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Slot Tech Editorial

Blast From the Past

A long time ago, in a galaxy far, far away, slot machines were the furthest thing from my mind. Back in 1972, the amusement machine business was just entering the "Golden Age" of videogames with the popular success of Atari's "Pong." Back then, slot machines were boring, electromechanical devices. Videogames were much more interesting and so that's the path I followed as a technician. Of course, these were the days before the Internet so I shared what I learned by writing a monthly technical column for one of the industry trade journals, Play Meter Magazine.

Randy Fromm's Slot Tech Magazine

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Along the way, Play Meter acquired another technical correspondent, a specialist in the repair of redemption games named Vic Fortenbach. Over the years, Vic contributed numerous articles on the subject, often specializing in the troubleshooting and repair of ticket dispensers. He was "Ticket Vic" and well known throughout the amusement machine industry.

Fast-forward to the present and slot machines are finally something interesting to work on. I made the switch from amusements to gaming and apparently, so did Mr. Fortenbach who now works as a slot tech at The Spa Casino in Palm Springs, California. I received the following e-mail:

Hi Randy.... Long time.

I'm thinking of jumping in the authoring arena again by writing for Slot Tech magazine. What about a "starter article" about the upcoming WIGC show here in Palm Springs? I can cover it with photos and a "what's new at the show" article.

Let me know,

*Vic Fortenbach - Slot Technician
Spa Resort Casino*

Well, that's a long introduction to a short article about the Western Indian Gaming Conference. You can read Vic's report on page 35. Nice to hear from you again, Vic.

There's a pretty interesting mix of things this month. Canadian Correspondent Kevin Noble took a field trip to the United States of America to visit Osborne Coinage and IDX. His report begins this month on page four. Part 2 of Herschel Peeler's Bally S6000 article continues on page 10.



For the mathematically inclined, John Wilson presents us with another look at PAR sheets. John has a knack for actually making this stuff understandable and interesting, compelling one reader to write in: "Up 'till now, no one has ever been able to answer what the volatility index was for, except for maybe a quick generic answer. I read your article and have absolutely no questions. Thanks for a very detailed, well thought out explanation."

*John Green - Slot Tech Supervisor
Horseshoe Casino & Hotel*

Slot Tech Magazine also welcomes Chris Appoldt. Chris is the Manager of Technical Publications for WMS Gaming Inc. His contribution "Writing the Book - In Support of Technical Writers" chronicles the creation of a service manual for a slot machine. Since WMS has always produced superb tech manuals, he and his team must be doing it right!

If you're interested in attend TechFest in Iowa or Minnesota, please make your reservations as soon as possible. Most of these things sell-out. This year's TechFest features a record number of presentations by tech trainers from throughout the industry. For a complete schedule, visit the website at slot-tech.com.

That's all for this month. See you at the casino.

Randy Fromm
Randy Fromm - Publisher

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IDX and Osborne Coinage

By Kevin Noble



In the February 2002 issue of Slot Tech Magazine, I wrote about the X-10 coin Xeptor from IDX. Two years have now passed and so I thought I would like to follow up on the new technology that IDX has introduced. This was all brought about because of some new games that we had received on the gaming floor. When programming the IDX, we discovered some values that we were not used to seeing. I wanted to discover the differences between the two similar IDXs.

My first thought was to e-mail my good friend, Mr. James Halsey (President of IDX) and get some answers to my questions. I knew that when AGCO saw these new values, they would be looking for answers. This was the perfect time to stay ahead of the game. When asked, I could have all the answers without any major delays in getting our games approved and up to the public.

Within days, I received a phone call from Ed Dixon (Pro-

duction Manager and Technical Support) regarding all my concerns. Ed answered all my questions. He also explained in detail, some facts and figures that were not made public.

A few days after that, I called James to personally thank him for allowing me that information. The conversation grew to include different products that are new on the market and some products that are about to come out. James also informed me that he had sent a care package for the techs and myself that included the new, hot off the press, IDX flipbook, feeler gauge, and some special IDX tokens to hand out.

That is when I threw out the idea of writing another article on the IDX. I wanted to do something different; something this time about the company. I asked James if he had any objection to my writing an article about IDX Inc. I wanted to include how it all started, his staff, the company and especially, his new products. Shortly thereafter, I received an e-mail inviting me to visit Osborne Coinage

in Cincinnati, Ohio and, after seeing how the coins are manufactured, fly down to El Dorado, Arkansas to visit the IDX plant.

This was a chance for me to learn about the new products that I eagerly wanted to explore and to see how they worked. This was also an opportunity to meet his staff, with whom I have had many telephone conversations but had never actually met. I couldn't pass it up. In the past couple of years, I've written about products, upgrades, conversions, manufacturers, training, progressives and many forms of procedures and paperwork. This was going to be an article in a different direction that I was really looking forward to writing. So, let's begin with my day with Osborne Coinage.



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Brief History

Founded in 1835, Osborne Coinage has the unique distinction of being America's oldest private Mint. Today, Osborne continues to process tokens made of different metal alloys and sizes. In 1997, Osborne entered the gaming industry, producing the new X-Mark token that is currently in many casinos around the world.

I began my visit to Osborne Coinage, sitting in the boardroom waiting for my escort. Being Canadian, I was interested in a framed collection of the 1998 Canadian hockey team coin set that I had noticed on the wall. The names of Gretzky, Yzerman, Sakic, and Roy were all stamped on these coins. Jeff Stegman, CEO for Osborne Coinage, pointed out the fact that they manufactured more than just casino tokens. They also produced promotional items like the set of hockey coins, key chains, coin cards, embeddings and display boxes, to name a few of the many items produced at the plant. After receiving my clearance and I.D. tag, Jeff walked me out to the floor where all the processes begin.

Slot Token Production Process

Alloy Melt: Unique alloys specifically for high security gaming tokens are specified by Osborne and assayed by a qualified mill.

Rolling and Slitting: The mill then casts an ingot and rolls

the metal out until it is the right thickness. A slitting operation cuts the wide roll into strips of the specified width.

Blanking: The rolls are pulled through a blanking press, which produces blanks (featureless disks of metal).

Die Making: Casino artwork and X-Mark codes are cut onto tool steel cylinders called dies using a proprietary process at Osborne. Dies are secured and controlled by an approved process.

Coining: The dies are hardened and installed into a high speed coining press. The coining press feeds blanks between the two dies, which come together with tremendous force (up to 360 tons) and create the finished coins.

Quality: All aspects of quality are constantly checked during the coining process. This includes diameter and thickness to a tight specification, the artwork image and the strength of the X-Mark codes.

