

**SERVICE MANUAL**  
**BULK-LOADED DOLLAR BILL CHANGERS**



**ARDAC**

ARDAC BULK LOADER  
TROUBLE SHOOTING GUIDE

The ARDAC bulk loaded changer is a reliable product built with the operator in mind. You can achieve maximum efficiency with a minimum of preventative maintenance.

Should a problem occur, the unique design allows quick, precise trouble shooting, using the interchangeability of many of the components.

The following will give you tips on preventative maintenance and trouble shooting, to insure minimum down time.

PREVENTATIVE MAINTENANCE (P. M.)

Although it is difficult to measure the value of P. M., the old adage says, "an ounce of prevention is worth a pound of cure", holds true with all equipment, including the ARDAC changer. The frequency of P. M. will be governed by usage and environment.

An additional ten minutes spent on the average location every two or three months, can prevent expensive time consuming trouble calls.

## P. M. PROCEDURE

### A. NOTE ACCEPTOR

1. Remove stacker (item 2, figure 1 & 2) from note acceptor.

Note: If stacker is not used, remove acceptor brake plate, (item 1, figure 3).

2. Remove acceptor top plate (item 3, figure 3).

3. Remove top roller plate (item 2, figure 3).

4. Using a soft cloth, cotton swab or pipe cleaner, clean grid lamp filter (item 4, figure 3), secondary sensor (item 5, figure 3).

5. Clean tray insert (item 6, figure 3) top and bottom with soft cloth. Reassemble acceptor.

### B. HOPPER

1. Remove upper channel front (item 1, figure 5). Clean upper channel back (black plastic, item 2, figure 5). Remove any burrs from top of upper channel back.

2. Remove emitter lamps (item 3, figure 5), remove coin channel from item 4, figure 5. With pipe cleaner or cotton swab, clean lower coin channel (item 5, figure 5).

Note: When reassembling the hopper, care should be taken to insure presence of toggle spring (item 6, figure 5). Top portion of spring should fit in crotch of toggle, (item 7, figure 5).

3. Test Unit.

## CHANGER SEQUENCE

This sequence is a basic interpretation of what occurs in an ARDAC bulk load changer, from insertion of the note to completion of the payout. Steps are listed in order of occurrence, beginning with acceptance.

1. Acceptance (note in tray, tray closing)
  - A. Tray clear switch (item 7, figure 3) actuated by note.
    - a. Grid lamp (item 8, figure 3) to high intensity (5VDC)
    - b. Power (19.5VDC to N. 0. side of trigger switch.
  - B. Trigger switch (item 9, figure 3) actuated.
    - a. Power to one side of accept relay (item 10, figure 3)
  - C. Primary and secondary detection.
    - a. Detection systems view the note and determine its validity. (Primary, item 8, 11, 14, 15, figure 3), (Secondary, item 5, 11, figure 3).
    - b. Signals from the detection system are inputted to the amplifier module (item 11, figure 3) for processing.
    - c. If all signals are O.K., the circuit for the accept relay is completed, allowing it to energize.
2. Collect and Vend
  - A. Accept relay energize, contacts close.
    - a. Power to motor rail and solenoid (item 12, figure 3). Motor and solenoid energized, locking the tray and beginning collection cycle.

- b. Aft clear switch (item 13, figure 3) actuated by note.
  - c. Note clears solar cell (item 4, figure 3).
  - d. Tray clear switch (item 7, figure 3) returns to normal.
- B. Aft clear switch returns to normal as note exits acceptor.
- a. Vend relay (item 10, figure 3) energizes, closing its contacts.
  - b. The vend signal (26VAC) is outputted through the brown wire (pin 3) of acceptor plug.

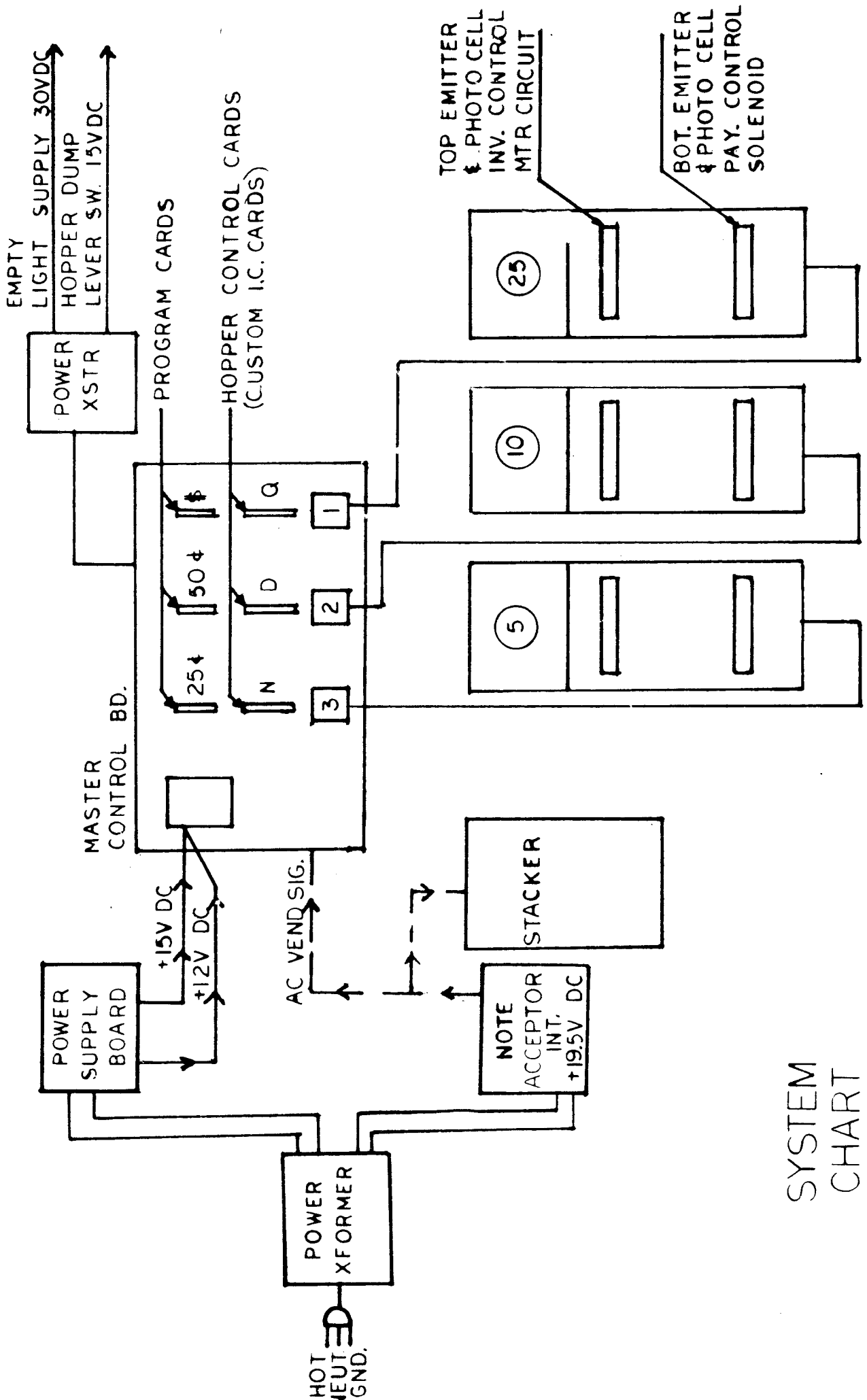
### 3. Payout

- A. The 26VAC vend signal is inputted to the note stacker and begins the stacker cycle.
- B. The vend signal from the acceptor is inputted to changer control box. (item 4, figure 1 & 2)
  - a. The 26Vac vend signal is used to trigger an electronic switch (opto isolator) that outputs 12VDC as the vend signal. This takes place on the control board (mother board), (item 1, figure 6 & 7).
  - b. The 12VDC vend signal is fed to the hopper control cards, (custom I.C.), (item 3, figure 6 & 7).
  - c. The hopper control cards initiate the payout, based on the coin combination supplied by the dollar program card.
  - d. The payout signal from the hopper control cards is fed through the hopper harness to the payout solenoid (item 8, figure 5) causing it to energize and de-energize, which in turn toggles the payout pin (item 9, figure 5) allowing coins to payout.

- e. Counting of the coins being paid out, is accomplished by the bottom emitter housing (light source), (item 3B, figure 5) and the bottom detector (item 10B, figure 5). This signal is generated by the detector seeing light after a coin passes.
- f. The count signal is then sent to the hopper control cards, where the actual count down occurs.

4. Hopper channel refill

- A. The hopper has completed its payout.
  - a. A signal is generated by the top detector (item 10A, figure 5), seeing the light from the top emitter housing (item 3A, figure 5). This signal is transmitted back to the hopper control cards, where a motor on signal is outputted.
  - b. The motor on signal is transmitted through the hopper harness to the hopper motor, turning it on.
  - c. The hopper motor drives the coin channel (item 5, figure 5). When the top detector is covered by a coin, the motor turns off, ending the cycle.



SYSTEM CHART

ARDAC BULK-LOADED CHANGER

T8770 & T8880

Main Cabinet  
(Cabinet harness, coin  
chute, illumination  
and empty lamps)

5 Coin acceptor & mounting  
(Payout switches)

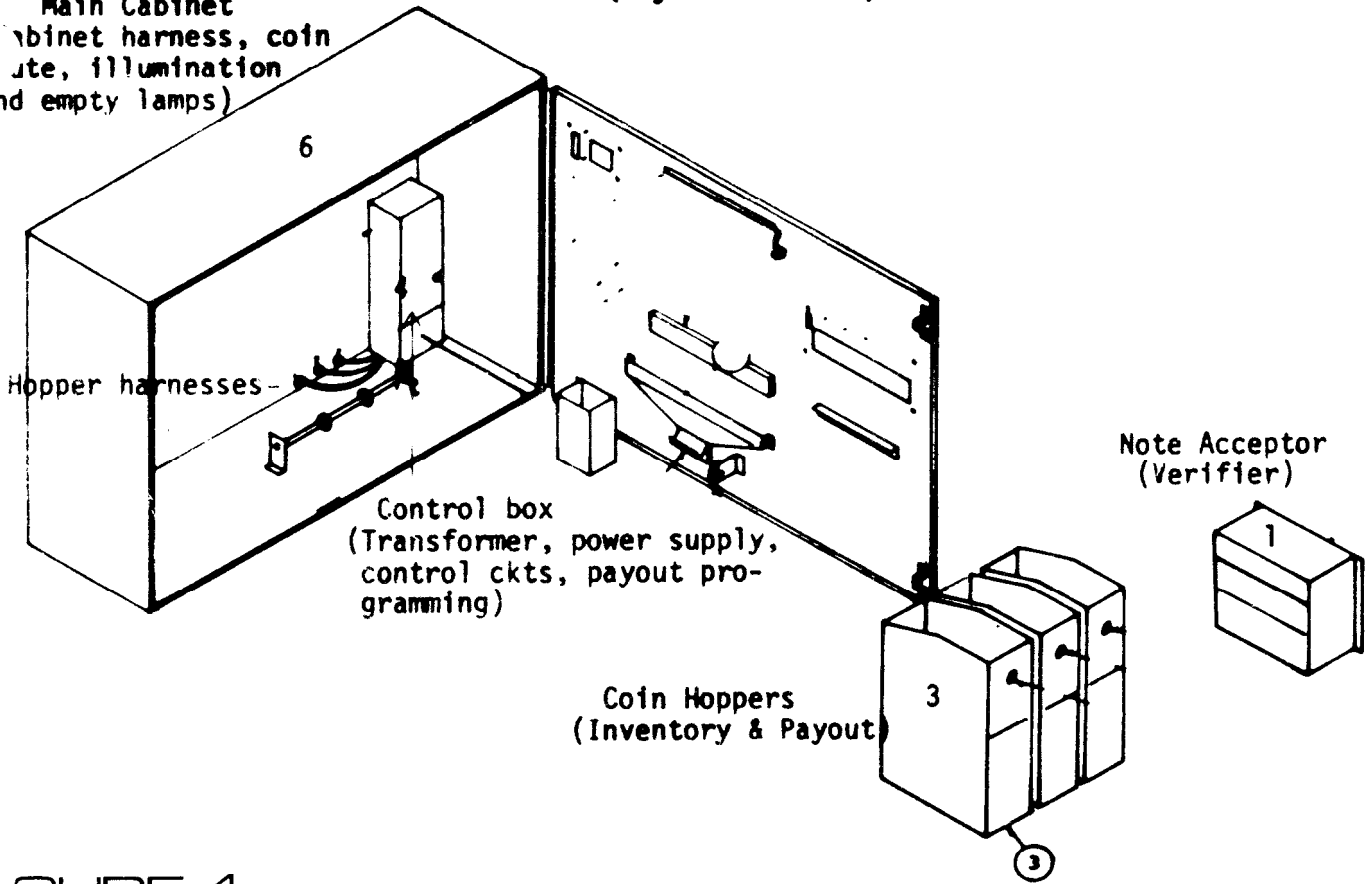


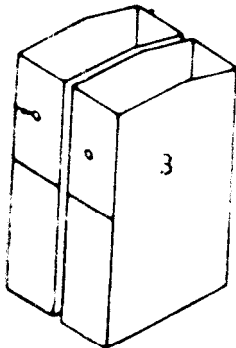
FIGURE 1

ARDAC BULK-LOADED CHANGER

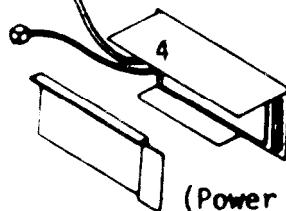
C3090

Main Cabinet  
(Cabinet harness, coin chute)

Coin Hoppers  
(Inventory & Payout)



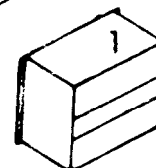
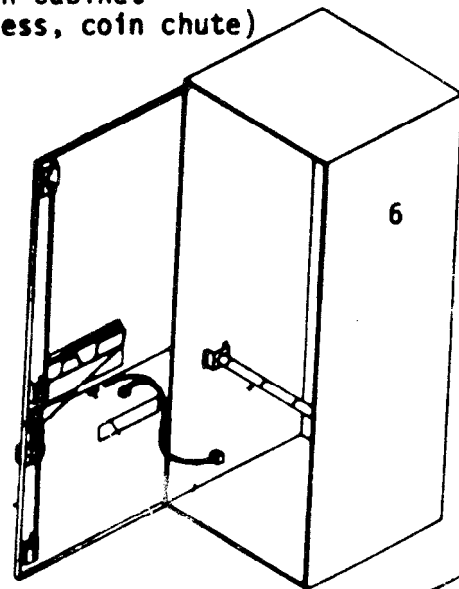
Hopper Harness



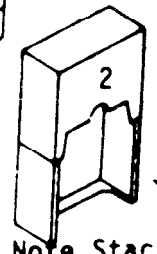
Control Box  
(Power Supply & Control cks,  
Payout programming)



5 Transformer (two 26vac outputs)



Note Acceptor  
(Verifier)



