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Slot Machine Technology for the International Casino & Gaming Industry

May 2012

Slot Tech Magazine

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PLUS-Randy Fromm on the most important things you can know:
Component Identification and Testing/LCD Monitor Repair/ Power Supply Repair

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Slot Tech Magazine Editorial

May 2012

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Randy Fromm

This month, I am so pleased to be able to publish "Techs For Success: Organizing your Tech Resources to optimize their Productivity." This is a really great guide, written by John-Martin Meyer. If you don't know J-M^2, you should. He is a super-smart slot expert, with roots firmly planted in the world of the slot tech and what it takes to run a successful slot shop. The article begins on page four.

HEY! Guess who's back? My old friend Vic Fortenbach has graced us with an article about MEI bill validators. Thanks for the submission, Vic. Welcome back.

TechFest 24 is this month at Mystic Lake Casino, near Minneapolis. If you miss it, you can come the following month to TechFest 25 in Las Vegas.

See you at the casino.

Randy Fromm

Publisher

Slot Tech Magazine

Randy Fromm's
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Mystic Lake Casino
May 15-17
TechFest 25-Las Vegas
June 5-7
TechFest 26-Detroit, MI
November 6-8

Techs For Success

Organizing your Tech Resources to optimize their Productivity:

By John-Martin Meyer, COO/ Founder, Perpetual Gaming

Undoubtedly, you have been exposed to hundreds of theoretical methods by which you can schedule and organize your Tech staff. The main drawback is their lack of insight of how to apply their methods to the gaming industry and, in particular, Slot Tech Staff. For most of us, this segment of your slot labor dollar is the costliest on a per hour basis. Therefore, we wish to make sure that we receive the greatest return for each man-hour expended.

Staffing Allocation

The first step to any productive tech staff is scheduling them to be available to complete the daily maintenance as well as accomplish the goals of the projects. For most properties, their staffing logic is too linear to meet both needs. By linear, I mean that all shifts are either eight or ten hours with the bulk of the staff scheduled as part of the day shift. This distribution of hours may work to please the staff but is the least productive for the property due to the fact that the business levels grow consistently during this shift so any attempted work will impose on the players experience and negatively affect revenue generation.

After many experiments, creating a "project crew" who work four, ten hour shifts from Monday morning through Thursday morning, has proven to be he most effective. This "project crew" works from 4 am to 2 pm and is fully independent from the "shift" techs whose responsibility is to keep the floor running.

This is not to say that the shift techs do not play a role in projects. In actuality, they play a very important role in the preparation and completion of the projects. This is in the form of the shift techs placing the games out of service and completing any procedures necessary to secure the games funds. On the back end of the project, the shift techs load the games and work with the audit department to place the games on line and open to the players.

Autocad Diagrams

In today's environment, every slot department should have an AutoCAD "go-to" person. This person could be the lead tech, analyst, or the director. With the cost of the latest "light" version being about $800, there is no reason for a property not have the program. For the average Joe, the basic software tutorial will get you started and there are many options for additional training.

It is extremely rare that property does not have access to its architectural drawings on CAD. Your engineering department usually has the needed contact information to have the basic floor plans forwarded to your attention.

With the cost of labor and the extensive number of departments currently involved in projects, AutoCAD drawing are priceless in illustrating the scope projects. CAD is equally important in the planning stage to determine if your concepts will work as conceived. It is much less costly to experiment on

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Measure Once, Move Once

The "I thought it would work" lament is the most amusing but costly. This occurs when you either do not complete any form of filed inspection or CAD diagrams. This also occurs when you do not take your CAD drawing or plans to the actual area to be updated. It is not worth the grief or tarnish on to your image to be questioned by your superior as to why you are rearranging the same section multiple times.

A very simple procedure to verify your thoughts is through the use of cardboard templates. Using large sheets of card board, prepare game base footprint templates of the various bank shapes you have installed on your floor. During a slow period, place these templates in the potential position of the projects changes . Once you have the layout you wish, use duct tape to mark the corners or other such distinctive angles.

In my drive to be accurate, my visits to the gaming floor to verify my measurements have caused many cocktail Servers to become alarmed at my presence. They were concerned as to the potential affect it may have on their assigned sections. As a mater of fact, on several occasions, the mere sight of me toting my tape measure, diagram, and roll of duct tape around the gaming floor has resulted in a call from the server's union representative before I have even completed my work on the floor.

