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January 2009

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Randy Fromm

Dear Friends,

I spent a couple of weeks in December at the Inn of the Mountain Gods in New Mexico. I worked with a team of technical instructors to present a two-week course in slot machine repair to a mixed group of slot techs and gaming regulators.

Part of the class was a hands-on repair lab. Although most repairs are routine, I was reminded again that there are still plenty of opportunities for wonderment and surprise as a casino technician. What happens when the slot technician's best friend, Swaptronics, fails completely and, instead of leading you to the cause of the problem, actually points you away from the fault? That's what happened to us during the training. I just had to write it up, not because it's an unusual failure (it's not. In fact, it's really pretty common. You'll likely know exactly what I'm talking about as soon as you begin reading the article) but because it points to a genu-

ine failure of a trusted troubleshooting technique. If I hadn't seen it myself, I wouldn't believe it to be possible but I did and it is. Read about it starting on page six.

Also in this month's issue, both Pat Porath and Kevin Noble are back with some more items from their own repair logs. Included as well is a report from Malta and James Borg. James always has an interesting slant on things and I enjoy reading his reports a great deal. Read about "Doris" starting on page 21.

Finally, TechFest 19 has been planned for May 12-14 2009. As usual, it's at Mystic Lake Casino Hotel at Prior Lake, close to Minneapolis, Minnesota. You can save \$100 on the tuition with an "Earlybird Discount" that is available online at slot-techs.com.

That's all for this month. Happy new year. I'll see you at the casino.

Randy Fromm - Publisher

Slot Tech Magazine

Randy Fromm's Slot Tech Magazine

Editor

Randy Fromm

Technical Writers

Ted Befus, Kevin Noble,
Herschel W. Peeler, Pat
Porath, Vic Fortenbach,
James Borg

International Contributor

Martin Dempsey

Slot Tech Magazine is published
monthly by
Slot Tech Magazine
1944 Falmouth Dr.
El Cajon, CA 92020-2827
tel.619.593.6131 fax.619.593.6132
e-mail editor@slot-techs.com
Visit the website at slot-techs.com

SUBSCRIPTIONS

Domestic (North America)

1 year - \$60.00

2 years - \$120.00

International

1 year - \$120.00

2 years - \$240.00

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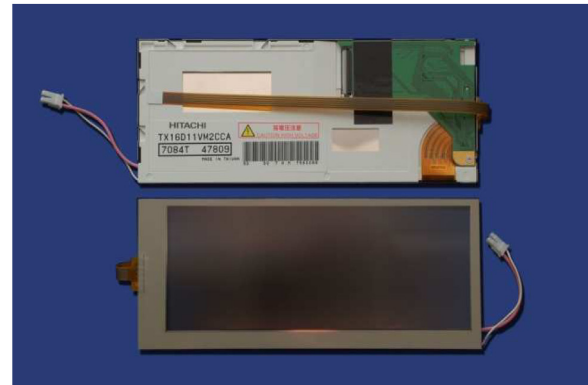
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Logic Failure

**Swaptronics fails to prove the source of the problem
Experience wins out over all**

By Randy Fromm

Although most repairs are routine, there are still plenty of opportunities for wonderment and surprise as a casino technician. I want to tell you a little tale and, at the end of it, if you want to stand and say "No way, Randy! You're a dirty rotten liar!" I will totally understand your point of view. If I hadn't witnessed it myself, I wouldn't have believed it. Here is the story:

As you will read in this month's issue, I spent a couple of weeks on a training mission at the Inn of the Mountain Gods in Mescalero, New Mexico. It's a beautiful property, nestled by the shore of a small lake, a mile and a half high in the mountains of Eastern New Mexico. We had a half-dozen machines in the training room that we were using for demonstration purposes as well as for our "hands-on" training sessions, during which we would install various problems for the students to locate and repair.

As luck would have it, one of the IGT S2000s developed a fault on its own. The error message was displayed on the machine's VFD. It read something like "Netplex error to displays." I wish I had grabbed a snapshot of the display as I am writing this some two weeks after the event and I can't recall the exact wording.

The machine wouldn't get past the error and was totally inoperative. This was a great opportunity for my first guest instructor, Pat Porath, to dazzle us with his troubleshooting skills and show us how to diagnose the problem.

As he stood in front of the class,

he carefully explained that visual inspection was very important and pointed to all the connectors and sub-assemblies that needed to be checked. He cautioned against "hot plugging" anything. He re-seated anything that had anything to do with anything but that wasn't the problem.

Then, out of the blue he announced "It's a power supply problem."

I asked him how he knew that, since he hadn't whipped out a meter to check the output voltage. He said he'd seen it before. His response didn't surprise me. His 14 years of experience as a slot tech was the reason he was there to begin with!

Enter Swaptronics! The power supply was pulled and taken out to the gaming floor where it was swapped with an identical unit in an identical (working) slot machine. The machine on the slot floor came on perfectly. Naturally, the swapped power supply was left in place in the working machine. If it's working, there is no reason to swap them back.

The power supply from the working slot machine on the slot floor was installed into the IGT S2000 in the training room. The error remained as before.

OK, so logically thinking, what does that tell you about the condition of power supply? Is the power supply good or is it bad? I'll wait . . .

Logic tells you that whatever the problem is with this slot ma-

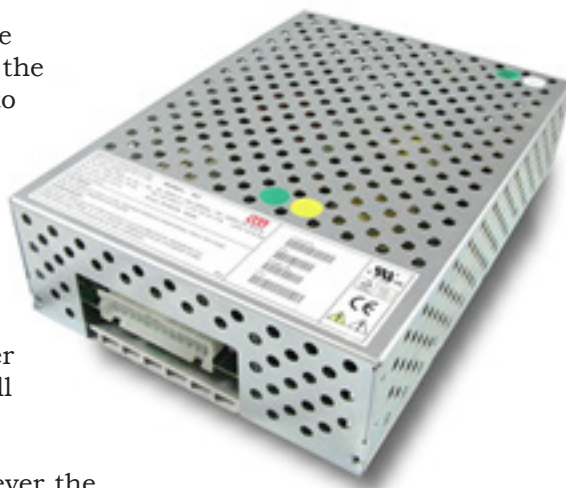
chine, the power supply can't possibly be the problem. We swapped power supplies but the problem remained in the machine and did not travel with the power supply. I think a five year old is capable of that sort of deductive reasoning.