Note Stacker

FIGURE 2



U.S. ONE DOLLAR NOTE ACCEPTOR

EXPLODED VIEW

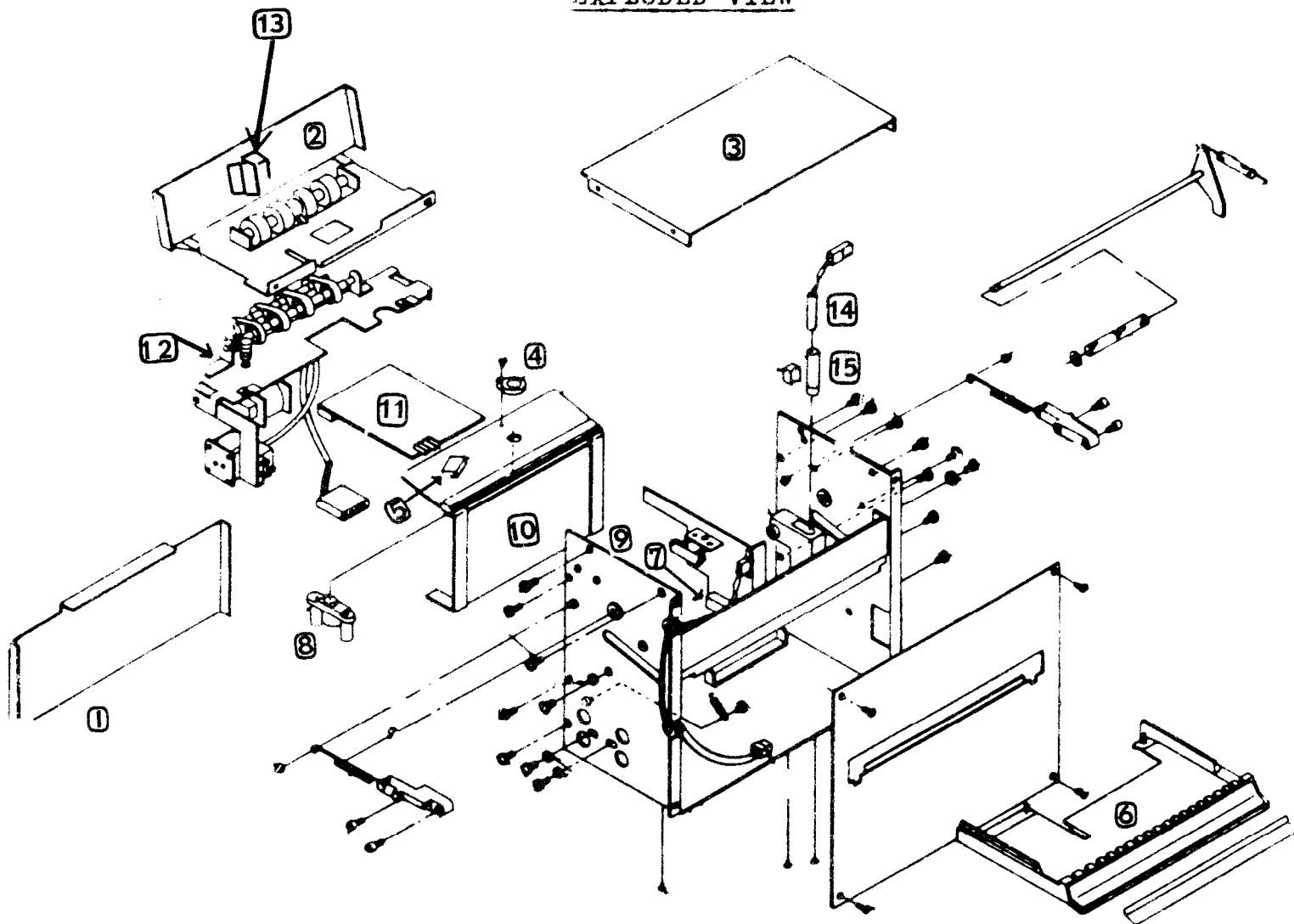


FIGURE 3

ARDAC BULK-LOADED CHANGER

HOPPER CHASSIS

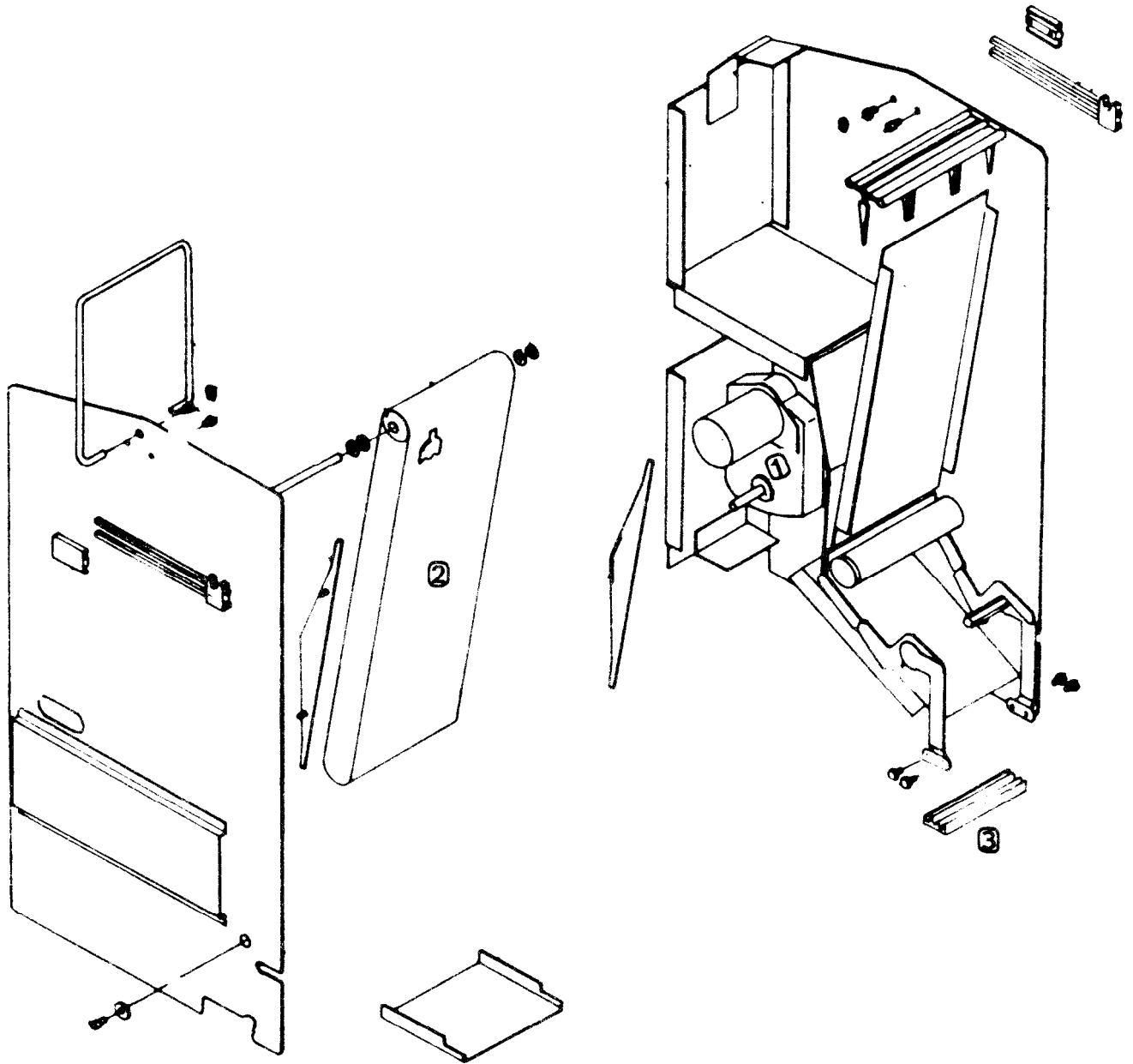


FIGURE 4

ARDAC BULK-LOADED CHANGER

COIN CHANNEL

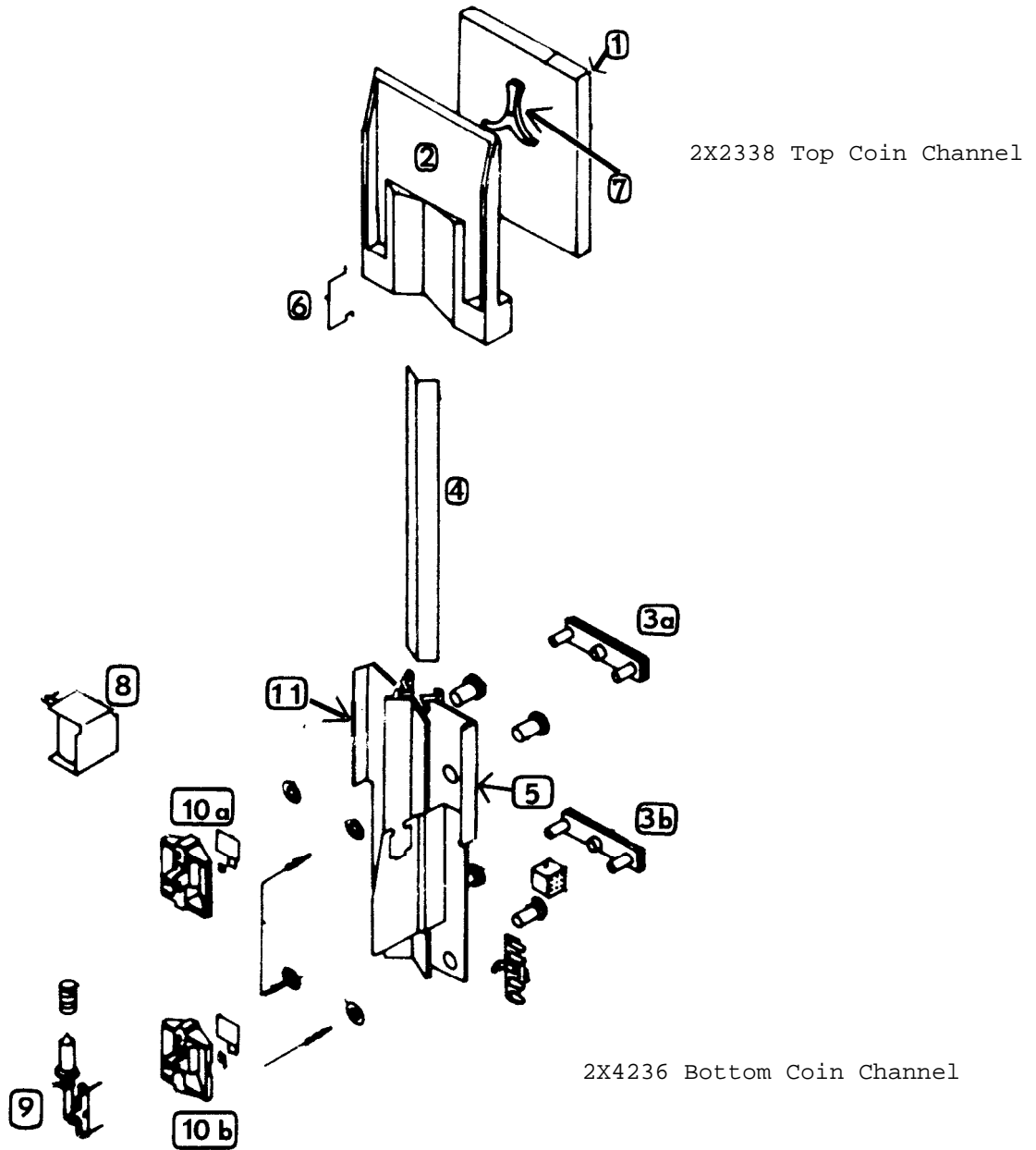


FIGURE 5

ARDAC BULK-LOADED CHANGER

CONTROL BOX

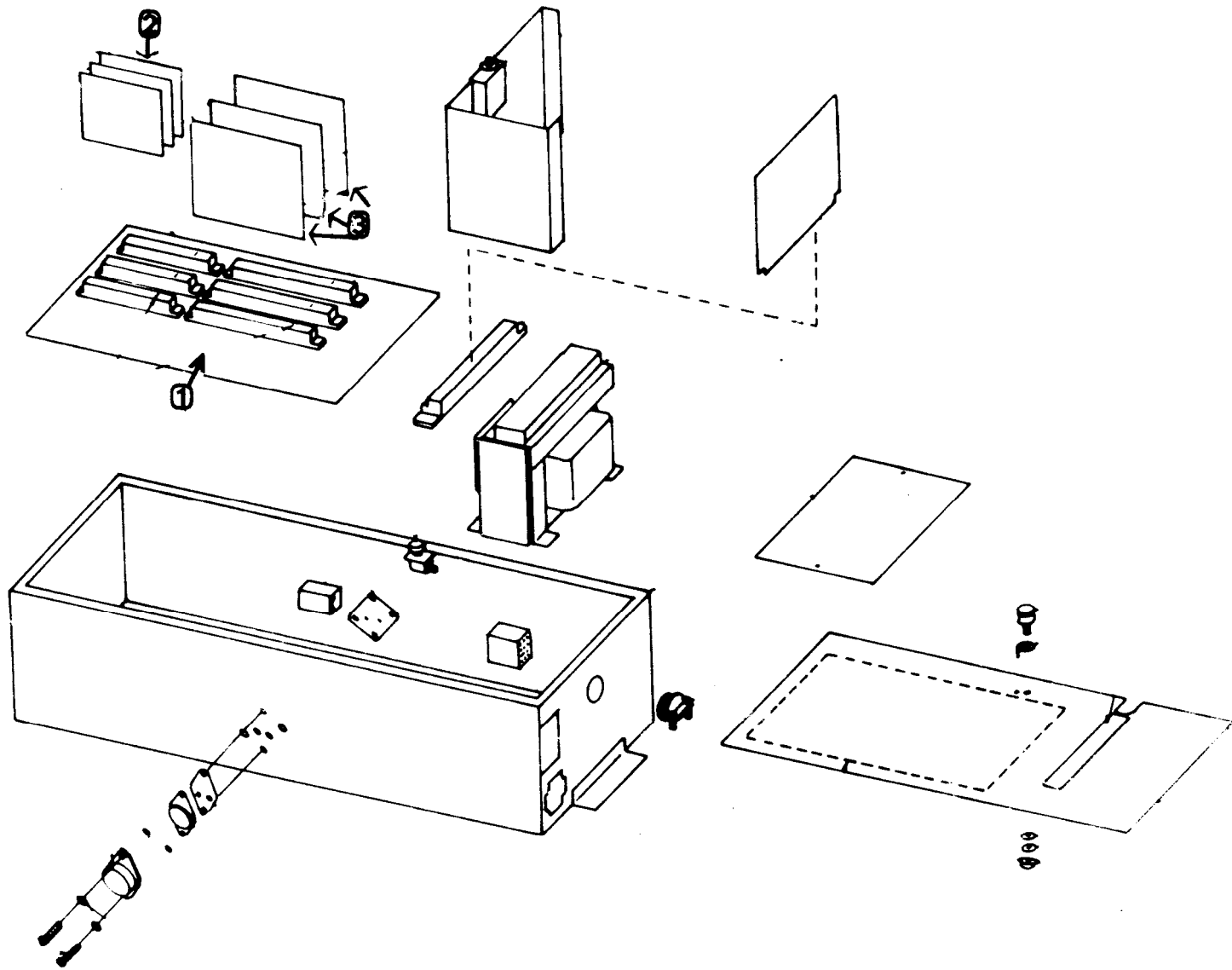


FIGURE 6

ARDAC BULK-LOADED CHANGER  
CONTROL CIRCUIT PANEL

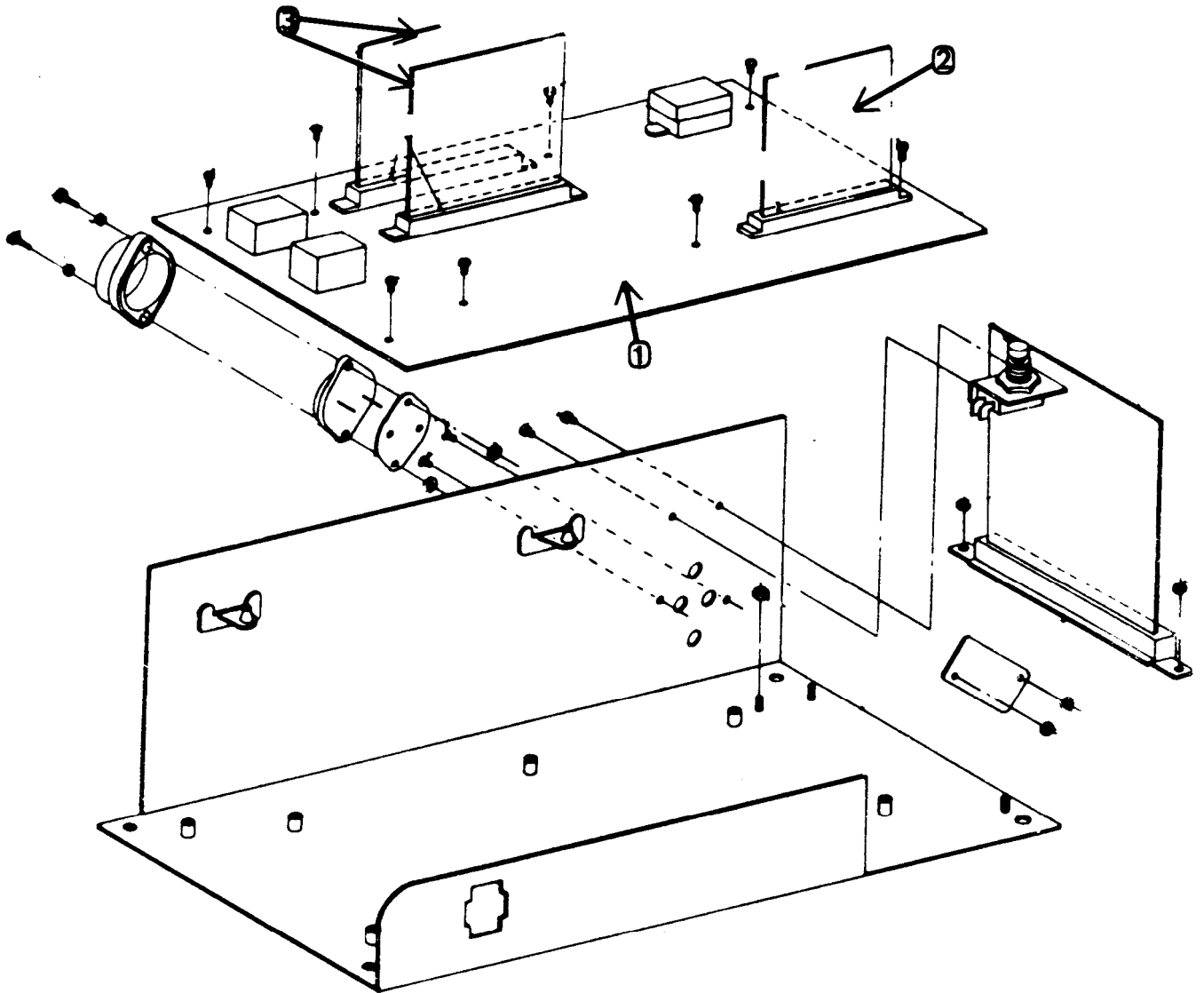


FIGURE 7

U.S. ONE DOLLAR NOTE STACKER

48 X 24

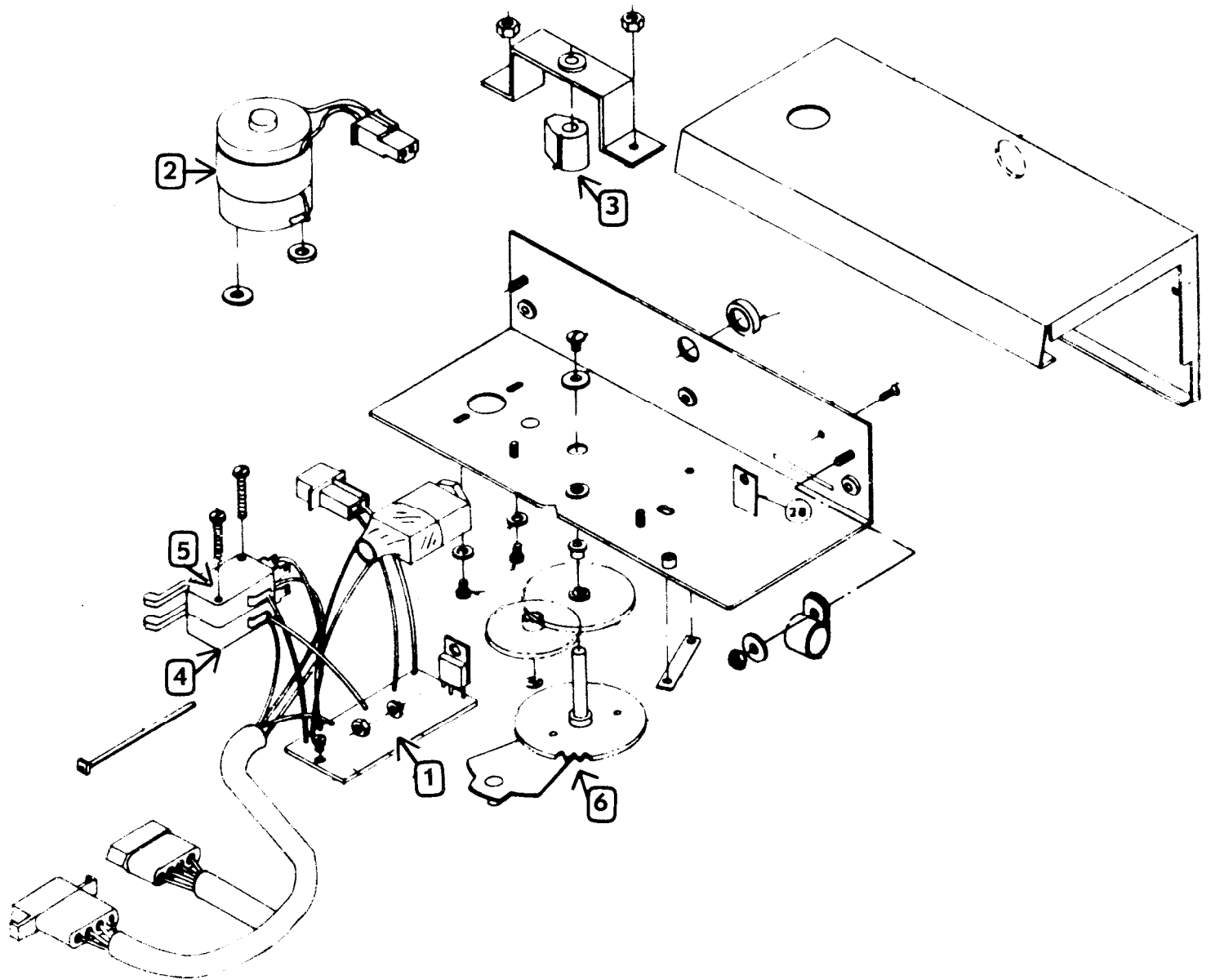


FIGURE 8

FLAT STACKER (new)  
48X120

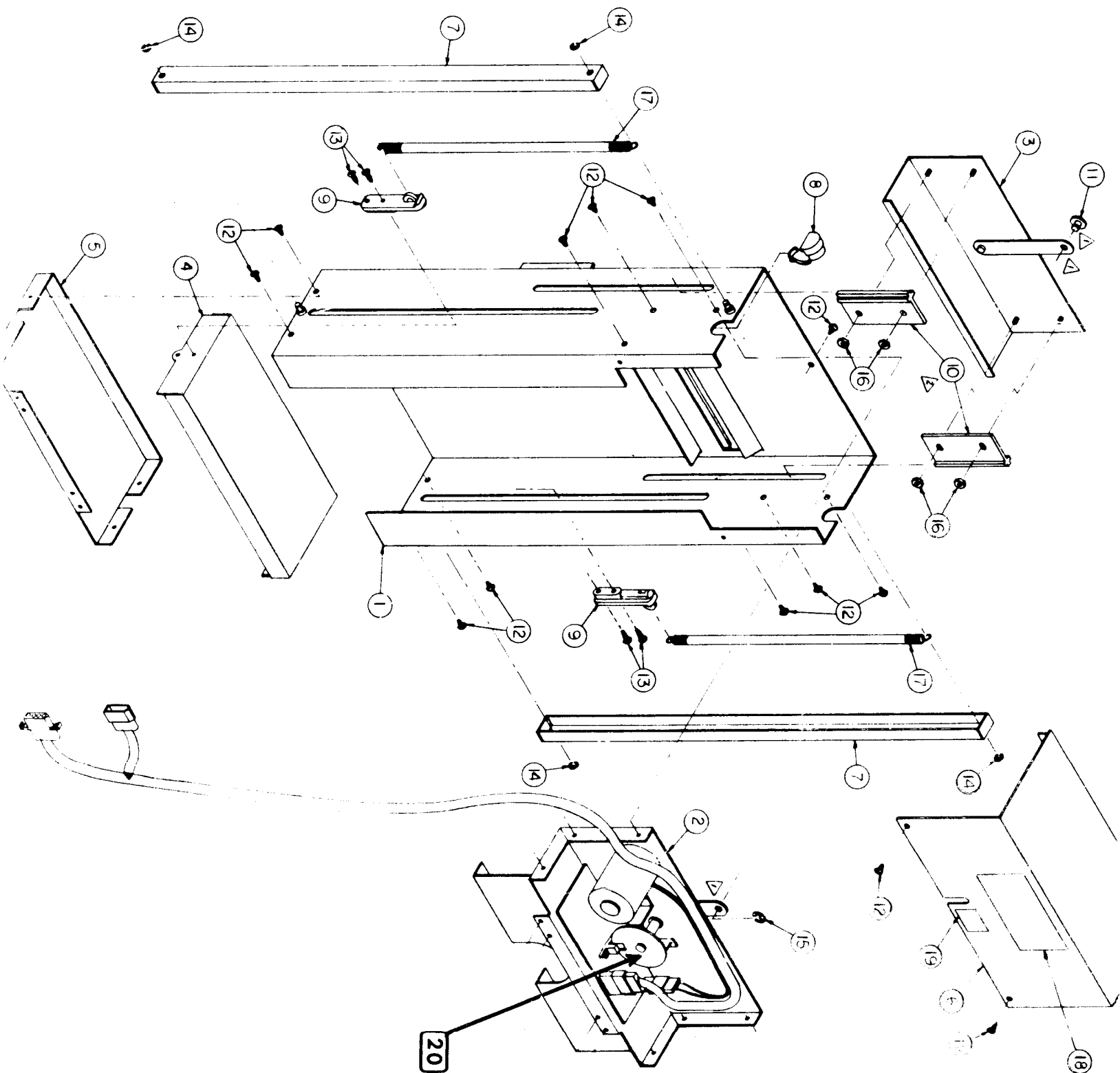


FIGURE 9

### BASIC ACCEPTOR SEQUENCE

- (1) Tray clear actuated by note, grid lamp to high intensity (5vdc)
- (2) Trigger switch actuated by tray, 19.5 vdc to accept relay (k1)
- (3) Primary scan, (proper alignment of grid lamp, reticle tube and solar cell required), signal from solar cell to amplifier module.
- (4) Accept relay energized, output from amp, module completes circuit for accept relay.
- (4A) Accept relay contacts K1A close, power to motor rail and solenoid starting collection.
- (5) After clear switch (S2) actuated by note.
- (6) Note clears reticle.
- (7) Tray clear returns to stand-by (N. C.)
- (8) After clear switch (S2) returns to stand-by, energizing vend relay (K2)
- (9) Vend relay energizes (K2)
- (9A) (K2) contacts K2A close, 26 vac from pin 4 of J1 out putted through closed contacts of K1A and closed contacts of K2A to pin three of J1 to control box of changer.
- (10) Cap timer (C6) times out, accept relay (k1) deenergizes releasing tray ending cycle.



## PRIMARY OVERVIEW

The signal generated by scanning of the note is amplified by operational amplifier U 1. The resulting signal is inputted to the base of transistor Q 1 which is used as a class C amplifier. (zero collector current with no input signal) Transformer T 1 steps up the resulting waveform which charges capacitor C 5. As a result of voltage division SCR Q 2 turns on providing a ground for the accept relay through pin 4 to ground,(pin 1).

## PRIMARY DETAIL

1. The signal generated by the scanning of the note is inputted to pin 3 of the STR module. This signal is composed of both an A.C. and a D.C. component. The D.C. level is approximately 150 to 200 millivolts. The A.C. waveform is approximately 30 to 80 millivolts.
  - A. Pot R 1 is used as a voltage divider to vary the amount of signal inputted to U 1.
  - B. Capacitor C 1 filters out the D.C. component of the signal so that only the A.C. component is applied to pin 3 of U 1.
2. Operational amplifier U 1 amplifies the A.C. signal. Its gain is approximately 1000.
  - A. Pot R 7 sets the steady state level at TP 1 at 10 VDC.
  - B. At TP 1 the A.C. waveform varies between approximately 2.0 V and 17 V.
  - C. Capacitor C 3 filters out the steady state 10 VDC. The resulting waveform is applied to the base of transistor Q 1.
3. Transistor Q 1 is used as a class C amplifier. (zero collector current when no signal is applied to the base - OFF -) When a valid accept

signal is applied to the base of transistor Q 1 it turns ON. The resulting waveform is stepped up by transformer T 1.

A. Zener diode Z 1 protects transistor Q 1 from spikes generated by transformer T 1.

B. Resistor R 8 is a current limiting resistor.

C. Resistor R 9 provides proper biasing for transistor Q 1.

4. The stepped up voltage charges capacitor C 5 to approximately 1.8 VDC. The resulting voltage division of R 10 and R 11 provides approximately 0.4 VDC to 0.6 VDC to the gate of the SCR(Q 2) turning it on. The result of SCR(Q 2) turning on is to provide a ground for the accept relay K 1.

#### SECONDARY OVERVIEW

U 2 is a quad operational amplifier, a single package containing four independent amplifiers. The currents generated by the photo voltaic sensing cells are amplified (current to voltage converted) by two of the amplifiers. The outputs from these amplifiers are inputted to the remaining two amplifiers on the package which are used as comparators. The outputs from the comparators are used to turn transistor Q 4 on or off. When transistor Q 4 turns on the base of transistor Q 1 is grounded shorting the primary signal to ground. SCR Q 2 does not turn on, therefore, no accept.