Security: The production runs of coins as well as the obsolete token and chip destruction process are secured using controls approved by all gaming jurisdictions. The shipments of tokens into the casino and obsolete tokens out to Osborne are coordinated closely between casino and Osborne personnel.

The X-Mark Token

Following the conceptual development of creating a coin acceptor that would accept a



coin with a special X-Mark minted into a coin, Osborne Coinage accepted the challenge to bring this idea into reality. Teaming up with IDX Inc., the X-Mark token was created for the gaming industry to provide greater security in a coin that would be impossible to recreate. With this in mind, the special X-Mark token was created with different metal alloys, a special X-Mark stamped into the coin and different coin diameters, eliminating cross play in any casinos in the world today. With a log of which alloy metals are used along with the special X-Mark embedded into the token, the combination will never be duplicated into any other casino's token thus eliminating any cross play.

The Plant

Jeff and Todd Stegman both took a turn showing me around the plant. I had the chance to observe many manufacturing processes and was honored that I was able to go into some restricted parts of the plant that I cannot mention in this article. I was amazed at the security and camera coverage throughout the plant, with card swipe access required to enter certain rooms.



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Taking Care of Business

I was shown the secure area where tokens are stored to be later destroyed. I also saw a bin of tokens that had already been destroyed. All of the destroyed tokens are shipped back to the mill, to be melted down and used again. Another neat thing I saw was Osborne's own tool and die shop and toolmakers. All worn out machine parts and tools are reproduced right there in the plant if needed.

The Future

Having had many conversations with both Todd and Jeff, they have informed me that there are many promotional products that have just started filtering their way into some casinos. One thing that caught my eye was a table game chip with a central holographic image, an X-Mark code and a plastic outer rim. The casino's information and denomination was stamped right into the plastic to prevent any of the lettering from rubbing off. On the edge of the chip, there was a unique code/pattern that will determine the chip's denomination. Osborne feels that this new age token will be used both on table games and in slot machines in the future plus be used as a marketing tool.

Another item that was developed and implemented at the Riviera Hotel and Casino was a set of "Limited Edition" hologram coins that were used as a marketing tool for special holidays and events that were



Meet John, and his horizontal press. This process is called "coining."

The "coining" process is when two dies coming together striking the blank (Cold Forming Process) while the tonnage of the press causes the material to flow evenly into all the small recesses. John was nice enough to show me the complete process of changing dies from start to finish. Thanks John!

inserted into circulation. The idea was to create many different images that allowed the patron to collect a series

of sets. These marketing tokens could be obtained from both slot machines and table games. The casino benefits



Meet Greg, and his vertical press. This press is built for speed and has the pressure that comes from below to strike the blank. At the time of this photo, Greg was running Hiawatha's 5-cent gaming Tokens. Don't worry Ralph and Jim, your tokens all passed inspection and you should be getting them soon.

by making a profit on each coin that leaves the site created by increased customer visits and play.

Overview

Having experienced yet another process in the gaming industry, it was very interesting to watch how a token is produced from start to finish. It is amazing to see the number of items that are produced at the plant, including antiqued bronze coins, pewter finish, holograms, aluminum, plated and color vinyl filled centers, bi-metal and silver coins. I had seen how a slot machine was assembled at Bally Gaming some years ago, and next on my list will be the fabrication, assembly, testing and repairing of the IDX coin acceptor.

- Kevin Noble
knoble@slot-techs.com



This is a picture of all gaming tokens that are destroyed so they can never be used again. After the coins are destroyed, they are shipped back to the mill where they are re-melted. These containers are kept in a locked room under camera coverage where you must log in to enter this room. These tokens will never make it into circulation.

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Bally S6000 Part 2

By Herschel Peeler

Part 2 continues with a look at Reset. Where not reproduced here, schematic diagrams are available on the Slot Tech Magazine ftp server in the "Herschel Peeler Collection" sub-directory.

All games, all microprocessors, have a Reset circuit to start the processor off at a known specific address and condition all latches on the board to a predictable state. U77 (TL7702A) is a Reset Supervisor Circuit that may be triggered from three different sources. Power-On Reset is generated from pin 7 of U77. The length of the Reset pulse is determined by capacitor C19. U75A (TLC372C) generates the Reset on pressing the Reset button or, if enabled by jumper JW19, upon a signal being detected by the Antenna.

"Antenna?" you may ask. "What is a slot machine doing with an antenna?" There is a

path on the circuit board that runs around the board and actually goes nowhere. Its purpose is to detect a sporadic pulse of an abnormal magnetic field and cause the game to do a Reset. Another jumper may be added to extend this antenna out to the backplane. Once was a time people thought they could make the game do something special by zapping it with a cattle prod. I hope they didn't pay much for that wisdom. Nonetheless, this activity caused Bally to add the antenna to their design, just in case.

