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The Gold Standard in Gaming Printers

February 2008

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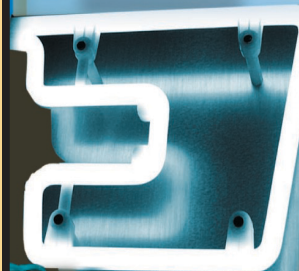
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Slot Tech Editorial

As many of you are aware, I have an extensive background in the amusement machine industry, going back as far as 1972 when I first began working for an amusement operator in Los Angeles, California. Yes, things were mostly relays back then but I recall being struck by the fact that although they used more-or-less the same contacts and motors, Bally's schematics were drawn in a different way than other manufacturers' schematics were drawn. Not better. Not worse. Just different.

Randy Fromm's Slot Tech Magazine

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As the amusement industry grew in the 70s and 80s, many new manufacturers joined the fray. Some of the names are familiar to you from the gaming business. I've mentioned Bally. WMS was Williams pinball back then (Harry Williams invented the plumb bob tilt mechanism). Konami made some really great video games such as Track & Field and Hyper Sports, games that were so good, the buttons wore out about as fast as we could replace 'em.

And speaking of buttons, as the number of manufacturers grew, the need for standardization of mundane things such as buttons and locks became clear. As a route operator's field service mechanic, I had to carry hundreds of different replacement parts for all of the games we had on the route. My lock collection, with its associated cams, washers, nuts and other hardware, rivaled that of a professional locksmith. It had to. Every coin door was different from game to game and between manufacturers.

Enter the "Standardizations Committee." The amusement industry's manufacturers and other participants met a couple of times a year in an attempt to hammer out some standards. They began with modest proposals such as a standard size and shape for buttons (which, arguably, lead to the birth of Happ Controls but that's another story) and a standard diameter and barrel



length for door locks.

Some of the proposals failed. My participation was limited to suggesting a video standard which, at the time, was a hodgepodge of voltage levels and timing. By the time we got around to it, the computer VGA standard had been established and that was adopted instead.

Today's standards for the gaming industry cast a wide net over the operation of a modern casino and can only get better with the adoption of new, open standards. For a detailed report, read seasoned industry reporter Sharon Harris' introduction to Gaming Standards in this issue.

There is more, of course, including a contribution from Slot Tech Juan, Herschel Peeler on building a shop and Quick & Simple Repairs. Don't forget to order your 2008 Suzo-Happ catalog. They're free.

See you at the casino.

Randy Fromm
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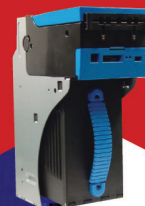
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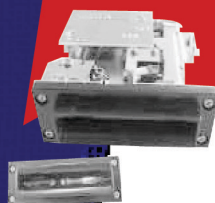
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Quick & Simple Repairs # 35

By Pat Porath

WBA Motor Replacement

When putting on a new encoder gear on a WBA, has the motor ever come apart on you? It has happened to me twice so far. The motors may have been put together incorrectly at the factory or what not but it did happen. Or have you ever had a WBA that is "running slow" where it accepts bills very slowly compared to an average unit?

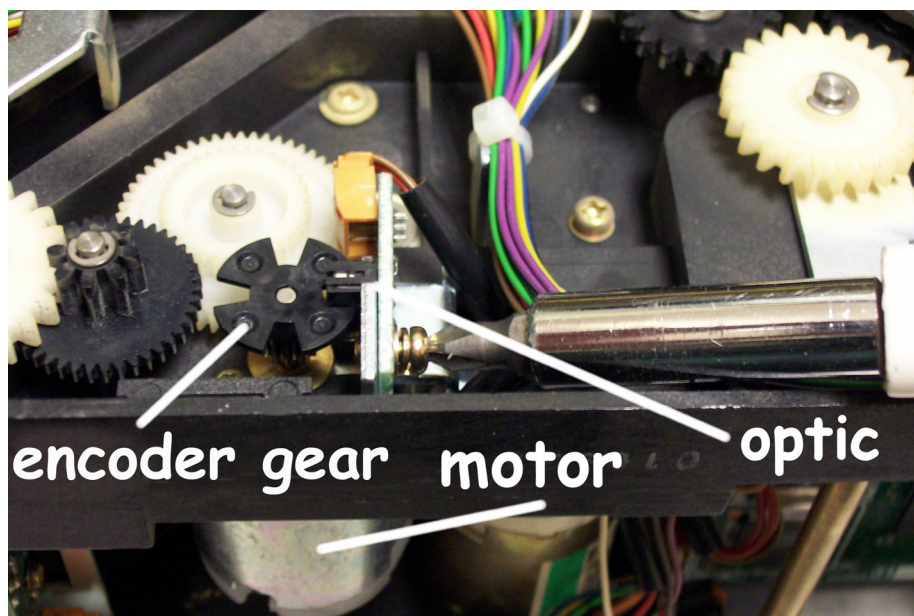
There are many factors why a unit may be running slow, but a weak carrier motor may be the cause and they aren't very difficult to replace. Before installing a new motor, take a look at the Encoder gear. If the teeth on the gear look a bit worn, they are pretty inexpensive, so it should be replaced to cause fewer problems down the road. Also the bill acceptor is in the shop anyway so why not give it a little "tune up?" It is also a very good idea to check the F-guide (located at the bottom of the unit

where the bill would exit into the stacker). If there are any cracks or broken parts, it needs to be replaced.

As the carrier motor removal starts, first take out the small screw that holds on the "encoder gear" optic. Next, take a pair of pliers or the handy "Leatherman" (that most of us carry) and remove the gear. Now you will see two screws that hold the motor to the frame. Remove the screws and trace the cable to the bill acceptor CPU and unplug it. There are TWO different motors that the WBA takes.

Make sure you install the correct one. Compare the numbers that are marked on the motor and only replace it with the exact same numbers that are on the motor. To my knowledge, the two motors are NOT interchangeable.

With the correct new motor, plug in the connector to the correct socket on the CPU and reinstall the two screws that hold the motor to the bill acceptor frame. Now, GENTLY (VERY GENTLY) press on the encoder gear (this is the part where I broke the two motors). I use the famous 4-in 1 pocket





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CPA4082L	19" WMS Bluebird Upright	WMS Bluebird Replacement	\$780
CPA4088L	19" Aristocrat Upright	LCD for Aristocrat USA	\$837
CPA4096L	19" IGT Slant 25 Pin	19" LCD AVP Slant 25 pin	\$868
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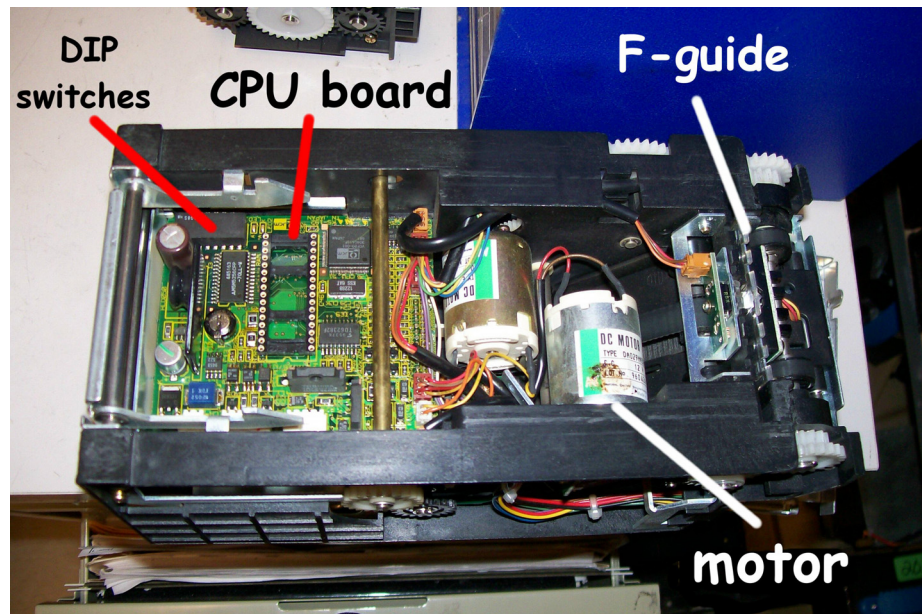
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driver with the rubber cap end and press on the gear so it is flush with the motor shaft. Once the encoder gear is in place, simply reinstall the gear optic. The unit should now be ready for calibration and bill testing. If you are unsure of anything that you did with the bill acceptor, you can look at a spare to make sure everything is in place.