Standard List of Steps

As with most business endeavors, communication is the key. For the tech projects, informing all those involved is the strongest way to achieve a successful project. To ensure all parties are on the same page, a listing of the steps being completed is the key. Since most of our projects are very similar in scope, creating a standardized list of the steps will expedite the information dissemination portion and make it easier for those completing the work (as well as those observing the work) to ensure consistency and adherence to procedures. These standardized lists will be distributed to all appropriate departments so that they have the foundation to understand your project outlines. Instead of listing the 1,000 words of the standard operating procedures for each project, you simply note that "all standard steps apply." With this in place, you only need to note the exceptions.

A key to these lists is to note the affect the procedures will have on each department and then distribute the complete listing to all departments. This will provide general information so that all departments involved have insight to the other departments' responsibilities.

Spread the News

Dissemination of your schedule of projects is vitally important to their success. A main function is to ensure that you're not creating any scheduling conflicts with other departments. By creating a simple, rolling, four-week calendar, you are providing a three week heads-up to all involved so that they will be able to discuss any concerns which will, in turn, be used to update your calendar and the methodology by which the project will be conducted. Prior to distribution of the initial version, inform all involved that nothing is set in stone and that the purpose of the calendar is to inform as well as receive input and feedback. You don't want to be perceived as being dictatorial. This calendar should be updated weekly on a Monday or Friday for consistency purposes.

The calendar contains brief outlines of the projects and the day that they are to be completed. The details should be noted in a subsequent listing of each project and its needs. Like the calendar, the detail listing is your way of informing all

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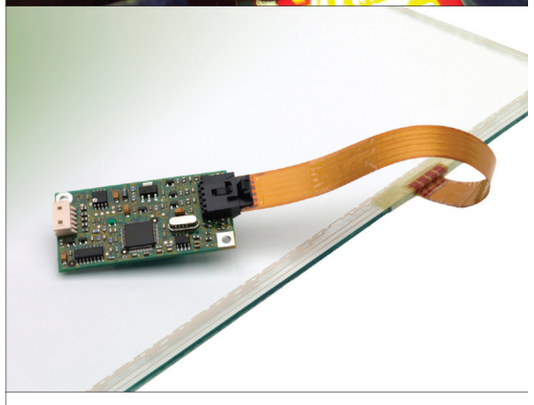

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parties involved of their responsibilities and to gather feedback. The feedback will be used to modify the calendar and the project listing. I suggest that this be updated and distributed with the calendar.

Some of you may be thinking that this will be adding a major volume of work to your already involved schedule but once you have prepared the initial version of the lists and calendar, the upkeep is minimal. The process mainly becomes a matter of filling in the blanks.

I find it very interesting how we slot types seem to consistently think myopically as to how our projects affect other departments. To address this challenge, the following departments should be placed on your standard distribution list: Slot audit, Security, Cage, Surveillance, F&B, Engineering, Housekeeping, and Slot Department. Additional departments should be added based on the proximity of your project to their area of operations. As a practice, to ensure that no department was overlooked, I added the "all department heads" e-mail group to the distribution list. You can't go wrong with the ol' hand grenade approach to information.

Success is in the Details

Details do not need to be intimidating. As noted earlier, the overwhelming majority of our projects are basically the same so a standard set of procedures can be prepared. Re-using a basic format allows us to get very detailed. By achieving a high level of detail, you head off the majority of potential oversights and problems.

To take this to the next level, you can modify the list of procedures into check lists with spaces to insert the name of the responsible party. These check lists will be distributed to the tech staff the day of the project. Next to this name and task, you create a space for that responsible employee to initial when completed. To ensure that all facets are covered, create a portion for "special" instructions to note any deviations from the standard operating procedures.

All Together Now

To quantify the suggested paperwork, the following outlines an actual 2,500 machine property's program.

The calendar was a single page created on a Word template.

On average, the Projects Listing contained between five and eight projects consisting of a one to two paragraph outline each. The total listing was usually four pages long.

The Calendar and Projects listing were combined into a single e-mail sent out to a mail group established within Outlook.

The Tech check lists consisted of a single page for the pre-work, a separate page for the project crew, and a single page for the shift techs completing the process. When the entire process is placed into perspective, you will understand how straightforward the process can be once you get past the initial implementation.