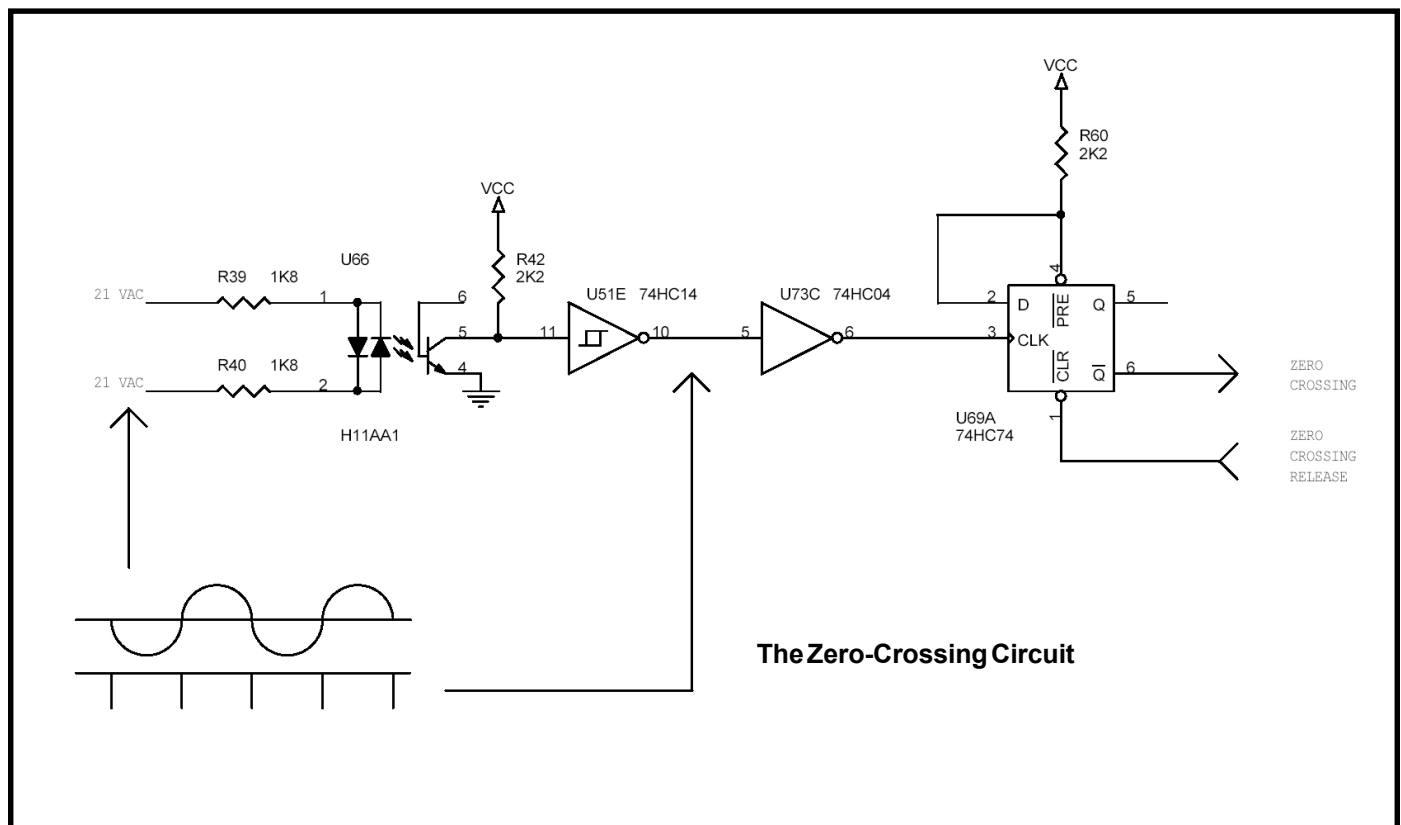
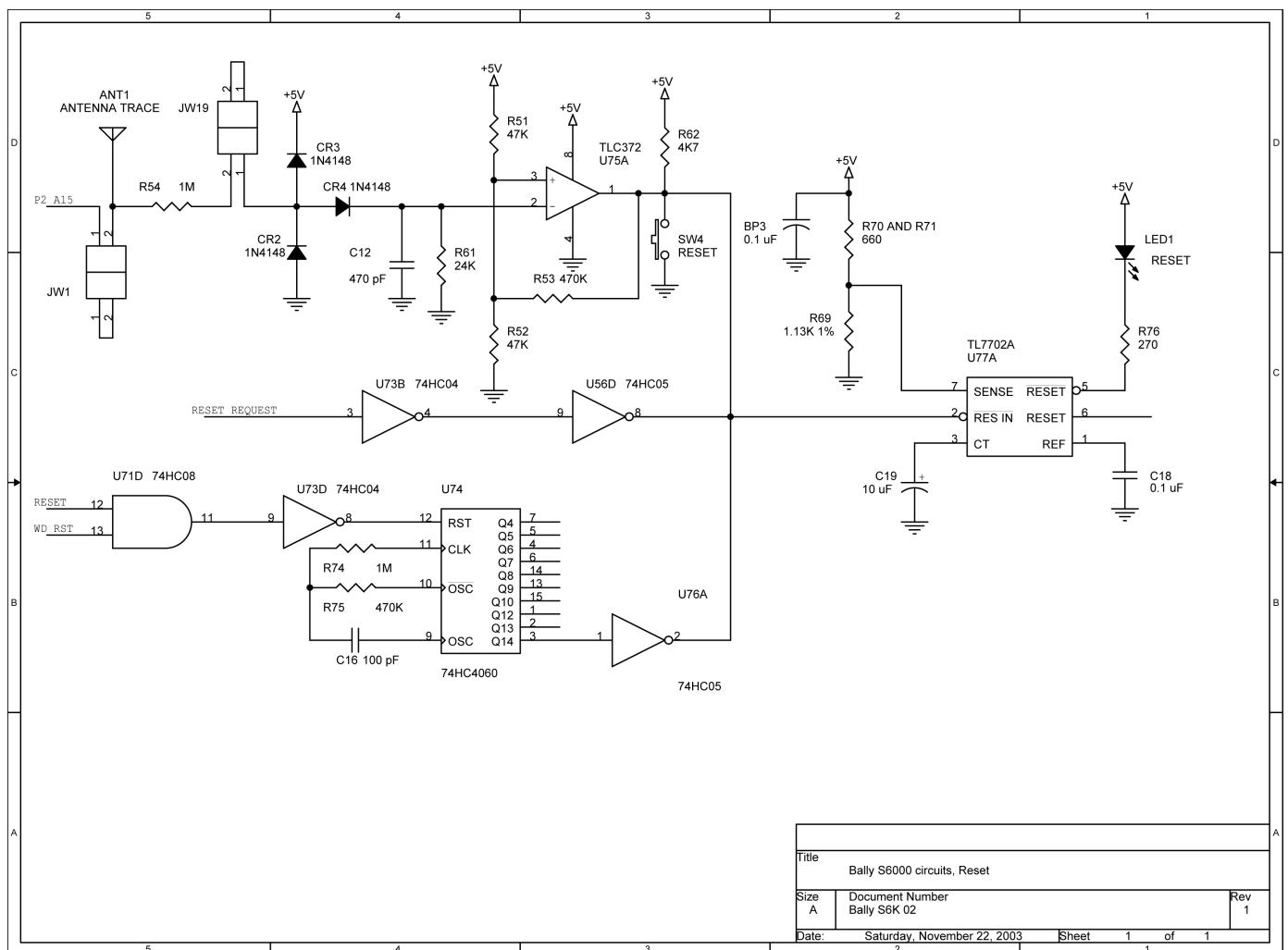
When the antenna picks up a signal the positive side of this signal builds up a positive voltage on R61, through CR4. Diodes CR2 and CR3 keep this voltage from going higher than 5.6 Volts or lower than -0.6 Volts. This process is called "clamping."

U75A is a Voltage Comparator. R51 and R52 form a voltage divider that sets the Non-Inverting input (+) of U75A to +2.5 Volts. The voltage developed across R61 is applied to the Inverting (-) input. When the voltage on the Inverting input exceeds +2.5 Volts, the output of U75A goes low, triggering a Reset. Removing JW1 and JW19 disables these

antenna functions.

