Slot Tech Magazine

Slot Machine Technology for the International Casino & Gaming Industry

December 2010

A Spectacularly Incendiary Incident With a WMS Bluebird

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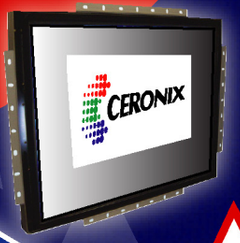

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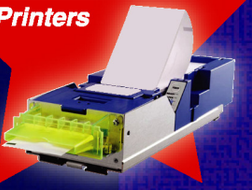

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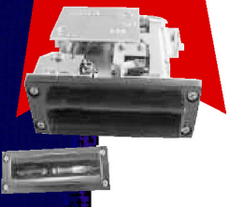

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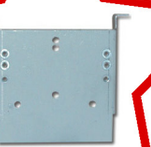

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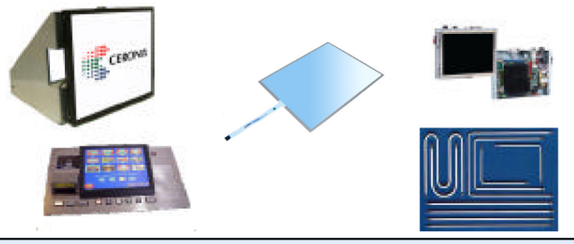

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Randy Fromm

Fire in the hole! Actually, "holes made by fire" might be a better description as Chuck Lentine presents a plethora of pyromaniacal problems he has encountered at his casino. That's right, he actually owns the casino and just works there for fun. What a guy. Anyway, please pay careful attention to Chuck's presentation because more than just cause and effect, Chuck presents us with an important philosophical point of view when troubleshooting and that is that it is critical to ascertain the exact nature of the destruction and the exact cause of same before you slap in a couple of thousand bucks worth of new sub-assemblies and flip the switch to "on." A slot tech's errors can easily cost the casino thousands of dollars, bottom line. I see it often. Chuck points out, specifically, how he conducted a forensic analysis into this poor Bluebird's condition and made sure it wasn't going to develop a smoking habit before he plugged it back in and turned it on. This article is a super-good lesson to us all as technicians. Thanks for the contribution, Chuck.

In addition to our old friends Kevin Noble and Pat Porath, Craig Nelson is back again this month with an update for the IGT AVP Video PCB. Is that enough abbreviations for you?

We have a sort of hidden theme running through Slot Tech Magazine this month and it's fans. Watch for it in the magazine and watch for them on the floor. There may be a half dozen in a machine. It has become a big (read $$$) service issue.

Randy Fromm

Randy Fromm - Publisher
Slot Tech Magazine

Randy Fromm's
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Relaxing by the Fireplace

By Chuck Lentine

Perhaps the one more interesting things that can happen in the life of a slot tech is the pleasure of being one of the first employees on the casino floor to witness a slot machine in self- destruct mode. You get the radio call that a machine is royally smoking and on fire. Upon your arrival, there are customers and slot hosts running around like the world is coming to an end. It looks like everything in the machine is on fire due to the large amount of smoke coming out of every vent.

Now, you have to be the brave one to cut off power to the machine. If the power lines are in the base it is your lucky day. If not, it's time to grab the keys and go head first into the game. Reaching in you find the power switch and shut off the upright inferno. The casino facilities department has now turned on the ventilation system to clear the smoke your machine caused. You and your co-workers now speculate on what caused the machine to carry on like it did. At the end of this article I will describe what caused one of these particularly stellar incidents.

This article will look at the cause and effects of some electronic device failures seen in our industry and most importantly, how to avoid them. I'm sure all of you veterans of the slot tech world have heard this a million times before, the number one piece of advice I give to my slot technicians is NEVER EVER, EVER connect or disconnect ANY circuit board with the power on period! Some exceptions in our casino are the JCM UBA, Transact printers and most 120VAC LCD monitors can be hot-swapped without causing a mess on the casino floor.

Refer to figure 1. Here we have what is left of an inverter (530128A) found in the Konami Advantage series game belly door. One of the CCFL power wires got frayed and shorted out on the belly glass frame and blew off the end of the CCFL and this little inverter took the brunt of it. It did not damage anything else in the machine. We now put extra lengths of heat shrink tubing on the wires every time a CCFL lamp gets replaced to avoid this in the future.

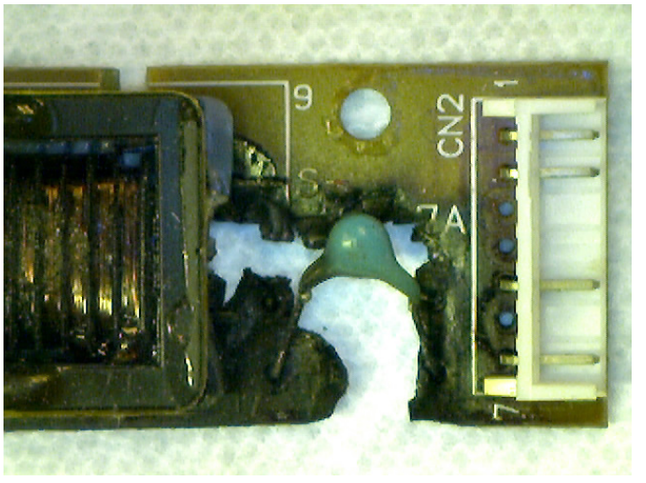
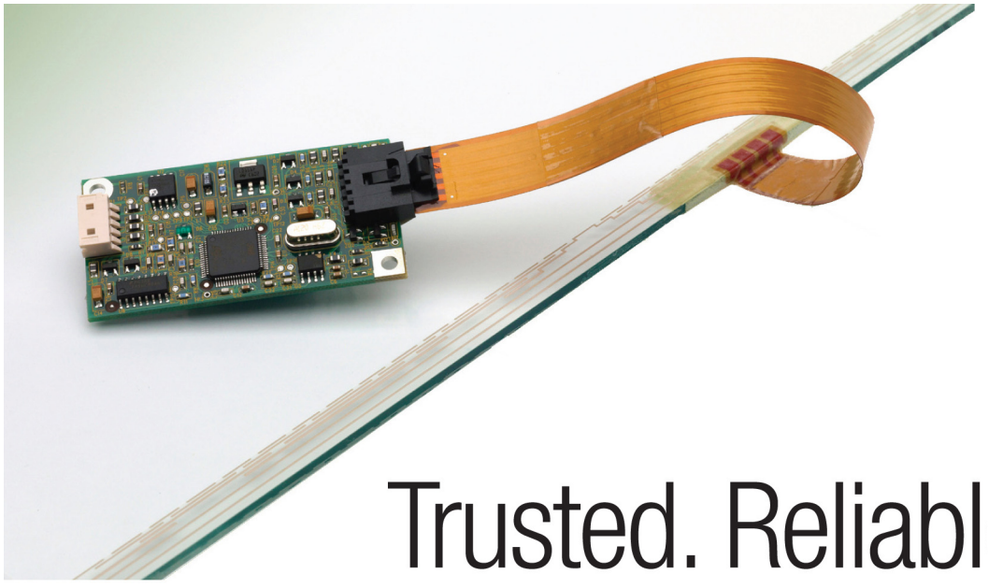


Figure 1-Konami belly glass inverter



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Refer to figure 2. This was a 16 bit I/O board (75435100W) that came from an IGT S2000 slot. This board sits on the main door just behind where the coin acceptor is mounted. It had worked its way out and was intermittently making connection with the power. It finally had enough and flamed out. It didn't stop here, read on.

