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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.

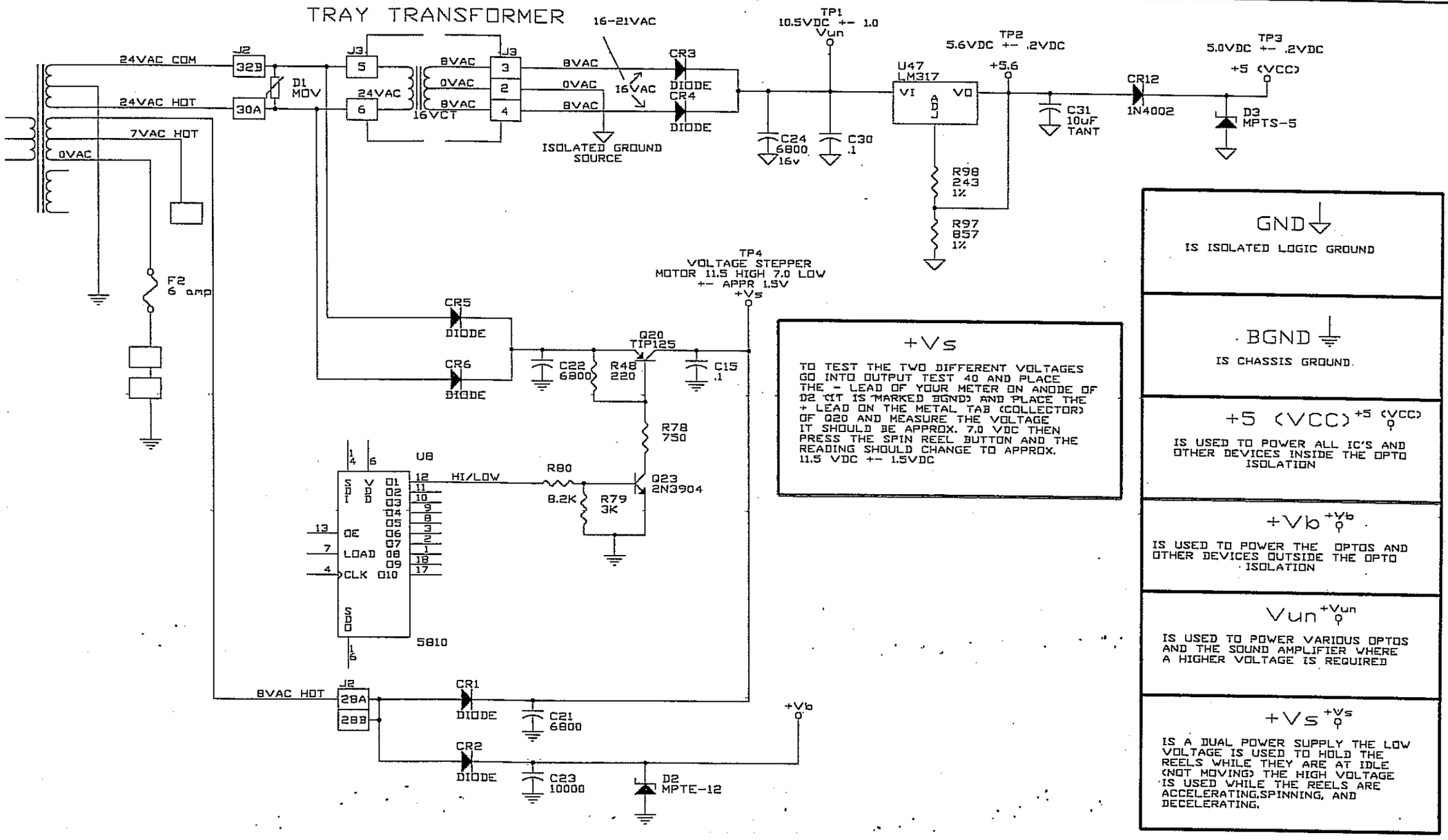
Inputs Test

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

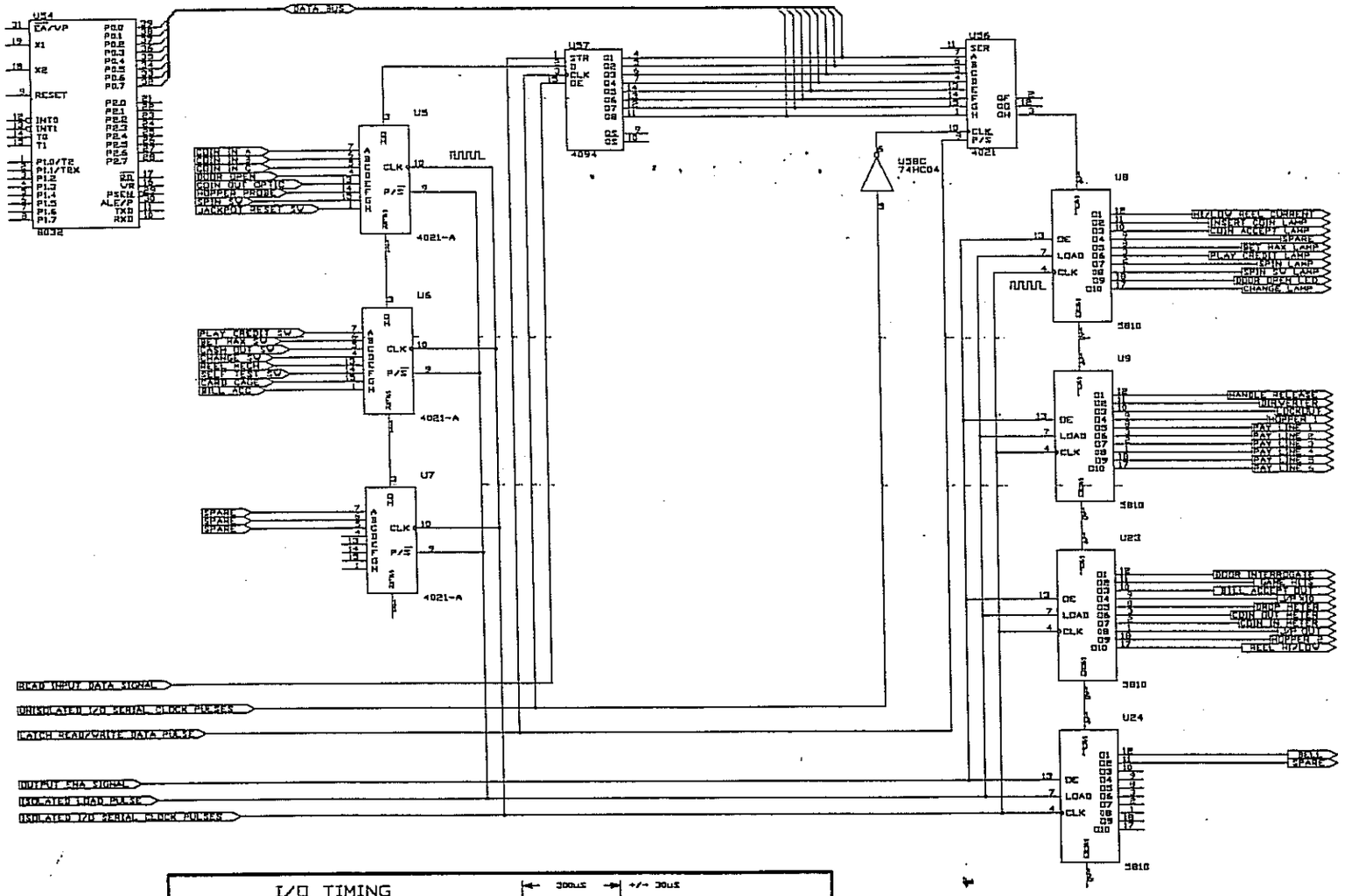
IS USED TO POWER THE OPTOS AND OTHER DEVICES OUTSIDE THE OPTO ISOLATION

Vun +Vun

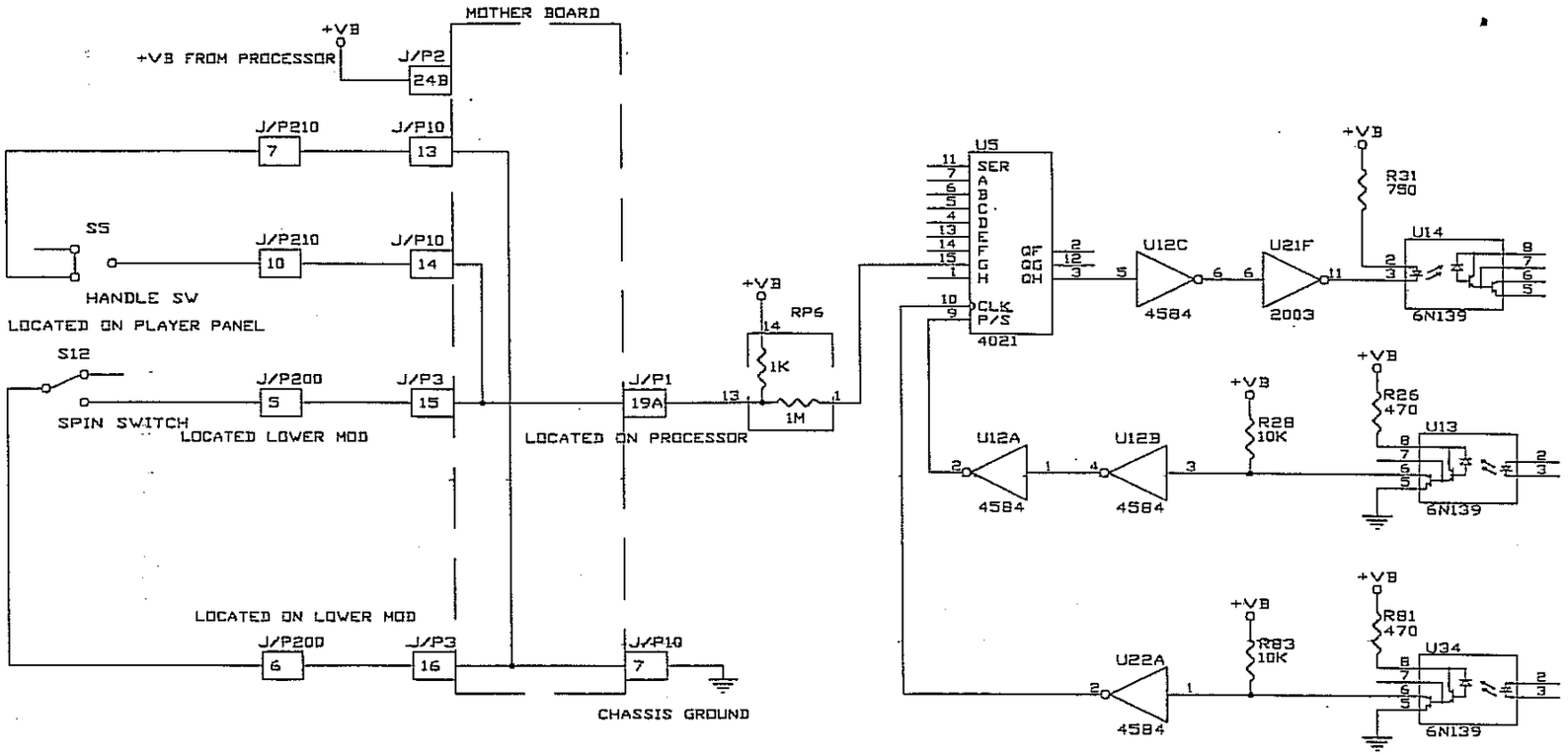
IS USED TO POWER VARIOUS OPTOS AND THE SOUND AMPLIFIER WHERE A HIGHER VOLTAGE IS REQUIRED

+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.

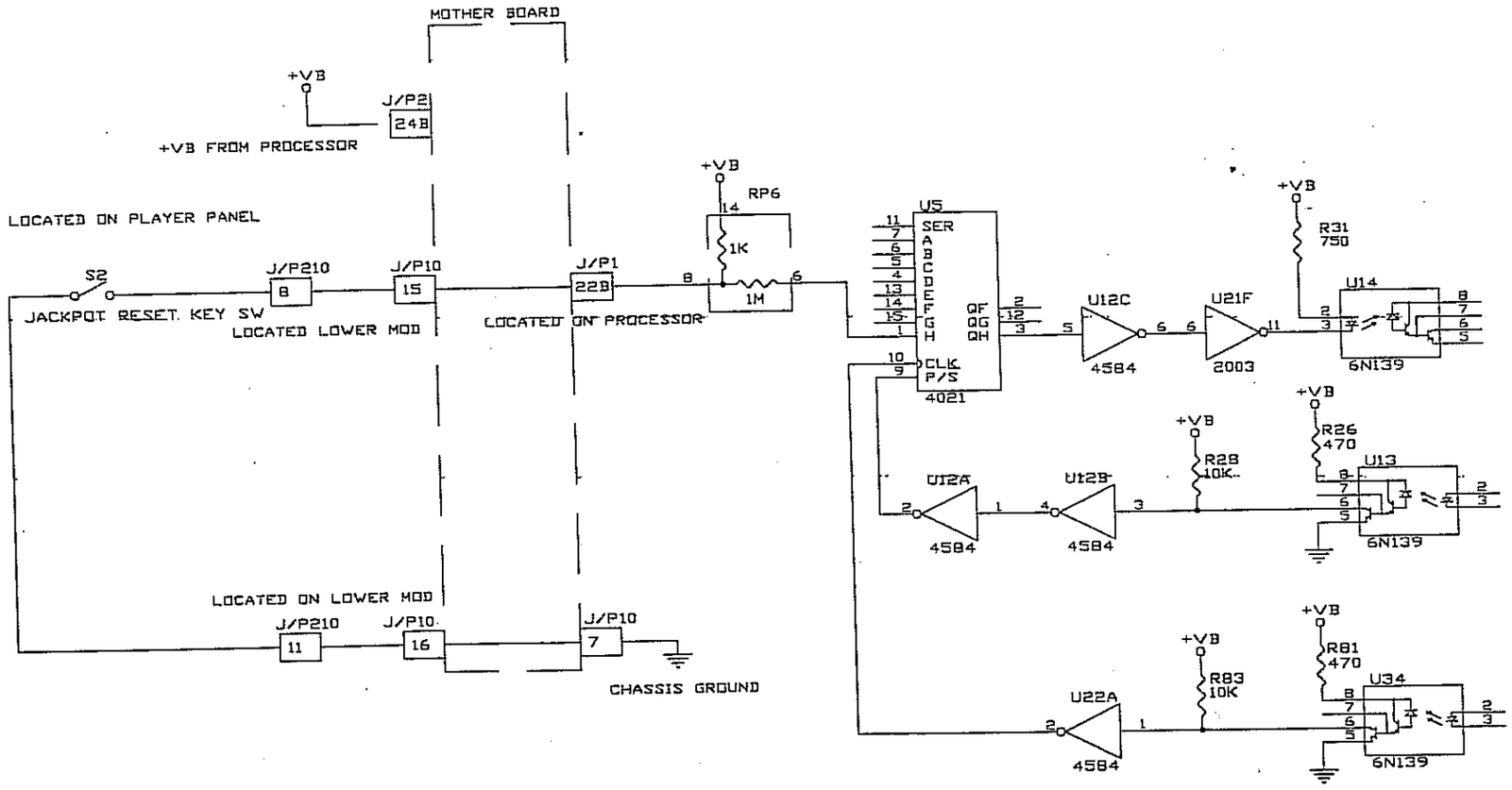
Before removing the processor board, check the following areas:

- ✓ 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:

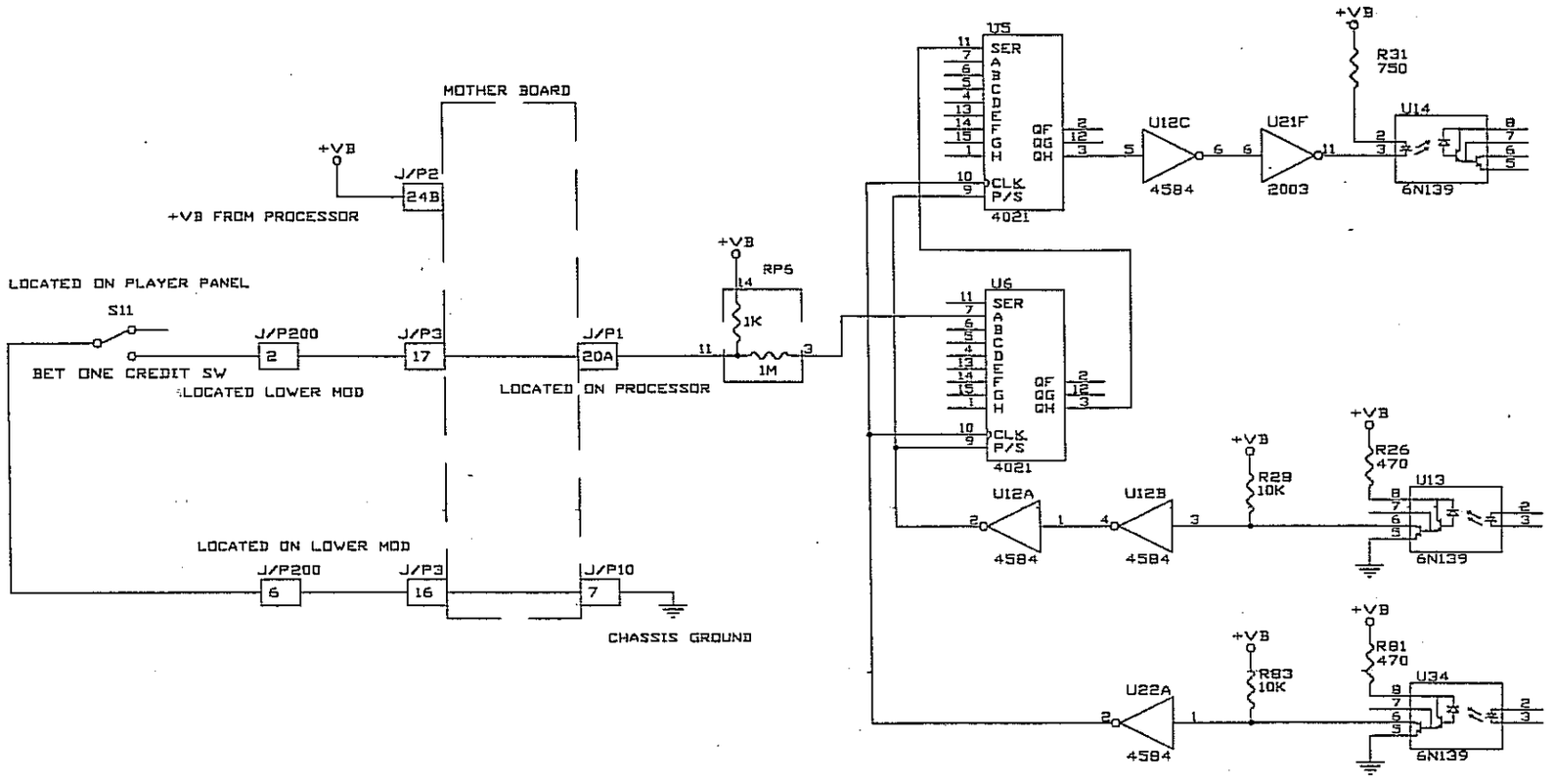
- ⇨ Replace processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in tester
- ⇨ If processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor are good, then use this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

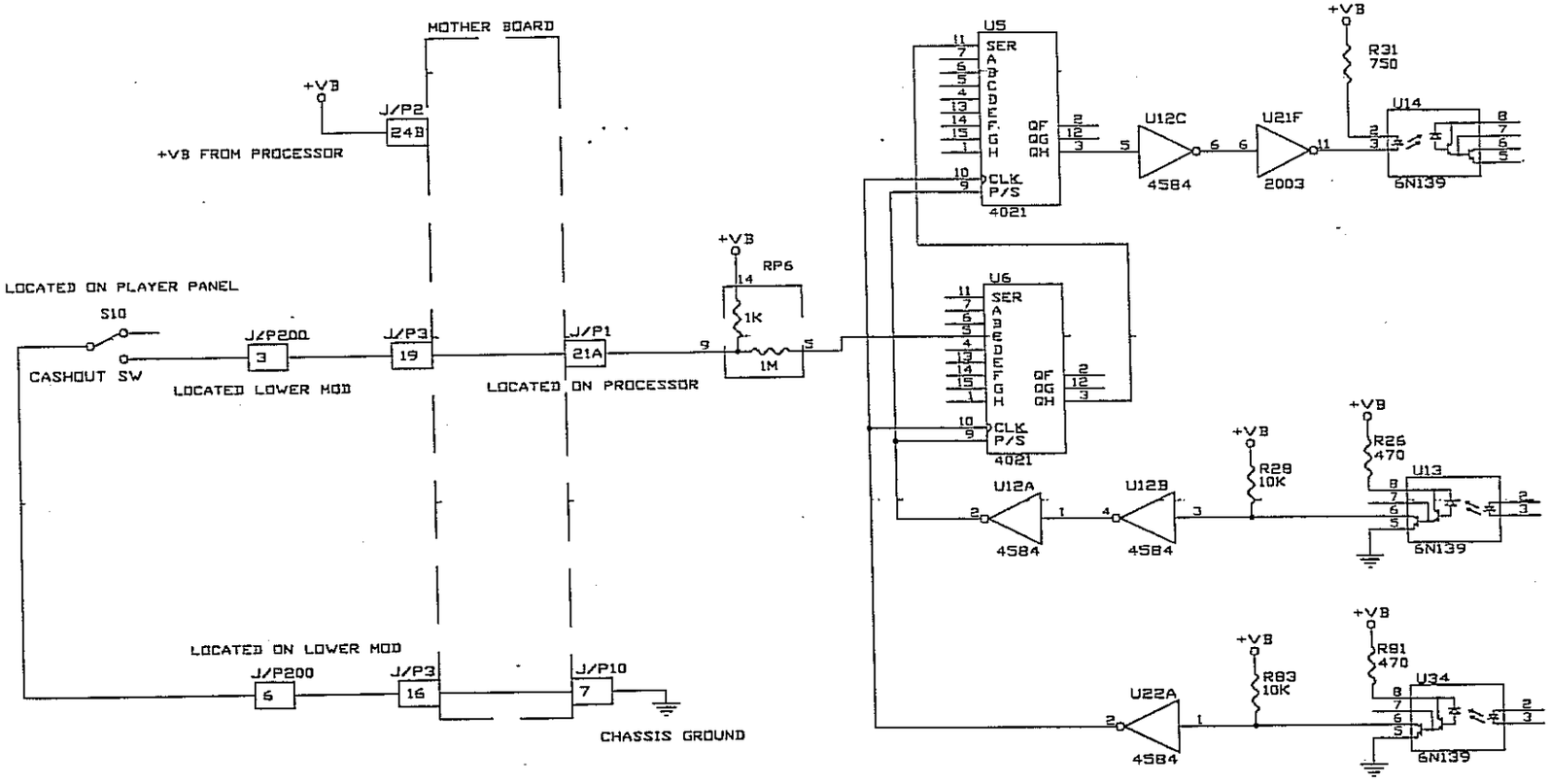
Before removing the processor board, check the following areas:

- ✓ 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

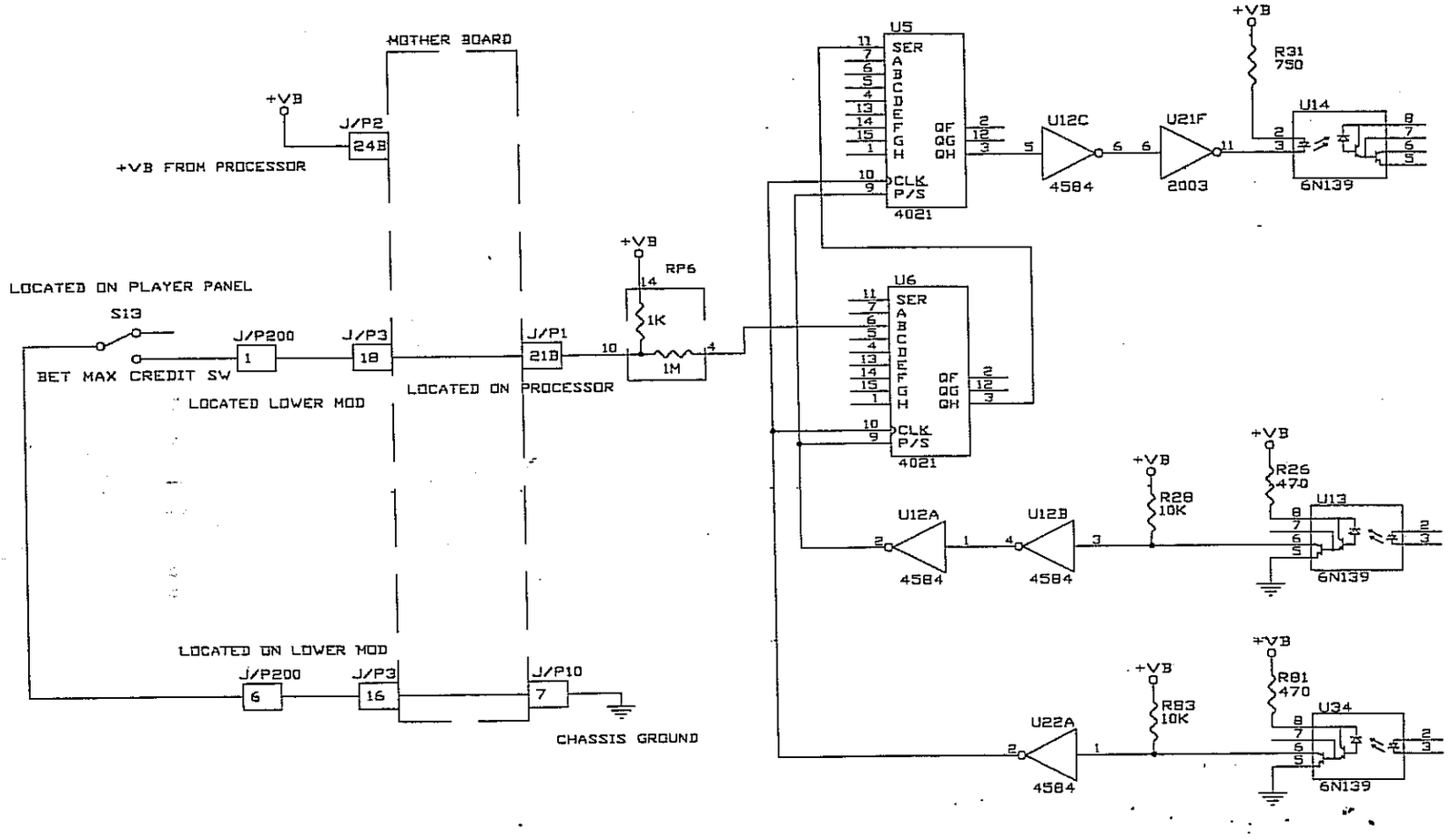
Before removing the processor board, check the following areas:

- ✓ 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

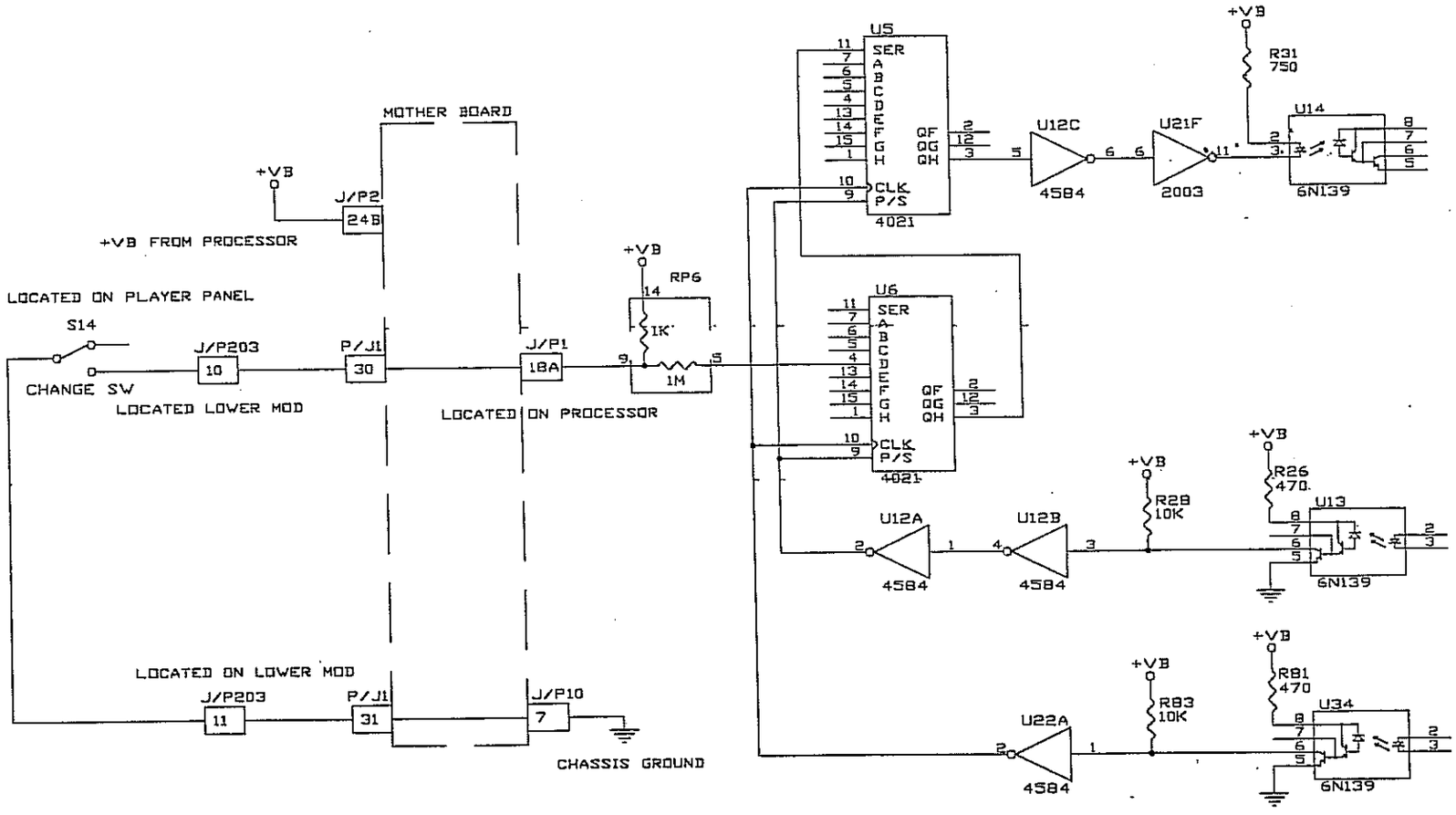
Before removing the processor board, check the following areas:

