

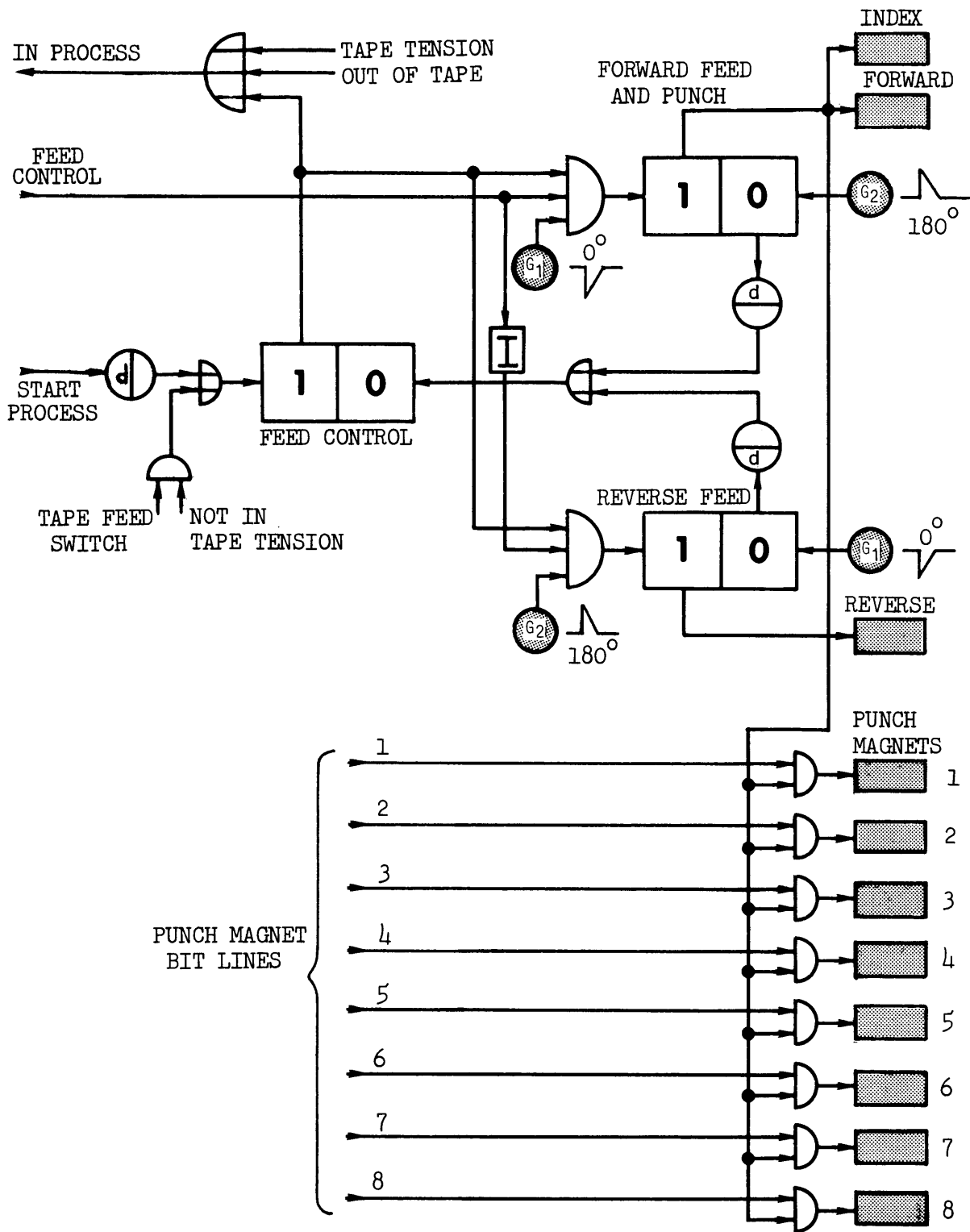
PUNCH ELECTRONICS

<u>Contents</u>	<u>Page No.</u>
Punch Logic	PE5-2 and 3
Punch Static Conditions	PE5-4
Punch Dynamic State	PE5-5
Punch Electronic Timing	PE5-6
Punch Printed Circuit Card Component Location	PE5-7 and 8
Punch Sechematic (at end of Section)	

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PUNCH LOGIC DIAGRAM



PUNCH LOGICGENERAL

This unit is a 50 Character per second Punch designed to punch 5,6,7 or 8 Channel Tape. The signal requirements from the controlling source are the Coded Bits, the Feed Direction Control Line and the Start Process Control. Immediately after the controlling signals are received, the unit will emit an In Process Signal for the duration of the necessary portion of the Feed Punch Cycle.