- J-MMeyer
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Quick & Simple Repairs #85

By Pat Porath

IGT Slant Top Video Game NETPLEX Problem

A note was written in our log book to replace a motherboard on an IGT video slant top. The problem appeared to be within the NETPLEX. NETPLEX on IGT games is a type of communication for devices such as the bill acceptor, touch screen, and ticket printer. In this case, those three errors were on the screen and none would clear. I tried a few things like reseating the main processor board, a trick called "zeroing NETPLEX" in which the three devices are disconnected and the game turned on until it boots up all the way and the game "doesn't see" the devices. After they are put back in and power is turned back on, the game will "see" them again, maybe re-establishing communication with them. Anyway, that didn't work either. It looked like the motherboard would have to be replaced. After getting a few tools, a cup of coffee, and tearing the game apart, the motherboard was replaced. Now the question remained, was it installed properly and will it fix the NETPLEX problem? Game power was turned on and everything looked good so far. After boot up, a couple of errors remained but a few door resets cleared all of the errors. The game was ready for play. A replacement motherboard fixed the problem.

Aristocrat Mark IV Button Problem

I received a complaint about a bet-three button not working on an older Aristocrat Mark IV game. Upon arrival, the button was in fact making the "clicking noise" that it is supposed to make when the button is pressed all the way down. The noise told me there was a very good chance the microswitch part of the button was working. Even though it sounded OK, I replaced the button with a spare but the issue remained. What was going on? After putting the game into diagnostic mode to test all of the buttons, I found the bet-five button wasn't working either. This was pretty unusual for an Aristocrat game I thought.

Since the problem wasn't a button maybe it was software? Both the I/O and the processor boards were reseated but that didn't help either. Maybe the problem was in the wiring? I checked connections on the buttons and they all appeared to be OK. Next, while the game was in diagnostic mode for button testing, I held down the bet-three button while I wiggled a large cable that comes from the door and goes to a connection on the inside of the game. BINGO! A loose connection was the problem. Simply by pushing the cable snug into its connector, both buttons now work perfectly.

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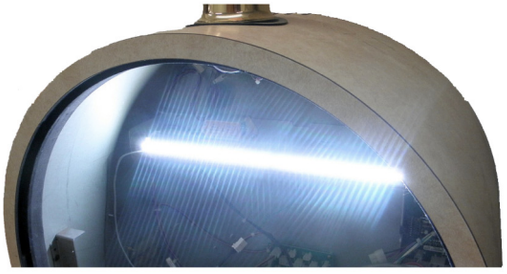

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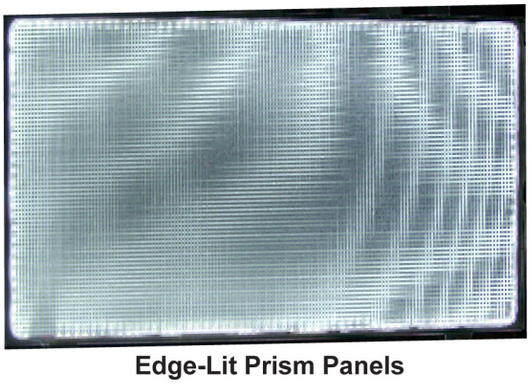

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It Was, No Doubt, a Monday

The day started off as a quiet Monday. There weren't any major projects scheduled, only 12 IGT SBX conversions which wasn't a big deal. Then everything changed within one second. A phase of the main power flickered for a second and around a third of the gaming floor was affected. Some games were rebooting themselves. On others, screens were frozen and the game needed a reboot. Two LCDs had gone black and were replaced, one on a Bluebird 2, the other on an Aristocrat.

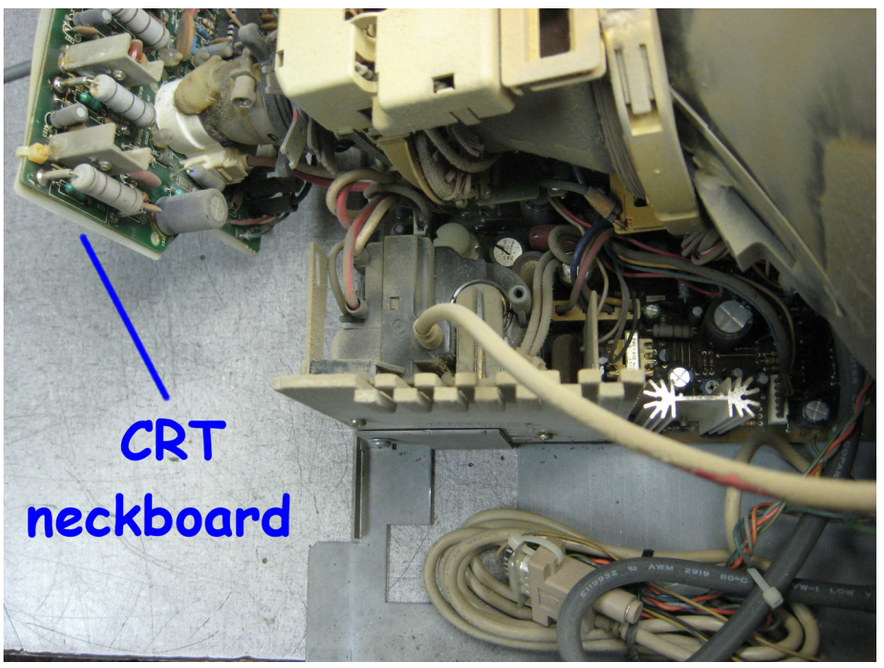
After all the affected games were back running again, a customer mentioned that the game he was playing didn't have any sound. It was an IGT upright 3.5 SBX game. Connections were checked, which all looked OK, then a reboot was done. Now the game wouldn't come up. It started to boot up, then everything would go out and restart, over and over. Now what? The 440 watt power supply was swapped with the game next door and the problem followed; the unit had failed. When a replacement was installed, the game was fine. FINALLY getting caught up on the floor, I thought it would be a good idea to check the "Floor Logicx Monitor" to see if there were any "serial com down" games. This means the game and or Sentinel have lost communication with the Oasis system. Sure enough, there were a few Aristocrat games on the list. After doing a power cycle on the SPC boards they were OK. By this time, the IGT SBX games paperwork was ready to be verified, then they could be put into play. Without a doubt, the shift flew by.