- ✓ 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

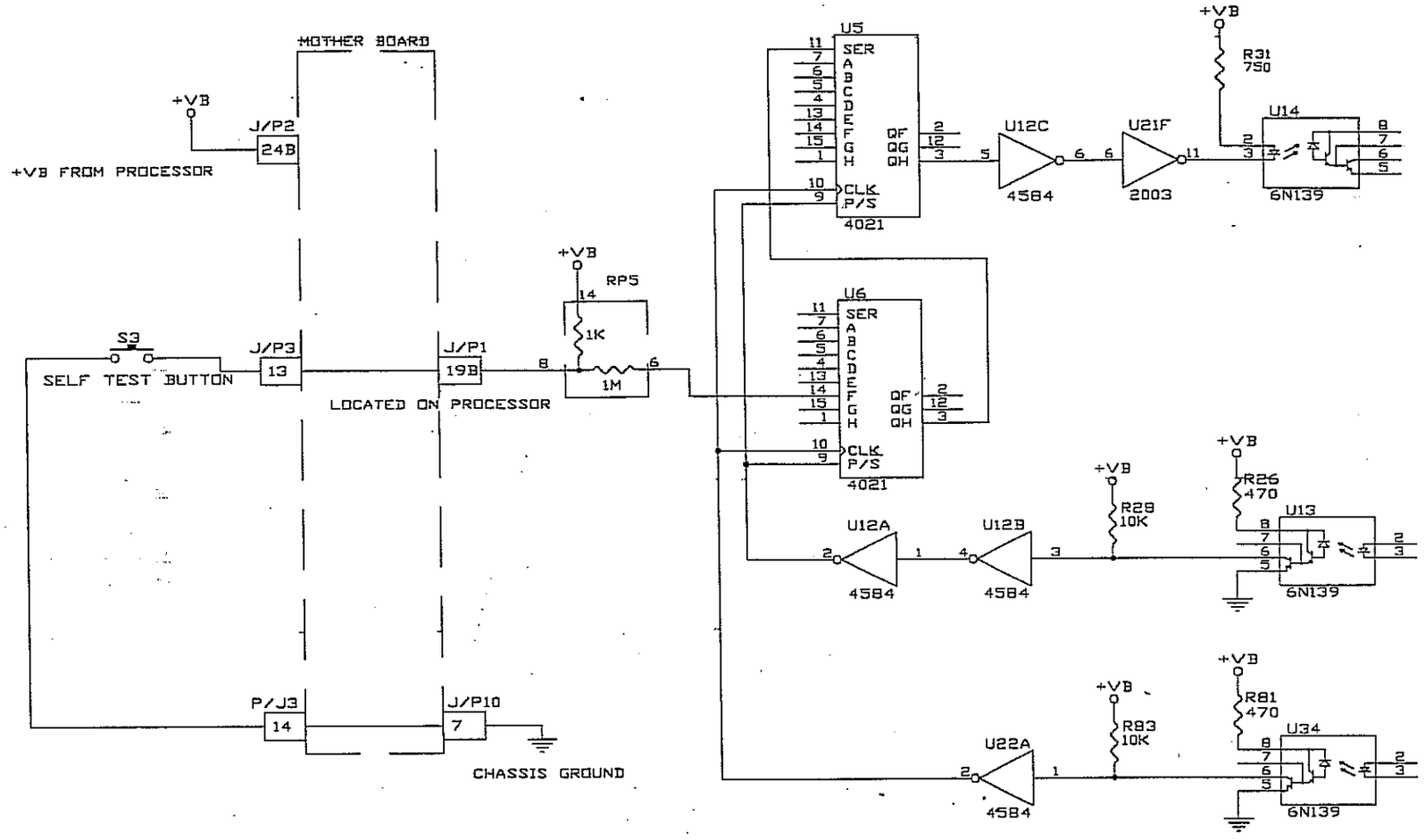
Before removing the processor board, check the following areas:

- ✓ 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

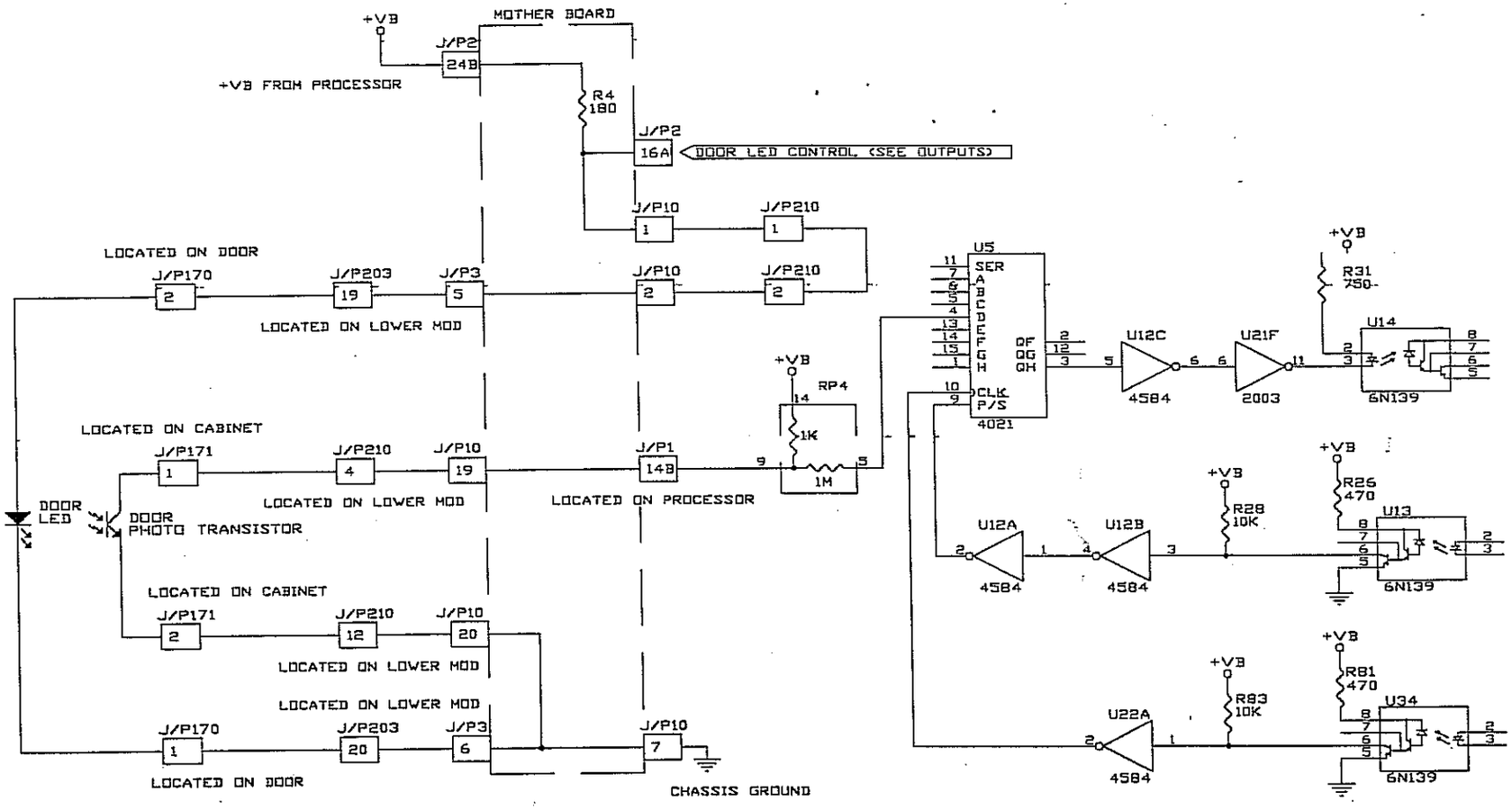
Before removing the processor board, check the following areas:

- ✓ 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.

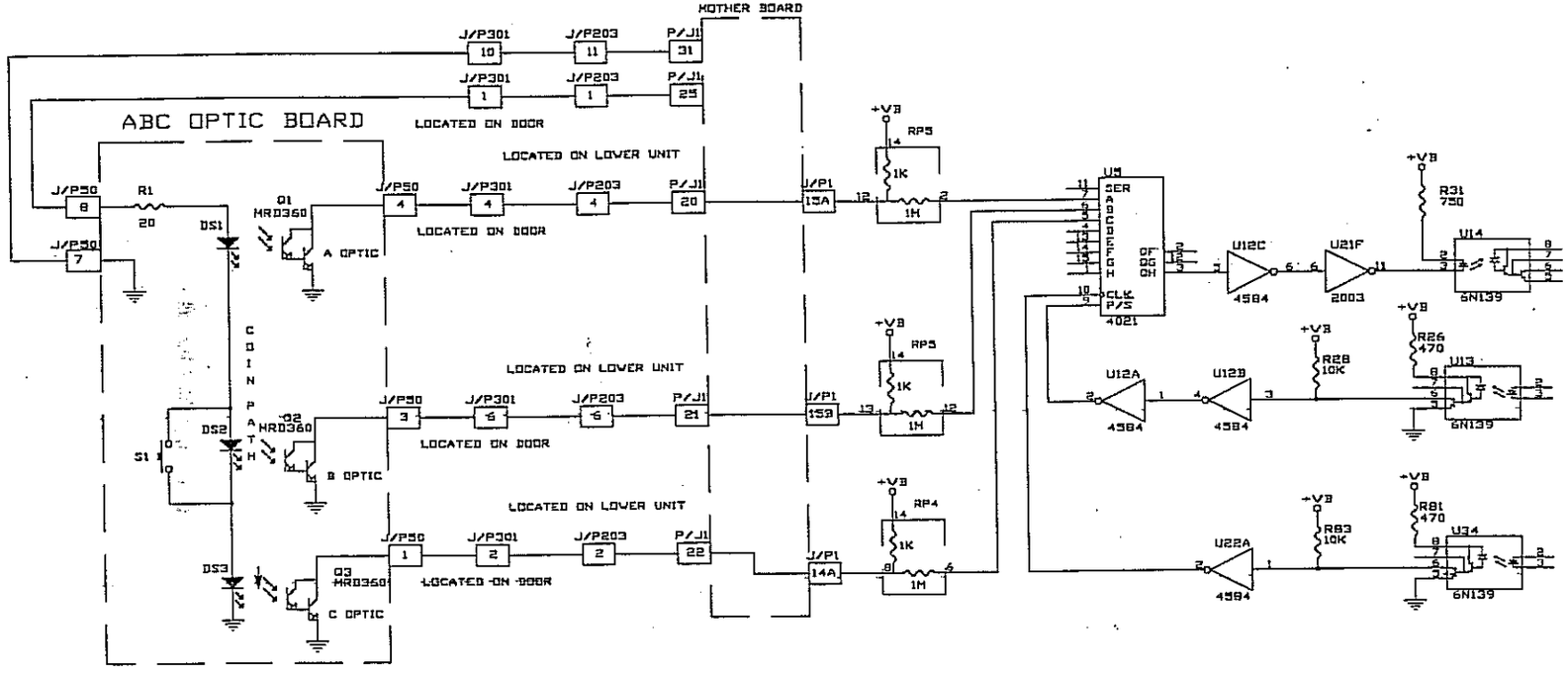
Before removing the processor board, check the following areas:

- ✓ 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.

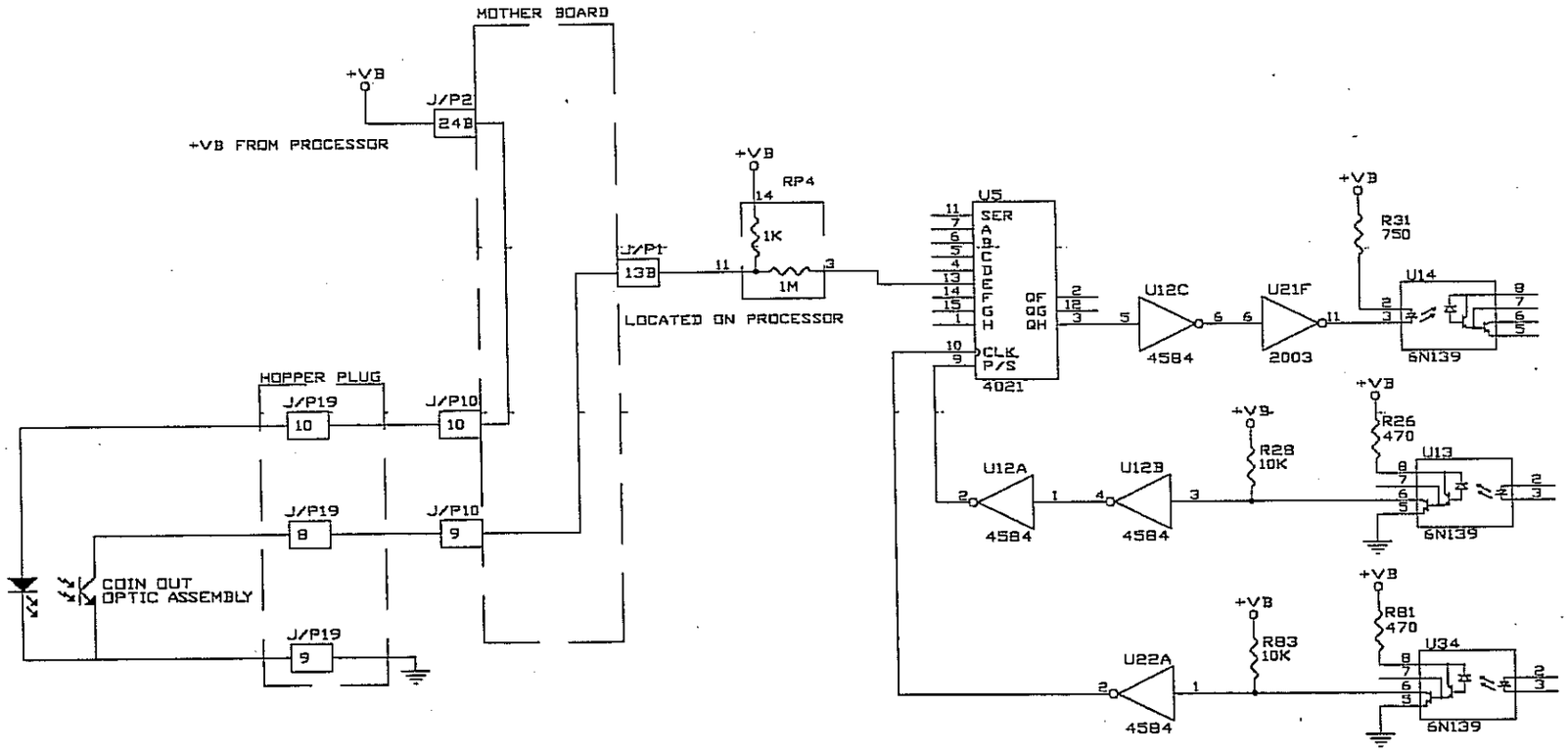
Before removing the processor board, check the following areas:

- ✓ 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.

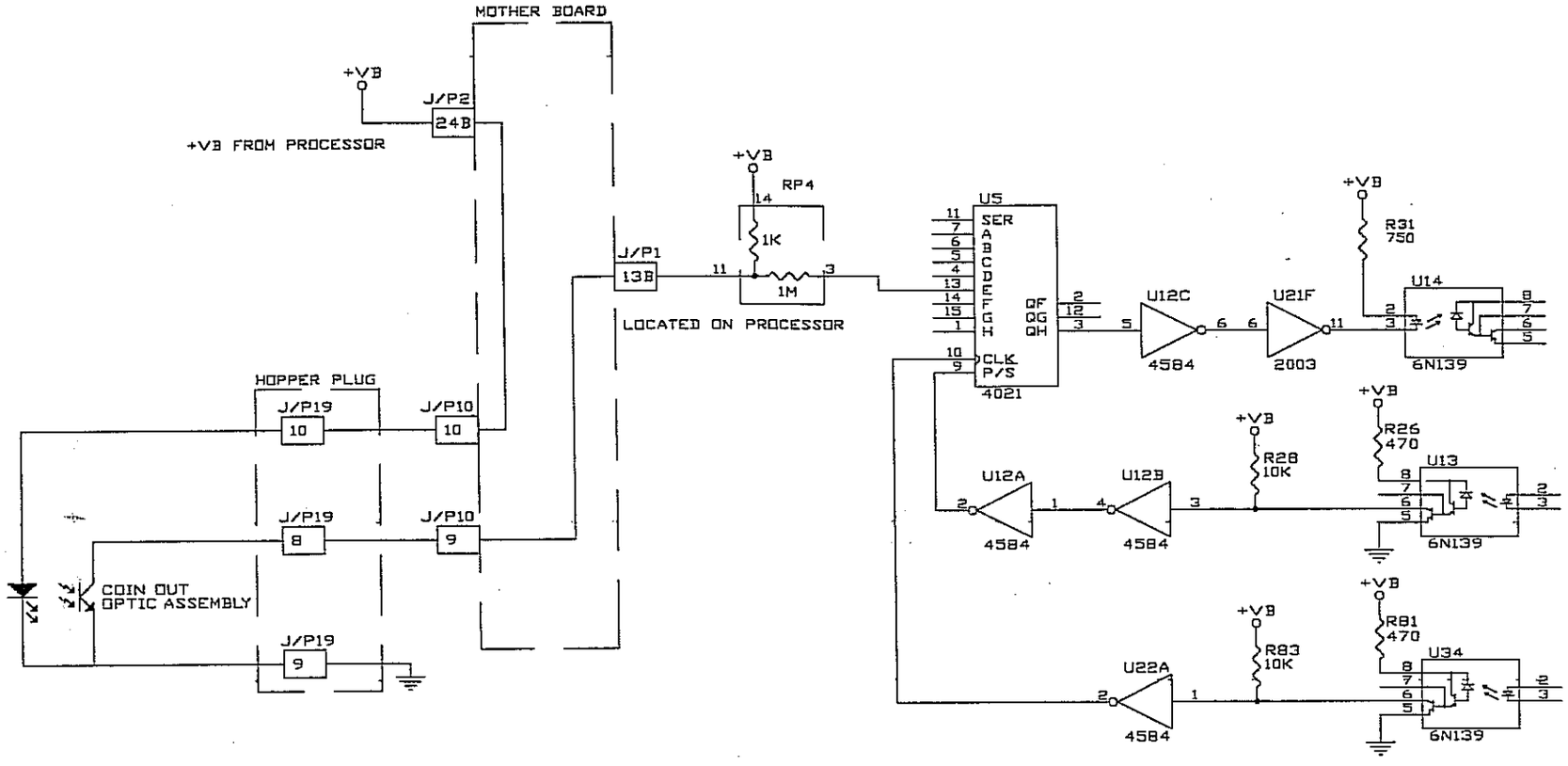
Before removing the processor board, check the following areas:

- ✓ 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.

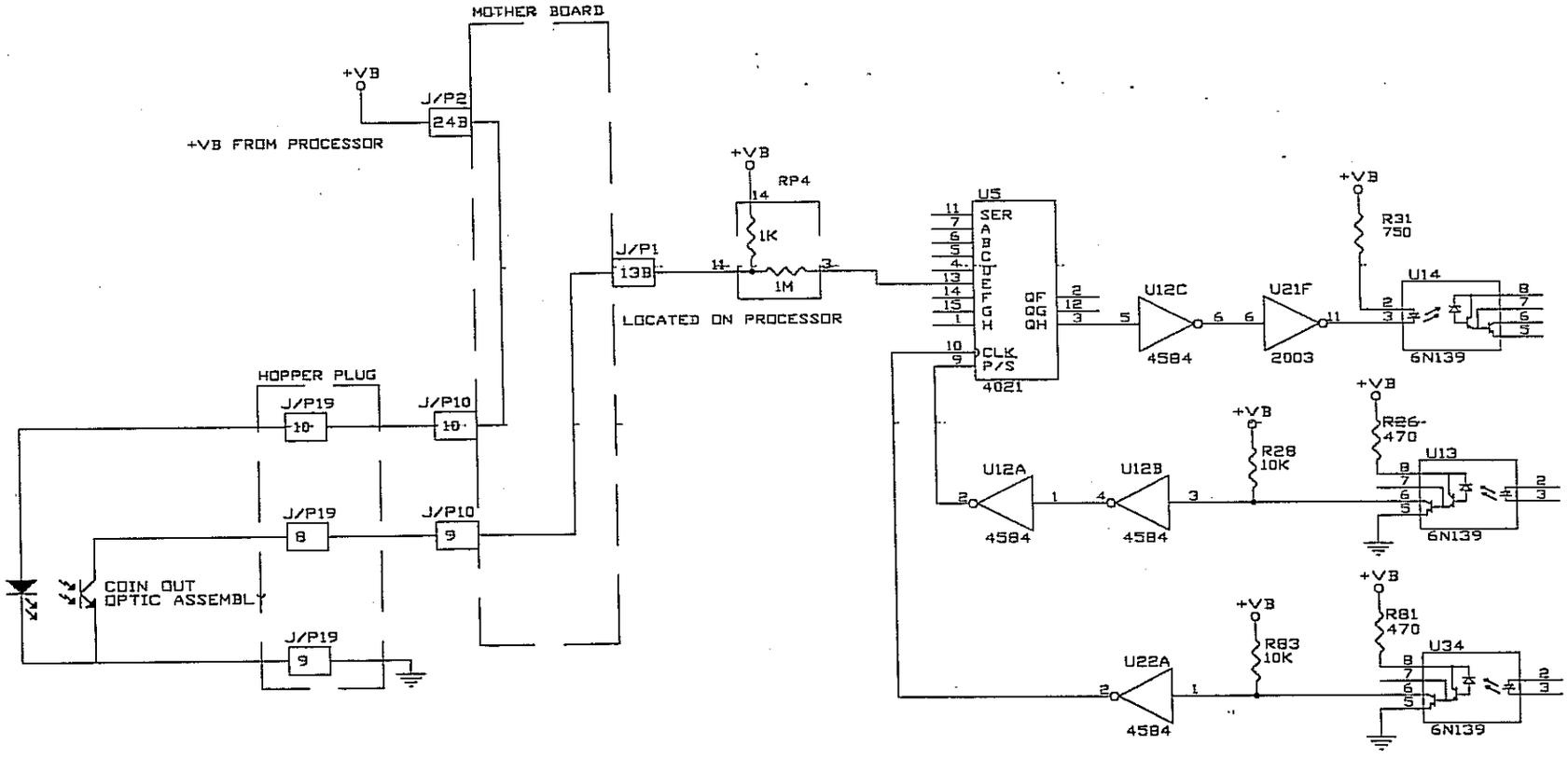
Before removing the processor board, check the following areas:

- ✓ 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.

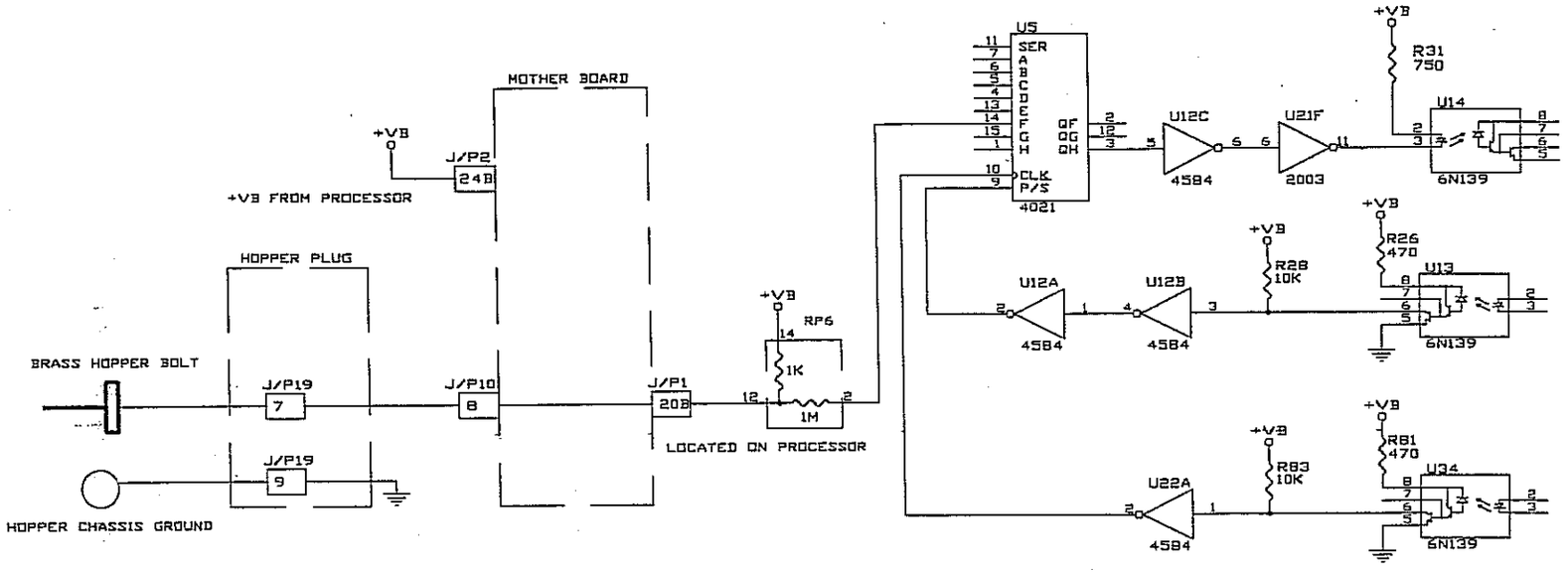
Before removing the processor board, check the following areas:

- ✓ 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:

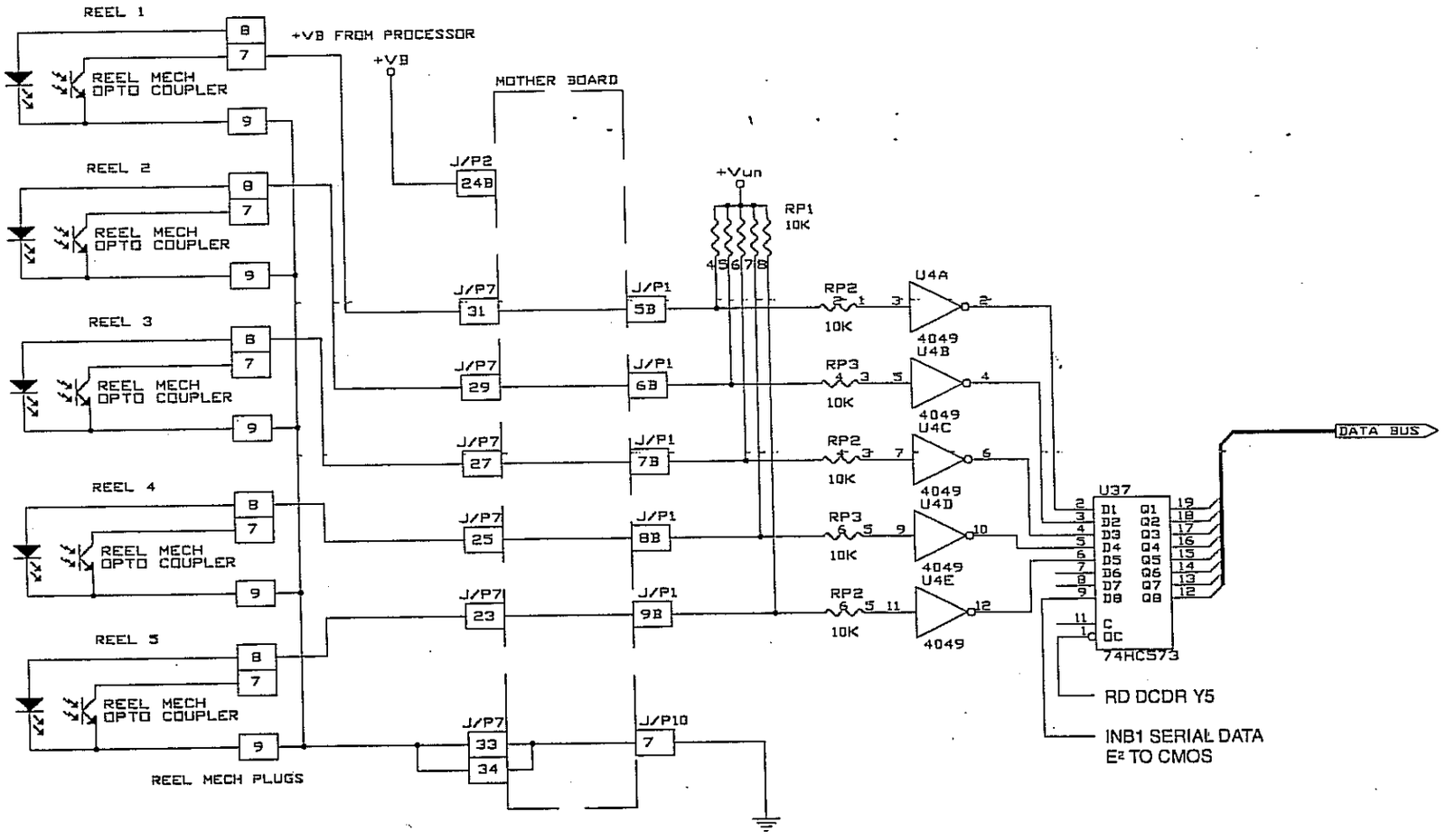
- ⇨ Replace processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in tester
- ⇨ If processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor are good, then use this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

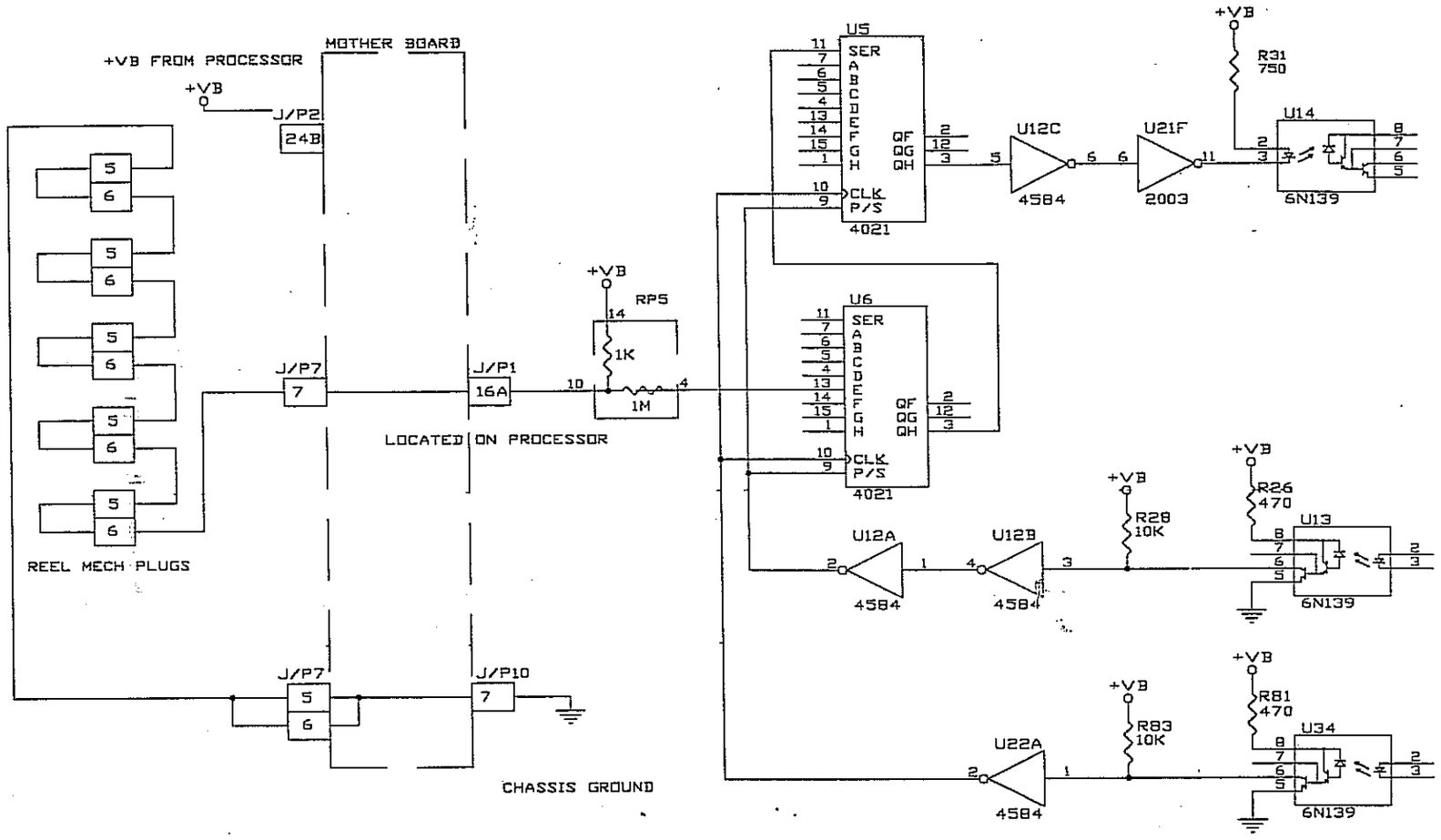
Before removing the processor board, check the following areas:

