



KNOWN ISSUES SORTED BY BOARD REVISION

DYNAMO HOCKEY PCBs LISTED IN THIS WORKSHEET are no longer available for purchase or serviced by the manufacturer. Most tables can be upgraded to Dynamo's latest v7.0 PCB, giving your table all the current functionality and programming, and a board with no prior repair history.

Also, Board-level components listed on this guide are not available from Valley-Dynamo, and may no longer be available at all as some date back more than 20 years. Boards that old probably should be replaced in the event of a problem.

When installing the v7.0 PCB, the 12-volt Transformer on your Dynamo table will need to be replaced with a 10-volt transformer. YOUR GAME WILL NOT WORK PROPERLY AND MAY BE DAMAGED if attempting to operate a v7.0 PCB and a 12-volt transformer.

Order these parts

880400125 – Air Hockey v7.0 Controller PCB

880400715 – Air Hockey 10v Transformer

from your Valley-Dynamo distributor or at www.valleydynamoparts.com

VERSION 2.4 A-C

v2.4 A-C version boards are no longer repairable and will need to be replaced if they fail.

PROBLEM:

The game cuts off soon after it is coined up and will not start another game until the game is turned off and back on. This can happen every game or once in a while.

An additional symptom would be that it will not score.

CAUSE:

The board is programmed to end the game if it detects one of the 3 input switches closed for more than 1 minute. The unit is also programmed to only accept one input at a time (that is why it will not score).

Please note that all input switches need to be wired Normally Open.

SOLUTION:

You will need an Ohmmeter to isolate, which of the 3 switches is closed.

- 1. Turn the A/C power off and unplug the game from the power source.**
- 2. Unplug the 15-pin edge connector from the main board.**
- 3. Using your meter, check for a closed circuit on the left score switch between pins F (pink wire) and 6 (gray wire).**
- 4. Using your meter, check for a closed circuit on the right score switch between pins H (orange wire) and 7 (gray wire).**
- 5. Using your meter, check for a closed circuit on the coin switch between pins J (brown wire) and 8 (blue wire).**

If you did not find 1 of the 3 closed then you may have a switch that is momentarily getting stuck.

- A. Check to make sure the Coin mech is returning to the vend position every time.**
- B. Remove both metal goal covers and then slightly pull the actuator wire away from the end wall. Next trim off about 1/16" to 1/8" from the tip of the actuator wire. Replace the covers.**

The next steps will reference the left score switch as the closed circuit.

If you found a closed circuit use the following steps:

- C. Go to the left end of the hockey table and remove the goal cover.**
- D. Recheck the circuit to see if you still have a closed circuit.**

If your circuit is open now and you did not have a stuck puck or a foreign object stuck in the end goal area refer to step B. If you did have something stuck your problem should be fixed.

- E. If you still have a closed circuit, make sure the switch is wired properly. The pink wire should be going to the connector marked NO (normally open) and the gray wire should be connected to the pin marked COM (common).**
- F. If the wiring is correct, disconnect the Pink wire from the switch and again check for a closed circuit.**

If it shows open now, replace the switch.

If it still shows closed, you have a short in the wiring harness.

VERSION 2.4 A-C

PROBLEM:

The game displays will not come on until you coin a game and the table will not score. The game also ends very soon after it is started.

CAUSE:

In the boards initial self-test it looks at the coin switch and will stop the boot up sequence if it sees the switch in the closed position. The reason the displays come on after you vend the coin switch is because you are opening the switch momentarily, letting the self-test complete. The unit is also programmed to only accepted one input at a time (that's why it will not score). It ends the game because the logic board monitors all 3 input switches and if one is in the closed positions over 1 minute it will end the game being played.

Please note that all input switches need to be wired Normally Open.

SOLUTION:

You will need an Ohmmeter to isolate the problem.

1. Turn the A/C power off and unplug the game from the power source.
2. Unplug the 15-pin edge connector from the main board.
3. Using your meter, check for a closed circuit between pins J (brown wire) and 8 (blue wire).

If it reads open then you have a main board problem. If your version is 2.4A you will need to purchase a new main board and display (880400202). If your version is a 2.4C you will only need a new main board.

If you did have a closed circuit:

1. Make sure the switch is wired correctly. The brown wire needs to be connected to pin NO (normally open) and the blue wire connected to COM (common).
2. Once you verify that the switch is wired correctly, unplug the brown wire and check to see if you have a closed switch.

If it still shows a closed switch, you have a short in the wiring harness.

If the circuit shows open, replace the switch.

If your table were still set up with a micro switch this would be a good time to upgrade the table to a reed switch. When you order just ask for part number 030400500.

VERSION 5.1

PROBLEM:

When you coin a game the meter starts running non stop or adds extra credits up to 99.

Or

The game will not start (come on) when it is coined up but the meter shows the credit.

Or

When you coin a game, it gives more than one game, anywhere from 2 – 99.

Or

Any combination of the three.

CAUSE:

The program has been altered. This can happen due to six things.

- 1. The game sustained a large A/C spike.**
- 2. The game is in an area with a lot of static electricity.**
- 3. The field ground circuit has broken.**
- 4. IC number 93C46 is bad.**
- 5. The micro controlled 80C31 is bad.**
- 6. The Crystal XTAL is bad.**

SOLUTION:

First you will need to reset the program.

- 1. Hold the toggle switch located on the main board in the CAL 1 position for at least 5 seconds.**

THE DISPLAY WILL BE COUNTING IN TENTHS OF SECONDS, WHEN THE DISPLAY READS 50 YOU CAN RELEASE THE SWITCH.

66 = the number of times you need to vend the push chute before you get a credit.

77= how long the game lasts in increments of 1 minute.