So, Pat Porath, Mr. Big Time Experienced Slot Tech, what do you think is the problem now?

"It's the power supply," Pat said.

Now, on one hand, I'm kind of relaxed because I know that it's not *my* head on the chopping block here. I am not the one standing in front of a class of slot techs, troubleshooting a slot machine. That's why I asked Pat to teach this part of the class. He is the one with real floor experience, not I.

On the other hand, I'm sort of wondering if poor Mr. Porath has been affected by the thin atmosphere at 7500 feet above sea level because we just *proved* that the power supply couldn't possibly be the source of the problem, didn't we?



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"Is the S2000 on the floor still working properly?" I enquired. It had been cooking inside the machine on the slot floor for about ten minutes at this point. Maybe the failure took a while to show up (although it was an instantaneous failure in the S2000 in the training room).

It was working properly. Scratch the power supply as the cause.

I was starting to get a little nervous. How's it going to look if one of Slot Tech Magazine's crack team of technical instructors fails to isolate and repair a live fault?

While I was paralyzed by premonitions of being run out of town for failing to find and fix the fault, IOTMG's Lead Tech Gary Smith was galvanized into action by Pat's firm conviction that his diagnoses was correct and went to obtain another power supply. This time, he returned with a power supply taken not from the floor but from the parts room. It was a new power supply.

You know where this is going, don't you? You guessed it. With the new power supply installed, the machine fired up perfectly. What the heck?

We opened the "working" power supply (the one that had been taken from the working machine on the floor) and sure enough, there was a slew of bad output filter capacitors (and others). They were the usual culprits, visibly bad with their swollen tops.

This was not (thank goodness) a mystery repair in that we could see what was really wrong with the power supply. We weren't left with some sort of weird speculation like "bad connector" or "poorly crimped wire" or other hoodoo.

We were, however, left with the question "How is this possible?" Was the machine in the training

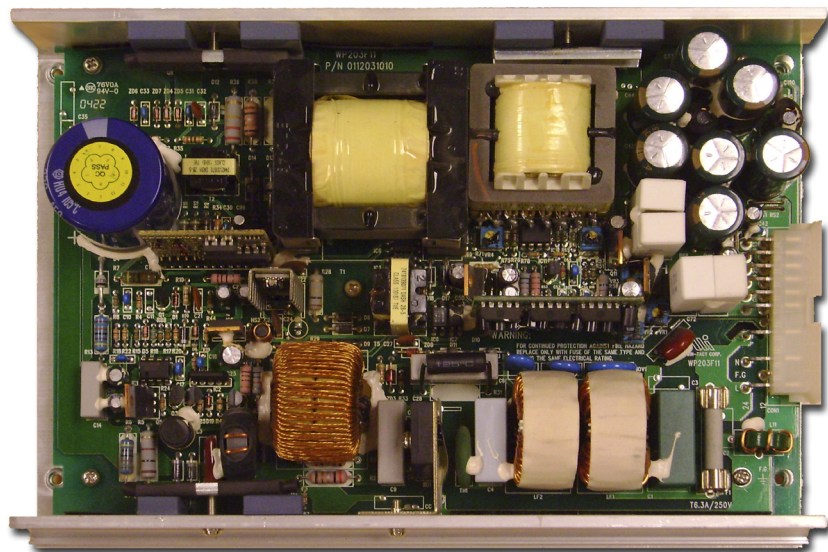
room somehow more "sensitive" to the ripple or other output problems caused by the bad capacitors than was the machine on the floor? Was the working machine on the slot floor some sort of Super S2000, impervious to the dodgy power supply?

If you're looking for an answer in this column, you're going to be disappointed. I don't have one. I have a pretty open mind when it comes to what's "possible" in the wacky world of slot machine repair but this scenario wasn't in the playbook, not by a long shot.

I suppose there are a couple of lessons here. One is that when you see an error like "Netplex connection to displays down" on the VFD of an S2000, you may have bad capacitors in the power supply. The second is that Swaptronics can lead you down a dark path from which you may never return if you trust it 100%.

Oh yeah, I guess there's a third lesson here as well: Always trust Pat Porath.

- STM



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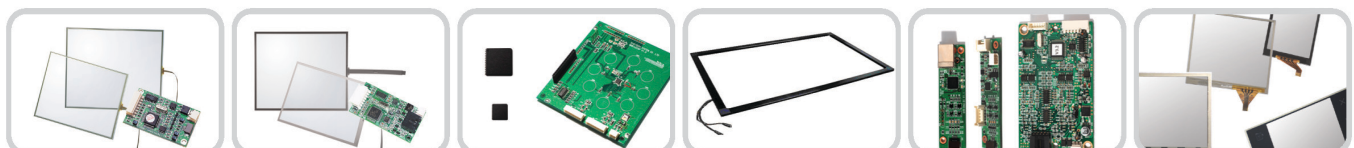
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Slot Tech Training at: The Inn of the Mountain Gods

I am sometimes invited to some very nice properties for slot tech training. In December 2008, I was invited to spend a couple of weeks at the Inn of the Mountain Gods in New Mexico. I worked with a team of technical instructors to present a two-week course in slot machine repair to a mixed group of novice slot techs (newly hired with no experience) experienced slot techs with a couple of years under their belts and even a small handful of gaming regulators. There was a lot to learn in two weeks, that's for sure.

If you are interested in slot tech training for your property, contact Slot Tech Magazine at 619.593.6131 or visit the website at slot-techs.com.



Hands-On! Pat Porath assists one of the class teams with an Atronic e-motion during a hands-on repair lab.



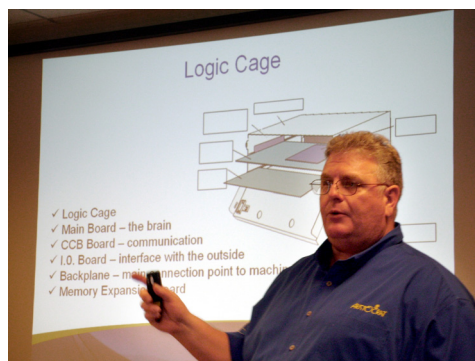
Atronic's Chris Sweeney held a two-part class. Part one was held in the classroom. After lunch, we reconvened on the gaming floor for some actual e-motion repairs.



What a luxury! An entire day with JCM's Jack Geller. Jack covered both WBA and UBA units.