Punch Logic Description

When the Start Process Signal is applied the signal is differentiated and sets the Feed Control Flip-Flop. This Flip-Flop produces an In Process Signal and satisfies the first Leg of two AND Gates that control the setting and resetting of the Forward and Reverse Feed Flip-Flops. The second Leg of the AND Gates is controlled by the Feed Direction Control Line. When this line is held at Ground it satisfies the Leg of the AND Gate controlling the Forward Feed Flip-Flop and since this signal is inverted it does not satisfy the Leg of the AND Gate controlling the Reverse Feed Flip-Flop. When the Feed Direction Control Line is Negative, it does not satisfy the Leg of the AND Gate controlling the Forward Feed Flip-Flop, but since the Negative Signal inverted is Ground, it satisfies the Leg of the AND Gate controlling the Reverse Feed Flip-Flop. The Feed Direction Control Line must be conditioned before the Start Process Signal is applied to insure the desired direction of Tape Feeding. The third Leg of each of the AND Gates is controlled by the Pulse Generator on the Main Shaft. G1 is the Pulse at 0 degrees and controls the Leg of the AND Gate for the Forward Feed Flip-Flop. G2 is the Pulse at 180° and controls the Leg of the AND Gate for the Reverse Flip-Flop.

The Logic Flow is as follows:

Codes may only be punched when the Tape is Feeding in the forward direction. With the Feed Direction Control Line conditioned for Forward Feed, the differentiated Start Process Signal sets the Feed Control Flip-Flop.

The Feed Control Flip-Flop also produces the In Process Signal. At the same time the Start Process Signal is applied, the signals to the selected Bit Lines must also be applied and held for the duration of the In Process Signal. The Feed Control Flip-Flop plus the Feed Direction Control Line satisfy two of the Legs of the AND Gate controlling the Forward Feed Flip-Flop. When the G1 (0°) Pulse satisfies the third Leg of this AND Gate the Forward Feed Flip-Flop is set and power is applied to the Forward Feed and Index Punch Magnets. Also one leg of the eight AND Gates controlling the Punch Magnets is satisfied. The other leg of the AND Gates is conditioned by the selected Input Bit Lines.

The Forward Feed Flip-Flop is reset by the G2 (180°) Pulse, and removes the power from the Punch and Feed Magnets. The resetting of the Forward Feed Flip-Flop is differentiated and resets the Feed Control Flip-Flop to remove the In Process Signal.

For operation at 50 CPS the next Start Process Signal and selected Code Signals must be applied within 10 Milliseconds or before the next G1 (0°) Pulse.

Tape Feed, Tape Tension and Out-Of-Tape Operation

The Tape Feed Switch applies a set Signal to the input of the Feed Control Flip-Flop provided the Tape Tension Switch has not transferred. This causes Tape to feed Forward and Punch Index Holes or feed in reverse depending on the condition of the Feed Direction Control Line. Feeding will continue until the Switch is released.

Tape Tension and Out-Of-Tape Switches produce the In Process Signal when in their transferred state.

PUNCH STATIC CONDITIONS (With Power On, Tape Loaded and No Tape Tension)Switches

Tape Tension Switch - 4 and 5 closed.
 Tape Feed Switch - 4 and 5 open.
 Punch Out-of-Tape Switch - 3 and 4 closed.
 (Models 524 and 525)

Flip-Flops

Reverse TR13 On clamped to the
 reset state (Ground on Collector TR13)
Forward TR15 On clamped to the
 reset state (Ground on Collector TR15)
Feed Control TR18 On (reset state)

Emitter Follower

TR11 Continuously conducting Positive
 and Negative Pulses.

Amplifiers

TR1 thru 8 Off Not Conducting
 TR9 Not Conducting
 TR10 Not Conducting

Magnets

L1 thru 11 De-energized

Feed Direction Control

If -6 Volts is present at the junction of CR27 and CR31 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 Ground 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.

Start Process

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

In-Process

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), Ground will be at the Collector of TR17. The Feed Control Flip-Flop will be set, removing the Ground clamp from the Forward and Reverse Flip-Flop by way of CR24 and CR25 and the Collector of TR18. With the Ground clamps removed, the Feed Direction Control Signal designates Forward or Reverse direction. A Ground at the junction of CR27-CR31 will keep the Reverse Flip-Flop clamped in its reset state.

