April 2009

Slot Tech Magazine

Slot Machine Technology for the North American Gaming Industry

Bally Power Supply Repair

Problem Gaming

Quick and Simple Repairs #49

A Five Star Dilemma

Slot Tech Magazine

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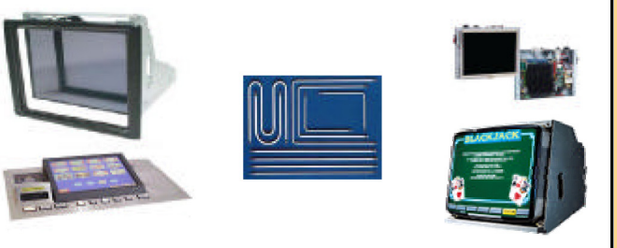

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Randy Fromm

Dear Friends,

Ted Befus sets the scene for us. It's Valentine's Day, 8:30 PM and all is going swimmingly well. Their IGT S2000 Five Star progressive is getting a lot of play, then BANG! It happens. Two slots on the same progressive bank hit the same jackpot at the same time! Is it a Valentine's Day miracle, is it a curse or is it something much more sinister? Find out by reading "Five Star Dilemma" beginning on page six.

When Kevin Noble submitted his latest article, I almost sent it back to him without reading it. After all, I don't really want to have anything to do with "Problem Gaming" which is the title of the article. The joke was on me as the title was a clever twist. "Problem Gaming" isn't about customers that would rather wear diapers than leave their favorite slot machine to attend to business, it was about gaming machines with problems! It's a good compendium of pesky problems and it begins on page 12.

I am always so pleased when James Borg submits an article to Slot Tech Magazine. This month, James helps us with a common power supply failure in Bally slot machines. As usual, we don't have the schematic diagram but we get the job done, regardless. James' Bally Power Supply Repair article begins on page 16

Um . . . Yeah. Pat Porath Q&S #49 too.

That's all for this month. Don't forget that TechFest 19 will be held May 12-14 2009 at Mystic Lake. See you there?

Randy Fromm

Randy Fromm - Publisher

Randy Fromm's
Slot Tech Magazine

Editor
Randy Fromm
Technical Writers
Ted Befus, Kevin Noble, Pat Porath, James Borg

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1944 Falmouth Dr.
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tel.619.593.6131 fax.619.593.6132
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A Five Star Dilemma

By Ted Befus

Let me start by setting the scene for every one. It's Valentine's Day, 8:30 PM and all is going swimmingly well. Our IGT S2000 5 Star progressive is getting a lot of play, then BANG! It happens. Two slots on the same progressive bank hit the same jackpot at the same time! Is it a Valentine's Day miracle, is it a curse or is it something much more sinister?

This article is going to discuss exactly what happened to cause one of the biggest noodle scratchers that I have ever experienced here. I personally have never seen two games hit that close together, EVER! To make things more bizarre, these machines are sitting back to back on the bank. Are these winners in "cahoots?" Did they do something to make this happen or is it one of those things that make you want to buy a lottery ticket right away to see if their luck has rubbed off on you?

I know the first thing that pops into your mind.

"That's impossible" you say.

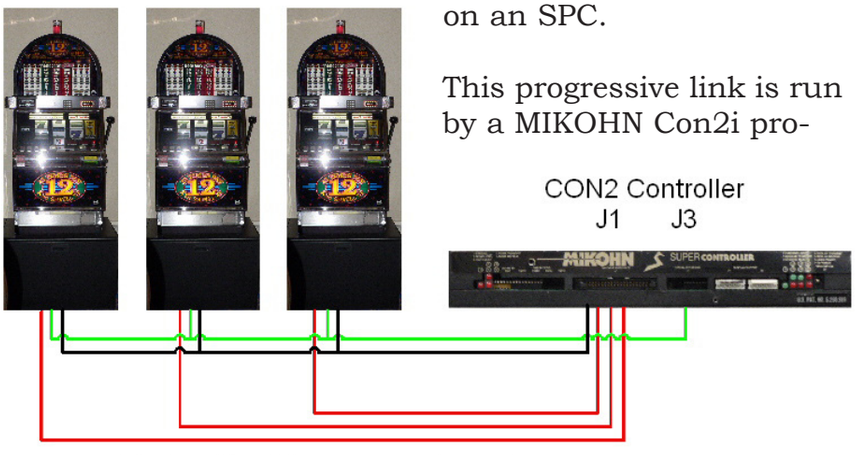
Funny, that's the same thing everyone else has said too.

Ok, here is the dilemma: Only one of these winners should get paid the actual top award, while the other should get paid the lesser progressive start out value. So who gets what? Oh, I should mention to make things even more difficult, each game is showing a jackpot for the exact same amount! To answer another obvious question you have, yes there is an overhead display, which is actually telling the staff what is happening but for some reason they get confused, probably from the excitement of it all happening so quickly.

I walked into this mess on a Monday morning of all days. What a great thing to walk into, phones ringing, emails flying, people talking about getting GLI involved for forensic testing of both games and the controller. Way too much to deal with on a Monday.

Let's get the investigation started with a quick look at exactly how the games connect to the controller. In the past, I have given my loyalty to the PGI Secure Progressive Controller but alas, this progressive is not on an SPC.

This progressive link is run by a MIKOHN Con2i pro-



Red - Machine progressive pulse
Black - Common
Green - Serial return

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gressive controller using the machine scan port (labeled as J1). Each S2000 game is connected on an individual address line into this port to send progressive pulses which the controller then uses to increment the current jackpot value. The controller has an output line from its serial connector (labeled J3) which it uses as a return line to provide current jackpot information to the games connected. Since this is not a true serial progressive (using J1 makes this a multiplexed input) all games on the link share this serial return line to gather current progressive information and commit it to game memory. Figure #1 shows how the S2000 connects to the controller.

How this works is simple. The controller is continually polling its inputs, looking for information. Since it's a multiplexed input, it can only poll one input at a time meaning that in the controller there is only ONE definite winner. The current jackpot value is sent out from the controller on the serial return line where the games take the value and load it into their memory. The games are always updating the current value from the controller to keep up to speed on the jackpot amount (Don't ask me how often it happens. I don't know exactly).

