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Player's Edge-Plus & S-Plus Electronic Repair Manual

Player's Edge-Plus & S-Plus Electronic Repair Manual

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About This Manual

This manual was developed in conjunction with related field service manuals. Any specific questions should be addressed by the field service manual for each IGT machine type. Contact IGT Customer Service to order manuals.

Related Documentation:

- The *Player's Edge-Plus* Field Service Manual (p/n 821-037-02) contains information required to install, configure, troubleshoot and repair a Player's Edge-Plus machine.
- The *S-Plus* Field Service Manual (p/n 821-027-01) contains information required to install, configure, troubleshoot and repair a S-Plus machine.

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Repair Tips For Technicians

When the technician receives a board with a problem, he should verify the problem in the tester. The technician would first check the schematic to isolate the circuit. With the problem isolated, the board is put into the tester with the input or output in question activated. The technician will then use the oscilloscope to locate and follow the active signal through the circuit and its components to the faulty component(s). The multimeter is useful in checking voltages, continuity, resistance, testing diodes, and transistors.

The following suggestions are recommended for repairs:

- The basic equipment requirements for board testing are: soldering and desoldering equipment, replacement IC's, schematics, multimeter, oscilloscope, and an IGT tester.
- Visually inspect the processor board for: burned or broken traces, broken or missing components, spread pins on IC sockets, bent or folded pins on socketed IC's, and insulation crimps on molex pins.
- Perform continuity testing using a wire with ends stripped back to get into smaller connector openings.
- To repair a broken wire either solder and insulate with heat shrink or use a butt-splice type connector. Next, tug on wires to test the joint and then test for continuity.
- The technician should have access to correct pins and crimpers in order to correctly replace bad pins.
- Use as little heat as possible when removing I.C's. Cut each pin next to the IC package, then remove each with a magnetic tipped soldering iron or needle-nosed pliers
- Use new heat sink paste if required.
- When repairing traces, use rework or wire-wrap wire.

There are two J/P1 and J/P2 connectors on the S-Plus mother board. The J/P1 and J/P2 connectors will always have an A or B side designation, following a pin number (1 -32). The other J/P1 and J/P2 have only one pin number.

NOTE: This manual uses the S-Plus and Player's Edge-Plus Superboard. The processor board designations should be correct for the S-Plus and Player's Edge-Plus games manufactured currently.

The motherboard and wiring harness designations are specific to the S-Plus and Player's Edge-Plus stand-up machine models.

BE AWARE that the motherboard and wiring designations will be different for other machine models (eg. Slant-Top).

Refer to the relevant field service manual for a different model type.

Tracing Inputs

Each input problem is taken individually and traced to its "opto-isolation" on the processor board. Opto-isolation is a defense against static electricity, noise, or any unwanted electrical feedback. The majority of board problems are I/O and voltage problems. These problems usually occur between opto-isolation and the board connectors. The vast majority of input problems are not board problems. Any suspect board problem should be isolated to the board, on a tester if possible, before any repair is attempted.

Start With the Problem

The simplest means of treating machine and board repairs is to start with the problem and then try to isolate the cause. Treat each potential input problem individually, and trace it from the exterior of the machine onto the processor board, to the point of opto-isolation.

The technician should verify each problem in the inputs test. The technician can then reference each input in question in this manual.

When using the diagram provided with each input problem, the following items should be kept in mind:

- Each input, when activated, sends a signal through the wiring and connectors to the mother board.
- The mother board then connects the signal via a trace to the processor board (processor board connects to the mother board at J/P1 and J/P2).
- On the processor board, typically there is a pull-up resistor pack, then a parallel to serial shift registor, followed by buffers and opto-isolation.

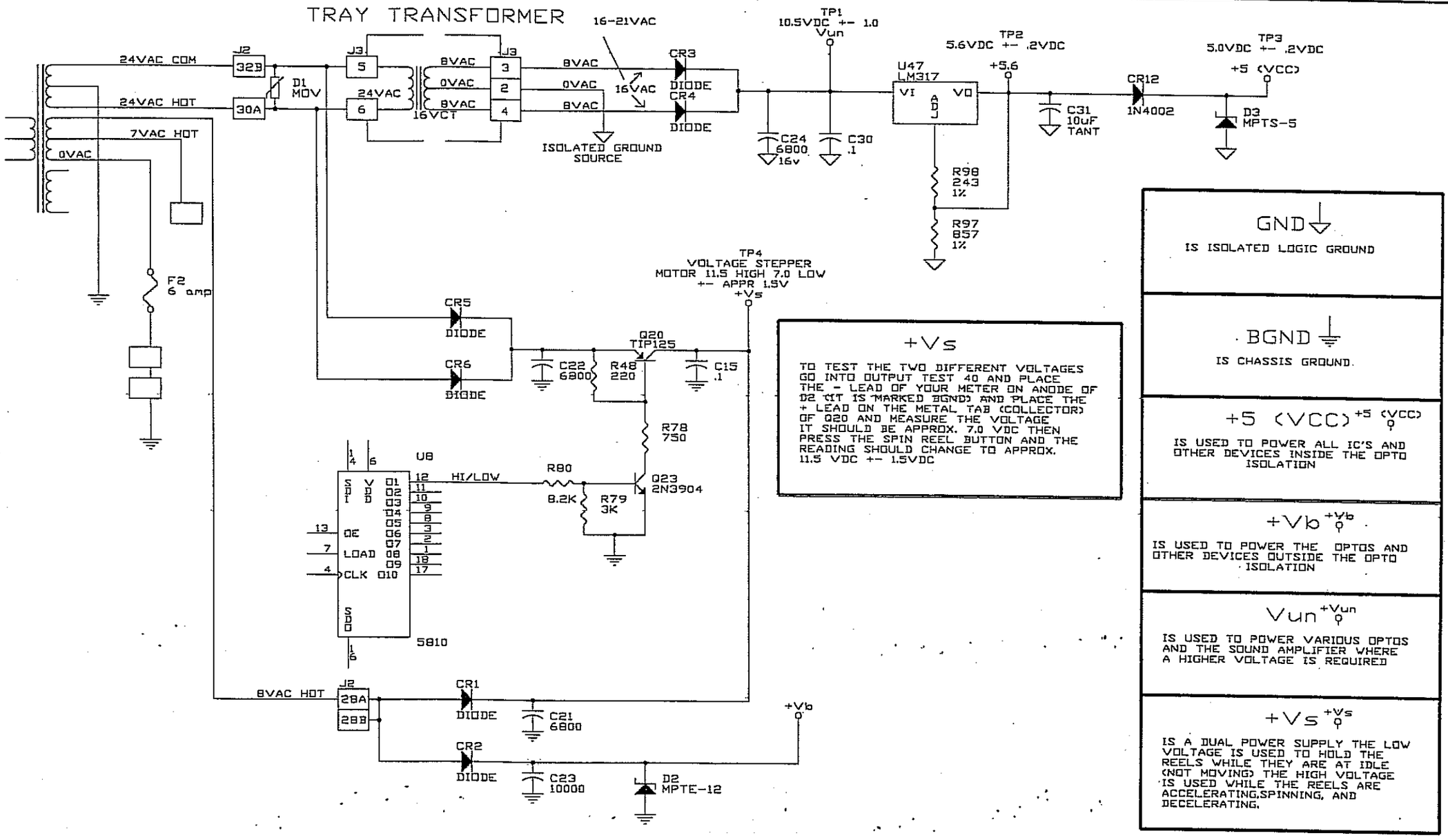
Inputs Test

The inputs self test allow the operator to test machine inputs. The number 1 appears in the Coins Played display. During each input test, 3 digits of a 4-digit code appear in the Winner Paid display (for example, 10_0).

To test an input, locate the number for that input on the inputs table and the corresponding toggle instructions. Turn the reset key until the 2 digits on the left-hand side of the display correspond to the number of the input. As each input is tested, the logic level toggles between 1 and 0. Typically a "0" indicates that the circuit or switch is in an open state and a "1" indicates that the circuit or switch is closed.

Refer to inputs table on the next page and use the reset key to step through each input. Press the self test switch to enter the next self test page. The inputs and outputs for each S-Plus stepper slot machine may vary depending upon the physical configuration of the machine involved.

Inputs Test		
Winner Paid	Description	Action to Toggle Input
10_1	Coin In A	Activated only when coin comparitor accepts coins in door-closed game mode; go to COIN B input test
11_1	Coin In B	Remove the coin comparitor and disconnect the comparitor harness; drop a coin into the coin path, between the rear encoder- board mounting bracket and the black plastic insert for each optic input (B and C)
12_1	Coin In C	
13_0	Door Optics Receiver	Close and firmly lower the door locking-bar to its lowest position
14_1	Hopper Coin Out	Cover hopper optic with a flat, opaque object to simulate coin out
15_0	Hopper Probe	Ground hopper coin-level probe to hopper chassis
16_0	Spin	Press player panel switch or trip handle-spin mechanical switch
17_0	Jackpot Reset	Turn reset key one time
20_0	Play One Credit	Press Bet One Credit player switch
21_0	Play Max Credits	Press Play Max Credits player switch
22_1	Cashout Credits	Press Cash Out player switch
24_1	Reel Mechanism	Disconnect reel harness from J7 mother board connector
25_0	Self Test	Press self test switch one time
27_0	Bill Acceptor	Insert bill into bill acceptor
31_0	Drop Door	Completely close the drop door
40_X	Reel 1	Move first reel up (or down) one stop and return to position
41_X	Reel 2	Move second reel up (or down) one stop & return to position
42_X	Reel 3	Move third reel up (or down) one stop and return to position
43_X	Reel 4	If present, move fourth reel up (or down) one stop and return
44_X	Reel 5	If present, move fifth reel up (or down) one stop and return
0 = a low state 1 = a high state X can be 1 or 0 The state of Reel 1-5 inputs depends upon where each reel has stopped.		



+Vs

TO TEST THE TWO DIFFERENT VOLTAGES GO INTO OUTPUT TEST 40 AND PLACE THE - LEAD OF YOUR METER ON ANODE OF D2 (IT IS MARKED BGND) AND PLACE THE + LEAD ON THE METAL TAB (COLLECTOR) OF Q20 AND MEASURE THE VOLTAGE IT SHOULD BE APPROX. 7.0 VDC THEN PRESS THE SPIN REEL BUTTON AND THE READING SHOULD CHANGE TO APPROX. 11.5 VDC +- 1.5VDC

GND

IS ISOLATED LOGIC GROUND

BGND

IS CHASSIS GROUND.

+5 (VCC) +5 (VCC)

IS USED TO POWER ALL IC'S AND OTHER DEVICES INSIDE THE OPTO ISOLATION

+Vb +Vb

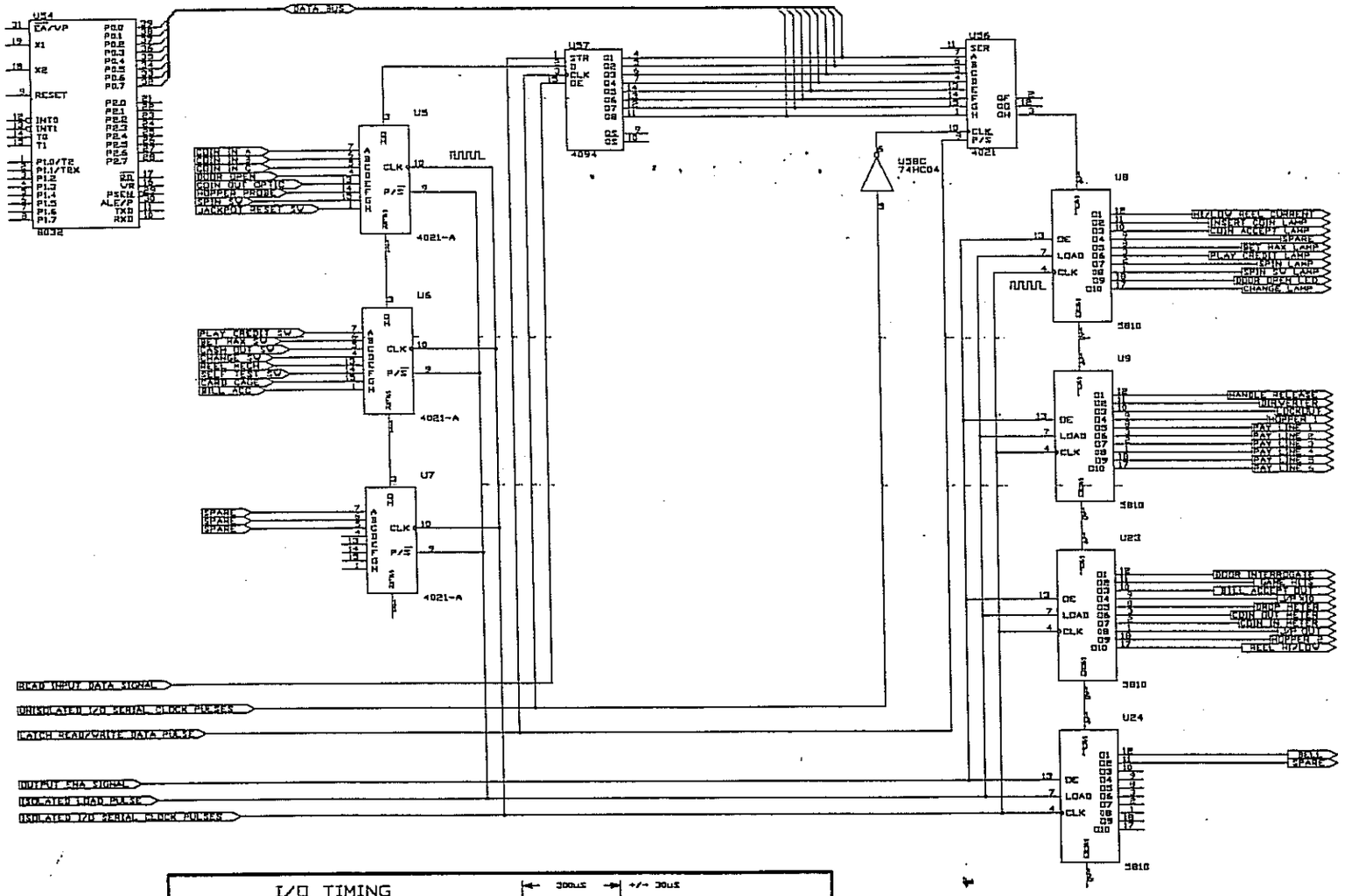
IS USED TO POWER THE OPTOS AND OTHER DEVICES OUTSIDE THE OPTO ISOLATION

Vun +Vun

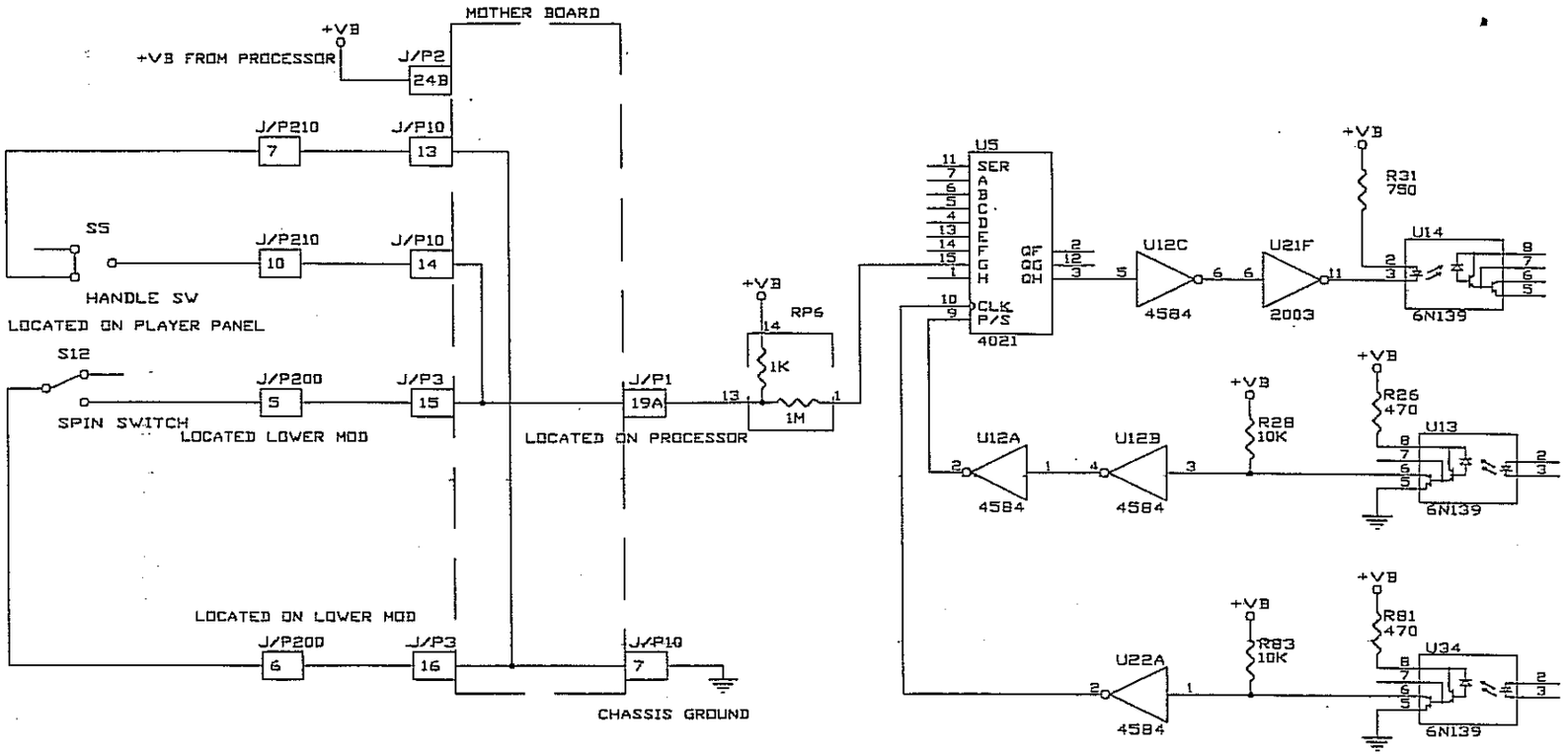
IS USED TO POWER VARIOUS OPTOS AND THE SOUND AMPLIFIER WHERE A HIGHER VOLTAGE IS REQUIRED

+Vs +Vs

IS A DUAL POWER SUPPLY THE LOW VOLTAGE IS USED TO HOLD THE REELS WHILE THEY ARE AT IDLE (NOT MOVING) THE HIGH VOLTAGE IS USED WHILE THE REELS ARE ACCELERATING,SPINNING, AND DECELERATING.


DATA BUS
U5
U6
U7
U8
U9
U23
U24
4021-A
5810
READ INPUT DATA SIGNAL
UNISOLATED I/O SERIAL CLOCK PULSES
LATCH READ/WRITE DATA PULSE
OUTPUT ENA SIGNAL
ISOLATED LOAD PULSE
ISOLATED I/O SERIAL CLOCK PULSES
I/O TIMING
LATCH READ/WRITE DATA PULSE
READ INPUT DATA SIGNAL
OUTPUT ENA SIGNAL
UNISOLATED I/O SERIAL CLOCK PULSES
ISOLATED LOAD PULSE
SIGNAL SHOWN AT
POINT OF GENERATION

Problem: Spin Switch/ Handle Switch Doesn't Function Properly



WIRE CONTINUITY TEST
Spin SW
NC to J/P3-16
NO to J/P3-15
Handle SW
NC to J/P10-14
NO to J/P10-13

MOTHER BOARD CONTINUITY CHECK
J/P10-7 to J/P3-16 & J/P10-13
J/P1-19A to J/P3-15 & J/P10-14

PROCESSOR BOARD TEST
Test U5 - if problem continues, then replace.
Test U14 - if problem continues, then replace.
Test U21 - if problem continues, then replace.
Test U12 - if problem continues, then replace.
Test RP6 - if problem continues, then replace.

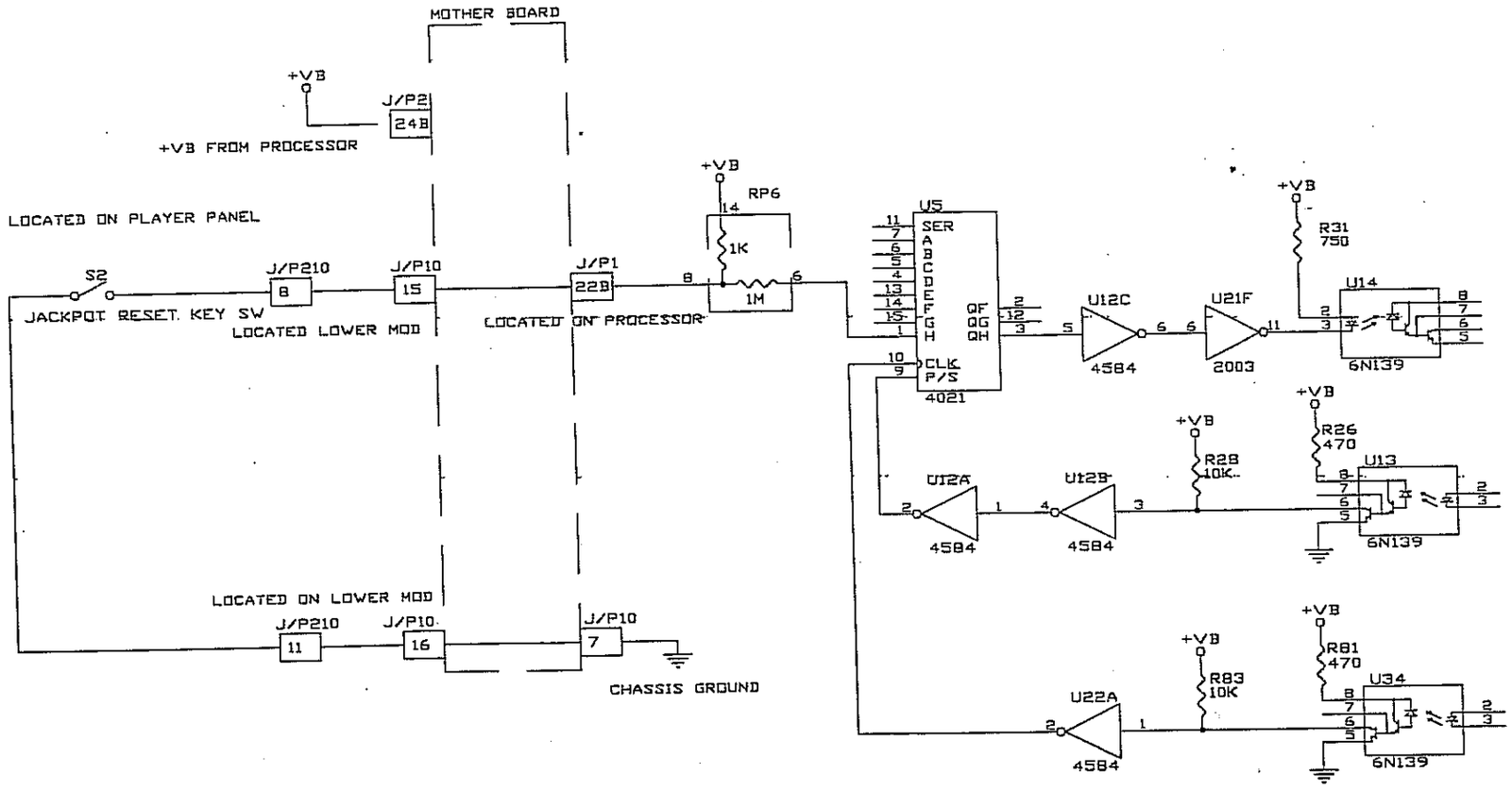
Before removing the processor board, check the following areas:

- ✓ Use input test 16 to verify the problem
- ✓ Verify that the Spin switch and Handle switch are correctly wired using the normally open and common leads
- ✓ Check button assembly (clean, with no broken or missing parts)
- ✓ If the microswitch is wired incorrectly, then re-connect by checking another machine
- ✓ Visually inspect wires and connectors
- ✓ Connect one meter lead to the normally open leg of the switch and the other meter lead connected to the chassis ground (B gnd), then measure for ~~–~~8 ~~to~~ 10 VDC
- ✓ Activate the switch– the voltage should drop to zero volts
- ✓ If the voltage seems bad, use this diagram to search for damage to a wire or connector

If that doesn't work, try the following steps:

- ➪ Replace processor board with a "known good" one
- ➪ If the processor board seems bad, verify in tester
- ➪ If processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor are good, then use this diagram to test for wire continuity

Problem: Jackpot Reset Key Doesn't Function Properly



Before removing the processor board, check the following areas:

- ✓ Use input test 17 to verify the problem
- ✓ Check wire and connector for defects
- ✓ Check for ~8 to 10 VDC across 2 leads to the Jackpot/Reset key
- ✓ If the voltage seems bad, use this diagram to search for damage to a wire or connector
- ✓ If the voltage is good, replace the jackpot reset switch

If that doesn't work, try the following steps:

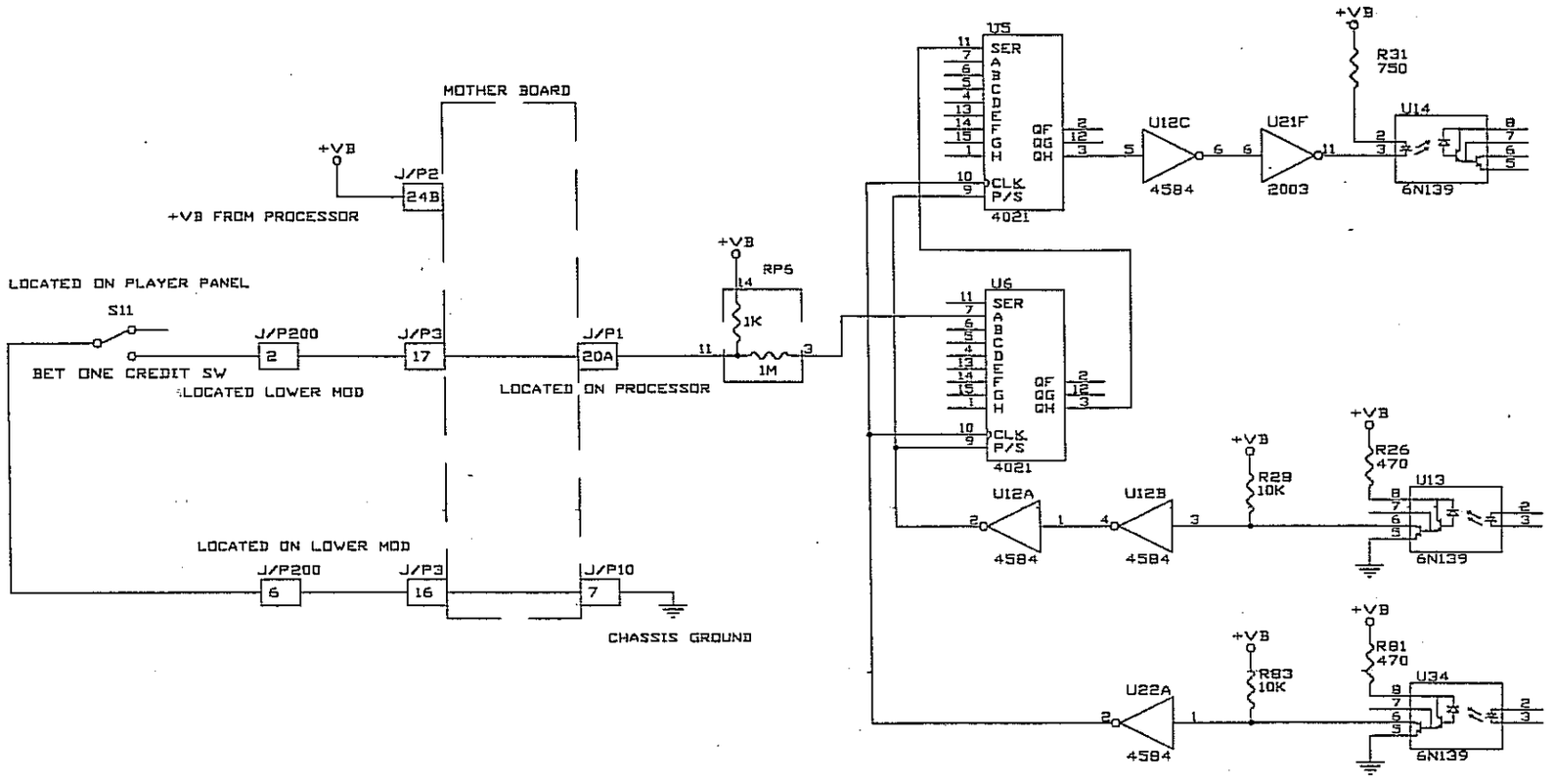
- ⇨ Replace processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in tester
- ⇨ If processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
Ground lead to J/P10-7
No lead to J/P10-5

MOTHER BOARD CONTINUITY CHECK
J/P10-15 to J/P1-22B
J/P10-7 to J/P10-16

PROCESSOR BOARD TEST
Test U5 - if problem continues, then replace.
Test U14 - if problem continues, then replace.
Test U21 - if problem continues, then replace.
Test U12 - if problem continues, then replace.
Test RP6 - if problem continues, then replace.

Problem: Bet One Credit Switch Doesn't Function Properly



WIRE CONTINUITY TEST
Common lead to J/P3-16
Normally open lead to J/P3-17

MOTHER BOARD CONTINUITY CHECK
J/P3-17 to J/P1-20A
J/P3-16 to J/P10-7

PROCESSOR BOARD TEST
Test U6 - if problem continues, then replace
Test U5 - if problem continues, then replace
Test U14 - if problem continues, then replace
Test U21 - if problem continues, then replace
Test U12 - if problem continues, then replace
Test RP6 - if problem continues, then replace

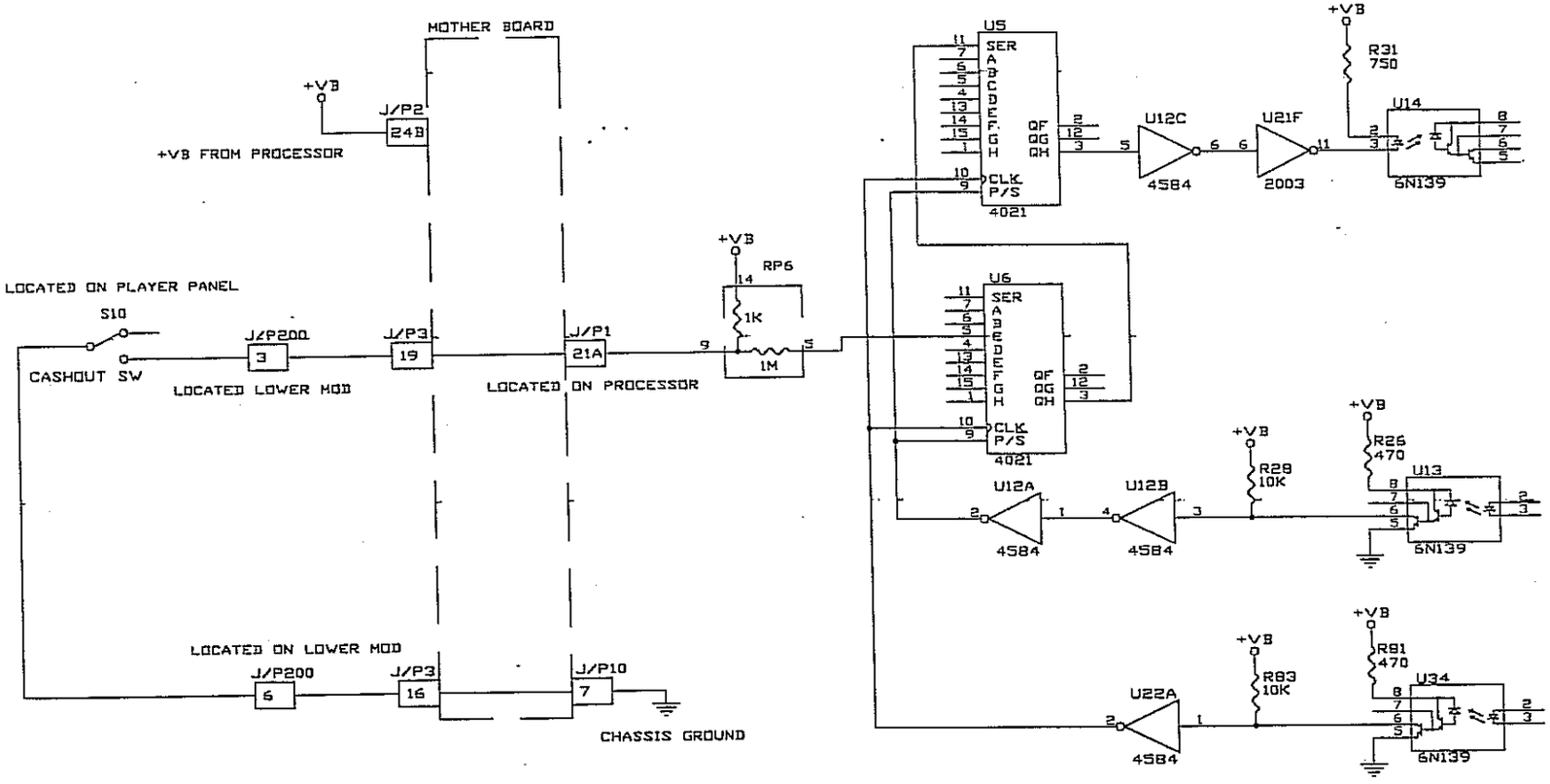
Before removing the processor board, check the following areas:

- ✓ Use input test 20 to verify the problem
- ✓ Check button assembly (make sure the button is clean with no broken parts)
- ✓ If the microswitch is wired incorrectly, then re-connect by checking another machine of the same type
- ✓ Visually inspect wires and connectors
- ✓ Connect one meter lead to the normally open leg of the switch and the other meter lead connected to the chassis ground (B gnd), then measure for −8 to 10 VDC
- ✓ Activate the switch– the voltage should drop to zero volts
- ✓ If the voltage tested bad, trace wires
- ✓ If the microswitch is faulty , replace it

If that doesn't work, try the following steps:

- ➪ Replace processor board with a "known good" one
- ➪ If the processor board seems bad, verify in tester
- ➪ If processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor are good, then use this diagram to test the wire continuity

Problem: Cashout Credit Button Doesn't Function Properly



WIRE CONTINUITY TEST
Common lead to J/P3-16
Normally open lead to J/P3-19

MOTHER BOARD CONTINUITY CHECK
J/P3-19 to J/P1-21A
J/P3-16 to J/P10-7

PROCESSOR BOARD TEST
Test U6 - if problem continues, then replace
Test U5 - if problem continues, then replace
Test U14 - if problem continues, then replace
Test U21 - if problem continues, then replace
Test U12 - if problem continues, then replace
Test RP6 - if problem continues, then replace

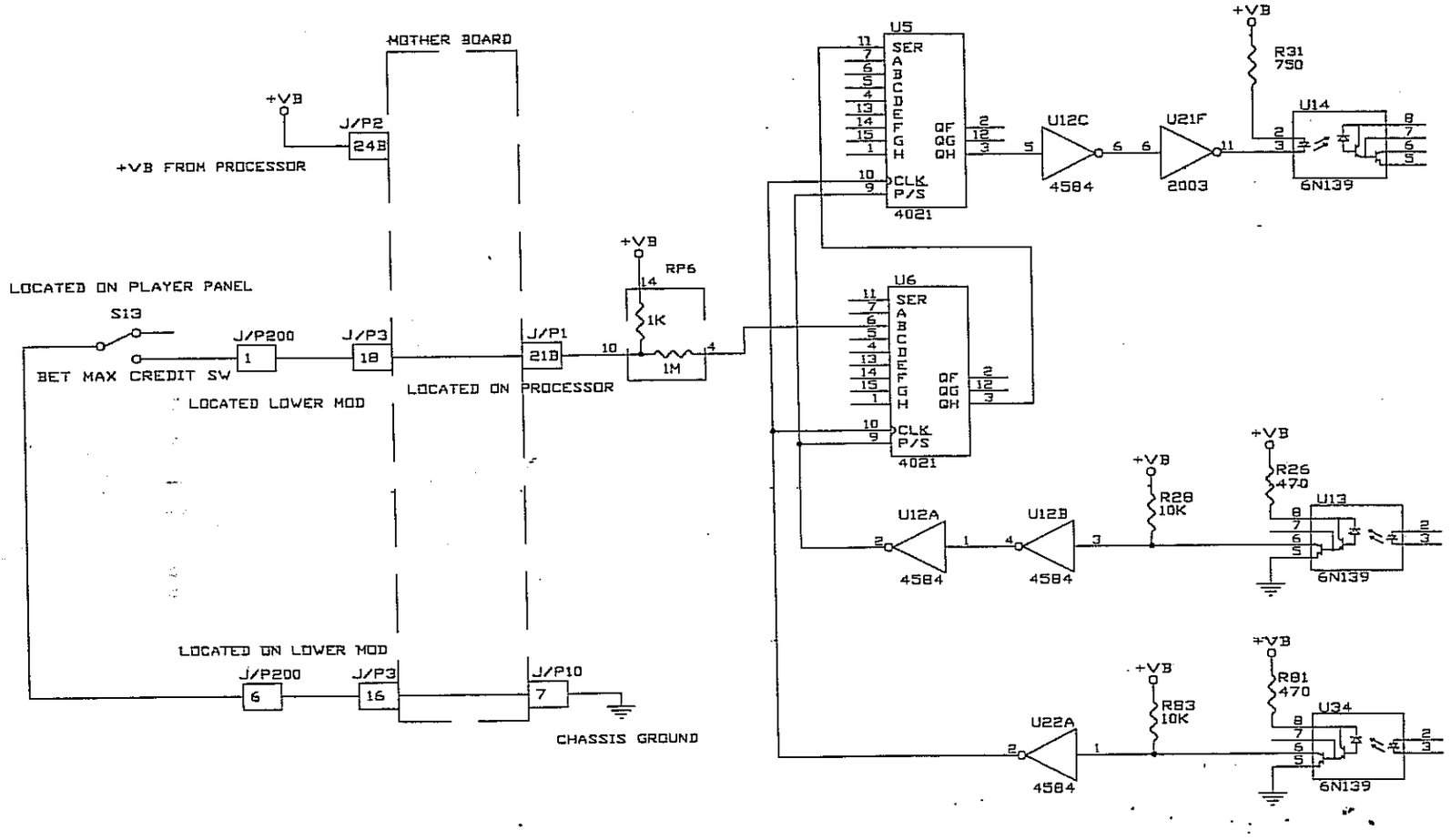
Before removing the processor board, check the following areas:

- ✓ Use input test 22 to verify the problem
- ✓ Check button assembly (make sure the button is clean with no missing parts)
- ✓ If the microswitch is wired incorrectly, then re-connect by checking another machine of the same type
- ✓ Visually inspect wires and connectors
- ✓ Connect one meter lead to the normally open leg of the switch and the other meter lead connected to the chassis ground (B gnd), then measure for −8 to 10 VDC
- ✓ Activate the switch– the voltage should drop to ~~zero volts~~
- ✓ If the microswitch is faulty, replace it
- ✓ If the voltage seems bad, use this diagram to test for wire continuity

If that doesn't work, try the following steps:

- ➪ Replace processor board with a "known good" one
- ➪ If the processor board seems bad, verify in tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor are good, then use this diagram to test the wire continuity

Problem: Bet Max Credits Switch Doesn't Function Properly



WIRE CONTINUITY TEST
Common lead to J/P3-16
Normally open lead to J/P3-18

MOTHER BOARD CONTINUITY CHECK
J/P3-18 to J/P1-21A
J/P3-16 to J/P10-7

PROCESSOR BOARD TEST
Test U6 - if problem continues, then replace
Test U5 - if problem continues, then replace
Test U14 - if problem continues, then replace
Test U21 - if problem continues, then replace
Test U12 - if problem continues, then replace
Test RP6 - if problem continues, then replace

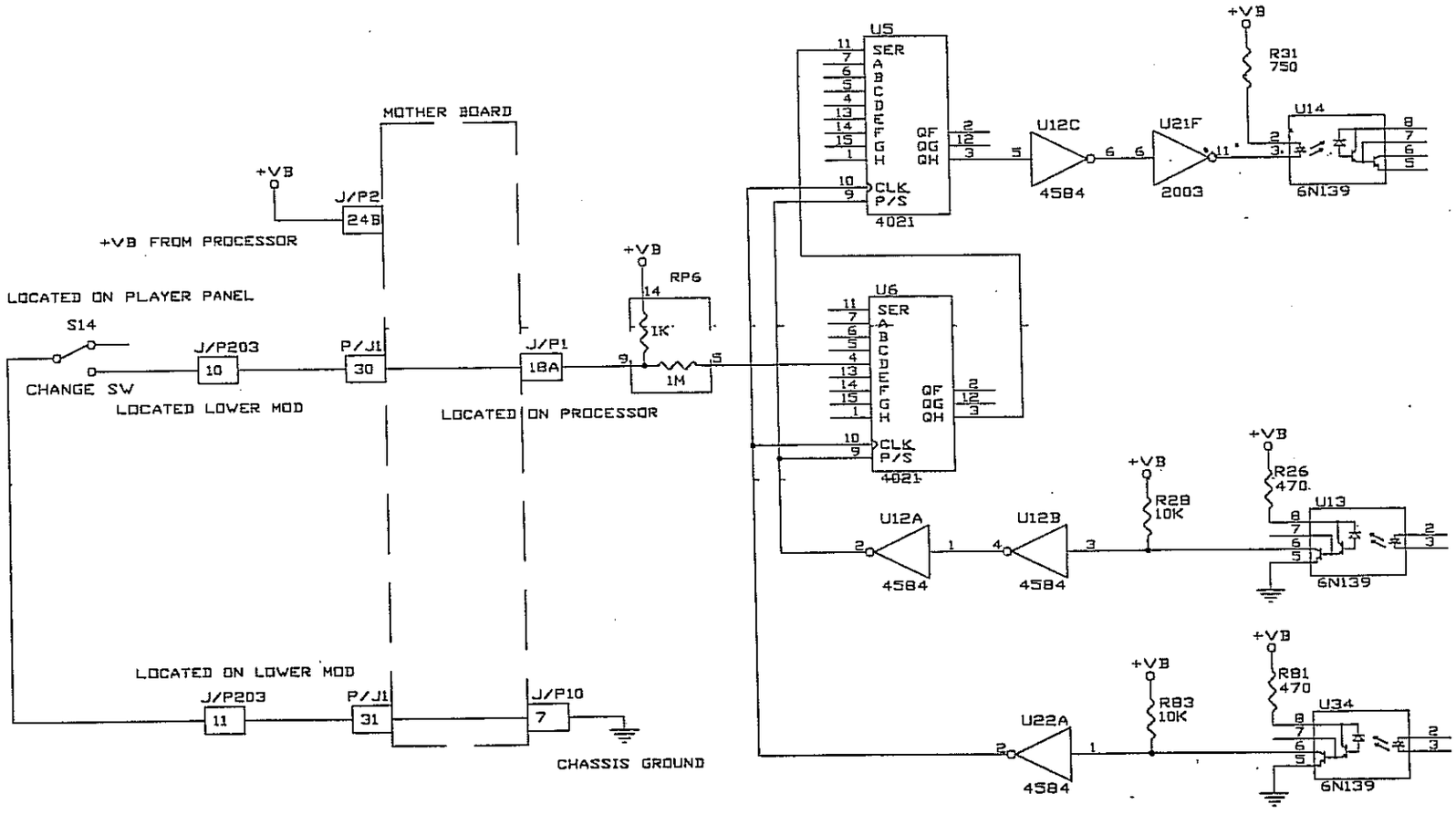
Before removing the processor board, check the following areas:

- ✓ Use input test 21 to verify the problem
- ✓ Check button assembly (make sure the button is clean with no missing parts)
- ✓ If the microswitch is wired incorrectly, then re-connect by checking another machine of the same type
- ✓ Visually inspect wires and connectors
- ✓ Connect one meter lead to the normally open leg of the switch and the other meter lead connected to the chassis ground (B gnd), then measure for −8 to 10 VDC
- ✓ Activate the switch– the voltage should drop to zero volts
- ✓ If voltage tests bad, then use this diagram to test for wire continuity
- ✓ If the microswitch is faulty, replace it

If that doesn't work, try the following steps:

- ➪ Replace processor board with a "known good" one
- ➪ If the processor board seems bad, verify in tester
- ➪ If processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor are good, then use this diagram to test the wire continuity

Problem: Change Switch Doesn't Function Properly



WIRE CONTINUITY TEST
Common lead to J/P1-31
Normally open lead to J/P1-30

MOTHER BOARD CONTINUITY CHECK
J/P1-30 to J/P1-18A
J/P1-31 to J/P10-7

PROCESSOR BOARD TEST
~~Test U6 - if problem continues, then replace~~
Test U5 - if problem continues, then replace
Test U14 - if problem continues, then replace
Test U21 - if problem continues, then replace
Test U12 - if problem continues, then replace
Test RP6 - if problem continues, then replace

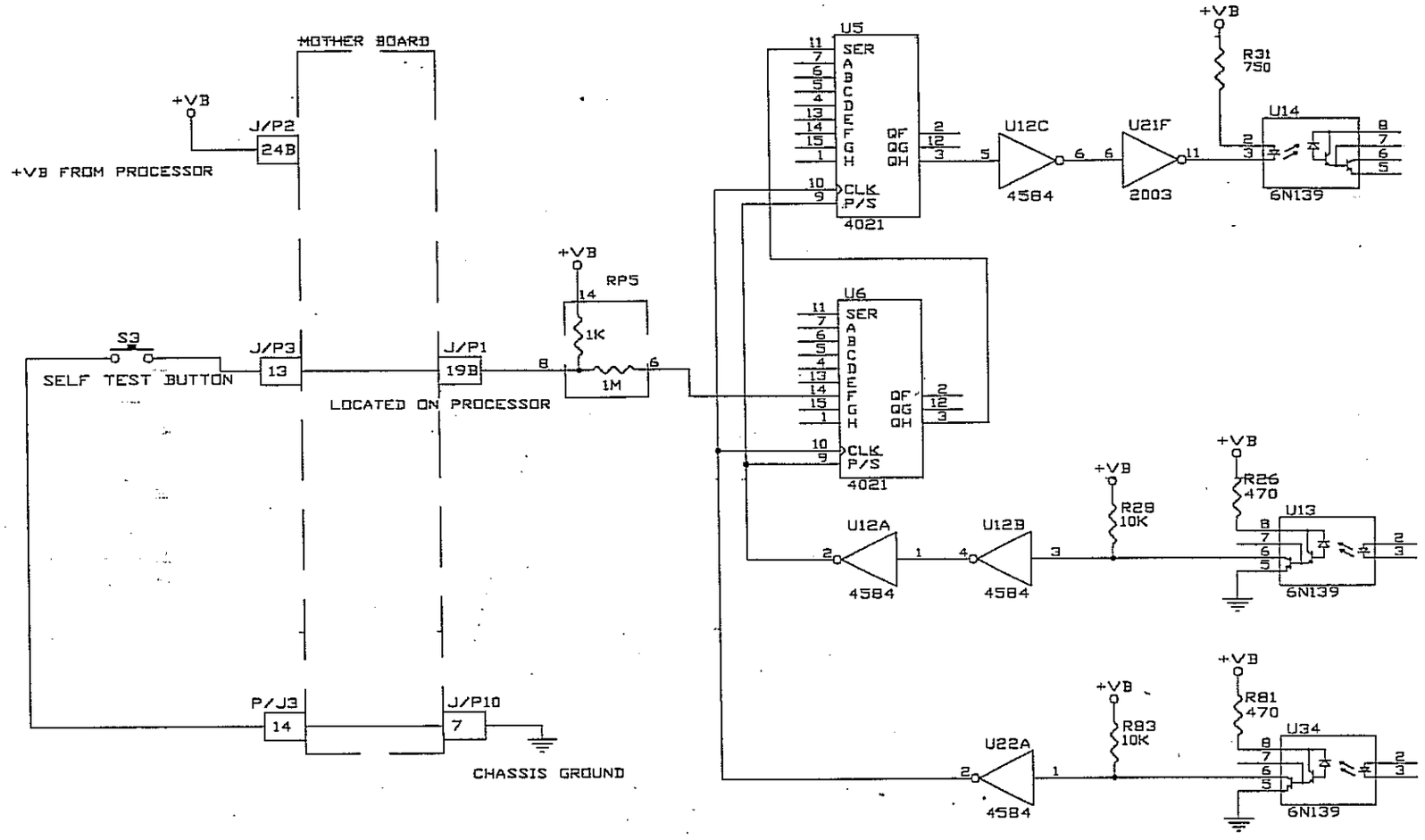
Before removing the processor board, check the following areas:

- ✓ Use input test 23 to verify the problem
- ✓ Check button assembly (make sure the button is clean with no missing parts)
- ✓ If the microswitch is wired incorrectly, then re-connect by checking another machine of the same type
- ✓ Visually inspect wires and connectors
- ✓ Connect one meter lead to the normally open leg of the switch and the other meter lead connected to the chassis ground (B gnd), then measure for −8 to 10 VDC
- ✓ Activate the switch– the voltage should drop to ~~zero volts~~
- ✓ If the voltage tested bad, then use this diagram to test for wire continuity
- ✓ If a faulty microswitch, then replace it

If that doesn't work, try the following steps:

- ⇨ Replace processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in tester
- ⇨ If processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor are good, then use this diagram to test for wire continuity

Problem: Can't Access Self Test Mode



WIRE CONTINUITY TEST
J/P3-14 to J/P3-13

MOTHER BOARD CONTINUITY CHECK
J/P3-13 to J/P1-19B

PROCESSOR BOARD TEST
Test U6 - if problem continues, then replace
Test U5 - if problem continues, then replace
Test U14 - if problem continues, then replace
Test U21 - if problem continues, then replace
Test U12 - if problem continues, then replace
Test RP5 - if problem continues, then replace

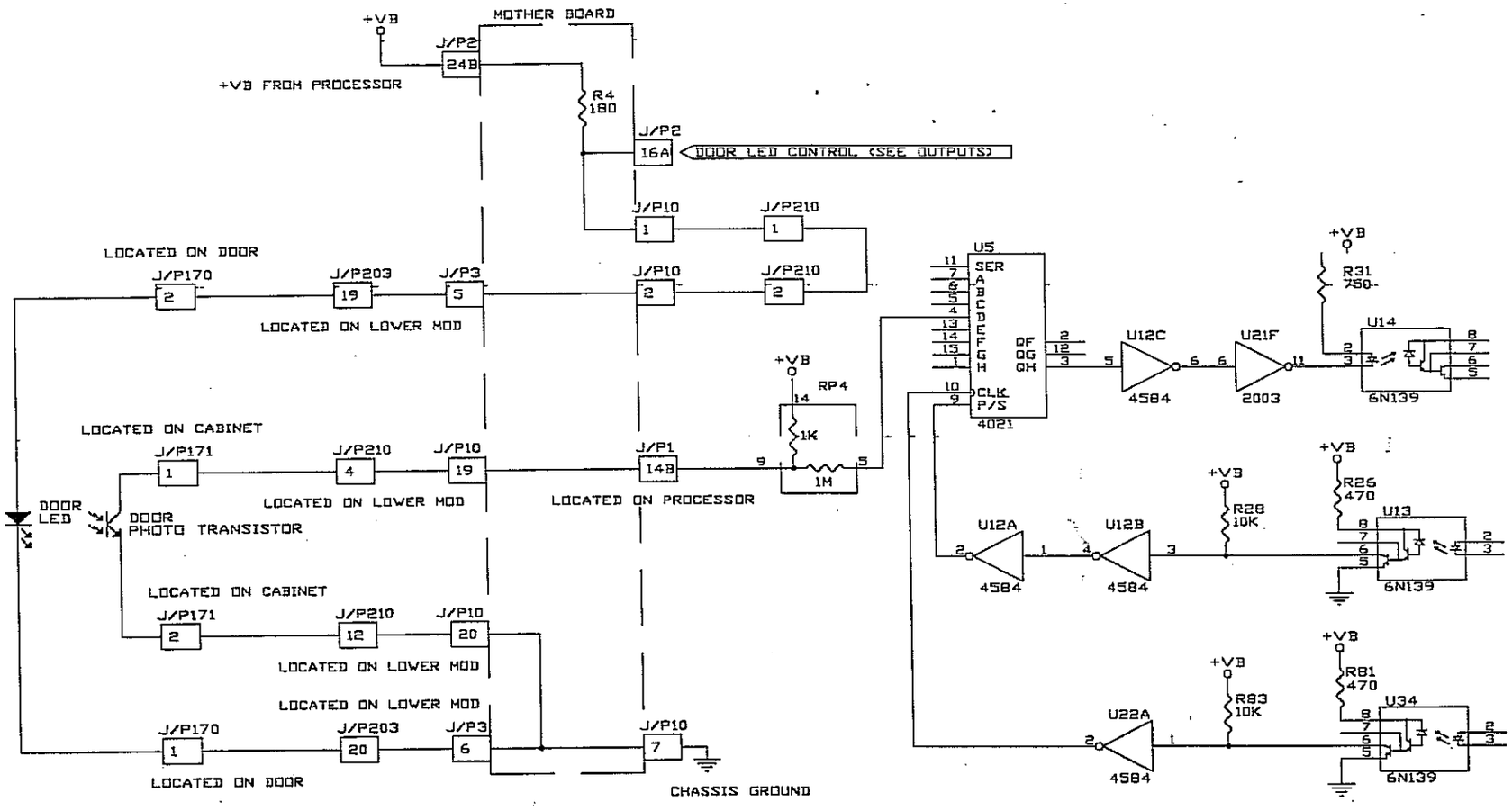
Before removing the processor board, check the following areas:

- ✓ Check the self test button for broken wires
- ✓ Check the wire and connectors for defects
- ✓ Replace the self test switch

If that doesn't work, try the following steps:

- ⇨ Replace processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in tester
- ⇨ If processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor are good, then use this diagram to test for wire continuity

Problem: Constant "Door Open" State



WIRE CONTINUITY TEST
LED Side: (J/P170-1 to J/P3-6)
LED Side: (J/P170-2 to J/P3-5)
DET Side: (J/P171-1 to J/P10-19)
DET Side: (J/P171-2 to J/P10-20)

MOTHER BOARD CONTINUITY CHECK
J/P10-20 to J/P10-7
J/P3-6 to J/P10-7
J/P10-19 to J/P1-14B
J/P3-5 to J/P2-24B (Note: Jumper at J/P10)

PROCESSOR BOARD TEST
Test U5 - if problem continues, then replace.
Test U14 - if problem continues, then replace.
Test U21 - if problem continues, then replace.
Test U12 - if problem continues, then replace.
Test RP4 - if problem continues, then replace.

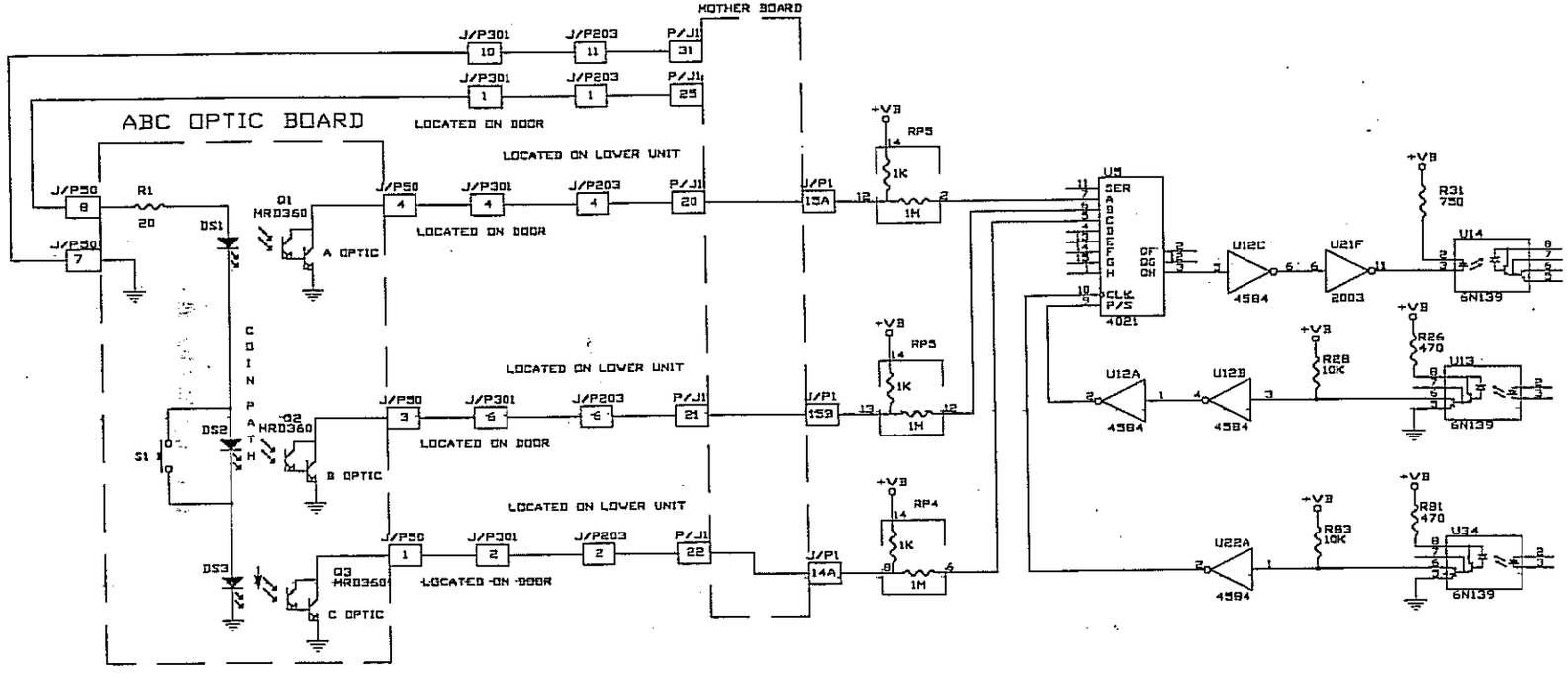
Before removing the processor board, check the following areas:

- ✓ Use input test 13 to verify the problem
- ✓ Check alignment of door optics
- ✓ Determine if the phototransistor works by shinning a flashlight on it
- ✓ If the phototransistor works, then replace the LED
- ✓ If the phototransistor is not activated by the flashlight, then replace it
- ✓ Check optic alignment (door LED to phototransistor on chassis)
- ✓ Verify that the bill validator door switch is closed
- ✓ Visually inspect wires and connectors
- ✓ Disconnect LED at J/P170, and test for ~5VDC
- ✓ Disconnect phototransistor at J/P171 and test for ~8 to 10VDC

If that doesn't work, try the following steps:

- ➪ If the voltage seems bad on J/P170 and J/P171, then replace the processor board with a "known good" one
- ➪ If the processor board seems bad, then verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the processor board and mother board are good, then perform the wire continuity test

Problem: Coin-In Timeout (Optic Sensors Blocked for Over 100 msec)



WIRE CONTINUITY TEST
LED Side: (J/P50-8 to J/P1-25),
LED Side: (J/P50-7 to J/P1-31)
DET. Side: (J/P50-4 to J/P1-20 (A Optic)
DET. Side: (J/P50-3 to J/P1-21 (B Optic)
DET. Side: (J/P50-1 to J/P1-22)

MOTHER BOARD CONTINUITY CHECK
J/P1-20 to J/P1-15A
J/P1-21 to J/P1-15B
J/P1-23 to J/P1-14A

PROCESSOR BOARD TEST
Test U5 - if problem continues, then replace.
Test U14 - if problem continues, then replace.
Test U21 - if problem continues, then replace.
Test U12 - if problem continues, then replace.
Test RP5 - if problem continues, then replace.

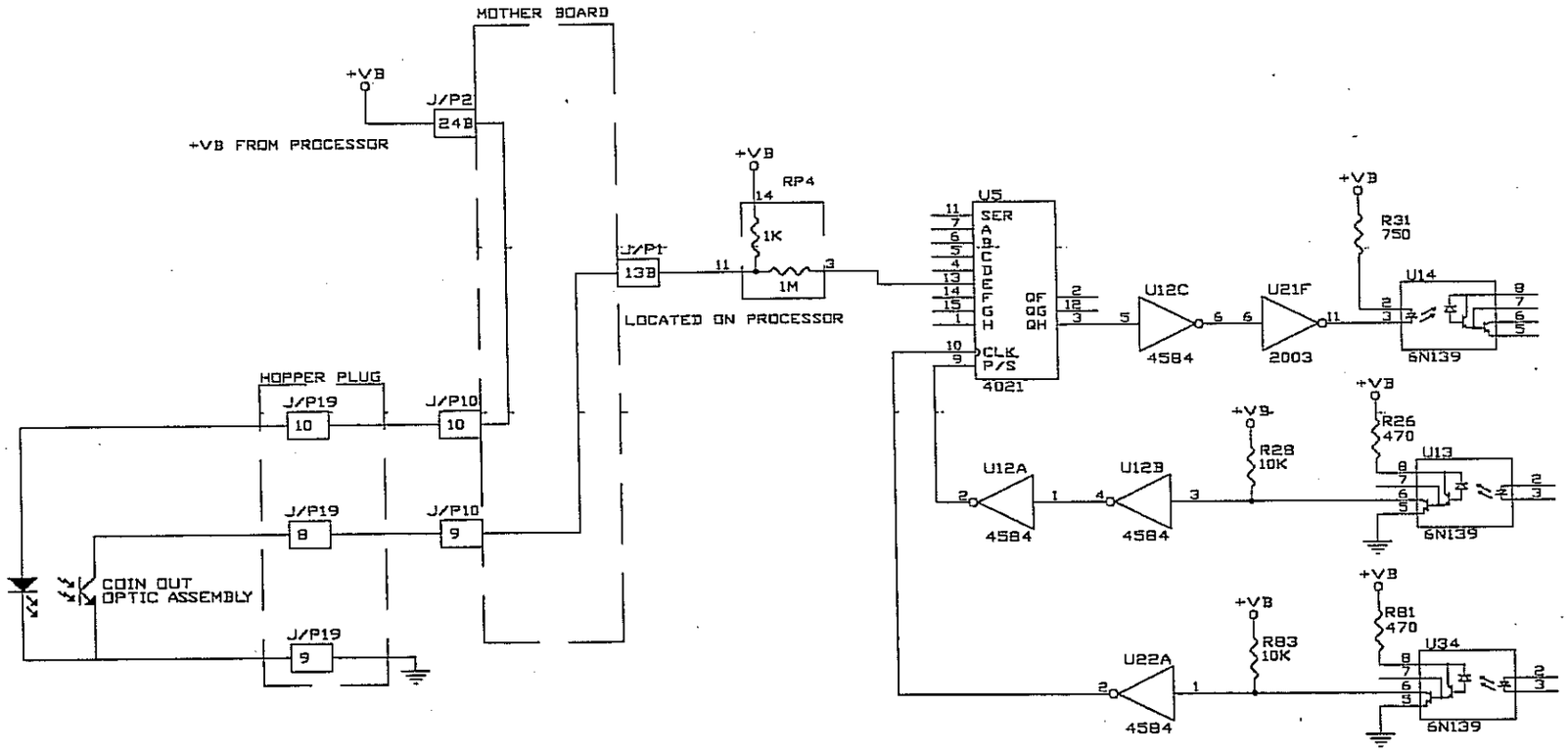
Before removing the processor board, check the following areas:

- ✓ Use inputs test 11 & 12 to verify the problem
- ✓ Check for obstructions in the ABC optics
- ✓ If diverter paddle doesn't move quickly, clean and repair
- ✓ Unplug the 10 pin plug at J/P50 to measure pins 1, 3, & 4 for −8 VDC and Vb at pin 8 (ground lead on chassis)
- ✓ Check pin 7 for ground (green wire)
- ✓ If voltage is good, replace ABC optics
- ✓ If voltage seems bad, check harness wiring and plugs
- ✓ Replace ABC optics, and test

If that doesn't work, try the following steps:

- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Extra Coin Paid Out (3100 Code)



WIRE CONTINUITY TEST
LED Side: (J/P19-10 to J/P10-10
DET. Side: (J/P19-8 to J/P10-9

MOTHER BOARD CONTINUITY CHECK
J/P10-9 to J/P1-13B
J/P10-10 to J/P2-24B

PROCESSOR BOARD TEST
Test U5 - if problem continues, then replace.
Test U14 - if problem continues, then replace.
Test U21 - if problem continues, then replace.
Test U12 - if problem continues, then replace.
Test RP4 - if problem continues, then replace.

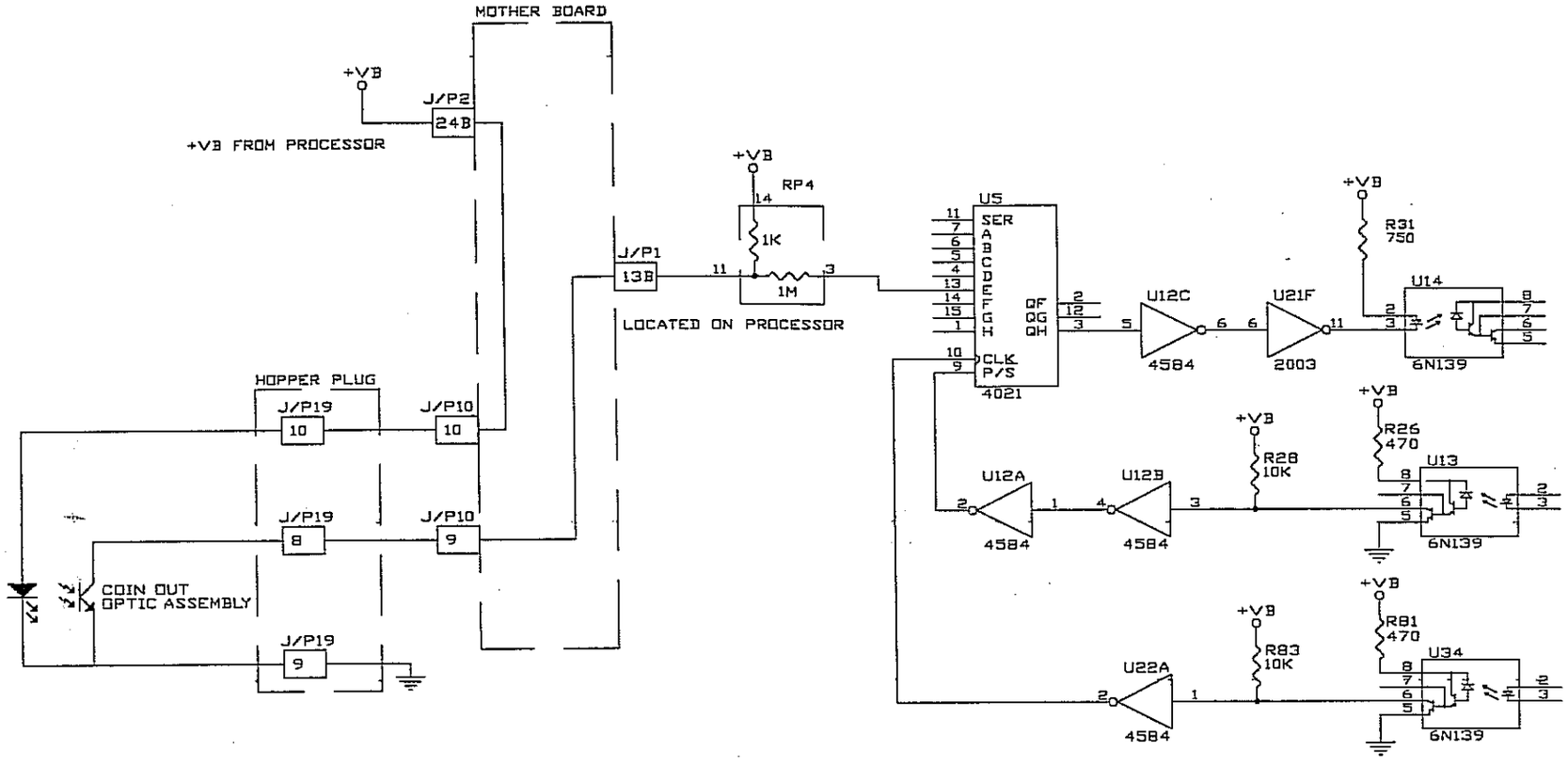
Before removing the processor board, check the following areas:

- ✓ Use input test 14 to verify the problem
- ✓ Check hopper brake and brake spring
- ✓ Check hopper pinwheel and wiper
- ✓ Check optics and optic wire for damage
- ✓ Perform hopper test (self test 3), if problem recurs replace optics
- ✓ With the escalator hopper, coin-out optics and mechanical flag may need adjustment or spring may need replacement
- ✓ Check machine for possible tampering or cheating
- ✓ Verify that the optic ground lead is secured to the chassis optics connector
- ✓ Visually inspect wires and connectors

If that doesn't work, try the following steps:

- ⇨ Replace processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in tester
- ⇨ If processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor are good, then use this diagram to test the wire continuity

Problem: Coin-Out Problems (3200 Code)



WIRE CONTINUITY TEST
LED Side: (J/P19-10 to J/P10-10)
DET. Side: (J/P19-8 to J/P10-9)

MOTHER BOARD CONTINUITY CHECK
J/P10-9 to J/P1-13B
J/P10-10 to J/P2-24B

PROCESSOR BOARD TEST
Test U5 - if problem continues, then replace.
Test U14 - if problem continues, then replace.
Test U21 - if problem continues, then replace.
Test U12 - if problem continues, then replace.
Test RP4 - if problem continues, then replace.

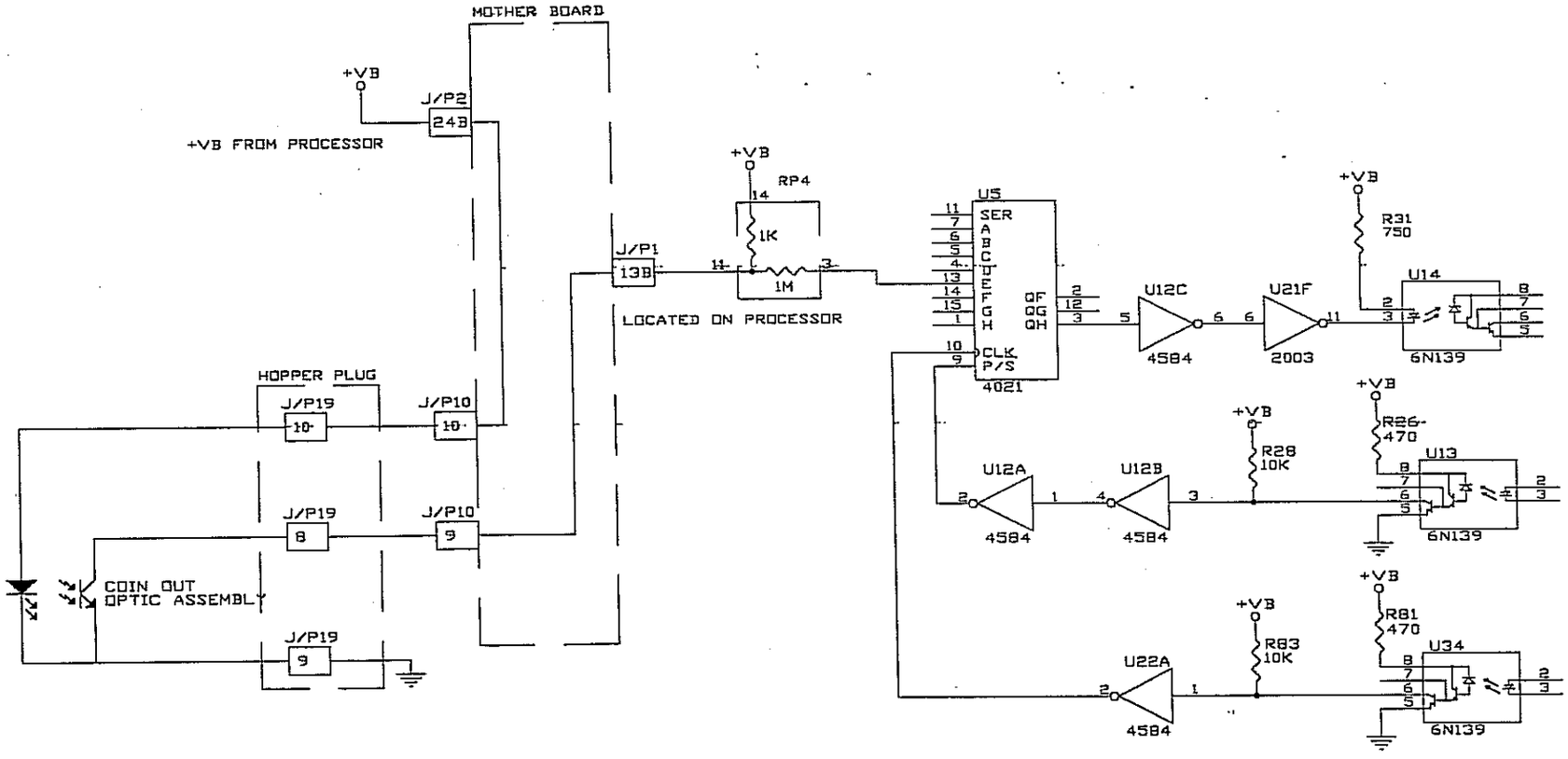
Before removing the processor board, check the following areas:

- ✓ Use input test 14 to verify the problem
- ✓ Perform the hopper test in the self test mode, if problem recurs then replace optics
- ✓ Verify Vb (~8 to 10 VDC) is at hopper plug (J/P19-9 to J/P19-10) and check connections
- ✓ Check for any physical reason why coin stays in the optics for over 700m sec.
- ✓ Clean optics, and test
- ✓ Check optic and optic wires for damage
- ✓ Verify optic ground lead is secure to chassis and optics connector
- ✓ With escalator hopper, coin-out optics and mechanical flag may need adjustment or spring replacement
- ✓ Visually inspect wires and connectors

If that doesn't work, try the following steps:

- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Empty Hopper (3300 Code – Hopper Optic Does Not Sense a Coin For 7–8 sec)



WIRE CONTINUITY TEST
LED Side: (J/P19-10 to J/P10-10)
DET. Side: (J/P19-8 to J/P10-9)

MOTHER BOARD CONTINUITY CHECK
J/P10-9 to J/P1-13B
J/P10-10 to J/P2-24B

PROCESSOR BOARD TEST
Test U5 - if problem continues, then replace.
Test U14 - if problem continues, then replace.
Test U21 - if problem continues, then replace.
Test U12 - if problem continues, then replace.
Test RP4 - if problem continues, then replace.

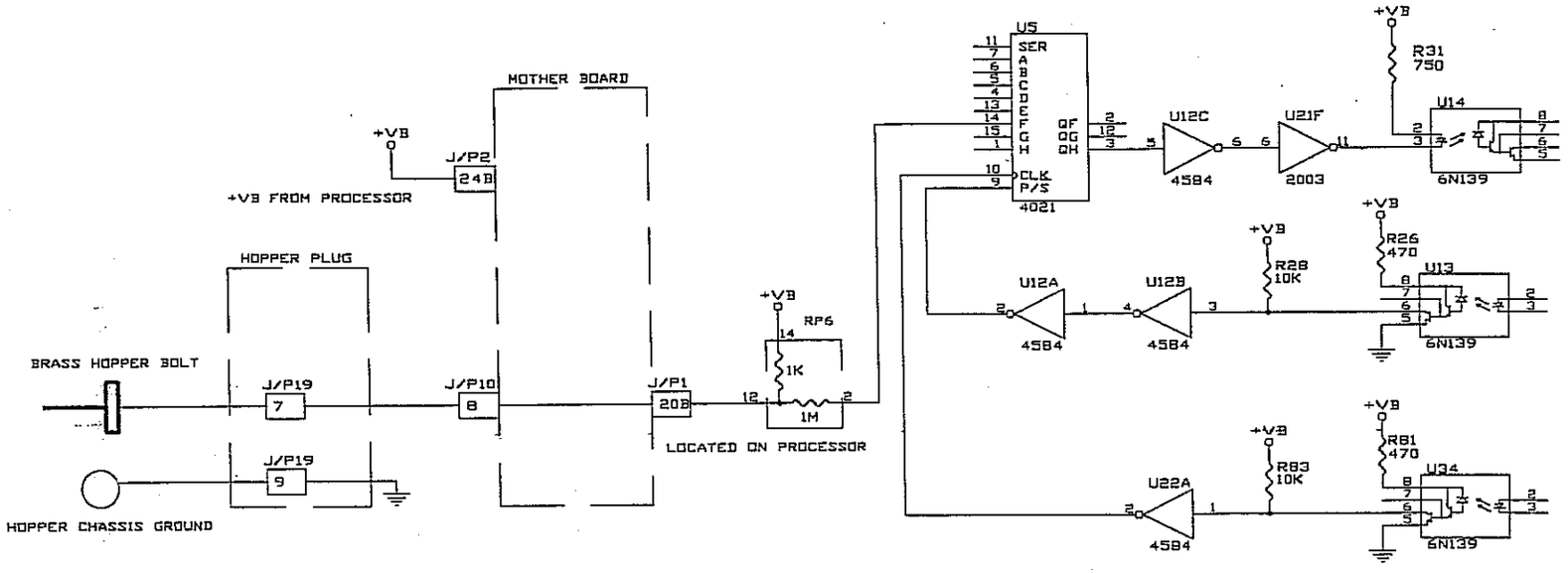
Before removing the processor board, check the following areas:

- ✓ Check for low or empty hopper
- ✓ If coins are jammed, clear jam
- ✓ If coins are doubled-up in escalator of the hopper, consider replacing entry plate, and/or shimming out pinwheel, and/or replacing pinwheel
- ✓ Perform hopper test in self test 3 (watch the hopper in action to spot problem)
- ✓ Visually inspect wires and connectors
- ✓ Check hopper motor, gearbox, and roll pin (replace if necessary)
- ✓ Verify optic ground lead is secure to chassis optics connector
- ✓ With escalator hopper, coin-out optics and mechanical flag may need adjustment or spring may need replacement.

If that doesn't work, try the following steps:

- ⇨ Replace processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in tester
- ⇨ If processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor are good, then use this diagram to test for wire continuity

Problem: Hopper Overflow



Before removing the processor board, check the following areas:

- ✓ Visually inspect for coins bridging the probe (especially $ machines)
- ✓ Check diverter function (output test 33)
- ✓ Use input test 15 to verify that the probe is functional
- ✓ Check wire and connectors for defects

If that doesn't work, try the following steps:

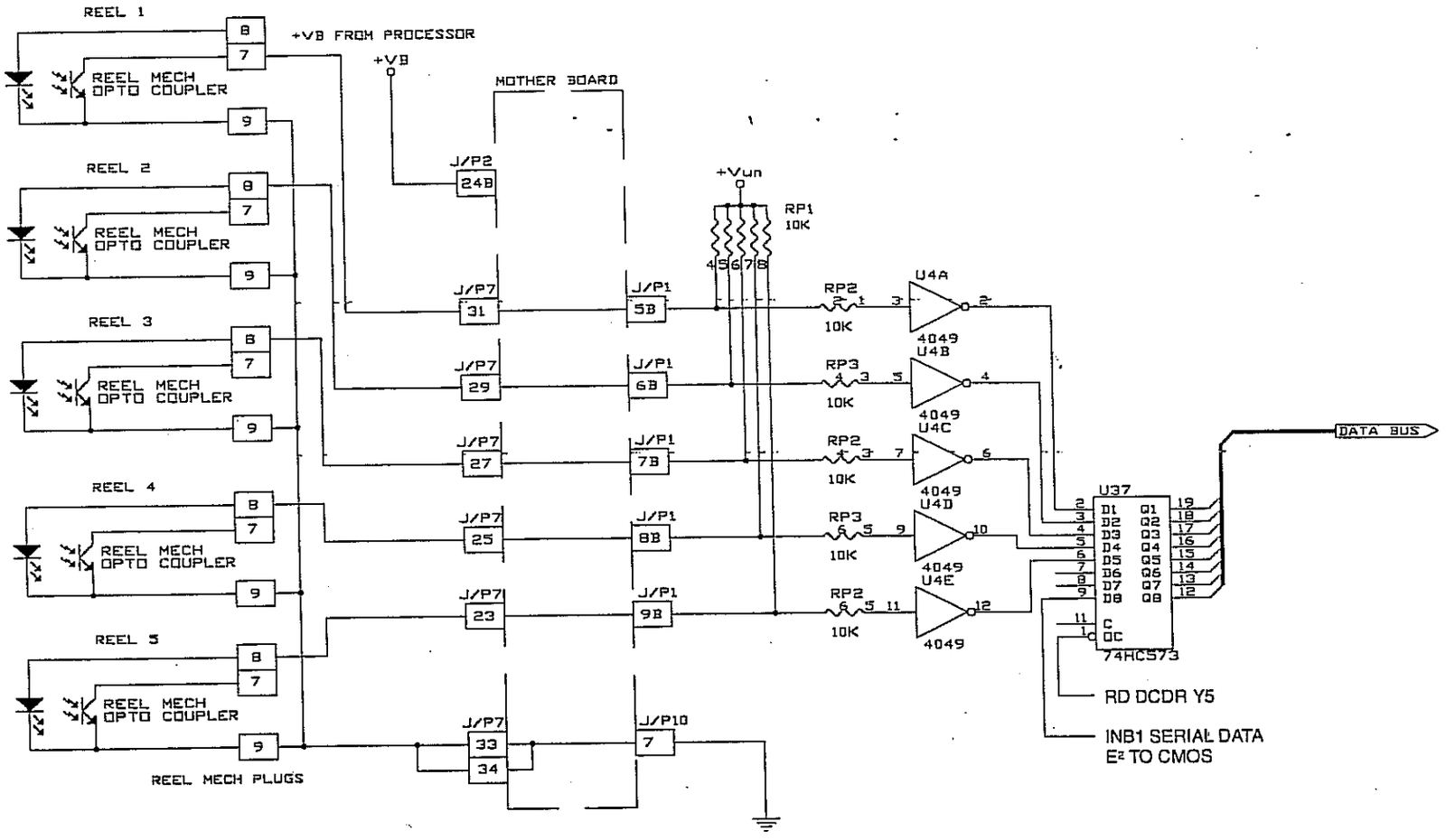
- ⇨ Replace processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in tester
- ⇨ If processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P19-7 (hopper plug) to J/P1-20B

MOTHER BOARD CONTINUITY CHECK
J/P10-6 to J/P1-20B

PROCESSOR BOARD TEST
Test U14 - if problem continues, then replace.
Test U21 - if problem continues, then replace.
Test U12 - if problem continues, then replace.
Test RP6 - if problem continues, then replace.

Problem: Reel Mech Opto Detectors (41 to 45 Error Code)



WIRE CONTINUITY TEST
Pin 7 (plug) to J/P7-31 (#1),
J/P7-29 (#2), J/P7-27 (#3),
J/P7-25 (#4), J/P7-23 (#5)

MOTHER BOARD CONTINUITY CHECK
J/P7-31 to J/P1-5B
J/P7-29 to J/P1-6B
J/P7-27 to J/P1-7B
J/P7-25 to J/P1-8B
J/P7-23 to J/P1-9B

PROCESSOR BOARD TEST
Test U4 - if problem continues, then replace.
Test U37 - if problem continues, then replace.
Test RP1, 2, 3, if problem continues, then replace.

