35 EDGE PUNCHED CARD

TYPING REPERFORATOR SET BASE (2A BASE)

DESCRIPTION AND PRINCIPLES OF OPERATION

CONTENTS

1. GENERAL

1.01 This section provides the descriptior and principles of operation for the 35 Edge Punched Card Typing Reperforator Set Base (2A BASE — Figure 1). It is reissued to add engineering changes, replace the photographs with photographs of current design units, and to rearrange the text. Since this is a general revision, marginal arrows used to indicate changes and additions are omitted.

1.02 The description and principles of operation are for both early design and current design units, except where stated otherwise.

1.03 The base provides a foundation for the associated units (keyboard, typing reperforator, and cover) which comprise the typing reperforator set. It contains the motor unit, gear and pulley assembly, distributor assembly, selector magnet driver assembly, and relays, rectifier, switches, etc, associated with set operation.

1.04 Refer to the following sections which pertain to the base, and also Section 574-206-100 which provides the description and principles of operation for the set (including the description and principles of operation for the pushbutton switches which are mounted to the base — Figure 1).

Section No.	Content
574-244-700	Base Adjustments
574-244-701	Base Lubrication
574-244-702	Base Disassembly and Reassembly

2. DESCRIPTION

A. General

2.01 The following paragraphs describe the principal components mounted on the edge punched card typing reperforator set base.

B. Base

2.02 The main base construction is of sheet metal with a mounting plate suspended by vibration and shock mounts located in a vertical plane. The outer base pan encompasses the mounting plate for suspension purposes and provides an oil pan to prevent lubricants from contaminating any surface on which the unit is mounted.

C. Distributor

2.03 The distributor is a modified mounting of the 33 type driven through a gear train and powered from an extension shaft at the

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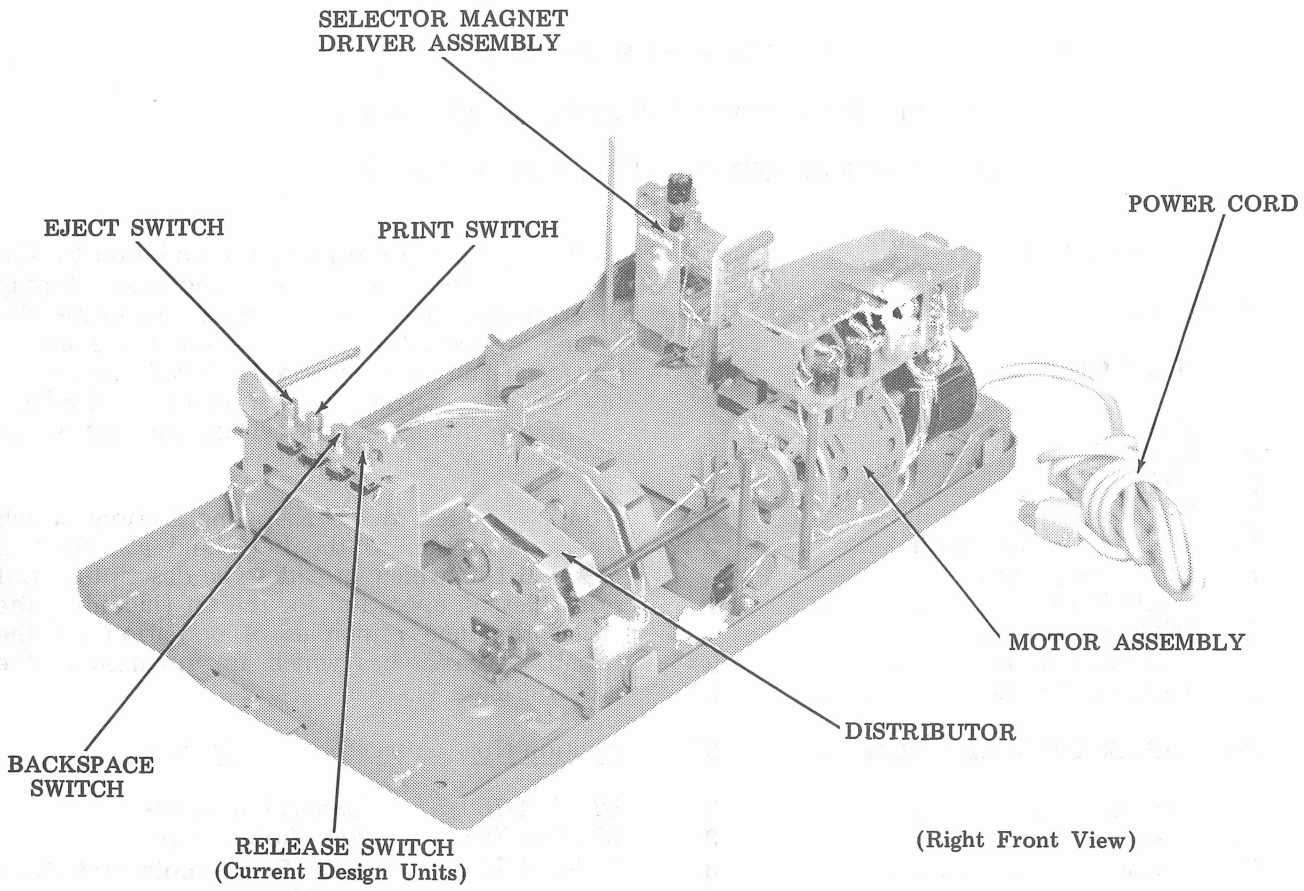