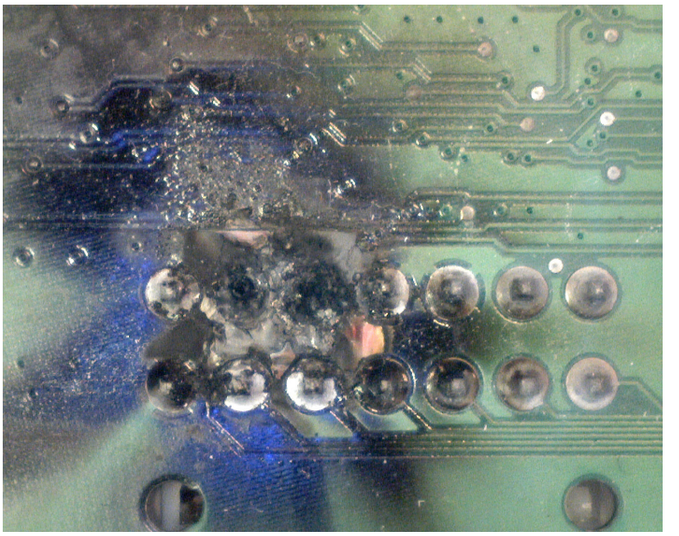

Figure 2-16 bit I/O board (75435100W) from an IGT S2000 slot.

Refer to figure 3. On our multi-line and 5 reel S2000s there is an LED multiplier display board mounted on the left side of the reel glass. When the above I/O board shorted out, it also took out this multiplier (76927000 PCB 2dg, 9 line control) board.

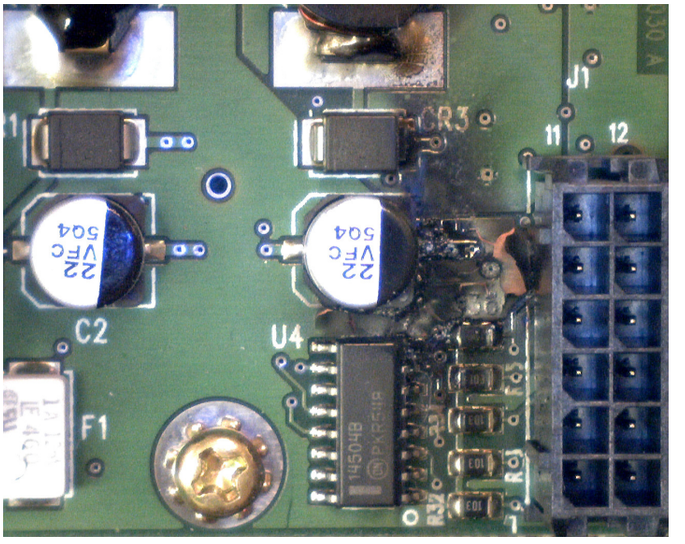

Figure 3-Multiplier board (76927000 PCB 2dg, 9 line control)

Refer to figure 4. On the WMS Bluebird machines, some of them have an oval shaped bonus button on the control panel. It is usually red and has LEDs on the perimeter. The LEDs are actually mounted on a circuit board sandwiched underneath the metal panel and shine through small holes cut in the panel (WMS A-012564-01-02) Universal Animator Display. When the nut holding this assembly together loosens up, the board can float around and ground some of the LEDs to the metal panel. It this instance, the animator display did not receive any damage but started a fire on the SPN distribution board (6779-012604-02-00) mounted in the upper left corner of the cabinet. The traces on the board caught on fire first and then melted the power connector which had to be cut off and re-pinned with a new Molex connector.

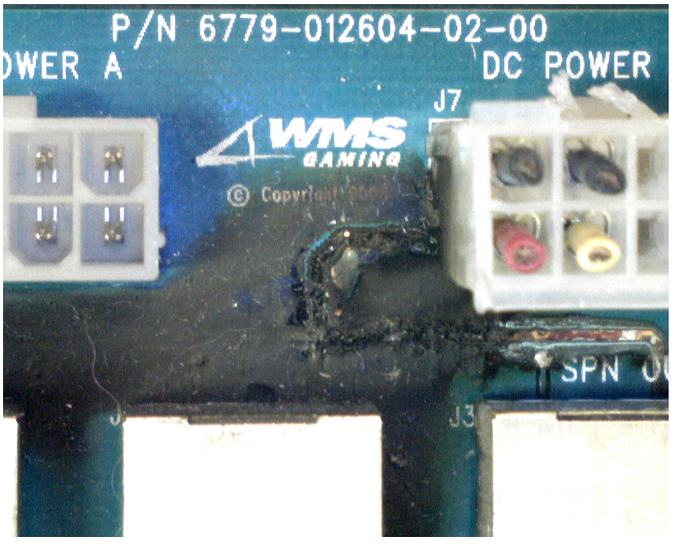

Figure 4-WMS SPN distribution board (6779-012604-02-00)

Refer to figure 5. This toasty board came from an IGT AVP Trimline. It is a fiber optic daughter card (7540260) that is mounted on the distribution board found on the back wall behind the printer. It connects all of the machines together via a fiber link. The fiber optic lines got hooked behind the printer and every time it got pulled out, so did this board with live power going to it. Need-

Bob Yabroff
President

"I have always supported Slot Tech Magazine"

"But to tell you the truth, the content of this magazine is gobbledygook to a seating guy like me."

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less to say, it had enough and started a small fire. It also took out the small 5v/12v power supply that controls these communication boards.

Refer to figure 6. In the Aristocrat Mark V cabinets, This Setec fluorescent ballast (4700R2) can be found in the top box and behind the belly door. One of the F8T5 lamp ends cracked off and went into a dead short in the lamp socket causing this ballast to fry half of the secondary section.

In the beginning of this article I described a spectacular incendiary incident we have never seen before. The machine is a WMS Bluebird with a top monitor. When the machine was opened and the fire burned itself out, every assembly was removed and inspected. Surely it could it have been the power supply? Read on warrior.

Figure 7 and figure 8 show some of what was found:

After sorting everything out, we discovered what was damaged. The CPU I/O board (A-008318-06) had a one inch burn scar on both sides of the board just above connector P2 and under the small CPU board. About eight circuits and traces were involved in the fire and it melted the plastic insulator behind it and the CPU metal housing. The interesting thing is

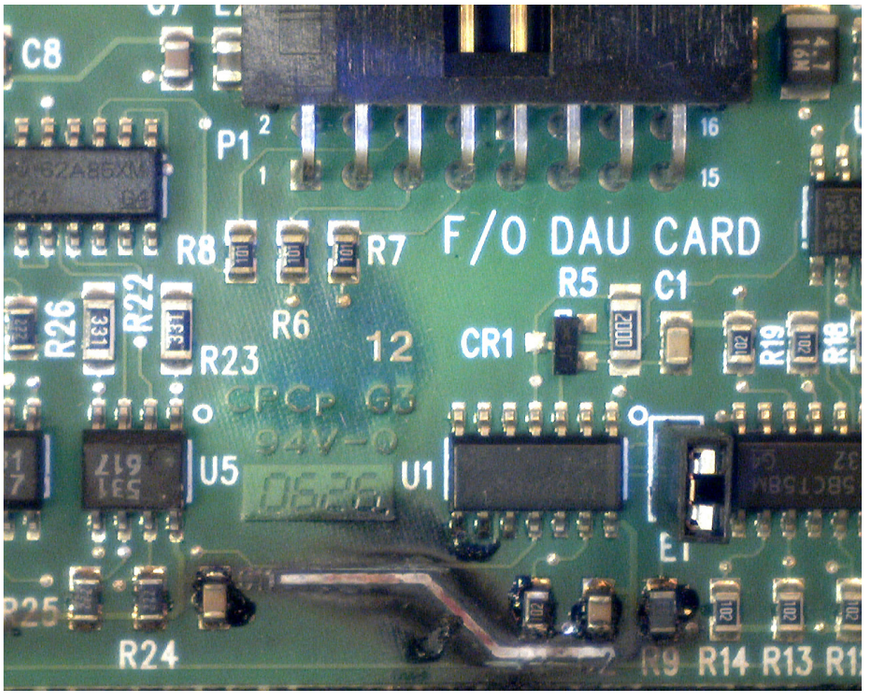

Figure 5-Fiber optic daughter card (7540260) from IGT AVP Trimline

that this board's logic section still works and was displaying a picture on the screen!