By having a Ground 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 Ground 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 through R41, R24, Base-Emitter of TR9 also R26, Base-Emitter of TR10. 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 Ground from its Collector to the Emitters of TR1 thru 8.

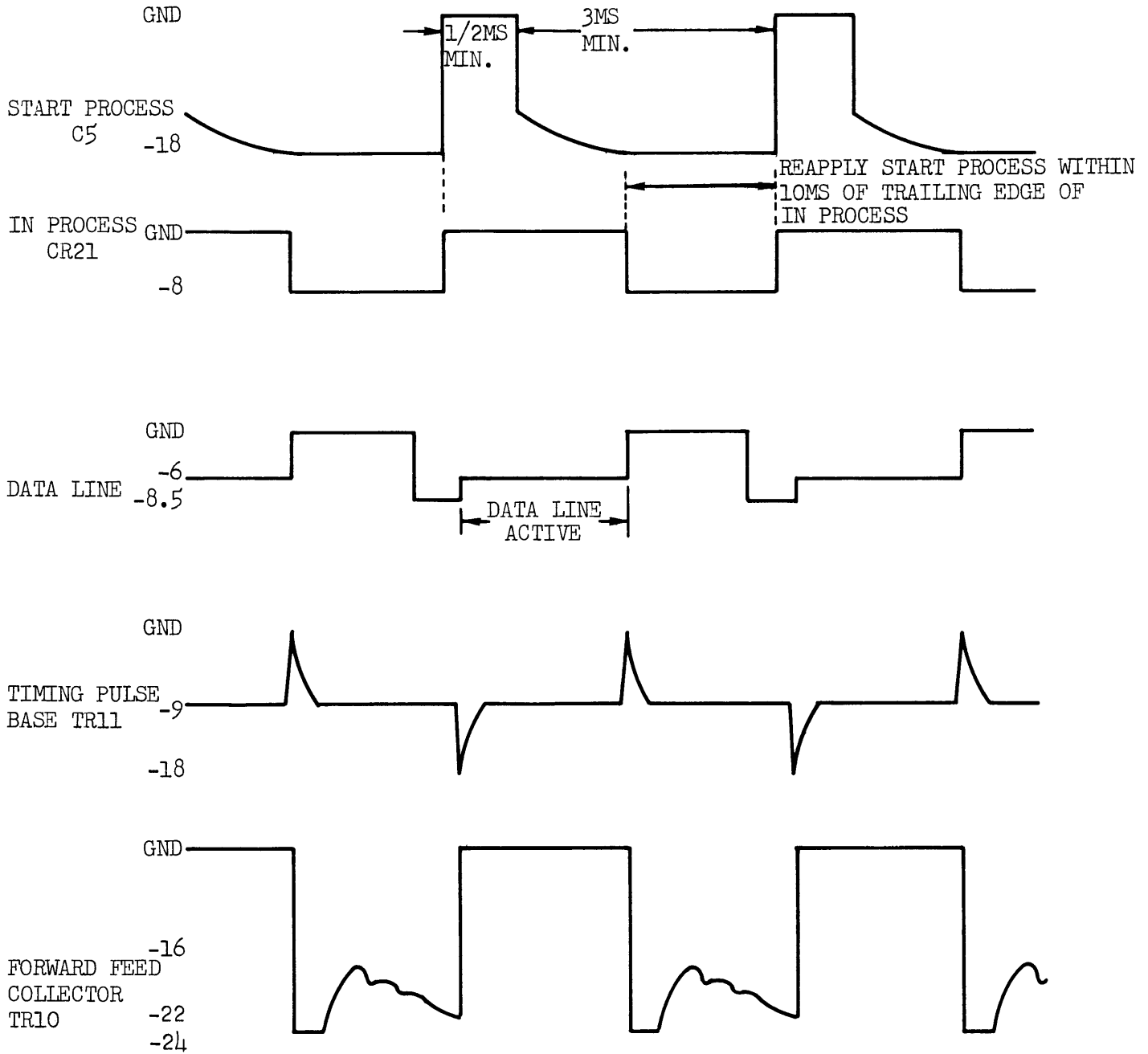
This allows any or all of TR1-TR8 to conduct depending upon which of the transistors received an Input code (-6 Volts) on their Bases from the outside source. In this case, (Tape Feed) we are assuming the Input sources are at Ground potential and that only the Index Hole will be punched.