David Oldham (Suzo-Happ) held a day of training on Futurelogic printers and MEI bill validators.



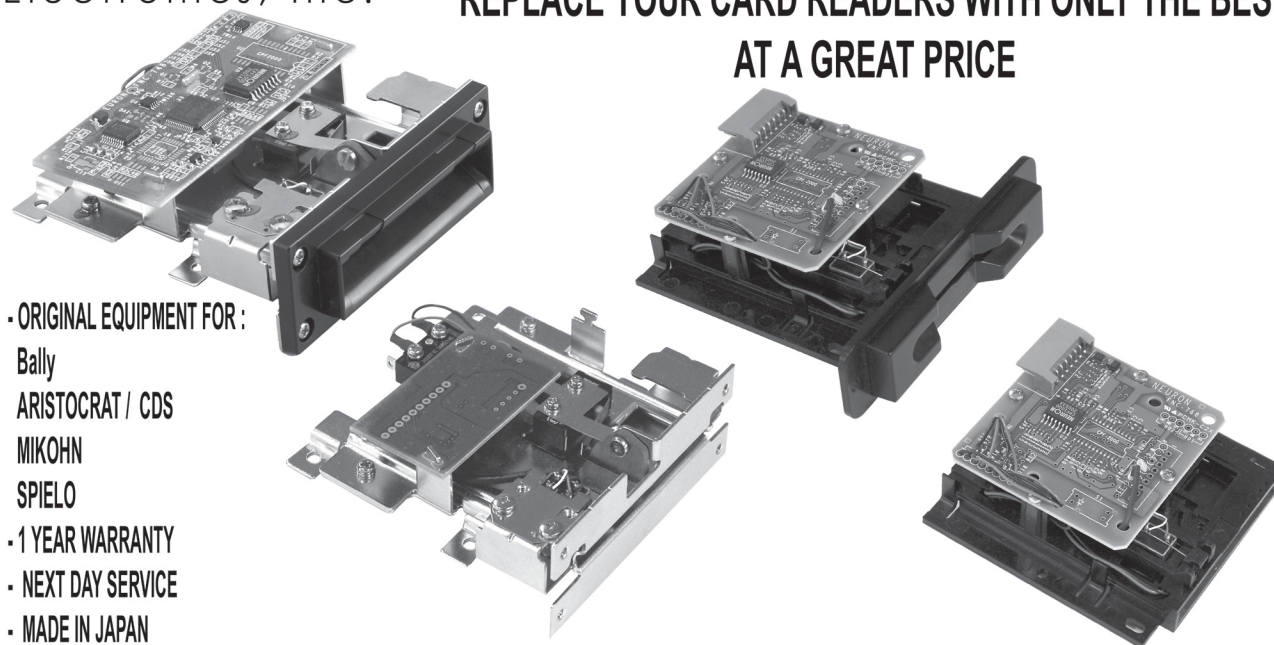
Bruce Wright (Aristocrat) covered the machines themselves and OASIS.



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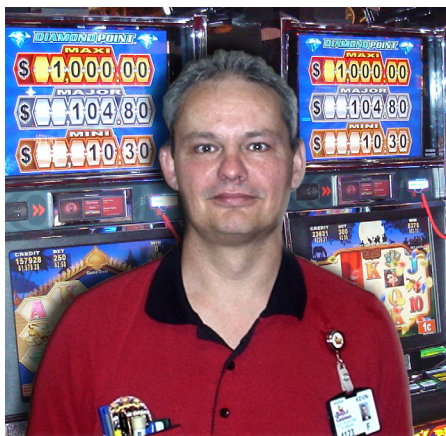
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Machine Problems Repaired

By Kevin Noble



Atronic Cashline Printing Duplicate Tickets

I got a call to an Atronic Cashline game that was printing duplicate tickets. Checking the MEAL book I noticed that the printer has been swapped with another game so there had to be a problem before but no explanation to why it was swapped out. The next thing was to turn the reset key and go into the print ticket option to see what the printer was printing. Once the print ticket was selected and the button depressed, the monitor blanked out and the game started to reboot itself. This was really odd and usually not the norm. Once the game was booted up and ready, I attempted to reprint another ticket and the same problem happened again. The next step was to check if any wires were getting pinched

behind the printer when I noticed that a small chunk of the ribbon cable was missing. It looked like a mouse had taken a bite out the cable. About five or six ribs were missing with exposed wires. The ribbon cable was replaced and the printer was retested with no problems. We have not had a problem with the game printing duplicate tickets again.

Bally Alpha Reels NVRAM Error + Battery Low Error

We started our shift first thing in the morning when I was handed a note that one of the games had an NVRAM error. This was the first time that I had to deal with one of the newer Bally Alpha reels with a battery problem. I checked the MEAL book and dating back about a week, I noticed an NVRAM error being reset and, just recently, "Low Battery" entries into the log. At first we thought that we could just replace the batteries on the CPU and hope to get away without losing any of the options. The game restarted fine until it reached a certain point. Then, the monitor went blank and stayed

blank for a while. I also noticed that the progressive display showed the progressive figure then went into a C52 code. I figured that I had lost the progressive option and had to clear and reset the game. I placed the clear flash card in and cleared the game with no problem. I placed the Operating System in the game, it booted up and went back into the blank screen and stayed there again. I did not want to have AGCO remove all the seals off the CPU so I next tried the CPU power supply. I swapped the power supplies from a spare one in the shop, inserted the RAM flash and cleared the game again. Once completed, I placed the Operating system back in the game; the game went through its set of instructions and allowed me to re-option the game. The machine was tested and eventually placed back in service.

TPE_RPT log CVT #20 Fiber optic loop up / Fiber optic loop down

This was a two part troubleshooting challenge. We thought that this one

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Aristocrat video machine was causing all the problems because it was being reported as manual jackpots for some time. It wouldn't work and then it would work for no reason. When I was first called to this machine for jackpots not reporting, I checked the soft and Mikohn meters and they did not match. I tried to reset the SPCII board to get the meters to match but it would not let me. I went back to the shop and grabbed another board and inserted it into the game, cleared it and checked the meters and everything was great for about an hour. I got called back to the game for manual jackpots again.

