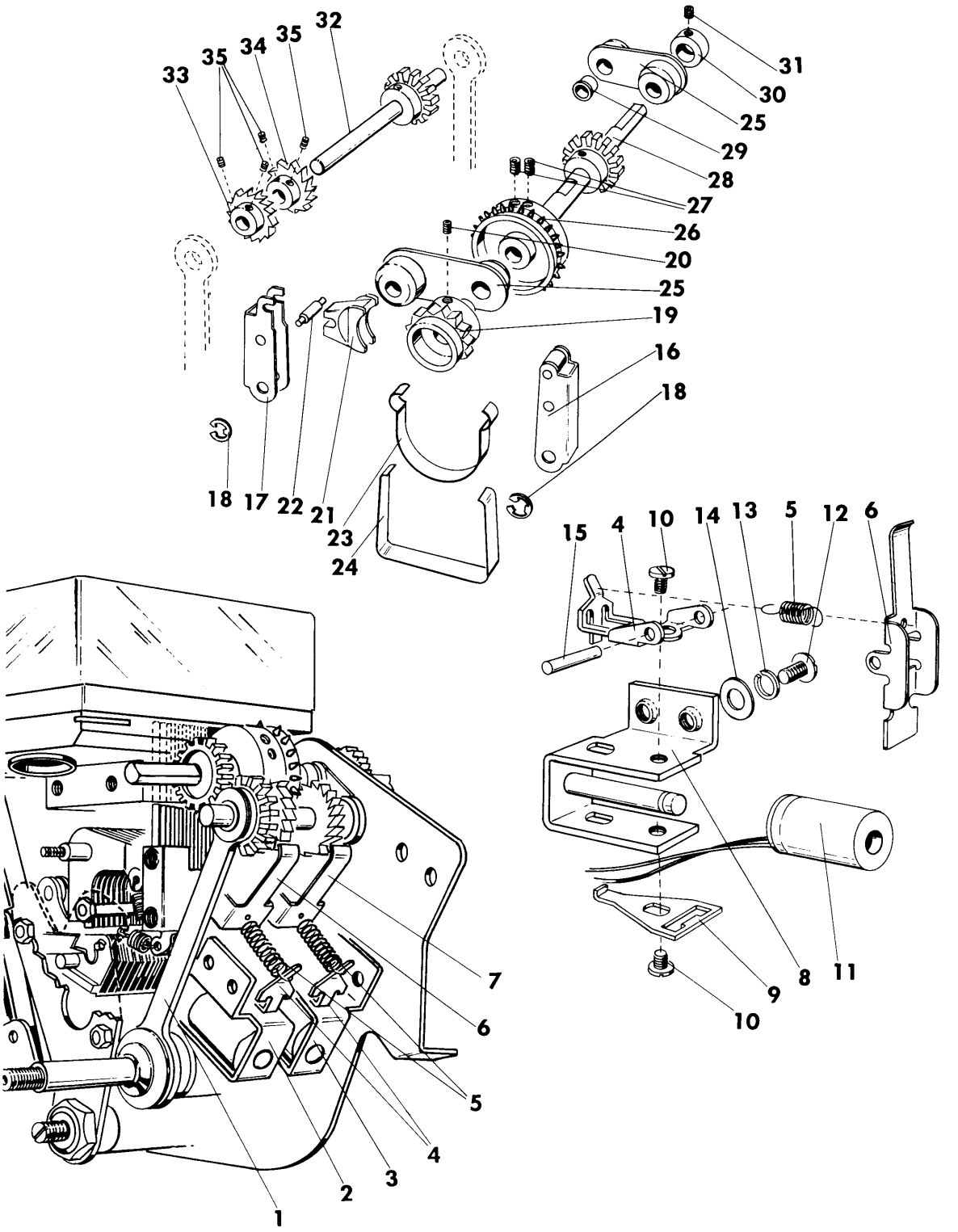


BASE AND SWITCH PARTS

Ref. No.	Part No.	Name	Models
(1)	1632-10171	Tape Tension Switch Brkt.	510-520-560-570-580-590 #
(2)	1632-10400	Tape Tension Switch Roll	510-520-560-570-580-590 #
(3)	1A3-1035	Tape Tension Switch Roll Pivot Shaft	510-520-560-570-580-590 #
(4)	1632-10241	Tape Tension Switch Lever	510-520-560-570-580-590 #
(5)	1632-10410	Tape Tension Switch Brkt. Guide	510-520-560-570-580-590 #
(6)	Z4277	Tape Tension Switch Mounting Screw (6-40) .	510-520-560-570-580-590 #
(7)	P11064	Tape Tension Switch Mtg. Screw Lock Washer	510-520-560-570-580-590 #
(8)	1632-10070	Tape Tension Switch Actuator Pivot Rod	510-520-560-570-580-590 #
(9)	8612	Tape Tension Switch Actuator Pivot Rod Retaining Ring	510-520-560-570-580-590 #
(10)	Z4289	Switch Actuator Spring Adj. Screw (6-40) ..	510-520-560-570-580-590 #
(11)	P4470	Switch Actuator Spring Adj. Screw Nut(6-40)	510-520-560-570-580-590 #
(12)	1632-10110	Tape Tension Switch Over Centering Spring Rod	510-520-560-570-580-590 #
(13)	1632-10060	Tape Tension Switch Over Centering Spring ..	510-520-560-570-580-590 #
(14)	1632-10120	Tape Tension Switch Actuator Spring	510-520-560-570-580-590 #
(15)	1A8-1566	Micro Switch	510-520-550-560-570-580-590 #
(16)	1A5-1059	Micro Switch Binding Screw Nut Plate(2-56)	510-520-560-570-580-590 #
(17)	1A1-1275	Micro Switch Binding Screw (2-56)	510-520-560-570-580-590 #
(18)	1A8-1555	Punch Button Switch Actuator with Lock Washers & Nuts (2-56)	510-520-580-590 #
(19)	1A1-1276	Punch Button Switch Micro Switch Binding Screw (2-56)	510-520-570-590 #
(20)	1A6-1254	Punch Button Switch Micro Switch Spacer ...	510-520-580-590 #
(21)	1A8-1580A	Relay Assembled (Type AC)	510-520-560-570-580-590 #
(22)	1A1-1116	Relay Assb. Binding Screw (6-32)	510-520-560-570-580-590 #
(23)	2E649	Electrical Connectors	510-520-560-570-580-590 #
(24)	1A8-1211	Fuse Extractor Post Assb.	510-520-560-570-580-590 #
(25)	1A8-1557	Dual Unit Motor (115 V-60 Cycle) (1/40 HP) (3250 RPM)	580-590 #
	1A8-1593	Single Unit Motor (115V-60 Cycle) (1/40 HP) (3250 RPM)	510-520-560-570 #
(26)	9E4509	Motor Connector Lead Nut (8-32)	510-520-560-570-580-590 #
(27)	1632-10050	Motor Fan	510-520-560-570-580-590 #
(28)	1A1-1149	Motor Fan Set Screw (8-32)	510-520-560-570-580-590 #
(29)	1632-00021	Motor Pulley Assb. (16 Grooves)	510-520-560-570-580-590 #
	1611-00400	Motor Pulley Assb. Reader (15 Grooves) (Optional) (G.E.)	590 #
(30)	1A1-1294A	Motor Pulley Assb. Set Screw (4-40)	510-520-560-570-580-590 #
(31)	1A8-1237	Cable Clip (3/8 - 6)	510-520-560-570-580-590 #
(32)	1A8-1381	Cable Clip "D" Washer	500-510-520-560-570-580-590 #
(33)	Z4240	Cable Clip Binding Screw (6-40)	500-510-520-560-570-580-590 #

NOTE: These Parts are also used on corresponding Advance Feed Hole Models 501, 511, 521, 551, 561, 571, 581, 591.

READER AND PUNCH INDEXING PARTS



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READER & PUNCH INDEXING PARTS

Ref. No.	Part No.	Name	Models
(1)	1631-00171	Reader & Punch Index Link Assembled.....	All #
(2)	1631-00201	Forward Index Magnet Complete w/Ref. Nos. (4)-(5)-(6)-(8)-(9)-(10)-(11) & (15).....	All #
(3)	1631-00211	Reverse Index Magnet Complete w/Ref. Nos. (4)-(5)-(7)-(8)-(9)-(10)-(11) & (15).....	All #
(4)	1631-10300	Pivot Arm Interposer.....	All #
(5)	21261	Index Magnet Armature Spring.....	All #
(6)	1631-10051	Forward Index Magnet Armature.....	All #
(7)	1631-10061	Reverse Index Ratchet Pawl.....	
(8)	1631-00100	Magnet Shell Assembled (Right).....	All #
	1631-00120	Magnet Shell Assembled (Left).....	All #
(9)	1631-10141	Armature Limit.....	All #
(10)	1A1-1296	Armature Limit Binding Screw (4-48).....	All #
		Pivot Arm Interposer Binding Screw.....	All #
(11)	1A8-1564	Punch Index & Reader Pin Retracting Coil (50 Ohms).....	All #
(12)	Z4240	Forward & Reverse Magnet Assembly Mounting Screw (6-40).....	All #
(13)	P11064	Forward & Reverse Magnet Assembly Mounting Screw Lock Washer.....	All #
(14)	PY3561	Forward & Reverse Magnet Assembly Screw Washer.	All #
(15)	1A3-1025	Interposer Pivot Pin.....	All #
(16)	1631-00072	Detent Arm & Roll Assembly.....	All #
(17)	1631-00081	Detent Arm Assembly.....	All #
(18)	3300-00780	Detent Arm Retaining Ring.....	All #
(19)	1631-10101	Detent Wheel.....	All #
(20)	1A1-1234	Detent Wheel Set Screw (3-56).....	All #
(21)	1631-10080	Detent Friction Shoe.....	All #
(22)	1A2-1088	Detent Friction Shoe Pivot.....	All #
(23)	1631-10260	Detent Spring.....	All #
(24)	1632-10360	Detent Damping Spring.....	500-510-520-590 #
(25)	1631-10550	Ratchet Shaft Pivot Link.....	All #
(26)	1631-10120	Tape Feed Sprocket.....	All #
(27)	1A1-1235	Tape Feed Sprocket Set Screw (4-40).....	All #
(28)	1631-00052	Sprocket Shaft & Gear Assembly.....	All #
(29)	1B1-1025	Ratchet Shaft Pivot Link Bearing.....	All #
(30)	3355	Sprocket Knob Coupling.....	500-510-520-590 #
(31)	1A1-1021	Sprocket Knob Coupling Set Screw (4-40).....	500-510-520-590 #
(32)	1631-00061	Ratchet Shaft & Gear Assembly.....	All #
(33)	1631-10170	Reverse Tape Feed Ratchet.....	All #
(34)	1631-10160	Forward Tape Feed Ratchet.....	All #
(35)	1A1-1234	Reverse Tape Feed Ratchet Set Screw (3-56).....	All #
		Forward Tape Feed Ratchet Set Screw.....	All #

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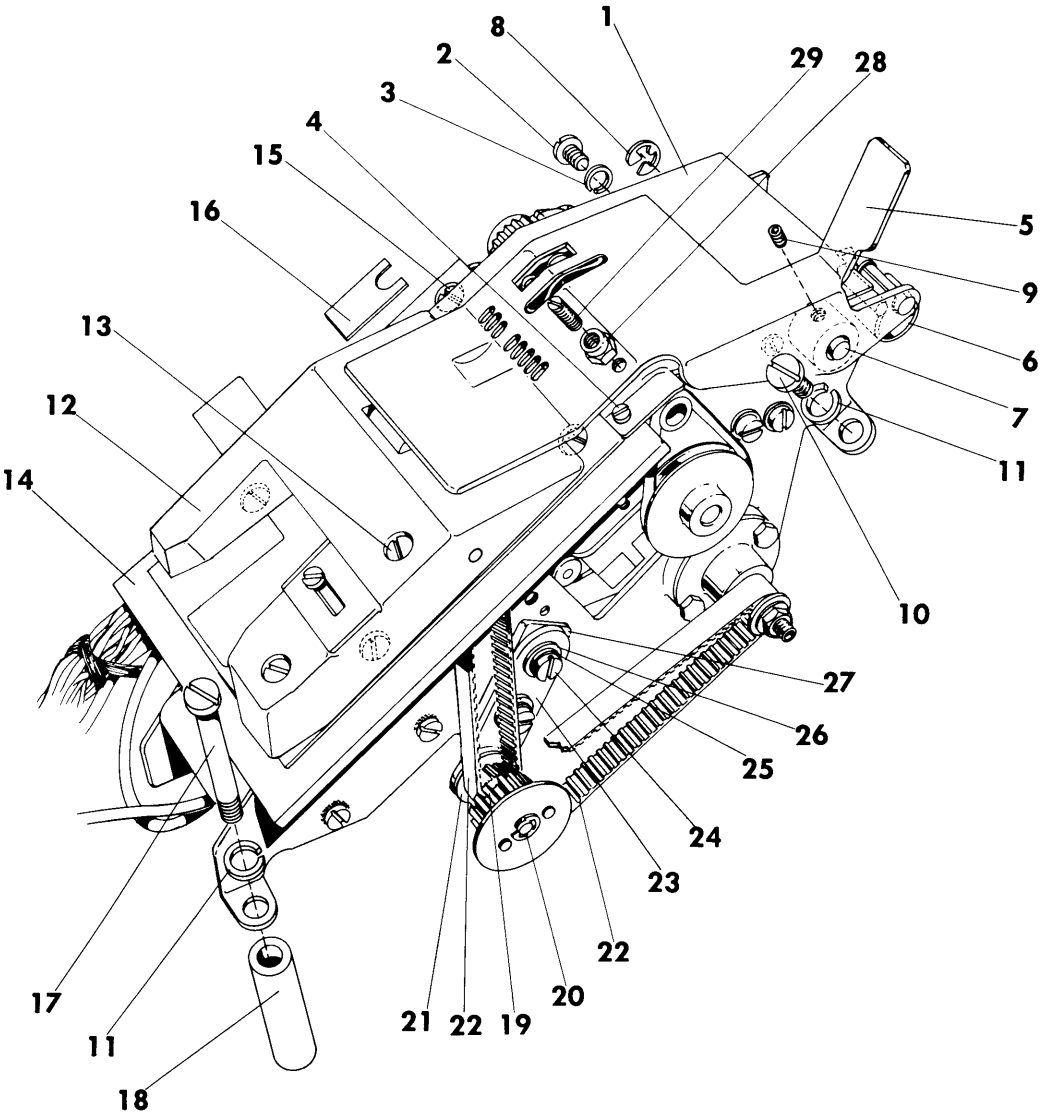
READER MECHANISM PARTS



READER MECHANISM PARTS

Ref. No.	Part No.	Name	Models
(1)	1611-00143	Reader Platen Assb.	550-560-570-590 #
(2)	Z4240	Reader Platen Binding Screw (Side)(6-40)	550-560-570-590 #
(3)	P11064	Reader Platen Binding Screw Lock Washer (Side)	550-560-570-590 #
(4)	PZ4072	Reader Platen Binding Screw (Top)(3-56)	550-560-570-590 #
(5)	1611-00152	Reader Tape Deflector Assb.	550-560-570-590 #
(6)	1631-10110	Tape Deflector Spring	550-560-570-590 #
(7)	1631-10420	Tape Deflector Pivot Rod	550-560-570-590 #
(8)	Z2740	Tape Deflector Pivot Rod Retaining Ring	550-560-570-590 #
(9)	1A1-1031	Reader Tape Deflector Set Screw (6-40)	550-560-570-590 #
(10)	9E4098	Reader Unit Mounting Screw (Rear)(6-40)	560-570-580-590 #
(11)	P11064	Reader Unit Mounting Screw Lock Washer	560-570-590 #
(12)	1611-10351	Reader Tape Guide Plate	550-560-570-590
	1664-10010	Reader Tape Guide Plate (Advance Feed Hole) ..	551-561-571-591
(13)	1A1-1277	Reader Tape Guide Plate Binding Screw (6-40) .	550-560-570-590 #
(14)	1611-10760	Reader Tape Guide Support	550-560-570-590 #
(15)	Z4263	Reader Tape Guide Support Screw (6-40)	550-560-570-590 #
(16)	1611-11001	Reader Tape Guide Support Shim (Optional)	550-560-570-590 #
(17)	9E4297	Reader Unit Mounting Screw (Front) (6-40)	560-570-580-590 #
(18)	1A6-1253	Reader Unit Mounting Screw Spacer	560-570-580-590 #
(19)	1611-10120	Tape Feed Drive Idler Pulley	550-560-570-590 #
(20)	3300-00780	Tape Feed Drive Idler Pulley Flange Retaining Ring (Large)	550-560-570-590 #
(21)	1A6-1248A	Tape Feed Drive Idler Pulley Flange (Small) ..	550-560-570-590 #
(22)	1B2-1008	Tape Feed Drive Belt (81 Teeth)	550-560-570-590 #
(23)	1611-00201	Tape Feed Drive Pulley Post Assb.	550-560-570-590 #
(24)	Z4277	Tape Feed Drive Pulley Post Binding Screw (6-40)	550-560-570-590 #
(25)	P11064	Tape Feed Drive Pulley Post Binding Screw Lock Washer	550-560-570-590 #
(26)	PY3561	Tape Feed Drive Pulley Post Binding Screw Washer	550-560-570-590 #
(27)	1A6-1229	Tape Feed Drive Pulley Post Assb. Spacer	550-560-570-590 #
(28)	1A5-1065	Tape Hold Down Adjusting Nut (4-48)	550-560-570-590 #
(29)	1A1-1289	Tape Hold Down Screw (4-48)	550-560-570-590 #

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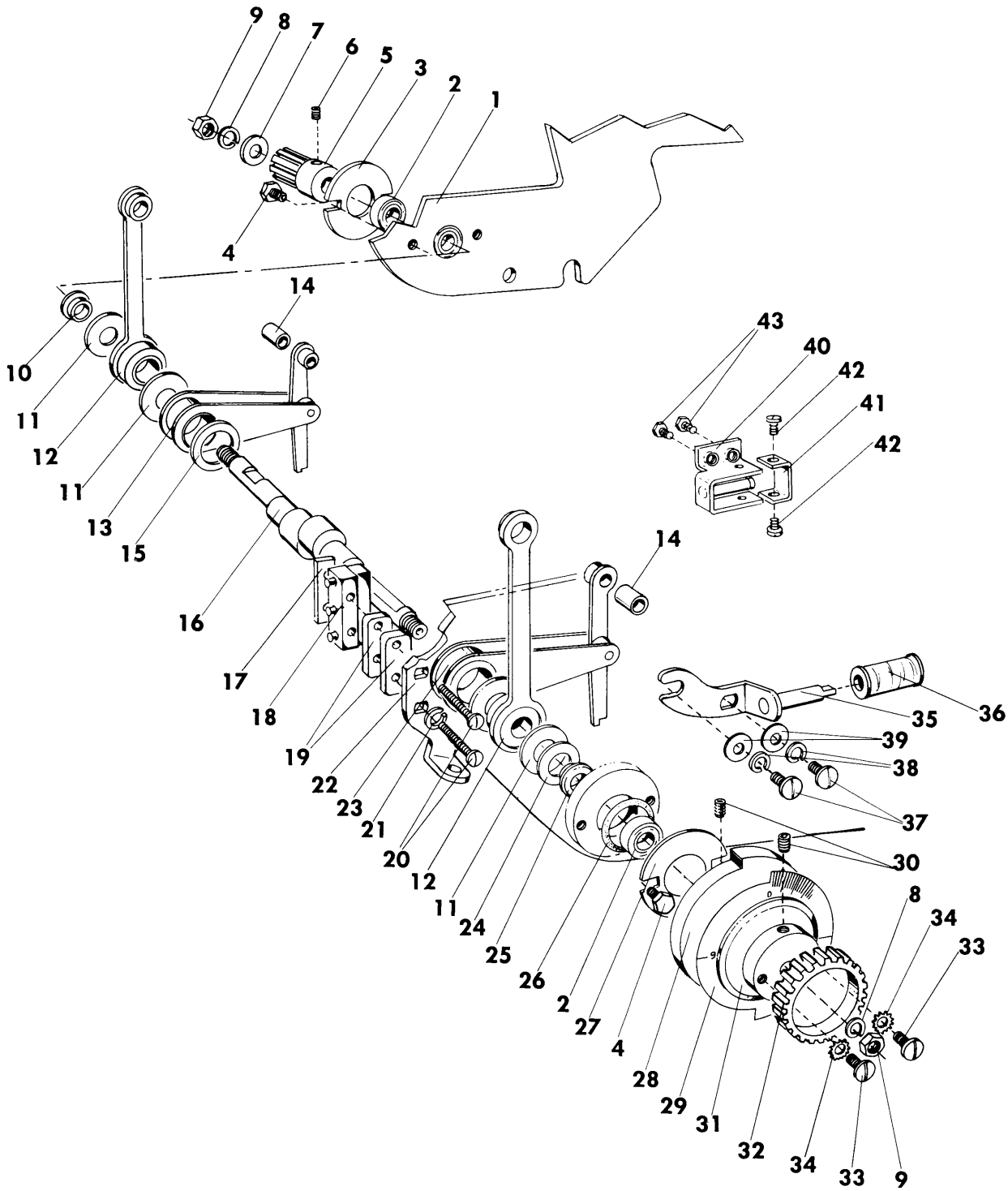
READER MECHANISM PARTS (continued)



