

May 2008

SLOT TECH MAGAZINE

Slot Machine Technology for the North American Gaming Industry

Kristel 1428 Meltdown
JCM WBA Maintenance
Machine Troubleshooting
Quick & Simple Repairs #38

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April 2008

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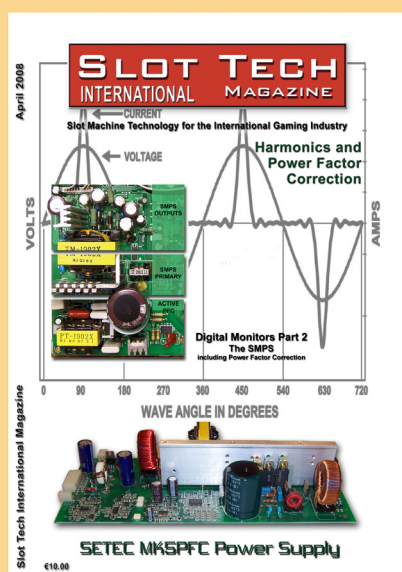
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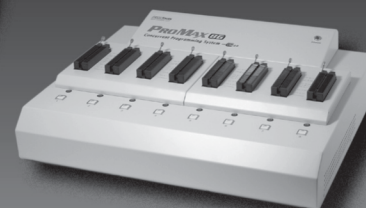
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Slot Tech Magazine Goes Green!

Solar Server sponsored by Ceronix

As you know, we run a server at slot-tech.com. It's full of schematic diagrams, service manuals, podcasts, powerpoint presentations and other technical data. It's all free for the taking and naturally, it runs 24/7. I had one of my sometimes crazy ideas that it would be fun to make it solar powered. It wouldn't take much to power a cable modem, a router and a cpu. The Ceronix LCD monitor I use as a display wouldn't draw much current and even then, it would only be used intermittently. I figured that a 250 watt system would be more than enough to power the system during a sunny day. We have a lot of sunny days here in San Diego, California. At night, I could simply go back on the grid.

Randy Fromm's Slot Tech Magazine

Editor

Randy Fromm

Technical Writers

Ted Befus, Jason Czito,
Kevin Noble, Herschel W.
Peeler, Pat Porath, Vic
Fortenbach, Charlie Tuff,
Peter Eagle, James Borg

International Contributor

Martin Dempsey

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Slot Tech Magazine
1944 Falmouth Dr.
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served.

For advice, I turned to industry solar pioneer Don Whitaker, whose Ceronix factory sports a 400 kW photovoltaic array on the roof. If anyone had the connections to obtain a small PVA, he would. Truth be told, I was also looking for sponsorship. I asked Don if he would be interested in providing a small solar system (a PVA, not a sun with orbiting planets and stuff) in exchange for perpetual acknowledgment of Ceronix as being a really awesome sponsor.

"I think we can do better than that," Don responded. "I think we can power your whole operation."

And so it came to pass that nine, SHARP NT-185U1, 185 Watt solar panels and a Sunny Boy 2500 Watt grid tie inverter, with all the accoutrements such as High Voltage DC and AC switchboxes, cables and conduit appeared (neatly pallatized by Ceronix's Troy Nofziger himself) on my doorstep.

So there you have it. During the day, my entire office load is only a few hundred watts. Just some desktop computers, a couple of monitors (I won't give up my CRT monitor) a fax and a couple of other office machines, a desktop lamp and, of course, the server, cable modem, etc. The surplus is fed back through the grid tie inverter to the power grid. I'm not going to be totally without a "Carbon Footprint" as I have heating and cooling requirements that will exceed the energy provided by my 1600 Watt system, but on warm sunny days it will be fun to pull up a lawn chair and watch my meter spin backward.

So, thank you Ceronix for sponsoring the Technical Server at slot-tech.com. You are really awesome. Ceronix products give me fresher breath and a brighter smile.



I owe an apology to Slot Tech Magazine's newest contributor, James Borg. I had been waiting for James to send me a photograph of himself at work. In the meantime, I just couldn't resist using an image of another, somewhat more well-known "Borg" as a placeholder. It somehow ended up being published. That was a mistake and I apologize to James (and to Paramount, I suppose, for using their image without permission). I'm sure James was expecting something quite a bit more dignified than that. Mea culpa.

I'm sure you enjoyed James' humorous article on the MK5PFC Power Supply in last month's issue. This month, James is back with an interesting and sometimes frightening look at a Kristel 1428 meltdown. The fun starts on page six.

Also inside is a nice look at JCM WBA maintenance, Pat Porath and more.

That's all for this month. See you at SlotFest, Mystic Lake Casino May 6-8.

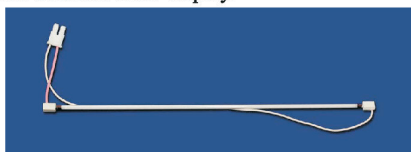
Randy Fromm



Replacement parts for LCD displays in: Player Tracking Systems.

IGT NexGen

New 70,000 hour cold cathode lamp assembly for NexGen LCD display.



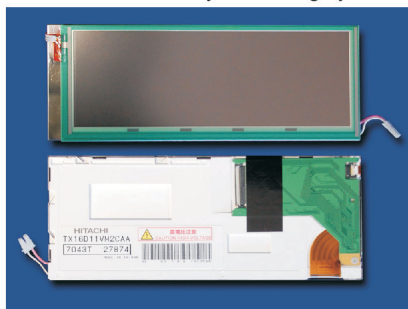
Part #8500 Price \$17.25

Protective Mylar sheet with copper tape attached for NexGen LCD display, this piece helps the touch screen from getting scratched.



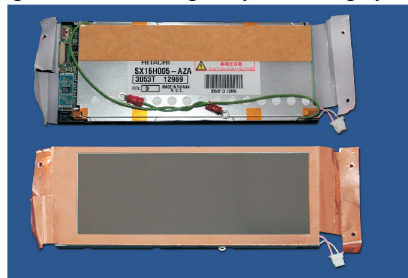
Part #8610 Price \$9.00

6.2 inch Hitachi LCD display with 4 wire touch screen for NexGen Player Tracking System.



Part #8570 Price \$275

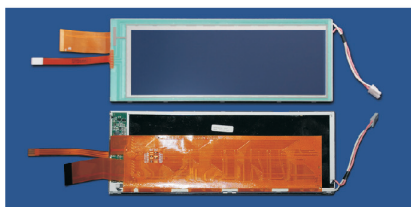
6.2 inch Hitachi LCD display with 4 wire touch screen for use with IGT/Acres 1st generation Advantage Player Tracking System.



Part #8580 Price \$225

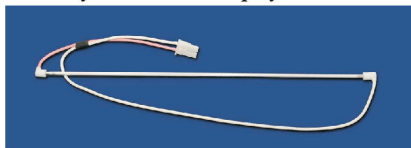
Bally I-View

6.2 inch "IDW" LCD display with separate 5 wire touch screen for 1st generation I-View Player Tracking System.



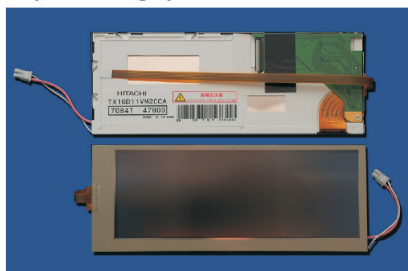
Part #8660 Price \$325

New 70,000 hour cold cathode lamp assembly for Bally I-View LCD display.



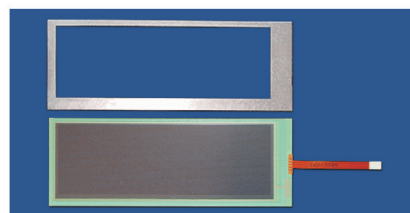
For 1st generation with "IDW" LCD use part #8650 Price \$17.25
For 2nd generation with Hitachi LCD use part #9010 Price \$17.25

6.2 inch Hitachi LCD display with 5 wire touch screen for 2nd generation I-View Player Tracking System.



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James Borg, alias "Jimbo Tech", was born in Mtarfa, Malta. Raised and educated in Gzira. A former army technician and dedicated "Techy Trekkie", he has had vast experience in the technical side of equipment and slot machine repair. He is currently working at the Oracle Casino in Qawra (Malta) where is a highly respected member of staff. Clientele also appreciate his unique sense of humour and dedication to customer care.

James Borg lives in Birkirkara, Malta with his wife Jill, a teacher as his first critic. They have two teenage sons, Dominic and David.

Phone rings in the office. A distant voice at the other end said that our presence was needed at the extreme end of the casino. No problem. The phone never stops. We're always needed somewhere or another. That is all well and good as it makes the shift pass quicker. The evening was starting to drag a bit. Not many clients in at that moment so things can get somewhat boring. Ideally

Autodestruct Sequence Engaged Kristel 1428 Meltdown

By James Borg

the place would not be too busy and not too quiet which gives us some slack with clients. It's fun talking to most clients, getting their innermost thoughts to surface with all kinds of stories that date back years before I was even born. Grabbing the keys and the payment book, I slowly started walking towards the area requested. Stopping for a general scan of the area showed nothing out of the ordinary. People pushing at buttons. People talking to their machines. People hitting machines. People stroking machines hoping that some tender loving care would get the jackpot to strike. Other people waving lucky charms around. Some waving rosary beads (we're very religious here in Malta). Others with smiles and others with frowns. Some sipping at coffees, filling their face with toast and having a good heated conversation about how they never win anything. All in all, nothing out of the ordinary.

Just as I was about to turn around and walk on to a different area, this hand pops out from behind a

machine and starts to wave to get my attention. The hand's mission was successful. It turned out to be a smiling person that was pointing to a screen on a machine that she wanted to play on. The machine was an Aristocrat MK5. Very popular machines these Aristocrats and most of them have the same people on them. They come especially from home to play on "their" machine and end up somewhat upset if somebody has got on to it before they do. A determined person would hover about for ages waiting for the machine to be vacated, like a vulture circling around waiting for its prey. Others give up and try their luck on a different game. It's amazing how people get attached to a particular machine and make it their own. Come rain come shine, it's theirs and theirs alone and nobody will take it away from them. Not even wild horses.