Our Reset may also be triggered under software control by the signal "RES_REQ" (Reset Request) or from the Watchdog Reset circuit of U72. The circuit around U72 is a classic Watchdog Timer design. U72 is an oscillator and counter. R75 and C16 set up a timing circuit for the oscillator built into U72. The counter counts the pulses from this oscillator. If the counter counts all the way up to 100 0000 0000 0000 (4000 hex) the Reset circuit is triggered. This counting process takes about 430 mS. Normally, this should never happen. Software should come around and clear the counter more often than that by pulling on the WDRST (Watchdog Reset) signal. If the processor should become hung up and not get around to pulling on WDRST, the counter completes its count and pulls on Reset, restarting the processor back to a known condition. If the problem is a solid hardware failure, the game will hang up doing a Reset twice each second. This lessens the possibility that an erroneous logic operation can result from a component failure on the board.

All processors have a Reset



circuit in them. Most have a Watchdog Timer much like this one.

Page 1

Address Selection

The right side of Page 1 is address selection. Every operation the processor does must have an address the CPU must reference to perform that operation. This is the primary circuit that decodes the Address and Status line to resolve select lines that control all operations. The Programmable Logic Gates (U60 and U62) are high failure rate components. These are areas of high signal activity and build up a lot of heat.

Interrupt Requests and Arbitration

Another one of the Programmable Logic Gates (U46) controls Interrupt Arbitration. At any given time, the MPU may have a number of different tasks going on. Determining which process to do next is up to the Arbitration circuit. U46 has inputs from various chips on the board that put out an Interrupt Request, telling the CPU that it has an ongoing operation that requires the CPU's attention. The design of U46 has been made to give higher priority to the more urgent Interrupt Request if more than one is present at the same time. It is the design engineer's task to assign these priorities. All processors have a circuit with this function.

Page 2

In the upper left corner of this schematic is most of the memory. Upper right corner is the circuit that drives the Reel Driver boards. The drivers are actually located on the Reel Driver Board on the Reel Mechanism itself. This is a good feature of the design of the Pro-series family. The motor drivers are likely areas of potential failure. Putting them on the Reel Mechanism not only puts a potentially high failure part off of the MPU board, but gives maximum flexibility of design for different reel mechanisms, like the Big Bertha games.

At the bottom of this page is U52 (AY2149). This is the Sound generator circuit that generates noises for the game's sound. The sound chip also has 16 general-purpose digital line available to the imagination of the engineer. In this case they are used to read the DIP switches where some of the game options are set. The AY2149 has three audio channels. These channels are feed together and go to the Power Audio Amplifier just above this circuit.

The circuits at the bottom left control SafeRAM (U34 and U35).

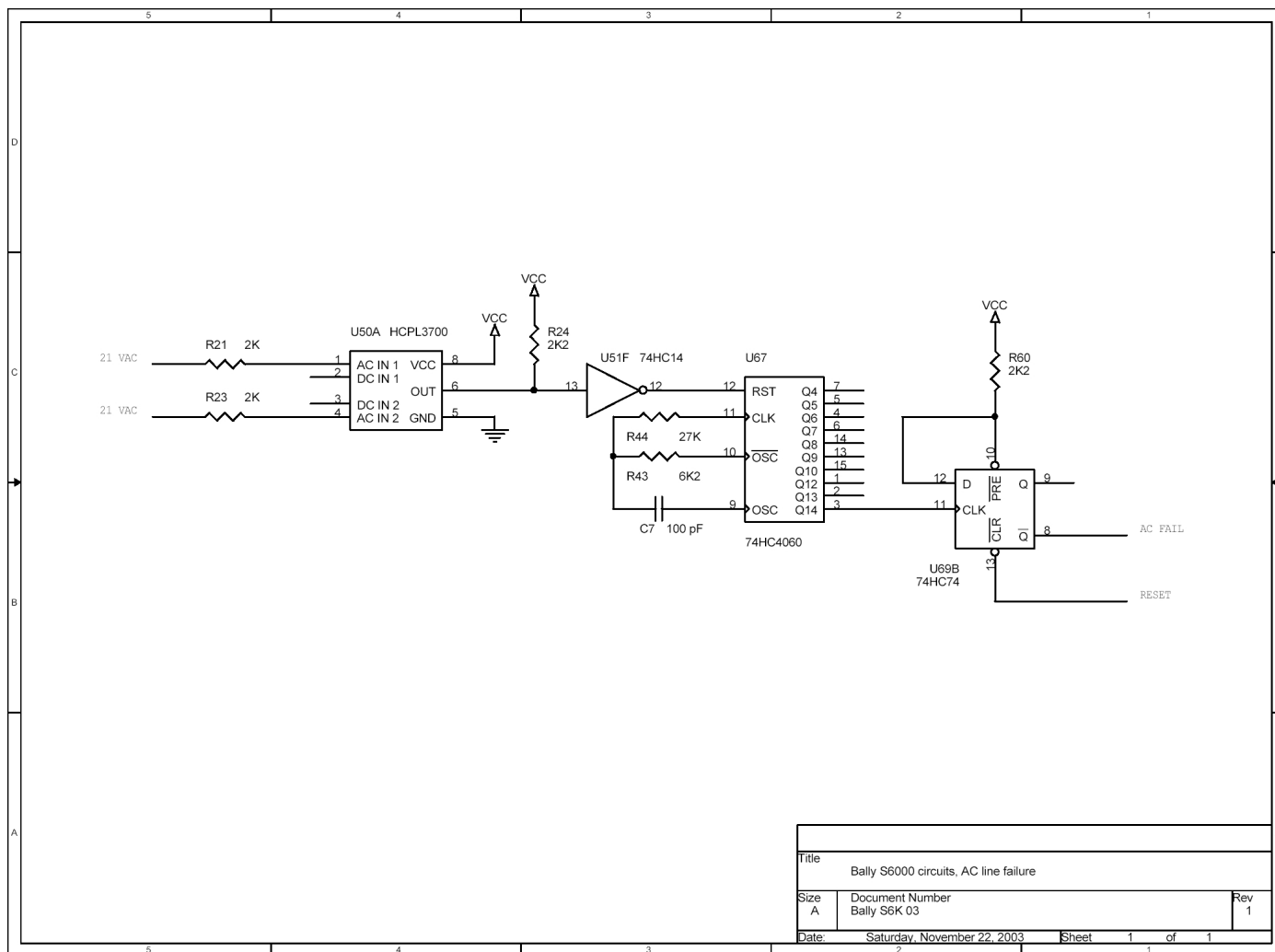
AC Sense Circuits

Referring to the schematic with the H11AA1 at the left side. U66 (H11AA1) and its circuits are used to sense the

AC line voltage crossing through zero volts. With 21 VAC applied to the inputs, one of the LEDs in U66 is on almost all the time. Only when the signal is below about 1.5 Volts (positive or negative) do both LEDs turn off. Every time the AC line makes a transition through ground (going positive or negative) the transistor on the output of U66 turns off and outputs a high. So coming out of U66 we should see short positive pulses at a 120 Hz rate. These pulses are squared up by U51, a Schmidt Trigger, and inverted. U73 inverts the signal back again to positive going pulses. The clock signals are applied to U69. On each positive edge of the signals we should set U69. We get a pulse out of U69A named "Z_CROSS" or "Zero Crossing." The processor comes back and clears U69A with "Z_CR_REL" (Zero Crossing Release) ending the pulse out of U69.