- ✓ 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

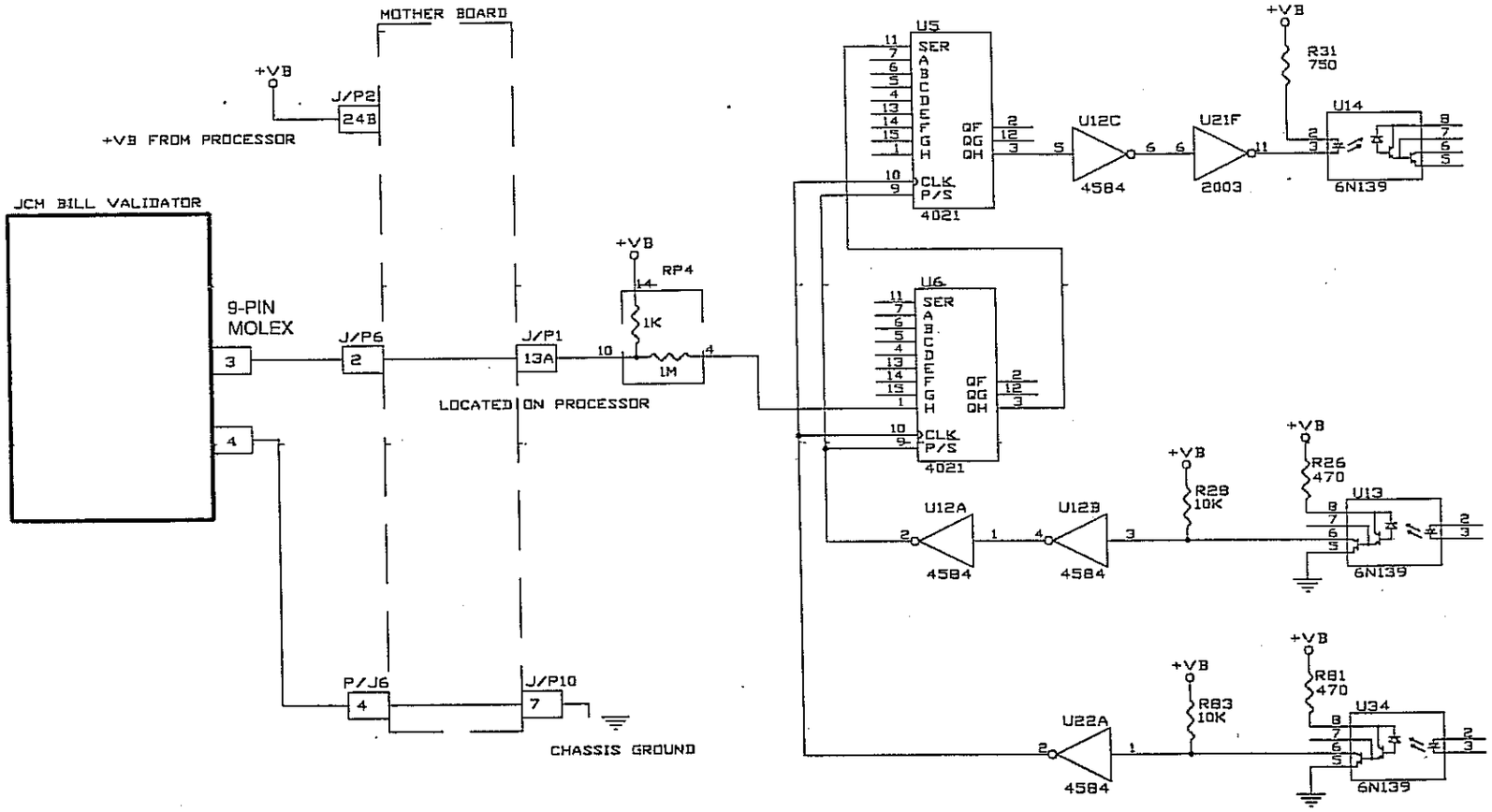
Before removing the processor board, check the following areas:

- ✓ 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

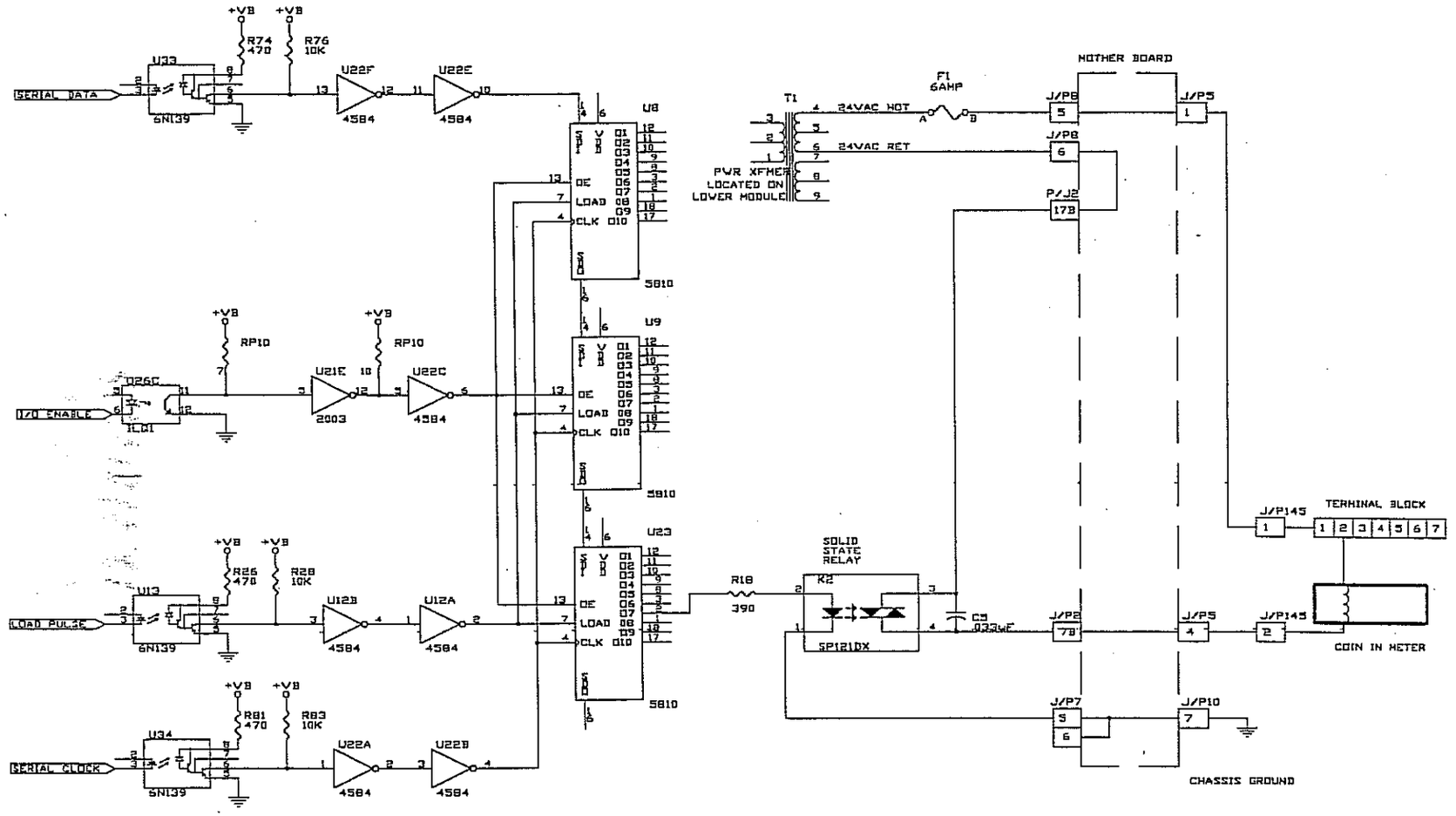
The outputs test page allows the operator to test machine outputs. The number 2 appears in the Coins Played display. During each output test, 2 digits of a 4-digit code appear in the Winner Paid display (for example, 10_ _).

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:

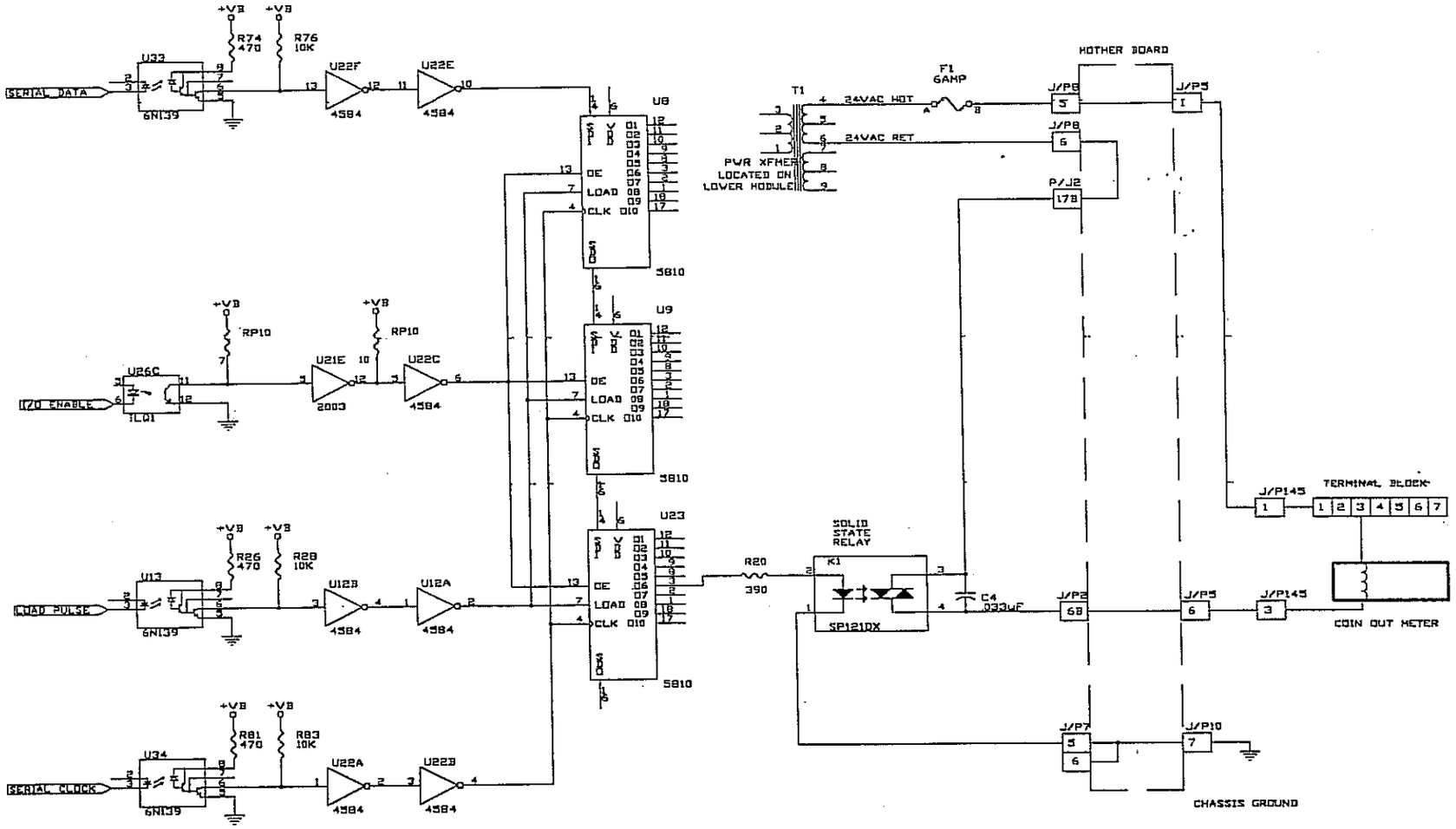
- ➪ If the meter is locked up, then replace the coin-in meter and retest
- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram 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:

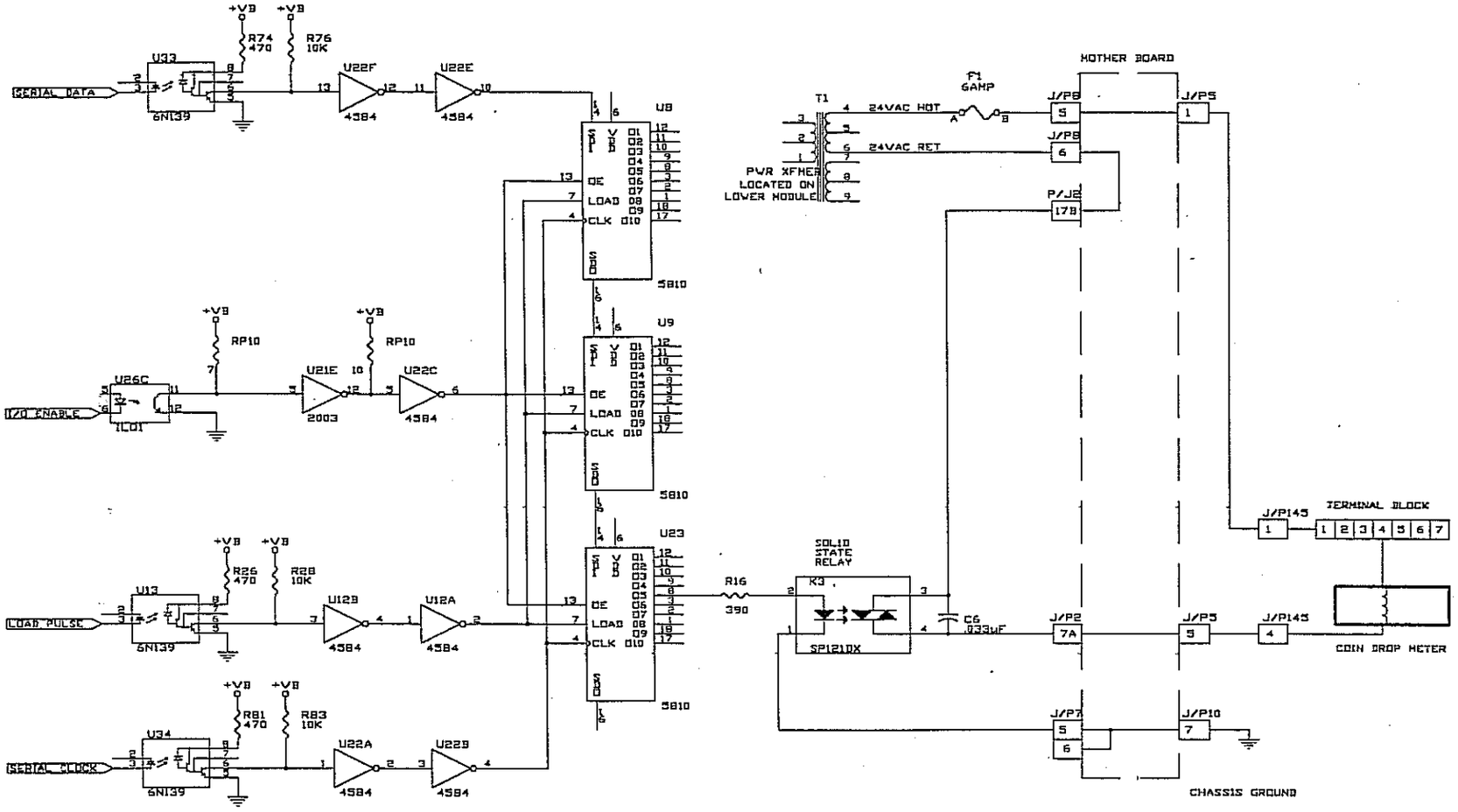
- ➪ If the meter is locked up, then replace the coin-out meter and retest
- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram 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:

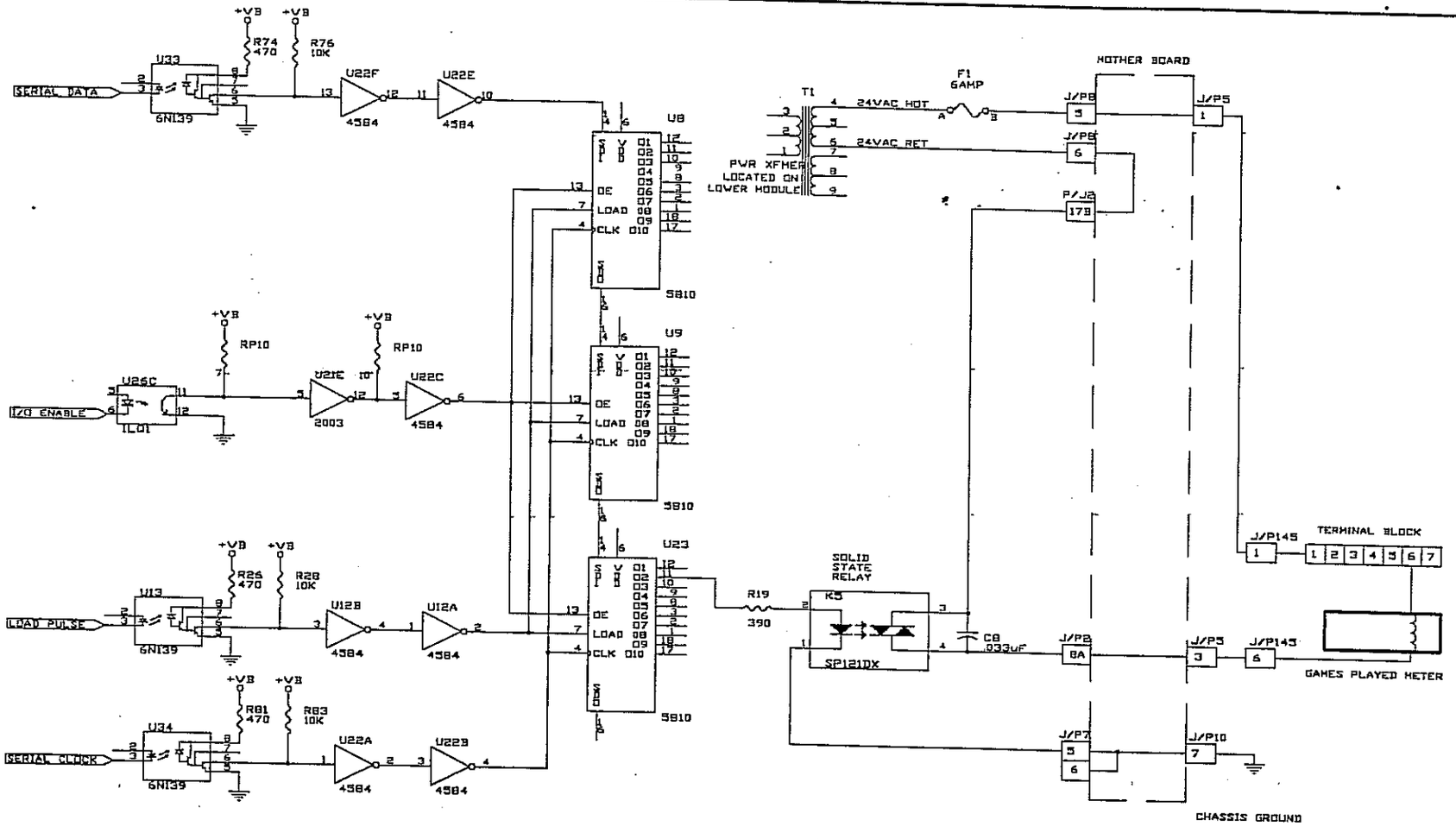
- ⇨ If the meter is locked up, replace the drop meter and retest
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate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

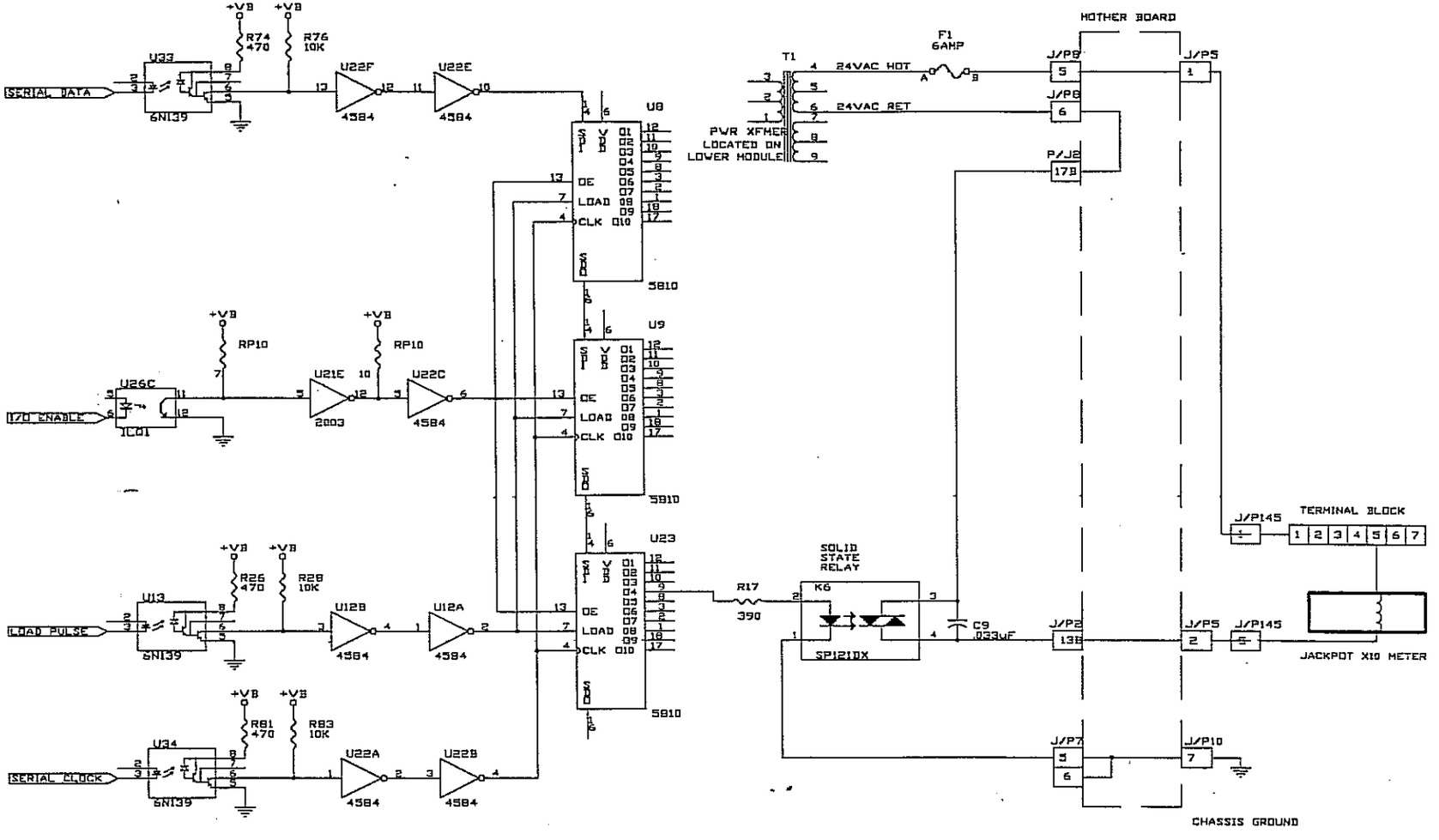
- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are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

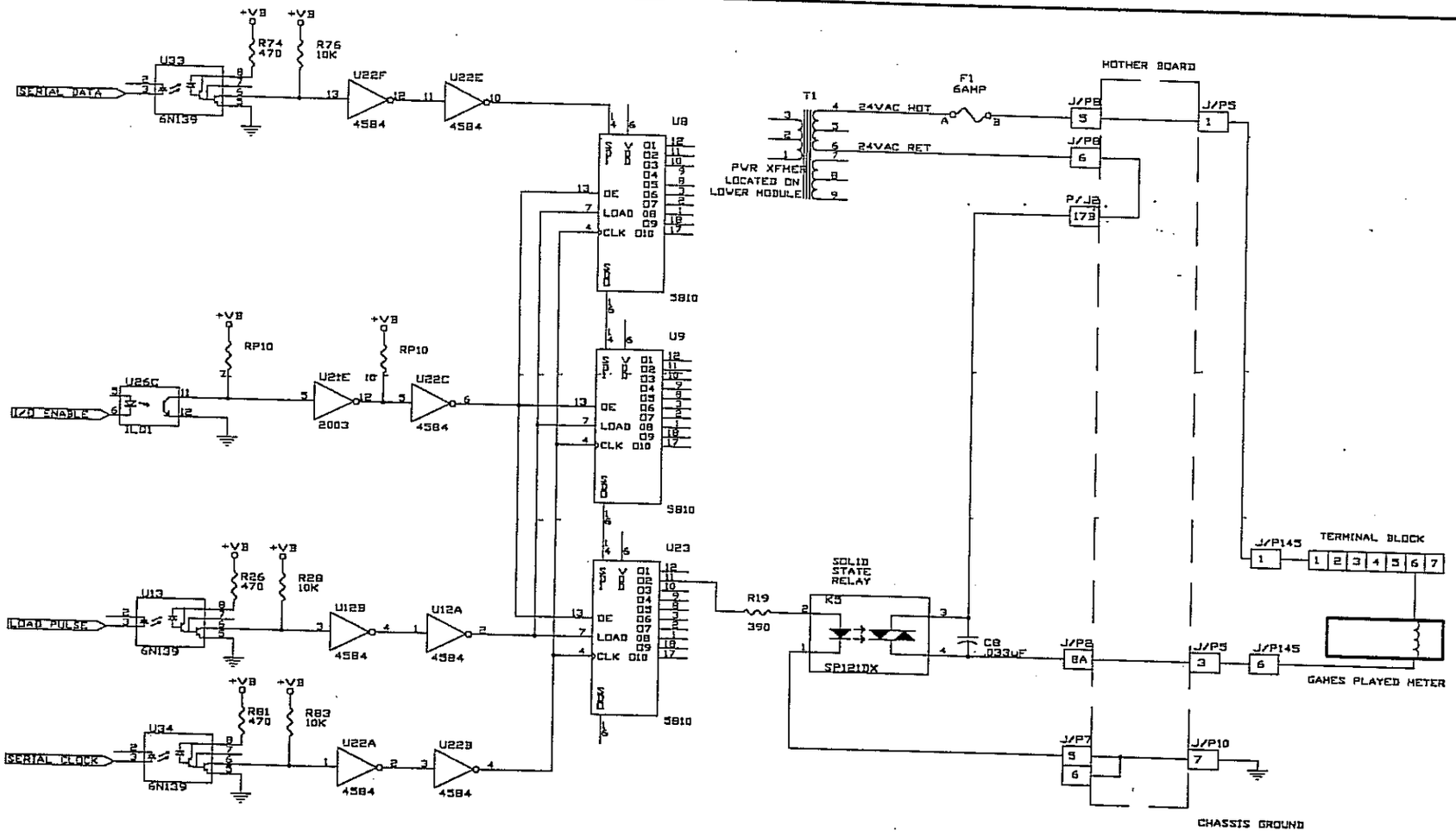
- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are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

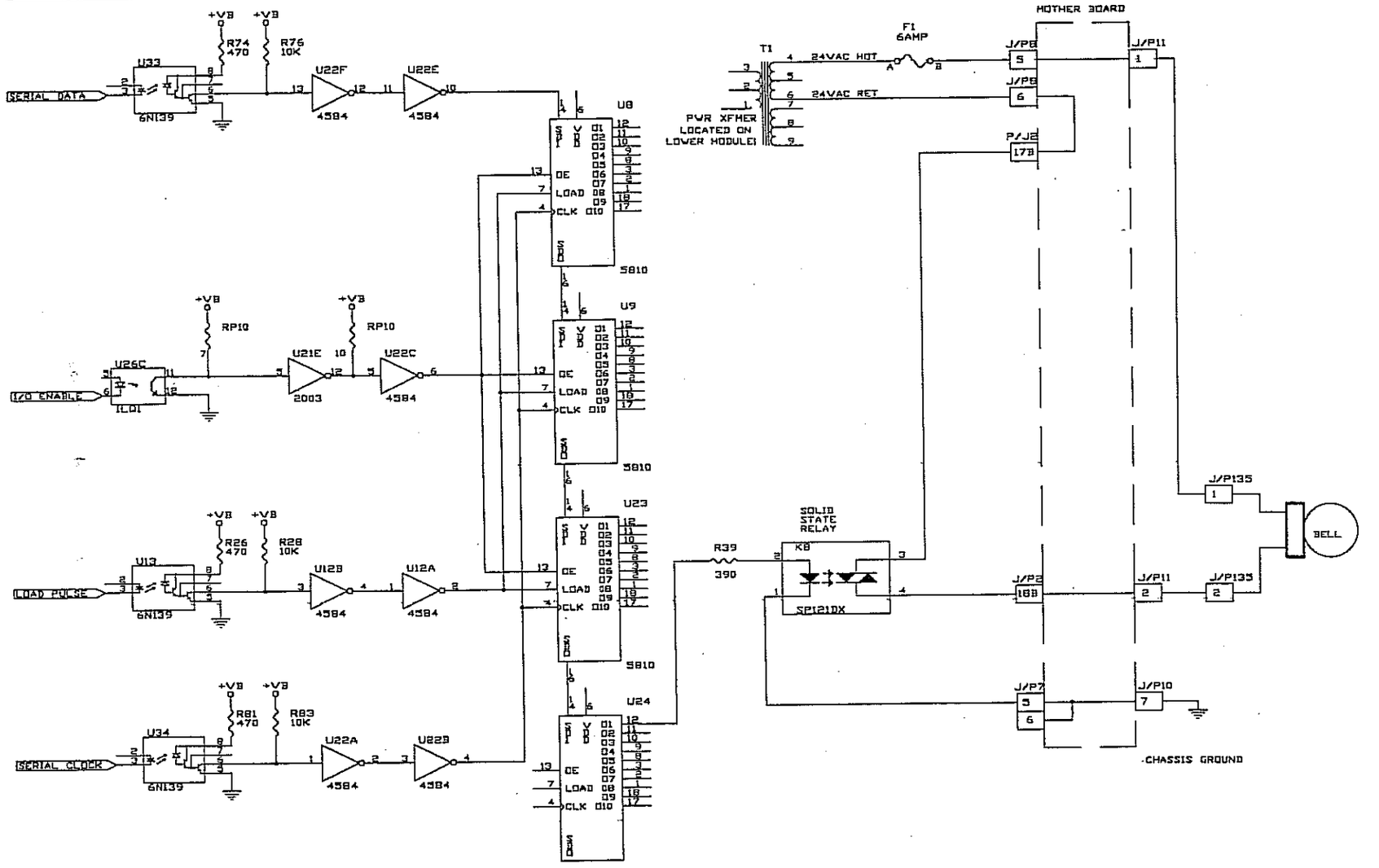
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are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