#### SECONDARY DETAIL

1. The Str sensor (2 x 1541) contains a light source (lamp 65 x 130-1) and two photo voltaic sensing cells. The light generated from the lamp is reflected by the underside of the note. The reflected light is sensed

by the photo voltaic cells. (used in the current source mode).

Because the sensors receive reflected light from slightly different areas of the note the outputs from the sensing cells are not equal. The outputs from the STR sensor are inputted to the STR amplifier module at plug P, pins 2, 4 and 1.

2. The outputs of the photo voltaic sensing cells, yellow and green wire, inputted to the STR module at pins 2 and 4 of connector P/J are inputted to pin 9 and 13 of operational amplifier U 2 where they are current to voltage converted. The outputs are pin 8 (TP 5) and pin 14 (TP 2).

A. The outputs at TP 5 and TP 2 will not be equal if a valid note is sensed by the photo voltaic sensing cells.

B. With the 49 x 108 STR balance card locked in the tray, the voltage at TP 5 and TP 2 with respect to ground will be 10.0 VDC.

C. Capacitors C 7 and C 6 are to prevent oscillation.

D. Resistors R 13, R 15, and R 14, R 16 establish the gain of the amplifiers.

3. The outputs of the current to voltage convertors are inputted to the comparators, pins 2 and 6. If the voltage at pin 6 is greater than the voltage at pin 5 and the voltage at pin 2 is greater than the voltage at pin 3 the outputs from the comparators will be low (approximately zero volts). The lows from the comparators are inputted to the base of transistor Q 4 preventing it from turning on, which in turn keeps transistor Q 1 on, permitting an accept.

A. Only a low outputted by both comparators will permit an accept.

If a low and a high or a high and a low are outputted from the comparators transistor Q 4 will turn on grounding the base of transistor

Q 1 which will not permit an accept.

B. The reference voltage for the comparators is established by the divider network of R 18, R 19 and R 20 resistors.

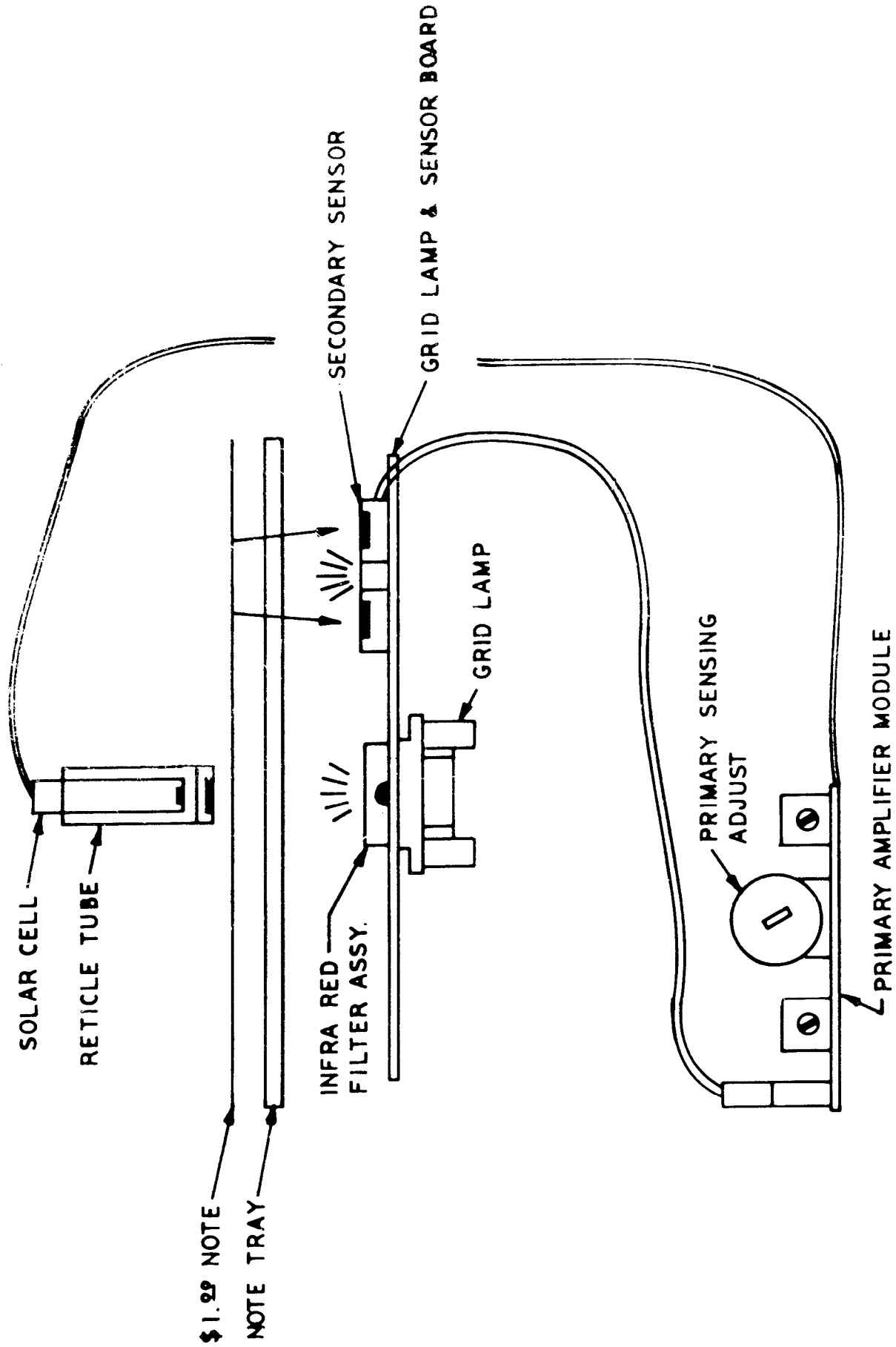
C. Resistors R 21, R 22 and diode D 7 cause a high to be outputted from pin 7 of U 2 in the event that the lamp burns out in the 2 x 1541 STR sensor. (NO ACCEPT)

D. Diode D 4 protects transistor Q 1 from negative spikes.

3. Resistors R 29, R 27 and R 28; transistor Q 3, zener diode D 8 and diode D 9 comprise the constant voltage source for the STR sensor lamp.

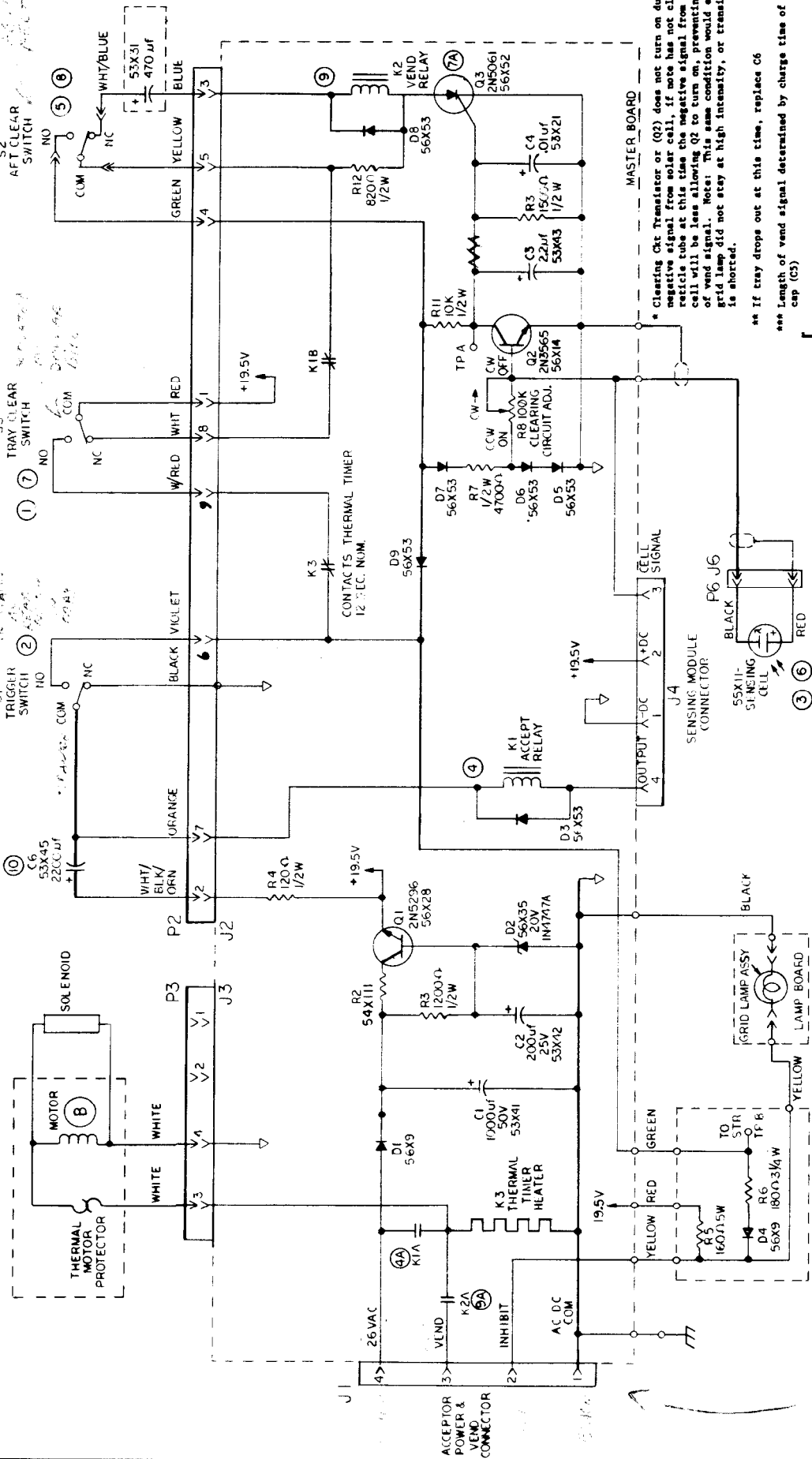
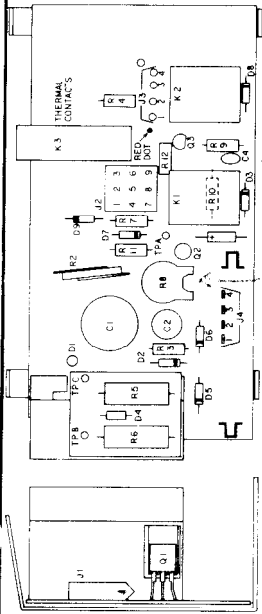
The base of transistor Q 3 is clamped at 10.6 volts d.c. by zener diode D 8 and diode D 9. The emitter of transistor Q 3 outputs a regulated 10.0 volts d.c. through resistor R 27, to the lamp in the STR sensor. Lamp voltage approximately 5 VDC.

PRIMARY SENSING



**SEQUENCE**

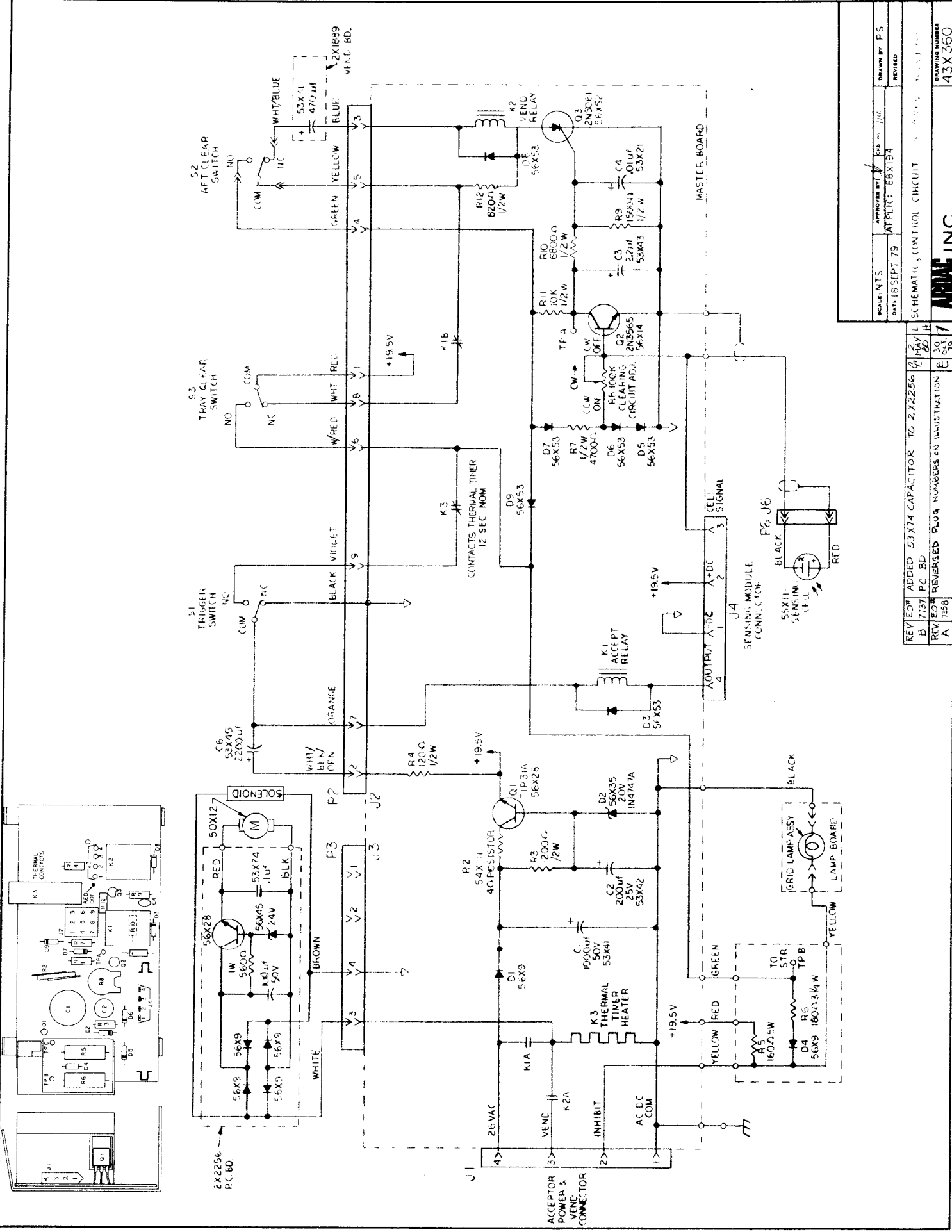
- (1) Tray clear switch actuated by tray, grid lamp to high intensity (5 vdc), 19.5 vdc to N.O. contacts of trigger switch
- (2) Trigger switch actuated by tray, 19.5 vdc to accept relay (K1)
- (3) Primary beam, proper alignment of grid lamp, reticle tube & solar cell required, signal from solar cell to clearing ckt. & amplifier module.
- (4) Accept relay energized, output from amp. module thru pin 4 of J4 completes ckt to accept relay
- (5) Aft clear switch (S2) closes, 26 vac to motor rail & solenoid starting collection, 26 vac to thermal timer, K1B closes.
- (6) Aft clear switch (S2) actuated by note.
- (7) Note clear switch, solar cell signal to clearing ckt goes more negative.
- (8) Tray clear switch on - turn to stand-by (N.C.), K1 power now thru aft clear switch (power to clearing ckt thru K1B & aft clear switch)
- (9) SOR (Q3) turns on - thru R2, K1B & tray clear switch
- (10) Aft clear switch (S2) turns to stand-by (N.C.), SOR (Q3) now on thru vend relay (K2) charging vend capacs Accept relay (K1) power now thru cap time charge time (C6)
- (11) Vend relay energizes (K2)
- (12) K2 contacts K2A closes, 26 vac from pin 4 of J1 out thru closed contacts of K1A and closed contacts of K2A to pin three of J1 to control box of changer.
- (13) Cap timer (C6) times out, accept relay (K1) deenergizes, releasing tray, ending cycle.



\* Clearing Ckt Transistor or (Q2) does not turn on due to the negative signal from solar cell, if note has not cleared the reticle tube at this time the negative signal from the solar cell will be less allowing Q2 to turn on, preventing issue of vend signal. Note: This same condition would exist if grid lamp did not stay at high intensity, or transistor Q2 is shorted.

\*\* If tray drops out at this time, replace C6  
 \*\*\* Length of vend signal determined by charge time of vend cap (C6)

24 VAC 16W  
 (COUNTER  
 ATTACHED)  
 TO THE  
 BOARD



|                            |                          |                  |                |                       |
|----------------------------|--------------------------|------------------|----------------|-----------------------|
| SCALE: NTS                 | APPROVED BY: [Signature] | DATE: 16 SEPT 79 | APPLIC: B6X194 | DRAWN BY: PS          |
| SCHEMATIC, CONTROL CIRCUIT |                          |                  |                | REVISED               |
| DATE: 16 SEPT 79           |                          |                  |                | APPLIC: B6X194        |
| REVISED TO: 2X2256         |                          |                  |                | REVISED TO: 30 OCT 78 |
| REVISED BY: A              |                          |                  |                | REVISED BY: B         |
| REVISED BY: A              |                          |                  |                | REVISED BY: B         |
| REVISED BY: A              |                          |                  |                | REVISED BY: B         |
| REVISED BY: A              |                          |                  |                | REVISED BY: B         |

REVISIONS: ADDED 53X74 CAPACITOR TO 2X2256

REVISED TO: 2X2256

REVISED BY: A

REVISED BY: B

REVISED BY: A

REVISED BY: B

REVISED BY: A

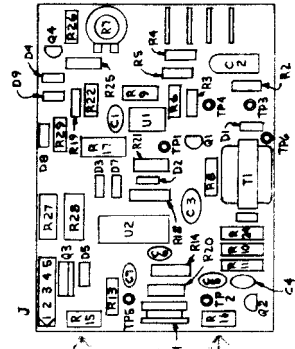
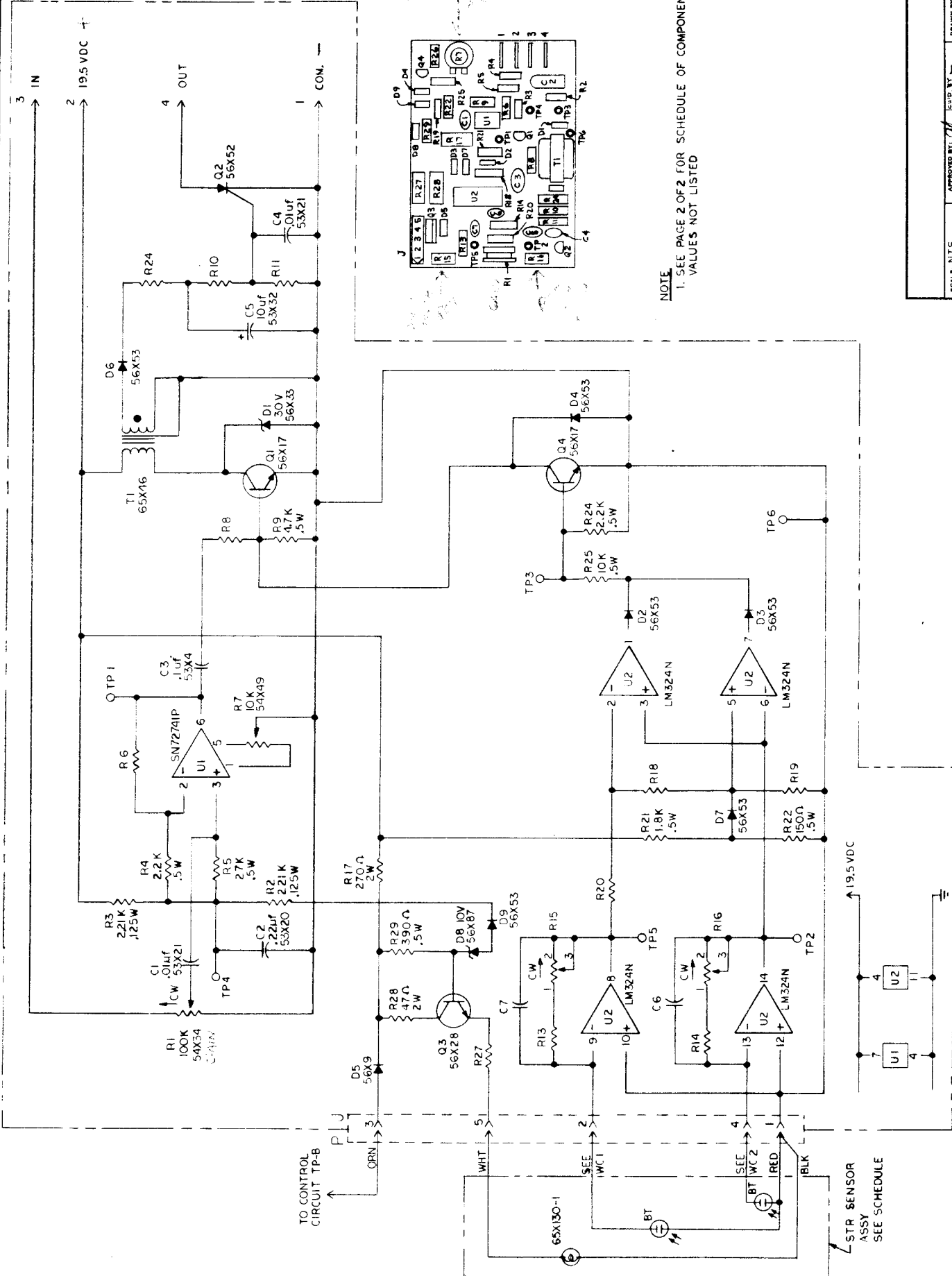
REVISED BY: B

REVISED BY: A

REVISED BY: B

|                       |               |               |               |               |
|-----------------------|---------------|---------------|---------------|---------------|
| REVISED TO: 2X2256    | REVISED BY: A | REVISED BY: B | REVISED BY: A | REVISED BY: B |
| REVISED TO: 30 OCT 78 | REVISED BY: A | REVISED BY: B | REVISED BY: A | REVISED BY: B |
| REVISED TO: 30 OCT 78 | REVISED BY: A | REVISED BY: B | REVISED BY: A | REVISED BY: B |
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19788 PRINTED ON NO. 100000 CLEARANCE