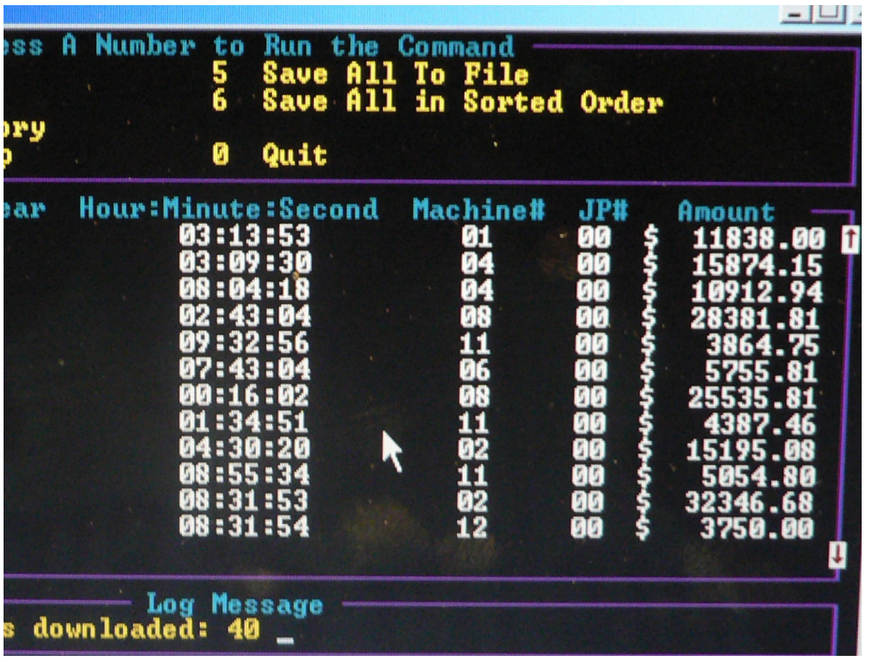
The first thing we wanted to look at was the controller jackpot history. On the back of the CON2 there are two ports: a computer port (used for setup with the PSP or PCID programs) and an accounting port which is used with accounting programs like C2Hist or to connect to an online system if possible.

The first thing we did was to connect to the accounting port so we could use the C2Hist program to look at the controller jackpot history. I have to be honest and say that in 13 years of dealing with these controllers, I had never used this program. I had actually considered deleting it from my files. It's a good thing I didn't. Once we ran the program and downloaded all the jackpot history from the controller, it became clear that in the controller's mind there was one definite winner. See figure #2 for an actual screenshot from my laptop as I worked on it.

If you look at the last two jackpots you will see the time difference of one second (I would think it may be less but since the program doesn't go into microseconds, I'll take it as it gives it). Along with the times you will see it designate a machine number (that number will correspond to an actual machine number programmed in the controller's PCID setup). You can also see the jackpot group affected and the dollar amounts as well.

At this point all that was left was to check PCID to see who the actual winner was and let management know who won.

But now we have another dilemma. Why, if the controller knew who hit first, would both games show the



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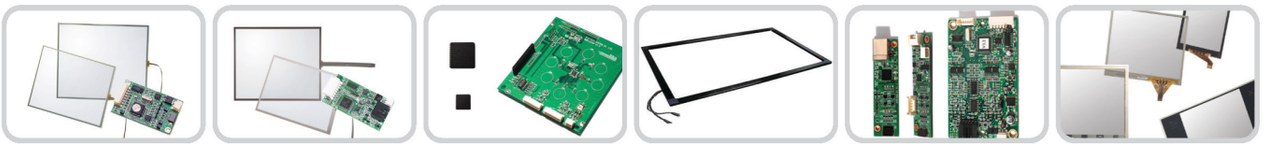
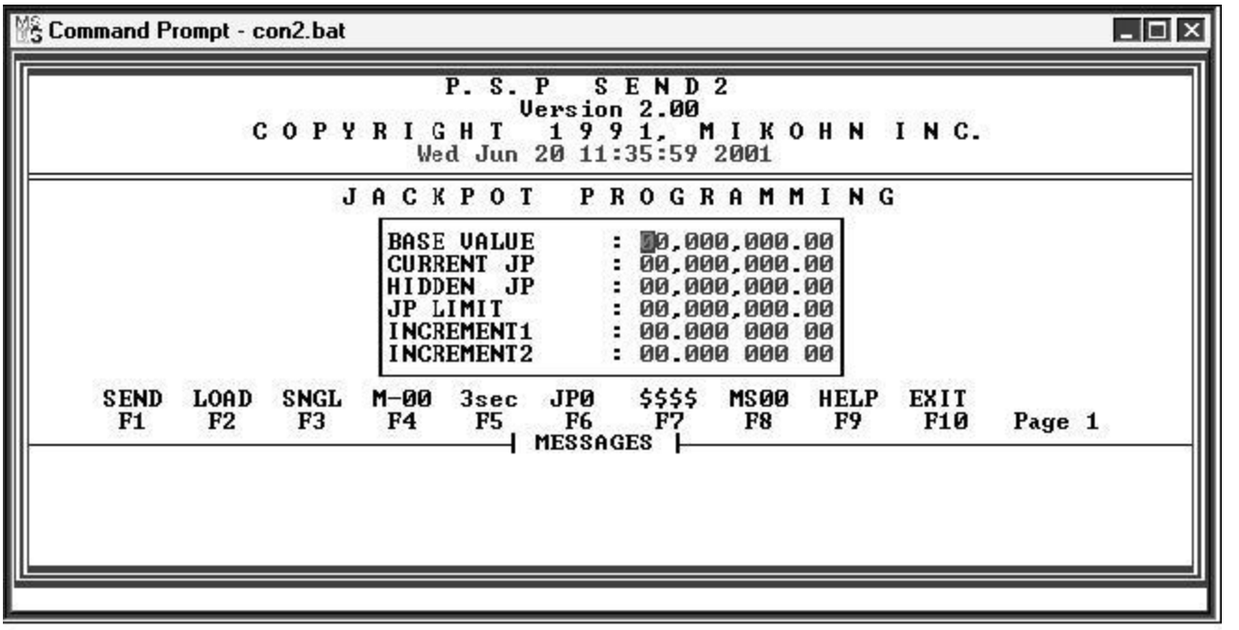