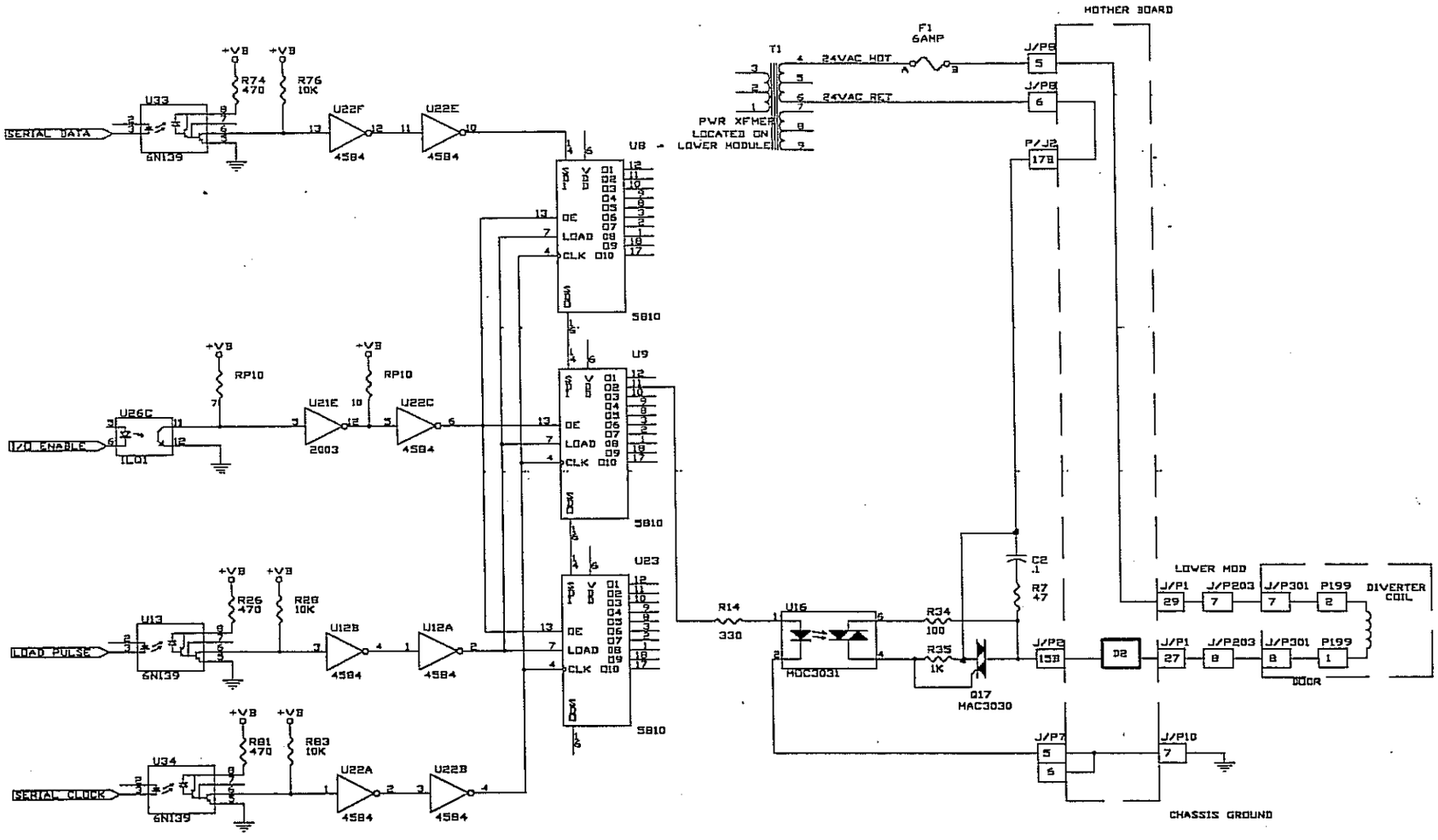
Before removing the processor board, check the following areas:

- ✓ 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

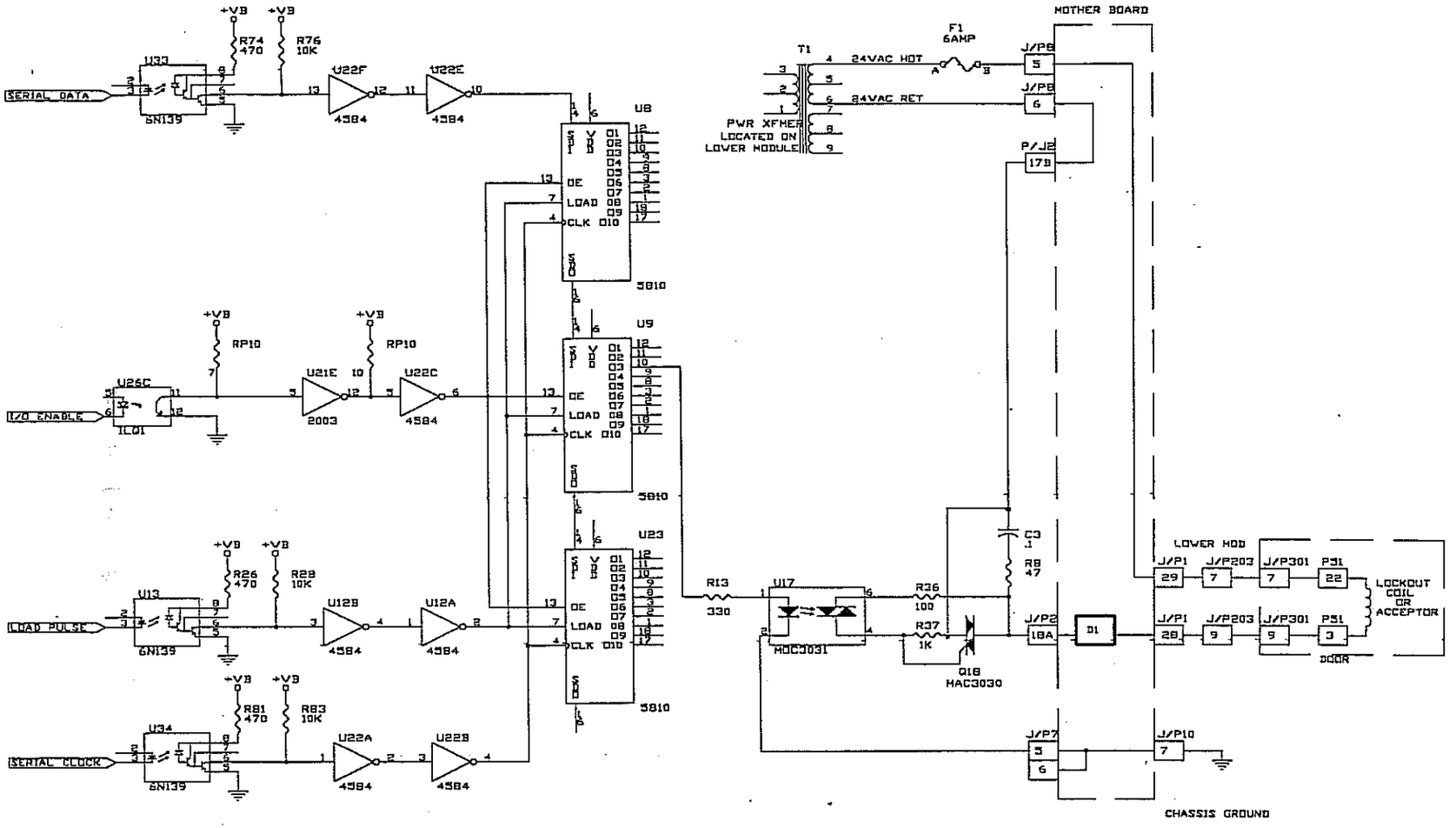
Before removing the processor board, check the following areas:

- ✓ 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:

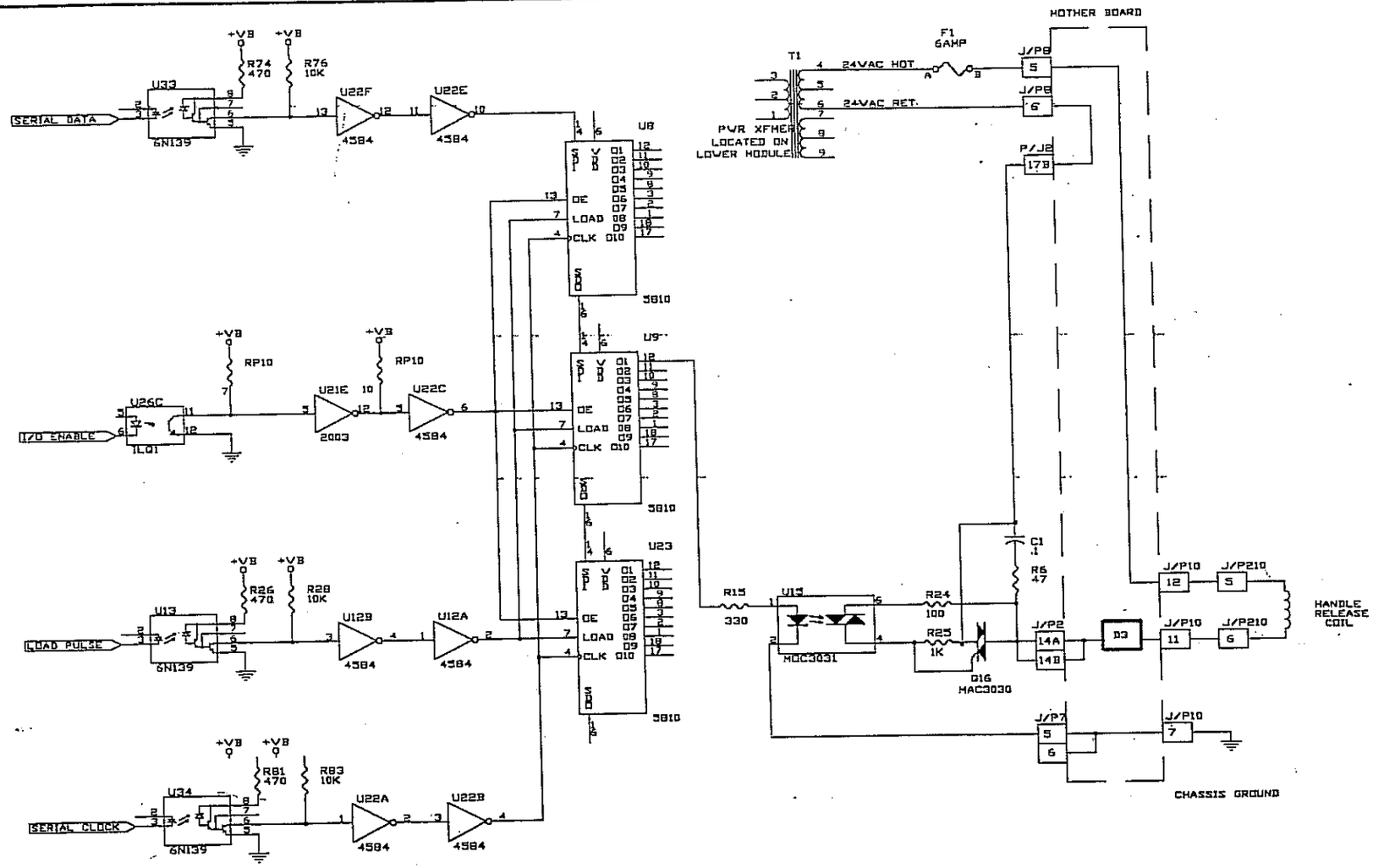
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are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

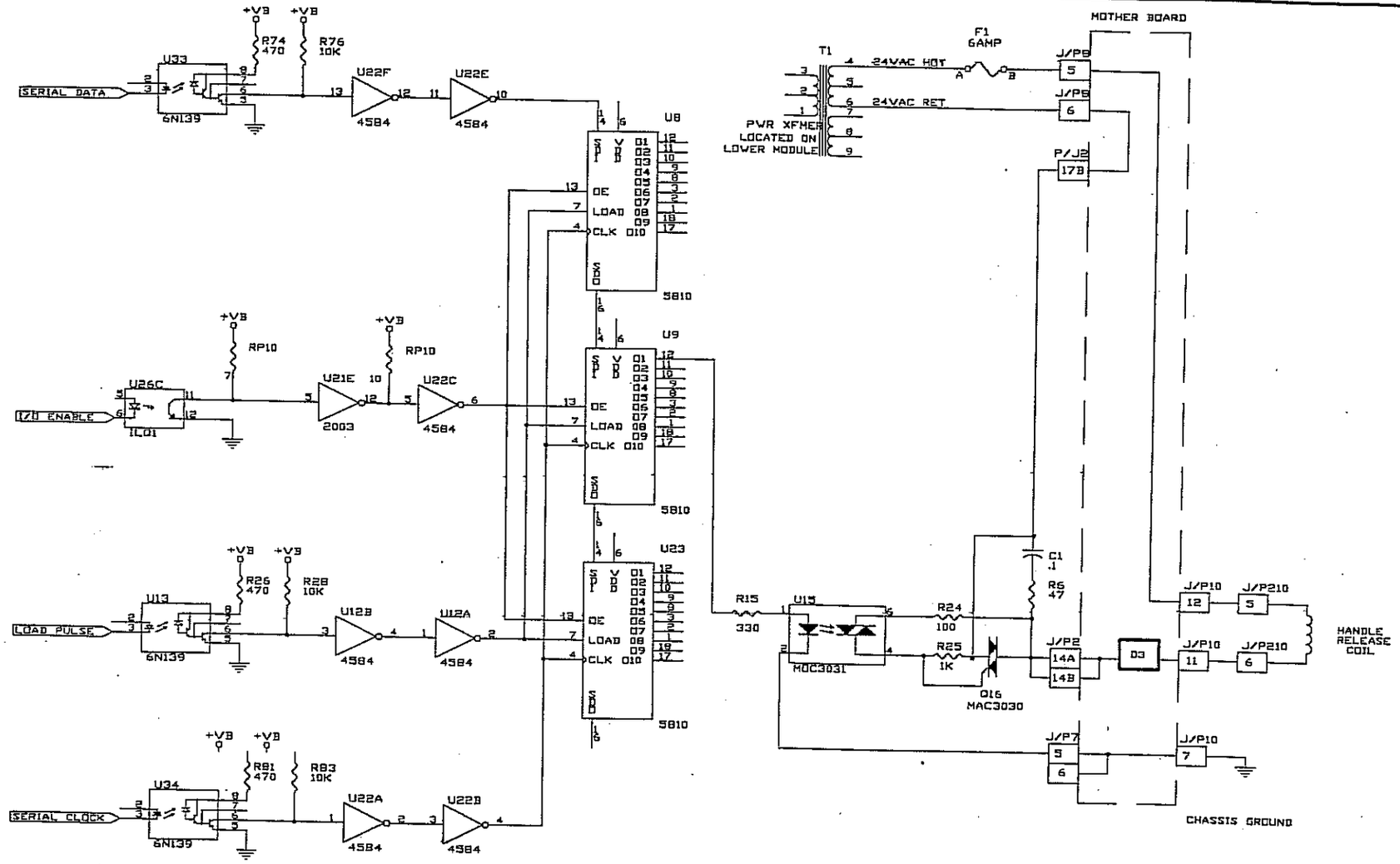
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are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

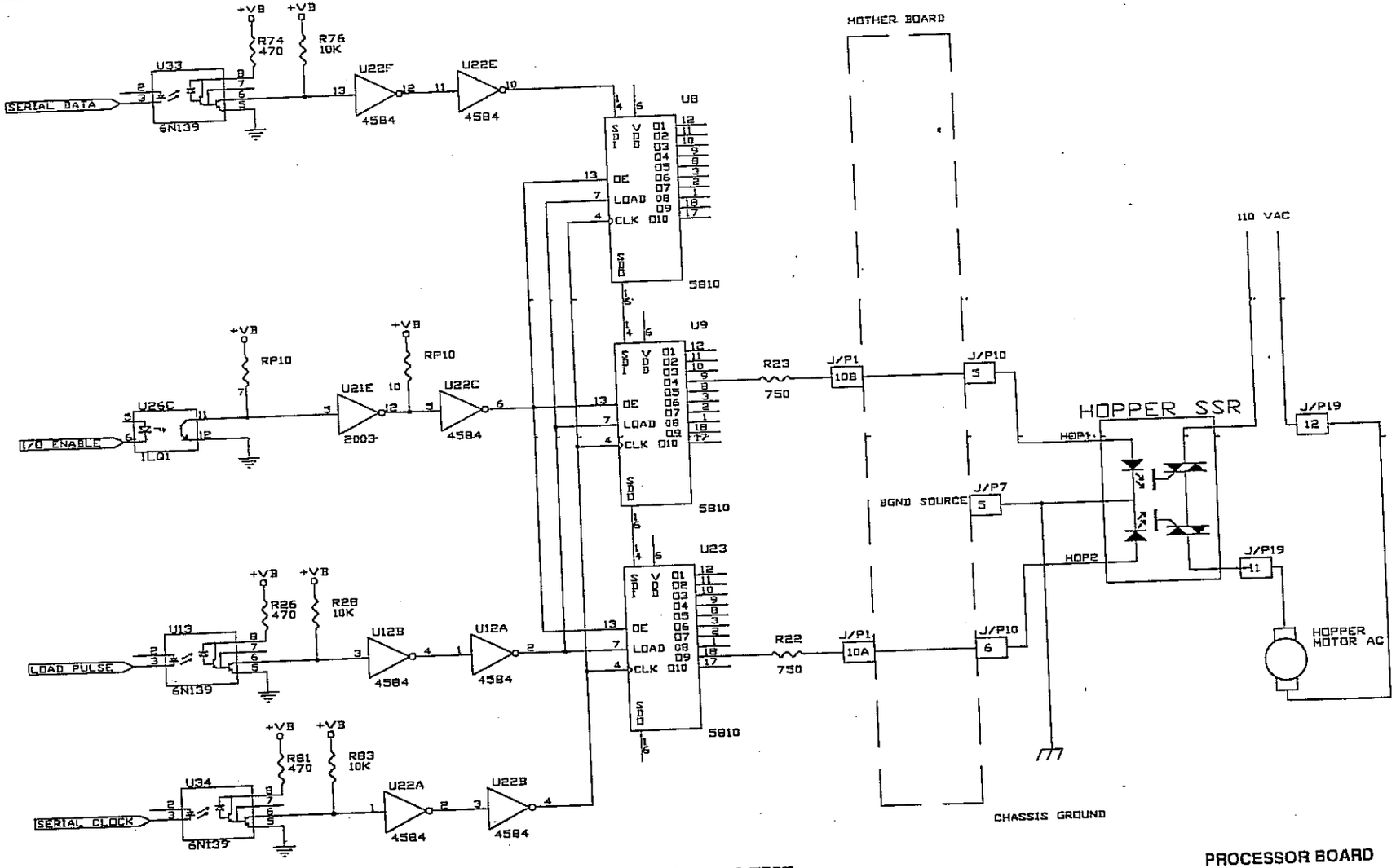
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are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

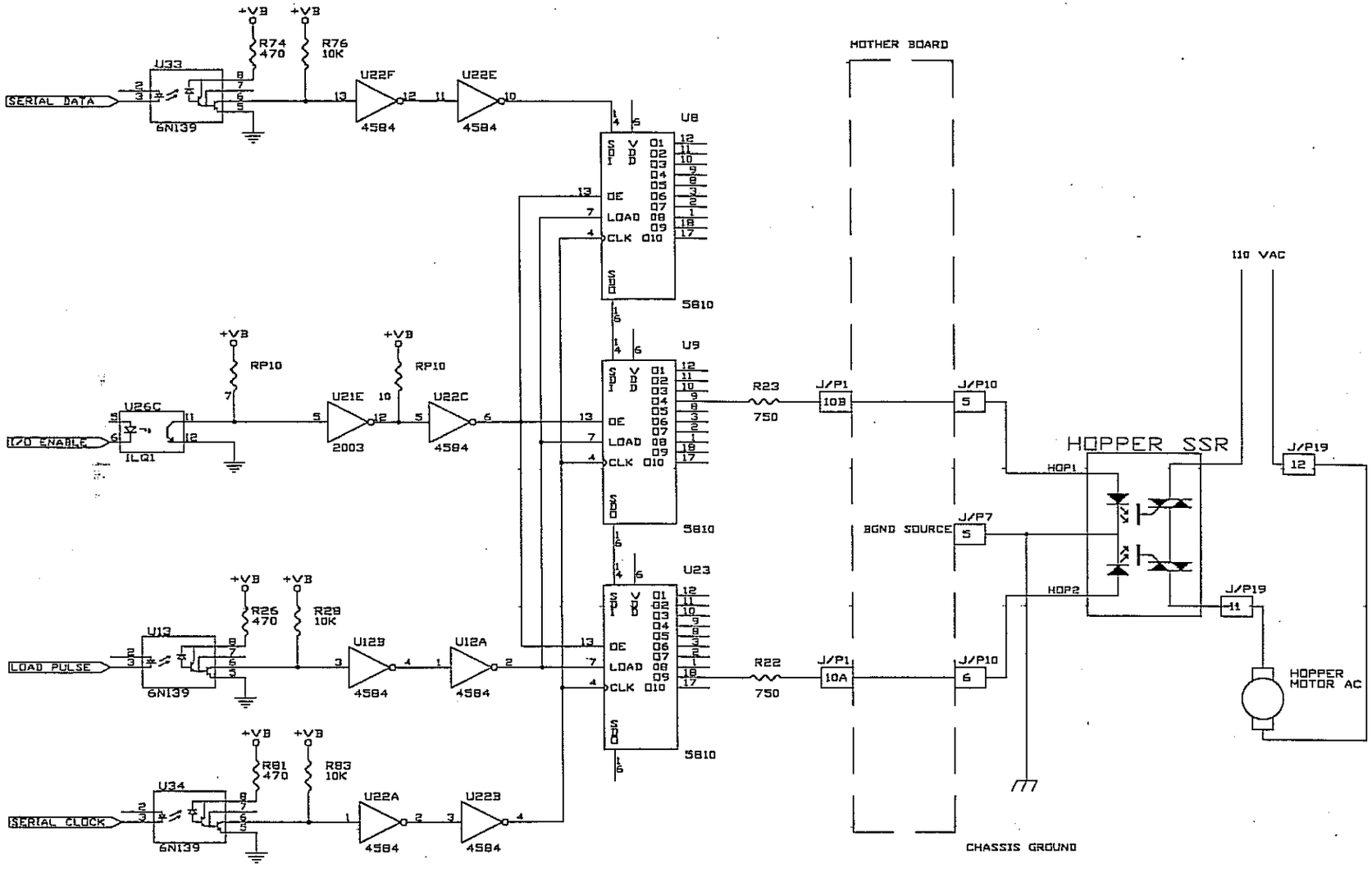
Before removing the processor board, check the following areas:

- ✓ 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:

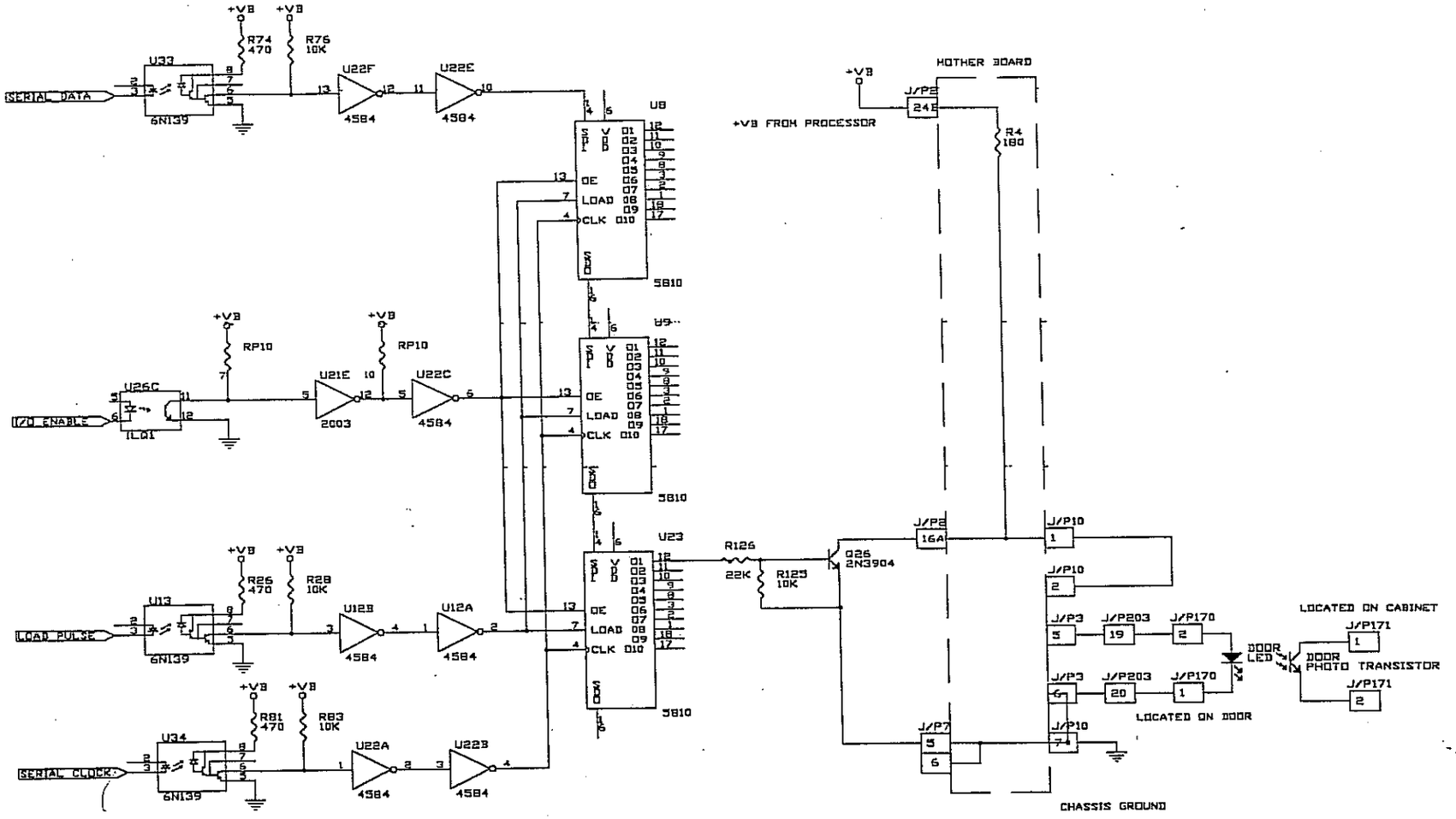
- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are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

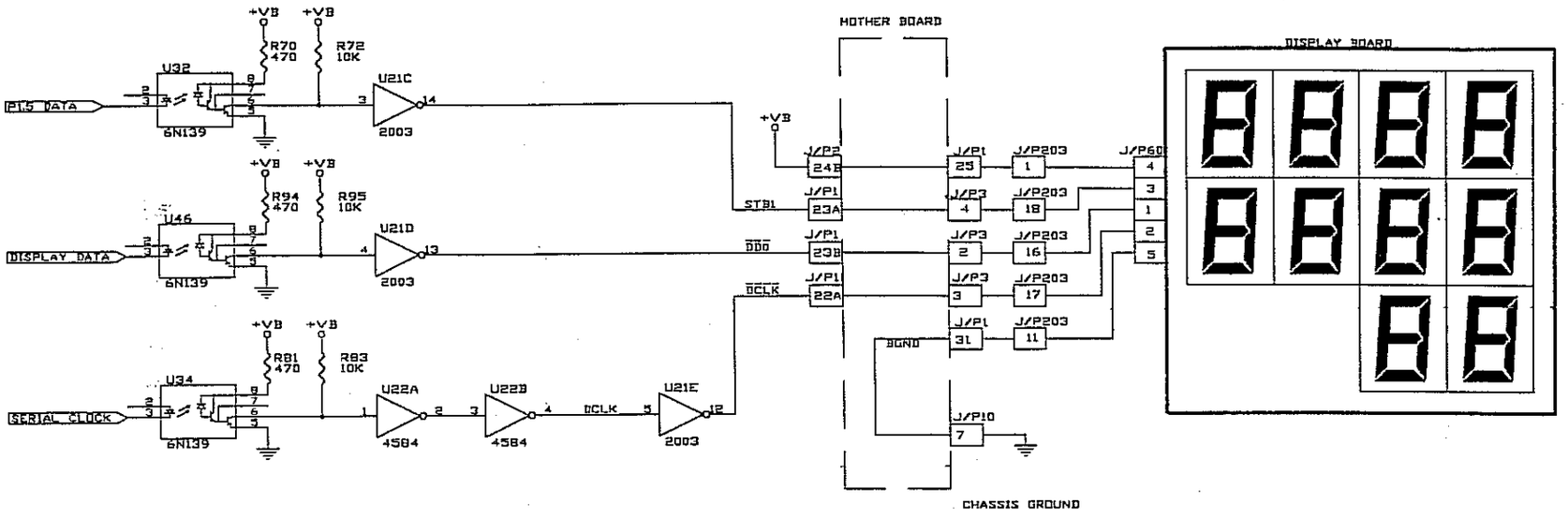
- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are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

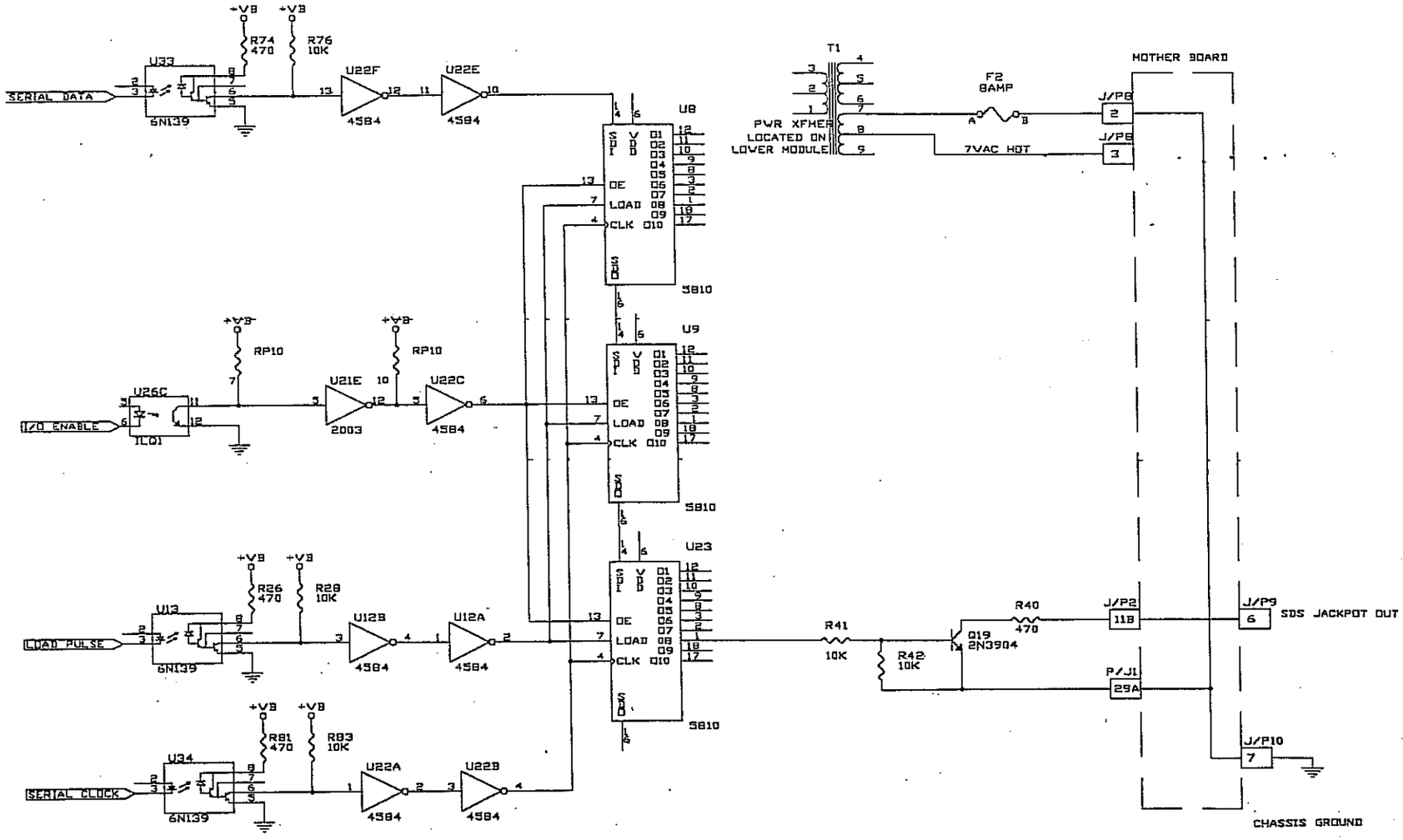
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are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