Upon further inspection of the components, the fluorescent light ballast (6620-004995-00-00) had the distinct odor also coming from it. The vent holes were black from the acrid smoke. Something must have happened in here also. After cracking the melted plastic case open, there were about seven transistors, resistors, and capacitors

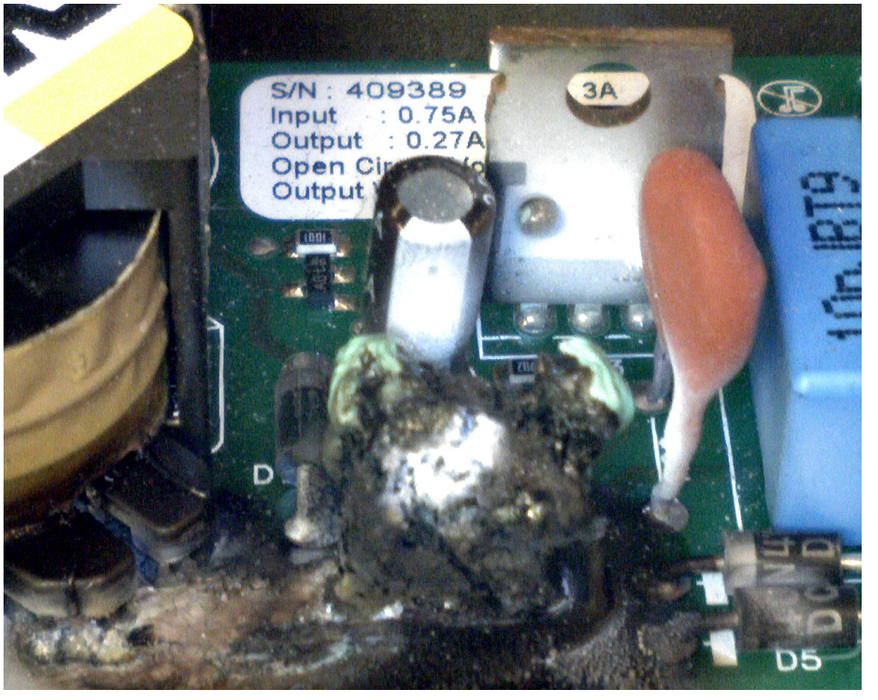

Figure 6-In the Aristocrat Mark V cabinets, This Setec fluorescent ballast (4700R2) can be found in the top box and behind the belly door.

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About Randy Fromm: I am the publisher of Slot Tech Magazine. First published in 2001, Slot Tech Magazine is a monthly trade journal focusing on casino slot machine repair. I have been repairing electronics for the gaming industry since 1972. I really enjoy what I do and I love showing others how easy it can be. ***No previous knowledge of electronics is required.***

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blown into oblivion.

The rest of the components and assemblies were inspected and verified working one at a time in a different machine. That left us with one fried CPU and ballast that caused all that commotion. And yes, the power supply was fine.

What blew up first?
Why did this happen?
How can we prevent it from happening again?

These components are on two totally different circuits which made the cause much harder to backtrack and understand. The ballast is on the main 120VAC and just lights up the small lamp behind the marquee near the control panel. The CPU section that cooked handles low voltage lamps in the buttons on the control panel.

I suppose after spending twenty years as a volunteer firefighter in the local neighborhood fire company, one can develop an instinct of not taking what you see at face value. We have seen enough electrical fires to understand some of the causes are not easily identified and more investigation is usually warranted. Same goes here. How are these two problems related? Well, they are not directly and that is what makes this very interesting putting the pieces of the puzzle back together.

I could simply just put in another spare CPU and turn on the power and hope for the best. The problem is these spare units cost thousands of dollars and the risk of blowing up another is just too costly. I really don't believe that at this point, the culprit has been truly identified which would warrant powering it up just yet. I also have a hard time believing this problem just showed up on its own doing this amount of damage. Could it have been a random act of destruction? Funny things can happen with electronics, right?

Heading back to the machine armed with a cart of

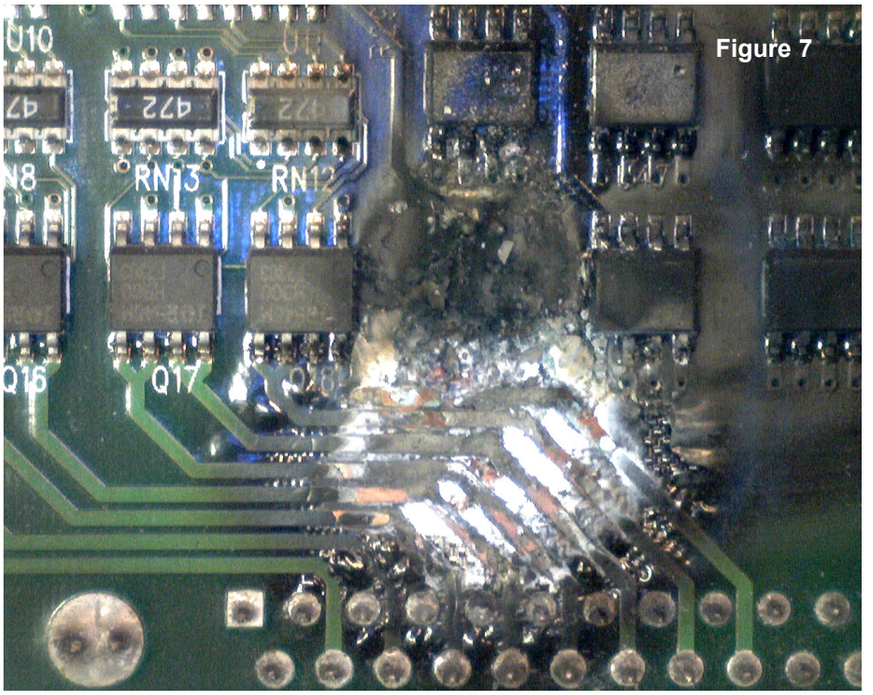

Figure 7

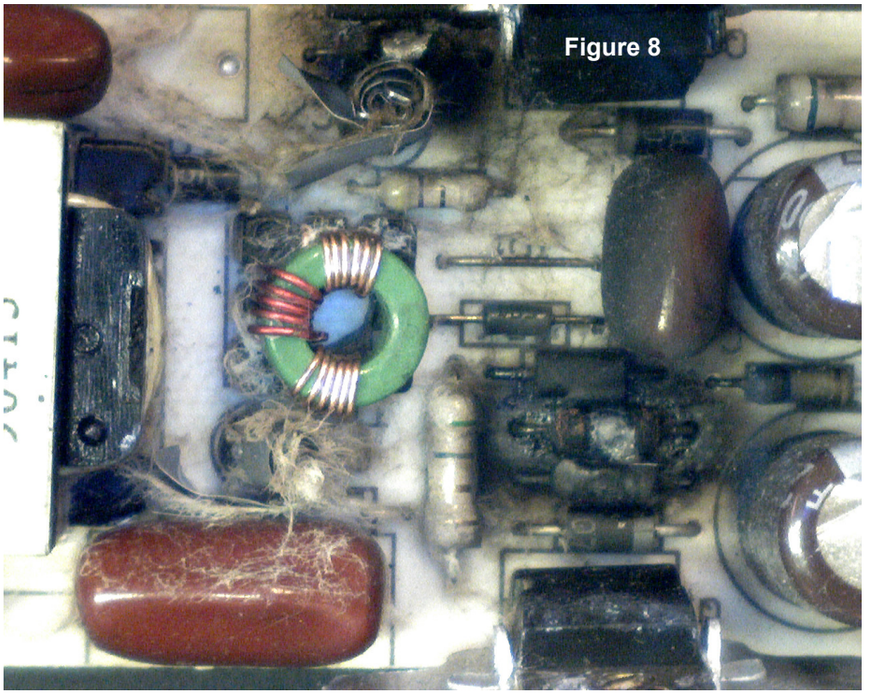
Figure 8

tools and bright lights we were determined to locate the cause. We started with the main power cord and outlet it was plugged into, then into the power distribution areas for the high and low voltages. I wanted every square inch of this cabinet looked at and every wire inspected, still believing the cause is buried in this machine somewhere and will do the same damage if it's not found. Every lamp was removed and replaced and their socket covers were taken apart. The monitor and power supply were closely examined inside and out down to the component levels for anything obvious even though they tested fine in another machine. All of the peripherals were taken back to the shop and put on our testers and thoroughly inspected, cycled and stressed out for hours. Even the communications and player tracking systems were turned upside down. The control panel was taken out and every button and LED was checked on our tester. No problems found. I'm still not happy or convinced yet. Looking into the machine there is nothing left except the wiring harness. One would believe with that amount of heat a short in the harness would be melted and left with a big melted pile of goo and wire. Nothing was showing as damaged. It's time to start cutting all the wire ties on the harness for the door and inspecting one at a time, working my way backwards into the main cabinet. It was in the area of the hinge I felt a bump in two wires that were hidden in the middle of the harness. Upon further inspection, they had a small slice in each wire going in the same direction. Went back to the shop and grabbed the BB1 wiring diagrams to see where these wires went to.