NOTE  
1. SEE PAGE 2 OF 2 FOR SCHEDULE OF COMPONENT VALUES NOT LISTED

|                          |                          |                 |          |                        |      |
|--------------------------|--------------------------|-----------------|----------|------------------------|------|
| SCALE: NTS               | APPROVED BY: [Signature] | DATE: 26 DEC 78 | REV: 1   | PG 1                   | OF 2 |
| DRAWN BY: [Signature]    |                          |                 | REVISED: | DRAWING NUMBER: 43X328 |      |
| SCHEMATIC SENSING MODULE |                          |                 |          |                        |      |
| <b>ARIAC INC.</b>        |                          |                 |          |                        |      |

REV 100 577 SENSE NMS NOT CALLED OUT  
A 10931



| SCHEMATIC | ASSY. NO. | R6                   | R8                 | R10                  | R11                | R13                      | R14                      | R15    | R16    | SENSOR B.D. | R18                      | R19                      | R20                      | R24                    | R27                  | C     | APPLC.               |
|-----------|-----------|----------------------|--------------------|----------------------|--------------------|--------------------------|--------------------------|--------|--------|-------------|--------------------------|--------------------------|--------------------------|------------------------|----------------------|-------|----------------------|
| 43x212-1  | 2x1542    | 54x5-185<br>1.8 M.A. | 54x5-102<br>1 K.A. | 54x5-222<br>2.2 K.A. | 54x5-681<br>680 A. | 54x60-5762<br>57.6 K.A.  | 54x60-5762<br>57.6 K.A.  | 54x95  | 54x124 | 2x1541      | 54x131-1581<br>1.58 K.A. | 54x131-2371<br>2.37 K.A. | 54x131-4990<br>499 A.    | 54x131-272<br>2.7 K.A. | 54x139-470<br>470 A. | 53x21 | 88x142-104<br>88x172 |
| 43x212-2  | 2x1549    | 54x5-225<br>2.2 M.A. | 54x5-102<br>1 K.A. | 54x5-123<br>12 K.A.  | 54x5-102<br>1 K.A. | 54x131-2323<br>232 K.A.  | 54x131-2943<br>294 K.A.  | 54x124 | 54x101 | 2x1547      | 54x60-1741<br>1.74 K.A.  | 54x60-1581<br>1.58 K.A.  | 54x60-3740<br>374 A.     | 54x5-102<br>1 K.A.     | 54x139-430<br>430 A. | 53x21 | 88x127-133           |
| 43x212-3  | 2x1621    | 54x5-225<br>2.2 M.A. | 54x5-102<br>1 K.A. | 54x5-222<br>2.2 K.A. | 54x5-381<br>380 A. | 54x131-3243<br>324 K.A.  | 54x131-3243<br>324 K.A.  | 54x101 | 54x101 | 2x1620      | 54x131-1581<br>1.58 K.A. | 54x131-2211<br>2.21 K.A. | 54x131-4990<br>499 A.    | 54x5-102<br>1 K.A.     | 54x139-470<br>470 A. | 53x21 | 88x138-1337-103      |
| 43x212-4  | 2x1685    | 54x5-185<br>1.8 M.A. | 54x5-102<br>1 K.A. | 54x5-472<br>47 K.A.  | 54x5-681<br>680 A. | 54x60-1003<br>100 K.A.   | 54x60-1583<br>158 K.A.   | 54x101 | 54x101 | 2x1547      | 54x60-1003<br>100 K.A.   | 54x131-2432<br>2.43 K.A. | 54x131-1401<br>1.4 K.A.  | 54x5-222<br>2.2 K.A.   | 54x139-470<br>470 A. | 53x21 | 88x120-103 PROTOTYPE |
| 43x212-5  | 2x1799    | 54x5-185<br>1.8 M.A. | 54x5-102<br>1 K.A. | 54x5-222<br>2.2 K.A. | 54x5-681<br>680 A. | 54x131-2323<br>232 K.A.  | 54x131-2323<br>232 K.A.  | 54x124 | 54x101 | 2x1705      | 54x131-1401<br>1.4 K.A.  | 54x131-2491<br>2.49 K.A. | 54x131-1581<br>1.58 K.A. | 54x5-272<br>2.7 K.A.   | 54x139-430<br>430 A. | 53x21 | 88x153-143           |
| 43x212-6  | 2x1818    | 54x5-225<br>2.2 M.A. | 54x5-102<br>1 K.A. | 54x5-222<br>2.2 K.A. | 54x5-681<br>680 A. | 54x131-2323<br>232 K.A.  | 54x131-2943<br>294 K.A.  | 54x101 | 54x101 | 2x1547      | 54x131-2941<br>2.94 K.A. | 54x131-665<br>6.65 K.A.  | 54x131-1401<br>1.40 K.A. | 54x5-102<br>1 K.A.     | 54x139-430<br>430 A. | 53x21 | 88x142-105           |
| 43x212-7  | 2x1832    | 54x5-225<br>2.2 M.A. | 54x5-102<br>1 K.A. | 54x5-222<br>2.2 K.A. | 54x5-381<br>380 A. | 54x131-2943<br>294 K.A.  | 54x131-2943<br>294 K.A.  | 54x101 | 54x101 | 2x1547      | 54x131-1581<br>1.58 K.A. | 54x131-1581<br>1.58 K.A. | 54x131-4990<br>499 A.    | 54x5-102<br>1 K.A.     | 54x139-430<br>430 A. | 53x21 | 88x157-143           |
| 43x212-8  | 2x1865    | 54x5-225<br>2.2 M.A. | 54x5-102<br>1 K.A. | 54x5-222<br>2.2 K.A. | 54x5-331<br>330 A. | 54x131-5762<br>57.6 K.A. | 54x131-5762<br>57.6 K.A. | 54x95  | 54x95  | 2x1867      | 54x131-2941<br>2.94 K.A. | 54x131-5231<br>5.23 K.A. | 54x131-1581<br>1.58 K.A. | 54x5-102<br>1 K.A.     | 54x139-470<br>470 A. | 53x21 | 88x158-143           |
| 43x212-9  | 2x1933    | 54x5-185<br>1.8 M.A. | 54x5-102<br>1 K.A. | 54x5-222<br>2.2 K.A. | 54x5-681<br>680 A. | 54x131-5762<br>57.6 K.A. | 54x131-5762<br>57.6 K.A. | 54x95  | 54x95  | 2x1867      | 54x131-1581<br>1.58 K.A. | 54x131-2371<br>2.37 K.A. | 54x131-4990<br>499 A.    | 54x5-102<br>1 K.A.     | 54x139-470<br>470 A. | 53x21 | 88x117-144           |
| 43x212-10 | 2x2054    | 54x5-185<br>1.8 M.A. | 54x5-102<br>1 K.A. | 54x5-222<br>2.2 K.A. | 54x5-681<br>680 A. | 54x131-5762<br>57.6 K.A. | 54x131-5762<br>57.6 K.A. | 54x95  | 54x95  | 2x1867      | 54x131-2941<br>2.94 K.A. | 54x131-665<br>6.65 K.A.  | 54x131-1401<br>1.40 K.A. | 54x5-272<br>2.7 K.A.   | 54x139-470<br>470 A. | 53x21 | 88x167-154           |
| 43x212-11 | 2x2054    | 54x5-185<br>1.8 M.A. | 54x5-102<br>1 K.A. | 54x5-222<br>2.2 K.A. | 54x5-681<br>680 A. | 54x131-5762<br>57.6 K.A. | 54x131-5762<br>57.6 K.A. | 54x95  | 54x95  | 2x1867      | 54x131-2941<br>2.94 K.A. | 54x131-665<br>6.65 K.A.  | 54x131-1401<br>1.40 K.A. | 54x5-272<br>2.7 K.A.   | 54x139-470<br>470 A. | 53x21 | 88x176-144           |

| REV | EO   | DATE       | DESCRIPTION    | REV | EO | DATE | DESCRIPTION | REV | EO | DATE | DESCRIPTION                | REV | EO | DATE | DESCRIPTION | REV | EO   | DATE | DESCRIPTION |
|-----|------|------------|----------------|-----|----|------|-------------|-----|----|------|----------------------------|-----|----|------|-------------|-----|------|------|-------------|
| X   | 715  | 43x212-2   | RIS R16 54X124 | D   | 19 | P    | 5           | REV | EO | 5/27 | APPLC 88x153-143 WAS -123  | P   | 11 | P    | 3           | MAX | 3/77 |      |             |
| N   | 659  | 43x212-11  | WAS 54x101     | P   | 12 | P    | 5           | REV | EO | 5/27 | ADDED 43x212-7 TO SCHEDULE | P   | 11 | P    | 3           | MAX | 3/77 |      |             |
| V   | 659  | 88x142-104 | WAS 88x142-3   | S   | 18 | R    | 5           | REV | EO | 5/23 | ADDED 43x212-7 TO SCHEDULE | P   | 11 | P    | 3           | MAX | 3/77 |      |             |
| U   | 6265 | 43x212-5   | WAS 88x142-6   | D   | 28 | Q    | 5           | REV | EO | 5/23 | ADDED 43x212-6 TO SCHEDULE | P   | 11 | P    | 3           | MAX | 3/77 |      |             |
| T   | 644  | 43x212-11  | WAS 7P         | P   | 20 | P    | 5           | REV | EO | 5/23 | ADDED 43x212-8 TO SCHEDULE | P   | 11 | P    | 3           | MAX | 3/77 |      |             |

ARDAC INC. 43x212-11 pg 2 of 2

## ELECTRICAL SEQUENCE

### STACKER 48 X 24

#### STAND-BY MODE

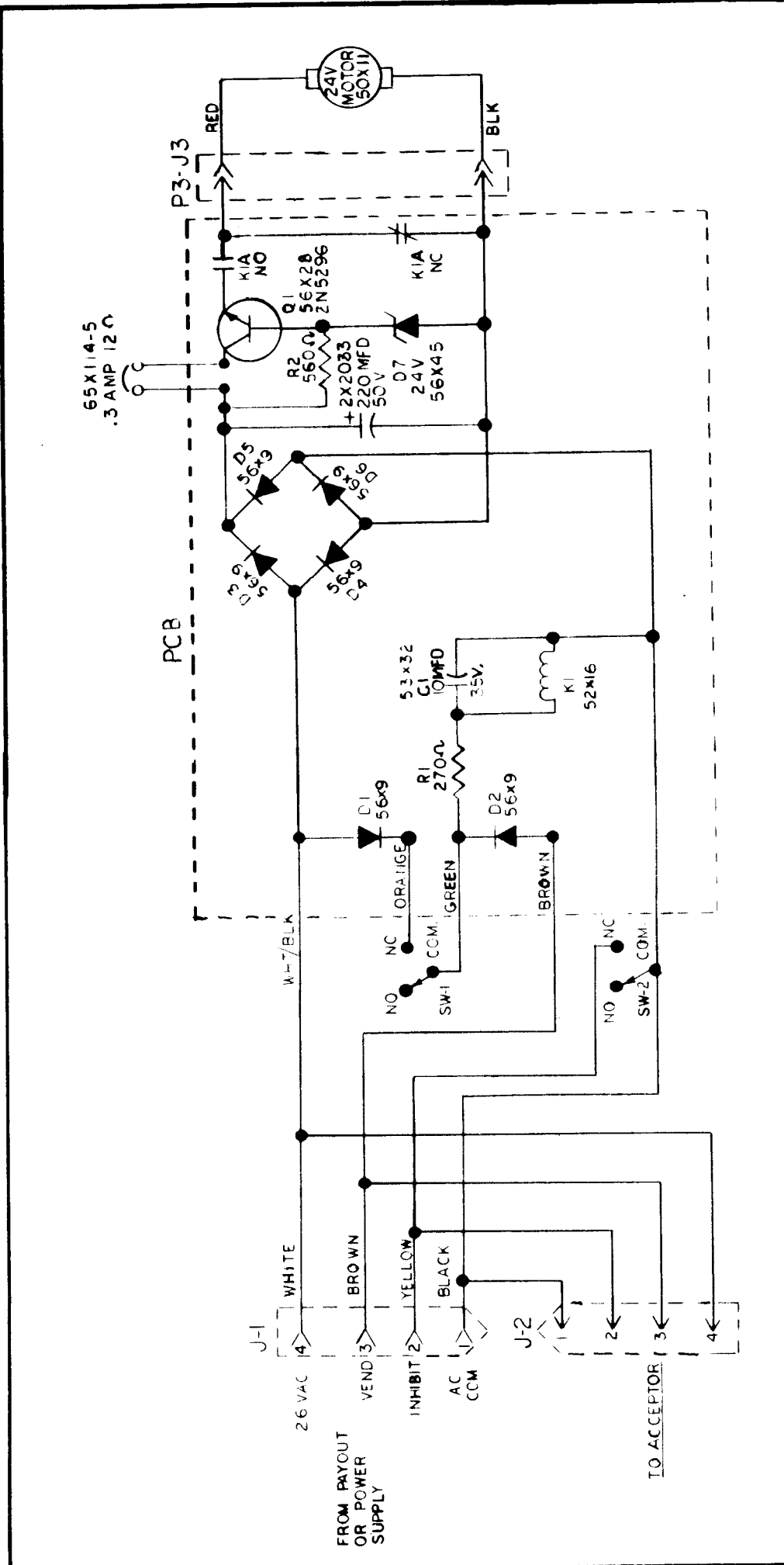
- (1) 26 vac is supplied from one secondary of the transformer through connector J 1, pin 4 (white wire) to the bridge rectifier consisting of diodes D3, D4, D5, and D6.
- (2) The output of the bridge rectifier (approx. 35 vdc) is filtered by the 220 mfd capacitor and fed through resistor R 2, zener diode D 7 clamps the base of Q 1 at 24 vdc.

Note: All voltage readings taken on the vend line, inhibit line or 26 vac line, before the bridge rectifier, must be taken with respect to A C common. All voltage readings taken after the bridge rectifier, must be taken with respect to D C common (negative lead of 220 mfd capacitor or black wire on motor harness).

#### OPERATION

- (1) 26 vac vend signal from the note acceptor is fed through connector J 1, pin 3 (brown wire) and rectified by diode D 2, through resistor R 1, and applies approx. 17 vdc to K 1 relay.
- (2) K 1 energizes closing N. O. K 1 A contacts and opening N. C. K 1 A contacts. This allows transistor Q 1 to conduct through the motor, turning it on.
- (3) As the motor rotates, the switch cam deactuates switches S 1 (motor switch) and S 2 (inhibit switch). Power for K 1 relay is now provided through diode D 1, switch S 1, and resistor R 1.
- (4) The mechanical linkage drives the punch plate down stacking the note in the cash box. After the punch plate returns to its stand-by position, the switch cam actuates switches S 1 and S 2, removing power from K 1 relay.
- (5) K 1 relay deenergizes opening the N. O. K 1 A contacts removing power from the motor. A motor break circuit is provided the N. C. K 1 A contacts to prevent coasting.

Note: Switch S 2 (inhibit),when deactuated puts a ground on the yellow wire, which is connected to the note acceptor grid lamp circuit, turning the lamp off. This prevents the acceptor from taking a note during the stack cycle.



|   |                        |              |
|---|------------------------|--------------|
| SCALE: NTS                                  | APPROVED BY: <i>JD</i> | DRAWN BY: PS |
| DATE: 16 MAY 78                             | PP: 4B x 24 - 3        | REVISED      |
| SCHEMATIC STACKER CIRCUIT 24V (ARDAC CHNGR) |                        |              |
| DRAWING NUMBER: 43X308                      |                        |              |

**ARDAC INC.**

REL ON E.D. 642B

## ELECTRICAL SEQUENCE

### FLAT STACKER (48 X 120)

#### STAND-BY MODE

- (1) 26 vac from secondary of transformer to pin 4 (white wire) of plug P-1 and P-2 of stacker.
- (2) 26 vac inputted to the printed circuit board through pin 4 of P-3 and half wave rectified by diode D-1, the output is filtered by capacitor C-1 (500 mfd) outputting approximately 37 vdc.
- (3) 37 vdc inputted at pin 1 of U 1, a 24 V regulator.
- (4) 24 vdc from U 1 pin 2 provides voltage for stacker motor through pin 3 (red wire) of P-4.
- (5) 24 vdc from U 1, pin 2 also provides a 12 vdc reference voltage through voltage divider network (R 1 and R 2), this is applied at all points marked (REF v)
- (6) The slot in the optical interrupt disc (black disc) is aligned to permit the light from the emitter of U 3 to strike the detector. This forward biases the transistor allowing it to conduct holding pin 5 of U 2 low (approx. 0 vdc)

#### OPERATION

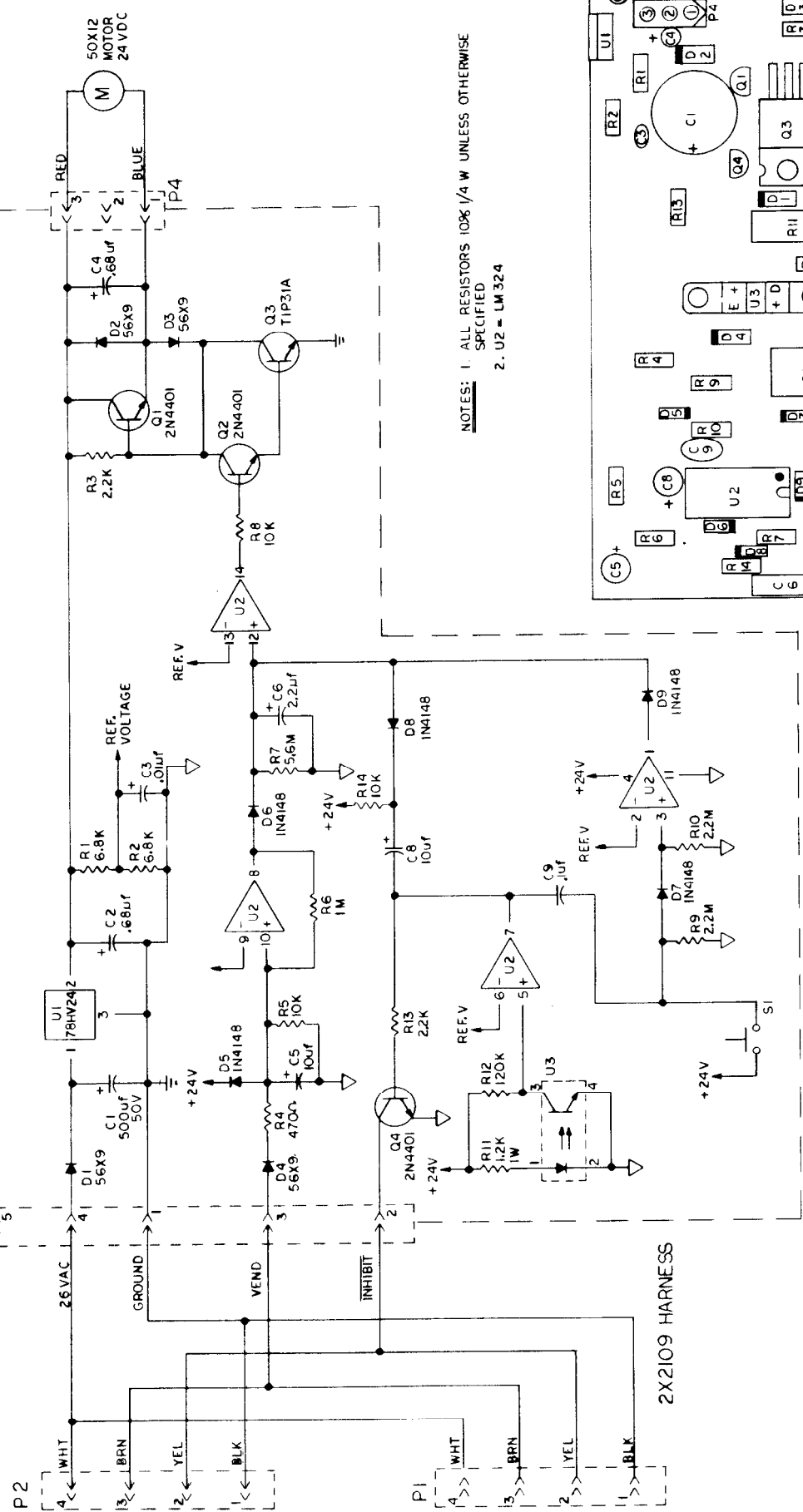
- (1) Acceptor vend signal(26 vac)inputted through Pin 3 (brown wire) of P 2 to the circuit board.
- (2) The 26 vac is half wave rectified by diode D 4. The half wave DC charges capacitor C 5 (10 U F) to approximately 24 vdc.
- (3) The voltage on C 5 is applied to pin 10 of U 2, when this voltage exceeds the 12 vdc reference voltage on pin 9 of U 2, pin 8 goes high (approx. 24 vdc). This charges capacitor C 6 (2.2 U F)
- (4) The voltage on C 6 is applied to pin 12 of U 2, when this voltage exceeds the 12 vdc reference voltage on pin 13 of U 2, pin 14 goes high, approx. (22 vdc).

- (5) Approximately 1.3 vdc is applied to the base of Q 2, (the remainder is dropped across R 8). This forward biases the Darlington (Q 2 - Q 3) allowing Q 3 to conduct through the stacker motor turning it on.
- (6) As the motor rotates the optical interrupt disc will block the light from the emitter, cutting off the photo transistor U 3. This will cause pin 5 of U 2 to go high (24 vdc) outputting a high from pin 7 of U 2.
- (7) The high at pin 7 of U 2 is coupled through resistor R 13 to the base of Q 4 turning it on. Q 4 conducting provides a ground on the inhibit line (yellow wire).

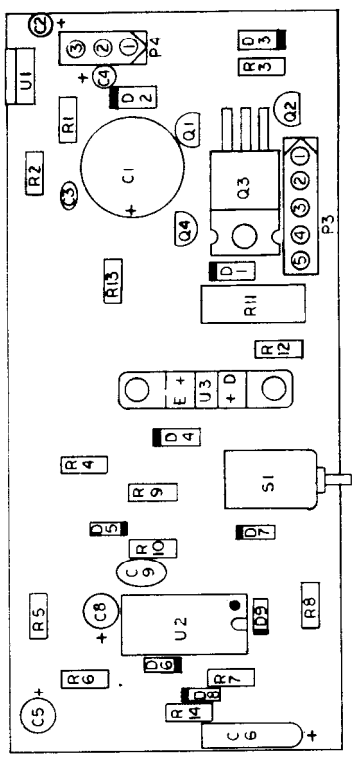
Note: This ground is applied to the acceptor grid lamp circuit through the yellow wire turning the grid lamp off. This prevents the acceptance of a note during the stack cycle.