AC Power Failure Warning

Referring to the picture with the HCPL3700 on the left side. U50 (HCPL3700) is used for AC Power Failure Warning circuit. The HCPL3700 a bridge rectifier on the input to it, just before the LED. We may reference the LED directly using the DC inputs, or we may input an AC signal, which goes through the bridge before going to the LED. The circuit of the LED has a current limit built in. This is the same device used on the Williams Power Supply board. The output is a TTL level sig-



nal. This circuit in the Bally game following the HCPL3700 is a Watchdog counter kind of design. As long as we keep getting pulses out of U50 (indicating AC power is present) we keep resetting the counter (U67). If U67 ever counts down, we assume we have missed a cycle of AC and that DC power will follow as soon as the filter caps in the power supply discharge. This warning gives us sufficient time to store all the contents of the CPU's registers in Battery Backed up RAM for safe keeping, set flags indicating that the AC power has failed and that the next power up will not be an initial power up (that is, we may have a game

in progress).

Does one missing AC cycle really give us much time? The CPU is running at, say 16 Mhz. This means the processor is actually executing one instruction about every 500 nS. This equates to about 2 instructions every microsecond or 2,000 instructions in a millisecond.

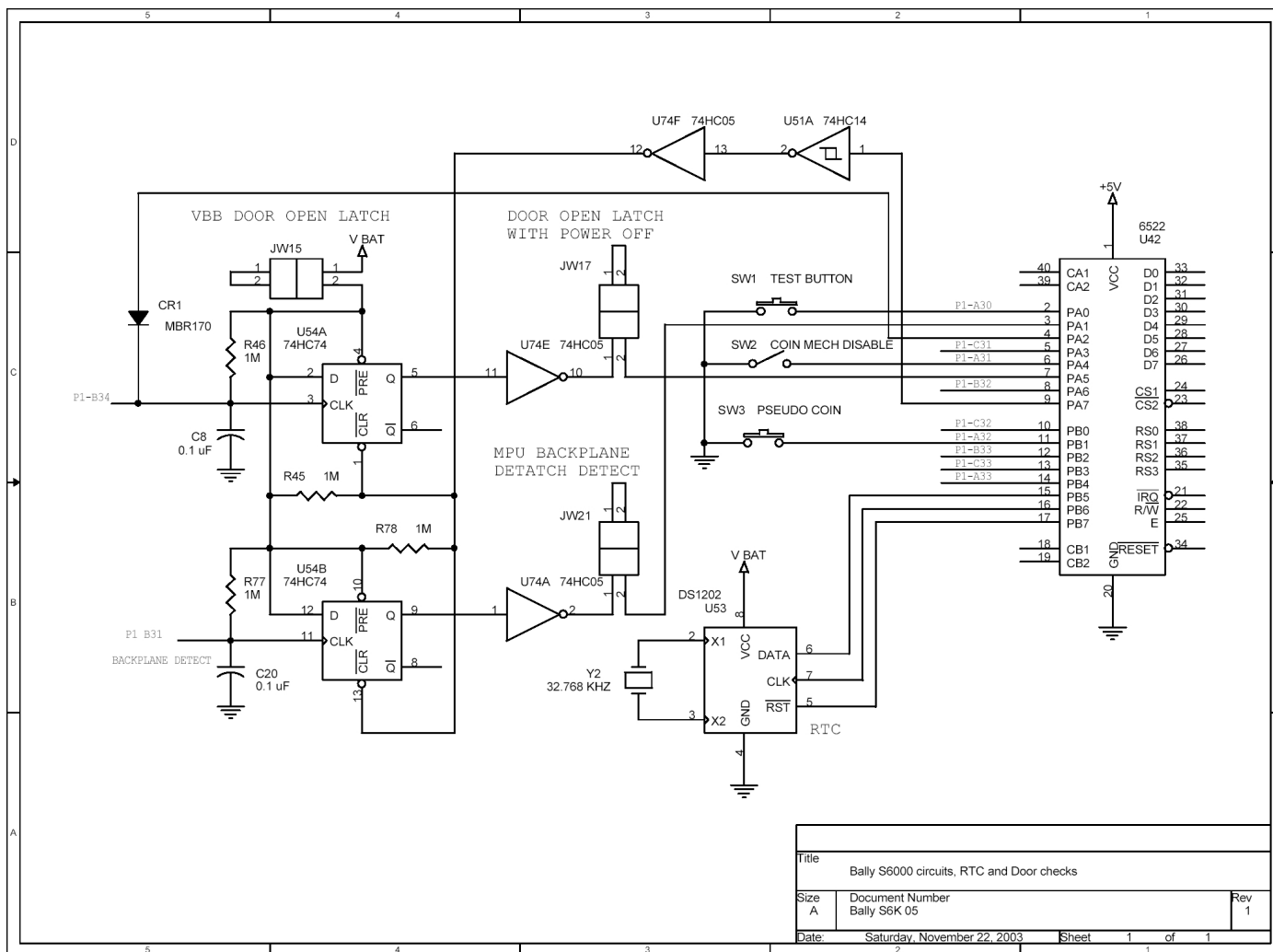
In an AC cycle lasting 16 mS, even this ancient slow processor can execute about 32,000 instructions in the time it takes the AC line to complete one cycle. In the 200 to 300 mS it takes the filter caps in the power supply to discharge after AC line

voltage drops we can execute about 500,000 instructions.

All these calculations are, of course, rough numbers. Not all instructions execute in the same length of time. But you can see that the processor has a lot of time after noting the missing AC cycle to take care of business. Most important information is already in RAM. The registers in the processor need to be moved to RAM to be preserved and a little housekeeping is in order.

Page 3

These are our basic simple I/O ports. Unlike the IGT de-



sign, most of our simple inputs and outputs are read and written to as byte (8-bit) or word (16-bit) values directly from the CPU's reference. We have no SENET-like structure. Each switch or lamp has an address and bit designation.