A look at the screen proved that the client was right about not being able to play on this machine because all there was on it were horizontal coloured lines busily

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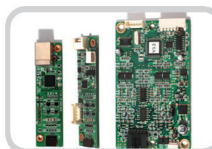
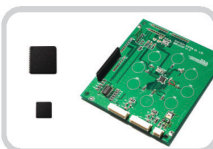
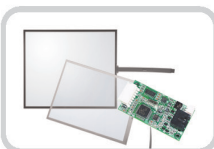
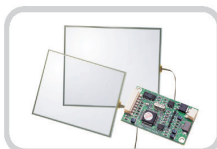
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chasing each other all over the place. It shouldn't be too much of a problem getting this one done in a jiffy (or perhaps two jiffies). The horizontal synchronization seems to have gone somewhat bananas but that's why some clever engineer whilst designing the board thought of including variable settings in the monitor to help us poor tech souls pull the settings back into line.

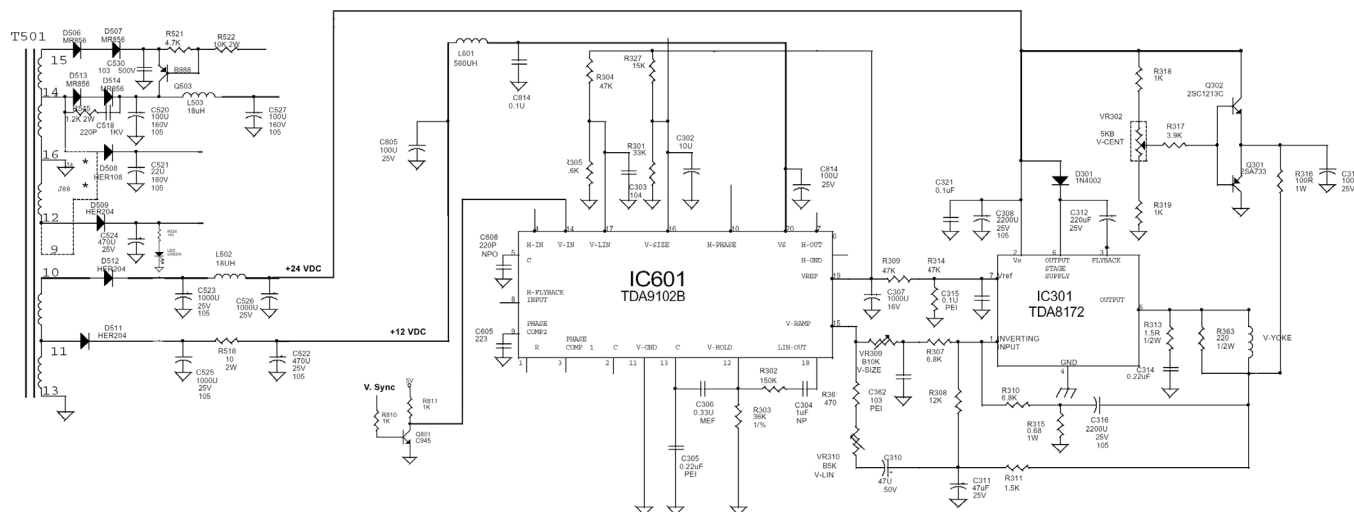
"Oh dear" I heard myself telling the smiling person. It seems that your machine isn't working properly. "Don't worry as we'll soon have it back good as new." The smiling person's smile grew even bigger. I couldn't set the monitor on the spot as I didn't have the extension harness with the juice and signals from the machine to the monitor available so it was a case of pulling the monitor out, taking it to my workshop, rigging it on to my computer and a touch here and a touch there with my screwdriver tester should do it.

Fiddling with the keys I opened up the machine, sliding it out slowly and surely being the order of the day as they are quite heavy. Pulling a face and tugging from the sides, the monitor sees the light of day. I gently put it on a nearby chair while I closed the machine up again. The smiling person nods a nod of approval and waves as the monitor's journey to the workshop begins.

"This shouldn't take too long," I thought. It will take longer rigging it up and waiting for the soldering iron to reach its working temperature and my computer to boot up. Little did I know that I was going to eat those words, each and every one of them. Famous last words? Words that shouldn't have been uttered in the first place? Surely I was being negative as absolutely nothing can go wrong. This was an easy job. A cinch! A time filler. A bit of fun.

I had to clear some of the mess on my worktop to be able to put the patient on it and commence surgery. It is said that a clean desk is a sign of a sick mind and I follow all that to the letter. Nobody can question my sanity in that department. It's a shame that not all follow my views on the subject but that having been said, I guess it's each to their own. Having said that, I usually end up being shot at dawn for my belief. I have to be in my element to concentrate. When it's too clean, it sort of disturbs my vibes and I will eventually turn left instead of turning right, putting me off track totally and ending up at the outer most parts of Mongolia.

My computer has finally booted up and the soldering iron reached a good enough temperature to start melting my solder. Looking amongst my neatly placed set of test cables to hook up the pc to the monitor reminded me of the huge plate of spaghetti I had the



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night before, all tangled up and twisted. Try as I might I just couldn't make heads or tails which is which. Ah, there you are. Your presence is needed. Come to daddy little one and do your thing.

A quick check to see if all is in place. Mains cable connected – check. Video cable connected to pc – check. All the video solder connections made – check. Pc happy and running Windows – check. I dare not shake it about a lot as it will crash on me and will have to reboot it again which will take another 15 minutes when it finally decides to show me the desktop one more time. I can't really complain as it works after all. One day I'll remove the cable-ties holding the heat sink to the CPU, but till then it'll do as it is.

OK. Everything looks good: Juice cable, video cable, little tester ready in my hand to set pot VR 601 (Horizontal Hold) in question which should make the patient feel better. Applying juice to this Kristel 1428 unit didn't quite have the desired results I was waiting for. I was hoping to see the coloured lines chasing each other as I had seen previously when connected to the machine. There was a strange noise emanating from it, a strange noise that wasn't supposed to be present. Stranger still was that it was slowly increas-

ing in pitch and volume. Don't panic! Keep your cool. Chill. Any second now it will soon build enough juice and I'll have the crackling of the high tension building up, the noise that I love hearing most in a monitor.

When you repair monitors you'll find out that you start enjoying certain noises that a normal human being won't even think twice about. Sigh! Is it a sign of madness? A sign of great things to come? A sign of a sad life perhaps? No, certainly not sad. Not when this operation will make the smiling person waiting outside by her machine happy. Anything to make a client smile more and happiness in the air is a welcome thing.

Next second, the strange noise changes drastically as the Vertical Output IC TDA8172 (IC301) starts smoking and cracks, with part of the black resin deciding to pull away from the chip and drop on the board below. "TDA" remaining stuck and the "8172" bit come away and hits the deck. Ouch! The switched mode power supply starts to imitate a machine gun blowing away shells in all its glory. The green LED on the 7v dc line coming on and off like a crazy Christmas light. The 18V Zener diode (ZD 502) breaks in half. R 507 (22 Ohm) starts to smoke after going a shade darker. C523 and C525 both 1000U/25V

start to belch out their electrolytic and inflate, imitating a rocket about to blast off. The monitor was dying before my very eyes. Next second the fuse flashes and blinds me! I hope the dilithium crystals didn't get cooked too. Shock! Horror! I'm sure that during all this my heart missed a beat or two in the process. That shouldn't have happened. That should never have happened. What happened anyway? My God Jim, it's dead!

A sudden panic attack engulfs me and I quickly start to follow the breathing exercises to help manage the stress levels. Silence reigns in the workshop, nothing moves, apart from two clouds, one which just came out from the monitor hitting me in the face and one which was just forming overhead.

That's a really good job there. I couldn't have done it better myself. A cinch, I thought? It will be ready in a jiffy or perhaps two, I thought? Judging from what had just happened, I think that this would take more than a jiffy or two to get it back up and running. I've had many monitors that just needed a little tweak here and there, a loving nudge here and there, a spot of solder here and there... all in the name of happiness!

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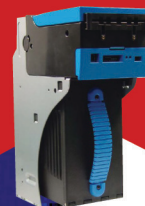
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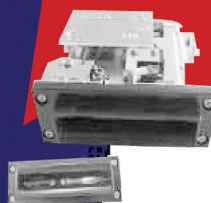
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play against all the rules? What went wrong? Right. Time for some tea. That helps me think straight and analyze the situation. A quick ciggie, I roll up my sleeves and start to dig in. First of all, I have to remove the casualties out of there. They lived a good life and brought loads of joy to many. They didn't deserve to go like this. Their memory lives on in our hearts.

Here is a list of the fallen in the course of duty. They gave their all and paid the ultimate price:

F501 3A fuse (The one that blinded me)
ZD502 18V Zener Diode (The one that broke in two)
PWM Chip IP3842 (This one just stopped living)
Q501 FS7KM-16 MOSFET (This one did the same)
R507 22 Ohm Resistor (This one sort of went a shade darker)
C523 1000U/25V Capacitor (the one that belched electrolytic smoke)
C525 1000U/25V Capacitor (as above)
IC301TDA8172 – (The one that smoked and cracked)

Once the above were replaced, it was time to do the deed and apply the juice to it. All the above would be a total waste of time and parts if I left something out. No stone was left unturned.

This is the where the tension starts to build up. The moment of truth draws nearer. Will it be a huge success or a total disaster? Will there be a band playing in the background or another cloud of smoke? Is Armageddon closer than I thought?

All systems at the ready, double check the wiring and making sure that no elusive screw would be on my precious new components. Lights out. It was pitch black with the only light in the workshop being my soldering station's red indicator lamp. It's now or never. Mains juice was applied. The power supply was on and the green LED indicator was as steady as a rock which boosted my confidence levels somewhat. So far so good. The heaters at the end of the tube could be seen starting to glow beautifully and the most welcome crackling noise could be heard (that's certainly a sound for sore ears). The picture started to appear slowly and surely. Yippee! And double Yippee for luck! It didn't take a great deal of tweaking the preset pots to get a good picture. Seeing Windows 98 on it seemed like the find of a lost world. Huge sighs of relief soon followed accompanied by a smile from ear to ear and the odd jump into the air

whilst doing the Ali-shuffle at the same time. All this tension is making me grow old before my time. Am I living or am I existing? The monitor lives! IT LIVES! The smiling person should smile again.