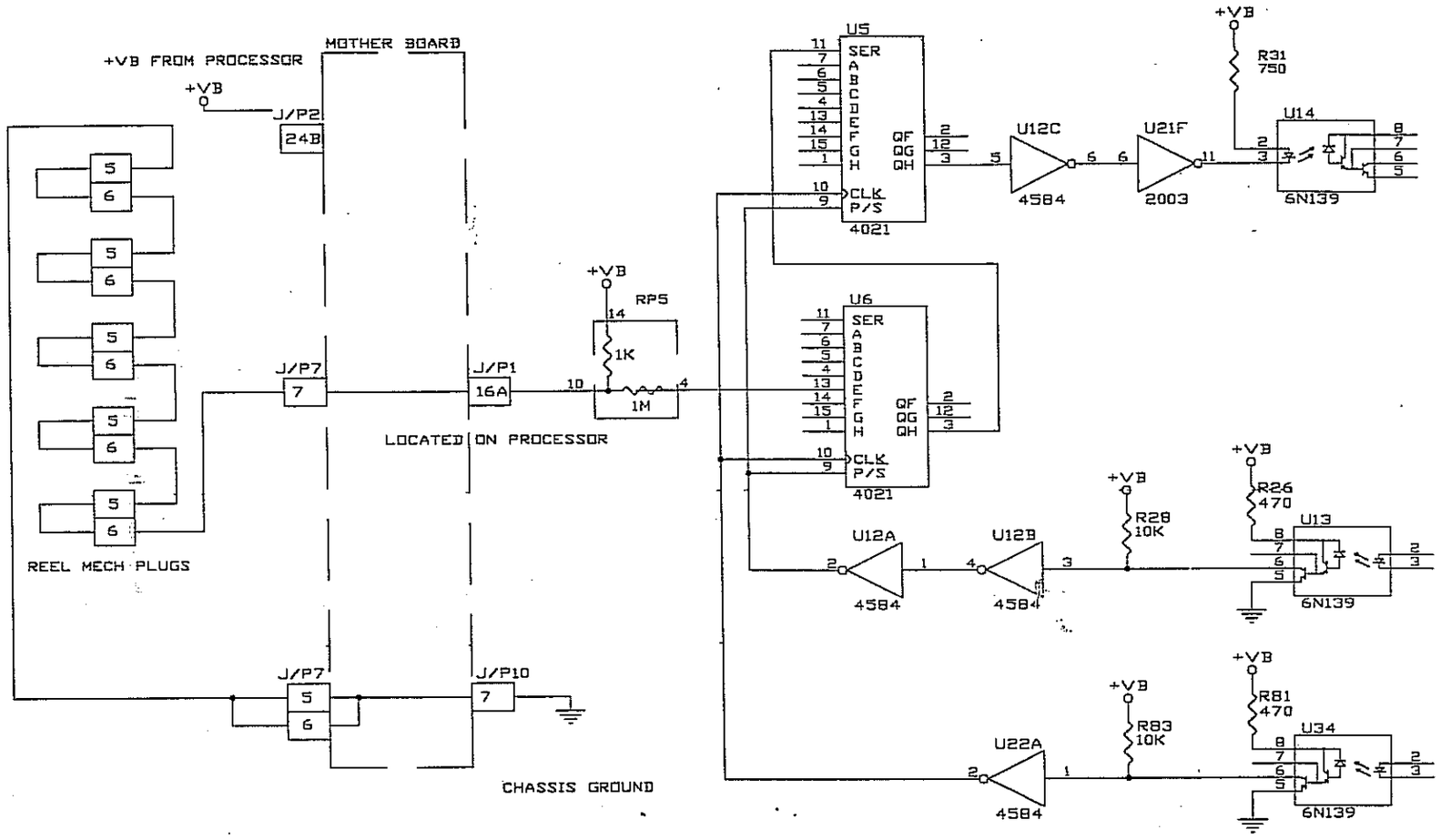
Before removing the processor board, check the following areas:

- ✓ Use input test 40 to 44 to verify the problem (check for flickering on the door)
- ✓ If so, verify that the encoder ring is not damaged
- ✓ Replace the problem reel with a known good reel
- ✓ If replacement reel works, replace optics on problem reel
- ✓ If problem remains, visually inspect wires and connectors to the mother board
- ✓ Check for ~10 to 11 VDC across pins 8 & 9 of the reel plug

If that doesn't work, try the following steps:

- ⇨ Replace processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in tester
- ⇨ If processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor are good, then use this diagram to test for wire continuity

Problem: Reel Mech Installed Loop (49 Code)



WIRE CONTINUITY TEST
J/P7-7 to J/P7-5
J/P7-7 to J/P7-6

MOTHER BOARD CONTINUITY CHECK
J/P7-7 to J/P1-16A
J/P7-5 to J/P7-6 to J/P10-7

PROCESSOR BOARD TEST
Test U6 - if problem continues, then replace
Test U5 - if problem continues, then replace
Test U14 - if problem continues, then replace
Test U21 - if problem continues, then replace
Test U12 - if problem continues, then replace
Test RP5 - if problem continues, then replace

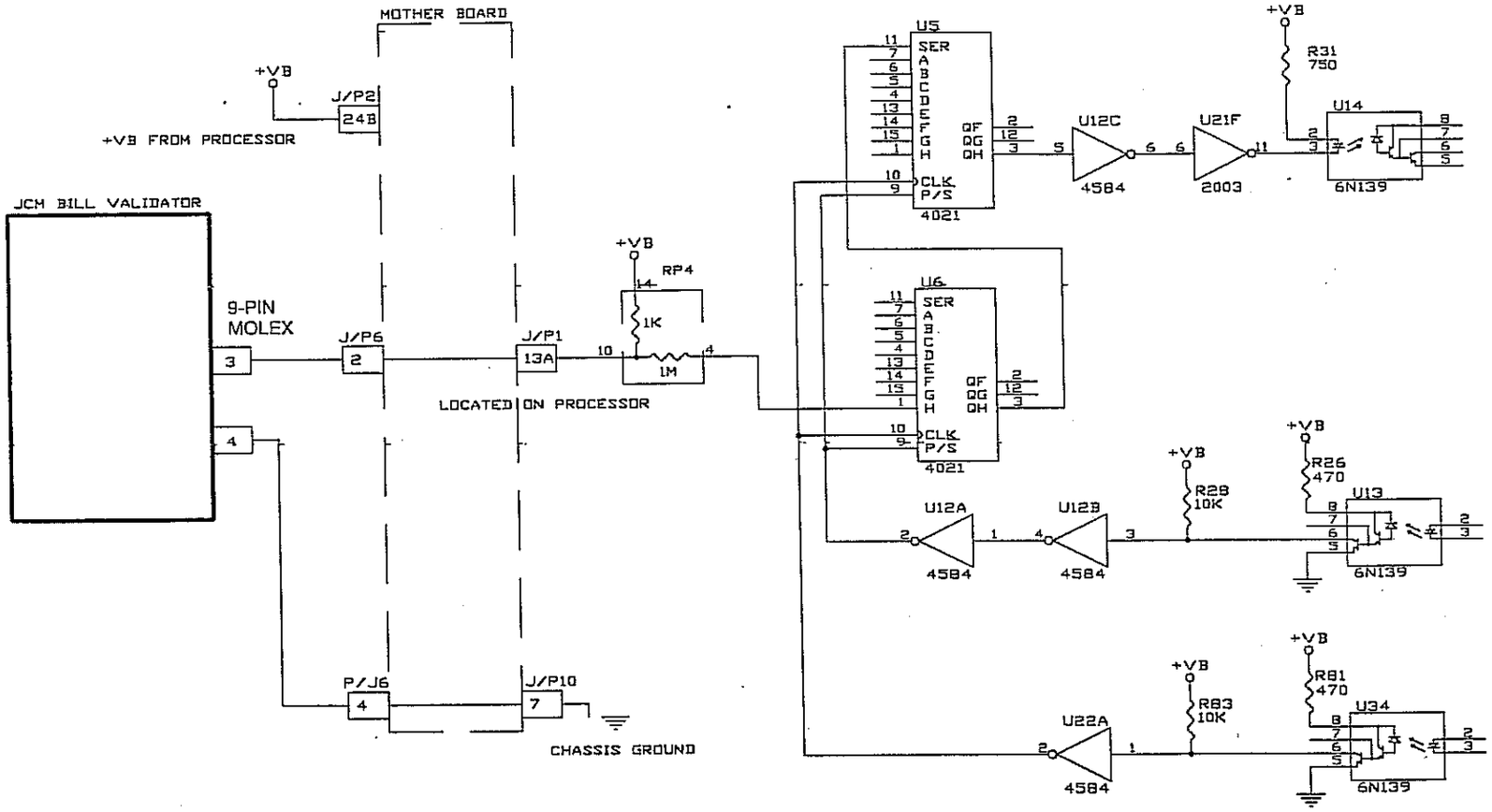
Before removing the processor board, check the following areas:

- ✓ Use input test 24 to verify the problem
- ✓ Check reel plugs for a firm connection
- ✓ Check for a blue jumper on the male side of the reel plugs
- ✓ Check for a loose Molex pin on the connector
- ✓ Refer to the diagram below and for the wire continuity

If that doesn't work, try the following steps:

- ➪ Replace processor board with a "known good" one
- ➪ If the processor board seems bad, verify in tester
- ➪ If processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor are good, then use this diagram to test the wire continuity

Problem: Bill Validator Won't Accept Bills (No Vend Signal)



Before removing the processor board, check the following areas:

- ✓ Use input test 27 to test the bill credit signal from the validator
- ✓ Check wires and connectors for defects
- ✓ Use output test 26 to verify validator enabled

If that doesn't work, try the following steps:

- ⇨ Replace validator with a "known good" one
- ⇨ Replace processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in tester
- ⇨ If processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
4 to J/P6-4
3 to J/P6-2

MOTHER BOARD CONTINUITY CHECK
J/P6-2 to J/P1-13A
J/P6-4 to J/P10-7

PROCESSOR BOARD TEST
Test U6 - if problem continues, then replace
Test U5 - if problem continues, then replace
Test U14 - if problem continues, then replace
Test U21 - if problem continues, then replace
Test U12 - if problem continues, then replace
Test RP5 - if problem continues, then replace

Start With the Problem

The simplest means of treating machine and board repairs is to start with the problem and then try to isolate the cause. Treat each output problem individually, and trace it from the exterior of the machine onto the processor board, if necessary.

When solving an output problem, consider the following items.

- Each output, when activated, is energized through the wiring and connectors from the mother board.
- The mother board connects directly to the processor board (processor board connects to the mother board at J/P1 and J/P2).
- The processor board typically has a driver (e.g. triac) that is activated by an output pin on the parallel side of a shift register.

Output Section of the Processor Board

The output section contains four 10-bit shift registers (U8, U9, U23 and U24). Each shift register requires input from four common inputs. Each shift register requires digital activity to pin 14 (serial data), pin 4 (serial clock), pin 7 (load pulse), and pin 13 (enable). Each of these inputs is protected by an opto-isolator with 2 buffers; serial data out (U33) with the buffer U22; ENA (U26) with the buffer U21 and U22; serial clock (U34) with the buffer U22; and load (U13) with buffers U21 and U22.

Outputs Test

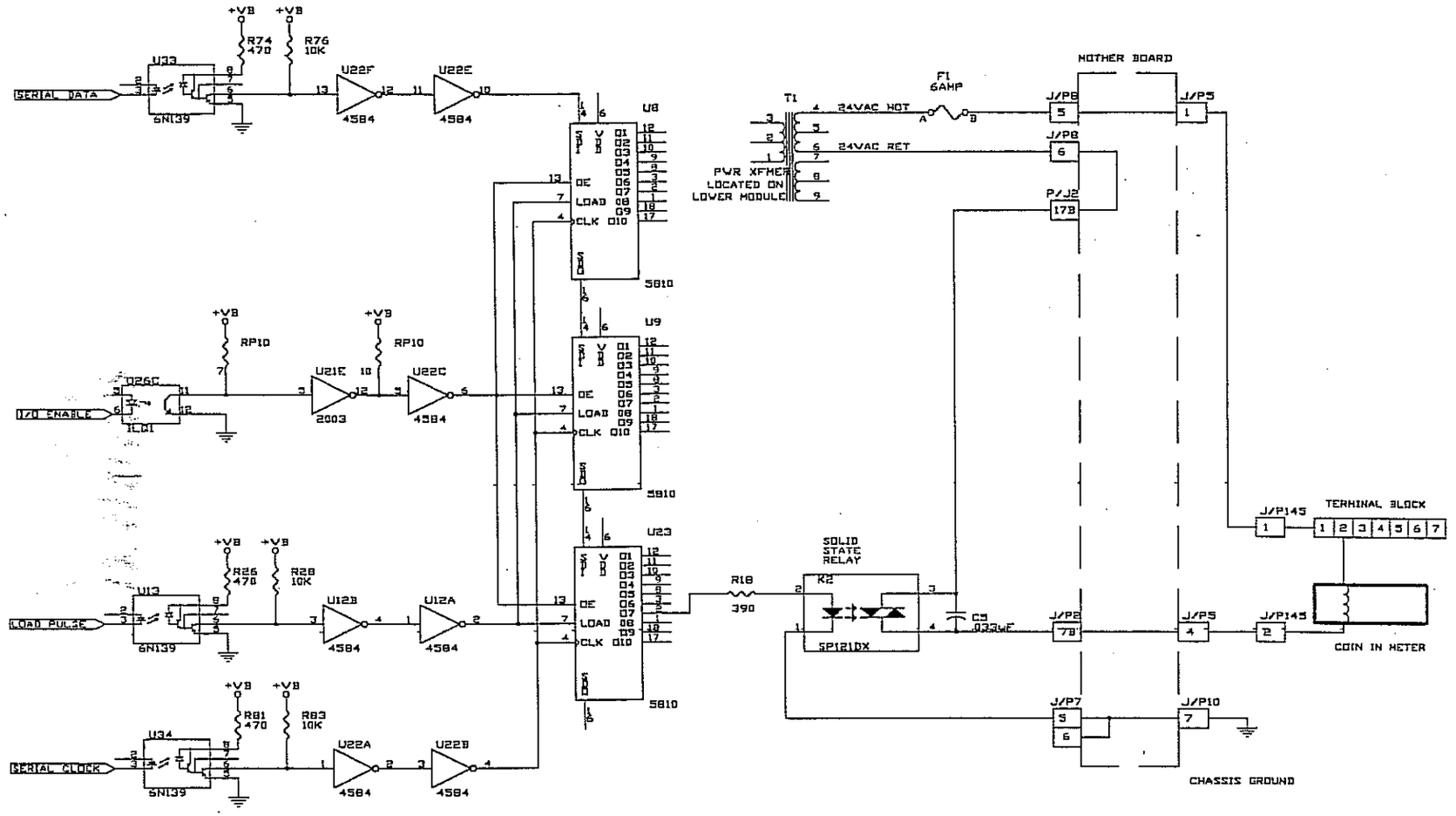
The outputs test page allows the operator to test machine outputs. The number 2 appears in the Coins Played display. During each output test, 2 digits of a 4-digit code appear in the Winner Paid display (for example, 10_ _).

To test an output, locate the number for that output on the outputs table and the corresponding toggle instructions. Turn the reset key until the 2 digits on the left-hand side of the display correspond to the number of the input. Press the Spin switch to activate/deactivate the output.

Outputs Test		
Winner Paid	Description	Action to Toggle Output
10__	Coin Drop Meter	Press Spin Reels switch to test coin-to-drop-box counter
11__	Coin-Out Meter	Press Spin Reels switch to test coin-out counter
12__	Coin-In Meter	Press Spin Reels switch to test coin-in counter
13__	B Switch (SDS)	Press Spin Reels switch to test B switch
14__	Hopper Drive #2	Press Spin Reels switch to activate test.
15__	Stepper Motor Direction	(Bench-level processor board test only)
16__	Mechanical Bell	Press Spin Reels switch to hear mechanical bell
17__	Cancelled Credits Meter	Press Spin Reels switch to test the cancelled credits counter
20__	Payline Light #3	Press Spin Reels switch to illuminate third-coin payline
21__	Payline Light #4	Press Spin Reels switch to illuminate fourth-coin payline
22__	Payline Light #5	Press Spin Reels switch to illuminate fifth-coin payline
23__	Payline Light #6	Press Spin Reels switch to illuminate sixth-coin payline
24__	Door Optics Transmitter	Press Spin Reels switch to test door optics transmitter
25__	Games Played Meter	Press Spin Reels switch to test games played counter
26__	Bill Acceptor	Press Spin Reels switch to test bill acceptor enable
27__	Jackpot Coins	Press Spin Reels switch to test jackpot counter

Outputs Test		
Winner Paid	Description	Action to Toggle Output
31__	Change Lamp	Press Spin Reels switch to illuminate change lamp
32__	Handle Release	Press Spin Reels switch to hear handle release activate
33__	Diverter	Press Spin Reels switch to see coin-channel diverter move
34__	Coin Lockout	Press Spin Reels switch to hear coin lockout activate
35__	Hopper Drive #1	Press Spin Reels switch to activate test.
36__	Coin Stepper #1 Lamps	Press Spin Reels switch to illuminate first-coin payline
37__	Coin Stepper #2 Lamps	Press Spin Reels switch to illuminate second-coin payline
40__	Stepper Motor Power Sup.	(Bench-level processor board test only)
41__	Insert Coin Lamp	Press Spin Reels switch to illuminate Insert Coin lamp
42__	Coin Accepted Lamp	Press Spin Reels switch to illuminate Coin Accepted lamp
43__	Jackpot/Hand Pay Lamp	Press Spin Reels switch to illuminate Jackpot/Hand pay lamp
44__	Bet Maximum Credits	Press Spin Reels switch to illuminate Bet Maximum Credits
45__	Bet One Credit Switch Lamp	Press Spin Reels switch to illuminate Bet One Credit switch
46__	Cashout Credits Switch	Press Spin Reels switch to illuminate Cashout Credits switch

Problem: Coin-In Meter is Nonfunctional or Locked Between Digits



Before removing the processor board, check the following areas:

- ✓ Use output test 12 to verify the problem
- ✓ Check wire and connector for defects
- ✓ Verify meter lead is seated in position #2 in terminal block

If that doesn't work, try the following steps:

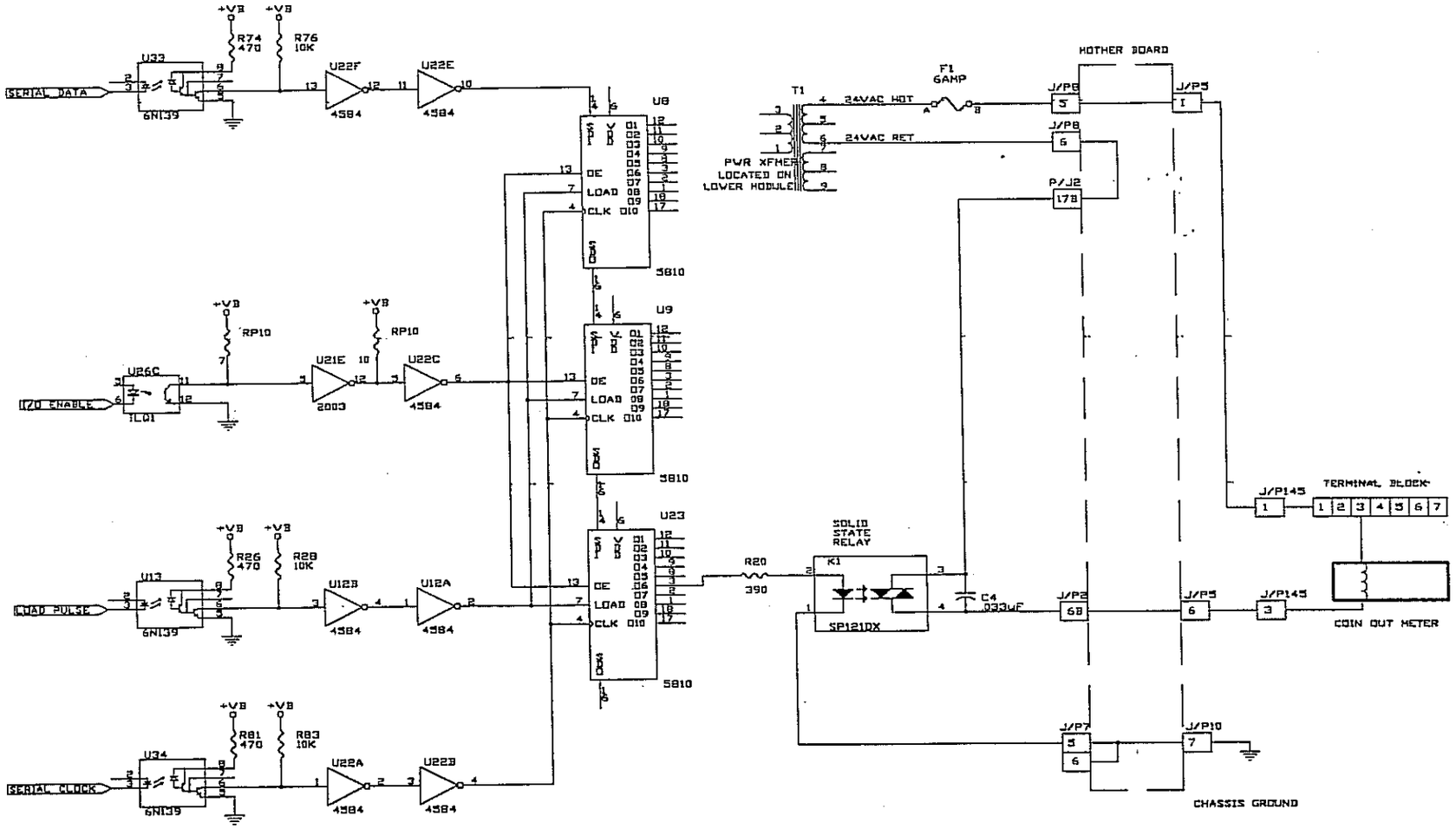
- ➪ If the meter is locked up, then replace the coin-in meter and retest
- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are good, then use this diagram to test for wire continuity.

WIRE CONTINUITY TEST
J/P145-2 to J/P5-4

MOTHER BOARD TEST
J/P5-4 to J/P2-7B
J/P8-6 to J/P2-17B
J/P7-5 & 6 to J/P10-7

PROCESSOR BOARD TEST
Check from K2 to edge for burned trace
Test K2 (SP121DX), if problem continues, then replace.
Test U23, if problem continues, then replace.
Test C5 (shorted cap) – replace

Problem: Coin-Out Meter is Nonfunctional or Locked Between Digits



Before removing the processor board, check the following areas:

- ✓ Use output test 11 to verify the problem
- ✓ Check wire and connector for defects
- ✓ Verify meter lead is seated in position #3 in terminal block

If that doesn't work, try the following steps:

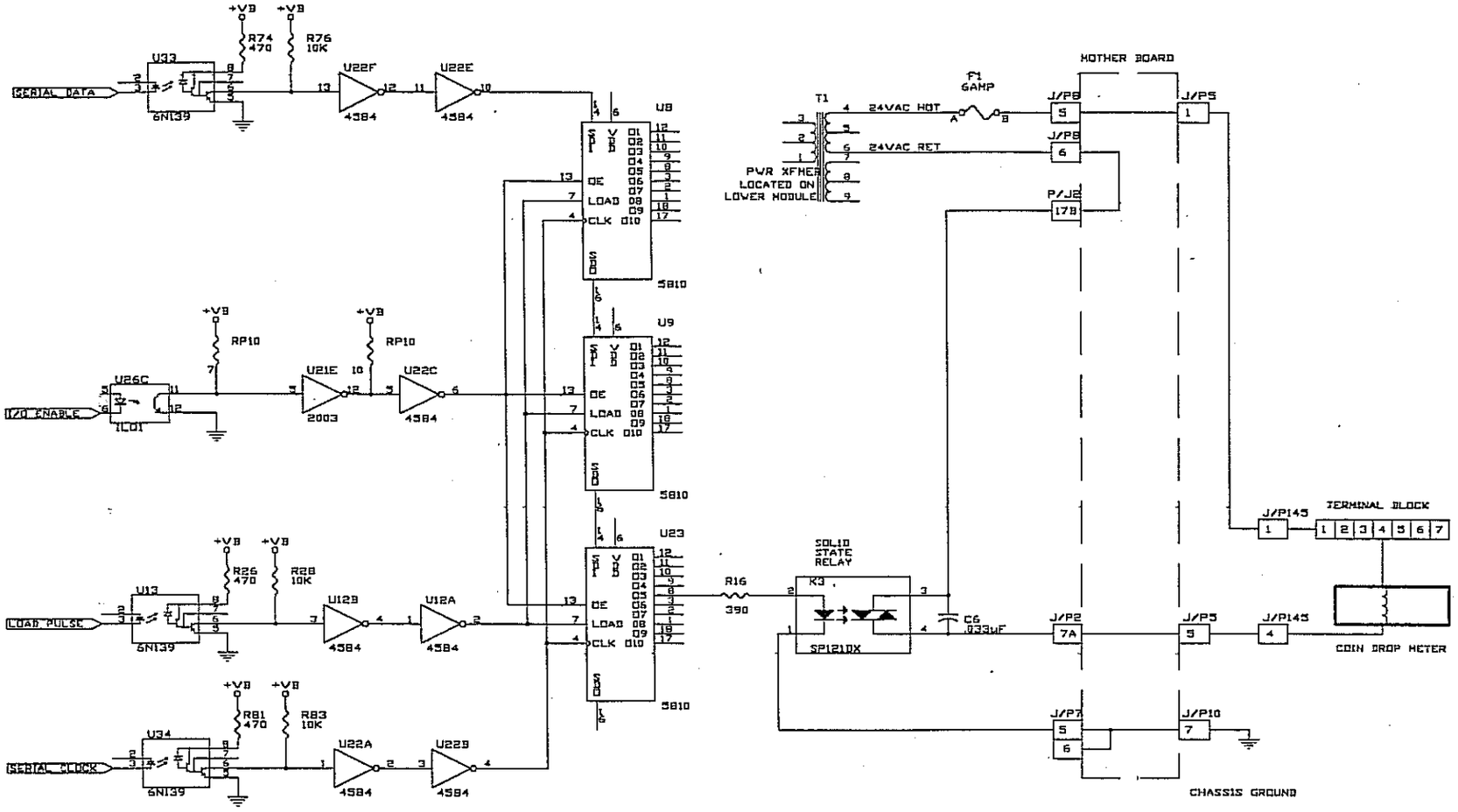
- ➪ If the meter is locked up, then replace the coin-out meter and retest
- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P145-3 to J/P5-6
J/P8-5 to J/P8-6

MOTHER BOARD TEST
J/P5-6 to J/P2-6B
J/P8-6 to J/P2-17B
J/P7-5 & 6 to J/P10-7

PROCESSOR BOARD TEST
Check from K1 to edge for burned trace
Test K1 (SP121DX), if problem continues, then replace.
Test U23, if problem continues, then replace.
Test C4 (shorted cap) – replace

Problem: Coin Drop Meter is Nonfunctional or Locked Between Digits



Before removing the processor board, check the following areas:

- ✓ Use output test 10 to verify the problem
- ✓ Check wire and connector for defects
- ✓ Verify meter lead is seated in position #4 in the terminal block

If that doesn't work, try the following steps:

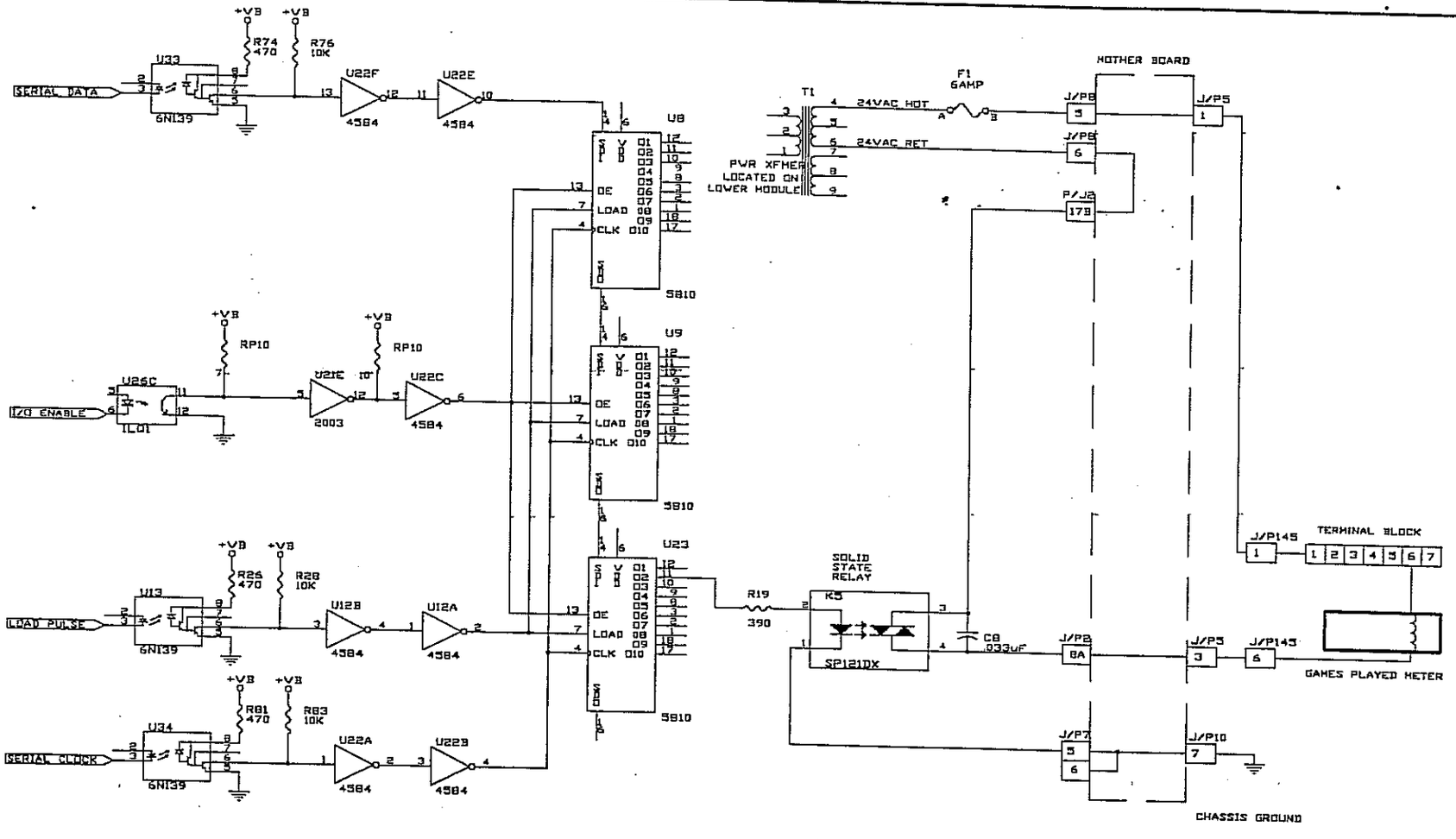
- ⇨ If the meter is locked up, replace the drop meter and retest
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P145-4 to J/P5-5
J/P8-5 to J/P8-6

MOTHER BOARD TEST
J/P5-5 to J/P2-7A
J/P8-6 to J/P2-17B
J/P7-5 & 6 to J/P10-7

PROCESSOR BOARD TEST
Check from K3 to edge for burned trace
Test K3, if problem continues, then replace.
Test U23, if problem continues, then replace.
Test C6 (shorted cap) – replace

Problem: Games Played Meter is Nonfunctional or Locked Between Digits



Before removing the processor board, check the following areas:

- ✓ Use output test 25 to verify the problem
- ✓ Check wire and connector for defects
- ✓ Verify that the meter lead is seated in position #6 in terminal block
- ✓ Remove and replace the games played meter, and test

If that doesn't work, try the following steps:

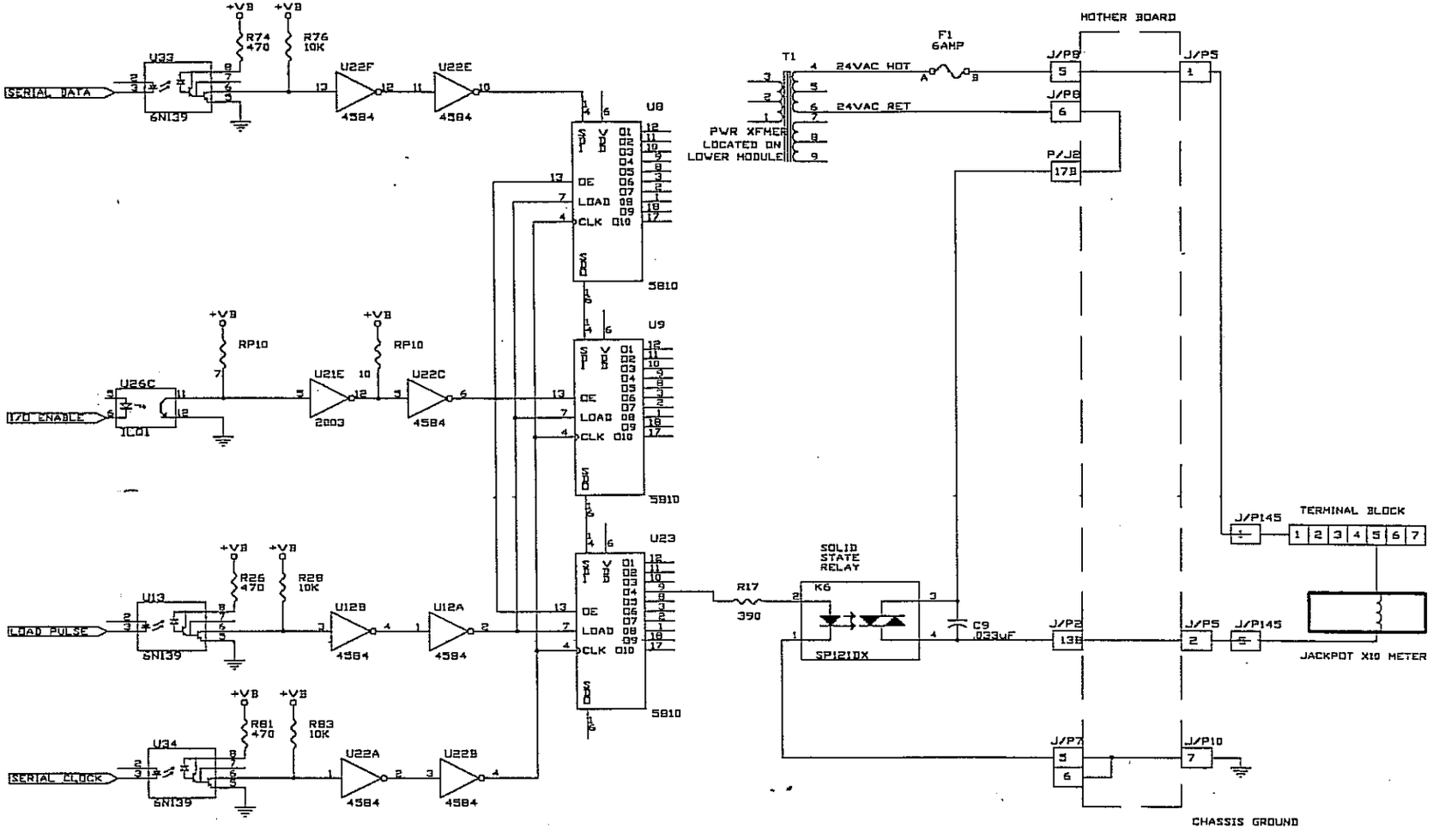
- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P145-6 to J/P5-3
J/P145-1 to J/P5-1

MOTHER BOARD TEST
J/P5-3 to J/P2-8A
J/P8-6 to J/P2-17B
J/P10-7 to J/P7-5 & 6
J/P5-1 to J/P8-5

PROCESSOR BOARD TEST
Check from K5 to edge for burned trace
Test K5 (SP121DX) - if problem continues, then replace.
Test U23 - if problem continues, then replace.
Test C8 (shorted cap) – replace

Problem: Jackpot X10 Meter is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test 27 to verify the problem
- ✓ Check wire and connector for defects
- ✓ Verify meter lead is seated in position #5 in terminal block
- ✓ Replace the jackpot meter and retest

If that doesn't work, try the following steps:

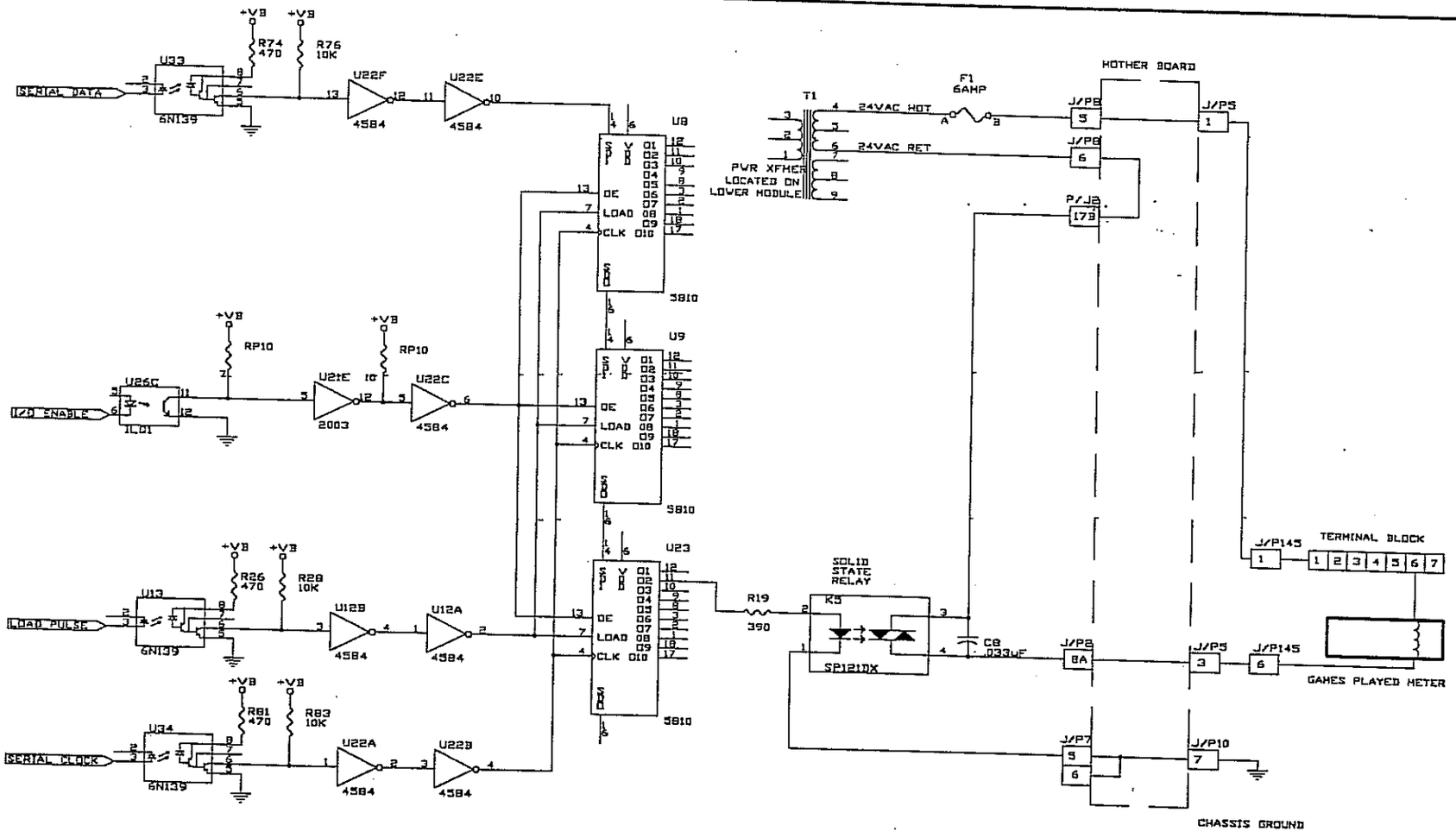
- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P145-5 to J/P5-2
J/P145-1 to J/P5-1

MOTHER BOARD TEST
J/P5-2 to J/P2-13B
J/P8-6 to J/P2-17B
J/P5-1 to J/P8-5

PROCESSOR BOARD TEST
Check from K6 to edge for burned trace
Test K6 (SP121DX) if problem continues, then replace.
Test U23, if problem continues, then replace.
Test C9 (shorted cap) – replace

Problem: All Meters are Nonfunctional or Locked Between Digits



Before removing the processor board, check the following areas:

- ✓ Use output test 10, 11, 12, 25, and 27 to verify the problem
- ✓ Check (24VAC 6A) fuse
- ✓ Check wire and connector for defects
- ✓ Check that terminal block wires are seated adjacently starting at position #1

If that doesn't work, try the following steps:

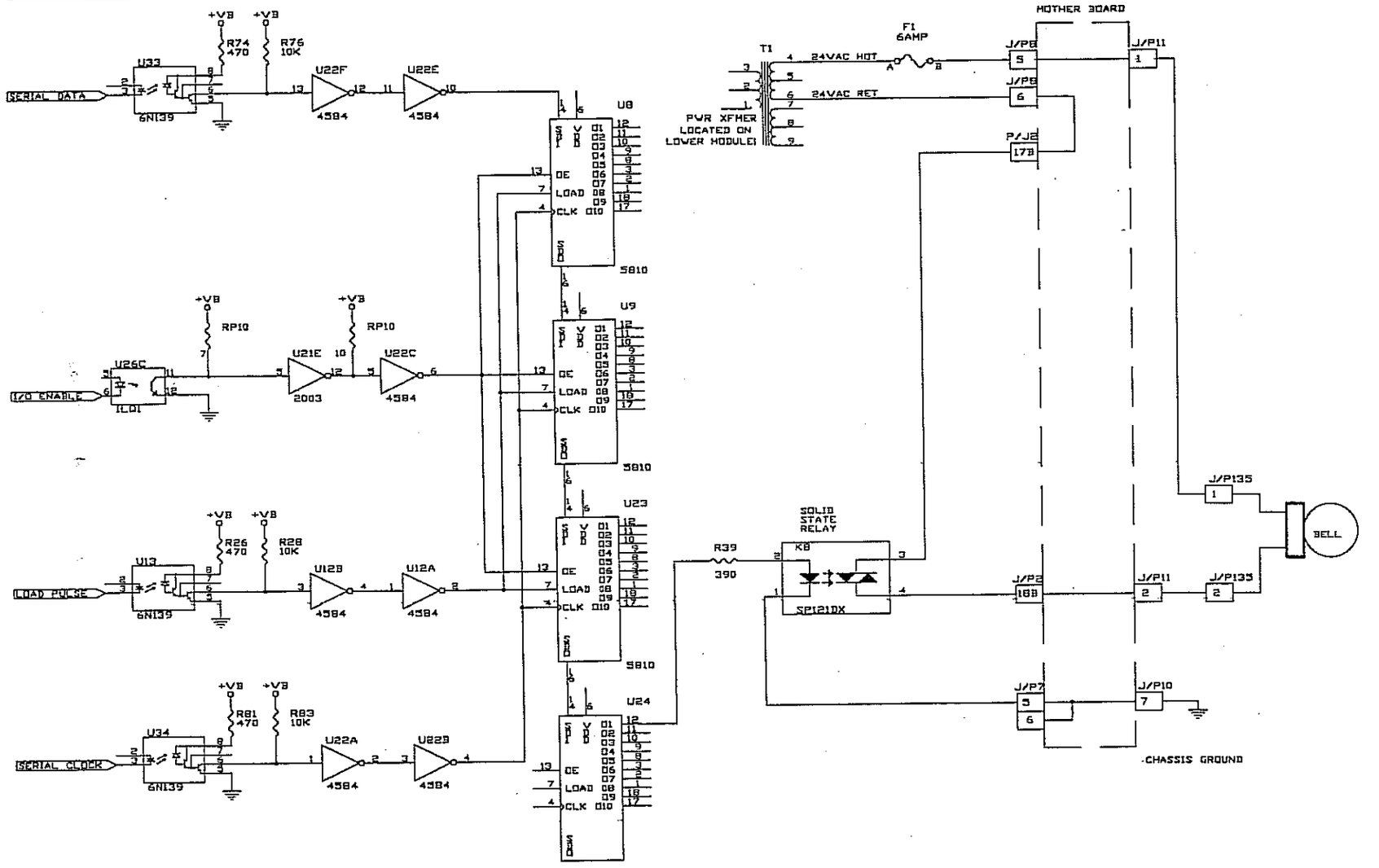
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P145-1 to J/P5-1

MOTHER BOARD TEST
J/P5-1 to J/P8-5
J/P10-7 to J/P7-5 & 6

PROCESSOR BOARD
Test U23 - if problem continues, then replace.
Test U33, U26, U13 & U34

Problem: Bell is Nonfunctional



WIRE CONTINUITY TEST
J/P135-1 to J/P11-1
J/P135-2 to J/P11-2

MOTHER BOARD TEST
J/P11-2 to J/P2-18B
J/P10-7 to J/P7-5&6
J/P11-1 to J/P8-5
J/P8-6 to J/P2-17B

PROCESSOR BOARD
Check from K8 to edge for burned traces
Test K8 (SP121DX), if problem continues, then replace.
Test U23, if problem continues, then replace.

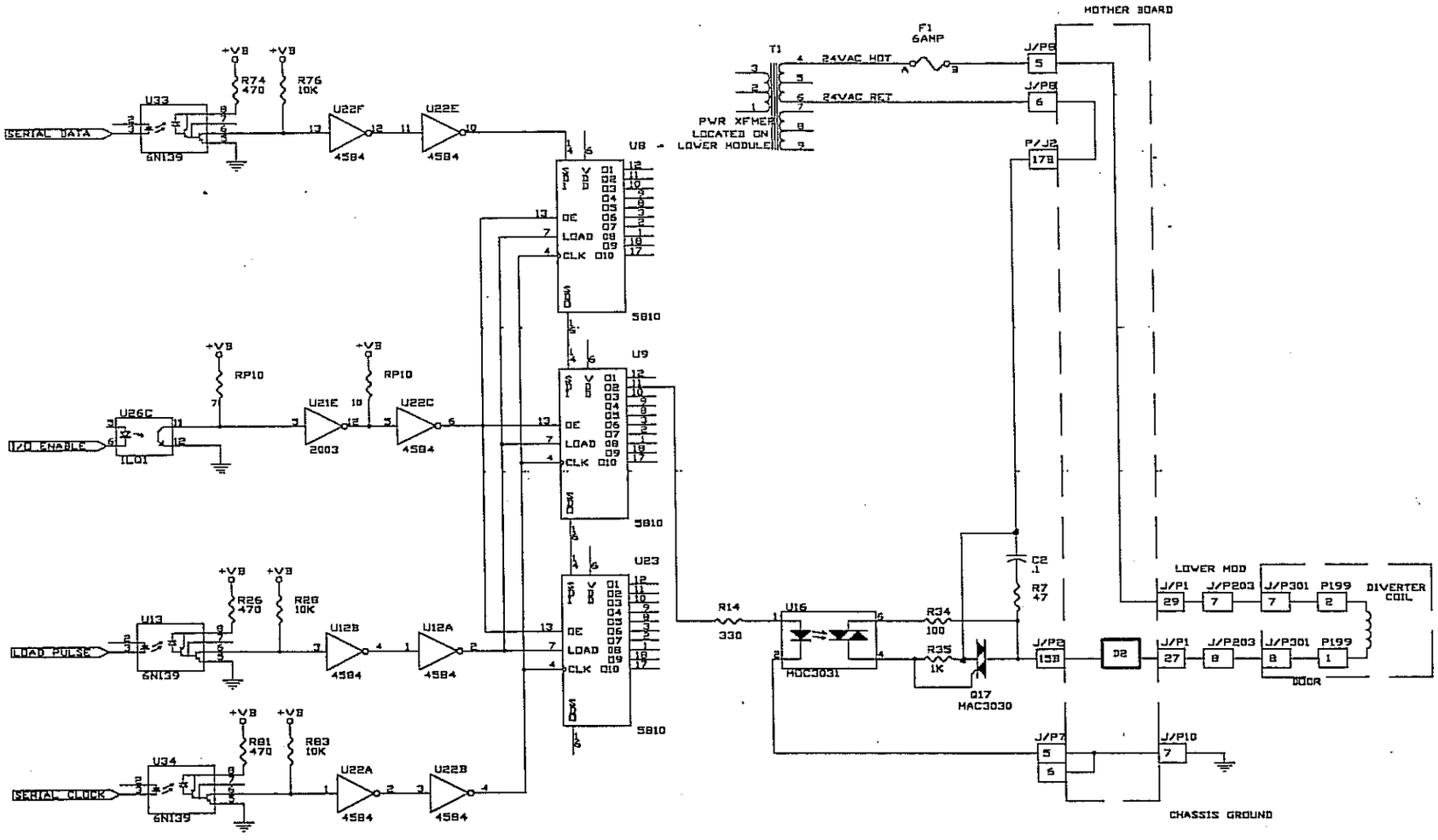
Before removing the processor board, check the following areas:

- ✓ Use output test 16 to verify the problem
- ✓ Check wires and connectors for defects
- ✓ use this diagram to test for wire continuity

If that doesn't work, try the following steps:

- ➪ If the bell is nonfunctional, then replace the bell, and test
- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Diverter is Nonfunctional



WIRE TEST CONTINUITY
J/P199-1 to J/P1-27
J/P199-2 to J/P1-29

MOTHER BOARD TEST
J/P1-27 to J/P2-15B
J/P1-29 to J/P8-5
J/P10-7 to J/P7-5 & 6

PROCESSOR BOARD TEST
Check from Q17 to edge (J/P2-15B & J/P2-17B) for burned trace
Test Q17 (MAC3030) - if problem continues, then replace.
Test U16 (MOC3031) - if problem continues, then replace.
Test U9
Test R14
Test C2 (shorted cap) – replace

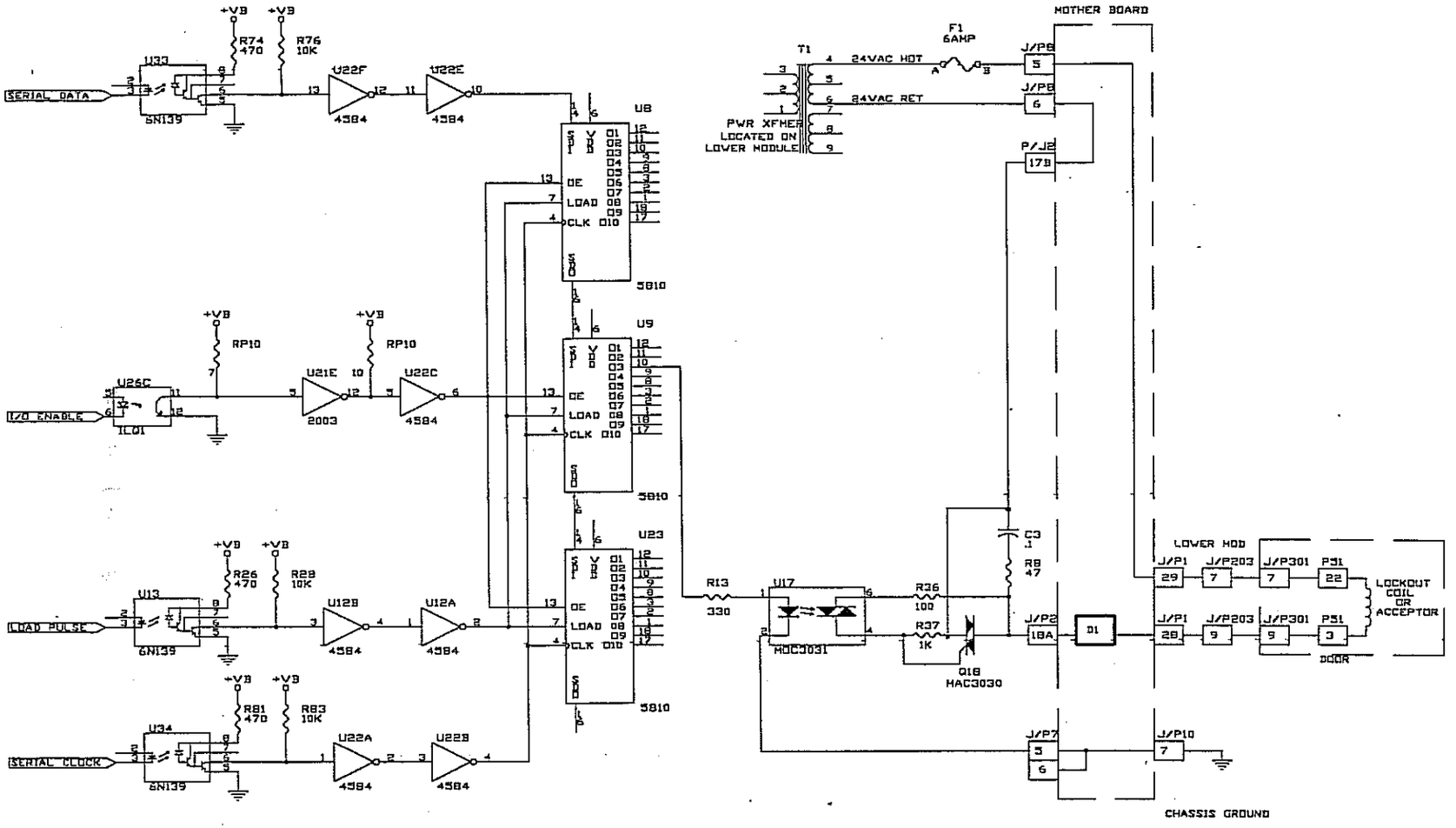
Before removing the processor board, check the following areas:

- ✓ Use input test 15 to verify if the problem is the hopper full probe
- ✓ Use output test 33 to verify the diverter problem
- ✓ Check (24 VAC) fuse
- ✓ Replace coil and retest

If that doesn't work, try the following steps:

- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Lockout is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test 34 to verify the problem
- ✓ Check (24 VAC) fuse
- ✓ Replace lockout coil, and test

If that doesn't work, try the following steps:

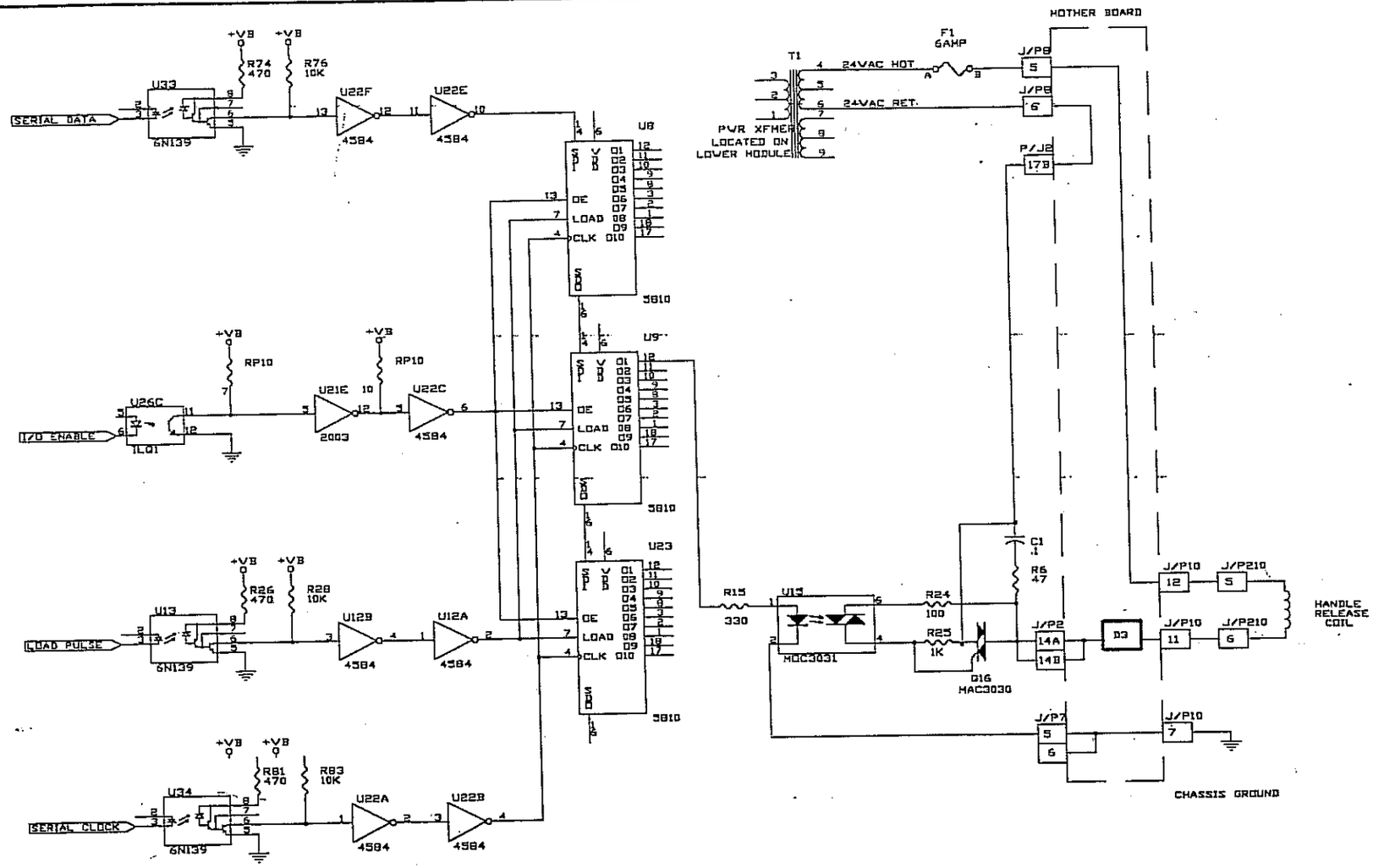
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE TEST CONTINUITY
J/P51-22 to J/P1-29
J/P51-3 to J/P1-28

MOTHER BOARD TEST
J/P1-28 to D1; D1 to J/P2-18A
J/P1-29 to J/P8-5
J/P8-6 to J/P2-17B
J/P16-7 to J/P7-5 & 6

PROCESSOR BOARD TEST
Check from Q18 to edge (J/P2-18A & J/P2-17B) for burned trace
Test Q18 (MAC3030) - if problem continues, then replace.
Test U17 (MOC3031) - if problem continues, then replace.
Test U9
Test R13
Test C3 (shorted cap) – replace

Problem: Handle Release Coil Stays Locked or Won't Lock



Before removing the processor board, check the following areas:

- ✓ Use output test 32 on later programs
- ✓ Check leads to coil
- ✓ Check hammer spring and rachet spring in handle mechanism
- ✓ Check (24 VAC) fuse
- ✓ Replace handle release coil, and test

If that doesn't work, try the following steps:

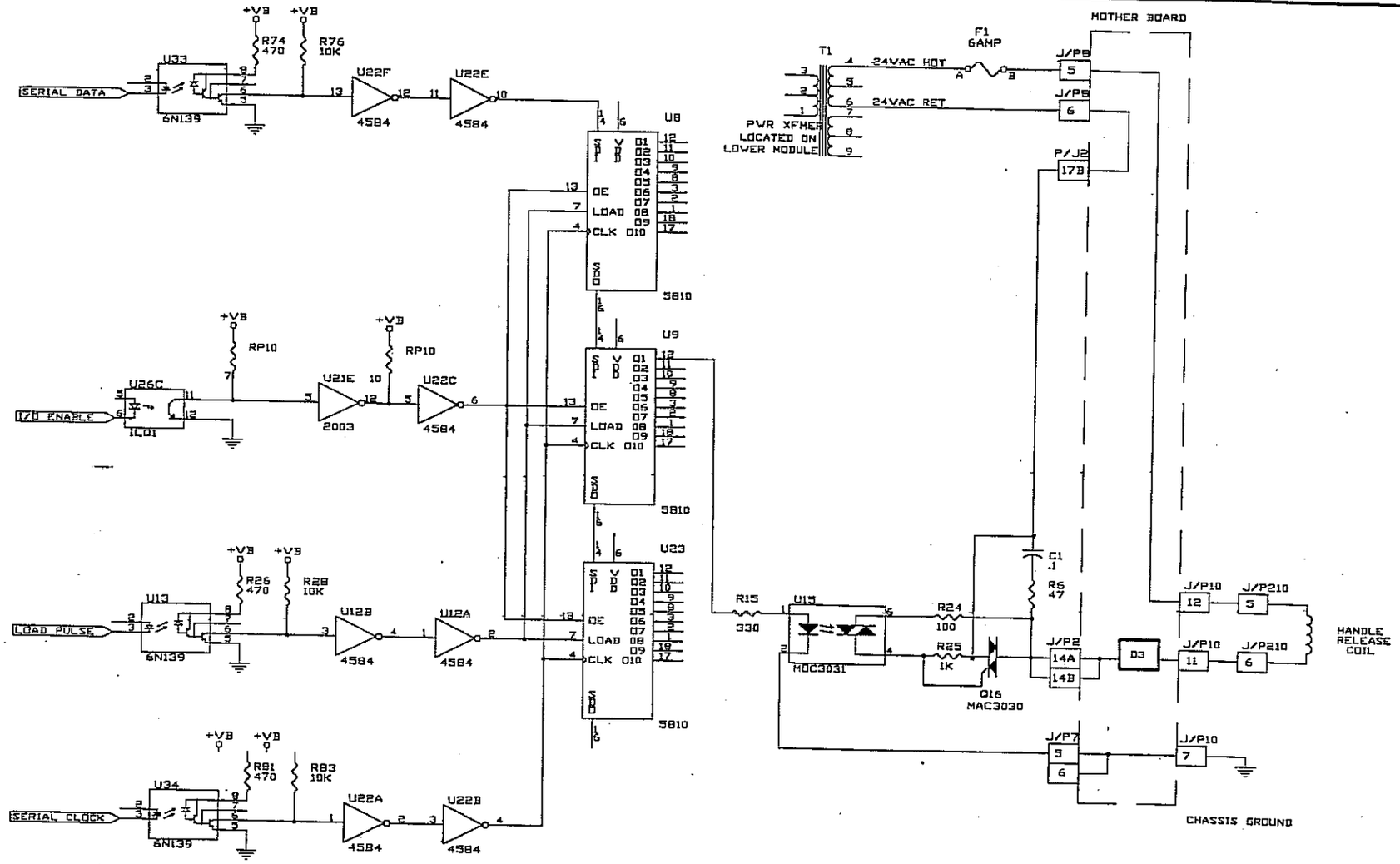
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE TEST CONTINUITY
J/P210-5 to J/P10-12
J/P210-6 to J/P10-11

MOTHER BOARD TEST
J/P10-12 to J/P6-5
J/P10-11 to D3
D3 to J/P2-14A & 14B
J/P10-7 to J/P7-5 & 6

PROCESSOR BOARD TEST
Check from Q16 to edge (J/P2-18A & J/P2-17B) for burned trace
Test Q16 (MAC3030) - if problem continues, then replace.
Test U15 (MOC3031) - if problem continues, then replace.
Test U9
Test R15
Test C1 (shorted cap) – replace

Problem: Diverter, Lockout, and Handle Release are All Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test 33 and 34 to verify the problem
- ✓ Check (24 VAC) fuse

If that doesn't work, try the following steps:

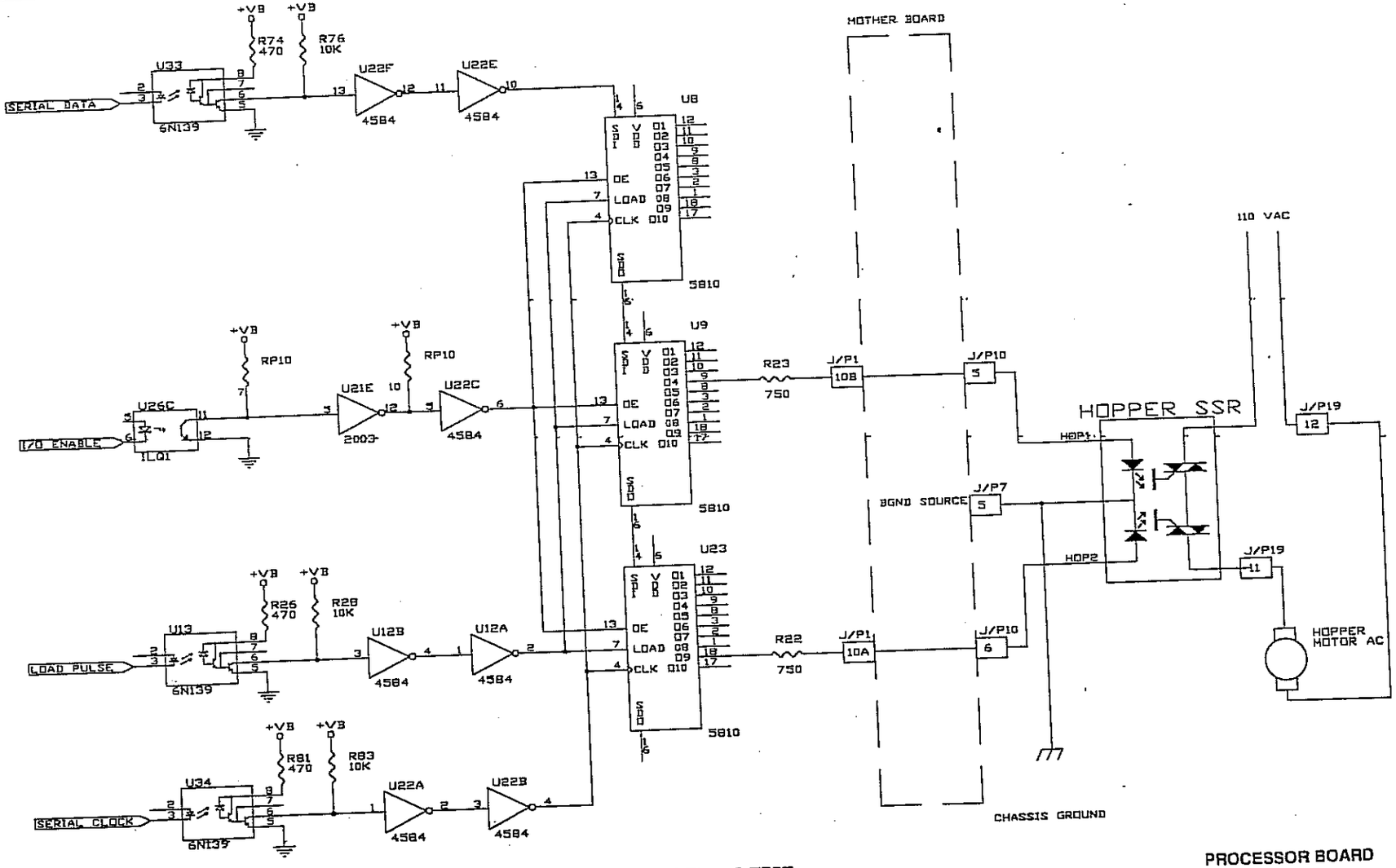
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE TEST CONTINUITY
J/P10-12 to Solenoid
J/P10-11 to Solenoid

MOTHER BOARD TEST
J/P1-29 to J/P6-5
J/P10-7 to J/P7-5 & 6

PROCESSOR BOARD TEST
Check J/P2-17B for burned traces
Test U9

Problem: Hopper Won't Activate



WIRE TEST CONTINUITY
J/P10-5 to SSR
J/P10-6 to SSR
J/P7-5 to SSR
Check at Beau Plug (J/P19-11 and J/P19-12)

MOTHER BOARD TEST
J/P10-6 to J/P1-10A
J/P10-5 to J/P1-10B

PROCESSOR BOARD
U9-9 to J/P1-10B
U23-18 to J/P1-10A
Test R22 & R23 (750Ω ea.)

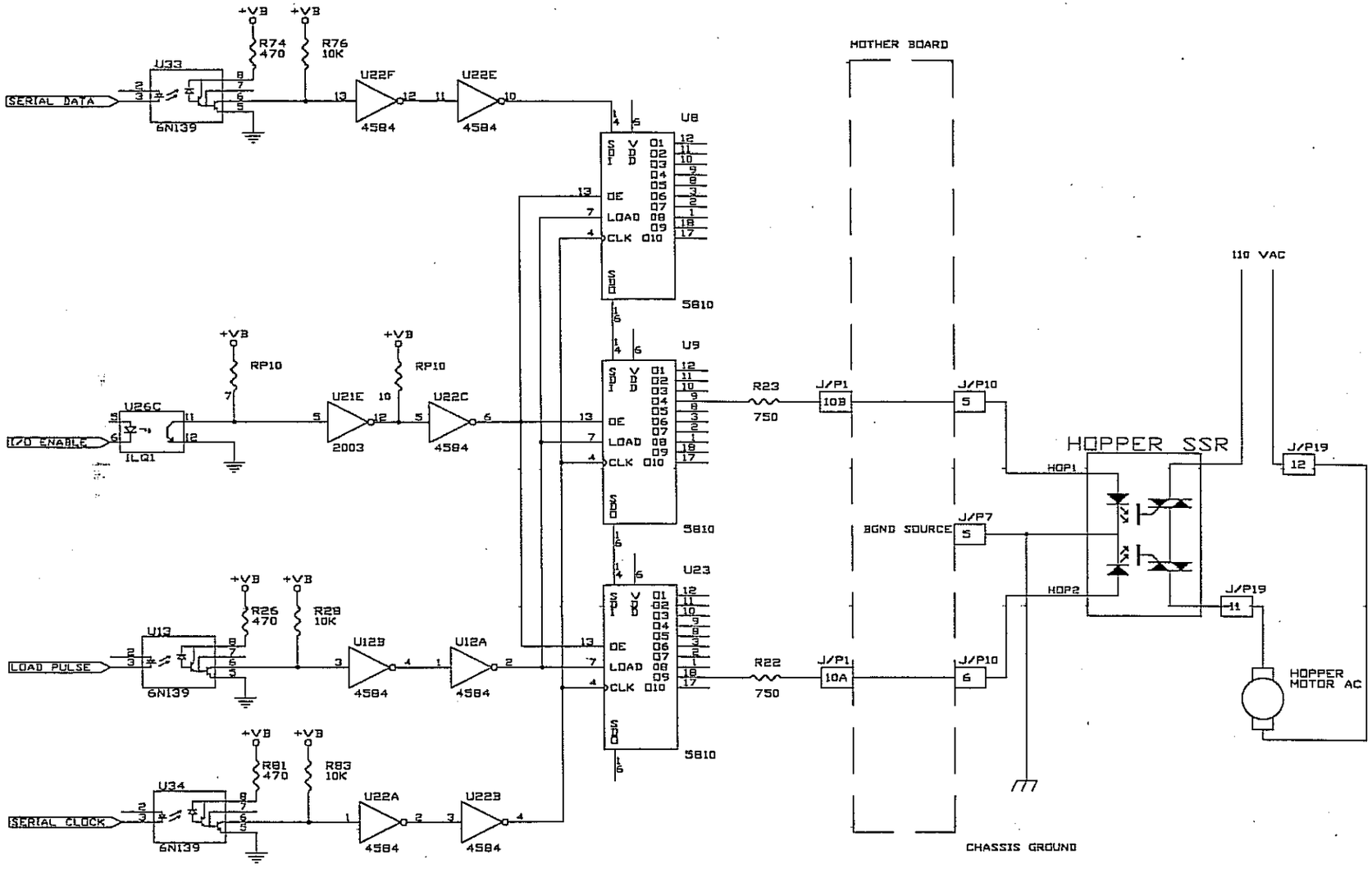
Before removing the processor board, check the following areas:

- ✓ Check Cashout switch function in input test 22
- ✓ Use outputs test 35 and 14 (if either test activates the hopper then either the SSR or the processor is defective)
- ✓ Check for loose or defective wires
- ✓ Test for 110VAC across J/P19-11&12
- ✓ If the 110VAC is good, replace the Hopper SSR and test
- ✓ Use another hopper to determine if the motor seems bad

If that doesn't work, try the following steps:

- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Runaway Hopper



Before removing the processor board, check the following areas:

✓ Use outputs test 35 and 14 (if either test activates the hopper, then either the SSR or the processor board is defective)

If that doesn't work, try the following steps:

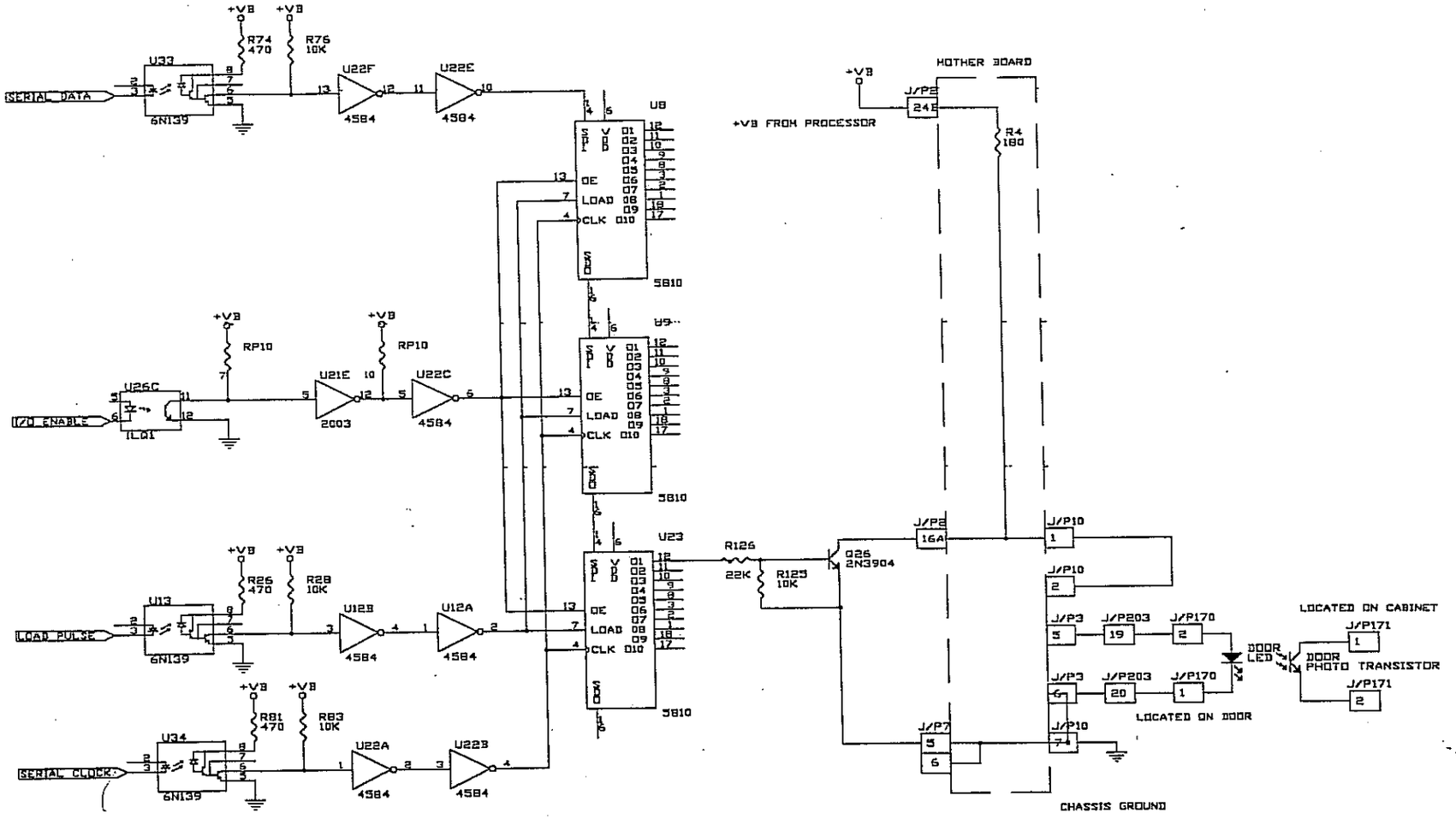
- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE TEST CONTINUITY
J/P10-5 to SSR
J/P10-6 to SSR
J/P7-5 to SSR
Check at Beau Plug (J/P19-11 and J/P19-12)

MOTHER BOARD TEST
J/P10-6 to J/P1-10A
J/P10-5 to J/P1-10B

PROCESSOR BOARD TEST
U9-9 to J/P1-10B
U23-18 to J/P1-10A
Test R22 & R23

Problem: Constant Door Open Message (Suspect Bad LED)



Before removing the processor board, check the following areas:

- ✓ Use input test 13 to verify that the phototransistor is good (use a flashlight to simulate a LED)
- ✓ Measure Vb at J/P170 pins 1 & 2 (~5VDC)
- ✓ Check wires and connectors for defects
- ✓ Replace the LED, and test

If that doesn't work, try the following steps:

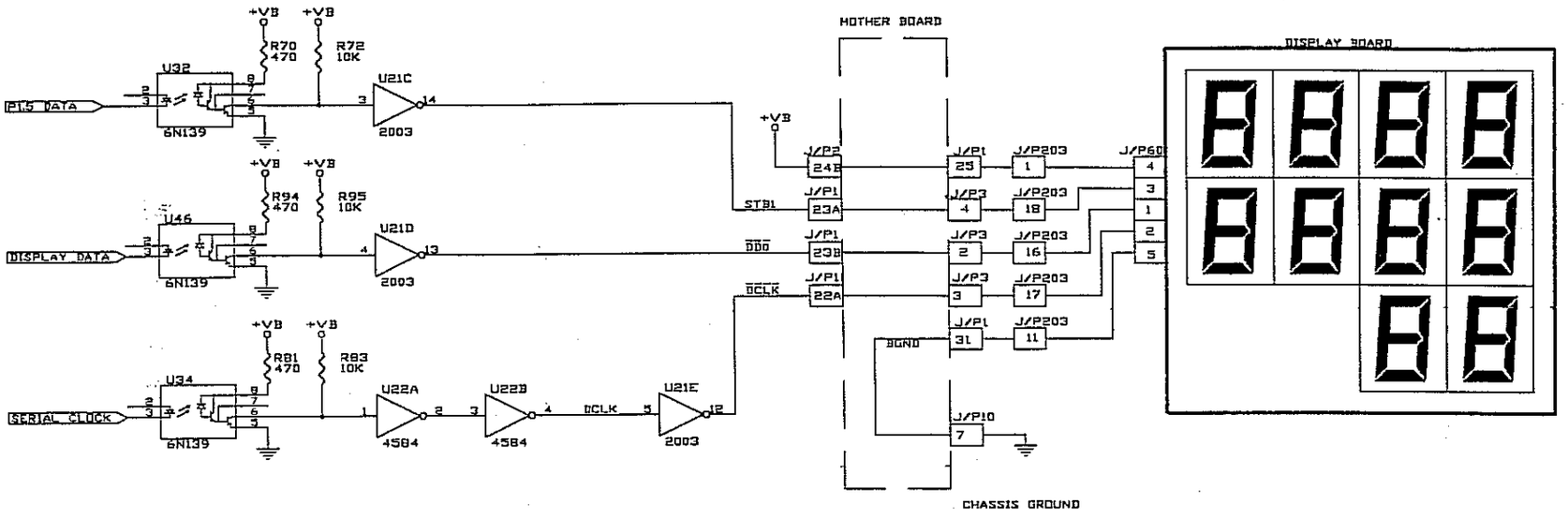
- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P170-2 to J/P10-1 (Intermediate Connections)
J/P170-1 to J/P3-6

MOTHER BOARD TEST
J/P3-6 to J/P10-7 and J/P7-5 & 6
J/P3-5 to J/P2-16A and J/P2-24B (note R4 & test also)

PROCESSOR BOARD TEST
Test Q26 (2N3904) - if problem continues, then replace.
Test R125 (10K OHM) - if problem continues, then replace.
Test R126 (22K OHM) - if problem continues, then replace.
Test U23 - if problem continues, then replace.

Problem: Display Board is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Replace the display board, and test

If that doesn't work, try the following steps:

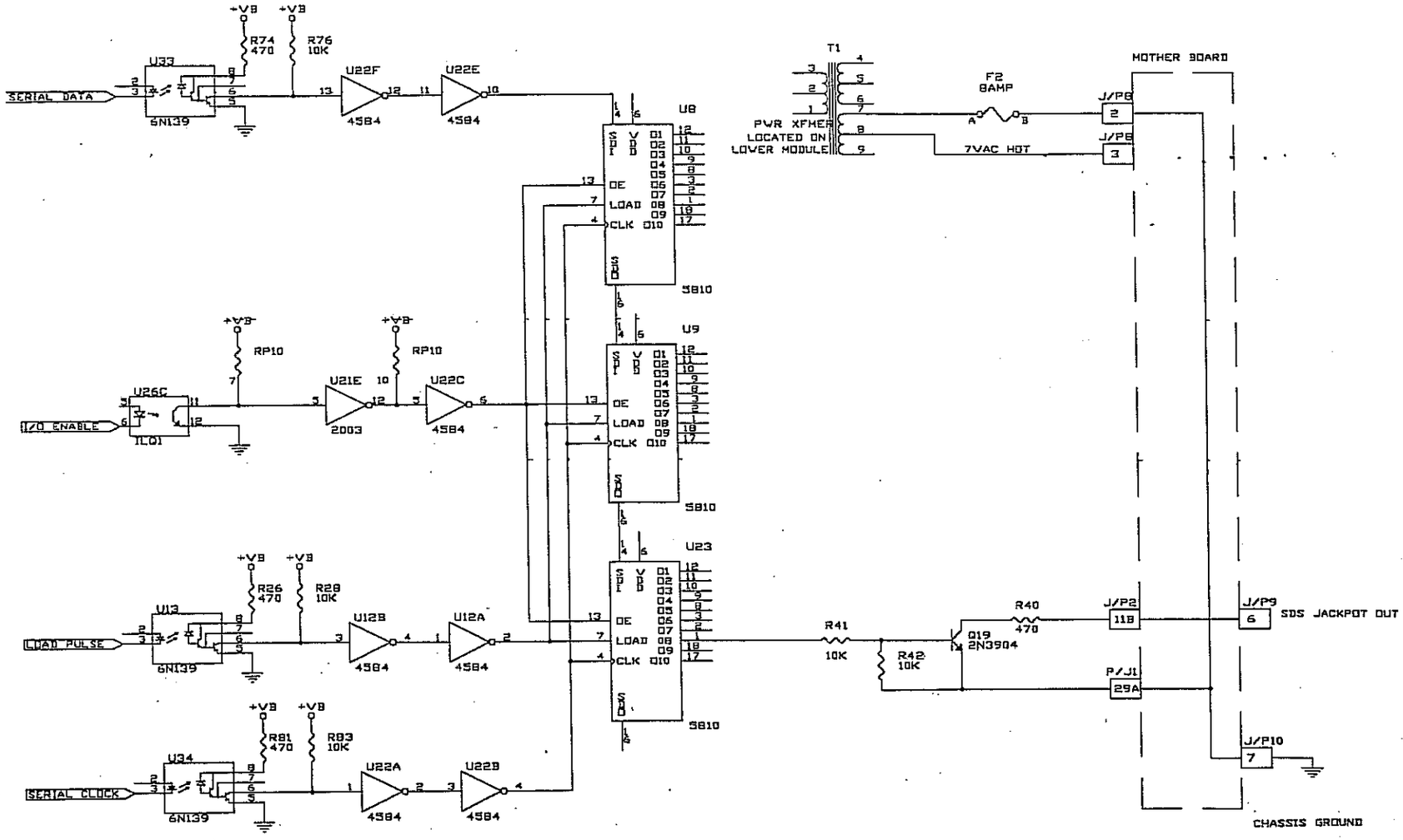
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P60-4 to J/P1-25
J/P60-3 to J/P3-4
J/P60-1 to J/P3-2
J/P60-2 to J/P3-3
J/P60-5 to J/P1-31

MOTHER BOARD CONTINUITY TEST
J/P3-2 to J/P1-23B
J/P3-4 to J/P1-23A
PROGRESSIVES
J/P1-25 to J/P1-24B
J/P1-10 to J/P1-23B
J/P3-3 to J/P1-22A
J/P1-31 to J/P10-7

PROCESSOR BOARD TEST
Check Vb across D2
Test resistors R94, R95, R70, & R81
Test U46, U32, U34, U22, & U21

Problem: SDS Not Receiving Jackpot or Door Open or Handle Signals



MOTHER BOARD TEST
J/P3-6 to J/P1-11B
J/P10-7 to J/P1-29A and J/P6-2

PROCESSOR BOARD TEST
Test Q19 (2N3904) - if problem continues, then replace.
Test R40(470 OHM) - if problem continues, then replace.
Test R41 (10K OHM) - if problem continues, then replace.
Test R42 (10K OHM) - if problem continues, then replace.
Test U23 - if problem continues, then replace.