In the book you will see references to each operation being at a certain Port. This Port is the address the CPU will reference to access that operation. At that Port address it can reference 16 bits of information, that is, 16 inputs or 16 outputs designated "0" through "F" (hexadecimal number system).

Notice that the outputs on the right side of the page have

a triac. Our player panel lamps are run off of 6.3 Volts AC. Some of our outputs are designed to be standard Logic levels (Gnd and +5 Volts). Some are designed to drive to +24 Volts (Port 2A and 2B for instance), and some are designed to drive AC lamps as already mentioned. Our inputs have protection resistors. None use optoisolators.

A side-note here: The player panel lamps are, by nature, inductive devices. When we turn them off we get an inductive kick on the line. This not only shortens the life of the lamp but also endangers the lamp driver and puts noise on the power line that supplies them. Using a Triac (or

even an SCR) as the lamp driver avoids this problem. By their nature, these devices will turn themselves off when power on the output drops to zero. By running our lamps from AC (or pulsating DC in the case of the SCR) the Triac/SCR turns off the lamp the next time the supply voltage crosses zero volts following removal of the Gate voltage, avoiding the inductive kick.

Page 4

Page 4 shows our three DUARTS (Dual Asynchronous Receivers and Transmitters) type MC68681, giving us six serial I/O channels and two 6522 VIO (Versatile I/O) ports.

Each 6522 has two 8-bit ports and a 4-bit port. At the top right corner we have another serial port (PCD8584) that feeds to J12 on the backplane, somewhat like SENET. It has a bi-directional data line and a synchronous Clock pulse. This is an "I2C" port that would talk to some simple device like an EEPROM or Clock Chip.

Real Time Clock

The Real Time Clock (RTC) is a Dallas Timekeeper IC, Dallas Semiconductor DS1202. This is an 8-pin DIP. The CPU talks to this device through a simple synchronous serial interface. We have a Clock line and a Data line. The CPU talks to the DS1202 by shift-

ing in commands and data one bit at a time. The DS1202 responds by sending back serial data on the same lines. This is a slow process, but it works acceptably well for such a simple device and function. The RTC has its own oscillator and counts these clock pulses to keep track of time and date. It gets its power from the battery so it keeps track of time even when the game is turned off. The CPU talks to the DS1202 through one of the VIA (Versatile Interface Adapters), U42.

Door Sense Circuits

Some jurisdictions require the game to be aware of doors being opened even when power to the game has been

removed. To this end, we have the circuit around U54 to handle this function. The circuit runs on battery power when the game is off. U54A is "set" if the door switch is sensed. U54B does the same for the board being removed from the backplane. Both of these latches stay set as long as there is battery power or until they are cleared by software (or pulling U74, pin 12, to ground).

That covers most of the schematics for the MPU board. We'll continue next month with the third and final part.

- **Herschel Peeler**
hpeeler@slot-techs.com


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PAR Excellence: Improve Your Edge

By John Wilson



Most technicians working with slot machines, computers, or automobiles, generally have a thirst for the smallest details of how something works. When working with a slot machine, the diagnostics you perform are more meaningful if you know how they work and what they are testing for. While you might not use PAR sheets every day, having an understanding of how the slot machine plays and pays and possessing a general 'feel' for the game can only help you. Whether

you are attempting to settle a customer dispute by determining if a machine is working correctly or just answering questions for your supervisor, the more detailed knowledge you have, the better.

In December 2003, we took an in-depth look at part of a PAR sheet, the Volatility Index. This month, we'll take some time to examine the basics of a PAR sheet and try to make sense of all the information these reports contain.

The basic piece of information that all PAR sheets contain is the payout percentage and number of hits for each coin. A sample PAR sheet summary is shown in table 1.

The first thing that you are likely to notice is that all of our numbers are nice, even numbers. It is very unlikely that you will ever see all of the numbers work out so evenly. Although this isn't from an

actual PAR sheet, the numbers are still valid. For the purpose of explaining the PAR sheets, however, using even numbers simplifies our calculations.

This example is obviously a 3-coin machine. A few years ago, manufacturers didn't always include the totals for the middle coins - in this case they would only have listed coin 1 and coin 3. Most of them are showing you all of the details now.

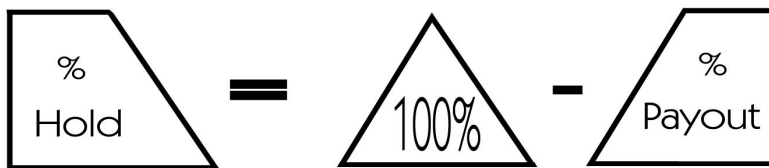
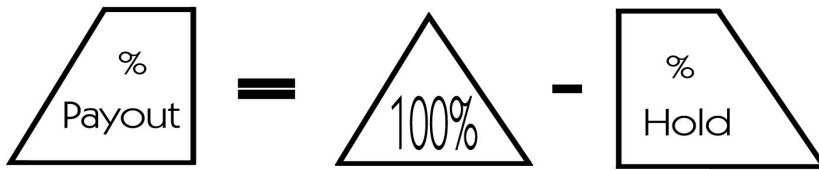
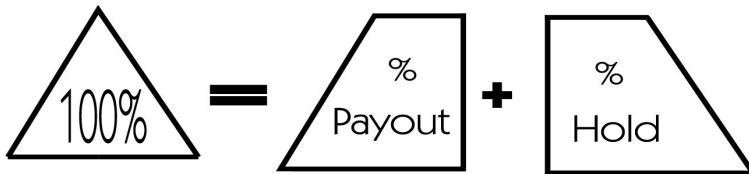
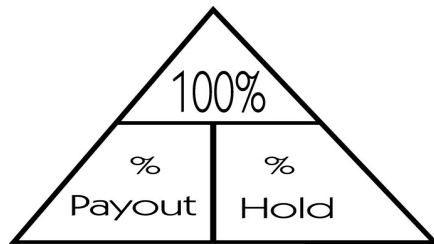
The payout percentage and hit frequency tell us quite a bit about the game. By also examining the volatility index and the number of stops per reel, we can generally tell what type of game it is and the payout type. By this I mean if the machine has a large jackpot, is an intermediate paying game, or if the majority of the pays are through small wins.