READER MECHANISM PARTS (continued)

Ref. No.	Part No.	Name	Models
(1)	1611-00103	Reader Side Plate Right w/Bearings.....	550-560-570-590 #
(2)	1B1-1024	Eccentric Shaft Bearing.....	550-560-570-590 #
(3)	1A6-1263	Eccentric Shaft Bearing Retaining Washer.....	550-560-570-590 #
(4)	4504	Eccentric Shaft Bearing Washer Screw (4-48).....	550-560-570-590 #
(5)	1611-00220	Tape Feed Pulley Assembled.....	550-560-570-590 #
(6)	1A1-1021	Tape Feed Pulley Set Screw (4-40).....	550-560-570-590 #
(7)	Z134	Tape Feed Pulley Washer.....	550-560-570-590 #
(8)	1A6-1041	Tape Feed Pulley Lock Washer.....	550-560-570-590 #
		Input Shaft Pulley Lock Washer.....	550-560-570-590 #
(9)	Z4453	Tape Feed Pulley Retaining Nut (8-36).....	550-560-570-590 #
		Input Shaft Pulley Retaining Nut.....	550-560-570-590 #
(10)	1A6-1260A	Reader Eccentric Shaft Spacer (Right).....	550-560-570-590 #
(11)	1A6-1267B	Reader Eccentric Shaft Washer.....	550-560-570-590 #
(12)	1611-00171	Index Link Assembled.....	550-560-570-590 #
(13)	1611-00331	Interposer Arm Assembled (Right).....	550-560-570-590 #
(14)	1A6-1228	Interposer Arm Spacer.....	550-560-570-590 #
(15)	1A6-1240	Reader Eccentric Shaft Washer (Center).....	550-560-570-590 #
(16)	1611-10182	Reader Eccentric Shaft.....	550-560-570-590 #
(17)	1A5-1059	Reader Micro Switch Nut Plate (2-56).....	550-560-570-590 #
(18)	1A8-1566	Reader Micro Switch Assembled.....	550-560-570-590 #
(19)	1A6-1238	Reader Micro Switch Spacer.....	550-560-570-590 #
(20)	1A1-1023	Reader Micro Switch Mounting Screw (2-56).....	550-560-570-590 #
(21)	1A6-1043	Reader Micro Switch Lock Washer.....	550-560-570-590 #
(22)	1611-00124	Reader Side Plate Left w/Bearings.....	550-560-570-590 #
(23)	1611-00341	Interposer Arm Assembled (Left).....	550-560-570-590 #
(24)	1A6-1292	Reader Eccentric Shaft Spacer (Left).....	550-560-570-590 #
(25)	1A6-1291	Reader Eccentric Shaft Spacer (Left).....	550-560-570-590 #
(26)	1A6-1274A	Input Shaft Bearing Retaining Seal.....	550-560-570-590 #
(27)	1A6-1278A	Input Shaft Bearing Retaining Seal Washer.....	550-560-570-590 #
(28)	1611-10941	Reader Generator Disc.....	550-560-570-590 #
(29)	1B9-1025	Reader Timing Dial Label.....	550-560-570-590 #
(30)	1A1-1031	Reader Generator Disc Set Screw (6-40).....	550-560-570-590 #
		Input Shaft Pulley Hub Set Screw.....	550-560-570-590 #
(31)	1631-10210	Input Shaft Pulley Hub.....	550-560-570-590 #
(32)	1631-10180	Input Shaft Pulley (18 Teeth).....	550-560-570-590 #
(33)	Z4262	Input Shaft Pulley Retaining Screw (6-40).....	550-560-570-590 #
(34)	1A6-1106	Input Shaft Pulley Retaining Screw Washer.....	550-560-570-590 #
(35)	1611-00240	Pulse Generator Magnet Coil Bracket Assembled...	550-560-570-590 #
(36)	1A8-1615	Pulse Generator Magnet Coil (685 Ohms).....	550-560-570-590 #
		Pulse Generator Choke Coil.....	550-560-570-590 #
(37)	Z4138	Pulse Generator Magnet Coil Brkt. Screw (6-40)..	560-570-590 #
	Z4240	Pulse Generator Magnet Coil Brkt. Screw (6-40)..	550 #
(38)	P11064	Pulse Generator Magnet Coil Brkt. Lock Washer...	550-560-570-590 #
(39)	PY3561	Pulse Generator Magnet Coil Brkt. Washer.....	550-560-570-590 #
(40)	1631-00120	Magnet Shell Assembled (Left).....	550-560-570-590 #
(41)	1631-10530	Pulse Generator Choke Bracket.....	550-560-570-590 #
(42)	1A1-1296	Pulse Generator Choke Bracket Screw (4-48).....	550-560-570-590 #
(43)	4132	Pulse Generator Magnet Shell Screw (4-40).....	550-560-570-590 #

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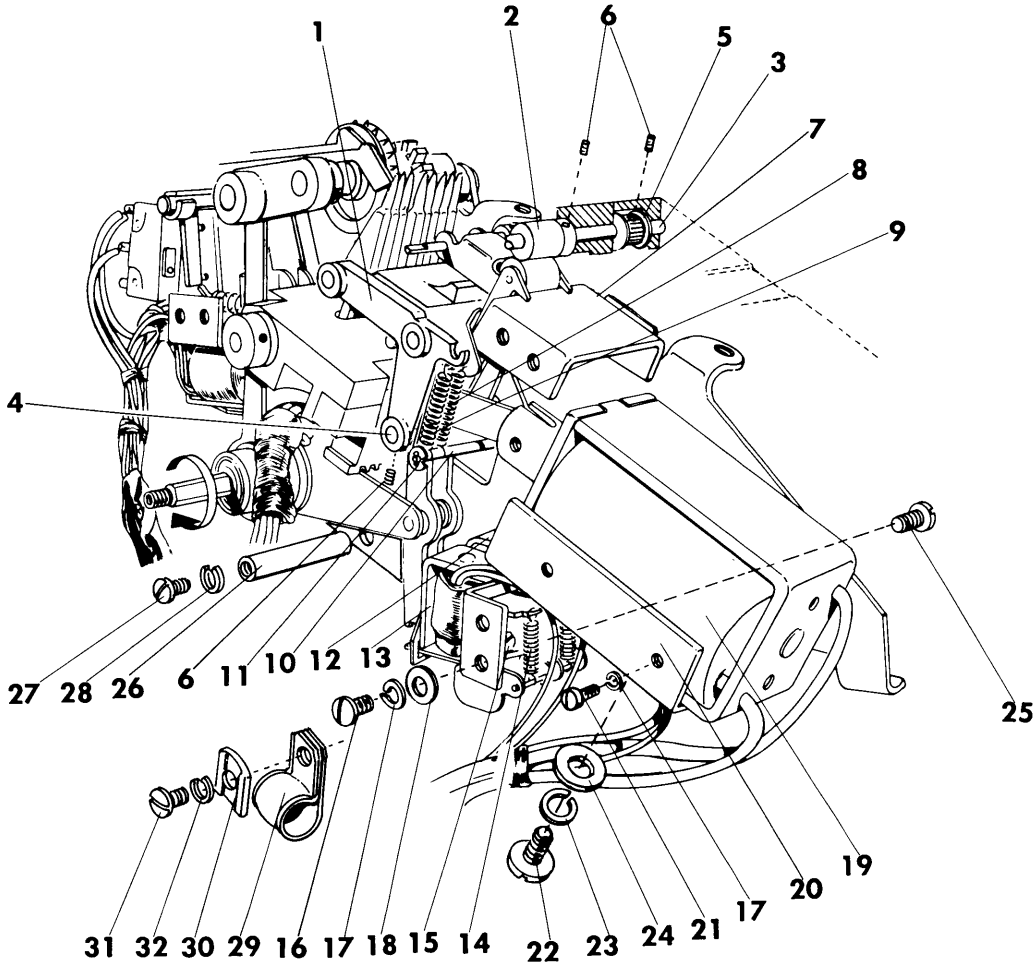
READER MECHANISM PARTS (continued)

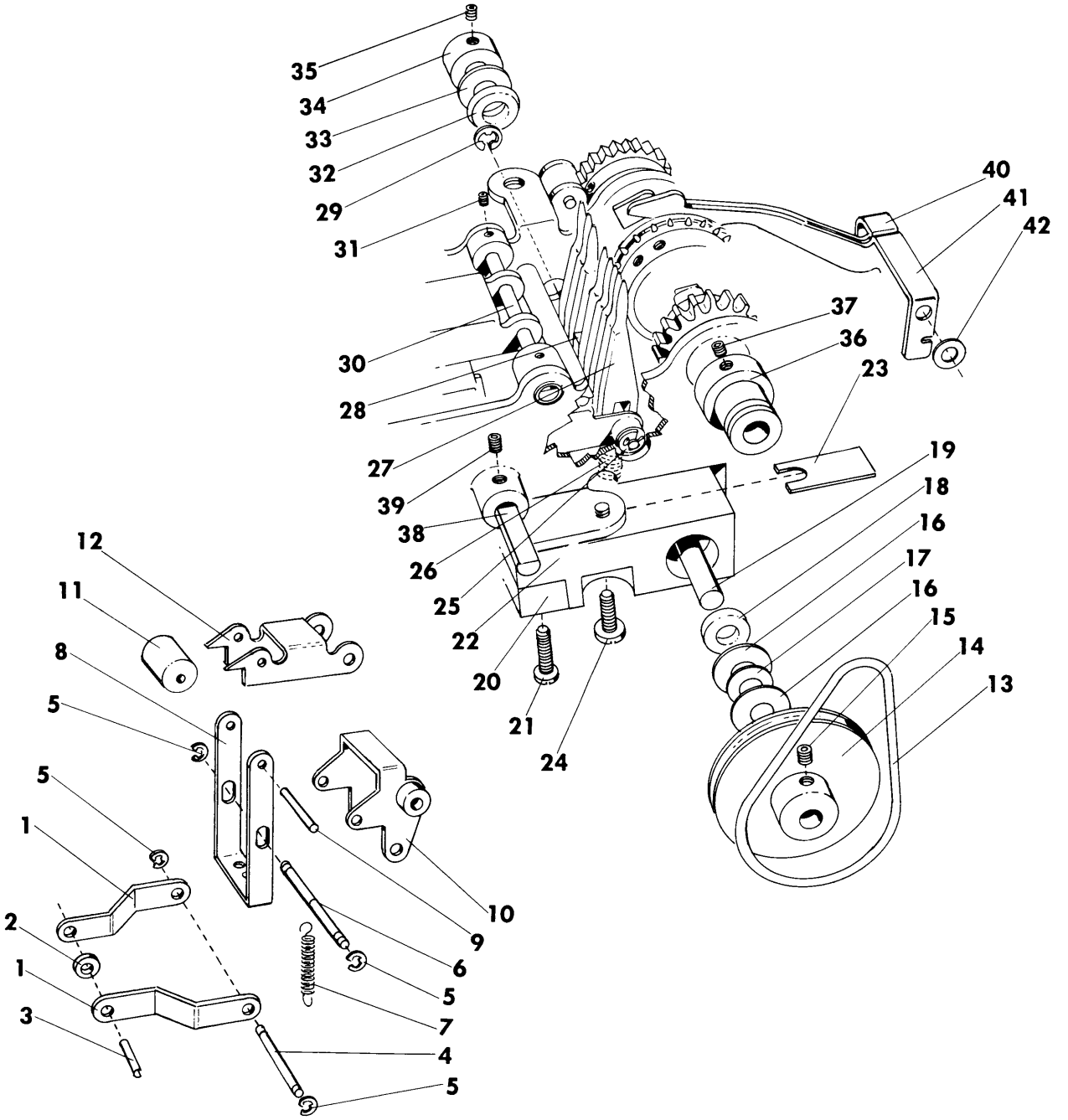


READER MECHANISM PARTS (continued)

Ref. No.	Part No.	Name	Models
(1)	1611-10600	Reader Bracket Arm Assembly.....	550-560-570-590 #
(2)	1611-00171	Tape Feed Roll Assembly.....	550-560-570-590 #
(3)	1611-10500	Tape Feed Roll Shaft.....	550-560-570-590 #
(4)	1611-10851	Pin Carrier Brkt. & Interposer Arm Shaft.....	550-560-570-590 #
(5)	1611-00180	Tape Feed Roll Pulley.....	550-560-570-590 #
(6)	1A1-1234	Tape Feed Roll Set Screw (3-56).....	550-560-570-590 #
		Pin Carrier Brkt. & Interposer Arm Shaft Set Screw.....	550-560-570-590 #
		Tape Feed Roll Pulley Set Screw.....	550-560-570-590 #
(7)	1611-10880	Bracket Arm Support.....	550-560-570-590 #
(8)	9479	Pin Retractor Bracket & Spring Anchor Rod Connecting Spring.....	550-560-570-590 #
(9)	4E933	Reader Bracket Arm Assembly & Spring Anchor Rod Connecting Spring.....	550-560-570-590 #
(10)	1611-10650	Spring Anchor Rod.....	550-560-570-590 #
(11)	8612	Spring Anchor Rod Retaining Ring.....	550-560-570-590 #
(12)	1611-00270	Interposer Magnet Assembly Complete Right....	550-560-570-590 #
(13)	1611-00260	Interposer Magnet Assembly Complete Left.....	550-560-570-590 #
(14)	21261	Interposer Magnet Assembly Spring.....	550-560-570-590 #
(15)	1A1-1296	Interposer Magnet Pivot Arm Binding Screw (4-48).....	550-560-570-590 #
(16)	Z4138	Interposer Magnet Left Assembly Mounting Screw (6-40).....	550-560-570-590 #
(17)	P11064	Interposer Magnet Assembly Mounting Screw Lock Washer.....	550-560-570-590 #
		Solenoid Support Brkt. Side Screw Lock Washer	550-560-570-590 #
(18)	PY3561	Interposer Magnet Assembly Mounting Screw Washer.....	550-560-570-590 #
(19)	1A8-1332	Tape Card Roll Solenoid Complete w/Plunger...	550-560-570-590 #
(20)	1611-10270	Solenoid Support Bracket.....	550-560-570-590 #
(21)	Z4129	Solenoid Support Bracket Side Mounting Screw (3-56).....	550-560-570-590 #
(22)	1A1-1111	Solenoid Support Brkt. Bottom Screw (8-32)...	550-560-570-590 #
(23)	1A6-1041	Solenoid Support Brkt. Bottom Screw Lock Washer.....	550-560-570-590 #
(24)	Z134	Solenoid Support Brkt. Bottom Screw Washer...	550-560-570-590 #
(25)	Z4240	Interposer Magnet Right Assembly Mounting Screw (6-40).....	550-560-570-590 #
(26)	1611-10970	Reader Side Plate Spacer.....	550-560-570-590 #
(27)	Z4240	Reader Side Plate Spacer Binding Screw (6-40)	550-560-570-590 #
(28)	P11064	Reader Side Plate Spacer Binding Screw Lock Washer.....	550-560-570-590 #
(29)	1A8-1382	Cable Clamp (5/16-6).....	550-560-570-590 #
	1A8-1335	Cable Clamp (7/16-6).....	550-560-570-580-590 #
(30)	1A8-1381	Cable Clamp D Washer.....	550-560-570-590 #
(31)	Z4277	Cable Clamp Binding Screw (6-40)(Use w/ Ref. No. (29) 1A8-1382.....	550-560-570-590 #
	Z4240	Cable Clamp Binding Screw (6-40)(Use w/ Ref. No. (29) 1A8-1335.....	550-560-570-590 #
(32)	P11064	Cable Clamp Binding Screw Washer.....	550-560-570-590 #

NOTE: These Parts are also used on corresponding Advance Feed Hole Models 501, 511, 521, 551, 561, 571, 581, 591.