F8 Key	Protocol	JP Groups	Cycling	HID Swap
MS00	MIKOHN (SINFO)			
MS01	Bally Multi-Com			
MS02	IGT 3 group	JP0, JP1, JP2	No Cycling	No
MS03	IGT 3 group	JP0, JP1, JP2	Cycling	No
MS04	IGT 1 group	JP0	No Cycling	No
MS05	IGT 8 group	JP0, JP1, JP2, JP3, JP4, JP5, JP6, JP7	No Cycling	Yes
MS06	IGT 3 group	JP0, JP2, JP4	No Cycling	Yes
MS07	IGT 3 group	JP0, JP2, JP4	Cycling	Yes
MS08	IGT 1 group	JP0	Cycling	No
MS09	IGT 8 group	JP0, JP1, JP2, JP3, JP4, JP5, JP6, JP7	Cycling	Yes
MS10	Sigma	Reg. 14 Serial Protocol		
MS11	UGI	Reg. 14 Serial Protocol		
MS12	Games of Nevada	Reg. 14 Serial Protocol		
MS13	IGT 2 group	JP0, JP1	No Cycling	Yes
MS14	IGT 2 group	JP0, JP1	Cycling	Yes
MS15	IGT 4 group	JP0, JP1, JP2, JP3	No Cycling	Yes
MS16	IGT 4 group	JP0, JP1, JP2, JP3	Cycling	Yes
MS17	IGT 5 group	JP0, JP1, JP2, JP3, JP4	No Cycling	No
MS18	IGT 5 group	JP0, JP1, JP2, JP3, JP4	Cycling	No
MS19	IGT 6 group	JP0, JP1, JP2, JP3, JP4, JP5	No Cycling	No
MS20	IGT 6 group	JP0, JP1, JP2, JP3, JP4, JP5	Cycling	No
MS21	IGT 7 group	JP0, JP1, JP2, JP3, JP4, JP5, JP6	No Cycling	No
MS22	IGT 7 group	JP0, JP1, JP2, JP3, JP4, JP5, JP6	Cycling	No
MS23	Reserved	Reserved	Reserved	Reserved

same winning amount?

The controller is capable of doing a couple of different things here. Do you remember that I mentioned the serial return line at the beginning of this article? It's on this line that the machine gathers its data right? Here's the deal. The controller can do one of two things on that line: It can broadcast either the current jackpot value or it can split that broadcast and also broadcast a hit value. PGI refers to this as jackpot cycling. All of this data comes out of the serial return line from the CON2. It's entirely possible that the hits were so close that the second game picked up the wrong jackpot hit value that was being broadcast from the first hit. I guess that could be it.

To check the validity of this, we needed to get into the controller setup and look at how the controller serial settings are configured. These can be found on the PSP programming page. If you look at figure #3 you see a sample of the programming page (I can't show you the actual page because it contains information for my eyes only). I'll skip past all the settings until you get to function key F8, this is where you set the serial setting. Figure #4 is the MS setting chart you use to set the serial settings. If you look closely you can probably see where our controller should be set. Since we are running a single level top prize jackpot and we want NO cycling, we should be set to MS04. A check of the actual controller proved that we were indeed on MS04.

So why did this happen? Why did both games show the exact same jackpot value? Were the stars aligned just in such a way to cause a karmic imbalance and turn our world topsy-turvy for a split second?

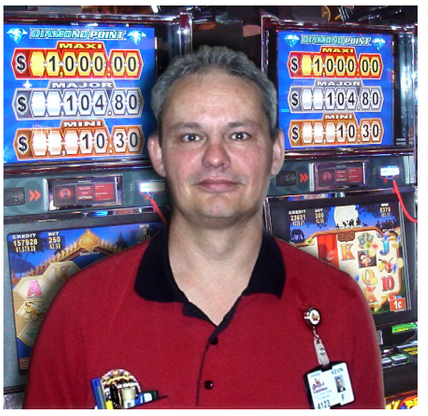
As it turns out, the games hit so close together that the second game had no opportunity to update itself with the new starting value that the controller would have put out eventually. Instead, it went with the value stored in memory, which in this case caused our Five Star dilemma.

That's what I believe anyway, if you believe in karmic imbalance and celestial interference causing this that's up to you.

- Ted Befus
tbefus@slot-techs.com

Problem Gaming

By Kevin Noble



IGT I-GAME
VGM Responding / Not Responding

What a wonderful tool that TPE_log tool has been. Every day it is checked and more often when the Supervisor comes across the radio saying the CVT # 11 is down or that they are having manual jackpots on that line. Every so often on a Thursday or late Friday we get the call that the CVTs are acting up and in about a five minute span they go away like nothing every happened. This time when the log was checked, this IGT I-game filled the screen with VGM responding / VGM not is responding messages. I kept a log of everything that was done on this game to see what the problem was going to be. Gary started with looping the game out from the bank and the errors disappeared. He changed the super stepper COM board and plugged the fiber back in. The error messages came back. We tried the power distribution board that was in the same housing as the COMM board but that did not solve the problem. The SMIB and printer were unplugged and again the error messages. We had AGCO come in and break seals so we could experiment with the CPU board and motherboard if needed. The CPU board was changed out that night but the messages remained. Reggie, the lone Technician for the next two days, assisted in trying to solve this problem. I kept in contact with Reggie to see what had done to repair this game (hoping he could unlock the mystery) but the problem remained. Reggie stated that he swapped everything you could think of with the game beside it except for the cabinet and asset and location tags but the problem would not move.

We contacted Wendell, our Regional IGT Tech, and he suggested that we upgrade CPU, motherboard, legacy board, and the DSPL EPROM to see if that solved the problem. Once the new parts arrived, the parts swapped out and the RAM clear performed, the test was on. I clicked on the TPE_log icon and it opened up, scrolled down to the last log, clicked on it and waited for the screen to open. Waiting that five or six seconds before it initialized, I scrolled down to where I recognized when the work was being done on the CVT and poll number where the screen and the problem still existed. I then contacted our IGT representative again and explained to him the upgrade was completed and now the game would not recognize the site and asset number on the test tickets. He suggested having us contact Central and take the game out of the EZ PAY system, re-enroll the game, and reconfigure the poll # on the CVT. The next step was for us to call the Financial System Analyst and state our case to her and to see what she could do on her end. She removed the game off the EZ Pay system by removing it from the gaming floor and placing it back on the floor. We were not too confident that just removing the game and placing it back was the cure to this ongoing problem. We opened the report and checked the log and there was nothing. The log just flat-lined and the problem was gone just like that. I rubbed my eyes in disbelief. I opened the log again, and again, and yet another time, the time of 12:23:26 remained. I thought the system had crashed or been frozen. Then on the fourth time a JP was reported but still no CVT 11 poll #17 problems, best yet it was gone. I also checked 20

minutes later and it was still working. The guts in machine #17 were now in machine #18 and vise versa. We had upgraded the CPU and motherboard and the problem continued. We were told it was on our end on numerous occasions and in a matter of a few seconds that game was working fine by re-enrolling it back into the system. Awesome.