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.

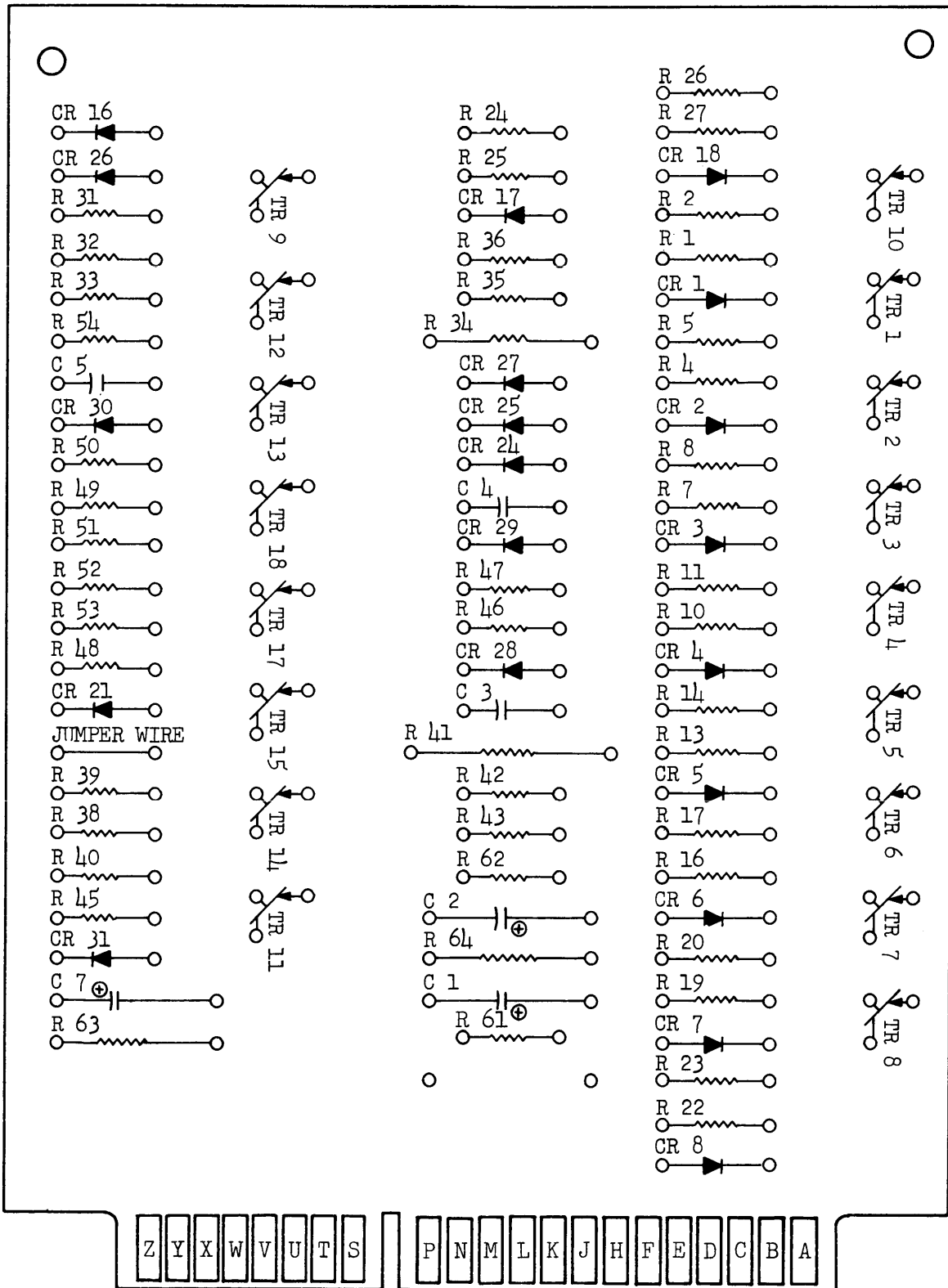
In operations other than Tape Feed, the Start Process Signal (GND) sets the Feed Control Flip-Flop. At this time an In Process signal is generated to the outside source indicating that the Punch is in operation and a normal Feed and Punch operation will occur as described above.