READER MECHANISM PARTS (continued)

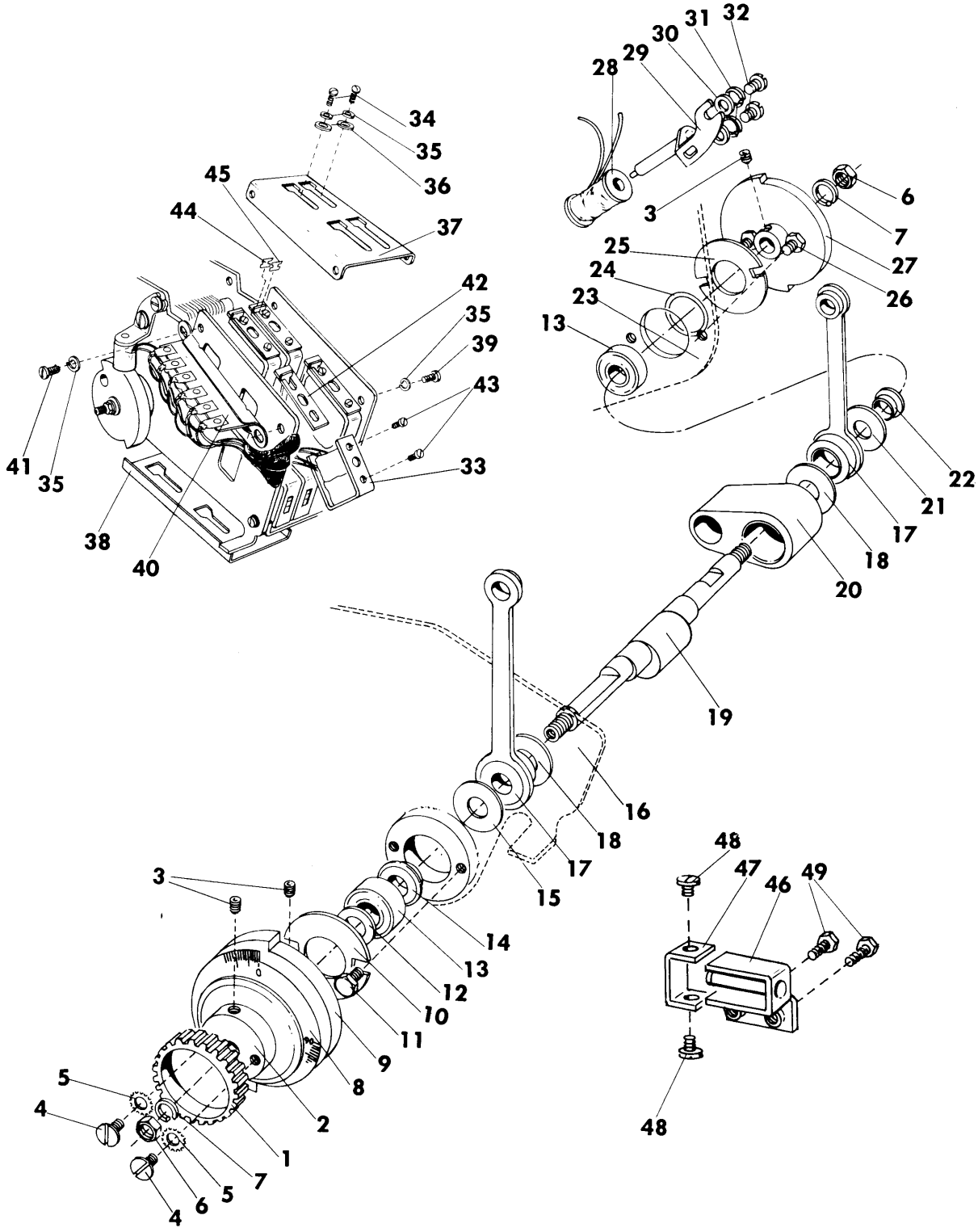


READER MECHANISM PARTS (continued)

Ref. No.	Part No.	Name	Models
(1)	1611-10250	Solenoid Link	550-560-570-590 #
(2)	9E1023	Solenoid Link Spacer	550-560-570-590 #
(3)	3760	Solenoid Link Roll Pin	550-560-570-590 #
(4)	1611-10300	Solenoid Link Connecting Rod	550-560-570-590 #
(5)	8612	Solenoid Link Connecting Rod Retaining Ring	550-560-570-590 #
		Tape Feed Roll Link Pivot Rod Retaining Ring	550-560-570-590 #
(6)	1611-10670	Tape Feed Roll Link Pivot Rod	550-560-570-590 #
(7)	23254	Tape Feed Roll Link Spring	550-560-570-590 #
(8)	1611-10860	Tape Feed Roll Link	550-560-570-590
(9)	1611-10660	Tape Feed Roll Link Rod	550-560-570-590 #
(10)	1611-00191	Tape Feed & Pin Retractor Assb.	550-560-570-590 #
(11)	1611-10840	Pressure Roll	550-560-570-590 #
(12)	1611-10830	Pressure Roll Arm	550-560-570-590 #
(13)	1B2-1009	Sensing Shaft Drive Belt	550-560-570-590 #
(14)	1611-10541	Sensing Shaft Pulley	550-560-570-590 #
(15)	1A1-1234	Sensing Shaft Pulley Set Screw (3-56)	550-560-570-590 #
(16)	9E1033	Sensing Shaft Washer (Right)	550-560-570-590 #
(17)	1A6-1280	Sensing Shaft Spring Washer	550-560-570-590 #
(18)	1A6-1215	Sensing Shaft Seal	550-560-570-590 #
(19)	1611-10042	Sensing Contacts Shaft	550-560-570-590 #
(20)	1611-00970	Moulded Steel Sensing Contacts & Harness Assb.	550-560-570-590 #
(21)	1A1-1051	Moulded Steel Sensing Contacts Mounting Screw (3-56)	550-560-570-590 #
(22)	1611-10010	Sensing Contacts & Pin Guide	550-560-570-590 #
(23)	1611-11001	Sensing Contacts Pin Guide Shim	550-560-570-590 #
(24)	9E4176	Sensing Contacts Pin Guide Mount. Screw(6-40).	550-560-570-590 #
(25)	1611-10070	Sensing Pins Shaft	550-560-570-590 #
(26)	1A7-1036	Sensing Pin Compression Spring	550-560-570-590 #
(27)	1611-10090	Sensing Pin	550-560-570-590 #
(28)	1611-10461	Interrogate Sensing Pin	550-560-570-590 #
(29)	8612	Sensing Pins Shaft Retaining Ring	550-560-570-590 #
(30)	1611-10821	Pressure Roll Pivot & Stop Rod	550-560-570-590 #
(31)	1A1-1234	Pressure Roll Pivot & Stop Rod Set Screw(3-56)	550-560-570-590 #
(32)	1A6-1215	Sensing Shaft Seal	550-560-570-590 #
(33)	1A6-1232	Sensing Shaft Washer	550-560-570-590 #
(34)	1A6-1231	Sensing Shaft Collar	550-560-570-590 #
(35)	1A1-1234	Sensing Shaft Collar Set Screw (3-56)	550-560-570-590 #
(36)	1611-10580	Sensing Shaft Drive Pulley	550-560-570-590 #
(37)	1A1-1234	Sensing Shaft Drive Pulley Set Screw (3-56)	550-560-570-590 #
(38)	1611-10870	Pin Arm Pivot & Pin Arm Limit Shaft	550-560-570-590 #
(39)	1A1-1234	Pin Arm Pivot & Pin Arm Limit Shaft Set Screw (3-56)	550-560-570-590 #
(40)	1611-10990	Position Card Ribbon Switch Blade	550-560-570-590 #
(41)	1611-10980	Reader Switch Blade Final	550-560-570-590 #
(42)	1A6-1091	Tape Deflector Pivot Rod Switch Blade Spacer	550-560-570-590 #

NOTE: These Parts are also used on corresponding Advance Feed Hole Models 501, 511, 521, 551, 561, 571, 581, 591.

PUNCH MECHANISM PARTS



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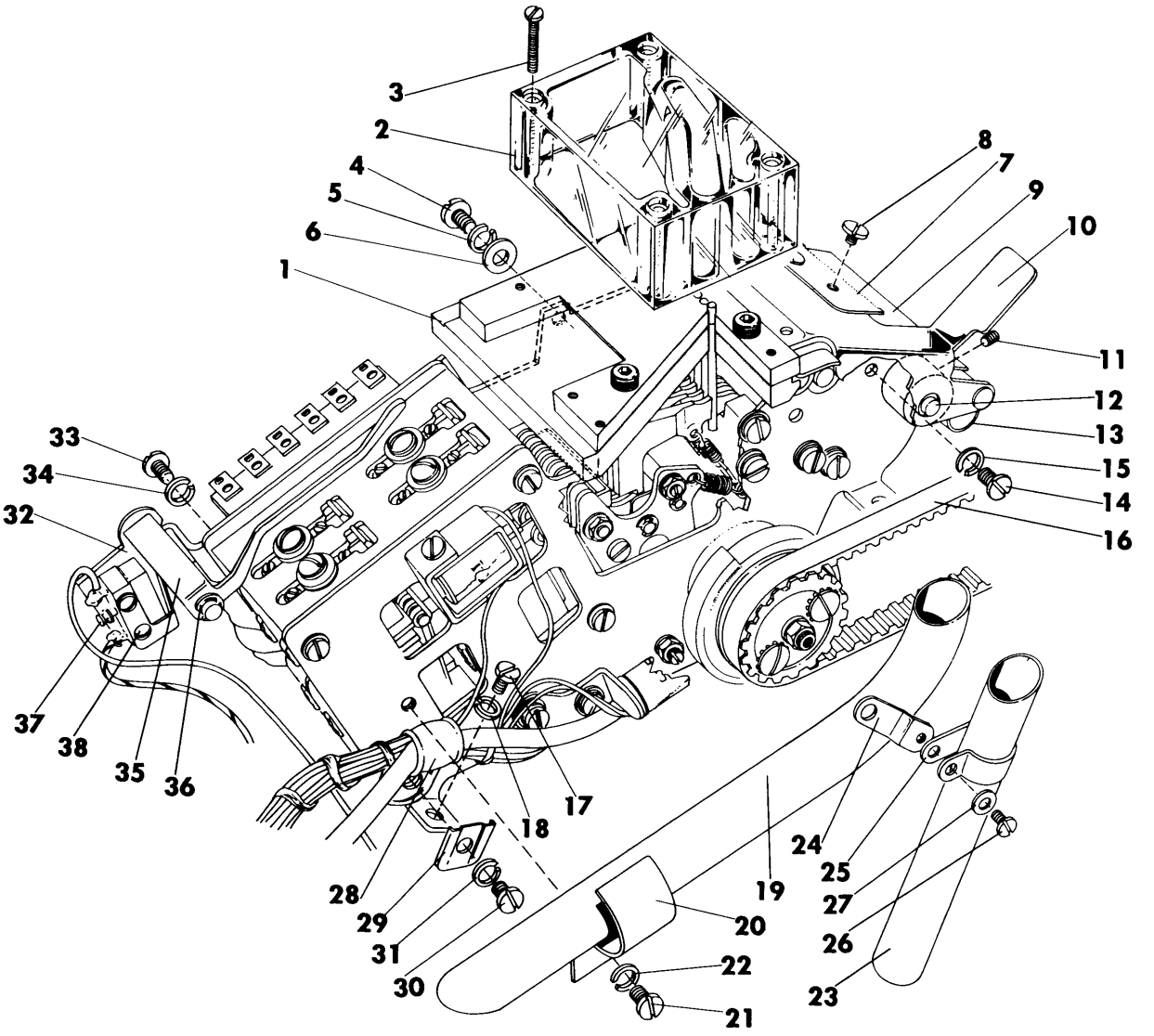
Ref. No.	Part No.	Name	Models
(1)	1631-10180	Input Shaft Pulley (18 Teeth).....	500-510-520-590 #
	1601-10850	Input Shaft Pulley (17 Teeth)(Optional)(G.E.)...	590 #
(2)	1631-10210	Input Shaft Pulley Hub.....	500-510-520-590 #
(3)	1A1-1031	Input Shaft Pulley Hub Set Screw (6-40).....	500-510-520-590 #
		Punch Counterweight Generator Disc Set Screw....	500-510-520-590 #
(4)	Z4262	Input Shaft Pulley Screw (6-40).....	500-510-520-590 #
(5)	1A6-1106	Input Shaft Pulley Screw Lock Washer.....	500-510-520-590 #
(6)	Z4453	Punch Input Shaft Binding Nut (8-36).....	500-510-520-590 #
(7)	1A6-1041	Punch Input Shaft Binding Nut Lock Washer.....	500-510-520-590 #
(8)	1B9-1026B	Punch Timing Dial Label.....	500-510-520-590 #
(9)	1601-10512	Punch Counterweight Generator Disc.....	500-510-520-590 #
(10)	1A6-1278A	Input Shaft Bearing Retaining Washer.....	500-510-520-590 #
(11)	4504	Input Shaft Bearing Binding Screw (4-48).....	500-510-520-590 #
(12)	1A6-1135	Punch Counterweight Generator Disc Washer.....	510-520-580-590 #
(13)	1B1-1024	Input Shaft Bearing (Right & Left).....	500-510-520-590 #
(14)	1A6-1260A	Input Shaft Spacer (Right).....	500-510-520-590 #
(15)	1A6-1267B	Input Shaft Washer (Outer Right).....	500-510-520-590 #
(16)	1601-00223	Punch Side Plate Right w/Bearings.....	500-510-520-590 #
(17)	1631-00171	Index Link Assembled.....	500-510-520-590 #
(18)	1A6-1272	Input Shaft Washer (Inner).....	500-510-520-590 #
(19)	1601-10402	Punch Input Shaft.....	500-510-520-590 #
(20)	1601-00361	Punch Drive Link Assembled.....	500-510-520-590 #
(21)	1A6-1292	Input Shaft Spacer (Left Inner).....	500-510-520-590 #
(22)	1A6-1291	Input Shaft Spacer (Left).....	500-510-520-590 #
(23)	1601-00232	Punch Side Plate Left w/Bearings.....	500-510-520-590 #
(24)	1A6-1274A	Input Shaft Bearing Seal Left.....	500-510-520-590 #
(25)	1A6-1263	Input Shaft Bearing Seal Left Retaining Washer..	500-510-520-590 #
(26)	4504	Input Shaft Bearing Seal Retaining Screw (4-48).	500-510-520-590 #
(27)	1601-10512	Punch Counterweight Generator Disc.....	510-520-590 #
(28)	1A8-1615	Pulse Generator Magnet & Choke Coil.....	500-510-520-590 #
(29)	1611-00240	Pulse Generator Magnet Bracket Assembled.....	500-510-520-590 #
(30)	PY3561	Pulse Generator Magnet Bracket Screw Washer.....	500-510-520-590 #
(31)	P11064	Pulse Generator Magnet Brkt. Screw Lock Washer..	500-510-520-590 #
(32)	4273	Pulse Generator Magnet Brkt. Screw (6-40).....	500-510-520-590 #
(33)	1601-00052	Punch Magnet Upper Assembled w/Short Link.....	500-510-520-590 #
	1601-00062	Punch Magnet Lower Assembled w/Short Link.....	500-510-520-590 #
	1601-00072	Punch Magnet Upper Assembled w/Long Link.....	500-510-520-590 #
	1601-00082	Punch Magnet Lower Assembled w/Long Link.....	500-510-520-590 #
(34)	4273	Punch Magnet Binding Screw (6-40).....	500-510-520-590 #
(35)	P11064	Lock Washer.....	500-510-520-590 #
(36)	2193	Punch Magnet Binding Screw Washer.....	500-510-520-590 #
(37)	1601-10260	Punch Magnet Bracket (Upper).....	500-510-520-590 #
(38)	1601-10270	Punch Magnet Bracket (Lower).....	500-510-520-590 #
(39)	Z4129	Punch Magnet Bracket Binding Screw (6-40).....	500-510-520-590 #
(40)	1A8-1569A	Punch Magnet Terminal Strip.....	500-510-520-590 #
(41)	Z4240	Punch Magnet Terminal Strip Screw (6-40).....	500-510-520-590 #
(42)	1601-10080	Punch Magnet Armature Retainer.....	500-510-520-590 #
(43)	1A1-1002	Punch Magnet Armature Retainer Screw (3-56).....	500-510-520-590 #
(44)	1601-10130	Punch Magnet Armature Spacer.....	500-510-520-590 #
(45)	1601-10330	Punch Magnet Armature Spring.....	500-510-520-590 #
(46)	1631-00100	Magnet Shell Assembled (Right).....	500-510-520-590 #
(47)	1631-10530	Pulse Generator Choke Bracket.....	500-510-520-590 #
(48)	1A1-1296	Pulse Generator Choke Bracket Screw (4-48).....	500-510-520-590 #
(49)	4132	Pulse Generator Magnet Shell Screw (4-40).....	500-510-520-590 #

NOTE: These Parts are also used on corresponding Advance Feed Hole Models 501, 511, 521, 551, 561, 571, 581, 591.

PUNCH MECHANISM PARTS (continued)

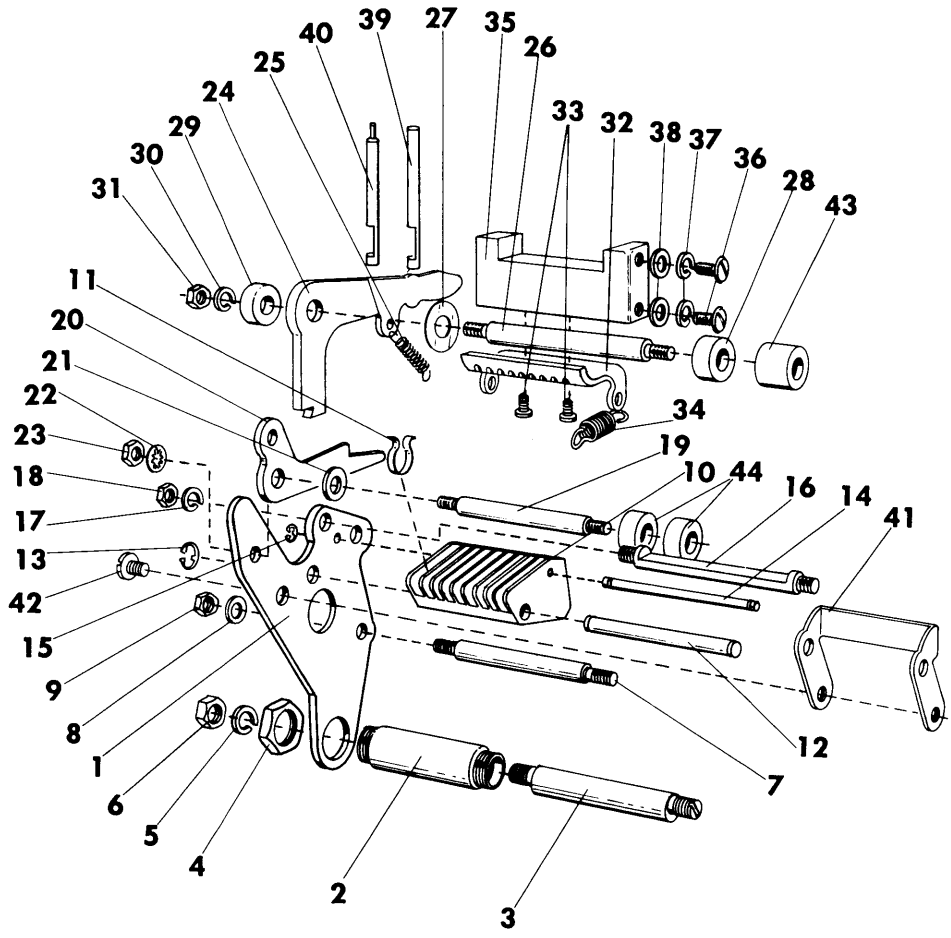


PUNCH MECHANISM PARTS (continued)

Ref. No.	Part No.	Name	Models
(1)	1601-00030	Punch and Die Guide Assembled.....	500-510-520-590
	1661-00010	Punch and Die Guide Assembled (Advanced Feed Hole).....	501-511-521-591
(2)	1601-10250	Punch Cover.....	500-510-520-590 #
(3)	1A1-1270	Punch Cover Binding Screw (3-56).....	500-510-520-590 #
(4)	Z4240	Punch and Die Guide Assembled Mounting Screw (6-40).....	500-510-520-590 #
(5)	P11064	Punch and Die Guide Assembled Mounting Screw Lock Washer.....	500-510-520-590 #
(6)	PY3561	Punch and Die Guide Assembled Mounting Screw Washer.....	500-510-520-590 #
(7)	1601-10620	Punch Tape Cutter.....	500-510-520-590 #
(8)	4102	Punch Tape Cutter Mounting Screw (3-56).....	500-510-520-590 #
(9)	1601-00183	Punch Platen Assembled.....	500-510-520-590 #
(10)	1601-00042	Punch Tape Deflector Assembled.....	500-510-520-590
(11)	1A1-1031	Punch Tape Deflector Set Screw (6-40).....	500-510-520-590 #
(12)	1631-10420	Tape Deflector Pivot Rod.....	500-510-520-590 #
(13)	1631-10110	Tape Deflector Spring.....	500-510-520-590 #
(14)	9E4098	Punch Platen Assembled Mounting Screw (6-40)..	500-510-520-590 #
(15)	P11064	Punch Platen Assembled Mounting Screw Lock Washer.....	500-510-520-590 #
(16)	1B2-1010	Input Belt.....	510-520-560-570-580-590 #
(17)	9E4098	Punch Unit Mounting Screw (6-40).....	510-520-590 #
(18)	P11064	Punch Unit Mounting Screw Lock Washer.....	510-520-590 #
(19)	1601-10530	Chad Tube.....	500-510-520-590 #
(20)	1601-10520	Chad Tube Clamp.....	500-510-520-590 #
(21)	9E4098	Chad Tube Clamp Binding Screw (6-40).....	500-510-520-590 #
(22)	P11064	Chad Tube Clamp Binding Screw Lock Washer.....	500-510-520-590 #
(23)	1601-10830	Chad Tube (Optional).....	510-520-590 #
(24)	1601-10860	Chad Tube Bracket Rear (Optional).....	510-520-590 #
(25)	1A8-1641	Chad Tube Cable Clip (Optional).....	510-520-590 #
(26)	Z4240	Chad Tube Bracket Binding Screw (6-40) (Optional).....	510-520-590 #
(27)	PY3561	Chad Tube Bracket Binding Screw Washer (Optional).....	510-520-590 #
(28)	1A8-1382	Cable Clip (5/16-6).....	500 #
(29)	1A8-1381	Cable Clip D Washer.....	500 #
(30)	Z4277	Cable Clip Binding Screw (6-40).....	500 #
(31)	P11064	Cable Clip Binding Screw Lock Washer.....	500 #
(32)	1601-00470	Out of Tape Switch Bracket Assembled (Optional).....	500-510-520-590 #
(33)	Z4277	Out of Tape Switch Bracket Binding Screw (6-40)	500-510-520-590 #
(34)	P11064	Out of Tape Switch Bracket Binding Screw Lock Washer.....	500-510-520-590 #
(35)	1601-10770	Out of Tape Switch Blade (Optional).....	500-510-520-590 #
(36)	Z2740	Out of Tape Switch Blade Retaining Ring.....	500-510-520-590 #
(37)	1A8-1566	Micro Switch (Optional).....	500-510-520-580-590 #
(38)	1A8-1555	Micro Switch Actuator w/Screws & Nuts.....	500-510-520-580-590 #

NOTE: These Parts are also used on corresponding Advance Feed Hole Models 501, 511, 521, 551, 561, 571, 581, 591.