With power off to the unit, turn "ON" DIP switches 5, 6, 7, and 8. Power it up and it should cycle. This is not a "normal" bill acceptor cycle like it would do in a game on the floor, but a "calibration cycle." Next, insert the black and white WBA calibration paper into the unit, black side first. The paper should go in and out of the unit quite a few times before it fully rejects it. Once the paper is rejected, there is supposed to be a fast flashing light on the diagnostic cable. If there is a "flash code" showing, then there is a problem. Such as if the light flashes four times and then pauses, then four times again, something is wrong and you will have to refer to one of the "flash code" troubleshooting repair tables that is found in a WBA repair manual. So if the case was indeed a weak motor, now the bill acceptor test should be perfectly fine.

More on the WBA

In many cases, a good cleaning and calibration will



cure a lot of the problems with the unit. Sometimes part of the "F-guide" gets broken off and only it needs replacement. Other times a badly worn "encoder gear" will cause problem. When the bill acceptor is in the shop and a part does need to be replaced, it is a VERY good idea to clean and calibrate it. Recently I had a problem with one that seemed a bit out of the norm for me. Everything looked good from what I could tell so far. New en-

coder gear, the F-guide looked fine, it was cleaned, but it wouldn't calibrate. I looked closer to see if there were any obvious problems. Once the encoder gear optic was removed from the bill acceptor frame, it was easier to see that something had scratched it. I found a replacement and installed it. The unit now calibrated and was put on the spare bill acceptor shelf.



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WMS Bluebird Touch Screen Problem

I received a call to a Bluebird in which the customer complained that the volume was too loud. With the use of the touch screen, is usually takes only seconds to demonstrate that the volume on the game is "player selectable." I went to show the customer how the volume button worked but this time, there wasn't a response from the touch screen. The first few things that came to mind were a bad LCD unit (that has the touch screen on it), a bad cable or a bad main processor board. Why not try something simple to start off with? How about rebooting the game? It won't take as long as it would to swap out boards and cables. Weirder things have happened. After the game was rebooted, it was time to see if there was a response from the touch screen. Since there was a problem, it was a good idea to try to calibrate it. I pressed the diagnostic button, and selected "calibrate touch screen." When I pressed it, IT WORKED! Bingo! A simple reboot of the game somehow established communication back with the screen. I calibrated it and showed the customer that there are three selectable volume levels that can be chosen: High, medium or low. I also explained to her that we have quite a few games that feature an external volume control. Sim-

ply look in one of the corners of the screen for the icon.

IGT PE Plus "Coin in Timeout"

The problem was obviously within the "coin in assembly" which includes the following: a coin comparator, coin in optics, a coin diverter, a blind type connector, a frame and a wire harness. The industry standard "CC-16" 24vac coin comparator by Coin Mechanisms, Inc. was the unit in this specific game. The first thing I did was to swap the coin with the sample coin from the comparator. After time, the coin gets somewhat magnetized (so I heard) and when there are problems, swap the coin out first. This has worked many times when a machine wouldn't accept coins but it didn't work in this specific case. The next thing I did was to reseal the complete "coin in assembly." The machine is a slant top version. I also rebooted the machine. With the combination of reseating and rebooting, the game accepted the first coin that I tried. Three more coins were tested just to make sure everything worked properly. Sure enough, everything was back to normal and the customer continued to play their favorite video poker slot machine at the "Island Resort and Casino--where the slot machine action is always hot" even if there is

a wind chill of one degree outside. That is correct, this morning the temperature with the wind chill was not one degree! Here in Michigan, winter is definitely here.

Bally 5500 Acting Like a Change Machine

We have a bank of older nickel progressive Bally games that are still pretty popular. I received a call that one of the games wasn't quite working properly. When a customer inserted a bill, the machine immediately paid them out of the hopper. We call it "acting like a change machine." To repair this problem, the test button needs to be pressed until the number 11 appears in the display. Then scroll down the "machine options" until you reach "11-0." With the "11-0" changed to "11-1" by pressing the spin button, the machine will be back to normal; when a customer inserts a bill, the credits will go directly to the credit meter. It so happened that the woman did try a \$1.00 bill and it worked perfectly. To change the machine options on a Bally 5500, the machine must be in an "idle" state, meaning there aren't any credits in the credit meter and there aren't any coins inserted that are ready to be spun off. Be careful when in the machine options. One wrong press of a button and a game can really get screwed up. In many of the



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Bally games that we have on the floor there is an option sheet right in the game. If not, it is in the manual and can be found online at www.ballygaming.com

IGT Wheel of Fortune Spectrum Display Problem

First of all, what the world is a "spectrum display" on a slot machine? When the tech stated he wanted to check out a few of the displays that weren't working 100% properly, I had to ask him, "What do you mean by the spectrum display?" It is simply the meter that is in the top part of an upright Wheel of Fortune game that shows the progressive dollar amount. When we started looking at the displays, the very top section wasn't lit up. More than likely the "spectrum display board" needed to be replaced. There were some spares on hand, so the board was replaced. Once the game had been turned back on, the display came up great. The problem must have been in the board. On the next game, it was a case of a loose connection. The unit only needed to be seated properly. That is all that was wrong that time.

Aristocrat Upright Game Not Showing Main Door Closed I received a call that an upright Aristocrat game wouldn't show a "main door" closed. I pushed on the main slot door and nothing hap-

pened. Once the game was opened up, I pushed on the upper and lower cherry switches to simulate a door closure. This also tested the switches to see if they were working properly. With both switches pressed in at the same time, the game showed "main door closed" and of course the bill acceptor lit up too.

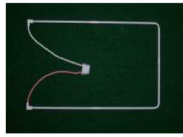
Why wouldn't it show a closure with the main slot door closed? On the Aristocrat upright games, if it was a belly door switch problem, the game would come up with an error showing so. Unlike an IGT that shows "door open M" where the case could be the hopper door (on a slant top game) or the top door open, (slant top also) it could also be in fact a main door optic. But in the case of an Aristocrat, the problem almost had to be something with the main door or the main door switches. At this point, I know that the switches are in fact good, so what is the deal? Upon inspection of the main slot door lock assembly, I noticed something. The top "strike plate" that pushes on the upper door switch is loose. Could a loose plate actually be the problem? It was tightened and the main door was closed once again. This time, since the parts were snug in place, the game showed "main door closed." Another game back online.

IGT "Trimline" No Credit for a \$20 Bill

Many of us techs (if not all of us) have been called to a game at one point or another, when a customer states that a specific bill didn't register in the machine. I could go on and on with numerous situations. Here is one for example: I walked up to game (it happened to be an older Aristocrat) and the customer said he inserted a five dollar bill and nothing happened. Ok, last bill recall was performed and the bill acceptor assembly was checked for a jammed bill. The five was no where to be found. I simply told the guy, "I don't see a five anywhere."

Would you like to hear his crazy response? He said "Oh, that's ok. No big deal." I had to bite my tongue a bit on that one but went on my way. The guy KNEW he didn't put a bill in the machine.