Figure 1 - 35 Edge Punched Card Typing Reperforator Set Base

forward end of the motor. The electrical interconnection transfers the signal into an 8-level neutral start-stop telegraphic code output signal.

D. Motor

2.04 A synchronous motor, single phase 115 volts ac, 60 hertz, is used to drive the base units. The motor is a 33 millihorsepower, 3600 revolutions per minute, two-pole, wound stator sleeve bearing motor with a squirrel-cage type rotor. The stator has two windings, a main run winding and an auxiliary start winding. The auxiliary winding is in series with a 96 mfd electrolytic capacitor and a current sensitive motor start relay.

E. Selector Magnet Driver

2.05 The constant current 0.500 ampere selector magnet driver consists of an etched circuit card, an externally mounted power transistor, power transformer, and filter capacitor.

2.06 The circuit of the selector magnet driver is a two-stage triggering amplifier capable of switching high output currents (0.500 ampere) at very closely controlled input current levels.

F. DC Power Supply (Early Design)

2.07 The dc power supply for the relays, magnets, and solenoid is an unfiltered bridge rectifier.

G. DC Power Supply (Current Design)

2.08 The dc power supply on current design units (Figure 2) is a regulated 110 v dc rectifier assembly (TP332970).

H. Terminal Blocks

2.09 Power input to the complete set is made via screw type terminal blocks, designated R, V, and S, located at the rear of the base (Figure 2).