Quickly removing all the solder joints and unplugging all the test cables from the monitor, it was warp speed to the smiling person who was on her last reserves of smiles. A sudden influx of energy filled that smile as she saw her monitor making its return journey back to her machine. Fiddling with the keys once again, and following the whole process back to front, the monitor was back in its proper place. Hitting the machine's ON/OFF button brought back the familiar and much loved crackling noise. White text on a black background starting coming up. Looking good! Next second the screen was filled with the smiling person's favourite game.

"Ah! That's better," I told the person, who at that point had just started playing on a totally different game. Oh well, that's the way the cookie crumbles. It's really all worth it in the end. Really, it is. Now where's my hot chocolate?

- James Borg

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CPA4059L	15" Bally Bar Top	Fits Bally Bar Top Game

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CPA4077L	17" Atronic Cashline w/o T/S	Atronic 65018825
CPA4085L	17" Aristocrat Slant	LCD for Aristocrat p/n L30700
CPA4089L	17" Konami Upright	LCD for Konami p/n 530002
CPA4090L	17" WMS Upright	LCD for WMS
CPA4093L	17" Star Games	STAR GAMES - VEGAS STAR
CPA4095L	17" Atronic Upright T/S	LCD for Atronic 65024300

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CPA4028L	19" Konami Upright	Replaces KT-LS19E4
CPA4038L	19" Aristocrat Upright w/o T/S	LCD for Aristocrat p/n 566498
CPA4056L	19" Aristocrat Upright	Aristocrat WGF1990-TSLS92F
CPA4062L	19" IGT Upright 25 pin	LCD for IGT Game King Plus
CPA4064L	19V / 20" WMS Slant	LCD for WMS
CPA4076L	19" SDG Upright 19 Pin	SDG 19V LCD 19 pin
CPA4078L	19V / 20" Aristocrat Upright	LCD for ALI 19V (20")
CPA4079L	19" SDG Upright 25 Pin	SDG 25 pin
CPA4080L	19" Bally Upright	Bally 9000 Replacement
CPA4082L	19" WMS Bluebird Upright	WMS Bluebird Replacement
CPA4088L	19" Aristocrat Upright	LCD for Aristocrat USA
CPA4096L	19" IGT Slant 25 Pin	19" LCD AVP Slant 25 pin
CPA4097L	19" IGT Slant 19 Pin	19" LCD IGT Slant 19 pin

All LCDs include Touch Screen and Controller as noted
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IGT S2000 Sticky Belly Door

I received a call from the hard count team that they had a problem opening and closing the belly door on an upright IGT S2000. When I opened up the door there wasn't a problem at all but when I went to lock it, the problem was obvious. The door frame has three tabs that need to align into the grooves so the locking assembly works properly. It happened that the tabs on it somehow got bent upward a little. So, using my pliers, I bent them down just a bit and the door closed and locked perfectly. Now it doesn't need to be slammed to be locked, which could lead to a broken belly glass.

Atronic e-motion Power Supply Installation

Installing a power supply on an e-motion game is pretty simple. It looks somewhat like the ones used in WMS' Bluebird games, only with a different configuration of cables. A co-worker came across the radio and said "Pat I have a present for you in the north

Quick & Simple Repairs #38

By Pat Porath

shop." I thought, "Cool. Maybe some ticket printer parts came in or we got some free t-shirts." Not this time. The present was the power supply for the e-motion game. "Here you go. Throw this in when you get time." "Sure, piece of cake," I said. The unit only had a total of four connectors and one mounting bolt. Simply secure the power supply in place with the mounting bolt, plug in the connectors (they are dummy proof) and fire up the game. PRESTO! The game was booting up within minutes. Why can't even HALF of our repairs go this easily?

IGT S2000 Reel # 4 Problem

This specific game happened to be the fourth game with reel problems that we had lately (stepper games of course). The first reel problem was traced to a main processor board problem. It was decided to send the board in for repair at a cost of around \$300.00. We thought the price was a bit high but the board had to be repaired. A co-worker, "Doc" (a bench tech with around 15 years experience) went on igt.com to look for a schematic for the processor board but was unable to find one because the board

was too new. It happened to be an "S2000 Enhanced" processor board, part number 75512702 revision B. Doc called IGT customer service on three different occasions in order to obtain the correct schematic. IGT's customer service here at the Island Resort and Casino has always been awesome. I would guess because the board is so new, it took them a bit just to find what exact schematic Doc wanted. After receiving it, he found the components that more or less drive all of the reels. The "S2000 enhanced" processor board is set up to drive five reels. The game he was working on only had four so he took components from the 5th reel circuitry (which weren't being used in this application) and used them in the other part of the board to get the game running again.

How did he do it? Well, the locations of the "reel drive" components are: reel 1-U102, reel 2-U101, reel 3-U100, reel 4-U88, and reel 5-U87. These components are called "stepper drive ICs" IGT part number 32108990. Along with those ICs are some Shockley switching diodes which he found to be shorted in each case so far with the reel problems. Their locations on the processor board are

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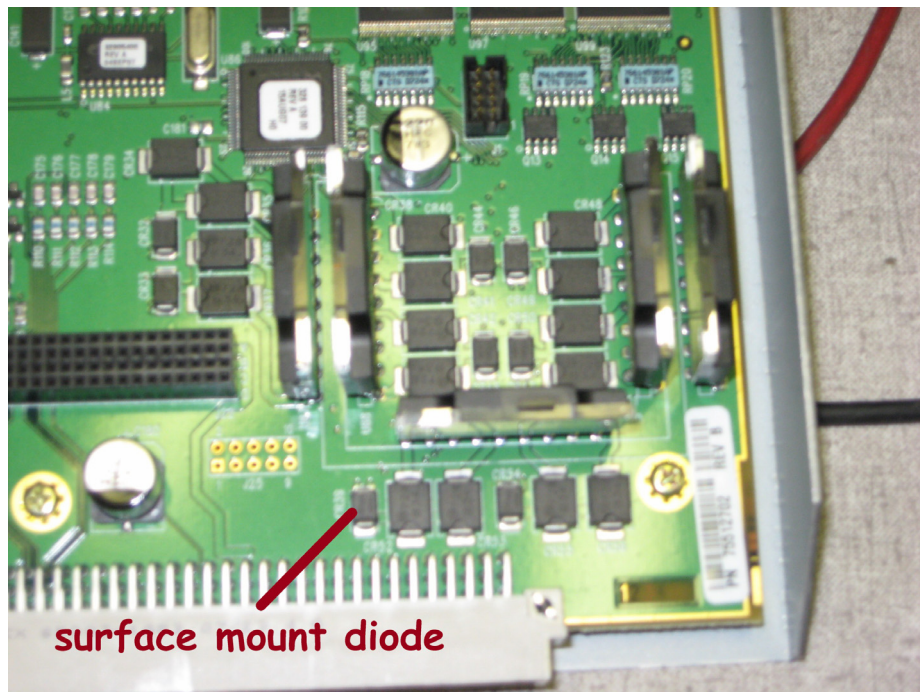
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CR9, CR12, CR34 thru CR 37, CR40 thru CR43, CR48 thru CR53, and CR55 thru CR60. In all of the cases, he found one or two of the diodes shorted. The IGT part number for these is 48013791. The cost of the board repair this time was under \$10.00, which now saved the slot repair budget \$290.00. He performed the repair in under a half hour. Since it was a surface mount diode, the board did not need to be removed from the board tray.

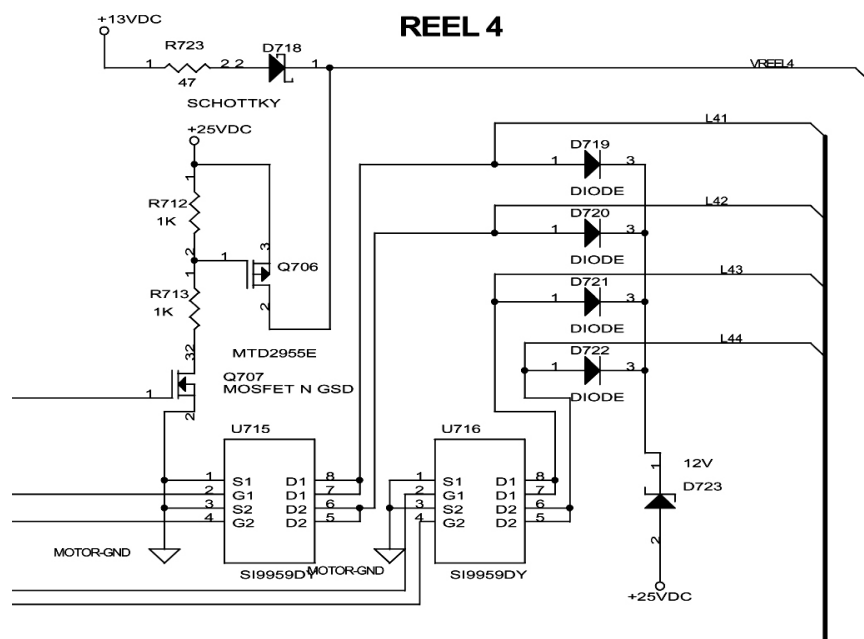
If you are not experienced at soldering, DO NOT attempt to repair the board because you will ruin it. If you are experienced, be very careful. If you are unsure, ask someone for assistance. One way to remove the surface mount diode WITHOUT the proper tools is to use two hot soldering irons, one placed at each side. When the solder melts, quickly remove the diode. As mentioned earlier, we didn't happen to have any of the diodes needed in stock, so one was removed from 5th reel circuit and installed in the 4th reel circuit. The processor board was put back in the game and it worked great with no errors at all. So, if you have an IGT S2000 that has a reel tilt that will not clear and troubleshooting leads you to the processor board, you may have a bad surface mount diode on your hands. From the "repair budget" aspect, the first board cost \$300 to repair because it had to be sent out. Three other repairs were made, this one being the fourth. The total would



surface mount solder iron



surface mount diode



have been \$1200 but since the repairs were done in-house, the savings were around \$1160.00. (We paid for the first \$300 repair, total of four boards would have been \$1200, then minus \$10 for four repairs = saving of \$1160.) By getting the schematic and finding out exactly what the problem was on the board, there was a substantial savings in cost of the repair and there wasn't much down time of the game.