This time I changed the transformer to the fiber board and closed the machine up. About another hour had passed and this time the entire bank went down. I went into the game and checked the fiber board and found that the board was emitting a bright laser beam out of the fiber board out position. I had to change both board and transformer, checked my communication, closed up the game and everything was good, or was it? The next day Gary Smith, another Senior Technician experienced the same problems. He noticed on the TPE_RPT report the game was repeating the messages "VGM is responding – VGM not responding." He read in the

MEAL book what I had done and started troubleshooting it a bit further. He decided to swap out the CPU board in the game. He had AGCO come in and break the seals, replaced the board, and optioned the game. Gary checked the log report and noticed that the game was responding but also noticed that the CVT was still displaying fiber optic loop up and then fiber optic loop down. All along we thought that this game was initially the fault of this fiber optic loop problem on the CVT.

On this CVT were two banks of machines. On the first bank were 12 IGT S2000s and on the second bank were mixed Aristocrat video and Bally Alpha Video. The front half (ten games) were the Aristocrat and the last half were the Bally video. Because we thought that the Aristocrat games were causing the problem, we looped out those games and the errors went away. Gary next looped out half of the Aristocrats and that was fine also. There were only three left looped out of the system but in about two hour's time, the fiber optic loop went down. He started from scratch again by looping out all the Aristocrat games and the loop continued to stay down. Gary then proceeded to loop out both banks and the loop came back up. That meant that the CVT was not the problem and

the send and return line were also good, but somewhere out on the floor there was a game behaving badly and he was determined to find out which one. Gary next looped in the 20 games Aristocrat and Bally bank and it stayed on line. Some where on the IGT S2000 bank lays the problem? One by one, Gary looped out each game until the ninth game in the bank where he found there was no red light flickering from the super stepper Comm board. Once he replaced the Comm board, the problem went away.

**TPE_RPT
CVT #15
No machine ID/asset
number reported from
machine**

That was message being displayed on every game on CVT 15 after a service report was issued to two machines on this bank. After playing the two games, it was noticed that any tickets being printed from these two machines would not cross validate. No other machine on the entire gaming floor would accept tickets from these two machines. When the log was checked for errors, there was a machine #5 displaying VGM not responding. When the game was opened and the top glass removed, the SPCII board had fallen off its perch and was grounding out on the metal

frame that housed the SMIB board in the top box. Once reseated, the entire bank came alive and we were back in service.

The afternoon shift then placed them all out of service. The next morning this was passed on to us and we started looping out banks of games to see what was causing the CVT loop down error. We eliminated the ten, Atronic e-motion machines and the eight WMS games. We were left with the original seven Aristocrats from the other day that were still not looped back in. We wanted to verify that everything was working fine before we continued on with looping individual games to find the problem. After troubleshooting the bank and isolating the problem to machine #2 we read in the MEAL book that that night, a Slot Attendant went into the game to replenish the paper which knocked out all three banks on CVT #15. I started by replacing the SPCII board, then the fiber board and the SMIB but that did not solve the problem. Each time, I had to run back to the shop to check if the loop came back up, which it had not.

I tried removing the CPU and I/O board with the same results. I tried removing the printer from the game and disconnecting it from the motherboard but the

problem remained. I posted this problem on the OLG slot Tech forum and waited for an answer. I passed this problem on to Andrew which suggested that he would try the game's power supply (that did not work) and lastly opened a ticket to have out Central site look into problems on their end. The next morning it was suggested that we swap out the CVT for another. We worked eagerly in the morning to get this swapped out before the 9:00 am opening. At the same time, Richard Haddow from another site suggested that we swap the fiber board transformer. So in the morning we swapped out the CVT, swapped out the transformer and fiber board completely with a known good one from another CVT and bank. We were examining the TPE_RPT log on the computer in the shop and

noticed that at 9:49 am the errors completely stopped. The CVT was changed about 9:30 am, the fiber board and transformer was soon after. The errors did not follow the transformer and fiber board and the CVT did display error messages after it was changed, but at 9:48 they disappeared.

Atonics Cashline Printing Duplicate Tickets Part II

We were called to this machine for printing duplicate tickets when we noticed that when you tapped on the monitor, the game would cut out. We checked the ribbon cable that connects into the printer in the top box but it was fine. We did this because we had experienced a bad ribbon cable causing the same problem earlier in another

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machine. We replaced it with another game to rule out that it was the problem. We checked all the connections in the game but again if you tap on the monitor the game went blank. We swapped the monitor with another game to eliminate the possibility that the monitor was the problem, which it was not. Gary once again faced with another tough decision decided to swap out the power supply and the problem went away. But because of an unfortunate slip Chris hit the monitor with his knee and the game went out again. This was the second power supply now that was placed in the game and the problem continued. Next the CPU and motherboard was replaced but the problem still existed. Gary decided to swap out another power supply from the shop and the problem went away. Just to make sure the monitor was tested and beaten to verify that this would not happen again. The duplicate ticket problem went away.

CVT Loop up/Loop Down

That is what the report stated every two seconds when we looked at the log first thing in the morning. At first we came up with a game plan of eliminating one bank at a time to see where our problem was. The first bank was a bank of Bally Alpha that we

looped out and the errors continued. The second bank was a bank of IGT S2000 that was removed from the loop and the problems still continued. We then pulled another bank of Bally Alphas until we pinpointed it to a group of ten Aristocrats. Looping out the back side made five games the cause of our problems. We started to loop out two games at a time when we discovered that two fiber board transformers and one SCP II board were causing all

the damage. The SPC II board had fallen off its mount in the top box and had grounded out on the SMIB board. Once removed, that machine came back online. The other two games that were looped out were placed back in the loop which made other games on the line start chirping. One at a time we replaced the transformers until all messages and chirping went away.

- Kevin Noble
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Quick & Simple Repairs #46

By Pat Porath

IGT S2000 VFD problem

On an IGT S2000, have you ever seen a VFD with only dots on it? I was called over to the game and was told that it had a display problem, and obviously it did. I thought maybe one of the I/O cards may have come loose. The game was turned off and I made sure the cards were snug and the main processor was snug in place. They both were. Next, I checked the connections on the VFD and they all looked good. This was the first time that I had seen a VFD that had only dots on it. Why not try a replacement?

The shop was nearby so I grabbed a spare and installed it. As soon as the game was turned on, the VFD was operating perfectly. It showed "PLEASE WAIT...TESTING MEMORY." I could have swapped the original with the game next to it (good ol' swaptronics) but since the shop was nearby, I just grabbed a spare.