- (8) The high at pin 7 of U 2 is also AC coupled to pin 3 of U 2 providing a momentary high, allowing the comparator to switch, outputting a momentary high from pin 1 of U 2. This high provides additional charging for C 6.  
Note: If power is removed from the stacker during the cycle, this circuit will provide a path to complete the cycle when power is restored.
- (9) As the stack cycle is completed the cutout in the optical interrupt disc will allow light to strike the photo transistor turning it on. This will cause pin 5 of U 2 to go low (approx. 0 vdc) switching pin 7 of U 2 low, providing a quick discharge path for capacitor C 6.
- (10) When C 6 discharges to approx. 12 vdc, pin 14 of U 2 will go low, cutting off Q 2 and Q 3 turning the motor off.
- (11) To prevent coasting, a brake circuit is added (Q 1 and motor) to stop the motor instantly.

2X2106 P.C. BD. ASSY



NOTES: 1. ALL RESISTORS 10% 1/4 W UNLESS OTHERWISE SPECIFIED  
 2. U2 = LM324



P.C. BOARD COMPONENT LAYOUT

|                           |                          |              |
|---------------------------|--------------------------|--------------|
| SCALE: NTS                | APPROVED BY: [Signature] | DRAWN BY: PS |
| DATE: 30 OCT 78           | APPLIC: 48X120           | REVISED      |
| SCHEMATIC STACKER CIRCUIT |                          | 48 X 120     |
| DRAWING NUMBER            |                          | 43X322       |

## INTERCHANGEABILITY OF STACKER

Interchangeability of the 48x24-3 and 48x120-1 stackers.

As of 9-1-79 the 48x120-1 has become the current production model stacker. This stacker, commonly called the "flat stacker", requires a note acceptor equipped with the 2x2148 super extended drive motor rail. This motor rail is required to insure proper delivery of the note into the stacker. The 2x2148 super extended drive motor rail protrudes approximately 3/8 of an inch past the rear of the note acceptor. The distance between the driven roller assembly and the idler roller is approximately 1-1/4 inches center to center. The idler roller has four white plastic rollers. The 48x120-1 stacker must be used with the 2x2148 motor rail.

The 48x24-3 stacker may be used with either the 2x1501 motor rail (which does not protrude outside the rear of the note acceptor) or the 2x2148 super extended drive motor rail.

Simply stated:

A 2x1501 or 2x2148 motor rail may be used with a 48x24-3 stacker.

A 2x2148 super extended drive motor rail must be used with the 48x120-1 stacker.



## OPERATION OF THE 2 X 1094-1 POWER SUPPLY

The purpose of the power supply board is to convert the incoming AC voltage to suitable DC voltage levels to operate the hoppers, custom IC cards and the empty light.

1. The incoming AC voltage is brought into the changer via the 3 wire line cord.
2. The 3 wire line cord is connected to the transformer terminal strip.
  - A. For a T 8770, T 8771, T 8772 and L 8880
    - the black wire connects to #1
    - the white wire connects to #2
    - the green wire connects to #6
  - B. For a C 8090 and C 8091
    - the black wire connects to #1
    - the white wire connects to #3
    - the green wire connects to #5
3. The transformer terminal strip connects the line cord to the primary of the transformer. Note: the 2 X 1266 circuit breaker assembly is in series with the line cord and primary of the transformer.
4. The transformer has a dual secondary. One secondary (green, green/white) is 27 VAC and powers the note acceptor, stacker and illumination lamps. The other secondary (white, brown/white) provides approximately 22 VAC to the power supply board inputted to pins 3 and 4 of the edge connector.
5. The incoming 22 VAC is rectified by the full wave bridge and is filtered by the 2500 mfd capacitor. At the node where the positive side of the 2500 mfd capacitor and the 0.5 ohm resistor connect, typically the voltage measured is approximately 30 volts DC.

6. Transistor T5 is used as a pass transistor. The filtered DC is connected through the 0.5 ohm resistor to the collector of T5. The base of transistor T5 is clamped at 17 VDC  $\pm$  5% by zener Z<sub>1</sub>.
7. The regulated output is obtained at the emitter of transistor T5, typically 17 VDC. (T5 is a darlington so the base-emitter voltage drop will be approximately 1.2 VDC).
8. The 5 K ohm pot., the 1.2 K ohm, 1 K ohm, 3.9 K ohm and 10 K ohm resistors, transistors T<sub>1</sub> and T<sub>2</sub> comprise the current limiting circuit. Current limiting is factory set at 6.0 amps.
  - A. The 5 K ohm pot., the 1.2 K ohm, 1 K ohm, 3.9 K ohm and 10 K ohm resistors and transistor T<sub>1</sub> are used to bias transistor T<sub>2</sub>.
  - B. Increasing the current drawn by the changer changes the biasing of transistor T<sub>2</sub> causing the voltage drop across zener Z<sub>1</sub> to decrease which in turn decreases the voltage available at the emitter of transistor T<sub>5</sub>.
9. The regulated output at the emitter of transistor T<sub>5</sub> (violet wire) is approximately 17 volts DC and is used in the following ways:
  - A. to power the hopper motor in the dump mode only
  - B. provides power to one side of the latch relay coil
  - C. provides power to one side of the latch relay contacts
  - D. to bias the empty light transistors T<sub>3</sub> and T<sub>4</sub>
10. When the reset button is depressed the latch relay is momentarily energized. This causes the contacts to mechanically be locked open or closed depending on the previous condition. Each depression of the switch causes the contacts to alternately open or close.
  - A. When the latch relay contacts close power is provided to the node at which: the inhibit relay coil, the anode of the power diode, the positive end of the 500 mfd capacitor and the 12 volt voltage regulator is connected.

1. The power to operate: the motor during refill, the payout solenoid and the emitter lamps is also provided at this node via the power diode and the green wire pin 7 of the edge connector.

2. The 12 volt regulator (56 X 58) has approximately 15 VDC at its input which will then output 12.0 VDC  $\pm$  2%. The 12 VDC output provides power for the custom IC cards, the photo detectors and biasing for transistor T 3.

B. When the latch relay contacts are open power is only provided to the hopper motor for the dump mode only. No power is applied to: the emitter lamps, the payout solenoid, the custom IC cards or the hopper motor for refill.

#### 11. The Empty light

One terminal of the empty light always has power applied to it. The power is obtained from the collector of transistor T<sub>5</sub>. Grounding the other terminal of the empty light causes the lamp to turn on.

This grounding is accomplished by turning on transistor T<sub>4</sub>.

A. In the non-empty mode transistor T<sub>3</sub> is turned on causing the base of transistor T<sub>4</sub> to be grounded. When the base of transistor T<sub>4</sub> is grounded the transistor is off and the empty light is not grounded (empty light off).

B. In the empty mode transistor T<sub>3</sub> is turned off causing transistor T<sub>4</sub> to be forward biased (on). This provides a ground for the empty light. (Empty light on).

#### 12. The inhibit relay

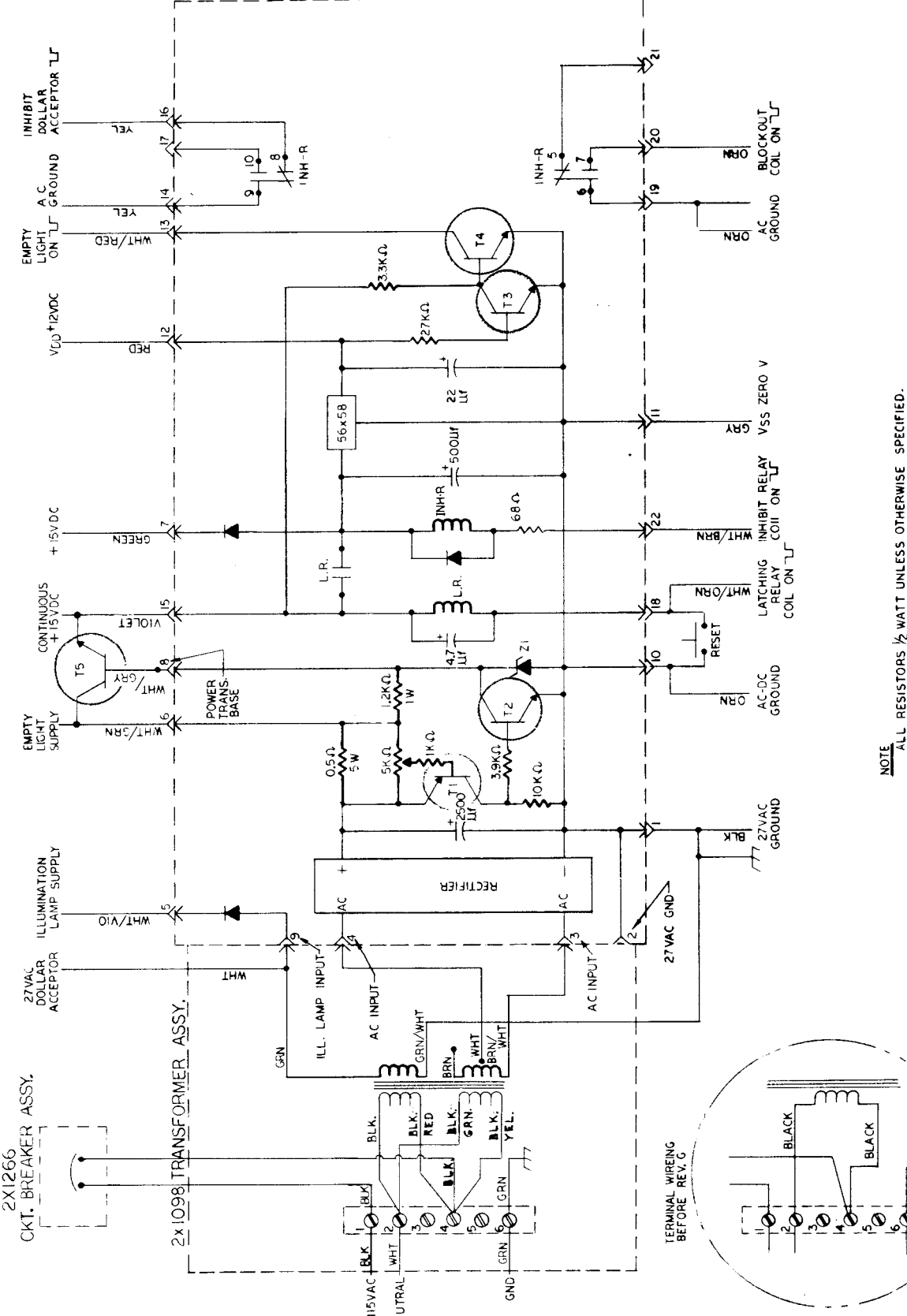
A. In the normal operating mode, that is the changer ready to accept a dollar or a coin, the inhibit relay is energized. When the inhibit relay is energized a ground is provided for the block out coil through the relay contacts. This allows the fingers of the block out coil to be removed from the coin mech. Also, at this time an additional set of contacts in the relay open removing the inhibit from the note acceptor.

B. When the changer is in the inhibit (during payout or empty), the inhibit relay is not energized. This opens the relay contacts that provide a ground for the block out coil causing the fingers on the block out coil to be inserted in the coin mech. At the same time the other set of contacts in the relay close providing an inhibit to the note acceptor by grounding out the grid lamp.

2X1094 POWER SUPPLY BOARD

| <u>Socket<br/>Pin #</u> | <u>Color<br/>Wire</u> | <u>Function</u>   |
|-------------------------|-----------------------|---|
| 1                       | Black                 | 27 Vac Ground   |
| 2                       | Green/White           | 27 Vac Ground   |
| 3                       | Brown/White           | A.C. Input  |
| 4                       | White                 | A.C. Input  |
| 5                       | White/Violet          | 26 Vac. ILL Lamp Supply   |
| 6                       | White/Green           | T5 Collector, 30 VDC Collector of T5 PWR Transistor (Empty Lite Supply) |
| 7                       | Green                 | Auto Function of Hoppers +15 VDC Hopper Solenoid & MTR Emitter Lamps    |
| 8                       | White/Gray            | T5 Base +17 VDC Base of T5 PWR Transistor                               |
| 9                       | Green (or) White      | 27 VAC Acceptor Supply  |
| 10                      | Orange                | AC-DC Ground Reset Button   |
| 11                      | Gray                  | VSS Zero V  |
| 12                      | Red                   | +12 VDC Custom I.C. Cards & Hopper Photo Cells                          |
| 13                      | White/Red             | T4 Collector - Empty Lite on  |
| 14                      | Yellow                | AC Ground = Pin #9 Inhibit Relay  |
| 15                      | Violet                | T5 Emitter +15 VDC Continuous Hopper Dump Lever SW                      |
| 16                      | Yellow                | Inhibit Dollar Acceptor = Pin #8 Inhibit Relay                          |
| 17                      |                       | Inhibit IC Pin #11 = Pin #10 of Inhibit Relay                           |
| 18                      | White/Orange          | (Reset) Latch Relay Coil on   |
| 19                      | Orange                | AC Ground Pin #6 Inhibit Relay  |
| 20                      | Orange                | Block out Coil on Pin #7 Inhibit Relay                                  |
| 21                      |                       | To Pin #5 of Inhibit Relay  |
| 22                      | White/Brown           | Inhibit Relay (Coil) on   |

# 2X1094 POWER SUPPLY BOARD



NOTE  
ALL RESISTORS 1/2 WATT UNLESS OTHERWISE SPECIFIED.

| REV | DESCRIPTION | DATE | BY   | CHKD | TERMINAL | WIRE | LOCATIONS |
|-----|-------------|------|------|------|----------|------|-----------|
| E   | 5197        | 0    | 1/27 | 1    | 1        | 2    |           |
| D   | 4872        | 0    | 1/27 | 1    | 2        | 3    |           |
| C   | 4772        | 0    | 1/27 | 1    | 3        | 4    |           |
| B   | 4556        | 0    | 1/27 | 1    | 4        | 5    |           |
| A   | 4558        | 0    | 1/27 | 1    | 5        | 6    |           |

| REV | DESCRIPTION | DATE | BY   | CHKD |
|-----|-------------|------|------|------|
| G   | 5390        | 0    | 1/27 | 1    |
| F   | 5385        | 0    | 1/27 | 1    |

| REV | DESCRIPTION | DATE | BY   | CHKD |
|-----|-------------|------|------|------|
| D   | 4772        | 0    | 1/27 | 1    |
| C   | 4772        | 0    | 1/27 | 1    |
| B   | 4556        | 0    | 1/27 | 1    |
| A   | 4558        | 0    | 1/27 | 1    |

| REV | DESCRIPTION | DATE | BY   | CHKD |
|-----|-------------|------|------|------|
| D   | 4872        | 0    | 1/27 | 1    |
| C   | 4772        | 0    | 1/27 | 1    |
| B   | 4556        | 0    | 1/27 | 1    |
| A   | 4558        | 0    | 1/27 | 1    |

| REV | DESCRIPTION | DATE | BY   | CHKD |
|-----|-------------|------|------|------|
| D   | 4872        | 0    | 1/27 | 1    |
| C   | 4772        | 0    | 1/27 | 1    |
| B   | 4556        | 0    | 1/27 | 1    |
| A   | 4558        | 0    | 1/27 | 1    |

| REV | DESCRIPTION | DATE | BY   | CHKD |
|-----|-------------|------|------|------|
| D   | 4872        | 0    | 1/27 | 1    |
| C   | 4772        | 0    | 1/27 | 1    |
| B   | 4556        | 0    | 1/27 | 1    |
| A   | 4558        | 0    | 1/27 | 1    |

| REV | DESCRIPTION | DATE | BY   | CHKD |
|-----|-------------|------|------|------|
| D   | 4872        | 0    | 1/27 | 1    |
| C   | 4772        | 0    | 1/27 | 1    |
| B   | 4556        | 0    | 1/27 | 1    |
| A   | 4558        | 0    | 1/27 | 1    |

| REV | DESCRIPTION | DATE | BY   | CHKD |
|-----|-------------|------|------|------|
| D   | 4872        | 0    | 1/27 | 1    |
| C   | 4772        | 0    | 1/27 | 1    |
| B   | 4556        | 0    | 1/27 | 1    |
| A   | 4558        | 0    | 1/27 | 1    |

| REV | DESCRIPTION | DATE | BY   | CHKD |
|-----|-------------|------|------|------|
| D   | 4872        | 0    | 1/27 | 1    |
| C   | 4772        | 0    | 1/27 | 1    |
| B   | 4556        | 0    | 1/27 | 1    |
| A   | 4558        | 0    | 1/27 | 1    |

2X1266  
CKT. BREAKER ASSY.

2X1098 TRANSFORMER ASSY.

115VAC NEUTRAL

27VAC DOLLAR ACCEPTOR

ILLUMINATION LAMP SUPPLY

EMPTY LIGHT SUPPLY

+15VDC CONTINUOUS

+5VDC

VDD +12VDC

EMPTY LIGHT ON

A.C. GROUND

INHIBIT DOLLAR ACCEPTOR

RECTIFIER

AC INPUT

ILL. LAMP INPUT

POWER TRANS. BASE

L.R.

INHR

56x58

33K

27K

22 uF

500uF

47 uF

68

0.5W

5K

1.2K

3.9K

10K

T5

T2

T3

T4

INH-R

27VAC GND

27VAC

AC-DC GROUND

RESET

LATCHING INHIBIT RELAY COIL

INHIBIT RELAY COIL

BLOCKOUT COIL

AC GROUND

2X1094 POWER SUPPLY BOARD

SCALE: NTS

DATE: 18 SEPT 73

APPROVED BY: KN

SCHMATIC POWER SUPPLY

DRAWING NUMBER: 43X154

ARAC INC.

11711 CHILTON RD

CANTON, OHIO 44705

1728 PRINTED ON NO. 10000 CLEARPRINT

OPERATION  
OF THE  
2x1731 POWER SUPPLY

The purpose of the power supply board is to convert the incoming AC voltage to suitable DC voltage levels to operate the hoppers, custom I.C. cards, the empty light and the illumination lights.

1. The incoming AC voltage is brought into the changer via the 3 wire line cord.
2. The 3 wire line cord is connected to the transformer terminal strip.
  - a) For a T8770, T8771, T8772 and L8880, the black wire connects to #1.  
The white wire connects to #2.  
The green wire connects to #6.
  - b) For a C8090 and C8091, the black wire connects to #1  
The white wire connects to #3  
The green wire connects to #5.
3. The transformer terminal strip connects the line cord to the primary of the transformer. Note: the 2x2126 power switch and circuit breaker assembly is in series with the line cord and the primary of the transformer.
4. The transformer has a dual secondary. One secondary, (green, green/white) is 27VAC and powers the note acceptor and stacker. The other secondary, (white, brown/white) provides approximately 22VAC to the power supply board inputted to pins 3 and 4 of the edge connector.
5. The incoming 22VAC is rectified by the full wave bridge U2 and is filtered by the 2500 MFD Capacitor. The voltage measured from the positive side of the 2500 MFD Capacitor with respect to ground is approximately 30 VDC.
6. The MJ 3000 transistor is mounted on the control box and it is used as a pass transistor. The filtered DC is connected to the collector of the MJ 3000 transistor ( via the white/green wire). The base of the MJ 3000 transistor is clamped at approximately 17.5 VDC by the voltage regulator U1.
7. The regulated output obtained at the emitter of the MJ 3000 transistor is typically 16.5 VDC ( The MJ 3000 is a darlington so the base-emitter drop will be approximately 1.0 VDC).

OPER. OF  
2x1731.

8. Resistors R1, R2, R3, R4, R5, R8; diode D4 and voltage regulator U1, comprise the current limiting circuit. Current limiting is set at 6.0 Amps. Increasing the current drawn by the changer causes the output voltage of U1 to decrease which in turn decreases the voltage available at the emitter of the MJ 3000 transistor.
  - a) The following is a list of voltages measured from selected pins on the voltage regulator U1 with respect to ground.
    1. Pin 12 with respect to ground approximately 29.5 VDC.
    2. Pin 10 with respect to ground approximately 17.5 VDC.
    3. Pin 3 with respect to ground approximately 16.5 VDC.
    4. Pin 4 with respect to ground approximately 7.2 VDC.
9. The regulated output at the emitter of the MJ 3000 transistor ( violet wire) is approximately 16.5 VDC and is used in the following ways:
  - a) to power the hoppers in the dump mode only (Pin 17 of connector)
  - b) provides power to one side of the latch relay coil
  - c) provides power to one side of the latch relay contacts
  - d) to bias the empty light transistors Q1 and Q2
  - e) provides power to one side of the empty light (Pin 17 of connector)
  - f) to power the illumination lamps (Pin 17 of connector)
10. When the reset button is depressed the latch relay is momentarily energized. This causes the contacts to mechanically be locked open or closed depending on the previous condition. Each depression of the switch causes the contacts to alternately open or close.
  - a) When the latch relay contacts close, power is provided to the node at which: the inhibit relay coil, the anode of the power diode D2, the positive end of the 500 MFD capacitor and the 12 volt voltage regulator is connected.
    1. The power to operate; the motor during refill, the payout solenoid and the emitter lamps is also provided at this node via the power diode D2 and the green wire ( Pin 7 of the edge connector).
    2. The 12 volt regulator U3 has approximately 16.5 VDC at its input which will then output 12.0 VDC. The 12 VDC output provides power for the custom IC cards, the photo detectors, and biasing for transistor Q2.



- b) When the latch relay contacts are open, power is only provided to the hopper motor for the dump mode only ( Pin 17).  
NO power is applied to: the emitter lamps, the payout solenoid, the custom IC cards or the hopper motor for refill.

#### 11. The Empty light.

One terminal of the empty light always has power applied to it. The power is obtained from Pin 17 ( violet wire approximately 16.5 VDC with respect to ground). Grounding the other terminal ( Pin 13) of the empty light causes the lamp to turn on. This grounding is accomplished by turning on transistor Q1.

- a) In the non-empty mode transistor Q2 is turned on causing the base of transistor Q1 to be grounded. When the base of transistor Q1 is grounded, the transistor is off and the empty light is not grounded ( empty light off).
- b) In the empty mode transistor Q2 is turned off causing transistor Q1 to be forward biased ( on). This provides a ground for the empty light. ( empty light on).