IGT S2000 Displays "Netplex Down" Error

On an IGT S2000, if the VFD shows "Netplex down" the problem may be a bad power supply. When I initially opened up the game and turned it on, I waited a minute or two and the error didn't change. I had seen this symptom before and was trying to recall what

the cure was for problem. After a few minutes, something told me that it was possibly a power supply problem. I wasn't exactly sure though. Not only was there an error on the VFD, there wasn't any voltage at the reels either. When I gave one a spin by hand, it "free wheeled." Still not positive that it was indeed a power supply problem, a co-worker and I swapped the supply with a game next door. The "suspect" power supply that we swapped is the one located directly behind the reels. (It was an IGT S2000 three-reel upright game.) Once the swap was complete and both games were turned back on, no doubt it was a bad power supply. The original game fired up perfectly. I went to the shop, grabbed a spare, and installed it where the bad one was. Now both games were

back up and running. To install the power supply behind the reels is very easy. Simply remove the reels, loosen one small bolt and slide the unit to the left. It now should be out of its mounting bracket. Install the replacement and there you go! Another game up and running.

CDS (OASIS) Communication Problem With a Game

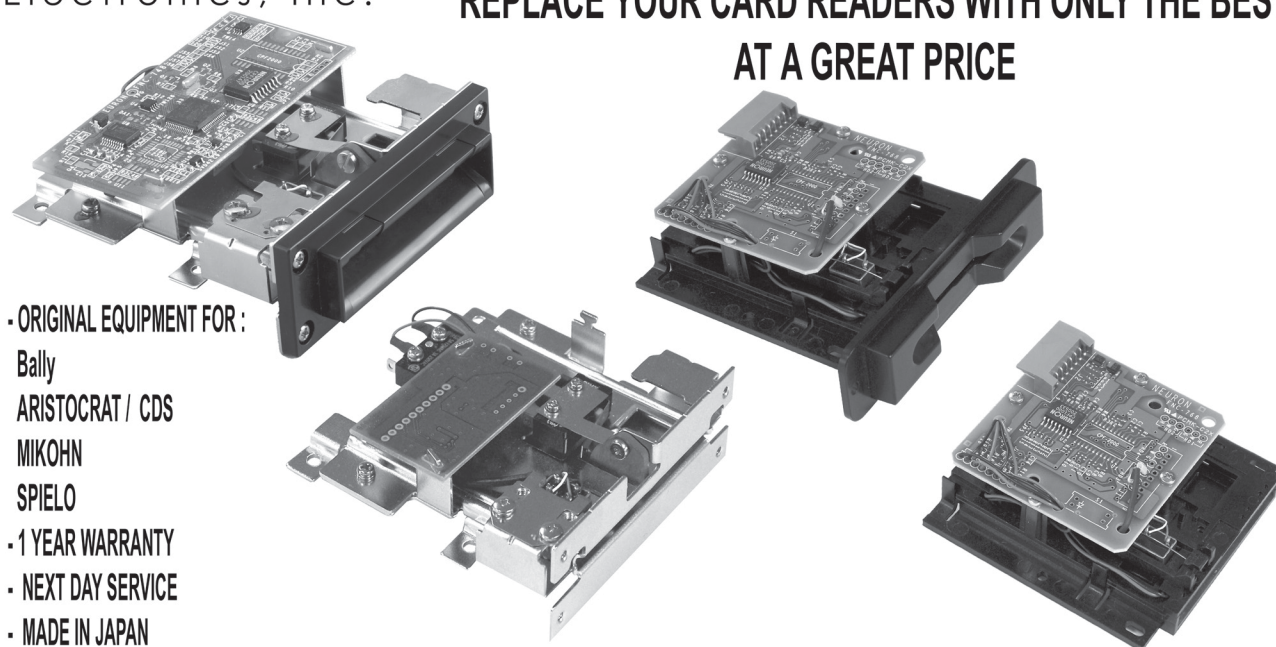
This game happened to be a WMS Bluebird. It didn't seem to matter what I did, the game would not communicate with the system. Surveillance called me and asked me to look at it because when a slot attendant was in the game, nothing came up for it on their computer screen. I checked out all kinds of things at the game end. The "global setup" was correct, the

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machine was communicating with the Sentinel board because I had a “main door” OPEN and CLOSED on the CDS display. (I am used to calling it CDS but it is also known as the Oasis system too.)

So what was going on? The green communication LED on the Sentinel was flashing rapidly, which meant that it was working properly. What about the computer system side of it? I checked out the CDS “diagnostic monitor” and clicked on the “transactions” tab. It did NOT show that I was even in the game! No doubt there was a problem somewhere. Next I looked at the “poller” screen. On the DPU where the game is, there were a couple of games that had errors (maximum 24 games per DPU). At this point I knew I had a problem somewhere in the bank of machines but where? The bank next door was in the process of being installed but I didn’t see what that had to do with the bank that had the problem.

At this point, I wasn’t sure what to do. An outside company tech was working on the new bank and a co-worker was getting them set up to be released to be played. I started to help get the new bank of games up and running too. During the “global setup” process I came across the Sentinel identification number of 12. What the world? The game next door is on the same DPU and is supposed to be ID number 12. Maybe this is the problem. Come to find out, the global setup

wasn’t done yet on the new bank, which meant that a new game AND the game in the other bank BOTH had a Sentinel ID of 12. Two games with the same identification number is a problem. You cannot have two games on one DPU with the same Sentinel ID number. I set up the new bank of machines like they were supposed to be and BINGO! Both banks of games were now communicating properly. Awesome! I checked the “poller” computer and the whole bank was colored yellow, which meant all of the games and the DPU were fine. In conclusion, two games that were on the same DPU had the same Sentinel ID number causing major communication problems.

Quick and Simple Ticket Printer Repairs

Some individuals may or may not agree with the way I personally repair them (or try to repair them in some cases) but whatever the case may be, this is my basic “plan of attack.” Where in the world do you even start? On one side, there are two Ithaca 850s with different software versions, such as REV. 33 and REV. 37 (different motherboard PLCC chips). A REV.33 version will work in an “Aristocrat” game, but will not work in a “Bluebird”. But, a REV. 37 chip WILL work in a “Bluebird.” A REV. 33 chip will also work in an older WMS 550 ticket printer. What if there is a GEN 2 Netplex printer that has a tag in it that is marked “broken paper

release lever?” Just because the lever is broken, doesn’t mean the whole printer assembly is bad. The motherboard is still good and can be swapped with a board that seems to be bad.

Repair Tips for the Ithaca 850

Simply cleaning the printer optics with a dry Q-tip and using compressed air to blow out the dust bunnies cures some of the problems. If an 850 has a tag in it that reads “communication error” the motherboard may need a BRAND NEW UNUSED PLCC chip. If the correct version or “REV.” isn’t available, try a BRAND NEW UNUSED different version chip in it. Make sure the power to the printer is OFF, remove the original chip, then install the BRAND NEW one. If it is the same version, the printer is ready to be tested. If you install a different version of a BRAND NEW chip, then power up the unit with it installed and feed paper into the print head. Make sure the black index mark is aligned properly. Next, power it down and install the ORIGINAL chip. By doing this procedure, it doesn’t seem to cure only some of the communication errors but also some of the “printer flag timeout” errors.

If the printer has been cleaned and it still doesn’t want to feed paper, try a different print head. There are only three cables that connect it to the motherboard. If the motherboard seems to be

bad in a different printer, the print head still may be good. Why not try to make one good unit out of two bad ones? I have also repaired a few of the 850s by ever so gently and VERY CAREFULLY “adjusting” the black mark index optic (that is already mounted at angle) to point more toward the center of the paper. I DO NOT mean to BEND the optic frame so that it is “looking” at the center of the paper, but adjust it so it points inward a very, very little bit more than it did before. For example less than ½ a millimeter! (A very small adjustment! Like adjusting the potentiometers on a DBV 145 bill head. Anyone remember them? :-)) If the printer paper partially goes in and out quickly, once it has been fed into the printer head, then the “adjustment” may cure the problem. Or if the printer STARTS to print normally but then all of the sudden the roller goes in reverse and takes the ticket back into the print head, it may need the “optic adjustment.” What if a known good spare 850 is installed and the game STILL displays a printer error? It may be a bad power board, AKA “com board.” The Com board (located directly behind the printer in which the ribbon cable plugs into) may need to be replaced. On the Ithaca 850 there are only two small screws and two connectors to remove the board from the printer assembly. Of course this is only done with the power off.

FutureLogic GEN 2 Printer

Mostly what I do with this type of printer is cleaning. I recently ran into a GEN 2 on the floor where it would not feed paper into the print head. The game was rebooted and there weren't any obstructions in the print head. I did notice that an optic was very dirty though. It is located near the front of the unit in the center and it had a bunch of dust on it. I didn't have a Q-tip on me to clean the optic and the shop was further away than a nearby Kleenex box so I grabbed a tissue and cleaned the optic. Guess what? Once it was clean and it could “see what it was doing” the paper loaded fine and the game was back up and running. On the bench I have started to use a dry small soft bristle paint brush (The same one that is used for cleaning bill accep-

tors on the bill acceptor bench). The brush works quicker and does a good job on the larger areas even though a Q-tip is still needed for the optics. I also use compressed air to blow the dust bunnies out. On a few of them, it was hard to believe all of the dust that flew out. If one GEN 2 NETPLEX printer has a broken release lever and another GEN 2 NETPLEX appears to have a bad board, why not make one good one out of the two bad ones? Take the good board out and install it into the one that has the bad board. Now you should have a GEN 2 NETPLEX that should test ok. As a reminder, NETPLEX is associated with IGT games, so you wouldn't want to put a GEN 2 RS232 board in a unit that is marked “NETPLEX” because it wouldn't work in an IGT game.

Cont. Page 21

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Be prepared for six hours of accelerated learning each day. Class begins at 9:00 am sharp each day and continues until 4:00 pm. The Casino School provides each student with reference materials and troubleshooting guides that will be valuable aids for repairing equipment on location and in the shop.