IGT Slant Top Quick CRT Repair

Upon arrival for my shift, there was an IGT slant top video game that was shut off because of a monitor problem. I was told the monitor in the game was black and we didn't have any spares to replace it so why not check it out anyway? Power was turned on and sure enough the monitor (CRT) was definitely black, no sign of any life whatsoever. Well, an "old school" game may need an "old school" repair. Power was turned off and I removed the monitor for a quick inspection. I didn't see anything out of the ordinary and I didn't see any caps that were "domed." A domed capacitor is an indication it is bad. Just for the heck of it, I carefully grabbed onto the neck board on the CRT to see if it was loose. It seemed to be a little bit loose so I pushed it nice and snug onto the neck of the tube. After the monitor was put back into the game it was time to turn power back on. This time it worked! The game started loading, the touch screen was tested and it was put back in play. A loose neck board on the CRT was the problem.

A Black LCD on a Bally Hot Shot Progressive Sign

One of the two LCDs were black on a Bally Hot Shot Progressive sign. My first thought was a bad LCD. It was totally black, no text, no graphics, and no backlighting. I called our Bally tech. I told him that I thought the LCD was bad and may need to be replaced. The sign graphics controller had already been rebooted twice. The tech



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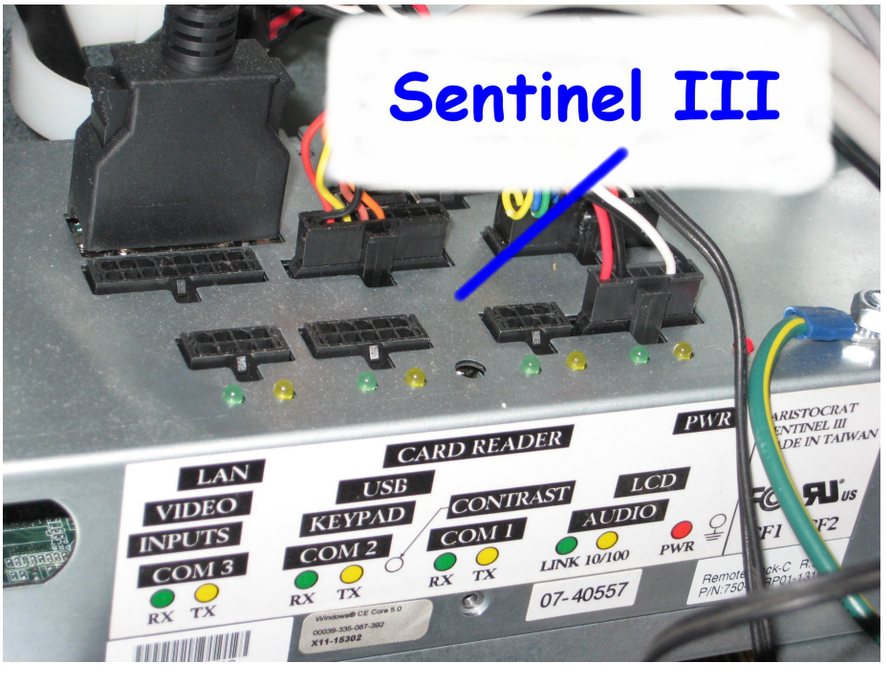
told me once in a while an LCD may "go to sleep" and the main sign power may need a power cycle to bring it back to life. Why not give it a try? Directly after the power cycle the sign LCD was working once again and has been working for a week straight without any problems to my knowledge.