PUNCH MECHANISM PARTS (continued)



PUNCH MECHANISM PARTS (continued)

Ref. No.	Part No.	Name	Models
(1)	1601-10463	Punch Pawl Yoke Side Plate	500-510-520-590 #
(2)	1601-10091	Punch Pawl Yoke Bushing	500-510-520-590 #
(3)	1601-10240	Punch Pawl Yoke Eccentric	500-510-520-590 #
(4)	1A5-1009A	Punch Pawl Yoke Bushing Nut (3/8-24)	500-510-520-590 #
(5)	1A6-1041	Punch Pawl Yoke Eccentric Binding Nut Lock Washer	500-510-520-590 #
(6)	Z4453	Punch Pawl Yoke Eccentric Binding Nut (8-36)	500-510-520-590 #
(7)	1601-10471	Punch Drive Link Pin	500-510-520-590 #
(8)	1812	Punch Drive Link Pin Binding Nut Lock Washer	500-510-520-590 #
(9)	4402	Punch Drive Link Pin Binding Nut (4-40)	500-510-520-590 #
(10)	1601-10320	Punch Pawl Guide	500-510-520-590 #
(11)	1601-10352	Punch Pawl Spring	500-510-520-590 #
(12)	1601-10410	Punch Stripper and Pawl Rest	500-510-520-590 #
(13)	3300-00780	Punch Stripper and Pawl Rest Retaining Ring	500-510-520-590 #
(14)	1601-10391	Punch Pawl Overcentering Spring Rod	500-510-520-590 #
(15)	1A6-1246	Punch Pawl Overcentering Spring Rod Retaining Ring	500-510-520-590 #
(16)	1601-10681	Punch Stripper	500-510-520-590 #
(17)	1812	Punch Stripper Retaining Nut Lock Washer	500-510-520-590 #
(18)	4402	Punch Stripper Retaining Nut (4-40)	500-510-520-590 #
(19)	1601-10480	Punch Pawl Pivot	500-510-520-590 #
(20)	1601-10102	Punch Pawl	500-510-520-590 #
(21)	1601-10490	Punch Pawl Spacer	500-510-520-590 #
(22)	1812	Punch Pawl Pivot Nut Lock Washer	500-510-520-590 #
(23)	4402	Punch Pawl Pivot Nut (4-40)	500-510-520-590 #
(24)	1601-10582	Punch Arm	500-510-520-590
	1661-10011	Punch Arm (Advanced Feed Hole)	501-511-521-591
(25)	1A7-1038	Punch Arm Spring	500-510-520-590 #
(26)	1601-10440	Punch Arm Pivot	500-510-520-590 #
(27)	1601-10430	Punch Arm Spacer (Center)	500-510-520-590 #
(28)	1A6-1242	Punch Arm Spacer Right	500-510-520-590 #
(29)	1A6-1243A	Punch Arm Spacer Left	500-510-520-590 #
(30)	P11064	Punch Arm Pivot Binding Nut Lock Washer	500-510-520-590 #
(31)	4402	Punch Arm Pivot Binding Nut (4-40)	500-510-520-590 #
(32)	1601-10693	Punch Arm Spring Anchor	500-510-520-590 #
(33)	P4014	Punch Arm Spring Anchor Binding Screw (3-56)	500-510-520-590 #
(34)	1A7-1042A	Punch Pawl Yoke Spring	500-510-520-590 #
(35)	1601-10232	Punch Arm Stop	500-510-520-590 #
(36)	Z4240	Punch Arm Stop Mounting Screw (6-40)	500-510-520-590 #
(37)	P11064	Punch Arm Stop Mounting Screw Lock Washer	500-510-520-590 #
(38)	PY3561	Punch Arm Stop Mounting Screw Washer	500-510-520-590 #
(39)	1601-10571	Punch	500-510-520-590 #
(40)	1601-10561	Index Punch	500-510-520-590 #
(41)	1601-10750	Punch Driver Arm Pawl Limit Stop	500-510-520-590 #
(42)	P4144	Punch Driver Arm Pawl Limit Stop Binding Screw (4-48)	500-510-520-590 #
(43)	1A6-1300B	Punch Pawl Spacer Right (Advanced Feed Hole)	501-511-521-591
(44)	1A6-1242	Punch Pawl Spacer (Advanced Feed Hole)	501-511-521-591

NOTE: These Parts are also used on corresponding Advance Feed Hole Models 501, 511, 521, 551, 561, 571, 581, 591.

ELECTRICAL PARTS LIST

COMPONENTS	CODE NOS.	MANUFACTURER	PART NOS.	DESCRIPTION
RESISTORS				
Punch Card	R26	Allen Bradley	1A8-1452	82 Ohms**
	R35	Allen Bradley	1A8-1362	270 Ohms**
	R63	Ohmite Mfg.	1A8-1629	68 Ohms 10W*
	R41	Ohmite Mfg.	1A8-1596	180 Ohms 3W*
	R27, R62	Allen Bradley	1A8-1286	680 Ohms**
	R32	Allen Bradley	1A8-1508	1.8K**
	R31, R36, R52	Allen Bradley	1A8-1457	115K**
	R45	Allen Bradley	1A8-1475	1.2K**
	R47, R54	Allen Bradley	1A8-1363	8.2K**
	R34, R64	Allen Bradley	1A8-1570	470 Ohms 1W**
	R61	Allen Bradley	1A8-1507	470 Ohms**
	R24, R38, R39, R42, R48, R49, R51	Allen Bradley	1A8-1295	1K**
	R40, R50, R53	Allen Bradley	1A8-1500	6.8K**
	R1, R4, R7, R10, R13, R16, R19, R22	Allen Bradley	1A8-1476	820 Ohms**
	R2, R5, R8, R11, R14, R17, R20, R23, R25, R46	Allen Bradley	1A8-1344	3.3K**
	R33, R43	Allen Bradley	1A8-1343	4.7K**
Reader Card	R92	Allen Bradley	1A8-1436	30 Ohms*
	R11	Ohmite Mfg.	1A8-1595	68 Ohms 3W*
	R93	Allen Bradley	1A8-1621	150 Ohms**
	R5	Allen Bradley	1A8-1536	180 Ohms**
	R22, R25	Allen Bradley	1A8-1540	220 Ohms**
	R4, R31	Allen Bradley	1A8-1287	330 Ohms 2W**
	R37, R38	Allen Bradley	1A8-1507	470 Ohms**
	R45, R95	Allen Bradley	1A8-1570	470 Ohms 1W**
	R47	Allen Bradley	1A8-1572	270 Ohms 2W**
	R33, R36	Allen Bradley	1A8-1286	680 Ohms**
	R3, R23, R34	Allen Bradley	1A8-1476	820 Ohms**
	R12, R16, R17, R19, R24, R26, R35, R50	Allen Bradley	1A8-1295	1K**
	R32	Allen Bradley	1A8-1475	1.2K**
	R1, R8, R9, R20	Allen Bradley	1A8-1457	1.5K**
	R2, R49	Allen Bradley	1A8-1508	1.8K**
	R6, R10, R13, R29, R39, R40, R90, R91, R94	Allen Bradley	1A8-1343	4.7K**
	R18, R21, R28	Allen Bradley	1A8-1500	6.8K**
	R14, R15, R27, R44, R46	Allen Bradley	1A8-1363	8.2K**
	R41	Allen Bradley	1A8-1044	10K**
	R48	Ohmite Mfg.	1A8-1629	68 Ohms 10W*

* ---------- Plus or Minus 5%
** --------- Plus or Minus 10%

ELECTRICAL PARTS LIST (continued)

COMPONENTS	CODE NOS.	MANUFACTURER	PART NOS.	DESCRIPTION
TRANSISTORS				
Punch Card	TR10, TR12	Texas Instrument	1A8-1551	2N1038
	TR13, TR14, TR17, TR18	Texas Instrument	1A8-1577	2N1372
	TR1 thru TR9	Texas Instrument	1A8-1579	2N1373
	TR11, TR15	Philco	1A8-1549	2N1478
Reader Card	TR1, TR7, TR8	Texas Instrument	1A8-1551	2N1038
	TR2, TR3, TR4, TR5, TR6, TR9, TR10, TR11, TR12	Texas Instrument	1A8-1577	2N1372
	TR13	Philco	1A8-1549	2N1478
DIODES				
Punch Card	CR1 thru CR8, CR16, CR17, CR18	Unitrode	1A8-1317	UT111
	CR21, CR24 thru CR31	Clevite	1A8-1578	CTP462
Reader Card	CR1, CR2, CR3, CR7, CR20, CR35, CR36	Unitrode	1A8-1317	UT111
	CR4, CR5, CR6, CR8 thru CR14, CR16, CR17, CR19, CR28, CR29, CR30, CR33, CR37	Clevite	1A8-1578	CTP462
CAPACITORS				
Punch Card	C3, C4	P.R. Mallory & Co.	1A8-1502	.05 uf 100V + 80%-20%
	C5	Good-All Electric	1A8-1513	.33 uf 50V ± 20%
	C1, C2	Barco	1A8-1575	10 uf 50V - 10% + 100%
	C7	Sprague	1A8-1630	50 uf 25V +0 -10%
Reader Card	C5, C8, C9	P.R. Mallory	1A8-1502	.05 uf 100V +80% -20%
	C3, C4	Good All Electric	1A8-1513	.33 uf 50V ±20%
	C11	Cornell Dubilier	1A8-1467	2 uf 50V -10% +150%
	C1, C2	Barco	1A8-1575	10 uf 50V -10% +100%
	C10	Sprague	1A8-1630	50 uf 25V +0 -10%
	C7	Sprague	1A8-1538	.1 uf 50V +80% -30%
COILS	L1 thru L8, L11	Dano Electric	1A8-1435A	321 Ohms
	L9, L10, L14, L15, L18, L19	Dano Electric	1A8-1564	50 Ohms
	L12, L13, L17, L20,	Dano Electric	1A8-1615	685 Ohms
SOLENOID		Phillips Control	1A8-1332	115 Ohms
RELAY	K1	Phillips Control	1A8-1580A	115 VAC(50-60) 645 Ohms Type 12AC

ELECTRICAL PARTS LIST (continued)

COMPONENTS	CODE NOS.	MANUFACTURER	PART NOS.	DESCRIPTION
SWITCHES	S2, S6, S7, S8, S9, S11 -------	Micro Switch Minn. Honeywell -	1A8-1566 ---	Type 11 SM233-2T
FUSE	F1 ----------	Littelfuse, Inc.-	1A8-1626 ---	3AG-3 AMP(Slo-Blo)
FUSE EXTRACTOR POST	----------	Littelfuse, Inc.-	1A8-1211 ---	3AG min. Type #342012
MOTORS	M1 ----------	Alliance Mfg. ---	1A8-1557 ---	115V-60 Cycle, 1/40 HP @ 3250 RPM Dual Unit
		Alliance Mfg. ---	1A8-1593 ---	115V-60 Cycle, 1/40 HP @ 3250 RPM Single Unit
CONNECTORS	C,D,F,G --------	Amp. Inc. -------	1A8-1616 ---	12 Pin Plug
		Amp. Inc. -------	1A8-1397 ---	12 Pin Plug
		Amp. Inc. -------	1A8-1398 ---	12 Pin Cap
		Amp. Inc. -------	1A8-1617 ---	12 Pin Cap
		Amp. Inc. -------	1A8-1568 ---	Contact (C-42859 1)
		Amp. Inc. -------	1A8-1567 ---	Polarizing Plug
	E, ER, EP ------	Gorn Electric ---	1A8-1581 ---	34 Pin Type (Male) (GMCT-34-M-T-U-A-O)
	(Optional)	Gorn Electric ---	1A8-1614 ---	34 Pin Type (Female) (GMCT-34-F-E-P-A-Y)
		Gorn Electric ---	1A8-1588 ---	Contact Block
		Gorn Electric ---	1A8-1589 ---	Shell
		Gorn Electric ---	1A8-1590 ---	Guide Socket
		Gorn Electric ---	1A8-1591 ---	Guide Pilot
		Gorn Electric ---	1A8-1585 ---	#20-24 Wire (Contact)
		Gorn Electric ---	1A8-1586 ---	#16-20 Wire (Contact)
	A,B ----------	Amp. Inc. -------	1A8-1582 ---	44 Pin-Amp Leaf (Multiple Edge)
		Amp. Inc. -------	1A8-1583 ---	Contact (18-22) Wire)
		Amp. Inc. -------	1A8-1584 ---	Polarizing Plug
	N ----------		1611-00970 -	Molded Steel Sensing Contacts & Harness Assb.

PRINTED CIRCUITS

Punch Card Assembled ----------	1632-00052 -	Punch Card w/All Components
Punch Printed Circuit Card ----------	1632-10320 -	Punch Card w/Printed Circuitry only.
Reader Card Assembled ----------	1632-00062 -	Reader Card w/All Components.
Reader Printed Circuit Card ----------	1632-10331 -	Reader Card w/Printed Circuitry only.

PARTS CATALOG INDEX

NAME

Royal McBee Corporation - Printed in U.S.A. January 1964

NUMERICAL INDEX

NUMERICAL INDEX (continued)

NUMERICAL INDEX (continued)

NOTES

Royal McBee Corporation - Printed in U.S.A.

April 7, 1964

INDUSTRIAL PRODUCTS RELEASE #3

500 SERIES

TAPE HANDLING EQUIPMENT

TAPE DECK

and

Revised Pages 2-3 and 2-12

The attached Section 4 illustrates and describes the Function, Operation, Disassembly, Assembly and Adjustments of the Tape Handling and Tape Deck equipment.

Also included are Revised Pages 2-3, 2-4 and 2-11, 2-12.

Insert this material in the following places:

Section 4:	After Section 3, 500 Series Reader/Punch Service Manual Revised January 1964
Pages 2-3, 2-4: (Rev. April 1964)	In place of Pages 2-3, 2-4, dated January 1964.
Pages 2-11, 2-12: (Rev. April 1964)	In place of Pages 2-11, 2-12, dated January 1964.

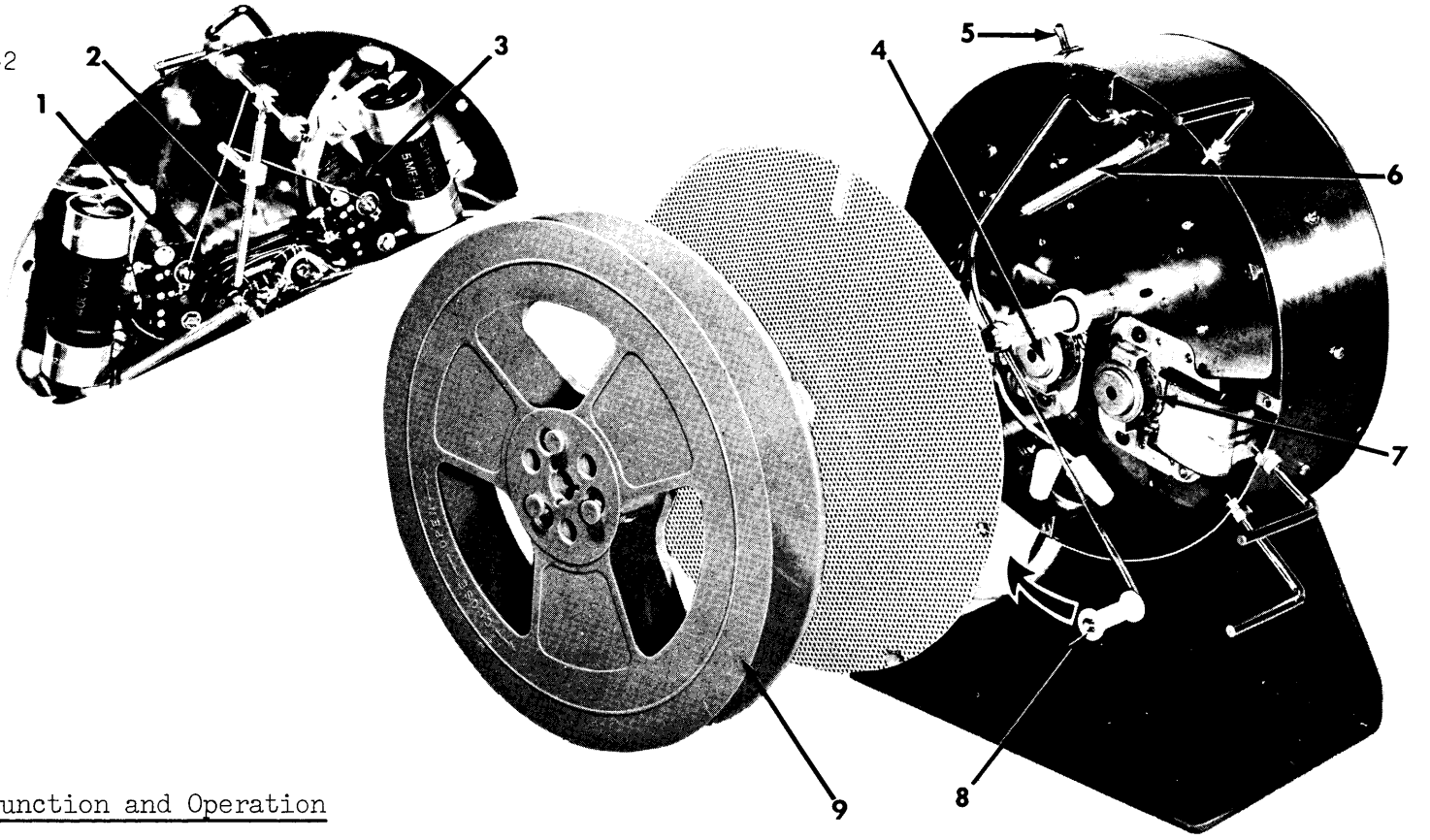
Included in Section 4 is the replacement Parts List covering the Tape Handling equipment and Tape Deck. The Parts may be obtained through the normal part ordering procedure.