Sure enough one was the 120VAC to the door ballast and the other was the common to the control panel lamp matrix. As the wires were arranged in the harness, these two were pulled into the middle out of sight but stuck out when the door was closed and got pinched right in the hinge. The fire was from 120VAC going into the lamp return to the CPU. Repaired the wire damage and put everything back together and felt very confident to turn it on. Everything came back on and the machine has been happy ever since. We have now started to beef up the harnesses on the Bluebird machines by adding additional wire ties in the hinge area.

I would like to extend happy and healthy holiday wishes to all of the Slot Tech Magazine readers and their families around the world! See ya next year.

- Chuck Lentine
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8610 Protective Mylar sheet for IGT NexGen 6.2 inch Hitachi LCD #TX16D11VM2CAA
1400 Single output 5 volt cold cathode lamp inverter for 6.2" IGT NexGen Hitachi LCD #TX16D11VM2CAA
8570 NEW 6.2" Hitachi LCD #TX16D11VM2CAA with 4 wire touch screen for IGT NexGen
1310 Used 6.2" Hitachi LCD #TX16D11VM2CAA with attached 4 wire touch screen for IGT NexGen
9090 Single raw cold cathode lamp for 6.2 inch Hitachi LCD #SX16H005-AZA in 1st generation IGT NexGen
9030 Protective Mylar sheet for IGT 1st generation NexGen 6.2" Hitachi LCD #SX16H005-AZA
8480 Single raw cold cathode lamp for IGT game with 10" LCD monitor
8920 Single raw cold cathode lamp for 15 inch LCD monitor in IGT games
9670 Single raw cold cathode lamp for 17 inch LCD monitor in IGT games
9290 Single raw cold cathode lamp for 19 inch LCD monitor in IGT games
1150 Single raw cold cathode lamp for 20 inch LCD monitor in IGT games
1160 Single raw cold cathode lamp for 22 inch LCD monitor in IGT games

KONAMI

8700 Dual cold cathode lamp assembly & 12 volt inverter for Konami belly glass that is edge-lit with cold cathode lamps
9870 12 volt dual output cold cathode lamp inverter for Konami belly glass that is edge-lit
1260 Dual cold cathode lamp assembly for Konami edge-lit belly glass
9240 LED edge- lit panel for belly glass in Konami K2V cabinet
8670 Single RAW cold cathode lamp for Konami belly glass that is back-lit with cold cathode lamps
9780 “L” shaped cold cathode lamp assembly for Konami 7 inch bonus screen LCD
1050 Single raw cold cathode lamp for 15 inch LCD monitor in Konami games
8600 Dual cold cathode lamp assembly for Konami slot machine with 17" LCD monitor
9680 Single raw cold cathode lamp for 17 inch LCD monitor in Konami games
9070 Single raw cold cathode lamp for 19 inch LCD monitor in Konami games
1100 Single raw cold cathode lamp for 22 inch LCD monitor in Konami games
1010 7 inch AU Optronics LCD #070VW01 for Konami bonus screen
1080 Cold cathode lamp inverter for 7" AU Optronics LCD #A070VW01 in Konami bonus screen
8550 Single “U” shaped cold cathode lamp assembly for Konami 7" LCD bonus screen
8590 Single cold cathode lamp assembly for Konami 1.5 video upright denomination back-lit panel

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MULTIMEDIA

9700 Single raw cold cathode lamp for 15 inch LCD monitor in Multimedia games
9710 Single raw cold cathode lamp for 17 inch LCD monitor in Multimedia games
9720 Single raw cold cathode lamp for 19 inch LCD monitor in Multimedia games
9850 Single raw cold cathode lamp for 23 inch LCD monitor in Multi Media games

SPIELO

9740 Single raw cold cathode lamp for 15 inch LCD monitor in Spielo games
9750 Single raw cold cathode lamp for 17 inch LCD monitor in Spielo games
9760 Single raw cold cathode lamp for 19 inch LCD monitor in Spielo games

WMS

8490 NEW 6.4" LG LCD #LB064V02 (TD)(01) for WMS Bluebird bonus screen **(does NOT come with touch screen)**
8470 Single cold cathode lamp assembly for 6.4" LG LCD #LB064V02 (TD)(01) in WMS Bluebird bonus screen
8510 Triple cold cathode lamp assembly for WMS Bluebird 17" LCD monitor
8520 Triple cold cathode lamp assembly for WMS Bluebird 18" LCD monitor
9300 Single raw cold cathode lamp for 19 inch LCD monitor in WMS games
9830 Single raw cold cathode lamp for 22 inch LCD monitor in WMS games

Lamp Testers

9220 Bench top cold cathode lamp tester **(includes A/C adapter & power strip with ON/OFF switch)**
9840 Bench top dual ccfl inverter & lamp tester

Miscellaneous

1280 Raw cold cathode lamp 2.0mm X 250mm
1320 Single raw cold cathode lamp 2.4mm X 245mm
1420 Raw cold cathode lamp 2.6mm X 294mm
1290 Raw cold cathode lamp 2.0mm X 300mm
9910 Raw cold cathode lamp 2.0mm X 310mm
9970 Raw cold cathode lamp 2.6mm X 316mm
1190 Single raw cold cathode lamp 2.6mm X 342mm
8420 Raw cold cathode lamp, color white, size 2.4mm x 381mm
1330 Single raw cold cathode lamp 2.6mm X 385mm
1340 Raw cold cathode lamp, color white, size 2.6mm x 390mm
8400 Raw cold cathode lamp, color white, size 2.4mm x 394mm
1350 Single raw cold cathode lamp 2.6mm X 420mm
1020 Single raw cold cathode lamp, **purple color,** 4.0mm X 580mmRaw
1070 Single raw cold cathode lamp for Wells Gardner 6.4" LCD
8450 Single raw cold cathode lamp for 15" LCD in Touchtunes Maestro Monitor
9920 Single raw cold cathode lamp for 15 inch LCD in Touchtunes Genesis General Touch monitor
9960 Single raw cold cathode lamp for 17 inch ELO LCD
8440 Single raw cold cathode lamp for 19" LCD in MackVision LCD Monitor
1210 Silicone end cap for 2.6mm cold cathode lamp
1220 Single “O” ring for 2.6mm cold cathode lamp
1230 Figure 8 “O” ring for 2.6mm cold cathode lamp
9980 24v single output ccfl inverter for Aristocrat Viridian belly light
1250 Sharp 7" LCD #LQ070T3AG02
1380 One set of touch screen tape for 6.2 inch LCD Includes 2 long pieces and 2 short pieces of tape
8620 24 volt single output cold cathode lamp Piezo inverter