Aristocrat Not Printing Tickets

This was a funny one that I wanted to share. I got called about a game not printing any tickets. The Slot Supervisor called and said that the printer was hard to slide out of its housing. I tried to pull the printer assembly out and he was right, it was pretty hard to move. I removed the top box glass to get a better look and to remove any pressure that might have put strain the printer assembly. With a little more effort, I finally removed the printer and noticed that at some point in time, the paper must of sort wedged between the tray and the bezel. The funny thing was that it was a popular game that was always being played (so tickets must have been printed off before the jam) and the last entry was a paper fill the day before. I removed the mangled piece of ticket paper and re-fed the printer, slid the printer back with no effort, making sure the paper was tucked neatly in its home.

Aristocrat Touchscreen Communication Failure

Have you ever looked deep into a problem and yet the problem was as plain as the nose on your face? This is one case that made us scratch our heads for a few days. It all started when a patron punched our flat screen monitor on the game and shattered the front glass on the touchscreen. The complete unit was swapped out with another one from stock and the game went into touchscreen communication error after the door was closed. The BV would flash four times and then the game would go into the error. The monitor was swapped out with the game next to it to allow for the game to cash out its credits. With no more monitors in stock we placed an order for two more monitors and shipped back the old shattered one. When the two new monitors arrived, they both displayed the same message “touchscreen communication error” after the main door was closed. Just to make sure we were not going crazy, we tried the monitors in other games but the problem continued. We received another one the next day and the same problem continued. We decide to swap out the Touchscreen communication controller

with the game beside it and the problem moved. Duh! was the first thing that went through my head, we should of thought of that a long time ago. We borrowed one from one of the CRTs in the shop and TA-DA! The game was back in service.

WMS VIDEO
Multiple Problems: Not Accepting Tickets & Alarms Not Reporting

One of the procedures at our site is that the cash boxes are not allowed to go into the games until all alarms are verified with Surveillance. I was asked to re-verify alarms with Control so we can impress the machine and start our bill and ticket test. We were being pushed hard to get the new games (Top Gun and Wizard of Oz) up and running for employee training and you knew mistakes and procedures violations were going to be made. On this one game, the main door alarms were not reporting during a routine alarm test on the afternoon shift and it was passed on to me. I started with the main door and belly glass door not getting any alarms at all but the bill cash box was getting the correct alarm to Control. So the problem is with the game and not an enrollment problem.

I checked the wiring from the SMIB (Slot Machine Interface Board) down to the motherboard. In that harness, it split to the logic door, the main door and the belly glass door. By unplugging the logic door, the Mikohn display switched from displaying a lowercase "f" to the capital "F" indicating that the door is open. I unplugged all the door cables off the SMIB to see if all the letters changed from lowercase to uppercase to indicate that the SMIB was recognizing the change of state of the doors. The letters should have changed state from a small "g" to a Capital "G" (main door) and small "d" (drop door) to capital "D." When I plugged the harness back in, the letters remained the same. All the door alarms were working except for the main door which is wired in series with the belly glass door and the Auxiliary door. I followed all the wiring, reconnected any harness for any bad connection and reseated plugs just in case there was a bad connection.

One thing that puzzled me was there were no Cherry switches in the cabinet to allow the drop door to be open and closed like the games we have on the floor already. This must be a new set up from WMS I had not seen.

This got to the point that I have exhausted everything I knew about WMS video to the point that I gave up and waited until the reps arrived. The only good thing about this day was our WMS representatives Marty and Justin were in town for a sign install just down the road at Caesars Windsor and were to show up around noon to help with this "special" training. I explained the problem and what I had done to try and troubleshoot the problem. I had to leave to answer a floor call and when I arrived back ten minutes later, they resolved the problem. They explained to me that in the older games, they would use a Cherry switch that plugged into the Auxiliary door harness (this is not being used at our site) and now they just plugged a set of jumper wires to now close off the series circuit. These jumpers are now replacing the drop door cherry switch and the Auxiliary door cherry switch. The male and female connector were plugged in and not making contact with the metal tabs thus keeping the main, belly and aux doors constantly in the door open position. The main door and belly glass doors were tested with control allowing us to impress the game with the cash box so we can begin our bill testing.

WMS Video
Not Accepting Tickets (Problem #2)

Just when you thought that you resolved one issue with this game, another one popped up. Again, Management pushing still to get this game running. I signed out a set of bills to get the game playable for training. I inserted the bills into the game, cashed out my ticket, recorded my information on the meter sheet and reinserted my ticket when problem #2 reared its ugly head. Standing behind me were Shift Managers, Operations Manager, Slot Attendant Supervisor, and the WMS technicians all waiting for this to accept the voucher and begin that "special" training we were to receive.

The voucher was inserted into the game, the machine held it for 15 seconds (or three hours it seemed to me)

and spit it back out. I tried a promo ticket but with the same results. We swapped a new fiber board with the same results. I asked Marty why the game spit out the ticket if the game was offline. He explained to me that the game will hold only one sequence number. That is why when we inserted a $100.00 bill and cashed out, the game went into a jackpot hand pay. By this time the Managers were growing impatient and were starting to drop off like flies with every thing we tried. We replaced the fiber cable with the same results and another one left.

We replaced the BV with the same results and another one departed. Rebooted the CVT and wrote "CC Config" report and the problem remained until it was just Technicians left to troubleshoot the problem. We had a strong signal coming into the fiber board, we swapped the fiber board in question, force downloaded the CVT but we were still getting "no data" for every available figure on the report.

Marty decided to swap the DB9 cable that connects from the fiber board to the bulkhead board from the game beside it. That game was working so it was now down to swapping parts to see what the culprit was. When they removed the DB9 cable from the good game, Marty noticed that the Mikohn and the fiber board cables, plugged into the bulkhead board, were reversed. He disconnected the plugs and plugged them into their correct positions, inserted a promo ticket and it accepted. The credits were played off and the inspection started and I was on my way home. When I was leaving Marty, Justin and I could not believe that the alarms worked with Control with the Mikohn plug being in the wrong position on the bulkhead board.