44= the number of credits shown on the coin counter per vend.

11= the number of games per credit.

The factory default is:

66= 01 It only takes 1 vend on the push chute to equal one credit.

77=07 A game will last for 7 minutes.

44=01 The coin meter will only increment by 1

11=01 Only 1 game is issued

VERSION 5.1

TO MAKE SURE ALL OF THE SETTINGS ARE RIGHT YOU WILL NEED TO GO THROUGH THE COMPLETE LOOP OF OPTIONS. For example, in 66 even if it currently is set to 01 you will need to toggle the switch until the display reads 01 again.

- 2. The display will flash the number 66 and then go to a stationary number between 01 and 99. You will need to toggle the switch into the CAL 2 position until the display shows 01.**
- 3. Toggle the switch into the CAL 1 position 1 time.**
- 4. The display will now flash 77 and then go to a stationary number between 01 and 15. You will need to toggle the switch into the CAL 2 position until the display shows 07.**
- 5. Toggle the switch into the CAL 1 position 1 time.**
- 6. The display will now flash 44 and then go to a stationary number between 01 and 99. You will need to toggle the switch into the CAL 2 position until the display shows 01.**

7. Toggle the switch into the CAL 1 position 1 time.
8. The display will now flash 11 and then go to a stationary number between 01 and 99. You will need to toggle the switch into the CAL 2 position until the display shows 01.
9. Toggle the switch into the CAL 1 position 1 more time.

The display should now be flashing 00 – 0. Check to make sure the game will coin up correctly.

10. Turn the A/C power off and disconnect the power cord from the outlet.
11. Using an ohm meter inspect the A/C power cords field ground for an open circuit. If it shows that it is open replace the power cord.
12. Once you've determined the power cord is good, plug the game back in and turn the power back on. Your display should show an 8 in the left segment then an 8 in the right segment followed by 00-0.
13. Try to coin up a game. If it will, then the IC 93C46 is good.

If both the line cord and IC 93C46 show to be good your problem was from an A/C spike, static electricity, or a bad ground on your outlet. We suggest that you install a surge suppressor.

VERSION 5.1 – 6.02

PROBLEM:

The game will not start and 11 is flashing on the display.

CAUSE:

The logic board is detecting a constantly closed circuit on the right end goal.

SOLUTION:

1. Remove the end goal cover. You will probably find a stuck puck or some type of foreign matter.
2. If you did find something, replace the cover and see if the game will coin.
3. If you did not find stuck objects, the next step is make sure the inside of the goal cover has a flat black 4" X 4" label or has the area painted flat black. If it does not, the optic may be reading itself. By painting the inside of the end goal with flat black paint, the problem is eliminated.
4. Turn the power off of the game and unplug it.
5. Pull off the 15-pin edge connector from the main board.
6. Using an ohm meter, check for a closed circuit on the right score optic between pins H (orange wire) and 7 (gray wire).
7. If it shows open you need to replace the main board.
8. If the circuit shows closed, remove the goal entry cover and disconnect the 4-pin connector from the optic board and recheck the circuit.
9. If it now shows open, replace the optic board (880404200)
10. If the circuit still shows closed, you have a wiring problem.

PROBLEM:

The game will not start and 22 is flashing on the display.

CAUSE:

The logic board is detecting a constantly closed circuit on the left end goal.

SOLUTION:

1. Remove the end goal cover. You will probably find a stuck puck or some type of foreign matter.
2. If you did find something, replace the cover and see if the game will coin.
3. If you did not find stuck objects, the next step is make sure that the inside of the goal cover has a flat black 4" X 4" label or has the area painted flat black. If it does not, the optic may be reading itself. By painting the inside of the end goal with flat black paint, the problem is eliminated.
4. Turn the game power off and unplug it.
5. Pull off the 15-pin edge connector from the main board.
6. Using an ohm meter check for a closed circuit on the right score optic between pins F (pink wire) and 6 (gray wire).
7. If it shows open, you need to replace the main board.
8. If the circuit shows closed, remove the goal entry cover and disconnect the 4-pin connector from the optic board and recheck the circuit.

9. If it now shows open, replace the optic board (880404200)
10. If the circuit still shows closed, you have a wiring problem.

VERSION 5.1 – 6.02

PROBLEM:

The display shows a single 8 on the left segment of the score display.

CAUSE:

The logic boards self-test have detected the coin circuit closed.

SOLUTION:

You will need an Ohmmeter to isolate the problem.

1. Turn the A/C power off and unplug the game from the power source.
2. Unplug the 15-pin edge connector from the main board.
3. Using your meter check for a closed circuit between pins J (brown wire) and 8 (blue wire).

If it reads open then you have a main board problem. The board will require replacement

If you did have a closed circuit:

(If your table uses a reed switch instead of a micro switch skip step #4).

3. Make sure the switch is wired correctly. The brown wire needs to be connected to pin NO (normally open) and the blue wire connected to COM (common).
4. Once you verify that the switch is wired correctly unplug the brown wire and check to see if you have a closed switch.

If it still shows a closed switch, you have a short in the wiring harness.

If the circuit shows open, replace the switch.

If your table is still set up with a micro switch this would be a good time to upgrade the table to a reed switch. When you order just ask for part number 030400500.

VERSION 6.02 – 6.03

PROBLEM:

When you coin a game the meter starts running non stop or adds extra credits up to 99.

Or

The game will not start (come on) when it is coined up but the meter shows the credit.

Or

When you coin a game, it gives more than one game, anywhere from 2 – 99.

Or

Any combination of the three.

CAUSE:

The program has been altered. This can happen due to six things.