#### 12. The Inhibit relay.

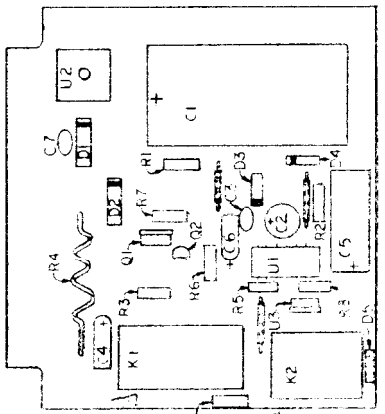
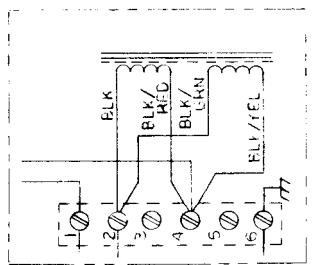
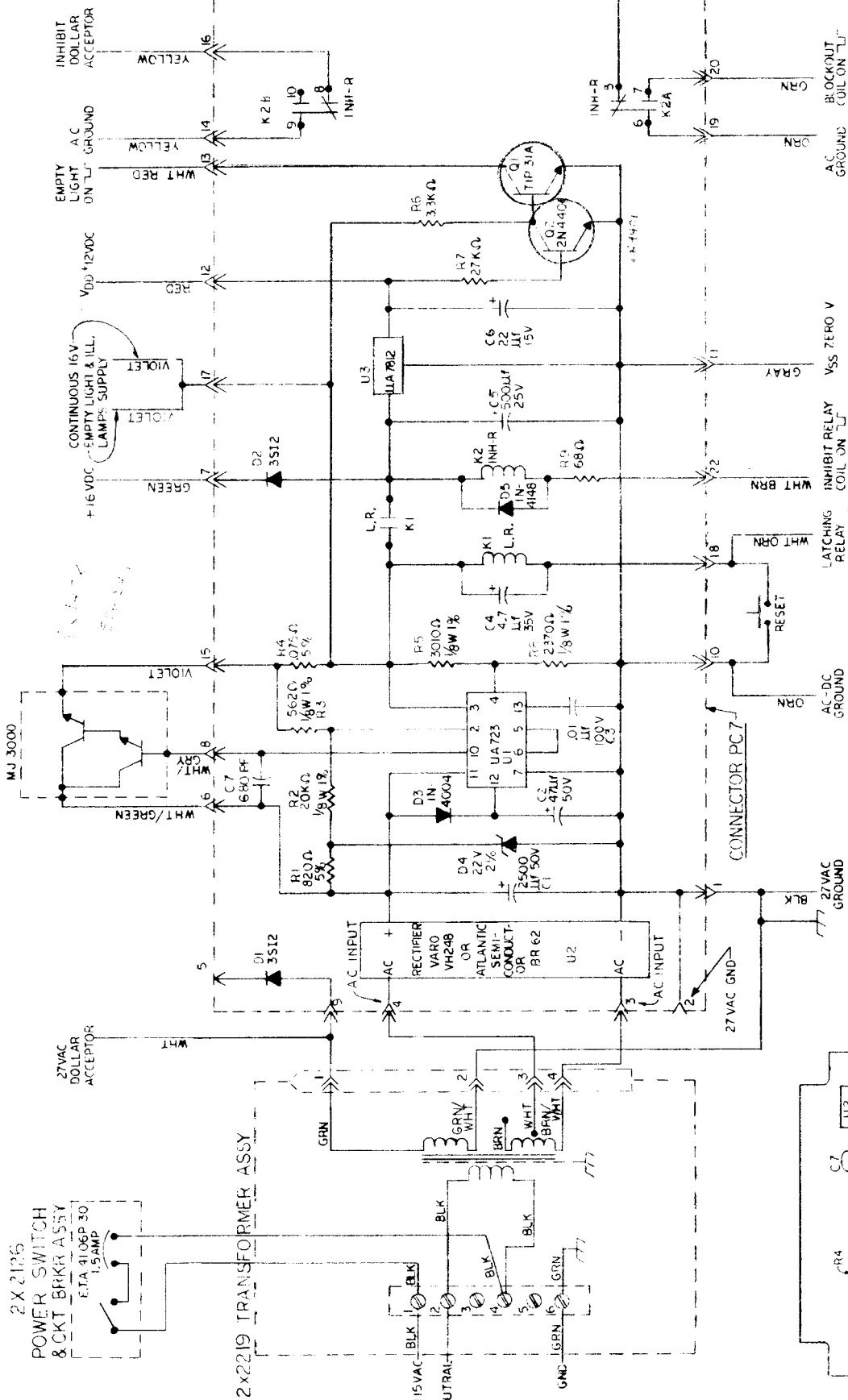
- a) In the normal operating mode, that is the changer ready to accept a dollar or a coin, the inhibit relay is energized. When the inhibit relay is energized a ground is provided for the block out coil through the relay contacts. This allows the fingers of the block out coil to be removed from the coin mech. Also, at this time, an additional set of contacts in the relay open removing the inhibit from the note acceptor.
- b) When the changer is in the inhibit (during payout or empty), the inhibit relay is not energized. This opens the relay contacts that provide a ground for the block out coil causing the fingers on the block out coil to be inserted in the coin mech. At the same time the other set of contacts in the relay close providing an inhibit to the note acceptor by grounding out the grid lamp.

2X1731 Power Supply Board

| <u>Socket<br/>Pin #</u> | <u>Color<br/>Wire</u> | <u>Function</u>  |
|-------------------------|-----------------------|--|
| 1                       | Black                 | 27 VAC Ground  |
| 2                       |                       | Not Used   |
| 3                       | Brown/White           | A.C. Input   |
| 4                       | White                 | A.C. Input   |
| 5                       | White/Violet          | Not Used   |
| 6                       | White/Green           | MJ 3000 Collector, 30VDC on collector of MJ 3000 Power Transistor            |
| 7                       | Green                 | Auto Function of Hoppers, hopper solenoid, motor and emitter lamps           |
| 8                       | White/Gray            | 17.5 VDC at the base of MJ 3000 Power Transistor                             |
| 9                       | Green and White       | Not Used   |
| 10                      | Orange                | AC-DC Ground, Reset Button   |
| 11                      | Gray                  | VSS, Ground ( Zero Volts)  |
| 12                      | Red                   | +12 VDC to Custom I.C. Cards & Hopper Photo Cells                            |
| 13                      | White/Red             | O1 Collector, Empty Light on when low. ( Grounded )                          |
| 14                      | Yellow                | AC Ground - Pin #9 Inhibit Relay, K2B  |
| 15                      | Violet                | MJ 3000 Emitter, 16.5 VDC <i>REGULATOR</i>                                   |
| 16                      | Yellow                | Inhibit Dollar Acceptor-Pin #8 Inhibit Relay K2B                             |
| 17                      | Violet                | Continuous 16 Volt Supply, hopper dump mode, empty light, illumination lamps |
| 18                      | White/Orange          | Reset, Latch Relay Coil on when low. ( Grounded )                            |
| 19                      | Orange                | AC Ground Pin #6 Inhibit Relay K2A   |
| 20                      | Orange                | Blockout Coil on when low ( Grounded ) Pin #7 Inhibit Relay K2A              |
| 21                      |                       | TO Pin #5 of Inhibit Relay K2A   |
| 22                      | White/Brown           | Inhibit Relay Coil on when low. ( Grounded )                                 |

2X 2126  
POWER SWITCH  
& CKT BRKR ASSY  
ETA 3106P 30  
1.5 AMP

2X2219 TRANSFORMER ASSY



**NOTE**  
1. ALL RESISTORS 1/2 WATT UNLESS OTHERWISE SPECIFIED  
2. SEE 43X158 FOR CONTROL BOX HARNESS CONNECTIONS TO 2X1731, CONNECTOR NO. PC7

Power supply 2X1731 Board

| REV | DESCRIPTION | DATE | BY | CHKD | APP'D |
|-----|-------------|------|----|------|-------|
| 1   | REVISED     |      |    |      |       |
| 2   |             |      |    |      |       |
| 3   |             |      |    |      |       |
| 4   |             |      |    |      |       |
| 5   |             |      |    |      |       |
| 6   |             |      |    |      |       |
| 7   |             |      |    |      |       |

SCHEMATIC POWER SUPPLY U.L. CHANGE 4  
ARDAC INC.  
43X326

## INTERCHANGEABILITY OF POWER SUPPLY BOARDS

Interchangeability of the 2x1731 and 2x1094-1 power supply board.

Changers manufactured after the following serial numbers have the new style power supply board 2x1731 installed in them.

C8090 serial number 089003

T8770 serial number 079026

L8880 serial number 079009

The first two digits of the serial number represent the month and the third digit represents the year of manufacture. Example: 019555 means the changer was manufactured in January, 1979, 01 - January, 9 - 1979 (third digit). These changers are readily identifiable by having an on/off switch located on the control box to the left of the circuit breaker on a T8770, T8771, T8772 and L8880 or on the transformer cover below the circuit breaker on a C8090 or C8091.

Note: If the new power supply board 2x1731 is installed in an earlier version of the above mentioned changers (ie. with a 2x1094-1 power supply board manufactured before the above serial number, no on/off switch) the changer will continue to operate properly. However, if a 2x1094-1 power supply is installed in the latest version of the changer, with an on/off switch, the following operations will not function.

The empty light and illumination lamps will not operate and the hopper will not run in the dump mode. (ie. upon lifting

the dump handle of the hopper, the hopper motor will not run).

Simply stated:

A changer with an on/off switch has a 2x1731 power supply board.

A changer without an on/of switch has a 2x1094-1 power supply board.

## HOPPER SEQUENCE

1. Press changer reset button
  - A. Hopper emitter lamps on (black bar front of hopper).
  - B. Light from top emitter lamp strikes top detector (behind coin channel).
  - C. Signal transmitted to hopper control card (custom IC).
  - D. "Motor on" signal sent from hopper control card to hopper.
  - E. Motor on, turning hopper belt to fill coin channel.
  - F. Channel full, top detector covered, signal sent to hopper control card which sends "motor off" signal to hopper.

Note: If a hopper does not fill the coin channel within 24 seconds, the changer will return to empty conditions.

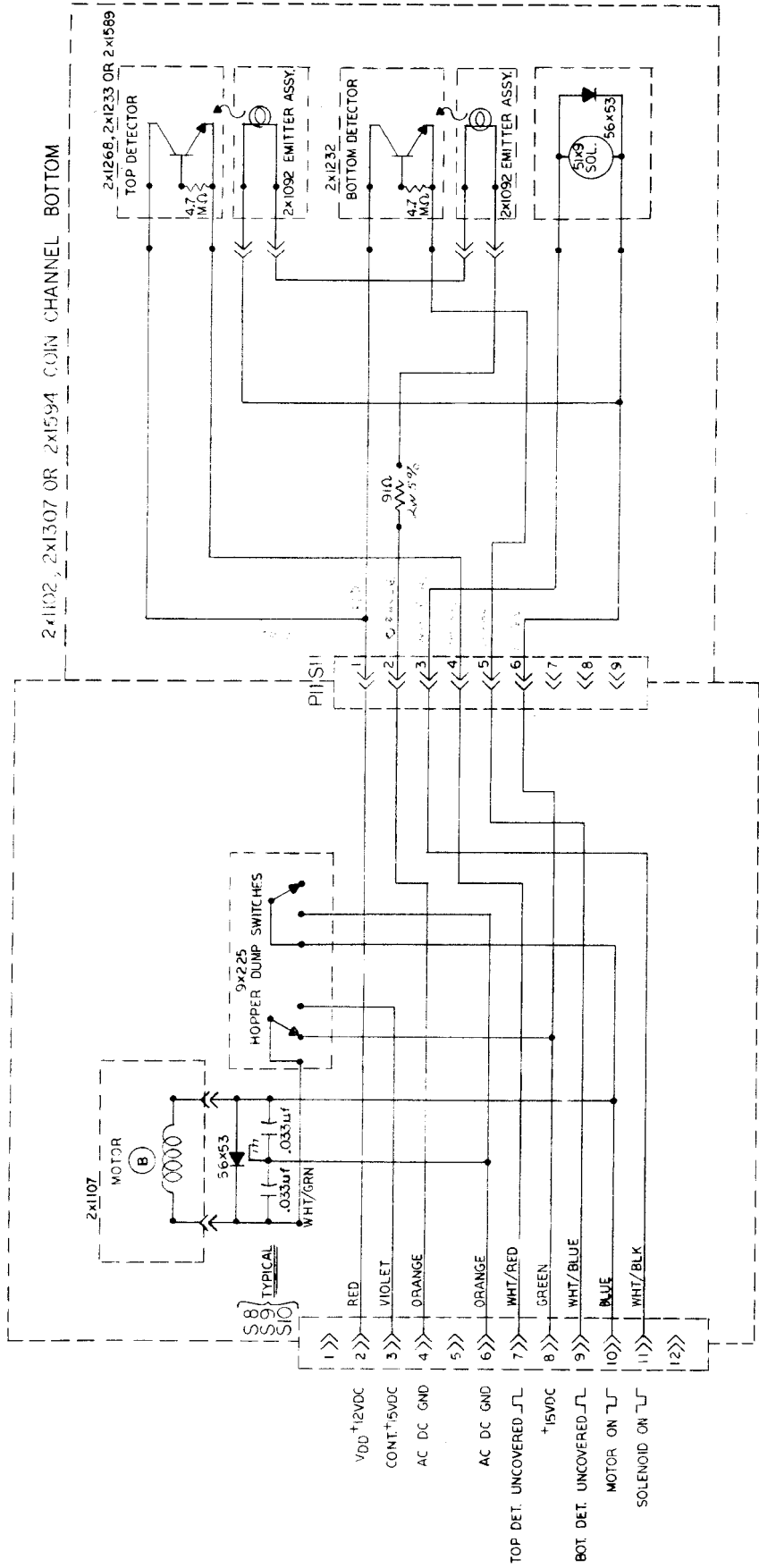
2. Dollar bill inserted in acceptor
  - A. Vend signal to hopper control board.
  - B. Hopper control card sends "solenoid on" signal to the hopper causing the payout pins to toggle once. This allows one coin to drop and hold second coin above lower detector.
  - C. Light from the lower emitter housing strikes the lower detector.
  - D. This signal is fed to hopper control card which counts the coin and removes power from the payout solenoid.

This sequence is continual until the payout is complete.

Note: The number of coins paid out by each hopper is governed by the program card, e. g. 2Q, 4D, 2N.

3. Payout is complete and the coins removed from the coin channel causes the top detector to see light repeating the motor on sequence.

43x152



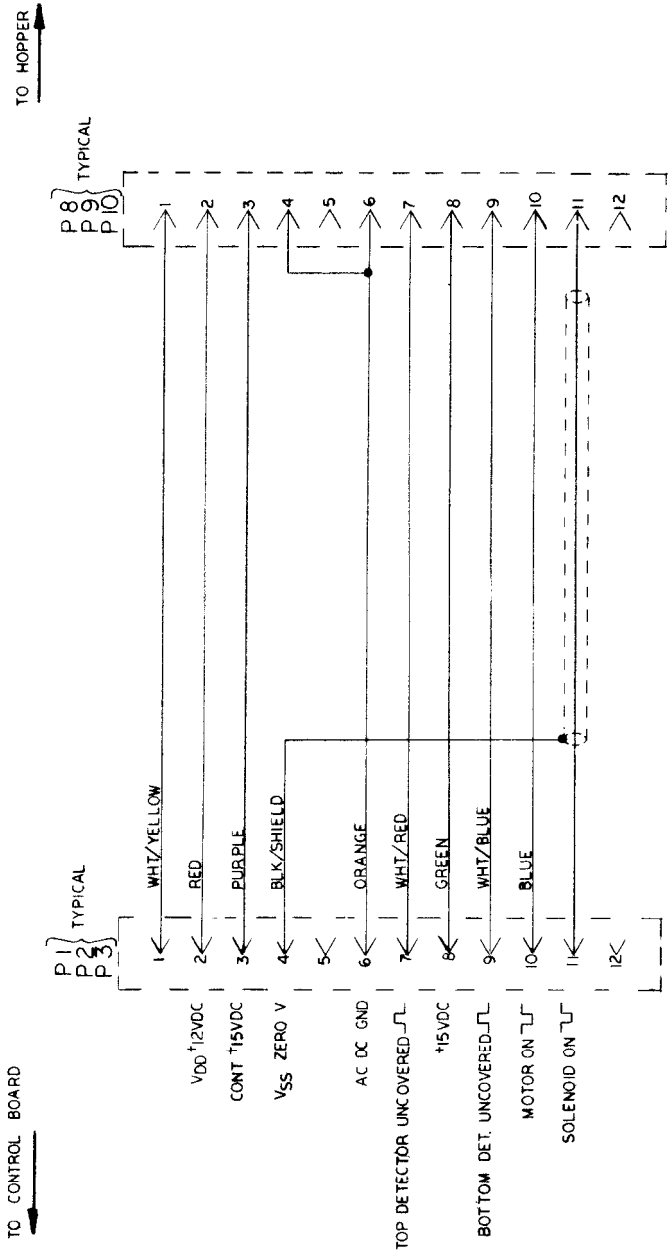
| REV   | DESCRIPTION                                  | DATE      | BY | CHKD |
|-------|--|-----------|----|------|
| REV E | UPDATED TO ADD 2x1307 & 2x1594               | 27 JUL 77 | P  | 3    |
| REV D | REVISED WIRES FROM MODEL                     | 9 DEC 76  | P  | 9    |
| REV C | REVISED WIRES FROM MODEL                     | 5 DEC 76  | P  | 9    |
| REV B | 2x1266 WAS 2x1092, 2x1232 WAS 2x1000         | 74        | G  | 70   |
| REV A | ADDED 2x1092, 2x1232, 2x1266, 2x1589, 2x1594 | 74        | P  | 74   |
| REV F | ADDED CHASSIS SYMBOL                         | 77        | P  | 77   |
| REV G | 110Ω RESISTOR WAS 100Ω                       | 77        | P  | 77   |
| REV H | ADDED CHASSIS SYMBOL                         | 77        | P  | 77   |
| REV I | 100Ω RESISTOR WAS 150Ω & LAYOUT WAS LED      | 77        | P  | 77   |
| REV J | MOVED A TIA 5% RESISTOR TO TOP DETECTOR      | 74        | P  | 74   |
| REV K | MOVED A TIA 5% RESISTOR TO BOTTOM DETECTOR   | 74        | P  | 74   |
| REV L | 100Ω RESISTOR WAS 150Ω & LAYOUT WAS LED      | 77        | P  | 77   |

|       |     |             |            |          |
|-------|-----|-------------|------------|----------|
| SCALE | NTS | APPROVED BY | DATE       | DRAWN BY |
|       |     |             | 13 SEPT 73 | DHB      |
|       |     |             |            | REVISED  |

|                        |        |
|------------------------|--------|
| CHANNEL WIRING DIAGRAM |        |
| DRAWING NUMBER         | 43x152 |



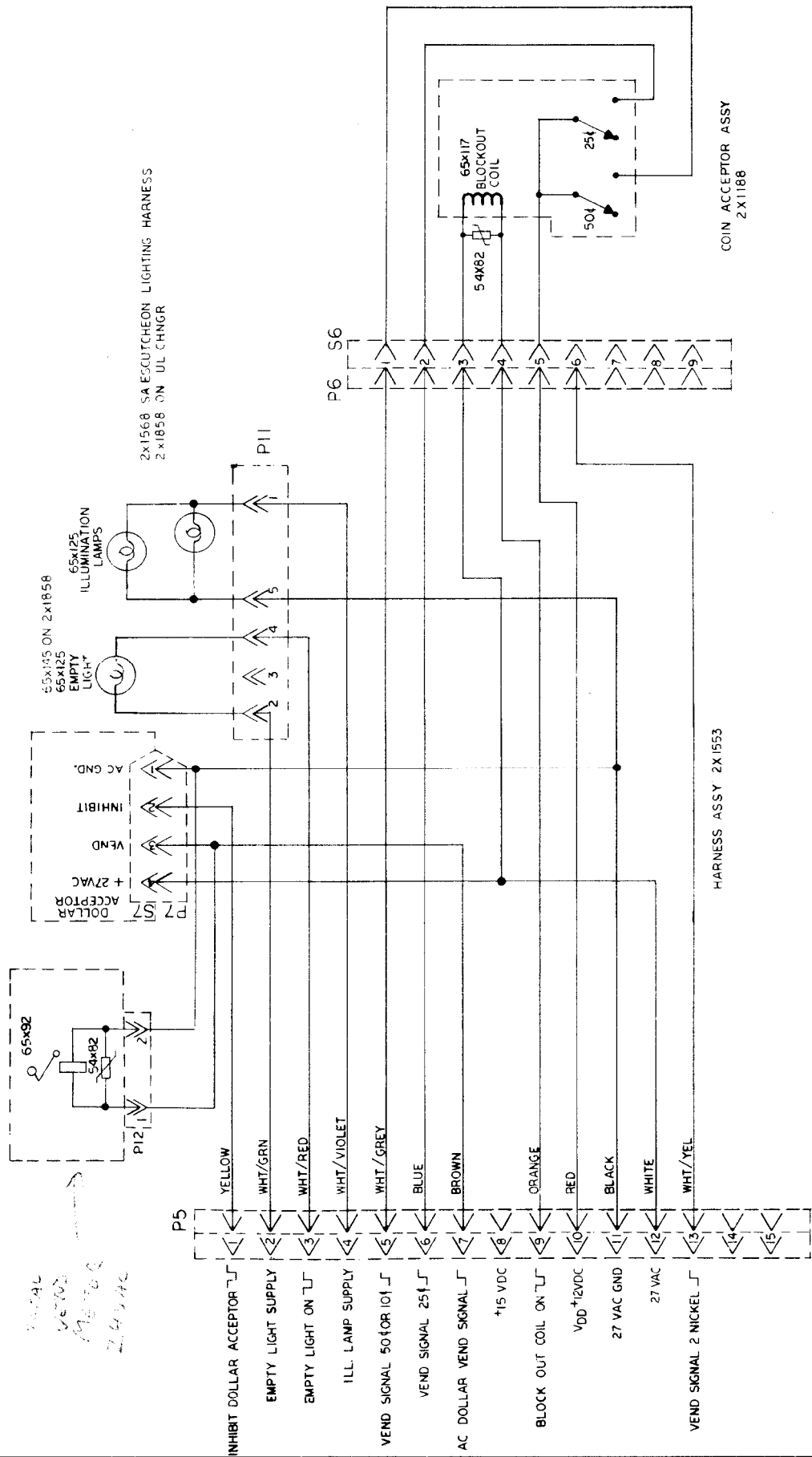
|          |                  |         |
|----------|------------------|---------|
| PLUG NO  | HARNESS ASSY. NO | HOPPER  |
| P1 & P8  | 2X1293-1         | QUARTER |
| P2 & P9  | 2X1293-2         | DME     |
| P3 & P10 | 2X1293-3         | NICKEL  |

|                                 |                             |                 |
|---------------------------------|-----------------------------|-----------------|
| SCALE NTS                       | APPROVED BY: <i>AS ZHNS</i> | DRAWN BY: GORTI |
| DATE: 31 DEC 74                 |                             | REVISION        |
| HOPPER TO CONTROL BOARD HARNESS |                             |                 |
| <b>ARDAC INC.</b>               |                             |                 |
| DRAWING NUMBER                  |                             | 43X179          |