JCM UBA Hardware Enhancements

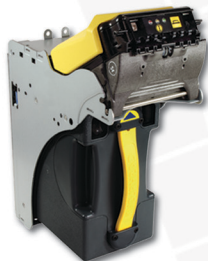
Recently released by JCM for the UBA, is a "waterproof shield" that can be installed on the bill acceptor to prevent damage on bar top games when a drink is spilled on it. The JCM part number for it is 900-200205RA. JCM also has a "dust protection kit" available. The part number is 701-100083RA. They are covers that go over the upper and lower sensor boards to

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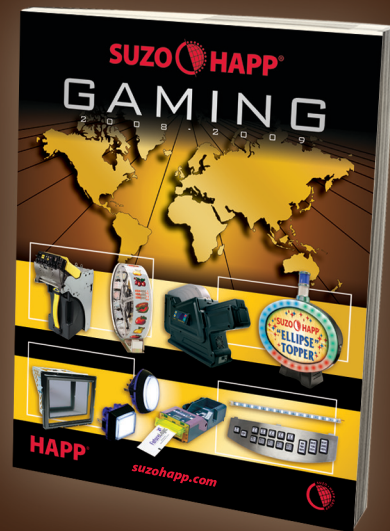


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prevent dust from entering. If dust makes its way over or even partially over a sensor, then there is a good chance that it won't work.

IGT S2000 reel 4 not working

We had a game down because reel number 4 wasn't working properly and we didn't happen to have a spare on hand for it. The

first thing I did was to take the main processor board to the shop and test the diodes. On some IGT S2000s, when there are reel errors and the problem is in the game (not the reel) a diode is bad. Replace the

Conditions:

In an ongoing effort to improve product performance in extreme environmental conditions, JCM Engineering has developed a cover to be used on units that are operating in environments at risk for liquid spills, (bar top, etc).

Resolution:

This cover (CPU Waterproof Shield, P/N 900-200205RA), (Refer to Figure 1) is placed over the CPU to prevent damage caused by spills (Refer to Figure 2). This will become standard on production UBA units as of September, 2008.



Conditions:

In an ongoing effort to improve product performance in extreme environmental conditions, JCM Engineering has developed a retrofit kit to be used on units that are operating in smoke and dust filled environments.

Resolution:

This retrofit (Kit, Dust Protection P/N 701-100083RA) has new covers placed over the upper (Refer to Figure 1) and lower (Refer to Figure 2) sensor area to prevent potential buildup inside the sensor lens area. The Bar Cap is removed for installation on UBA 24 Models.

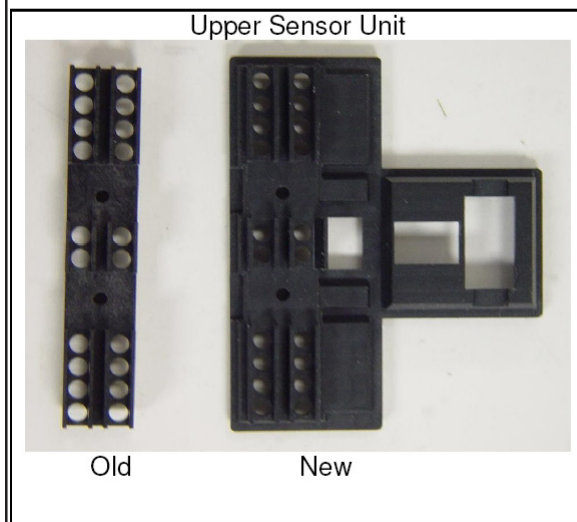


Figure 1.

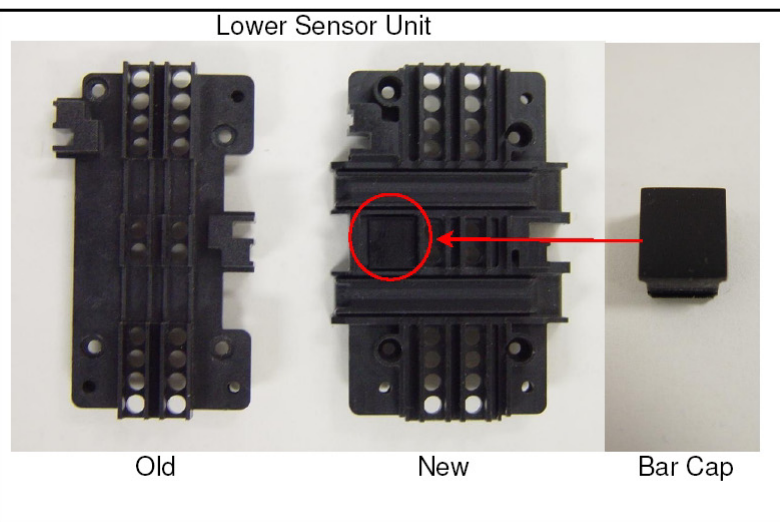


Figure 2

bad diode and no more reel tilts. This time while on the bench ALL of the diodes in the reel area circuitry tested good! I didn't believe it, so I checked them all again only with the same result, they all tested good. Next, I checked the connections on the mother board and they all appeared to be in place. Next, the number 4 reel was removed from the game. When I began to check it out, the problem was very obvious. One of the wires that go to the reel stepper motor was broken. The reel assembly was brought to the shop and the wire was repaired. I removed the old pin that was in the connector, crimped the wire in the new pin, and inserted it into the connector. It was now time to see if it worked. The reel assembly was put back in the game and the power was turned on. When IGT stepper games "boot up," the reels will spin to the position that they were last at. The game spun without an error but is it really fixed? Next, I entered the "auto payable test" so the game would spin the reels and continue to spin until I stopped it or until it had an error. I let it spin for a few minutes just to make sure that it did work properly and it did not have any reel tilts. I was wrong with the initial diagnosis. I had thought that a diode was bad on the main processor. When they ALL tested good, I wasn't sure where to go next. Then I

January 2009

remembered a phrase that a co-worker told me some time ago. "Sometimes the problem is right in front of you if you only LOOK." In a short period of time the broken wire was found, repaired and the game was back online.