Oasis Sentinel III, No Display

One side of a bank of games was converted from an Oasis Sentinel II to a Sentinel III and one of the games still needed the Sentinel installed in it. I was handed the unit, plugged in all of the connectors then, last but not least, the power cable was plugged in. As I looked at the Oasis display, nothing appeared. It was totally dead. I had a light blinking on the Sentinel so what was the deal? Within the last few years to my knowledge, only a couple of Sentinel III displays have been replaced so I didn't think it was bad. Since it was a "fresh install" I wanted to take a look inside of the Sentinel just to see if anything looked out of the ordinary. After the cover was removed, I started looking closely at the guts. To my surprise, for some odd reason, the boot chip was in backwards. In other words, the 40 pin EPROM notch did not match the notch on the board, therefore, it was in backwards. Just luckily I didn't leave the power on very long otherwise I might have fried it. Now, with the chip inserted properly and everything reconnected, it was time to apply power once again. This time I had information on the display along with the unit starting to boot up. Afterward my "global card" was used to properly set items such as the "slot mast I.D." and the Sentinel location number. Within a few minutes, it was communicating with the system.

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



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A-OK at TechFest Tulsa

Ceronix's Brett Bruce

When the Hard Rock contacted me about holding Tech Fest at their Tulsa casino, I was happy to oblige. As a rocker myself (and former soundman and roadie) I embrace the whole milieu of Rock 'n' Roll. I might still be in the industry if things had gone just slightly differently for me.

But I digress. The real story here is about one of the best TechFests ever with the addition of a new presenter from Ceronix, Brett Bruce. Brett was a superhero at the event as he brought with him (shipped ahead, actually) a pallet with over 300 pounds of

JCM's Dan Petersen

Transact Technologies' Russ Wigé answers some questions for Scot and John during a short break.

LCD monitors for teardown and re-assembly during the event. Everyone had a chance to completely tear down an LCD monitor (down to the CCFLs in the panel) and, hopefully, have it actually work properly when re-assembled. Most did when brought to the testing station. This event will be repeated at future TechFests. It was a whole lot of crazy fun (not to mention educational) for us tech geeks.

Thanks to Hard Rock Casino and Slot Manager Mike Cooper for your hospitality in sponsoring the event. - **STM**

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Mars CashFlow Bill Acceptor

By Vic Fortenbach

Over 50 years ago, a company named Mars electronics invented the first electronic coin mechanism for candy vending machines. The invention was a natural since Mars electronics was part of the Mars candy company that makes M&M's candy. In 2006 the company was spun off to Mars Electronics Incorporated, or MEI. MEI makes bill acceptors for the food vending, amusement and gaming industries. It's purely coincidental that the yellow color used on most of MEI BA's matches the yellow packaging of the M&M's peanut candy.

For Casinos in the USA, the SC66 is the model of bill acceptor used. The "66" refers to the width (in millimeters) of USA banknotes. The "world" version of the unit is the SC83 which has a wider bill path in order to accommodate the wider banknotes used outside of North America. Both units look and function identically, only the programming is different.

The Bill Acceptors consist of three sub-assemblies: the acceptor head, the chassis and the stacker. There is an interface board or interface card (IF card) as MEI calls it, which acts as a "middleman" between the slot machine and the BA head. This interface card slides into the chassis and mates with the harness through a card edge connector. Mounted to the underside of the IF card is the stacker detect switch. This switch is a small microswitch with a lever. To remove the IF card, use a firm grip and slide the card toward you. IF cards for IGT machines have one micro switch. IF cards used on Bally, WMS and other manufacturers, have two stacker detect switches. These switches are mounted side by side. Use caution when you remove or insert the interface card. It's possible to damage the stacker switch metal levers. Once the IF card has been inserted into the chassis, the BA head also slides in and locks down for connection to the IF card. There is a locking bar; just below the front bezel on the BA that locks the Bill Acceptor to the chassis. If you need to remove the BA from the chassis, release the locking bar by using an upward motion to "unlock" the BA from the chassis. The chassis is designed to hold the stacker with a force fit. This mean no lever to release the stacker; just pull on the yellow handle to remove it. The stacker handle is yellow colored by default, so it will not get easily confused with metal or blue colored stackers from JCM, since obviously they are not interchangeable. If you want to color coordinate the MEI stacker handles, maybe green for WMS games and orange for Bally, this is possible. Suzo-Happ sells the stacker handles in green, orange and blue.