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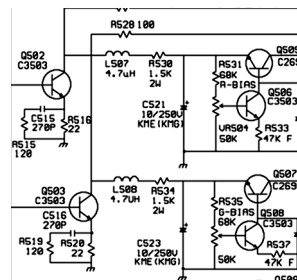
This relatively inexpensive piece of test equipment is easy to operate. Casino School students learn to use the digital multimeter to perform tests and measurements that will pinpoint the cause of a failure down to a single component.

ELECTRONIC COMPONENTS

The individual components used in games are introduced. Parts such as resistors, capacitors, diodes, potentiometers and transistors are covered individually. Students learn how the components work and how to test them using the meter.

SCHEMATIC DIAGRAMS

Schematic diagrams are the "blueprints" for electronics. Learning to read schematics is easy once you know how the parts work!



JCM Ticket Printers

First of all, let me say that the JCM ticket printers that we have usually run very well. I only have accumulated three spares so far, and out of the three that weren't working, two of them now are. How you may ask? Simply by blowing out the printer heads with compressed air and cleaning the different sets of optics, they now test good in a game. Once the print head is open, it is obvious where the optics are located. As with the vast majority of printers, I prefer to clean them with a dry Q-tip and compressed air. Only if the units are very dirty, I prefer to use the "printer cleaning pen." The cleaning pen looks more or less like a permanent marker. It is about the same size and has a cleaning solution in it. The pen cleans up the thermal print head really well and I have used it on the GEN 2 optics as well. I do not know if it is recommended to use on optics but I haven't run into any problems with them so far. We have around 1350 ticket printers on the floor, including the Ithaca 750, the Ithaca 850, the GEN 1 (AKA Seiko printers), the FutureLogic GEN 2 and the GEN 2 Universal (complete with a USB port), JCM, and even some of Transact Technology's Epic 950s.

That's all for now. Tune in next month for more Quick and Simple Repairs.

- **Pat Porath**
pporath@slot-techs.com

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This article focuses on the JCM WBA Bill validator as used in casino machines. Make sure that you have the latest software. Check the JCM website jcm.global.com

The main problem with the units in the field is that of dirt. Usually in the head (this affects performance) or in the transport (this will cause errors that will disable the bill validator).

The Head

Remove the head from the transport by pulling down on the round bar in front and sliding the entire head out. Open the head by pulling the two plastic clips forward and simultaneously lifting the upper section of the head.

You will now observe the sensors – the rectangular lenses are optical sensors, the magnetic head is fairly obvious and the round lenses are only for positioning.

Maintaining your JCM WBA Bill Validator

By Peter Eagle

DO NOT USE AN ALCOHOL BASED CLEANER

With a soft damp cloth (not dripping – important) wipe the inside of the unit removing all dirt that has accumulated inside the note path. (This is especially applicable to drink spill residue.

Examine the rectangular lenses for scratches – any scuffing or a milki-ness caused by alcohol based cleaning solvents will degrade the acceptance performance.

If the lenses are scratched they can possibly be polished (you can polish the scratches out at a push using Brass and a glass lapping plate or a beeswax type polish but replacing them is better).

If the lenses are milky they should be replaced. This involves removing both the upper and lower sensor boards and pushing the lenses out. See the procedure outlined below for opening the head and removing and replacing these lenses. If the units have been in the field a while, one can perform a “deep clean” – this is a fiddly and time consuming but not difficult job. One proceeds as follows: Remove the bezel if fitted by removing the two screws (figure 1).

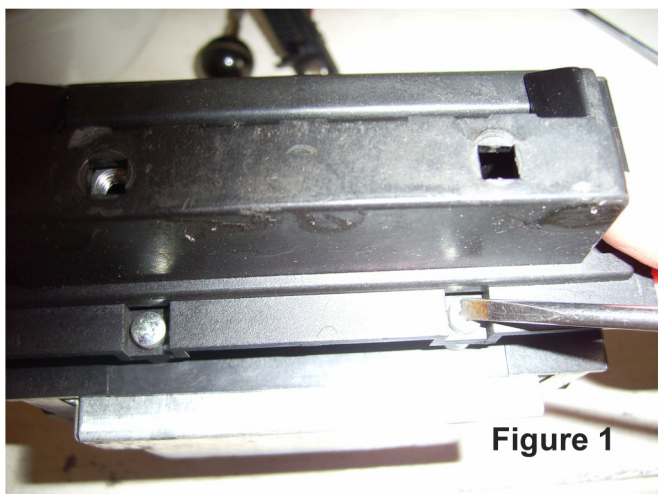


Figure 1

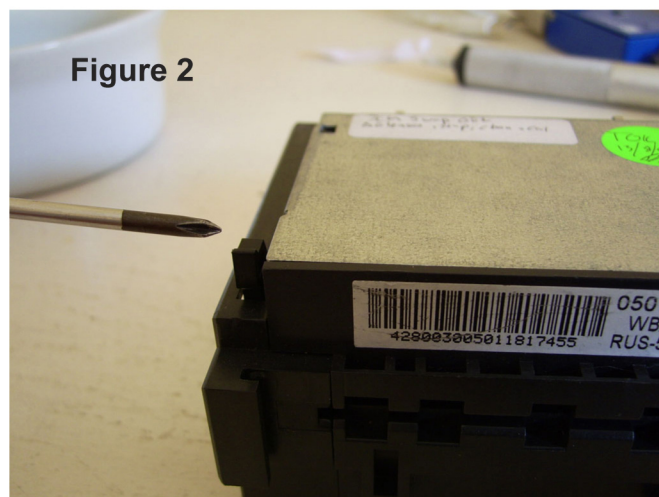


Figure 2

The bezel is removed by opening the head and sliding the bezel out upwards. The head is opened by pulling forward on the two plastic clips indicated and simultaneously pulling the top of the head upward (figure 2).

Open the head unit and remove both sensor boards the upper one by pressing in the two plastic clips and sliding the top metal cover off backwards (see picture of clips figure 3) Remove the lower cover by unscrew-

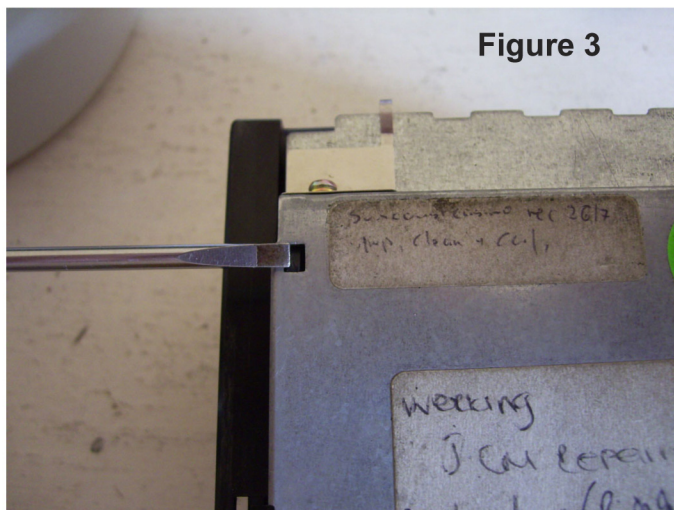


Figure 3

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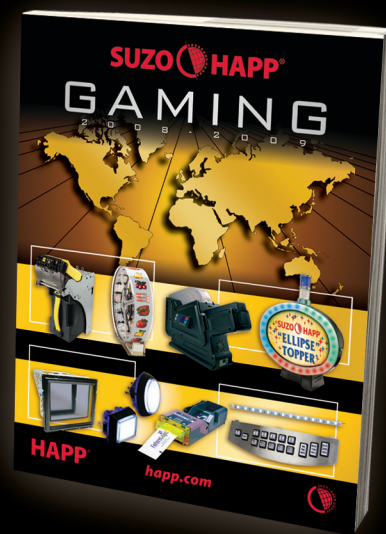


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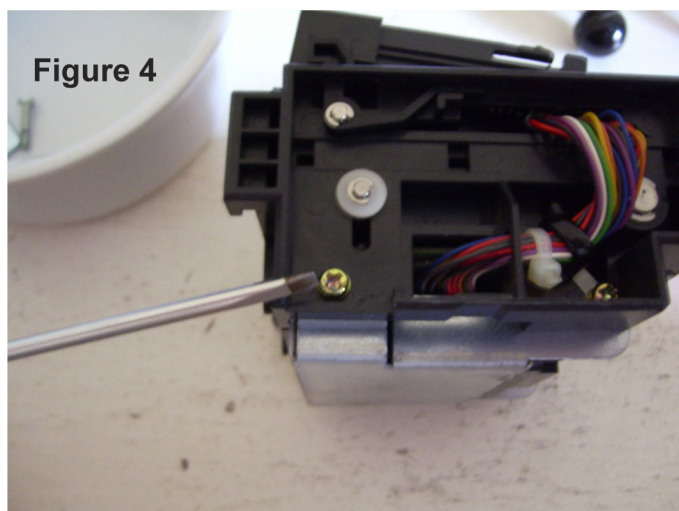
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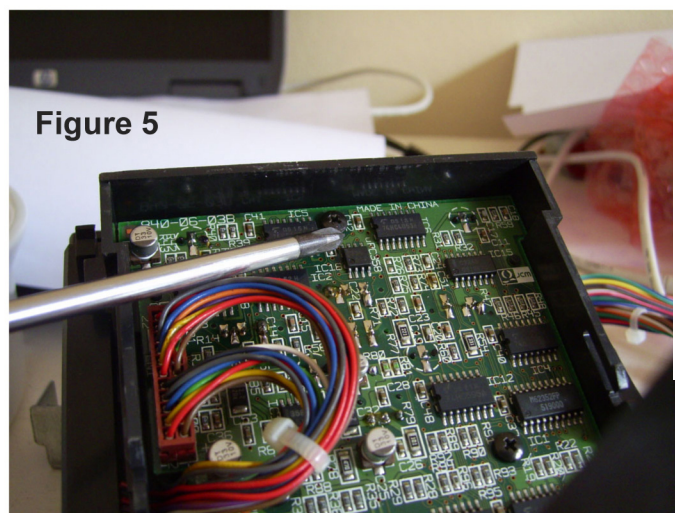
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ing the four screws as indicated in figure 4.