Back to the IGT Trimline, it is very rare to receive "bill issues" with these games. Ours have the JCM UBA 10's or the UBA 14's in them which run very well. To receive a call that a \$20 bill didn't register was downright odd. I attempted to enter into the "last bill recall" menu of the game but no avail. When I closed the main door, the game started to reboot itself (this is unusual). Once the game fully booted up, there were the customers 2000 cred-



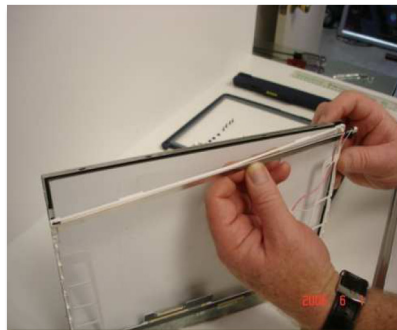
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its. \$20.00 + 1 cent game = 2000 credits. The slot attendant and the customer asked me what had happened. Why did it do that? I told them it was "MAGIC." We laughed, then I told them the story, that more than likely something was corrupt and caused the game to reboot itself when it was in the middle of the bill transaction. The customer was now happily playing his penny game.

Aristocrat Slant Top With a Scrambled LCD

A customer stated that he just completed a bonus round on our Aristocrat "Loco Loot" bank on penny machines and when the game went back to "normal play mode" the LCD was partially scrambled. There were odd lines going through the screen. I thought the video connection may have come loose. It was nice and snug though, all of the video connections were in place. The main processor and I/O boards were under lock and key. Only an Aristocrat tech has the key so I was unable to reseal the boards on it. What would the next plan of attack be? Why not a good old fashion reboot? The machine was rebooted and when the game screen came back up, it looked perfect. Without a doubt, this would be another (as Randy would say) "FM" repair (freakin' magic). Maybe something was corrupt on the I/O board or

even in the video section of the main processor board. A simple reboot of a game, in some cases, takes care of the problem.

More on Reboot

On a Bluebird if communication is lost between the CDS Sentinal board and the game, a reboot of the machine usually cures the problem. It doesn't happen often but it does happen. Before you reboot a game, make sure to verify the customer's credits. If something is seriously wrong (for example on an IGT S2000) and the game is rebooted, it may go into a RAM error and the credits will be gone. If you didn't verify them beforehand, now there is a bigger problem. In conclusion, if an LCD is scrambled on an Aristocrat "Loco Loot" game, simply try a power cycle on it. It just may do the trick.

WMS "Bluebird" GEN 2 Printer Problem

It was brought to my attention that there was a GEN 2 ticket printer problem with a Bluebird game. I thought, why not swap it out with a known good one and see if the error clears? A known good spare (a printer that was tested in the specific game and two demo tickets were printed out) was installed in machine. Still the error didn't clear. What was going on here? We had a printer problem, a known good spare was replaced

and still there was a problem? It didn't really make any sense. Instead of swapping main processor boards, checking cables, among other things, why not make the call to a WMS tech? The tech mentioned one little thing that was overlooked, one small simple little thing. The "hopper door" needed to be opened and closed to do a reset. Wow, I didn't even think of it. A door reset? Not the main door, but the lower door (where access to the hopper would be). The main door and then the hopper door were opened, then both were closed. You know what? The error disappeared. I'm almost positive that if I had cleaned and tested the original printer that was removed from the game, it would have been fine. All of the printers that I work on are cleaned, and then tested in a machine that they are supposed to be in. They are also marked "RFI for Bluebird" or "RFI for IGT" whatever manufacturer that the specific printer is used in. RFI = Ready For Installation. This way, when a slot tech is in a hurry to grab a spare, they can easily look at the tag that is in it and grab the correct one.

Konami Upright Reel 2 Tilt

I'm not really sure what happened but on a bank of multi-denom Konami games, there were two games that each had a reel number two tilt. The first

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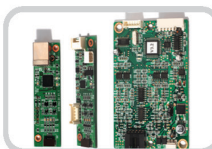
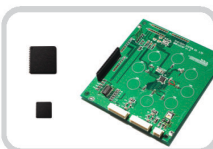
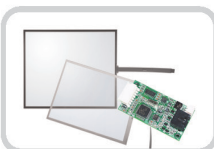
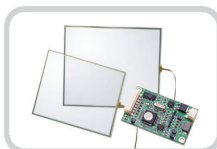
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machine was rebooted and the reset lock turned but it didn't clear the tilt. I tried the reset switch with the main slot door open and closed and another reboot, still the error remained. Why not cause another tilt to see if it will clear both? I turned the third reel by hand to cause a reel three tilt, which it did. Next I tried the key reset again and towards the bottom of the small LCD it showed "checking the system." This means that more than likely the game will reset. When the main slot door was closed once again, the error reset and the game was back online and ready for play. With the other game in the bank, I did the same thing as with the first one. I turned reel three, did the key reset, and the game was fine. A RAM clear may have cleared the error also, but it wasn't needed. Sometimes with slots (I don't really know why) when the game doesn't want to reset the current error and another error is caused on purpose, the machine will clear both errors.

IGT Video "I" Game GEN 2 Paper Problem

I was called to a bank of IGT video slots where one game had a "paper feed" problem. Instead of heading to the shop to grab spare unit, we checked out the printer to see what was going on. The attendant stated that when the paper was inserted into the

printer head, paper would feed continuously and stop after four or so tickets came out. Right away I opened the printer and took a look at the "paper chute" optic. This optic looks to see if paper is in the chute on its way out of the print head. As soon as I saw the optic the problem was obvious. There was a lot of paper dust obstructing it. I used a Q-tip to clean it and tried feeding the paper again. The printer took it on the first try and worked great. With the main slot door closed the errors cleared and the game was fine. All that was wrong was a dirty optic and an easy cleaning cured the problem.

Atronic e-motion That Wouldn't Boot

I had an e-motion game that didn't want to boot up all the way. The game would start up and check the RAM, the CD, etc., then both of the LCDs would go black and that was it. I pulled and inspected the main processor board and made sure all of the chips were nice and snug. I also reseated the communication board (on the Atronic e-motion games such as "Cash Fever" or "King Kong Cash" the UPPER board is the communication board, and the LOWER board, that has the game EPROMS is the main processor board). The fuse LEDs were also checked. After the LCDs went black, the three fuse LEDs were still lit, which

meant that the fuses were ok. What about the diagnostic lights on the main processor board? It is marked right on the cover exactly what each light indicates. The center one is for status and the others are for specific voltages. All of the voltage lights were lit.

So, if all of the main fuses looked ok, and the voltage lights on the main processor looked ok, maybe it is a software issue or a loose connection somewhere? I looked at the vast majority of the connections on the backplane board and everything looked ok. The connections near the main fuses were checked too, and nothing looked out of place there either. Even the game CD was removed, cleaned, and put back in. That didn't help the problem either. I asked a co-worker to check it out. Maybe I overlooked something? It's happened before (more times than I would like to admit to). The communication board was removed once again but this time it was pulled out completely. This time the problem was obvious. A small "sub-board" wasn't seated all the way onto the communication board. Once this was done, the game booted right up right away. So...next time an e-motion game doesn't want to boot up properly, it may be a loose sub-board that connects to the communication board.

- Pat Porath
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Suzo-Happ Group Releases 2008 Gaming Catalog

Elk Grove, Illinois.....Suzo-Happ Group has released their North American Gaming Products catalog. This 304-page catalog contains a wide array of casino products including hard-to-find slot machine parts and the exciting new low profile RGB Xenon Toppers.

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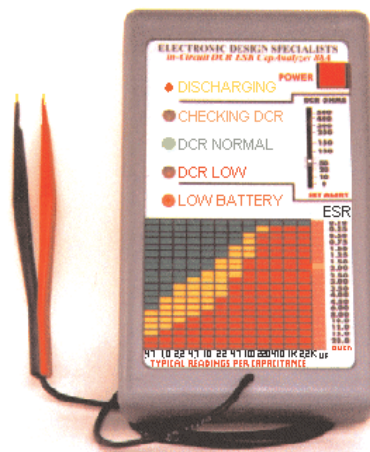


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Gaming Standards Association New Protocols

By Sharon Harris

Imagine the nightmare of buying a new appliance or electronic device if each had its own set of operational requirements and hardware- different plugs, outlets and wiring. The hassle for consumers would surely slow sales and stifle any creativity and ingenuity.