- 1. The game sustained a large A/C spike.**
- 2. The game is in an area with a lot of static electricity.**
- 1. The field ground circuit has broken.**
- 2. IC number 93C46 is bad.**
- 3. The micro controlled 80C31 is bad.**
- 4. The Crystal XTAL is bad.**

SOLUTION:

First you will need to reset the program.

- 1. Turn the A/C power switch OFF.**
- 2. Turn the A/C power switch back on while you hold the toggle switch located on the main board in the CAL 2 position for at least 5 seconds.**
- 3. Hold the toggle switch down in the CAL 1 position for a minimum of 10 seconds.**

THE DISPLAY WILL BE COUNTING IN TENTHS OF SECONDS, WHEN THE DISPLAY PASSES 99 AND STARTS TO COUNT OVER YOU CAN RELEASE THE SWITCH.

Once you have released the toggle switch the display will flash 55 one time and then display a 5 in the right display.

- 1. Push the toggle switch into the CAL 2 position 1 time. The display should now read a 1 in the right display.**
- 2. Push the toggle switch down into the CAL 1 position 4 times waiting at least two seconds between each toggle.**
- 3. The display should flash 00 then 0 back and forth in a repeat cycle. If it is not, simply push the toggle switch in the CAL 1 position a few more times.**

There are 4 levels in the 10-second program menu. The board will not register your closures on the toggle switch until the display has stopped flashing, that is why you need to wait at least 2 seconds between each toggle to proceed to the next level.

The display should now be flashing 00 – 0. Check to make sure the game will coin up correctly.

Continued on the next page.

VERSION 6.02 – 6.03

To eliminate possible causes, use the following steps.

If you where not able to get into the program, then the problem is on the main game board. The probable failures will be the Micro Controller (80C31) or the oscillating crystal (XTAL 6.144 Hz)

- 1. Turn the A/C power off and disconnect the power cord from the outlet.**
- 2. Using an ohm meter inspect the A/C power cords field ground for an open circuit. If it shows that it is open, replace the power cord.**
- 3. Once you've determined the power cord is good, plug the game back in and turn the power back on. Your display should show an 8 in the left segment then an 8 in the right segment followed by 00-0.**
- 4. Try to coin up a game. If it will then the IC 93C46 is good.**

If both the line cord and IC 93C46 show to be good your problem was from an A/C spike, static electricity, or a bad ground on your outlet. We suggest that you install a surge suppressor.

VERSION 6.02 – 6.11

PROBLEM:

The display shows an 8 in the left segment during power up and will not change.

CAUSE:

The logic board is reading a closed circuit on the coin switch.

SOLUTION:

- 1. Turn the A/C power off.**
- 2. Disconnect one wire from the coin switch.**
- 3. Turn the A/C power back on.**

If the game continued through the self-test and into the attract mode then you have a bad reed switch (880404000).

If the game still only displayed an 8.

You will need an Ohmmeter to isolate the problem.

- 1. Turn the A/C power off and unplug the game from the power source.**
- 2. Unplug the 15-pin edge connector from the main board.**
- 3. Using your meter check for a closed circuit between pins J (brown wire) and 8 (blue wire).**

If the circuit reads closed, the problem is in the wiring.

If the circuit reads open, the problem is the main board (880400106).

PROBLEM:

The display shows an 8 in the right display segment.

CAUSE:

The main board

SOLUTION:

The most common cause is that either CR1 or CR2 has been physically broken open.

VERSION 6.11

PROBLEM:

When you coin a game the meter starts running non stop or adds extra credits up to 99.

Or

The game will not start (come on) when it is coined up but the meter shows the credit.

Or

When you coin a game, it gives more than one game, anywhere from 2 – 99.

Or

Any combination of the three.

CAUSE:

The program has been altered. This can happen due to six things.

- 1. The game sustained a large A/C spike.**
- 2. The game is in an area with a lot of static electricity.**
- 5. The field ground circuit has broken.**
- 6. IC number 93C46 is bad.**
- 7. The micro controlled 80C31 is bad.**
- 8. The Crystal XTAL is bad.**

SOLUTION:

First you will need to reset the program.

- 1. Turn the A/C power switch OFF.**
- 2. Turn the A/C power switch back on while you hold the toggle switch located on the main board in the CAL 2 position for at least 5 seconds or until the display is flashing 00/0.**

The display should now be flashing 00 – 0. Check to make sure the game is coining up correctly.

To eliminate possible causes, use the following steps.

If you where not able to get into the program then the problem is on the main game board. The probable failures will be the Micro Controller (80C31) or the oscillating crystal (XTAL 6.144 Hz)

- 5. Turn the A/C power off and disconnect the power cord from the outlet.**
- 6. Using an ohm meter inspect the A/C power cords field ground for an open circuit. If it shows that it is open replace the power cord.**
- 7. Once you've determined the power cord is good, plug the game back in and turn the power back on. Your display should show an 8 in the left segment then an 8 in the right segment followed by 00-0.**
- 8. Try to coin up a game. If it will then the IC 93C46 is good.**

If both the line cord and IC 93C46 show to be good your problem was from an A/C spike, static electricity, or a bad ground on your outlet. We suggest that you install a surge suppressor.

DYNAMO HOCKEY TROUBLESHOOTING FLOW CHARTS

If you are experiencing a problem with your Dynamo Hockey table, you must first identify the type of problem in order to arrive at a solution. Most problems may be categorized as either mechanical or electronic, with electronic problems making up the majority.

The following flowcharts should provide you with enough information to accomplish most simple troubleshooting tasks on your Dynamo Hockey table. Please contact the Dynamo, Ltd. Customer Service Department at 972-595-5300, (option 2) if you have any problems not addressed in the following pages.