2 X 1967 COUNTER ASSY (OPTIONAL)

TOTAL  
VENDS  
MAY 76  
24 3/4"



HARNES ASSY 2X1553

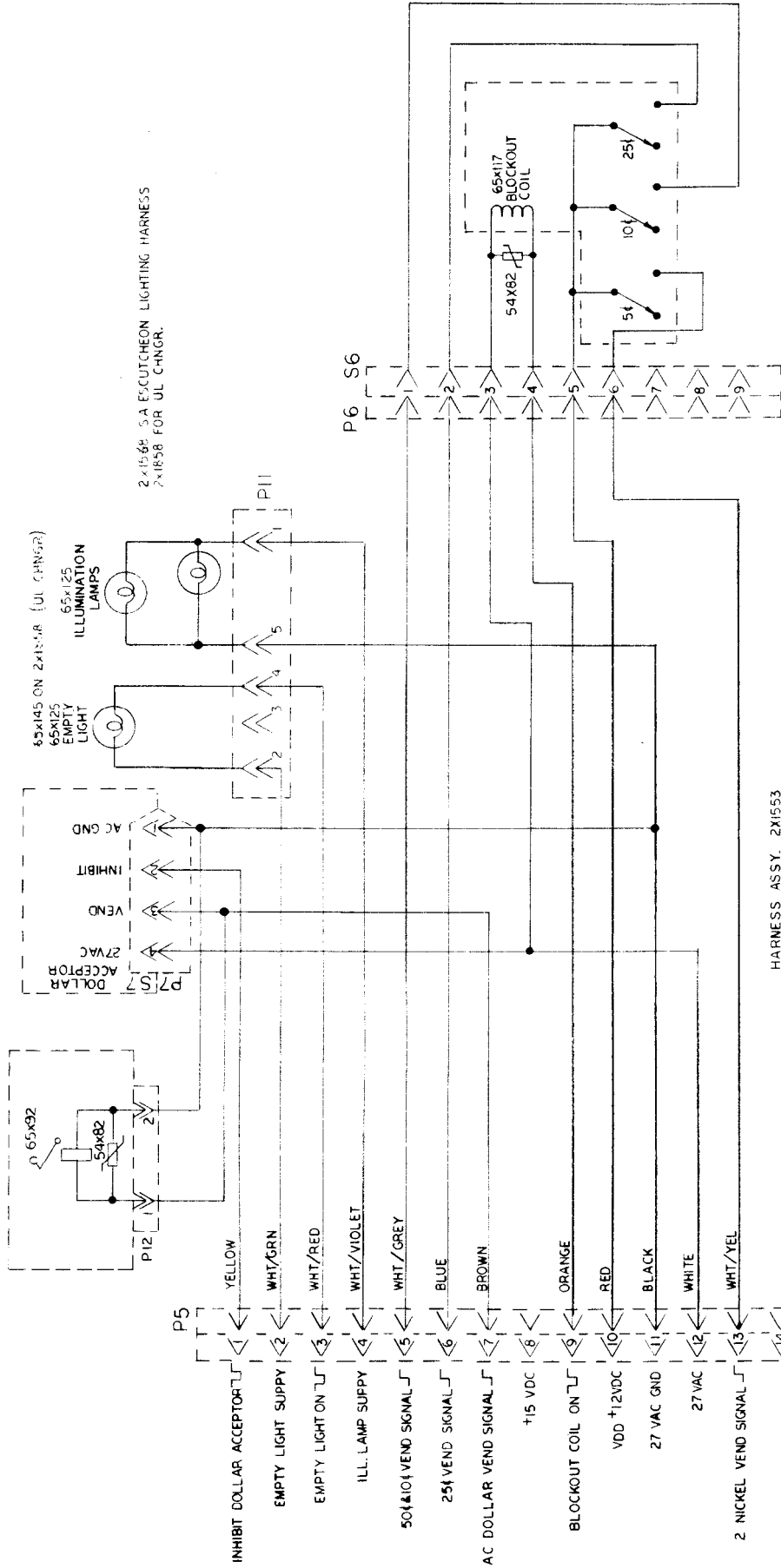
COIN ACCEPTOR ASSY  
2X1188

|   |                                 |                 |
|---|---------------------------------|-----------------|
| SCALE: N T S                                | APPROVED BY: <i>[Signature]</i> | DRAWN BY: D H B |
| DATE: 21 MAY 76                             | APPLIC: V B 770                 | REVISED         |
| MAIN CABINET & COIN ACCEPTOR WIRING DIAGRAM |                                 | DRAWING NUMBER  |
|   |                                 | 43x214          |
| <b>ARDAC INC.</b>                           |                                 |                 |

|         |                                    |             |
|---------|------------------------------------|-------------|
| REVISED | ADDED TRINGT COUNTER               | D 17 JAN 77 |
| B 6220  |                                    |             |
| REVISED | ADDED 2X1568 ESC. LIGHTING HARNESS | P 17 MAY 77 |
| A 3837  | ADDED 2X1858 Y 65X125 ON UL        |             |

43x217

2x1967 COUNTER ASSY (OPTIONAL)

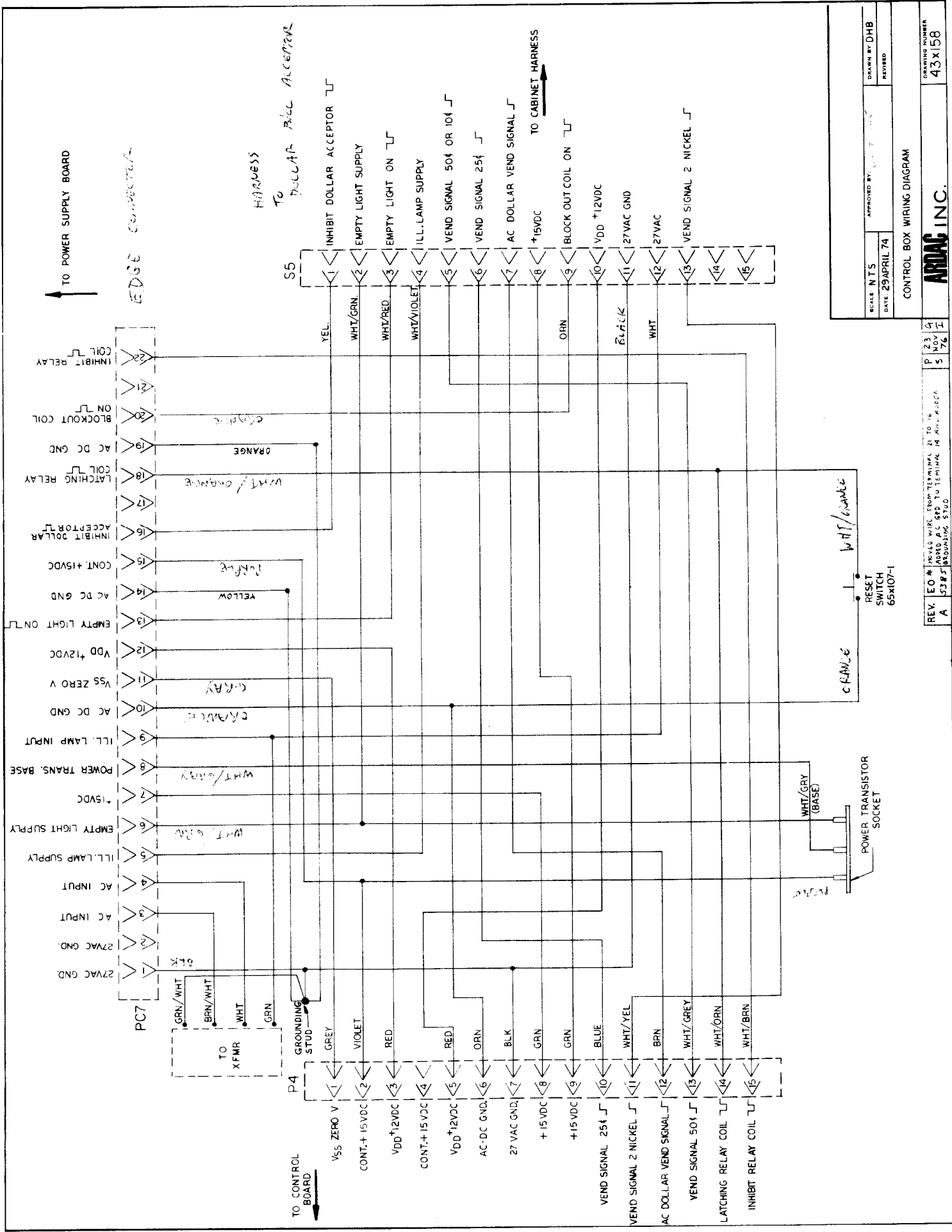


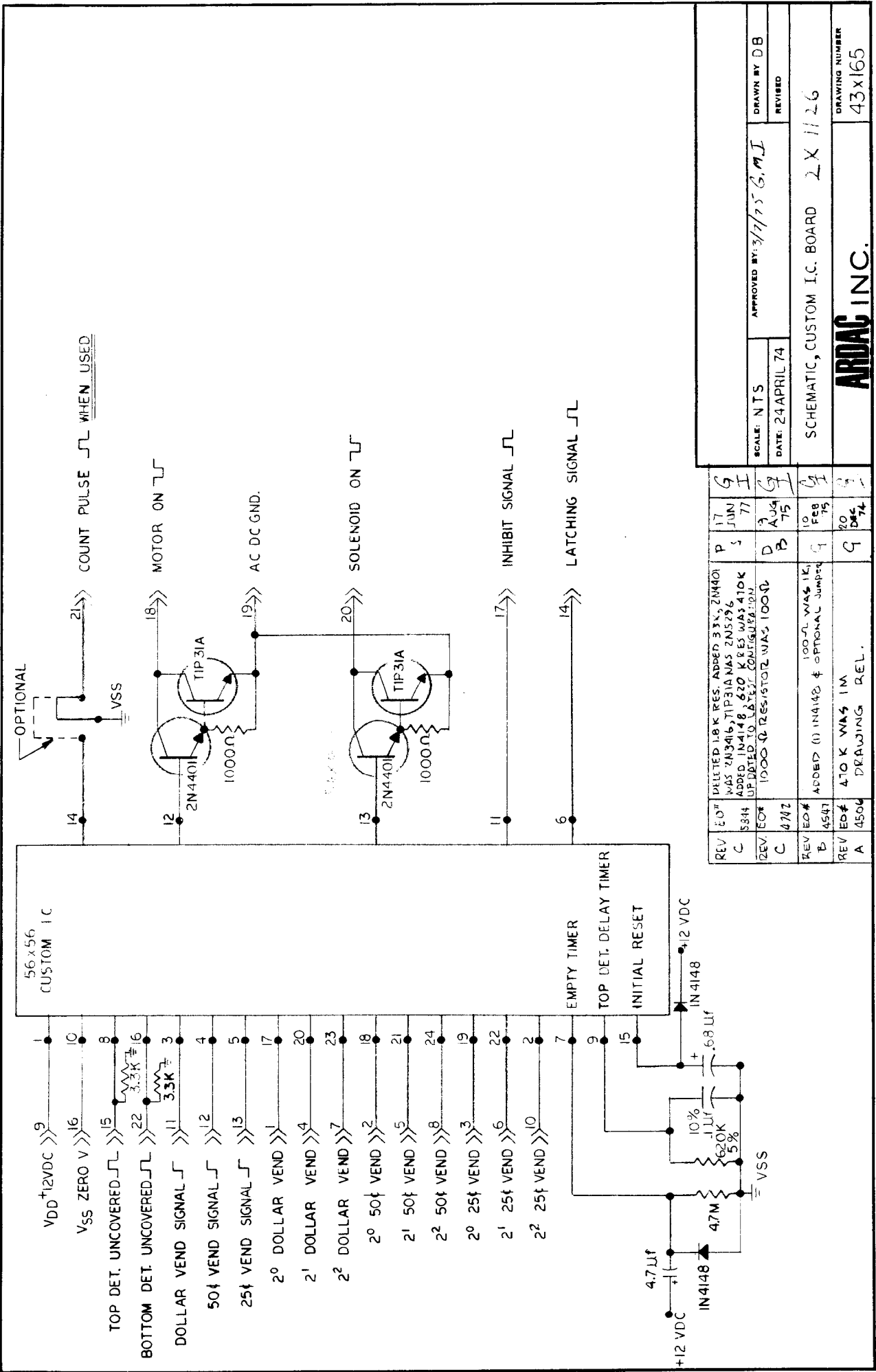
HARNESS ASSY. 2X1553

COIN ACCEPTOR ASSY.  
2X1192-2

|                |           |                                       |       |
|----------------|-----------|---------------------------------------|-------|
| SCALE          | NTS       | APPROVED BY                           | GORDI |
| DATE           | 21 MAY 76 | REVISED                               |       |
| MAIN CABINET   |           | COIN ACCEPTOR WIRING DIAGRAM 54104251 |       |
| DRAWING NUMBER |           | 43X217                                |       |

|     |     |                    |           |
|-----|-----|--------------------|-----------|
| REV | ED  | ADDED 2/1/67       | COUNTER Z |
| B   | WLD |                    |           |
| REV | ED  | ADDED 65x145       | FOR       |
| A   | JRS | ILL. CHNGR. 1-8-80 |           |





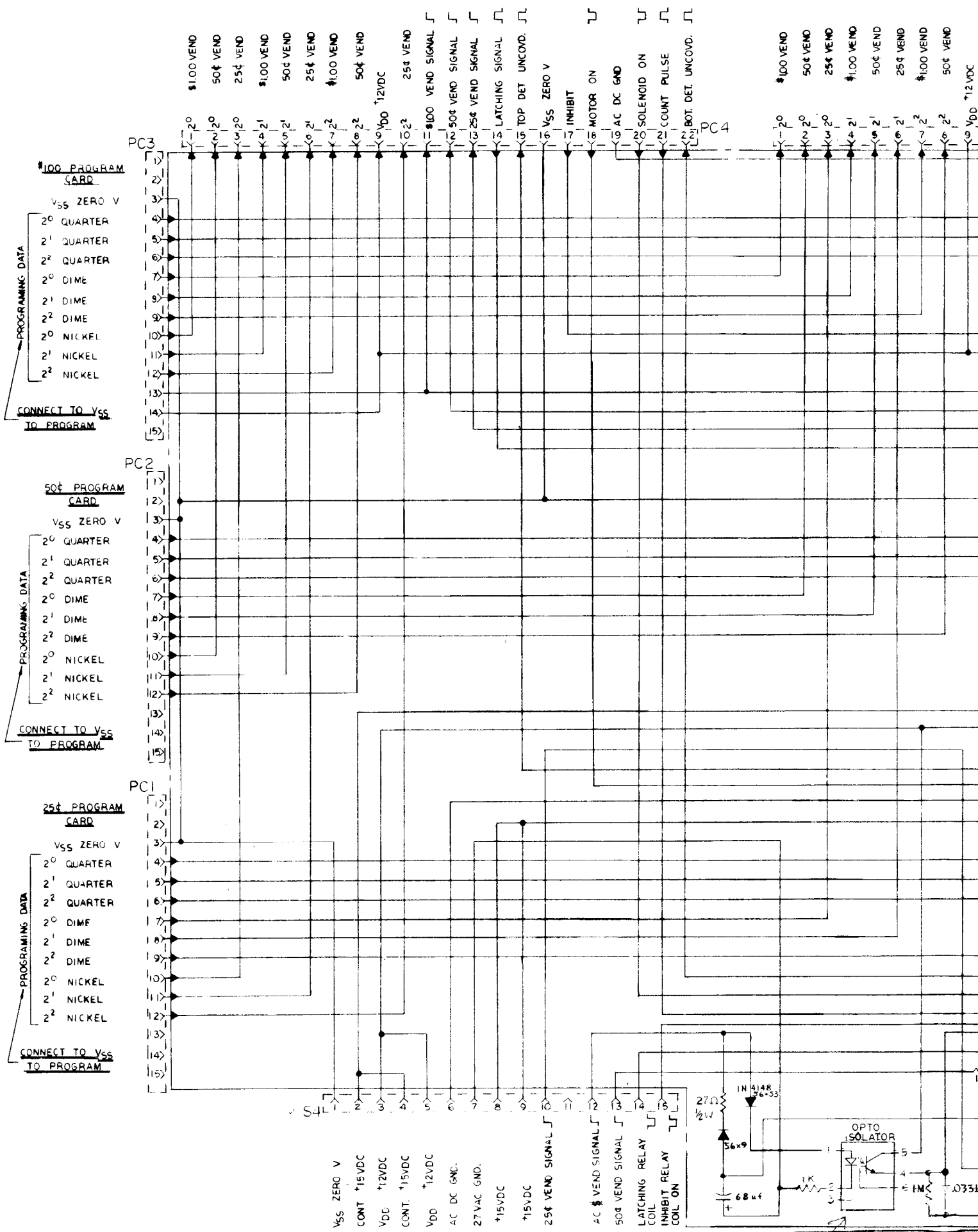
|         |  |   |    |    |
|---------|--|---|----|----|
| REV E07 | DELETED 18K RES. ADDED 33K 2N4401 WAS 2N3416, TIP31A WAS 2N5276  | P | 17 | GI |
| C       | ADDED IN4148 620 K RES WAS 470K UP DATED TO LATEST CONFIGURATION | S | 77 | GI |
| REV E06 | 1000Ω RESISTOR WAS 100Ω  | D | 75 | GI |
| C       | ADDED (1) IN4148 100Ω WAS 1K                                     | B | 75 | GI |
| REV E05 | ADDED (1) IN4148 & OPTIONAL JUMPER                               | G | 75 | GI |
| REV E04 | 470K WAS 1M DRAWING REL.   | G | 74 | GI |
| A       | 4506   |   |    |    |

|                              |                             |                |
|------------------------------|-----------------------------|----------------|
| SCALE: NTS                   | APPROVED BY: 3/17/75 G.M.I. | DRAWN BY: DB   |
| DATE: 24 APRIL 74            |                             | REVISED        |
| SCHEMATIC, CUSTOM I.C. BOARD |                             | 2X 1126        |
| ARDAG INC.                   |                             | DRAWING NUMBER |
|                              |                             | 43X165         |