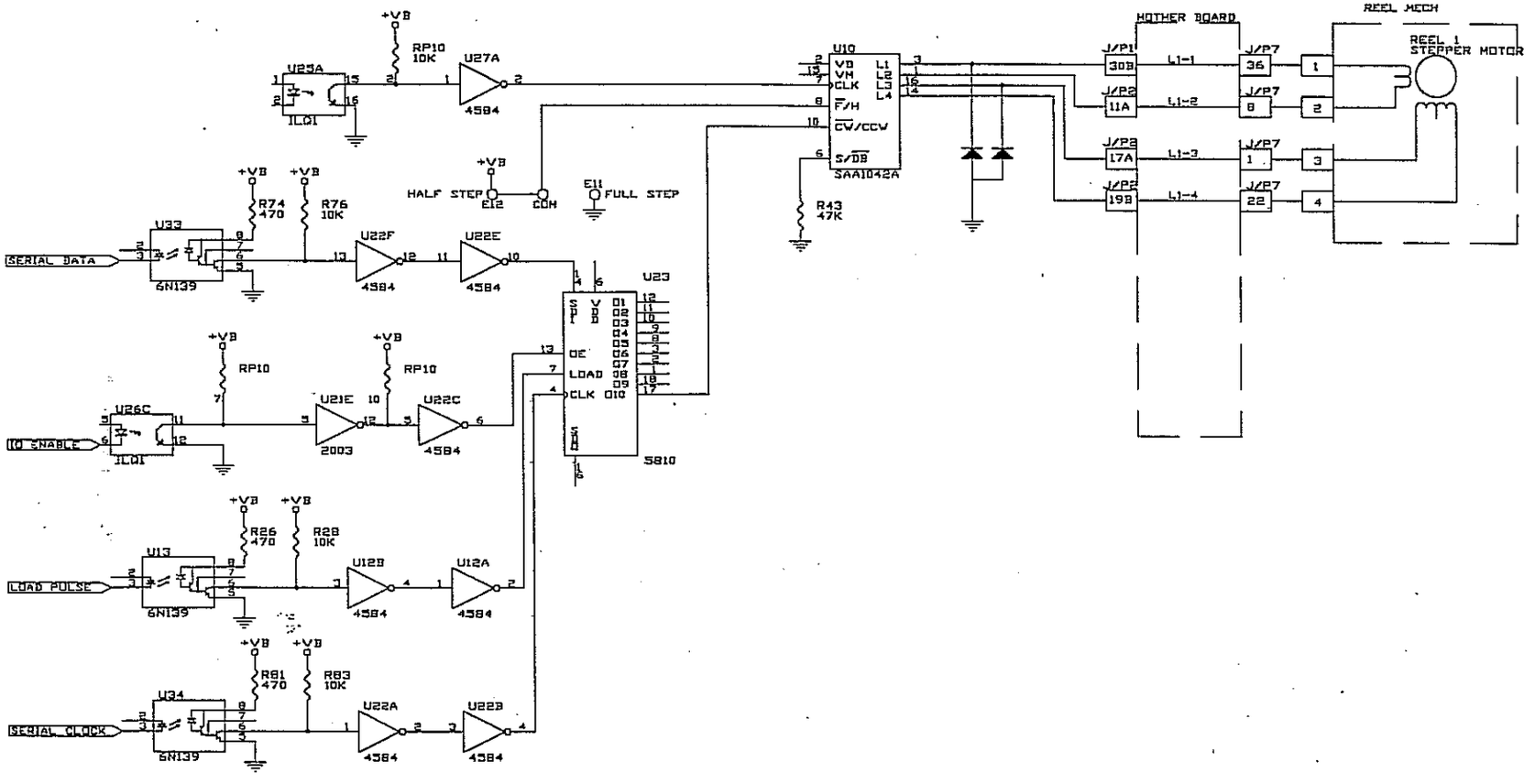
Before removing the processor board, check the following areas:

- ✓ 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:

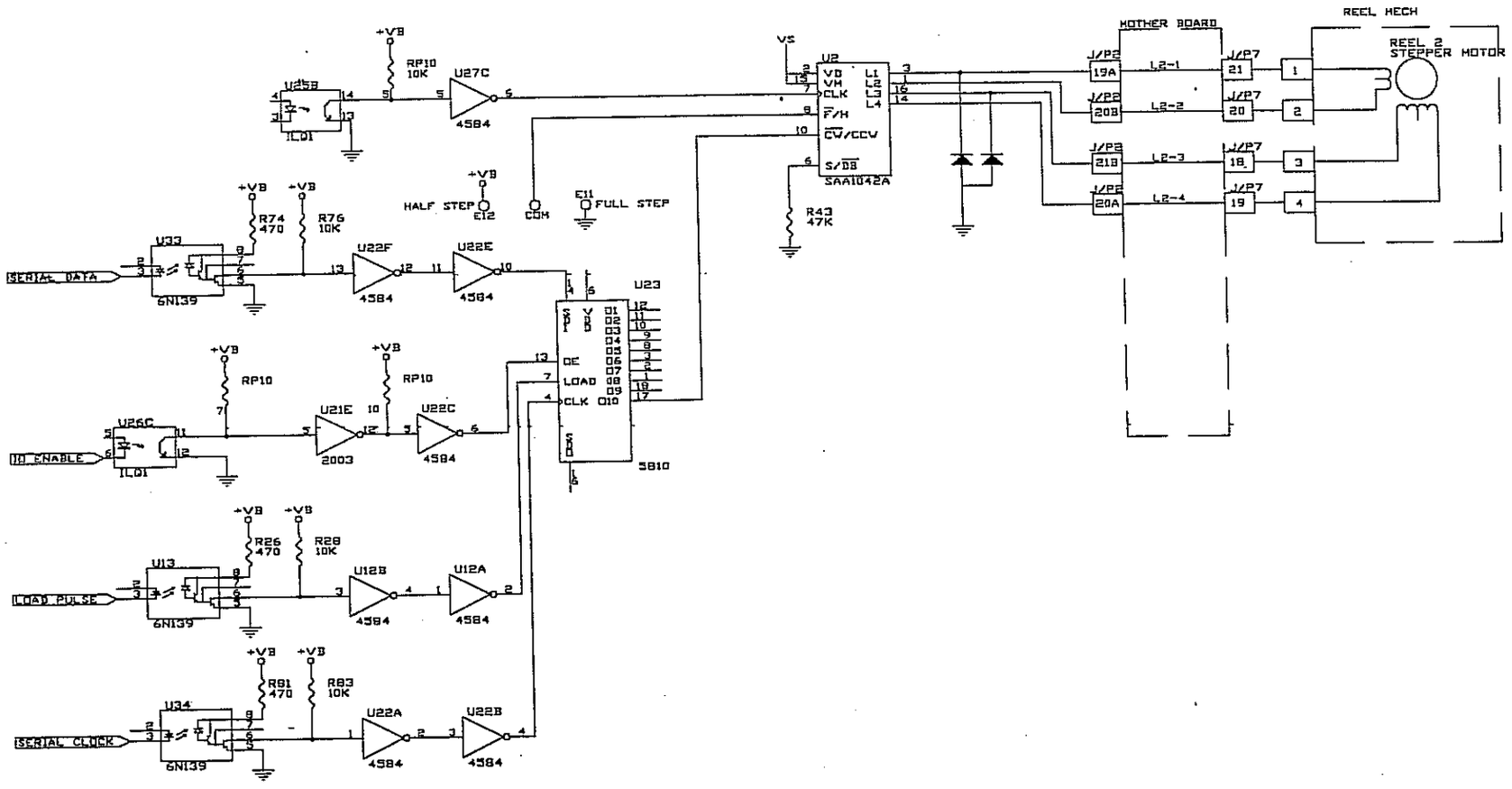
- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are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

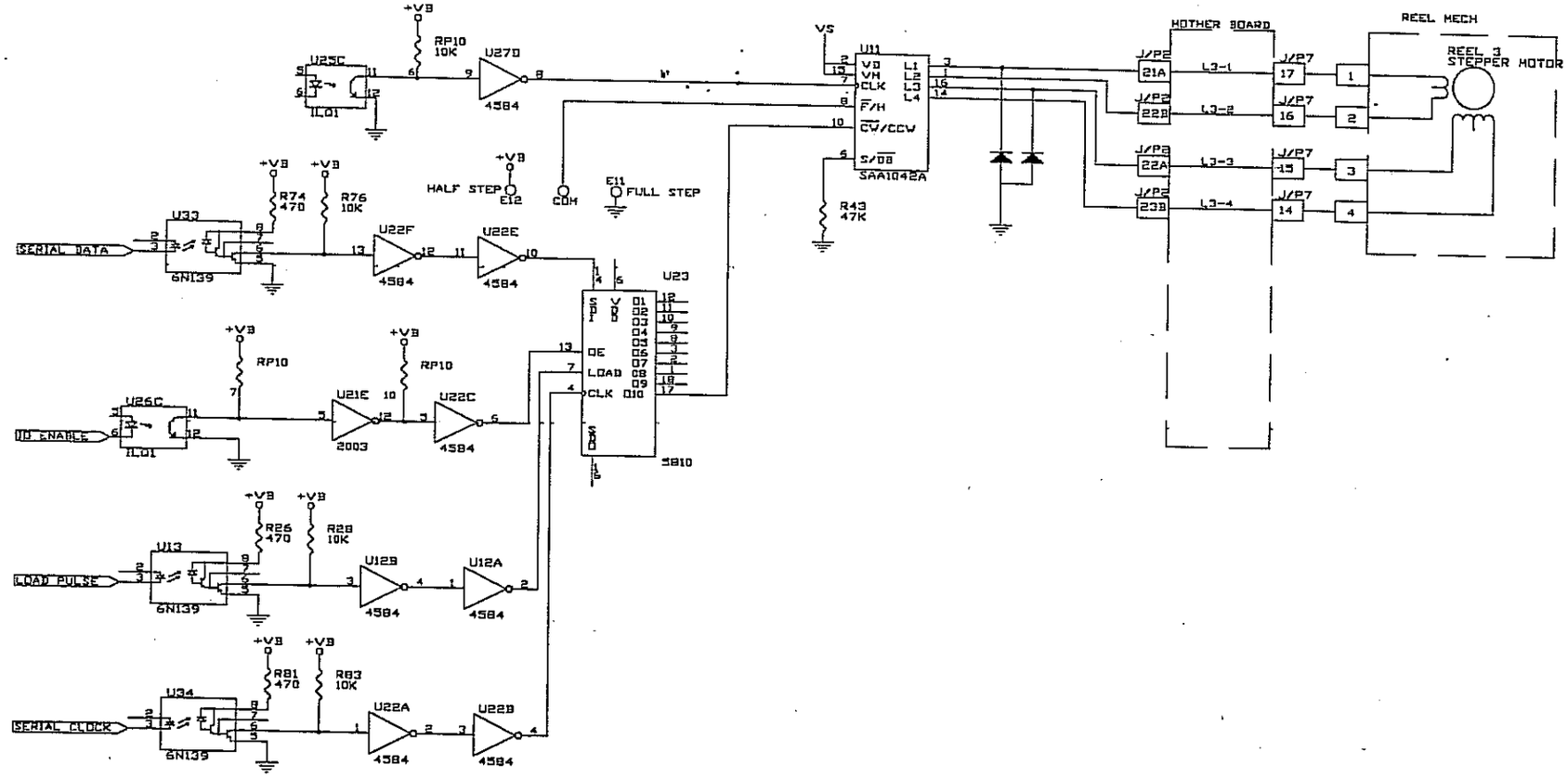
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are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

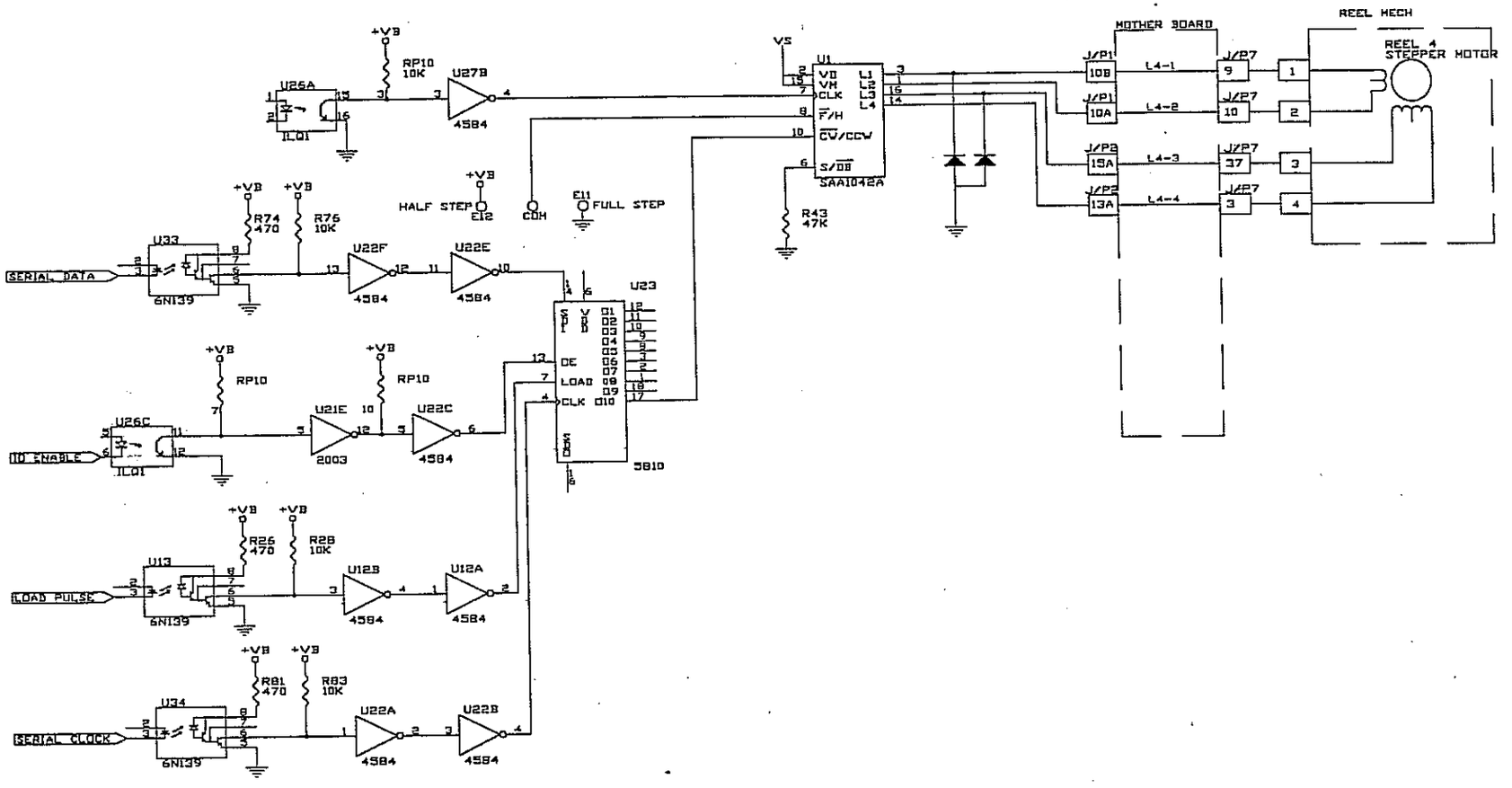
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are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

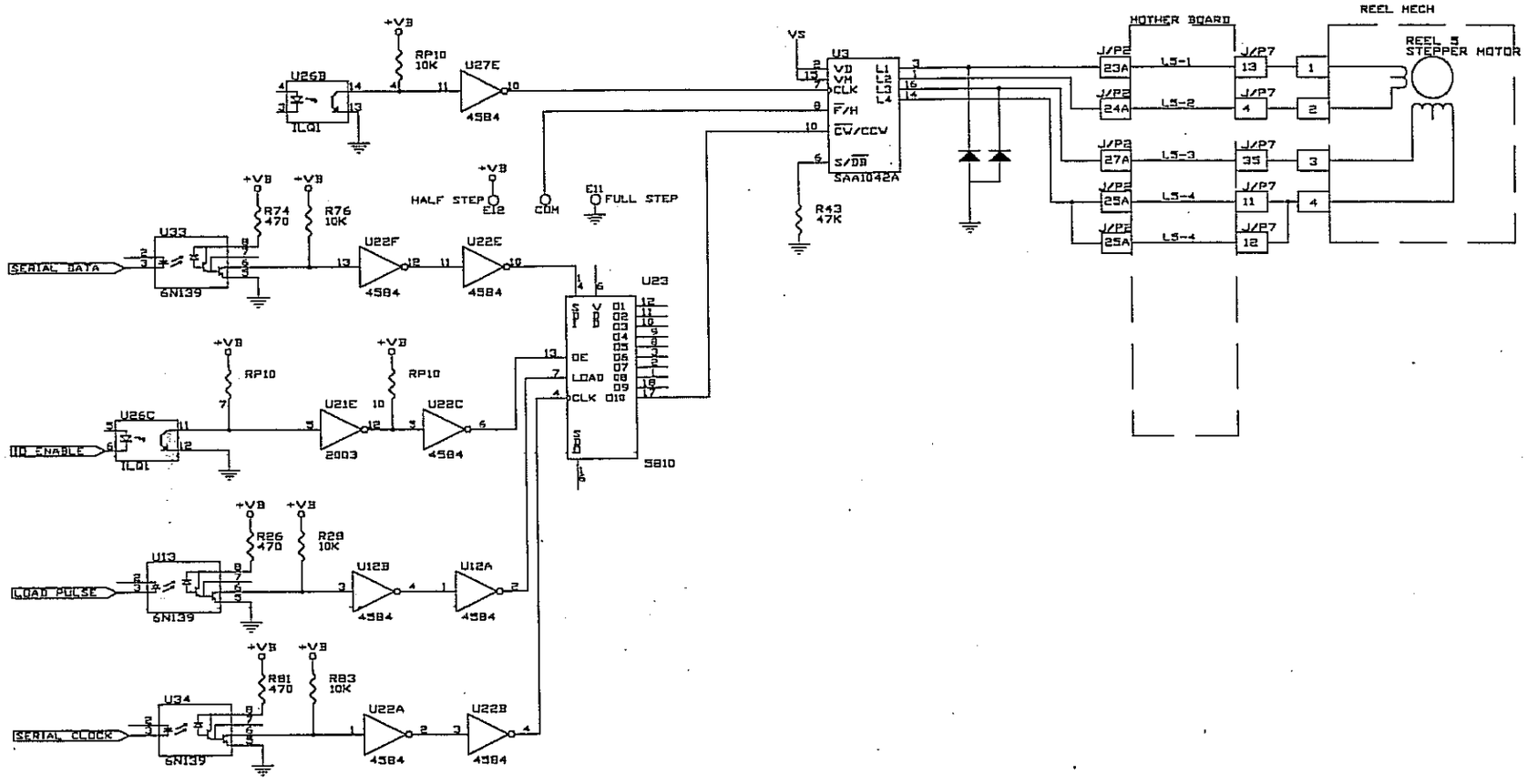
- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are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

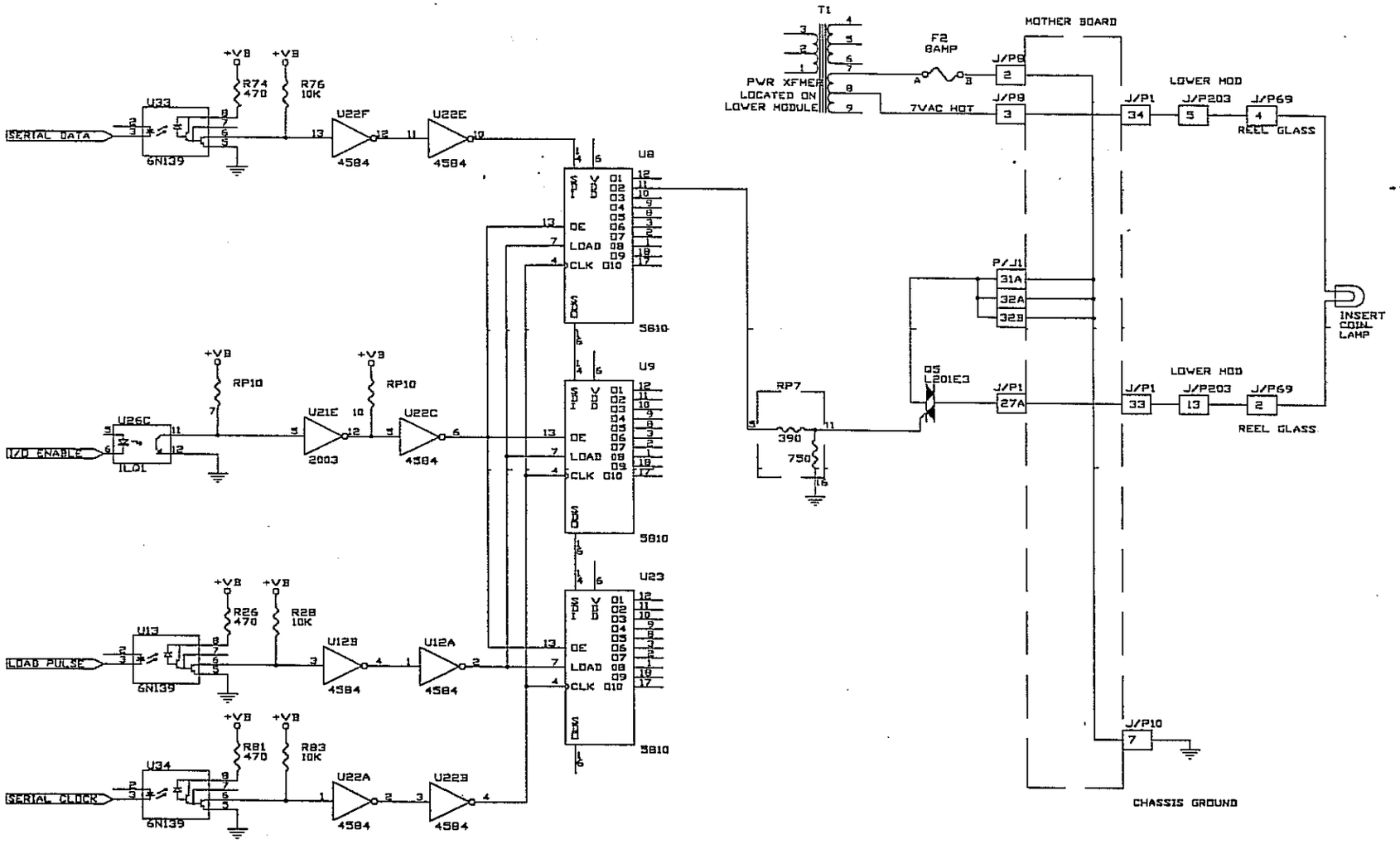
➪ If the mother board and processor board are good, then use this diagram to test for wire continuity

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

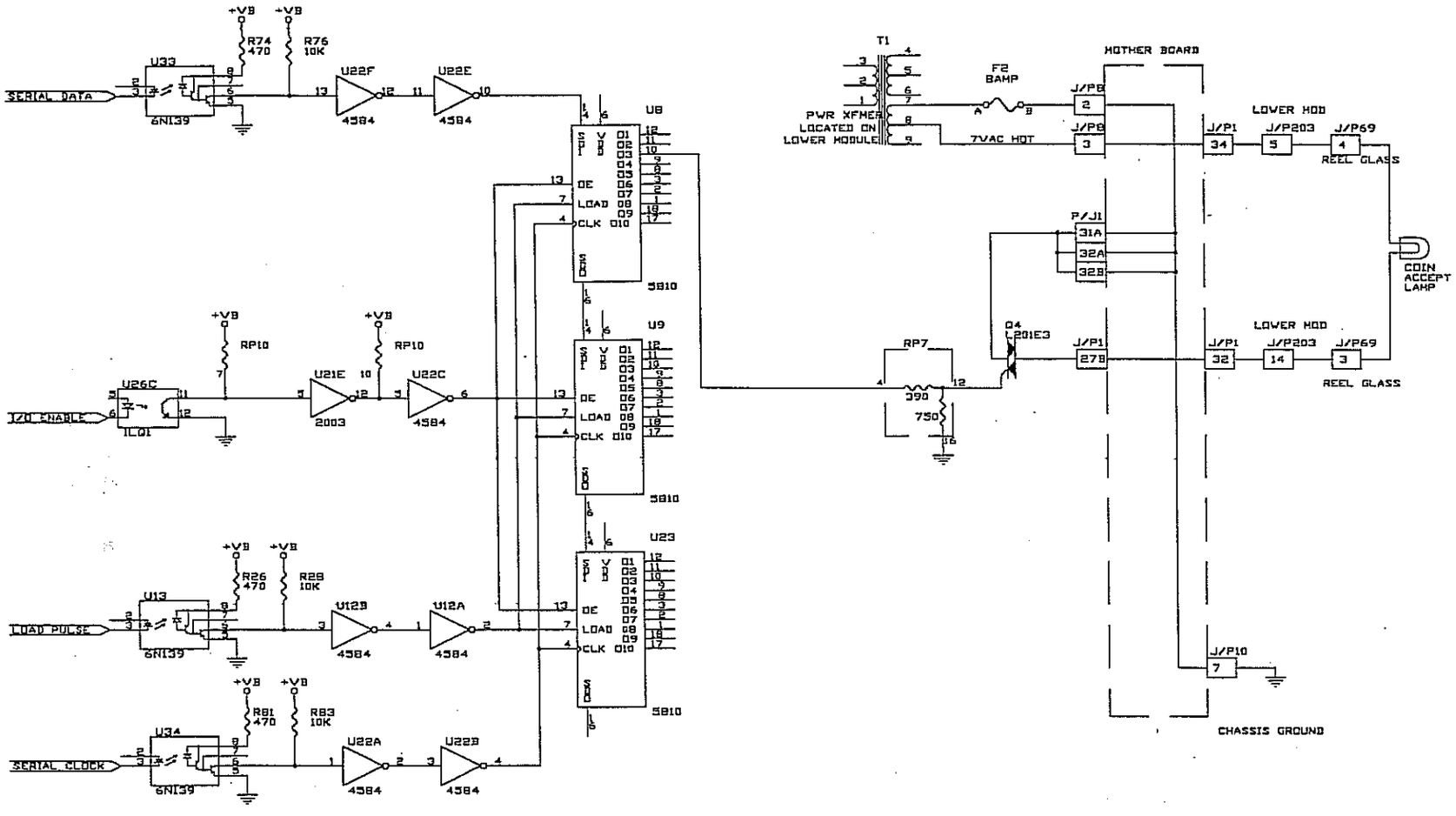
Before removing the processor board, check the following areas:

- ✓ 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:

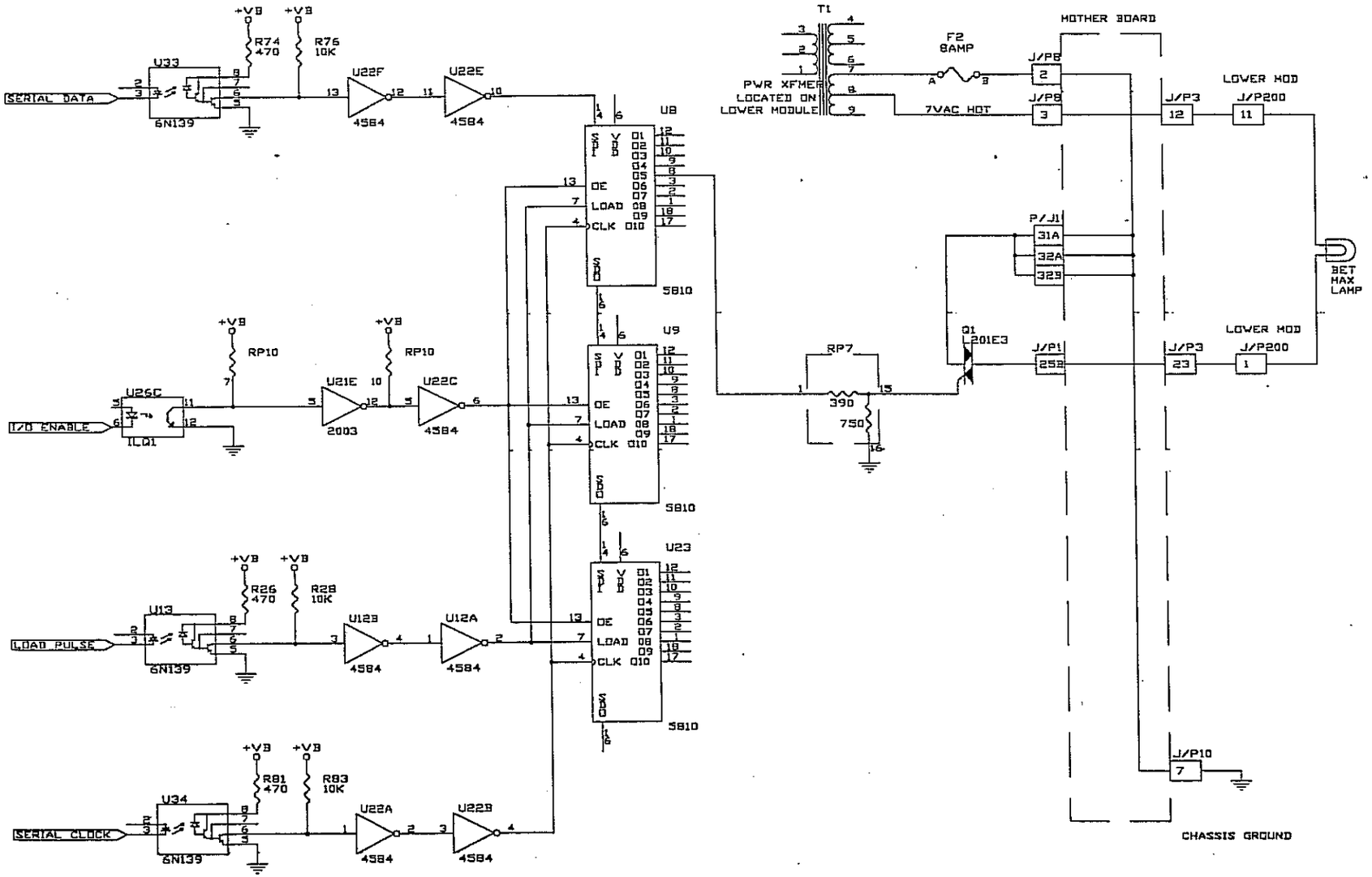
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are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