Special note on changing PC Boards:

When changing the PC board in your Dynamo Hockey game, please note the following: There are two 15-pin connectors on your board that appear to be identical. Be certain that the display unit is connected to the pin connector marked "display/score." The other pin connector (marked "MARS C-120") is used for an electronic coin comparator, which is not normally shipped as a part of your game.

CHART # 1, PROBLEM ISOLATION FLOWCHART

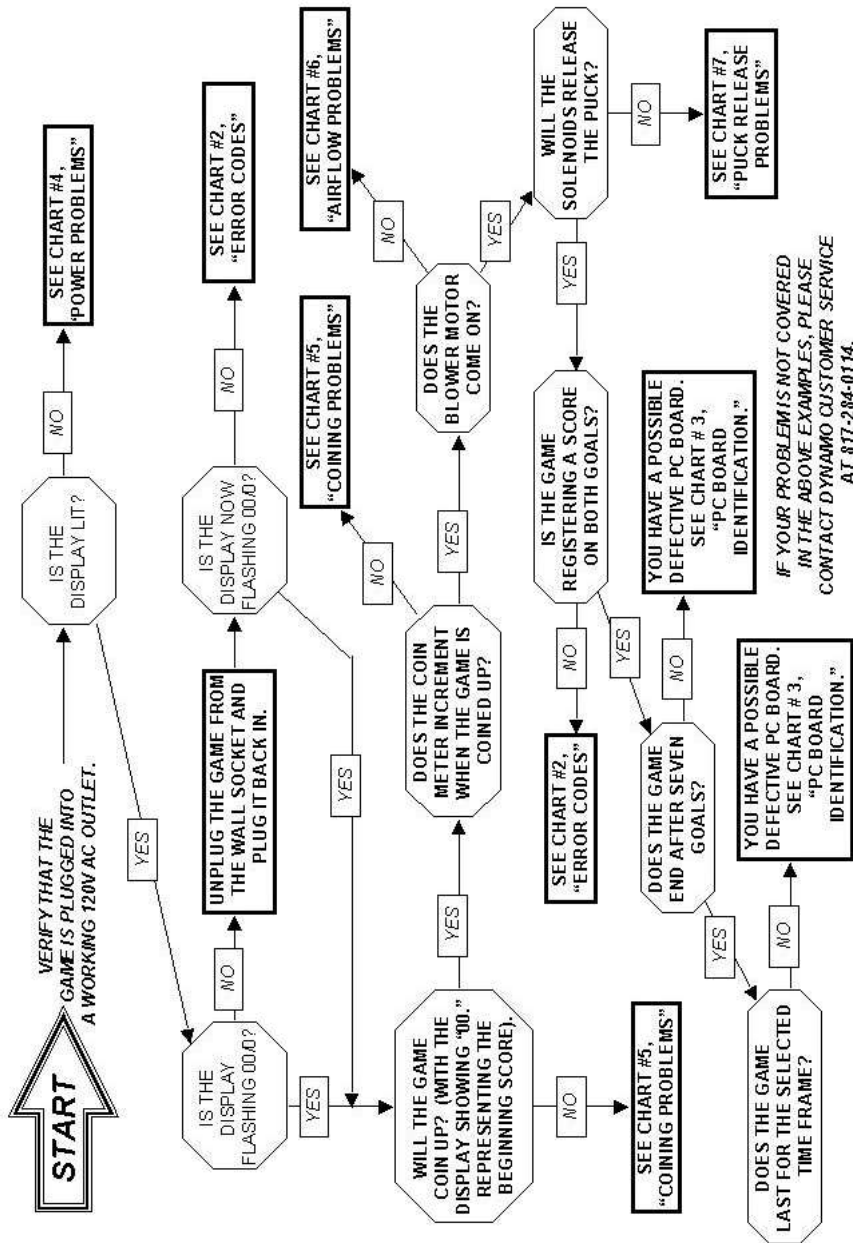


CHART #2, ERROR CODES

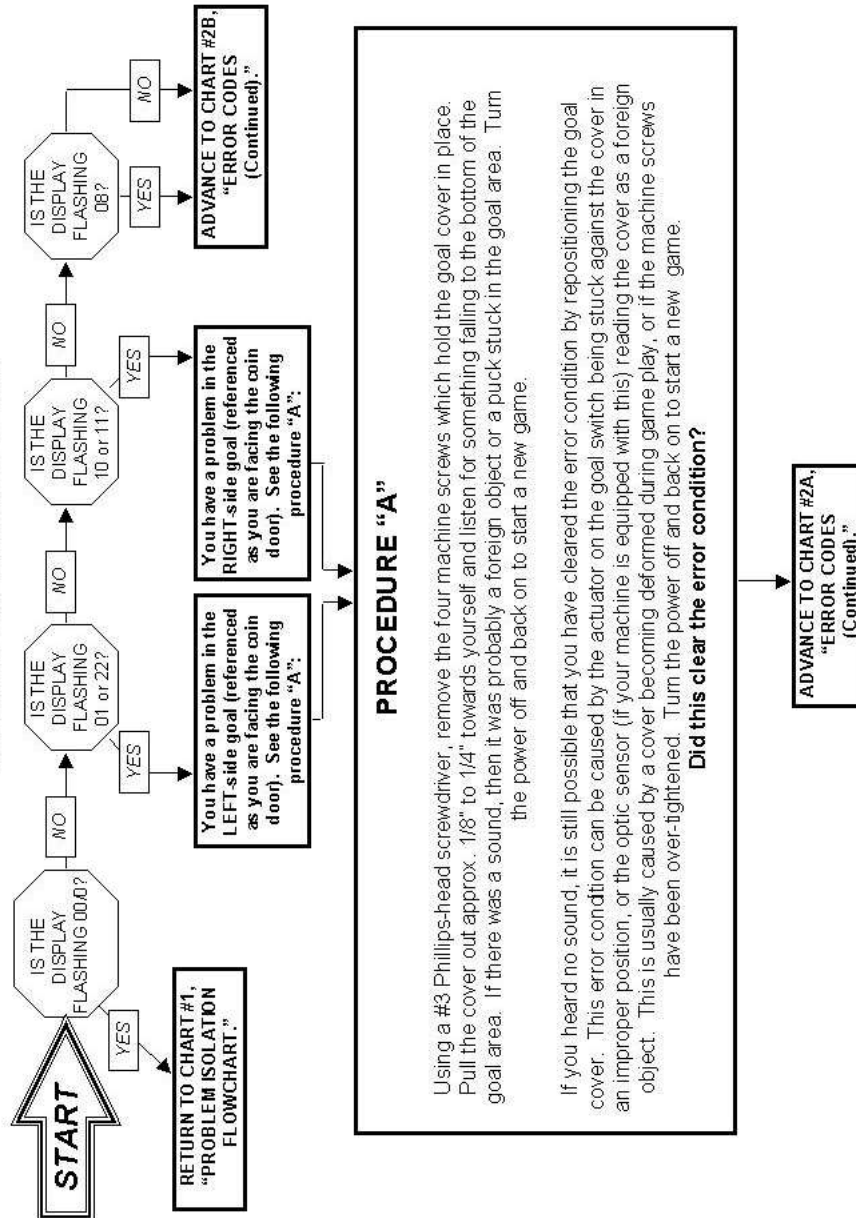


CHART # 2A, ERROR CODES (Continued)

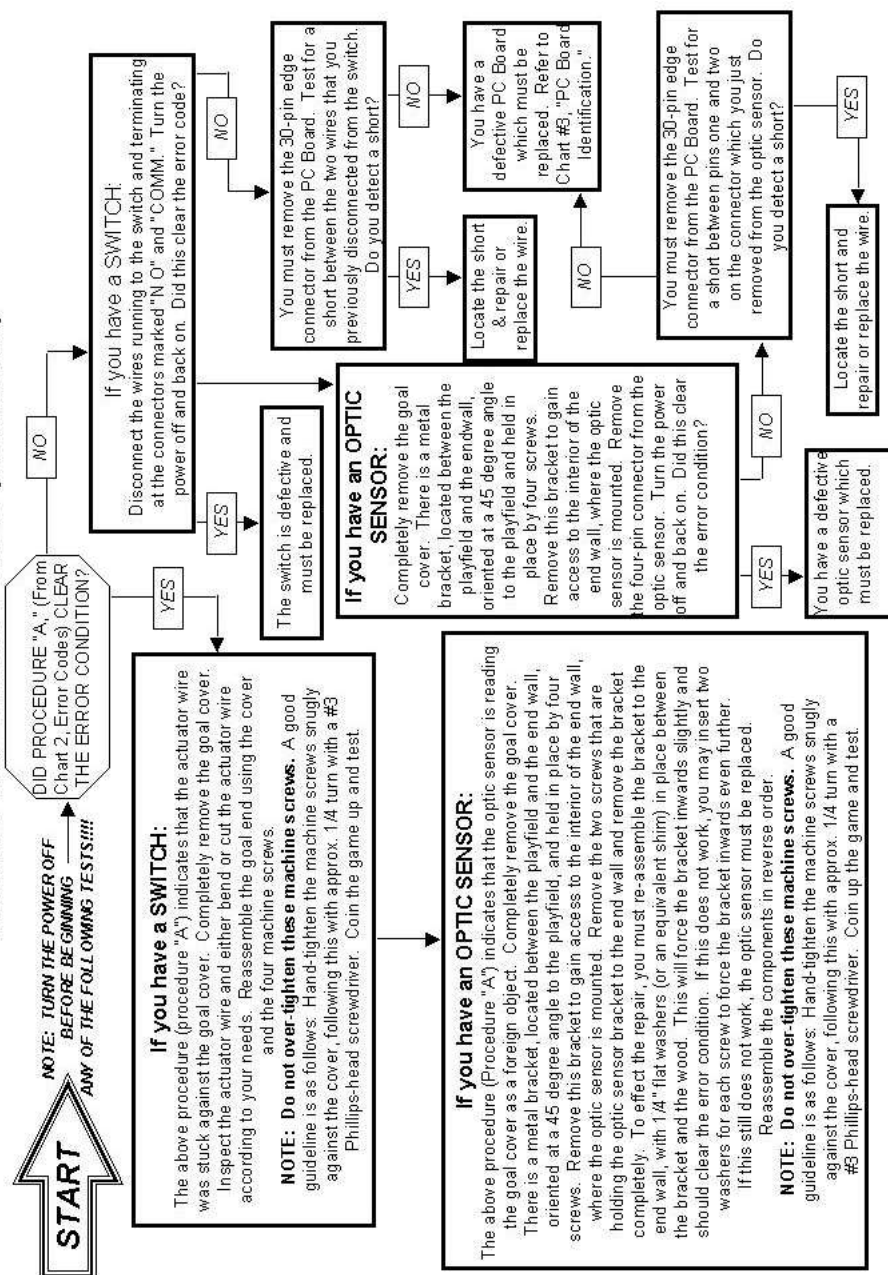
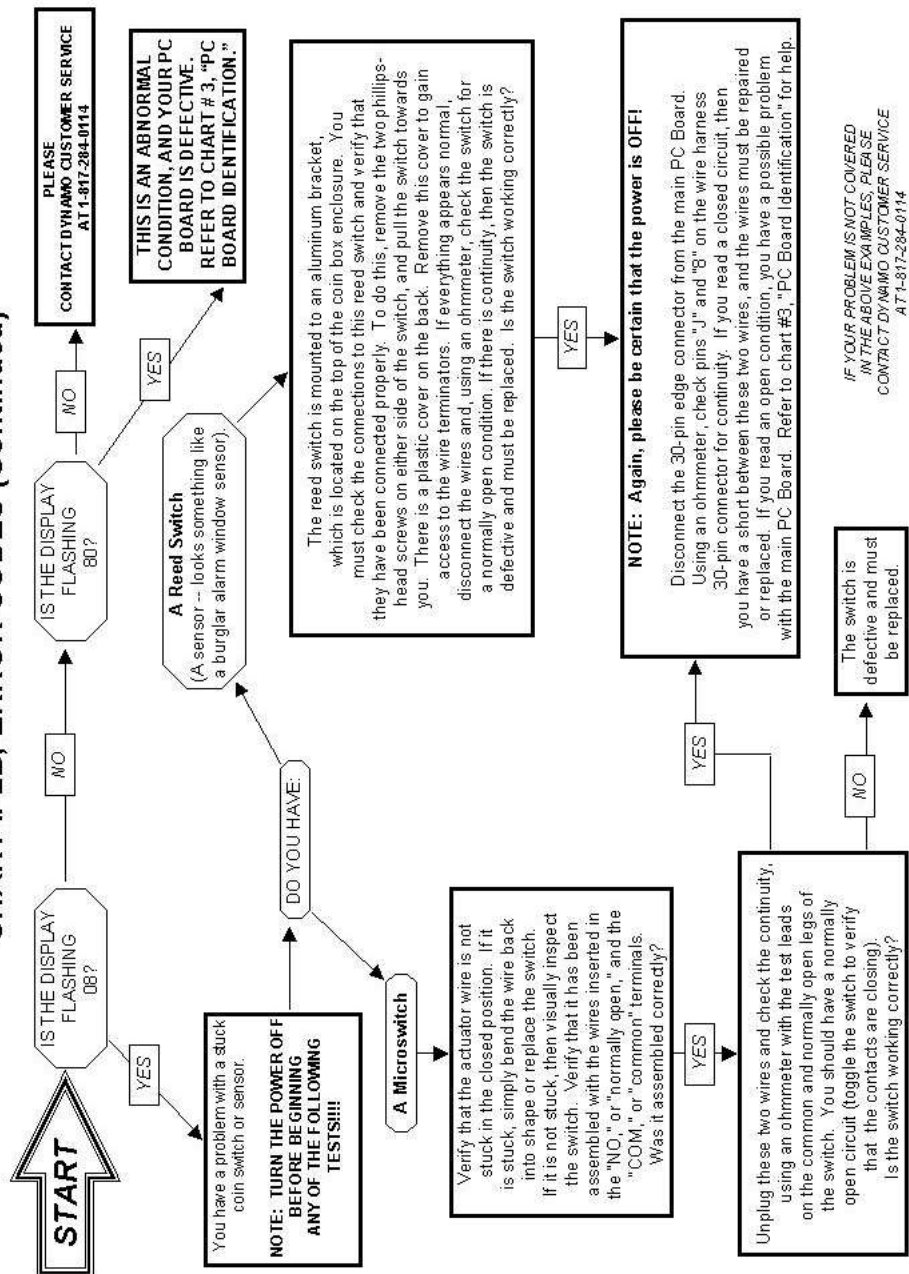