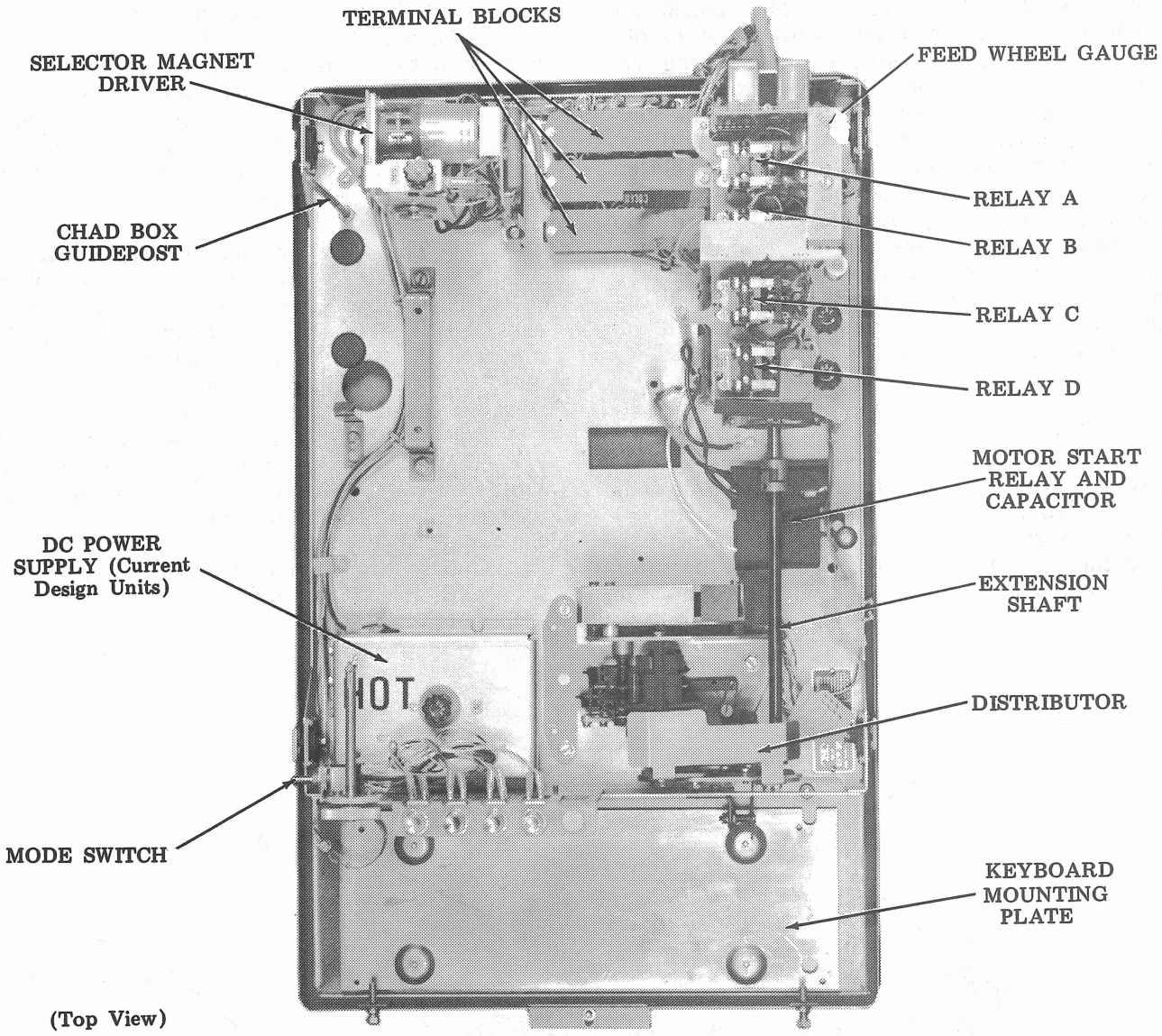

Figure 2 - 35 Edge Punched Card Typing Reperforator Set Base

3. PRINCIPLES OF OPERATION

A. General

3.01 The paragraphs that follow describe the principles of operation for the major components of the edge punched card typing reperforator set base.

B. Base

3.02 The main base structure is isolated from vibration and shock by plate type isolation mounts located in a vertical plane. An outer base pan acts as a snubber for the vibration mounts, and limits the amount of deflection (on the mounts). The keyboard portion of the base is fixed.

C. Distributor

3.03 The distributor is disc type with a multiwire input from the keyboard. It transmits sequentially the combination received from the keyboard selection. That is, the parallel selections set up in the keyboard contacts are distributed sequentially by a rotating brush. The normal stop position of the brush is near the end of the stop segment to maintain continuous line

current in the idle condition. The distributor clutch, when engaged, carries with it the distributor shaft and brush assembly distributing the combination set up in the keyboard contacts. Near the end of the distributor cycle, the keyboard trip lever is rotated in the opposite direction by a camming roller on the distributor clutch assembly. This unlocks its common linkage, and moves the clutch stop bail in a position to stop the clutch. These operations are repeated each cycle of keyboard operation, except when the repeat key has been depressed. In this operation, the keyboard trip arm is not latched up and the distributor runs continuously at full line speed.

D. Motor

3.04 The operation of the motor unit is as follows: The initial starting current causes the relay to pull up and its contacts to close the auxiliary winding circuit. As the rotor gains speed, the current flowing through the motor and through the relay coil decreases. When a predetermined current value is received, the relay armature is released, the relay contacts are opened, and the auxiliary winding circuit is discontinued. The rotor continues to accelerate until it reaches synchronous speed. The motor is wired so that the rotor revolves counterclockwise when viewed from the pinion end.

3.05 There are two fans located within the motor housing, one at each end of the rotor. These draw cooling air through slots in the end bells and exhaust it through slots in the motor shell. The end bells have rubber vibration mounts which are used to clamp the motor to the base. One end of the motor shaft has a tapped hole for use in fastening the motor pinion, to drive the pulley and gear assembly which provides motive power to the reperforator, and a centrifugal fan to provide additional air movement over the motor shell for cooling purposes (Figure 3). Attached to the other end of the motor shaft is an extension shaft to drive the distributor.