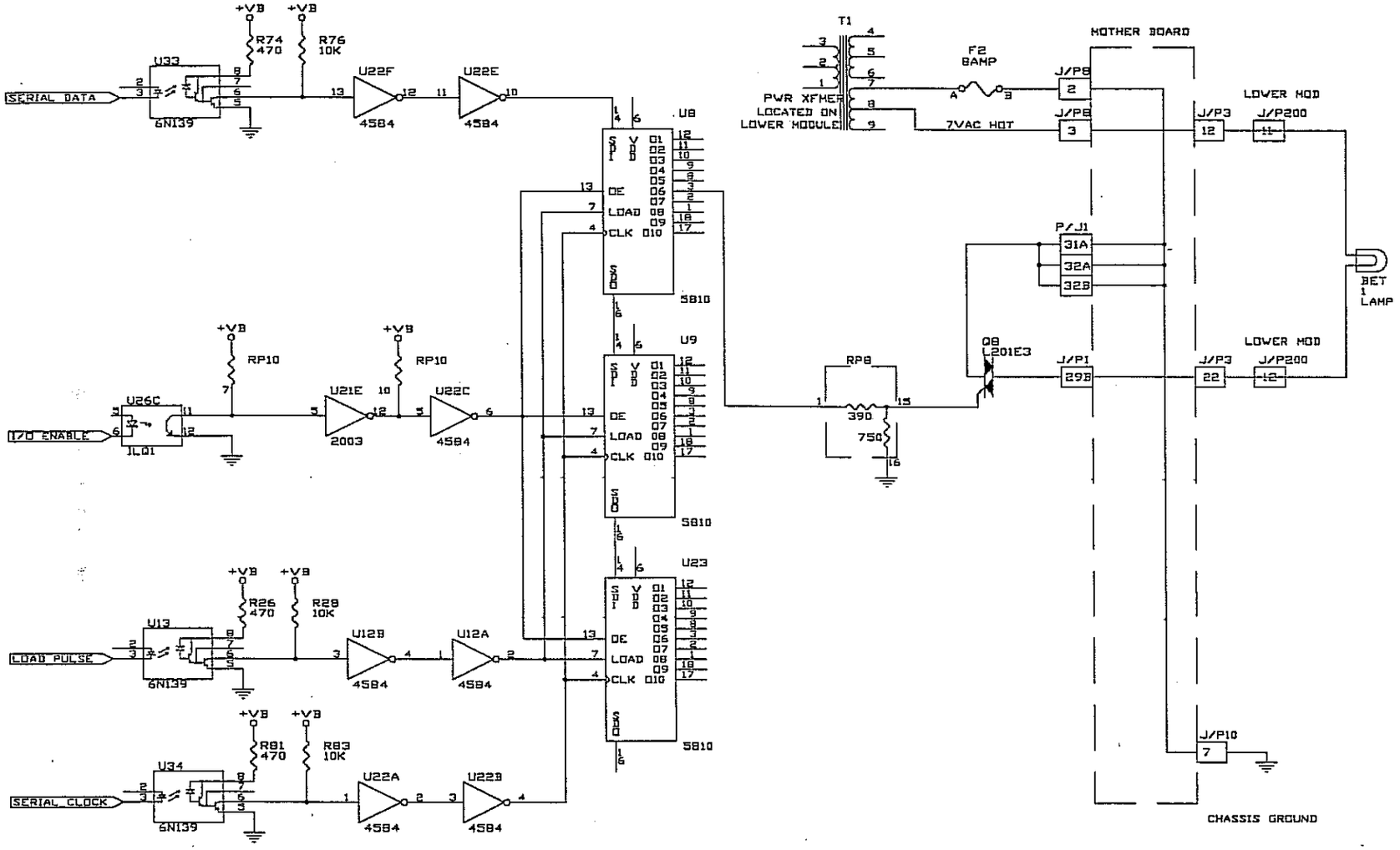
Before removing the processor board, check the following areas:

- ✓ 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:

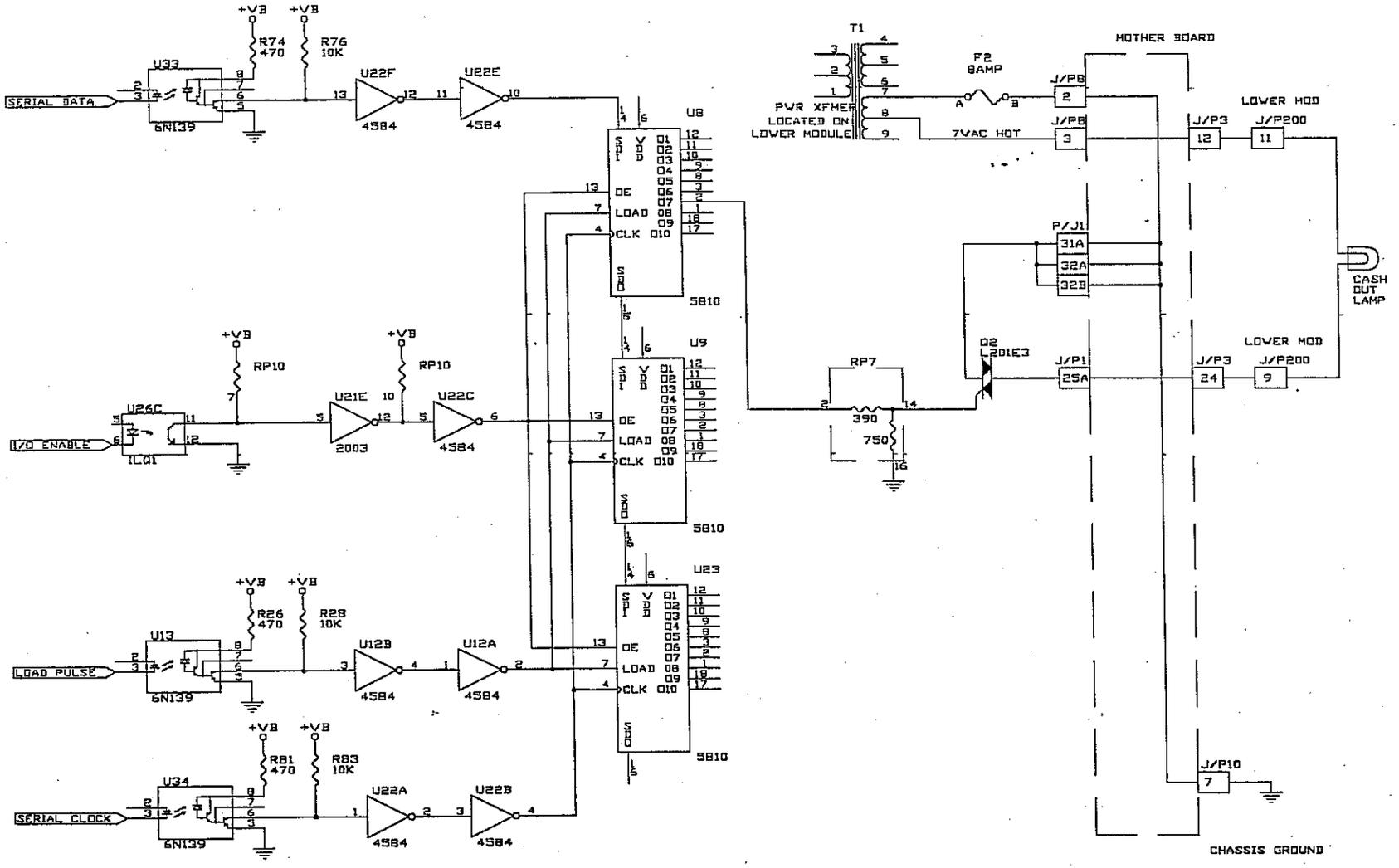
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are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

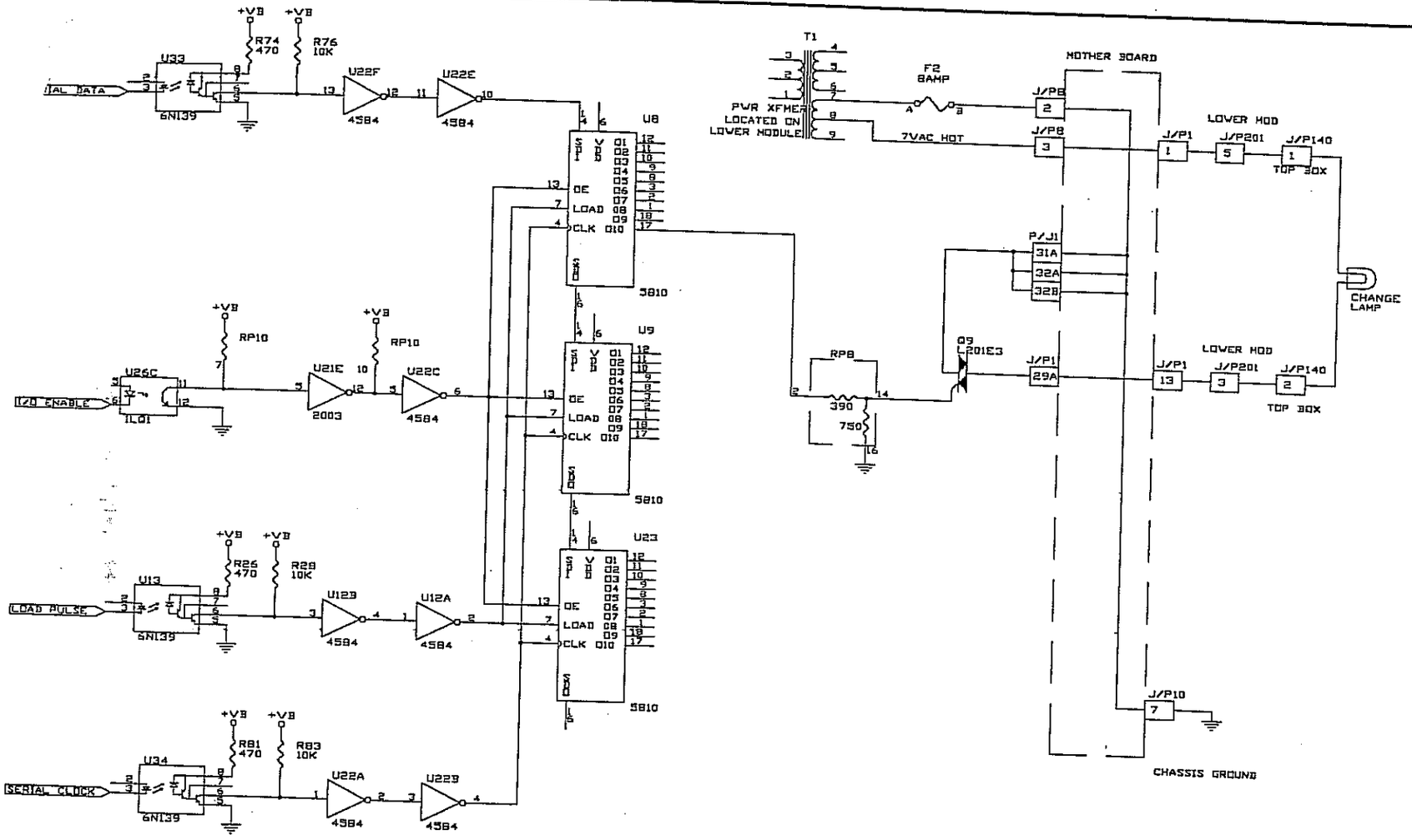
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are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

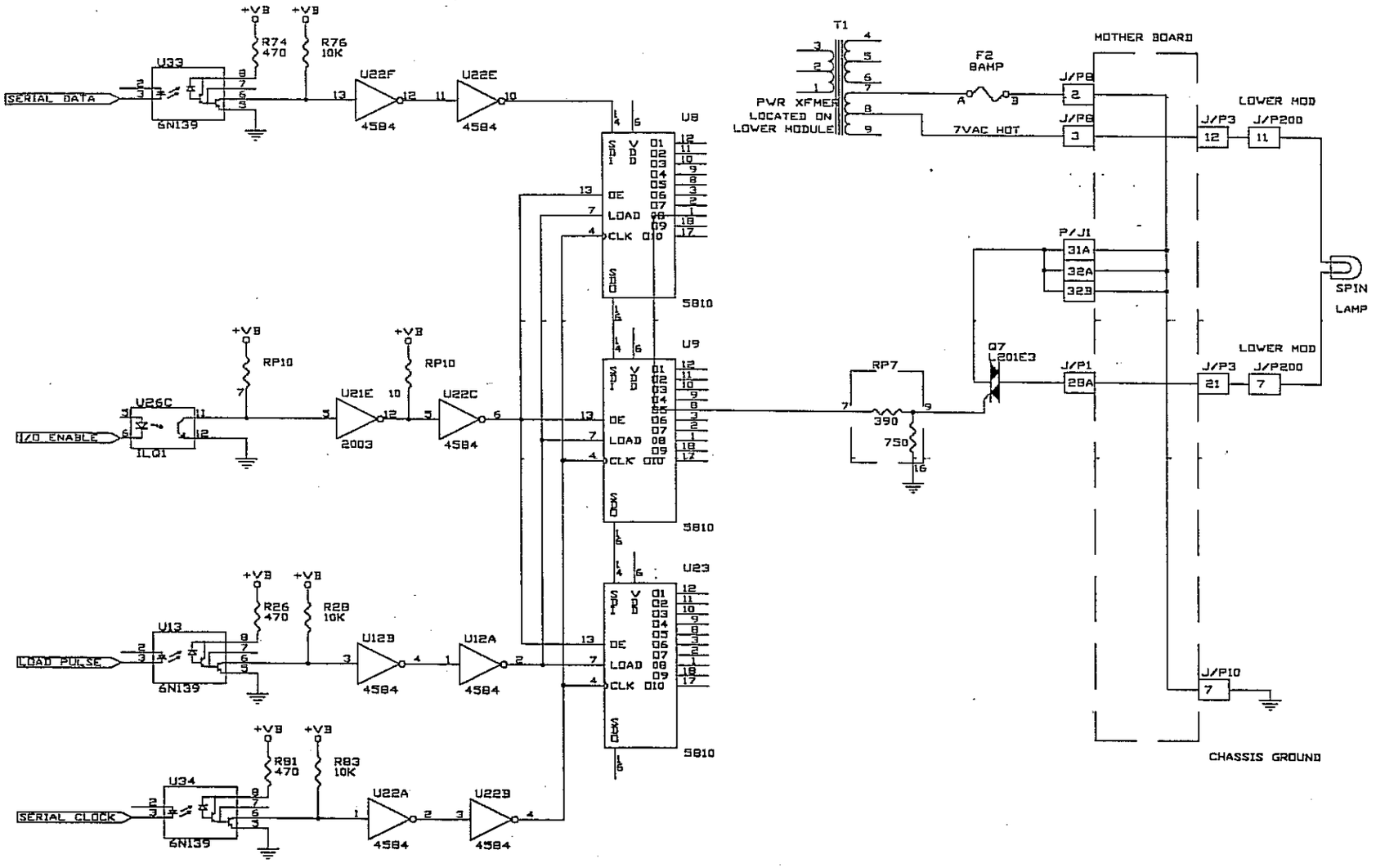
- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate the bad trace
- ➪ If the mother board and processor board are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

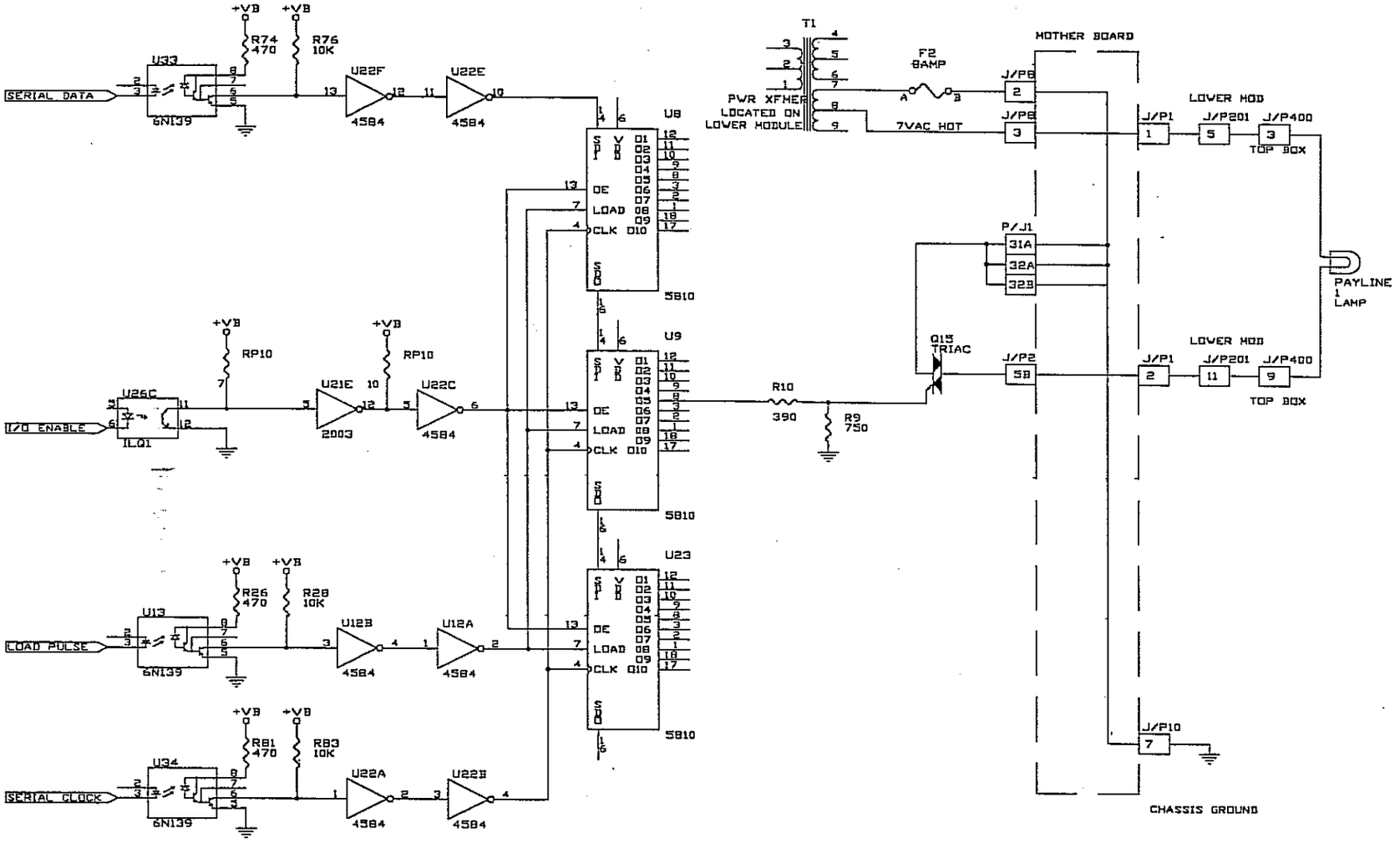
Before removing the processor board, check the following areas:

- ✓ 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:

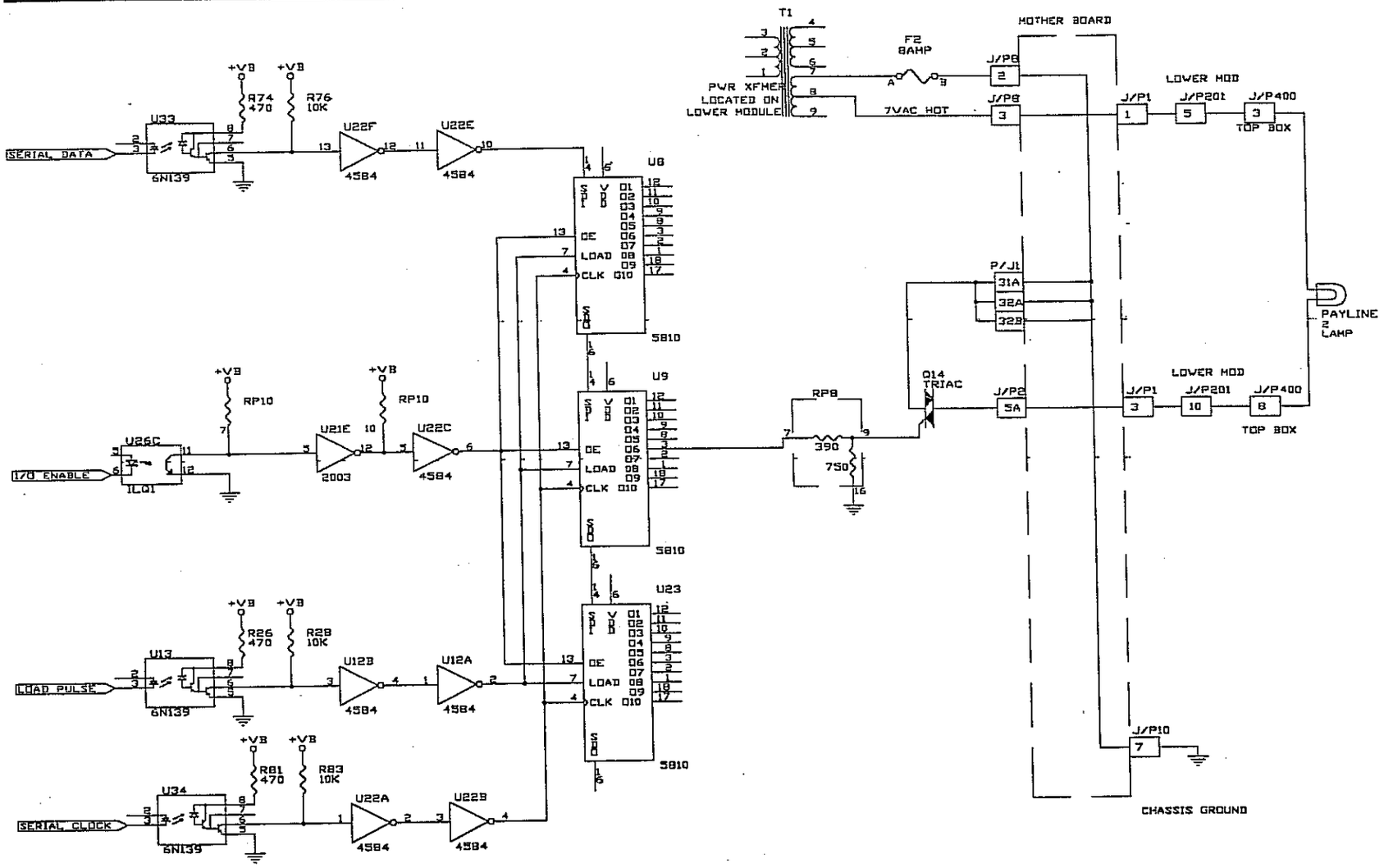
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are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

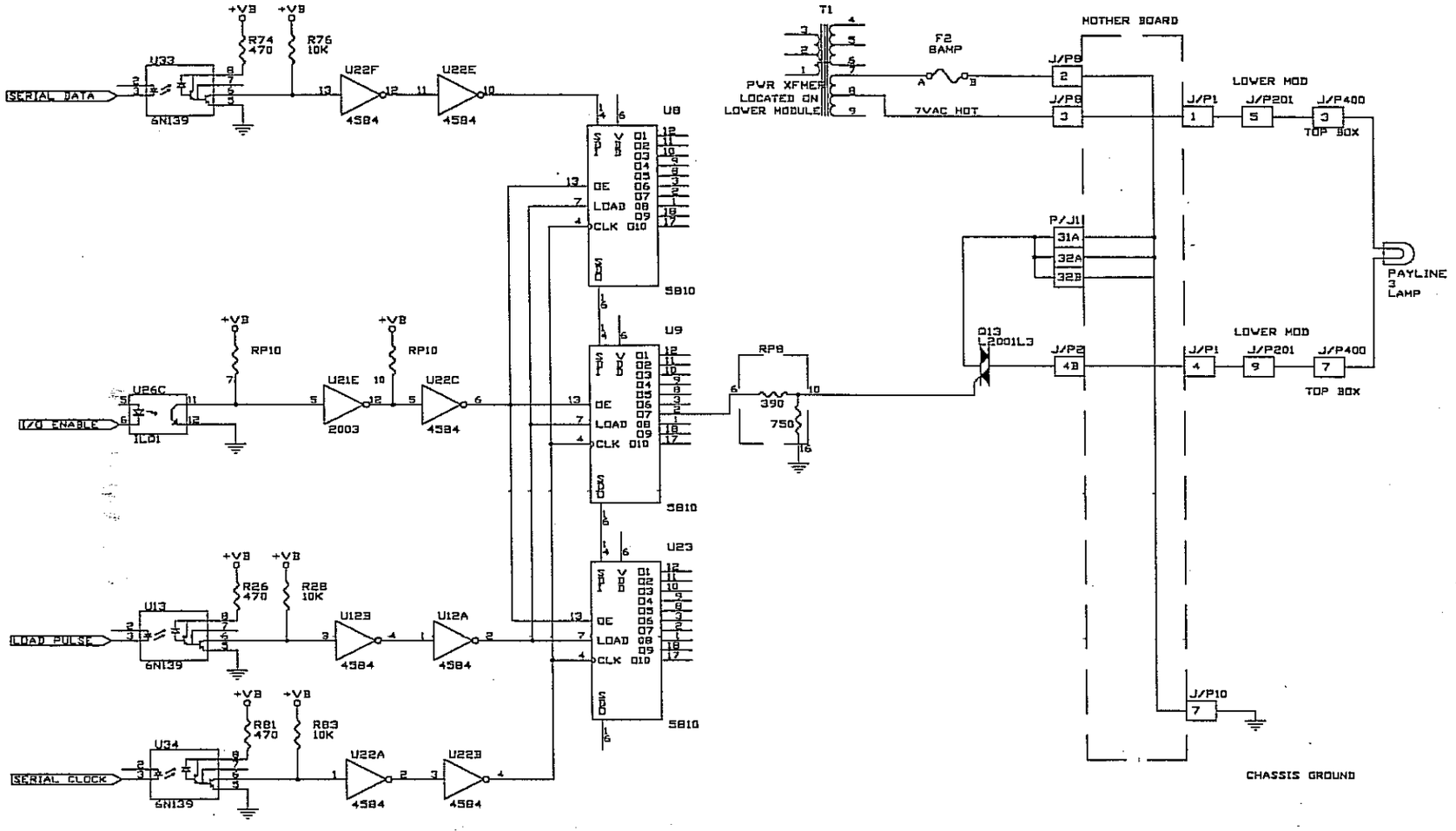
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are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

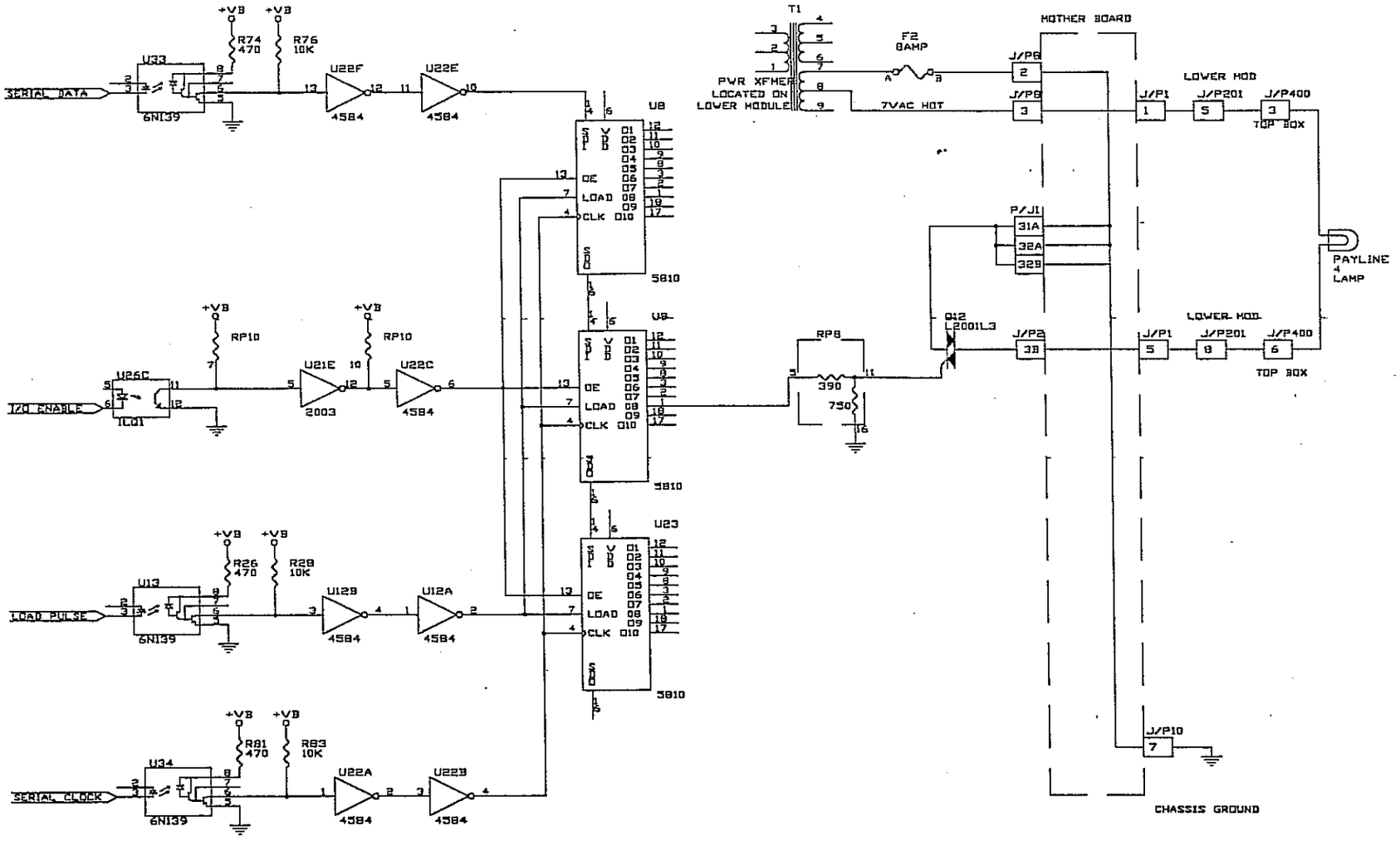
- ➪ If the lamp is nonfunctional, then replace the lamp and retest
- ➪ Replace the processor board with a "known good" one
- ➪ If the processor board seems bad, verify in the tester
- ➪ If the processor board is good, then replace the mother board
- ➪ To repair the mother board, use this diagram to isolate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