On the front of the Bill Acceptor, above the bezel is

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the 8 pin bezel light connector, a flush mounted push button, three LEDs and a USB "B" receptacle. The bezel light connector allows an animated arrow bezel to be connected to the BA. MEI manufactures two different types of bezels for the SC66, one with the animated arrow and a standard black bezel with two green LEDs. The bezel just snaps on to the BA head, no screws required. To remove the bezel, gently pry on the side of the BA head with a small flathead screwdriver to release the bezel. Depending on the type of front bezel mounted to the BA, you may have to remove it to access the inside of the bill acceptor and the bill path. The moving arrow bezel must be removed for access to the bill path area inside the BA.

The push button on the front of the BA is used to enable the configuration coupon acceptance (more on that later). The three LEDs give the slot technician a visual clue about the status of the Bill Acceptor. The USB connector on the front is for Bill Acceptor programming. The three LEDs are colored just like a traffic light: green, yellow and red. The green LED will remain lit when the BA is ready to accept bills and tickets. If the green LED is slowly flashing, then the Bill Acceptor is not talking to the game. Usually a power reset will correct this issue. The yellow LED is strictly related to the stacker issues. Three reasons the Yellow LED could be lit: the stacker is not firmly pushed in to the chassis, the BA did not detect a stacker installed or a there is a stacker jam. I have only seen this LED light when there is stacker jam or something continuously blocking the stacker pusher, preventing it from returning to its home posi-

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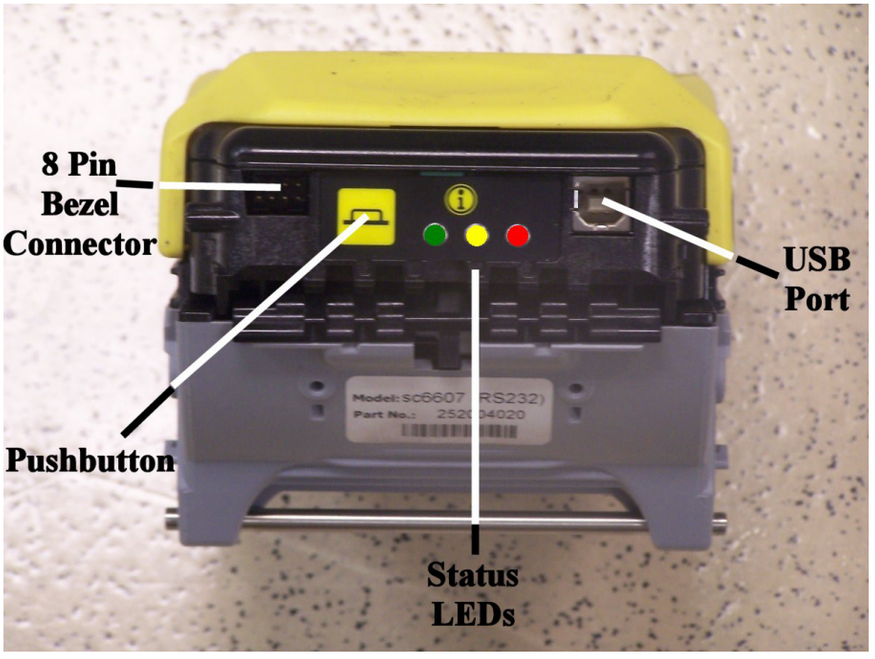
tion. Things that will cause this to occur include a torn piece of bill or ticket lodged in the pusher assembly. The red LED illuminates when there is a full stacker or a hardware fault.

When the yellow LED illuminates, this indicates a stacker jam. But how the Bill acceptor detects a jam inside the stacker is kind of cool, instead of having a plastic flag that moves to block a sensor at the rear of the bill acceptor. A light beam is shot out or emitted down ward from the front edge corner of the Bill Acceptor through a lens in the front corner of the stacker. The light beam is then angled 90 degrees and shoots across the inside front of the stacker through lenses in the pusher assembly. The light beam is angled again upward 90 degrees and shot through the opposite lens in the front corner of the stacker. This light beam is then received inside the opposite front corner of the Bill Acceptor. When the light beam is continuous in its path, the pusher is in the home position ready to stack bills. If something like a corner of a bill or ticket keeps the pusher from returning to its home position, the light beam is then blocked, and no light is received in the BA. This would indicate a jam and the BA circuitry would light the yellow LED accordingly. The only lenses that are visible are the lenses on the



front corners of the stacker. These can be scratched and will prevent the light beam from reaching the BA. For some reason, the lenses look cool and slot atten-

dants love to use a ball point pen to “clean” them. This will only color and scratch them. Since the lenses are recessed, normal use of the stacker will not scratch them.