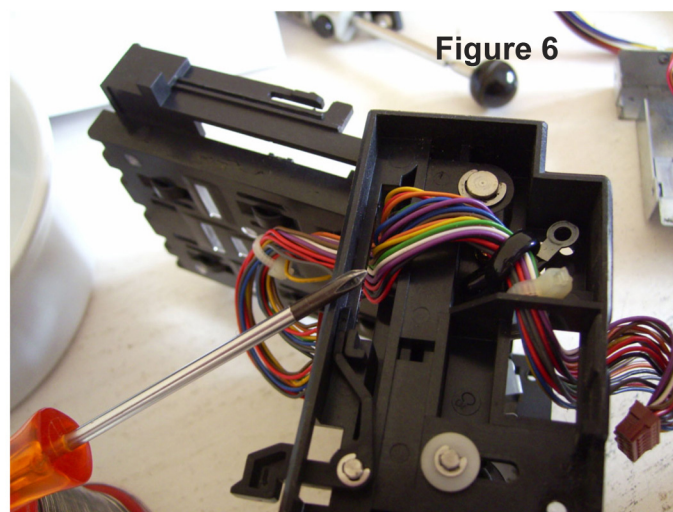
Remove both upper and lower sensors boards by removing the three screws holding each board in (figure 5).



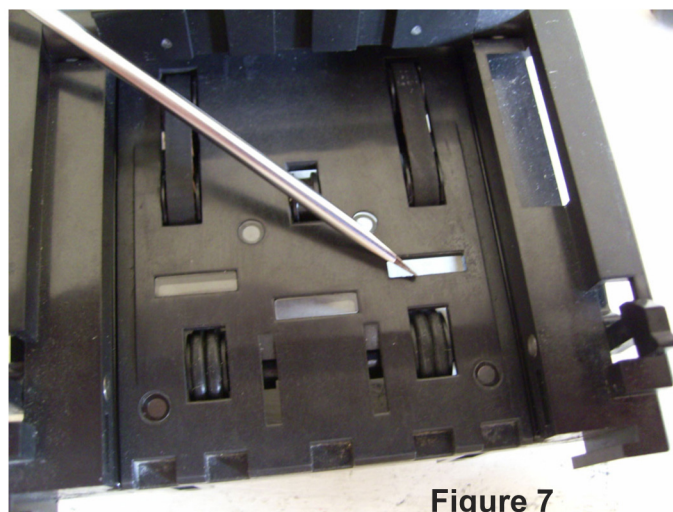
Remove the harness that connects upper and lower sensor board (figure 6).

Remove the six rectangular sensor lenses by pressing them out from the inside (figure 7)

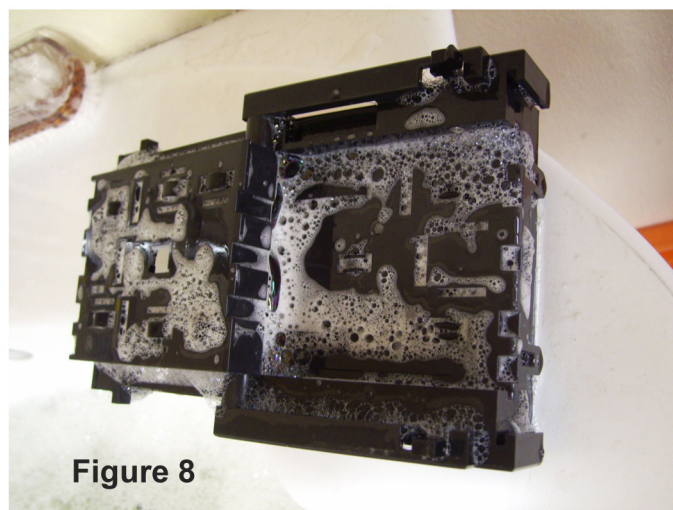
AFTER ensuring that ALL electronics and cables are removed, one can actually wash the plastic sensor



head parts in a bucket of warm soapy (dishwasher) water - paying special attention to the rollers and belts removing all deposits (fig. 8).



Dry the plastic parts thoroughly using a hair dryer. – Be careful not



to overheat the plastic mouldings. Dust off the sensor boards using a small paint brush – ensure that they do not look like this one.

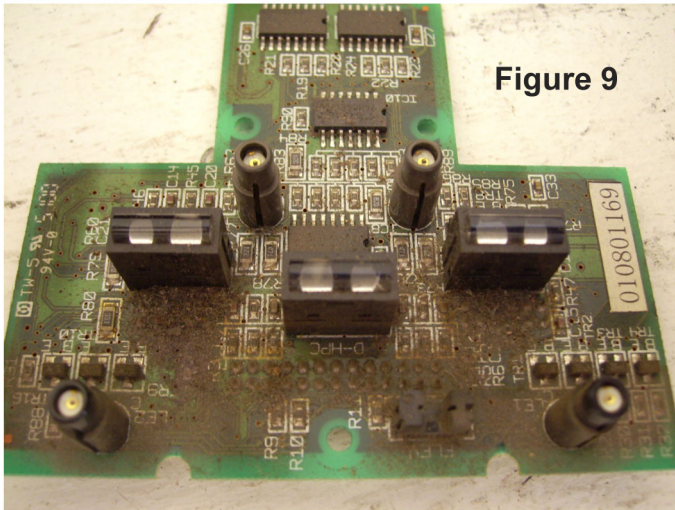


Figure 9

Clean any form of deposit from the boards using alcohol or PCB cleaner – taking care to get as little as possible on the actual sensors.

Figure 10- Replace the six rectangular sensor lenses (you can polish the scratches out at a push using Brasso and a glass lapping plate or a beeswax type polish but replacing them is better)

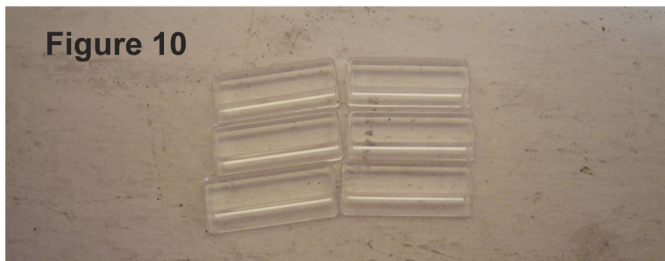


Figure 10

Reassemble the unit in reverse order paying special attention to the entry rollers and associated sensor “knife” (the two plastic prongs on the roller – make sure they are rolled as far forward as possible (figure 11)).

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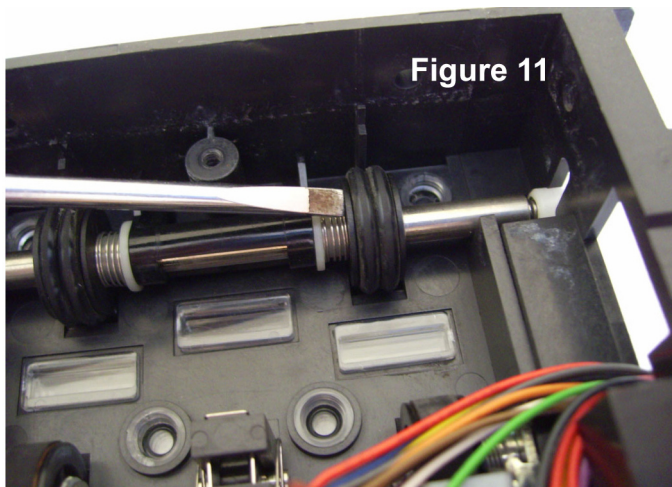


Figure 11

Once all the parts are replaced one should calibrate the unit using the special KS-036 black and white calibration paper (figure 12).



Figure 12

You power up the entire unit (in a machine is fine) with dipswitches 5, 6, 7 & 8 on (figure 13).

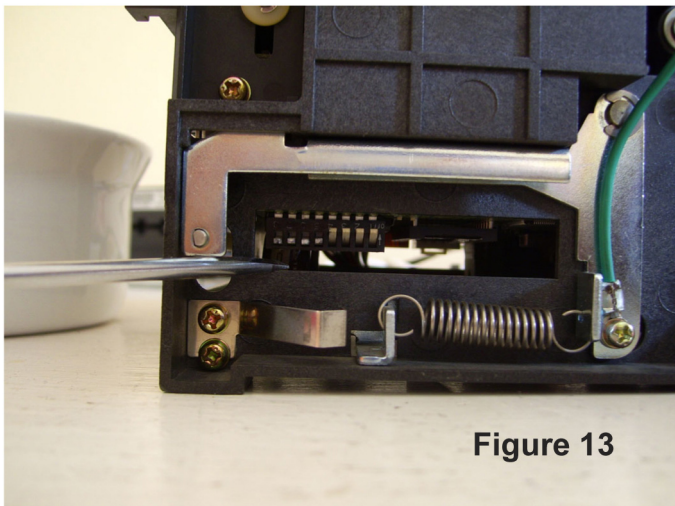


Figure 13

Place the cal paper in black side first. It will go in and out a few times and then come out. The bezel lights should then blink rapidly and continuously indicating a good cal – If they blink slowly in a repeating pattern that indicates an error and the number of flashes tell what kind of error it is (consult the manual).

Remove the BV and switch all dip switches off.

This procedure then ensures that the BV is in the best state to accept notes. If the acceptance is still poor, there is a software issue (usually due to note changes) and a new software version is required – JCMG will scan notes and get the engineers to make new software.

Transport

Use a small paint brush to remove all the dust from the unit. The transport contains several sensors used to indicate the position of the note in the transport during acceptance. The other main area that suffers from dirt build up is the feed out sensor. This will cause notes to be mis-stacked or there will be multiple bill disputes. This sensor is situated at the rear of the transport and looks like this (the smaller prismatic plastic unit in the centre of figure 14).

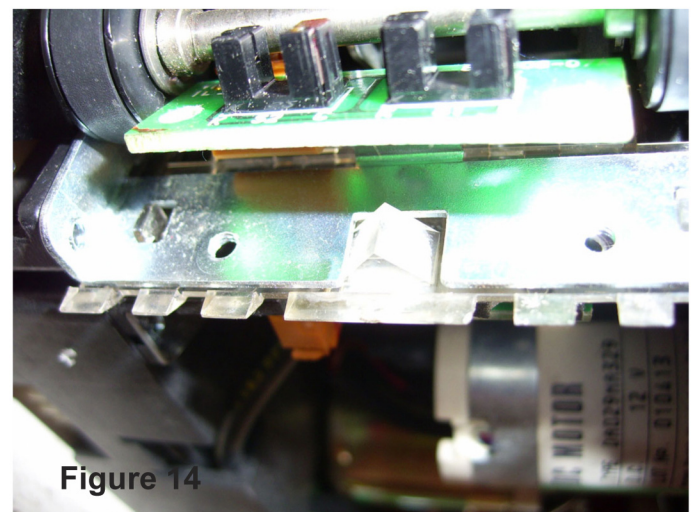


Figure 14

It is removed by removing the rear most gear on each side and then removing the two screws on each side, Upper (figure 15) and Lower (figure 16).