WBA Not Taking \$5.00 Bills

I received a complaint that a WMS stepper game wouldn't accept \$5.00 bills. The bill acceptor that happened to be installed in it was a WBA. One of my first thoughts was that the bill acceptor software may have missed the last software upgrade and therefore wouldn't accept NEW \$5.00 bills. I gave it a quick inspection, checking the optics and the rollers. The unit appeared to be relatively clean, so that shouldn't be the problem. When the unit was reseated, it didn't cycle the way it should so the unit was removed from the game and re-examined. While giving it another inspection, I found the problem. Someone had turned on DIP switches 1, 2, and 3 but hadn't turned them off. It appeared that it was put into test mode and not taken out. A very simple repair on this one. The DIPS were set to all OFF like they are supposed to be on that specific model of bill acceptor and game, and now it was

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fine. When the unit was put back into the game it cycled perfectly.

IGT S2000 With Bad Stepper Motor

Have you ever had a game that had a lot of reel tilts and the problem was a bit tricky to find? Well, one of the first things that I would look for is to see that the main door lock assembly and main door optics are where they are supposed to be. Simply grab the “locking knob” on the exterior of the game with the lock in the locked position to see if a “door open M” appears. The knob should move up and down very little. If a “door open M” doesn’t appear, that part of the game should be ok.

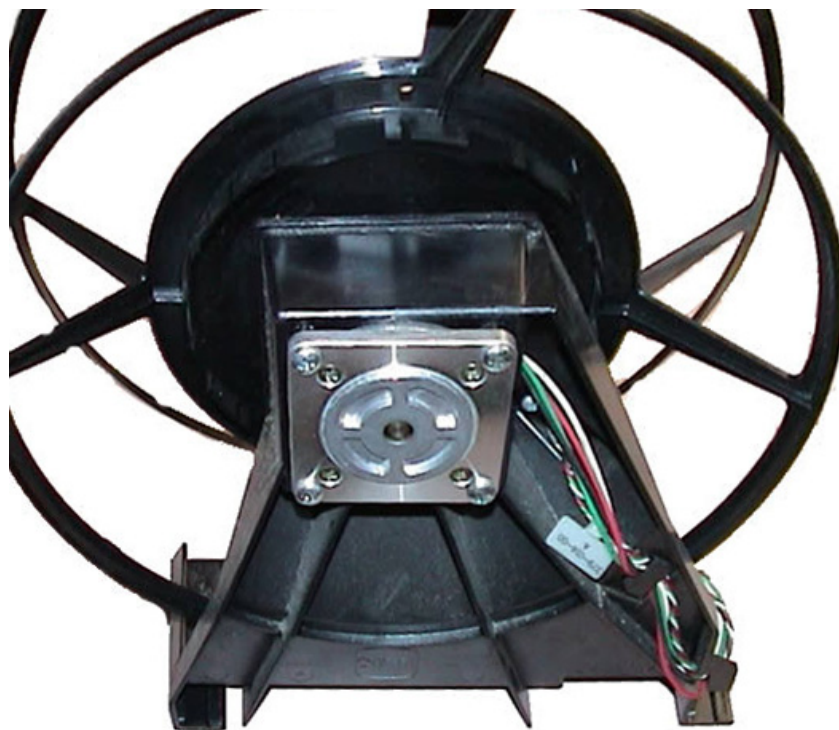
Another item to check is the belly door switch, which is located in the upper left had corner of the belly door. If it looks like it is slightly bent inward, gently pull it toward you so the switch makes better contact when the door is closed. The stacker door switch can also be checked. Open the belly door and gently pull on the stacker door (when it is in the locked position) to see if a “door open B” appears. If it doesn’t, that part of the game should be OK too.

Well, now what? What if all of the door switches and optics are OK and reel tilts still happen on the game? In this case it may be a bad

stepper motor. How can you tell? The power to the game needs to be on so the motor has power applied to it. Gently spin the reel that has been having a lot of errors; gently spin it by hand. If the suspected reel makes somewhat of a “grinding noise” and does not move smoothly, then you probably have a bad stepper motor. You will be able to tell the difference when you manually spin a reel that IS working properly. The movement will be very smooth. If the reel

does not spin very well manually, then it looks like the stepper motor needs to be replaced. If it is replaced, a “paytable test” should be preformed on the game not only to make sure that the reel assembly is installed properly, but it also tests it to make sure that there won’t be any reel tilts. If the “paytable test” is OK, the game should be OK and ready for a customer to play.

- Pat Porath
pporath@slot-techs.com



Gently spin the reel that has been having a lot of errors; gently spin it by hand. If the suspected reel makes somewhat of a “grinding noise” and does not move smoothly, then you probably have a bad stepper motor.



Doris

By James Borg

Doris came round to the office while I was still trying to get organized since I had just started my shift and said that her favorite machine had stopped working. She was looking a bit down and flustered.

“Don’t panic dear,” I told her. “Just give me a few moments and I’ll be right with you.”

Doris is a nice, elderly lady. She has white hair and wears glasses and isn’t either fat or thin. She usually plays on two specific Atronic machines. That evening, one of her favorite machines was being used so she went over to play on her other one. It’s an Atronic slant top which is right in the corner with nobody really close by to bother her as she’s the type of lady that keeps herself to herself. She seems to have only one real close friend who she spends a lot of time close to but that day, her friend wasn’t to be seen. Her only companion for that evening was her machine and that wasn’t proving to be such a good companion since it had pulled a fast one on her. Not very lucky indeed.

I quickly finished what I was doing in the office and went over to her machine. From a distance I could see that it was still on. The reels on the monitor looked fine. I couldn’t see any of the

buttons being lit from where I was but I could see that she still had some credits in the machine. That was not a good sign.

“Look,” said Doris. “What is wrong with it? I was playing away at it then it suddenly stopped.” she added.

I touched the screen and pressed the buttons to see if something shifts in the game. Nothing shifted. Even the INFO button wasn’t lit. I’ve seen this before. For some reason, the machine decides to call it a day and stops working. I told her that I was going to turn it off and then back on again. She looked a bit sad as her machine might not come alive again. A picture of distress was all over her face.

“Don’t worry as it’ll be fine,” I told her while I kept my fingers crossed and trying not to look at

her too much for her to notice that my nose had started the growing process. I had no idea if the machine was going to work myself for that matter.

Opening up the machine, I placed my hand just behind the hopper to where the power supply unit was to see if its fan was working. It was. The four LEDs on the front were all glowing nicely. All the supply rails were present. It’s not the first time that the power supply unit overheats due to its fan ceasing up and upsetting the machine. However, this wasn’t the issue here so I was hoping that a simple switch OFF and back ON again will sort it out. I’ve done it many times on many different machines before so I didn’t really foresee that this would be any different.