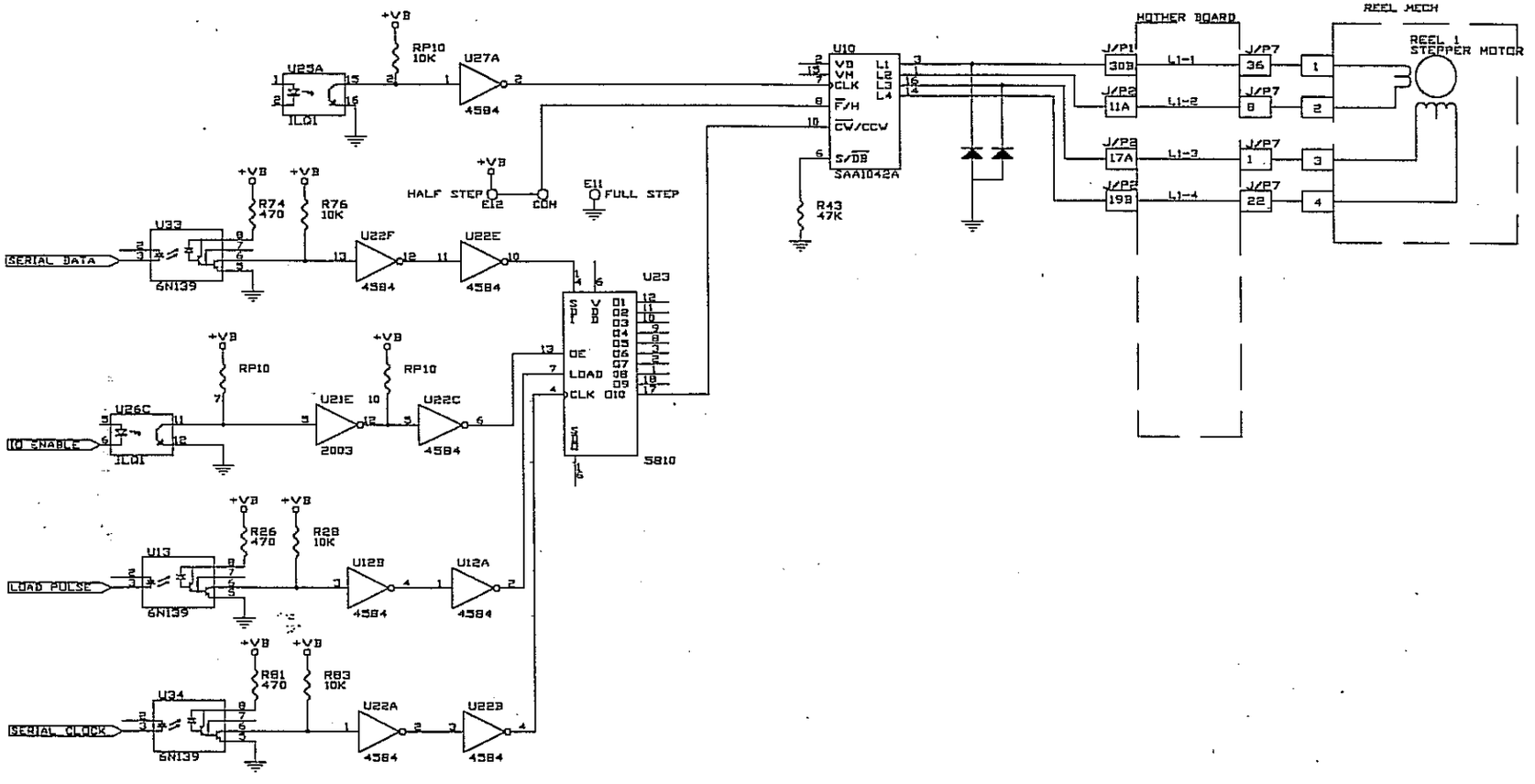
Before removing the processor board, check the following areas:

- ✓ Check 7V, 8A fuse
- ✓ Use output test 13 to verify the problem

If that doesn't work, try the following steps:

- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Reel Motor Driver – One is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Check reel input section to verify reel optic has no problem

If that doesn't work, try the following steps:

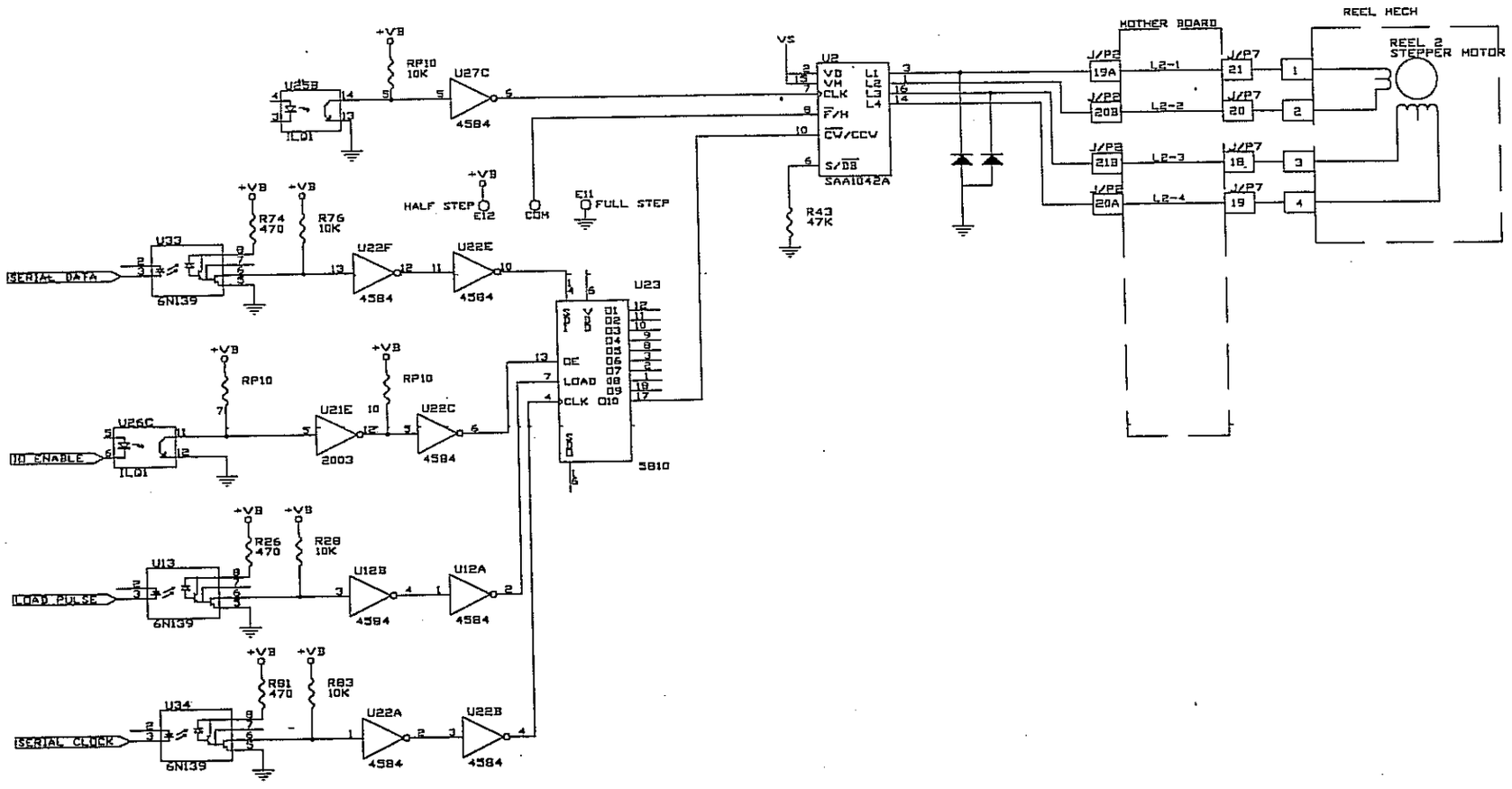
- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are good, then use this diagram to test for wire continuity

MOTHER BOARD CONTINUITY TEST
J/P7-36 to J/P1-30B
J/P7-8 to J/P2-11A
J/P7-1 to J/P2-17A
J/P3-28 to J/P2-17A
J/P7-22 to J/P2-19B

PROCESSOR BOARD TEST
Replace U10 - if problem recurs, then replace shunt diodes Test U25 and U27
Test U23 thru U33, U26, U13, & U34

Note: shunt diodes not used with new driver p/n 32102990
Replace U1O with number TY40477SAA-1042V
Obsolete – SAA1042A
Old p/n 32100490 (requires shunt diodes)

Problem: Reel Motor Driver – Two is Nonfunctional



Before removing the processor board, check the following areas:

✓ Check reel input section to verify reel optic has no problem

If that doesn't work, try the following steps:

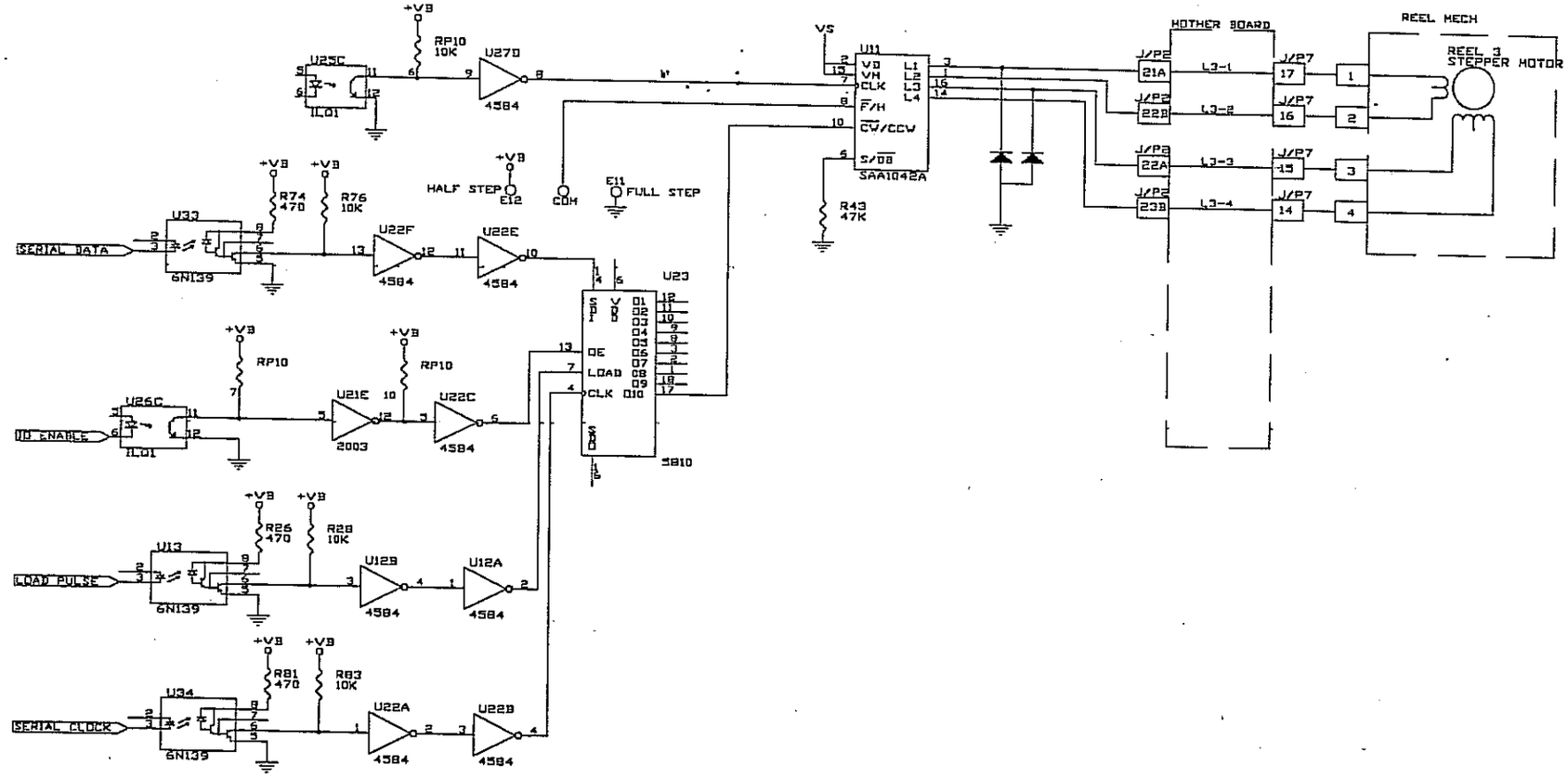
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

MOTHER BOARD CONTINUITY TEST
J/P7-21 to J/P2-19A
J/P7-20 to J/P2-20B
J/P7-18 to J/P2-21B
J/P7-19 to J/P2-20A

PROCESSOR BOARD TEST
Check U2 - if problem recurs, then replace shunt diodes
Test U25 and U27
Test U23 thru U33, U26, U13, & U34

Note: shunt diodes not used with new driver p/n 32102990
Replace U2 with p/n TY40477SAA-1042V

Problem: Reel Motor Driver – Three is Nonfunctional



Before removing the processor board, check the following areas:

✓ Check reel input section to verify reel optic has no problem

If that doesn't work, try the following steps:

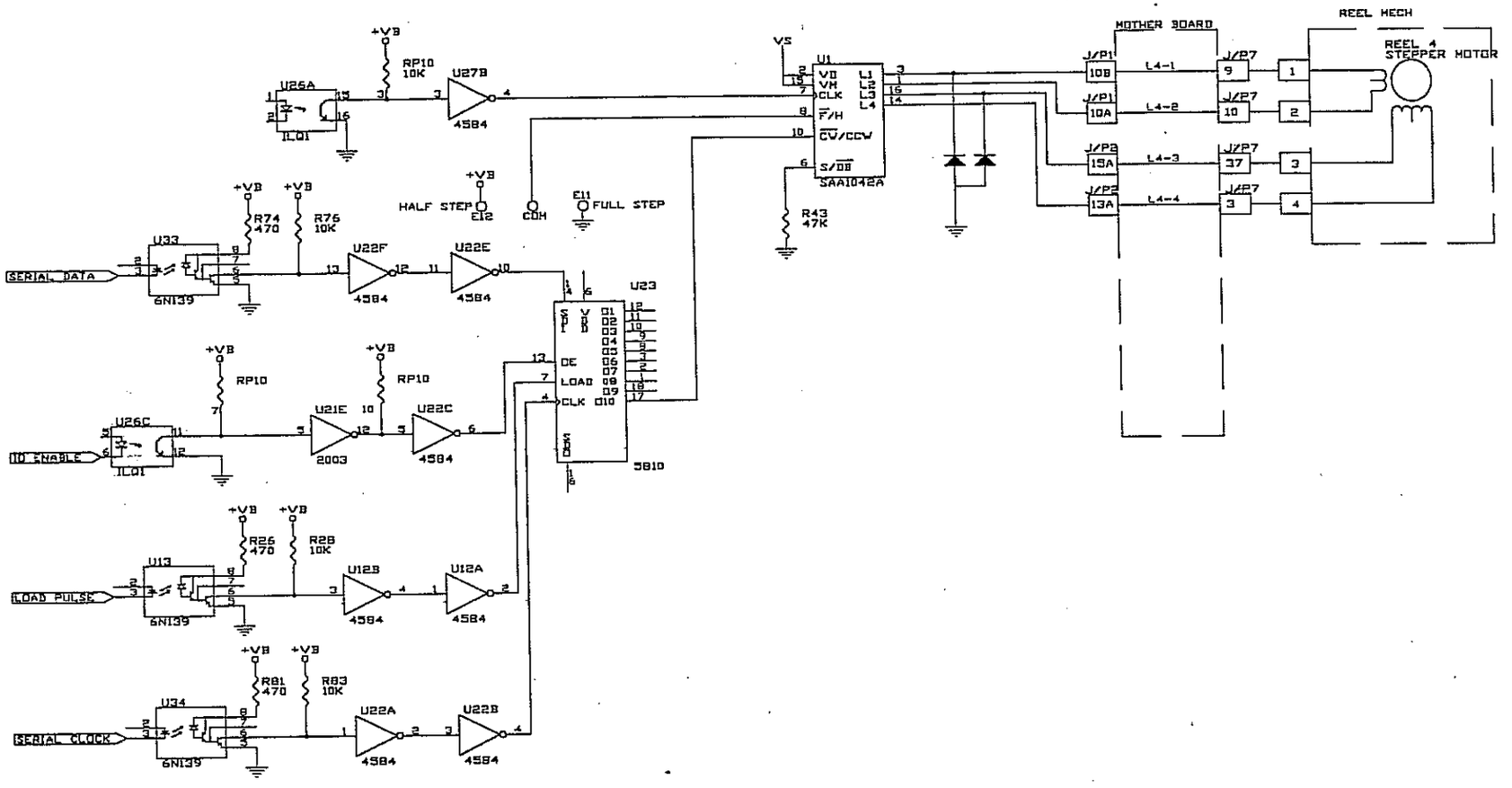
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

MOTHER BOARD CONTINUITY TEST
J/P7-17 to J/P2-21A
J/P7-16 to J/P2-22B
J/P7-15 to J/P2-22A
J/P7-14 to J/P2-23B

PROCESSOR BOARD TEST
Check U11 - if problem recurs, then replace shunt diodes
Test U25 and U27
Test U23 to U33, U26, U13, & U34

Note: shunt diodes not used with new driver p/n 32102990
Replace U11 with p/n TY40477SAA-1042V

Problem: Reel Motor Driver – Four is Nonfunctional



Before removing the processor board, check the following areas:

✓ Check reel input section to verify reel optic has no problem

If that doesn't work, try the following steps:

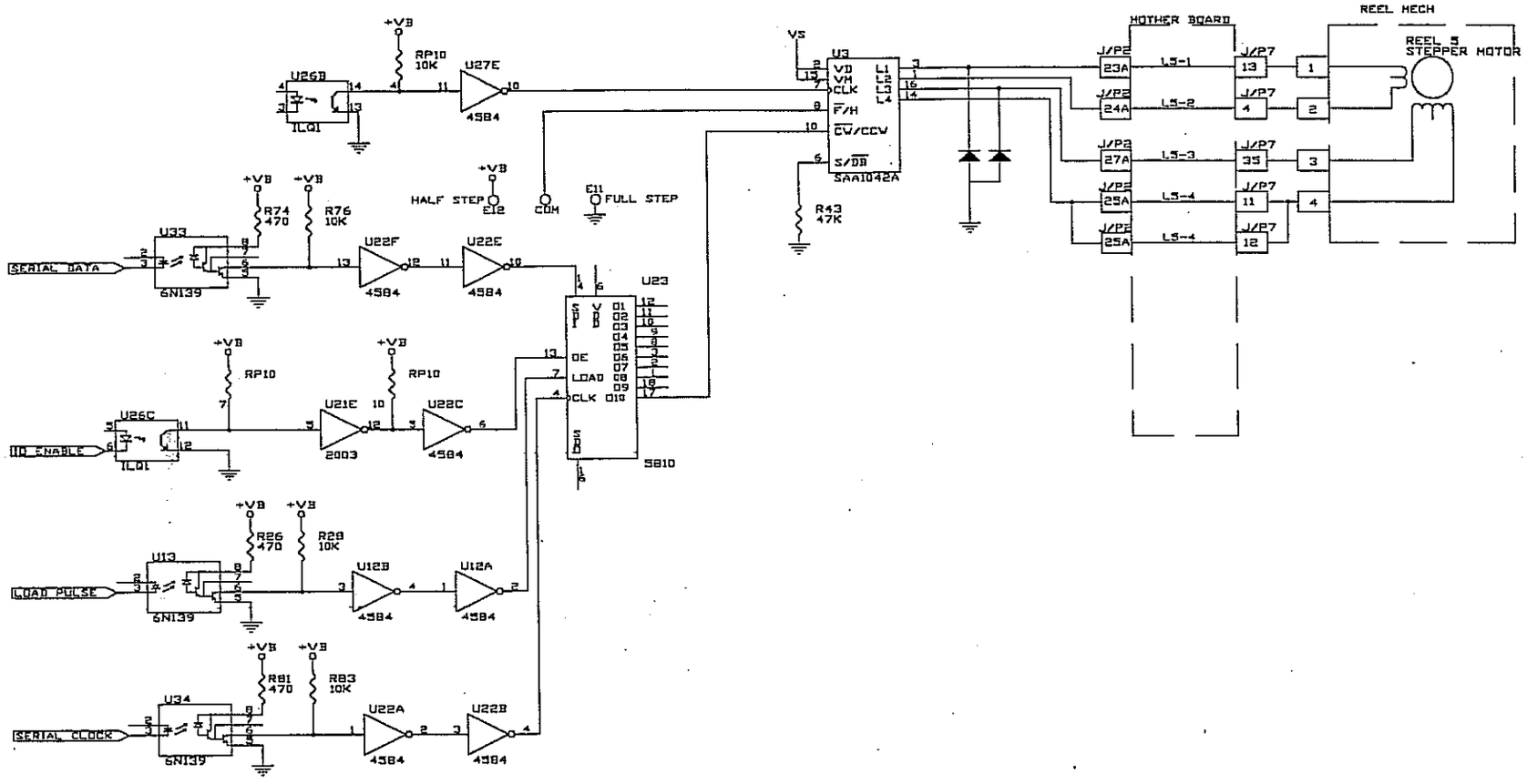
- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are good, then use this diagram to test for wire continuity

MOTHER BOARD CONTINUITY TEST
J/P7-9 to J/P1-10B
J/P7-10 to J/P1-10A
J/P7-37 to J/P2-15A
J/P7-3 to J/P2-13A

PROCESSOR BOARD TEST
Check U1 - if problem recurs, then replace shunt diodes
Test U25 and U27
Test U23 thru U33, U26, U13, & U34

Note: shunt diodes not used with new driver p/n 32102990
Replace U1 with p/n TY40477SAA-1042V

Problem: Reel Motor Driver – Five is Nonfunctional



Before removing the processor board, check the following areas:

✓ Check reel input section to verify reel optic has no problem

If that doesn't work, try the following steps:

➪ Replace the processor board with a "known good" one

➪ If the processor board seems bad, verify in the tester

➪ If the processor board is good, then replace the mother board

➪ To repair the mother board, use this diagram to isolate the bad trace

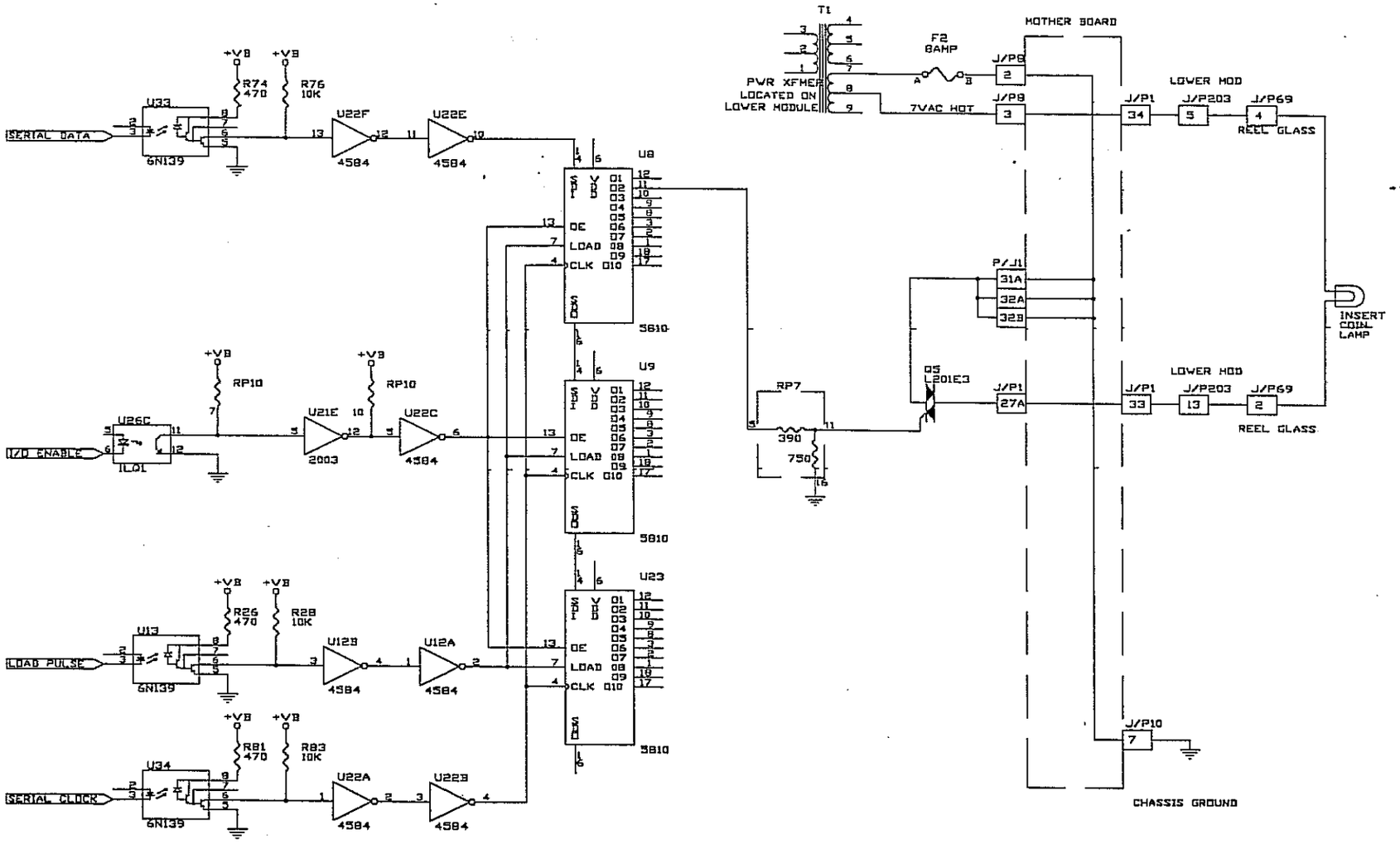
➪ If the mother board and processor board are good, then use this diagram to test for wire continuity

MOTHER BOARD CONTINUITY TEST
J/P7-13 to J/P2-23A
J/P7-4 to J/P2-24A
J/P7-35 to J/P2-27A
J/P7-11 & 12 to J/P2-25B

PROCESSOR BOARD TEST
Check U3 - if problem recurs, then replace shunt diodes
Test U25 and U27
Test U23 thru U33, U26, U13, & U34

Note: shunt diodes not used with new driver p/n 32102990
Replace U3 with p/n TY40477SAA-1042V

Problem: Insert Coin Lamp is Nonfunctional



WIRE CONTINUITY TEST
J/P59-2 to J/P1-33
J/P69-4 to J/P1-34

MOTHER BOARD TEST
J/P1-33 to J/P1-27A
J/P1-34 to J/P8-3
J/P10-7 to J/P8-2 & J/P1-31A, 32A, 32B

PROCESSOR BOARD TEST
Test Q5(L201E3) - if problem continues, then replace
Test RP7 - if problem continues, then replace
Test U8 - if problem continues, then replace

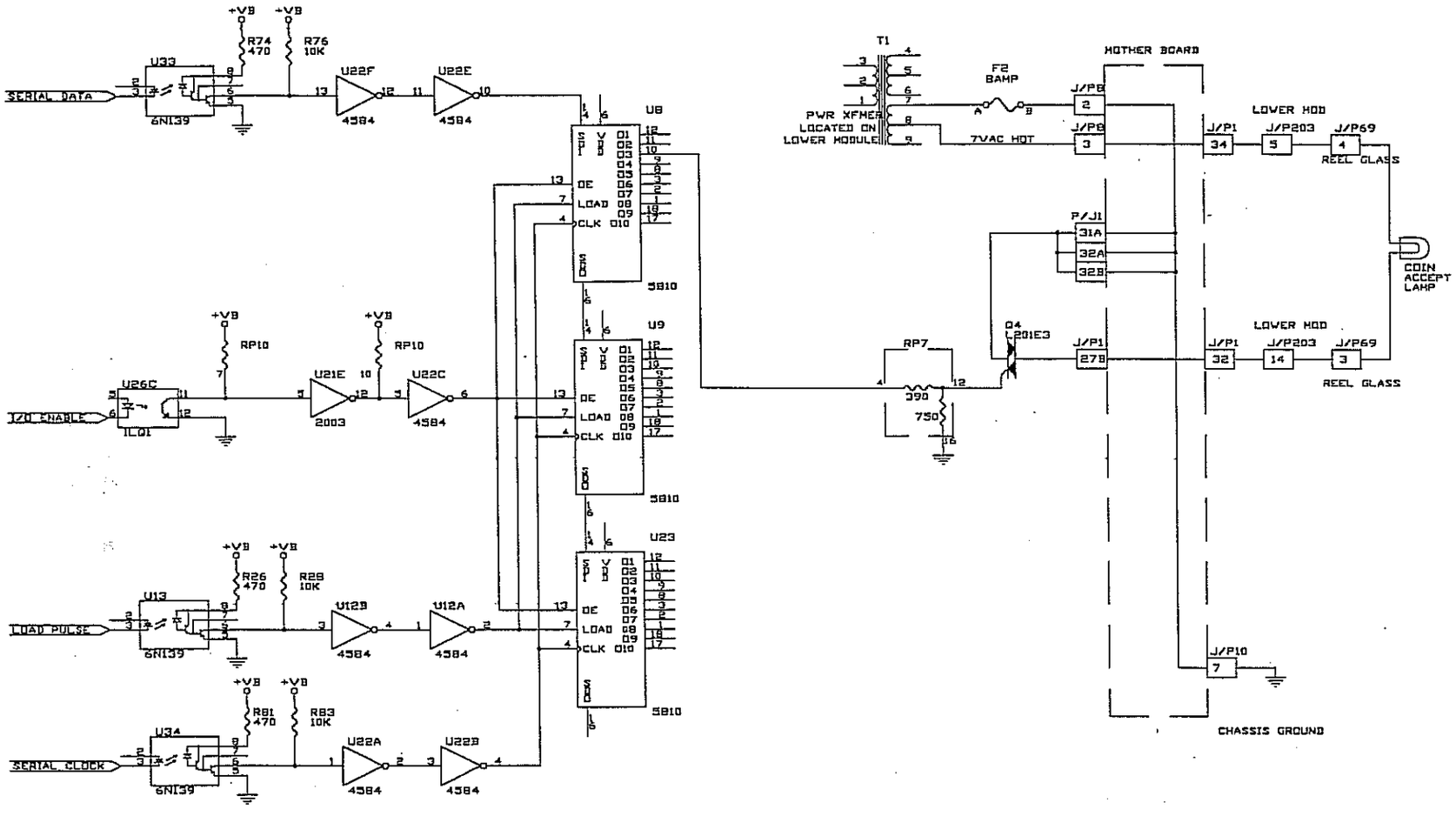
Before removing the processor board, check the following areas:

- ✓ Use output test 41 to verify the problem
- ✓ Replace the lamp, and test
- ✓ check wires and connectors for defects

If that doesn't work, try the following steps:

- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Coin Accept Lamp is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test 42 to verify the problem
- ✓ Replace the lamp, and test
- ✓ Check wires and connectors for defects
- ✓ use this diagram to test for wire continuity

If that doesn't work, try the following steps:

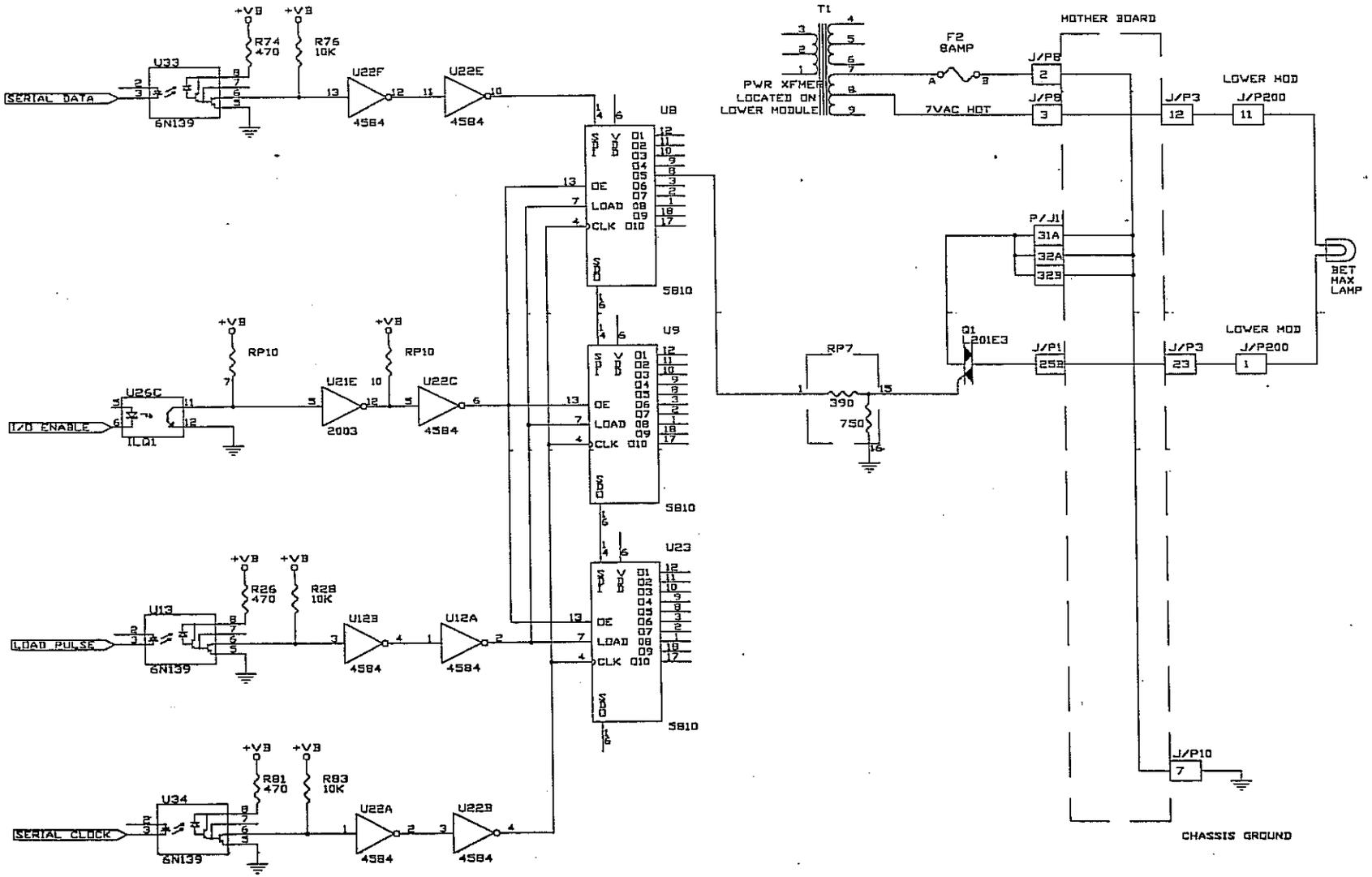
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P69-3 to J/P1-32
J/P69-4 to J/P1-34

MOTHER BOARD TEST
J/P1-32 to J/P1-27B
J/P1-34 to J/P8-3

PROCESSOR BOARD TEST
Test Q4(L201E3) - if problem continues, then replace
Test RP7 - if problem continues, then replace
Test U8 - if problem continues, then replace

Problem: Bet Max Lamp is Nonfunctional



WIRE CONTINUITY TEST
J/P200-1 to J/P3-23
J/P200-11 to J/P3-12

MOTHER BOARD TEST
J/P3-23 to J/P1-25B
J/P3-12 to J/P8-3
J/P10-7 to J/P8-2 & J/P1-31A, 32A, 32B

PROCESSOR BOARD TEST
Test Q1(L201E3) - if problem continues, then replace
Test RP7 - if problem continues, then replace
Test U8 - if problem continues, then replace

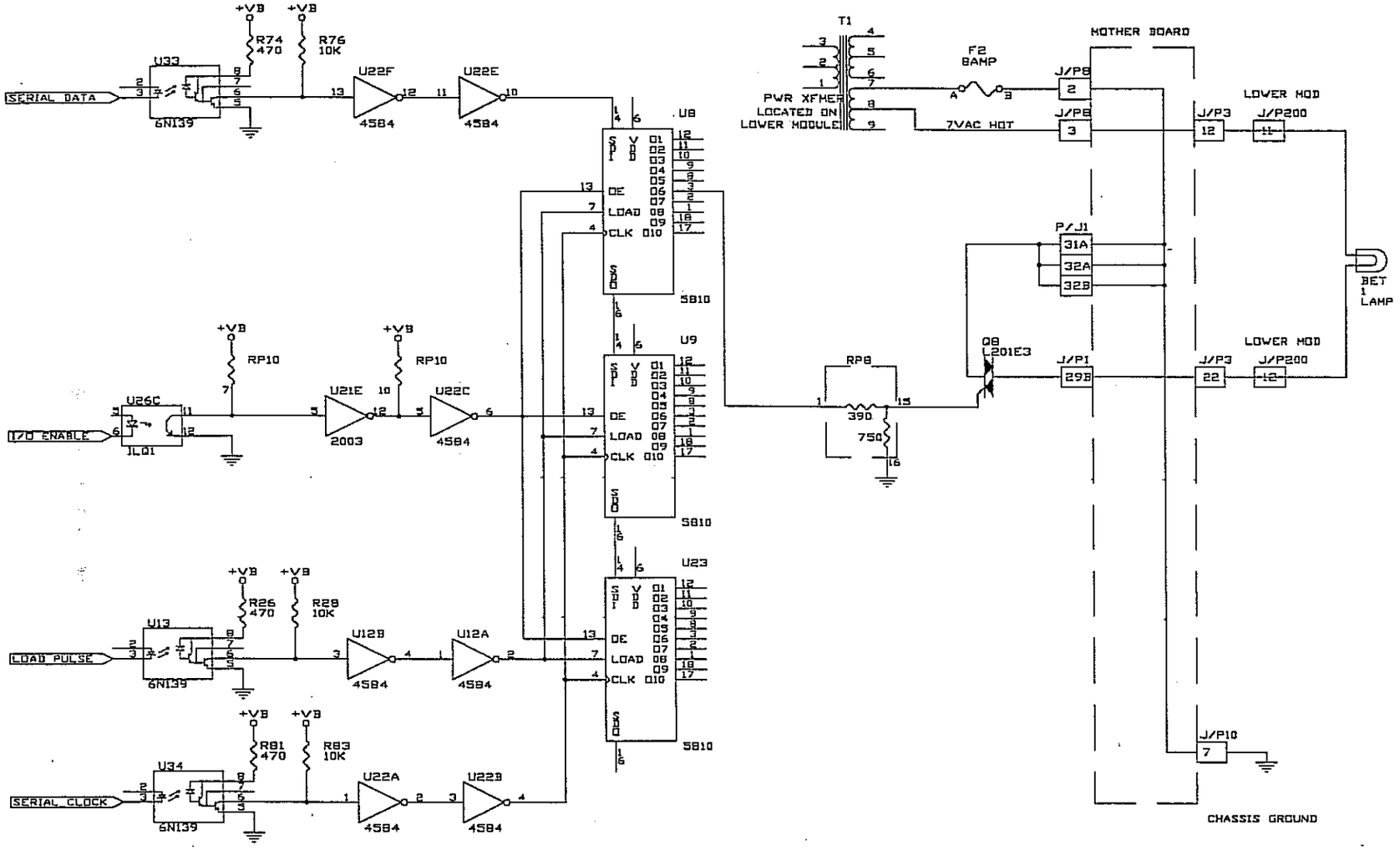
Before removing the processor board, check the following areas:

- ✓ Use output test 44 to verify the problem
- ✓ Replace the lamp, and test
- ✓ Check wires and connectors for defects

If that doesn't work, try the following steps:

- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Bet One Lamp is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test 45 to verify the problem
- ✓ Replace the lamp, and test
- ✓ Check wires and connectors for defects

If that doesn't work, try the following steps:

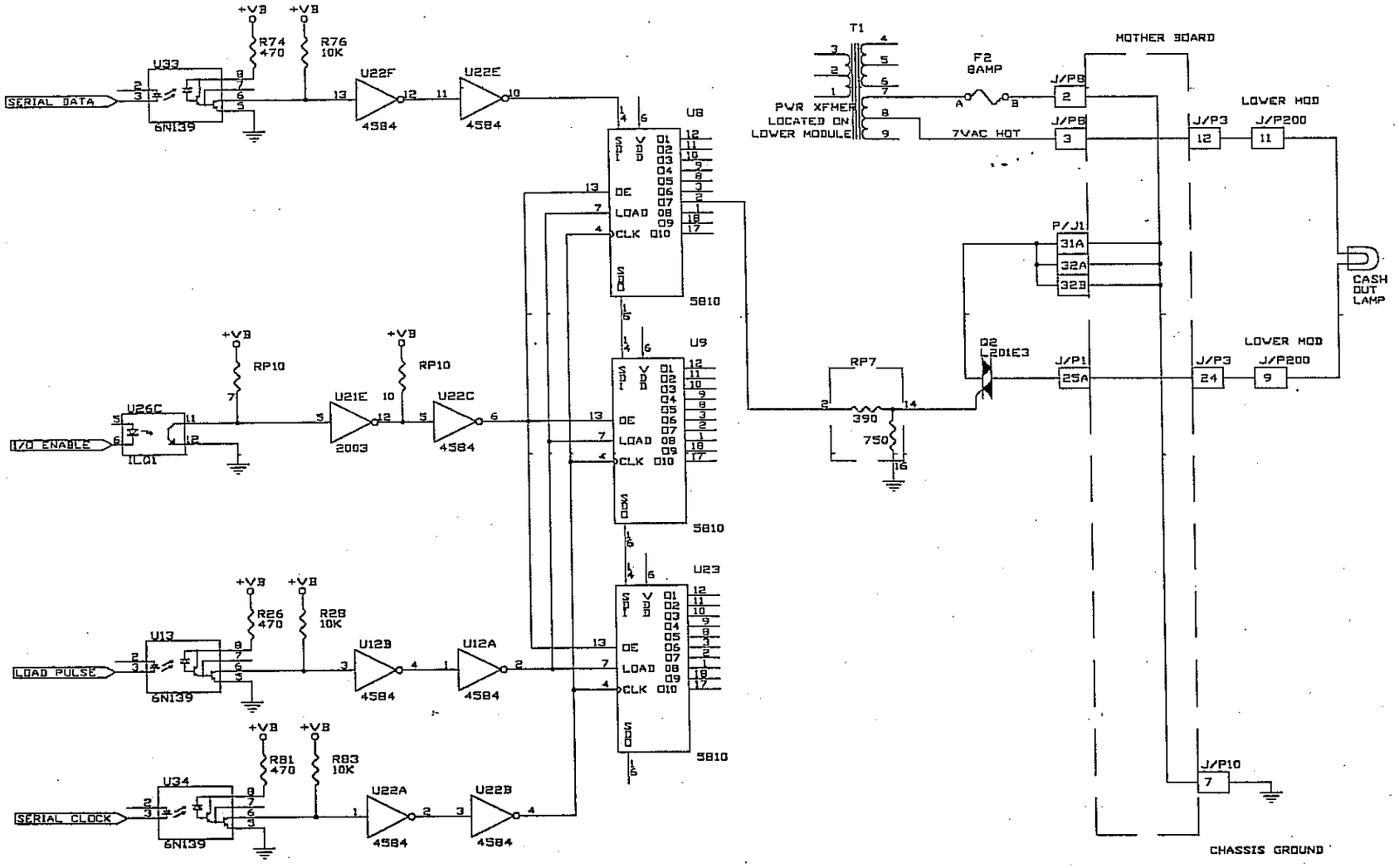
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P200-12 to J/P3-22
J/P200-11 to J/P3-12

MOTHER BOARD TEST
J/P3-22 to J/P1-29B
J/P3-12 to J/P8-3
J/P10-7 to J/P8-2 & J/P1-31A, 32A, 32B

PROCESSOR BOARD TEST
Test Q8(L201E3) - if problem continues, then replace
Test RP8 - if problem continues, then replace
Test U8 - if problem continues, then replace

Problem: Cash Out Lamp is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test 46 to verify the problem
- ✓ Replace the lamp, and test
- ✓ Check wires and connectors for defects

If that doesn't work, try the following steps:

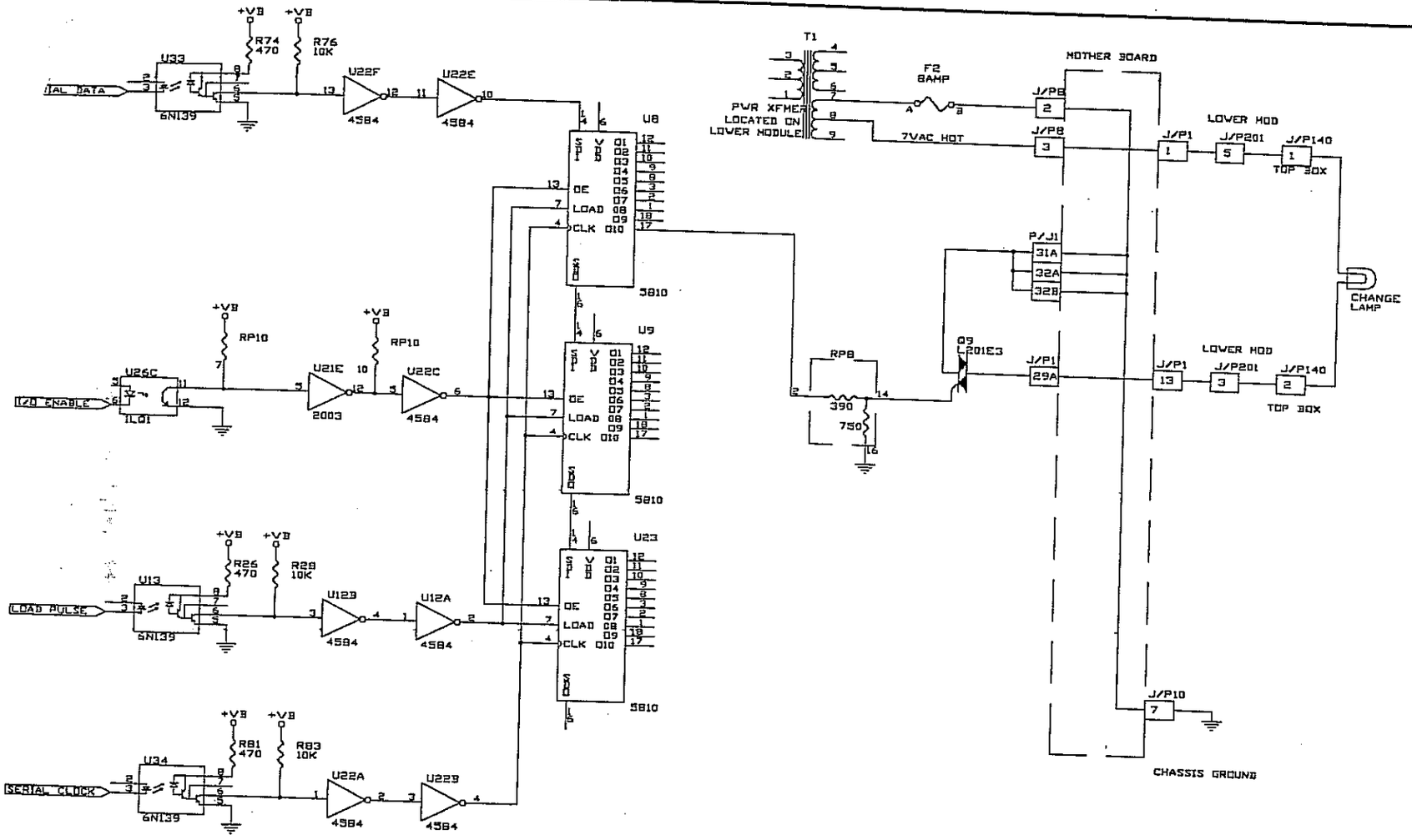
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P200-9 to J/P3-24
J/P200-11 to J/P3-12

MOTHER BOARD TEST
J/P3-24 to J/P1-25A
J/P3-12 to J/P8-3
J/P10-7 to J/P8-2 & J/P1-31A, 32A, 32B

PROCESSOR BOARD TEST
Test Q2(L201E3) - if problem continues, then replace
Test R7 - if problem continues, then replace
Test U8 - if problem continues, then replac.

m: Candle Change Lamp is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test 31 to verify the problem
- ✓ Check wires and connectors for defects
- ✓ Replace candle change lamp and retest

If that doesn't work, try the following steps:

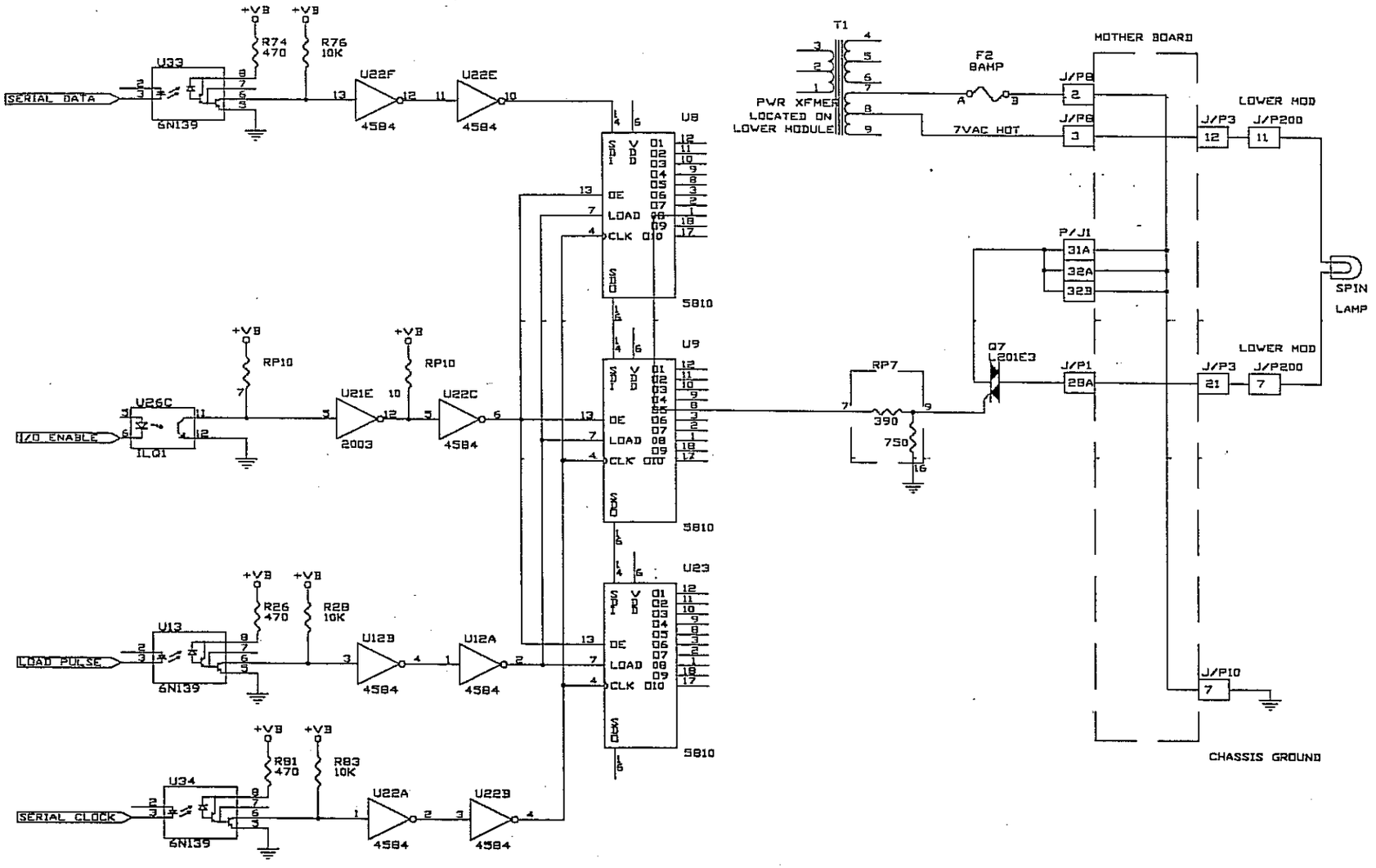
- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P140-2 to J/P1-13
J/P140-1 to J/P1-1

MOTHER BOARD TEST
J/P1-13 to J/P1-29A
J/P1-1 to J/P8-3
J/P8-2 to J/P10-7

PROCESSOR BOARD TEST
Test Q9 (L2001L3) if problem continues, then replace.
Test RP8, if problem continues, then replace.
Test U8, if problem continues, then replace.

Problem: Spin Lamp is Nonfunctional



WIRE CONTINUITY TEST
J/P200-7 to J/P3-21
J/P200-11 to J/P3-12

MOTHER BOARD TEST
J/P3-21 to J/P1-28A
J/P3-12 to J/P8-3
J/P10-7 to J/P8-2 & J/P1-31A, 32A, 32B

PROCESSOR BOARD TEST
Test Q7(L201E3) - if problem continues, then replace
Test RP7 - if problem continues, then replace
Test U8 - if problem continues, then replace

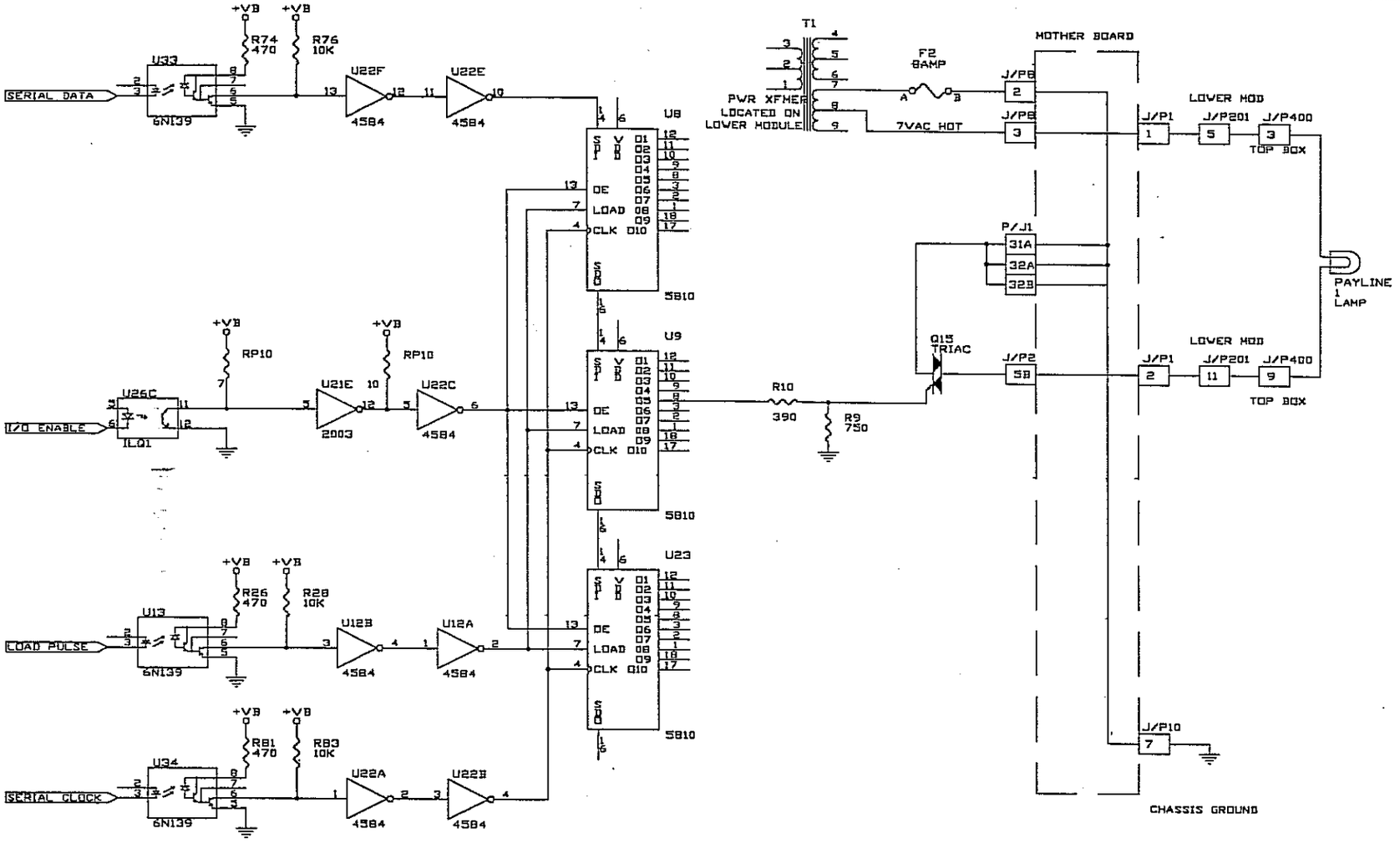
Before removing the processor board, check the following areas:

- ✓ Use output test 47 to verify the problem
- ✓ Replace the lamp, and test
- ✓ Check wires and connectors for defects
- ✓ use this diagram to test for wire continuity

If that doesn't work, try the following steps:

- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Payline 1 Lamp is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test 36 to verify the problem
- ✓ Replace the lamp, and test
- ✓ Check wires and connectors for defects

If that doesn't work, try the following steps:

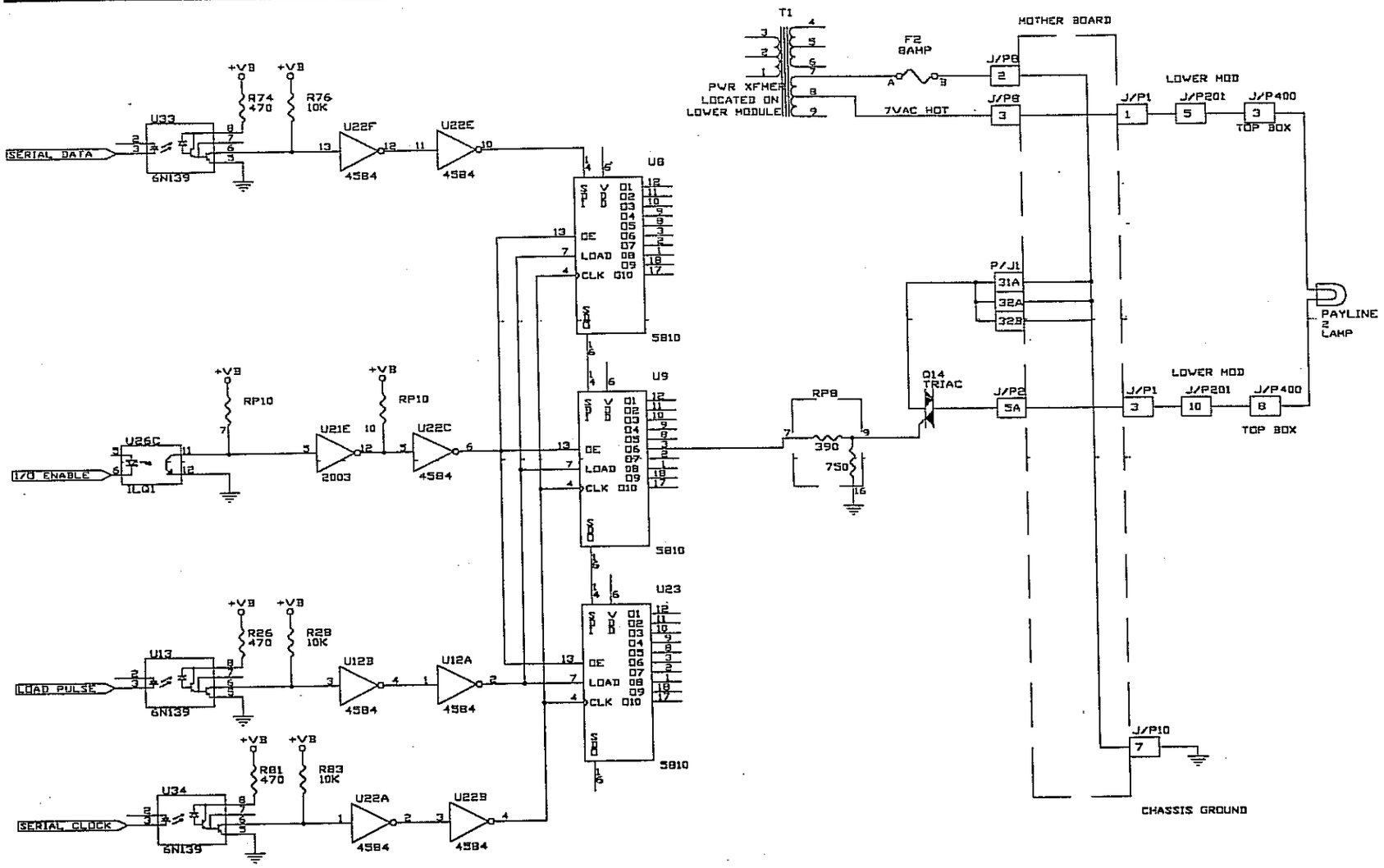
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P400-9 to J/P1-2
J/P400-3 to J/P1-1

MOTHER BOARD TEST
J/P1-2 to J/P2-5B
J/P1-1 to J/P8-3
J/P10-7 to J/P8-2 & J/P1-31A, 32A, 32B

PROCESSOR BOARD TEST
Test Q15 - if problem continues, then replace.
Test R10(390 OHM) - if problem continues, then replace.
Test R9 (750 OHM) - if problem continues, then replace.
Test U9 - if problem continues, then replace.

Problem: Payline 2 Lamp is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test 37 to verify the problem
- ✓ Replace the lamp, and test
- ✓ Check wires and connectors for defects

If that doesn't work, try the following steps:

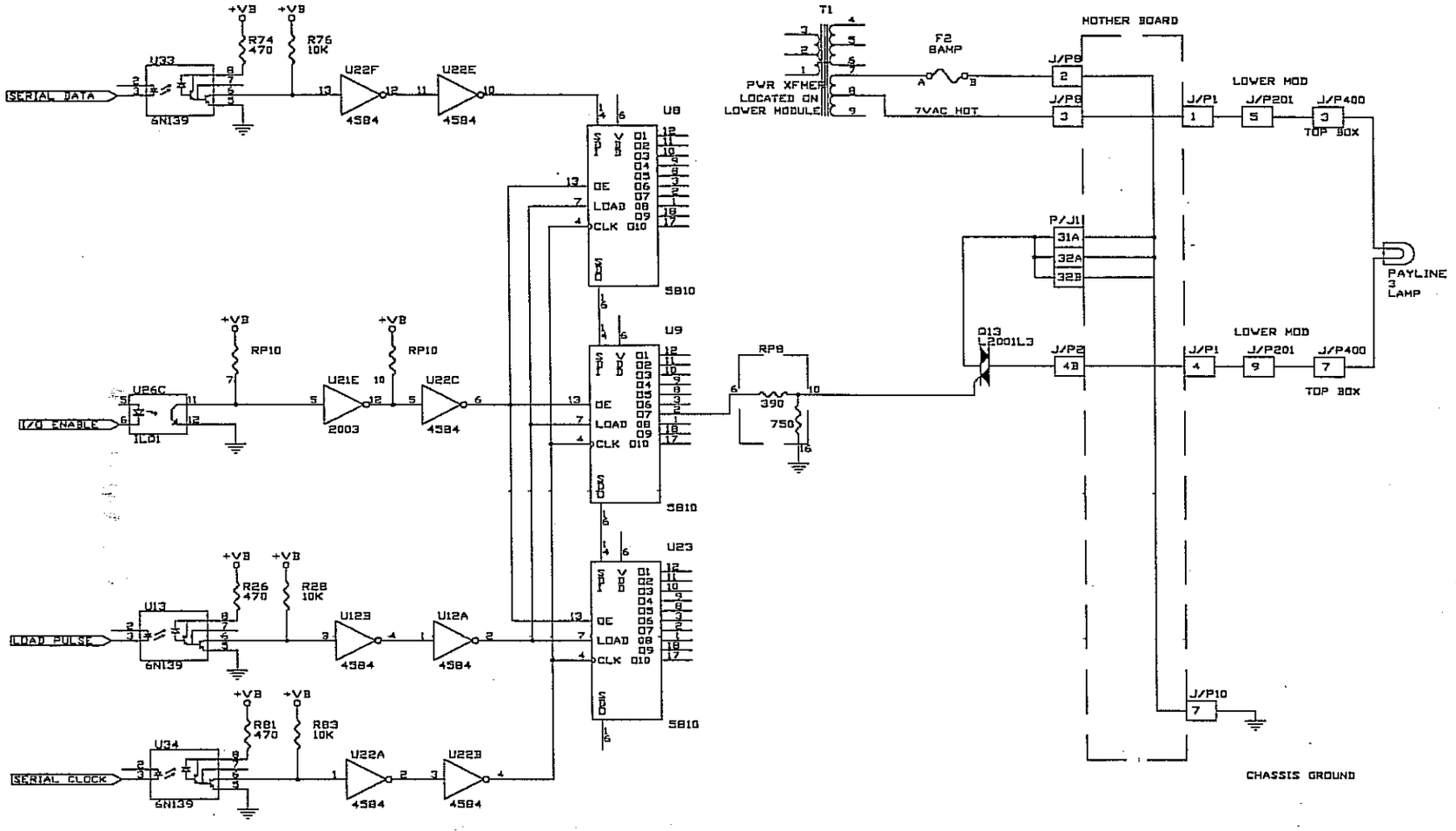
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P400-8 to J/P1-3
J/P400-3 to J/P1-1

MOTHER BOARD TEST
J/P1-3 to J/P2-5A
J/P1-1 to J/P8-3
J/P10-7 to J/P8-2 & J/P1-31A, 32A, 32B

PROCESSOR BOARD
Test Q14 - if problem continues, then replace
Test RP8 - if problem continues, then replace
Test U9 - if problem continues, then replace

Problem: Payline 3 Lamp is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Check 7V, 8A fuse
- ✓ Use output test 20 to verify the problem
- ✓ Check wires and connectors for defects

If that doesn't work, try the following steps:

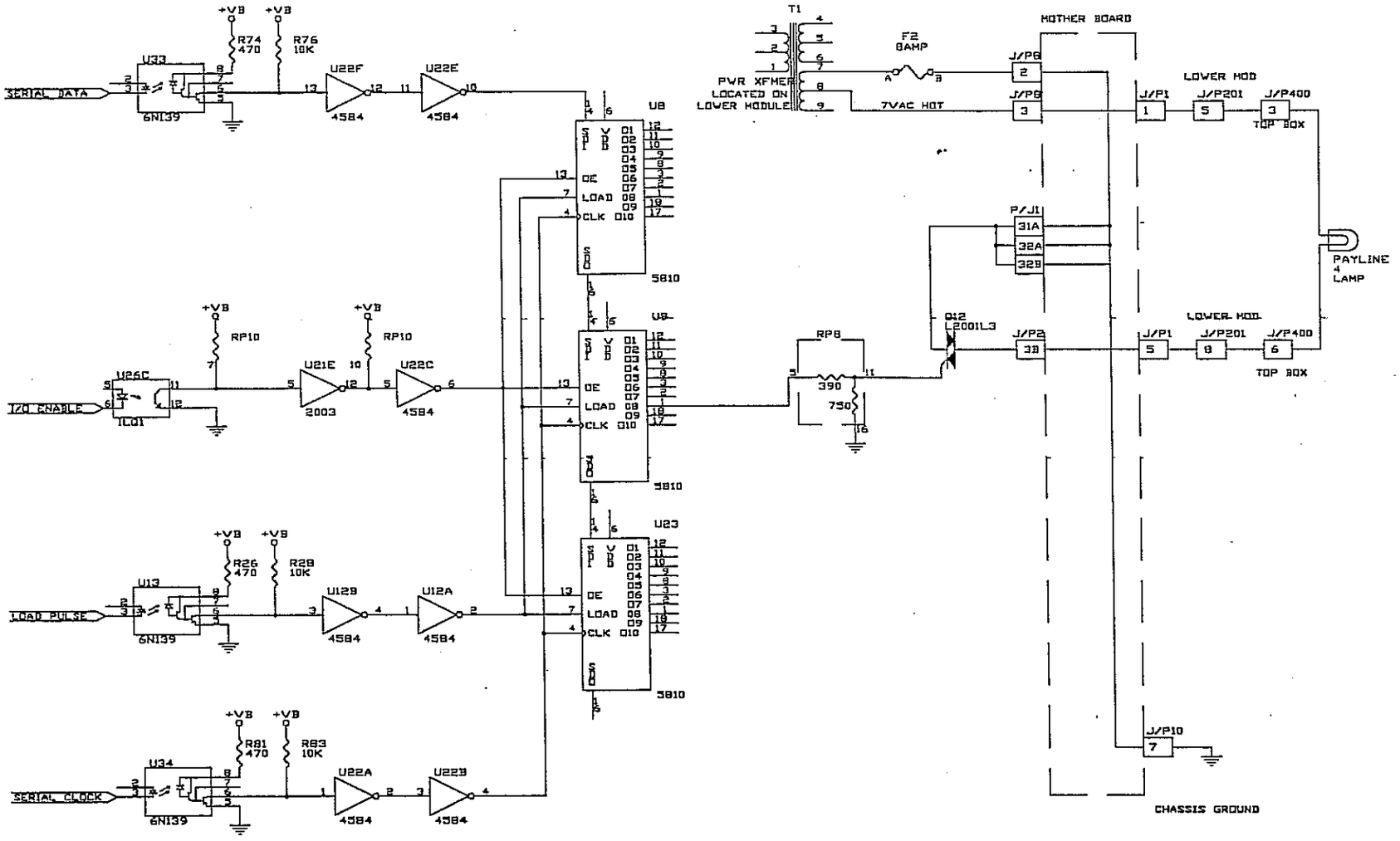
- ➪ If the lamp is nonfunctional, then replace the lamp and retest
- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P400-7 to J/P1-4

MOTHER BOARD TEST
J/P1-4 to J/P2-4B

PROCESSOR BOARD TEST
Test Q13 (L2001L3) - if problem continues, then replace
Test RP8 - if problem continues, then replace
Test U9 - if problem continues, then replace

Problem: Payline 4 Lamp is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test 21 to verify the problem
- ✓ Check wires and connectors for defects

If that doesn't work, try the following steps:

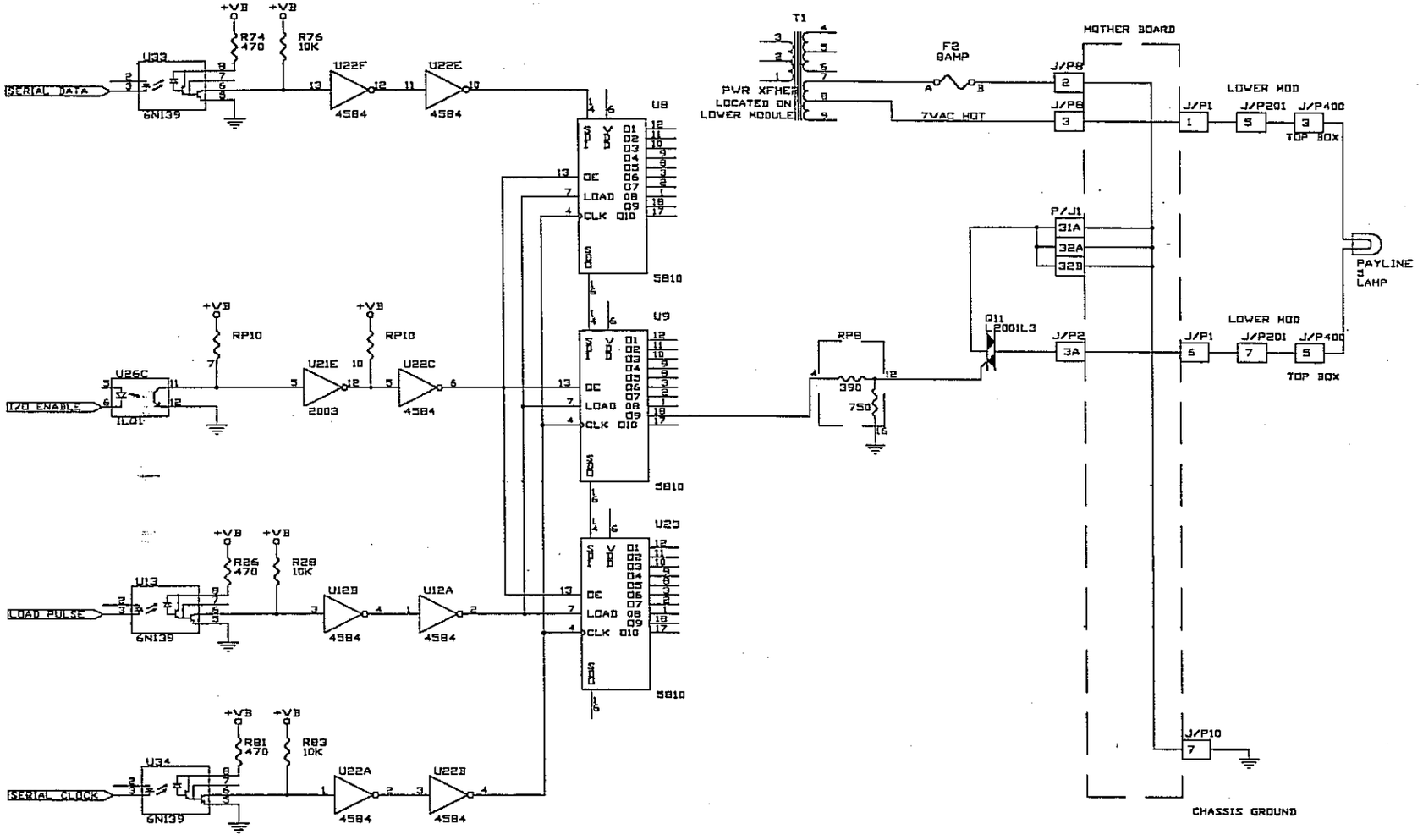
- ⇨ If the lamp is nonfunctional, then replace the lamp and retest
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P400-6 to J/P1-5

MOTHER BOARD TEST
J/P1-5 to J/P2-3B

PROCESSOR BOARD TEST
Test Q12 (L2001L3) - if problem continues, then replace
Test RP8 - if problem continues, then replace
Test U9 - if problem continues, then replace

Problem: Payline 5 Lamp is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test 22 to verify the problem
- ✓ Check wires and connectors for defects

If that doesn't work, try the following steps:

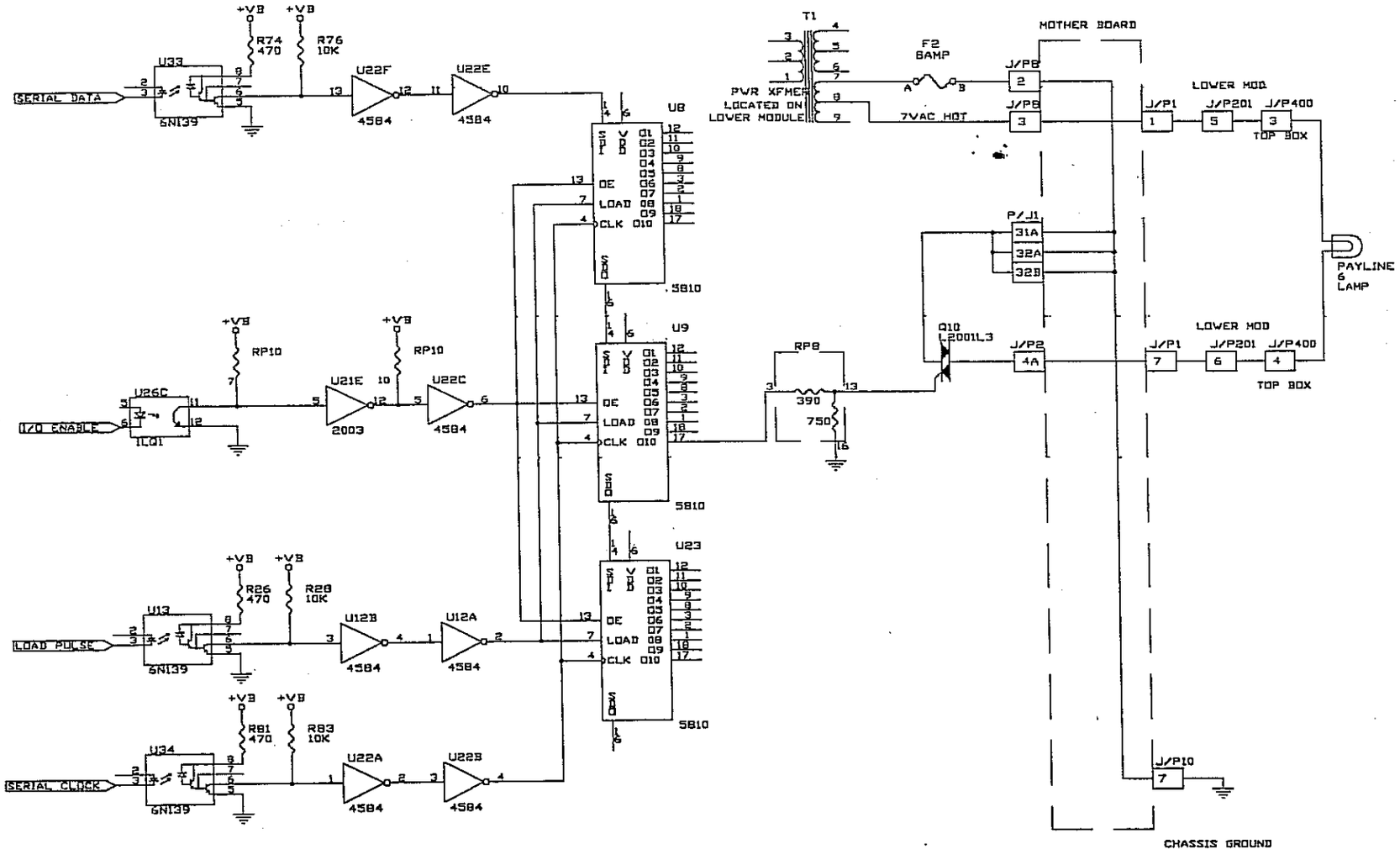
- ⇨ If the lamp is nonfunctional, then replace the lamp and test
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P400-5 to J/P1-6

MOTHER BOARD TEST
J/P1-6 to J/P2-3A

PROCESSOR BOARD TEST
Test Q11 (L2001L3) - if problem continues, then replace
Test RP8 - if problem continues, then replace
Test U9 - if problem continues, then replace

Problem: Payline 6 Lamp is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test 23 to verify the problem
- ✓ Check wires and connectors for defects

If that doesn't work, try the following steps:

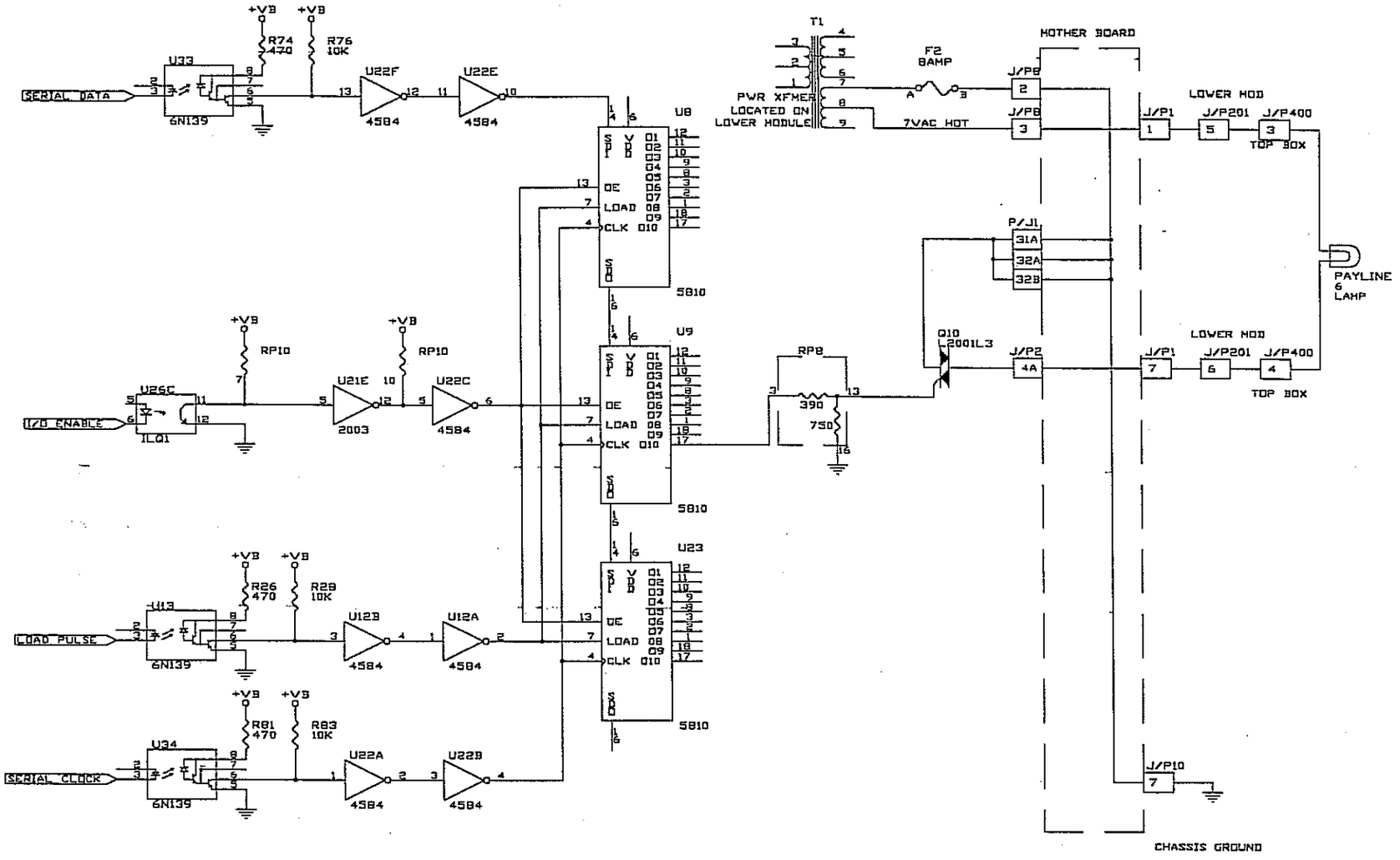
- ⇨ If the lamp is nonfunctional, then replace the lamp and test
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P400-4 to J/P1-7

MOTHER BOARD TEST
J/P1-7 to J/P2-4A

PROCESSOR BOARD TEST
Test Q10 (L2001L3) - if problem continues, then replace
Test RP8 - if problem continues, then replace
Test U9 - if problem continues, then replace

Problem: Payline 1 to 6 Lamps are Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test 20, 21, 22, 23, 36, and 37 to verify the problem
- ✓ Check (7 VAC 8A) fuse
- ✓ Check wires and connectors for defects

If that doesn't work, try the following steps:

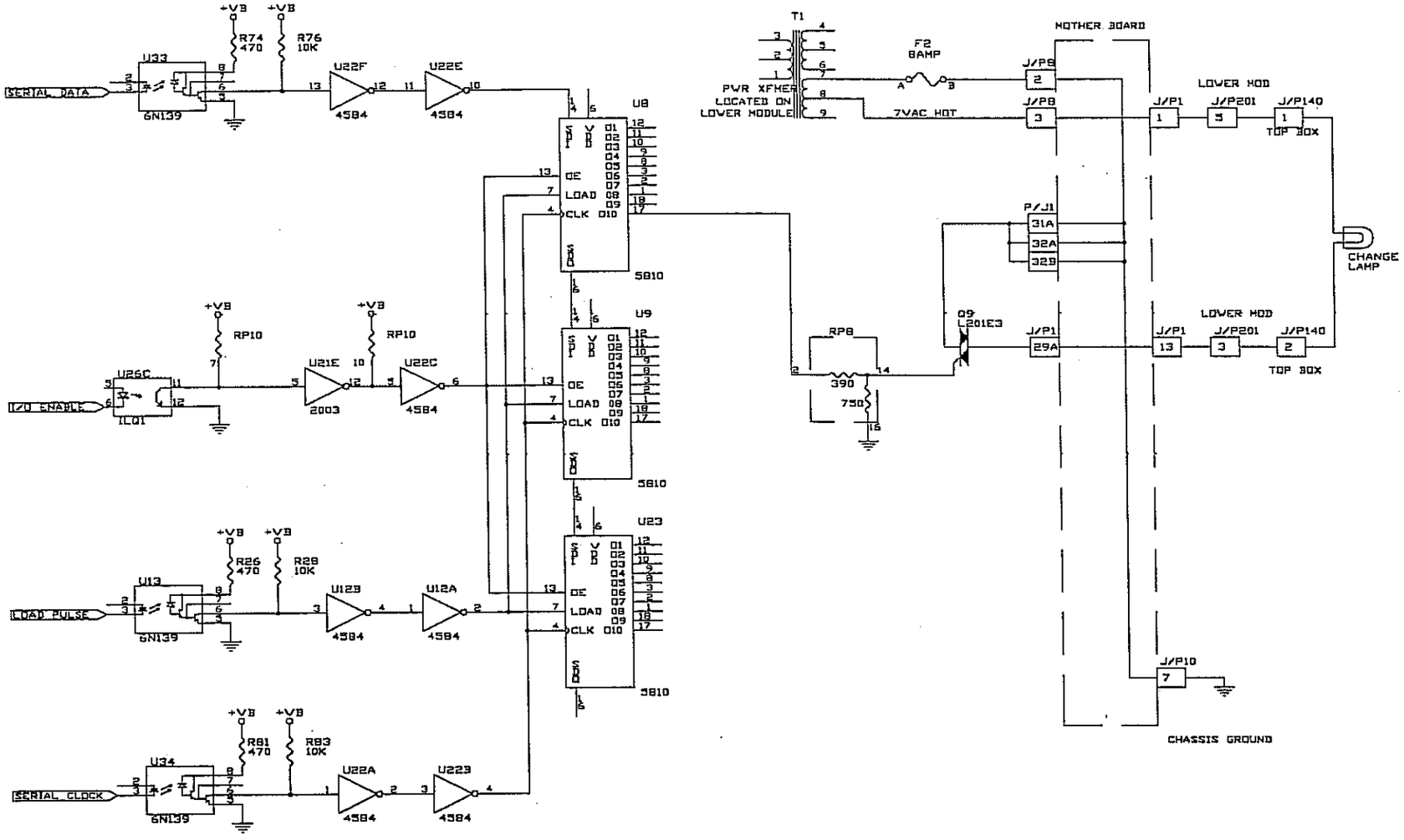
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P400-3 to J/P1-1

MOTHER BOARD TEST
J/P1-1 to J/P8-3
J/P10-7 to J/P8-2 & J/P1-31A, 32A, 32B

PROCESSOR BOARD TEST
Test RP8 - if problem continues, then replace
Test U9 - if problem continues, then replace

Problem: All Lamps are Nonfunctional



WIRE CONTINUITY TEST
J/P140-1 to J/P1-1

MOTHER BOARD TEST
J/P1-1 to J/P8-3
J/P10-7 to J/P1-31A, then 32A, then 32B and then J/P8-2

PROCESSOR BOARD TEST
Test RP8 - if problem continues, then replace
Test U8 & U9 - if problem continues, then replace

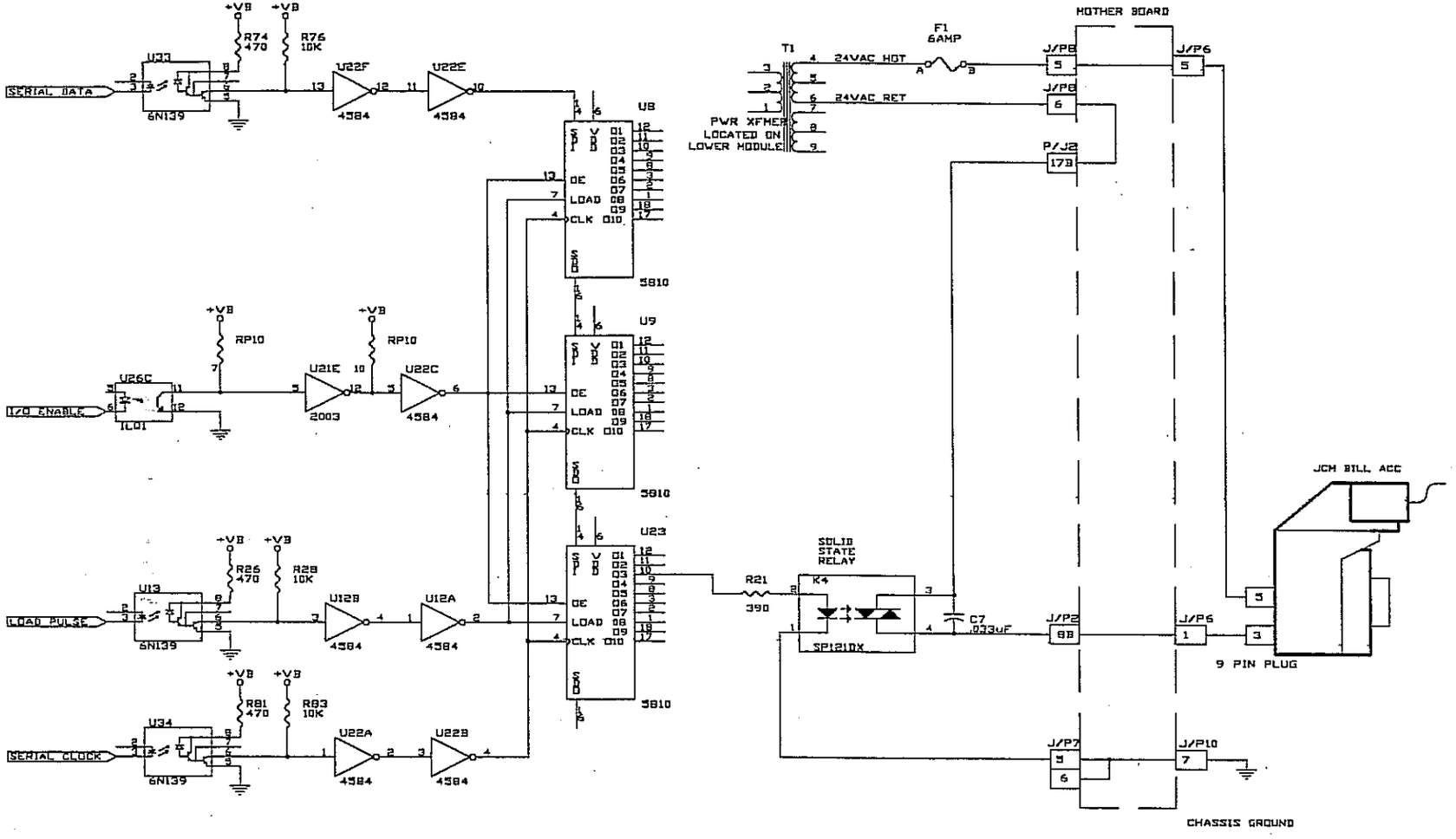
Before removing the processor board, check the following areas:

- ✓ Use outputs test 20-22, 23, 31, 36, 37, 41-46 to verify the problem
- ✓ Check (7VAC 8A) fuse

If that doesn't work, try the following steps:

- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Bill Acceptor is Not Enabled – 24 VAC Output



Before removing the processor board, check the following areas:

- ✓ Check 24V-6A fuse
- ✓ Use output test 26 to verify the problem
- ✓ Check wires and connectors for defects
- ✓ See note below

If that doesn't work, try the following steps:

- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

Note:

Denomination must be set to a value other than 0. In credit mode, the credits accumulated must be less than the maximum coin-in amount.