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Quick & Simple Repairs #69

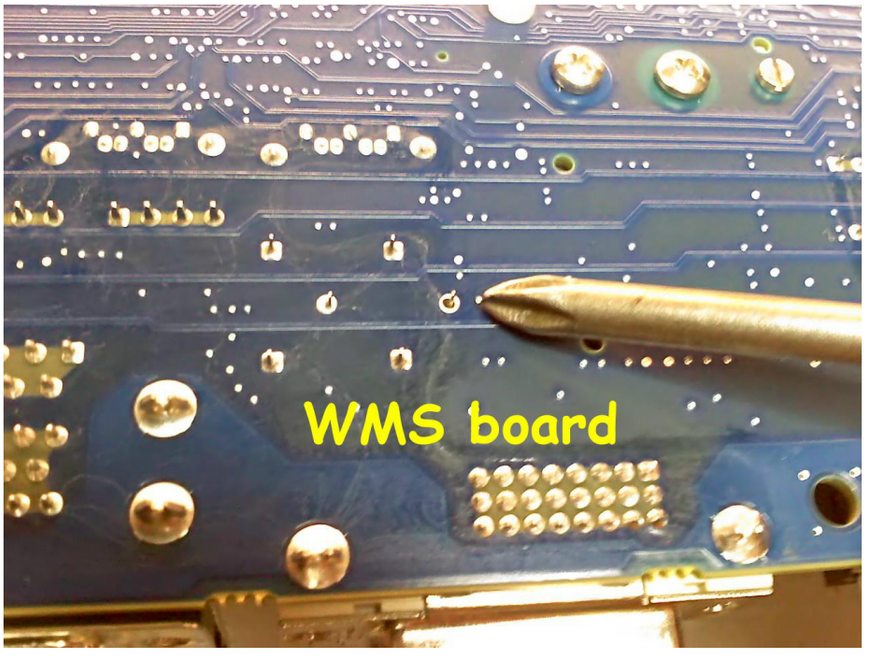
By Pat Porath

WMS Bluebird 2 Upgrade NV RAM Battery Low Error

Recently while up grading some Blue bird games to Blue-bird 2s, one of the games had a "NV RAM battery low error." How could the battery be low? It is a brand new CPU board fresh out of a sealed package. We had spares so it was no big deal. A co-worker was curious as to why the new board would have such an error. The individual removed it from the frame and started to look it over for any obvious reasons to why it didn't work. It wasn't long and the problem was found. Somehow a solder joint was missed at the factory that made the board. Was it human error or a robot error? LOL As pictured, the solder joint didn't even have any solder in it. On the front side of the board it was one of the battery terminals. Now it made some sense. One of the battery terminals didn't get soldered on the board, when the board was installed in a game and had a "battery error." One touch with a hot iron and some solder and the board was fine.

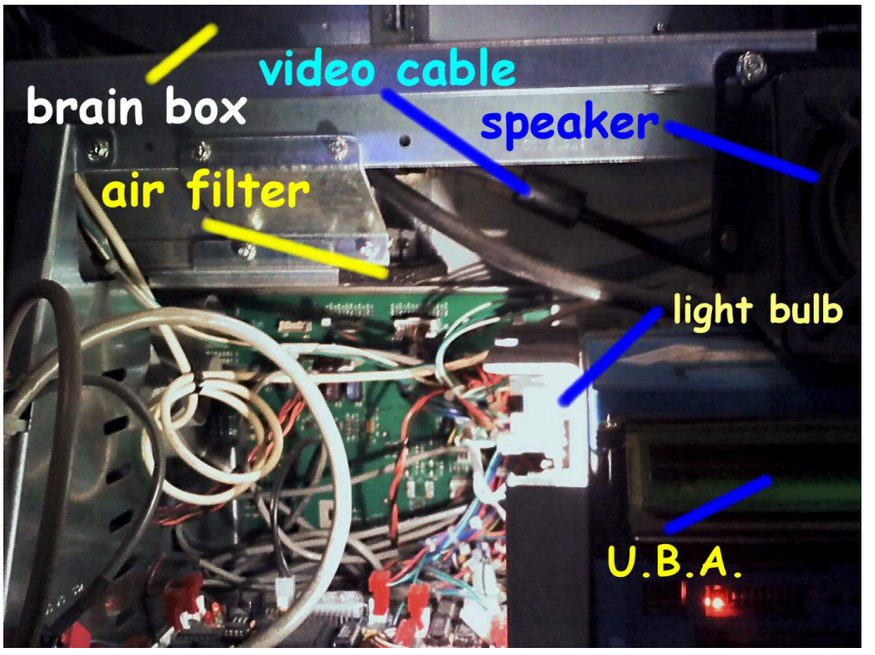
IGT Trimline Rebooting Itself
Plus a Reminder About Fans in General

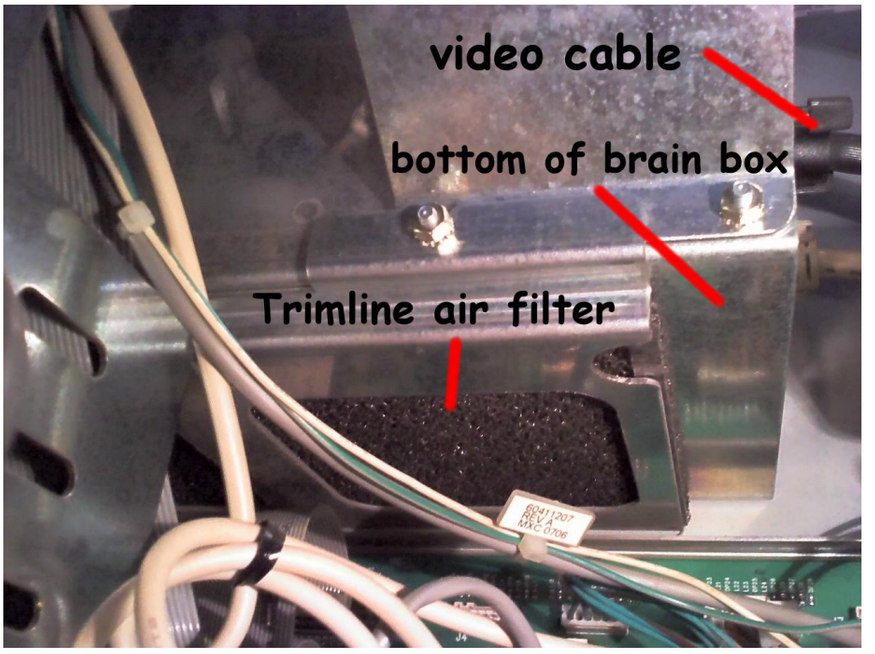
One of the first things I look at if a Trimline is rebooting itself, is if the "brain box" is seated correctly. If it is, the next item I suspect is a bad cooling fan which is located on the video card. In this case, the fan was good, so now what? A co-worker gave me the idea to check out the "air filter" a.k.a. "dust filter" on the game. After I used compressed air to blow the dust out of the "brain box" (we are fortunate enough to go outdoors to let the dust fly out there) I removed the filter. Wow, it was caked with dust bunnies. After the filter was cleaned and after the "brain box" was put back in, the game was turned back on. It booted up awesome and did not reboot itself for the remainder of the shift and the following day, no com-



plaints at all. I would say the problem was a clogged air filter. Since it had a thick amount of dust on it, the game didn't have proper air flow. When a game doesn't have good air flow with the cooling fans, filter, and vents, guess what happens? The game may overheat. What are two major things that causes problems with games?

Answer: heat and dust. In this game, dust had clogged the air filter which restricted the air flow around the cooling fan in the brain box and caused excessive heat. As I seen in Atronic e-motion games, there is a cooling fan located under the button panel (on an upright game) that helps cool the two LCD monitors. If the fan is clogged with





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dust or if the fan speed is slow, it can't cool the LCDs. This caused them to overheat and go black. I could go on and on. WMS Bluebird power supplies in upright games can get clogged with dust and cause premature failure. If the unit and cooling fan area have a ton of dust in it, the fan can't properly do the job, then the power supply will heat up and fail. If cooling fans aren't working properly in a Bally Cinevision game, the LCD may fail. If I remember correctly, the original Cinevisions didn't have a cooling fan in the top area and the LCD got quite hot. The games were upgraded with a fan, now they run much cooler. I've also seen 5/12v and 24v power supply fans not working or slow fan speeds on both Cinevision and Reel Vision power supplies. Now days, cooling fans are VERY important in slot machines.