Flicking the red power button once, the machine died. I left it

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off for a few moments as it's not healthy to switch it back on again immediately. The seconds slowly passed by and looking at Doris, she was perspiring with worry while looking all blank at the dead machine. A thought suddenly struck me which made me shiver like somebody walked over my grave. I wondered if I was going to be the next person perspiring if the machine didn't work properly.

Flicking the red button again, the machine started coming to life. The four LEDs came on, the monitor's high tension could be heard (nice sound that), the florescent lights came on and ATRONIC in blue showed on the screen. The bill validator could be heard cycling. All systems green and looking good. For what seemed like for ever and a day, the machine eventually decided to come on showing the game, the credits and at the exact screen where it had left off prior to going FUBAR. Doris seemed really happy and asked if she can play on it whilst inching forward her hand to start hitting the bet buttons once more even before I move aside. To my "yes, of course", a smile from ear to ear appeared.

I still stayed close by to see if all remains well. I felt an ill wind blowing that evening, and needed nourishment, in the form of a hot chocolate, to have enough oomph to tackle anything that's thrown at me. My big toe was signaling trouble ahoy though. Nine times out of ten, the signaling would be correct.

Only about an hour or so in, Doris caught up with me telling me that her machine wasn't working well again but this time it had a black screen with some writing on it. Hmmm... that doesn't sound too good at all as it seems like it has reset. Going over to the machine, I confirmed my fears. I waited for a while till the game started again, but it

didn't. Once it reached a certain stage, it was like some invisible hand had turned off the machine and then back on again, and the whole process started all over again. I had to break the bad news to her that I'd have no option but to turn her machine off. Panic showed on the poor thing's face. I explained to her that I needed to let it cool down for a while. She was then content to go on her other machine since this was vacated.

Left alone with the machine, I decided to have a look at it in its present state as that might be easier to locate the problem. So I dashed over to my workshop and got my multi meter and flash pen. Having a look inside and monitoring the supply LEDs while the machine reset didn't show anything at all. All four of them were emitting the same brightness during the fault sequence. The supply voltages were all correct too once checked with my multi meter. I wonder. Shall I replace the supply just the same? The symptoms seemed related to a faulty power line somewhere so I figured that changing the whole unit was a good move.

With that positive train of thoughts, I brought a spare from the workshop. Getting access to the supply on these slant top machines involves pulling out the hopper. Space is quite restricted but with some shoving here and shoving there, my fingers eventually found what they were looking for and the supply was pulled out and replaced. I slid the hopper back in before turning on the machine and hoping that the fault would be cleared. Was I aiming too high I wonder?

The ATRONIC in blue came on again and I held my breath and kept my fingers crossed yet again that all would be well. I smiled when the game came up. All was looking good. It actually seemed like the supply could

have been the culprit. With that, I called the client over and she came back and started playing on the machine one more time after thanking me and giving me her most radiant smile. She also asked if it was going to pay out now . . . to which I coughed politely.

That's another job well done I thought to myself. Not bad, not bad at all even if I say so myself. Little did I know that it wasn't another 'job well done' at all and that I was going to be perspiring like crazy on this machine soon.

As luck would have it, a certain person appeared again (Shock! Horror! Not to mention Panic Stations!). She didn't need to open her mouth as it was all over her face. A clear picture of doom and gloom was written all over it. My face spoke as well, but not the same language as hers. I sighed, looked at her and told her to give me some time on this one as it's not going to be a cup of tea after all that I had done and seen so far. I apologized to her but machines are machines and when they want to stop working, they just do. They don't care about letting people down and upsetting techies like myself in the process. This was going to be a showdown between the machine and myself. A do-or-die job. A job that needed doing. A job which I couldn't not do for many reasons, mainly because I couldn't let the machine get the better of me. So far none have as I always had the last laugh, but having said that, there's always a first time for everything.

Taking a deep breath, I opened it up. It was looking at me and I was looking back at it. The place was crawling with people but as far as I was concerned, there wasn't anybody around. The place was noisy. Shouting and laughing and machines hitting jackpots and all the usual noises one would expect in a casino, but as far as I was concerned, it could have been an empty

casino. I needed to focus totally on this one. This type of fault needed a logical approach if I was going to locate it. It was going to be a game of cat and mouse apparently and the reason for it resetting could be virtually caused by anything. A good start after replacing the power supply was to pull out all the boards, that is to say, the CPU, the COMM, the GRAPHICS and the SOUND boards and clean their connections to the backplane and push in any chips in their sockets just in case they had become loose or developed an oxide. A quick squirt of contact cleaner wouldn't go amiss. This I did to each and every board and the machine was turned back on again. After a few moments, the resetting process started once more. Ouch!!! Oh no!! So it's not a question of a duffy connection along the line. Right, ACTION STATIONS!! It was a time to get serious. No more Mr. Nice guy here. I replaced each and every card individually and paused in between. Resetting actions were seen again after each card was replaced. Bigger OUCH!!! Deep breathing and more logical thoughts started hitting me from all corners. What could it be? What could be causing this problem? Surely it can't be the validator. No good thinking about it at this stage so that was replaced as well. Same thing happened. That's brilliant, just brilliant not to mention fabulous. I felt that my doors were being closed quickly and not much else can be done pretty soon, apart from pressing the red button and start pulling my hair out.

I thought I'd time-out for a while as all this was getting to be beyond a joke. I had a ciggie as that usually helps my thinking process. All sorts of ideas came to mind. I was lost in thought...what was causing this symptom? It has to be something daft, but daft as it might be, I still didn't crack it and it certainly won't crack me even though the immediate future seemed bleak.

There is usually a good answer, a good explanation for everything. Problem is finding it though. By the looks of things I was still miles away.

Time-out time was over, and so was my ciggie. A black cloud loomed overhead and followed me all the way back to the machine. I was totally lost and confused. It's not a pleasant feeling. Looking at the machine I was hoping to hear a little voice coming from it telling me where the problem is. No such luck. Its secret was well and truly kept. A thought struck me. What if the hopper was upsetting the machine? It wasn't, and the machine reset again. Then, another thought struck me like a ton of bricks. I hadn't even looked at the button board located behind the monitor. This is a pain to replace so I just eliminated it by unplugging all the connections to it.