CUSTOMER SERVICE -

ECN161-0

TECHNICAL SERVICE PUBLICATIONS DEPARTMENT

TAPE WINDING EQUIPMENT SECTION
SERVICE MANUAL AND PARTS LIST
500 SERIES



Function and Operation

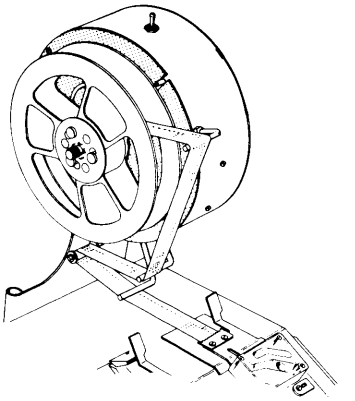
The Paper Tape Winding equipment is available in two styles; Unidirectional and Bidirectional. The Unidirectional Unit will wind Tape only when it is fed forward from the Reader or Punch. The Bidirectional Unit will wind Tape when fed by the Punch or Reader and when required, will also dispense the Tape during the reverse mode of the Reader or Punch. Both Units are capable of handling Tape at the rate of 60 codes per second.

The Units are threaded with Tape as illustrated below and Switch (5) is operated to turn the Unit on. When Tape is being fed to the Unit, Switch Rod (8) moves in the direction indicated through the tension of Spring (6) and the slackening of the Tape. Switch Trip Rod (2) moves and transfers Switch (3) operating Motor (4). Through a system of Reduction Pulleys, Motor (4) turns Take-Up Reel (9) in a counter-clockwise direction.

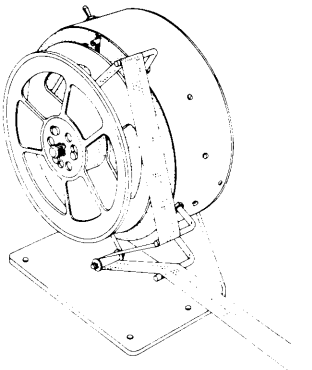
Take-Up Reel (9) winds the Tape until the tension on the Tape pulls Rod (8) and Trip Rod (2) away from Switch (3), transferring the Switch to stop Motor (4). The Take-Up Reel stops and as the Tape continues to be fed to the Unit, the action as previously described is repeated.

When the Tape is being pulled from the Unit, the tension of the Tape pulls Rod (8) in the opposite direction. Switch Trip Rod (2) moves into contact with Switch (1).

When Switch (1) is transferred, Motor (7) through the Pulley system will turn Take-Up Reel (9) in a clockwise direction. The Tape is fed from the Take-Up Reel and as it slackens, Trip Rod (2) moves away from Switch (1) through the action of Spring (6). Switch (1) transfers, turning off Motor (7). As the Tape continues to be pulled from the Unit, Rod (2) moves back, transferring Switch (1) to repeat the previously described action.



TAPE DECK THREADING



DESK MOUNT THREADING

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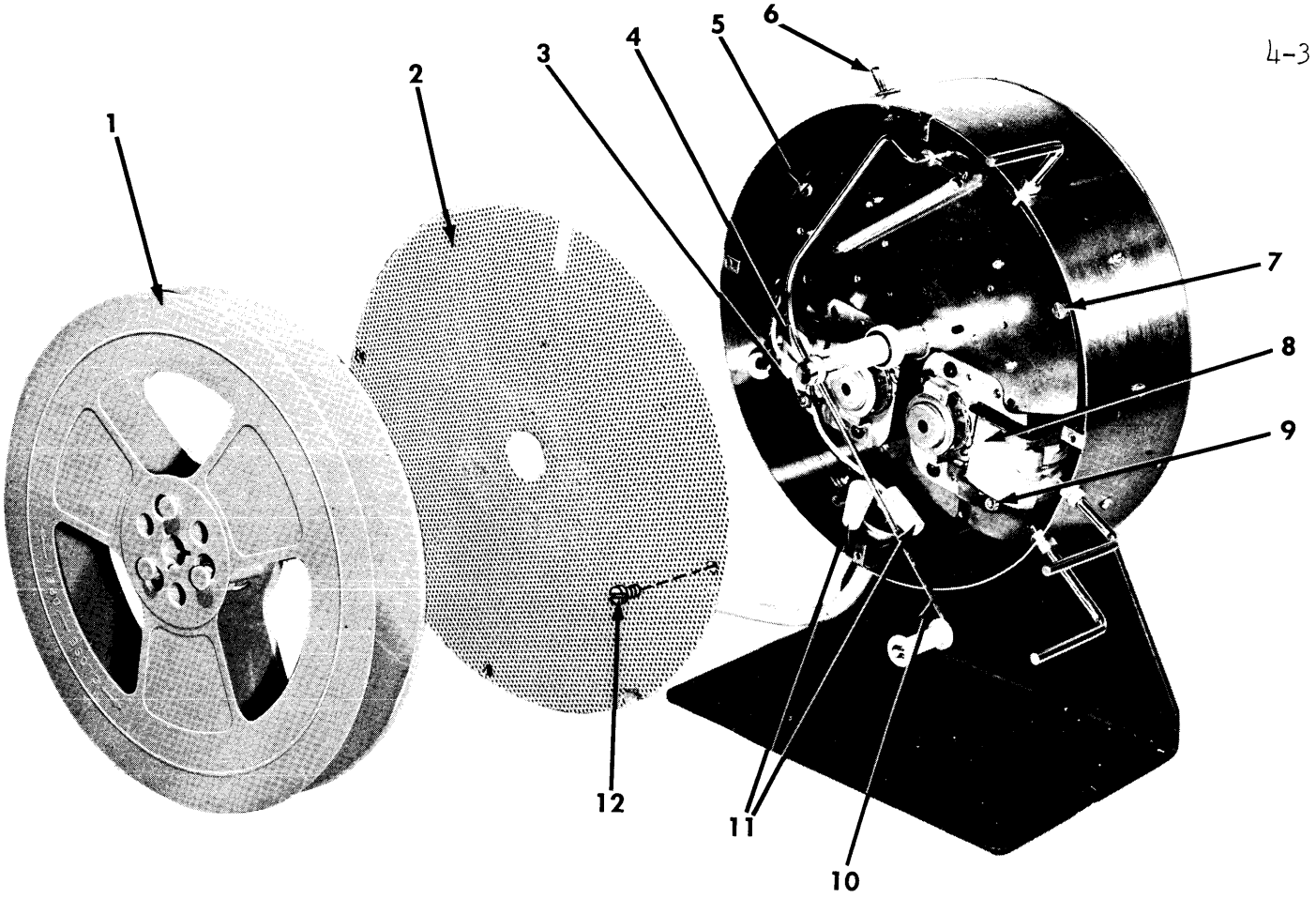


Disassembly and Assembly

In order to replace the Motor, Belts, Switches, Pulleys or other component parts of the Tape Winding Unit, it will be necessary to remove the Basic Mechanism from its covers.

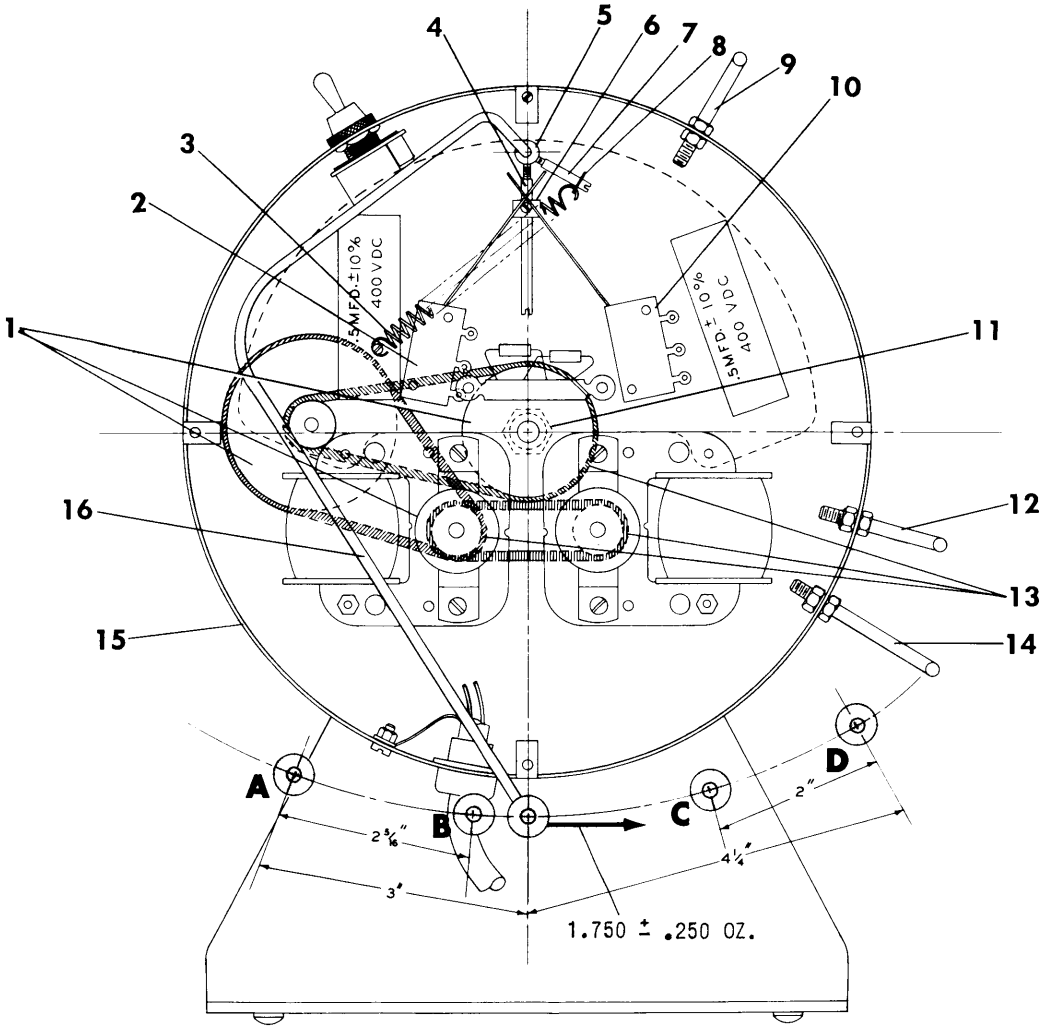
Disconnect the Power Cord and remove Take-Up Reel (1). Remove Screws (12) and Cover (2). Remove Nuts (3) and (9) and Screws (5) and (7).

Lay the Unit on its back, remove Connectors (11) and disconnect the two Power Cord Wires. Hold Rod (10) down and remove the Motors and Mounting Plate from the Rear Plate Assembly.

Turn the Motors and Mounting Plate Assembly upside down alongside the Rear Plate Assembly being careful not to overstress the Wires to Switch (6).

Access is now gained to the component parts. Motors (4) and (8) and their respective Switches are easily removed by removing their respective Mounting Screws. The Belts are removed by sliding them off their respective Pulleys.

After replacing defective parts, reassemble the unit in the reverse manner being careful that the Wires in no way interfere with the proper operation of the Pulleys, Belts or Switches.



Adjustments

Tape Guide (14) must be positioned directly in line with the Reader or Punch Platen. The Guide can be adjusted by loosening Nut (11) and rotating the Unit.

The Motors should start a fully loaded Reel immediately upon releasing the Tape. If sluggish motion of the Reel is noted, inspect Belts (13) and Pulleys (1). Clean the Pulleys and Belts or replace the Belts as necessary.

Spring Retainer (8) must be positioned 3/4" away from the center of Collar (5). Collar (6) must be positioned 1" away from the center of Collar (5).

Switch (2) must close at Point A and open at Point B. Switch (10) must close at Point D and open at Point C.

To adjust, loosen Collar (5) and move Rod (4) and its Collar to the point where the illustrated dimensions are as close as possible. Form the Arms of Switches (2) and (10) to obtain a precise adjustment.

Be sure the Arms of Switches (2) and (10) do not interfere with each other.

Switch Arm (16) must have 1.750 $\pm$ .250 oz. when positioned at Point A and pulled in the direction indicated parallel to the base of the Unit.

To adjust, loosen Rod (7) and its Collar. Move Rod (7) lengthening or shortening Spring (3) as required to obtain the described tension.

Guides (9) and (12) should extend approximately 1" out of Cover (15). Guide (14) should extend out approximately 1 9/16". Make this adjustment with the Guide Mounting Nuts.

Lubrication

Lubricate sparingly all Pivot Points, Fulcrum Points and Bearing Surfaces with Light Oil. Avoid getting Oil on the Belts or Pulleys.

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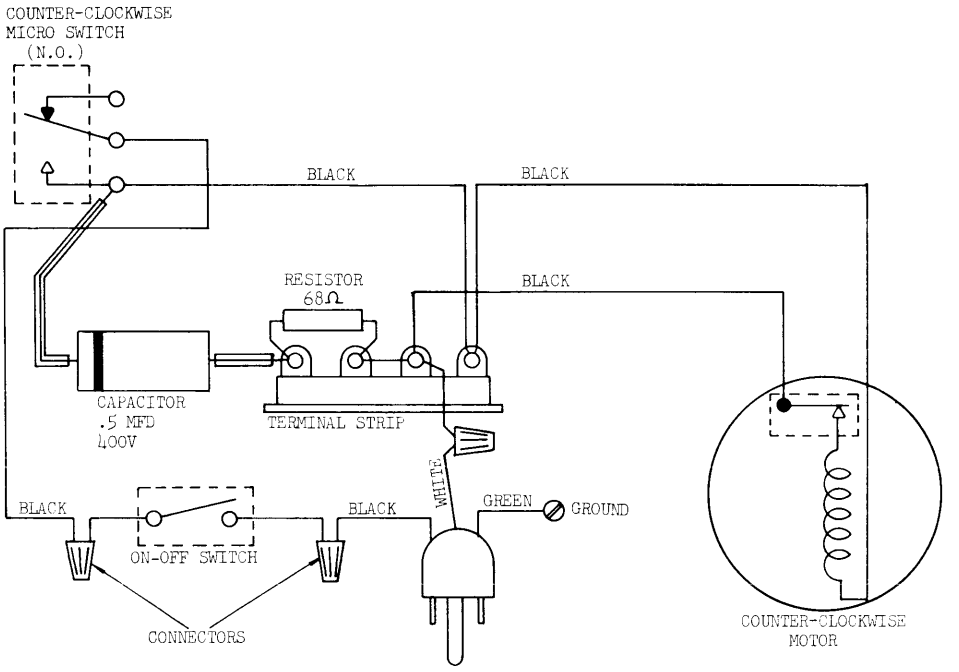
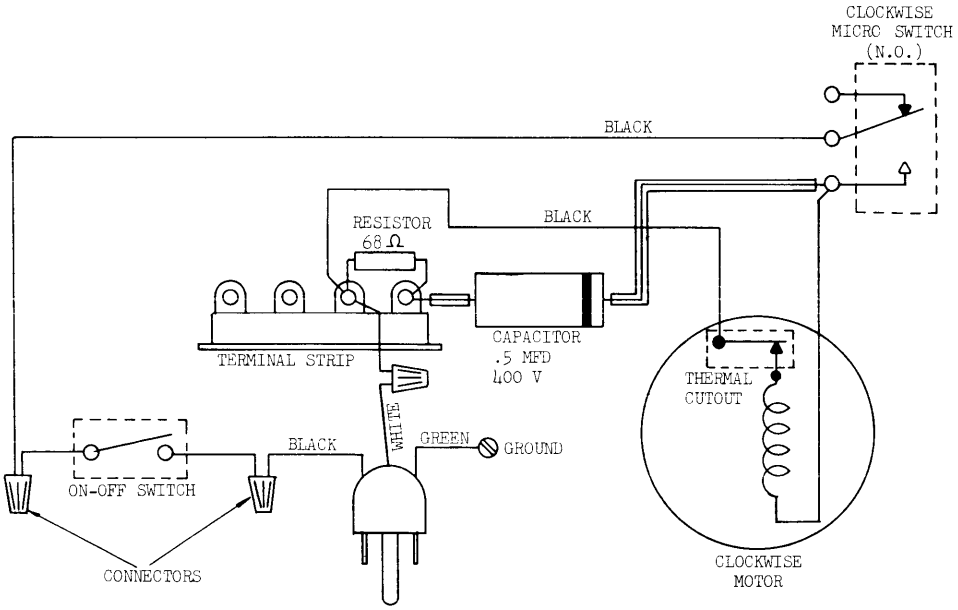
UNI-DIRECTIONAL TAPE WINDING UNIT