The SC Cashflow BA’s programming is available in two formats, a PLCC chip or by flashing the BA . The PLCC chip socket is under the yellow cap of the Bill Acceptor. The yellow cap can be removed by gently prying on the sides and moving the cap past its sliding stop points. To reconfigure the BA to accept any new bills, you would replace this chip. I have never seen a chip installed in this socket as it is a New Jersey requirement and I live and work in California. If your Bill acceptors do have this chip, removing it and replacing it with a new chip with is the only way to configure the BA. Once the chip is installed, reprogramming the BA by flashing it is no longer an option, even if you remove the chip. To flash or program the bill acceptor without a PLCC chip for new bills is done using the portable programming module or PPM. This yellow, handheld device is made by MEI to program the Cashflow bill acceptors. Since the PPM is yellow and slender, the PPM is referred to as the “banana.” The size of the PPM allows reprogramming of the BA quickly on the casino floor. The PPM was designed to hold one program but it can be changed using a computer and the STS program provided by MEI. Some casinos have multiple PPM units, one for each slot manufacturer. This allows for quick reprogramming of a BA instead of having to connect the PPM to a computer to change the program. On the front end of the PPM are two USB connections. These USB connections are used to program the PPM and to program the Bill Acceptor on the casino floor. The cable that connects to the PPM is a standard USB cable with a “A” and “B” ends. The PPM has red and green LED status indicators and a push button. The PPM is battery powered and uses two AA batteries. The PPM I use is going on over three years with hundreds of reprogramming sessions, with no replacement of the batteries.

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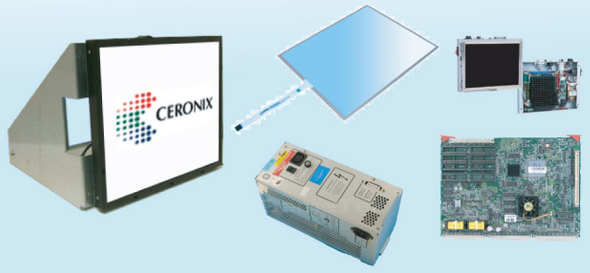

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It's effortless to program a BA using the PPM. Just connect the BA to the PPM with the USB cable and push the button. The LEDs on the PPM will flash and the whole programming process takes about a minute. The programming cycle is finished when the BA cycles. Some new bill programs will cause the BA to cycle once then a few seconds later cycle again. Don't get anxious and remove the PPM USB cable before the BA completes both cycles. If the cable is accidentally removed, this can cause the BA to lock up with all three LEDs lit. Reprogramming the BA will not unlock it since the error that causes the lock is in both the IF card and the BA. To unlock a locked BA, you will need a working BA head. Install the working BA head in to the chassis and reprogram it. This will clear any errors in the IF card. You can then leave the working BA in the chassis or replace and reprogram the locked BA. Replacing the IF card will also clear a locked BA after you have reprogrammed both the IF card and the BA.

There are no dip switches on the SC Cashflow bill acceptor to set the directions or the demon of bills accepted. Most of the time, the denom of the bills can be set in the slot machines options. WMS machines do not have an option to set accepted denoms. If you do not want to accept the two dollar dollar bill on WMS machines, you have to use the SC configuration coupon. The coupon is available in the SC66 maintenance and operation manual or at the Suzo-Happ web site. Here is a shortened link: http://bit.ly/Ii8mv3

The coupon is the same size as a bill or ticket. Using a #2 pencil (ahhh, memories of school tests come back to mind) mark the areas on the coupon for which bills and if vouchers are to be accepted. We mark all bills except the two dollar bill spot and which directions bill are to be accepted. Obviously you want bills accepted in all for directions. All SC66/SC83 Bill acceptors will only accept vouchers in only two directions. Once you have filled out the coupon, push and hold the push button that is between the bezel connector and the Green LED. Once you push and briefly hold the button, the green and yellow LEDs will flash. This indicates that the BA is ready to accept the configuration with the coupon. Insert the coupon as if you were inserting a bill into the BA. The coupon will be read and rejected in a few seconds. Configuration is complete. You can use the same coupon to configure all of the BAs on the casino floor.