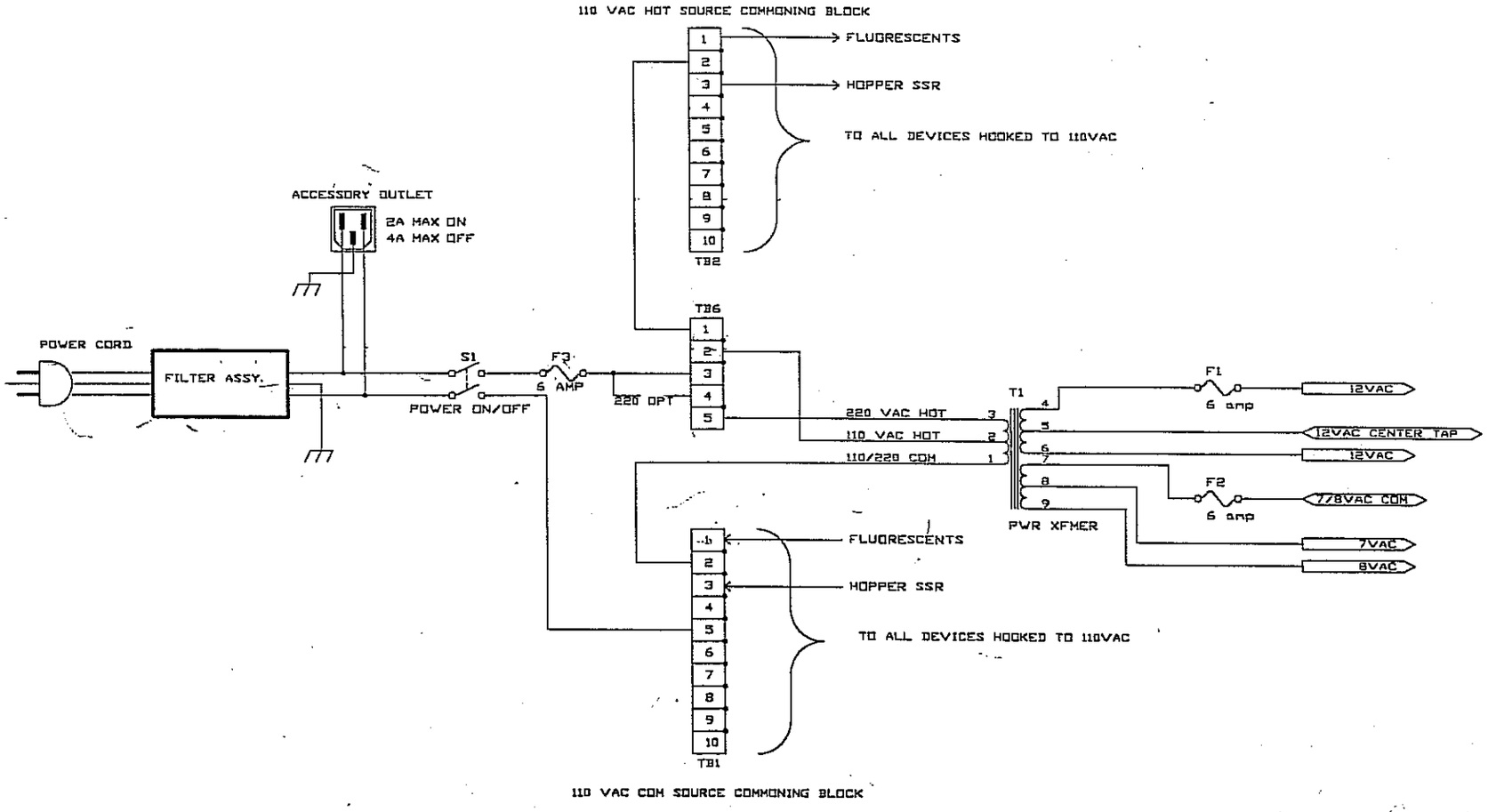
WIRE CONTINUITY TEST
J/P6-1 to J/P6-5

MOTHER BOARD TEST
J/P6-5 to J/P8-5
J/P8-6 to J/P2-17B
J/P6-1 to J/P2-8B
J/P16-7 to J/P7-5 & 6

PROCESSOR BOARD
Check K4 for burned trace
Test K4 (SP121DX) - if problem continues, then replace
Test U23 - if problem continues, then replace

S-Plus Power Supply – Common Problems

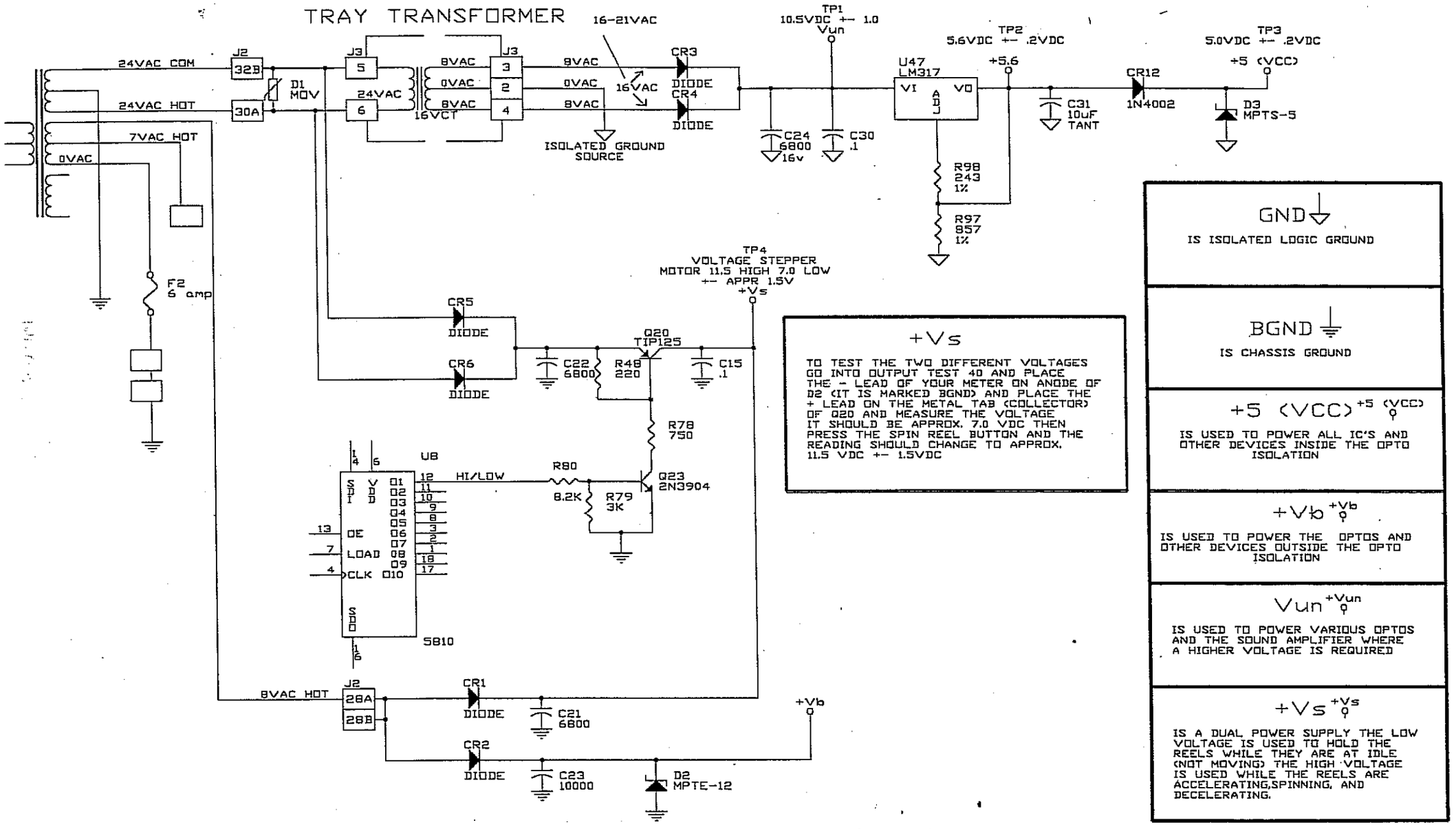
1. "Hot" machine (players get electrical shock) – Check from house outlet to power strip to machine, with "outlet polarity checker" for incorrect wiring.
2. Machine "blacked out" (no functions)
   a. If 110VAC 6A fuse keeps blowing, disconnect the hopper SSR and J/P208 (fluorescent connection) to isolate to main transformer and back.
   b. Replace the fuse (always use fast blow fuses with the correct rating).
   c. If the fuse does not blow, reconnect J/P208. This will indicate whether the problem is in the fluorescent circuit or in the SSR.
3. 24VAC fuse or 7VAC fuse constantly blows
   a. Remove the processor board and disconnect all mother board connections, then reseat the processor board.
   b. Replace the fuse (always use fast-blow fuses with the correct rating).
   c. If the fuse stills blows, then remove and replace the processor board to determine if the processor board or mother board is bad.
   d. If the original processor board and mother board did not cause the fuse to blow, then reconnect each connector one by one until the fuse blows.
   e. Trace the harnessing from the last connector to its input or output.
   f. Replace the load, first then check wiring insulation for breaks.
4. Be aware that wires must be fully seated in the terminal block (commoning blocks).
5. Be aware that a bad power strip or bad power cord will result in power problems.
6. To ensure proper current and voltage for each machine, connect no more than five machines per 20 Amp circuit breaker.
7. A potential hazard exists when a circuit is overloaded. From ground to neutral (at the outlet or across two machines) should not exceed 3VAC.
8. A device connected to the accessory outlet that draws over 2 amps can degrade the filter.



The AC power is routed from the floor through the machine drop area to the lower module. The AC power is then connected by plug to a filter (p/n 272 006 0x). The earth ground is delivered by the AC cord and connects to the lower module for chassis ground. This sets the machine frame or chassis at earth ground.

The 110VAC goes directly to the auxiliary receptacle, after which it meets a DPST toggle switch, then it is fused at F3 (110V 6A). It serves three separate functions: 110VAC is delivered to the primary of the main transformer; 110VAC is delivered to all fluorescent lamps; and, 110VAC is delivered to the hopper SSR.

The secondary of the main transformer will provide 12VAC center-tapped for the processor board tray transformer, 7VAC for incandescent lamps and 8 VAC for holding reels in the idle state.



+Vs

TO TEST THE TWO DIFFERENT VOLTAGES GO INTO OUTPUT TEST 40 AND PLACE THE - LEAD OF YOUR METER ON ANODE OF D2 (IT IS MARKED BGND) AND PLACE THE + LEAD ON THE METAL TAB (COLLECTOR) OF Q20 AND MEASURE THE VOLTAGE IT SHOULD BE APPROX. 7.0 VDC THEN PRESS THE SPIN REEL BUTTON AND THE READING SHOULD CHANGE TO APPROX. 11.5 VDC +- 1.5VDC

GND

IS ISOLATED LOGIC GROUND

BGND

IS CHASSIS GROUND

+5 (VCC)

IS USED TO POWER ALL IC'S AND OTHER DEVICES INSIDE THE OPTO ISOLATION

+Vb

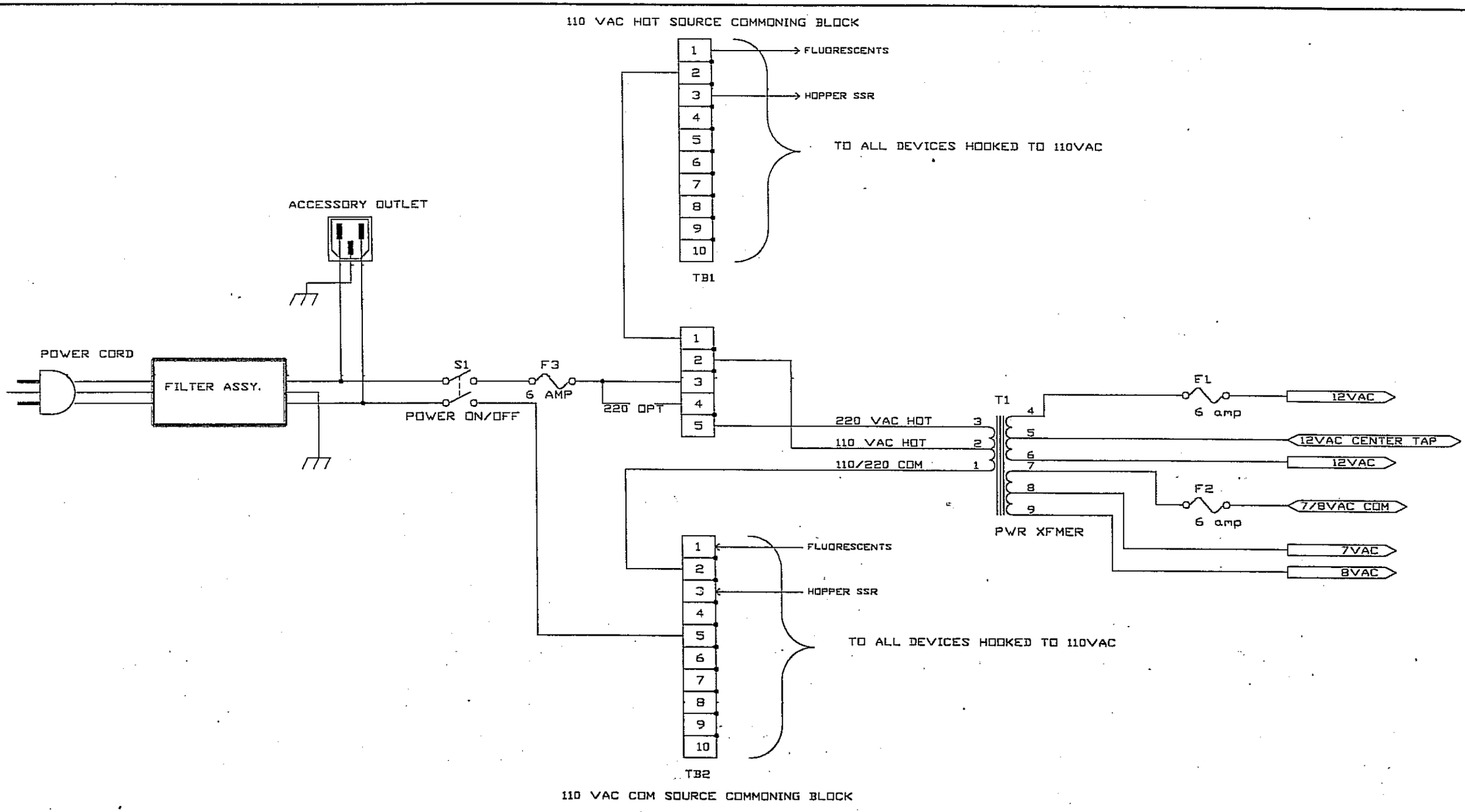
IS USED TO POWER THE OPTOS AND OTHER DEVICES OUTSIDE THE OPTO ISOLATION

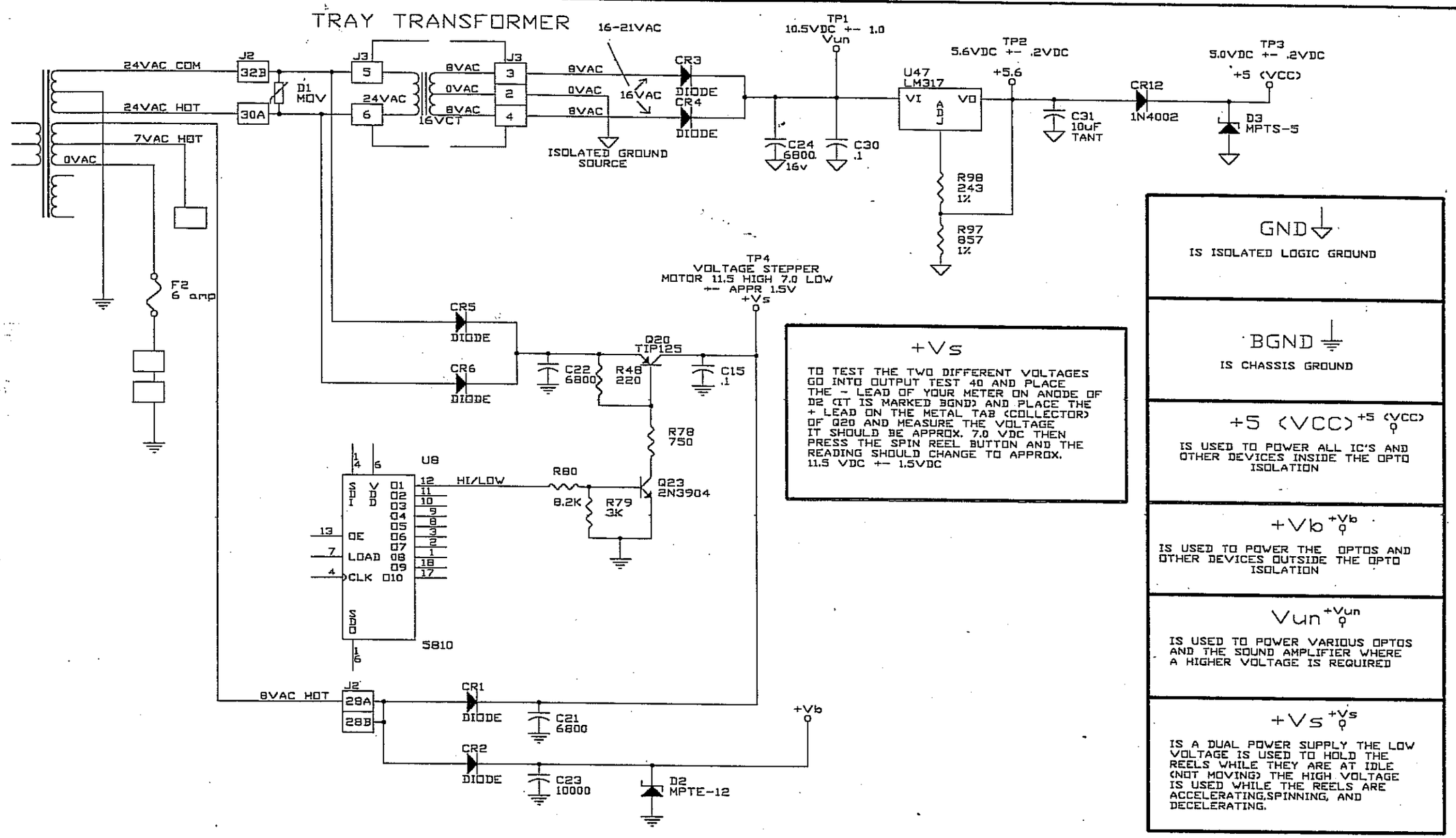
Vun

IS USED TO POWER VARIOUS OPTOS AND THE SOUND AMPLIFIER WHERE A HIGHER VOLTAGE IS REQUIRED

+Vs

IS A DUAL POWER SUPPLY THE LOW VOLTAGE IS USED TO HOLD THE REELS WHILE THEY ARE AT IDLE (NOT MOVING) THE HIGH VOLTAGE IS USED WHILE THE REELS ARE ACCELERATING,SPINNING, AND DECELERATING.


110 VAC HOT SOURCE COMMONING BLOCK
1
2
3
4
5
6
7
8
9
10
FLUORESCENTS
HOPPER SSR
TO ALL DEVICES HOOKED TO 110VAC
TB1
ACCESSORY OUTLET
POWER CORD
FILTER ASSY.
S1
POWER ON/OFF
F3
6 AMP
220 OPT
220 VAC HOT
110 VAC HOT
110/220 COM
T1
PWR XFMER
F1
6 amp
12VAC
12VAC CENTER TAP
12VAC
F2
6 amp
7/8VAC COM
7VAC
8VAC
TB2
FLUORESCENTS
HOPPER SSR
TO ALL DEVICES HOOKED TO 110VAC
110 VAC COM SOURCE COMMONING BLOCK



+Vs

TO TEST THE TWO DIFFERENT VOLTAGES GO INTO OUTPUT TEST 40 AND PLACE THE - LEAD OF YOUR METER ON ANODE OF D2 (IT IS MARKED BGND) AND PLACE THE + LEAD ON THE METAL TAB (COLLECTOR) OF Q20 AND MEASURE THE VOLTAGE IT SHOULD BE APPROX. 7.0 VDC THEN PRESS THE SPIN REEL BUTTON AND THE READING SHOULD CHANGE TO APPROX. 11.5 VDC +- 1.5VDC

GND

IS ISOLATED LOGIC GROUND

BGND

IS CHASSIS GROUND

+5 (VCC)

IS USED TO POWER ALL IC'S AND OTHER DEVICES INSIDE THE OPTO ISOLATION

+Vb

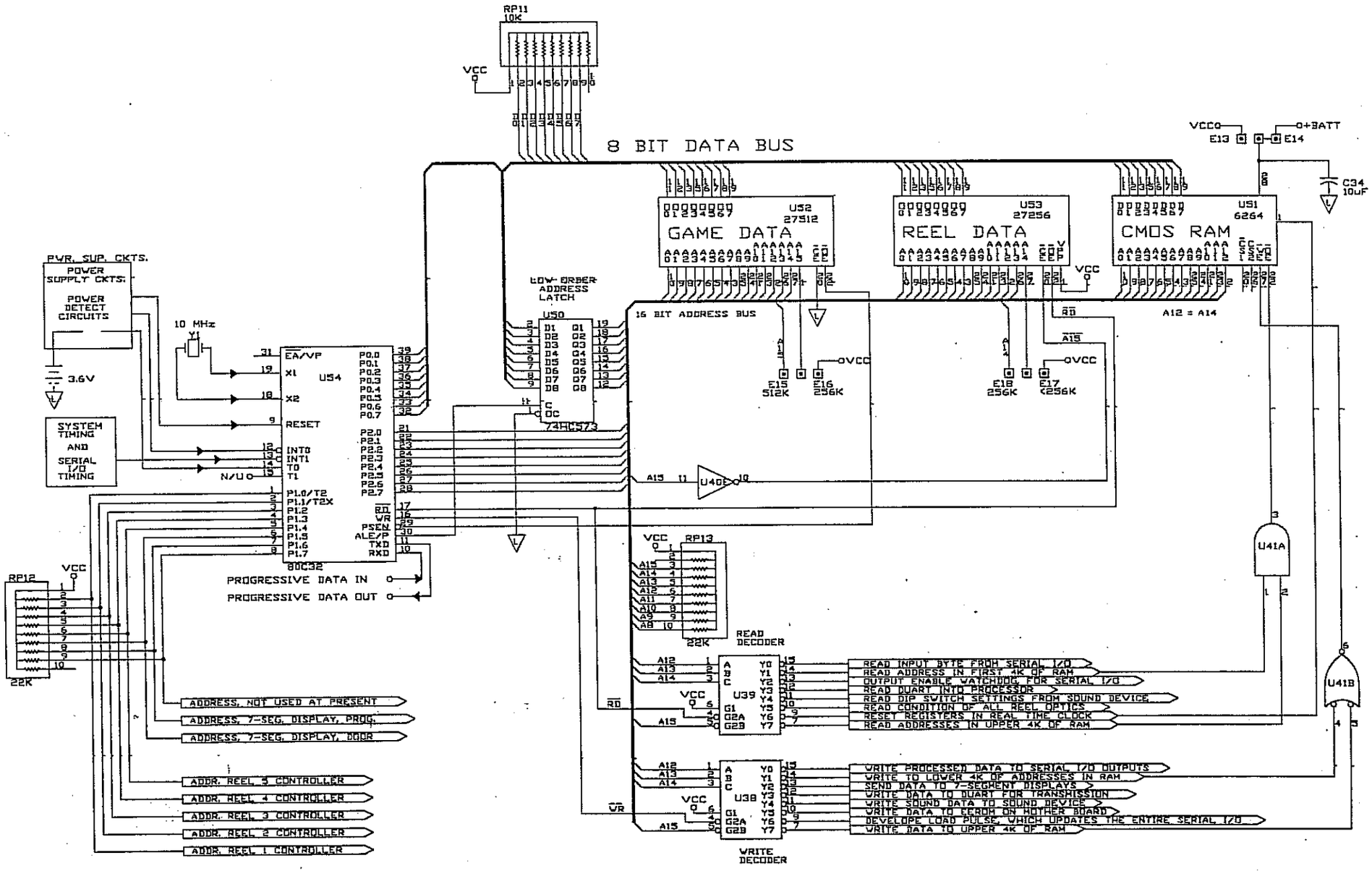
IS USED TO POWER THE OPTOS AND OTHER DEVICES OUTSIDE THE OPTO ISOLATION

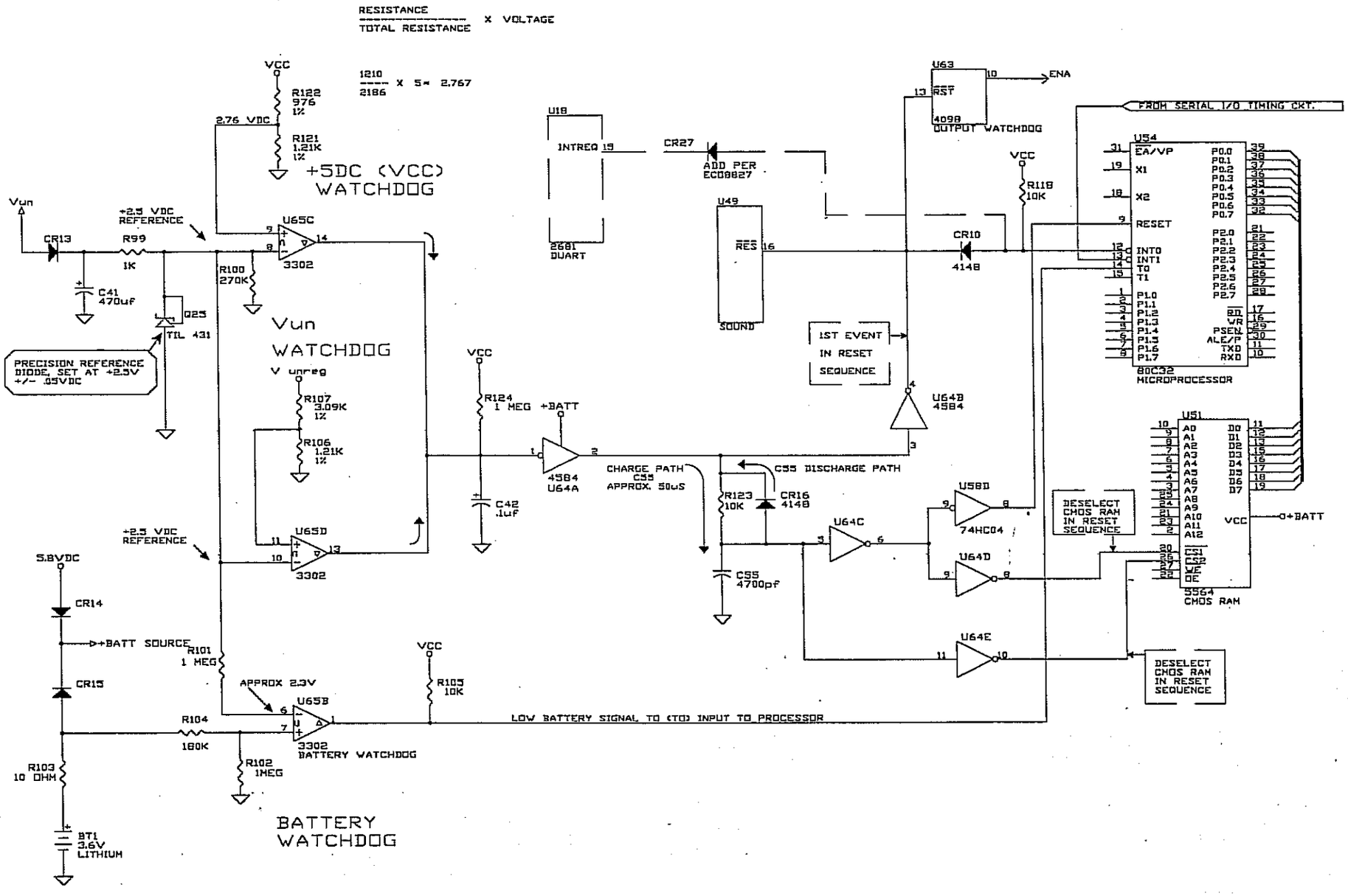
Vun

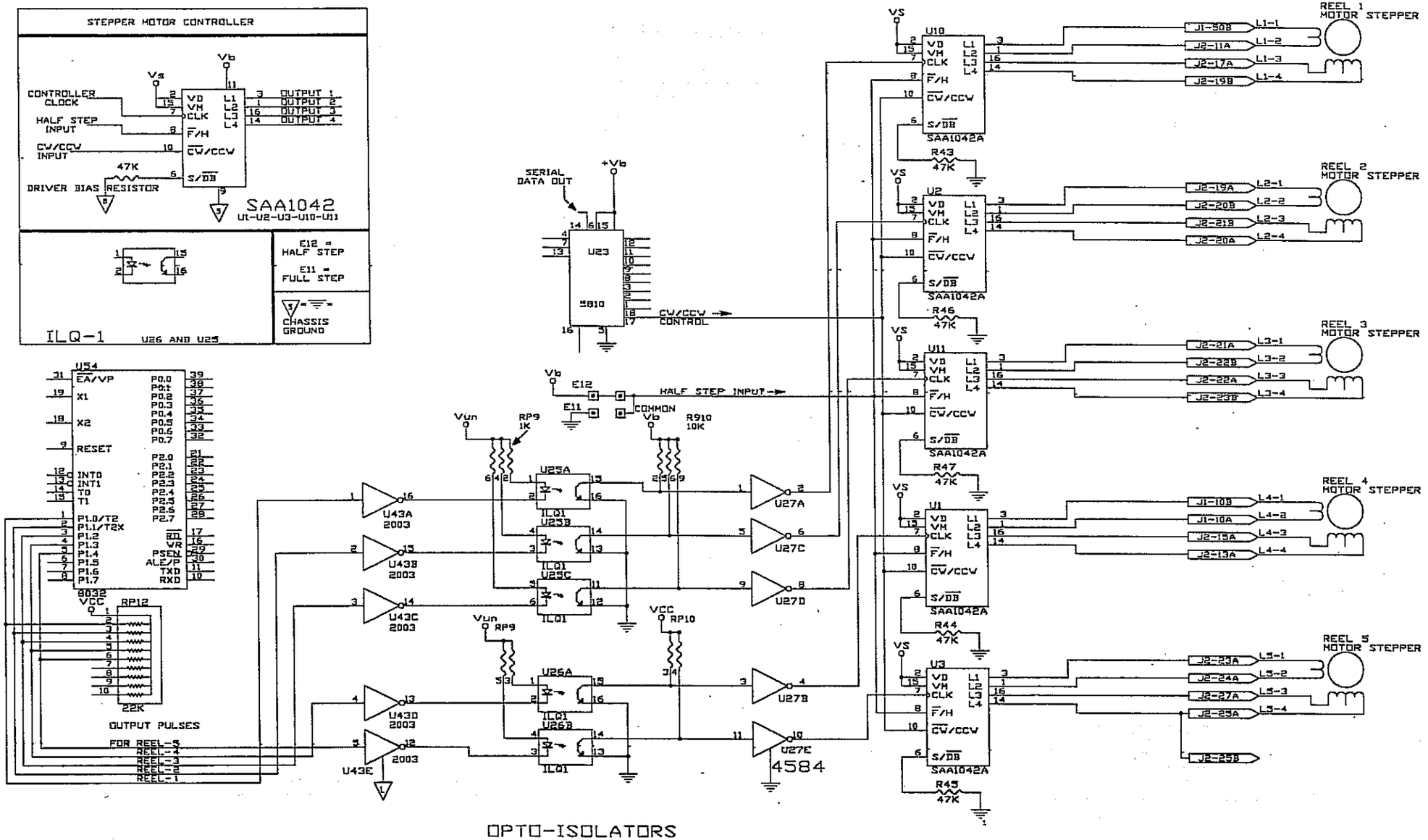
IS USED TO POWER VARIOUS OPTOS AND THE SOUND AMPLIFIER WHERE A HIGHER VOLTAGE IS REQUIRED

+Vs

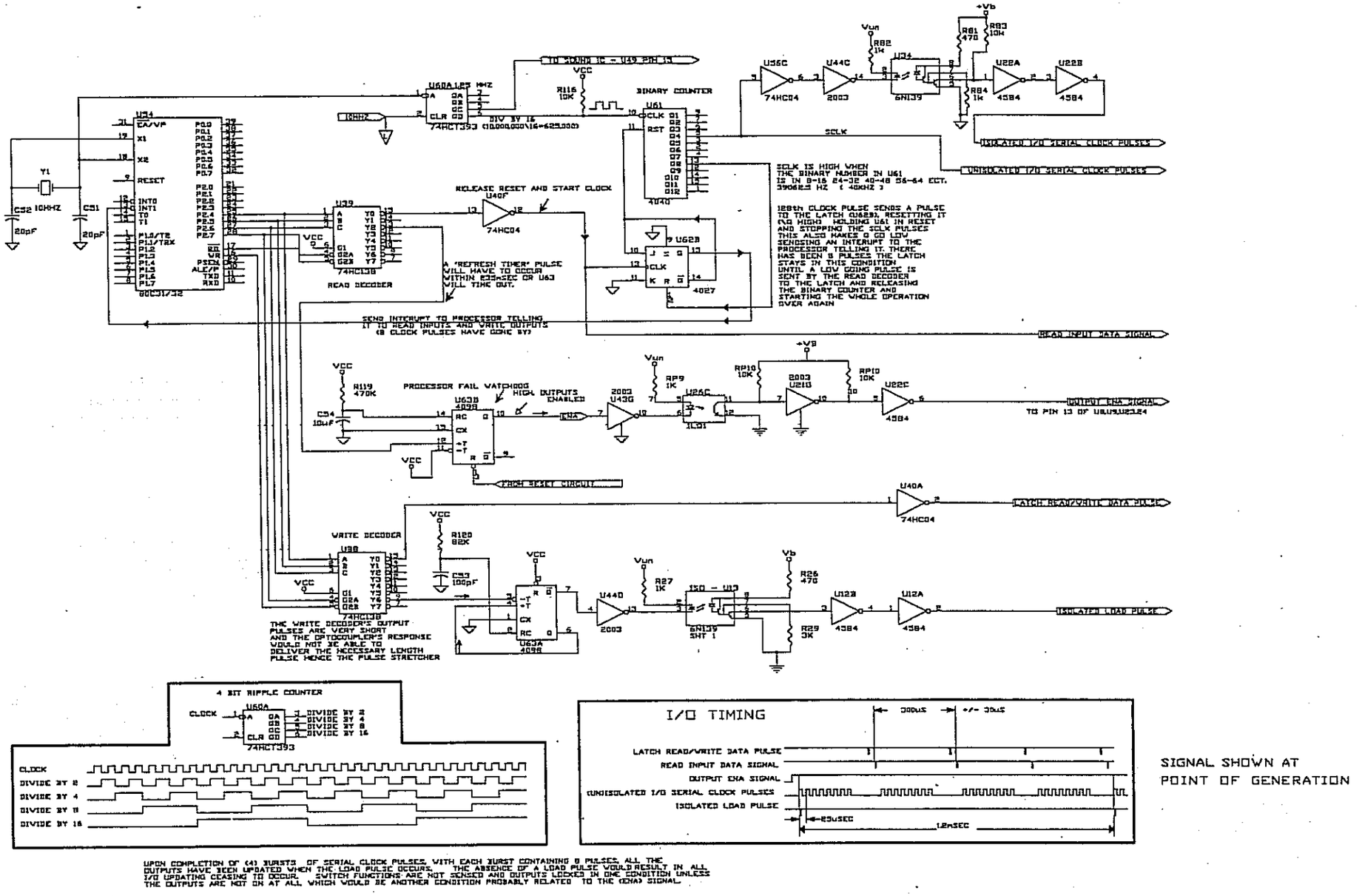
IS A DUAL POWER SUPPLY THE LOW VOLTAGE IS USED TO HOLD THE REELS WHILE THEY ARE AT IDLE (NOT MOVING) THE HIGH VOLTAGE IS USED WHILE THE REELS ARE ACCELERATING,SPINNING, AND DECELERATING.

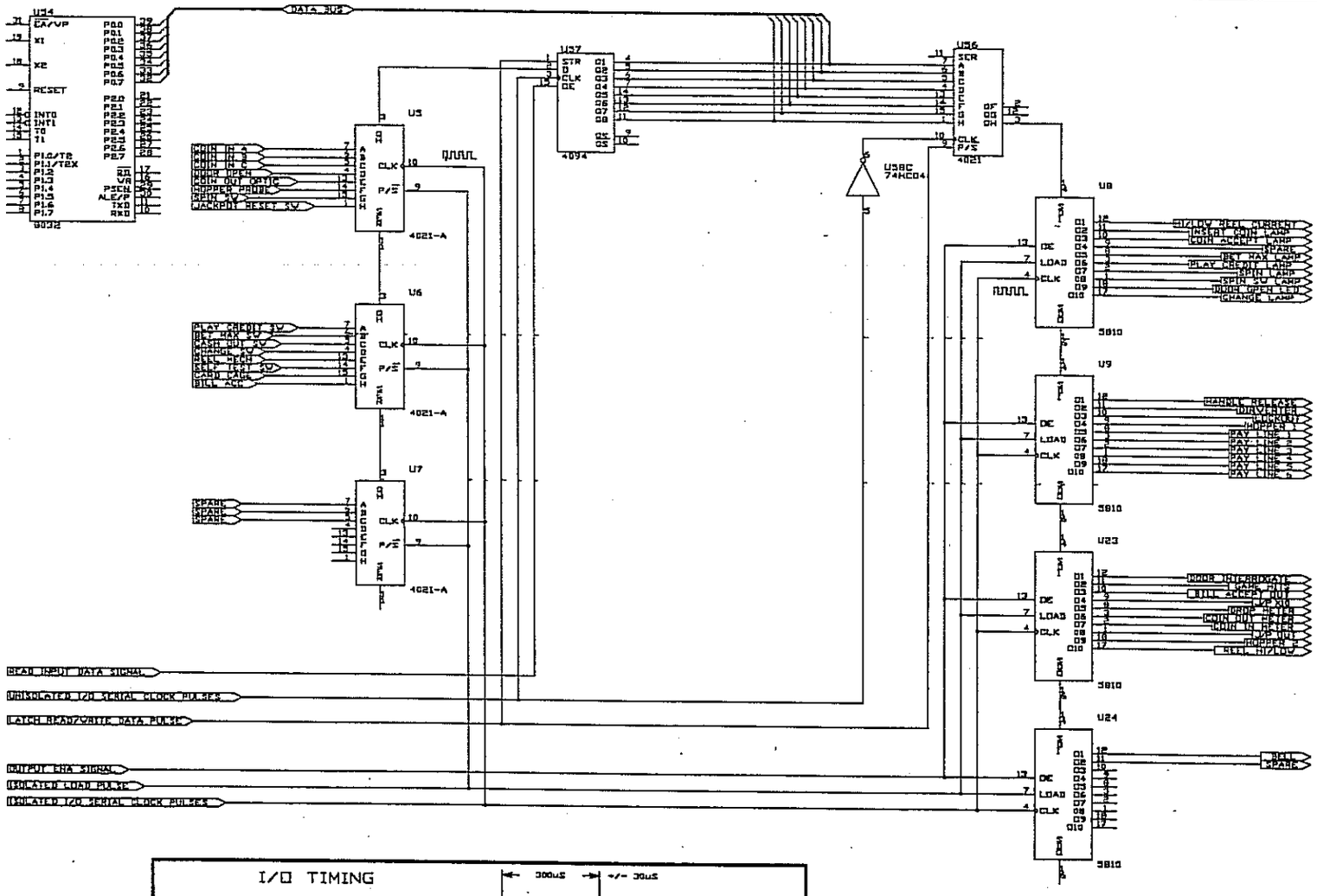

RP11
10K
VCC
8 BIT DATA BUS
U52
27512
GAME DATA
U53
27256
REEL DATA
U51
6264
CMOS RAM
VCC
E13
E14
+3ATT
C34
10uF
PWR. SUP. CKTS.
POWER SUPPLY CKTS.
POWER DETECT CIRCUITS
3.6V
10 MHz
Y1
SYSTEM TIMING AND SERIAL I/O TIMING
U54
80C32
EA/VP
X1
X2
RESET
INT0
INT1
T0
T1
N/U
P1.0/T2
P1.1/T2X
P1.2
P1.3
P1.4
P1.5
P1.6
P1.7
P0.0
P0.1
P0.2
P0.3
P0.4
P0.5
P0.6
P0.7
P2.0
P2.1
P2.2
P2.3
P2.4
P2.5
P2.6
P2.7
RD
WR
PSEN
ALE/P
TXD
RXD
PROGRESSIVE DATA IN
PROGRESSIVE DATA OUT
LOW ORDER ADDRESS LATCH
U50
74HC573
16 BIT ADDRESS BUS
A12 = A14
E15
512K
E16
256K
E18
256K
E17
<256K
U40E
U41A
U41B
RP12
22K
RP13
22K
READ DECODER
U39
WRITE DECODER
U38
ADDRESS, NOT USED AT PRESENT
ADDRESS, 7-SEG. DISPLAY, PROG.
ADDRESS, 7-SEG. DISPLAY, DOOR
ADDR. REEL 5 CONTROLLER
ADDR. REEL 4 CONTROLLER
ADDR. REEL 3 CONTROLLER
ADDR. REEL 2 CONTROLLER
ADDR. REEL 1 CONTROLLER
READ INPUT BYTE FROM SERIAL I/O
READ ADDRESS IN FIRST 4K OF RAM
OUTPUT ENABLE WATCHDOG FOR SERIAL I/O
READ UART INTO PROCESSOR
READ DIP SWITCH SETTINGS FROM SOUND DEVICE
READ CONDITION OF ALL REEL OPTICS
RESET REGISTERS IN REAL TIME CLOCK
READ ADDRESSES IN UPPER 4K OF RAM
WRITE PROCESSED DATA TO SERIAL I/O OUTPUTS
WRITE TO LOWER 4K OF ADDRESSES IN RAM
SEND DATA TO 7-SEGMENT DISPLAYS
WRITE DATA TO UART FOR TRANSMISSION
WRITE SOUND DATA TO SOUND DEVICE
WRITE DATA TO EEROM ON MOTHER BOARD
DEVELOPE LOAD PULSE, WHICH UPDATES THE ENTIRE SERIAL I/O
WRITE DATA TO UPPER 4K OF RAM

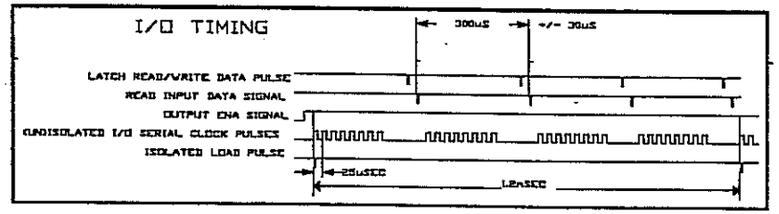

RESISTANCE / TOTAL RESISTANCE X VOLTAGE
1210 / 2186 X 5= 2.767
VCC
R122 976 1%
2.76 VDC
R121 1.21K 1%
+5DC (VCC) WATCHDOG
Vun
+2.5 VDC REFERENCE
CR13
R99 1K
C41 470uF
Q25 TIL 431
PRECISION REFERENCE DIODE, SET AT +2.5V +/- .05VDC
U65C 3302
R100 270K
Vun WATCHDOG
V unreg
R107 3.09K 1%
R106 1.21K 1%
U65D 3302
+2.5 VDC REFERENCE
5.8VDC
CR14
+BATT SOURCE
CR15
R101 1 MEG
APPROX 2.3V
U65B 3302 BATTERY WATCHDOG
R104 180K
R102 1MEG
R103 10 OHM
BT1 3.6V LITHIUM
BATTERY WATCHDOG
U18
INTREQ 19
2681 DUART
CR27
ADD PER ECO9827
U49
RES 16
SOUND
U63
RST 13
4098 OUTPUT WATCHDOG
ENA
R118 10K
CR10 4148
1ST EVENT IN RESET SEQUENCE
U64B 4584
FROM SERIAL I/O TIMING CKT.
U54
EA/VP 31
X1 19
X2 18
RESET 9
INT0 12
INT1 13
T0 14
T1 15
P1.0 1
P1.1 2
P1.2 3
P1.3 4
P1.4 5
P1.5 6
P1.6 7
P1.7 8
P0.0 39
P0.1 38
P0.2 37
P0.3 36
P0.4 35
P0.5 34
P0.6 33
P0.7 32
P2.0 21
P2.1 22
P2.2 23
P2.3 24
P2.4 25
P2.5 26
P2.6 27
P2.7 28
RD 17
WR 16
PSEN 29
ALE/P 30
TXD 11
RXD 10
80C32 MICROPROCESSOR
R124 1 MEG
+BATT
4584 U64A
CHARGE PATH C55 APPROX. 50uS
C55 DISCHARGE PATH
C42 .1uF
R123 10K
CR16 4148
C55 4700pf
U64C
U64D
U64E
74HC04
DESELECT CMOS RAM IN RESET SEQUENCE
U51
A0 10
A1 9
A2 8
A3 7
A4 6
A5 5
A6 4
A7 3
A8 25
A9 24
A10 21
A11 23
A12 2
D0 11
D1 12
D2 13
D3 15
D4 16
D5 17
D6 18
D7 19
CS1 20
CS2 26
WE 27
OE 22
VCC
+BATT
5564 CMOS RAM
DESELECT CMOS RAM IN RESET SEQUENCE
R105 10K
LOW BATTERY SIGNAL TO (TO) INPUT TO PROCESSOR


STEPPER MOTOR CONTROLLER
CONTROLLER CLOCK
HALF STEP INPUT
CW/CCW INPUT
DRIVER BIAS RESISTOR
47K
SAA1042
U1-U2-U3-U10-U11
ILQ-1
U26 AND U25
E12 = HALF STEP
E11 = FULL STEP
CHASSIS GROUND
SERIAL DATA OUT
U23
5810
CW/CCW CONTROL
HALF STEP INPUT
COMMON
RP9 1K
R910 10K
RP12
22K
OUTPUT PULSES FOR REEL-5
REEL-4
REEL-3
REEL-2
REEL-1
U43A 2003
U43B 2003
U43C 2003
U43D 2003
U43E 2003
ILQ1
U27A
U27C
U27D
U27B
U27E
4584
OPTO-ISOLATORS
REEL 1 MOTOR STEPPER
REEL 2 MOTOR STEPPER
REEL 3 MOTOR STEPPER
REEL 4 MOTOR STEPPER
REEL 5 MOTOR STEPPER
R43 47K
R46 47K
R47 47K
R44 47K
R45 47K

S-Plus Serial Clock Signals

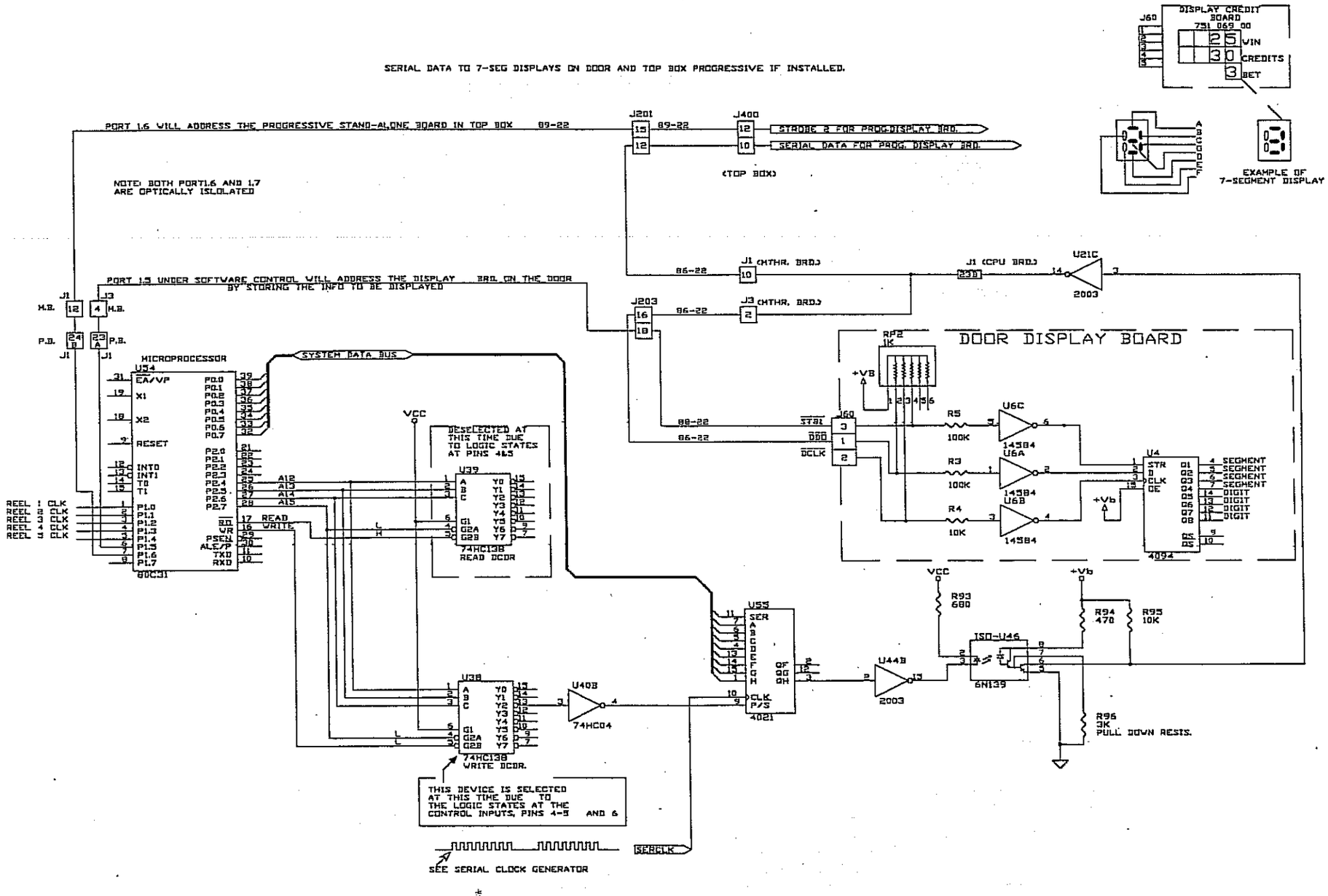


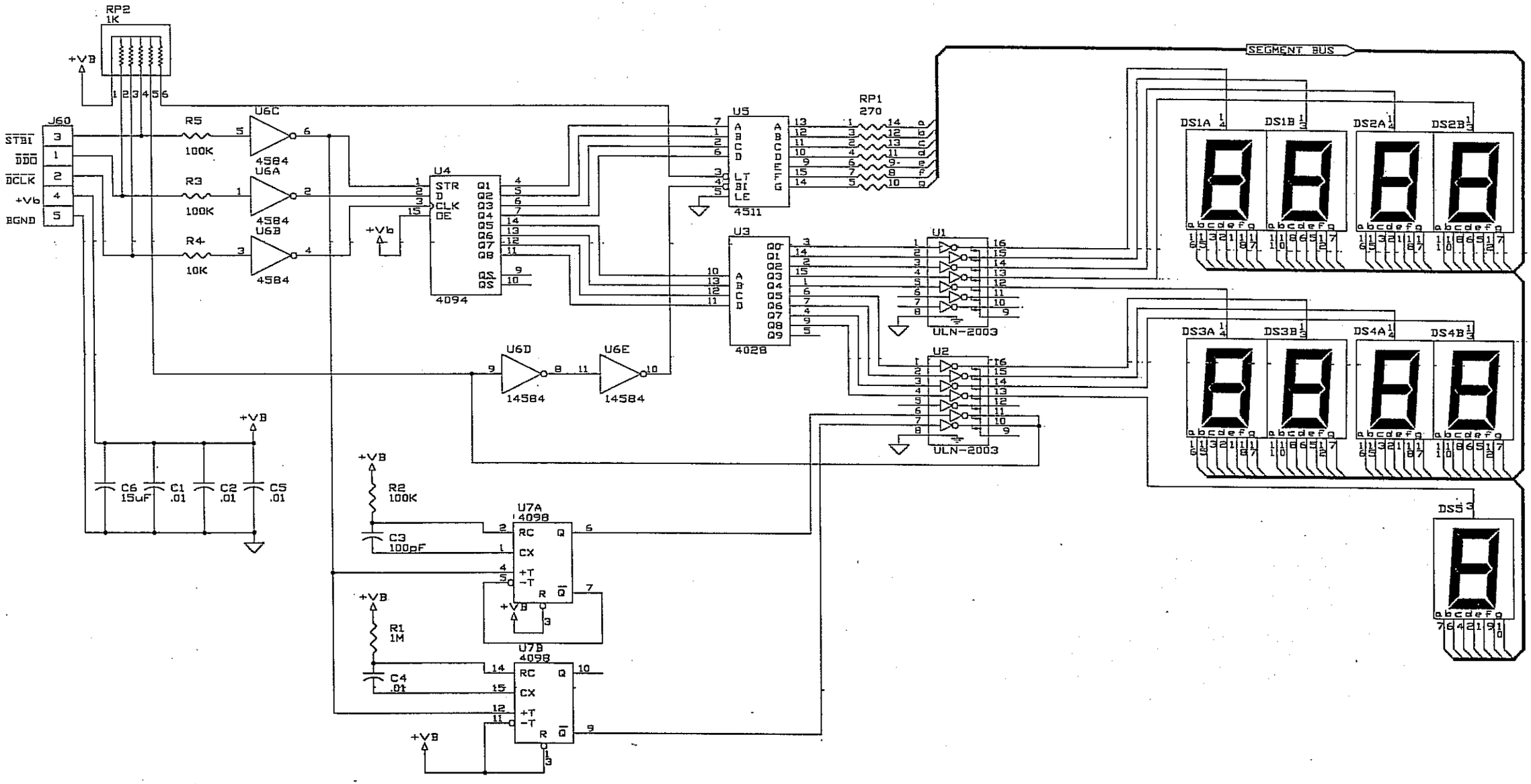




SIGNAL SHOWN AT
POINT OF GENERATION

S-Plus Display Data Out




RP2
1K
+VB
1 2 3 4 5 6
J60
STBI
DDO
DCLK
+Vb
BGND
R5
100K
R3
100K
R4
10K
U6C
U6A
U6B
4584
4584
4584
U4
STR
D
CLK
OE
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
4094
+Vb
U5
A
B
C
D
LT
BI
LE
4511
RP1
270
U3
4028
U1
U2
ULN-2003
ULN-2003
U6D
U6E
14584
14584
SEGMENT BUS
DS1A
DS1B
DS2A
DS2B
DS3A
DS3B
DS4A
DS4B
DS5
C6
15uF
C1
.01
C2
.01
C5
.01
R2
100K
C3
100pF
U7A
4098
RC
CX
+T
-T
Q
R
R1
1M
C4
.01
U7B
4098

Tracing Inputs

Each input problem is taken individually and traced to its "opto-isolation" on the processor board. Opto-isolation is the board's defense against static electricity, noise, or any unwanted electrical feedback. The majority of board problems are I/O and voltage problems. These problems usually occur between opto-isolation and the board connectors. The vast majority of input problems are not board problems. Suspected board problems should be isolated to the board, on a tester if possible, before any repair is attempted.

Start With the Problem

The simplest means of resolving machine and board repairs is to start with the problem and then try to isolate the cause. Treat each potential input problem individually. Trace the problem from the exterior of the machine to the processor board, and the point of opto-isolation.

The technician should verify every problem using the inputs test. The technician can then reference each input in question in this manual.

When using the diagram provided with each input problem, the following items should be kept in mind:

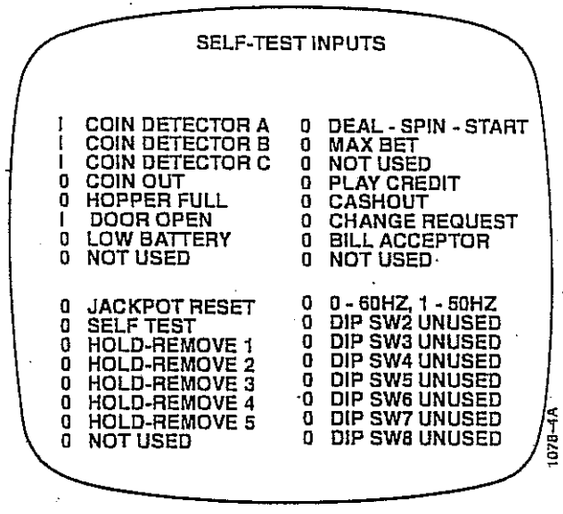
- Each input when activated sends a signal through the wiring and connectors to the mother board.
- The mother board connects the signal via a trace to the processor board
- The processor board has an input protection resistor pack with pull-up resistors tied to a Vb, followed by a parallel/serial shift register, which is then followed by buffers and opto-isolation.
- The input when activated presents a logic low inward. This input signal either goes directly to opto-isolation or in the case of all the player panel switches and self test mode, the input goes through a diode matrix then to opto-isolation.

Inputs Test

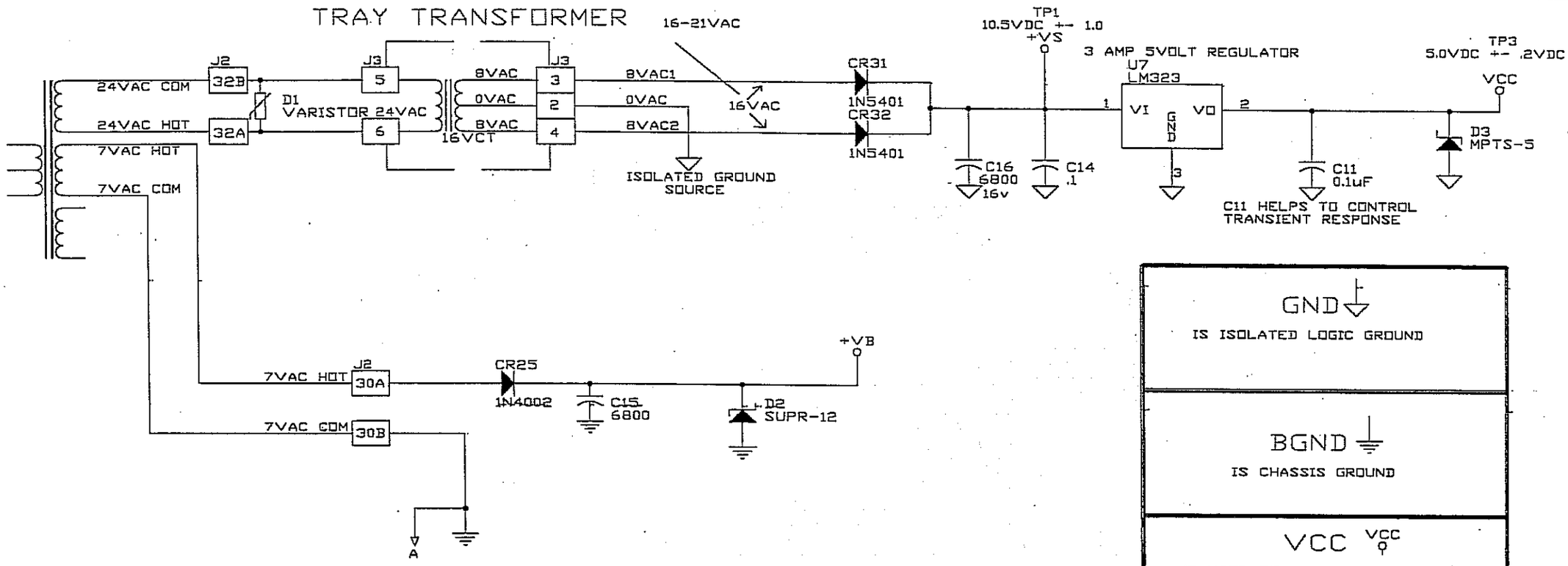
The message SELF-TEST INPUTS appears at the top of the video screen. Below it are the names of the available inputs with either a "0" or a "1" in front of each input. These numbers represent the present logic level of the input and are used to trouble-shoot specific input devices. Typically, a "0" indicates the circuit or switch is in an open state and a "1" indicates the circuit or switch is closed.

Activating an input changes its logic level from 0 to 1 or 1 to 0 when the input is working properly. If no change occurs as the switch is activated, the switch or its wiring may be faulty, or a problem may exist on the processor board or with the game program IC.

To activate a switch input, press that particular switch. To activate inputs that are not switches, simply operate the part as it is used on the machine. For example, a bill acceptor is activated by inserting a bill into the acceptor.



Typical Inputs Test (Poker).



GND

IS ISOLATED LOGIC GROUND

BGND

IS CHASSIS GROUND

VCC

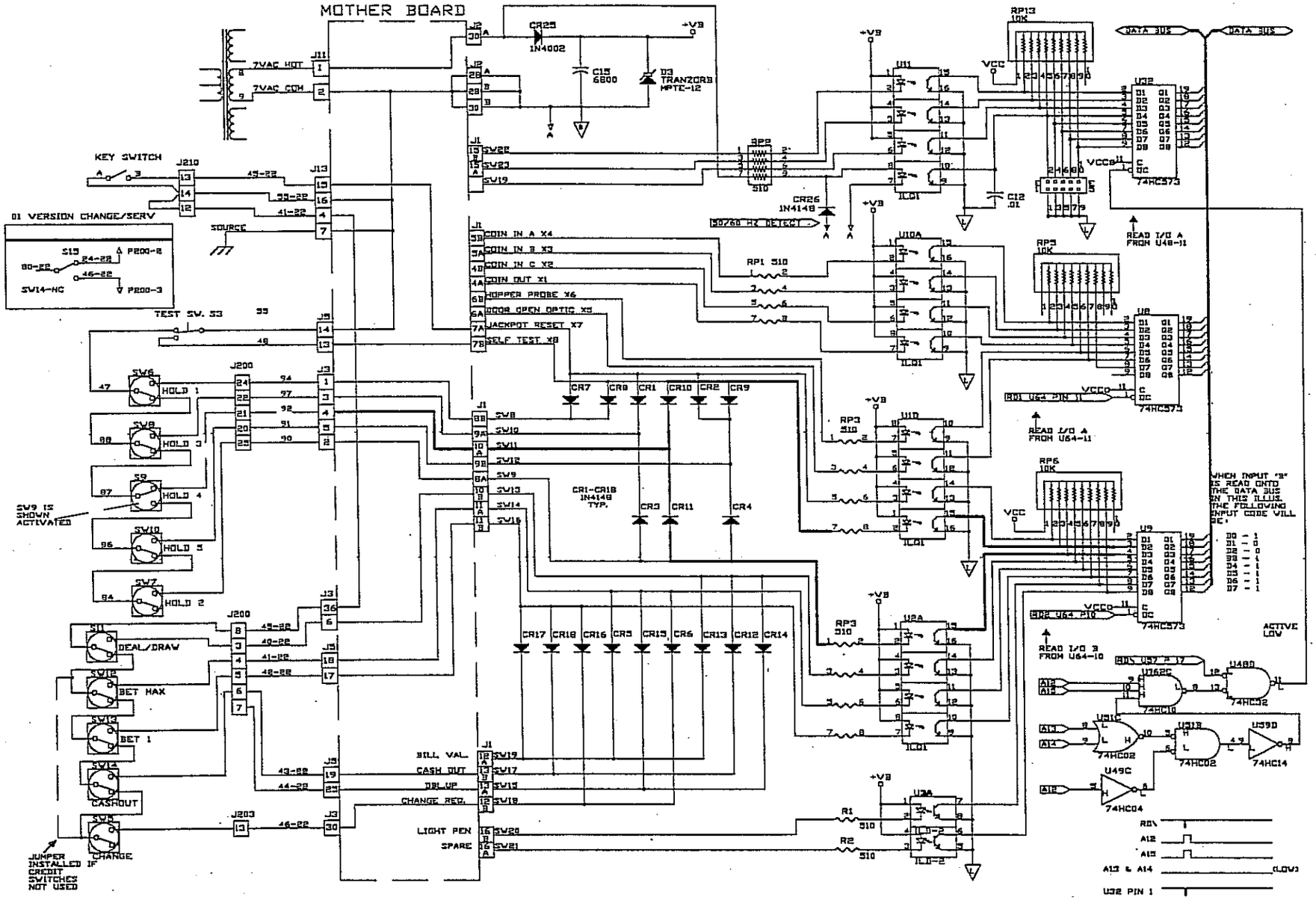
IS USED TO POWER ALL IC'S AND OTHER DEVICES INSIDE THE OPTO ISOLATION

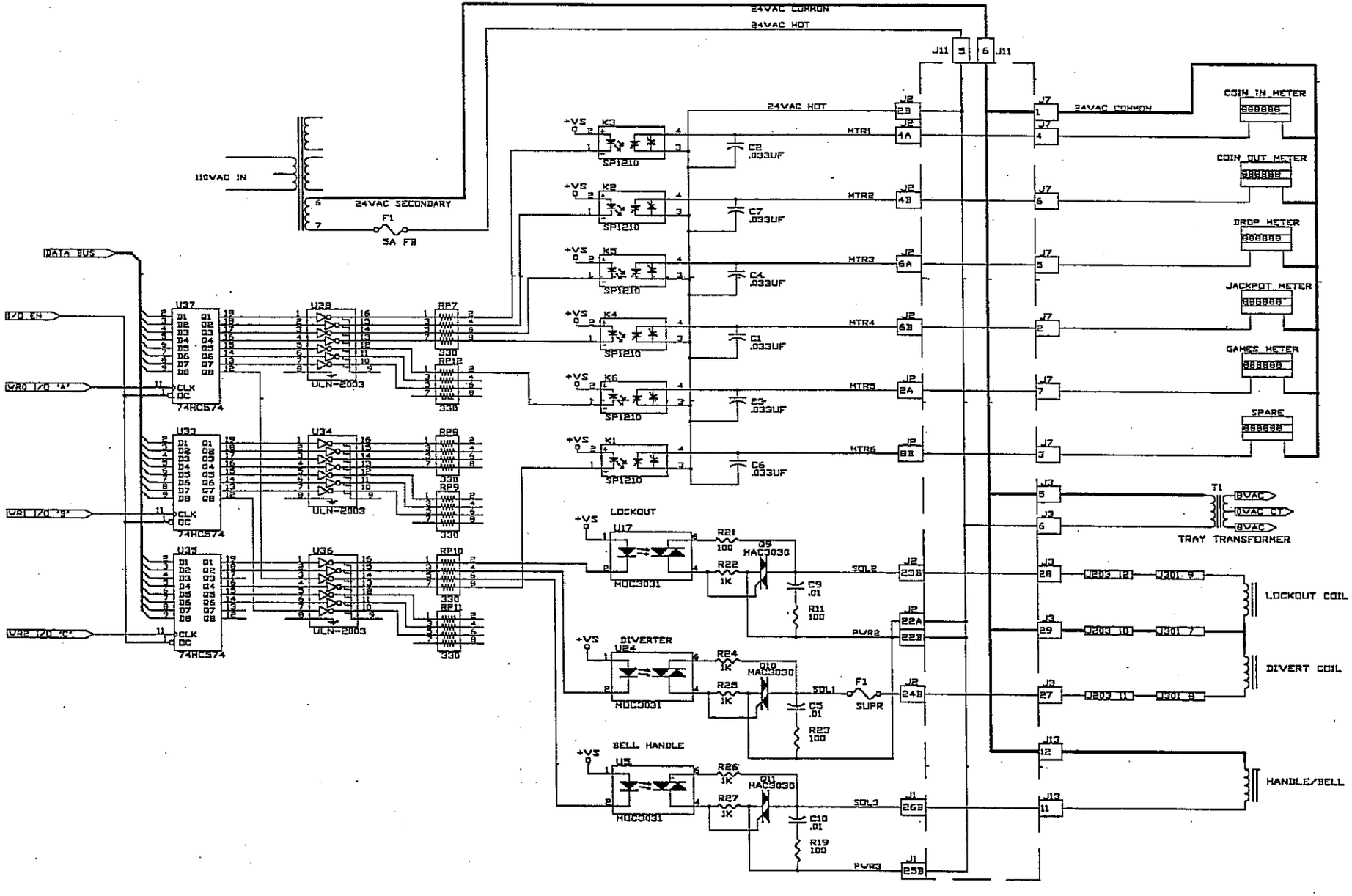
+Vb

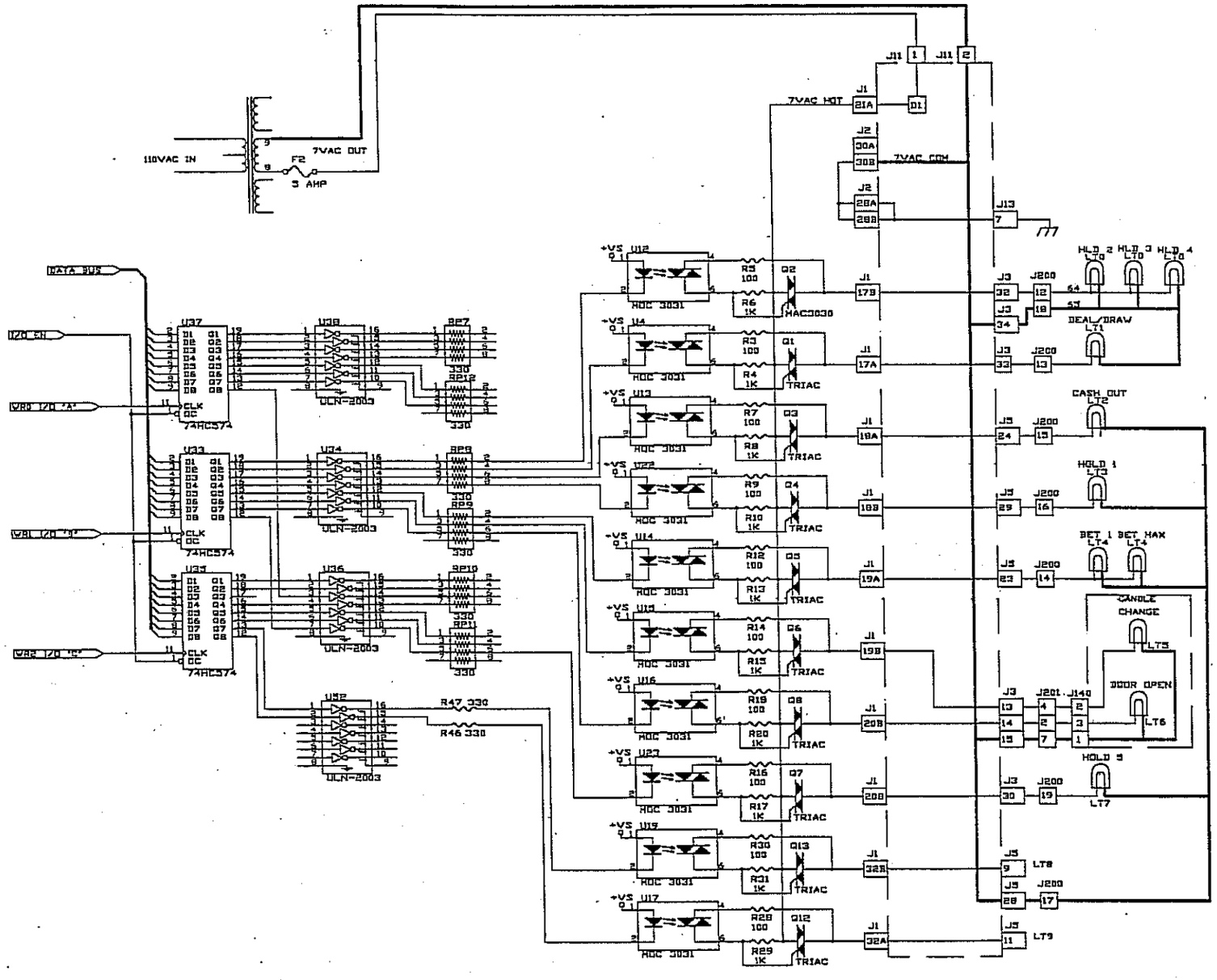
IS USED TO POWER THE OPTOS AND OTHER DEVICES OUTSIDE THE OPTO ISOLATION

+VS

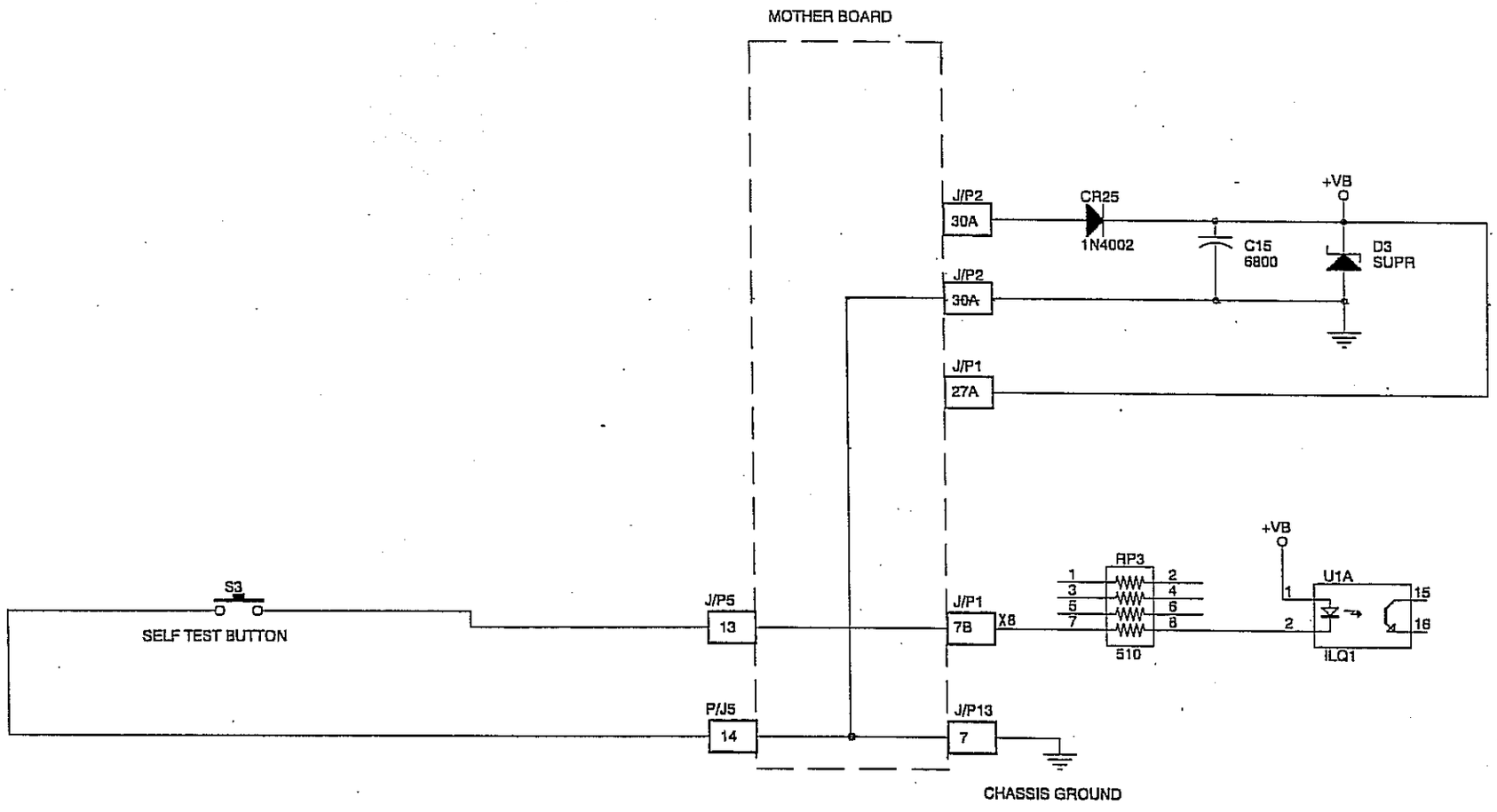
IS UNREGULATED VOLTAGE AND IS USED TO POWER VARIOUS OPTOS AND THE SOUND AMPLIFIER WHERE A HIGHER VOLTAGE IS REQUIRED


MOTHER BOARD
7VAC HOT
7VAC COM
KEY SWITCH
01 VERSION CHANGE/SERV
SOURCE
TEST SW. S3
HOLD 1
HOLD 3
HOLD 4
HOLD 5
HOLD 2
DEAL/DRAW
BET MAX
BET 1
CASHOUT
CHANGE
JUMPER INSTALLED IF CREDIT SWITCHES NOT USED
SW9 IS SHOWN ACTIVATED
COIN IN A X4
COIN IN B X3
COIN IN C X2
COIN OUT X1
HOPPER PROBE X6
DOOR OPEN OPTIC X5
JACKPOT RESET X7
SELF TEST X8
BILL VAL.
CASH OUT
DBL UP
CHANGE REQ.
LIGHT PEN
SPARE
CR1-CR18 1N4148 TYP.
CR25 1N4002
C15 6800
D3 TRANZORB MPTE-12
CR26 1N4148
50/60 HZ DETECT
RP1 510
RP2 510
RP3 510
RP13 10K
RP5 10K
RP6 10K
R1 510
R2 510
C12 .01
DATA BUS
74HC573
READ I/O A FROM U48-11
READ I/O A FROM U64-11
READ I/O B FROM U64-10
WHEN INPUT "2" IS READ ONTO THE DATA BUS IN THIS ILLUS. THE FOLLOWING INPUT CODE WILL BE:
ACTIVE LOW
74HC32
74HC10
74HC02
74HC14
74HC04
RD\
A12
A13
A13 & A14
U32 PIN 1


24VAC COMMON
24VAC HOT
J11
5
6
J11
110VAC IN
24VAC SECONDARY
F1
5A FB
DATA BUS
I/O EN
WR0 I/O "A"
WR1 I/O "B"
WR2 I/O "C"
U37
U33
U35
74HC574
U38
U34
U36
ULN-2003
RP7
RP12
RP8
RP9
RP10
RP11
330
+VS
K3
K2
K5
K4
K6
K1
SPI210
C2 .033UF
C7 .033UF
C4 .033UF
C1 .033UF
C3 .033UF
C6 .033UF
HTR1
HTR2
HTR3
HTR4
HTR5
HTR6
J2
2B
1A
4B
6A
6B
2A
8B
J7
1
4
6
5
2
7
3
COIN IN METER
COIN OUT METER
DROP METER
JACKPOT METER
GAMES METER
SPARE
LOCKOUT
U17
HOC3031
R21 100
R22 1K
Q9 HAC3030
C9 .01
R11 100
SOL2
PWR2
22A
22B
23B
DIVERTER
U24
R24 1K
R25 1K
Q10 HAC3030
C5 .01
R23 100
SOL1
F1
SUPR
24B
BELL HANDLE
U5
R26 1K
R27 1K
Q11 HAC3030
C10 .01
R19 100
SOL3
PWR3
26B
25B
J13
12
11
J3
28
29
27
J203 12
J203 10
J203 11
J301 9
J301 7
J301 8
LOCKOUT COIL
DIVERT COIL
HANDLE/BELL
T1
8VAC
8VAC CT
8VAC
TRAY TRANSFORMER


110VAC IN
7VAC OUT
F2
3 AMP
DATA BUS
74HC574
ULN-2003
HDC 3031
MAC3030
TRIAC
7VAC HOT
7VAC COM
HOLD 2
HOLD 3
HOLD 4
DEAL/DRAW
CASH OUT
HOLD 1
BET 1
BET MAX
CANDLE CHANGE
DOOR OPEN
HOLD 5
R47 330
R46 330

Problem: Self Test Switch is Nonfunctional (Can't Enter Self Test Mode)



Before removing the processor board, check the following areas:

- ✓ Check wires and connectors for defects
- ✓ Check for ~8 to 10 VDC across 2 leads of the self test switch
- ✓ Press the self test switch– measure the voltage (voltage should be 0 VDC)
- ✓ Replace the self test switch, and test

If that doesn't work, try the following steps:

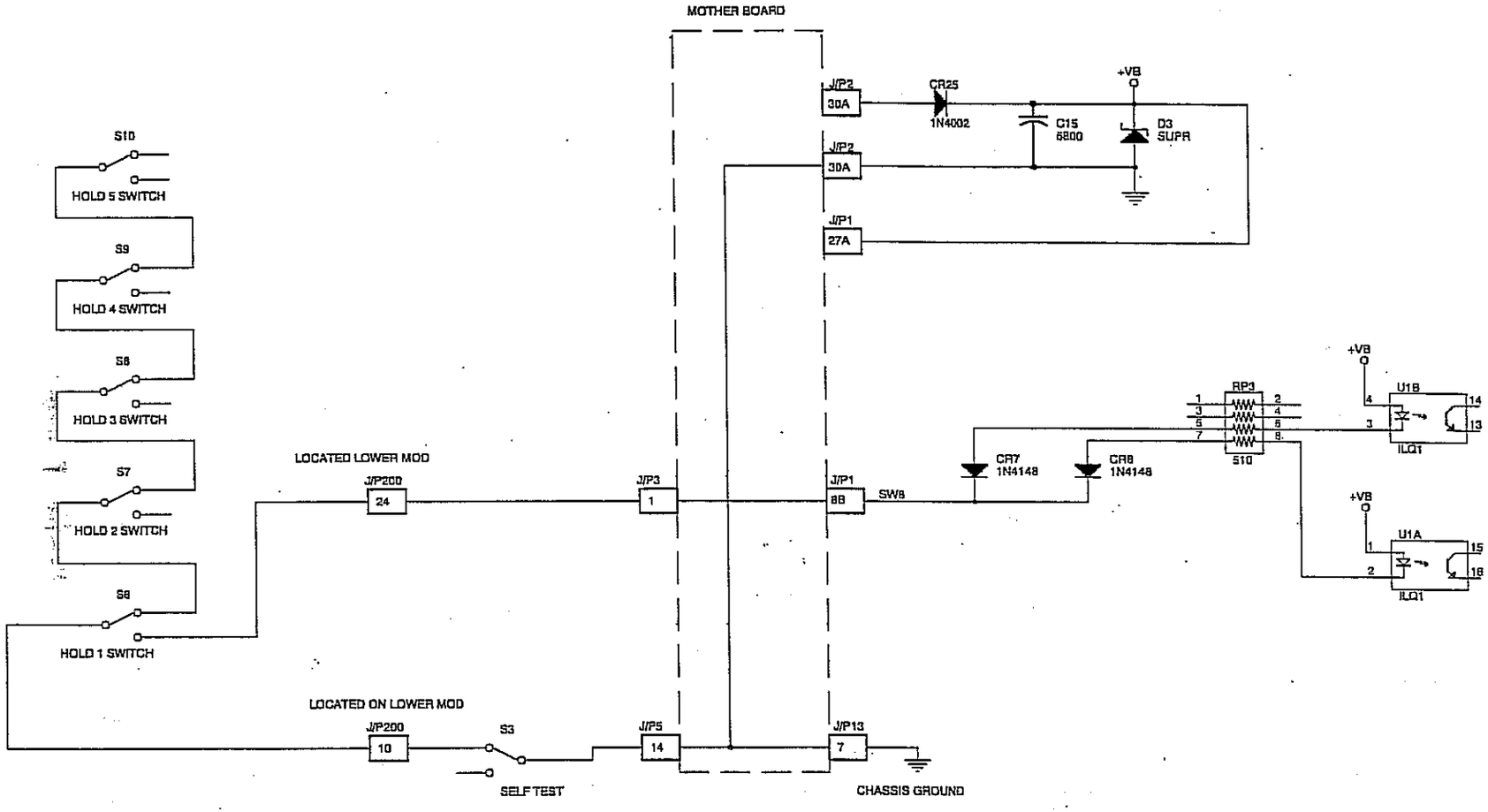
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
Ground lead to J/P5-14
Normally open lead to J/P5-13

MOTHER BOARD CONTINUITY TEST
J/P5-14 to J/P13-7 & J/P2-30A
J/P5-13 to J/P1-7B

PROCESSOR BOARD TEST
Check Vb at U1 (negative lead on B ground use positive lead to check pin 1 for Vb (~8-9VDC))
Test U1 - if problem continues, then replace.
Test RP3 - if problem continues, then replace.

Problem: Hold 1 Switch is Nonfunctional



WIRE CONTINUITY TEST
Common lead to J/P5-14
Normally open lead to J/P3-1

MOTHER BOARD CONTINUITY TEST
J/P5-14 to J/P13-7
J/P3-1 to J/P1-8B

PROCESSOR BOARD TEST
Check Vb at U10 (negative lead on B ground, use positive lead to check pin 1 & 4 for Vb (−8-9VDC))
Check Vb at U2 (negative lead on Bgnd , positive lead on pin 1)
Test CR7 & CR8 (1N4148's)
Test RP3 - if problem continues, then replace.