The buying public understands and demands conformity to make life easier. After decades of jealously guarded secrets and proprietary technology, the gaming industry has realized it too needs to create universal criteria that are used consistently throughout the manufacturing sector.

The Gaming Standards Association (GSA), an international trade association, has spearheaded the movement toward an international single set of protocols. The GSA's mission is to develop "benefits for

gaming manufacturers, suppliers, operators and regulators. We facilitate the identification, definition, development, promotion, and implementation of open standards to enable innovation, education, and communication for the benefit of the entire industry."

The GSA kicked off a year-long 10th anniversary celebration by exhibiting at the International Casino Exhibition (ICE) in late January in London. For the first time, the group also held its January 2008 Technical Committee Meeting in Europe.

The association's origins date back to the 1996 World Gaming Congress & Expo. Acres Gaming founder John Acres addressed an audience that represented many of the industry's largest equipment suppliers. He discussed issues pertaining to communication standards. Acres aimed to organize the industry's manufacturers, attempting to eliminate many technological communication problems faced by his company and other manufacturers as well.

By late 1997, 65 people,

representing 20 companies, had joined forces. A cabinet was selected, and the non-profit Gaming Manufacturers Association (GAMMA) officially formed in May 1998. Since then, the roster has grown to 72 members and affiliates.

In 2001, the association changed its name to the Gaming Standards Association in order to reflect its diverse membership. A growing number of casino operators have enrolled, as have regulatory advisors and other affiliate organizations. All share the common



GSA Technical Director Marc McDermott. Formerly, McDermott served eight years as the division chief, electronics services division of the Nevada testing lab.



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goal of promoting open standards.

GSA hired Technical Director Marc McDermott in early 2006. He extols the tangible benefits of membership. Formerly, McDermott served eight years as the division chief, electronics services division of the Nevada testing lab.

McDermott commented, "Why should anyone join GSA? Membership means controlling one's own fate. Downloading common protocols and open standards can often save time. If we do our jobs properly, members will think it is seamless and easy."

GSA President Peter W. DeRaedt has made it his personal mission to change the industry. Elected chairman at its 1998 incorporation, DeRaedt has been passionate about the industry since his earliest involvement in 1997.

DeRaedt has international degrees in electrical engineering and business management. These afford him the precise skills needed to direct and discuss GSA. For 20 years, DeRaedt has managed systems and technology divisions for various companies, but now presides over GSA fulltime. He also currently serves on the UNLV School of Informatics advisory board.

"We faced our ups and down like any small business starting from scratch.

I have witnessed a true evolution. What were once awkward gatherings for engineers has evolved into today's meetings, which show a great spirit of true collaboration at the highest levels. Our members understand that the fundamental exchange of information to build the basic underlying technology is not competitive and that it is to their advantage to have common open standards," DeRaedt says.

The GSA history has not been easy. Introducing new technologies to all companies, such as issues of "open" versus "proprietary" protocols, has proven challenging.

However, that is changing. More than 30 "languages" functioning in those proprietary protocols, allow various gaming devices to function and communicate with each other. Closed technology often interferes with successful communication. Open standards maximize an operation by offering valuable information to all.

NEW PROTOCOLS IMPROVE THE INDUSTRY

Thanks to the efforts of the gaming industry's technical professionals, advancements in many areas of machine communication have transformed the speed and ease of device data transfer. Developing a cohesive, streamlined process for manufacturers to communicate with casinos and

their gaming floors, plus creating a method to transmit information between machines, has been a dream come true for operators.

McDermott claims all North American machines have used the IGT SAS™ protocol for the past 17 years. He has personally witnessed many of the technological limitations in his current and prior positions. McDermott laments, "Casinos have been crippled by the communications limitations."

The introduction of three protocols has expedited communications. While designed to operate independently, coordinated use of the three will maximize operational efficiency. "The GSA is going to great efforts to make them compatible," McDermott says.



GSA President Peter W. DeRaedt

Game-to-System (G2S)

McDermott views the G2S protocol as the "biggest deal" so far. Industry leaders agree, and have recognized the G2S protocol as one of the most innovative new technologies in 2007.

G2S protocol enables secure communications between gaming devices and central management gaming systems. It works directly from the casino's servers to the machines, and is a two-way communications tool. Like a superior computer processor, G2S is more powerful. It also requires good wiring and bandwidth.

Slot machines will no longer function solely as standalone devices. The technology facilitates an operator's ability to audit games more efficiently, manage game combinations and provide customers with greater options, all at the speed of a software download. G2S is very user-friendly, allowing for quicker access to information from the floor. The G2S protocol replaces firmware by using an "auto-population" of the database to eliminate human error and maintenance time.

G2S also enhances maximum customer service. Game management is improved because the performance feedback supplied to a central management system assists in designing player promotions and bonuses.

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GSA released the first version in December 2006, after more than a year of collaboration. It integrates GSA's Best of Breed (BOB) and IGT's SuperSAS™ protocols.

"Eight companies provided input into the software development. More than a dozen people worked on this project, and we held four-hour teleconferences, three days a week. It was an amazing unified effort. At lunchtime several guys from rival companies were devising a protocol, setting their competition aside," McDermott states.

In addition to its current advantages, G2S will also benefit the industry of tomorrow. McDermott states that G2S has expandable properties for upgraded new commands and events. By basing them on proven protocols already on the Internet, G2S will deploy new products faster, minimizing communication problems in development.

G2S is a necessary support protocol for server-based or downloadable gaming; many believe these systems will become more mainstream. It is impossible to calculate the labor savings, which lowers overhead, from the ease of programming via computer buttons and prompts.

System-to-System (S2S)

The S2S protocol introduces one common interface from the manufacturer to the

back of the house in the casino. It is a win-win for everyone by enabling the diverse casino management systems to work together. S2S is based on commonly available technologies, including TCP/IP, XML, SOAP and Ethernet. Internationally, gaming manufacturers, suppliers, operators and regulators jointly developed the finished product.

There are currently more than 50 protocols for various hospitality and point-of-sale (POS) systems, which often confuses and frustrates casino operators. These are all proprietary rather than regulatory, so they are not monitored. They cannot be switched, and manufacturers typically will not custom write a language without guaranteed sales.

McDermott claims that the S2S introduces numerous options for operators. He says, "It is a communications protocol. By itself, it does not do anything, but does provide a real capability for operators to do cool and exciting stuff. It has no limits-everything runs on the system. It cleans up the back-of-the-house mess."

For example, a common language facilitates communication from slot floor to player tracking system. By eliminating multiple communication methods, developers may focus on creating quality content.

The real beauty of S2S is its
Slot Tech Magazine

ability to share information among the various casino management systems, which reduces overhead costs and means more efficient use of a property's IT and accounting staffs.

S2S allows operators to measure real time customer game play plus purchases in the property's food and beverage outlets, spas and retail shops. Having data from multiple systems enhances an operator's ability to make solid decisions.

Casinos may have their wishes and manufacturers may also have ideas. S2S can be a powerful combination of ideas from multiple manufacturing, operator and even regulatory sources, since compliance is a priority.

"The GSA guys may develop and pass the ideas along. We recently formed an operators' advisory committee because we want guidance and input from them," McDermott says.

Obviously, S2S maximizes slot machine technology, but the table games pit also benefits. New applications will let operators track table game activity with the same accuracy as slot machines. Information may then be combined with details from the slot, hospitality and P.O.S. systems into one master patron system. Operators will gain a more comprehensive view of the components of their busi-

ness.

S2S is currently in use at multiple Choctaw properties in Oklahoma and the Seminole Hard Rock in Florida.

Gaming Device Standard (GDS)

The simplest protocol of the three, GDS functions within the game. GDS uses standard USB peripherals in a "plug-and-play" format for devices such as printers, note and coin acceptors. GDS can combine peripherals from multiple vendors, adding to its flexibility. Because the technologies are compatible, the sole consideration for choosing peripherals will only be their features, reliability and serviceability.