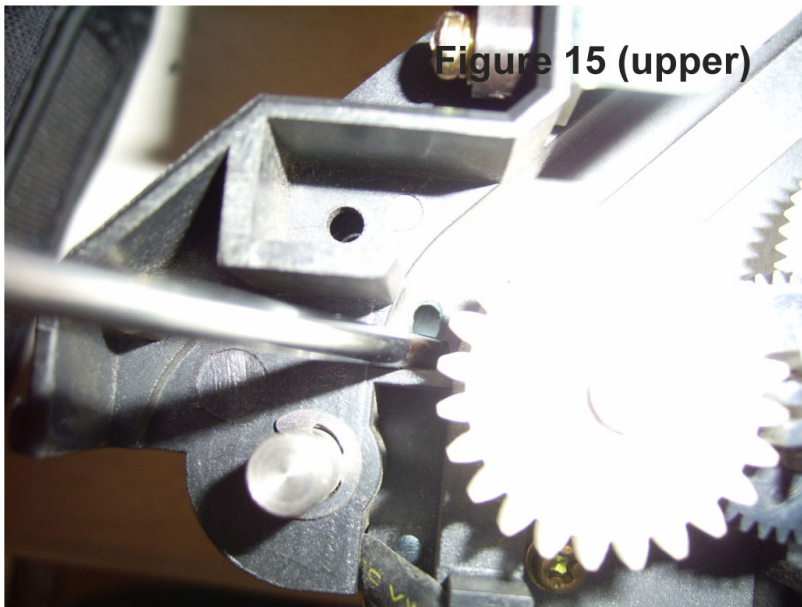


Figure 15 (upper)

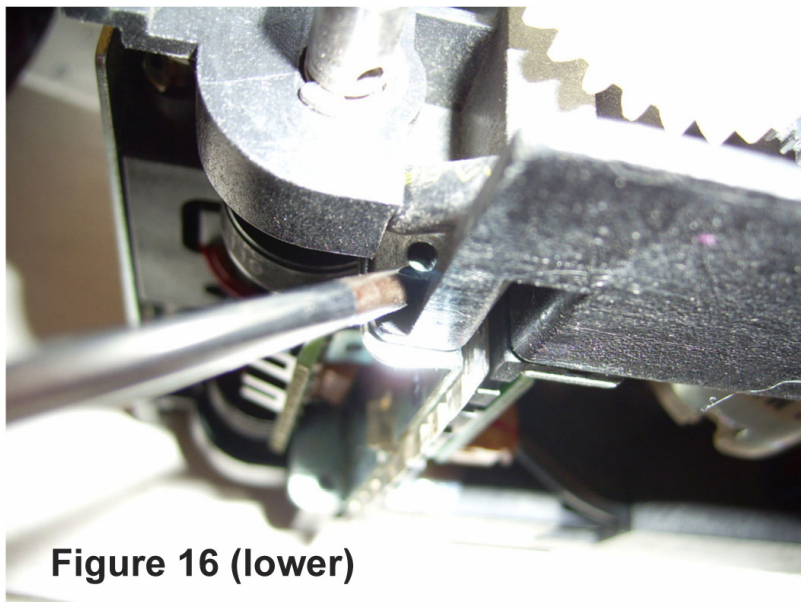


Figure 16 (lower)

Once this prism is removed it too can be cleaned with soapy water and reinstalled.

Conclusion

Once the issue of ensuring that the latest software is installed and the unit is properly cleaned and calibrated, most problems should be resolved. If however the problem persists, please contact your closest service agent (details available on the Figure 14 Figure 15 (upper) Figure 16 (lower) website JCM Global) and if they are not able to assist, please contact JCM Directly.

Hopefully this will provide some insight into the JCM products. Any comments or queries can be directed to me on eagle@jcm-germany.com

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- Peter Eagle



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Designing and Running Efficient Touch-Enabled Gaming Systems



By Charlie Tuff
Senior Applications Engineer

Over recent years, touch screens have moved from being a niche afterthought to an essential part of many gaming systems. By choosing the right technology and the right touch screen partner, it can be easy to design a successful touch screen system that will continue to function for years to come.

Selecting a good touch screen system

Many potential issues that may affect a touch screen can be avoided by designing a system and application with touch in mind.

Picking the wrong technology for a specific environment or not properly mounting the touch screen may prove costly in the long term. When selecting a touch technology, there are a number of things to take into consideration:

Where is the screen going to be located?
Will this be an attended or unattended location?
How regularly will it be

cleaned and maintained?
How rugged does the screen need to be (both in impact resistance and surface durability terms)?
What sort of input is required (finger/stylus/gloved hand)?

Knowing this information up-front will allow the customer and touch supplier to work out the best solution to suit the application's needs. Other considerations will depend on how the user interacts with the touch screen. For instance, if the user will be dragging their finger over the screen often, it is worth considering a touch screen with a smooth, easy glide surface (sometimes referred to as having a low surface energy).

If there are going to be a number of touch screens close to each other, it is advisable to choose a touch screen that has a consistent and tightly controlled optical specification, so that all the displays have a consistent image. An example of such a touch screen is the MicroTouch ClearTek II Capacitive Touch Screen

from 3M, the diversified technology company, which has an overall light transmission of 91.5%. For instances where impact resistance is required, touch screens such as the MicroTouch ToughTouch II Capacitive Touch Screen from 3M are ideal. ToughTouch II complies with UL-60950-1 safety standards, offering increased protection and superior wear resistance.

Every touch technology has certain requirements when it comes to the physical mounting of the touch screen, both with respect to mounting the touch screen into an enclosure, and to the surrounding environment. Touch screen manufacturers will detail in their instruction and installation guides how best to install the touch screens. They should also be able to offer detailed technical advice from specialist Applications Engineers.

The touch screen itself is only one part of the equation for designing a successful touch screen system. Other things that

affect the performance and ease of use are the electronics that drive the touch screen (commonly called the controller) and the driver software that resides on the computer. Using the best touch screen with a below-par controller will give poor results, whilst driver software that doesn't have a full feature set will limit the ability to configure the touch screen. Often, the touch screen systems are sold as a "pair" of electronics and touch screen together. This may offer a simplified solution compared to other offerings where it is necessary to perform a manual procedure in order to get to the quoted accuracy for the touch system. Newer controllers may also offer the ability to use the Windows native HID drivers, making installation easier.

The most modern software drivers for touch screens, such as MT 7.12 Software from 3M, can allow for a number of different configurations. Options such as multiple monitors driven by one computer, pre-programmed responses for certain areas of the touch screen are possible, as well as generating automated silent installation options. This is useful when deploying a large number of units that need to have the same configuration. System designers may also want to investigate the options available through using application programming

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interfaces (APIs) built in to drivers, allowing specific functions such as touch screen calibration to be called by other applications. Again, detailed technical advice is available from specialist Applications Engineers.

Keeping Your Touch Screen Functioning

Most times when a touch screen system fails, the root cause of the failure is one of a small number of reasons:

- Malicious damage
- The wrong touch technology installed (such as a resistive touch screen mounted in an unattended outdoor location)
- Use of incorrect cleaning materials
- Liquids being sensed by the system, generating false touches
- Liquids getting inside the enclosure through the touch screen seal.

Sometimes, using the

wrong chemicals to clean a touch screen can adversely affect the performance. For instance, typical Infrared-based touch screens use a polycarbonate plastic to house the IR LEDs. Some chemicals commonly used to clean touch screens may over time start to degrade the polycarbonate, affecting sensitivity.

If there is a risk of liquids falling onto the touch screen and there is a concern about this creating a false touch, then switching a touch technology such as surface capacitive that does not sense contaminants as touches may be the best course of action. This also applies to scenarios where it is important to seal the touch screen to a standard such as IP65 or NEMA4. Discussing these requirements with the touch supplier will help to determine the right touch technology.

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touch screens is that they require periodic recalibration. The modern touch solutions should only require a calibration when the system as a whole is altered (for example, if the picture on the display moves, if a touch screen has been replaced due to damage, and so on). In these cases, it is often advantageous to be able to perform a calibration without the need to exit the main application and call up the touch driver control panel. Launching a stand-alone calibration utility, or invoking a calibration through an API call in the main application makes this an easy option to design in.

What to do if the touch screen isn't working properly

After all this, there are still times when a touch screen will stop working, and there will be a need to diagnose and fix the problem. At this point, good diagnostic tools and a basic understanding of how the touch screen works can help immensely.

Most major touch screen manufacturers offer a number of software diagnostic tools that will allow performance testing of the touch screen, and diagnosis of where a fault may lie. These tools give a technician the ability to check a number of functions of the touch screen:

- Test the communications between the computer and controller
- Query the status of the touch controller
- Monitor the signals generated by the controller on the touch screen
- Check for external influences such as electrical interference from other equipment.

Often, the status LEDs on the controller boards also provide feedback regarding the function of the touch system, and can help to narrow down the area of the system affected. The controller reference guide from the touch screen manufacturer will detail what the LED signals and flashes mean. For instance, if there is no touch response, but the LED is responding as the guide says, this will point a technician to look first at the communications between the controller and the computer. Alternatively, if the LED is not responding as expected, this would point towards the touch screen or the connection from that to the controller as the area to investigate.

Summary

Modern touch screens are now a common core element within many successful games systems. By making a few decisions early in the design cycle, and working with an established touch screen manufacturer, a developer can be confident of having a reliable, solid platform for years to come.