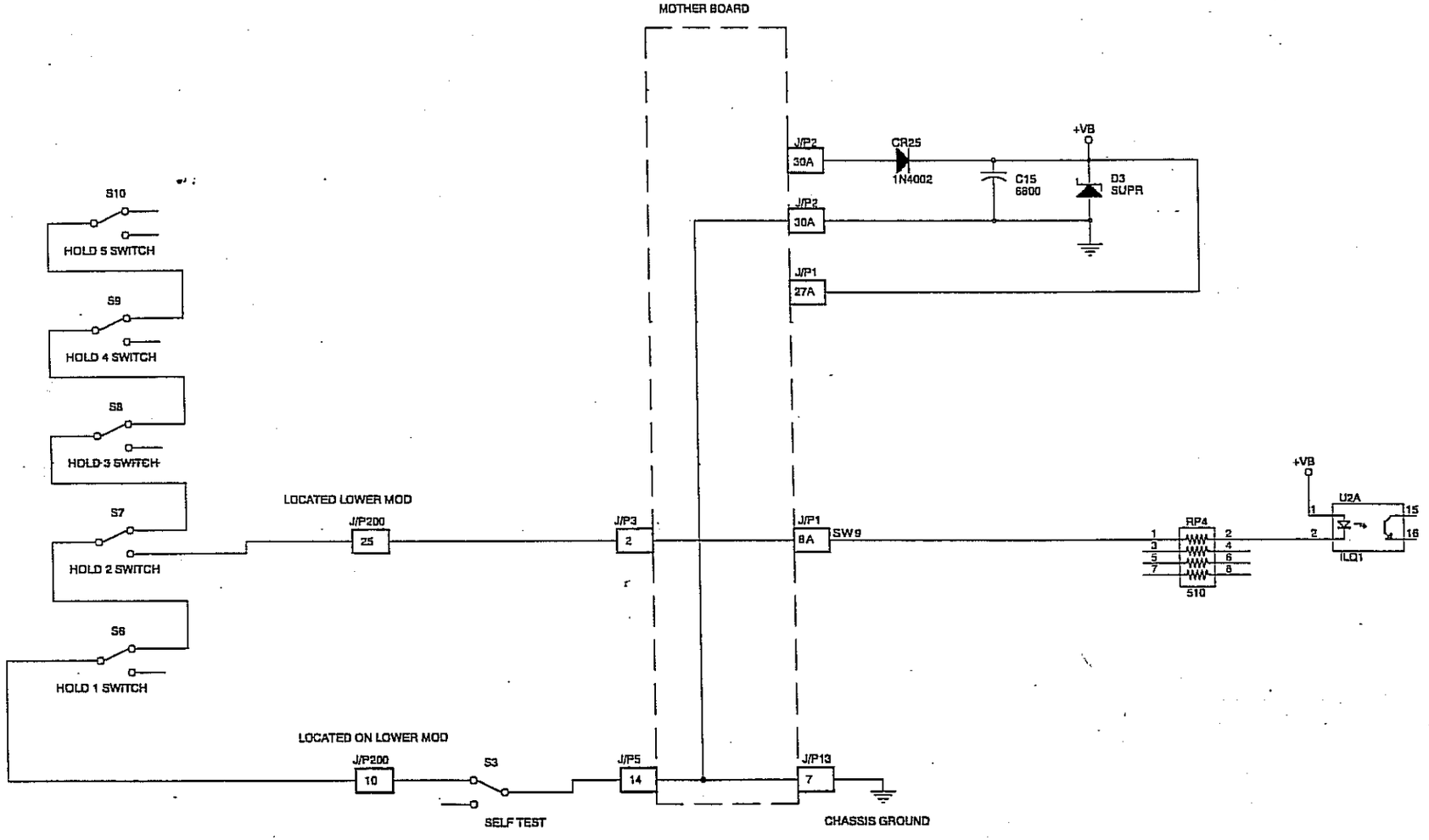
Before removing the processor board, check the following areas:

- ✓ Verify the problem by checking the inputs test in the self test mode
- ✓ Check to see if the button assembly is clean, and has no broken or missing parts
- ✓ If there is a faulty microswitch, replace it
- ✓ If all the hold switches are nonfunctional, replace the self test switch
- ✓ If the microswitch is wired incorrectly, reconnect by checking another machine of the same type
- ✓ Connect one meter lead to the normally open leg of the switch and connect the other meter lead to the chassis ground (B gnd), then measure for −8 to 10 VDC
- ✓ Activate the switch– the voltage should drop to zero volts
- ✓ Test for continuity from H/C1 common to the normally closed leg of H/C5
- ✓ If the switch measures open, then measure the next switch inward until a low resistance is measured

If that doesn't work, try the following steps:

- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Hold 2 Switch is Nonfunctional



WIRE CONTINUITY TEST
Common lead to J/P5-14
Normally open lead to J/P3-2

MOTHER BOARD CONTINUITY TEST
J/P5-14 to J/P13-7
J/P3-2 to J/P1-8A

PROCESSOR BOARD TEST
Check Vb at U2 (negative lead on B ground use positive lead to check pin 1 (U2) for Vb (~8-9VDC))
Test U2
Test RP4 - if problem continues, then replace.

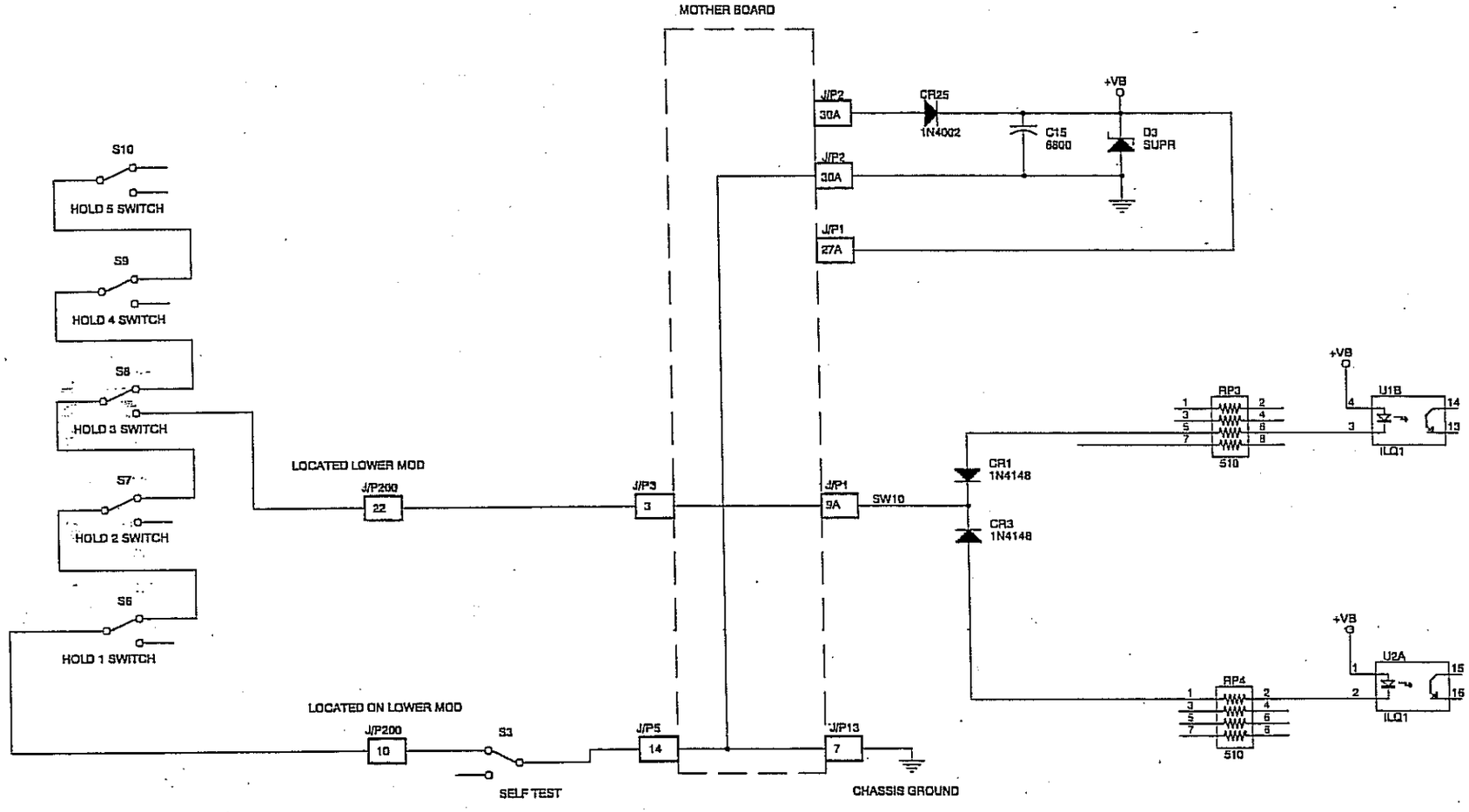
Before removing the processor board, check the following areas:

- ✓ Verify the problem by checking the input test in the self test mode
- ✓ Check to see if the button assembly is clean and has no broken or missing parts
- ✓ If there is a faulty microswitch, replace it
- ✓ If hold switches 2 through 5 are nonfunctional, replace hold switch one first
- ✓ If the microswitch is wired incorrectly, reconnect by checking another machine of the same type.
- ✓ Connect one meter lead to the normally open leg of the switch and connect the other meter lead to the chassis ground (B gnd), then measure for ~8 to 10 VDC
- ✓ Activate the switch– the voltage should drop to zero volts
- ✓ Test for continuity from H/C2 common to the normally closed leg of H/C5
- ✓ If the switch measures open, then measure the next switch inward until a low resistance is measured

If that doesn't work, try the following steps:

- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Hold 3 Switch is Nonfunctional



WIRE CONTINUITY TEST
Common lead to J/P5-14
Normally open lead to J/P3-3

MOTHER BOARD CONTINUITY TEST
J/P5-14 to J/P13-7
J/P3-3 to J/P1-9A

PROCESSOR BOARD TEST
Check Vb at U1 (negative lead on B ground use positive lead to check pin 1 , 2, 4 for Vb (–8-9VDC))
Check Vb at U2 (negative lead on B gnd and positive lead on pin 1)
Test U1 & U2
Test CR1 & CR3
Test RP3 or RP4 - if problem continues, then replace.

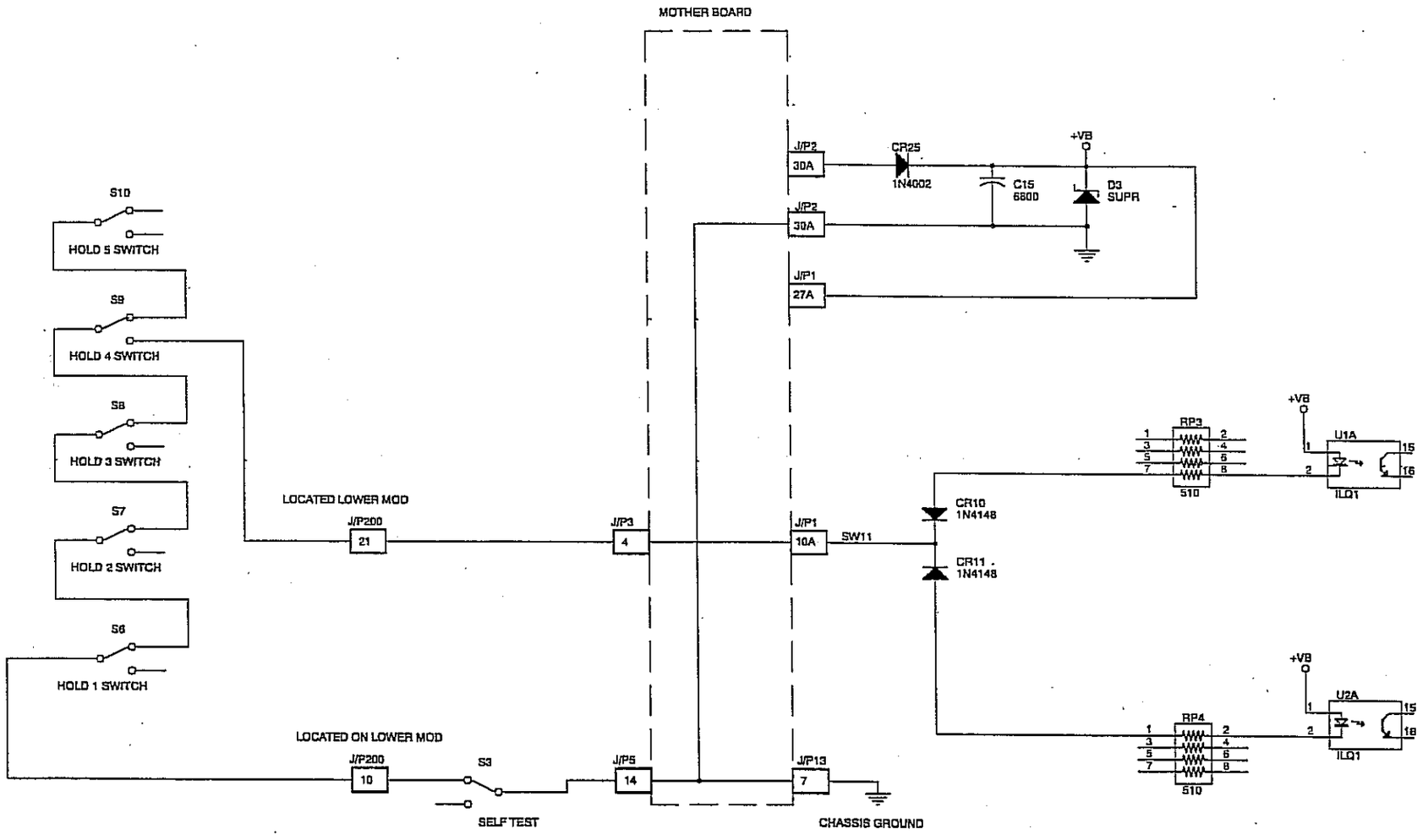
Before removing the processor board, check the following areas:

- ✓ Verify the problem by checking the input test in the self test mode
- ✓ Check to see if the button assembly is clean and has no broken or missing parts
- ✓ If there is a faulty microswitch, replace it
- ✓ If hold switches 3 through 5 are nonfunctional, replace hold switch 2 first
- ✓ If the microswitch is wired incorrectly, reconnect by checking another machine of the same type
- ✓ Connect one meter lead to the normally open leg of the switch and connect the other meter lead to the chassis ground (B gnd), then measure for –8 to 10 VDC
- ✓ Activate the switch– the voltage should drop to zero volts
- ✓ Test for continuity from H/C3 common to the normally closed leg of H/C5
- ✓ If the switch measures open, then measure the next switch inward until a low resistance is measured

If that doesn't work, try the following steps:

- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Hold 4 Switch is Nonfunctional



WIRE CONTINUITY TEST
Common lead to J/P5-14
Normally open lead to J/P3-4

MOTHER BOARD CONTINUITY TEST
J/P5-14 to J/P13-7
J/P3-4 to J/P1-10A

PROCESSOR BOARD TEST
Check Vb at U1 & 2 (negative lead on B ground use, positive lead to check pins 1 & 2 for Vb (~8-9VDC))
Test U1 & U2
Test CR10 & CR11
Test RP3 or RP4, if problem continues, then replace.

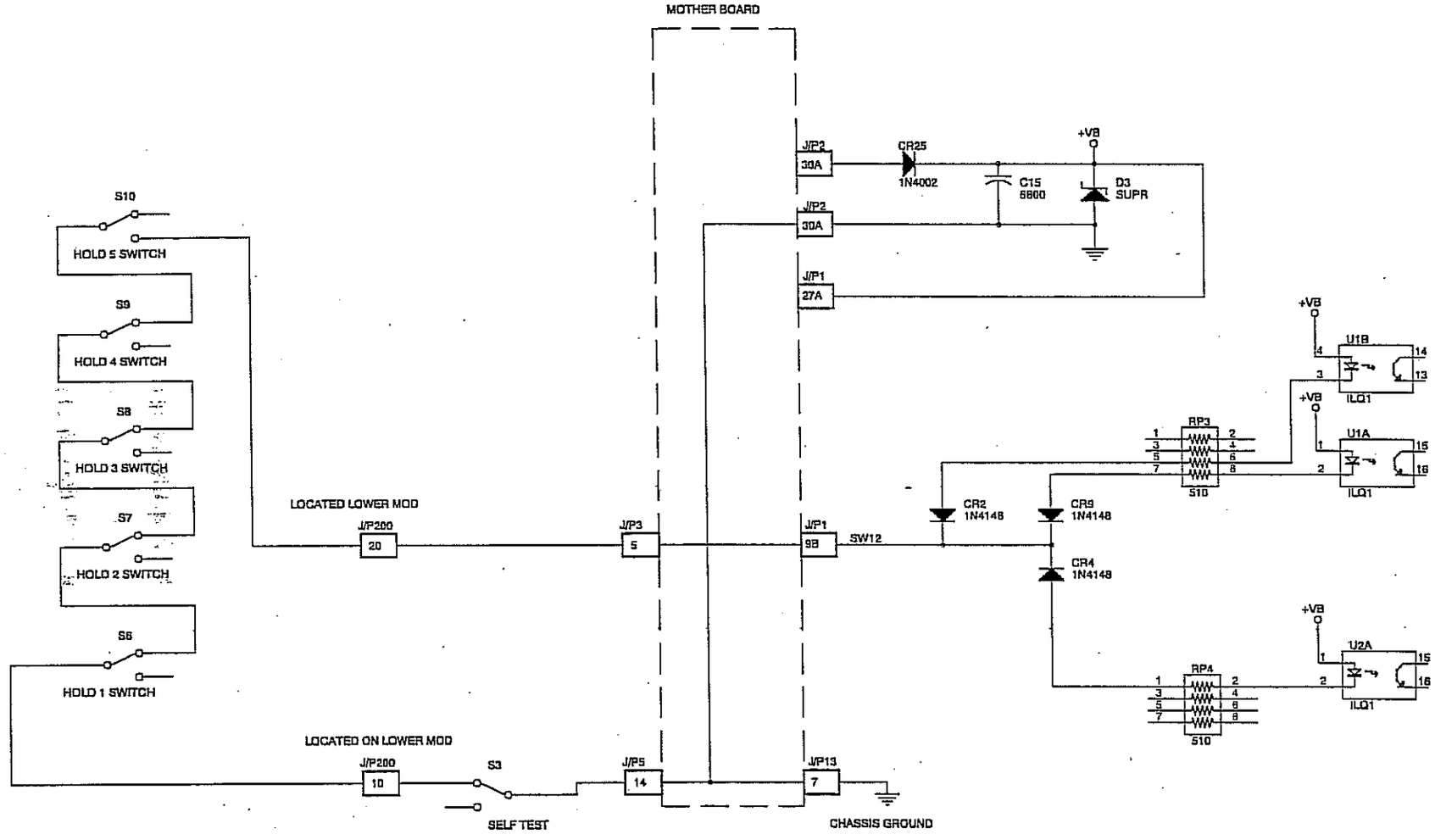
Before removing the processor board, check the following areas:

- ✓ Verify the problem by checking the input test in the self test mode
- ✓ Check to see if the button assembly is clean and has no broken or missing parts
- ✓ If there is a faulty microswitch, replace it
- ✓ If hold switches 4 and 5 are nonfunctional, replace hold switch 3 first
- ✓ If the microswitch is wired incorrectly, reconnect by checking another machine of the same type
- ✓ Connect one meter lead to the normally open leg of the switch and connect the other meter lead to the chassis ground (B gnd), then measure for ~8 to 10 VDC
- ✓ Activate the switch– the voltage should drop to zero volts
- ✓ Test for continuity from H/C4 common to the normally closed leg of H/C5

If that doesn't work, try the following steps:

- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Hold 5 Switch is Nonfunctional



WIRE CONTINUITY TEST
Common lead to J/P5-14
Normally open lead to J/P3-5

MOTHER BOARD CONTINUITY TEST
J/P5-14 to J/P13-7
J/P3-5 to J/P1-9B

PROCESSOR BOARD TEST
Check Vb at U1 & 2 (negative lead on B ground use positive lead to check pin 1 & 4 for Vb (~8-9VDC))
Check Vb at U2 (negative lead on B gnd and positivie lead on pin 1)
Test U1 & U2
Test CR's 2, 4, and 9 (1N4148's)
Test RP3 or RP4 - if problem continues, then replace.

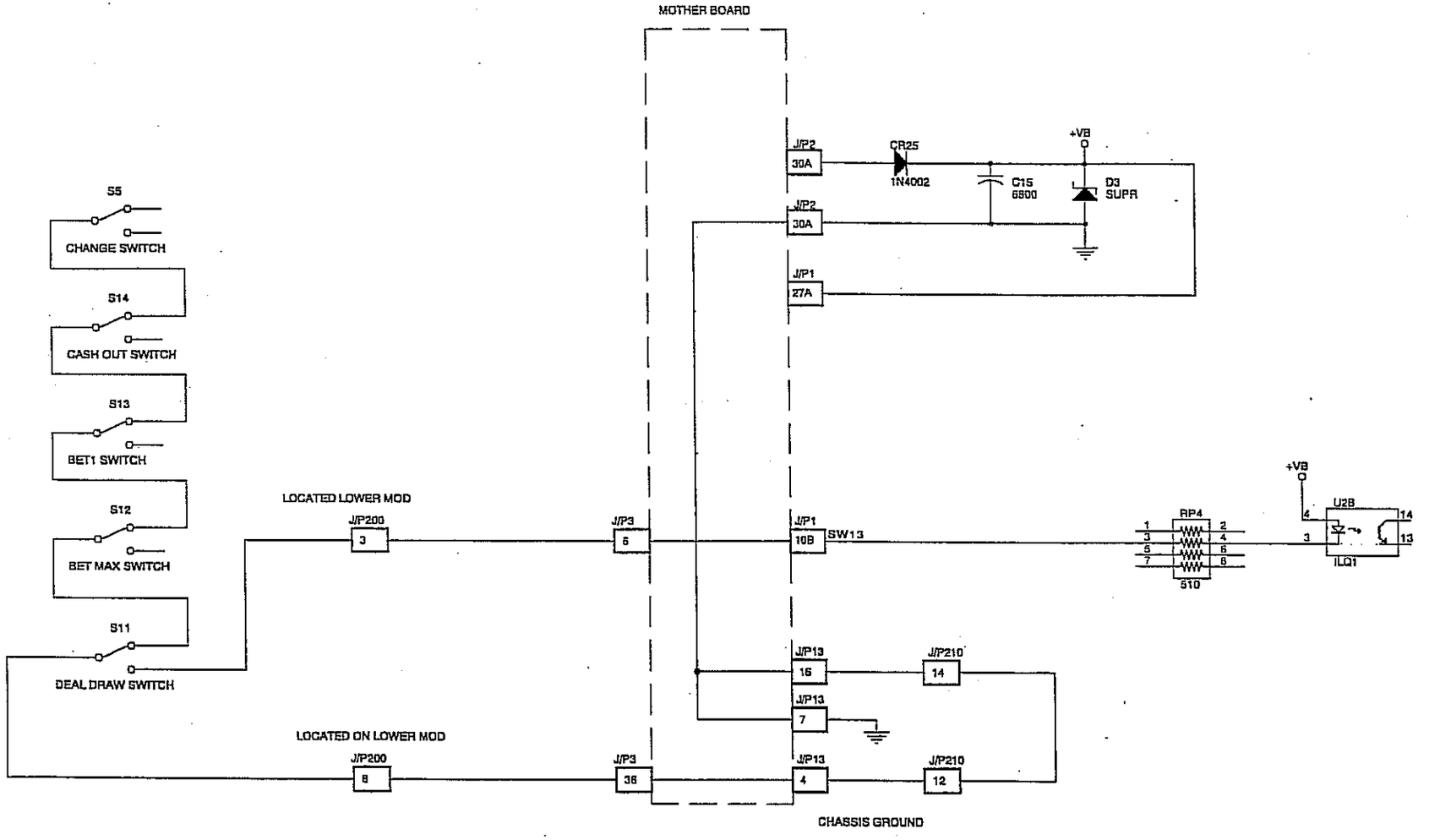
Before removing the processor board, check the following areas:

- ✓ Verify the problem by checking the input test in the self test mode
- ✓ Check to see if the button assembly is clean and has no broken or missing parts
- ✓ If there is a faulty microswitch, replace it
- ✓ If hold switch 5 is nonfunctional, replace hold switch 4 first
- ✓ If the microswitch is wired incorrectly, reconnect by checking another machine of the same type
- ✓ Connect one meter lead to the normally open leg of the switch and connect the other meter lead to the chassis ground (B gnd), then measure for ~8 to 10 VDC
- ✓ Activate the switch– the voltage should drop to zero volts
- ✓ If voltage is missing, use this diagram to test for wire continuity

If that doesn't work, try the following steps:

- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Deal/Draw Switch is Nonfunctional



WIRE CONTINUITY TEST
Common lead to J/P3-36
Normally open lead to J/P3-6

MOTHER BOARD CONTINUITY TEST
J/P3-36 to J/P2-30A (note intermediate connections)
J/P3-6 to J/P1-10B

PROCESSOR BOARD TEST
Check Vb at U2 (negative lead on B ground use positive lead to check pin 4 for Vb (~8-9VDC))
Test U2
Test RP4 - if problem continues, then replace.

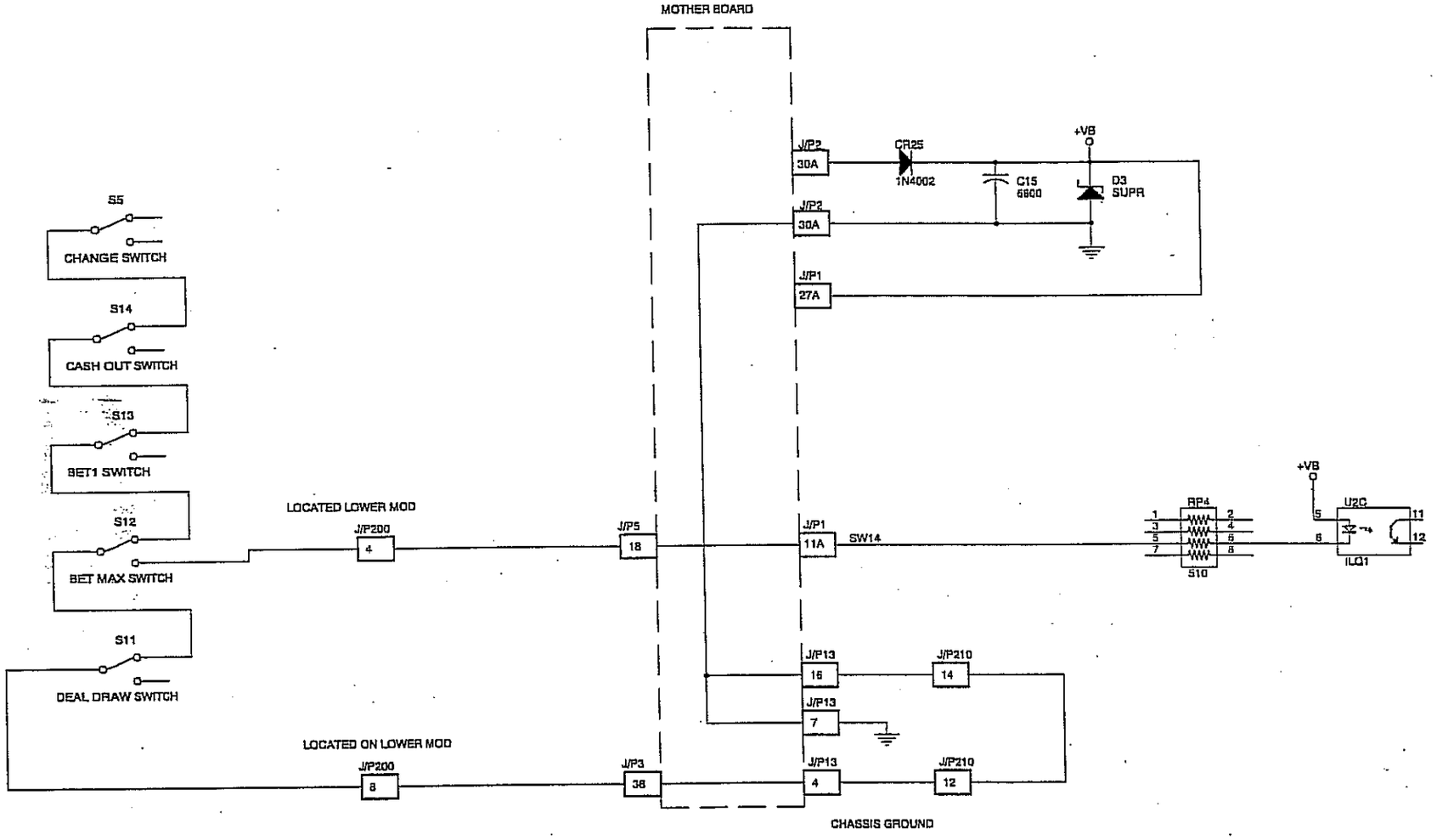
Before removing the processor board, check the following areas:

- ✓ Verify the problem by checking the input test in the self test mode
- ✓ Check to see if the button assembly is clean and has no broken or missing parts
- ✓ Connect one meter lead to the normally open leg of the switch and connect the other meter lead to the chassis ground (B gnd), then measure for −8 to 10 VDC
- ✓ Activate the switch– the voltage should drop to zero volts
- ✓ Test for continuity from Deal/Draw switch common to the normally closed leg of the Change switch
- ✓ If the switch measures open, then measure the next switch inward until a low resistance is measured
- ✓ If the voltage seems bad, then use this diagram to test for wire continuity.

If that doesn't work, try the following steps:

- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Bet Max Switch is Nonfunctional



WIRE CONTINUITY TEST
Common lead to J/P3-36
Normally open lead to J/P5-18

MOTHER BOARD CONTINUITY TEST
J/P3-36 to J/P2-30A (note intermediate connections)
J/P5-18 to J/P1-11A

PROCESSOR BOARD TEST
Check Vb at U2 (negative lead on B ground use positive lead to check pin 4 for Vb (−8-9VDC))
Test U2
Test RP4 - if problem continues, then replace.

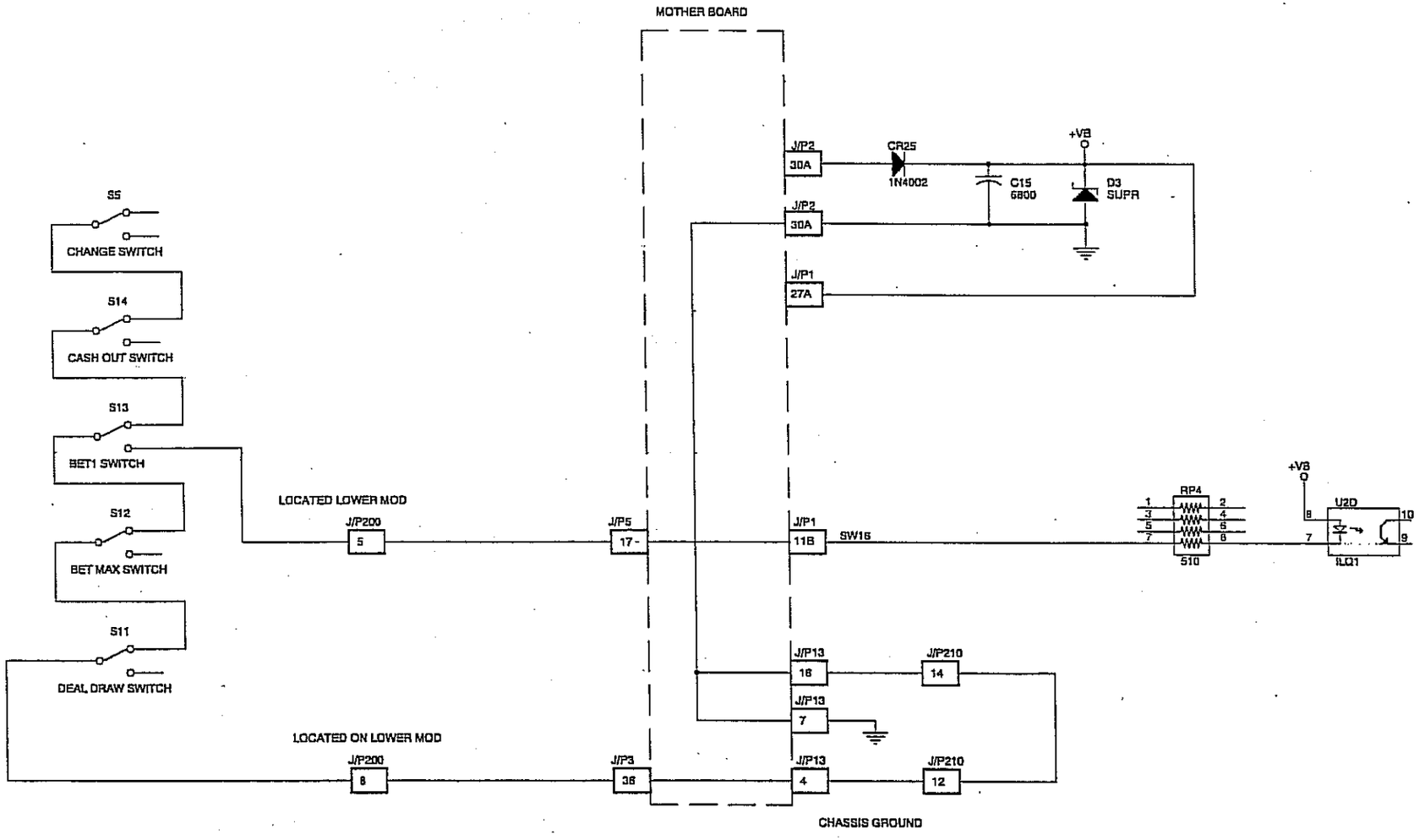
Before removing the processor board, check the following areas:

- ✓ Verify the problem by checking the input test in the self test mode
- ✓ If the other switches are nonfunctional, replace the Deal/Draw switch first
- ✓ Connect one meter lead to the normally open leg of the switch and connect the other meter lead to the chassis ground (B gnd), then measure for −8 to 10 VDC
- ✓ Activate the switch– the voltage should drop to zero volts
- ✓ Test for continuity from Bet Max switch common to the normally closed leg of the Change switch
- ✓ If the switch measures open, then measure the next switch inward until a low resistance is measured
- ✓ If the voltage seems bad, then use this diagram to test for wire continuity

If that doesn't work, try the following steps:

- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Bet 1 Switch is Nonfunctional



WIRE CONTINUITY TEST
Common lead to J/P3-36
Normally open lead to J/P5-17

MOTHER BOARD CONTINUITY TEST
J/P3-36 to J/P2-30A (note intermediate connections)
J/P5-17 to J/P1-11B

PROCESSOR BOARD TEST
Check Vb at U2 (negative lead on B ground use positive lead to check pin 8 for Vb (~8-9VDC))
Test U2
Test RP4 - if problem continues, then replace

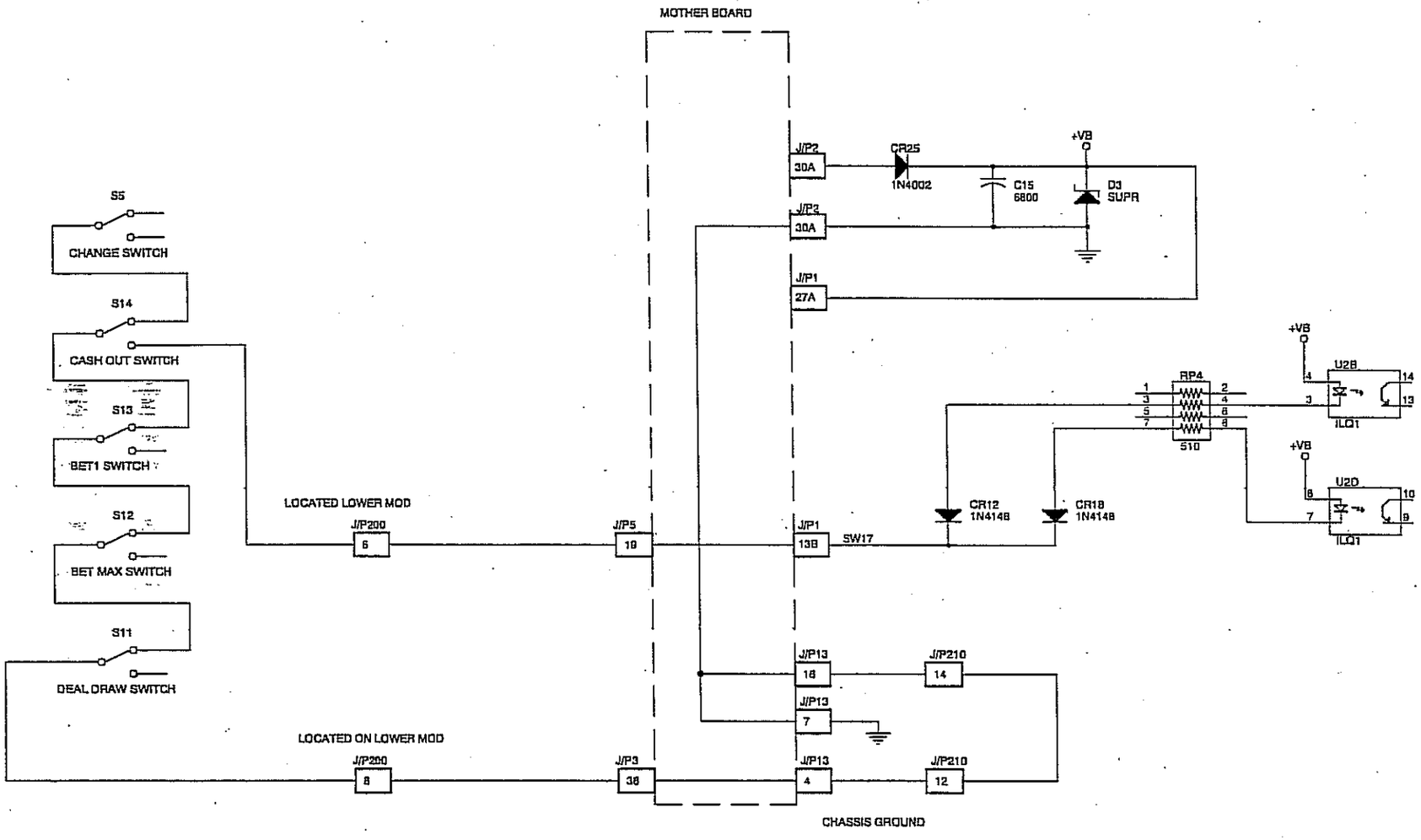
Before removing the processor board, check the following areas:

- ✓ Verify the problem by checking the input test in the self test mode
- ✓ Check to see if the button assembly is clean with no broken or missing parts
- ✓ If the other switches are nonfunctional, replace the Bet Max switch first
- ✓ Connect one meter lead to the normally open leg of the switch and connect the other meter lead to the chassis ground (B gnd), then measure for ~8 to 10 VDC
- ✓ Activate the switch– the voltage should drop to zero volts
- ✓ Test for continuity from Bet One switch common to the normally closed leg of the Change switch
- ✓ If the switch measures open, then measure the next switch inward until a low resistance is measured

If that doesn't work, try the following steps:

- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Cashout Switch is Nonfunctional



WIRE CONTINUITY TEST
Common lead to J/P3-36
Normally open lead to J/P5-19

MOTHER BOARD CONTINUITY TEST
J/P3-36 to J/P2-30A (note intermediate connections)
J/P5-19 to J/P1-13B

PROCESSOR BOARD TEST
Check Vb at U2 (negative lead on B ground use positive lead to check pin 4 & 8 for Vb (~8-9VDC))
Test U2
Test CR12 & CR18 (1N4148)
Test RP4 - if problem continues, then replace

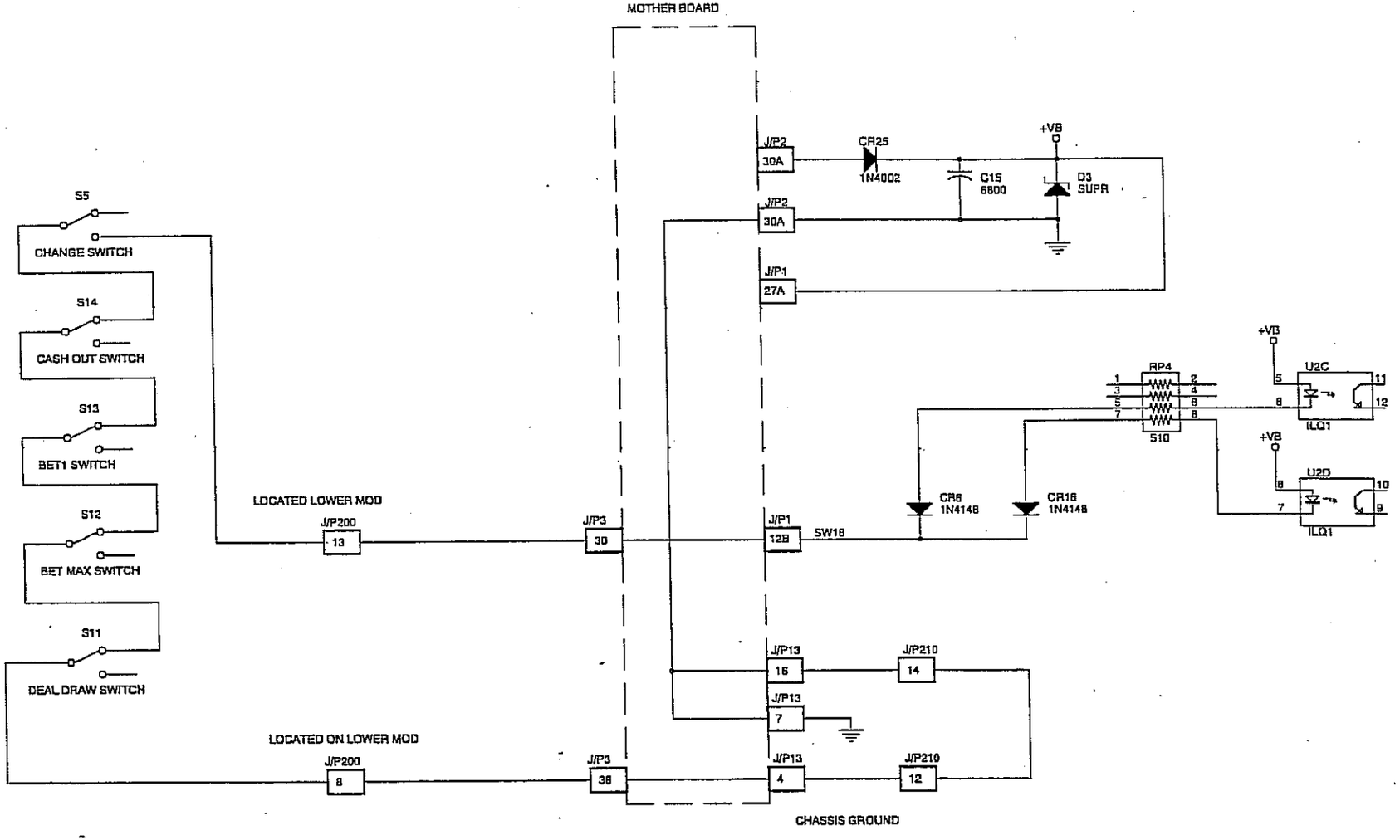
Before removing the processor board, check the following areas:

- ✓ Verify the problem by checking the input test in the self test mode
- ✓ Check to see if the button assembly is clean and with no broken or missing parts
- ✓ If the other switches are nonfunctional, replace the Bet One switch first
- ✓ Connect one meter lead to the normally open leg of the switch and connect the other meter lead to the chassis ground (B gnd), then measure for ~8 to 10 VDC
- ✓ Activate the switch– the voltage should drop to zero volts
- ✓ Test for continuity from Cash Out switch common to the normally closed leg of the Change switch.
- ✓ If the switch measures open, then measure the next switch inward until a low resistance is measured.

If that doesn't work, try the following steps:

- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Change Switch is Nonfunctional



WIRE CONTINUITY TEST
Common lead to J/P3-36
Normally open lead to J/P3-30

MOTHER BOARD CONTINUITY TEST
J/P3-36 to J/P2-30A (note intermediate connections)
J/P3-30 to J/P1-12B

PROCESSOR BOARD TEST
Check Vb at U2 (negative lead on B ground use positive lead to check pin 5 & 8 for Vb (–8-9VDC))
Test U2
Test CR6 & CR16 (1N4148)
Test RP4 - if problem continues, then replace

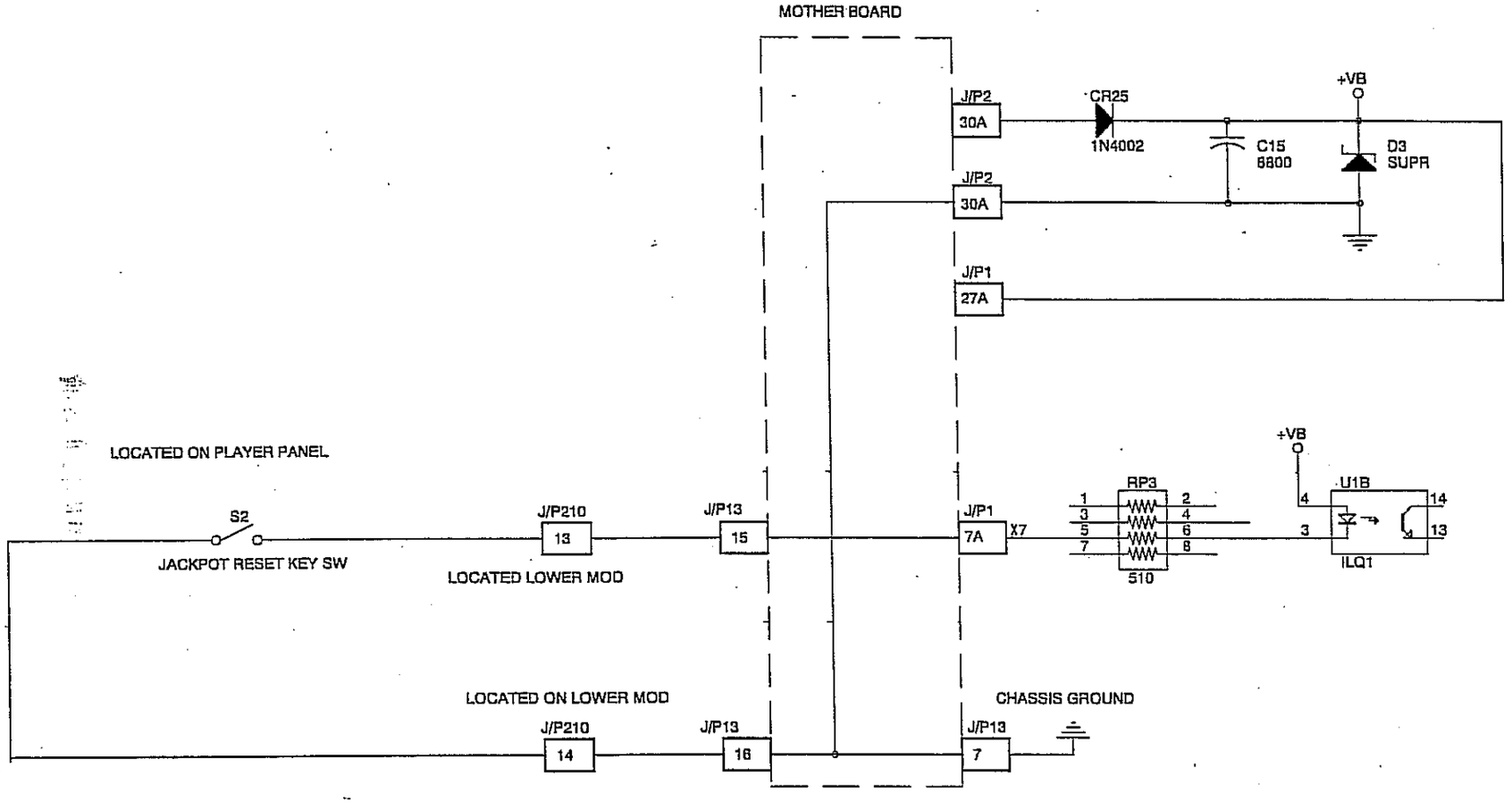
Before removing the processor board, check the following areas:

- ✓ Verify the problem by checking the input test in the self test mode
- ✓ Check to see if the button assembly is clean and has no broken or missing parts
- ✓ If the other switches are nonfunctional, replace the Cashout switch first
- ✓ Connect one meter lead to the normally open leg of the switch and connect the other meter lead to the chassis ground (B gnd), then measure for –8 to 10 VDC
- ✓ Activate the switch– the voltage should drop to zero volts
- ✓ If the switch measures open, then measure the next switch inward until a low resistance is measured.
- ✓ If the voltage seems bad, then use this diagram to test for wire continuity

If that doesn't work, try the following steps:

- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Jackpot Reset Key is Nonfunctional (Can't Reset a Jackpot or Access Soft Meters)



Before removing the processor board, check the following areas:

- ✓ Verify the problem in the input test
- ✓ Check wire and connectors for defects
- ✓ Check for −8 to 10 VDC across 2 leads to the jackpot reset key
- ✓ Replace jackpot reset key, and test

If that doesn't work, try the following steps:

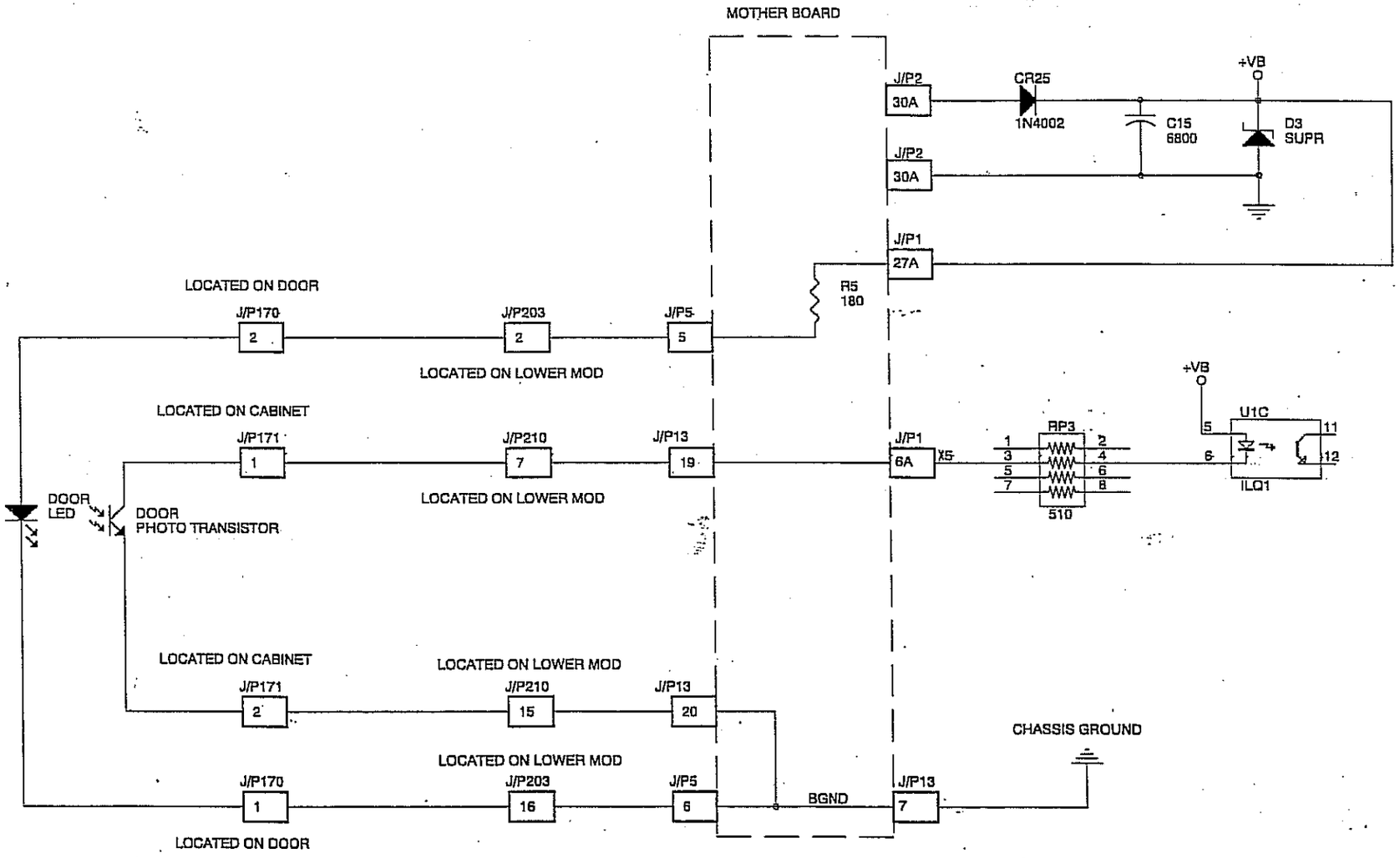
- ⇨ If there is no voltage, use this diagram below to test for wire continuity
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P19-7 to J/P13-6
No side to J/P13-15
Common side to J/P13-16

MOTHER BOARD CONTINUITY TEST
J/P13-15 to J/P1-7A
J/P13-16 to J/P13-7 & J/P2-30A

PROCESSOR BOARD TEST
Check Vb at U1 (negative lead on B ground use positive lead to check pin 4 for Vb (−8-9VDC))
Test U1 - if problem continues, then replace.
Test RP3 - if problem continues, then replace.

Problem: Constant "Door Open" State (Suspect Bad LED)



WIRE CONTINUITY TEST
J/P171-1 to J/P13-9
J/P171-2 to J/P13-20
J/P170-1 to J/P5-6
J/P170-2 to J/P5-5

MOTHER BOARD CONTINUITY TEST
J/P5-5 to R5 (test R5)
R5 to J/P1-27A
J/P13-19 to J/P1-5A
J/P13-20 to J/P5-6 & J/P13-7

PROCESSOR BOARD TEST
Check Vb at U10 (negative lead on B ground use positive lead to check pin 5 for Vb (~8-9VDC))
Test U1 - if problem continues, then replace.
Test RP3 - if problem continues, then replace.

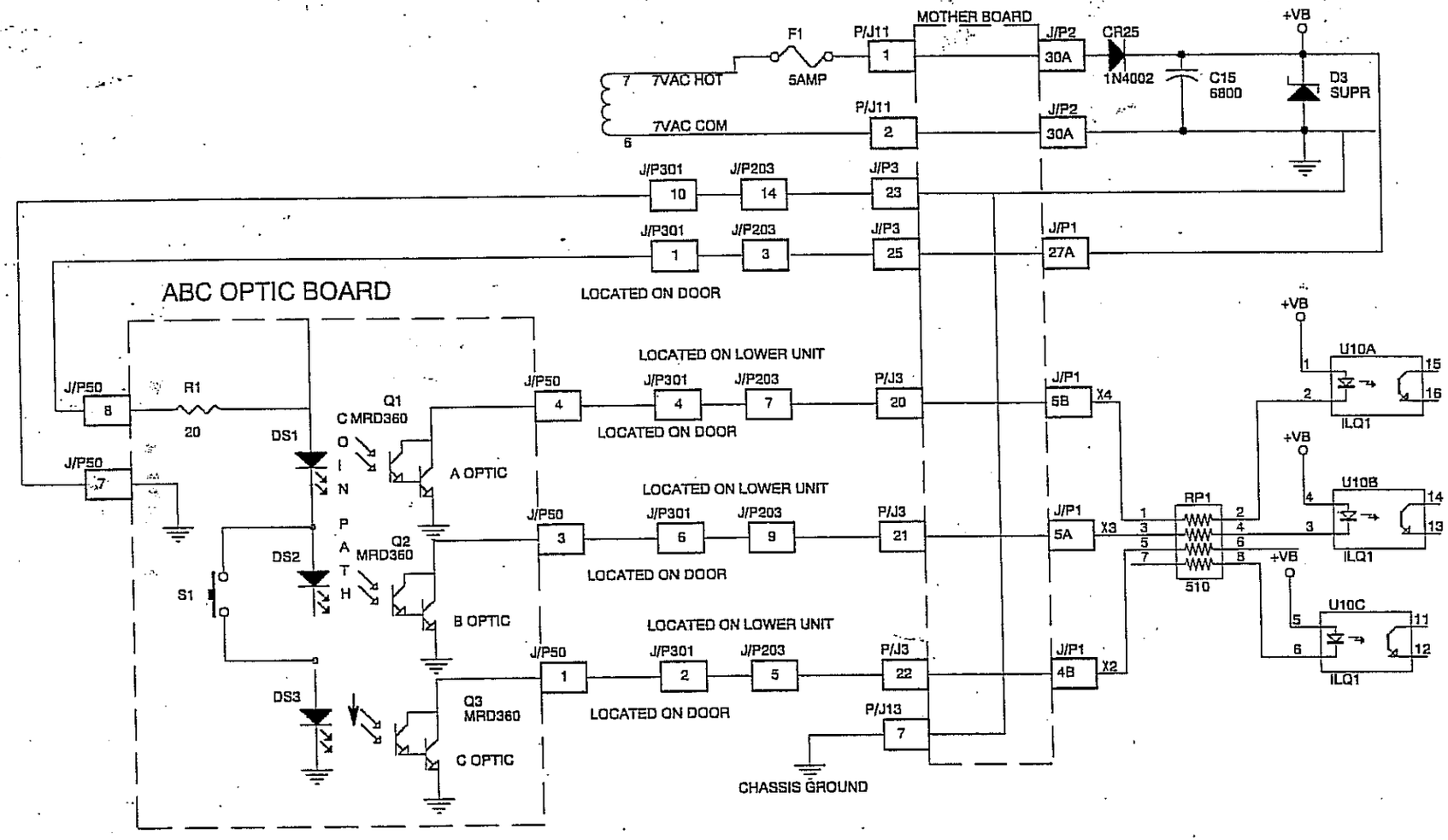
Before removing the processor board, check the following areas:

- ✓ Check self test inputs to verify problem (door open)
- ✓ Check the bill acceptor for a door open signal
- ✓ Check optic alignment (door LED to phototransistor on chassis)
- ✓ Visually inspect wires and connectors
- ✓ Use a flashlight to activate the phototransistor, if it works replace the LED
- ✓ If the phototransistor is not activated by the flashlight, then replace it
- ✓ Disconnect door LED at J/P170 and test for ~5VDC
- ✓ Disconnect the phototransistor chassis at J/P171 and test for ~8 to 9VDC

If that doesn't work, try the following steps:

- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Coin-In Timeout (Optic Sensors Blocked for Over 100 msec)



WIRE CONTINUITY TEST
LED Side: J/P50-8 to J/P3-25
LED Side: J/P50-7 to J/P3-23
DET Side: J/P50-4 to J/P3-20 (A Optic)
DET Side: J/P50-3 to J/P3-21 (B Optic)
DET Side: J/P50-1 to J/P1-22

MOTHER BOARD CONTINUITY TEST
J/P3-20 to J/P1-5B
J/P3-21 to J/P1-5A
J/P3-22 to J/P1-4B
J/P13-7 to J/P3-23
J/P13-7 to J/P11-2, J/P2-30A & J/P3-23
J/P3-25 to J/P1-27A

PROCESSOR BOARD TEST
Check Vb at U10 (negative lead on B ground use positive lead to check pins 1, 4, & 5 for Vb (−8-9VDC))
Test U10 - if problem continues, then replace.
Test RP1 - if problem continues, then replace.

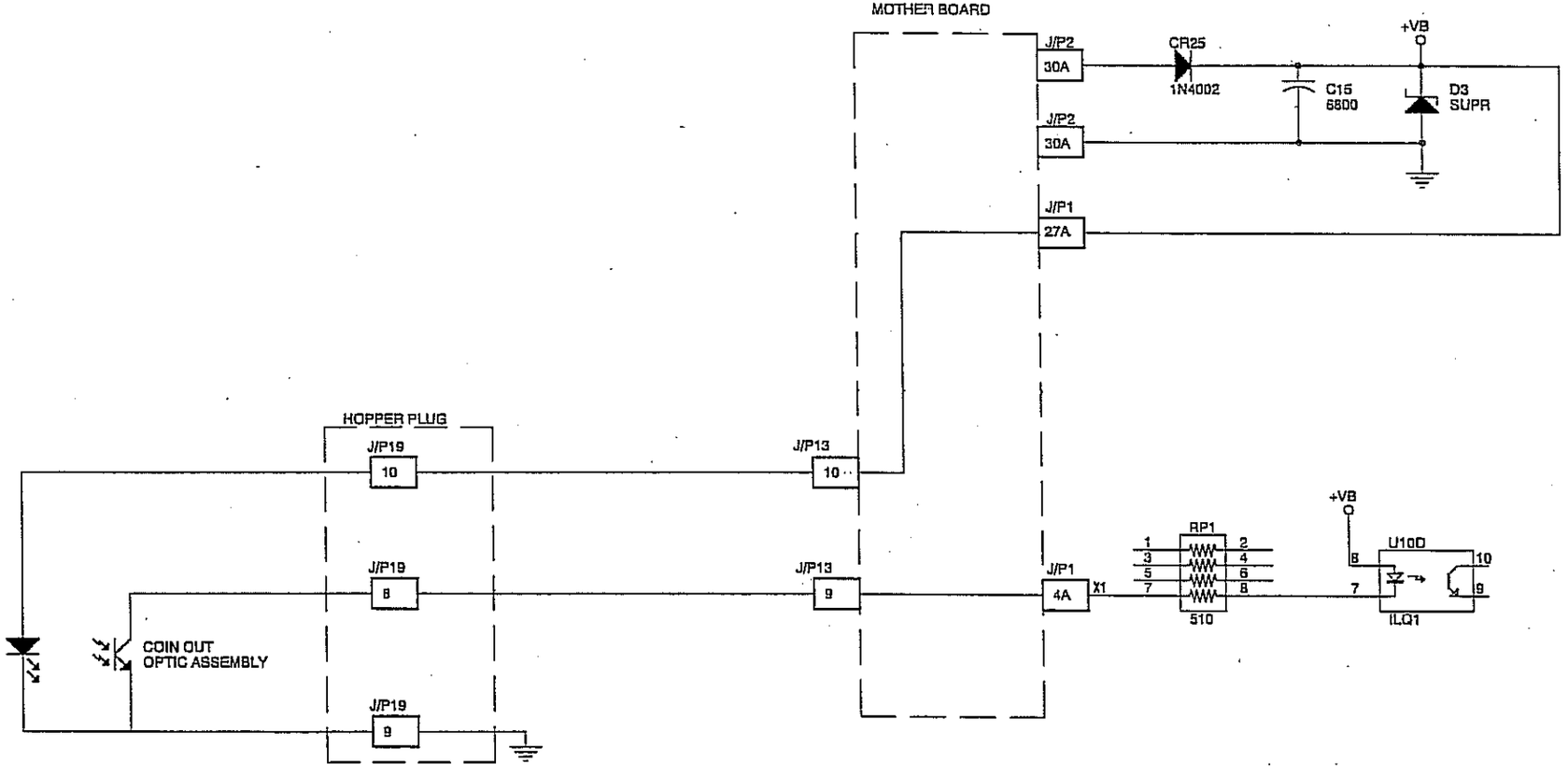
Before removing the processor board, check the following areas:

- ✓ Use input test 11 & 12 to verify problems
- ✓ Check for any obstruction in the ABC optics
- ✓ If the diverter paddle moves slowly, then clean and repair it
- ✓ Unplug the 10-pin plug at J/P50, to measure pins 1, 3, & 4 for ~8 VDC and Vb at pin 8 (ground lead on chassis)
- ✓ Check pin 7 for ground (green wire)
- ✓ If the voltage is good, replace ABC optics
- ✓ If the voltage is missing, then check harness wiring and plugs

If that doesn't work, try the following steps:

- ⇨ Change the ABC optics, and test
- ⇨ Replace the processor board, and test
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram below to isolate the bad trace
- ⇨ If the processor board and mother board is good, then go to the machine and check the wire continuity using the wiring diagram provided on this page

Problem: Coin-Out Timeout (Coin-Out Optics Blocked for Over .7 sec)



WIRE CONTINUITY TEST
(B ground should be at J/P19-9
LED Side: J/P19-10 to J/P13-10
DET Side: J/P19-8 to J/P13-9

MOTHER BOARD CONTINUITY TEST
J/P13-9 to J/P1-4A
J/P13-10 to J/P1-27A

PROCESSOR BOARD TEST
Check Vb at U10 (negative lead on B ground use positive lead to check pin 8 for Vb (~8-9VDC))
Test U10 - if problem continues, then replace.
Test RP1 - if problem continues, then replace.

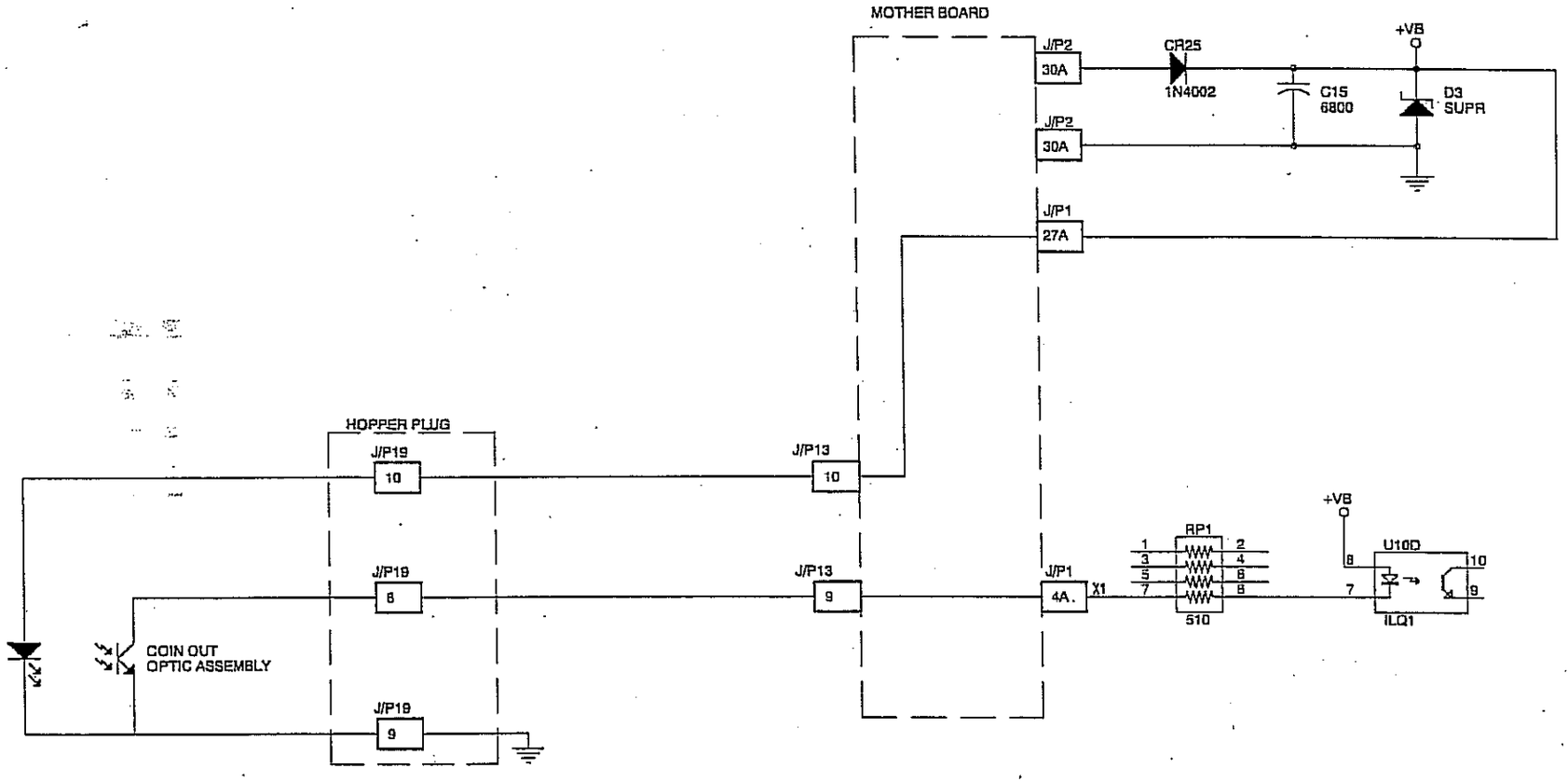
Before removing the processor board, check the following areas:

- ✓ Check the self test inputs to verify the problem (coin-out)
- ✓ Check for obstructions, misalignments, or any physical reason for the coins to pass slowly through the optics
- ✓ Check optics and optic wires for damage
- ✓ With escalator hopper, coin out optics and mechanical flag may need adjustment or spring may need replacement
- ✓ Verify ground lead is secure to chassis and the hopper beau plug is seated firmly
- ✓ Visually inspect the wires and connectors
- ✓ Perform the hopper self test; if problem recurs replace the optics
- ✓ Check hopper plug for ~8 to 9 VDC at J/P19-8 and J/P19-10 to J/P19-9

If that doesn't work, try the following steps:

- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Extra Coin Paid Out (Optic Senses Extra Coin or Payout)



WIRE CONTINUITY TEST
(B ground should be at J/P19-9
LED Side: J/P19-10 to J/P13-10
DET Side: J/P19-8 to J/P13-9

MOTHER BOARD CONTINUITY TEST
J/P13-9 to J/P1-4A
J/P13-10 to J/P1-27A

PROCESSOR BOARD TEST
Check Vb at U10 (negative lead on B ground use positive lead to check pin 8 for Vb (−8 to 9VDC)).
Test U10 - if problem continues, then replace.
Test RP1 - if problem continues, then replace.

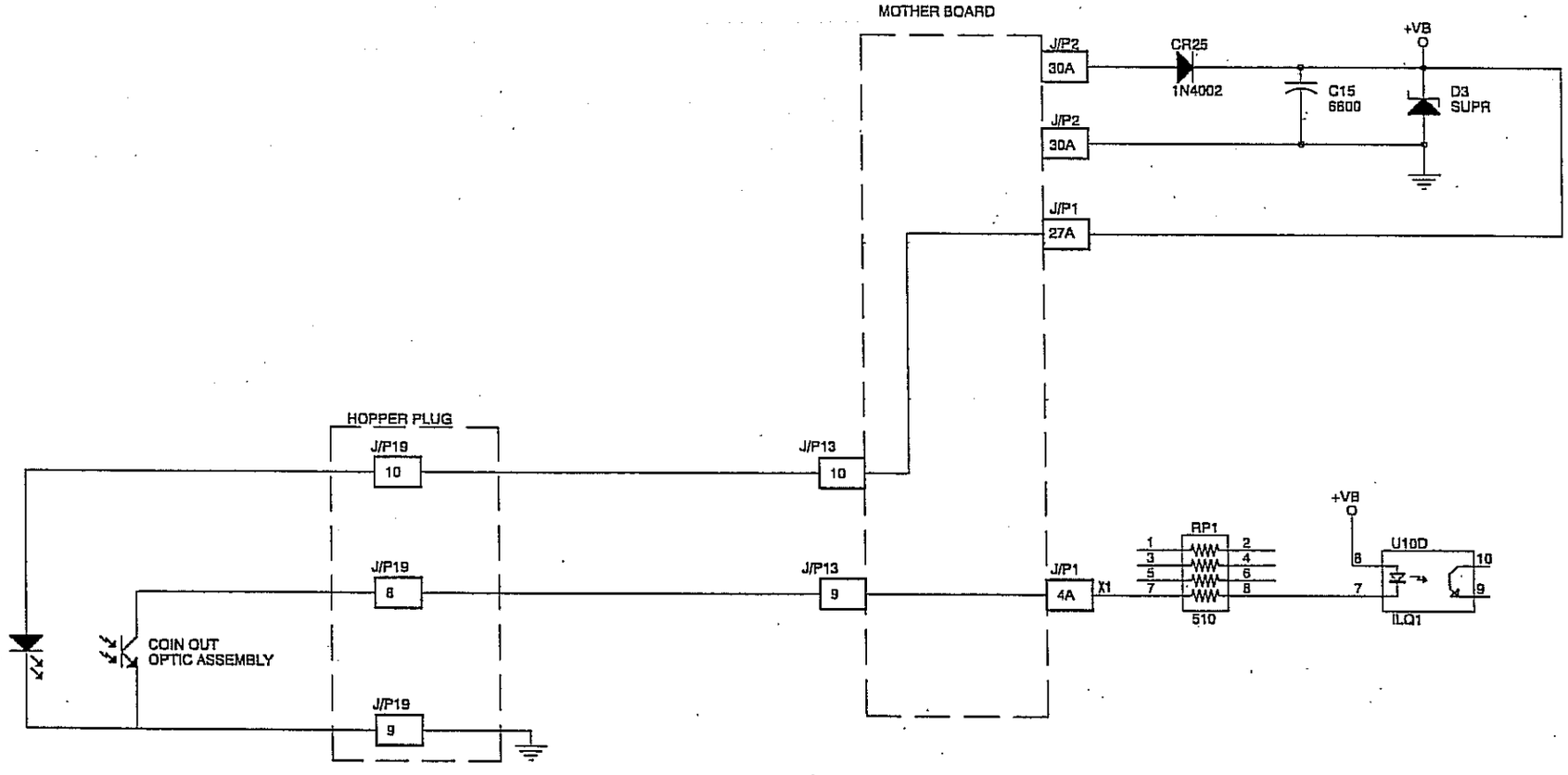
Before removing the processor board, check the following areas:

- ✓ Perform hopper test in self test mode, if problem recurs replace optics
- ✓ Check hopper brake and brake spring
- ✓ With the escalator hopper, check the coin-out optics and mechanical flag to see if adjustment or spring may need replacement
- ✓ Check hopper pinwheel and wiper for smooth operation
- ✓ Check optic and optic wires for damage
- ✓ Verify optic ground lead is secured to chassis and hopper beau plug is seated firmly

If that doesn't work, try the following steps:

- ⇨ Check hopper plug for −8 to 9 VDC at J/P19-8 and J/P19-10 to J/P19-9
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Empty Hopper Message (Hopper Optic Doesn't Recognize a Coin For 7–8 sec)



WIRE CONTINUITY TEST
(B ground should be at J/P19-9
LED Side: J/P19-10 to J/P13-10
DET Side: J/P19-8 to J/P13-9

MOTHER BOARD CONTINUITY TEST
J/P13-9 to J/P1-4A
J/P13-10 to J/P1-27A

PROCESSOR BOARD TEST
Check Vb at U10 (negative lead on B ground use positive lead to check pin 8 for Vb (–8-9VDC))
Test U10 - if problem continues, then replace.
Test RP1 - if problem continues, then replace.

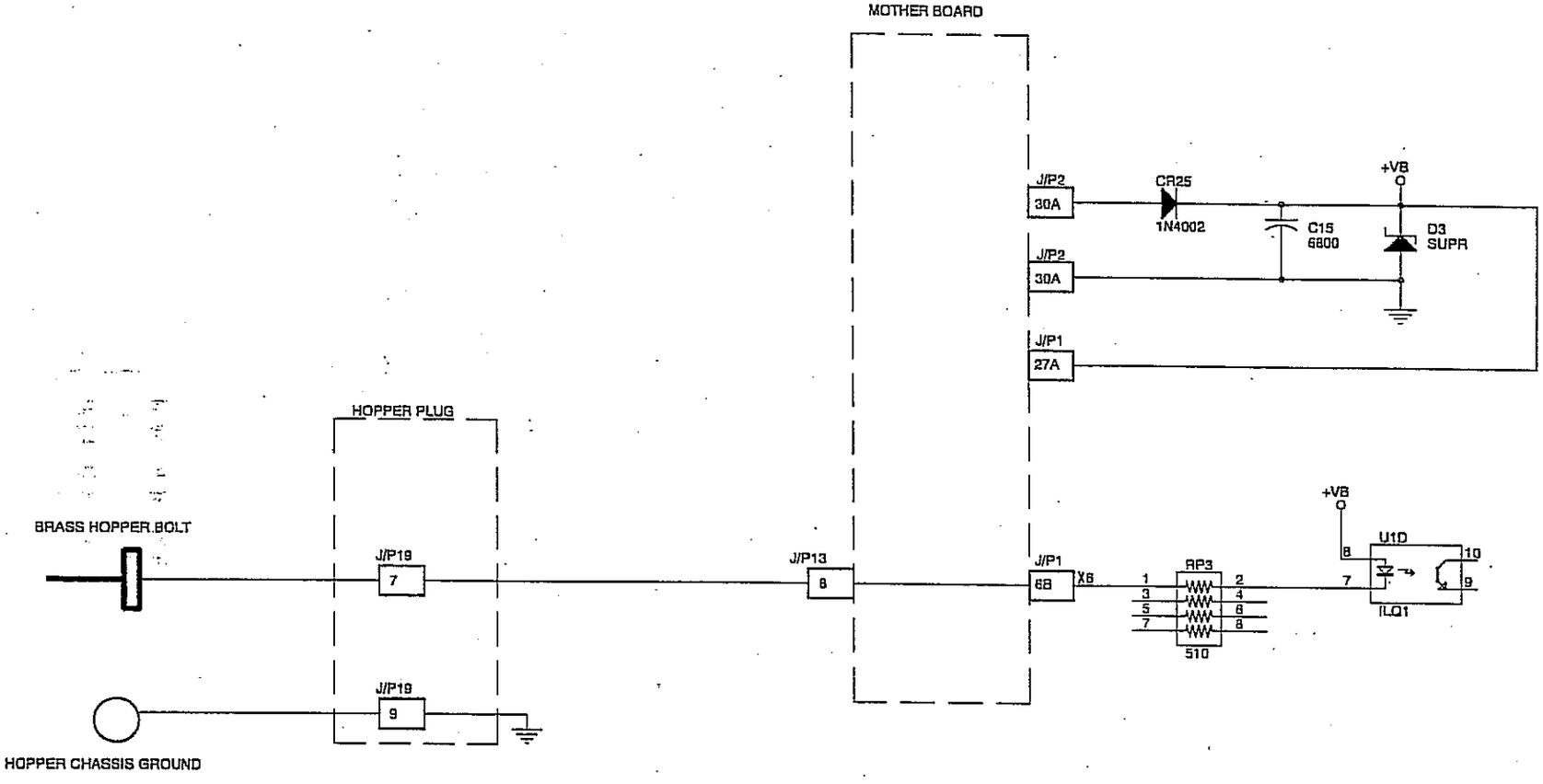
Before removing the processor board, check the following areas:

- ✓ Check for empty or low hopper
- ✓ Check to see if hopper is jammed
- ✓ Check hopper motor, gearbox, and roll pin
- ✓ Visually inspect wires and connectors to hopper plug
- ✓ If coins are jammed in the escalator hopper, remove the bent coin(s)
- ✓ If coins are doubled-up consider replacing the pinwheel, entry plate and/or pinwheel shims
- ✓ Perform the hopper test in the self test mode, observe hopper action to isolate problem
- ✓ Verify that coins are going through the hopper optics to the coin tray, and counted correctly

If that doesn't work, try the following steps:

- ⇨ Check the Vb at the hopper plug J/P19-8 and J/P19-10 to J/P19-9
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Hopper Overflow



Before removing the processor board, check the following areas:

- ✓ Check the hopper probe function in the self test inputs to verify the problem
- ✓ Check for coins bridging the hopper probe
- ✓ Check the diverter function in the output test
- ✓ Check wire and connectors for defects
- ✓ use this diagram to test for wire continuity

If that doesn't work, try the following steps:

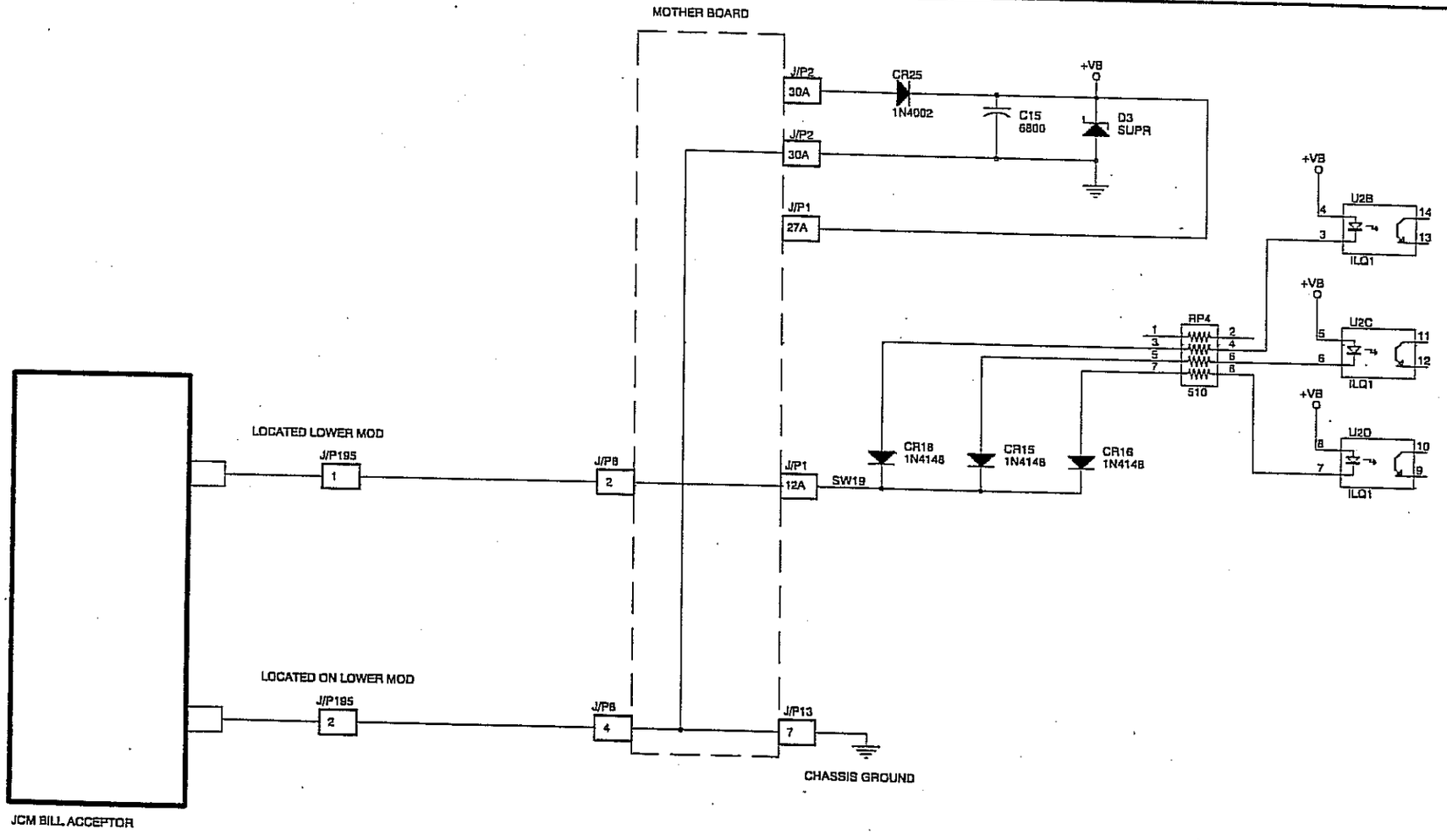
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P19-7 to J/P13-8

MOTHER BOARD CONTINUITY TEST
J/P13-8 to J/P1-6B

PROCESSOR BOARD TEST
Check Vb at U1 (negative lead on B ground use positive lead to check pin 8 for Vb (~8-9VDC))
Test U1 - if problem continues, then replace.
Test RP3 - if problem continues, then replace.

Problem: Bill Validator Won't Accept Bills (No Vend Signal)



Before removing the processor board, check the following areas:

- ✓ Verify the problem by checking the input test in self test mode
- ✓ Visually inspect wires and connectors
- ✓ Verify that the validator is enabled – see output test

If that doesn't work, try the following steps:

- ⇨ Replace the validator with a "known good" one
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P195-1 to J/P8-2
J/P195-2 to J/P8-4

MOTHER BOARD CONTINUITY TEST
J/P8-2 to J/P1-12A
J/P8-4 to J/P13-7 & J/P2-30A

PROCESSOR BOARD TEST
Check Vb at U2 (negative lead on B ground use positive lead to check pin 4, 5, 6 for Vb (–8-9VDC))
Test U2
Test CR15, CR16, & CR18 (1N4148)
Test RP4 - if problem continues, then replace

Start With the Problem

The simplest means of treating machine and board repairs is to start with the obvious problem and then try to isolate the cause. Treat each potential output problem individually, and trace it from the exterior of the machine to one of the processor boards, through the point of opto-isolation. Opto-isolation is a defense against static electricity, noise, or any unwanted electrical feedback.

The technician should verify each problem in the output test. The technician can then reference each output in question in this manual.

When using the diagram provided with each output problem, the following items should be kept in mind:

- Each output can be activated by a signal through the wiring and connectors from the mother board.
- The mother board connects the signal from the processor board (processor board connects to the mother board at J/P1 and J/P2).
- The processor board typically has a driver (e.g. triac) that connects to an output pin on the parallel side of the shift register.

Outputs Section of the Processor Board

The outputs section contains four 8-bit output latches (U33, U35, U37, and U39). Each output latch requires a steady low on its pin 1 and a clock pulse on pin 11. With these two conditions satisfied, the output latches can update the outputs from the data-bus.

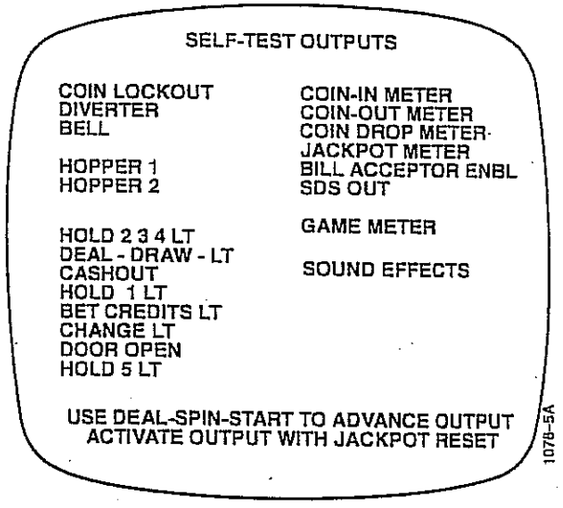
The output side of the output latches is a buffer and current limiting register for each output bit and then opto-isolation. From the point of opto-isolation on, is the driver area (the area most susceptible to damage). The majority of drivers are triacs (AC switches). Two output drivers are NPN transistors and digital switches (jackpot out and door open).