IGT REEL PLUS Not Accepting Bills

What could go wrong when you move a machine from point A to Point B? Still in the same project, we simply powered off the game, unplugged the fiber and jumped the game from the loop. We proceeded to unplug the Mikohn and power from the outlet and tucked all the wiring in the game like we have done a million times before. Once the game was moved and bolted, we started plugging in all the wiring and changing the poll address before the fiber was connected. Before we can place the game in service, we must bill or voucher test the game to verify that the meters increment correctly and alarm test the game with surveillance to verify the game is enrolled correctly. We also need the alarms to report the correct locations, and then we can install the BV cash box back in the game. Needless to say the alarms worked fine and they were confirmed with Control via the radio. But this game would not accept bills or vouchers when it was its turn. The bill acceptors were swapped out with the game beside it still the game would not accept. To make a long story short we asked to have the seals removed so we have more options when troubleshooting this game and eventually replaced the CPU and completed our bill and voucher test and had the game placed in service.

- Kevin Nobel
knoble@slot-techs.com

Bally Power Supply Repair

By James Borg

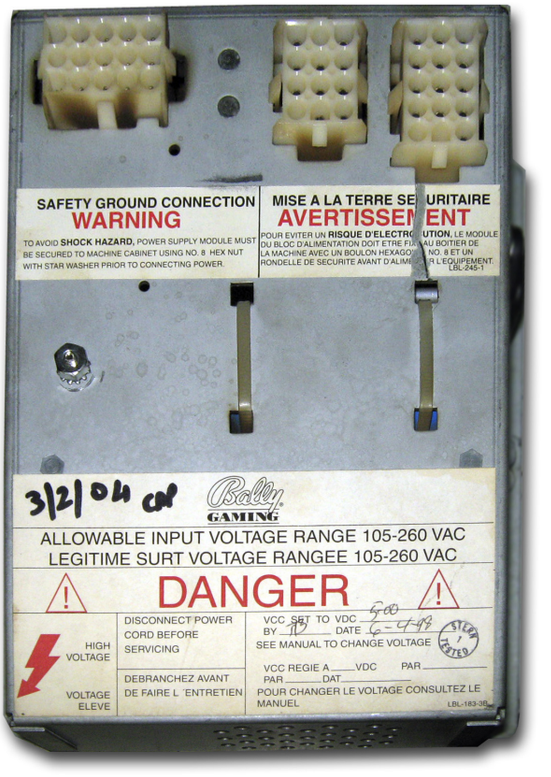
Don't you just feel so small when you turn off a machine for some reason or other and when you turn it back on again, nothing at all happens; the machine just remains dead no matter how many times the mains ON/OFF switch is tried? Don't you feel even smaller when the machine you just turned off happened to have credits in it and you have no idea just how many there were because you were distracted by a client wanting to know where the powder room is? Don't you feel yet even smaller when the client whose machine you've just switched off and whose credits belonged to, was right next to you looking at you with a very loving smile? Isn't life such a joy?

When that happens, you have three options at your disposal. Always remembering that you haven't got a good answer to give to the client why the machine hasn't come back to life again, and why he can't keep on playing. The cherry on the cake being that his credits are anybody's guess. Thoughts of a FUBAR power supply do come to mind which is an obvious assumption but another obvious assumption would be that a replacement isn't readily available. In not so many words, we never had any spare power supply units for these so the imminent future would look pretty bleak.

Happiness comes from within us and taking deep breaths like I was taught in Yoga while looking all knowledgeable does help a little. Just the same, best to have your phaser set on stun just in case the client doesn't buy whatever you're going to throw at him.

The first option is to smile and tell the client that it will be fine, while noticing if his facial expressions start to denote some sort of violent attitude. The second option is to smile, create a diversion and run away as fast as you can if the facial expressions aren't very promising. The third option is to ask Scotty to beam you up quickly (very quickly) but that doesn't always work due to circumstances beyond his control, like the transporter room needing refurbishing.

Actually, none of them are that good when you really ponder about them. The only thing you can do is to try and keep cool, calm and collected and let the technician in the place know that the machine is temporarily out of action so he can see



to it as soon as possible, if not sooner. Main reason would be that there's one unhappy client next to you with a possible violent nature. Actually, the right word to use when finding the technician would be "immediately" and followed by "please" for the sake of courtesy and have to keep on smiling while saying these words. You also have to remember that your life might be on the line and also since you've never had any bones broken and not familiar with the pain involved, such an experience is best not had if it can be avoided.

I have to admit that such an experience has happened to me directly. Not the broken bones bit but the machine being turned off and not coming back on again-and yes, with credits in the machine at the time-and yes with the client looking at me with loving looks. Fortunately enough, I didn't have to look too far for a technician as I'm the technician in this joint so I had to do myself a favour and repair the machine quickly while sending the client for a coffee or two at the bar. It's not that I want to continue stressing the already overloaded barmen but it works out better for the client to be away from 'his' machine for a while and it works out better for me too by not having the client analyzing each and every move I make. I know they mean well, but it doesn't seem to help me in my flow or level of happiness.

The machine in question in my case was a Bally, ProSlot 6000. They are still pretty popular as some clients just come and play on these and they spend hours upon hours just pressing away at the keys while tugging at the arm and keeping their fingers crossed every time the reels are about to stop rotating. They aren't keen on the new type of machines with all the fancy features involved for many reasons.

Just give them two or three buttons to press on and it makes their day watching the reels go round and round while hoping that they stop on a good combination for the machine to cough up loads of cash.