The MEI Cashflow can be cleaned easily with a just damp rag and a wipe inside and outside the Bill acceptor. Cleaning an MEI Cashflow bill acceptor is not something you have to do. When you do clean the bill acceptor, use only water, no chemicals like alcohol. Bill acceptor cleaning cards are available for the MEI bill acceptor but why spend the money when cleaning is so easy?

The SC66 Bill Acceptor does not need calibration on the slot floor. In fact, calibration is a rare event. We have some MEI SC66 bill acceptors that were purchased used and over five years old. We have yet to calibrate them. Since calibration is not regularly required, it is a procedure that has to be completed by an authorized service center.

In January of 2012, MEI started shipping their latest bill acceptor for casinos, the SC advance. It uses the same chassis, same stacker as the original SC series of bill acceptors, so upgrades are a no-brainier. The new SC advanced is faster in both bill and ticket acceptance and processing speed. The SC advance has expanded memory and four-way ticket acceptance.

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

For more information, including course offerings and complete pricing information, please visit the website at slot-techs.com

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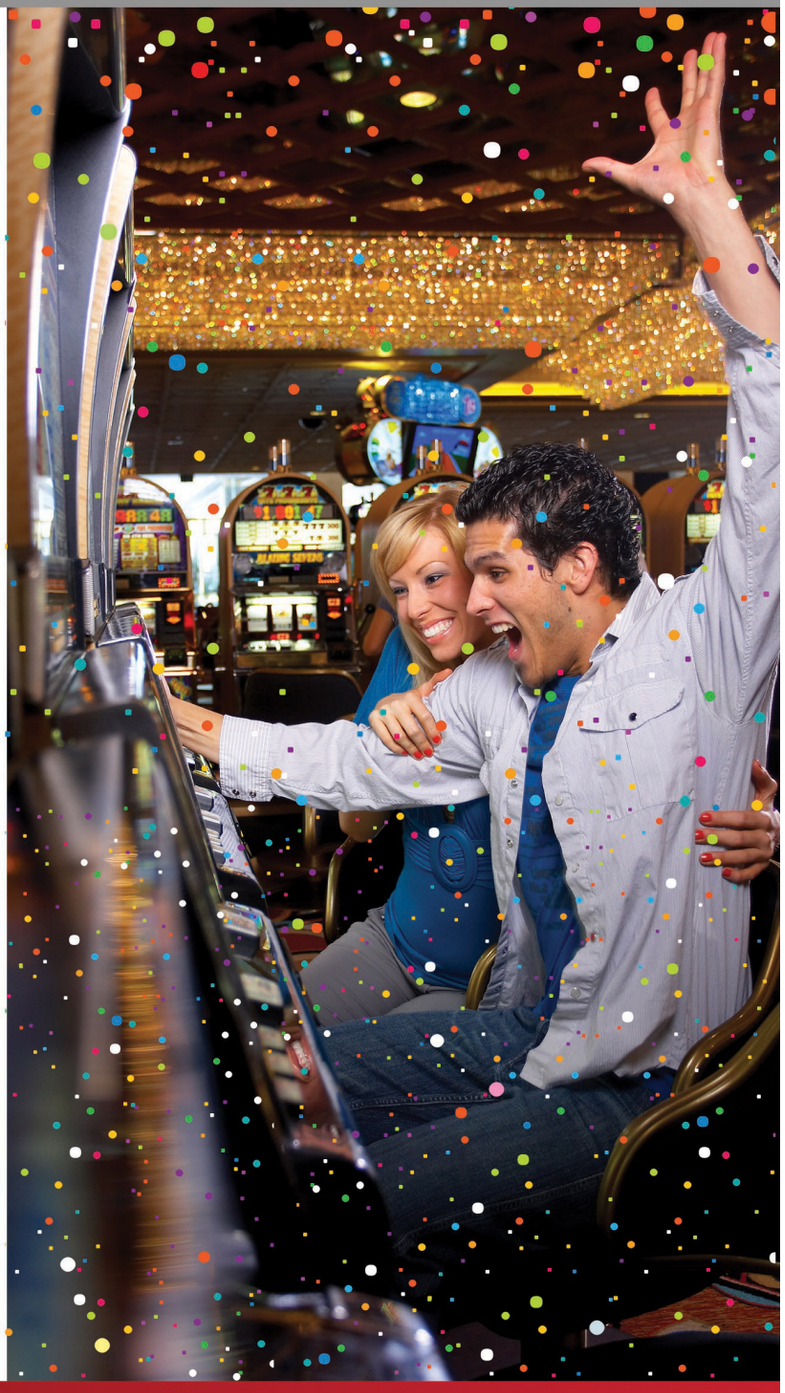

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