Outputs Test

The message SELF-TEST OUTPUTS appears at the top of the video screen. Below it are the names of the available outputs. An arrow-shaped cursor, located to the immediate left of the output names, indicates which output is under test.

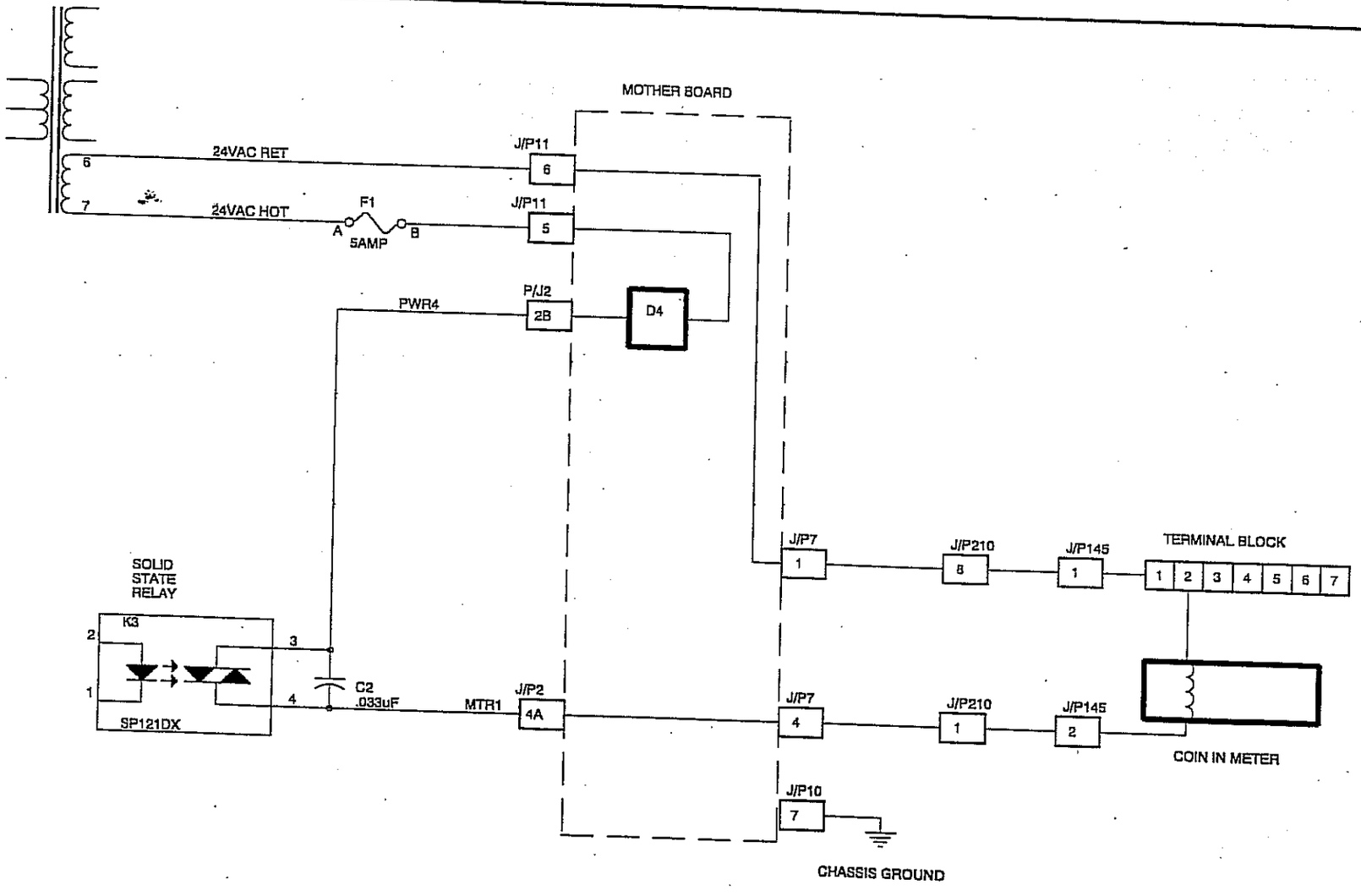
Consult the on-screen instructions and press the indicated switch on the player panel to move the cursor from one output to the next.

Turn the reset key to activate most outputs. Most tests illuminate one or more player panel switches to advance the cursor. The lockout test activates the LED indicator on the coin comparitor and the sound effects test produces a tone from the speaker. To activate the bill acceptor, insert a dollar bill.



Typical Outputs Test.

Problem: Coin-In Meter is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test to verify the problem
- ✓ Check wires and connectors for defects
- ✓ Verify meter lead is seated in position #2 of terminal block
- ✓ Replace meter, and test

If that doesn't work, try the following steps:

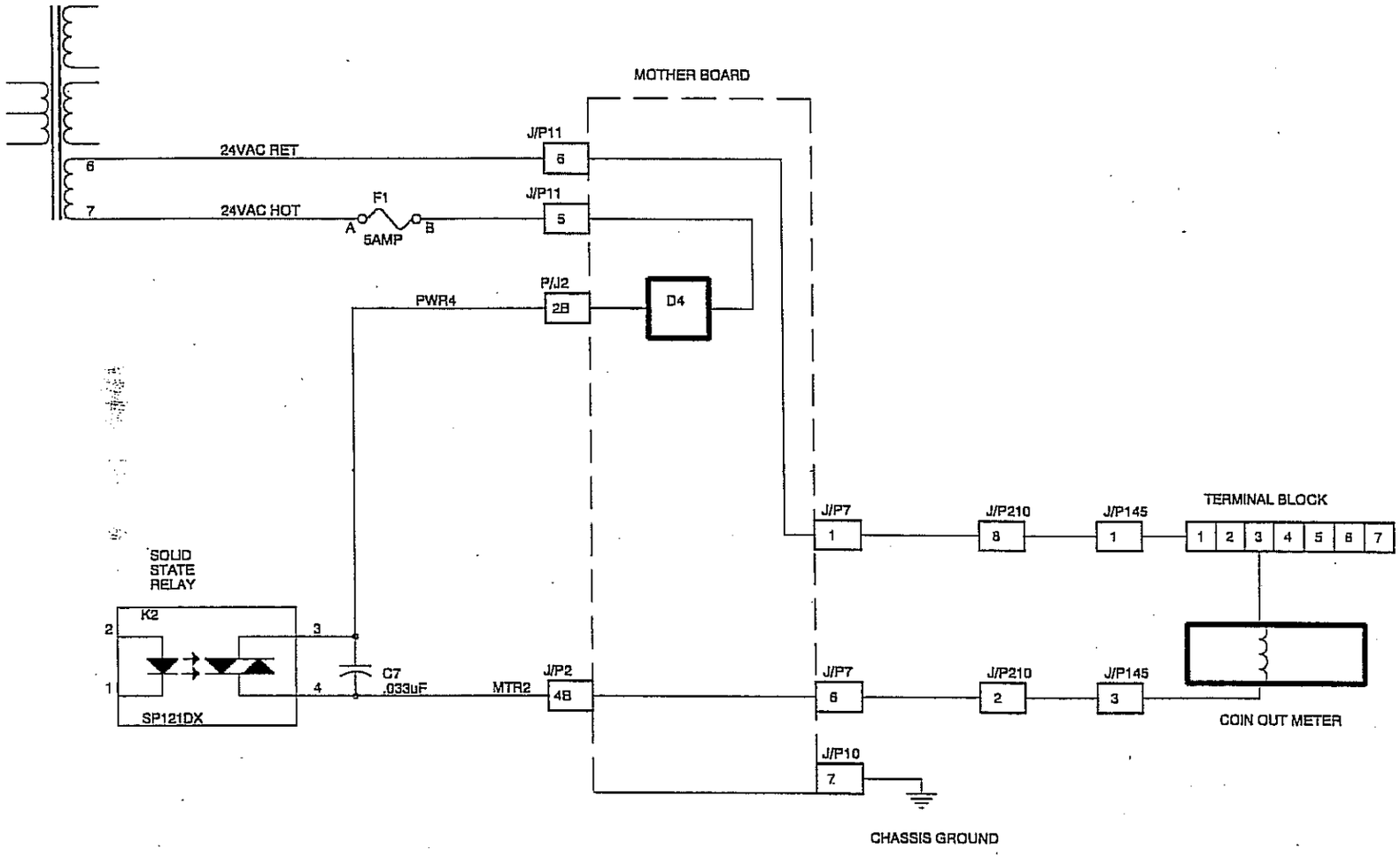
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P145-2 to J/P7-4
J/P145-1 to J/P7-1

MOTHER BOARD CONTINUITY TEST
J/P7-4 to J/P2-4A
J/P7-1 to J/P11-6
J/P11-5 to J/P2-2B

PROCESSOR BOARD TEST
Check from K3 to edge for burned trace
Test K3 (SP121DX) - if problem continues, then replace.
Test C2 - if driver ever turns on by itself

Problem: Coin-Out Meter is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test to verify the problem
- ✓ Check wires and connectors for defects
- ✓ Verify meter lead is seated in position #3 of terminal block
- ✓ Replace meter, and test

If that doesn't work, try the following steps:

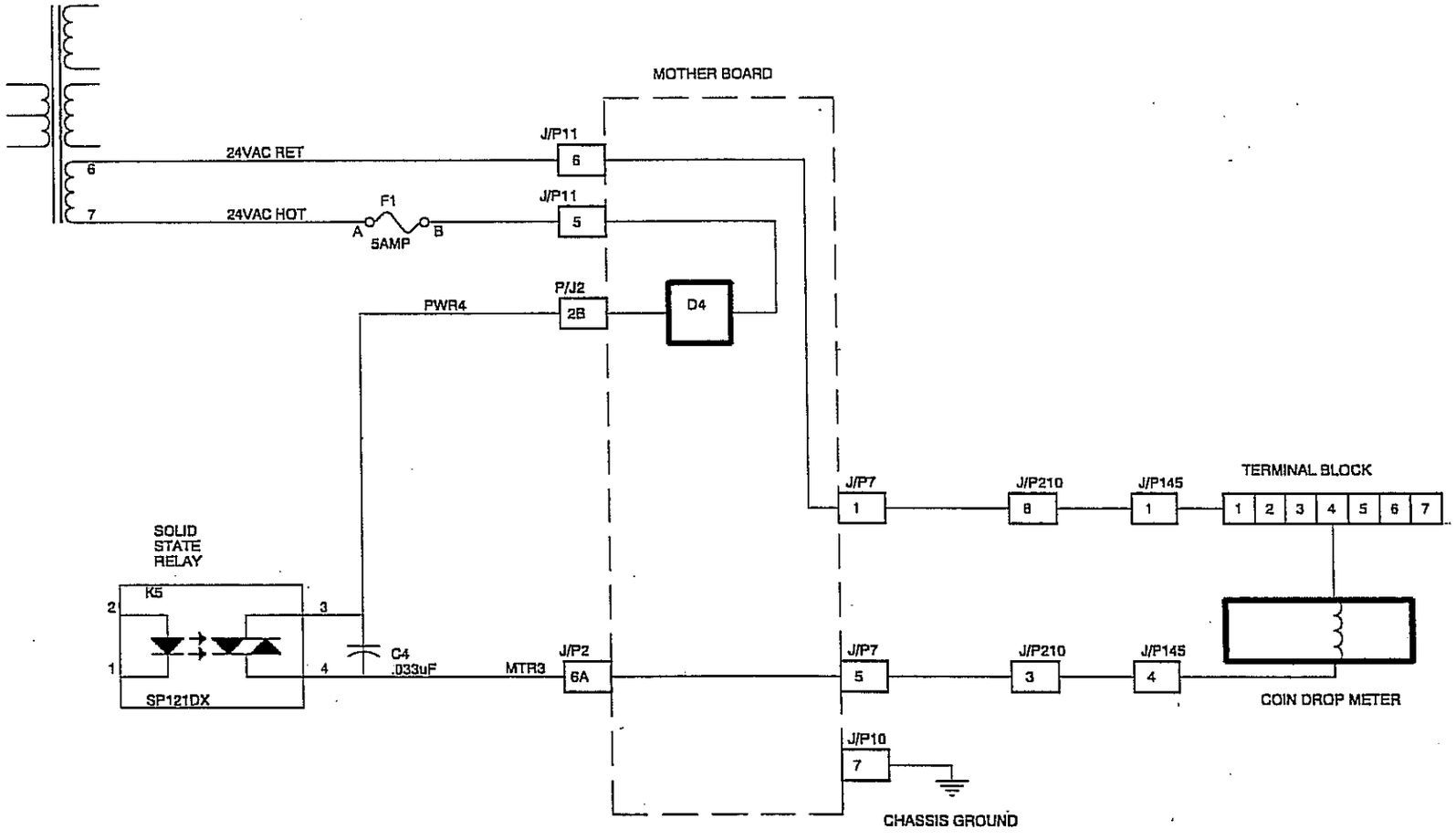
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P145-3 to J/P7-6
J/P145-1 to J/P7-1

MOTHER BOARD CONTINUITY TEST
J/P7-6 to J/P2-4B
J/P7-1 to J/P11-6

PROCESSOR BOARD TEST
Check from K2 to edge for burned trace
Test K2 (SP121DX) - if problem continues, then replace
Test C7 - if driver ever turns on by itself

Problem: Coin-Drop Meter is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test to verify the problem
- ✓ Check wires and connectors for defects
- ✓ Verify meter lead is seated in position #4 of terminal block
- ✓ Replace meter, and retest

If that doesn't work, try the following steps:

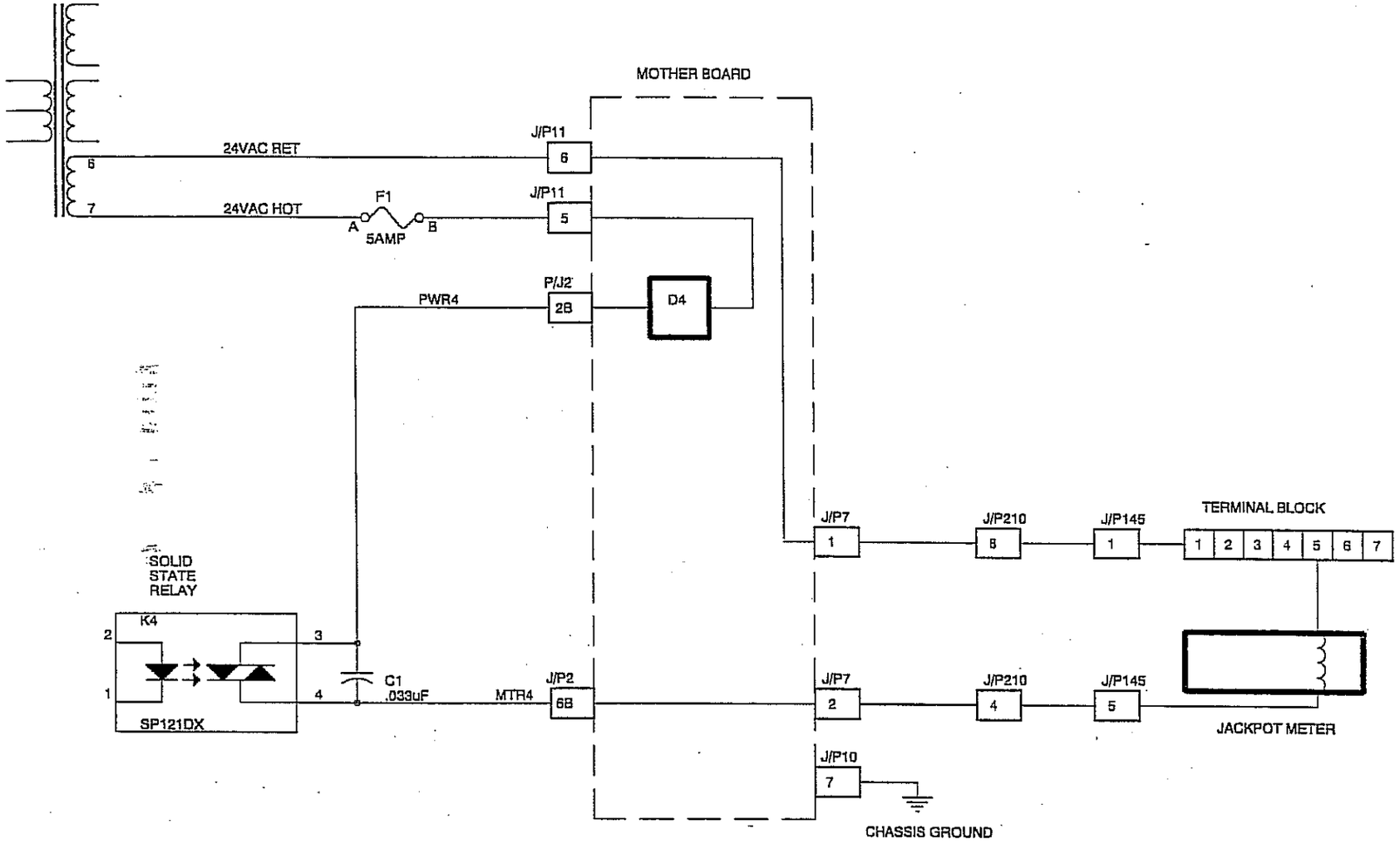
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P145-4 to J/P7-5
J/P145-1 to J/P7-1

MOTHER BOARD CONTINUITY TEST
J/P7-5 to J/P2-6A
J/P7-1 to J/P11-6

PROCESSOR BOARD TEST
Check from K5 to edge for burned trace
Test K5 (SP121DX) - if problem continues, then replace.
Test C4 - if driver ever turns on by itself

Problem: Jackpot Meter is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test to verify the problem
- ✓ Check wires and connectors for defects
- ✓ Verify meter lead is seated in position #5 of terminal block
- ✓ Replace meter, and test

If that doesn't work, try the following steps:

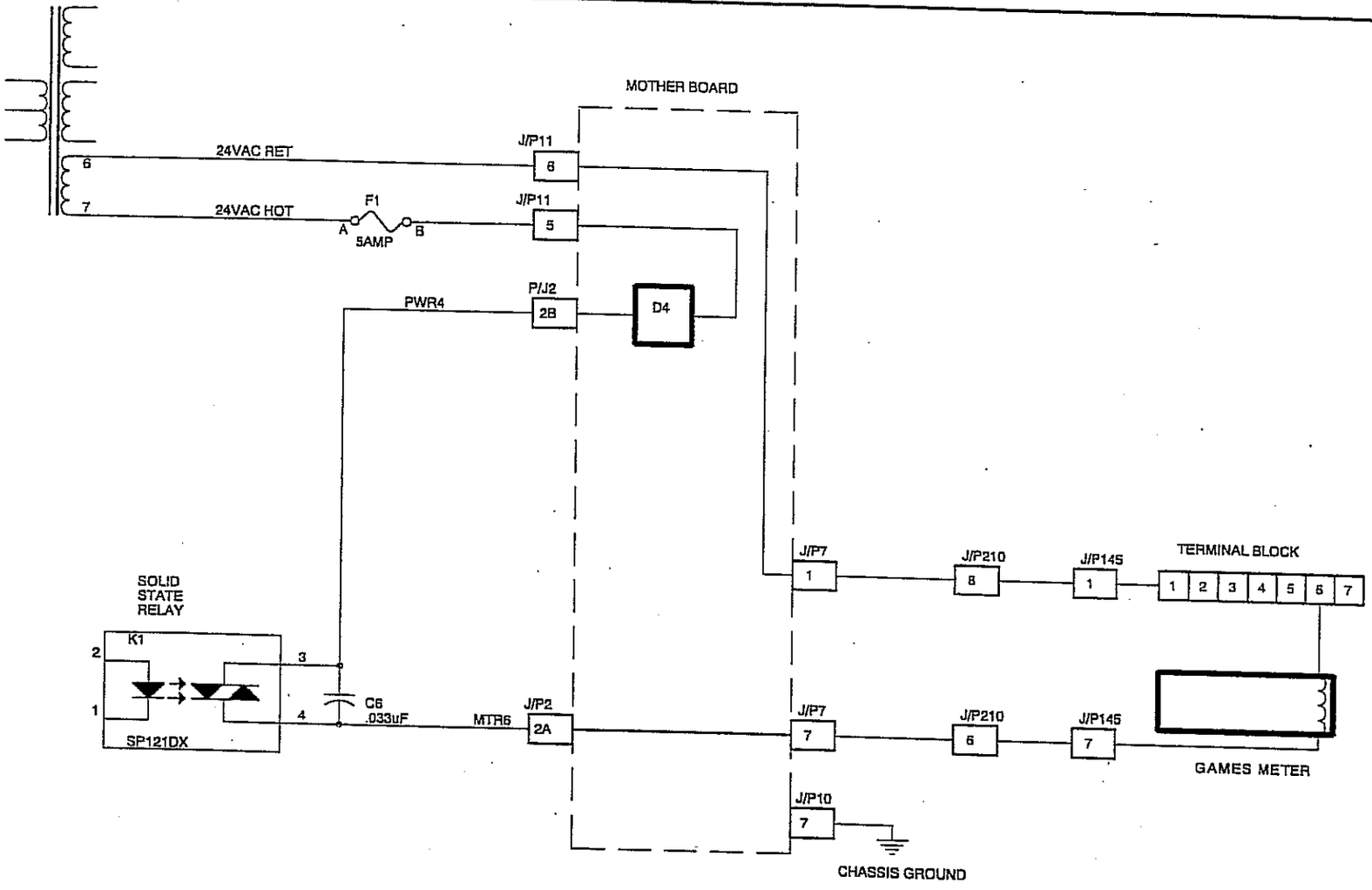
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P145-5 to J/P7-2
J/P145-1 to J/P7-1

MOTHER BOARD CONTINUITY TEST
J/P7-2 to J/P2-6B
J/P7-1 to J/P11-6

PROCESSOR BOARD TEST
Check from K4 to edge for burned trace
Test K4 (SP121DX) - if problem continues, then replace.
Test C1 - if driver ever turns on by itself

Problem: Game Meter is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use the output test to verify the problem
- ✓ Verify meter lead is seated in position #6 of in terminal block
- ✓ Check wires and connectors for defects
- ✓ Replace the meter, and test

If that doesn't work, try the following steps:

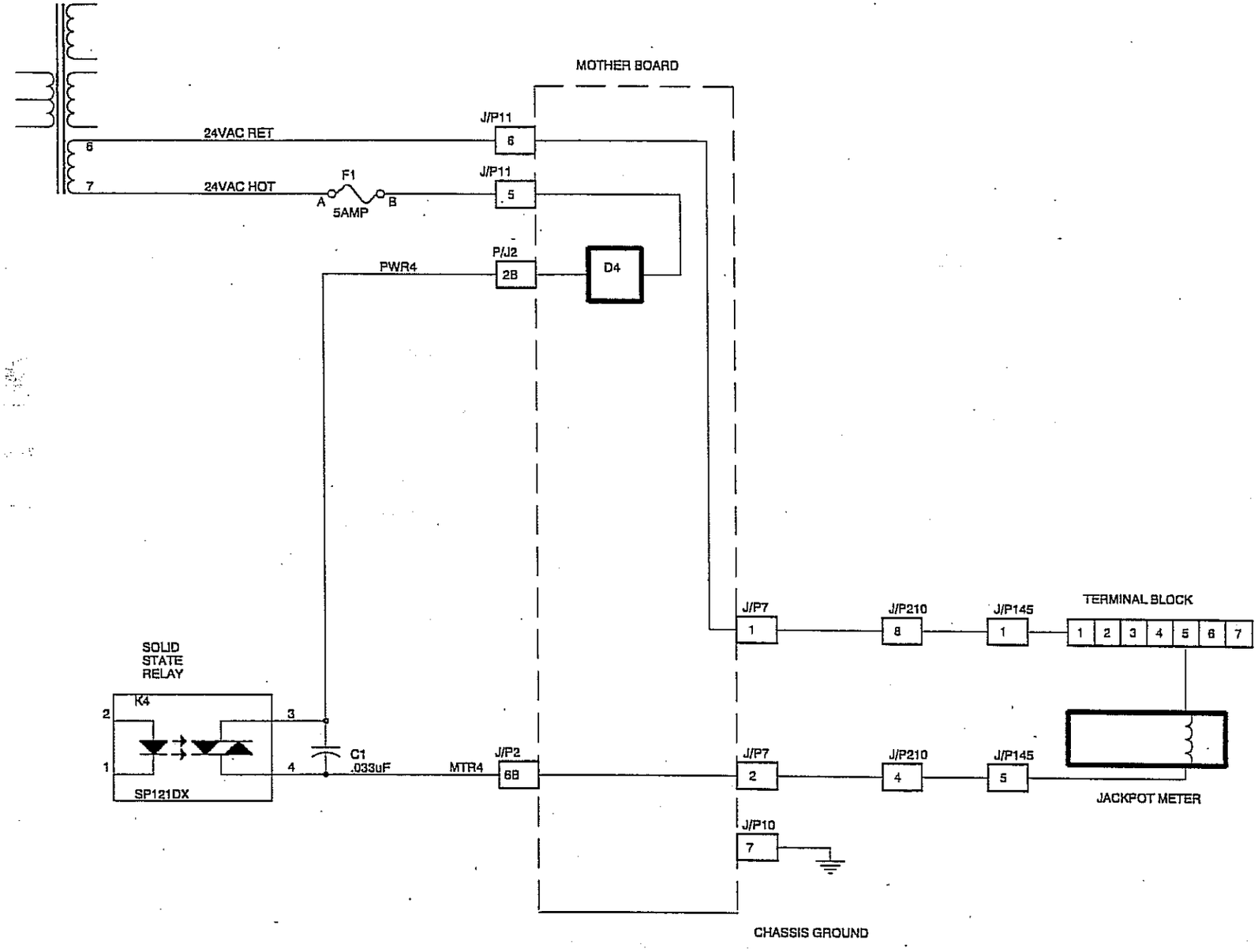
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P145-7 to J/P7-7

MOTHER BOARD CONTINUITY TEST
J/P7-7 TO J/P2-2A

PROCESSOR BOARD CONTINUITY TEST
Check from K1 to edge for burned trace
Test K1 (SP121DX) - if problem continues then replace
Test C6 - (if driver ever turns on by itself) if problem continues then replace

Problem: All Meters are Nonfunctional



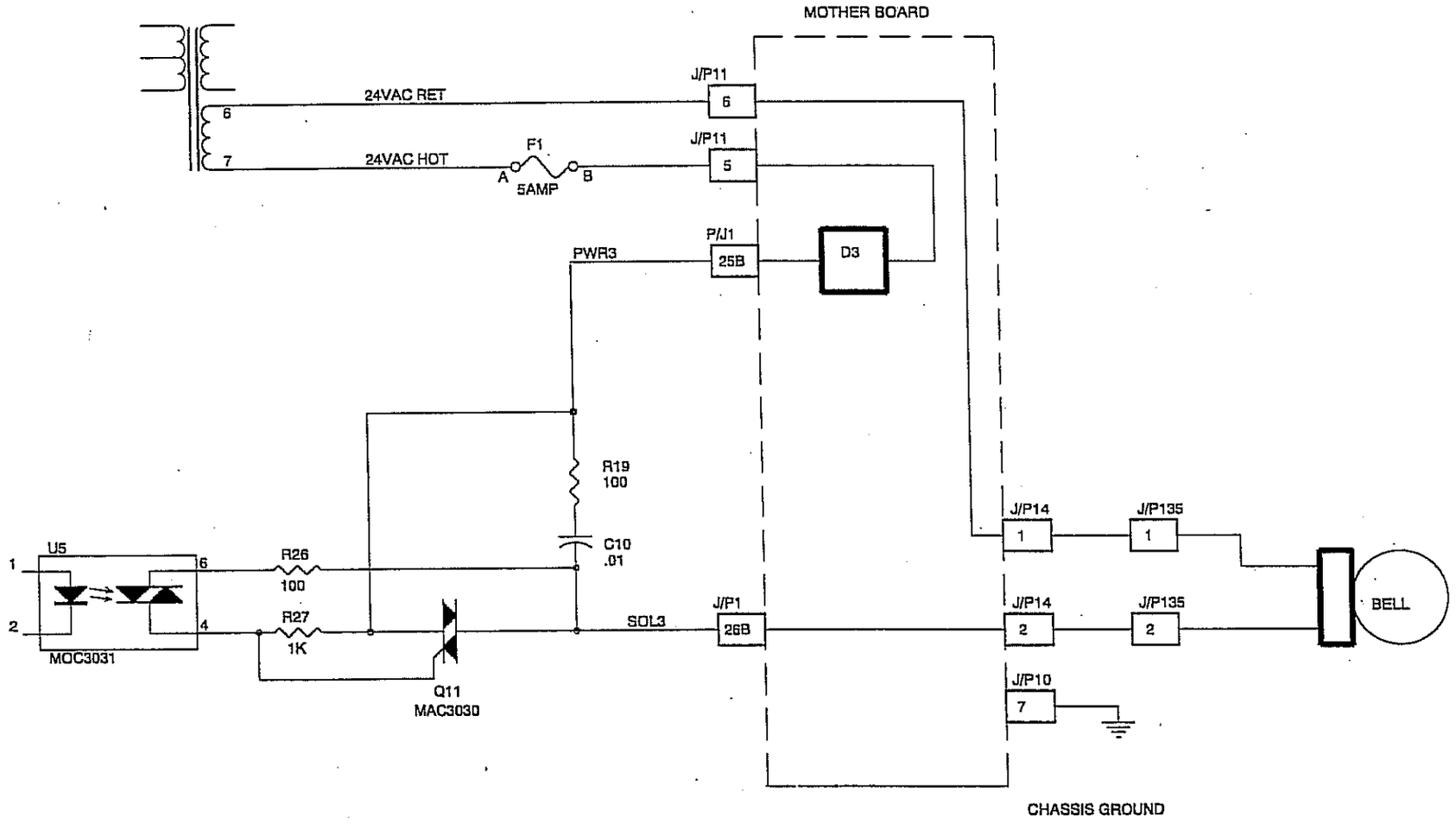
Before removing the processor board, check the following areas:

- ✓ Check 24V 5A fuse
- ✓ Check terminal block to see if #1 wire is seated firmly in place
- ✓ Check connector and wire from J/P145-1 to J/P7-1

If that doesn't work, try the following steps:

- ➪ Remove mother board, and test J/P7-1 to J/P11-6 and J/P11-5 to J/P2-2B
- ➪ If D4 stays "open", replace it (current suppressor 1.65A, RXE110)

Problem: Bell is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test to verify problem
- ✓ Check wires and connectors for defects
- ✓ Verify that J/P14 is connected at the rear of the mother board
- ✓ Replace the bell, and test

If that doesn't work, try the following steps:

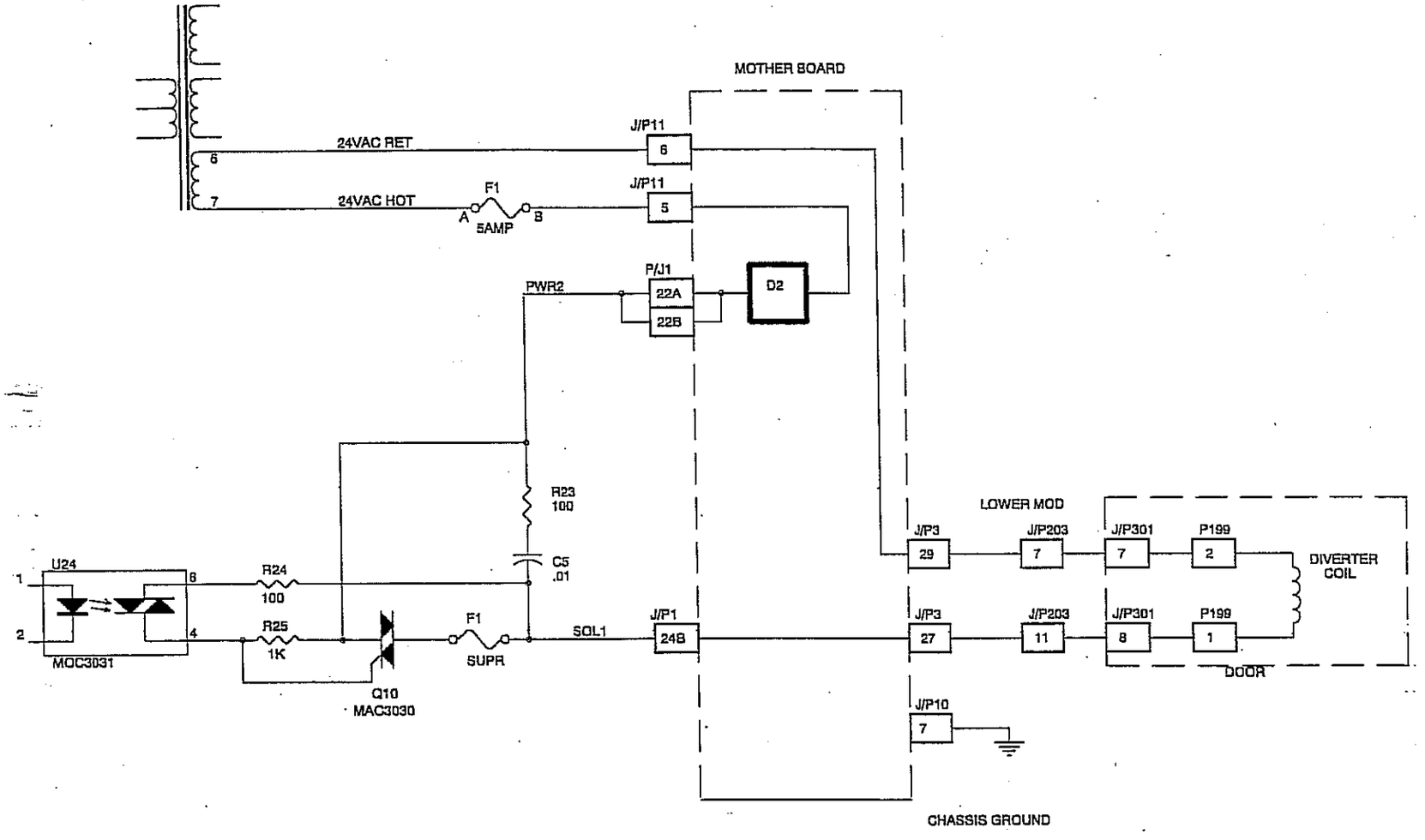
- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P135-1 to J/P14-1
J/P135-2 to J/P14-2

MOTHER BOARD CONTINUITY TEST
J/P14-2 to J/P1-26B
J/P14-1 to J/P11-6
J/P11-5 to J/P1-25B
Replace D3 if it stays "open"
D3 is a current suppressor, 1.65A RXE

PROCESSOR BOARD TEST
Check from Q11 to edge for burned trace
Test Q11 (MAC3030), and test
Test U5 (MOC3031), and test
R19 and C10 constitute a "snubber circuit" protecting Q11 from false triggering

Problem: Diverter is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test to verify problem
- ✓ Check the 24 VAC fuse
- ✓ Replace the diverter coil, and test

If that doesn't work, try the following steps:

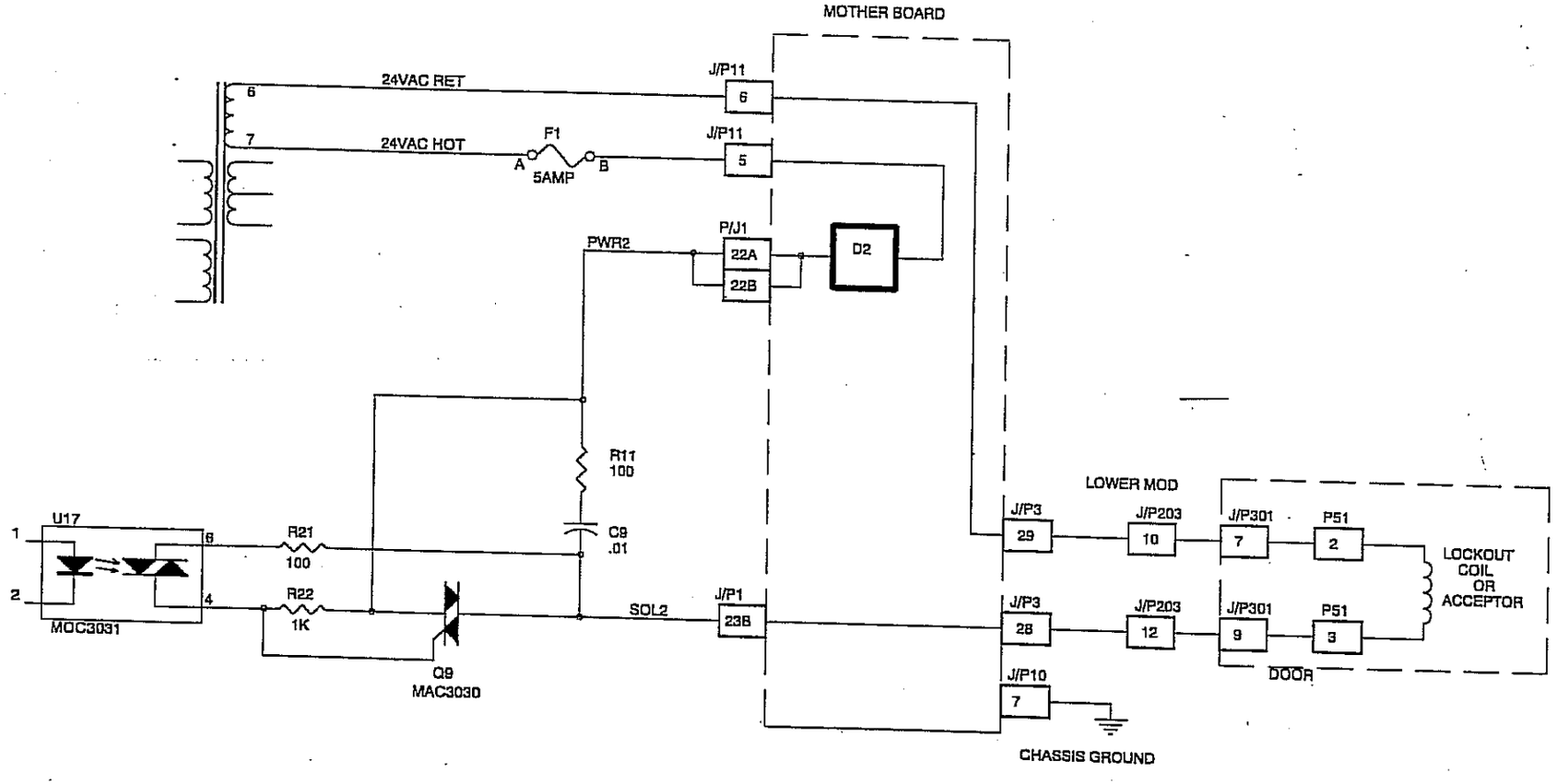
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P199-2 to J/P3-29
J/P199-1 to J/P3-27

MOTHER BOARD CONTINUITY TEST
J/P3-27 to J/P1-24B
J/P3-29 to J/P11-6
J/P11-5 to J/P1-22A & 22B
Replace D2 if it "stays" open
(D2 is a current suppressor 1.65A RXE)

PROCESSOR BOARD TEST
Check from Q10 to edge (J/P2-15B & J/P2-17B) for burned trace
Test Q10(MAC3030) - if problem continues, then replace.
Test U24(MOC3031) - if problem continues, then replace.
Test F1, current suppressor .075A (RXE 050)
Test R23, R24 & R25

Problem: Lockout On Comparitor is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test to verify problem
- ✓ Check the 24VAC fuse
- ✓ Replace the comparitor, and test

If that doesn't work, try the following steps:

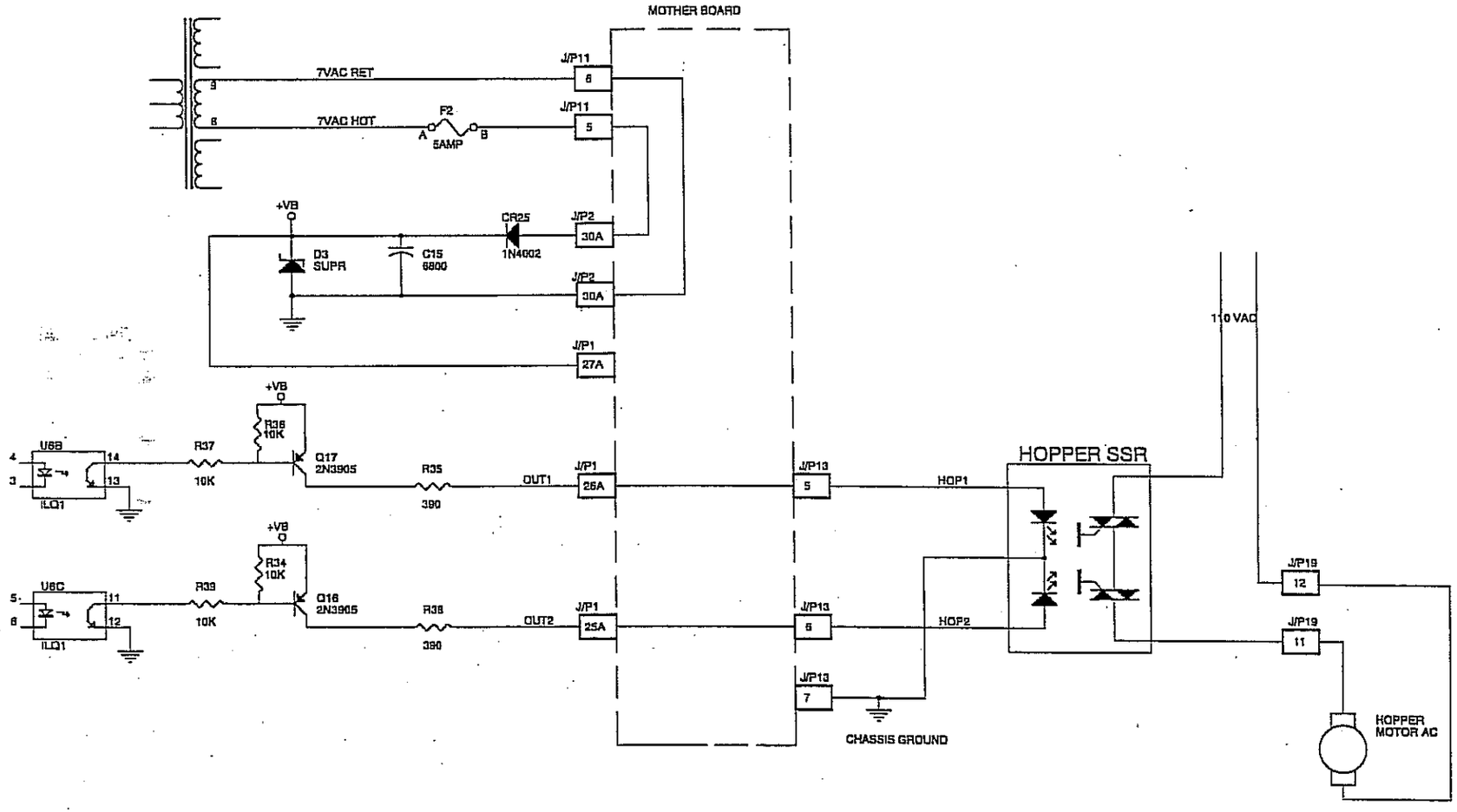
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P51-2 to J/P3-29
J/P51-3 to J/P3-28

MOTHER BOARD CONTINUITY TEST
J/P3-28 to J/P1-23B
J/P3-29 to J/P11-6
J/P11-5 to J/P1-22A & 22B
Remove and replace D2 if it stays "open"
D2 is a current suppressor (1.65A RXE)

PROCESSOR BOARD TEST
Check from Q9 to edge (J/P2-15B& J/P2-17B) for burned trace
Replace Q9(MAC3030) - if problem continues, then replace.
Replace U17(MOC3013) - if problem continues, then replace.
R11 and C9 constitute a "snubber circuit" protecting Q11 from false triggering.
Test R21 & R22.

Problem: Hopper Won't Turn On



MOTHER BOARD CONTINUITY TEST
J/P13-6 to J/P1-25A
J/P13-5 to J/P1-26A

PROCESSOR BOARD TEST
Use output test to isolate which hopper driver is defective
Check from Q16 & Q17 to edge for burned traces
Test Q16, Q17, R35, R37, R38 & R39
Test U6

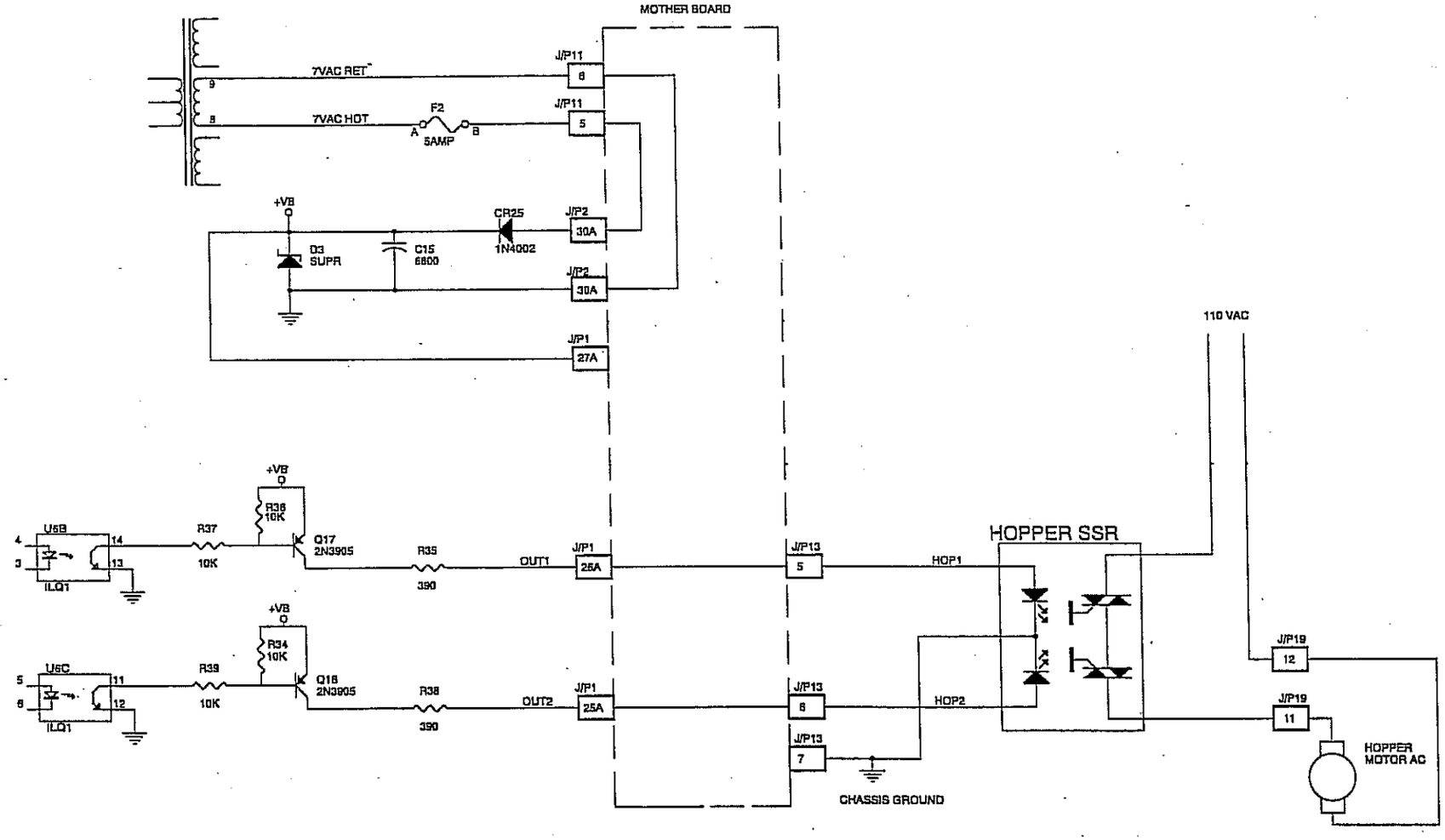
Before removing the processor board, check the following areas:

- ✓ Verify that the wires to the hopper motor are connected
- ✓ Verify that the roll-pin is good
- ✓ Test for 110VAC across J/P19-11 & 12
- ✓ If 110VAC is missing, then trace back for a broken connection
- ✓ If 110VAC is good, then replace the hopper SSR and test
- ✓ Check for obstructions in the hopper
- ✓ Use another hopper to determine if the motor seems bad

If that doesn't work, try the following steps:

- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

Problem: Runaway Hopper



Before removing the processor board, check the following areas:

- ✓ If the machine is operating correctly, verify the operation of the hopper in the outputs test
- ✓ Remove the processor board while activating the hopper
- ✓ If the hopper stops, replace the processor board
- ✓ If hopper continues to run without the processor board, replace SSR

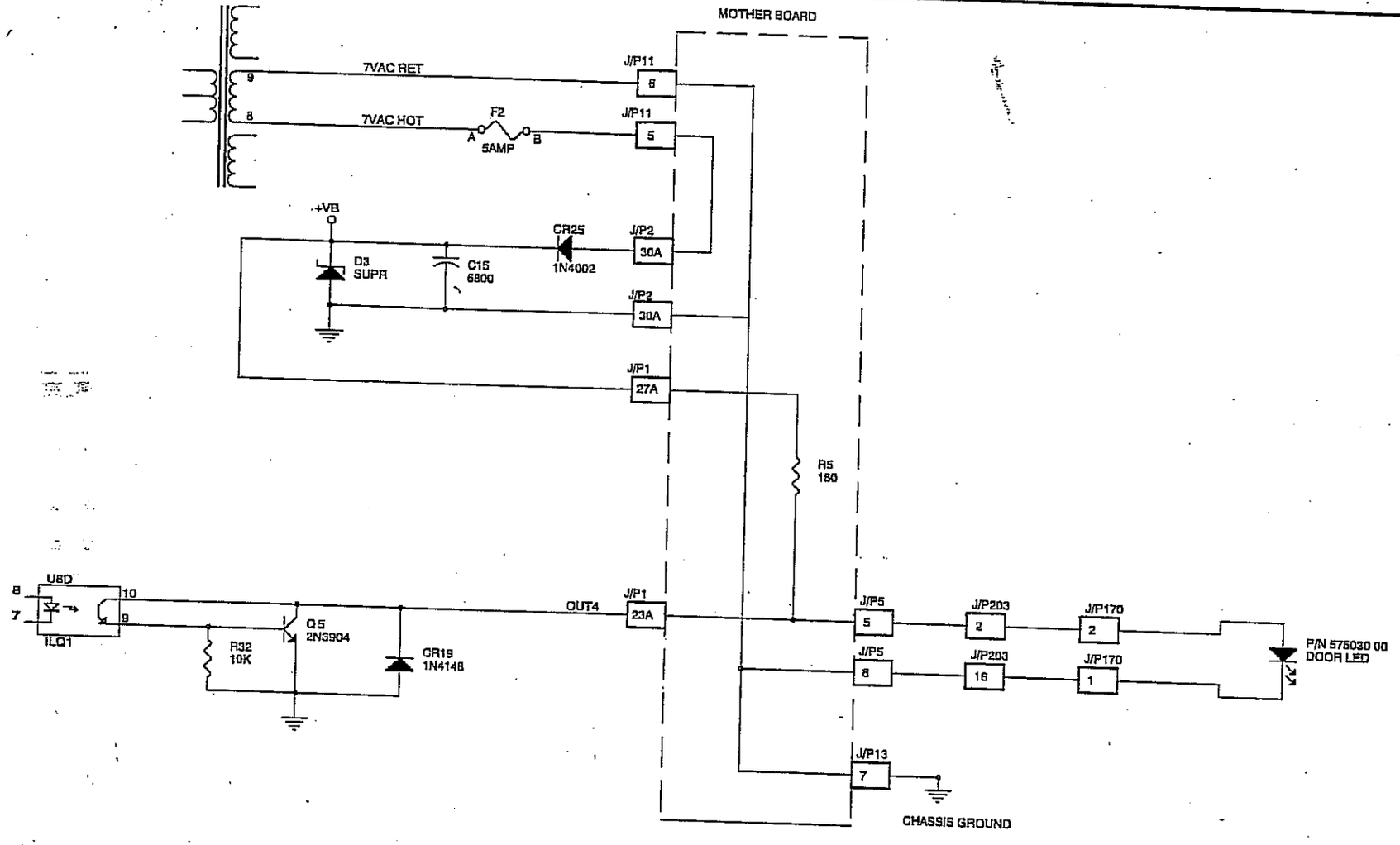
If that doesn't work, try the following steps:

- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace

MOTHER BOARD CONTINUITY TEST
J/P13-6 to J/P1-25A
J/P13-5 to J/P1-26A

PROCESSOR BOARD TEST
Test Q16, Q17
Test R35, R37, R38, R39
Test U6

Item: Constant Door Open Message (Suspect Bad LED)



Before removing the processor board, check the following areas:

- ✓ Verify optic alignment
- ✓ Use input test to verify if the phototransistor is good (use a flashlight to simulate a LED)
- ✓ Verify that the bill validator door switch is closed
- ✓ Test for ~8 to 10 VDC across J/P170
- ✓ If the door LED is nonfunctional, then remove and replace LED

If that doesn't work, try the following steps:

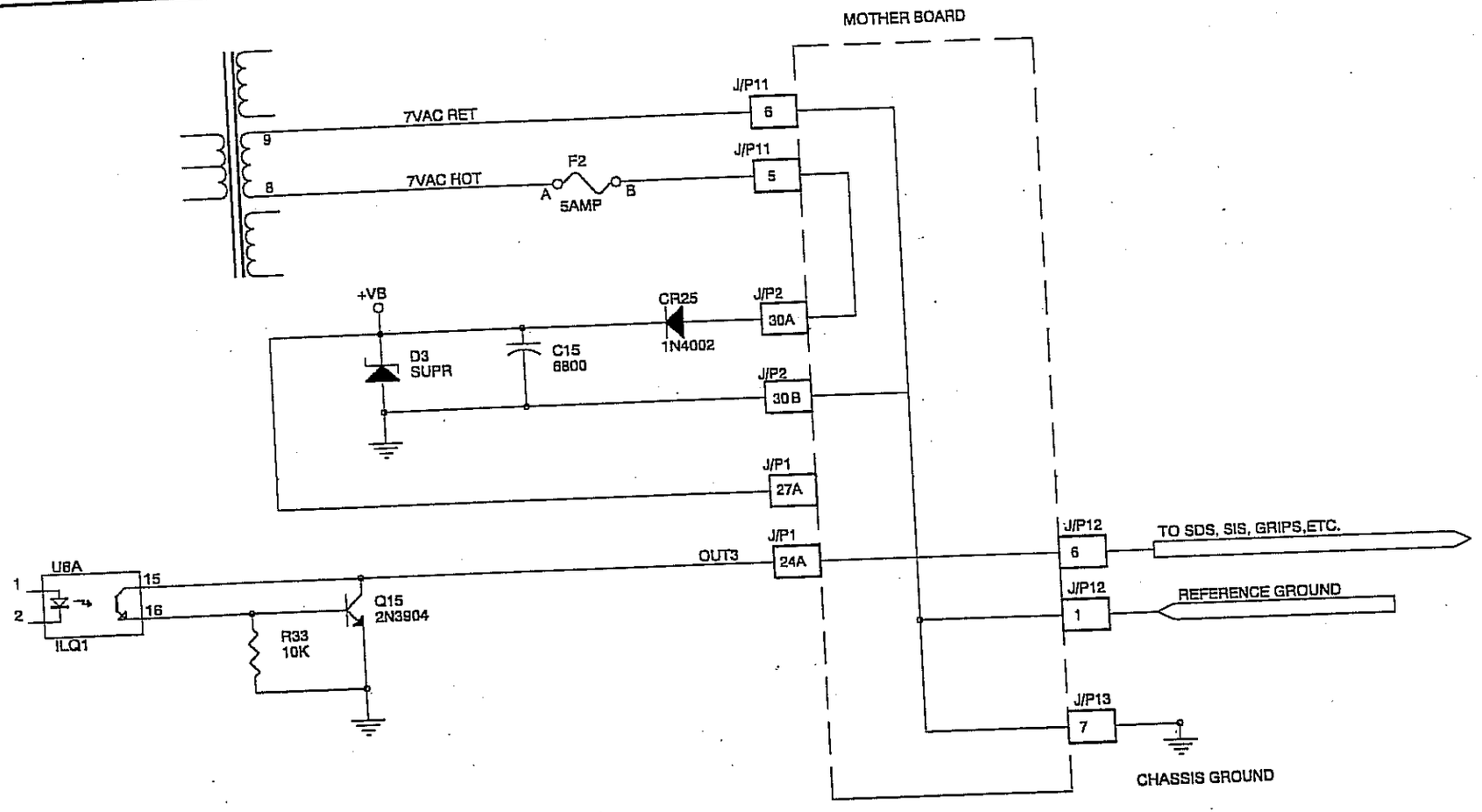
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P170-1 to J/P5-5
J/P170-2 to J/P5-6

MOTHER BOARD CONTINUITY TEST
J/P5-6 to J/P11-6, J/P13-7 & J/P2-30A
J/P5-5 to J/P2-23A & J/P2-27A
J/P11-5 to J/P2-30A

PROCESSOR BOARD TEST
Measure Vb at anode of CR19
Test Q5(2N3904) and check R32(10K Ohm), if problem continues, then replace.
Check CR19
Test U6, if problem continues, then replace.

Problem: SDS Not Receiving Jackpot Signals



Before removing the processor board, check the following areas:

✓ Use output test to verify the problem

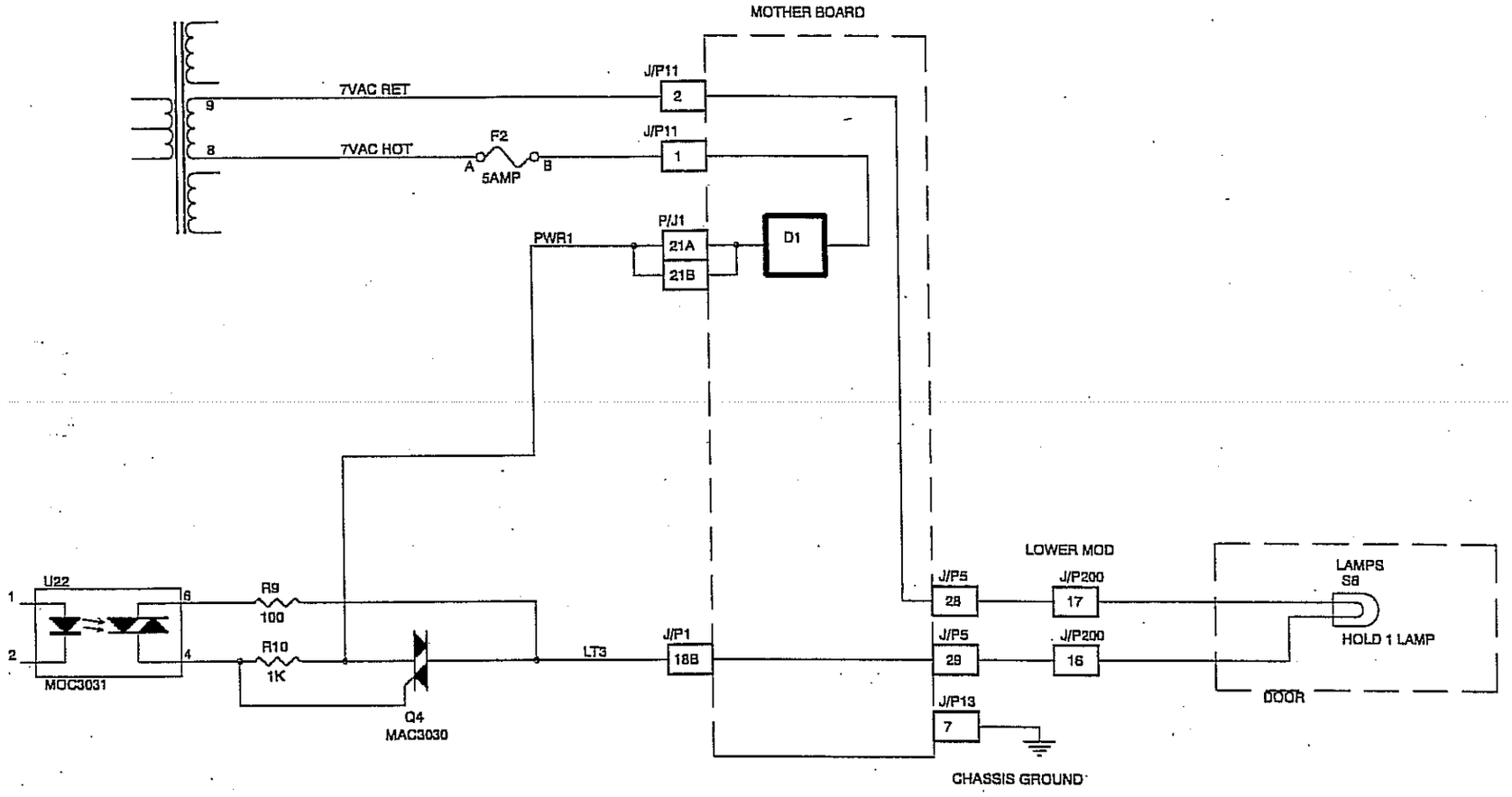
If that doesn't work, try the following steps:

- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are good, then use this diagram to test for wire continuity

MOTHER BOARD CONTINUITY TEST
J/P12-6 to J/P1-24A
J/P12-1 to J/P11-6, J/P2-30A, J/P2-30B, J/P13-7
J/P11-5 to J/P2-30A

PROCESSOR BOARD TEST
Test Q15
Test U6, R33

Problem: Hold Lamp 1 is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test to verify the problem
- ✓ Verify that the lamp is seated firmly in the socket
- ✓ Replace the lamp, and test
- ✓ Check wires and connectors for defects

If that doesn't work, try the following steps:

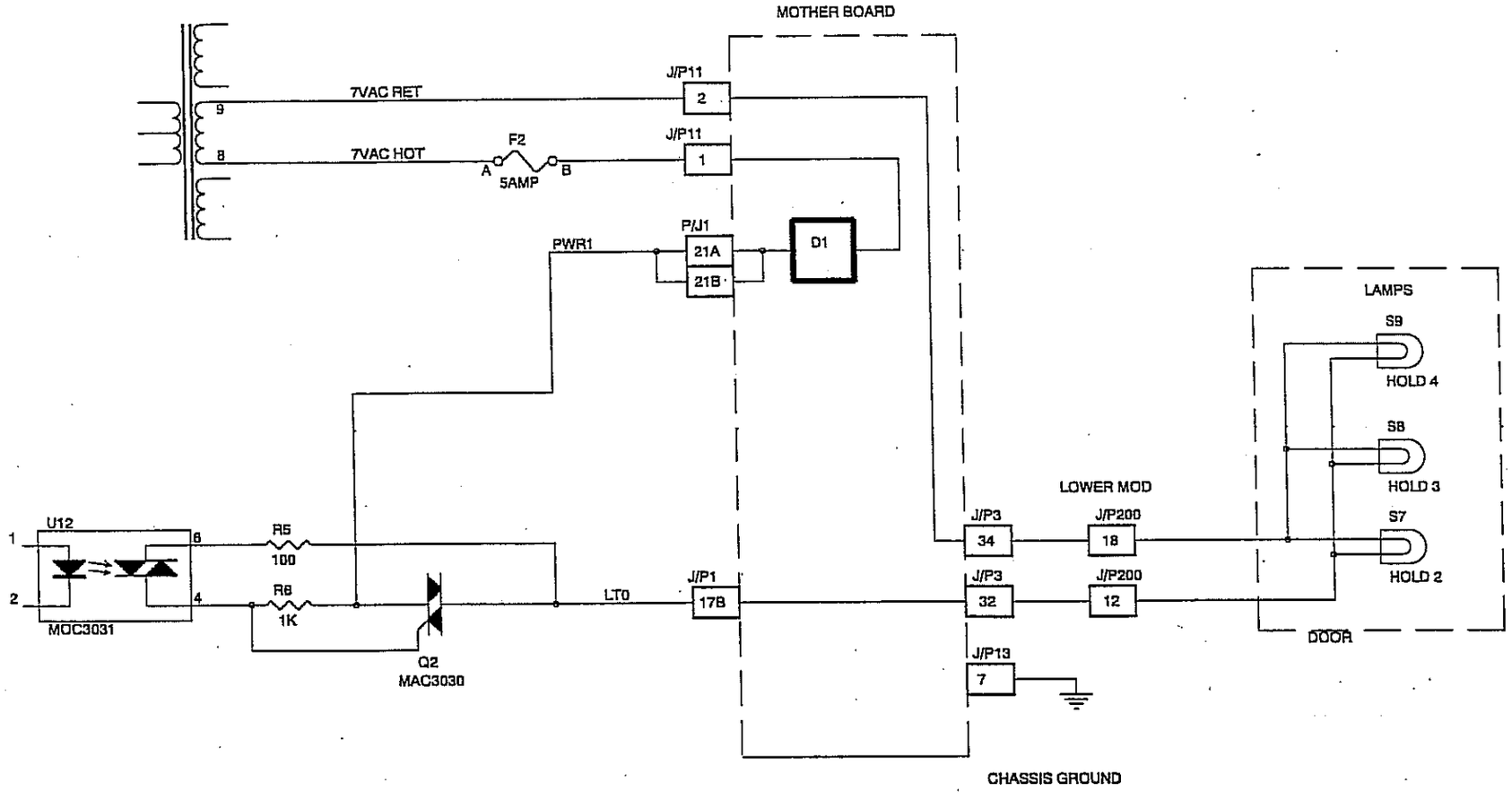
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P5-28 to J/P5-29

MOTHER BOARD CONTINUITY TEST
J/P5-29 to J/P1-18B
J/P5-28 to J/P11-2

PROCESSOR BOARD TEST
Check from Q4 to the edge for damaged trace
Test R9 & R10
Test Q4 (MAC3030) - if problem continues, then replace.
Test U22 (MOC3031) - if problem continues, then replace.

Problem: Hold Lamps 2, 3, & 4 are Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test to verify the problem
- ✓ Verify that the lamps are firmly placed in their sockets
- ✓ Replace the lamp, and test
- ✓ Check wires and connectors for defects

If that doesn't work, try the following steps:

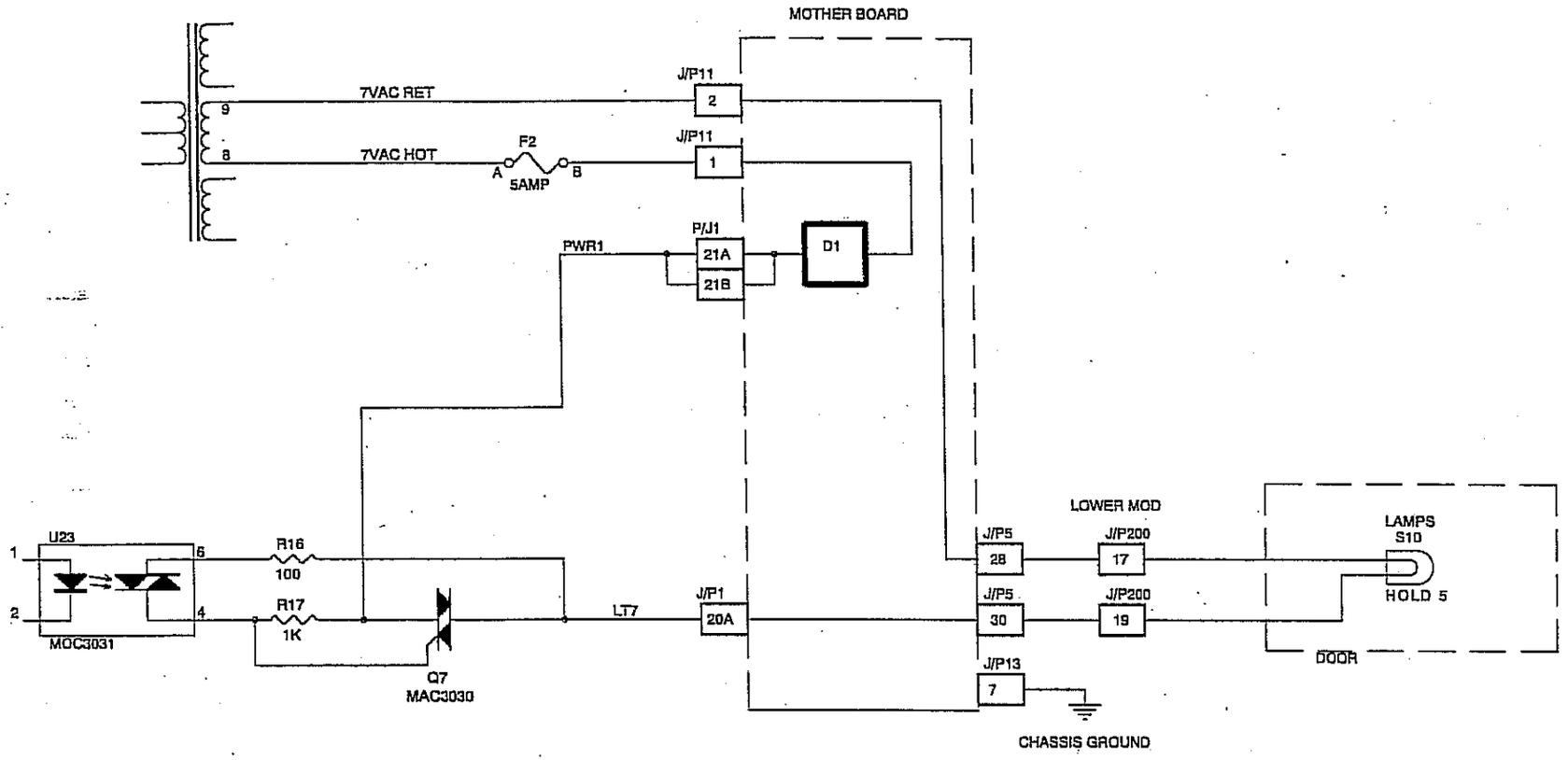
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P3-34 to J/P3-32

MOTHER BOARD CONTINUITY TEST
J/P3-32 to J/P1-17B
J/P3-34 to J/P11-2

PROCESSOR BOARD TEST
Check from Q2 to the edge for damaged trace
Test R5 & R6
Test Q2 (MAC3030), if problem continues, then replace.
Test U12 (MOC3031), if problem continues, then replace.

Problem: Hold Lamp 5 is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test to verify the problem
- ✓ Verify if the lamp is seated firmly in the socket
- ✓ Check wires and connectors for defects
- ✓ Replace the lamp, and test

If that doesn't work, try the following steps:

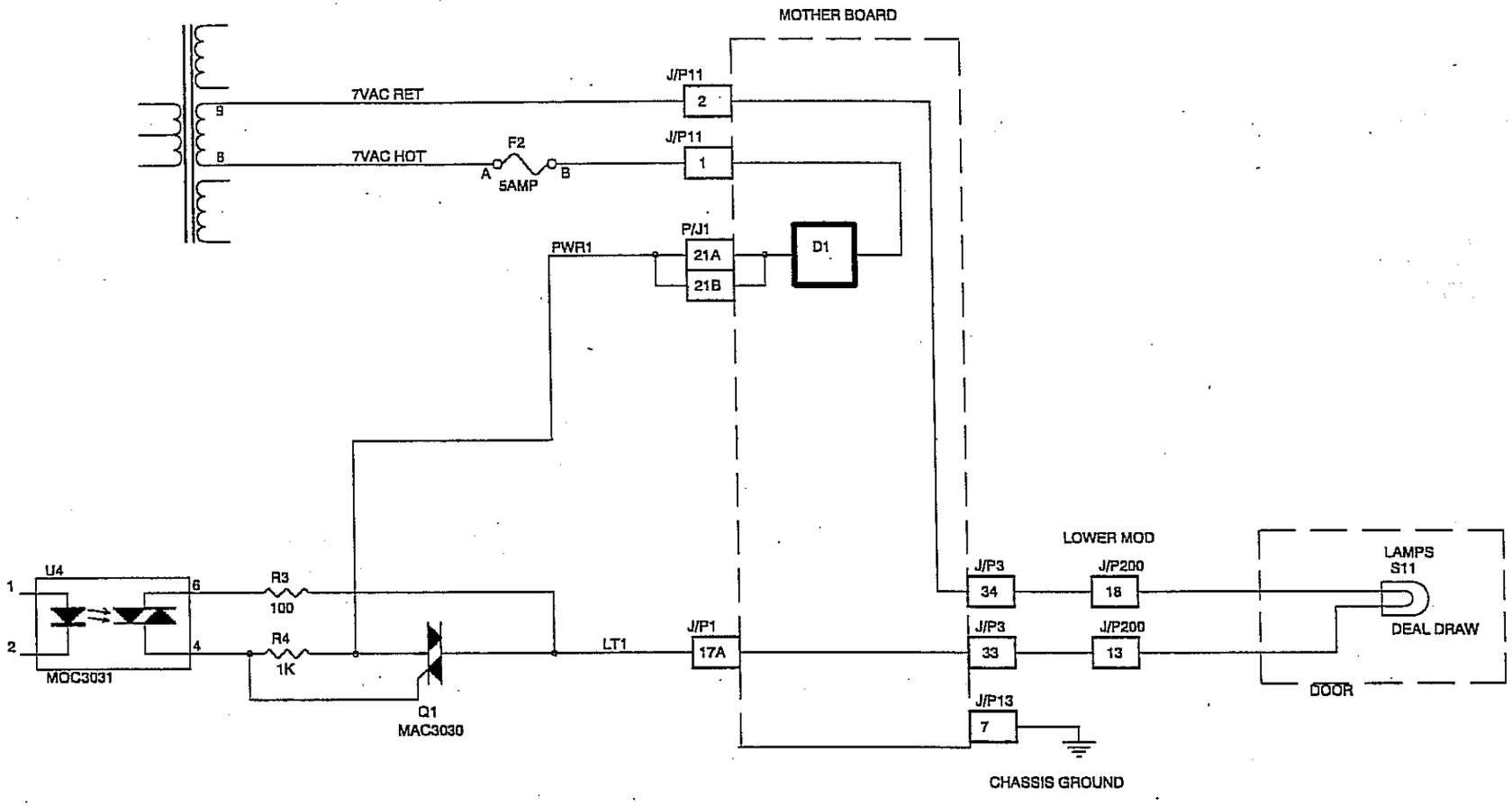
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P5-28 to J/P5-30

MOTHER BOARD CONTINUITY TEST
J/P5-30 to J/P1-20A
J/P5-28 to J/P11-2

PROCESSOR BOARD TEST
Check from Q7 to the edge for damaged trace
Test R16 & R17
Test Q7 (MAC3030), if problem continues, then replace.
Test U23 (MOC3031), if problem continues, then replace.

Problem: Deal/Draw Lamp is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test to verify the problem
- ✓ Verify that the lamp is seated firmly in the socket
- ✓ Replace the lamp, and test
- ✓ Check wires and connectors for defects

If that doesn't work, try the following steps:

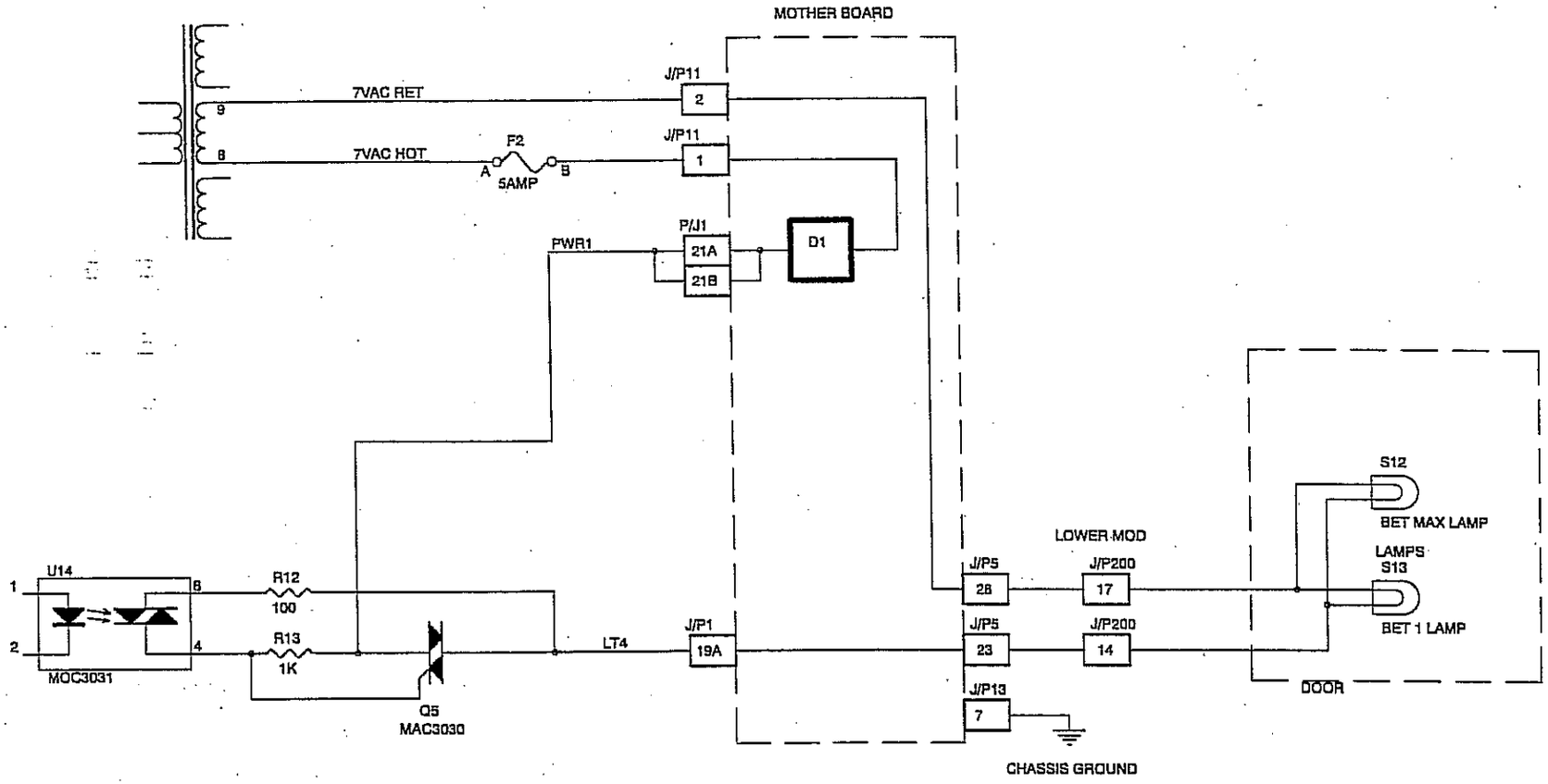
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P3-34 to J/P3-33

MOTHER BOARD CONTINUITY TEST
J/P3-33 to J/P1-17A
J/P3-34 to J/P11-2

PROCESSOR BOARD TEST
Check from Q1 to the edge for a damaged trace
Test R3 & R4
Test Q1 (MAC3030) - if problem continues, then replace.
Test U4 (MOC3031) - if problem continues, then replace.

Problem: Bet Max Lamp is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use the output test to verify the problem
- ✓ Verify that the lamp is seated firmly in the socket
- ✓ Replace the lamp, and test
- ✓ Check wires and connectors for defects

If that doesn't work, try the following steps:

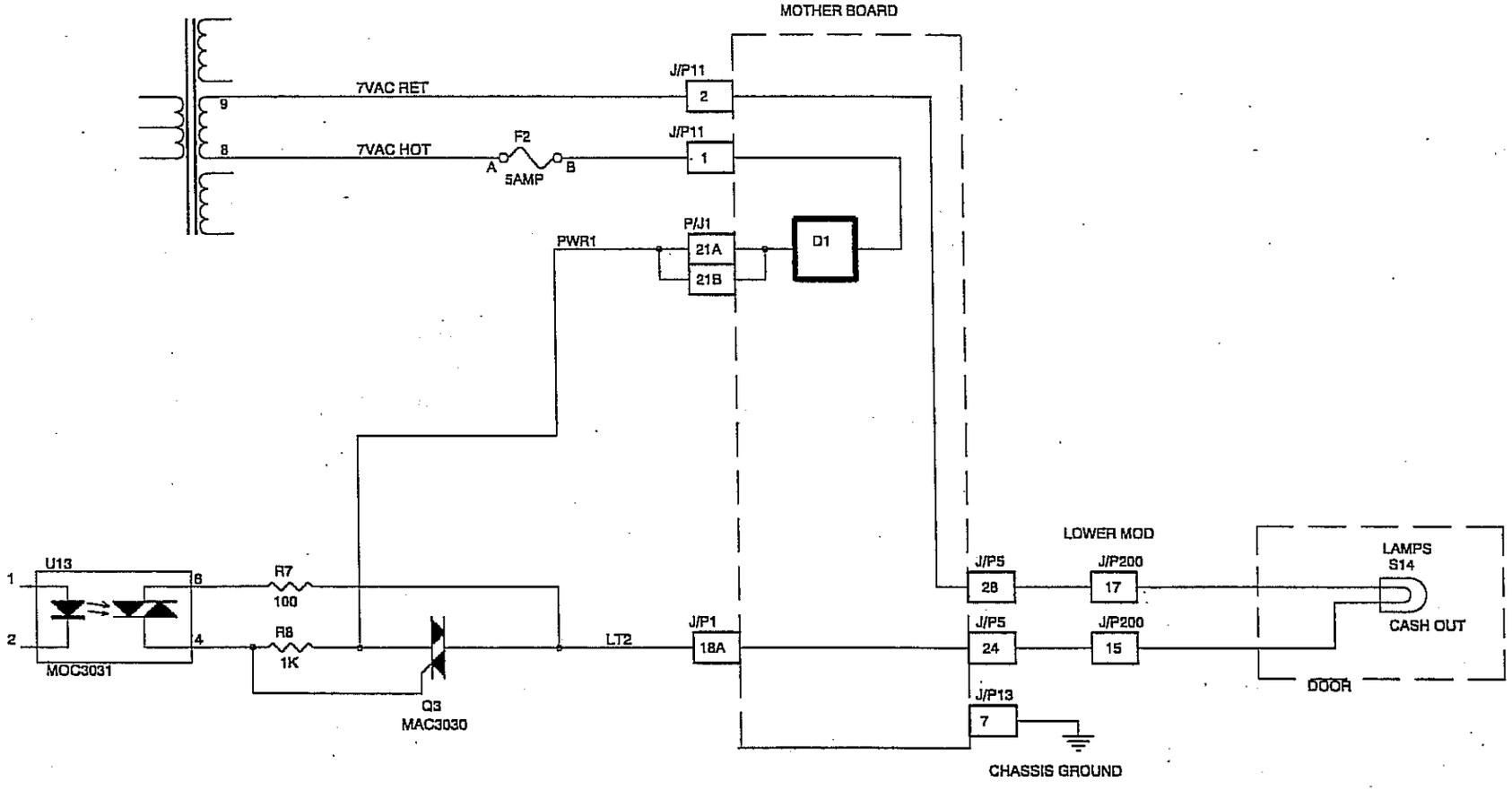
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P5-28 to J/P5-23

MOTHER BOARD CONTINUITY TEST
J/P5-23 to J/P1-19A
J/P5-28 to J/P11-2

PROCESSOR BOARD TEST
Check from Q5 to the edge for damaged trace
Test R12 & R13
Test Q5 (MAC3030) - if problem continues, then replace.
Test U14 (MOC3031) - if problem continues, then replace.

Problem: Cashout Lamp is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test to verify the problem
- ✓ Verify that the lamp is seated firmly in the socket
- ✓ Replace the lamp, and test
- ✓ Check wires and connectors for defects

If that doesn't work, try the following steps:

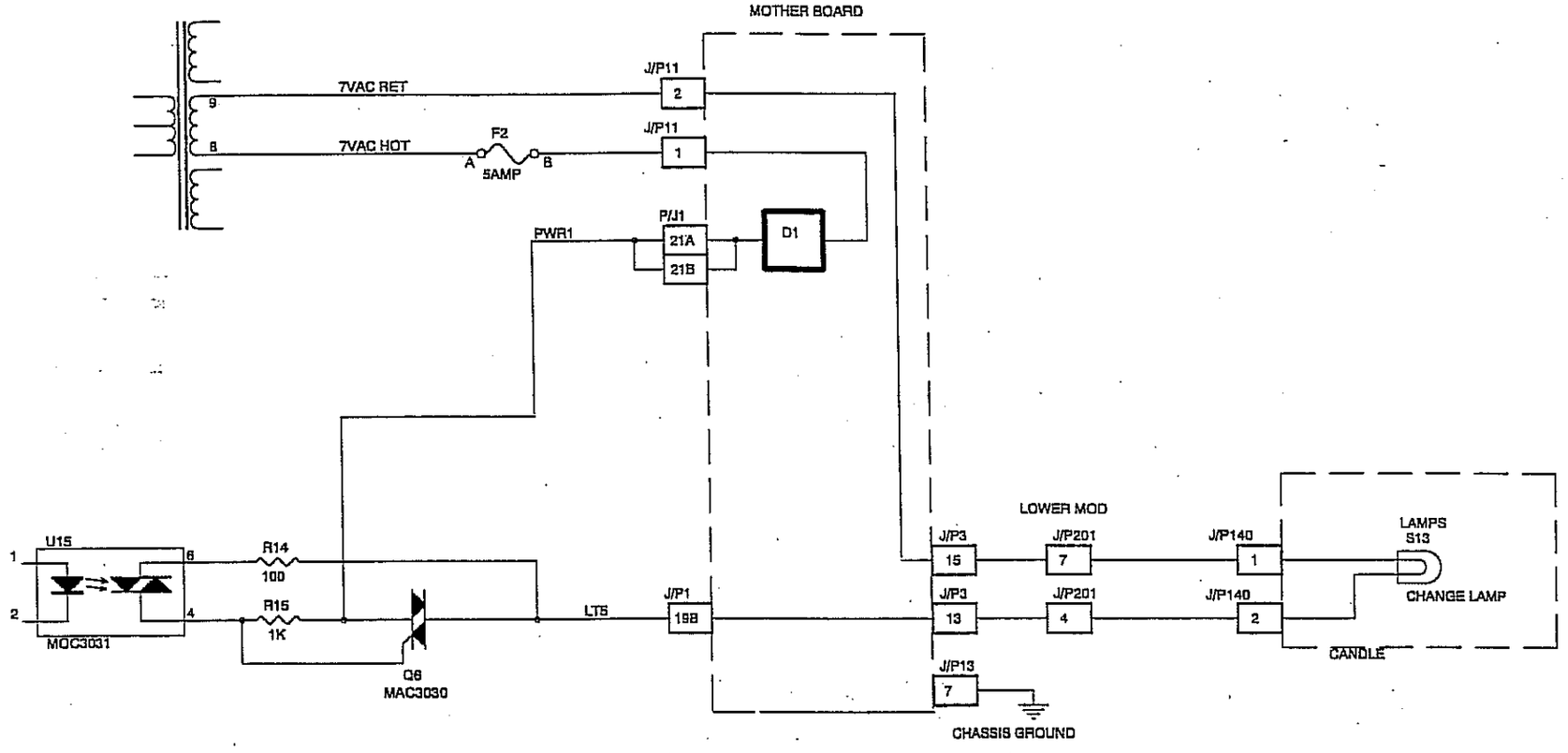
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P5-28 to J/P5-24

MOTHER BOARD CONTINUITY TEST
J/P5-24 to J/P1-18A
J/P5-28 to J/P11-2

PROCESSOR BOARD TEST
Check from Q3 to the edge for damaged trace
Test R7 & R8
Test Q3 (MAC3030) - if problem continues, then replace.
Test U13 (MOC3031) - if problem continues, then replace.