WIRING DIAGRAMS



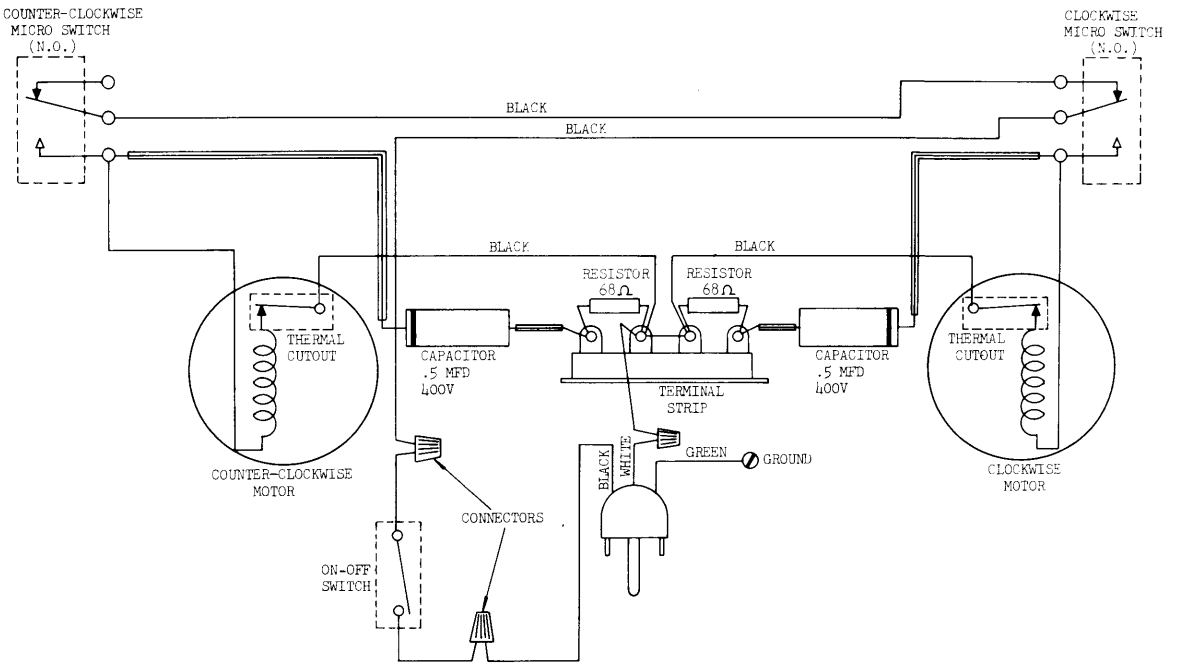
RIGHT SIDE UNIT



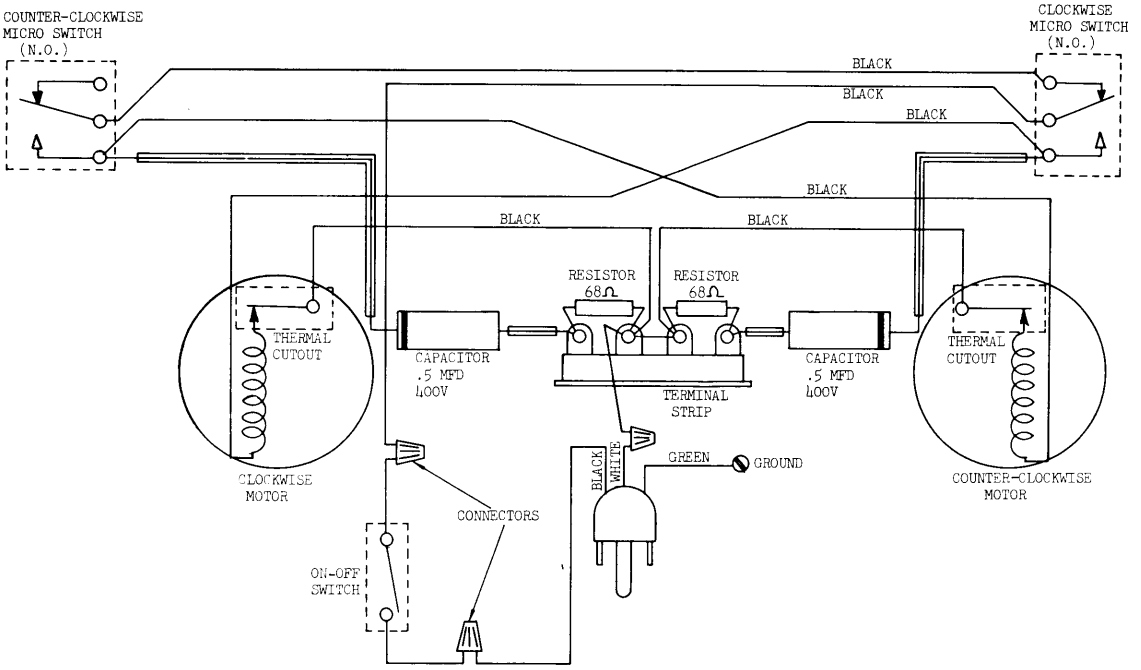
LEFT SIDE UNIT

BI-DIRECTIONAL TAPE WINDING UNITS

WIRING DIAGRAMS



RIGHT SIDE UNIT



LEFT SIDE UNIT

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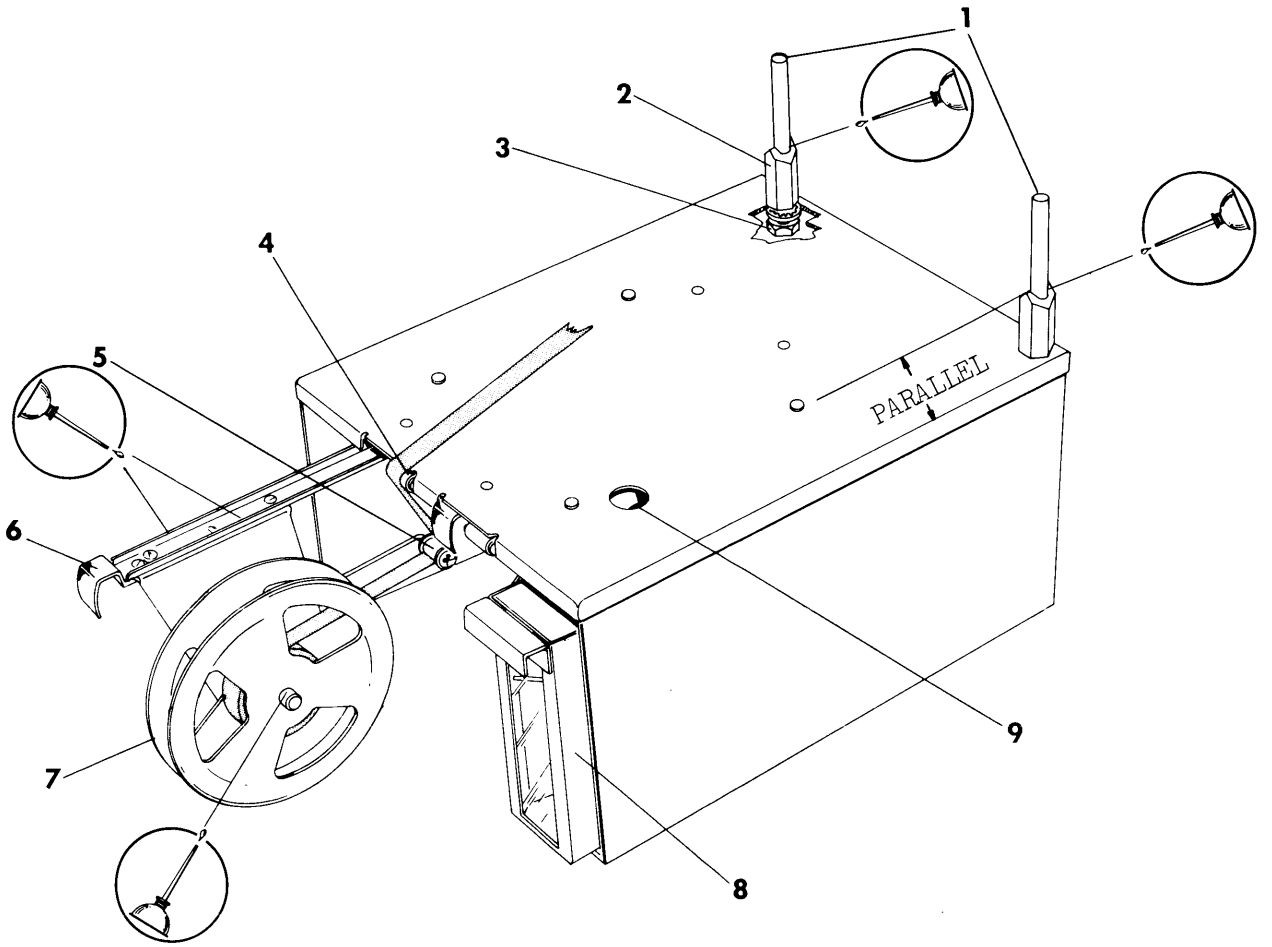

TAPE DECK OPERATION AND ADJUSTMENTS

The Tape Deck illustrated above is used in conjunction with the 500 Series Reader/Punch and the Tape Winding equipment described in this section.

Tape Supply Reels (7), mounted on Slides (6), conveniently store the Tape supply rolls beneath the Tape Deck.

Chad Box (8), located beneath Disposal Hole (9), collects the Chad as it is discharged from the Punch.

Removal and installation of Chad Box (8) is accomplished by holding the handle of Chad Box (8) up and sliding the Chad Box forward or rearward as desired.

NOTE: Punches used on the Tape Deck must be equipped with the Rear Discharge Chad Tube listed in Section 3, Page 3-21 Reference (23).

Rods (1) are provided to permit mounting of the Bi-directional or Uni-directional Tape Winding Units.

A special Bracket, listed in the accompanying Parts List, is attached to the Tape Winding Units and then placed on Rods (1).

Tape, emerging from the Reader or Punch, is threaded to the Tape Winding Units as previously described in this section.

Adjustments

Spacers (2) are adjusted by loosening Nuts (3) and rotating the Spacers until the points on Spacers (2) are parallel with the side of the Unit, as illustrated.

Arm and Roller (5) should have 1.5 oz. tension. Adjustment is made through its Tension Spring. The tension on Arm and Roller (5) must not exceed 2 oz.

Lubrication

Lubricate sparingly the points indicated above.

Threading Supply Tape to Reader or Punch

Thread the Tape off the top of Reel (7), under Roller (5) and over Roller (4).

NOTES

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TEMPORARY PARTS LIST

for

TAPE WINDING EQUIPMENT AND TAPE DECK

This Temporary Parts List contains all the parts used in the following Models and is subject to changes:

540 BL	Bi-Directional Left w/Desk Stand
540 BR	Bi-Directional Right w/Desk Stand
540 UL	Uni-Directional Left w/Desk Stand
540 UR	Uni-Directional Right w/Desk Stand
545	Tape Deck

APRIL 1964

CUSTOMER SERVICE

TECHNICAL SERVICE PUBLICATIONS DEPARTMENT

Hartford, Connecticut 06106

TAPE WINDING EQUIPMENT

PARTS LIST

Part No.	Name	Models
1671-00022	Motor Mounting Plate Assembly	All
1671-00030	Reel Holder Assembly with Main Shaft	All
1671-00042	Rear Plate Assembly	All
1671-00070	Motor Fan Assembly (CCW)	540 BL & UR
1671-00080	Motor Fan Assembly (CW)	540 BR & UL
1671-10020	Switch Trip Rod	All
1671-10070	Main Shaft Pulley	All
1671-10080	Motor Drive Pulley	All
1671-10090	Reel	All
1671-10100	Desk Stand Plate	All
1671-10121	Front Cover	All
1671-10160	Switch Rod Left	540 BL & UL
1671-10170	Switch Rod Right	540 BR & UR
1671-10180	Rubber Foot	All
1671-10220	Switch Trip Rod Roller	All
1671-10260	Take-Up Reel Frame	All
1671-10280	Motor Pulley	540 BR & BL
1671-10290	Tape Guide Take-Up Reel (Short)	All
1671-10300	Tape Guide Take-Up Reel (Long)	All
1672-00010	N.A.R.T.B. Reel Adaptor Assembly	All
1672-10030	N.A.R.T.B. Reel Adaptor Plain use with 1672-00010	All
2971-04500	Motor Pulley Set Screw 4-48	All
3071-04600	Capacitor Mounting Screw 6-40	All
3071-05600	Motor Mounting Screw 6-40	All
3071-06300	Switch Arm Collar Set Screw 4-48	All
3072-00501	Take-Up Reel Plate Hub Washer	All
3242-00901	Switch Rod Spring	All
3272-50400	Capacitor Mounting Nut 6-32 (Early Models Only)	All
5000-50200	Strain Relief Washer	All
5000-60060	Terminal Strip	All
1A1-1031	Main Shaft Pulley Set Screw 6-40	All
1A1-1224	Micro Switch Mounting Screw 4-48	All
1A1-1244	Front and Rear Plate Mounting Screw 6-40	All
1A1-1268	Motor Mounting Plate Screw 6-40	All
1A1-1284	Switch Rod Spring Anchor Screw 4-48	All
1A1-1288	Reel Holder Locking Screw 1/4-28	All
1A5-1009A	Take-Up Reel Plate Hub Nut 3/8-24	All
1A6-1031	Switch Trip Rod Spring Grip Ring	All
	Switch Rod Grip Ring	All
1A6-1103	Motor Support Stud Lock Washer	All
1A6-1106	Frame Closure Lockwasher	All
1A6-1140	Micro Switch Mounting Screw Lockwasher	All
1A6-1311	Reel Holder "O" Ring	All
1A6-1312	Switch Rod Collar	All
1A8-1600	Strain Relief Bushing	All
1A8-1631A	Motor - Counter Clockwise	540 BR, BL & UR
1A8-1632A	Motor - Clockwise	540 BR, BL & UL
1A8-1633A	Micro Switch - Counter-clockwise	540 BR, BL & UR
1A8-1634A	Micro Switch - Clockwise	540 BR, BL & UL

TAPE WINDING EQUIPMENT

PARTS LIST (continued)

Part No.	Name	Models
1A8-1635	Toggle Switch S.P. S.T.	All
1A8-1647	Resistor 68 Ohms 1/2W	All
1A8-1649	Capacitor .5 MFD 400VDC	All
1A8-1654	Power Cord Ground Terminal	All
1A8-1655	Capacitor Clamp	All
1B2-1012A	Speed Reduction Belt (Large)	All
1B2-1015A	Speed Reduction Belt (Small)	BR & BL
2193	Motor Mounting Washer	All
Z4049	Terminal Strip Mounting Screw 6-40	All
Z4129	Frame Closure Screw 6-40	All
Z4240	Cord Ground Clamp Screw 6-40	All
4268	Switch Rod Stop 6-40	All
4470	Frame Closure Screw Nut 6-40	All
	Cord Ground Clamp Screw Nut 6-40	All
15287	Main Shaft Collar	All
2E649	Electrical Connector	All
9E4078A	Main Shaft Collar Set Screw 6-40	All
9E4220	Switch Rod Spring Anchor Screw 6-40	All
9E4451	Motor Support Stud Nut 6-40	All
9E4506	Tape Guide Mounting Nuts 10-32	All
40E980	Power Cord	All
P11064	Capacitor Mounting Screw Lockwasher	All
	Terminal Strip Mounting Screw Lockwasher	All

TAPE DECK

PARTS LIST

Part No.	Name	Models
1632-10400	Tape Roller	545
1671-10020	Switch Trip Rod	545
1671-10090	Reel	545
1671-10180	Rubber Foot - Top Plate Locating	545
1671-10220	Control Arm Tape Roller	545
1673-00010	Top Plate Assembly	545
1673-00020	Paper Reel Bracket Assembly	545
1673-00040	Chad Box with Front Assembly	545
1673-00050	Tape Roller Bracket Assembly	545
1673-10080	Tape Supply Slide	545
1673-10141	Pivot Rod	545
1673-10151	Pivot Rod Base	545
1673-10160	Take-Up Unit Bracket (Right)	545
1673-10170	Take-Up Bracket (Left)	545
1673-10190	Tape Tension Control Arm	545
1673-10200	Tape Supply Reel Holder	545
1673-10210	Tape Roller Bracket	545
1673-10220	Tape Roller Pin	545
1673-10300	Rubber Foot - Tape Deck	545
2971-01800	Paper Reel Bracket Assembly Mounting Screw Front	545
3071-06300	Control Arm Collar Set Screw	545
1A1-1288	Reel Holder Screw	545
1A1-1297	Slide Mounting Screw 8-36	545
1A2-1221	Control Arm Limit Screw 3-56	545
1A5-1110	Pivot Rod Lock Nut	545
1A6-1031	Spring Anchor Grip Ring	545
	Tape Roller Grip Rings	545
1A6-1052	Supply Reel Holder Washer	545
1A6-1055	Supply Reel Holder Grip Ring	545
1A6-1057	Pivot Rod Lockwasher	545
1A6-1091	Slide Mounting Screw Washer	545
1A6-1311	Reel Holder "O" Ring	545
1A6-1312	Switch Rod Collar	545
Z4221	Spring Anchor Screw 6-40	545
4240	Paper Reel Bracket Mounting Screw Rear 6-40	545
Z4453	Slide Mounting Screw Nut 8-36	545
9E4192	Paper Reel Bracket Shoulder Screw Front	545
P4012	Tape Roller Bracket Assembly Mounting Screw 4-40	545
P4409	Control Arm Limit Screw Nut 3-56	545
P7626	Control Arm Spring	545
P11064	Paper Reel Bracket Mounting Screw Lockwasher	545

READER LOGIC
(see Page 2-2)

GENERAL

The Basic 5,6,7 or 8 Level Tape Reader is a 50 Character per second, Pin Sensing, Free-running device. It reads perforated Tape in either the Forward or Reverse direction. The Reader has a unique semi-automatic Tape Loading Feature. It is also furnished with a Tape Tension Switch.

Theory of Operation Reading And Feeding

The Reader Control Circuitry consists of four Bi-Stable Flip-Flops, AND and OR Gates and necessary Amplifiers and Inverters. Control of the Reader involves three lines between Reader and user's equipment. These are (1) the Start Search Line, (2) the Search Complete Line and (3) the Feed Direction Control Line. Referring to Page 2-2, the four Flip-Flops are shown as:

(1) Read Control Flip-Flop (set by the trailing edge of the Gated Start Search Signal and reset by the leading edge of the Interrogate Switch closure). (2) Feed Control Flip-Flop (set by the trailing edge of the Gated Start Search Signal or Auto-Feed Signal and reset by the resetting of the Forward or Reverse Feed Flip-Flop). (3) Forward Feed Flip-Flop clamped in the reset state by the Feed Control Flip-Flop or the Reverse Signal from the Feed Direction Control. When unclamped, the Forward Feed Flip-Flop is set and reset by the Pulse Generator. (4) Reverse Feed Flip-Flop clamped in the reset state by the Feed Control Flip-Flop or the Forward Signal from the Feed Direction Control. When unclamped, the Reverse Feed Flip-Flop is set and reset by the Pulse Generator.

In the static state with Tape in the read station, all the Flip-Flops are in the reset state. Start Search Line is grounded from a negative reference. To activate the Reader, the Start Search is ANDed with the Conducting Leg (reset condition) of the Read Control Flip-Flop, inverted twice and GROUNDS the common of the Code Contacts. Ground will be on Outputs 1 through 8 depending on the character code. At the same time, this signal appears on the Common Switch, it also appears as Search Complete for strobing purposes.

The trailing edge of Start Search sets the Feed Control Flip-Flop as well as the Read Control Flip-Flop. The Start Search Signal must remain as an Input for a minimum of 1 Millisecond. In order to guarantee 50 character per second operation, the Signal must not exceed 2 Milliseconds after the leading edge of Search Complete. Assuming a Forward condition, the Forward Feed Flip-Flop will then be set and reset by the output of the Pulse Generator coupled through an Emitter follower. The Forward Feed Flip-Flop is set by the first Negative Signal from the Generator and is reset 10 Milliseconds later by the Positive Signal.

During this set condition of the Forward Feed Flip-Flop, the Output is inverted and applied to the Forward Feed and Forward Pin Retract Magnets. This Logic synchronizes the Electrical Input Signal to the Mechanical Timing of the machine so the Pins may be retracted below the Tape Level and the Tape indexed one position forward. The Pins are retracted and then released by the resetting of the Forward Feed Flip-Flop as explained above to position themselves in the new code.

The Interrogate Contact follows the same motion except it closes slightly later and opens sooner than the Code Contacts. The reclosing of the Interrogate Contact resets the Read Control Flip-Flop. Should a Start Search Signal have appeared before this time the AND Gate would have been cut off because the Read Control Flip-Flop is in the set state. With the resetting of the Read Control Flip-Flop and a Start Search Command, the cycle is repeated. Reverse is the same operation as above except for the polarity of the Reverse Line and the synchronization to the Mechanical Cycle is now displaced 180° from the Forward Feed cycle.

READER LOGIC - Continued
(see Page 2-2)

Theory of Operation of Semi-Automatic Load

Two Switches are used to control the advance of the Tape (no reading at this time) to the Reading position. The Logic Diagram shows the condition of the Tape Tension, Paper In Position and Auto-Feed Switches with no Tape in the machine. With the exception of the Read Control Flip-Flop, all Flip-Flops are in their set state. Following the ground from the Tape Tension Switch through the Paper In Position Switch, it can be seen that the Tape Roll Solenoid and Forward Pin Retract Magnet are energized and the Read Control Flip-Flop is held in the set condition. As Tape is manually inserted into the Input Guide, it comes in contact with the Solenoid-Actuated "Friction" Feed Roller. As the "Friction" Drive Roller contacts the paper, it propells it through the Auto-Feed Switch to the Paper In Position Switch. When the Auto Feed Switch is transferred, it sets the Feed Control Flip-Flop to allow the Forward Feed Flip-Flop to be set and reset by the pulses of the Pulse Generator and thereby indexing the Tape at a rate of 50 characters per second. When the Paper In Position Switch is transferred, it removes the ground from both the Feed and Read Control Flip-Flops and de-energizes the Tape Roll Solenoid and Forward Pin Retract Magnet. The Read Control Flip-Flop is then reset by the Interrogate Contact and the Feed Control Flip-Flop is reset by the Forward Feed Flip-Flop which was reset by the Positive Pulse of the Pulse Generator.