Bally EVO Rebooting Itself

I received a call from a slot attendant that a Bally EVO was rebooting itself and wouldn't stay running. It would get to the "idle mode" where the game screen is and start booting up again. When I opened the door, I could smell something hot. The smell was similar to the smell of an Atronic e-motion game when both of the cooling fans aren't working on the backplane board and it starts "cooking." One of my first thoughts was to simply replace the "brain box" (the box located under the monitor area that includes the CD drive). Why not check into the problem further? I removed the "brain box" and took a look at the cooling fan. It appeared to be OK, there wasn't a lot of resistance while spinning it by hand. After putting it back into the game and turning the power back on, the CD drive access door was opened to take a look at the fan while power was applied. Sure enough it was spinning too slowly and the area around the fan was quite hot. The "brain box" was removed and taken to the shop to replace the fan. Hopefully the processor that was under it hadn't fried. The CD drive and bracket had to be removed to have access to the 12 volt fan. A spare was installed and it was time to power up the game. What the heck? The fan wasn't spinning! It was a new replacement, what was the problem? The "brain box" was removed once again to turn the connector around on the fan to see what happens. (Switched polarity.) The game was turned on once again and this time the fan was spinning like it was supposed to. Yes the fan connector was "keyed" so it would only go on one way, but it didn't work, so I had to flip it around. So far so good, the game is still online without rebooting itself. Luckily nothing got fried from getting hot.

Oasis Sentinel Error

I received a call that a few banks of games were down. When I arrived, I noticed the Oasis displays were randomly alternating from upper case letters to lower case. This told me we definitely had a communication problem somewhere. One way to start troubleshooting is to locate the number one (first) game in the bank. Next, remove the COM OUT cable on the Sentinel and put on a "terminator" (100 ohm resistor connected on the two pin connector). If the green COM light doesn't flash very fast or not flash at all, it could be a cable problem to the bank or maybe a DPU problem such as bad COM chips. In this specific case, once the "term resistor" was put on, the COM light flashed quickly. This told me that there was a very good chance of a problem further down the line. I moved the "term resistor" to the end game in the row with the same results. Next, I went to the last bank of games on the problem DPU and found an odd looking Sentinel display. It read something like "POINT SYSTEM NOT VALID." What was this? The Sentinel was rebooted which did not help the problem. How about a partial RAM clear of the Sentinel? Power was removed and the RAM chip removed. Power was applied again and the chip was put

back in (while power on, install chip). (Really? Power-on?-ed.) Now the display read "PLEASE INSERT PLAYER CARD" in capital letters which meant that there was a very good chance communication has been established. On the Sentinel side, the green COM light was flashing rapidly and looked very good. I looked at the other Oasis displays in the bank of games and they all seemed to stay in capital letters too. So far so good, all I needed now was the "problem Sentinel display" to read "WELCOME TO THE ISLAND RESORT AND CASINO." Within a few minutes, it was working properly. To me it looked like a corrupt Sentinel was taking down the whole bank of games.

- Pat Porath
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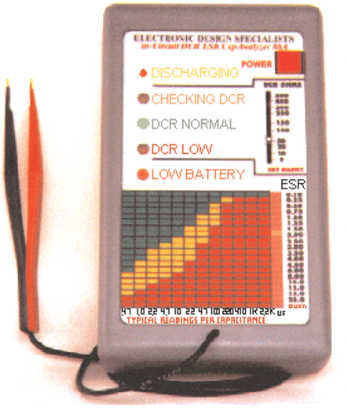

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IGT AVP Video Cards

By Craig Nelson

Disclaimer: Due to the different versions of the AVP platform there may be slight variations from platform to platform. The main ones covered here are: Trimline, G20, and G22 Slant.

If you have IGT machines on your floor that utilize the AVP 2.0 or 2.5 Brain Box, you most likely have encountered some form of video issues. The most common symptoms are a blanks screen(s), grainy video, horizontal or vertical lines, or even continuously rebooting (there are others but these are the most common). It must be noted that a continuously rebooting machine could also have a bad power supply or another defective part so do not approach a rebooting machine with the intent to replace the video card; use proper troubleshooting skills to reach that specific conclusion.

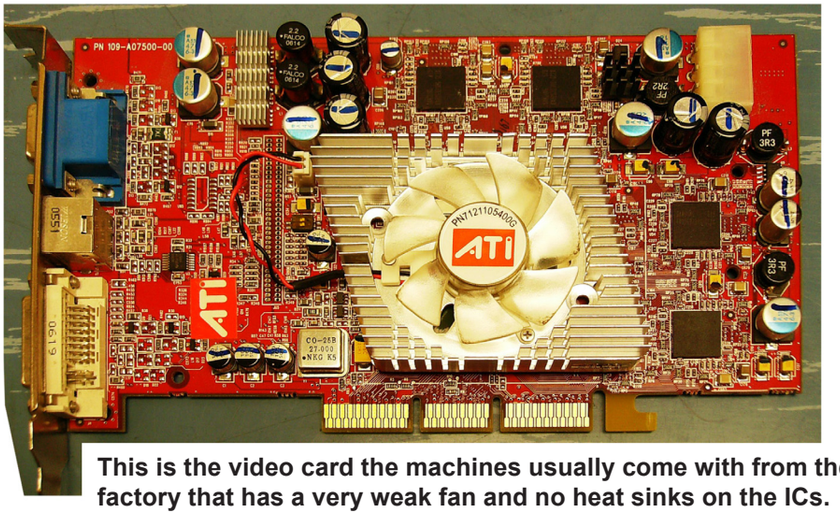
Video Card Replacement: Time/Difficulty: Quick/ Simple

The first thing you will need to have is a replacement video card; Suzo-Happ sells them for the cheapest that we can find currently. The unit pictured in figure 2 is a direct replacement from Suzo-Happ.

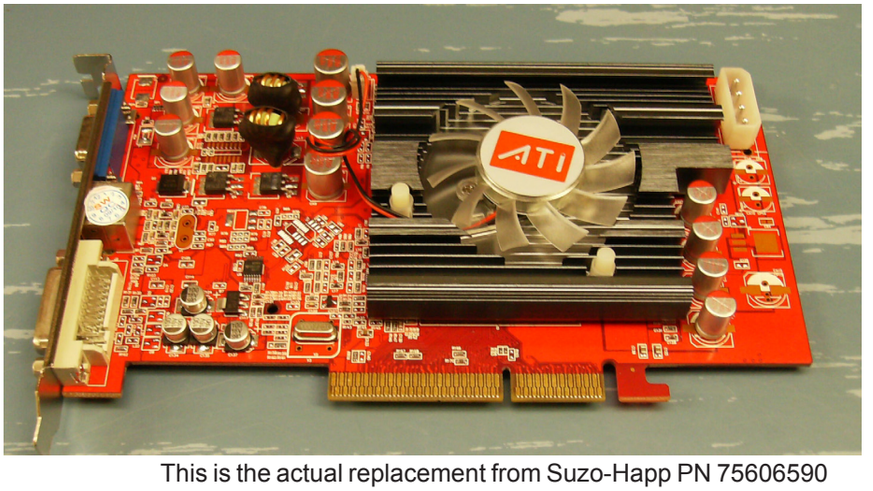
The revisions are: better/ more heat sink area, as well as a ball bearing fan for increased longevity of the card.

Another more costly option is an exchange directly through IGT for around $200 each. Contact the parts department for your jurisdiction as pricing and

Cont. on page 22



This is the video card the machines usually come with from the factory that has a very weak fan and no heat sinks on the ICs.