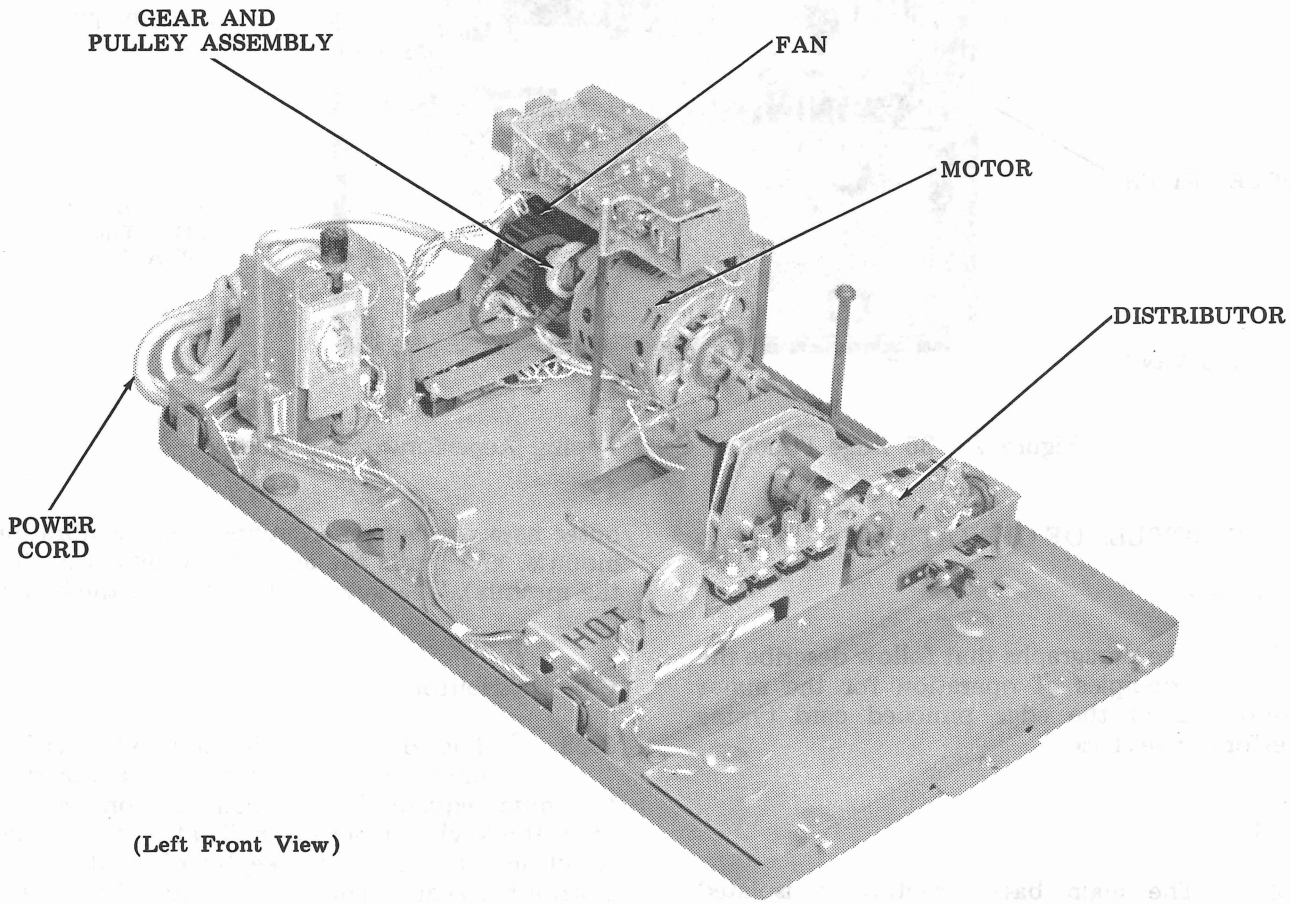

Figure 3 - 35 Edge Punched Card Typing Reperforator Set Base

3.06 The motor start relay and capacitor are mounted on the right side of the base between the motor and distributor (Figure 2).

E. Selector Magnet Driver

3.07 The electronic selector magnet driver circuits serve to couple telegraph signals to selector magnets requiring 0.500 ampere dc mark signals and essentially zero current space signals. Figure 4 illustrates a schematic diagram of the selector magnet driver circuit.

3.08 The input circuit of the selector magnet driver may be arranged to accept either 0.020 ampere or 0.060 ampere neutral signals.