Payout Percentage

Take a look at the payout percentage. The Normal Payout % is always based upon the maximum number of coins. This is a 90.00% machine, meaning that over the long-term, the machine will pay back 90% of what it takes in. The other 10%, therefore,

Table 1

Coin #	Percent Payback	Hit Frequency	Total Hits	Total Pays
1	90.00	10.00	100,000	100,000
2	90.00	10.00	100,000	200,000
3	90.00	10.00	100,000	300,000



Many of you may be familiar with the Ohm's Law triangle. This is a variation on it and will help you to remember the formula we're using. The bottom two values always add up to the top value. (Payout % + Hold % = 100%) To determine the value on the left, subtract the value from the right from the top value (Payout % = 100% - Hold %). Similarly, to determine the value on the right, subtract the value on the left from the top value (Hold % = 100% - Payout %).

must be held back. This is called the Hold %. If we know the hold % or the payout % we can calculate the other one. They always add up to 100%.

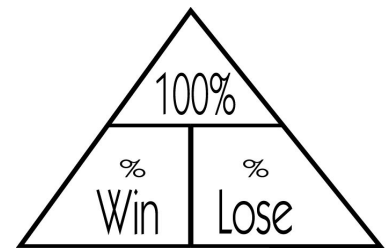
The payout percentage is usually higher for each coin. It might be the same, but it can't be lower and meet most gaming requirements.

Hit Frequency

The hit frequency tells us how often the machine will have a winning game. Hit frequency

could also be called win frequency. In our case, a 10% hit frequency means that on average the player will win 10% of the time. Or, stated another way, they will lose 90% of the games. The winning games and losing games always add up to 100%.

The total hits relate directly to the hit frequency. Somewhere on the pay sheet will be a summary of the total combinations available, also called the cycle. In our example, it would be as shown



100% = Win frequency + Lose frequency -or- Win Frequency = 100% - Lose frequency -or- Lose Frequency = 100% - Win frequency.

in Table 1

This is a 3 reel, 3 coin, 100 stop machine. Reel Combos: 1,000,000 We are interested in the number of reel combinations. There are 1,000,000 possible combinations of unique game outcomes in this game. (100 stops per reel with 3 reels: 100 x 100 x 100 = 1,000,000 combinations)

For each coin played, we can examine the hit frequency and determine the total number of winning games. 10% hit frequency * 1,000,000 games = 0.10 x 1,000,000 = 100,000 games, or Hit Frequency % x Games = # of Winning Games

Each game has the same hit frequency whether one, two or three coins are played. The payout amount changes because we are changing the total amount wagered, but the number of hits remains the same.

Volatility Index

If you remember the December issue, we learned that the Volatility Index is a gauge by which we can measure how

volatile or wide-ranging the slot machine pays out. A large Volatility Index means that the game will pay out widely and take a long time to reach its theoretical payout percentage. A small Volatility Index means that the overall pays don't vary too much and the game should pay close to the theoretical payout percentage in the short term.

A game with many small payments, such as a cherry symbol, will usually have a larger volatility index than one that has the smallest payout for mixed bars.

A small volatility index would be less than 10. A game with double and triple symbols may have a volatility index between 12 and 18. A game with a volatility index of 30 would likely have a number of wild symbols and multiplier values. It may have a very large jackpot award as well.

Again, as this is an index, it gives you an idea about the play but it isn't absolute. The values I chose for 'small' and 'large' aren't precise, either. I have picked these values only to give you a general idea of the range you might find.

Take some time to examine the PAR sheets and volatility indices for the games in your casino and you'll develop a pretty good feel for the machines on your floor.

Reel Stops

The number of virtual stops on the reels also gives you a good idea about the game. If it has 32 stops per reel, the maximum number of combinations is 32 x 32 x 32 or 32,768. At 3 coins, the game will take in 98,304 coins so all of the payouts including the jackpot must be less than this value. A 40,000 coin jackpot is out of the question.

Many games have 64 or 72 stops, for a total of 262,144 or 372,248 combinations. At 3 coins and 72 stops, the total coins in equals just over 1 million. The game may have a large jackpot (28,000 credits for example) or a smaller jackpot that occurs multiple times per cycle. New games with 256 stops have 16,277,216 combinations with 3 reels. This obviously allows a large jackpot (mega jackpot) a number of multiplier values (10x with 5x for example) or a significant number of smaller jackpots.

As a general rule of thumb, the higher the number of reel stops, the higher the volatility index will be and the more varied the payouts will be. Although this article discusses spinning-reel slots, the same concepts apply to video slots as well. The high-hit frequency and low average payout coupled with the bonus games changes these results a bit.

The guidelines discussed here aren't absolute, either. While they apply to the majority of games, some will have special features or unique properties about them. Your mileage may vary.

Types of Games: Multipliers, Buy-a-Pay, Line Games

Multipliers

A multiplier is a game where the payout for any combination of symbols is multiplied by the number of coins played. A single coin will pay for any combination of symbols, including the jackpot and two coins will double this amount. In some cases, there is a bonus payment for playing extra coins but each coin will pay for all combinations of symbols. In the case of a coin multiplier game, the payout

Table 2

Example "1"			Example "2"			Example "3"	
	Payout %			Payout %			Payout %
Coin 1	87.50		Coin 1	87.50		Coin 1	87.50
Coin 2	87.50		Coin 2	87.50		Coin 2	89.32
Coin 3	87.50		Coin 3	89.32		Coin 3	90.00

percentage can be the same for each coin played if there is no bonus for the maximum coins played.

In the three examples shown in table 2, we are looking at multipliers. In the first case, there is no bonus for playing 3 coins. In the second example, there is a bonus for the 3rd coin being played. In the 3rd example, each coin played provides a bonus. Take a look at the associated payglass (right) for these games and it will make sense.

Line Games

A line game is like a multiplier but each coin pays the same amount as the coin before. The player is buying extra paylines, not multiplying the payout amount by the coins played. A single coin buys all combinations of symbols including the jackpot, just as the multiplier does. There may be a bonus paid for higher paylines, especially for the jackpot. Most spinning-reel line games have 3 or 5 paylines although some have 9, 15 or higher.

A line game may show the same hit frequency for each coin or it may show the hit frequency being doubled for the second coin, tripled for the third coin, etc. It depends upon the manufacturer and how they wish to report the hit frequency for line games. If the hit frequency is the same for each coin, then they are showing you the hit frequency for each line, not for the game. In this case, the hit

			1st COIN 400	2nd COIN 800	3rd COIN 1200	
3 coin multiplier with no bonus.						
			1st COIN 400	2nd COIN 800	3rd COIN 1500	
3 coin multiplier with bonus for 3rd coin play.						
			1st COIN 400	2nd COIN 1000	3rd COIN 2000	
3 coin multiplier with bonus for 2nd and 3rd coin play.						