Problem: Change Lamp is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test to verify the problem
- ✓ Verify that the lamp is seated firmly in the socket
- ✓ Replace the lamp, and test
- ✓ Check wires and connectors for defects

If that doesn't work, try the following steps:

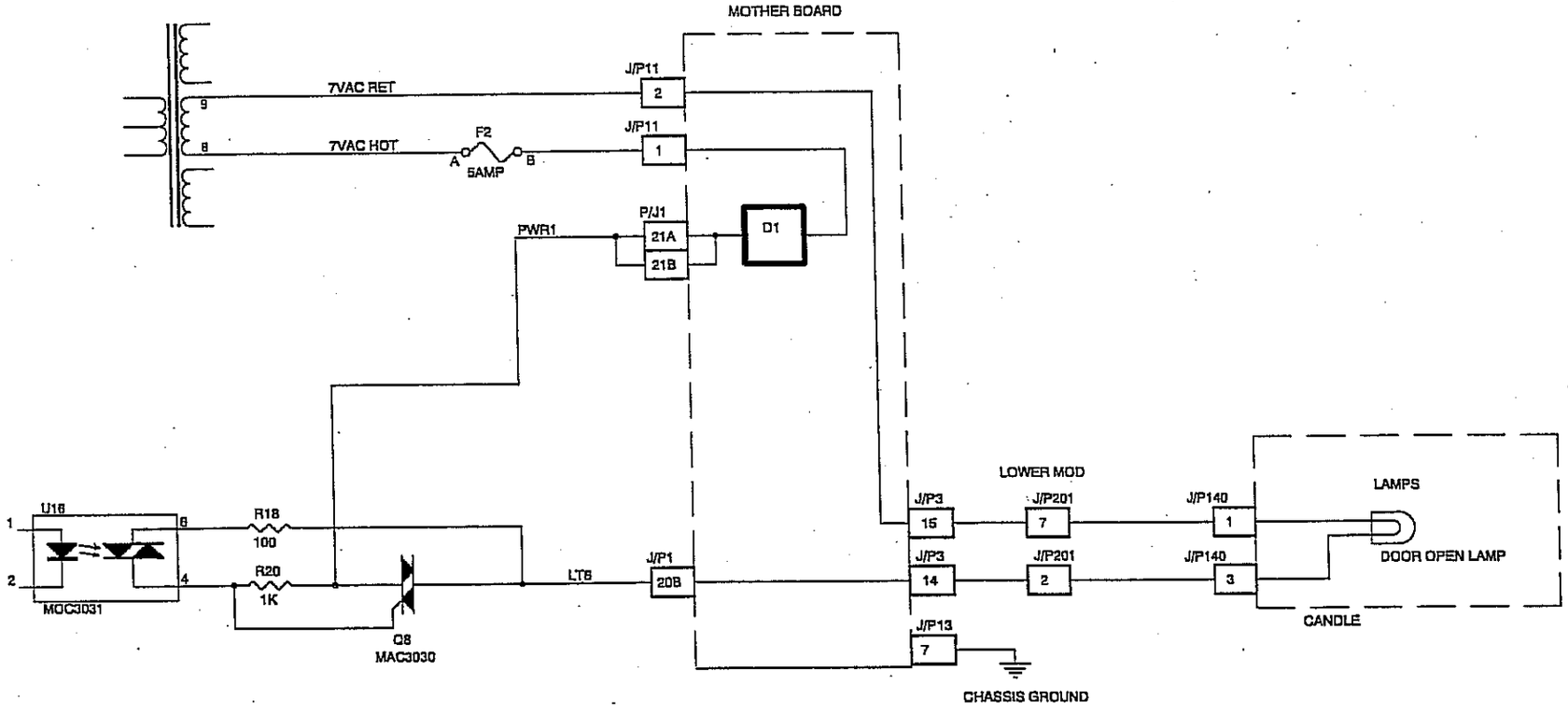
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P3-15 to J/P3-13

MOTHER BOARD CONTINUITY TEST
J/P3-13 to J/P1-19B
J/P3-15 to J/P11-2

PROCESSOR BOARD TEST
Check from Q6 to the edge for damaged trace
Test R14 & R15
Test Q6 (MAC3030) - if problem continues, then replace.
Test U15 (MOC3031) - if problem continues, then replace.

Problem: Door Open Lamp is Nonfunctional



Before removing the processor board, check the following areas:

- ✓ Use output test to verify the problem
- ✓ Verify that the lamp is seated firmly in the socket
- ✓ Replace the lamp, and test
- ✓ Check wires and connectors for defects

If that doesn't work, try the following steps:

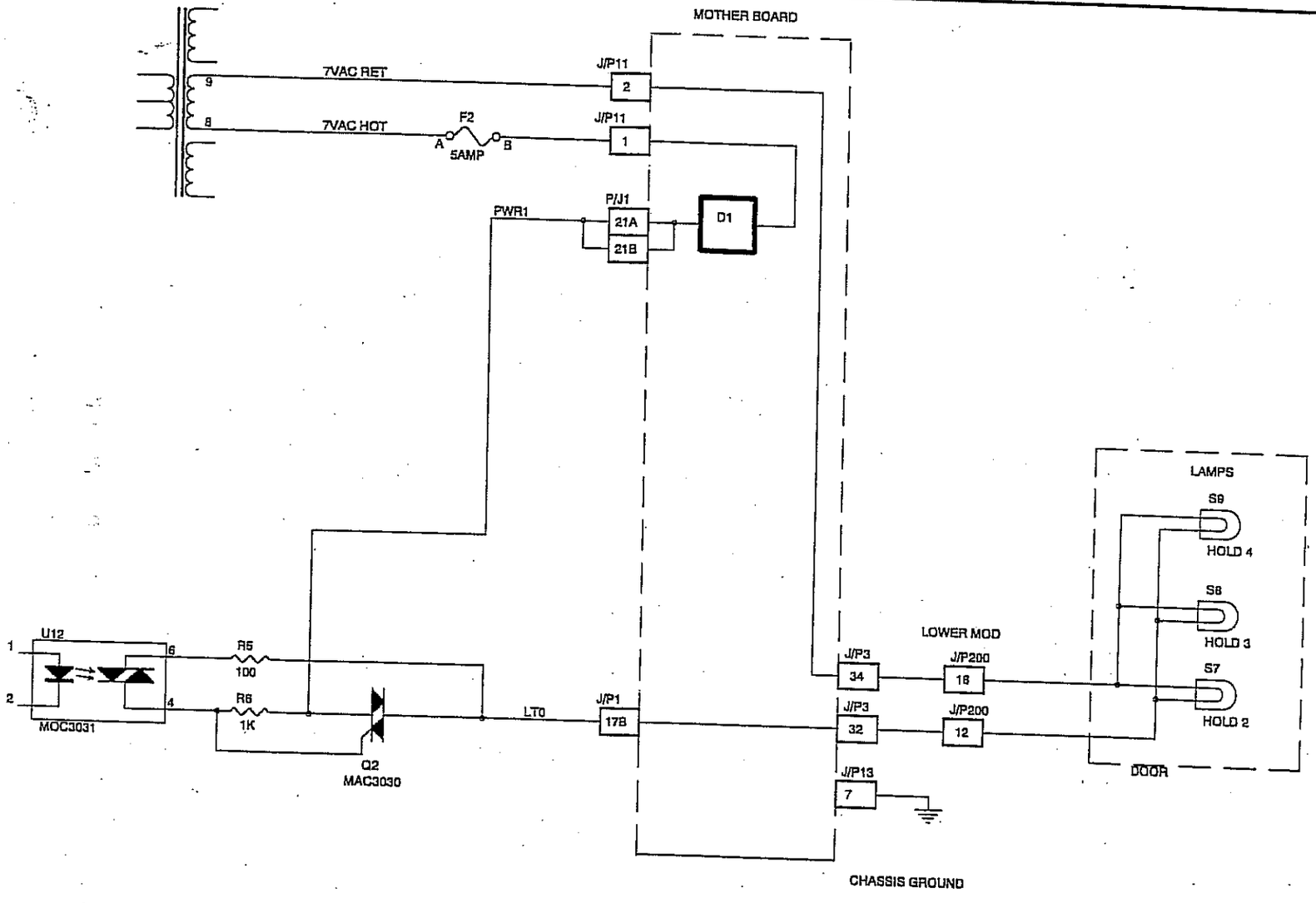
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

WIRE CONTINUITY TEST
J/P3-15 to J/P3-14

MOTHER BOARD CONTINUITY TEST
J/P3-14 to J/P1-20B
J/P3-15 to J/P11-2

PROCESSOR BOARD TEST
Check from Q8 to the edge for damaged trace
Test R18 & R20
Test Q8 (MAC3030) - if problem continues, then replace.
Test U16 (MOC3031) - if problem continues, then replace.

ɛm: All Incandescent Lamps are Nonfunctional



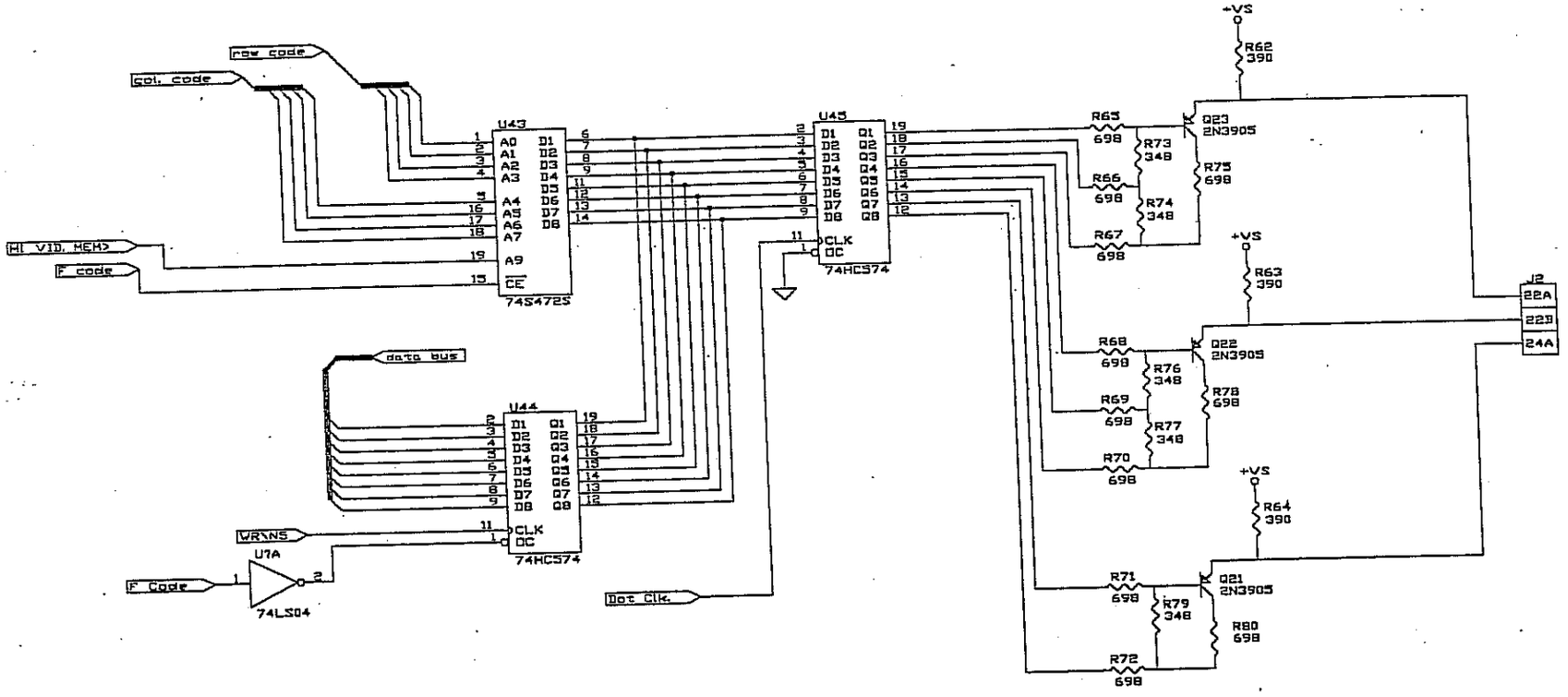
Before removing the processor board, check the following areas:

- ✓ Check the 7VAC, 5A fuse
- ✓ Use this diagram to isolate mother board traces (J/P11-1 to J/P1-21A & 21B)

If that doesn't work, try the following steps:

- ⇨ Test D1: if "open" replace it (current suppressor 2.8A), and test

Problem: Color is Over or Under Driven



Before removing the processor board, check the following areas:

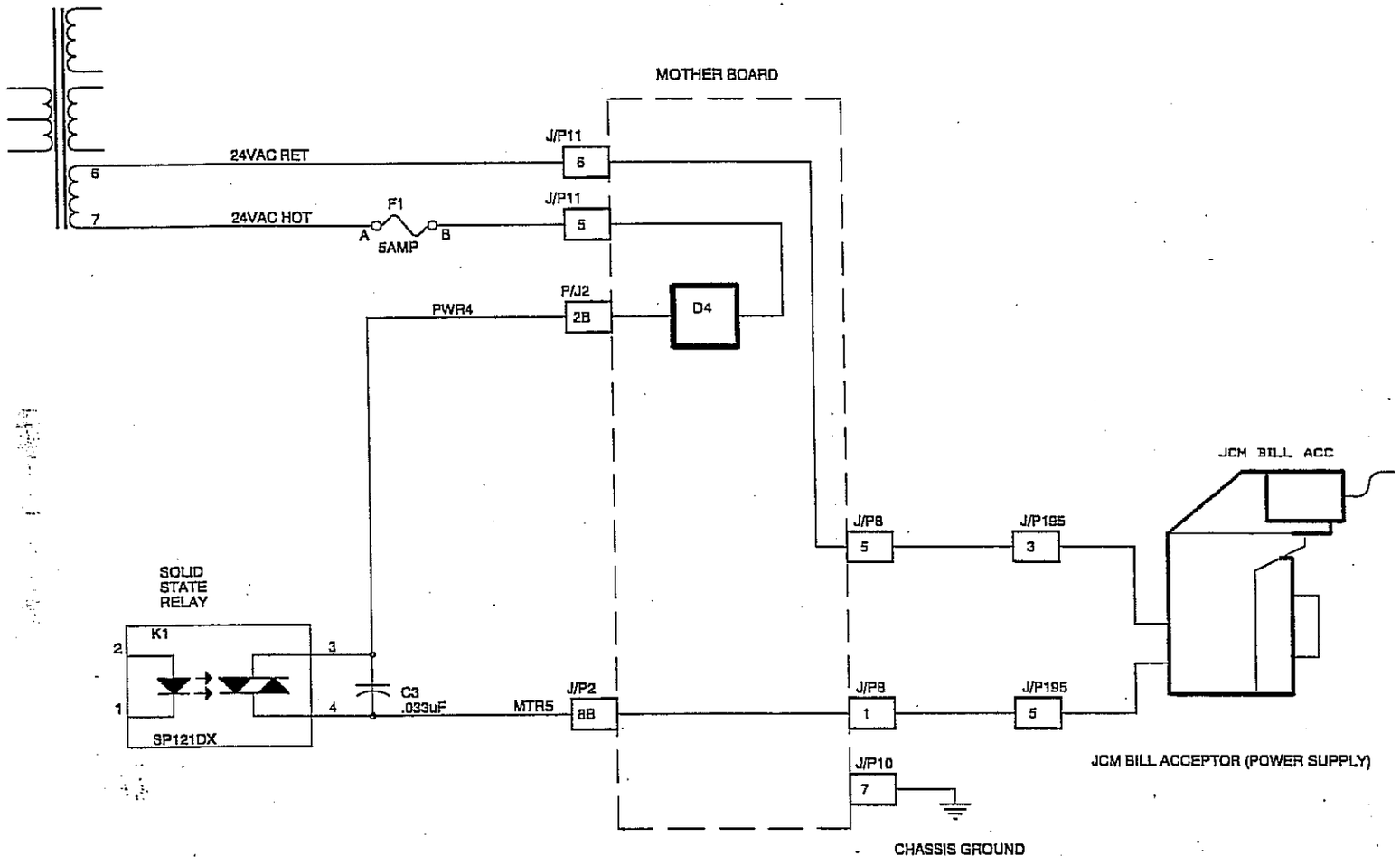
✓ Adjust the video from the dials behind the monitor

If that doesn't work, try the following steps:

⇨ Replace the monitor with a known "good one"

⇨ If the problem is on the processor board, replace the driver in question (red is Q23, green is Q22, blue is Q21, all three are 2N3905s)

Problem: Bill Acceptor is Missing 24 VAC Output Signal



Before removing the processor board, check the following areas:

- ✓ Use output test 27 to verify the problem
- ✓ Check 24V, 5A fuse
- ✓ Check wires and connectors for defects
- ✓ See note below

If that doesn't work, try the following steps:

- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are good, then use this diagram to test for wire continuity

Note:

Denomination must be set to a value other than 0. In credit mode, the number of credits accumulated must be less than maximum coin-in unless software permits programming level.

WIRE CONTINUITY TEST
J/P195-3 to J/P8-5
J/P195-5 to J/P8-1

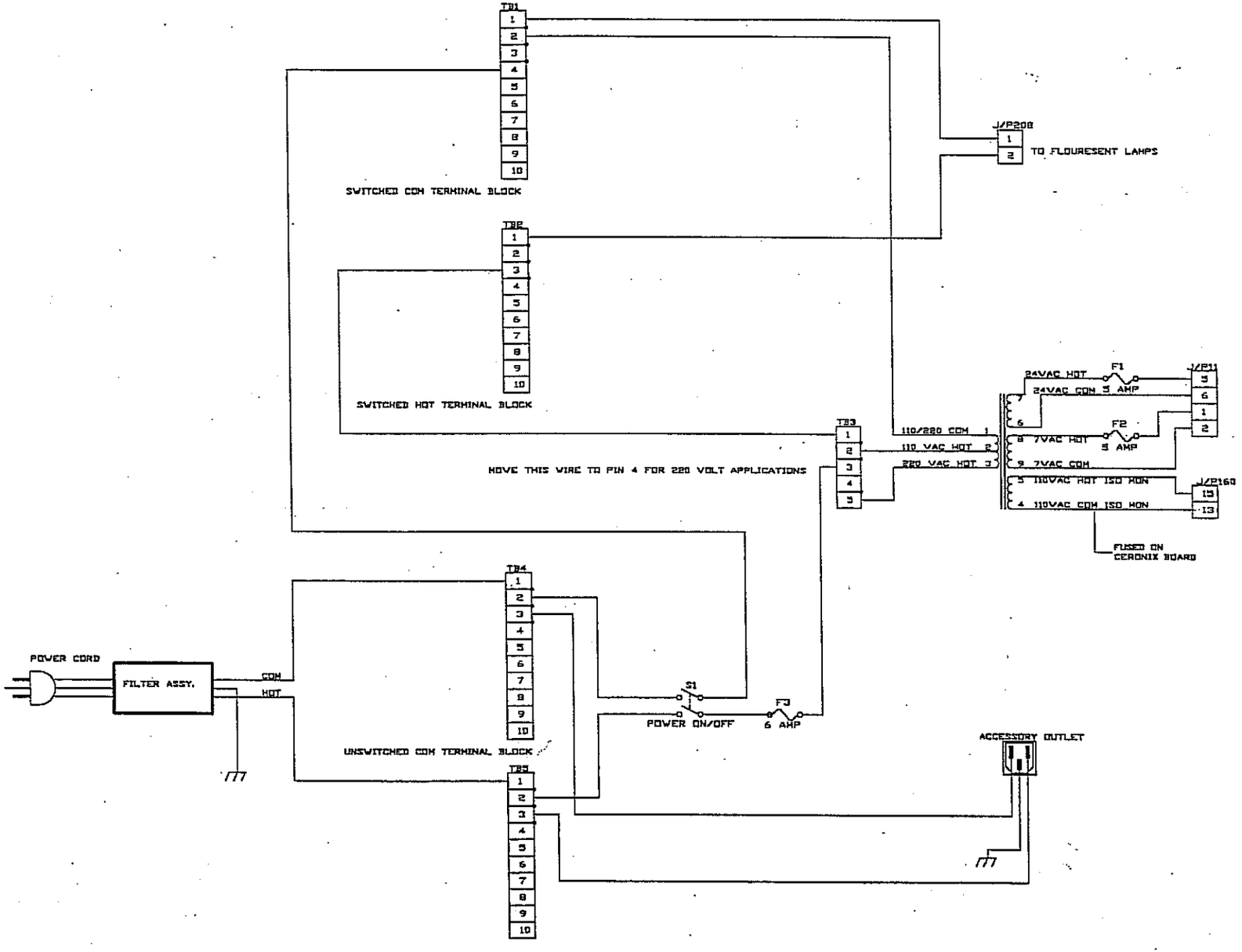
MOTHER BOARD CONTINUITY TEST
J/P8-5 to J/P11-6
J/P8-1 to J/P2-8B
J/P11-5 to J/P2-2B

PROCESSOR BOARD TEST
Check from K6 to edge for burned trace
Test K6 (SP121DX) - if problem continues, then replace.
Test C3 - if driver ever turns on by itself
Test D4 (current suppressor 1.65A) RXE110

Problem: Power Supply – Common Problems

1. "Hot"machine (players get electrical shock) – Check from house outlet to power strip to machine with "outlet polarity checker" for incorrect wiring.
2. Machine "blacked out" (no functions)
   a. If 110VAC 6A fuse keeps blowing, disconnect the hopper SSR and J/P208 (fluorescent connection) to isolate to main transformer and back.
   b. Replace the fuse (always use fast blow fuses with the correct rating).
   c. If the fuse does not blow, reconnect J/P208. This will indicate whether the problem is in the fluorescent circuit or in the SSR.
3. 24VAC fuse or 7VAC fuse constantly blows
   a. Remove the processor board and disconnect all mother board connections, then reseat the processor board.
   b. Replace the fuse (always use fast-blow fuses with the correct rating).
   c. If the fuse does not blow, then remove and replace the processor board to determine if the processor board or mother board is bad.
   d. If the original processor board and mother board did not cause the fuse to blow, then reconnect each connector one by one until the fuse blows.
   e. Trace the harnessing from the last connector to its input or output.
   f. Replace the device, first then check wiring insulation for breaks.
4. Be aware that wires must be fully seated in the terminal block (commoning blocks).
5. Be aware that a bad power strip or a bad power cord will result in power problems.
6. To ensure proper current and voltage for each machine, connect no more than five machines per 20 Amp circuit breaker.
7. A potential hazard exists when a circuit is overloaded. From ground to neutral (at the outlet or across two machines) should not exceed 3VAC.
8. A device connected to the accessory outlet that draws over 2 amps can degrade the filter.

Player's Edge-Plus 110 VAC Power Supply

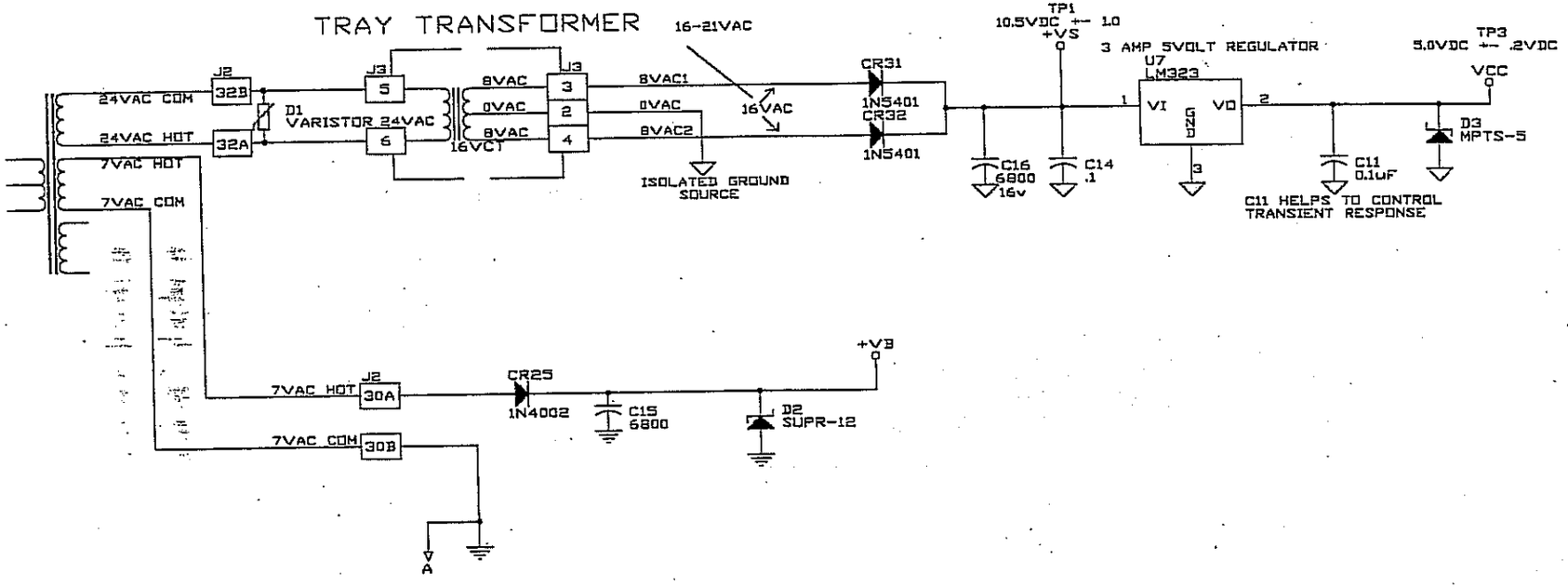


The AC power is routed from the floor through the machine drop area to the lower module. The AC power is then connected by plug to a filter (p/n 272 006 0x). The earth ground is delivered by the AC cord and connects to the lower module for chassis ground. This sets the machine frame or chassis at earth ground.

The 110VAC goes directly to the auxiliary receptacle after which it meets a DPST toggle switch, then it is fused at F3 (110V 6A). It serves three separate functions: 110VAC is delivered to the primary of the main transformer; 110VAC is delivered to all fluorescent lamps; and, 110VAC is delivered to the hopper SSR.

The secondary of the main transformer will provide: 24VAC for the processor board tray transformer, 7VAC for incandescent lamps, and 110 VAC for the video monitor.

Problem: Player's Edge-Plus Power Supply Problems

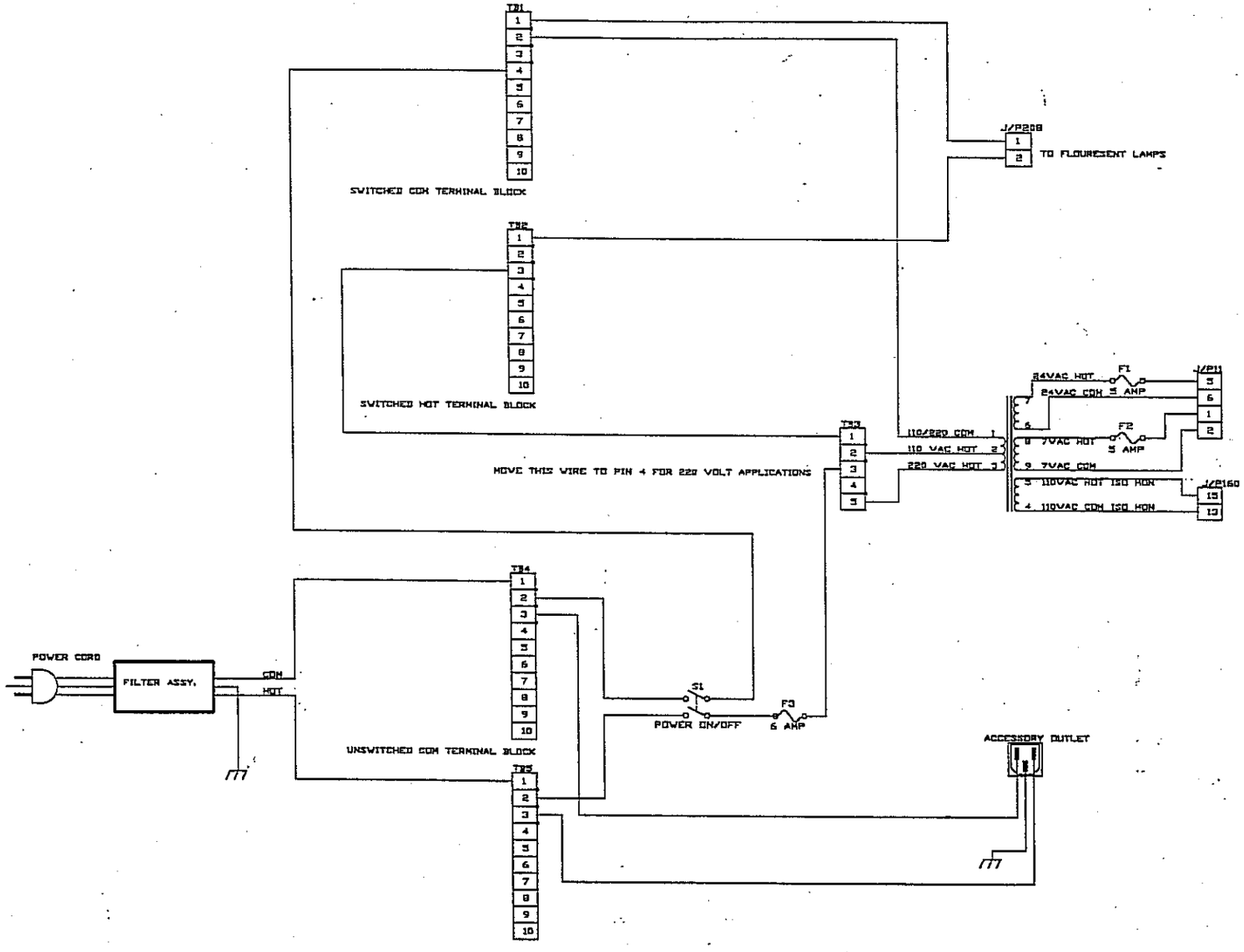


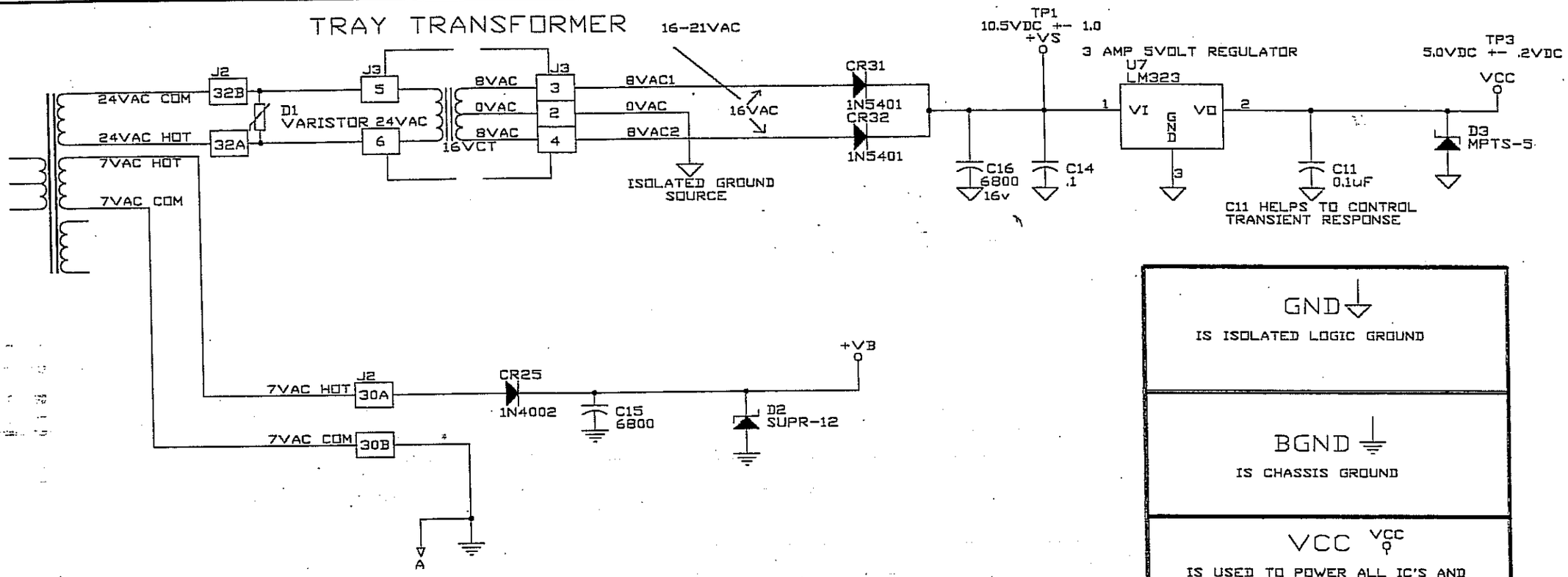
Before removing the processor board, check the following areas:

- ✓ Tray transformer: 24VAC - 16VAC center tapped secondary
- ✓ Center tap is the source for logic ground
- ✓ Three important logic ground voltages are the sequentially developed: Vun (10.5-11.5VDC), and 5.6VDC (RAM)
- ✓ VB is developed from the 7VAC secondary tap of the main transformer
- ✓ VB becomes a half wave rectified, unregulated DC voltage for I/O drive

Before removing the processor board, check the following areas:

- ⇨ Check to see if the rectifier diode is passing VAC or not passing VDC
- ⇨ Check the filter capacitor to see if there is too much VAC (ripple voltage)
- ⇨ Check the continuity of Vb and +5V


TB1
SWITCHED COM TERMINAL BLOCK
TB2
SWITCHED HOT TERMINAL BLOCK
J/P208
TO FLOURESENT LAMPS
T33
MOVE THIS WIRE TO PIN 4 FOR 220 VOLT APPLICATIONS
110/220 COM
110 VAC HOT
220 VAC HOT
24VAC HOT
24VAC COM
7VAC HOT
7VAC COM
110VAC HOT ISO MON
110VAC COM ISO MON
F1
5 AMP
F2
5 AMP
J/P11
J/P160
POWER CORD
FILTER ASSY.
COM
HOT
TB4
UNSWITCHED COM TERMINAL BLOCK
TB5
S1
POWER ON/OFF
F3
6 AMP
ACCESSORY OUTLET



GND

IS ISOLATED LOGIC GROUND

BGND

IS CHASSIS GROUND

VCC

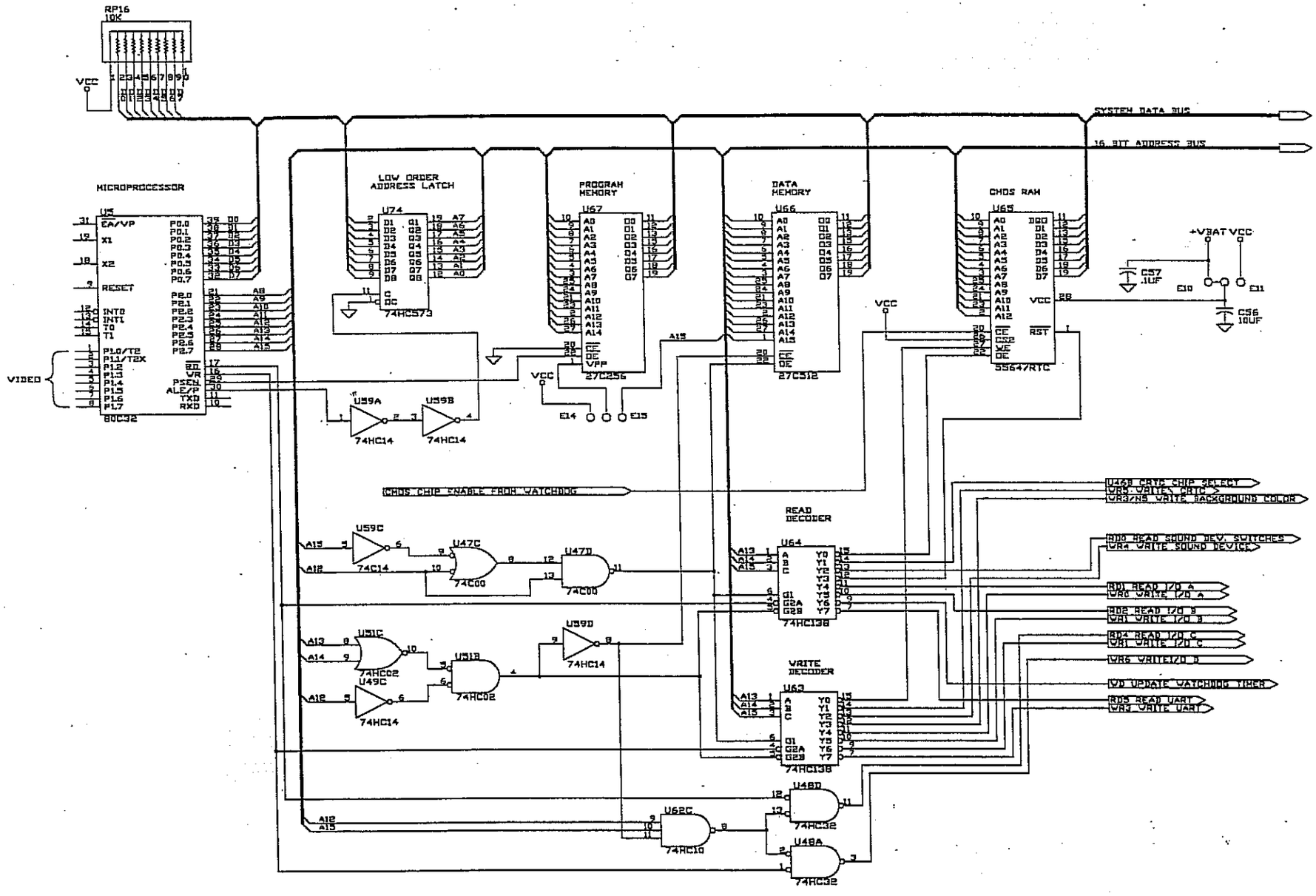
IS USED TO POWER ALL IC'S AND OTHER DEVICES INSIDE THE OPTO ISOLATION

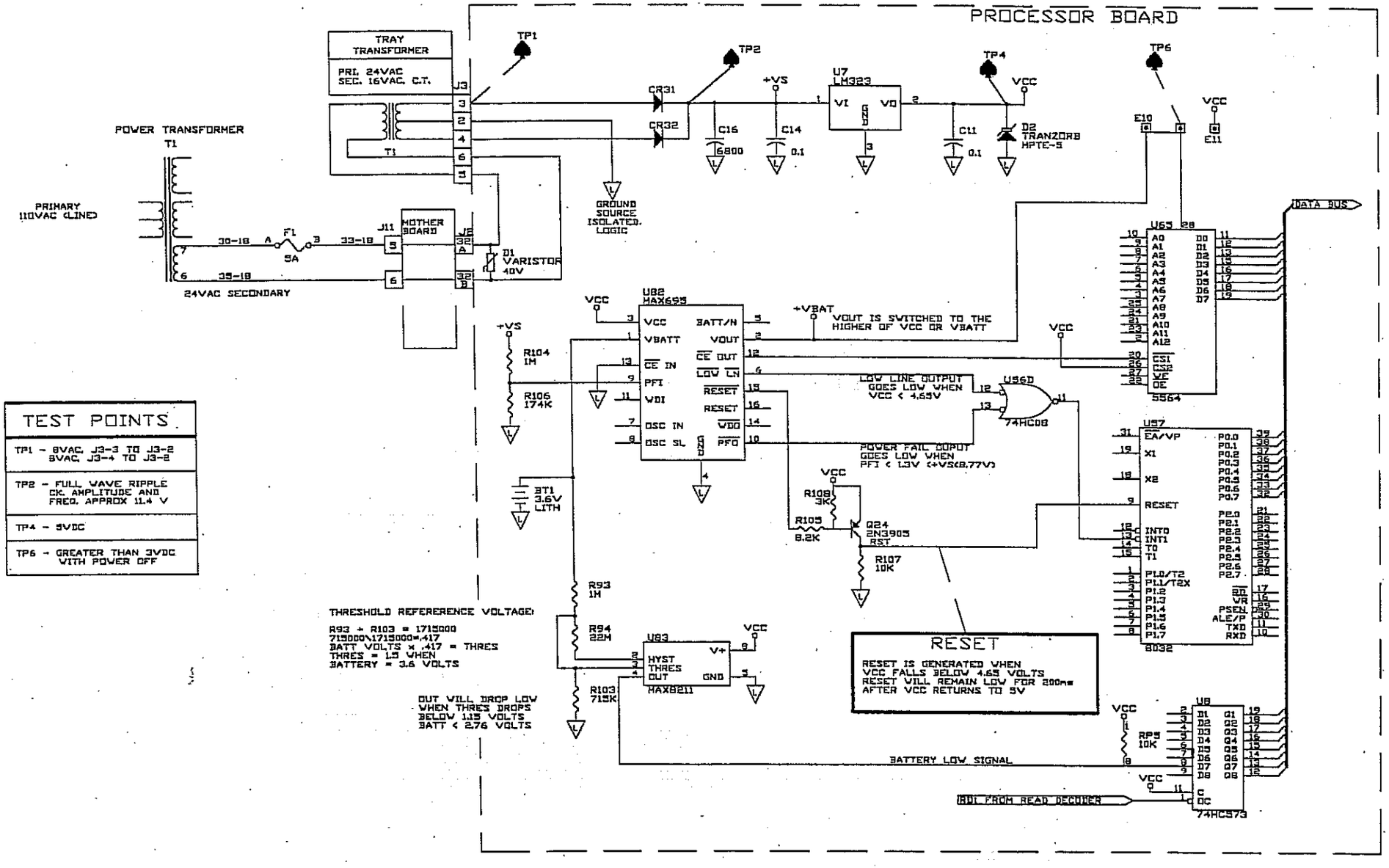
+Vb

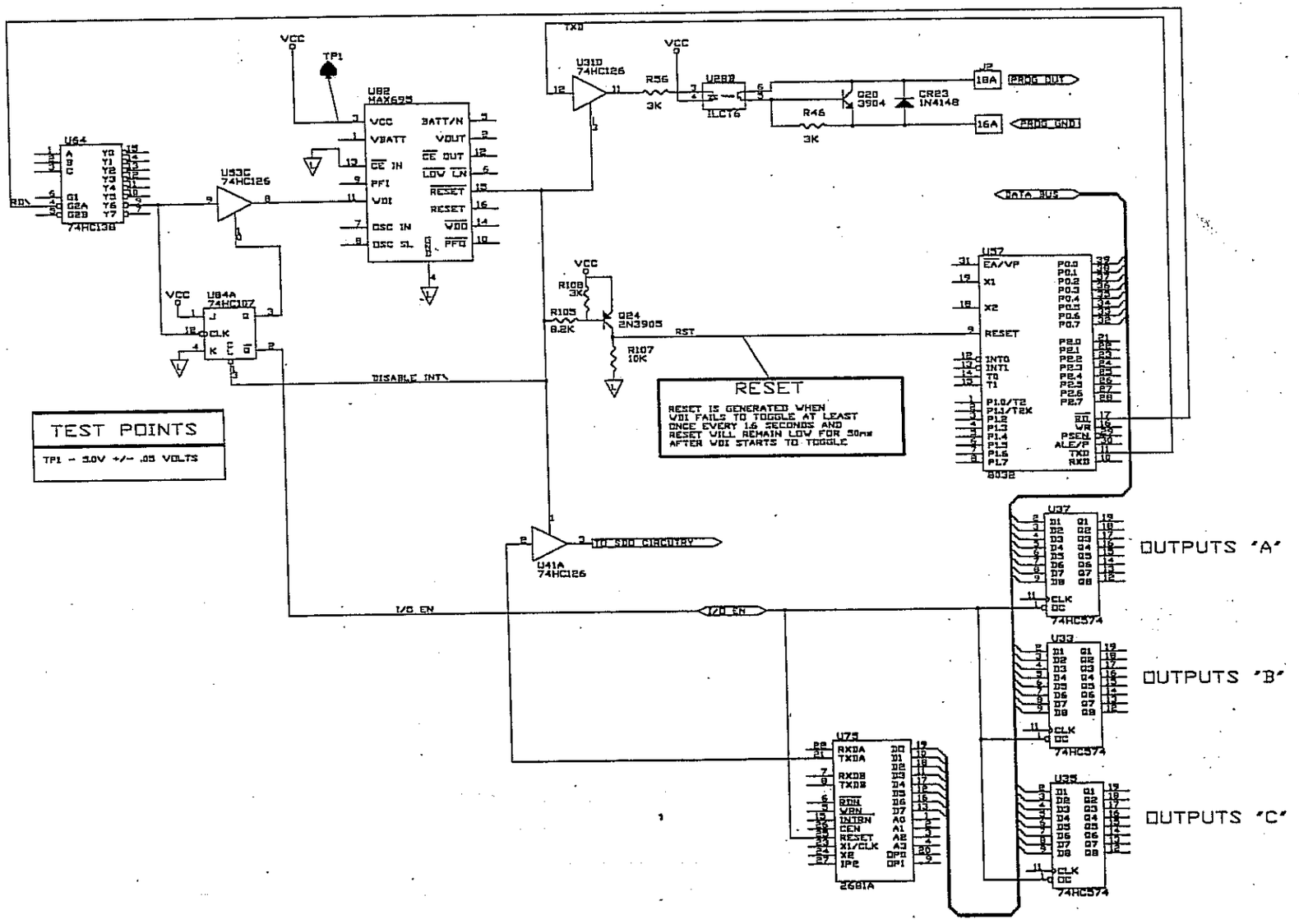
IS USED TO POWER THE OPTOS AND OTHER DEVICES OUTSIDE THE OPTO ISOLATION

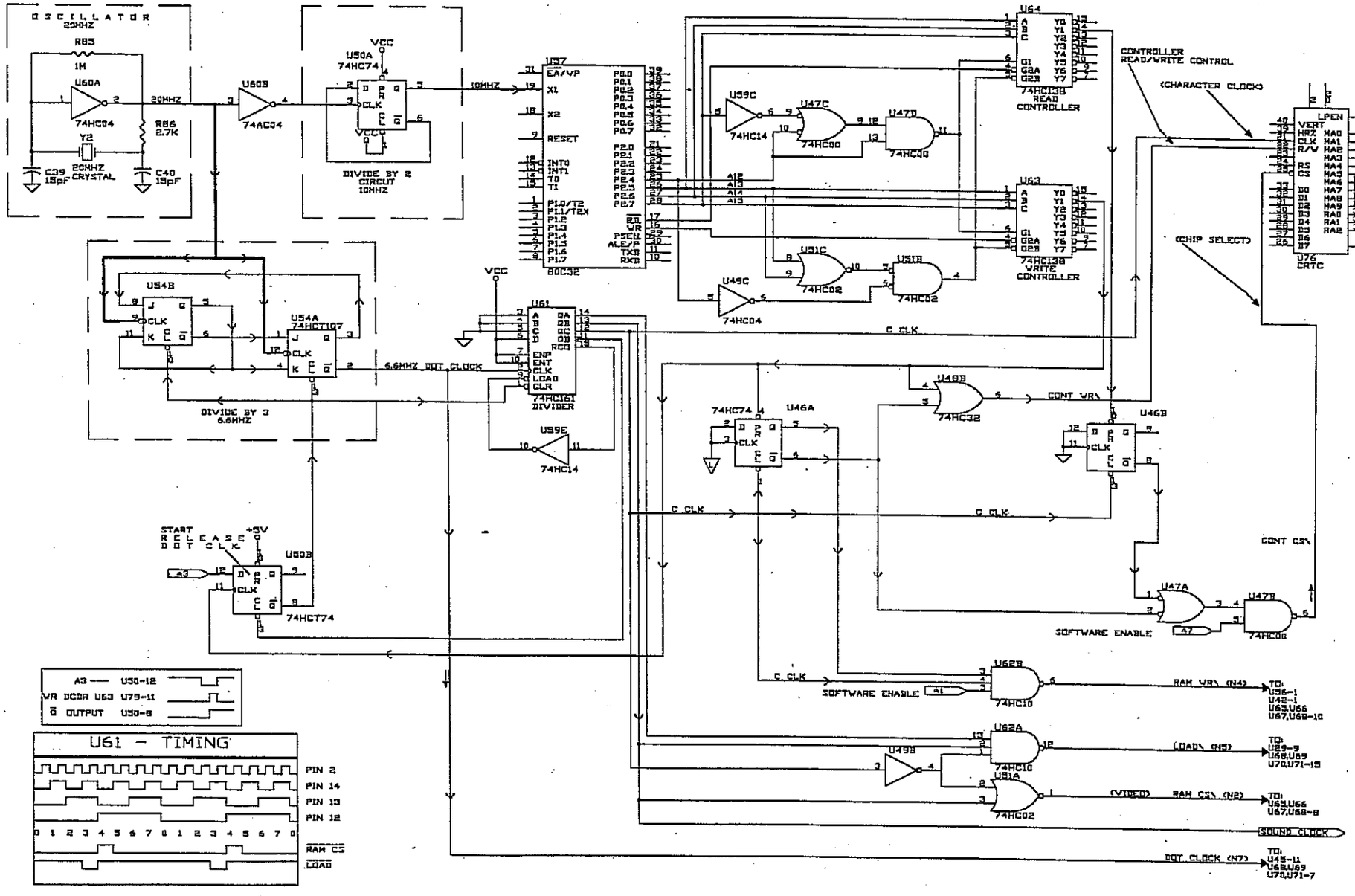
+VS

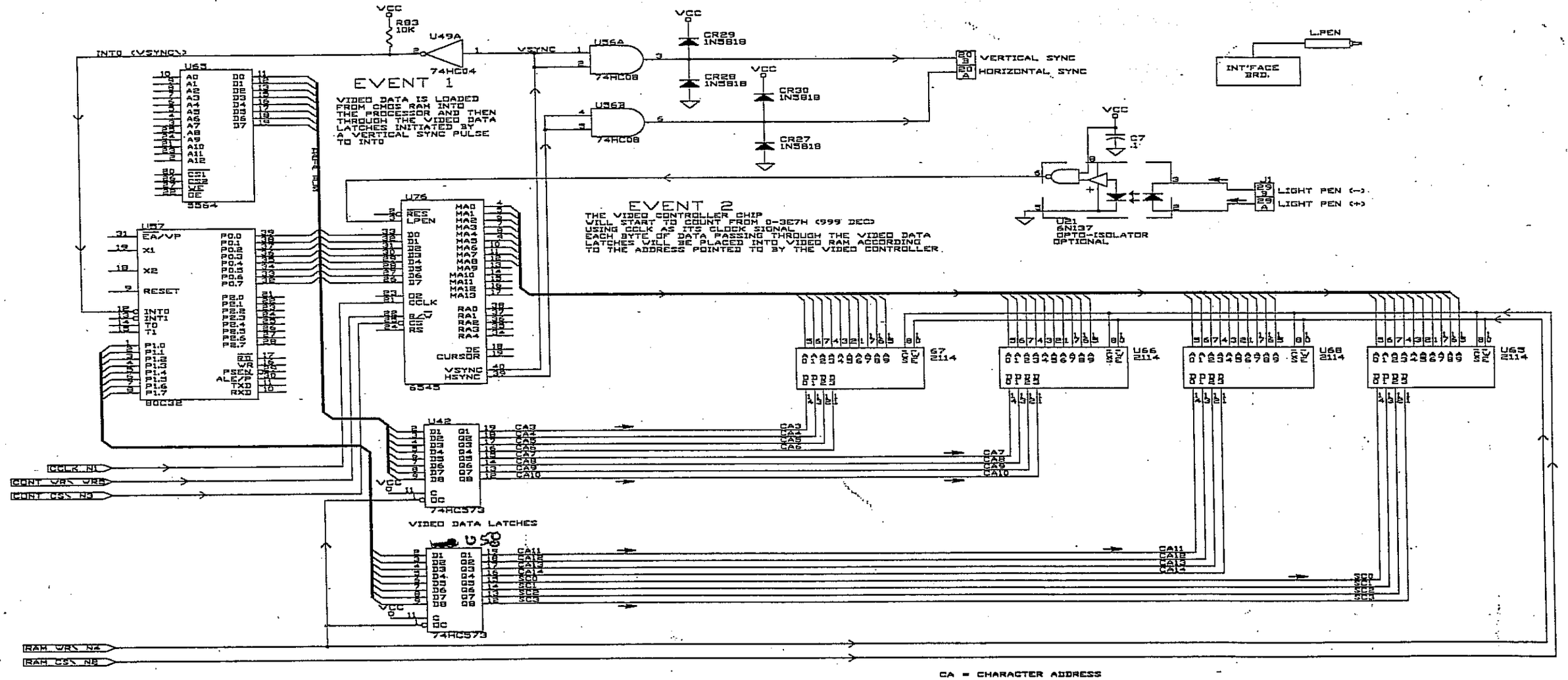
IS UNREGULATED VOLTAGE AND IS USED TO POWER VARIOUS OPTOS AND THE SOUND AMPLIFIER WHERE A HIGHER VOLTAGE IS REQUIRED


RP16
10K
VCC
MICROPROCESSOR
80C32
LOW ORDER
ADDRESS LATCH
74HCS73
PROGRAM
MEMORY
27C256
DATA
MEMORY
27C512
CMOS RAM
55647RTC
SYSTEM DATA BUS
16 BIT ADDRESS BUS
+VBAT
C57
.1UF
C56
10UF
VIDEO
74HC14
74HC00
74HC02
74HC10
74HC32
74HC138
READ
DECODER
WRITE
DECODER
CMOS CHIP ENABLE FROM WATCHDOG
RD0 READ SOUND DEV. SWITCHES
WR4 WRITE SOUND DEVICE
RD1 READ I/O A
WR6 WRITE I/O A
RD2 READ I/O B
WR1 WRITE I/O B
RD4 READ I/O C
WR1 WRITE I/O C
WR6 WRITE I/O B
WD UPDATE WATCHDOG TIMER
RD5 READ UART
WR3 WRITE UART


PROCESSOR BOARD
TRAY TRANSFORMER
PRI. 24VAC
SEC. 16VAC. C.T.
POWER TRANSFORMER
T1
PRIMARY 110VAC (LINE)
24VAC SECONDARY
30-18
33-18
35-18
F1
5A
J11
MOTHER BOARD
J2
D1 VARISTOR 40V
TP1
TP2
TP4
TP6
CR31
CR32
C16 6800
C14 0.1
C11 0.1
U7 LM323
VI
VO
GND
D2 TRANZORB HPTE-5
E10
E11
VCC
+VS
GROUND SOURCE ISOLATED LOGIC
DATA BUS
U65
5564
U82 MAX695
VCC
VBATT
GND
BATT/N
VOUT
CE OUT
LOW LN
RESET
VOD
PFO
CE IN
PFI
WDI
OSC IN
OSC SL
+VBAT
VOUT IS SWITCHED TO THE HIGHER OF VCC OR VBATT
R104 1M
R106 174K
BT1 3.6V LITH
LOW LINE OUTPUT GOES LOW WHEN VCC < 4.65V
U56D
74HC08
POWER FAIL OUPUT GOES LOW WHEN PFI < 1.3V (+VS<8.77V)
R108 3K
R105 8.2K
Q24 2N3905
R107 10K
U57
8032
EA/VP
X1
X2
RESET
INT0
INT1
T0
T1
P1.0/T2
P1.1/T2X
PSEN
ALE/P
TXD
RXD
R93 1M
R94 22M
R103 715K
THRESHOLD REFERENCE VOLTAGE:
R93 + R103 = 1715000
715000\1715000=.417
BATT VOLTS x .417 = THRES
THRES = 1.5 WHEN
BATTERY = 3.6 VOLTS
U83
MAX8211
HYST
THRES
OUT
V+
GND
OUT WILL DROP LOW WHEN THRES DROPS BELOW 1.15 VOLTS
BATT < 2.76 VOLTS
RESET
RESET IS GENERATED WHEN VCC FALLS BELOW 4.65 VOLTS
RESET WILL REMAIN LOW FOR 200ms AFTER VCC RETURNS TO 5V
U8
RP5 10K
BATTERY LOW SIGNAL
WDI FROM READ DECODER
74HC573
TEST POINTS
TP1 - 8VAC. J3-3 TO J3-2
8VAC. J3-4 TO J3-2
TP2 - FULL WAVE RIPPLE CK. AMPLITUDE AND FREQ. APPROX 11.4 V
TP4 - 5VDC
TP6 - GREATER THAN 3VDC WITH POWER OFF


TEST POINTS
TP1 - 5.0V +/- .05 VOLTS
RESET
RESET IS GENERATED WHEN VDI FAILS TO TOGGLE AT LEAST ONCE EVERY 1.6 SECONDS AND RESET WILL REMAIN LOW FOR 50ms AFTER VDI STARTS TO TOGGLE
VCC
TP1
U82 MAX695
U64 74HC138
U53C 74HC126
U84A 74HC107
U310 74HC126
U41A 74HC126
U37 74HC574
U33 74HC574
U35 74HC574
U75 2681A
U57 8032
R56 3K
R46 3K
R108 3K
R105 8.2K
R107 10K
Q20 3904
Q24 2N3905
CR23 IN4148
DISABLE INT\
I/O EN
RST
DATA BUS
PROG OUT
PROG GND
OUTPUTS "A"
OUTPUTS "B"
OUTPUTS "C"


OSCILLATOR 20MHZ
R85 1M
U60A 74HC04
20MHZ
R86 2.7K
Y2 20MHZ CRYSTAL
C39 15pF
C40 15pF
U60B 74AC04
VCC
U50A 74HC74
DIVIDE BY 2 CIRCUIT 10MHZ
10MHZ
U57 80C32
EA/VP
X1
X2
RESET
INT0
INT1
T0
T1
P1.0/T2
P1.1/T2EX
P1.2
P1.3
P1.4
P1.5
P1.6
P1.7
P0.0
P0.1
P0.2
P0.3
P0.4
P0.5
P0.6
P0.7
P2.0
P2.1
P2.2
P2.3
P2.4
P2.5
P2.6
P2.7
PSEN
ALE/P
TXD
RXD
U54B
U54A 74HCT107
DIVIDE BY 3 6.6MHZ
6.6MHZ DOT CLOCK
U61 74HC161 DIVIDER
U59E 74HC14
U59C 74HC14
U47C 74HC00
U47D 74HC00
U64 74HC138 READ CONTROLLER
U63 74HC138 WRITE CONTROLLER
U51C 74HC02
U51B 74HC02
U49C 74HC04
U76 CRTC
CONTROLLER READ/WRITE CONTROL
(CHARACTER CLOCK)
(CHIP SELECT)
C CLK
U48B 74HC32
CONT VR\
U46A 74HC74
U46B
CONT CS\
U47A
U47B 74HC00
SOFTWARE ENABLE
START RELEASE DOT CLK
+5V
U50B 74HCT74
U62B 74HC10
RAM VR\ (N4)
U62A 74HC10
LOAD\ (N5)
U49B
U51A 74HC02
(VIDEO) RAM CS\ (N2)
SOUND CLOCK
DOT CLOCK (N7)
A3 —— U50-12
VR DCDR U63 U79-11
Q OUTPUT U50-8
U61 - TIMING
PIN 2
PIN 14
PIN 13
PIN 12
0 1 2 3 4 5 6 7 0 1 2 3 4 5 6 7 0
RAM CS
LOAD



THE "RAM WRITE" CONTROL LINE WILL ENABEL U42 AND U56 DATA LATCHES. THE INFORMATION LATCHED THROUGH WILL BE "CA" CHARACTER ADDRESSES AND "SC", COLUMN ADDRESS CODES FOR THE "CAP" PROM.
THE CA3 THROUGH CA14 LINES WILL ADDRESS THE CHARACTER ROMS, SIMULTANEOUSLY, WHILE THE "RAM WRITE" IS LOW, THE VIDEO RAMS WILL "REMEMBER" THE CHARACTER ADDRESSES PRESENTED TO THE CHARACTER PROMS THROUGH DATA LATCHES U42 AND U56.

VIDEO RAMS ARE WRITTEN TO WHEN (RAM WR) IS IN THE LOW STATE. WHEN (RAM WR) IS IN IS IN THE HIGH STATE, THE VIDEO RAMS ARE REFRESHING OR "REMEMBERING" THE CHARACTER ADDRESSES AND WILL UPDATE THE CHARACTER ROMS UNTIL THE NEXT WRITE OR UPDATE TO RAM OCCURS.

THE NEXT WRITE TO VIDEO RAM IS NECESSARY ONLY WHEN INFORMATION ON THE SCREEN IS ALTERED.

CA = CHARACTER ADDRESS

RA = ROW ADDRESS
SC0 THROUGH SC3 ARE THE COLUMN

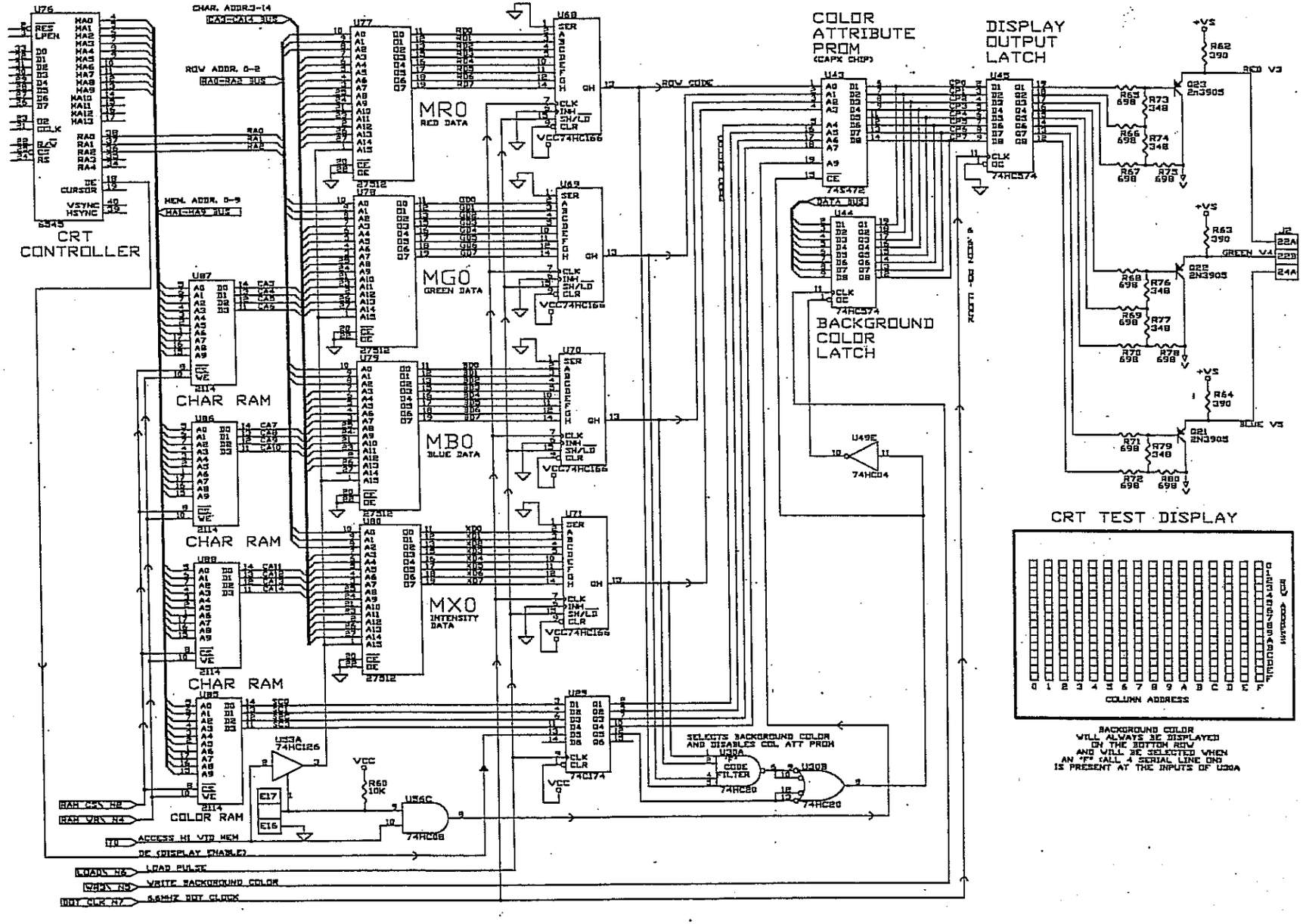
SC = STATIONARY COLOR ADDRESS
ADDRESS FOR CAP PROM.

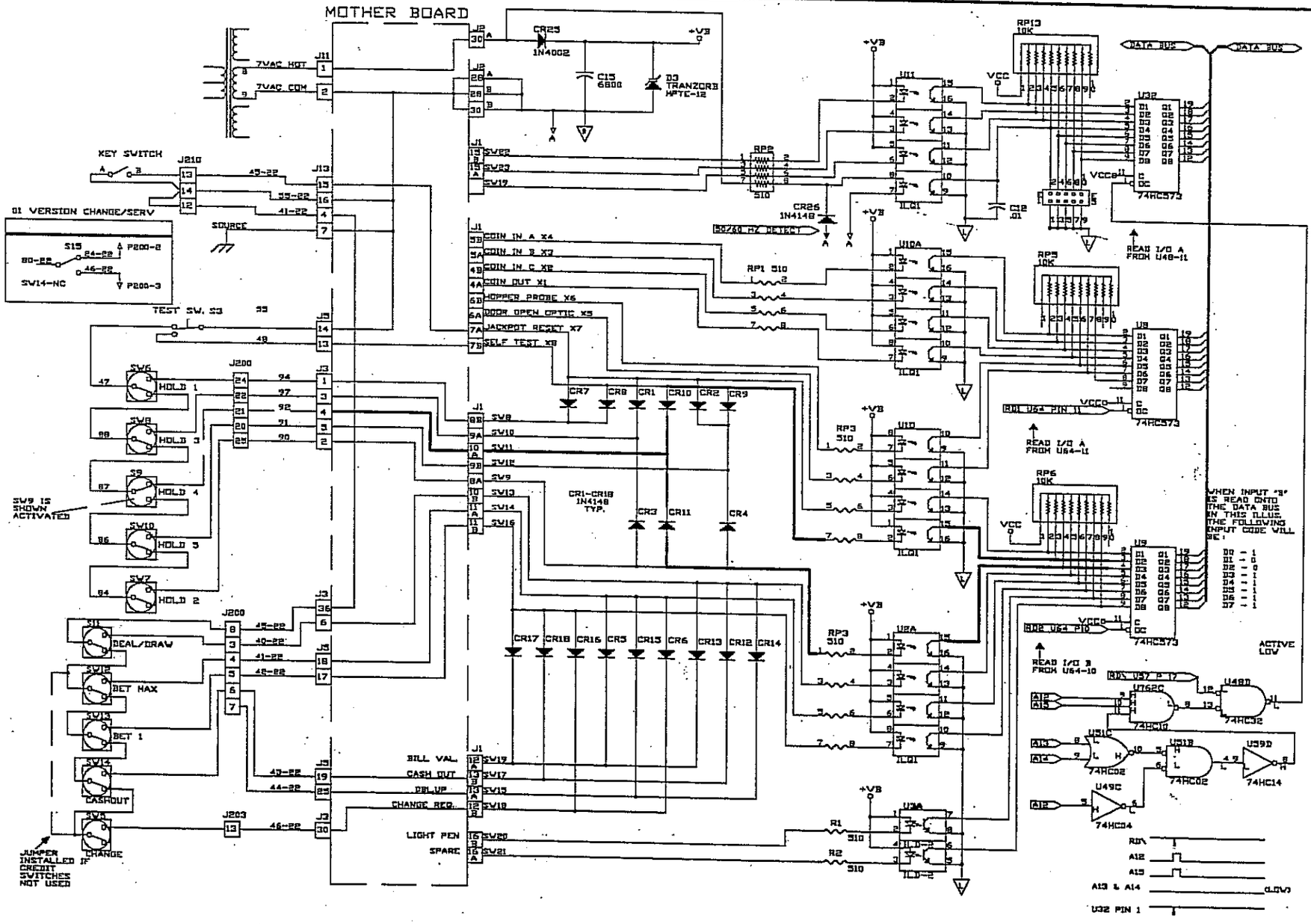
CONT WRITE = WRITE TO CRTC, ACTIVE LOW

CONT CS = CONTROLLER CHIP SELECT, ACTIVE HIGH

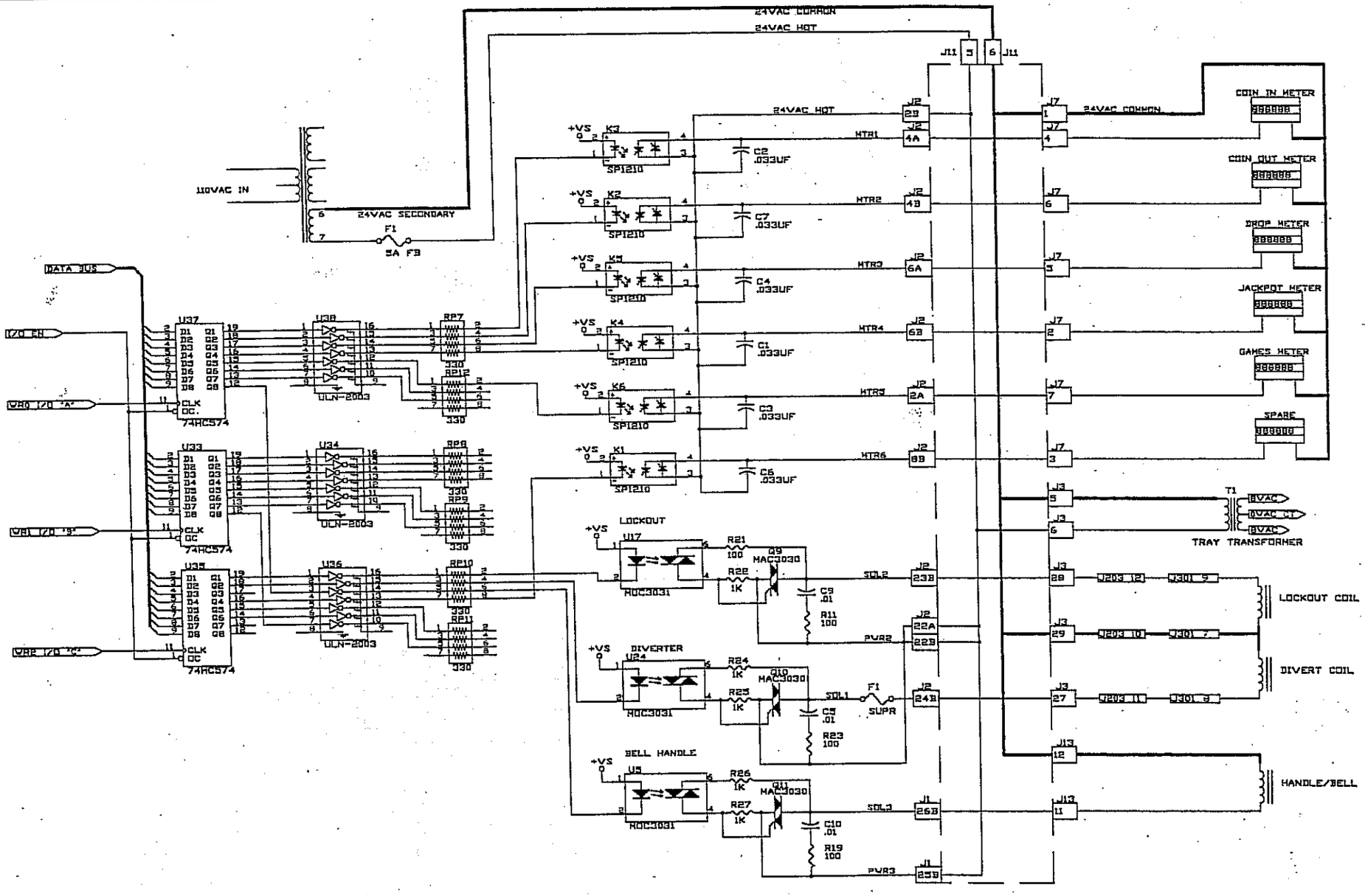
RAM CHIP SELECT = RAM CHIP SELECT, ACTIVE LOW
DESELECT, ACTIVE HIGH

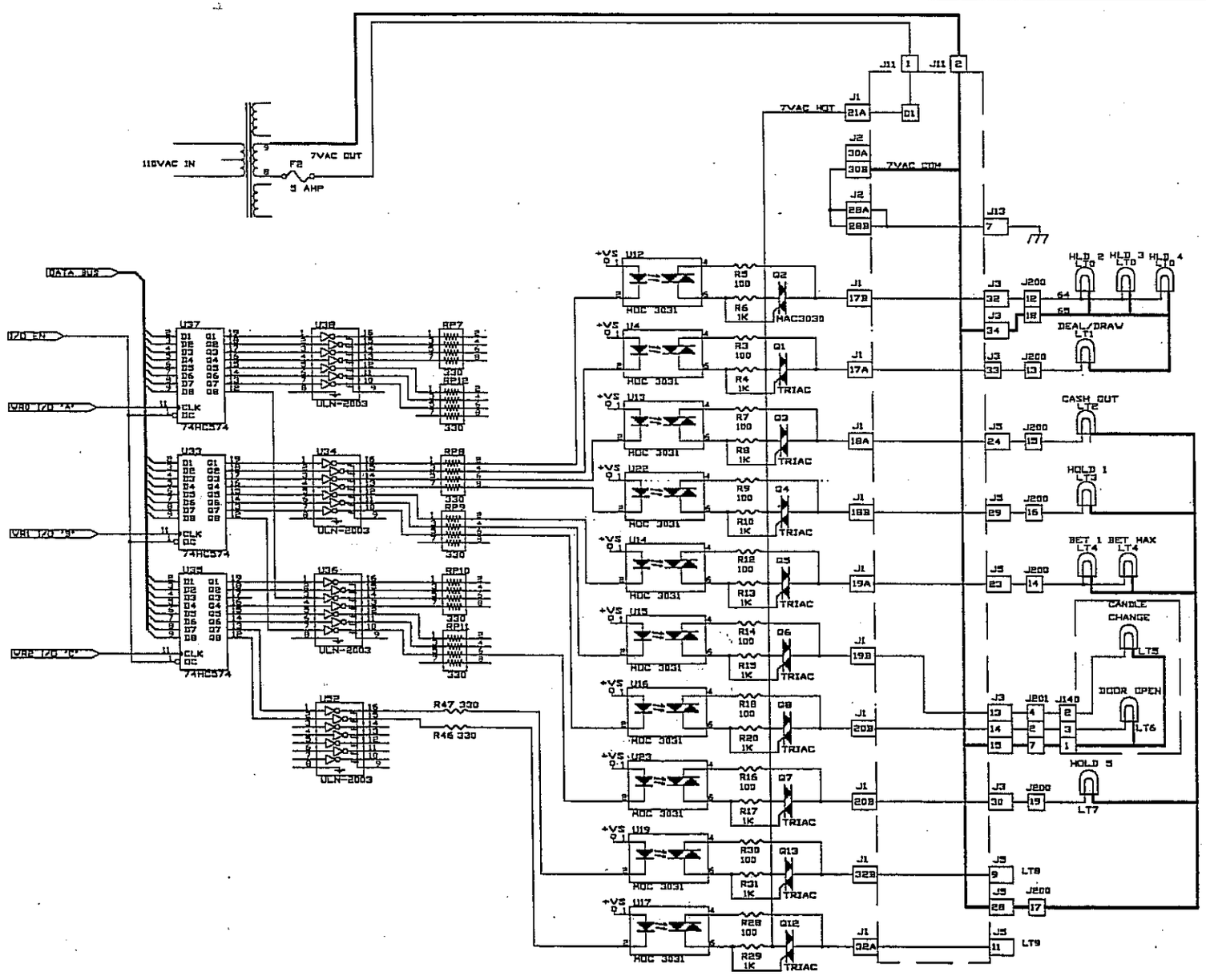
RAM WRITE = WRITE VIDEO RAMS, ACTIVE LOW
READ VIDEO RAMS, ACTIVE HIGH


CRT CONTROLLER
CHAR. ADDR3-14
CA3-CA14 BUS
ROW ADDR. 0-2
HA0-HA2 BUS
MEM. ADDR. 0-9
HA1-HA9 BUS
CHAR RAM
CHAR RAM
CHAR RAM
COLOR RAM
MR0
RED DATA
MG0
GREEN DATA
MB0
BLUE DATA
MX0
INTENSITY DATA
ROW CODE
COLOR ATTRIBUTE PROM
(CAPX CHIP)
DISPLAY OUTPUT LATCH
BACKGROUND COLOR LATCH
DATA BUS
CRT TEST DISPLAY
COLUMN ADDRESS
SELECTS BACKGROUND COLOR AND DISABLES COL ATT PROM
BACKGROUND COLOR WILL ALWAYS BE DISPLAYED ON THE BOTTOM ROW AND WILL BE SELECTED WHEN AN "F" (ALL 4 SERIAL LINE ON) IS PRESENT AT THE INPUTS OF U30A
ACCESS HI VID MEM
DE (DISPLAY ENABLE)
LOAD PULSE
WRITE BACKGROUND COLOR
6.6MHZ DOT CLOCK
RED V3
GREEN V4
BLUE V5


MOTHER BOARD
7VAC HOT
7VAC COM
CR25
1N4002
+V8
C13
6800
D3
TRANZORB
KEY SWITCH
01 VERSION CHANGE/SERV
SOURCE
TEST SW. S3
HOLD 1
HOLD 3
HOLD 4
HOLD 5
HOLD 2
DEAL/DRAW
BET MAX
BET 1
CASHOUT
CHANGE
JUMPER INSTALLED IF CREDIT SWITCHES NOT USED
SW9 IS SHOWN ACTIVATED
COIN IN A X4
COIN IN B X3
COIN IN C X2
COIN OUT X1
HOPPER PROBE X6
DOOR OPEN OPTIC X5
JACKPOT RESET X7
SELF TEST X8
CR1-CR18 1N4148 TYP.
BILL VAL.
CASH OUT
PBL UP
CHANGE REQ.
LIGHT PEN
SPARE
CR26 1N4148
50/60 HZ DETECT
DATA BUS
74HC573
READ I/O A FROM U48-11
READ I/O A FROM U64-11
READ I/O B FROM U64-10
WHEN INPUT "8" IS READ ONTO THE DATA BUS IN THIS ILLUS. THE FOLLOWING INPUT CODE WILL BE:
ACTIVE LOW
74HC32
74HC10
74HC02
74HC14
74HC04

Player's Edge-Plus Output Section 1



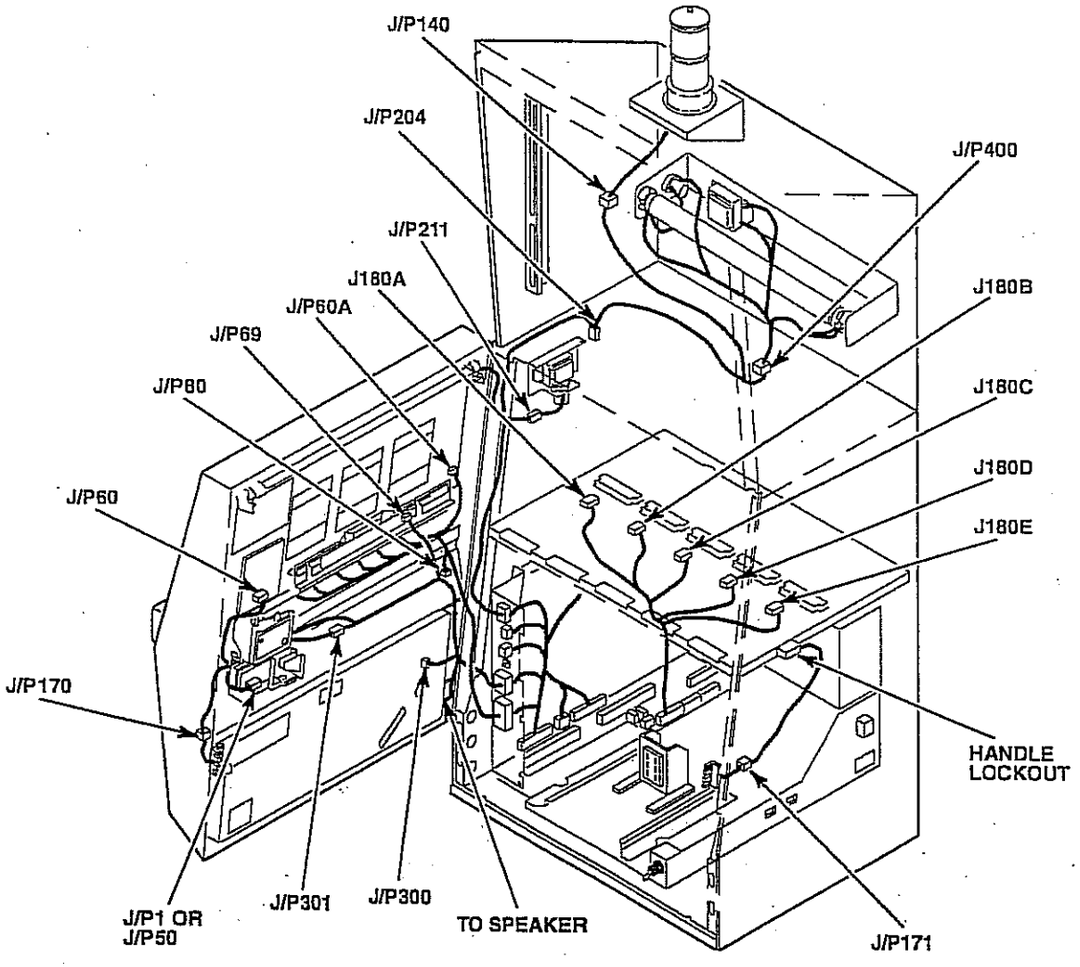

115VAC IN
F2
3 AMP
7VAC OUT
7VAC HOT
7VAC COM
DATA BUS
I/O EN
VR0 I/O "A"
VR1 I/O "B"
VR2 I/O "C"
74HC574
ULN-2003
HDC 3031
MAC3030
TRIAC
R47 330
R46 330
DEAL/DRAW
CASH OUT
HOLD 1
BET 1
BET MAX
CANDLE CHANGE
DOOR OPEN
HOLD 3
HLD 2
HLD 3
HLD 4

Schematics/Harnessing/Connectors

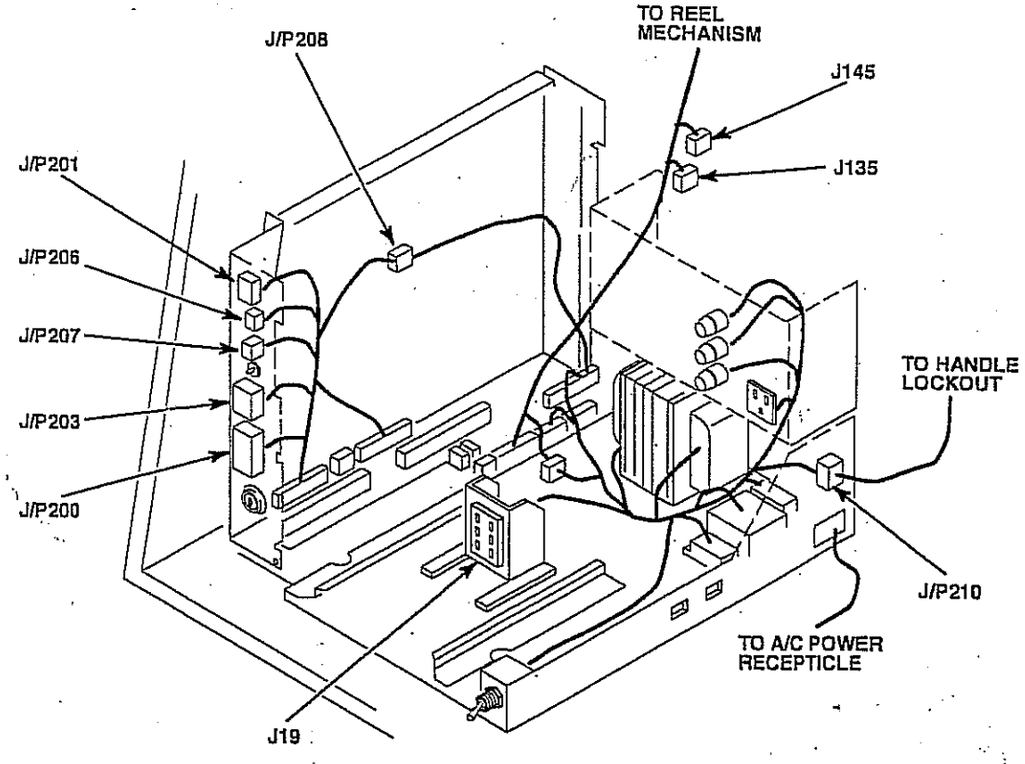
This section is an example of the type of information provided in IGT field service manuals. Different machine models (upright, drop-in-bar, slant-top) will have specific differences which include the mother board, wire harnessing and connectors.