3.09 The selector magnet driver circuit is powered from a 117 volt ac source through a step-down isolation transformer. Diodes CR1 and CR2 provide full wave rectification of the reduced voltage to -20 volts dc at terminal no. 15. The circuit common is connected to terminal no. 2 and a power supply filter capacitor is connected between terminals no. 2 and no. 15.

3.10 The negative side of the dc signal line is connected to terminal no. 2 and the positive side is connected to terminal no. 8 for 0.020 ampere, or to terminal no. 14 for 0.060 ampere neutral signals. Terminal no. 7 is strapped externally to terminal no. 8 or to no. 14 depending on the line current.

3.11 In the marking condition, Q1 is off-biased. With Q1 off, the base of Q2 will be clamped at the zener reference voltage by diode CR4. This voltage clamp is then translated to current regulation by the transistor action of Q2. The regulated magnet current is adjusted to 0.500 ampere by rheostat R4.

3.12 With the signal line in the open or spacing condition, Q1 is turned on by base current supplied through resistor R1. The potential at the collector of Q1 will be near zero off-biasing Q2. With Q2 off, no selector current flows allowing the magnet to release. During the turn off of Q2, the inductive transient developed at the collector is suppressed by the network consisting of CR3, R9, and C1.

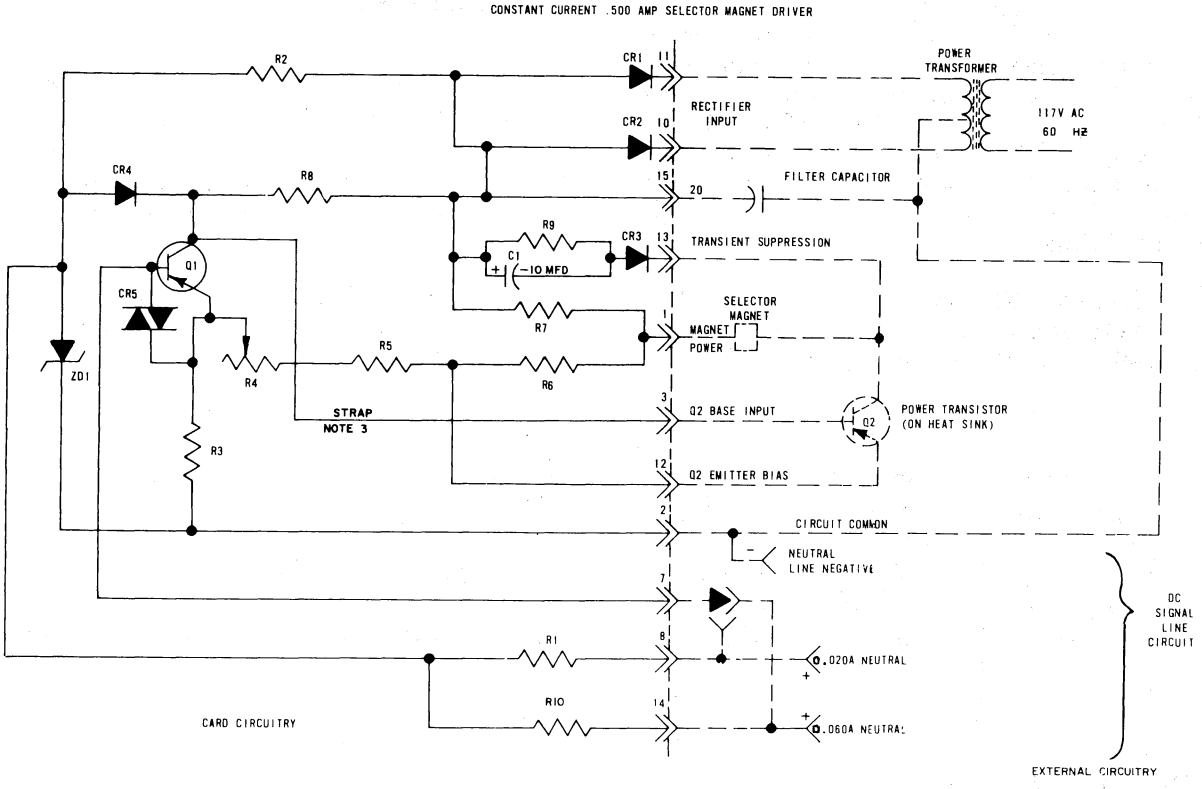

Figure 4 - Selector Magnet Driver Circuit (TP181821 Card Circuitry)

3.13 "Snap action" is supplied to the circuit transitions by feedback in the emitter circuit of transistor Q1.