CHART # 2B, ERROR CODES (Continued)




```

graph TD
    Start([START]) --> Q1{IS A DIP SWITCH BANK PRESENT?}
    Q1 -- NO --> Q2{IS THERE A TOGGLE SWITCH ON THE UPPER RIGHT-HAND CORNER OF THE PC BOARD, AND ONLY 2 CONNECTORS?}
    Q1 -- YES --> Q3{ARE THERE 14 RESISTORS LOCATED ON THE PC BOARD, IMMEDIATELY BELOW THE 15 PIN OUTPUT DISPLAY / SCORE CONNECTOR?}
    Q2 -- YES --> A1[YOUR BOARD IS A 2.4C.]
    Q2 -- NO --> Q4{IS THERE A TOGGLE SWITCH ON THE UPPER RIGHT-HAND CORNER OF THE PC BOARD, AND MORE THAN 2 CONNECTORS?}
    Q3 -- YES --> A2[YOUR BOARD IS A 2.4A.]
    Q3 -- NO --> A3[YOUR BOARD IS A 2.4C.]
    Q4 -- YES --> A4[YOUR BOARD IS A 5.1.]
    Q4 -- NO --> A5[YOUR BOARD IS A 6.0.]
  
```

THE FOLLOWING CHART SHOWS WHICH BOARDS WHICH MAY BE USED AS REPLACEMENTS FOR DEFECTIVE BOARDS.
AN "X" IN A ROW INDICATES THAT THIS BOARD IS COMPATIBLE.
EXAMPLE: IF YOUR 2.4C BOARD IS DEFECTIVE, IT MAY BE REPLACED WITH A 2.4C, 5.1 OR 6.0 BOARD.