Having done that, I turned on the machine again and it didn't reset!! Did I hit the nail on the head? Did I find the fault at last? Was this the culprit that had taken me on a merry-go-round? Was the defendant guilty as charged? Was it time to open the champagne? I thought it would be best to wait a while before I started crying victory. So I waited, and waited and waited. Game was still on. This was the first time it stopped resetting. It just could be the case that the button board was faulty after all. No reason why it shouldn't be. When you think about it, it's full of chips which can go funny and upset the circuitry.

Things seemed to look up at last. Even the black cloud hovering over my head had vanished, and that's a good omen. I wonder if it will come back again. Anything's possible. All still looked good for the next two hours and that's saying something. I think it was



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time this board was replaced. Trust my luck as the last board seemed to be the problem after all, but that's Sod's Law. That would also be the story of my life.

A went to my workshop and looked around the spare boards. Found one! Well, surely it had to be it. It just had to. Nothing else was left to replace actually so if it wasn't this board then heaven help me as I would be well and truly lost. Getting quite excited about it all, I went back to the machine and pulled the original board out and replaced it. Fingers crossed all the time while switching on the machine. All I have to do now is to wait, and hope and pray.

All looked fine as the machine fired into life. Game came up and all was promising. For how long nobody knows. I really hope I'd cracked it as I would be with my back to the wall if I didn't. Being shot at dawn isn't something to look forward to. The only thing as such left would be the program chips themselves, but that's a long shot. I didn't have another set to replace them with anyway so I stopped thinking about them.

I stood by the machine looking at it and trying to feel good about it since I was really hoping that it's fixed now. There was something not quite right though. I had this gut feeling that my 'feel good' experience would be short lived. I didn't have to wonder for very long as right in front of my very eyes, barely fifteen minutes had passed when the machine reset itself. It did it again!!! OH NO!!! OH HELP!!! OH CALAMITY!!! The feeling of disaster and disappointment

totally engulfed me. I'm afraid I have no choice but to throw in the towel. I'm stuck. Well and truly stuck. No way out. I've finally met a challenge I couldn't conquer. Was this my Waterloo? I was doomed to live in shame for the rest of my life. No bands this time, no jumping up and down for joy and certainly no Ali Shuffle, no reason at all to celebrate. What am I going to tell Doris? She'll stop smiling at me that's for sure. She'll probably end up hating me now for not fixing her machine. I think all this calls for another time-out to reflect on the situation. Back to the drawing board. Back under my rock. Wound licking time. This is awful. I can't believe it. I just can't believe that changing next to everything and the fault's still there. Something really fishy is at work here BUT WHAT?

Even though I practically changed the whole of the machine, I still was convinced that it was somehow a fault related to the power supply section. I checked the 5v and the 12v rails on the supply's cables directly and showed 5.02v and 12.15v which were fine. I had checked these previously anyway. Just for argument's sake, I decided to check these two rails on the backplane itself. I assumed I was wasting my time as these are practically the same point as the connections on the supply's cables themselves. What I found made my heart stop. The 12v was still very close to specifications, but the 5v rail had somehow dropped to 4.75v and that's a no-no. In fact, it was a big no-no. Was I on to something here?? A continuity test between the 5v rail directly from the supply to the 5v on the

backplane showed an amount of resistance which wasn't all that low. My thoughts raced like Formula One cars. What if? What if I was to jumper the 5v line directly to the backplane? It's practically the same point so I shouldn't see any sparks flying past my face surely. So back to the workshop to get a couple of wires and I jumpered both the 5v line and a 0v line directly on the backplane. The reading on the multi meter shot up from 4.75 to 5v!

Aaaaarrggggghhhhh! I don't believe it. I just don't believe it. Of course the machine would reset if the supply to the logic circuits would go low. Of course the fault would be intermittent. Of course changing all the boards and the supply itself along with the validator would have no effect at all on the fault. The problem was always on the backplane itself. It must have a resistive track which was dropping just enough voltage to upset the logic circuits. I wasn't quite sure if I was supposed to be glad or upset. The problem was solved so I should have been happy, but that kind of fault had annoyed me to kingdom come and it had left me with mixed feelings.

Turning round I saw Doris coming over running back to her game. At least there was one delighted person there. Oh well, that's the way the cookie crumbles. After all, it's all about keeping people like Doris pleased.

- James Borg
jborg@slot-techs.com



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Another One Week Alternative Class	LCD Monitors	Slot Ticket Printers	JCM UBA Bill Acceptor	OASIS Training		
One Week Class	OASIS Training		JCM UBA Training	FutureLogic Ticket Printers	3M Touch Systems	
Four Day Class	Power Supplies	CRT Monitors	LCD Monitors	Hands-On Repair Lab		
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Classes can accommodate up to 15 students. Other classes can be organized by special request. Just ask and we'll see what we can do for you. If we can't accommodate your request, we'll help you find someone who can.						

Here is another way to look at the modules that are offered. This chart shows the modules and the duration of each one. You can select the modules you need for your class.

Module	0.5 Day	1 Day	2 Days	2.5 Days	3 Days
Soldering	■				
LCD Monitor	■				
Touch Screens	■				
Power Supply		■			
CRT Monitor		■			
FutureLogic Printer		■			
Transact Printer		■			
JCM UBA		■			
OASIS Hardware			■		
Digital Electronics			■		
Basic Electronics				■	
Hands-on Repair Lab	■	■	■	■	■

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**Randy Fromm's
Slot Tech Magazine is
published monthly by:**
Slot Tech Magazine
1944 Falmouth Dr.
El Cajon, CA 92020-2827
tel.619.593.6131
fax.619.593.6132
e-mail editor@slot-techs.com

Subscription rates:

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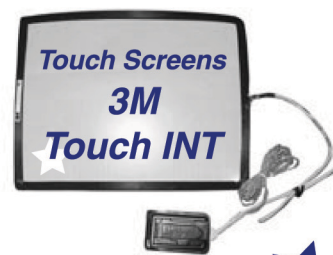
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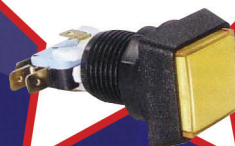
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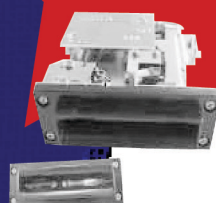
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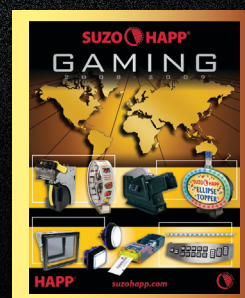
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