3.14 Protection of the input circuit is provided by the silicon varistor CR5 and resistors R1, R3, and R10.

F. DC Power Supply (Early Design)

3.15 All electrical components used in the control circuits of this set are operated from the 115 volt dc supply. The dc power is obtained by rectifying ac directly from the power line with a packaged bridge rectifier. Protection is in the form of a 3/4 ampere fuse (use fast-blowing type only) and an 8-ohm resistor, both located in the "live" ac side of the diode input circuit.

CAUTION: THE POLARITY OF THE AC POWER LINE MUST BE OBSERVED (REFER TO THE APPROPRIATE WIRING DIAGRAM) TO AVOID DESTRUCTION OF THE BRIDGE DIODES SHOULD THE DC BE SHORTED FOR ANY REASON.

G. DC Power Supply (Current Design)

3.16 The dc power supply (TP332970 rectifier assembly) operates by full wave rectification of the ac line voltage with series regulation. Referring to Figure 5, ac line voltage is applied to the input of the diode bridge. For the specified ac input variations of the 103 to 127 v ac, dc voltage of 147 to 182 volts is obtained across capacitor C1. Resistor R1 in series with capacitor C1 limits turn on surge current through the rectifier bridge.

3.17 Resistor R2 limits current to the 110 volt zener diode ZD1. The reference voltage established by ZD1 is applied to the base of transistor Q1. Resistor R3, in series with the collector of Q1, is used to drop voltage such that the collector to emitter voltage rating of Q1 will not be exceeded.

3.18 Capacitor C2 is a filter capacitor, and R4 is a bleeder resistor. When loading of the rectifier assembly causes the voltage across C2 to drop below the zener reference voltage (emitter becomes negative with respect to base or forward biased) Q1 conducts. When the voltage across C2 approaches the zener reference voltage (base voltage) Q1 turns off. Therefore, regulation at the reference voltage is obtained. A 1/2 amp fast-blow fuse is provided for protection of components.

H. Relays A, B, C, and D

3.19 These relays (Figure 2) operate on 115 volts dc and have coil resistances of 10,000 ohms.

3.20 Relay A acts as a delay by virtue of the 1 mfd capacitor across its coil. A delay in the start of ejection is necessary to allow the punch pins to be withdrawn from the card before rapid feeding begins.

3.21 Relay B is used to energize the print suppress magnet.

3.22 Relay C conditions the burst magnet to energize when the burst switch closes.

3.23 Relay D is used to open the hold path of relay A thereby initiating the drop-out of relay A.

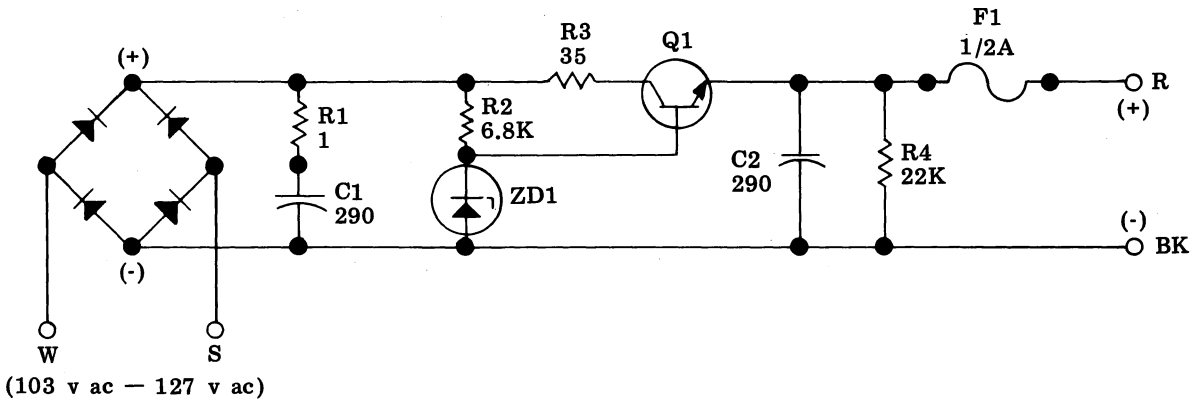

Figure 5 - DC Power Supply (TP332970 Rectifier Assembly) Schematic