	2.4A	2.4C	5.1	6.0	WEB 1.0
2.4A	X				
2.4C		X	X	X	
5.1		X	X	X	
6.0		X	X	X	
WEB 1.0					X

IF YOUR PROBLEM
IS NOT COVERED
IN THE ABOVE
EXAMPLES, PLEASE
CONTACT DYNAMO
CUSTOMER
SERVICE
AT 1-817-284-0114

CHART # 4, POWER PROBLEMS

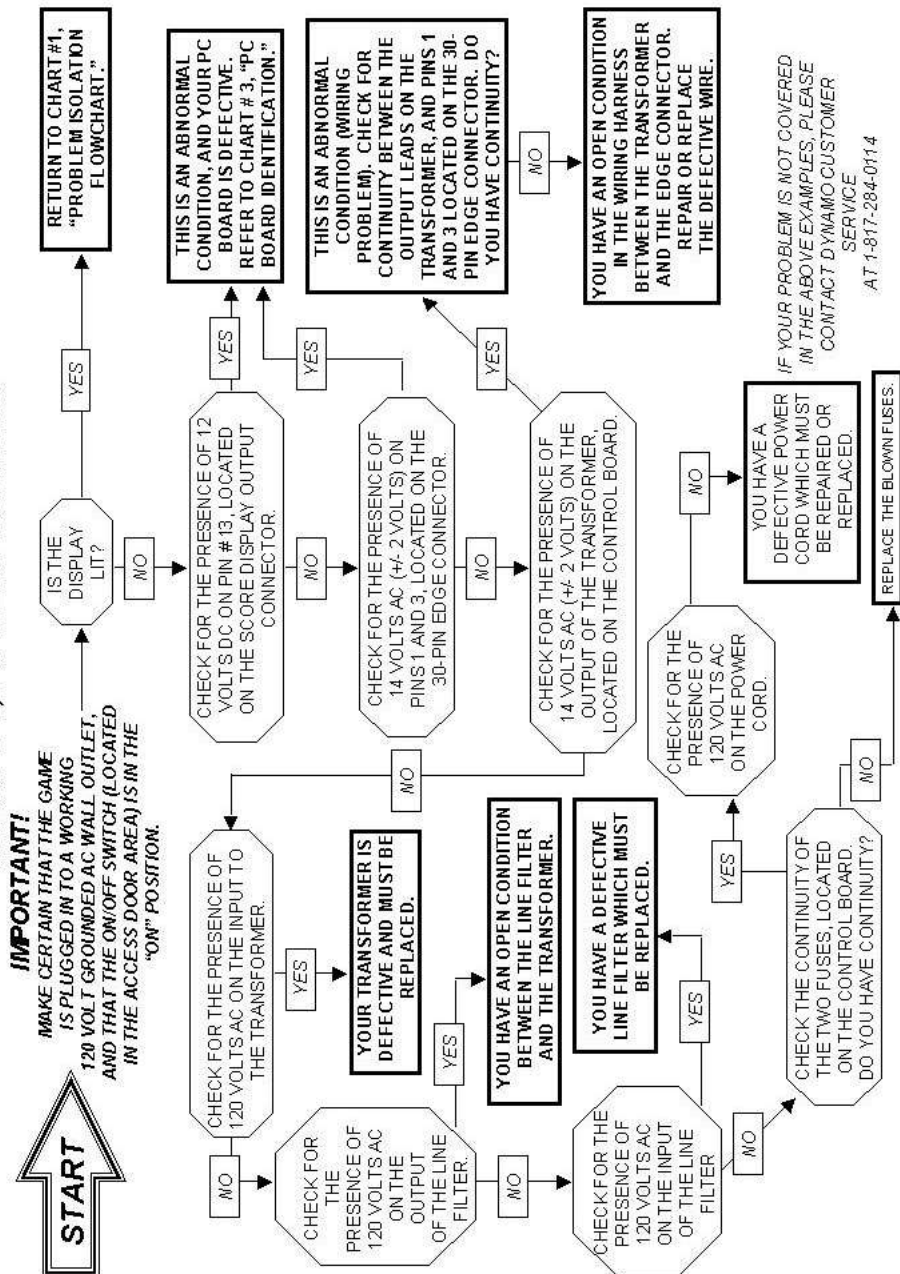


CHART #5, COINING PROBLEMS

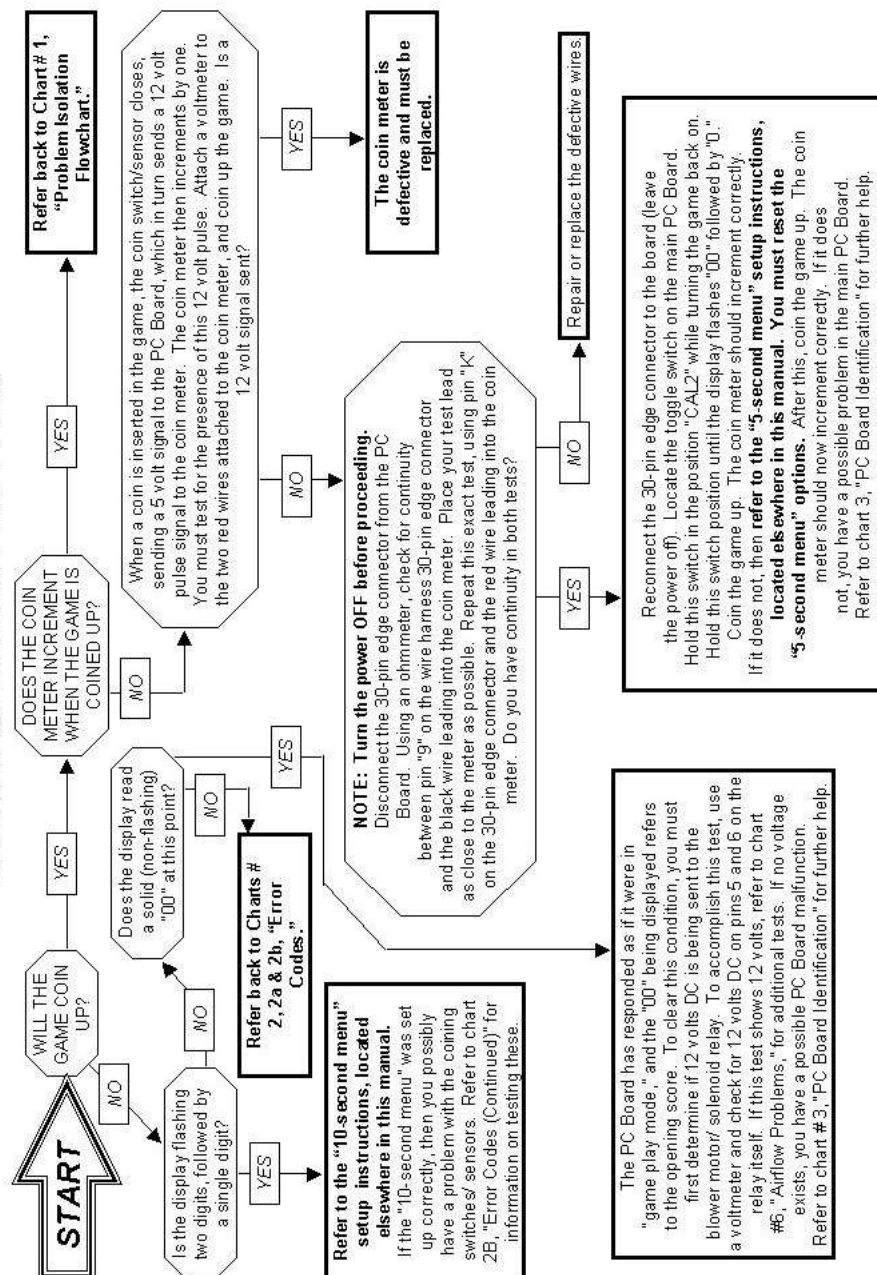


CHART # 6, AIRFLOW PROBLEMS

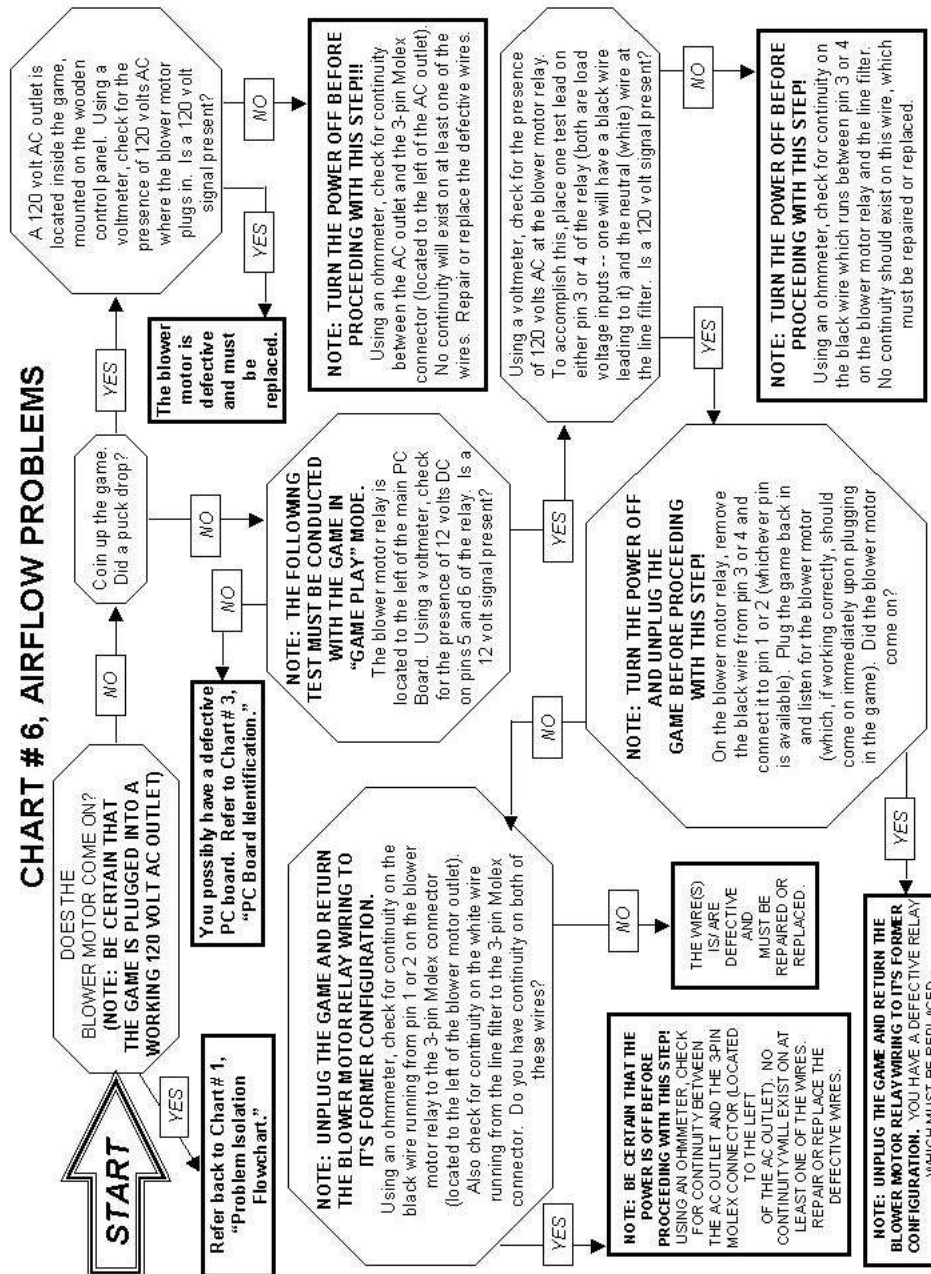


CHART # 7, PUCK RELEASE PROBLEMS