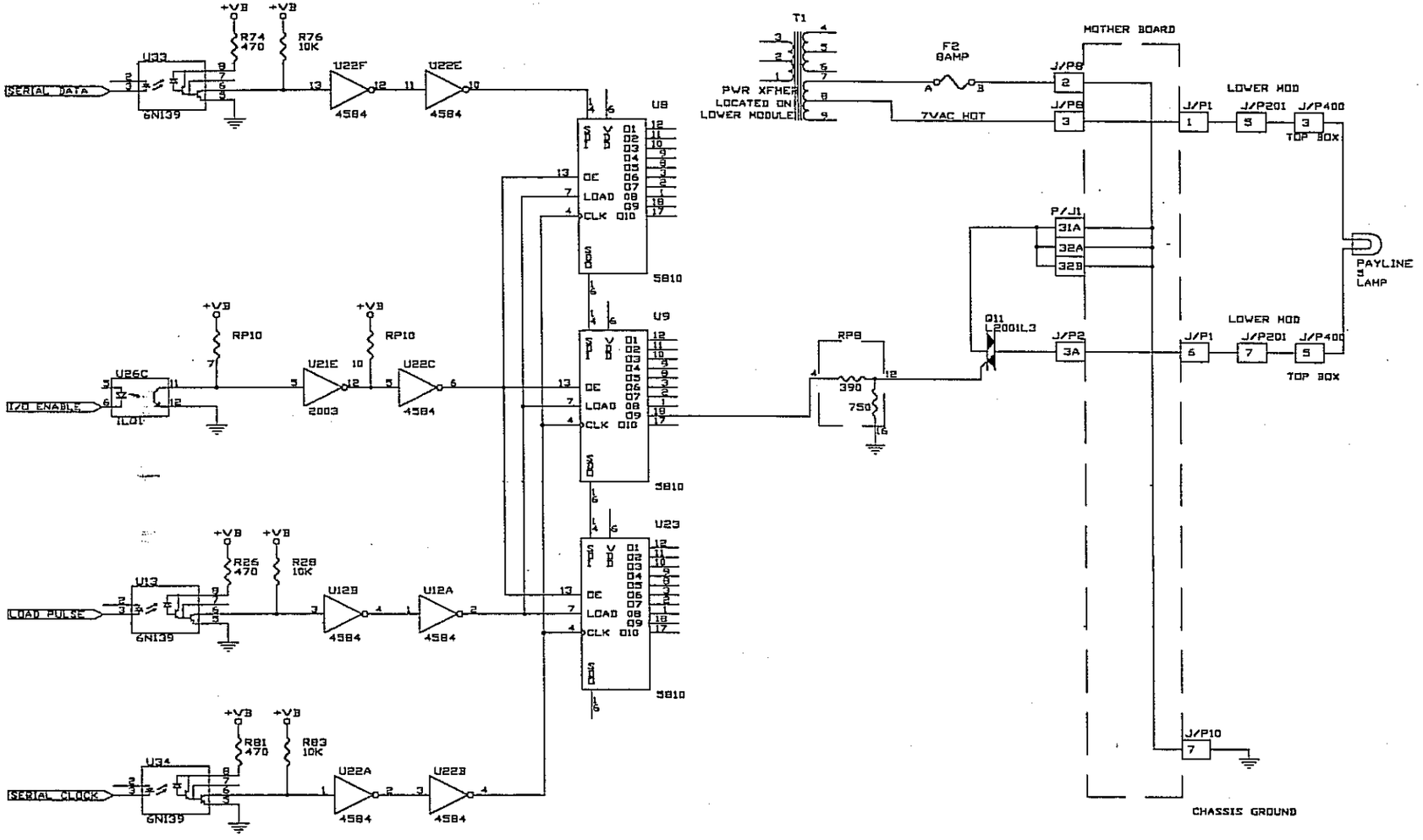
- ⇨ If the lamp is nonfunctional, then replace the lamp and retest
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate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

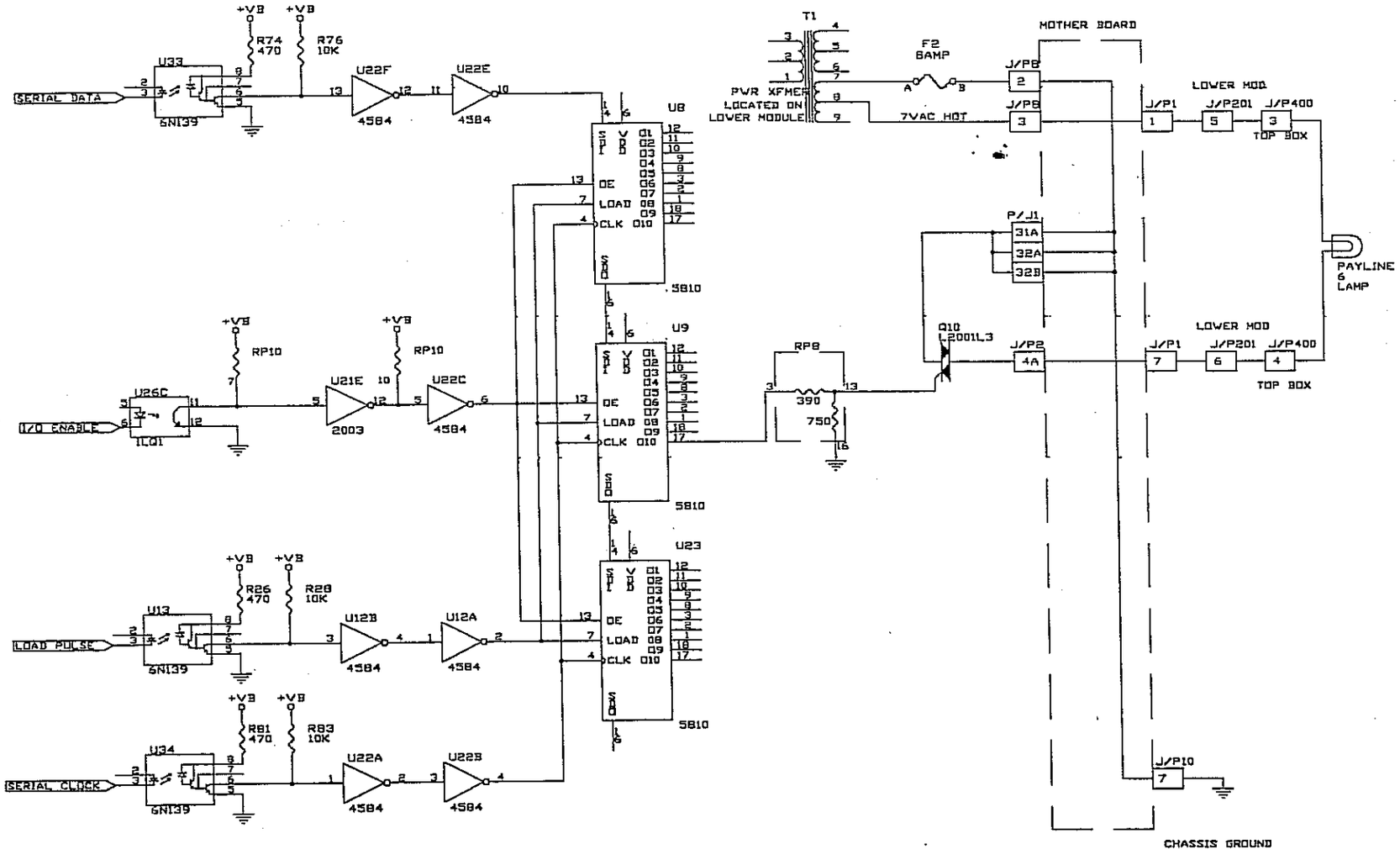
- ⇨ If the lamp is nonfunctional, then replace the lamp and test
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate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

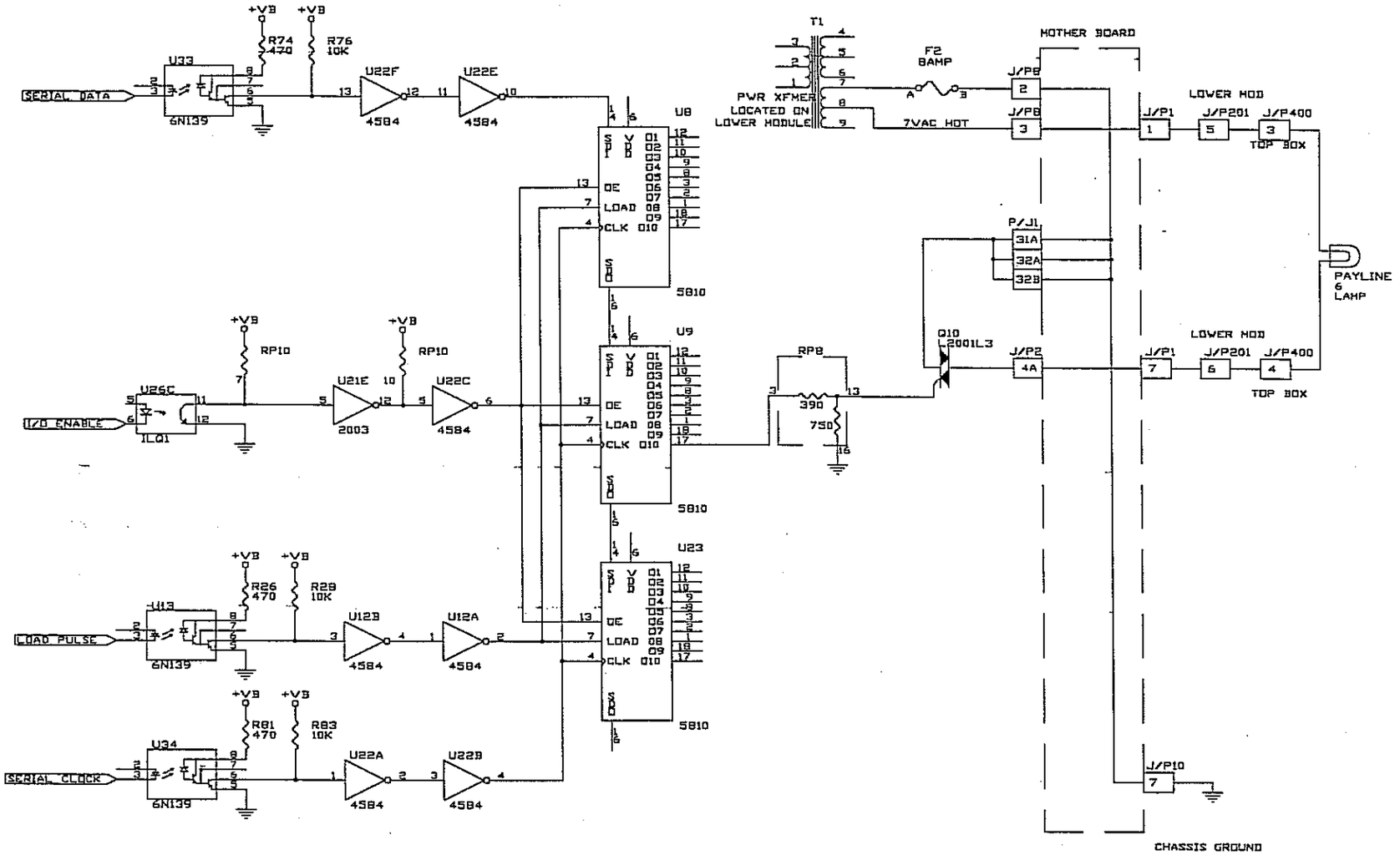
- ⇨ If the lamp is nonfunctional, then replace the lamp and test
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate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

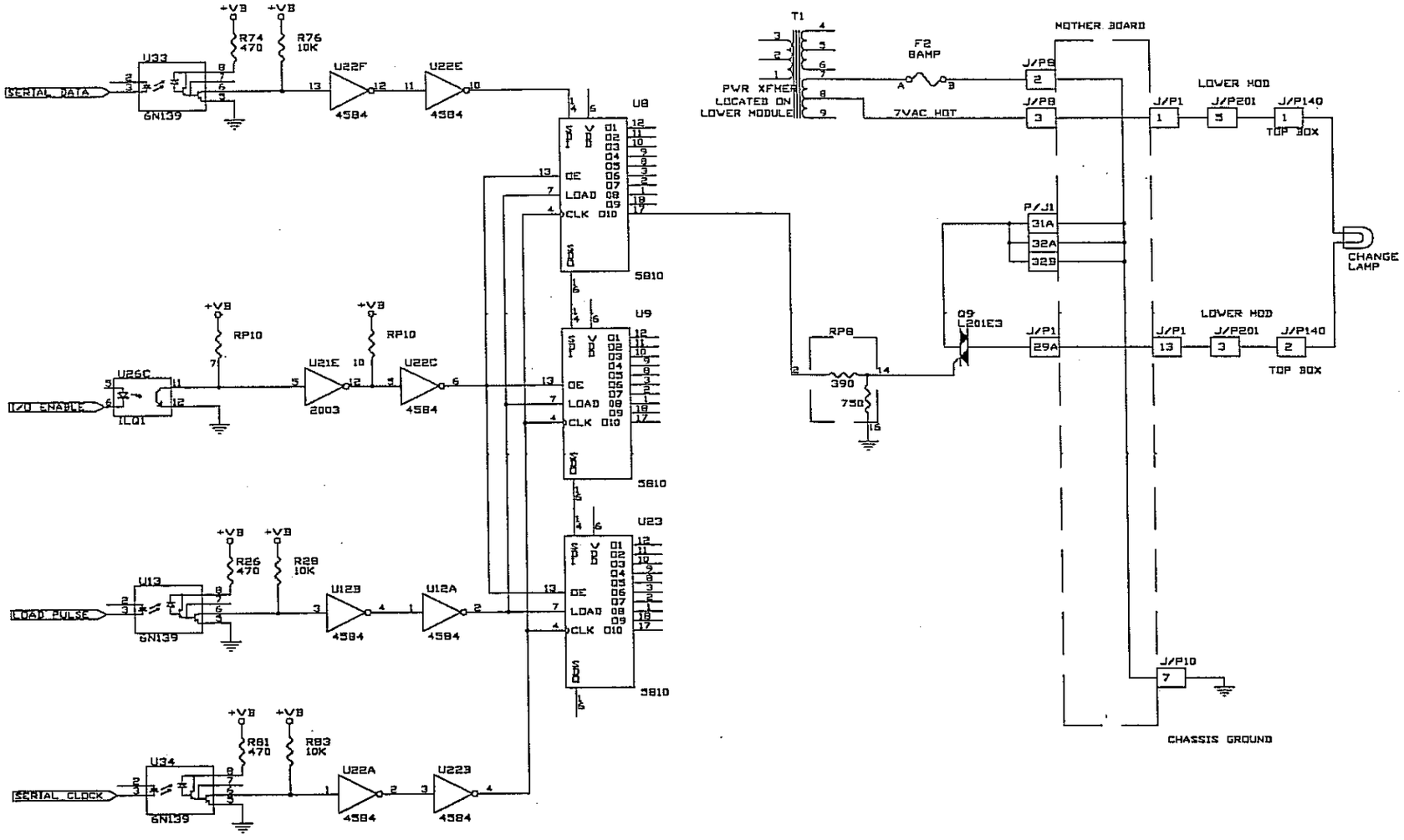
- ⇨ Replace the processor board with a "known good" one
- ⇨ If the processor board seems bad, verify in the tester
- ⇨ If the processor board is good, then replace the mother board
- ⇨ To repair the mother board, use this diagram to isolate the bad trace
- ⇨ If the mother board and processor board are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

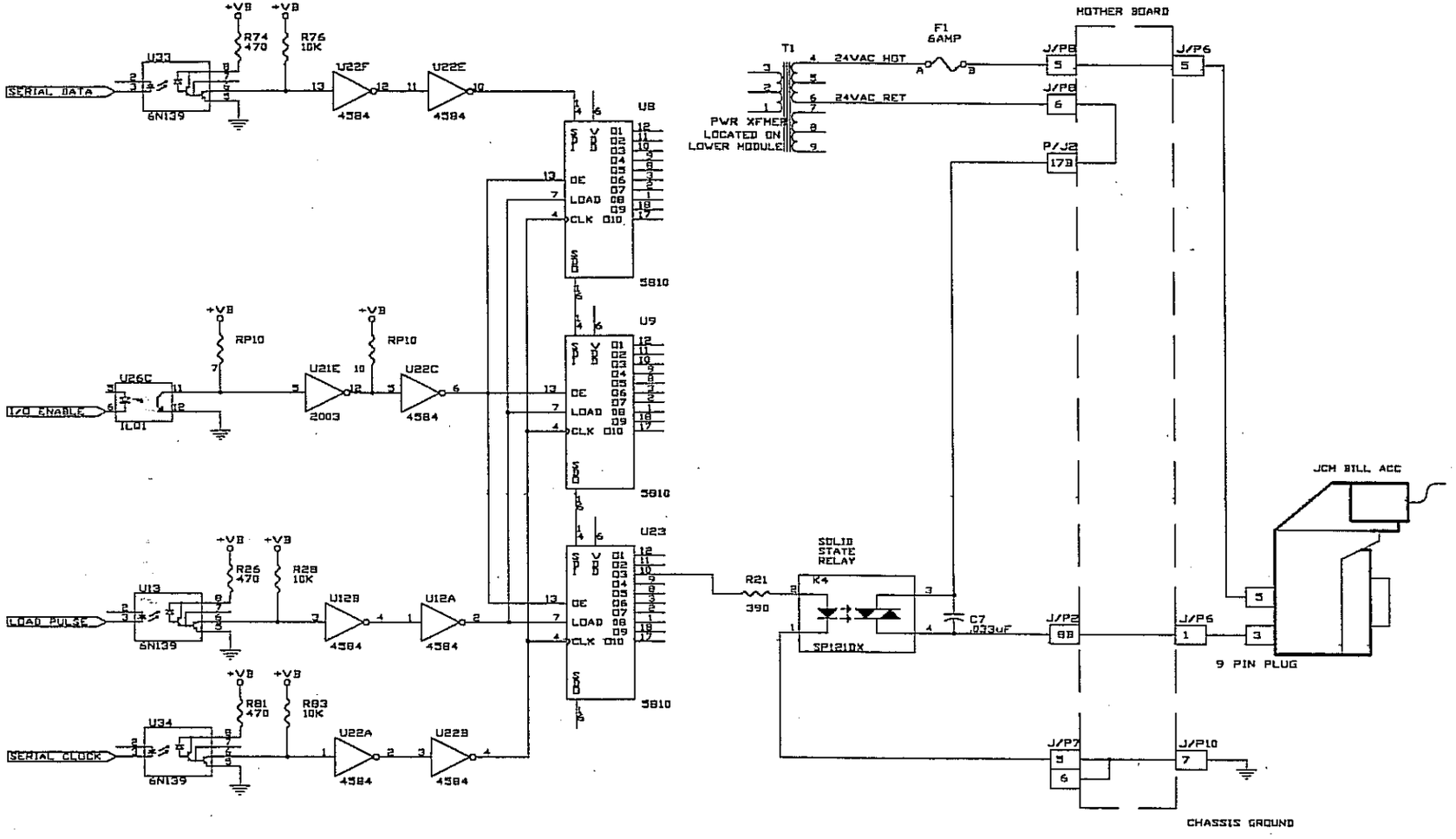
Before removing the processor board, check the following areas:

- ✓ 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.

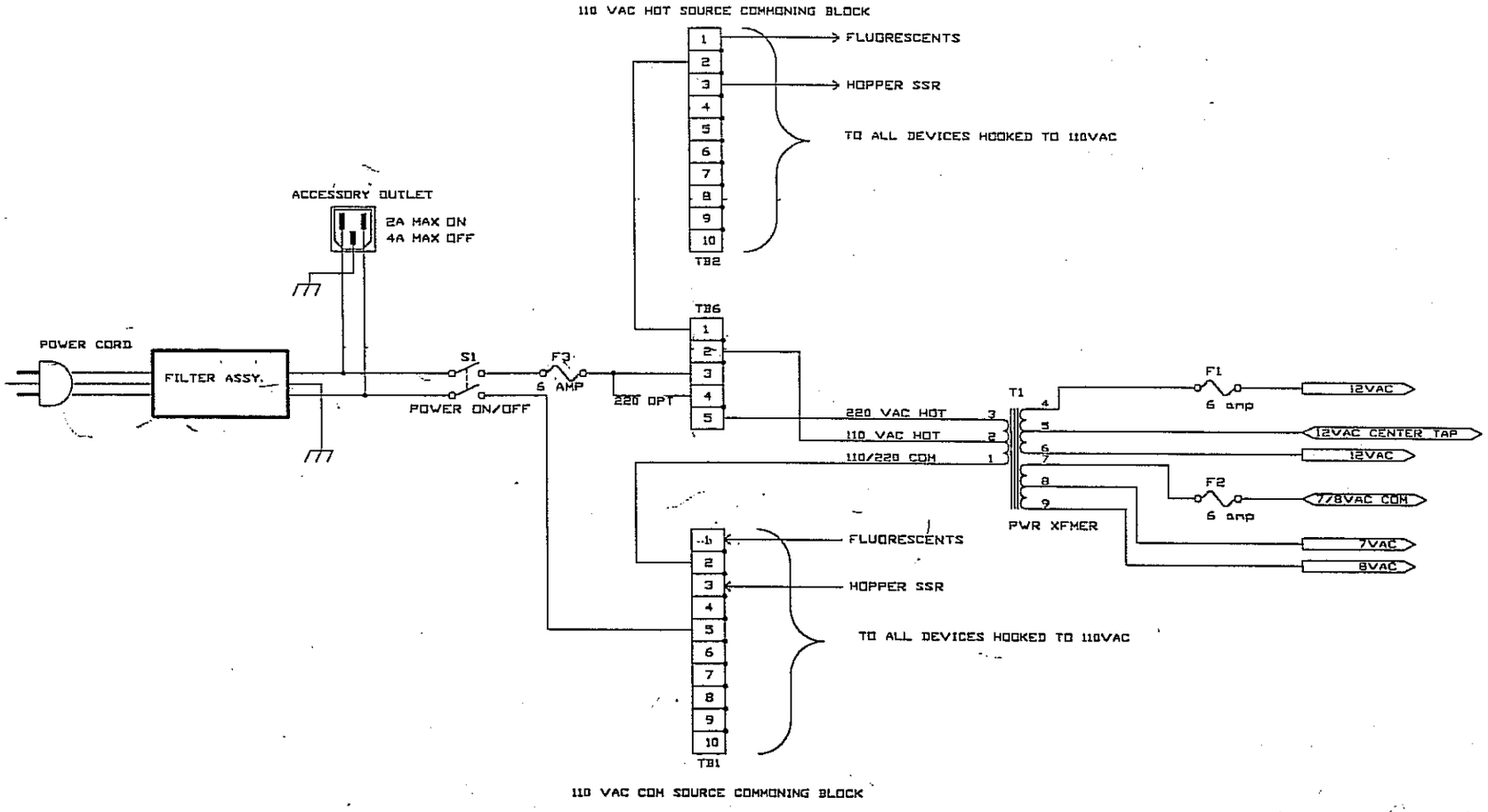
WIRE CONTINUITY TEST
J/P6-1 to J/P6-5

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

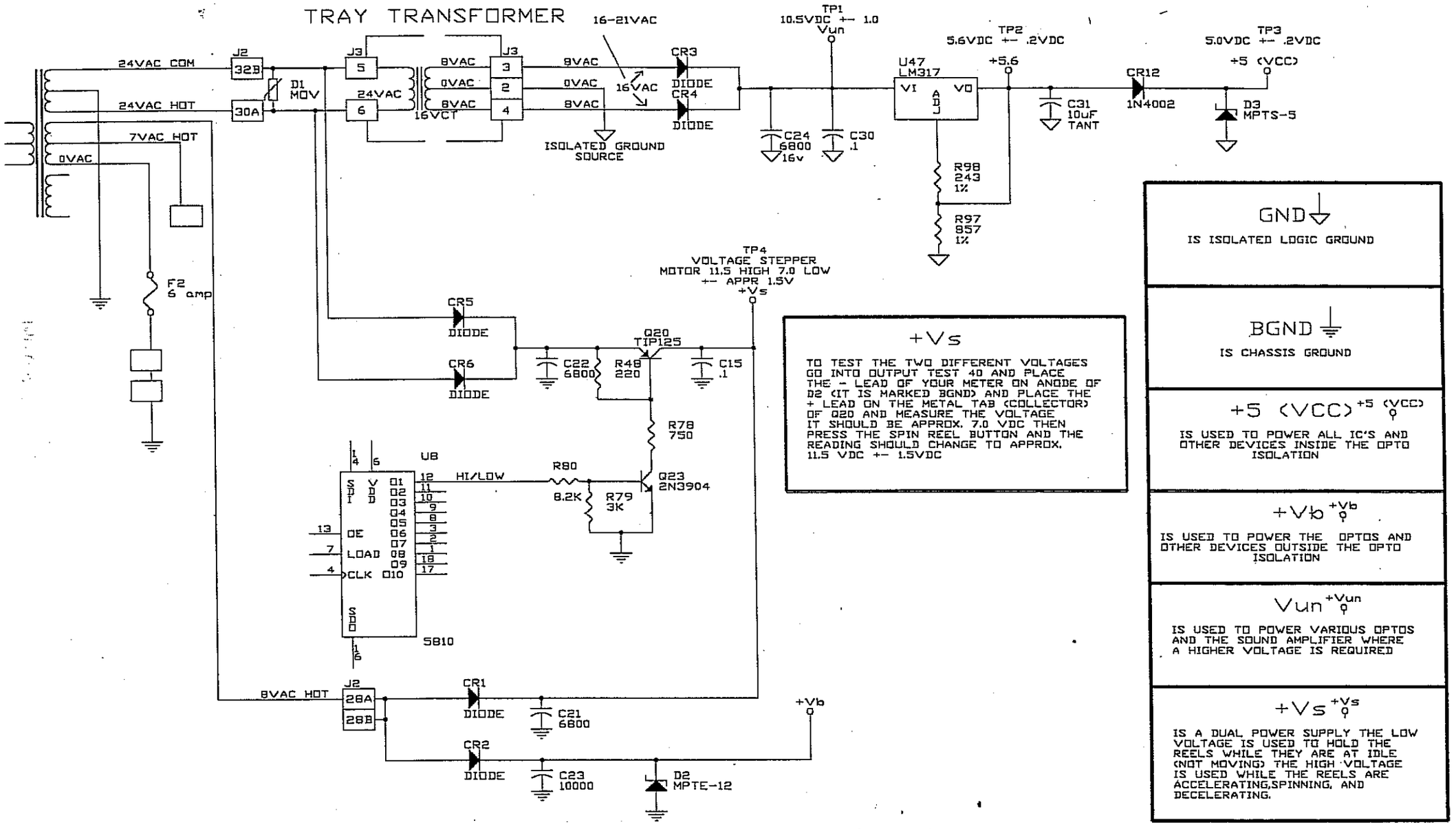
1. "Hot" machine (players get electrical shock) – Check from house outlet to power strip to machine, with "outlet polarity checker" for incorrect wiring.
2. Machine "blacked out" (no functions)
   a. If 110VAC 6A fuse keeps blowing, disconnect the hopper SSR and J/P208 (fluorescent connection) to isolate 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