The reason why this particular Bally had to be turned off in the first place was because its reels just continued to spin on their own without any control whatsoever. Opening up the machine and hitting the reset button at the front of the CPU board most times does the trick but it didn't do a little bit of good at this crucial moment. The only alternative left would be to turn it off, leave it off for a few moments and then bring it back to life once the power switch is activated. At least, that was the plan, sweet and simple being the order of the day. Nothing too complicated to cause undue stress. Flicking the mains switch ON did bring it to life, so to speak, but only partially. Just the neon (florescent) lights came on, but nothing showed on the small red displays at the front next to the buttons. Also, the reels didn't start to spin and reset. The bill validator didn't cycle either. Oh dear! Oh dear, dear... Oooops. I wasn't very impressed at all by what had just happened. Instead, there was only a high-pitched tone being emitted from the machine which could have been originating from the power supply unit. I've heard that noise before but only for a few seconds, then it changes in pitch, and eventually the machine usually fires back into life and all will be well again. This time however, it didn't. It just kept on making that noise and nothing else happened. The pitch didn't shift. It was just a constant tone that after about 15 minutes was becoming quite annoying. Having the client literally breathing down my neck never helps matters in the least. I could see it written all over his face

"What about my machine? What about my credits? What will happen now? Do you know what you're doing? Does anybody in this place know what they're doing? This place sucks! I'm going to beat you up in a minute!"

I couldn't really give him any answer at that point so it was best to avoid eye contact, at least till I could come up with something intelligent to say to him. Noticing that he had a tattoo on his neck saying "KILLER" didn't make me feel at all relaxed, or happy. I wonder why.

I ended up apologizing to the client for the inconvenience and re-assured him that his machine will be back and running within a few moments. This seemed to make his facial features become slightly less tense. That's a good start. Next step is to take out the PSU and have a look at it in the workshop to see what the problem was. It's a bit dark and cramped in there behind the hopper and I didn't have the right sized box spanner to undo the nuts mounting it to the back of the machine. My trusty LED flash light is a real life saver as at least I could see what I was doing. Pitch black isn't the right surrounding when doing that sort of thing, especially if you don't have the right tools for the right job at hand in the first place. I had to resort to a pair of pliers to undo the nuts. They eventually came loose, and so did my knuckles in the process after hitting all the metal corners in there. With a sign of relief and after wiping my fevered brow, the supply was pulled out and within the span of a few minutes it was in the workshop on my bench for observation.

Visual inspection from the top and the bottom sides of the printed board didn't reveal anything out of the ordinary. Nothing that resembled bits of charcoal which were once shiny components or signs of an explosion was evident. No burnt tracks, no inflated capacitors, no blown fuse or cracked semiconductors, nothing at all. In a way that isn't so bad but that means locating the faulty area might not take just a few seconds. It's always a good

idea to refer to the manual and its schematic for proper checks in similar cases where nothing relating to the fault is apparent.

I was lucky enough to have the machine's workshop manual in pdf format in the office computer. It turned out that lady luck had deserted me since where the supply's schematic should have been for me to digest, all there was present was a rectangular shaped outline saying 'Power Supply Unit' smack in the middle of it. It wasn't going to prove to be of much help that and it didn't do my "Happiness comes from within us" mantra a lot of good either. It looked like I had to resort to good old fashioned brain power and experience to tackle this baby, not to mention a clean workbench top and some elbow space in my workshop.

The supply unit on this Bally is a pretty straightforward type of SMPSU using the common UC3842 (U1) controller chip. Various resistance checks were carried out to see if anything was unmistakably FUBAR but didn't reveal anything.

The reservoir (filter) capacitor was fine and the fuse was intact. The bridge rectifier didn't have any of its four diodes either short or open. No resistors were cooked and the most important thing, the chopper transistor, Q1, was still intact. It isn't healthy at all when this component blows in any supply. This is mainly due to the fact that it's on the rectified mains (approx 400v DC) and when this goes, all hell breaks lose and all or most of the components connected in some way or another to it will end up meeting their maker after being cooked good and proper, not to mention dismembered and quartered.

The primary side of things seemed fine. A quick look at the secondary circuits seemed fine as well. No smoothing capacitors were either inflated, leaky or had changed colour. Resistance checks to ground for any short circuits were negative. A short circuit on the secondary circuits can cause the supply to go in overload protection mode and can cause some sort of noise that is audible. However, there is an opto-coupler (U2) to sense if there's any excessive loads on the secondary circuits and

should technically shut down the entire supply by inhibiting the operation of U1 in the first place. Nothing was found which could be the culprit at this stage. The plot thickens. Will I need the assistance of Sherlock Holmes and of his side-kick, Dr. Watson? This would be all well and good if I had plenty of time to spend on it as it becomes a nice juicy challenge, but when I remember that a very unhappy coffee-sipping-client at the bar is still waiting for his machine to be working again, the challenge becomes a problem. I don't like problems but I adore a good challenge. The next step to take was to apply juice to the unit via J1 and checking out the UC3842 with a scope or a multi meter for voltage readings.

The beauty about this type of SMPSU controller chip is that it's only an 8 pin chip and it's quite powerful for its size. Size isn't everything after all. The most obvious place to start off from when checking out this little beauty is its supply rail, namely pin 7 with reference to its grounding pin, which is pin 5. There should be a neat DC voltage which rises up to approx 16 volts then goes down to approx 12 volts when the chip starts to pump out its output to pin 3, and remains steady at that voltage. The capacitor that is an important part of this particular circuit is C14. This component is a 47uF / 50v capacitor and it has the very nasty habit of going dry on me so the supply rail here is anything but clean. A good move is to change it. If you get slightly disorientated which way was which, on the component side of the print, there's a little + sign indicating the capacitor's polarity. It's also a good move to check if the reservoir (filter) capacitor would be discharged before fiddling about with the board as this can pack quite a punch and cause a blinding flash if not handled with some tender loving care. In some power supply designs it take this capacitor ages to discharge whilst others have a bleeder resistor incorporated to slowly 'bleed' the voltage to a safe level and eventually come down to zero after a relatively short period of time. If the circuit has no such resistor, and you're in a rush, bridging the capacitor with a 1K resistor and leaving it connected for a few moments will do the trick. I don't really suggest you shorting the capacitor terminals as that might damage the plates inside it due to the sudden discharge taking place. I agree it is fun but it is also a NO-NO! It can actually puncture a hole in the dielectric.

A quick look in the bin containing my capacitors was a fruitful one as I managed to find a couple of 47uf/50v ones still there. After pulling out the old one and cleaning the solder pad with my trusty de-soldering wick, the new component was soldered nicely in place.