SPREADING THE MESSAGE

Due to their complexities, promoting these new protocols and delivering the message of their effectiveness requires a personal touch. "Although the media is good to us, operators and new jurisdictions may have difficulty understanding exactly what we do. All our members want a global standard. GSA has conducted and will continue to do road shows until the global gaming community understands and adopts the technology," says DeRaedt.

For example, DeRaedt is presently concentrating on South Africa, Macau and

Australia. South Africa will soon debate aligning their National Standards with GSA standards. New South Wales, Australia's largest gaming state, is examining the benefit of open standards versus a proprietary protocol.

However, he faces challenges because not all jurisdictions have accepted the concept of a uniform technology. DeRaedt claims that politics have forced some countries, which have rejected these standards, into a proprietary direction.

Fortunately, Macau is unaffected by history and constraints; Asia as a whole is progressive and wants to embrace the latest technologies. GSA has established a relationship with the Macau Polytechnic Institute. The organization is dedicated to gaming, especially as it affects research and technology.

To ensure an advancement of the world's gaming community with GSA and its standards, the group plans to conduct one international meeting each year. Following their 2008 European seminar, the 2009 conference is scheduled for Asia. If successful, the GSA will move forward with the annual event.

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Coin Comparator Bypass and Other Musings About the Slot Tech Profession

By Slot tech Juan



Coin Comparitor Disabling

Ever since the introduction of ticket in/out, casinos have been converting their machines to coinless operation. Some more affluent operations buy a kit to disable the coin comparator and the hopper that includes all the necessary bypass and parts. Others figure out a simple way to disable the coin comparator and hopper. Newer games have the option to disable these devices through the software. Where I currently work, we follow under the second category and this is what I have experienced:

As far as repairs go, this was one of the easiest to do. The problem was getting there. We have this bank of older I-Games that would freeze all the time after the floor attendant closed the main door. We knew what the problem was; the coin comparator would fall into

the hopper if the floor attendant used a little too much force (more like slamming the door shut) to close the main door.

The problem had been dealt with by using zip ties to attach the harness to the main door. Unfortunately, after a while the zip ties would fry and any time the door was shut, the coin comparator would end up in the hopper again and strange errors would return.

You may be saying to yourself, “why not attach the coin comparator in the proper manner, as the game was designed?” Well, the problem was that when we went from coin to coinless, management made the decision to only “partially” remove the coin-in assembly. The original conversion was not done carefully and as the result, screws and parts are missing.

The reasoning

for this decision was to preserve the machine in its original state as much as possible for future resale, just in case the new owner wanted to use coins and of course to save some money.

The problem with the coin comparator falling into the hopper got to be such a bother that the decision was made to bypass the coin comparator harness.

The connector to bypass the harness can be purchased from the manufacturer, which in this case was IGT. We had over 100 machines that needed the bypass for the coin comparator therefore cost was an issue for management. So since we had some free time between calls, why not do it our-



The Coin Comparators just wouldn't stay put. Time to remove 'em!



selves? We did. The finished product is shown in the illustration above

Now we do not have to worry about the coin in optics getting dusty and creating tilts nor do we have coin comparators falling into the hopper regardless of how much force the floor attendants use to close the door.

To reproduce the coin comparator bypass is easy. Using a standard coin comparator harness, cut all the wires about two inches from the connector. Then you can use a pin pusher to get rid of the pins that are not needed or you could leave them in. You will use pins 1, 6 and 7. They need to be connected together. If you have pins available, you may choose to re-pin two small wires as shown on the picture of the Original Equipment Manufacturer (OEM).

The Slot Tech Profession

Lately, there has been some talk regarding "what is a slot tech and what should

his skills and duties be?" I have the opinion that if a professional organization existed, the job description would be a uniform document that would be used throughout the US or a form of it thereof. Unfortunately, there is not a professional association to develop standard operating procedures and develop technical skills.

The technicians' duties vary widely from property to property. It appears that not all techs are created equal. I have chosen to change jobs often as a tool for developing my abilities, as well as my skills and of course my income.

During my journey as a slot tech I have had the opportunity to work for a slot machine manufacturer. I have traveled throughout the United States to some remote Indian reservations

setting up slot machines, progressive systems and conducting warranty repairs. What a beautiful country! I have also worked at two Native American casinos in California, a casino in Las Vegas and in addition, a slot concession operation.

During my years in the industry I have been exposed to several styles of casino management and as I mentioned before, my duties have varied widely. While in California, I worked at one casino that had a very proactive slot performance department. At that time we had a setup that was 95 percent ticket in/out. It had a small staff of three techs per shift to maintain 2000 slot machines. We were not only required to learn and practice slot repair but were encouraged to repair all the slot components and to be

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proactive when it came to slot repair. We looked for possible problems before they became issues and yes, that included preventative maintenance. I was very fortunate to take my first steps as a tech at this facility where team work was a reality and where the experienced techs were willing and able to teach other techs.

In contrast, the second Native American casino I worked at had about 95 percent coin and a very large staff. We had layers (titles) and techs were not allowed to go beyond their classification. We had four levels of techs.

While working for a slot machine manufacturer in Las Vegas, I found the traveling to be a little overwhelming. When dealing with difficult slot repairs, the feeling of being alone on the road is not a pleasant one. On the other hand, the opportunity to visit hundreds of different casinos was a very good learning experience. During my tenure with the manufacturer (small company), our duties ranged from handling service calls to installing and/or removing games to installing progressives and connecting to many different player tracking systems.

After leaving the manufacturer, I went to work for one of the major casino operators in Las Vegas. I was

hired to setup a brand new casino. I was involved everything from placing the machines bases to running the player tracking harnesses and setting the machine options. We set up over 2000 machines in a little over three months. Of course, we were working many 12 hour days and a few 16 hours days. This was a good experience which helped my retirement account greatly.

I suppose the boss was impressed enough with my performance as to offer me another position within his organization when the time came for cut-backs (new casinos are famous for over-hiring during the opening stages). I felt very fortunate, while four other techs were not. This job led to my current position, working for a slot concession.

In my current position (which I love) my duties range from repairing slot machines to repairing golf/electric carts (not to mention) bill counters, chairs, door locks, telephones and any equipment or device utilized in support of the operation. We cover a very large area and maintain over 1300 games. There is a lot of freedom, not good for techs with bad work ethics or weak characters. I have found that the Slot Tech profession can be very satisfying and financially rewarding. This has been my personal experience

with this profession.

I recall during the first years of my career as a slot tech, I used to spend many hours reading manuals and putting my notes in a computer for later use. With my tools, I carried a pocket PC. I would load my notes and pictures about slot machines into it, which were very useful when I worked as a floor tech.

I was hungry for information. During my years in the casino industry, the most frustrating issue for me has been the lack of information. For some reason, the people who have it do not want to share it. Of course I also realize that there are many who do not make an effort to find the information.

This, in a nut shell, has been my experience in the casino industry. No, I have never repaired a game board. I have repaired components and other than removing or replacing resistors, caps and others, have done very little board work. I felt guilty (some what), after hearing the comments of some fellow techs as to what the skills and qualifications of a tech should be. I have made a decent living in this field and frankly I feel that I should have done more to prepare myself.

Lately, I have heard much discussion about the subject of a "Professional Slot Tech" and what the skills

should be. It seems that some experts advocate a degree in engineering (reading schematics and repairing boards). There are others who believe a tech that cannot repair a component is useless to a casino.

I started thinking about it and got over the negative feelings in a hurry and decided to write this article to motivate any tech out there who may be feeling a little out of their element or unqualified. With all this said, should I dare to put forward the following?

If the goal of a casino is to have a game up for play at all times, making the most revenue possible (in manufacturing we used to call this being productive) then how could I be of value to the operation? How could I make the biggest contribution? I believe the goal for a slot tech should be to get in and out of a game in the shortest amount of time possible, having resolved the issue at hand.

I recall a number I heard some years ago, this was \$12.00 per hour. The property I was at during the time expected a machine to produce an average of \$12.00 per hour (of course this amount varies from property to property). This means that for every hour a game is down, management sees a loss of \$12.00 per game down. I agree it is only a potential loss. Nevertheless, a loss is a loss.