This is the actual replacement from Suzo-Happ PN 75606590

IGT AVP VIDEO CARDS

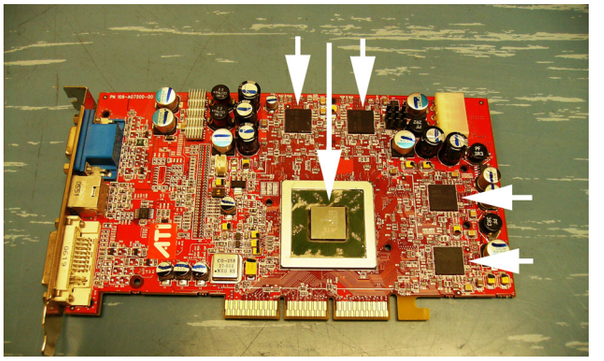
Video Card Fan/Heat Sink Upgrade:

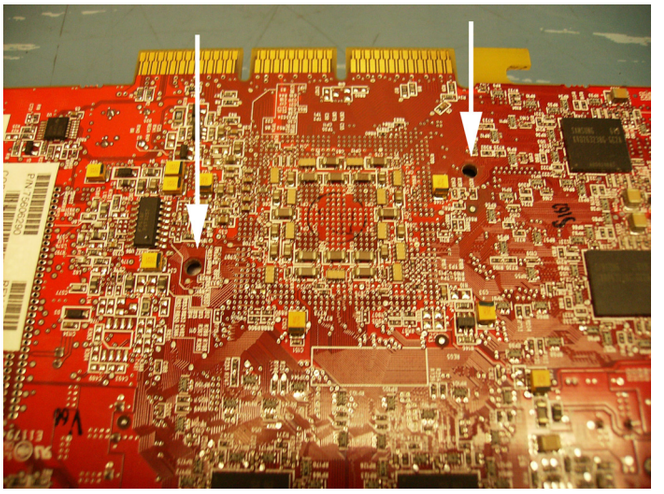
Time/Difficulty: 10 min/Moderate

This is the actual replacement from Suzo-Happ PN 80-0006-61

Procedure:

1. Remove the existing fan carefully, **SEE NOTE BELOW**
2. Put some thermal compound on the five sections indicated in the photo.
3. Install the new parts supplied in the kit which will be a fan, heat sinks, and a harness if applicable.
4. See IGT CN #4594 for new part # requirements.



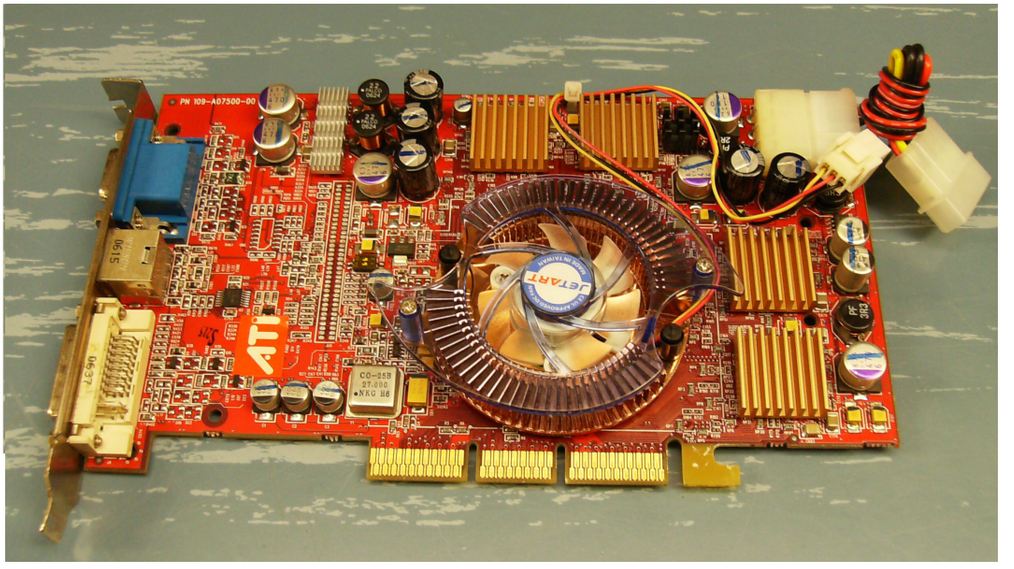


NOTE:

When removing the existing fan you need to clip the bottom of the posts on the back of the board. It is very important that you do not damage any circuits or components.

Pushing the posts from the top so they extend out further and then clipping them is the method that has proven to work the best.

When you are done with the upgrade, you should have a video card in front of you that looks like this:



availability might differ from place to place.

The third and most costly option would be to just buy a new replacement video card from IGT, which at the moment is over $600. Again, each property might have different pricing and availability.

To replace it, you will just need to remove the Brain Box from the game, remove the old video card and replace it with the new one. Some harness adjustment might be necessary depending on the style of your Brain Box.

The video card that you removed might be a candidate for repair. If it is the old style with an old style fan that has no heat sinks, you could try the upgrade procedure on page 22. If it already has the upgrade, then you could try a replacement fan. If it has the new style board as pictured, there is not an upgrade at this time.

We have not found anything (component levelwise) on these boards that has failed consistently and so more, in-depth bench repair has not been consistently successful. There have been a few boards that have had bad capacitors but the defective components haven't been directly related to their failures.

Tech Note:
The new style of fans on both the replacement video card and the upgrade kit are a heavier duty, ball bearing type fan that has proven to last longer than the previous version and the heat sinks will obviously dissipate heat from the ICs more effectively . It is suggested (but not required) to upgrade the video card(s) with this kit any time a conversion or similar work is done to each Brain Box. Even if the video card has been upgraded already, it is suggested that the fan be replaced. The upgrade kit is approximately $20 versus an $80-$600 video card or even a new Brain Box assembly if the video card gets too hot and takes out the mother board.

Another option (although not realistic for most properties) is to upgrade to an AVP 3.0 Brain Box. This platform has an onboard video generator which alleviates the problems that go with the traditional 'card' type video generator. Up until now, no adverse affects have been noticed with this type of Brain Box but these are fairly new so it may be too early to tell.

Preventative maintenance will be your best ally when it comes maintaining the AVP Brain Boxes. Due to the amount of air flow that the cabinets produce, they get full of debris very quickly. If they are left in that state too long, the fan(s) will become clogged with debris or just stop working all together. Blowing out the machine and the Brain Box at a 1-3 month interval will lower the risk of heat derived issues with these cabinets dramatically. There is also an IGT customer notification that is supposed to relieve some of the heat derived issues from the Brain Boxes. It is CN #4771B.

- Craig Nelson
cnelson@slot-techs.com

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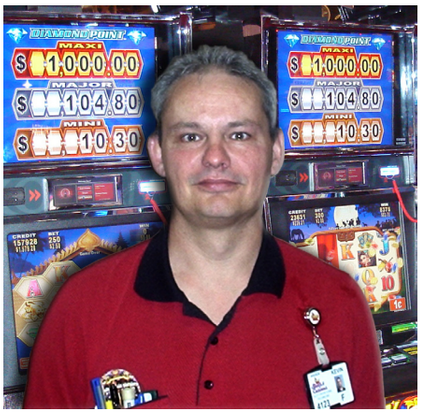

Troubleshooting Games

By Kevin Noble

Aristocrat
Machine Rebooting

There was an Aristocrat MKV game that kept rebooting. The CPU was changed out to see if the problem was there or not. The original problem stopped once the CPU was replaced but another problem reared its ugly head once the button deck buttons were depressed. The game started rebooting itself or sometimes it would blank out. The power supply was replaced but that did not solve the problem. Upon further inspection, all the wiring was checked for any bare wires or pinched wiring that could have been causing the problem which they could not find. The next option was to start eliminating parts and pieces to see what was causing the game to mysterious reboot after a button was depressed. The I/O board was changed and then the CPU since we already had the seals broken but this did not solve the problem. That last thing that they were facing was the motherboard when they noticed that the harness for the button deck was barely seated on the motherboard. When it was reseated correctly all the problems went away.

IGT S2000
2nd Amber Light on CPU Flashing

During a GME 1 & GME 2 upgrade project, I noticed that when I upgraded the GME EPROMS the 4th (or second Amber LED on the CPU) LED would blink. I thought this was odd, I had never seen this sign before. I decided to remove the CPU board and start the RAM clear procedure again. This

time, the game allowed me to clear the RAM and key chip the game. Another unexpected sign popped up again when the distinct warning sound IGT makes when you are trying to do a RAM clear was very faint. You could barely hear the noise. The message on the display asked me to turn the reset key on the side of the game. I inserted my key and turned the key. Nothing happened. I removed the third reel, disconnected the key switch connectors and jumped them together and still nothing happened. Having the choice of trying a new set of GME EPROMS and reseating the EPROMS already inserted on the CPU I, decided to reseat the chips on the board. I started the RAM clear procedure once again when message to turn the reset key popped up on the display. The game let out this loud familiar annoying sound like it is supposed to do. I next inserted the key chip, watched the LED indicator lights (which were normal), reinserted the BASE EPROM and completed resetting the game and configuring the options.