Theory of Operation of Tape Tension Switch

The Tape Tension Switch, as shown on the logic Diagram, is in the No Tension position and applies ground to the Read Control Flip-Flop reset AND Gate. In this state, the Interrogate Contact is allowed to reset the Flip-Flop. Should the Tension Switch transfer, it will not allow the reset of the Read Control Flip-Flop, therefore, not allowing start Search to start a new cycle. When the Tension Switch is reclosed, it resets the Read Control Flip-Flop through the Reset OR Gate allowing further Read-feed cycling if Start Search is active.

PUNCH DYNAMIC STATE

With the Tape Tension Switch closed (Tape not under tension) and the Tape Feed Switch closed (manually), GND will be at the collector of TR17 (Sec. 8A). The Feed Control Flip-Flop will be set, removing the GND clamp from the Forward and Reverse Flip-Flop by way of CR24 and CR25 (Sec. 6B&D) and the collector of TR18. With these GND clamps removed, the Feed Direction Control Signal designates Forward or Reverse direction. A GND at the junction of CR27-CR31 (Sec. 6C) will keep the Reverse Flip-Flop clamped in its reset state.

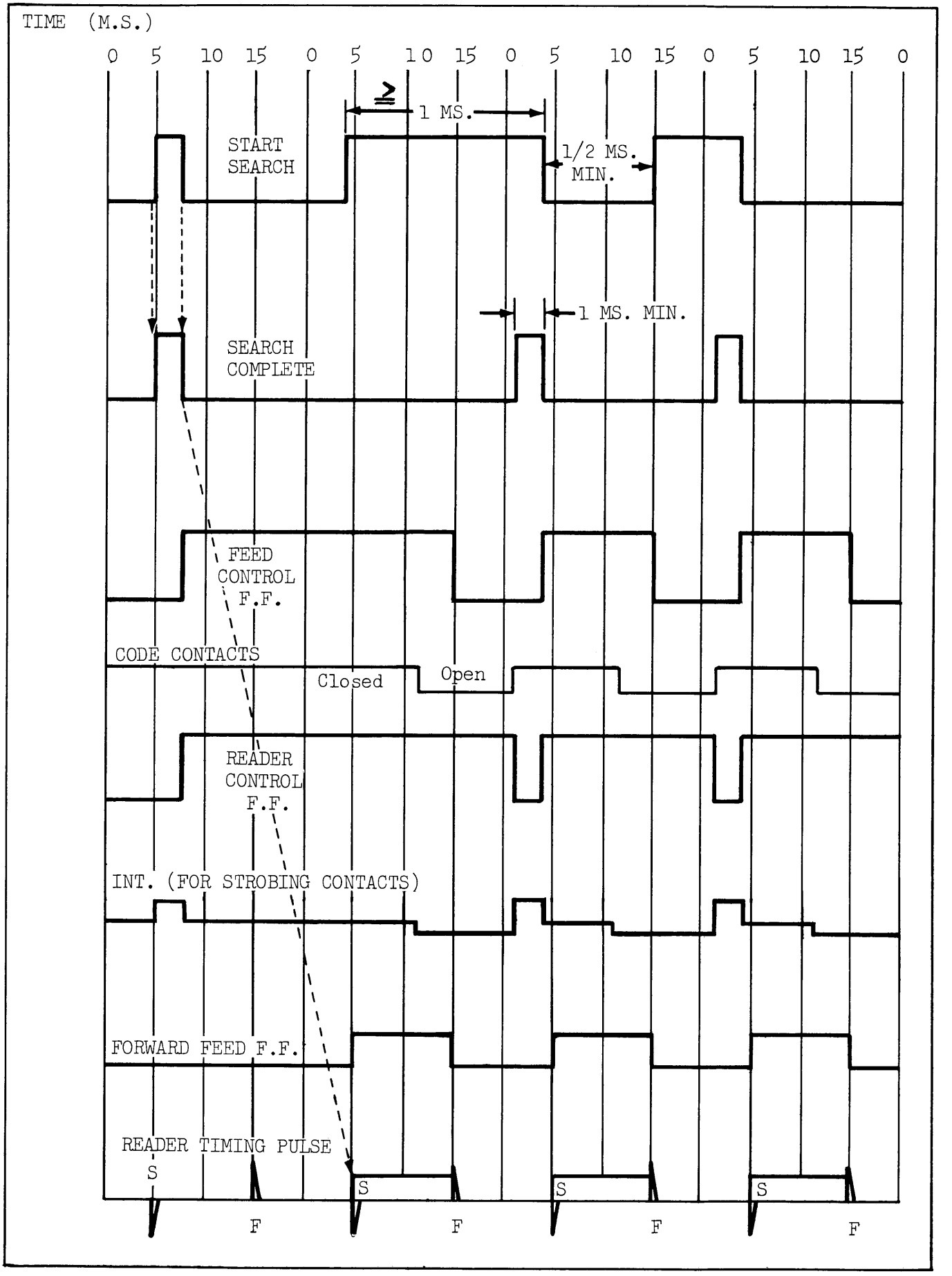
By having a GND signal at this point instead of -6 volts, the Forward Flip-Flop is allowed to be set when the next negative signal is received at the Base of TR14, from the Pulse Generator. With the Forward Flip-Flop in its set state, the GND that was present at the collector of TR15, when it was in its reset state, is now removed.

A current path is formed from -18VD (Sec. 6B) through R41, R24, base-emitter of TR9 (Sec. 8B) also R26, base-emitter of TR10 (Sec. 8C). With TR9 and TR10 conducting, an Index Hole will be punched in the tape and it will be fed forward one position. Also, TR10 supplies a GND from its collector to the emitters of TR1 thru 8 (Sec. 9A-E). This allows any or all of TR1-TR8 to conduct depending upon which of the transistors received an input code (-6 volts) on their bases from the outside source. In this case, (Tape Feed) we are assuming the Input sources are at ground potential and that only the Index hole will be punched.

When the Tape Feed Button is released, ground is removed from TR17 collector and the Feed Control Flip-Flop is allowed to be reset. The resetting action is accomplished by the next positive pulse from the Pulse Generator, resetting the Forward Feed Flip-Flop and applying ground from the collector of TR15 through C3 and CR28 to the Base of TR17 cutting it off, resetting the Feed Control Flip-Flop and removing the ground from the In-Process line indicating to the outside source that the punch is ready to receive a Start Process signal.

In operations other than Tape Feed, the Start Process Signal (GND) (Sec. 6B) sets the Feed Control Flip-Flop. At this time an In Process signal is generated to the outside source indicating that the Punch is in operation and a normal Feed and Punch operation will occur as described above.

READER TIMING



July 20, 1964

INDUSTRIAL PRODUCTS RELEASE #6

500 SERIES

POWER SUPPLY

Section 5

The attached Section 5 illustrates and describes the Desk Mounted Power Supply Model 530 that is used in conjunction with the 500 Series Reader and/or Punch.

Insert this material in the 500 Series Service Manual as follows:

Section 5. After Section 4, 500 Series Reader/Punch Service Manual Revised January 1964

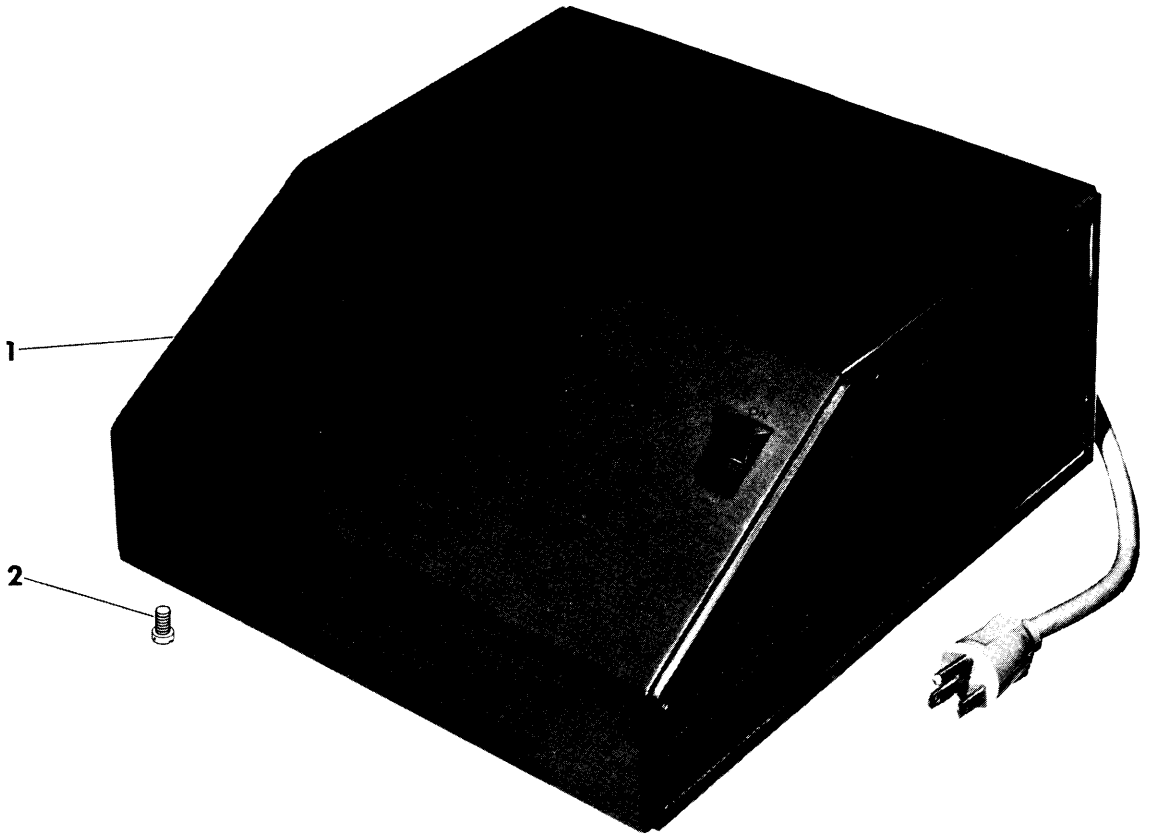
Included in Section 5 is the replacement Parts List covering the Power Supply. The parts may be obtained through the normal part ordering procedure.

CUSTOMER SERVICE -

ECN161-1

TECHNICAL SERVICE PUBLICATIONS DEPARTMENT

POWER SUPPLY SECTION
SERVICE MANUAL AND PARTS LIST
500 SERIES



POWER SUPPLY GENERAL DESCRIPTION AND OUTPUT VOLTAGES

The Power Supply Unit Model 530, shown above, is used to supplement the 500 Series Reader/Punch equipment, in order to supply the Power required to operate a Reader and/or Punch Unit.

The Output Voltages listed below are referenced to the Pin Identification Character on the 34 Pin Connector. The Power Supply Outputs are easily wired to a Reader and/or Punch Unit using the Interconnections Diagrams in Section 2.

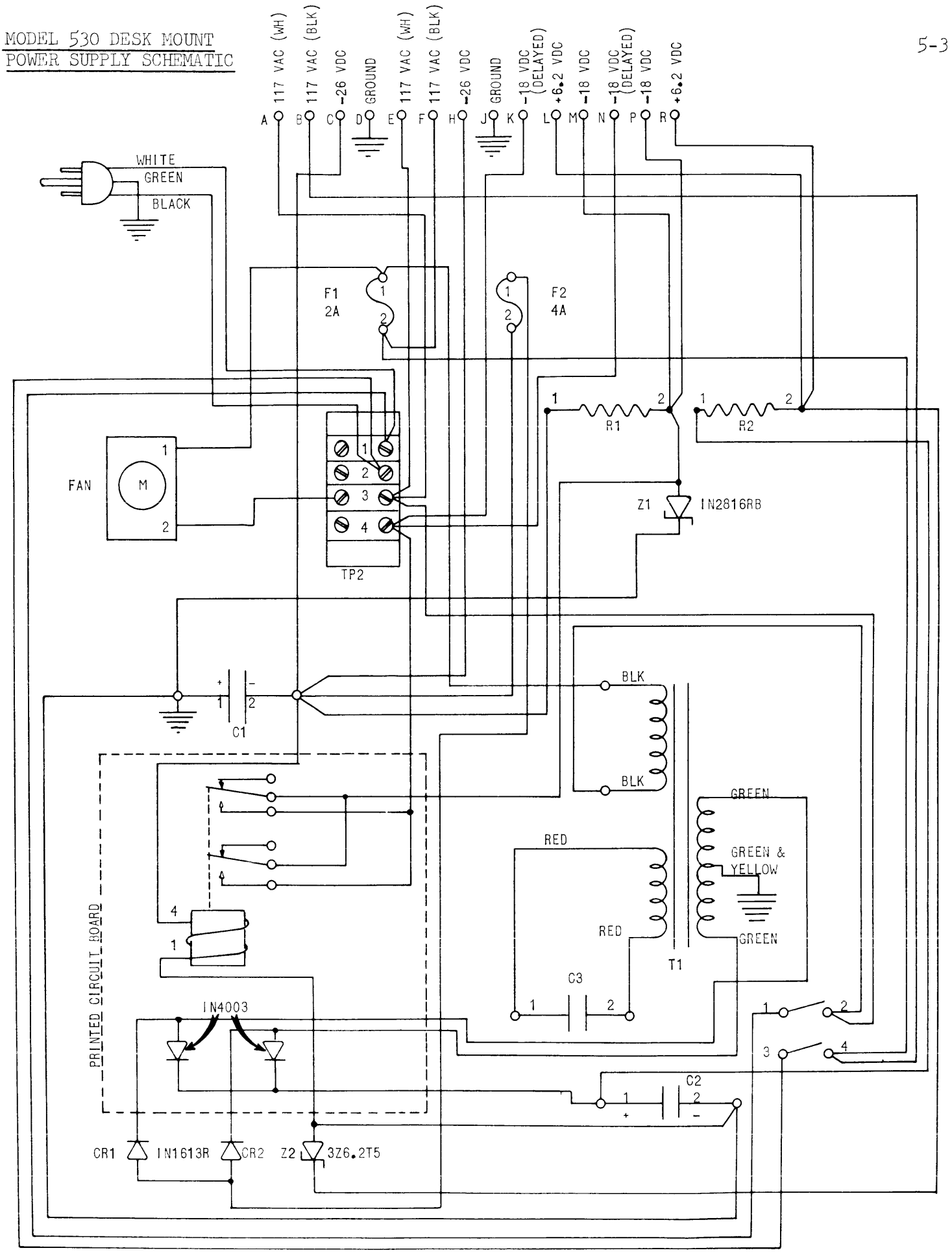
Access is gained to the components located within the Unit by removing 4 Screws (2) and Top Cover (1).

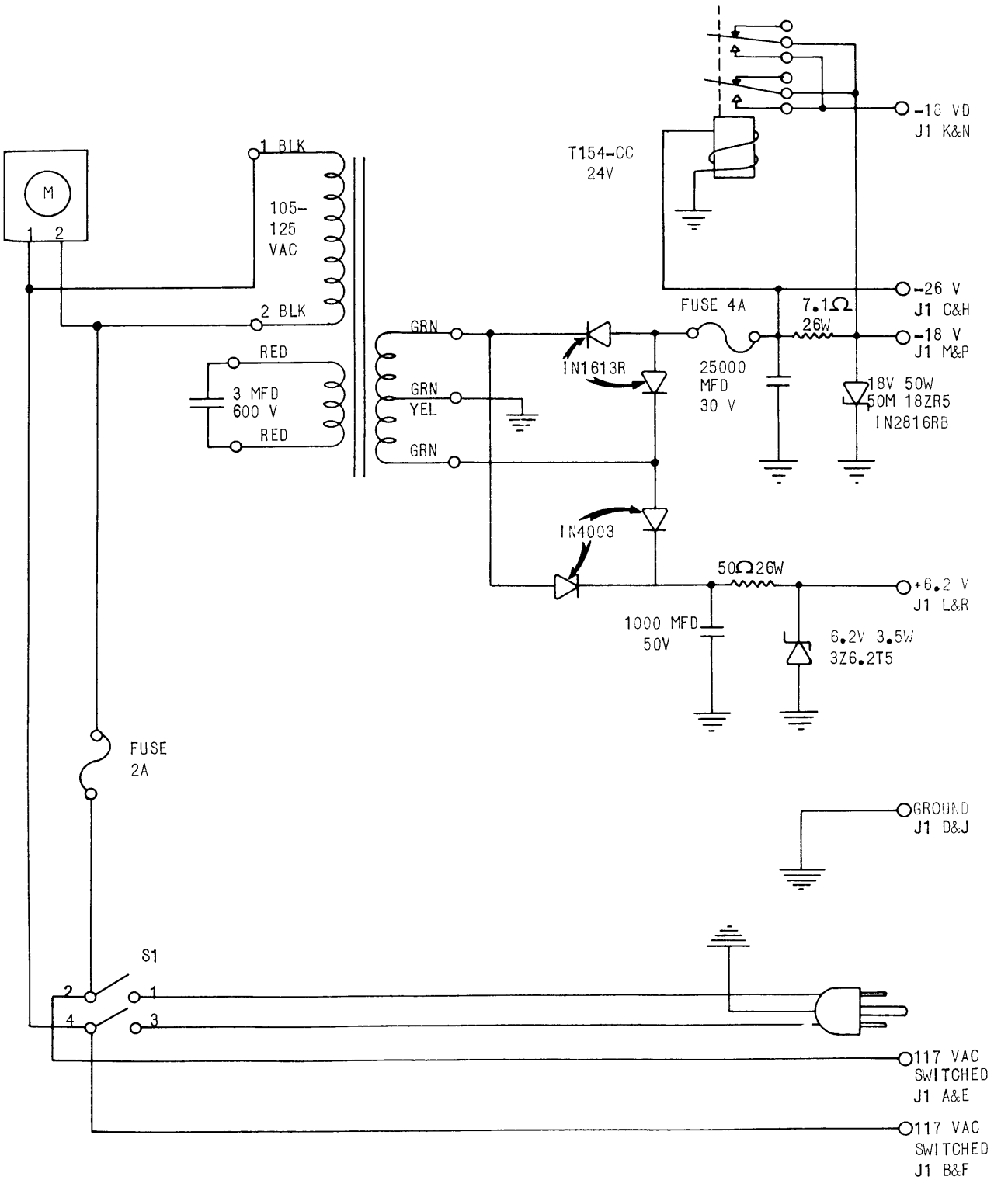
34 Pin Connector Output Voltages Location

Pin No.	Output
A	117 VAC Switched, 4 Amps. max., 60 cycle (white)
B	117 VAC Switched, 4 Amps. max., 60 cycle (black)
C	-26 VDC ± 5%, 500 Mv. Ripple
D	Ground (Green)
E	117 VAC Switched, 4 Amps. max., 60 cycle (white)
F	117 VAC Switched, 4 Amps. max., 60 cycle (black)
H	-26 VDC ± 5%, 500 Mv. Ripple
J	Ground (Green)
K	-18 VDC Delayed ± 10%, 150 Mv. Ripple
L	+6.2 ± 10%, 175 Mv. Ripple
M	-18 VDC ± 10%, 150 Mv. Ripple
N	-18 VDC Delayed ± 10%, 150 Mv. Ripple
P	-18 VDC ± 10%, 150 Mv. Ripple
R	+6.2 ± 10%, 175 Mv. Ripple