How could I be more productive as a Slot Tech? My goal should be to clear the tilt and put the game back in play as soon as possible. I could replace the component and do the troubleshooting later. I believe swapping a component (assuming you know what the problem is) is the most efficient and fastest manner in which to return a game to play. I know some experts frown on the swapping thing; but as long as you repair the component later, it should not be an issue. The most efficient way is to have all the machines up and running to earn their revenue.

February 2008



The advertisement for Kiesub Electronics features a collage of various electronic components and tools. At the top left, a blue sign reads "LED REPLACEMENT BOARDS". Below it are several circuit boards, including one labeled "INSERT BILLS MACHINE ACCEPTS \$5 \$10 \$20 \$50 \$100" and another labeled "GAME KING MULTI GAME". To the right, a green circuit board is shown. In the center, a black sign reads "TEST EQUIPMENT". Below it are three pieces of test equipment: a green digital multimeter (EXTECH EX330), a small electronic device with a screen and buttons, and a yellow digital multimeter (TS-1000). At the bottom left, a red sign reads "SLOT MACHINE HARNESSES". Below it are two coiled cables with connectors. In the center, a green sign reads "SLOT MACHINE MAINTENANCE". Below it are three cleaning products: a blue spray bottle labeled "TECHSPRAY DUSTER", a white container labeled "LCD CLEANING WIPES", and a blue spray bottle labeled "TECHSPRAY BLUE SHOWER". At the bottom, a black banner reads "YOUR COMPLETE SOLUTION FOR LED REPLACEMENT BOARDS, CABLE HARNESSES & ANY ELECTRONIC PARTS AND SUPPLIES". Below this banner is the company name "KIESUB ELECTRONICS" in large, bold, blue letters. At the very bottom, the address "3185 S. HIGHLAND DRIVE, LAS VEGAS, NV 89109" is listed, along with the phone number "CALL: 702-733-0024", the fax number "FAX: 702-733-0026", the email address "EMAIL: info@kiesub.com", and the website "WEB: www.kiesub.com".

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Troubleshooting a game component is a time consuming activity in which I prefer to do in the shop when time is allotted. Frankly, troubleshooting a component on the floor is difficult to do due to things like guests being around, lack of adequate lighting, available tools and testing fixtures, etc.

I recall once while attending an IGT training course, the instructor said "If you want to be successful when repairing a slot machine you need to know "How the knee connects to the chin bone." Most of the attendees laughed (including me) but that was a profound statement.

The ability to analytically look at a game and correctly point to the possible cause of the problem while removing / replacing the suspected component, then returning the game to play, is a very valuable skill that will make a tech very efficient. Of course if you are unsure of how a machine functions, you would have to go on a hunt taking the game out of service (who knows how long) until you get lucky and find the problem.

During my travels I have witnessed many different slot operation management styles and it is shocking to

see how the Slot Techs' duties vary from one location to the next. The one constant is character, which I had been taught as best demonstrated by "doing the right thing when no one is watching." A Slot Tech with good character will always have something to do and is a very efficient tech.

I feel a Slot Tech makes the best contribution to the operation. When we replace a light bulb on a game to make it more aesthetically pleasing to the costumer and entice them to play instead of walking by. If we go along with the general consensus that a rejected bill is a lost bill, then cleaning and calibrating a bill acceptor head is being productive. If I clean and test a printer head to ensure a costumer will be able to retrieve their cash-out ticket instead of waiting needlessly for a floor person, as well as possibly preventing a dispute, then I am being proactive which happens to be a good thing. There are many ways for a Tech to occupy his/her time.

I agree doing a PM is not as glamorous as doing a RAM clear, setting the options or removing and replacing the capacitor on the ballast or removing and replacing a touch screen. But the real-

ity is that since the introduction of ticket in/out our job has changed dramatically, it has become more of a series of proactive tasks rather than reactive ones.

It appears that the future will bring even more changes to this profession. Experts put forward the idea that in order to please the video games generation, casinos will morph into a new type of casino not yet seen. These so called café or niche casinos will offer server based games on a small homely setting in a Starbucks style. The Slot floor tech that has computer skills will become more valuable to the operation and will be able to survive the transformation.

So in conclusion, what are the skills necessary to succeed as a Slot Technician? Who knows? Do not feel bad if you cannot repair boards or components, because that is usually a requirement for a bench tech, not a floor tech. Regardless of your circumstances, the key to being successful in this field is the ability to be flexible. Be flexible enough to adapt to whatever your situation may be.

Good luck,

**- Slot tech Juan
stjuan@slot-techs.com**



Just over a year ago, we completed the transformation of our gaming floor from coin to TITO (Ticket In – Ticket Out). The swapping out and refreshing of the old games, upgrading, and the installation of TITO kits made this project one of the biggest in which I have been involved. The projects included installing printers, BVs, glass, and performing hundreds of RAM clears that lasted nearly a year. We had an analysis done on the gaming floor of what games, themes, and software were compatible with the EZ Pay system. Gone were the Williams Legacy, the Mini-Berthas and the customers' favorite, the IGT S+.

As of last month, all the slot machines I was introduced to over the past 12 years are gone. The Universal and Sigma slot machines were slowly faded away, the Bally 5500s and IGT S+s were now phased out and the new and improved editions of Bally and IGT have been introduced. Upgraded and redesigned Konami, Williams, Atronic and Aristocrat joined the competition as the new kids on the block. I remember starting out

TITO and Other Changes

By Kevin Noble

with slot machines that did not have Bill Acceptors. You had to buy rolls of tokens to play the machines. Coin in and coin out jams kept you busy most of the night with floor calls. Broken hopper knives, cleaning dirty coin in & out optics, and the coin mech that was not accepting coins was pretty much the everyday practice during the midnight and afternoon shift I had worked.

To remain on top and be competitive in this market, the manufacturers had to introduce new concepts, themes, cabinets, and progressive types. Technology has shown me plasma screen, multi-level progressives replacing chameleon signs, CRTs being replaced by flat screen monitors, hoppers & coin mechs are out while printers, CVTs and fiber optics are now in. Lights behind the reels, LED toppers, top box bonus games, bonus rounds and free spins were not even on the gaming floor when I started. The nudge reels were exciting once upon a time, I even remember a game that had buttons that you could select which reels you could nudge and in what direction up or down. Those were the good old days.

The Printer

FutureLogic, Transact, Nanoptix (A Canadian company!) are the new names in

town replacing Asahi Seiko, Gamesman, knives, shelf and pin wheels as all the new games are now being ordered and shipped without hoppers and coin in assemblies. The job security devices such as the hoppers and the IDXs are a thing of the past. The coins stuck behind the knife, foreign token in the hoppers, coins doubled in the IDX, etc. are all gone. Our inventory is slowly showing the effects of the downsizing, packaging, and sending all those parts not needed any more back to the warehouse. The open spaces and the extra room in the Vidmar cabinet drawers are now visible.