11417 PRINTED ON NO. 1000H CLEARPRINT HOPPER CONTROL CARD REL. ON E.O. # A 506

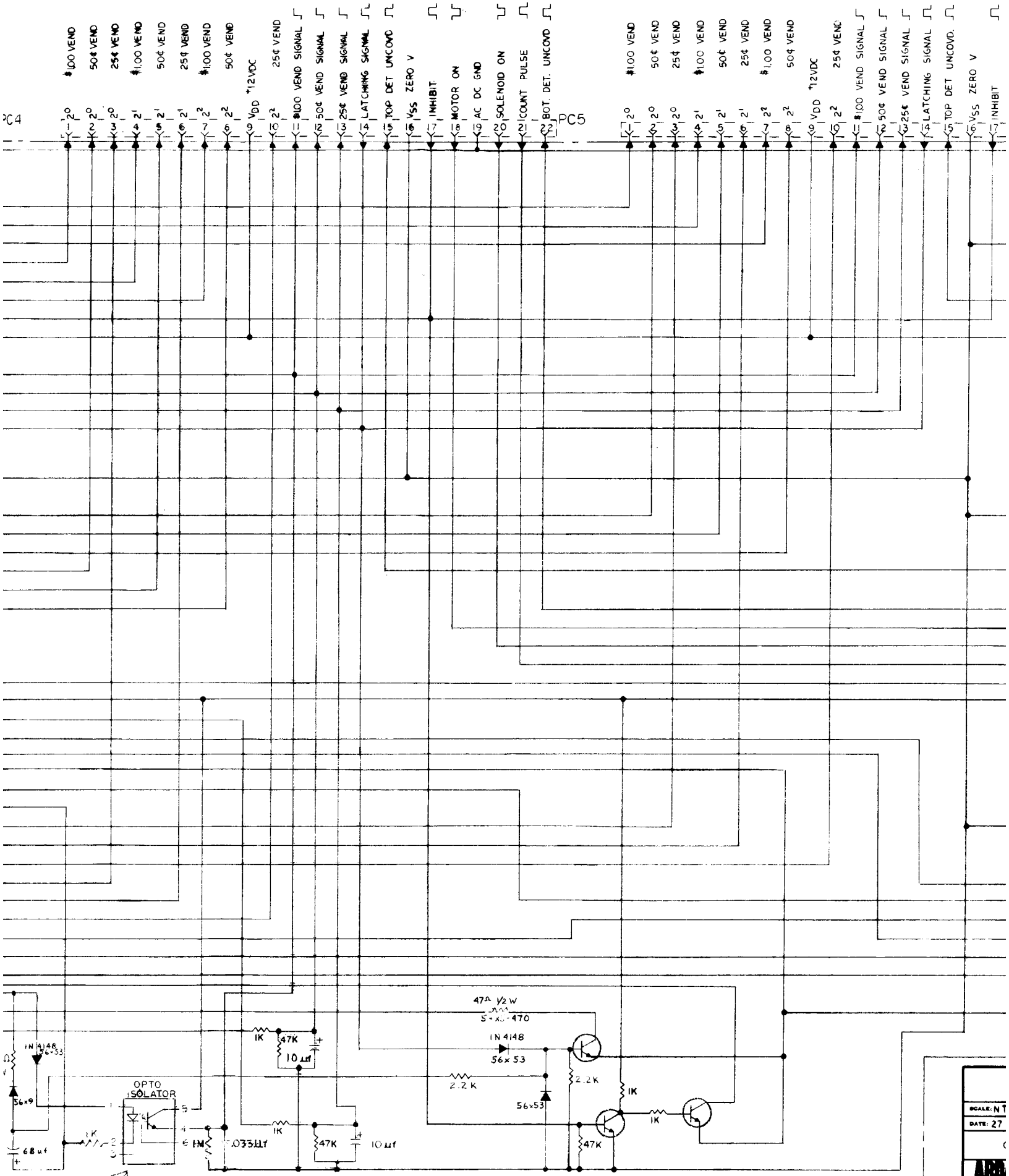
NICKEL IC CARD

DIME



DIME IC CARD

QUARTER IC CARD



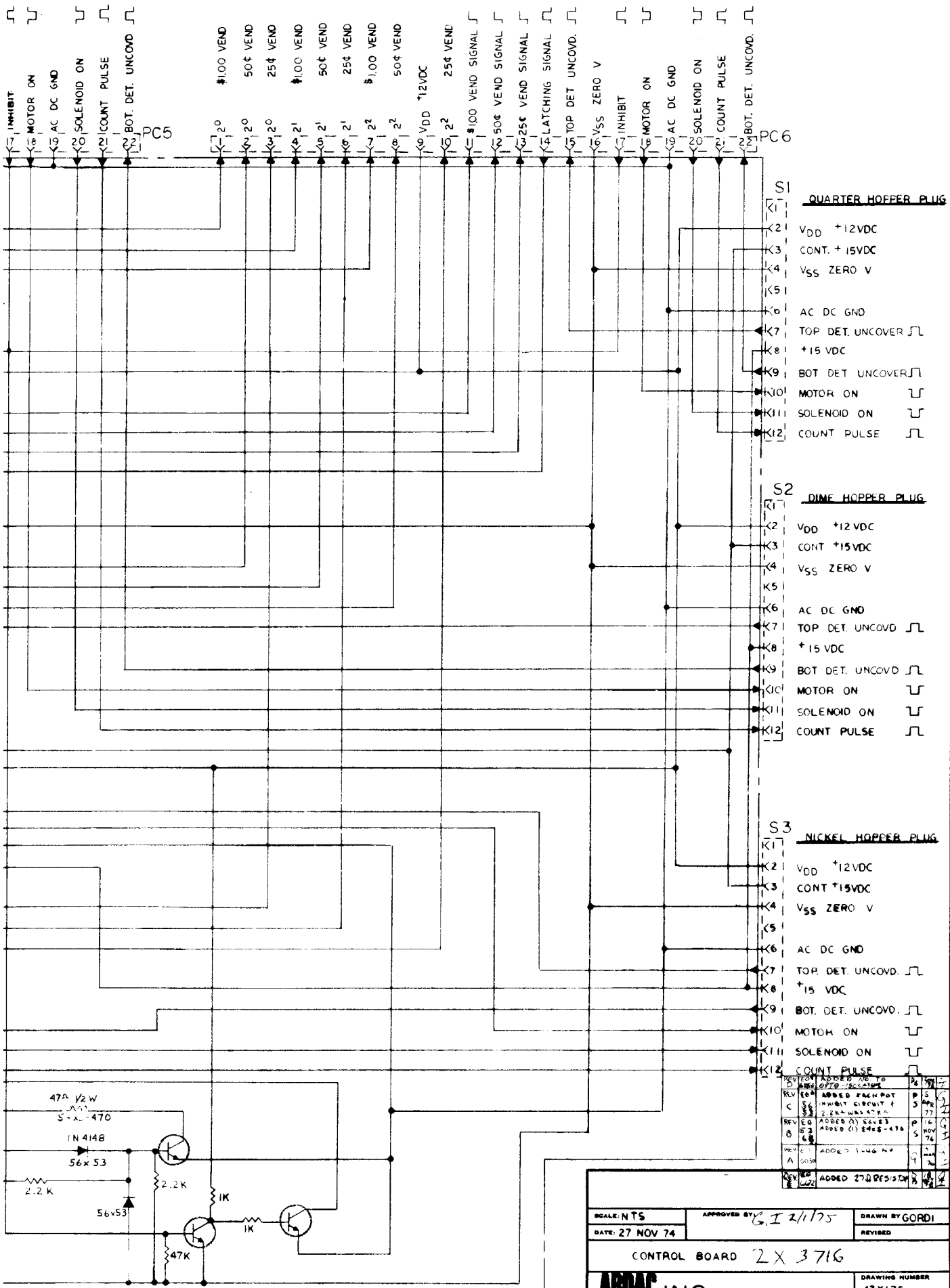
- #100 VEND
- 50¢ VEND
- 25¢ VEND
- #100 VEND
- 50¢ VEND
- 25¢ VEND
- #100 VEND
- 50¢ VEND
- VDD 12VDC
- 25¢ VEND
- #100 VEND SIGNAL
- 50¢ VEND SIGNAL
- 25¢ VEND SIGNAL
- LATCHING SIGNAL
- TOP DET UNCOVD
- VSS ZERO V
- INHIBIT
- MOTOR ON
- AC DC GND
- SOLENOID ON
- COUNT PULSE
- BOT. DET. UNCOVD

- #100 VEND
- 50¢ VEND
- 25¢ VEND
- #100 VEND
- 50¢ VEND
- 25¢ VEND
- #100 VEND
- 50¢ VEND
- VDD 12VDC
- 25¢ VEND
- #100 VEND SIGNAL
- 50¢ VEND SIGNAL
- 25¢ VEND SIGNAL
- LATCHING SIGNAL
- TOP DET UNCOVD
- VSS ZERO V
- INHIBIT

ECC 3040

SCALE: N 1  
DATE: 27  
[Signature]

QUARTER IC CARD



S1 QUARTER HOPPER PLUG

- K1 VDD +12VDC
- K2 CONT. +15VDC
- K3 VSS ZERO V
- K4 AC DC GND
- K5 TOP DET. UNCOVER
- K6 +15 VDC
- K7 BOT DET UNCOVER
- K8 MOTOR ON
- K9 SOLENOID ON
- K10 COUNT PULSE

S2 DIME HOPPER PLUG

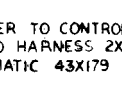
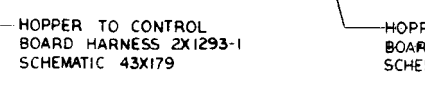
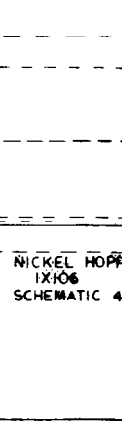
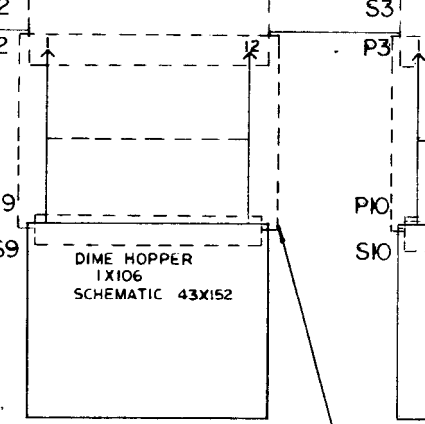
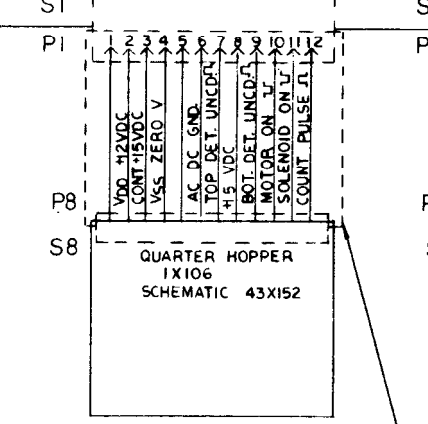
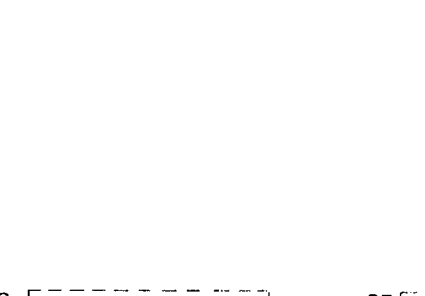
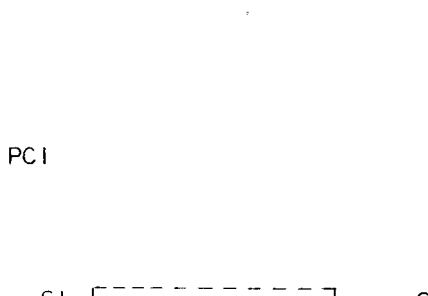
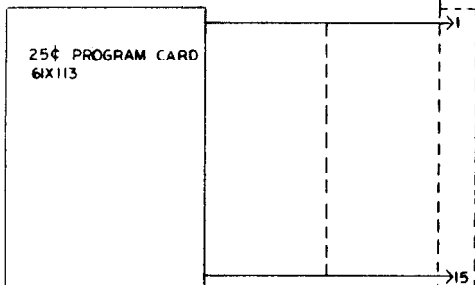
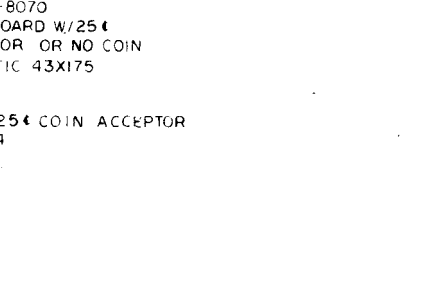
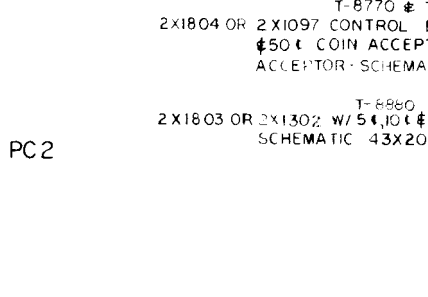
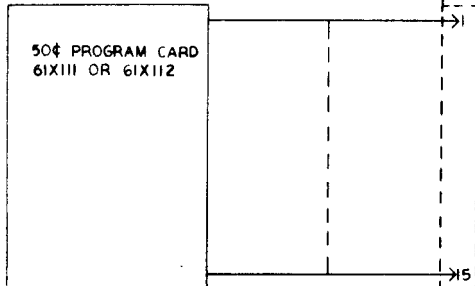
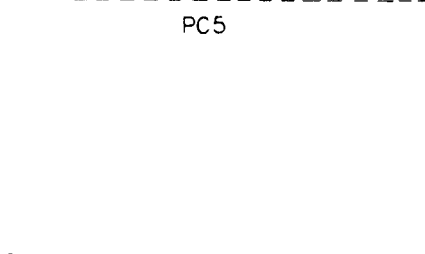
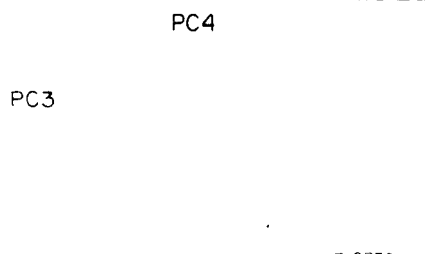
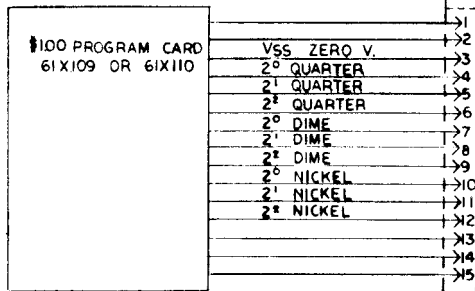
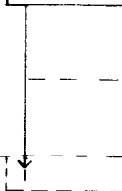
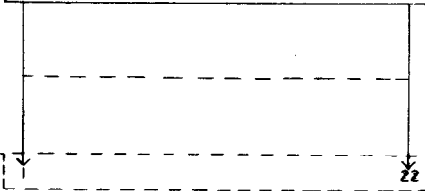
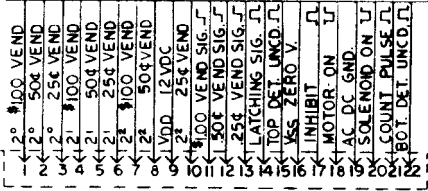
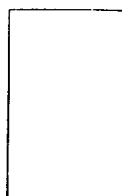
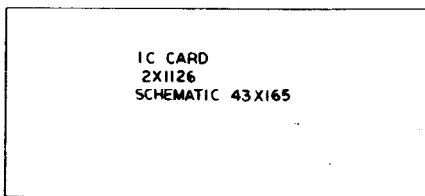
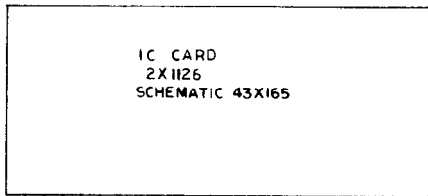
- K1 VDD +12VDC
- K2 CONT +15VDC
- K3 VSS ZERO V
- K4 AC DC GND
- K5 TOP DET. UNCOVD
- K6 +15 VDC
- K7 BOT DET. UNCOVD
- K8 MOTOR ON
- K9 SOLENOID ON
- K10 COUNT PULSE

S3 NICKEL HOPPER PLUG

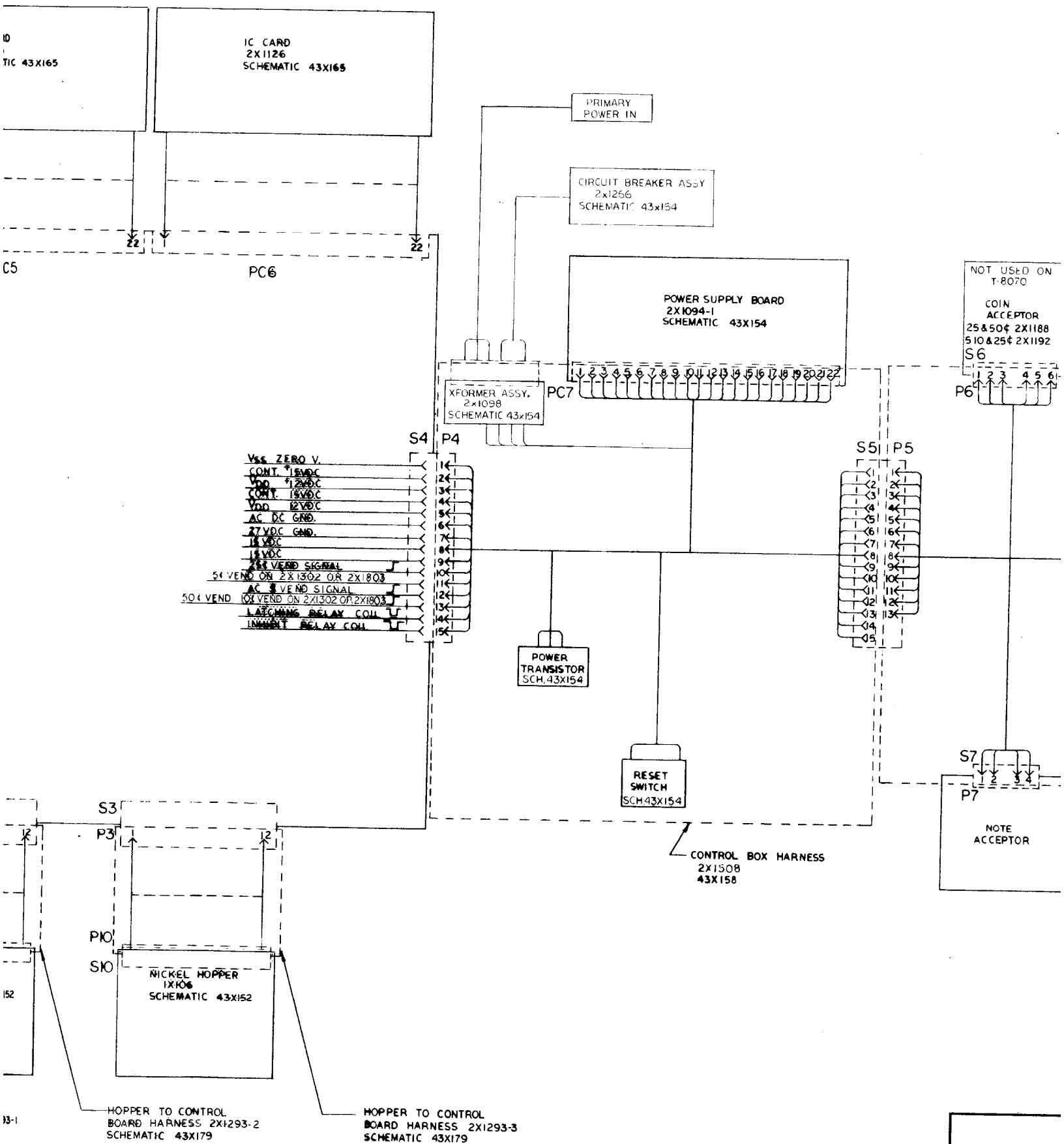
- K1 VDD +12VDC
- K2 CONT +15VDC
- K3 VSS ZERO V
- K4 AC DC GND
- K5 TOP DET. UNCOVD.
- K6 +15 VDC
- K7 BOT. DET. UNCOVD.
- K8 MOTOR ON
- K9 SOLENOID ON
- K10 COUNT PULSE

|     |    |                    |   |          |
|-----|----|--------------------|---|----------|
| REV | EO | ADDED 270 RESISTOR | 8 | 11/24/74 |
| REV | EO | ADDED 270 RESISTOR | 8 | 11/24/74 |
| REV | EO | ADDED 270 RESISTOR | 8 | 11/24/74 |
| REV | EO | ADDED 270 RESISTOR | 8 | 11/24/74 |
| REV | EO | ADDED 270 RESISTOR | 8 | 11/24/74 |

|                        |                           |                          |
|------------------------|---------------------------|--------------------------|
| SCALE: NTS             | APPROVED BY: G. I. 2/1/75 | DRAWN BY: GORDI          |
| DATE: 27 NOV 74        |                           | REVISED                  |
| CONTROL BOARD 2 X 3716 |                           |                          |
| <b>AMAC INC.</b>       |                           | DRAWING NUMBER<br>43X175 |

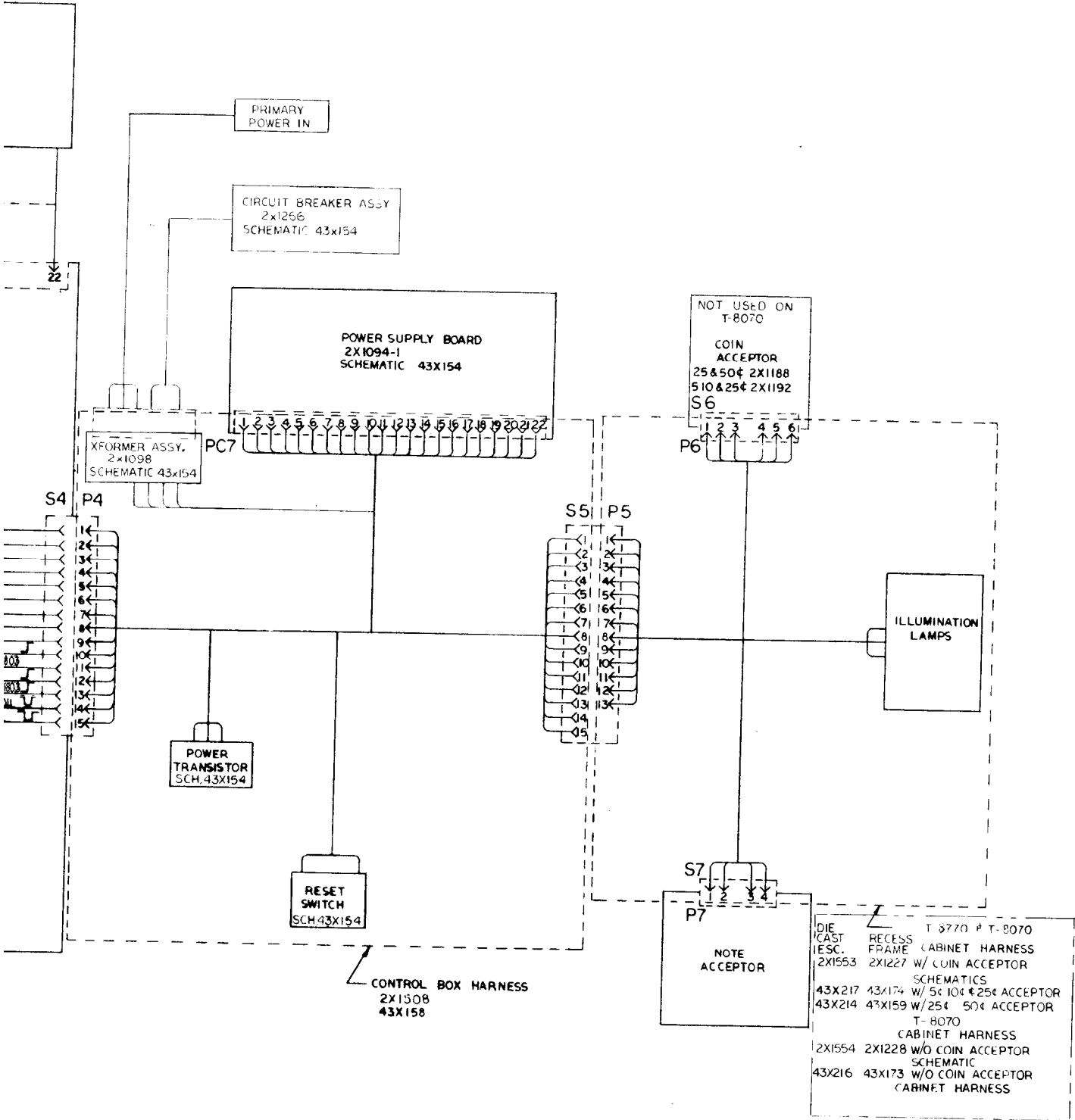






|                  |    |
|------------------|----|
| SCALE: NTS       |    |
| DATE: 27 NOV 74  | 3X |
| BULK LOADED      |    |
| <b>ARDAC INC</b> |    |

|     |     |  |   |    |      |    |
|-----|-----|--|---|----|------|----|
| REV | EO* | UPDATED, ADDED HARNESS PART NOS. FOR DIE CAST EX. 4 ADDED NOS FOR NEW CONTROL B.D. | S | 21 | JULY | 77 |
| REV | BO* | SUPPLIER PART NUMBERS & PART NO. ADD INFORMATION ON MODEL NO.                      | 6 | 18 | MAY  | 77 |
| REV | A   | 50%  |   |    |      |    |



UPPER TO CONTROL  
 HARD HARNESS 2X1293-3  
 SCHEMATIC 43X179

|     |     |   |   |    |     |      |    |    |
|-----|-----|---|---|----|-----|------|----|----|
| REV | ED* | UPDATED, ADDED HARNESS PART NOS. FOR DIE CAST EN. & ADDED NOS FOR NEW CONTROL BO. | D | 5  | 21  | JULY | 77 | DM |
| REV | 80F | ADJUSTED PART NO. NUMBERS & PART NO. ADD INFORMATION ON MODEL NO.                 | 9 | 10 | NOV | 70   | 6  | 2  |
| REV | A   | 5030  |   |    |     |      |    |    |

|                                      |                               |                          |
|--------------------------------------|-------------------------------|--------------------------|
| SCALE: NTS                           | APPROVED BY: <i>GI 2/1/75</i> | DRAWN BY: GORDI          |
| DATE: 27 NOV 74                      | 3x22-3x21 13x30               | REVISED                  |
| BULK LOADED CHANGER SYSTEM SCHEMATIC |                               |                          |
| <b>ARDAC INC.</b>                    |                               | DRAWING NUMBER<br>43X176 |

43-176