Note: 0-1.8 Amps. Collective Maximum on Pins C&H
0-380 Ma. Collective Maximum on Pins L&R
0-1 Amp. Collective Maximum on Pins K,M,N&P

MODEL 530 DESK MOUNT
POWER SUPPLY SCHEMATIC





MODEL 530 DESK MOUNT POWER SUPPLY SCHEMATIC

POWER SUPPLY PARTS LIST

Part No.	Description	Model No.
1634-10010	Rubber Foot	530
1674-00020	Cover Assembly	530
1674-10010	Base Plate	530
1674-10030	Switch Bracket	530
1674-10050	Heat Sink Bracket (For Zener Diode 1N2816RB)	530
1674-10060	Fuse, Cord & Connector Bracket	530
1674-10070	Motor Mounting Bracket (Rear)	530
1674-10080	Motor Mounting Bracket (Front)	530
1674-10090	Fan Clockwise	530
1674-10100	Fan Counter-Clockwise (optional)	530
1674-10110	Rectifier Heat Sink (for 3Z6.2T5 and 1N1613R)	530
5000-50200	Strain Relief Clamp Washer	530
5000-60030	Zener Diode 3Z6.2T5	530
5000-60050	Capacitor 25,000 MFD.	530
5000-60200	Zener Diode 1N2816RB	530
5000-60260	Relay-Enclosed 24 VDC Form "C"	530
5000-60280	Terminal-Crimp Type	530
5000-60290	Connector Block (34 Pin)	530
5000-60360	Silicon Control Rectifier 1N4003	530
5000-60390	Transformer (BTC-5740) 26 VDC @ 1.2-3.25 amp.	530
5000-60400	Capacitor 3 MFD, 660 V	530
5000-60410	Capacitor 1000 MFD 50 V	530
5000-60490	Zener Heat Sink (for 1N2816RB)	530
5020-00180	Printed Ckt. Assembly with CR1, CR2 & K2	530
5020-10080	Capacitor Bracket (use with 5000-60400)	530
5020-10220	Capacitor Clamp (use with 5000-60410)	530
5020-10230	Capacitor Clamp (use with 5000-60050)	530
1A1-1264	Zener Diode Mounting Screw	530
	Terminal Strip Mounting Screw	
1A1-1304	Resistor Mounting Screw	530
1A1-1305	Relay Circuit Board Mounting Screw	530
1A6-1041	Ground Screw Lock Washer	530
	Foot Screw Lock Washer	
	Resistor Mounting Screw Lockwasher	
1A8-1211	Fuse Holder	530
1A8-1381	Cable Clamp "D" Washer	530
1A8-1382	Cable Clamp	530
1A8-1594	Fuse 2 Amp	530
1A8-1600	Strain Relief Bushing	530
1A8-1631A	Motor - Counter-Clockwise (optional)	530
1A8-1632A	Motor - Clockwise	530
1A8-1654	Lug - Crimp Type #8 hole	530
1A8-1904	Resistor 7.1 OHM 26 Watt	530
1A8-1905	Switch Rocker	530
1A8-1906	Terminal Block (4 position)	530
1A8-1908	Resistor 50 OHM 26 Watt	530
1A8-1909	Lug Crimp Type #10 hole	530

POWER SUPPLY PARTS LIST - Continued

Part No.	Description	Model No.
1A8-1910	Fuse 4 Amp (AG-C-4)	530
1A8-1911	Rectifier 1N1613R	530
1A8-1912	Pin Contact (Female) (use with 5000-60290)	530
Z-134	Ground Screw Washer Resistor Mounting Screw Washer Transformer Mounting Screw Washer Switch Assembly Mounting Screw Washer	530
2398	Terminal Strip Mounting Screw Lockwasher Motor Mounting Bracket Binding Screw Lockwasher Switch Mounting Screw Lockwasher	530
4240	Cover Assembly Binding Screw Zener Diode Heat Sink Bracket Mounting Screw Switch Assembly Mounting Screw Rectifier Heat Sink Mounting Screw Cable Clamp Mounting Screw Fuse, Cord and Connector Bracket Mounting Screw	530
4263	Switch Mounting Screw Zener Diode Mounting Screw	530
4413	Zener Diode Mounting Screw Lock Nut	530
4555A	Ground Screw Foot Mounting Screw	530
Y2442	Relay Circuit Board Spacer	530
9E4128	Capacitor Clamp Mounting Screw (use with 5020-10220)	530
9E4309	Transformer Mounting Screw	530
40E980	Power Cord	530
P4116	Capacitor Bracket Mounting Screw (use with 5020-10080) Capacitor Bracket Mounting Screw (use with 5020-10230) Motor Mounting Screw	530
P11064	Cover Assembly Binding Screw Lockwasher Zener Diode Mounting Screw Lockwasher Zener Diode Heat Sink Bracket Mounting Screw Lockwasher Transformer Mounting Screw Lockwasher Switch Assembly Mounting Screw Lockwasher Capacitor Bracket Mounting Screw Lockwasher (use with P4116) Rectifier Heat Sink Mounting Screw Lockwasher Cable Clamp Mounting Screw Lockwasher Motor Mounting Screw Lockwasher Fuse, Cord and Connector Bracket Mounting Screw Lockwasher Relay Circuit Board Mounting Screw Lockwasher	530
3071-05600	Motor Mounting Bracket Binding Screw	530
3072-50500	Ground Screw Lock Nut	530
3272-00600	Resistor Insulating Washer	530

June 10, 1964
Industrial Products Service Release #4

READER AND PUNCH 500 SERIES PREVENTIVE MAINTENANCE AND LUBRICATION SPECIFICATIONS

The following information supersedes lubrication and maintenance instructions described on Pages 1-29, 1-32, Mechanical Section 1, ROYAL MCBEE 500 Series Reader Punch Service Manual, January 1964.

Initial Preventive Maintenance
(whichever occurs first)
After 40 million Punch and/or Read cycles of operation
or
After 360 million total cycles including idling
or
After 4 months elapsed time.

Second Preventive Maintenance
(whichever occurs first)
After 80 million Punch and/or Read cycles of operation
or
After 720 million total cycles including idling
or
After 4 months elapsed time, from initial preventive maintenance.

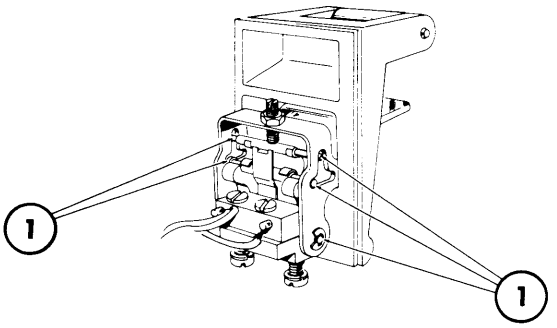
At the second Preventive Maintenance lubricate all lubrication points (1,2,3 and 4) as indicated on the reverse side.

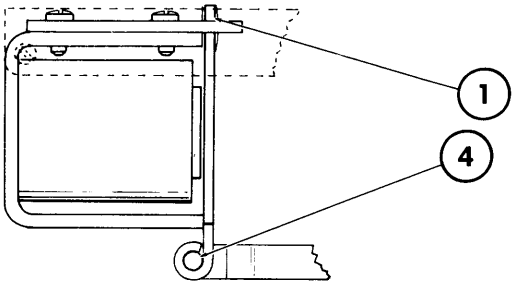
Thereafter, alternately perform the basic lubrication (areas circled) and the complete lubrication as outlined above.

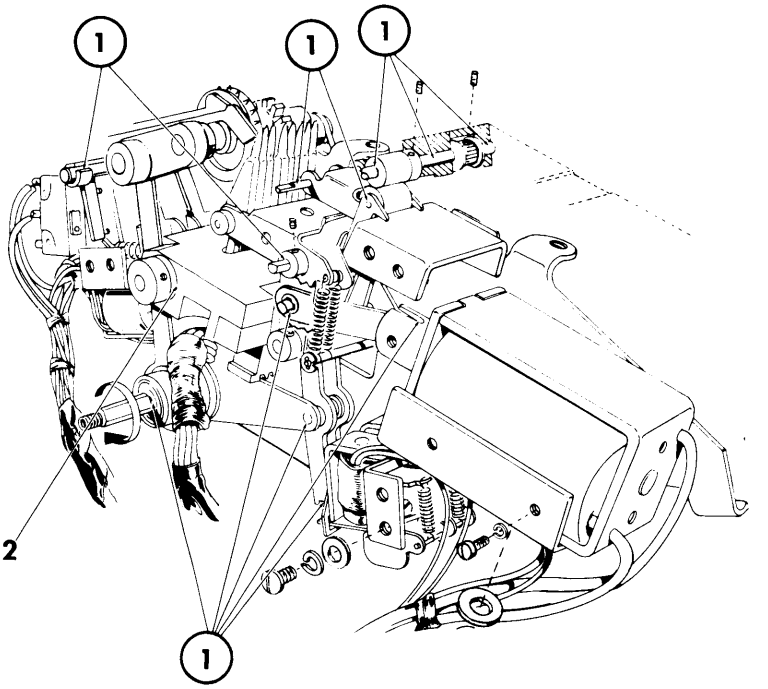
This Preventive Maintenance should consist of the following:

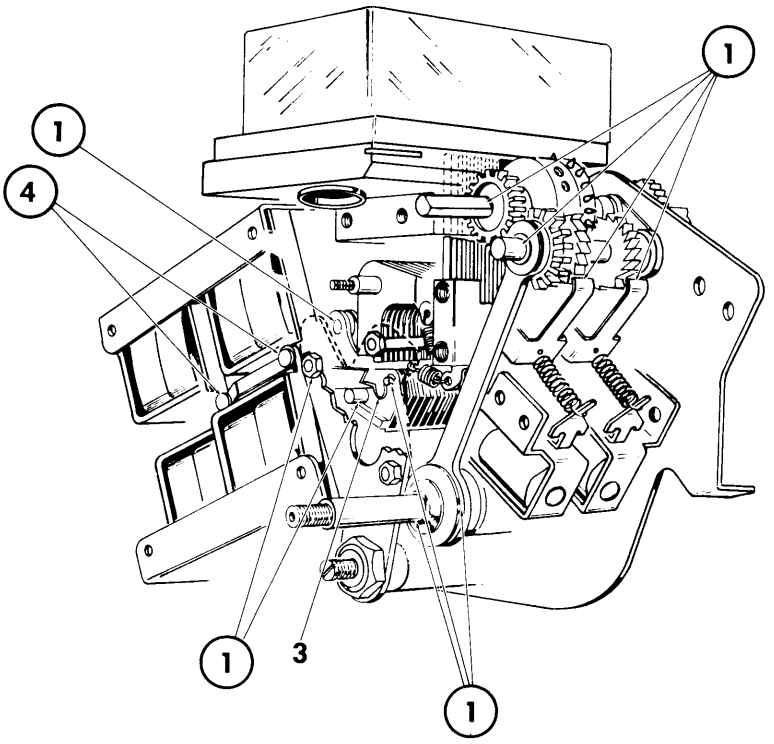
1. Remove the basic mechanism from its housing.
2. Use a soft cleaning brush to brush dirt and/or lint from the Unit A blower may be used cautiously to blow dirt and/or lint from the Unit.
3. Use a lint free cleaning cloth and remove excessive and/or dried lubricants.
4. Lubricate the Unit as described and illustrated on reverse side. NOTE: It may be necessary to remove some parts in order to properly effect lubrication.
5. CAUTION: Do not allow lubricants to come in contact with Solenoid Cores or Armature Surfaces since lubricants at these points accumulate lint, dust, etc., causing an adhesive condition which may adversely affect proper function.
6. During Preventive Maintenance procedure outlined above, check all adjustments and timing requirements described in Section 1, 500 Series Reader & Punch Service Manual. Adjust and/or replace worn parts as necessary.
7. After completion of Preventive Maintenance, reassemble the basic mechanism in its housing and perform a functional check of the Unit.
8. If any parts are removed or replaced during the Preventive Maintenance, they must be lubricated with the specified lubricant as the Unit is assembled.

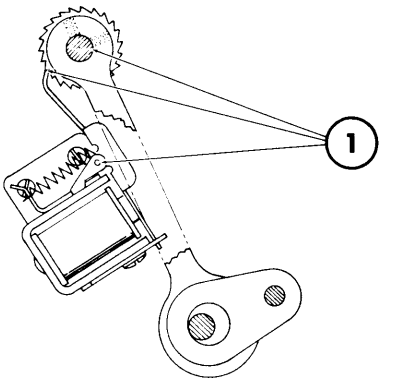
500 SERIES READER AND PUNCH LUBRICATION CHART

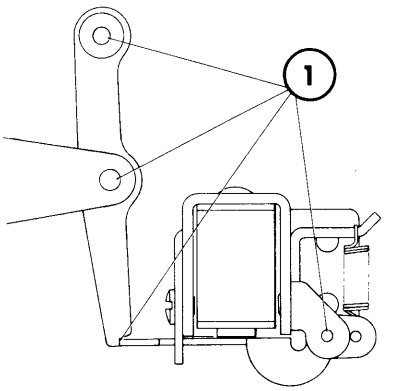












NOTES

1. DO NOT IMMERSE UNIT IN CLEANING SOLVENTS OR ULTRASONIC CLEANERS.
2. WHERE LUBRICATION IS REQUIRED ON SHAFTS, LUBRICATE THE AREAS INDICATED ON BOTH SIDES OF THE UNIT.

LUBRICATION KEY

1. BFL-2 GREASE.
2. LIGHTLY LUBRICATE BOTH ENDS OF SHAFT AFTER ASSEMBLY WITH BFL-2 GREASE.
3. OVERCENTERING SPRINGS ARE PACKED WITH BFL-2 GREASE AT ASSEMBLY.
4. LUBRICATE WITH 1 PART STP AND 5 PARTS XYLENE.

(1) LUBRICATE THESE AREAS EVERY 40 MILLION CYCLES OR EVERY 4 MONTHS WHICHEVER OCCURS FIRST.

Royal McBee Corporation
Printed in U.S.A.

CUSTOMER SERVICE -
TECHNICAL SERVICE PUBLICATIONS DEPARTMENT

July 10, 1964
Industrial Products Release #5

READER & PUNCH 500 SERIES

OPTIONAL 230 VAC COMPONENTS & OPTIONAL 48 VDC COILS

Motors & necessary Relays to operate a Reader and/or Punch Unit with 230 VAC have been made available as an optional requirement for the 500 Series Reader/Punch equipment.

The 48 VDC Coils for Index & Retract Magnets, and the Tape Card Roll Solenoid, have been made available for optional use on 500 Series Reader/Punch Units not equipped with Electronic Circuitry.

The following Models can be equipped with the 48 VDC Coils:

Punch 500, 501, 510, 511 Reader 550, 551, 560, 561 Reader & Punch 580, 581

Specifications

Reader Pin Retract Solenoid & Feed Solenoids

48 VDC ± 10%
2350 Turns of No. 39 Formvar
160 Ohms ± 10% at 70° F.

Source of impedance 250 Ohms shunted by 25 Microfarad Capacitor for Pin Retract Solenoids, 250 Ohms for Feed Solenoids - Based on 50 cps.

Punch Control Solenoids

48 VDC ± 10%
6000 Turns of No. 42 Formvar
1300 Ohms ± 10% at 70° F.

Punch Feed Solenoid Specifications are identical to Reader Feed Solenoids.

The attached Pages 3-27 & 3-28 contain the parts requirements for Units equipped with 230 VAC Motors or 48 VDC Coils.

The Parts are identified by Part Numbers & Names, and reference is made to the Reader & Punch Parts Catalog, January 1964, and to the specific Part it replaces.

Parts not listed on the attached sheet are identical to Parts used on the standard Reader and/or Punch.

Insert the attached Pages 3-27 & 3-28 after Page 3-26 Reader & Punch 500 Series Service Manual Revised January 1964.

Per 161-4
161-5
161-6

CUSTOMER SERVICE -

TECHNICAL SERVICE PUBLICATIONS DEPARTMENT

PARTS REQUIRED FOR 230 VAC OPERATION

Changed Parts

Page	Ref. No.	Part No.	Name	Models
3-5	(1)	1621-10131	Reader and Punch Base Front	580-590#
		1642-10011	Reader Base Front	560-570#
		1652-10032	Punch Base Front	510-520#
			CHANGED TO:	
3-5	(1)	1621-10132	Reader and Punch Base Front	580-590#
		1642-10012	Reader Base Front	560-570#
		1652-10033	Punch Base Front	510-520#

New Parts

3-7	(29)	1681-00010	Motor Pulley Assembly (230 VAC)	510-520-560-570-580-590#
3-5	(12)	1681-00030	Connector Bracket & Motor Holder Assembly (230 VAC)	580-590#
		1681-00040	Connector Bracket & Motor Holder Assembly (230 VAC)	510-520-560-570#
3-5	(25)	1681-10030	Adjustable Motor Mounting Spacer (230 VAC)	510-520-560-570-580-590#
3-7	(25)	1A8-1699	Single Unit Motor (GE) (230 VAC)	510-520-560-570#
		1A8-1900	Dual Unit Motor (GE) (230 VAC)	580-590#
3-7	(21)	1A8-1698	Relay Assembly (230 VAC)	510-520-560-570-580-590#
	(--)	1A8-1623	Flag Terminal	510-520-560-570-580-590#
	(--)	1A8-1653	Motor Starting Relay	510-520-560-570-580-590#
	(--)	3071-05200	Relay Mounting Screw (8-36)	510-520-560-570-580-590#

Note: These Parts are also used on corresponding Advance Feed Hole Models 501, 511, 521, 551 561, 571, 581 & 591.

PARTS REQUIRED FOR 48 VDC COILS

New Parts

Page	Ref. No.	Part No.	Name	Models
3-19	(33)	1682-00010	Punch Magnet Assembled Upper w/Short Link (48 VDC)	500-510-580#
		1682-00020	Punch Magnet Assembled Lower w/Short Link (48 VDC)	500-510-580#
		1682-00030	Punch Magnet Assembled Upper w/Long Link (48 VDC)	500-510-580#
		1682-00040	Punch Magnet Assembled Lower w/Long Link (48 VDC)	500-510-580#
3-9	(2)	1682-00070	Forward Index Magnet Complete (48 VDC)	500-510-550-560-580#
	(3)	1682-00080	Reverse Index Magnet Complete (48 VDC)	500-510-550-560-580#
	(11)	1A8-1901	Punch Index and Reader Pin Retracting Coil (48 VDC)(160 Ohms)	500-510-550-560-580#
	(--)	1A8-1903	Punch Magnet Coil (48 VDC) (1300 Ohms)	500-510-580#
3-15	(13)	1682-00050	Interposer Magnet Assembly Complete Left (48 VDC)	550-560-580#
	(12)	1682-00060	Interposer Magnet Assembly Complete Right (48 VDC)	550-560-580#
	(19)	1A8-1902	Tape Card Roll Solenoid Complete w/Plunger (48 VDC)(420 Ohms)	550-560-580#

Note: These Parts are also used on corresponding Advance Feed Hole Models 501, 511, 521, 551, 561, 571, 581 & 591.