Again, the laptop or shop computer is needed to program the Gen 1 and Gen 2 printers. Along come new problems, new challenges, more programming, and solutions to problems we have discovered during this year long project. I tried to log as many as I could. I would like to pass these along:

The Bill Acceptor

When bill acceptor technology was developed, our machines went from the CBA (Canadian Bill Acceptors) to the WBA (World Bill Acceptor) which used an EPROM and flash. The UBA (Universal Bill Acceptor) is pretty much standard in our games now. BV upgrades were simple to accom-

- LOST PROGRAMMING
- OUT OF PAPER
- DIRTY
- PAPER IN BACKWORDS
- NOT PROGRAMMED OR GAME OPTIONED INCORRECTLY
- UGM BOARDS - NEEDS REBOOTING
- REFER TO BALLY FIELD ADVISORY FA-04005 FOR RECALLED GEN 1 PRINTERS
- IGT SLANT TOP – NOT PLACED IN CORRECT POSITION
- FORCE DOWNLOAD TO GET FIBRE BOARD TO WORK
- BALLY - 38/36 CODES – OPEN / CLOSE DOOR TO CLEAR
- PRINTING BLANK AND DUPLICATE TICKETS
- TICKETS ROLL UP INSIDE THE HEAD
- CUSTOMERS ARE PULLING THE TICKETS BEFORE IT FINISHED PRINTING CAUSING A PAPER JAM
- PRINTER TILTS STACK UP RAPIDLY ON IGT S2000 OPEN AND CLOSE THE DOOR FOR EACH TILT

GEN 1 PRINTERS

- BACKBOARD
- PRINTER BRACKET HOUSING THAT HOLDS THE PRINTER LOOSE OR MISALIGNED.
- ATRONIC – GEN 1 - DISPLAYS LOW PAPER BUT PAPER IN PRINTER (BAD PRINTER)
- BRASS ALIGNMENT BRACKET BENT
- HEAD TENSION SCREW TOO TIGHT

CVT

- FORCE DOWNLOAD
- LOG ON CVT TO CLEAR ERROR CODES
- REFER TO CN 3594 CLEAR AND SET SOFTWARE AND PROCEDURES
- BLACK PUSH BUTTON LOCATED TO THE TOP RIGHT OF THE EXPANSION MEMORY

CARD IS A SOFT RAM CLEAR

- SOFT RAM CLEAR MAY BE REQUIRED AFTER A BATTERY CHANGE
- EXPANSION MEMORY CARD COMMONLY FAILS

MANUAL JACKPOTS ON TITO GAMES

- GAME OFF LINE
 - PLAYER TRACKING CARD STUCK IN THE PRINTER
 - CHECK RIBBON CABLE ON IGTS FROM THE COMM BOARD TO THE MOTHER BOARD
- IS SEATED PROPERLY
- DUPLICATE ADDRESSES MAY BE ASSIGNED TO GAMES ON THE SAME CVT
 - FIBER LOOP BROKEN
 - POWERING DOWN SOME MANUFACTURERS BREAKS FIBER LOOP (HOT SHOTS BANK)
 - TICKETS NOT FOUND BY CAGE AND COIN – CVT WAS OFF LINE
 - LOG INTO THE CVT AND HIT ENTER ONCE THE ERROR OR OPTIONS HAVE BEEN
- CHANGED MESSAGES ARE DISPLAYED.

PROBLEMS AND SOLUTIONS

IGT

- Ticket or site information not being updated. Doing a “soft RAM clear” solved this.
 - CVTs that don't seem to RAM clear correctly- Make sure the jumper settings are right (Jumper 1 all the way down, Jumper 2 on, Jumper 3 all the way to the right)
 - A bad printer, where it knocks out the display on the base game (AC COIN)
 - A harness going to the Netplex board, where everything would work but the printer
 - PRINTING MULTIPLE TICKETS BY OPENING AND CLOSING THE DOOR – POWER DOWN
- GAME AND POWER BACK UP
- PRINTER WAS PRINTING A RECEIPT – THIS OPTION WAS ENABLED.

BALLY

- PRINTER PRINTING DUPLICATE TICKETS – Ask CENTRAL TO REPOLL AND RECONFIGURE THE CVT IN QUESTION – THIS WILL CLEAR THE SERVER FROM ANY ERRORS IN THE SYSTEM.

ATRONIC

- PRINTING TICKETS OVER THE JP AMOUNT – LIMITS WERE SET WRONG
- MONITOR DISPLAYING “LOW PAPER” BUT WAS FULL – BAD PRINTER

plish by removing the old BV EPROM, inserting the new BV EPROM, and cleaning and calibrating the BV head. This is usually accompanied by the bill test to ensure the Bill Acceptor accepted all denominations. Now we use the laptop computer, a USB cable and extension cord for those really long upgrades on the UBAs. For the WBA, we have the DT downloader that programs up to eight WBAs at a time. We have it connected to a battery. The BV and cash box jams are still here but more of a priority now because you cannot just play coins anymore to get by. If the BV does not accept, the game might as well be shut down. There is no more alternative.

Games, Themes and EPROM Upgrades

There is one thing with the

older gambling generation, they hate the fact that their older machines have fulfilled their life cycle and are now replaced by the newer generation of technology advanced cousins like the WMS Bluebird and IGT S2000. I have heard the whining and crying about the guests are not coming back ever again because we took their favorite games off the floor but there was nothing I can do but explain to them that they were not ticket compatible. Gone now are the WMS legacy video, WMS dotmation and the IGT S+. Themes for Atronic Cashline, the IGT I-game and the Konami's Hercurlite were also on the list to be converted or removed on the floor. EPROMS were upgrade by the hundreds so they are TITO compatible. With the new models, come newer themes. Many of the themes that worked at our site

are now discontinued. They did not want the triple bonus and 100 times pay games, the original theme that was removed. It's hard to try and match the themes that were removed but the patrons are unaware of selection and don't want to hear that. banks that were "hot" and you cannot get on now sit empty. The cycles on these games are unbelievable and you can notice it on the gaming floor and with the patrons' comments. It's funny to see a small limit progressive bank nearing its expected limit and all the patrons flocking to play it. When it goes off, it clears out faster than a fire drill. These are just some of my observations while working the gaming floor every day.

- Kevin Noble
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Developing Your Tech Shop

By Herschel Peeler

As your casino grows and your technicians develop so should your shop's capability. The objective is to develop the abilities of the shop and the techs into an asset for the casino with the objective of cost effective repair of games and boards. Consider the following not in contrast to what you are currently doing but in addition to your current development.

What Does a Shop Need?

Certainly this depends on what you consider the needs of operation being. If you only consider assembly replacement as your method of repairing games the shop needs are small. But this is a very expensive method of operation. Each repair is at the most expensive level, almost. I guess the most expensive would be to replace the game instead of

fixing it. If the game has a Hold of 5% each \$1,000 spent in repair costs you \$20,000 in Handle. The game may be making revenue after replacing a monitor, ticket printer or bill validator but it isn't making any profit until the cost of that repair is paid for. If the cost of that repair is the cost of the parts, that may only be a dollar or two in components and a bit of labor if you do board repair. To accomplish this you need technicians capable of board repairs and a shop that fits their needs. Technicians you can either hire or train. The Tech room you have to develop. Initially it is an expense, but once developed the cost of repairs is only a couple of dollars in parts and maybe fifteen minutes of repairs to fix that \$1,000 assembly.

Job Descriptions

Defining what you need in technical staff is the first thing to do. As the saying goes, "if it ain't on the page it ain't on the stage." If cost effective operations isn't built into the design of the people and the shop you will only acquire effectiveness by luck. Personally I suggest operation by de-

sign, not coincidence and luck. Define the specific talents you need in a technician to perform the duties you desire. Define the specific tasks that should be and set requirements for a shop that can accomplish those needs.

Hire, Train Outside or Train In-house?

Once you define what you need in a technician, the next step is to bring your staff up to those requirements. You can hire new people that fit those requirements. You can send the techs you have off to training outside the casino if there is a local school. You can have formal classes in-house to train technicians. You can simply set the requirements and expect the techs to bring themselves up to speed.

Should the casino have to pay for the schooling? If you require them to have a college degree do you have to pay for their college? No, of course not. Their education and experience leaves with them if they should choose to leave your casino. Investing time and money in their education can be expensive and ineffective.

Some game manufacturers have training available. IGT has some excellent courses. Williams has the Slot Machine University. But each of these only covers their own games. They don't provide much in the way of education on electronics in general. The length of the course says a lot about what it includes.

I've been teaching techs for a long time. It is hard to cram the necessary topics into a 480 hour class over three to six months. Even at that you still have to breeze over some topics you would rather spend much more time on. A better suggestion is to spend two years of serious study developing a Technician. Does that seem like a long time? Two years in college for a

full time student comes to about 4,000 hours of study, plus time doing homework. That Associates degree still falls short of preparing you for any specific job. It just covers basic theories. To build the type of technician we are talking about we require thousands of hours of study in specific subjects that directly apply to the needs of the job.