A de-soldering pump could have been used to remove the excess solder but the tracks seemed to have been well and truly cooked after years of working and became brittle. Their fatal blow would be to be sucked off the board and finding themselves in the belly of this solder sucking monster. Not a good idea that. It was then a question of applying the juice and see if there's any output from the chip. I wasn't expecting any flashes of light to blind me or clouds to hit me in the face or to see the components suddenly change colour or anything drastic like that. Actually I wasn't expecting a great deal this time apart from a distant nearly inaudible noise which healthy SMPSUs make when starting up. I don't think I heard that noise after all and nothing seemed to happen once the supply was powered up. A dc check on the outputs showed signs of life. That's brilliant, wonderful, not to mention also fabulous. It was actually working. The client should be happy. I'm happy already. With that happy tone in the air, the supply was put together again and before I knew it, it was back in its rightful machine and working away fine. The client with the tense facial features appeared and was smiling. I was smiling. The barmen were smiling. Everybody was smiling and why not? After all, isn't a smile a wonderful thing? As a very dear friend of mine once told me"It is the most pleasing five-letter word. Use it."

- James Borg
jborg@slot-techs.com

Ceronix now offers a solution for the 3800 and 3900 Processor Boards with their new A to D converter board

The Ceronix goal for "Drop in LCD Replacement Kits" has always been to make it as easy as possible for the technicians to replace an OEM Monitor with a Ceronix LCD replacement. With a few of the kits Ceronix had some issues, mainly with video blanking on the IGT 3800 and 3900 processor boards. In the past, technicians were required to change out the U17 on the IGT 75703900 board. As for the 3800 processor board there was no solution, which required the technician to change out the board completely.

This is now all in the past, with the introduction of the new analog to digital (A to D) controller board for the Ceronix LCD line, there is no longer a need to change any parts on your game boards. Along with this change the Ceronix kits now work with all 3800 processor boards. The new Ceronix A to D controller board utilizes the Genesis gm5766 advanced image processing controller and has now resolved the blanking and other issues with all of the game manufacturers including IGT Players Edge and Bally Game Maker.

For more information contact Ceronix Technical Assistance or your local Suzo/Happ or Eurocoin service or sales representative.

April 2009

Quick & Simple Repairs #49

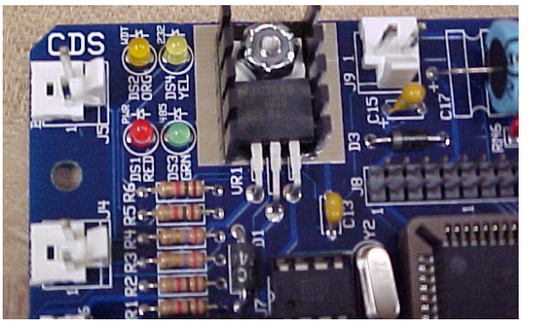
By Pat Porath

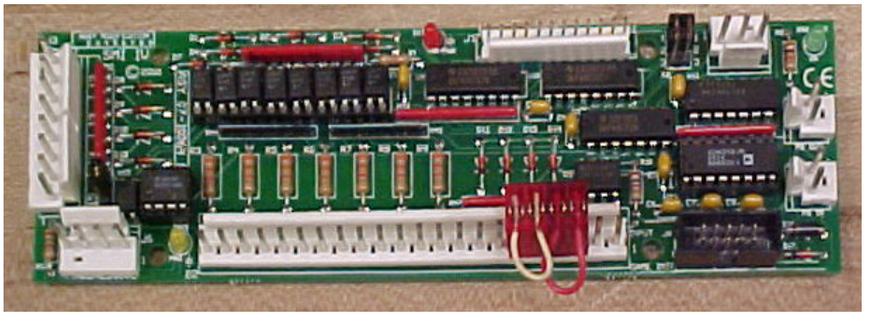
Oasis Sentinel Display Problem

Wow! This ordeal was a little frustrating. While working on a bank of new Bally Alfa 9000 games, the Oasis Sentinel that we installed wasn't working properly when power was applied. The display didn't show any text, only a greenish color appeared and the "watchdog" LED on the Sentinel board was flashing at a very slow rate. The LED is supposed to flash around 3 Hz (three times a second). On this board, it was only flashing once per second. My first guess was that the EPROM had gone bad. A spare was put in and a spare Sentinel was grabbed too. When power was applied with the replacement chip installed, it had exactly the same symptoms (Looks like I was wrong on that one). A spare Sentinel board was installed with the replacement EPROM. The same symptoms appeared. This time the spare Sentinel was tried with the original EPROM. It still didn't work properly. Next, the display itself was replaced. After that, a replacement display cable was temporarily installed. I STILL didn't have any text on the Oasis display. I thought for a second, maybe the Oasis power supply was going bad and it wasn't putting out the proper voltage? Just then, an idea was brought up. Why not replace the "whole works?" Replace everything as one unit. Simply grab a complete Sentinel assembly off of the shelf and install it. The original one was removed and the complete replacement was installed (The assembly includes: the Sentinel, the SMI board, all of the cables, and an EPROM). When power was applied to the replacement it worked right away. For some odd reason, none of the combination of replacement parts would work properly. I had heard that some of our replacement Sentinels weren't working and some of our Sentinel EPROMs are failing once in a while. So we may be setting up a small test area to figure out exactly what is going on and test the replacement parts to make sure that they are a known good replacement. With the replacement Sentinel assembly installed in the new game and working properly, it could be "globaled" and the game could get tested. One step closer to having the new game released to the public for play.

Bally "Reel Winners" Reel Tilts

We recently received six Bally "Reel Winners" and when they were put into play, one game had some "wheel" tilts. A "Reel Win-





ners" game is basically a Bally Alfa 9000 with a wheel type bonus device up top. When certain symbols land on a lit payline, the game goes into the "wheel bonus." A ball goes around and whatever amount it lands on, you win that amount. The problem was periodically the wheel bonus would have an error. Knowing that the reels could be calibrated, maybe the wheel could be calibrated and tested? I started off checking out the diagnostic software and sure enough found the area for a wheel calibration and a wheel test. It was in the same area of diagnostics as the reel calibration. First I calibrated the wheel then I proceeded to test it. Everything checked out OK. After the testing was complete and the main door closed, why not test out the game just to make sure I don't get called back to it later on in the day? I downloaded some "promotional credits" and proceeded to play-I mean test-the game. The game was spun at least 15 times and it did not have an error.