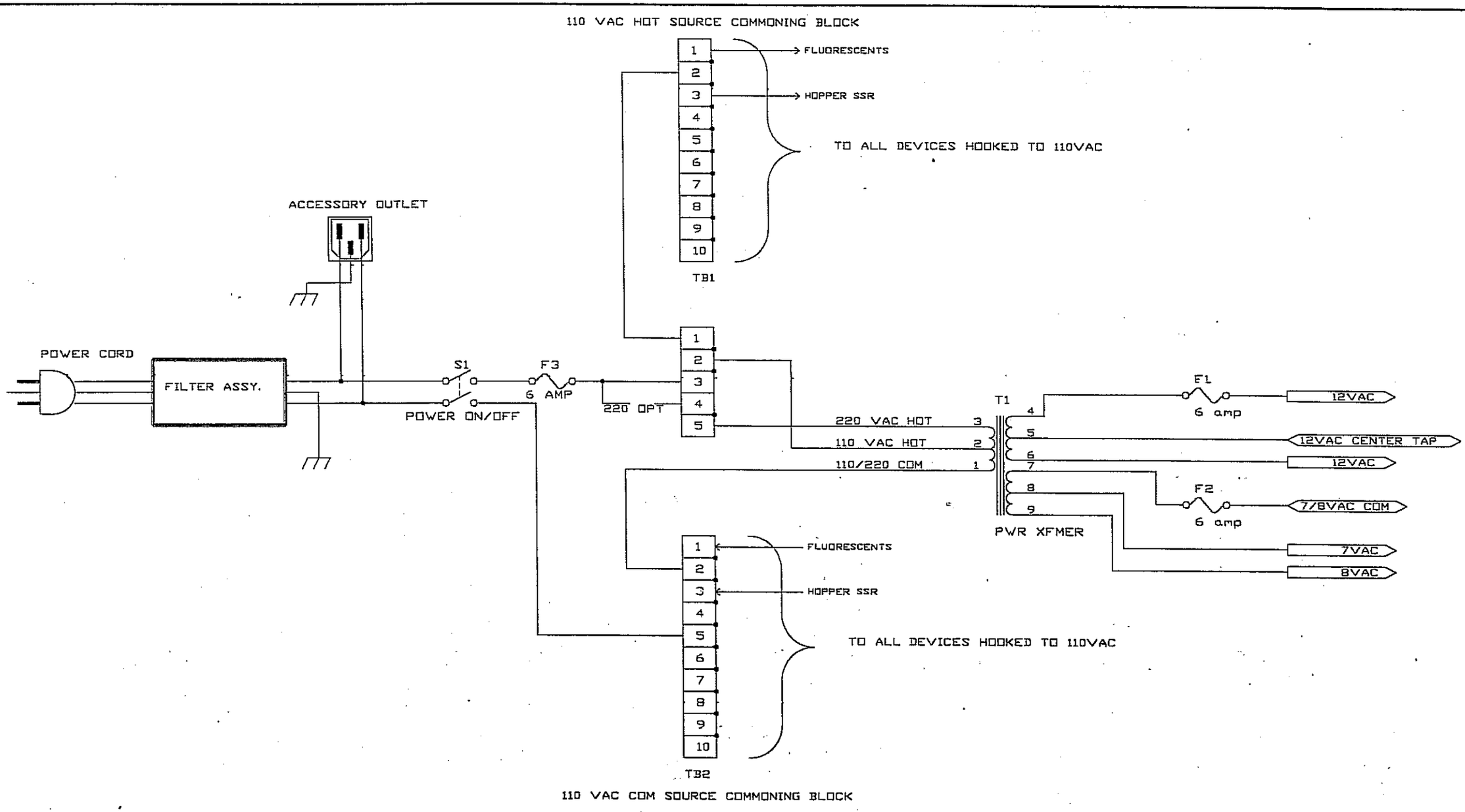
IS USED TO POWER THE OPTOS AND OTHER DEVICES OUTSIDE THE OPTO ISOLATION

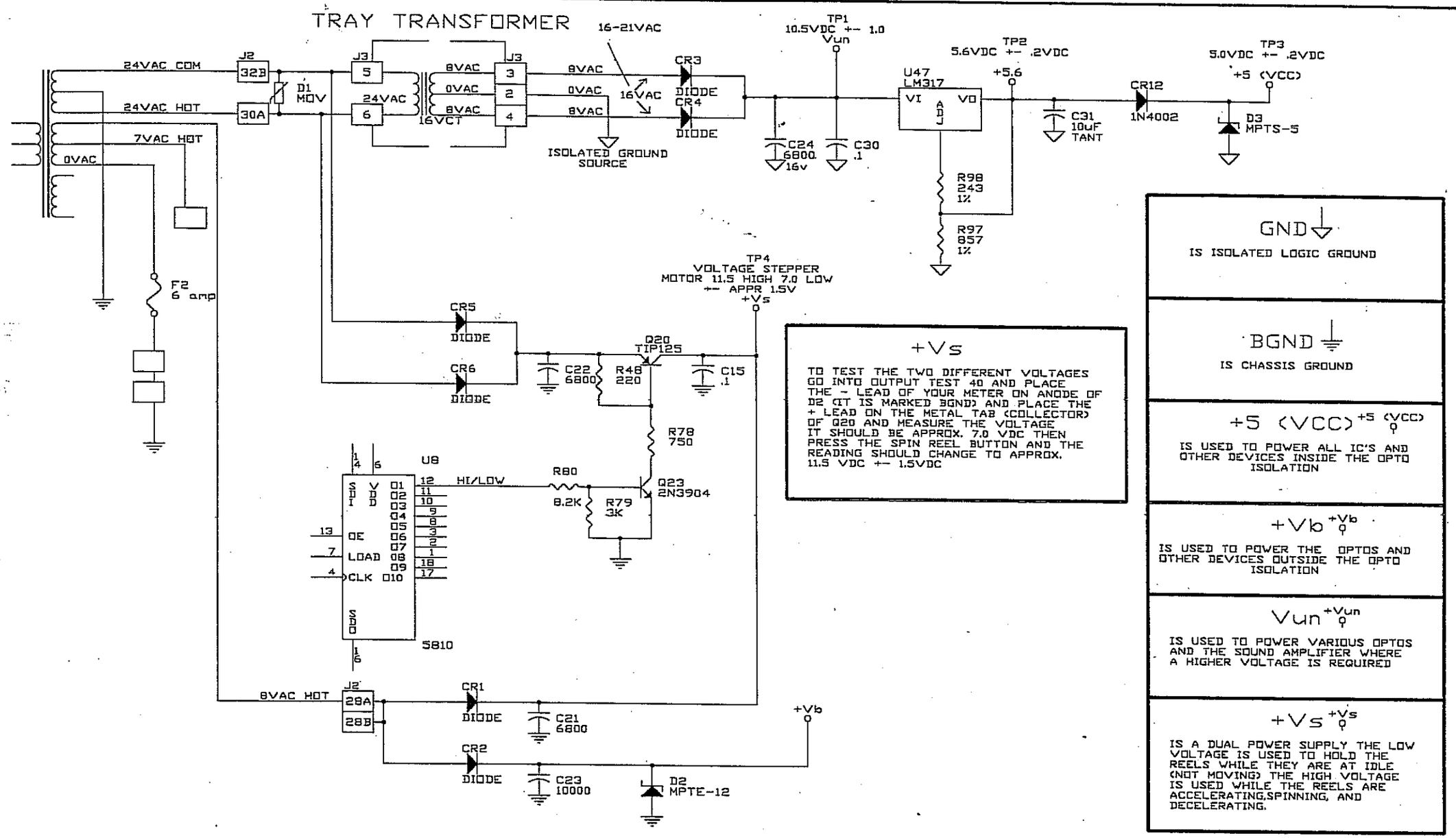
Vun

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

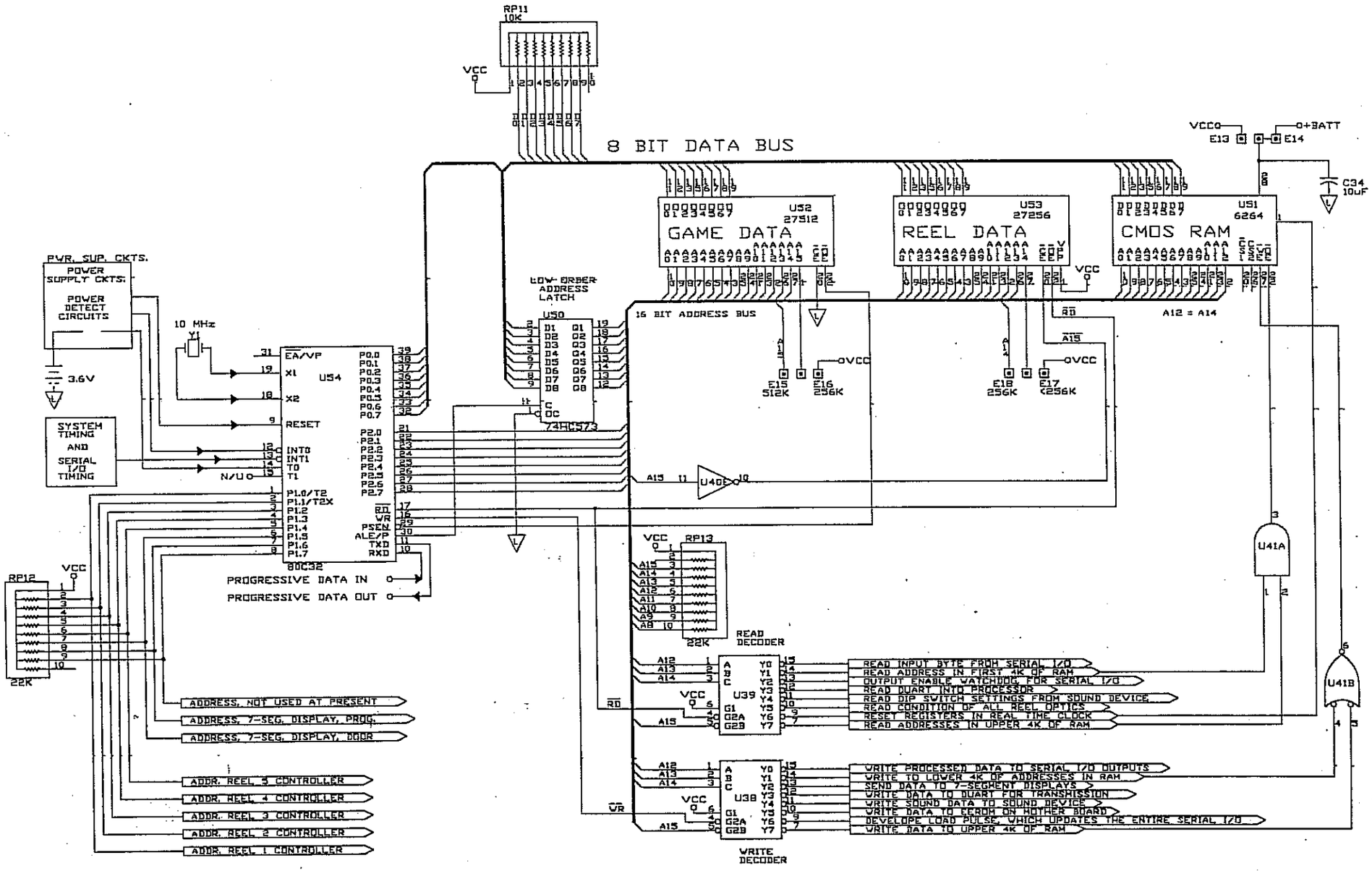
IS USED TO POWER THE OPTOS AND OTHER DEVICES OUTSIDE THE OPTO ISOLATION

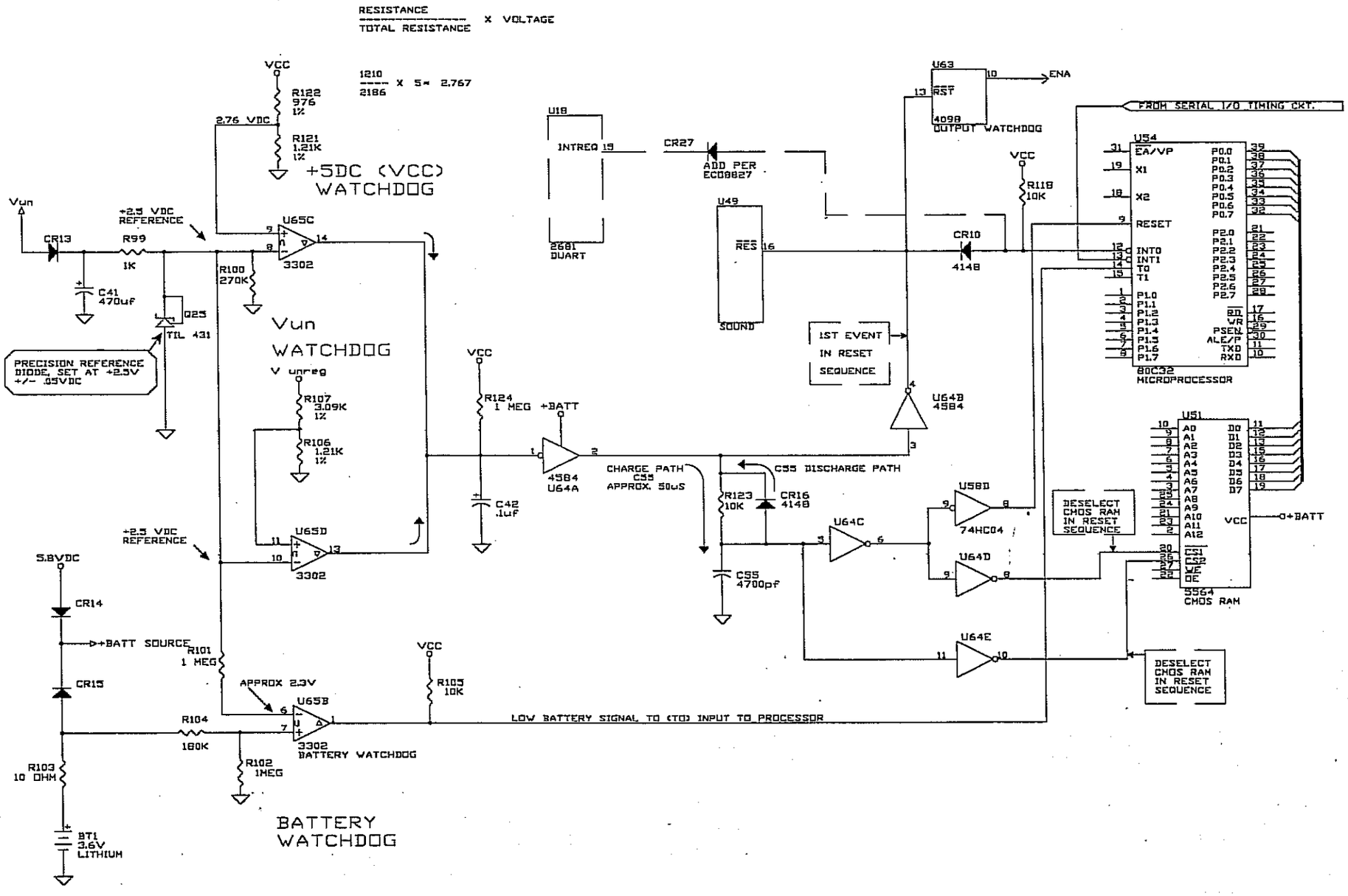
Vun

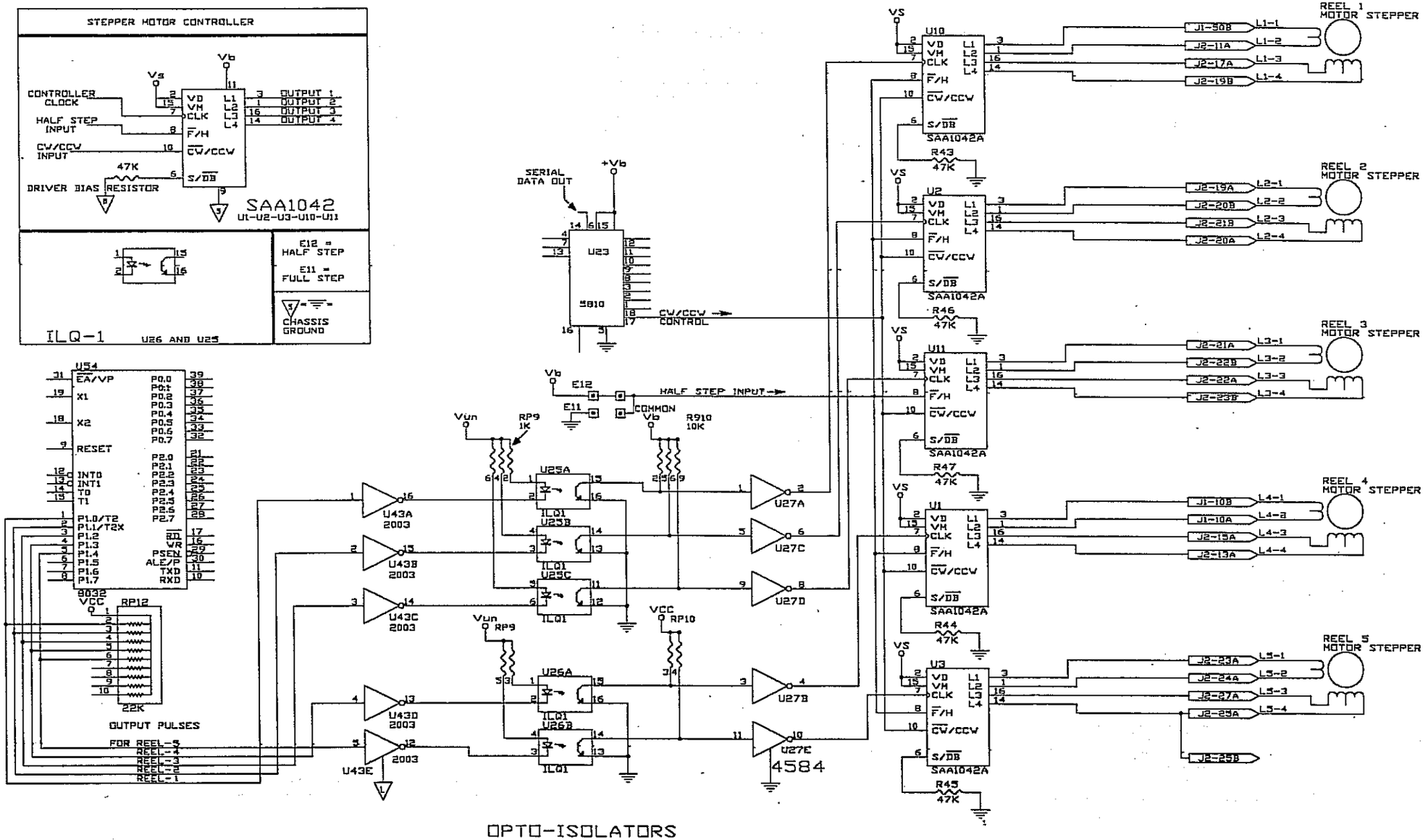
IS USED TO POWER VARIOUS OPTOS AND THE SOUND AMPLIFIER WHERE A HIGHER VOLTAGE IS REQUIRED

+Vs

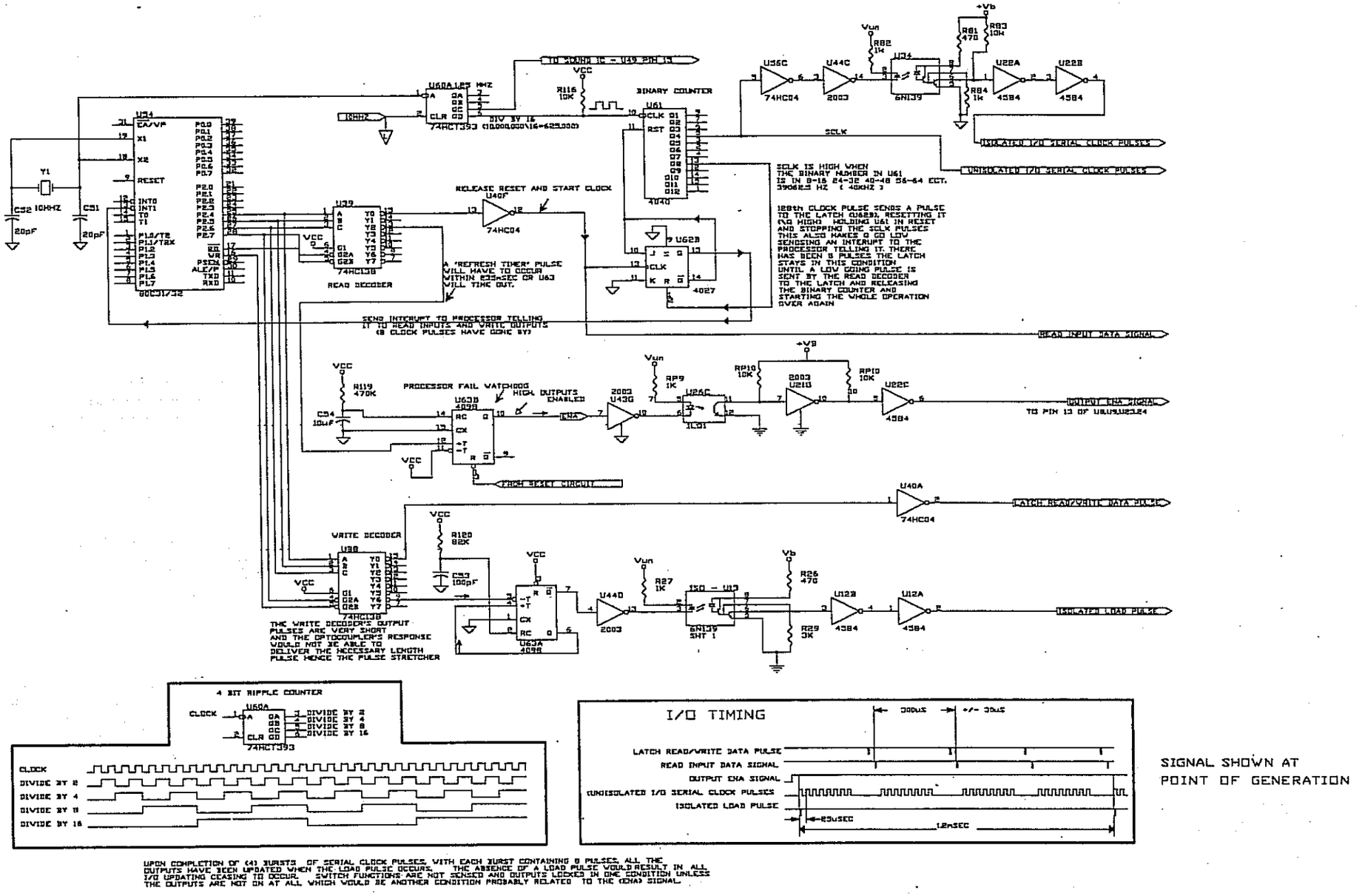
IS A DUAL POWER SUPPLY THE LOW VOLTAGE IS USED TO HOLD THE REELS WHILE THEY ARE AT IDLE (NOT MOVING) THE HIGH VOLTAGE IS USED WHILE THE REELS ARE ACCELERATING,SPINNING, AND DECELERATING.


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

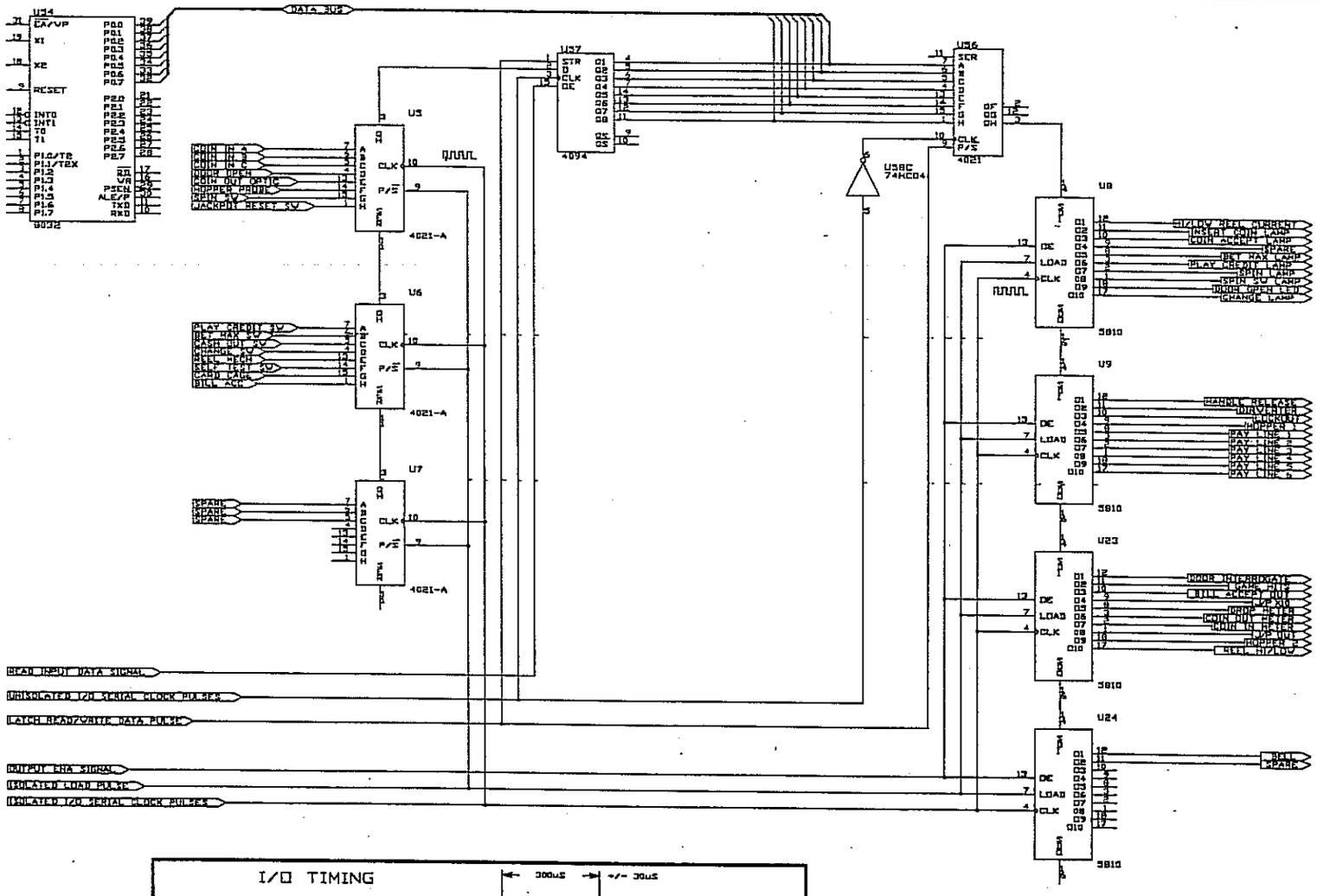

RESISTANCE / TOTAL RESISTANCE X VOLTAGE
1210 / 2186 X 5= 2.767
VCC
R122 976 1%
2.76 VDC
R121 1.21K 1%
+5DC (VCC) WATCHDOG
Vun
+2.5 VDC REFERENCE
CR13
R99 1K
C41 470uF
Q25 TIL 431
PRECISION REFERENCE DIODE, SET AT +2.5V +/- .05VDC
U65C 3302
R100 270K
Vun WATCHDOG
V unreg
R107 3.09K 1%
R106 1.21K 1%
U65D 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

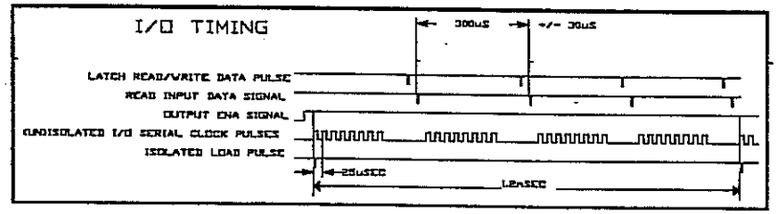

STEPPER MOTOR CONTROLLER
CONTROLLER CLOCK
HALF STEP INPUT
CW/CCW INPUT
DRIVER BIAS RESISTOR
47K
SAA1042
U1-U2-U3-U10-U11
ILQ-1
U26 AND U25
E12 = HALF STEP
E11 = FULL STEP
CHASSIS GROUND
SERIAL DATA OUT
U23
5810
CW/CCW CONTROL
HALF STEP INPUT
COMMON
RP9 1K
R910 10K
RP12
22K
OUTPUT PULSES FOR REEL-5
REEL-4
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



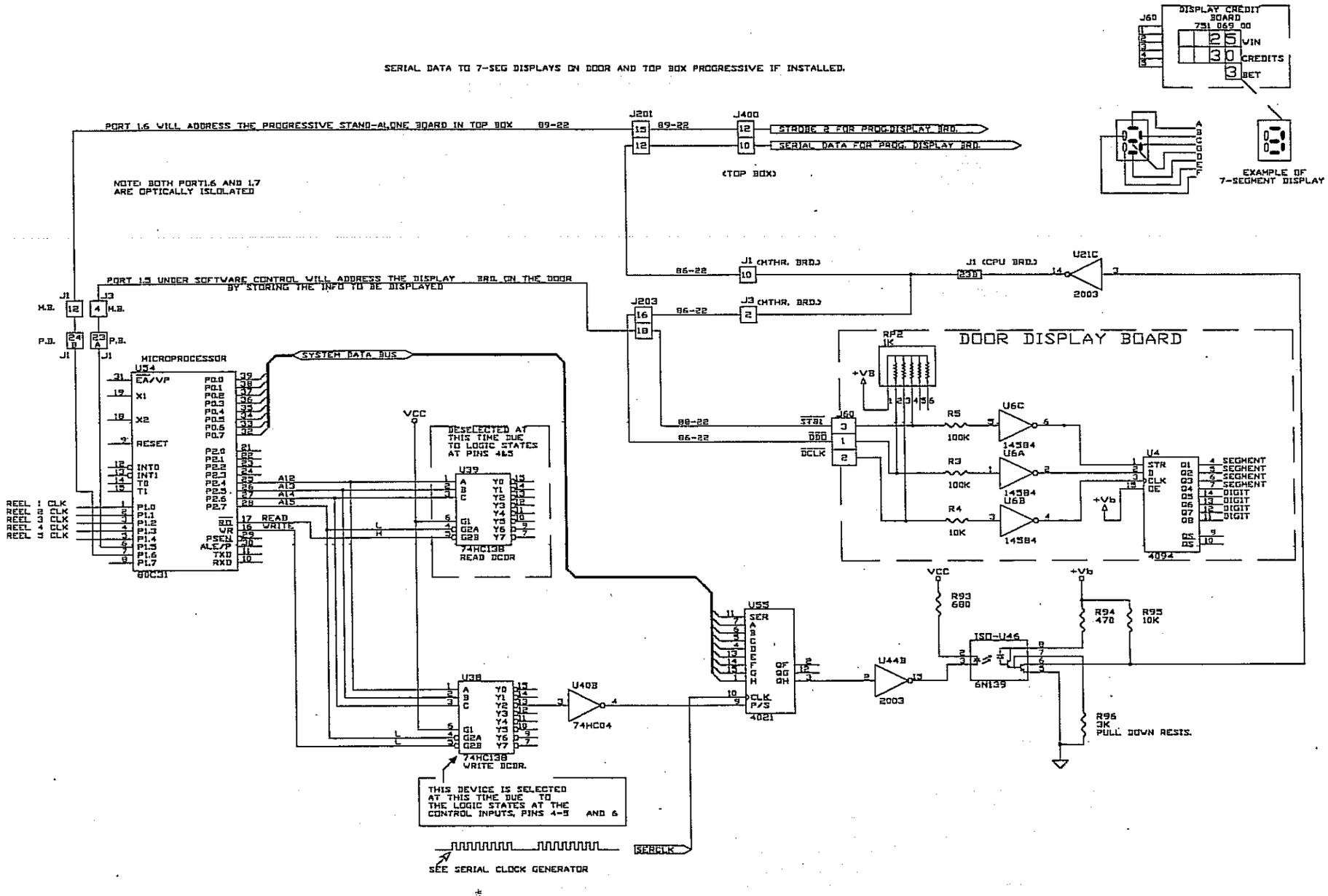
UPON COMPLETION OF (4) BURSTS OF SERIAL CLOCK PULSES, WITH EACH BURST CONTAINING 8 PULSES, ALL THE OUTPUTS HAVE BEEN UPDATED WHEN THE LOAD PULSE OCCURS. THE ABSENCE OF A LOAD PULSE WOULD RESULT IN ALL I/O UPDATING CEASING TO OCCUR. SWITCH FUNCTIONS ARE NOT SENSED AND OUTPUTS LOCKED IN ONE CONDITION UNLESS THE OUTPUTS ARE NOT ON AT ALL WHICH WOULD BE ANOTHER CONDITION PROBABLY RELATED TO THE (ENA) SIGNAL.

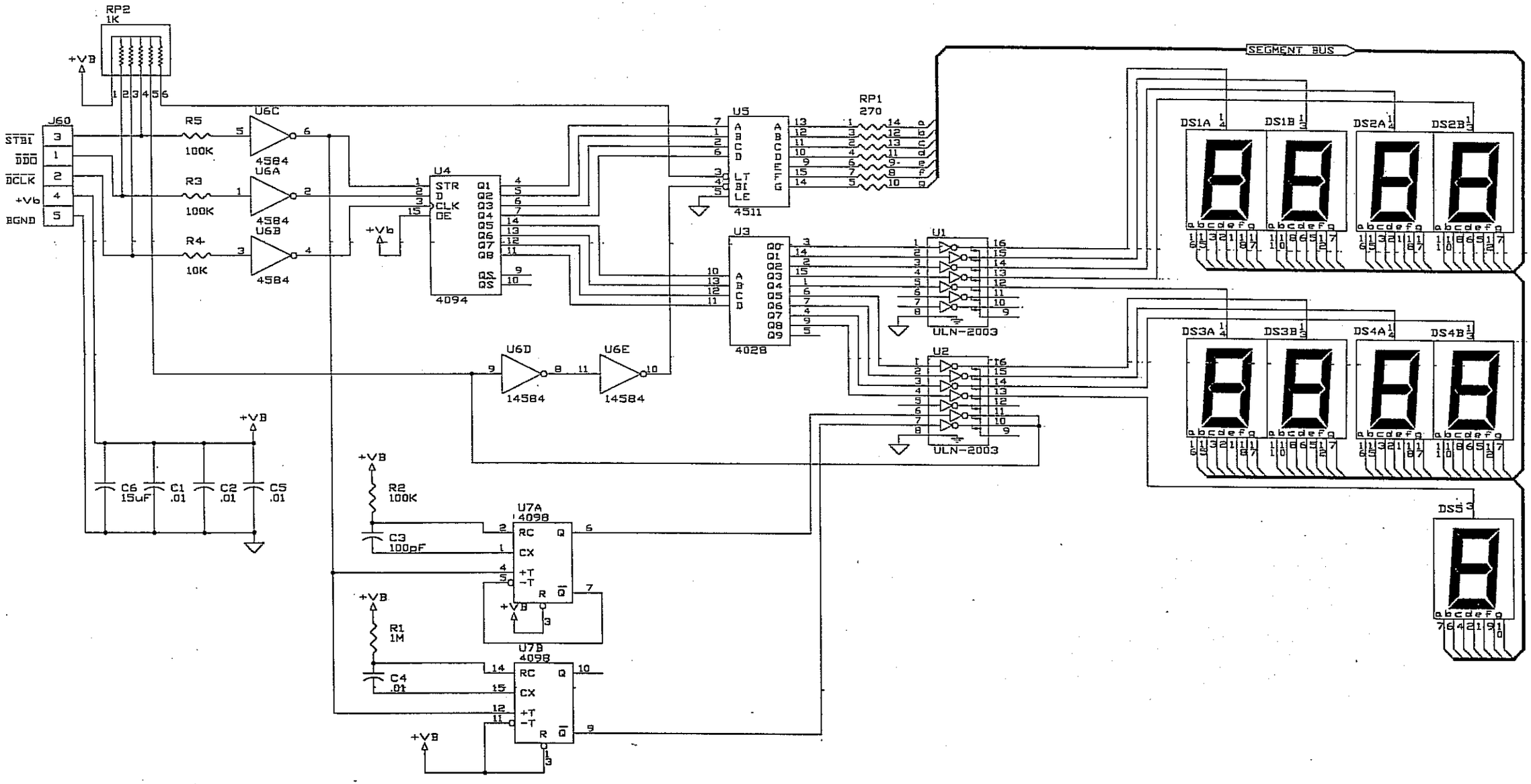




SIGNAL SHOWN AT
POINT OF GENERATION

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:

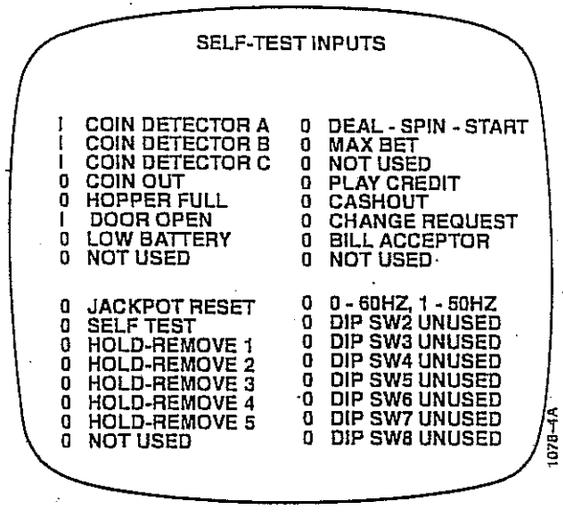
- Each input when activated sends a signal through the wiring and connectors to the mother board.
- The mother board connects the signal via a trace to the processor board
- The processor board has an input protection resistor pack with pull-up resistors tied to a Vb, followed by a parallel/serial shift 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).