Realize here my definition of a technician may differ greatly from yours. To avoid confusion of job titles I will use the term Casino Gaming Technician instead of Slot Technician or Bench Technician. I will refer to techs by different levels instead of different duties. All techs should have in their abilities (or in their goals) the capability to do

board repair in some capacity and know the games and systems in as much detail as is available to them.

I define CGT1 (Tech 1) as an entry level technician with some electronics (up to DC Circuits) and can work on games safely but with supervision and some guidance. This is the assembly and parts changer that may not have a complete understanding of the details of the parts they change.

CGT2 (Tech 2) is a more knowledgeable technician who knows the games and more electronics at the system and assembly level and can work without direct supervision and understands AC Circuits, Analog and Digital Electronics up to basic microprocessors



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and systems. Capability extends to component level repairs of leaded components with a strong working knowledge of the components.

CGT3 (Tech 3) has a higher level of knowledge of microprocessors and systems, programming and test fixture design. Capability extends to component level repairs of Surface Mount Components.)

As an alternative, may I suggest providing training material or pointing them to where they can find it? Encourage them to pursue their education. The job descriptions need to be specific. Training must meet those job descriptions. Evaluation needs to be equal to the job descriptions and training expected. All these together give a well running team of technicians BY PLAN, not chance.

This is in addition to any job requirements and descriptions you currently have. The job descriptions defined here are concerned with only the technical aspects of the job and are not intended to define the entire job description.

Shop descriptions

People with talent alone do not make things work. They need the resources of materials and equipment to make those things happen. You can buy, or you can

build. Buying Test Stations is expensive and you have the question of what to do with the test fixture when the last of those games comes off your floor. Some game manufacturers sell a Test Station that is basically a game fit into a different case to give access to all the assemblies for testing and troubleshooting. As one alternative, you can have a game in the tech shop to test assemblies on. Some jurisdictions do not allow a game with software off the casino floor. This kills the Test Station option. As an alternative, you can have Test Fixtures that simulate game operation and have no game MPU or game software requirements. These are mostly cheap and easy to build. Many of them can be pieced together for only a few dollars and allow cost effective repairs of even the most low dollar assemblies.

Repair parts inventory is much cheaper for component level repairs than for assembly level repairs. It is not hard to find a casino with a million dollars of assemblies and games sitting in warehouses they use to obtain repair parts from. Stripping a component from an assembly or game costs you the price of that assembly or game. \$1,000 to \$10,000 is a high cost repair. An inventory of components of maybe \$10,000 can support a casino with 1,000 games. So a few suggestions here

about parts inventory would be appropriate I guess.

Don't buy it if you don't need it. Buy as few as possible, not a lifetime supply (unless it's necessary, sometimes it is).

Keep an inventory system. A computer-based system is suggested but even a card file system is better than no system at all. Track what you have, where it is, who you got it from and their price, who else has it and their prices. Track what games this part is used on if it is used on more than one game. Give as complete a description of the part as necessary to identify that part and distinguish it from other similar parts. Provide a reference to data sheets, tech manuals or even training material concerning that part. Does this sound expensive? The basic parts list is FREE for the asking. There is a current Excel file you can download from the Slot Tech, Bench Tech or Casino Gaming Tech forums on Delphi Forums. A reference is at the end of this article. Links to reference material depends on the material you have available.

Test Fixtures: Buy or Build?

Test fixtures can vary in complexity and style. They can be as simple as lights and switches for simple assemblies or they can be as complicated as a SENET

or NETPLEX test fixture. They can be manually operated, microprocessor-based or connected to a desktop computer to provide the smarts for operation.

Where possible, build test fixtures from the same parts used in supporting the games. Avoid if at all possible buying parts that are only used for test fixtures. Sometimes we have to, of course. Test fixtures should be more reliable than the assembly they are testing. Current regulated power supplies are suggested. Use LEDs rather than incandescent lights for indicators.

There are quite a few manufacturers of test equipment out there. How much you spend on them depends on the technical capability of your techs as well as the technical capability of your shop. For example a variable voltage AC supply with line isolation is a necessary thing to have in your shop for safety reasons. You can buy an excellent one for under \$1,000 or you can build a more basic one for about \$100. An oscilloscope is a necessary item. You can spend thousands on one to fit your most critical board level repairs or you can spend hundreds and get a more basic one to fit general needs.

Test fixtures can be unique to each assembly you test or be generalized to test various assemblies. There

are pros and cons to either method. General test fixtures are a quick cheap way to come up with a test method for small assemblies. Only design of an interface cable may be called for to test additional assemblies. But if all your testing is done on this one general purpose tester and it breaks all testing comes to a halt until repairs are done. It is in the nature of testing known bad assemblies for it to take a toll on test fixtures. Building a unique test fixture for every assembly is more expensive, time consuming and clutters up your shop with a bunch of little test fixtures you don't remember why you built last year.

The desktop personal computer is a requirement these days as a tool at the work bench. You can test monitors with

touchscreens, ticket printers, bill validators and such. You can buy a small general purpose interface that gives analog and digital I/O lines to test various assemblies. This gives you the processing power of a game and a close simulation of game operation without game software or MPUs in the shop.

Just powering up a coin comparator, bill validator or ticket printer and putting it through built in diagnostics is useful checking problems internal to the assembly but these tell you nothing about the health of the interface to the game. Test fixtures must simulate operation of that interface for a complete test.

Designs for test fixtures are also available on the CGT Forum site or for the asking on any of the forums listed

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below. Many of those who hang around the forum are willing to share their designs readily. You don't have to re-invent the wheel to make your test fixtures. No matter what you are going to test there is a good possibility somebody has been there before you and done most of the work for you. Ah! Here is another reason you gotta have a computer in the shop: so you can get to these forums, web sites and such either for the vendors or other techs who have technical info available.

If you want the benefits of a well functioning shop you have to put out the effort to design and build it. Plan it, develop it, and invest in it. In the long run it is much cheaper than the alternatives.

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Randy Fromm's Casino School is a practical, no-nonsense look at how gaming machines work and how to repair them when they don't. **No previous knowledge of electronics is required** to get the most out of the school. The Casino School is geared for those who want to learn how to fix gaming devices without having to learn complex electronic theory or purchase expensive test equipment.

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.

Students learn how to work with:



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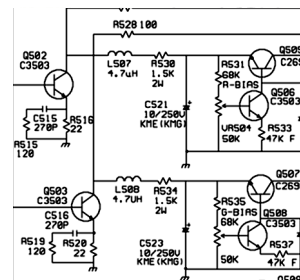
This relatively inexpensive piece of test equipment is easy to operate. Casino School students learn to use the digital multimeter to perform tests and measurements that will pinpoint the cause of a failure down to a single component.

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!



POWER SUPPLIES

Power supply failure is a common complaint in many different types of systems. Power supply failures are discussed during the class, along with shortcuts for troubleshooting and repairing them.



CRT and LCD MONITOR REPAIR

The monitors used in video slots are designed for quick, easy, and safe repair. Students will learn the theory of operation of all types of monitors and how to repair monitors down to the component level. Of course, monitor safety will also be discussed.

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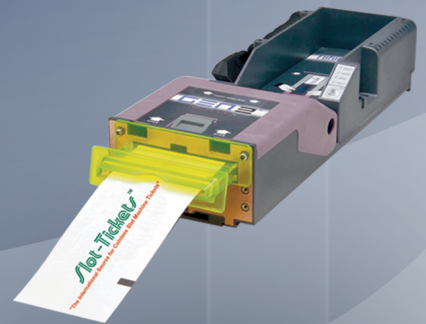
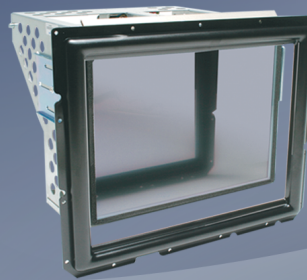
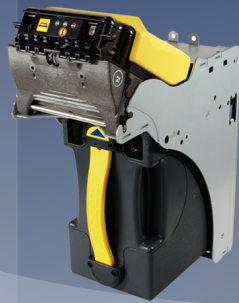
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