S-Plus and Player's Edge-Plus upright machine models are discussed in this section for instructional purposes. Refer to the appropriate IGT field service manual for particular model information.

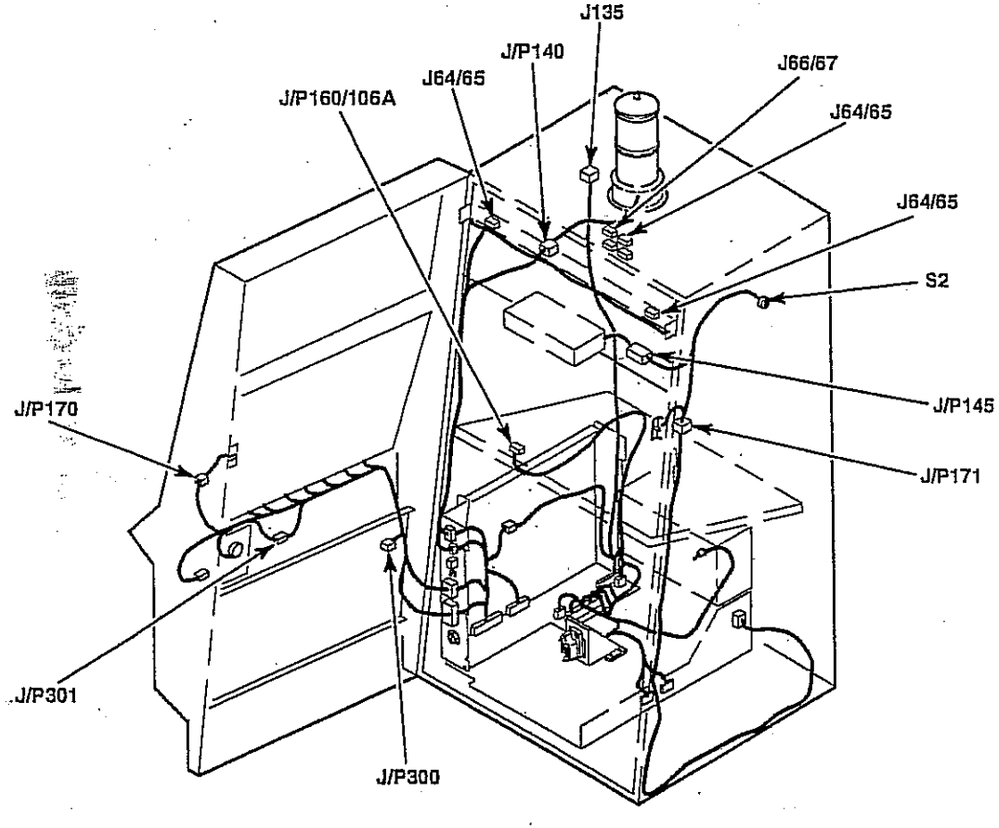
CONNECTOR OVERVIEW



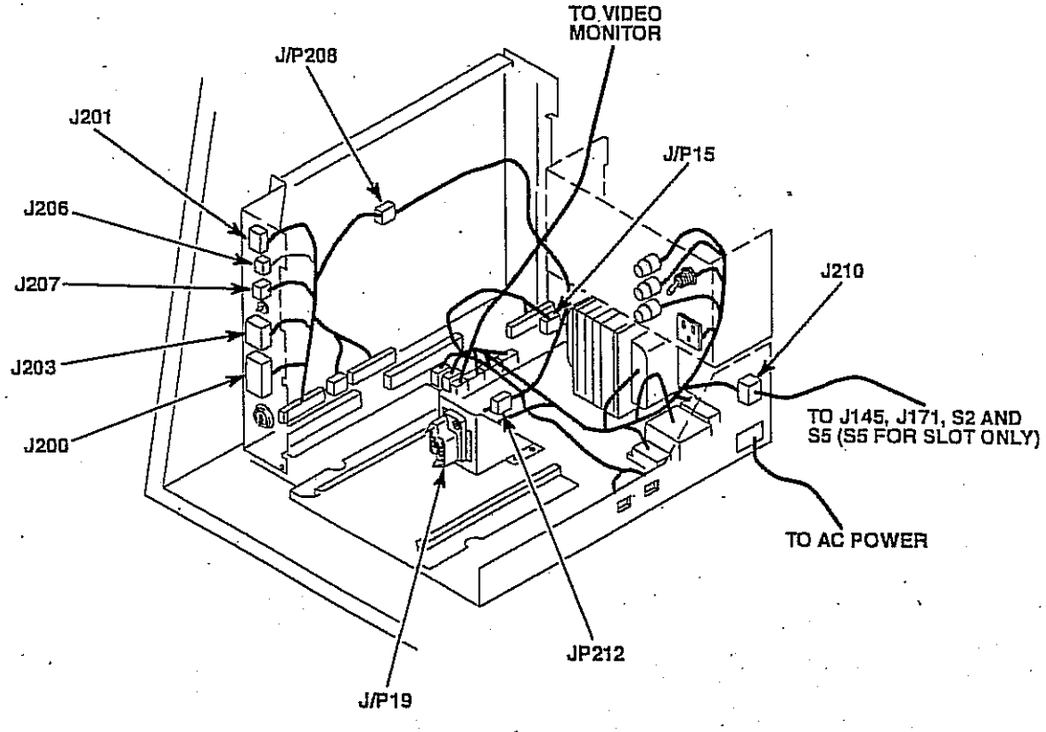
LOWER MODULE CONNECTORS



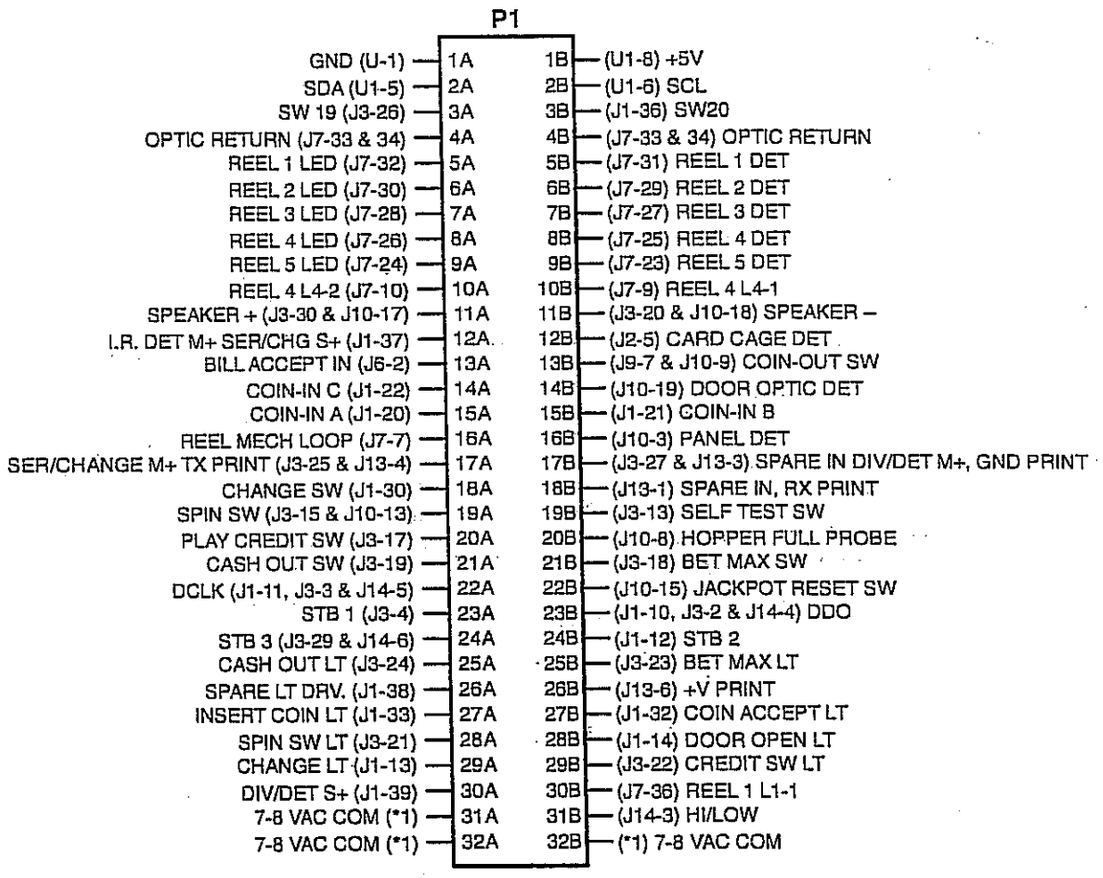
CONNECTOR OVERVIEW

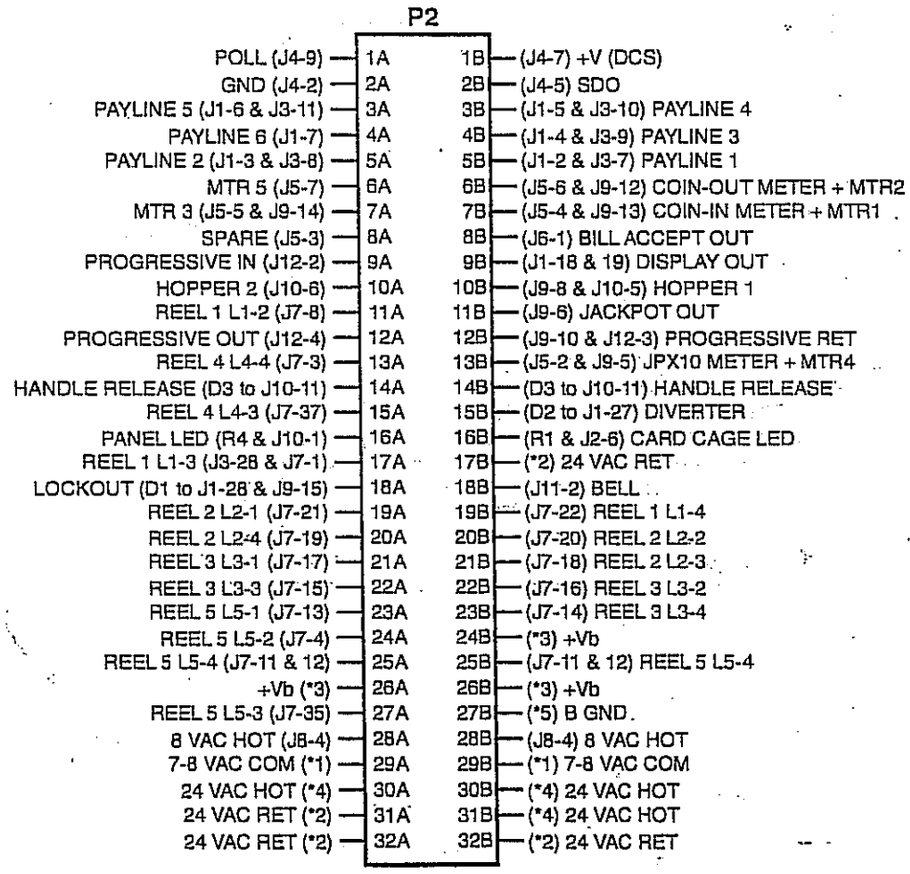


LOWER MODULE CONNECTORS

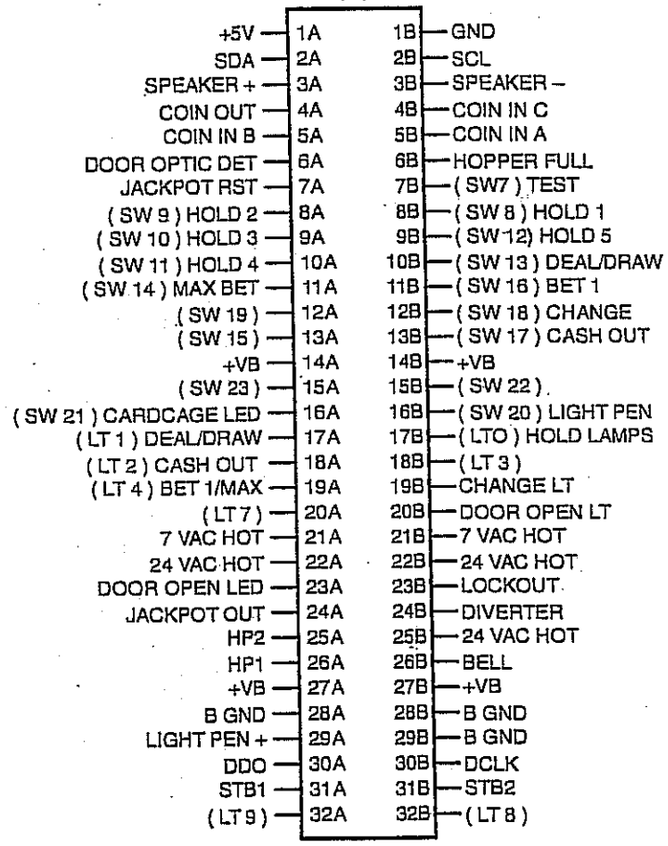


Connectors J/P1 and J/P2 for S-Plus Machines

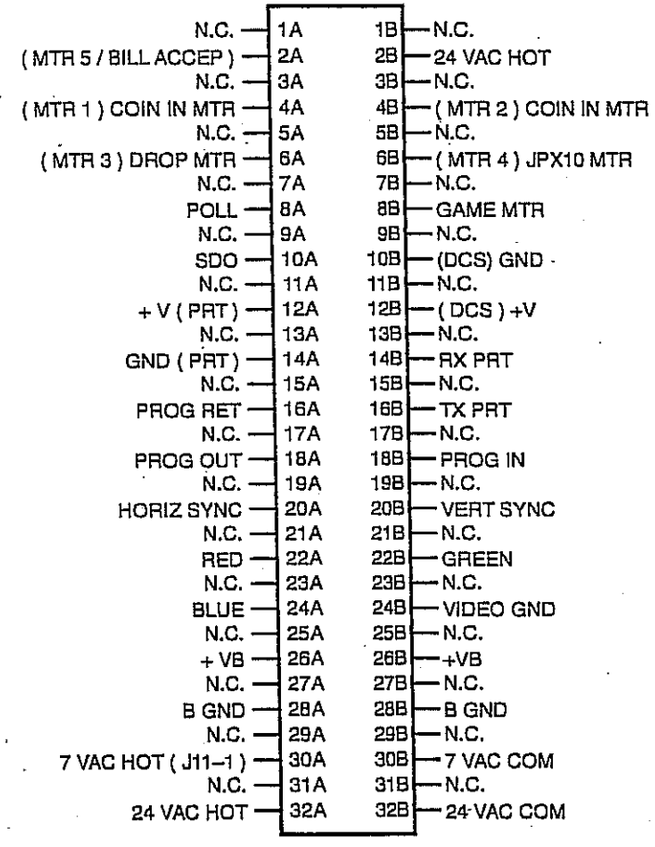




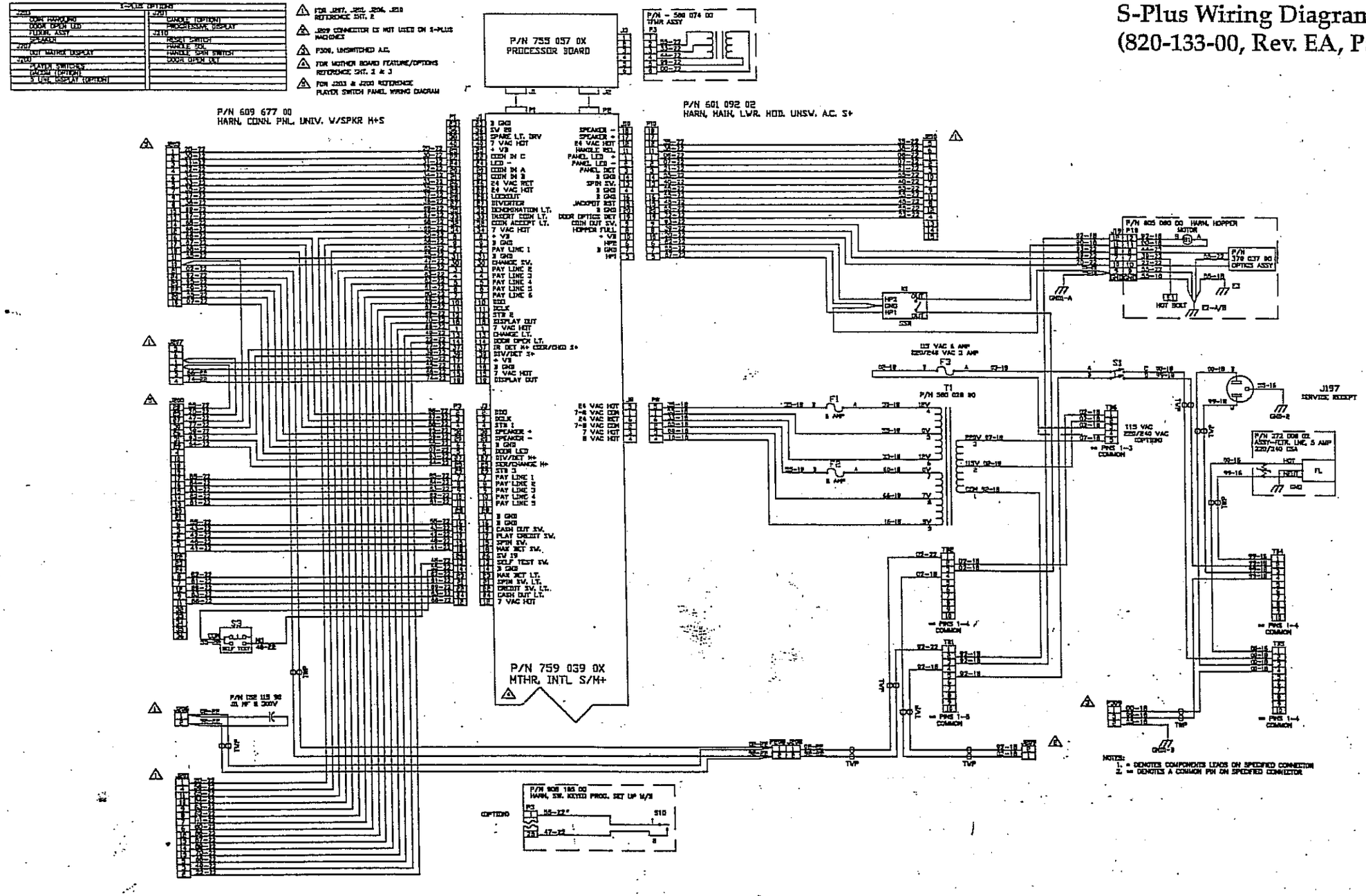
P1


+5V 1A 1B GND
SDA 2A 2B SCL
SPEAKER + 3A 3B SPEAKER –
COIN OUT 4A 4B COIN IN C
COIN IN B 5A 5B COIN IN A
DOOR OPTIC DET 6A 6B HOPPER FULL
JACKPOT RST 7A 7B (SW7) TEST
(SW 9) HOLD 2 8A 8B (SW 8) HOLD 1
(SW 10) HOLD 3 9A 9B (SW 12) HOLD 5
(SW 11) HOLD 4 10A 10B (SW 13) DEAL/DRAW
(SW 14) MAX BET 11A 11B (SW 16) BET 1
(SW 19) 12A 12B (SW 18) CHANGE
(SW 15) 13A 13B (SW 17) CASH OUT
+VB 14A 14B +VB
(SW 23) 15A 15B (SW 22)
(SW 21) CARDCAGE LED 16A 16B (SW 20) LIGHT PEN
(LT 1) DEAL/DRAW 17A 17B (LTO) HOLD LAMPS
(LT 2) CASH OUT 18A 18B (LT 3)
(LT 4) BET 1/MAX 19A 19B CHANGE LT
(LT 7) 20A 20B DOOR OPEN LT
7 VAC HOT 21A 21B 7 VAC HOT
24 VAC HOT 22A 22B 24 VAC HOT
DOOR OPEN LED 23A 23B LOCKOUT
JACKPOT OUT 24A 24B DIVERTER
HP2 25A 25B 24 VAC HOT
HP1 26A 26B BELL
+VB 27A 27B +VB
B GND 28A 28B B GND
LIGHT PEN + 29A 29B B GND
DDO 30A 30B DCLK
STB1 31A 31B STB2
(LT 9) 32A 32B (LT 8)

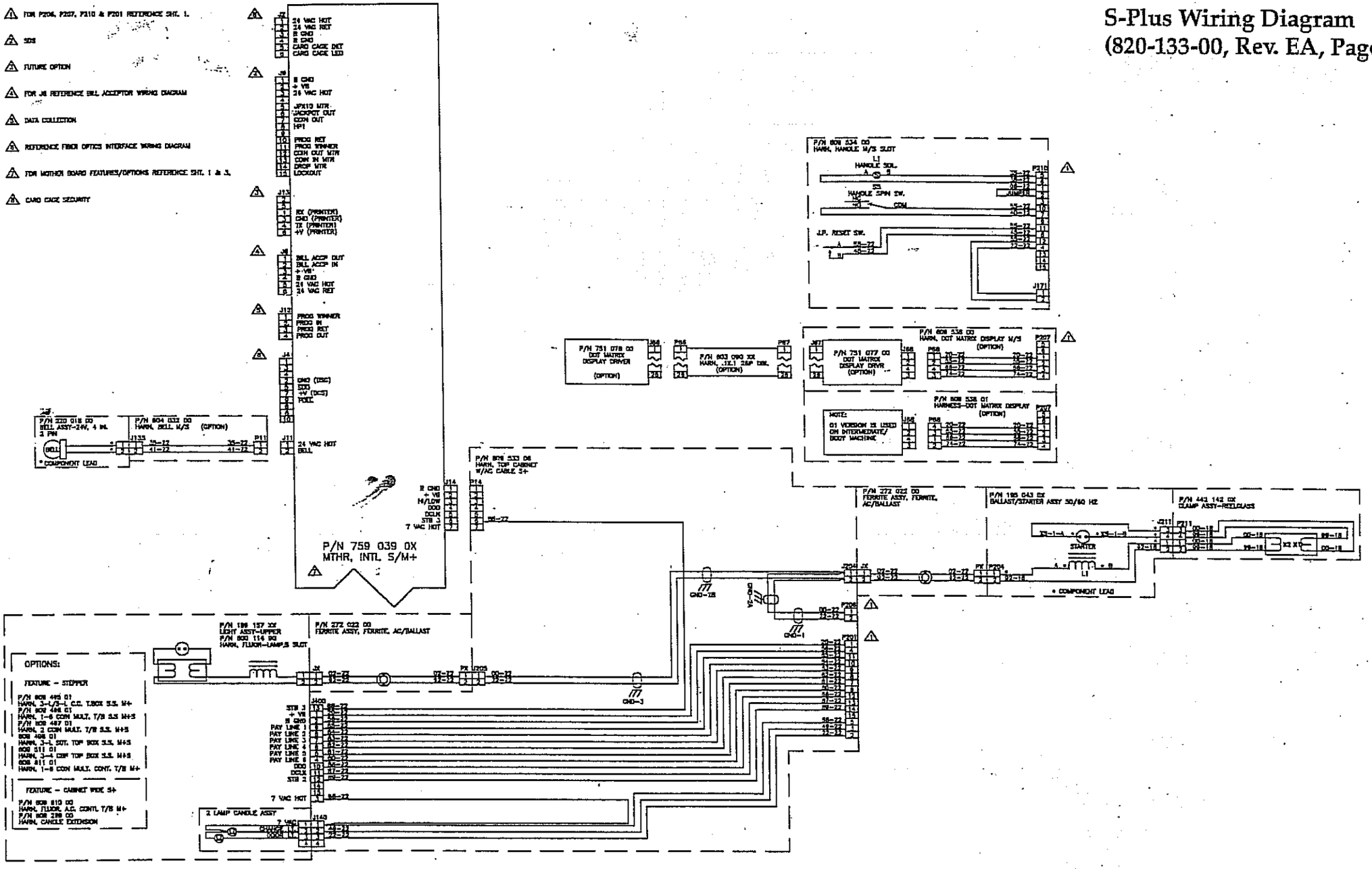
P2


N.C. 1A 1B N.C.
(MTR 5 / BILL ACCEP) 2A 2B 24 VAC HOT
N.C. 3A 3B N.C.
(MTR 1) COIN IN MTR 4A 4B (MTR 2) COIN IN MTR
N.C. 5A 5B N.C.
(MTR 3) DROP MTR 6A 6B (MTR 4) JPX10 MTR
N.C. 7A 7B N.C.
POLL 8A 8B GAME MTR
N.C. 9A 9B N.C.
SDO 10A 10B (DCS) GND
N.C. 11A 11B N.C.
+ V (PRT) 12A 12B (DCS) +V
N.C. 13A 13B N.C.
GND (PRT) 14A 14B RX PRT
N.C. 15A 15B N.C.
PROG RET 16A 16B TX PRT
N.C. 17A 17B N.C.
PROG OUT 18A 18B PROG IN
N.C. 19A 19B N.C.
HORIZ SYNC 20A 20B VERT SYNC
N.C. 21A 21B N.C.
RED 22A 22B GREEN
N.C. 23A 23B N.C.
BLUE 24A 24B VIDEO GND
N.C. 25A 25B N.C.
+ VB 26A 26B +VB
N.C. 27A 27B N.C.
B GND 28A 28B B GND
N.C. 29A 29B N.C.
7 VAC HOT (J11–1) 30A 30B 7 VAC COM
N.C. 31A 31B N.C.
24 VAC HOT 32A 32B 24 VAC COM

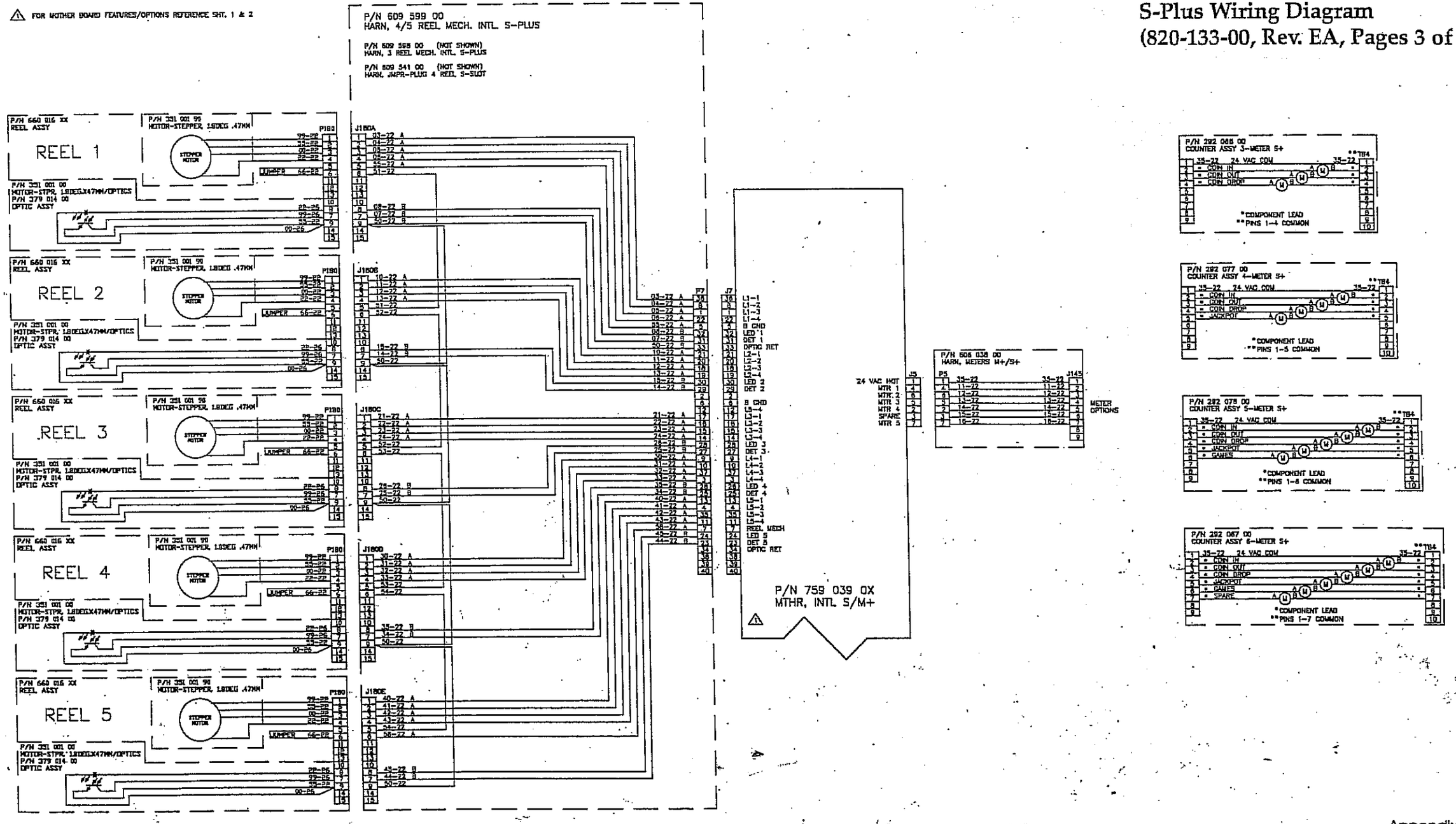
S-Plus Wiring Diagram
(820-133-00, Rev. EA, Pages 1 of 3)



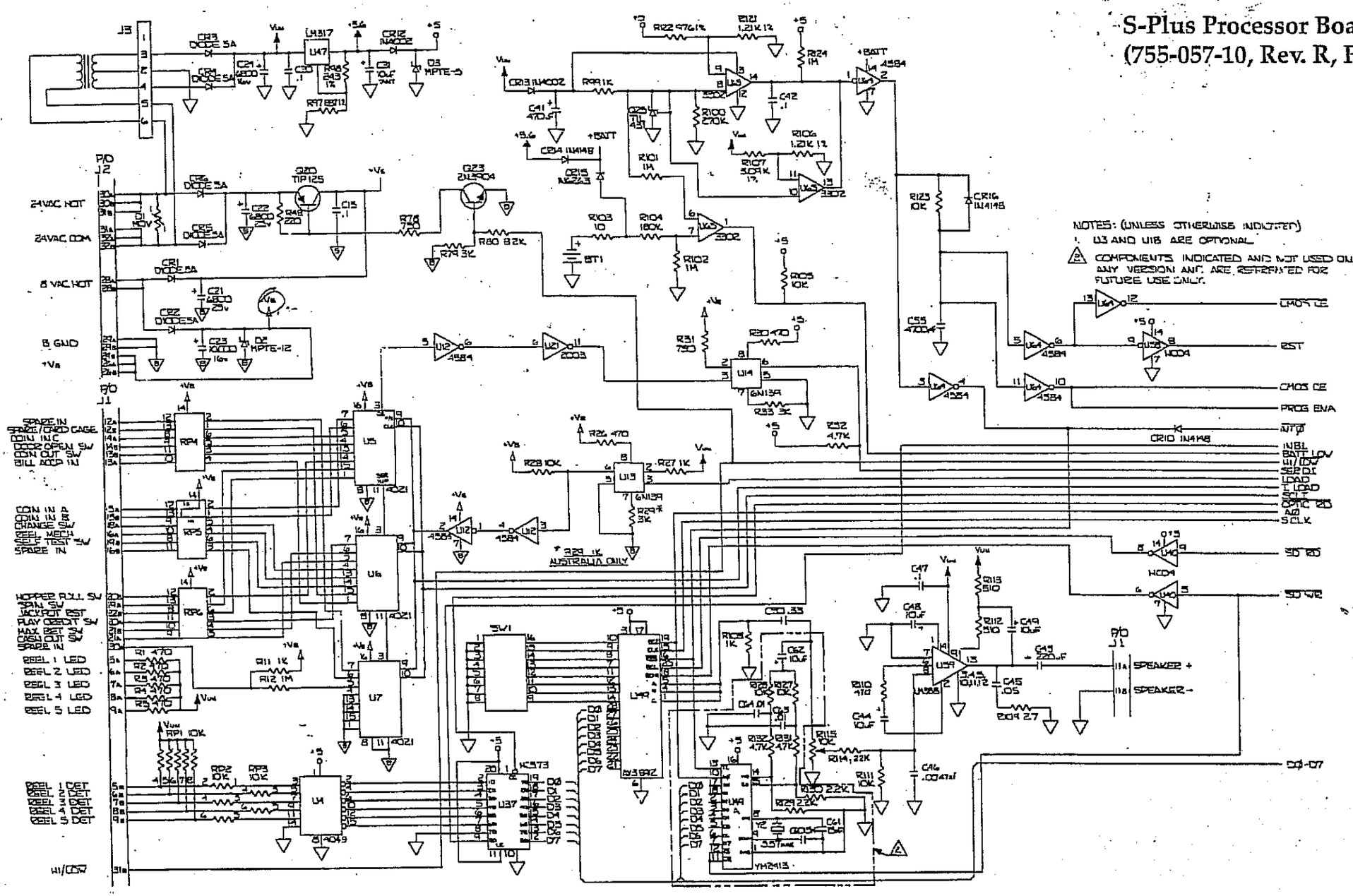
S-Plus Wiring Diagram
(820-133-00, Rev. EA, Pages 2 of 3)



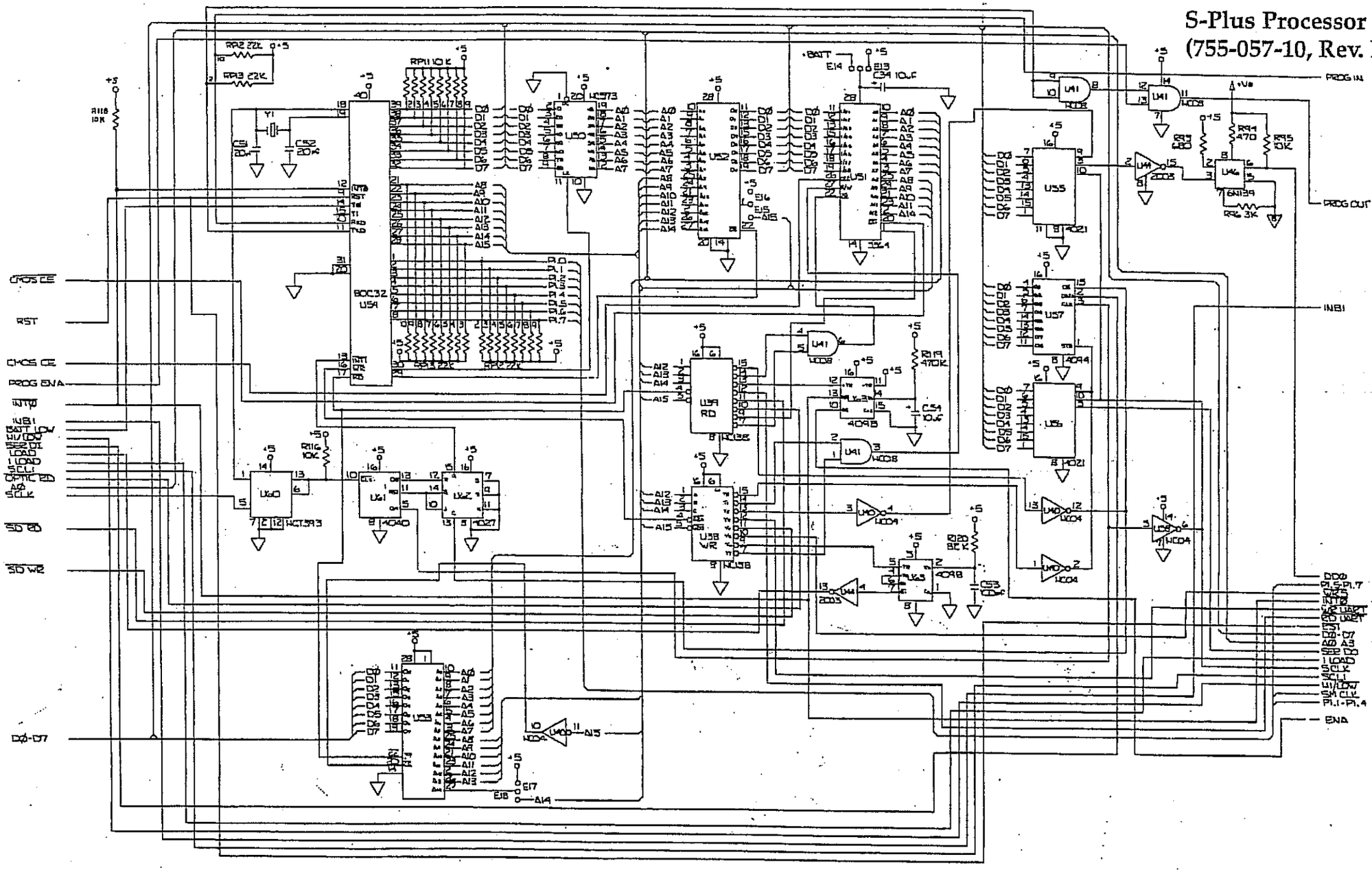
S-Plus Wiring Diagram
(820-133-00, Rev. EA, Pages 3 of 3)



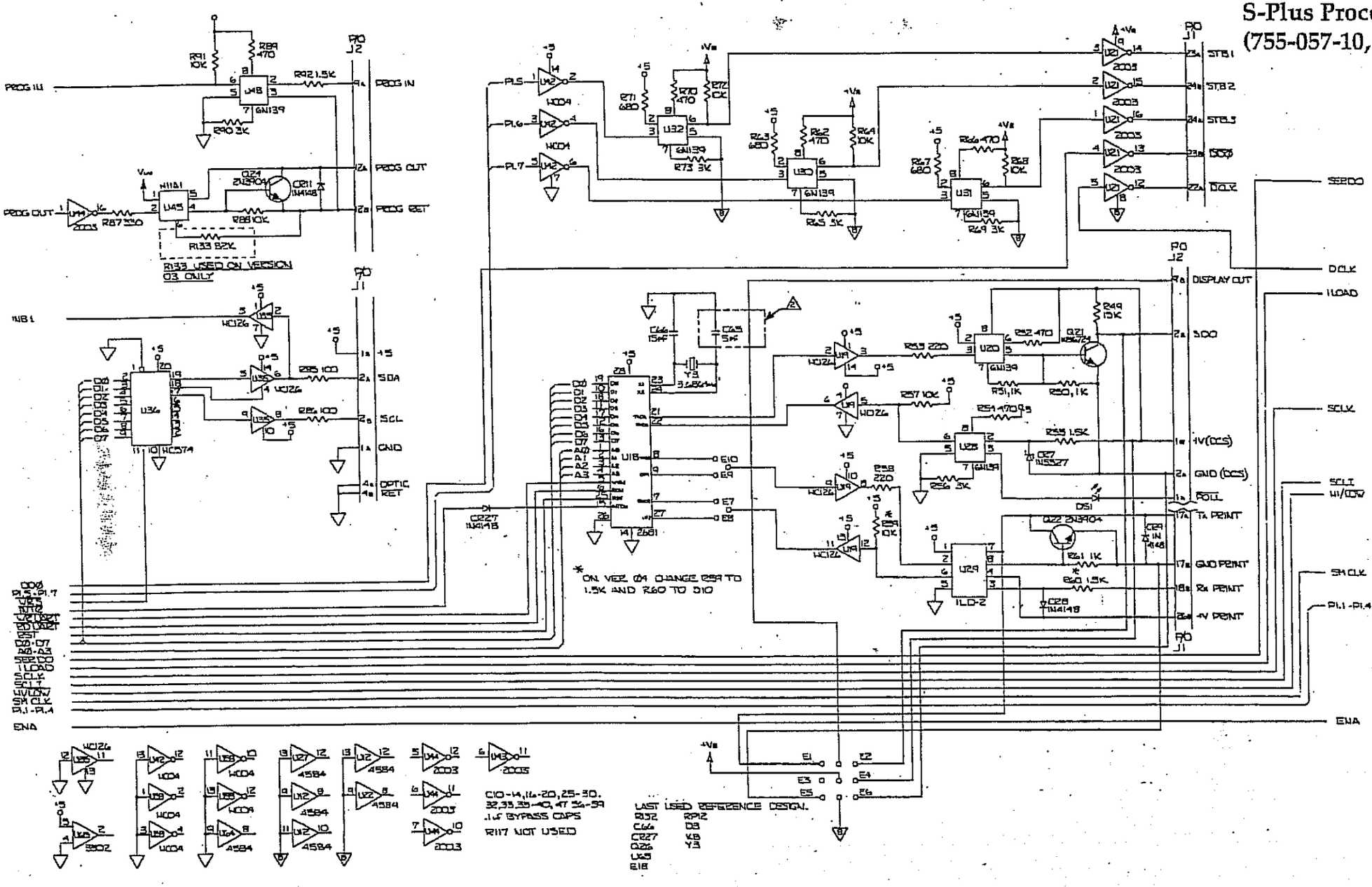
S-Plus Processor Board Schematic
(755-057-10, Rev. R, Page 1 of 4)



S-Plus Processor Board Schematic
(755-057-10, Rev. R, Page 2 of 4)

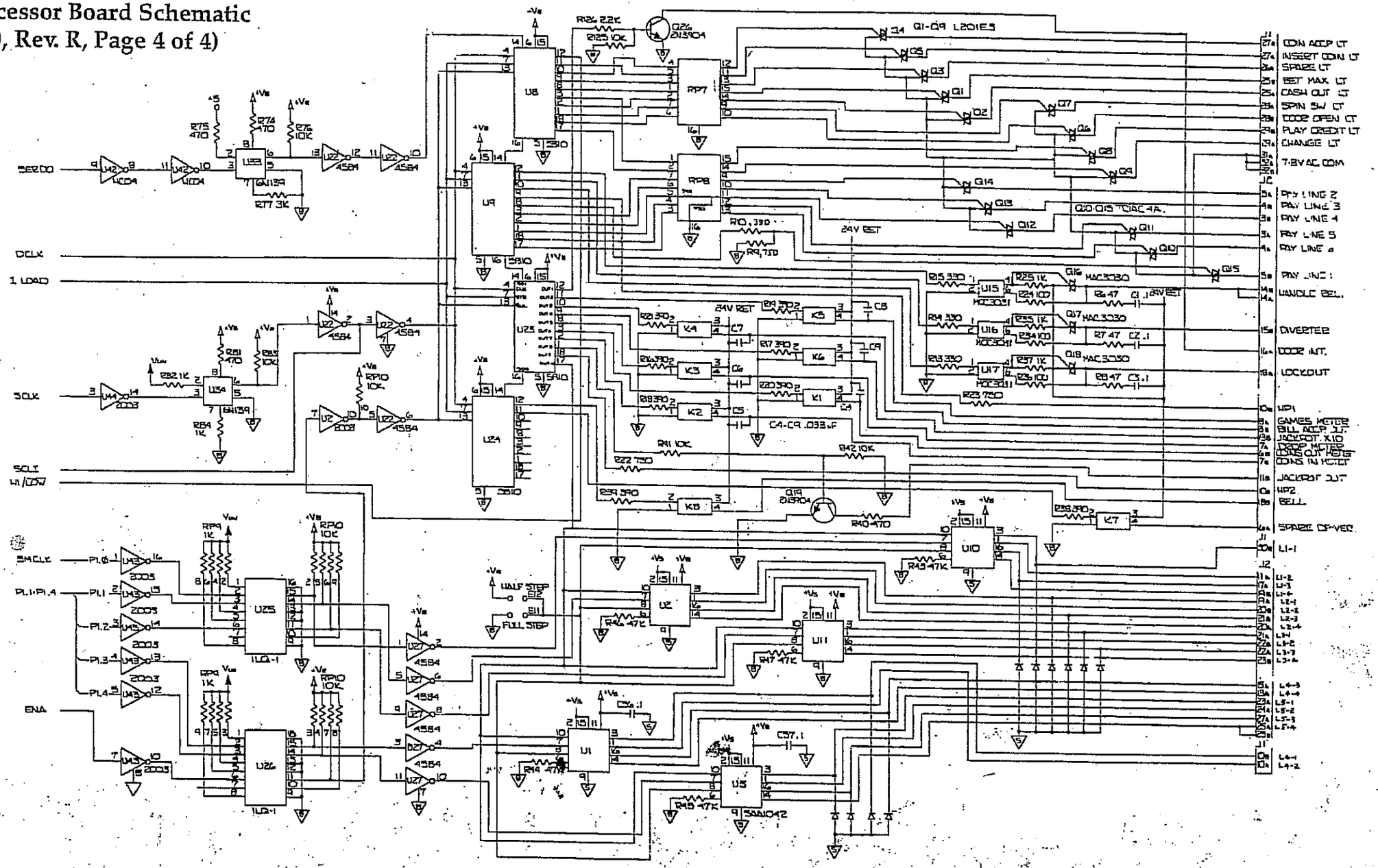


S-Plus Processor Board Schematic (755-057-10, Rev. R, Page 3 of 4)

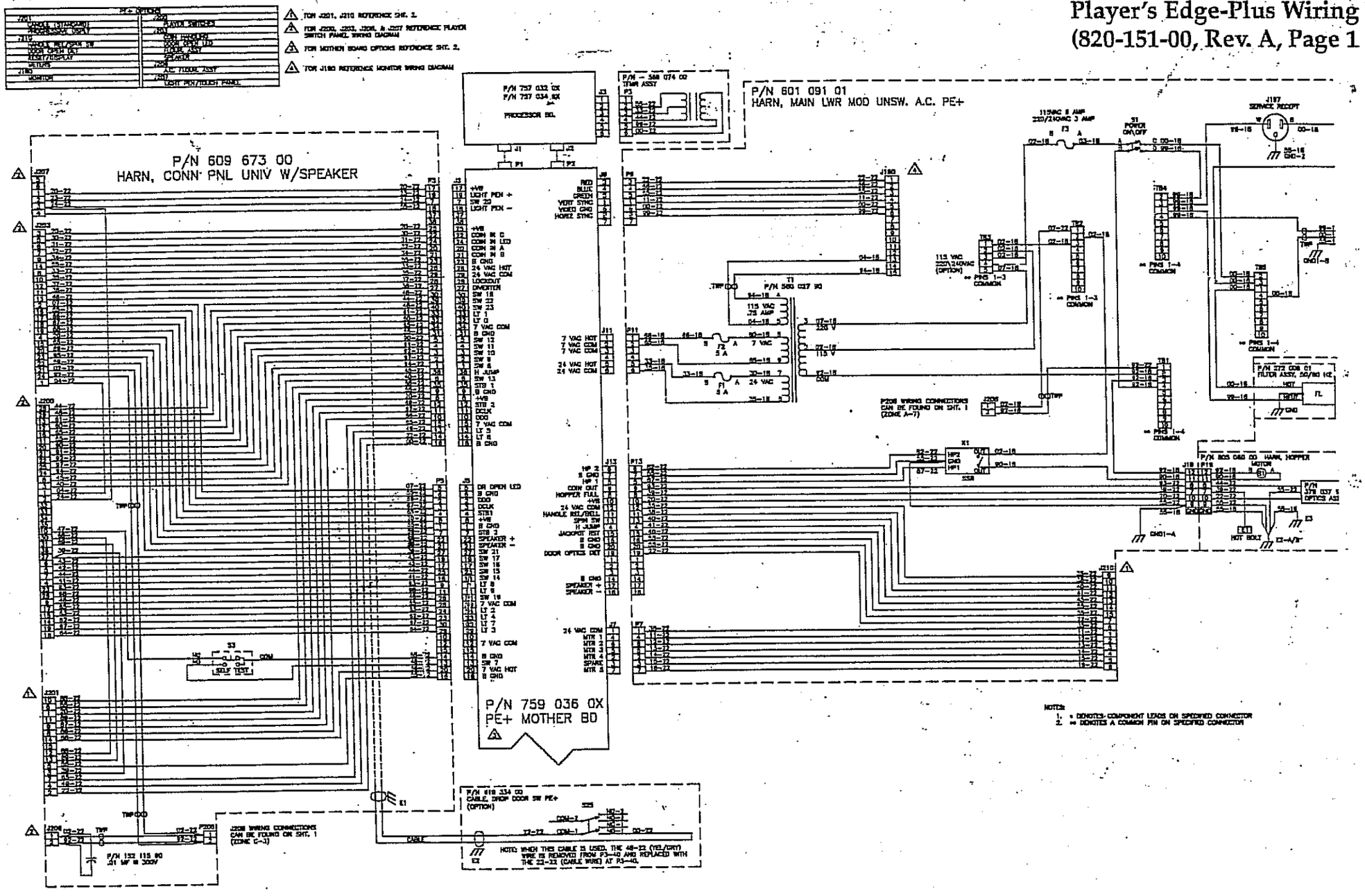


CD 40106 = MC14584

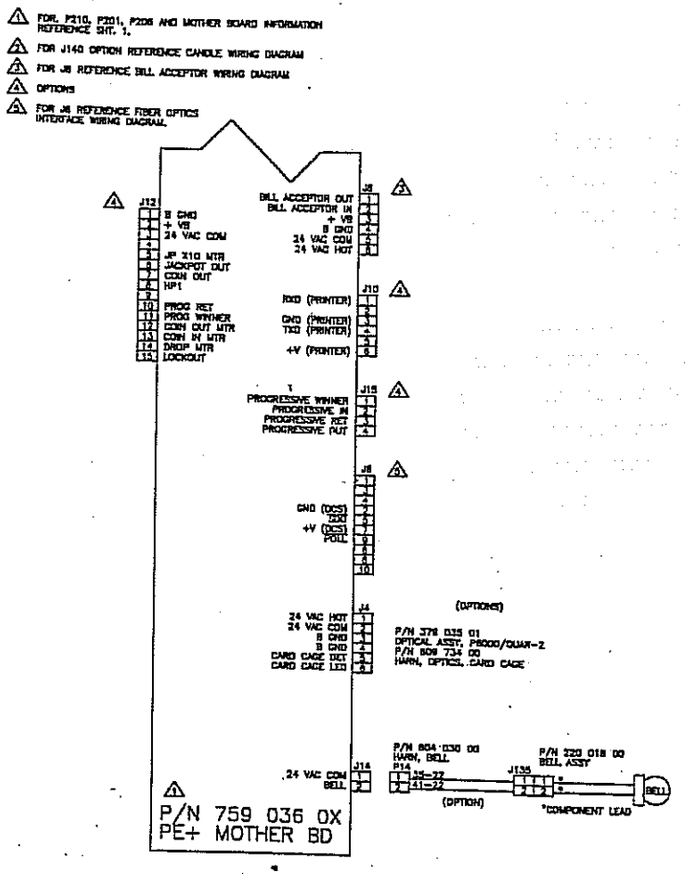
S-Plus Processor Board Schematic
(755-057-10, Rev. R, Page 4 of 4)



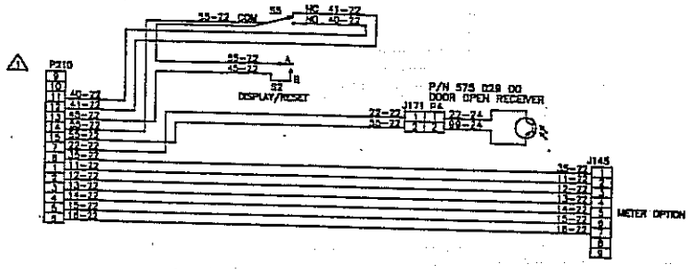
Player's Edge-Plus Wiring Diagram (820-151-00, Rev. A, Page 1 of 2)



Player's Edge-Plus Wiring Diagram (820-151-00, Rev. A, Page 2 of 2)

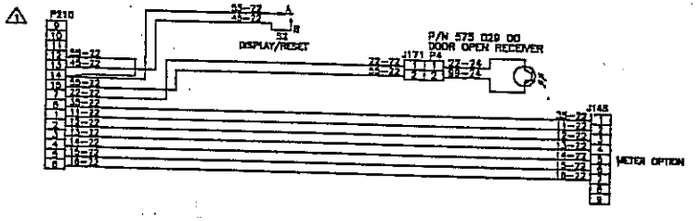


P/N 606 031 00
HARN, METERS/D.O./RESET/HANDLE



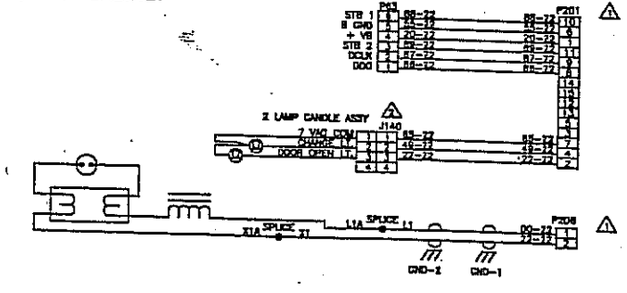
FOR SLOT VERSION

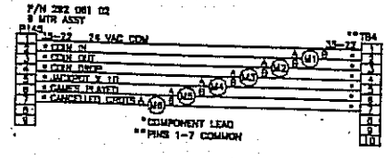
P/N 606 032 00
HARN, METERS/D.O./RESET

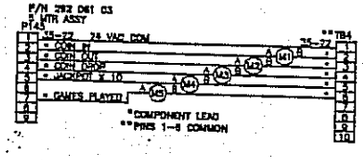


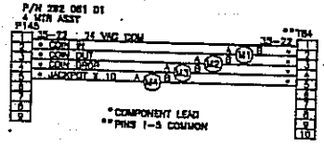
COMMONLY USED FOR POKER/KENO

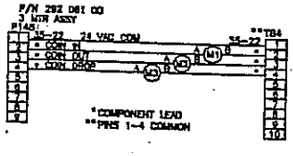
P/N 609 696 01
HARN, TOP CABINET



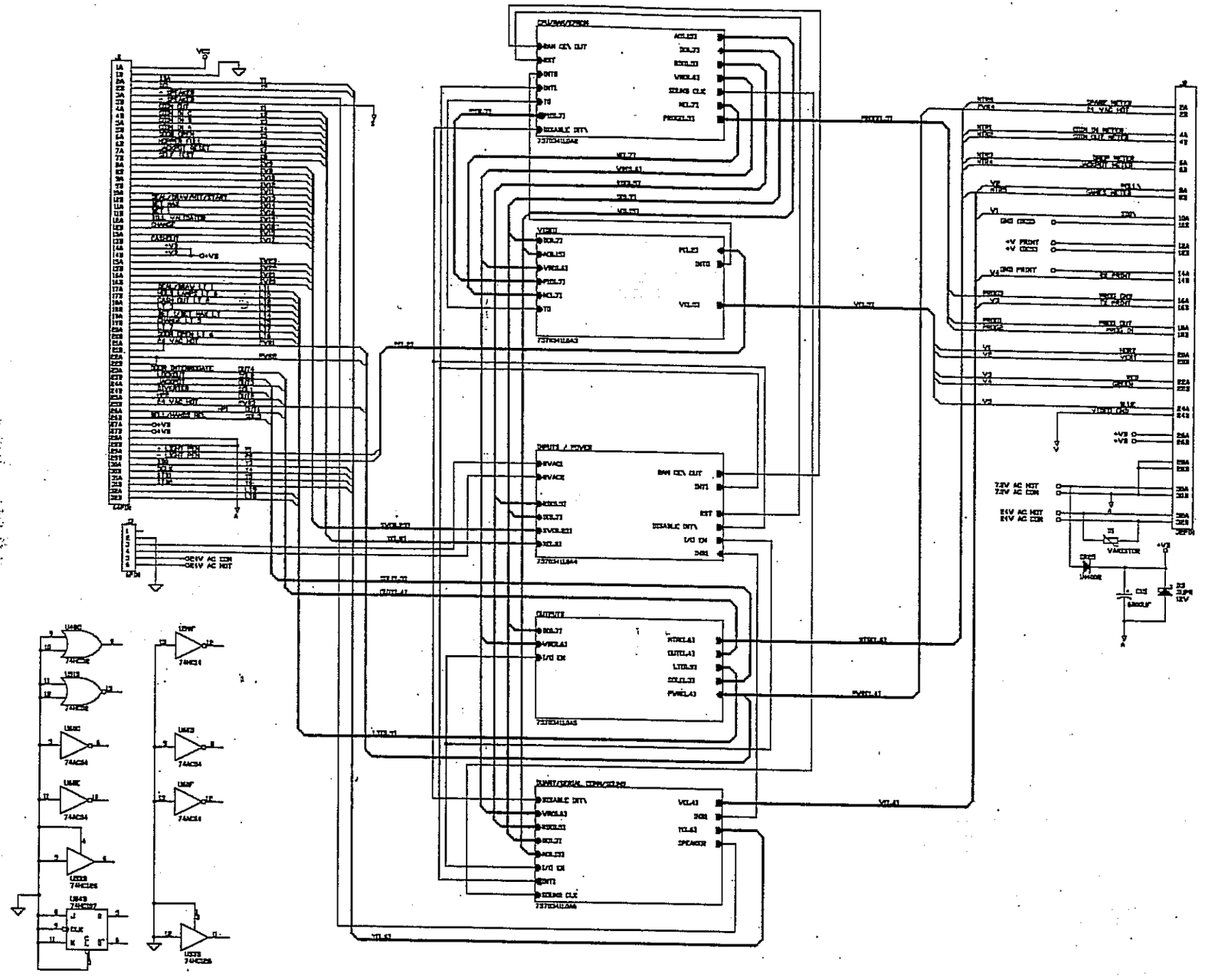






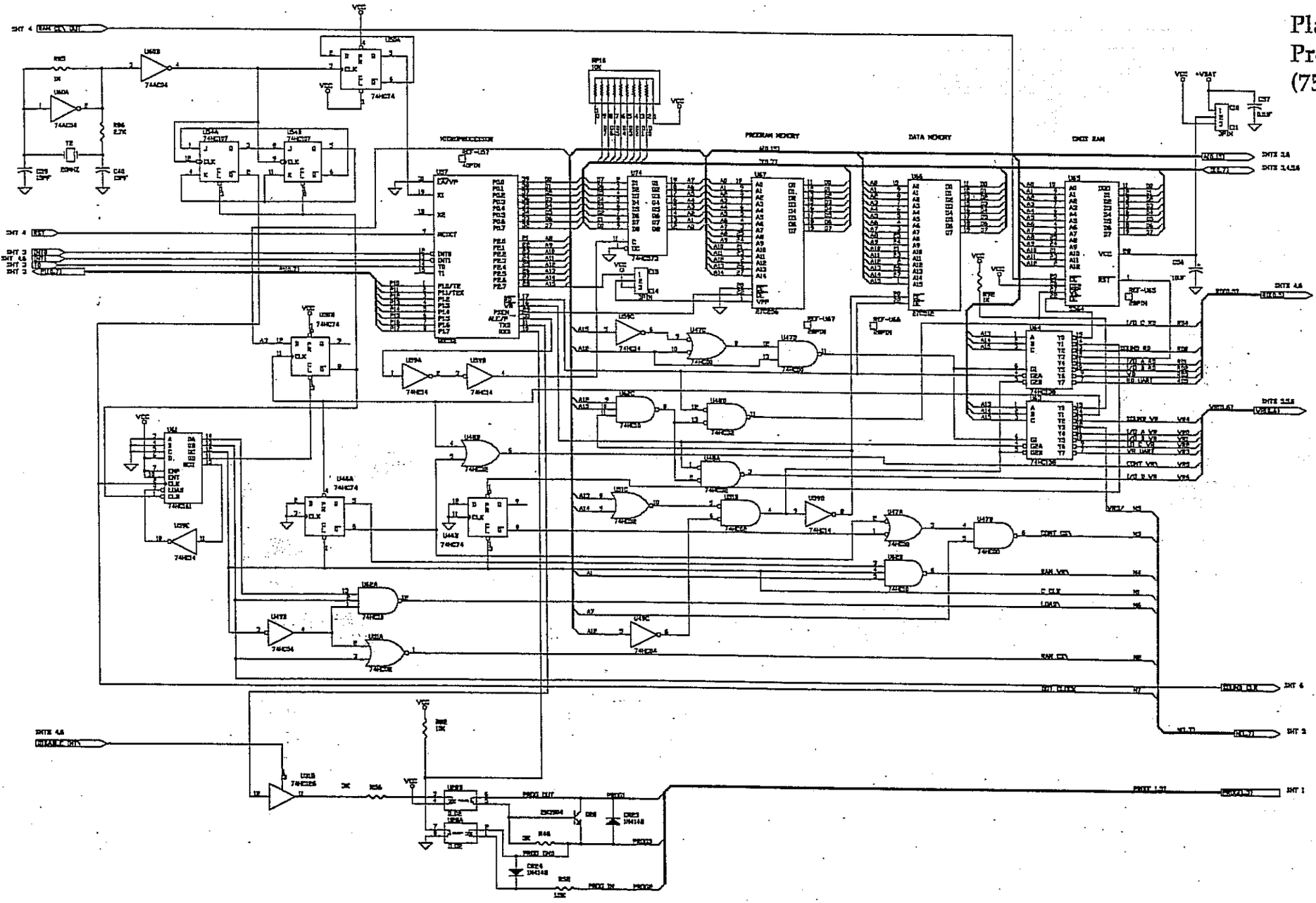


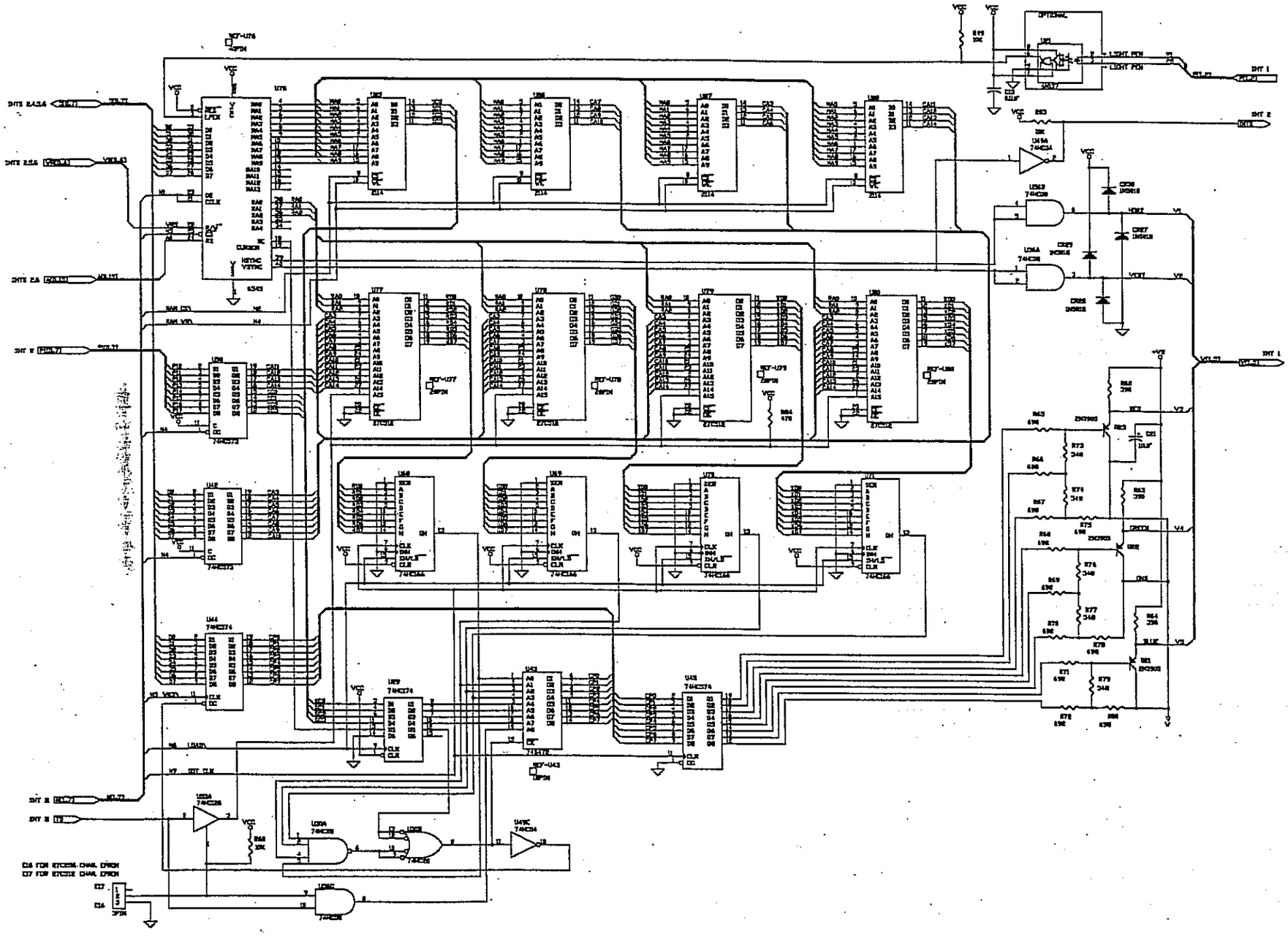
NOTES:
1. * DENOTES COMPONENT LEADS ON SPECIFIED CONNECTOR
2. ** DENOTES A COMMON PIN ON SPECIFIED CONNECTOR



Player's Edge-Plus
Processor Board Schematic
(757-034-11, Rev. C, Pages 1 to 6)

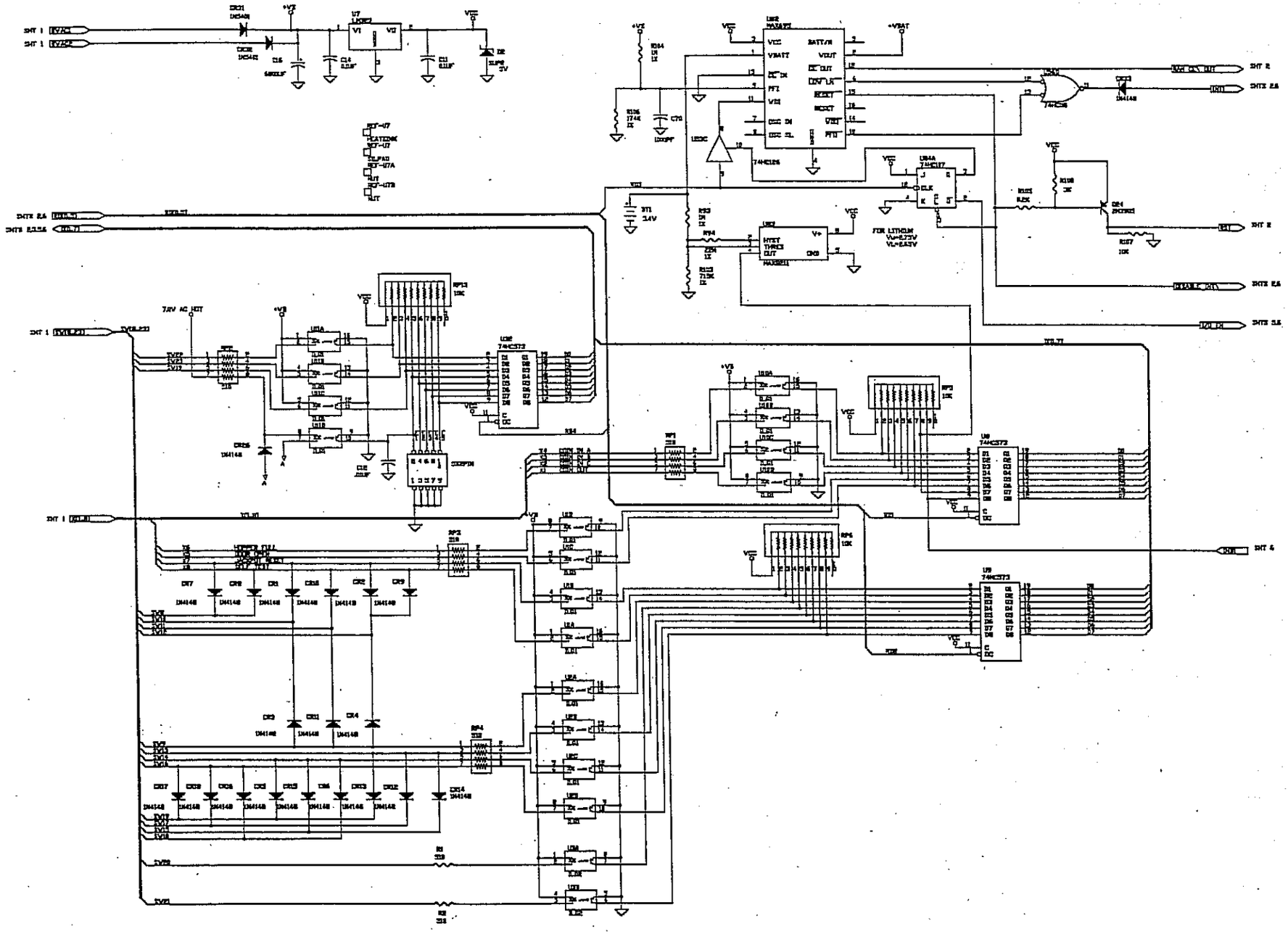
Player's Edge-Plus Processor Board Schematic (757-034-11, Rev. C, Pages 2 to 6)



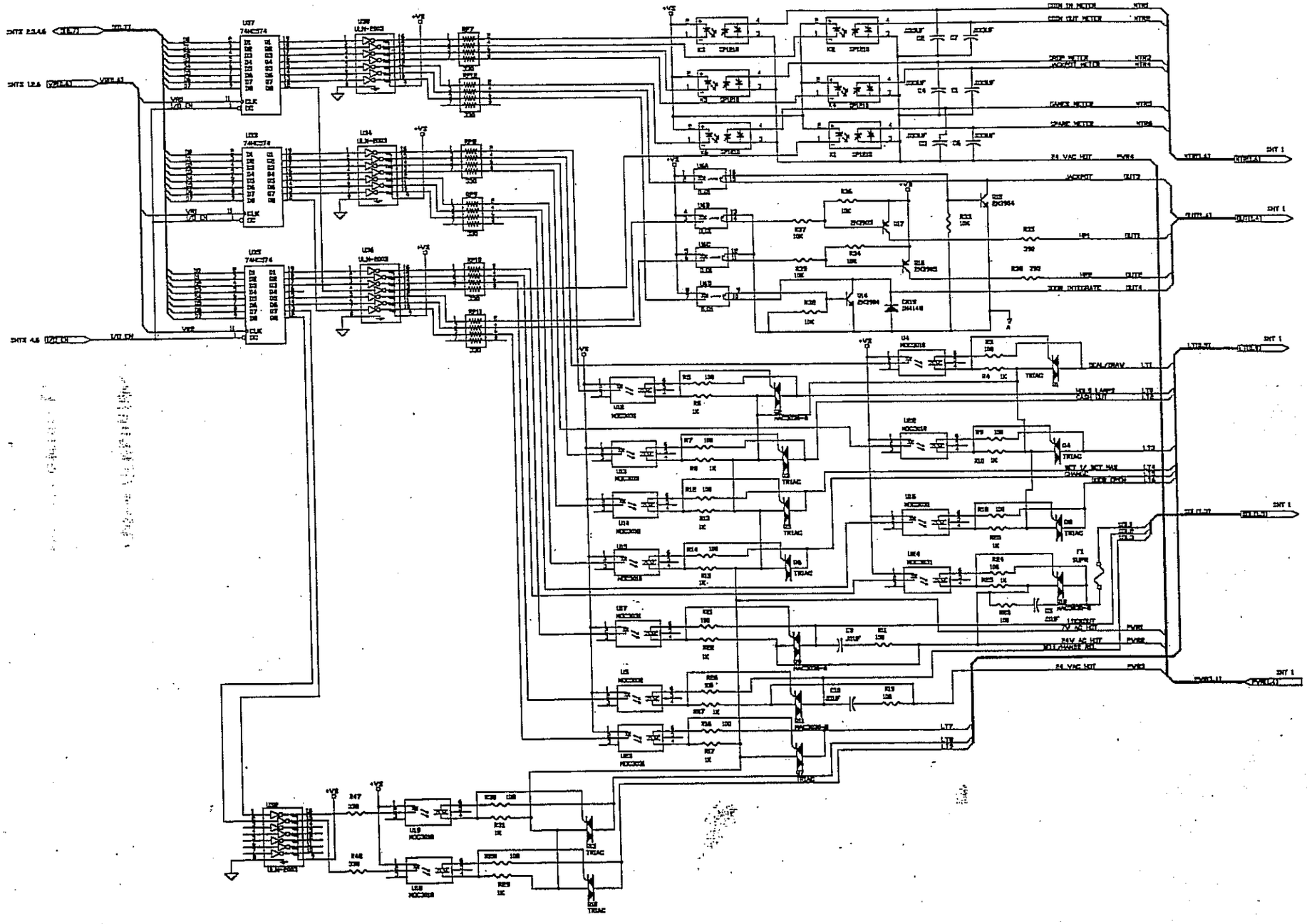


Player's Edge-Plus
Processor Board Schematic
(757-034-11, Rev. C, Pages 3 to 6)

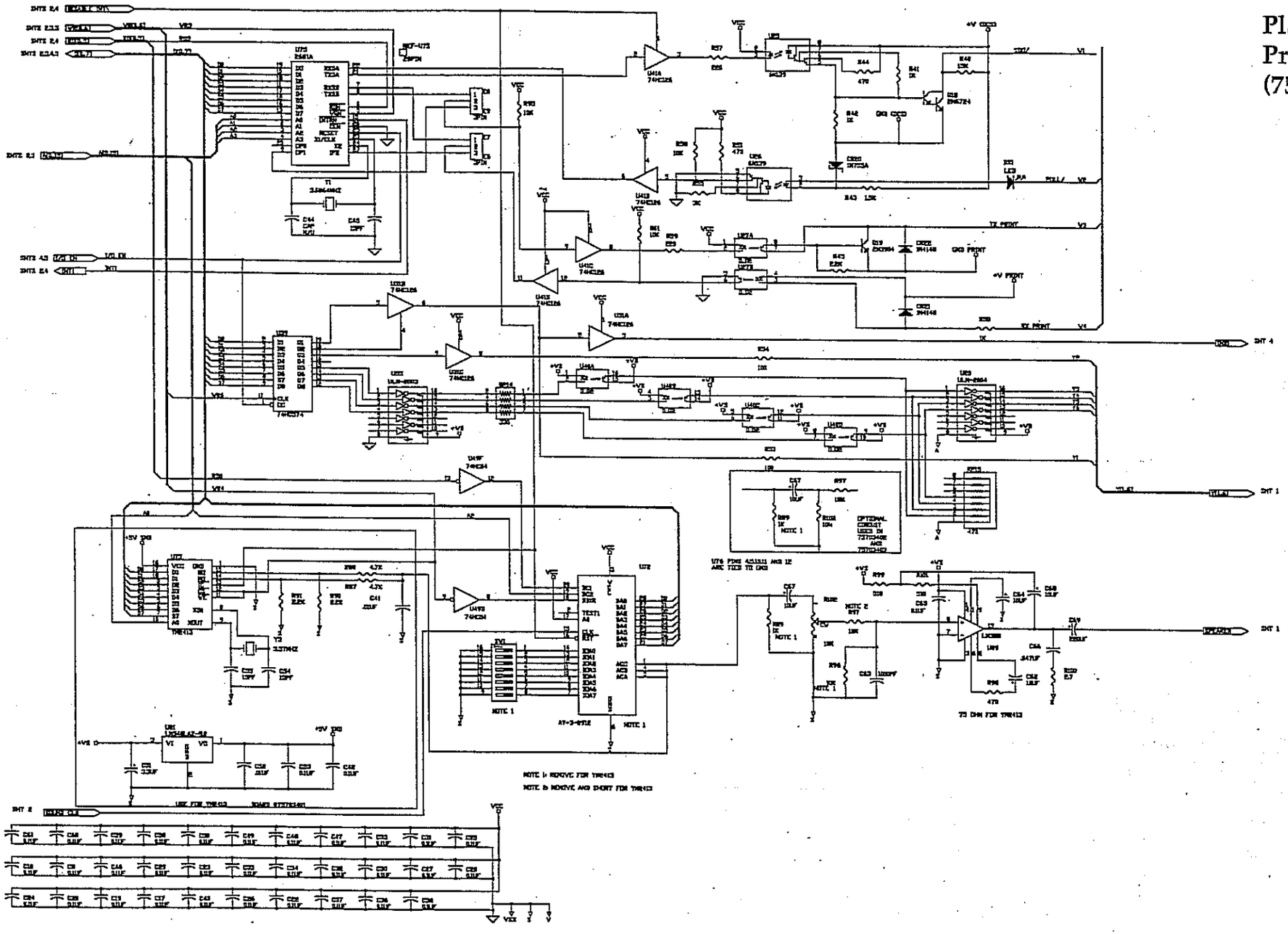
Player's Edge-Plus
Processor Board Schematic
(757-034-11, Rev. C, Pages 4 to 6)

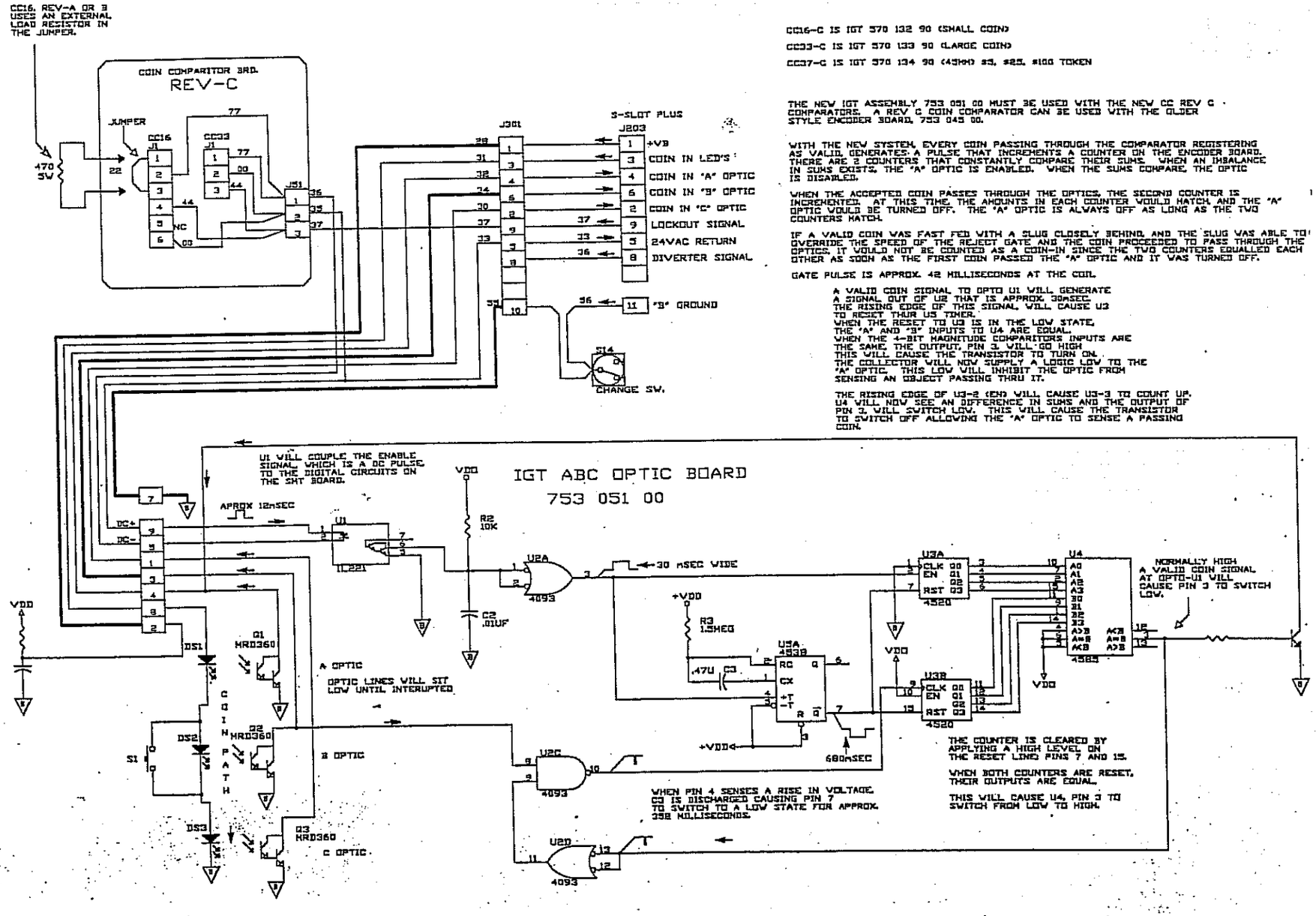


Player's Edge-Plus
Processor Board Schematic
(757-034-11, Rev. C, Pages 5 to 6)



Player's Edge-Plus
Processor Board Schematic
(757-034-11, Rev. C, Pages 6 to 6)




CC16: REV-A OR B USES AN EXTERNAL LOAD RESISTOR IN THE JUMPER.
COIN COMPARITOR BRD.
REV-C
JUMPER
CC16
CC03
470 5W
J301
J203
5-SLOT PLUS
+VB
COIN IN LED'S
COIN IN "A" OPTIC
COIN IN "B" OPTIC
COIN IN "C" OPTIC
LOCKOUT SIGNAL
24VAC RETURN
DIVERTER SIGNAL
"B" GROUND
S14
CHANGE SW.
CC16-C IS IGT 570 132 90 (SMALL COIN)
CC03-C IS IGT 570 133 90 (LARGE COIN)
CC07-C IS IGT 570 134 90 (45MM) $5, $25, $100 TOKEN
THE NEW IGT ASSEMBLY 753 051 00 MUST BE USED WITH THE NEW CC REV C COMPARATORS. A REV C COIN COMPARATOR CAN BE USED WITH THE OLDER STYLE ENCODER BOARD, 753 043 00.
WITH THE NEW SYSTEM, EVERY COIN PASSING THROUGH THE COMPARATOR REGISTERING AS VALID, GENERATES A PULSE THAT INCREMENTS A COUNTER ON THE ENCODER BOARD. THERE ARE 2 COUNTERS THAT CONSTANTLY COMPARE THEIR SUMS. WHEN AN IMBALANCE IN SUMS EXISTS, THE "A" OPTIC IS ENABLED. WHEN THE SUMS COMPARE, THE OPTIC IS DISABLED.
WHEN THE ACCEPTED COIN PASSES THROUGH THE OPTICS, THE SECOND COUNTER IS INCREMENTED. AT THIS TIME, THE AMOUNTS IN EACH COUNTER WOULD MATCH, AND THE "A" OPTIC WOULD BE TURNED OFF. THE "A" OPTIC IS ALWAYS OFF AS LONG AS THE TWO COUNTERS MATCH.
IF A VALID COIN WAS FAST FED WITH A SLUG CLOSELY BEHIND, AND THE SLUG WAS ABLE TO OVERRIDE THE SPEED OF THE REJECT GATE AND THE COIN PROCEEDED TO PASS THROUGH THE OPTICS, IT WOULD NOT BE COUNTED AS A COIN-IN SINCE THE TWO COUNTERS EQUALLED EACH OTHER AS SOON AS THE FIRST COIN PASSED THE "A" OPTIC AND IT WAS TURNED OFF.
GATE PULSE IS APPROX. 42 MILLISECONDS AT THE COIL.
A VALID COIN SIGNAL TO OPTO U1 WILL GENERATE A SIGNAL OUT OF U2 THAT IS APPROX. 30mSEC. THE RISING EDGE OF THIS SIGNAL, WILL CAUSE U3 TO RESET THUR U5 TIMER.
WHEN THE RESET TO U3 IS IN THE LOW STATE, THE "A" AND "B" INPUTS TO U4 ARE EQUAL.
WHEN THE 4-BIT MAGNITUDE COMPARITORS INPUTS ARE THE SAME, THE OUTPUT, PIN 3, WILL GO HIGH
THIS WILL CAUSE THE TRANSISTOR TO TURN ON.
THE COLLECTOR WILL NOW SUPPLY A LOGIC LOW TO THE "A" OPTIC. THIS LOW WILL INHIBIT THE OPTIC FROM SENSING AN OBJECT PASSING THRU IT.
THE RISING EDGE OF U3-2 (END) WILL CAUSE U3-3 TO COUNT UP. U4 WILL NOW SEE AN DIFFERENCE IN SUMS AND THE OUTPUT OF PIN 3, WILL SWITCH LOW. THIS WILL CAUSE THE TRANSISTOR TO SWITCH OFF ALLOWING THE "A" OPTIC TO SENSE A PASSING COIN.
U1 WILL COUPLE THE ENABLE SIGNAL, WHICH IS A DC PULSE, TO THE DIGITAL CIRCUITS ON THE SMT BOARD.
IGT ABC OPTIC BOARD
753 051 00
APPROX 12mSEC
U1
IL221
VDD
R2 10K
U2A
4093
C2 .01UF
30 mSEC WIDE
U3A
4520
U4
4585
NORMALLY HIGH
A VALID COIN SIGNAL AT OPTO-U1 WILL CAUSE PIN 3 TO SWITCH LOW.
R3 1.5MEG
.47U C3
U5A
4538
680mSEC
U3B
4520
THE COUNTER IS CLEARED BY APPLYING A HIGH LEVEL ON THE RESET LINE PINS 7 AND 15.
WHEN BOTH COUNTERS ARE RESET, THEIR OUTPUTS ARE EQUAL.
THIS WILL CAUSE U4, PIN 3 TO SWITCH FROM LOW TO HIGH.
DC+
DC-
Q1 MRD360
A OPTIC
OPTIC LINES WILL SIT LOW UNTIL INTERUPTED
COIN PATH
Q2 MRD360
B OPTIC
Q3 MRD360
C OPTIC
DS1
DS2
DS3
S1
U2C
U2D
4093
WHEN PIN 4 SENSES A RISE IN VOLTAGE, C3 IS DISCHARGED CAUSING PIN 7 TO SWITCH TO A LOW STATE FOR APPROX. 358 MILLISECONDS.