PUNCH ELECTRONIC TIMING (50 CPS OPERATION)

All Wave Forms shown in reference to Start Process

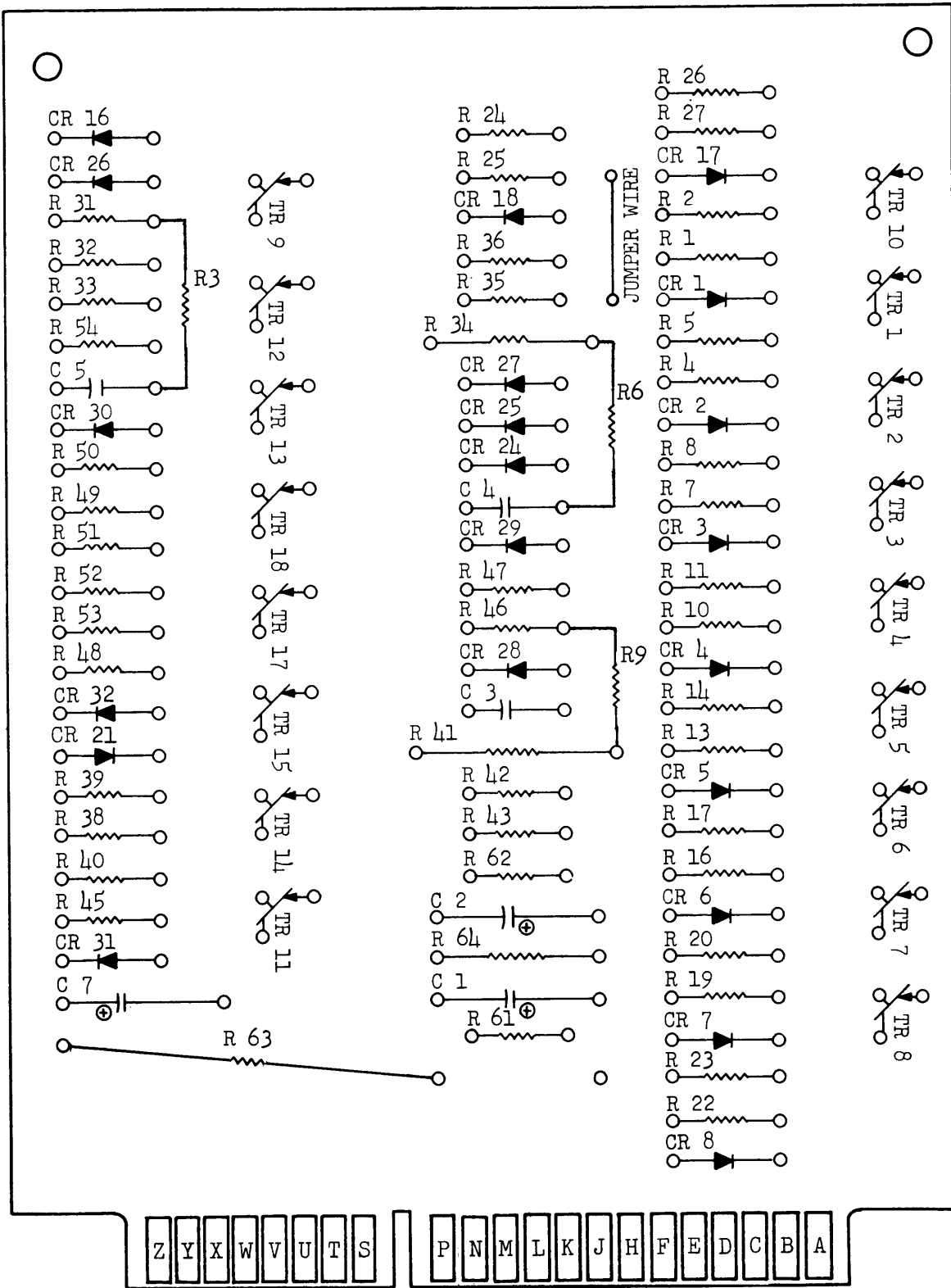


PUNCH CARD COMPONENT LOCATION (for Circuit Cards without Red Numeral 1 Identification)



REVERSE SIDE 22 21 20 19 18 17 16 15 13 12 11 10 9 8 7 6 5 4 3 2 1

PUNCH CARD COMPONENT LOCATION (for Circuit Cards with Red Numeral 1 Identification)



REVERSE SIDE 22 21 20 19 18 17 16 15 13 12 11 10 9 8 7 6 5 4 3 2 1