Bally EVO Stepper Game - No Display

I was told that chip U43 somehow got put in backwards in its socket. (For those that don't know, on this game both U28 and U43 are game chips. Not a good thing for one to be inserted backwards.) For those of us with experience, we know that sometimes a chip can still be OK if it is inserted backwards for a very short time while the game was turned on. Sometimes they will work, sometimes not. With this case I didn't know for sure how long the game was turned on with the chip not seated correctly. I still wanted to try to get the game running if I could. Did the chip in fact "fry" or not? Was it "medium rare" or "extra crispy?" When I first sat down and turned the power on to the game, it didn't even have a display (The seven segment display). I knew right away this was a bad sign. I removed both U28 and U43 chips just to make sure none of the legs were bent, and they were OK in that aspect. Another unusual occurrence was when the power was turned on, the red light on the processor would flash at a steady rate of around once per second (The red light that is located near the reset button). Well, back to good ole' swaptronics. Since these games were a bit older and I had two identical themes side by side I could simply swap main processor boards without any major issues. The known good processor was put into the problem game and the power was turned on. At least I had a display; it showed an error code of 43, which is a reel error. This

told me that the problem had to be somewhere in the main processor board. So I grabbed a spare board from the shop and compared dip switch settings and also made sure to enable the battery jumper. Sometimes processor boards have the battery disabled so it isn't actually being used while it is sitting on the shelf. Next I transferred the chips from the bad board to the replacement. On my way back to the game I grabbed the RAM clear chips. With the clear chips installed the board was put into the game (I did try a RAM clear on the original board earlier without any results). During power up I held in the "pseudo" and "test button" to clear RAM. Next I had the "CLP" then the "CLC" message displayed. This meant that the RAM clear was successful. So far so good right? Well, not quite. I put the game chips back in and turned the power on. No such luck this time, the game didn't have a display and the red light on the processor board was flashing just exactly as the original problem. This tells me that more than likely the chip that had been installed backwards was fried extra crispy. Once a replacement chip was installed and RAM had been fully cleared, the game was fine.

Atronic e-motion Bill Acceptor and Touch Screen Error

While doing some preventive maintenance on some e-motion games, I ended up with a bill acceptor and touch screen error. After I used a vacuum cleaner on the "button panel cooling fan" (which is actually for cooling the lower and upper LCDs) I was putting the button panel back in place and on power reset, it started to boot up. Once the game was done with boot up, then it had the errors. A few door resets were done and the error didn't clear. A reboot was done and that didn't help either. Still having the errors and knowing it may be a power issue, there was a chance that a fuse blew. On an Atronic e-motion game, near the upper left corner on the motherboard there are three fuses. Each has a small indicator light. When the light is on, the fuse is OK. When the light is off, the fuse may be bad. In this particular case when I saw that there was a light out on just one of fuses, I was pretty sure that the fuse was bad. The fuse was removed and sure enough it was bad. But, why did the fuse blow? When I was putting the player button panel back in somehow I must have touched a hot wire on a ground. I replaced the bad fuse (with power off of course) the power was turned back on and all of the fuse lights stayed lit. Once the game was done booting up and the main slot door was closed the bill acceptor and touchscreen errors went away.

IGT "Red Hot Progressive" IPC Progressive Errors

We have a bank of IGT S2000 upright "Red Hot Progressive" multi-denomination games that usually run very well. They get moderate play and our customers enjoy playing them. Lately we have seen a few "IPC progressive errors" and the whole bank of games disables. Sometimes the bank would reset itself after a few minutes, other times it would take a half hour.

What was causing the error? While a co-worker was looking at some of the "fiber COM boards" that are inside of the games. There were two of the LEDs that weren't flashing. This indicated that communication had been lost. After some troubleshooting, the game causing the error was identified and a "female fiber coupler" (also known as a gender changer) was installed to bypass the problem game. Once it was installed, the problem went away. It was thought that the game COM board wasn't working properly so it was replaced. The "female coupler" was removed and the game COM board was then connected and the game was turned back on. Since the replacement, we hadn't had any other problems with the bank.

Aristocrat "Promotional Credit Display" That Wouldn't Clear

I was called to an Aristocrat Mark 6 game that had a message on the screen that wouldn't clear. It said something on the order of "unable to cashout promotional credits, press any button to clear." With the machine locked, I tried pressing some of the buttons but the message wouldn't clear. I was also told that a customer had been playing the game and the message stayed on the screen the whole time. I opened and closed the slot door thinking maybe a door reset may do the trick. No such luck. Why not try a reboot? A simple reboot of the game cleared the mes-

sage and it was fine. Normally if a customer has "promo credits" on an Aristocrat it is suppose to show them the message that they cannot cashout. Then, like it is displayed, press a button and the message disappears. In this case a simple reboot did the trick.

WMS Slant Top Bluebird Monopoly - No Power

This game had been diagnosed with a possible bad power supply. The game itself didn't have any power and the auxiliary power outlet didn't have any power either, but the topbox part of the game did. Another tech and I made sure that the game was in fact plugged in and all of the 110 VAC connections were snug. They were. As we were checking things out we thought, why not check the main game fuse? The fuse was removed but we couldn't visually see if it was good or bad. It was the "non-explosive" ceramic type so a multi-meter would be needed to test it. Instead, we turned off the game next to it and swapped the fuses. The original fuse indeed was blown. Now why did the fuse blow and what will happen when a replacement is installed? A new one was put in, (ALWAYS replace the fuse with the same type and same amps) and the main power switch was turned on. So far so good, the fuse didn't blow and the game was fine. If it did go bad right away, then we would have a problem. Sometimes each wire harness has to be disconnected one at a time to find the area of the short. Other times devices need to be removed to find the area of a problem. I've seen a few times where a "hot wire" on a candle was shorting to ground and knocking down the whole game. It wasn't found until the wire harness for it was unplugged and the game turned back on. When the candle (aka service light) was disconnected from the circuitry, the game was ok. When it was plugged in, the game wouldn't work, and after the candle was taken apart, it was obvious where the problem was.

- Pat Porath
pporath@slot-techs.com

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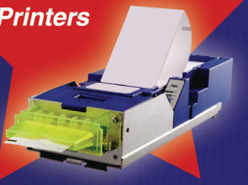

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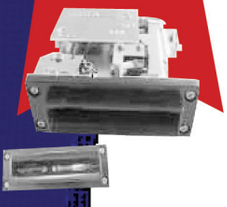

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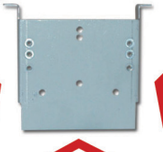

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