- Charlie Tuff

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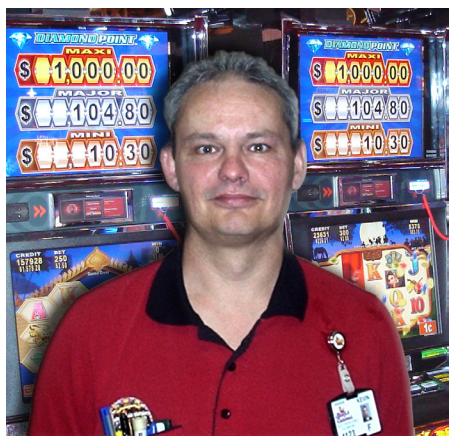
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WMS Bluebird

After a Slot Attendant had reseated a UBA live, the machine went into the MBR read failed, I/O error. We tried to reboot the game but to no avail. The machine stopped at the same error message every time we tried to reboot the game. Using the Bluebird manual, we attempted to research this new error message that we had not seen before. However we could not find it, so we did the next best thing and contacted our WMS Gaming representative, Marty Saar. We played e-mail tag discussing my new problem. I was given four options: Change the CPU board, change the bulkhead board, change the power supply or change the software. I knew that if I changed out the CPU board, I would have to have Marty drive down from Toronto and reset the MAC address on the controller. I decided to follow the instructions set out by Marty and swapped out the CPU board. After performing a RAM clear, powering down the game and placing the Operating System and game flash back in the game, the same situation came back up. I re-cleared the old board and placed it back in the game so Marty would not have to come down.

Troubleshooting Machine Problems

By Kevin Noble

Step two: Changing out the Bulkhead Board. Using a blue Sharpie, I first labeled all the connectors with the correct jack number. I wrote on the plugs so I would not miss any connections when I tried to install the new Bulkhead Board. Feeling confident that this would solve the problem, I started to re-clear the CPU again, placed the original flash card back in the socket and powered up the machine. Much to my disappointment, the error was still there.

Step three: This was a simple procedure of swapping out the power supply with a known

good one but as expected, the error persisted.

Step four: I ordered the Operating System, game theme flash and, just in case, the BIOS. The next day the software arrived from the warehouse as I was eagerly awaiting a solution to this problem.

I was tied up with another task for my Operations Manager so I asked Chris Mangham to swap out the flash card or the BIOS one at a time so that if one of the items failed, I would know exactly what caused the problem just in case this happened



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again in the future. I can also log it in my troubleshooting repair book. I heard over the radio that Chris was verifying options from another game with another tech. I knew that that problem was solved and after two days of troubleshooting, I wanted to know what the problem was. I quickly made my way out to the gaming floor and met up with Chris to find the solution to my problem. I asked him if he started to swap out one thing at a time and he said "yes." He stated that he had started with the Operating System, had RAM cleared the game and had set all the options. This cleared the problem.

Atronic Emotion Another Fun Mystery

Last year, we converted a Lady Orleans link progressive to a Deal or no Deal link progressive. This machine had a history of the game being rebooted around that time. When I got involved and reviewed the MEAL book, I was checking the history of any problems that this game had encountered and noticed the entry "game being rebooted - white screen, blank screen." Just recently the machine kept recycling. Every morning we would patrol the floor, looking for burned out lights, when we noticed this one game; both screens were white.

We powered the machine down and back up. It would reboot and game would come back into normal playing mode. We asked the Slot Attendants to keep an eye on this machine (This must have been the reboot game entries into the MEAL book). Later that same day, the afternoon shift noticed that both screens were now black but all the game machine lights were still on. We were asked why we didn't notify anyone that we powered off the game and placed it out of service. We told them that if we had pow-

ered off the machine there would be no machine lights at all. This machine was left out of service for the remainder of the night because the machine would not come back to life. Eventually, they powered off the game until we could have a look at it in the morning.

The first thing in the morning we powered up the game and it came back to life. No problems we encountered until 5:00 that afternoon when we got a call that the game was acting up. Of course, this happened right at shift change and we passed it on. The next morning we came in faced with the exact same situation. We powered it up and it began working again but this time, sometime in the afternoon we got a call to it when a patron was in bonus round. It took about an hour and a half to get this machine back up. This time, we contacted the Atronic field service representative and explained the problems we had encountered and the history in the MEAL book. It was suggested that we clean the CD because these games keep rebooting to the point where the screen would go into the white screen during the rebooting process.

After playing e-mail tag with Andrew from Atronic Gaming, we had performed many RAM clears, COMM board clears, replaced the CPU, replaced the COMM board, the drive unit and graphics board. On the back of the meter sheet, I had written everything down that I had done to the game. By the time the weekend rolled around and Gary Smith was on, I passed on the message that everything I did was on the meter sheet PLUS all the e-mails Andrew and I had exchanged were forwarded on to Gary to continue on with solving this problem. When I arrived back on Tuesday, my first question to Gary was if this was repaired and what he did to repair it. Gary said that he had changed the Multi-

media lite board and yes it was back in service.

Bally Alpha Link Progressive and the Chameleon Sign

A Silver and Gold Link progressive was just an old theme being upgraded with a newer version of Bally Alpha machines back in early December of 2007. Out was the Bally S6000 using a CON II controller. In was the Bally Alpha using the new DCU utilizing the Super Link software. Installed in these new cabinets was the never seen before CHAM III controller on the 14 cell mini display in the games. The problem was that the Chameleon sign worked by itself but when the ten games were added to the loop, the overhead sign would go into a C1. The sign would work by itself with up to two games on the bank but by adding another game, the sign would go into the C1 error again. I was off on vacation for the start to finish off this machine move and progressive project.

I started getting involved searching for answers with suppliers, other Technicians, and message boards on how to solve this problem, along with another Technician, Reggie Wood. Reggie continued to experiment with the information that I found and had passed along to him. We e-mailed this problem to two suppliers for any suggestions. There were a couple of ideas tossed around. It was suggested our software in the CHAM III boards needed to be upgraded. It was not like we could just pop in an EPROM and test it. We had to go through the proper steps and follow the policies and procedures and order an upgrade if it was approved.

This bank of machines using the same equipment was working at other sites which made this challenging. It was suggested that we try a 485 distribution board to amplify

the signal to both the games and to the overhead sign. This problem was on going for a couple of months and our Operations Manager started to get involved to get this problem solved once and for all. Billy McLellan from Macklyn's Casino Services was at the local commercial casino in town and was willing to stop by free of charge to look at the situation and to train us on the new Super Link software and programming procedures. Billy and I were in constant contact through e-mails trying to put an end to this dilemma. I was included in an e-mail to one of his contacts (Mike Fetic from PGI Corp) that had some information on how to solve this problem. The 485 board was one idea that was suggested along with the termination jumper located on the CHAM III board. This bank is a progressive that can only be worked on in the morning when we were closed because of all the patrons playing on the bank. We had to pick our spots to troubleshoot the C1 error with all the projects scheduled.

One Technician that never gave up was Reggie Wood. His constant probing into solving this situation went unnoticed. When he had the chance every morning, you could see him playing with the sign with the ideas passed on to us. He also found out that one technician had changed the address for the sign but that was not the solution. One day, with no projects scheduled, we had a couple of hours before opening and we decided to try our experiment. We hooked the 485 board up to the progressive sign and the bank of ten games. The first two games would go into C1 but the sign and the last eight games on the bank started to work. When this happened, we contacted Mike by phone to explain this weird situation. Mike suggested that we check the terminating resistors

located on the CHAM III board and checking to see if they were off. We noticed that all the jumpers were in the "ON" position.

We removed the jumpers, powered up the 485 boards and presto! The sign worked. There was the progressive amount on the overhead sign and on the machines. No C1 error message. Reggie quickly signed out a float and started testing the sign. The numbers on the sign started to increment equally with the games. Our Operations Manager heard us on the radio that the sign was working and flew down the stairs from his office faster than I could get to the gaming floor to congratulate Reggie for his persistence. Since the 485 board is not

approved in Ontario to use on a progressive sign, we had to power down the sign until the board was submitted for testing in the lab.

I suggested to Reggie to remove the 485 board just to see if the sign would come back without the board. Reggie removed the board and reconnected the DCU and the bank of games returned back to the original state when this project ended. Feeling confident that we had solved the problem, we contacted the EGO on duty to perform both progressive and incrementation rate tests for each game. This sign was placed back in service.

- Kevin Noble
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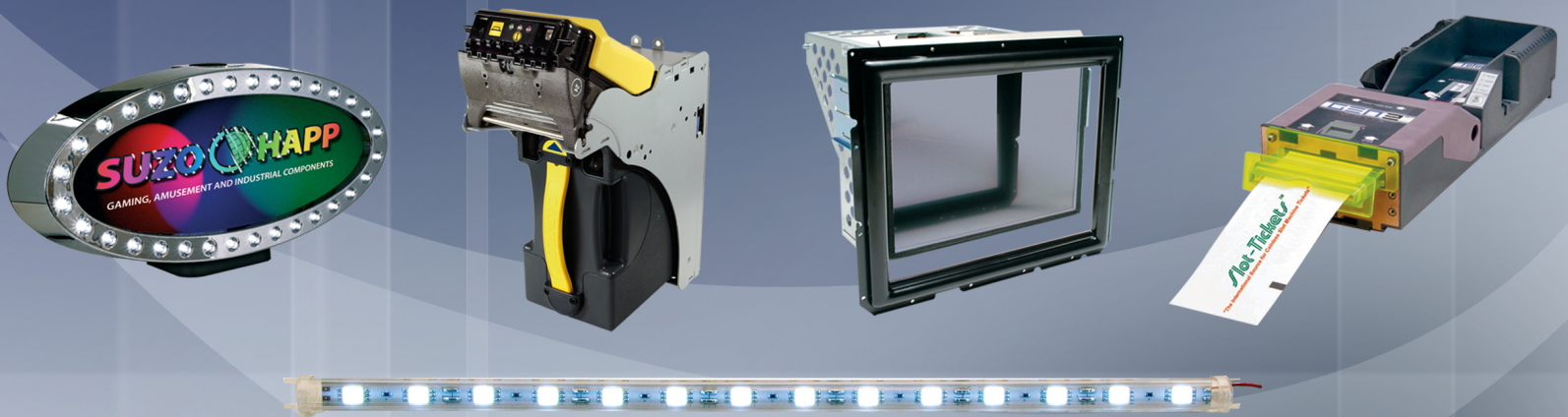
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