IGT S2000
Amber Lights Missing during Re-key

In the same chip change project, another problem happened involving the indicator lights on the CPU. The amber lights that are supposed to come on for a few seconds would not when I completed a RAM clear and inserted the Key chip. I thought that I was NOT seeing things I decided to re-clear the game because I could not recall seeing the amber lights during the key chip operation. After re-clearing the game and inserting the key chip I confirmed that I was not seeing things and the amber lights were missing during this process. I replaced the GME EPROMS to start eliminating what could be causing this problem. I decided to start at step one again and re-clear the game but paid close attention to the RAM clear amber lights on the CPU to verify that the lights are working. Once verifying the amber lights were indeed working, I inserted the Key chip and the lights were missing once again, but this time I did notice that the game displayed NETPLEX display was still waiting to be configured. I also sensed that this process was past the normal amount of time associated in this process. Usually when you power down an IGT S2000 and power back up you get the exact same message when the power supply behind the reels is bad. I decided to give it a shot and change out the power supply to see if the problem went away. I changed out the power supply, started the RAM clear process again (this time paying more attention to all the sights and sounds) and when I arrived at the key chip procedure, the small amber light decided to make an appearance, which now allowed me to continue on with the process and complete the optioning and testing of the machine.

IGT S2000
Broken Pin in the Legacy Board

Well this one all started when a pin broke off the base EPROM and wedge itself in the socket so we could not get it out. A new Base EPROM was ordered and the Legacy board replaced. When the new Base EPROM arrived you would of thought that it would be a slam dunk chip replacement verify options and away you go procedure, but not in my world. I decide to bring the set of clear chips (just in case) the newly arrived BASE EPROM and headed out to the game. I decide to replace the BASE EPROM to take the easiest option and much to my surprise, the CPU LED indicator lights were pretending it was Christmas the way they were blinking on and off. No problem as I will just re-clear the board and start from scratch. I swapped out the BASE EPROM with the clear, powered up the game and surprise! The problem still existed. I decide to begin the process again but re-inserting the BASE to get a better seat in the socket but that did not work either. Well, now it was time to pull out the big guns and get the CPU and, just in case, another new Legacy board. Arriving at the game for the second time, it was time to flip the coin again: heads I replace the board, tails I replace the legacy board. Opting to pick the easiest route again, I decide to remove the legacy board with all the EPROMs and plop it right on the new CPU board with the Clear chip already mounted. I fired up that bad boy and to my surprise again, it worked this time. I was able to key chip the game, set the options and bill and voucher test it for the next day when the gaming commission was scheduled.

Aristocrat MKV
Blanking Out

On the backside of this one peculiar machine that I was working on, I heard a small squeaky voice shriek out "what are you doing? My game just went blank." I told her that I was just checking out my game when her game went blank after I closed the main door. I had to go back into my original game when and when I powered down my game her game at the exact same moment lost power and rebooted itself again. Now I was thinking that is was kind of odd that when I powered down she also lost power and thought to myself some how I have a power problem. I checked all the power connections to my game at the same time asking the attendant about the status of her game. Once verifying there was nothing wrong on my end, I closed the main door again and she yelled at me again. I made my way over to the other side of bank and watched her game come back online. I started smacking the game, simulating me slamming the door on the other side and noticed that the game did blank out. I just eliminated the game behind that I was working on as the problem. I waited until the game rebooted itself and observed any messages that came on screen. I did notice watchdog reset being displayed but I figured that it was because the game losing power. I banged on the machine again and it went down again but I did notice that the Mikohn display did not go out so I knew it wasn't the power coming in from the floor.

I opened the game and started checking for any loose power cables going to the power supply and reseating any connection that might be involved. I next banged on the cabinet again and the game lost power again. I next wanted to reseat the CPU and I/O. I tested to see if the boards were seated properly to the motherboard. They felt secure, so I just reseated both boards on the game and tried banging on the game again but I could not get the problem to come back. Maybe it just needed a good connection on the motherboard.

WMS Video
No Power to the CPU/
Motherboard

After the glass was swapped out for this theme conversion, I powered on the game and noticed no lights on the motherboard or CPU were on. However, the machine had interior lights and also the SMIB display was scrolling so I knew that there was power coming in from the floor. I next tried to swap the power supply underneath the cashbox but no change. Deciding to go back to square one, Reg and I decide to check into the topper portion of the conversion and noticed that when you tapped on the topper assembly, the power would flicker on the boards. We decided to check a little further into the topper and found that the braided ground strap when wiggled would take out the power on the CPU and motherboard. Upon further inspection we noticed that the ground strap was indeed touching the printed circuit board that drives the lights in the topper. Once the ground strap was re-routed away from the PCB, the game allowed me to continue on with the RAM clear procedure and get the game up to the public after seals and final inspections were done.

IGT-I GAME
Meter Disconnected Error

When we were called to this machine for the meter disconnected error we thought it would be a slam dunk repair by swapping door I/O cards in the game. We used the cards from the game beside it and found that we blew those cards as well. We figured now that we had a wiring harness problem so we decide to check the MEAL book to see who was in the game last and what they did so we can have an idea where to look. My buddy suggested looking on the CPU for any damage because he had dealt with this issue many times before. We removed the legacy board that was mounted on top of the CPU and noticed on U74 there was a fairly decent sized burned mark on the chip with a hole clean right through the chip. He stated that this was very common on these types of games using that type of CPU boards. Once the CPU was swapped out and the I/O cards replaced, the game went back in service.

- Kevin Noble
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SCHEMATICS, etc.
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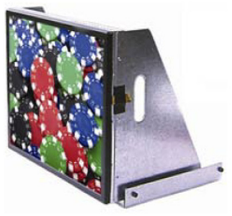

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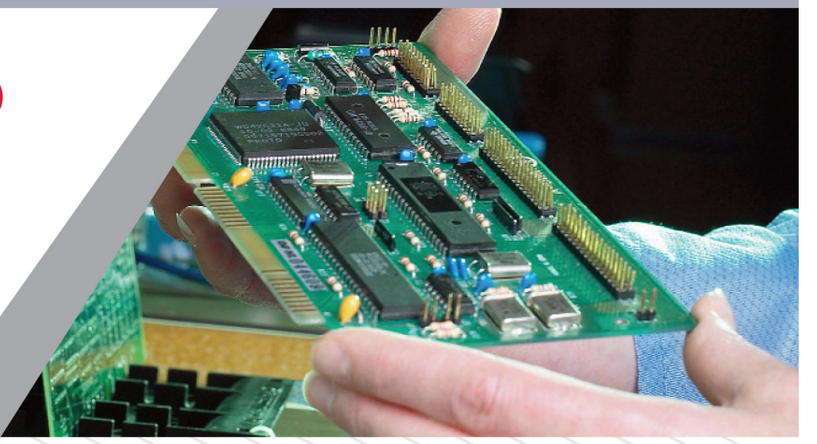

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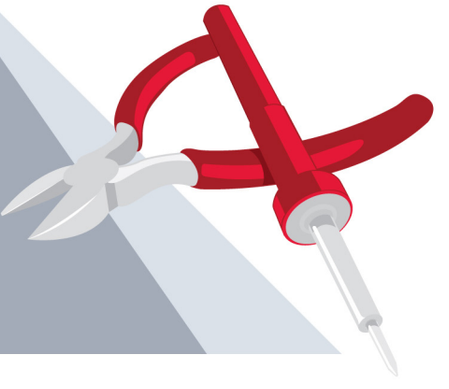

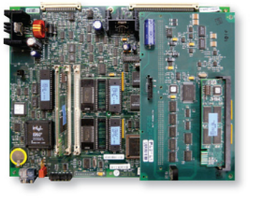

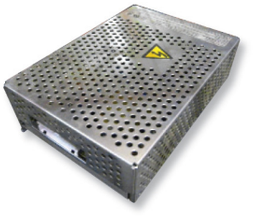

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