Three multiplier payglass - A multiplier will always have the same hit frequency for each coin, and the payout percentage will vary depending upon any bonus payments for playing more coins.

frequency will usually be referred to as "Hit Frequency per Line." If the hit frequency refers to the total game, then

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Example "A"		Example "B"	
	Hit Frequency <u>Per Line</u>		Hit Frequency
1 st Coin	11.45%	1 st Coin	11.45%
2 nd Coin	11.45%	2 nd Coin	22.90%
3 rd Coin	11.45%	3 rd Coin	34.35%
4 th Coin	11.45%	4 th Coin	45.80%
5 th Coin	11.45%	5 th Coin	57.25%

Table 3

the value shown is the hit frequency for that line plus all lines before it. This is illustrated in the example in Table 3.

In Example "A", we are shown the hit frequency for each line. Obviously the "Hit Frequency per Line" tells us that this is a line game. Example "B" shows the hit frequency per game. With one coin, we have a hit frequency of 11.45%. With two coins, we win on the 1st and 2nd paylines, so the hit frequency is 11.45% per line, for a total of 22.90%. For five coins, we win on all 5 paylines, so the hit frequency is 11.45% per line, for a total of 57.25%.

The line games will generally have the same hit frequency and a similar payout percentage for each coin. The jackpot amount is generally larger with each coin, so the payout % increases. For example, the pay table might look like this on a 3-line game (right).

In this case, the payout percentage increases with the bonus for each line. If all of the lines paid 1,000 for the jackpot, then the payout percentage would remain con-

stant.

Buy-a-Pay

The Buy-a-Pay game does not pay for all combinations of symbols for each coin. The jackpot amount would not be paid for a single coin. The pay table shows the payments

that each coin 'buys'. Many Buy-a-Pay games are a combination of Buy-a-Pay and multiplier. The Blazing 7's and Sizzling 7's games (in the 3-coin version) pay for bars on the first coin and various '7' symbols on the 2nd and 3rd coin. The 2nd coin buys the '7' symbols and the 3rd

2 nd Coin Payline	2000
1 st Coin Payline	1000
3 rd Coin Payline	5000

coin multiplies the 2nd coin payout combinations. This would be referred to as a 2-coin Buy-a-Pay, 3 coin multiplier on the PAR sheet.

If the hit frequency is the same for all coins, it rules out a Buy-a-Pay game. The Buy-a-Pay will have a different hit frequency for each coin. For example, if the first coin buys bars, the second buys SILVER, and the 3rd coin buys GOLD, the payout percentage won't be identical for each coin. Each coin's hit frequency must increase, as each coin buys the pays for that coin plus the ones before it. For example:

Coin 1 Buys BAR symbols
Coin 2 Buys SILVER symbols and BAR symbols
Coin 3 Buys GOLD symbols and SILVER symbols and BAR symbols.

In our first example, we are paid 90% for each coin played. This means that it is either a line game or a multiplier. For a spinning-reel slot machine, a line game will have either 3 or 5 coins. Video games have more lines, 5, 9, or more. If the game takes a maximum of 1, 2 or 4 coins, it can't be a line game.

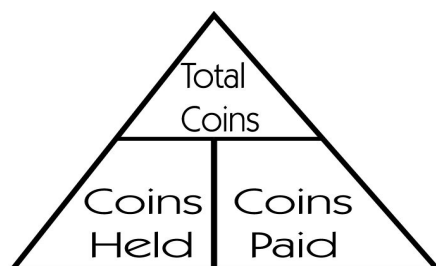
When we look at the payout % for each coin, it tells us quite a bit about the game. In this case, we are paid 90% for every coin. This must therefore be either a line-game (3-line or 5-line) or a multiplier. If there are only 3 coins played, it can't be a 5-line game. If there are only 2 coins then it's not a line game

(need at least 3 coins), but it could be a multiplier or a Buy-a-Pay. If it is a Buy-a-Pay, we will have a different payback percentage for each coin.

Note: The total pays + total held always equals the total amount of coins taken in.

1 coin * 1,000,000 games = 1,000,000 coins in. 900,000 held + 100,000 paid = 1,000,000 coins in.

Therefore, the following formulas apply: Coins In = Coins Paid + Coins Held -or- Coins Paid = Coins In - Coins Held -



or- Coins Held = Coins In - Coins Paid

How do we know if this is a large jackpot, intermediate pay or low-win paying machine?

The payout % for each coin will give us a good idea how the machine pays.

If the top-coin payout % is significantly higher than the lower coin %, it is likely that this has a substantial jackpot. Generally, most multipliers and line games will have the top-coin payout percent only a few percent higher than the lowest coin payout percentage.

If the hit frequency is large, then we must have a significant number of smaller paying wins. Consider the Bally Roaring 20's and similarly-themed games. We have a payout for a single bar on any reel, which increases the hit frequency tremendously. A significant amount of winning combinations are single-digit winnings, creating a very large hit frequency. The hit frequency may be over 30% on games like these.

Don't forget to check the volatility index. A small volatility index means that the game payout does not vary widely. In this case, it likely has a relatively low jackpot and an

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intermediate pay. For example, a 3-coin Blazing 7's or Sizzling 7's machine may pay 1,000 for 3-coins. That relates to 333 coins per coin bet. This is a very small overall jackpot. With a relatively large percentage of intermediate pays (for three 7's or three mixed 7's), the major portion of the payout will be in this area. If the volatility index is large, then we want to look at two areas. First of all, there may be a large jackpot, such as 30,000 coins for a 3-coin wager. There may also be a large multiplier value that varies the payout significantly. For example, a 10x multiplier (100x with the 10x symbol on 2 reels) creates significantly larger payout amounts. In this case, we would expect the volatility index to be much higher.

We'll examine some of the

general calculations in more depth in the next article on PAR sheets.

Ok, it's time for a test. You will see five PAR sheet summary tables. Try to determine what you can about the game from the information provided. Is the game a multiplier, line game or Buy-a-Pay? Also try to determine what the payout is like - intermediate pay, large jackpot, many small pays, etc. All games are spinning-reel slot machines with 3 reels. Each example has one mistake as well. The answers are given in the caption so don't read it until you've tried to work it out on your own.

Conclusion

In summary, you can see that the PAR sheets contain a wealth of information about

the game. Although you may not use them very often, take a few moments to look them over. Hidden inside is a great insight into how each game plays. Even if you're not mathematically inclined, the basic PAR sheet gives you some very important information about the games. Like all of your diagnostic tools, the PAR sheet is just one more method to verify the machines' operation and to gain a thorough understanding of their particular personality.

Next month, we'll examine some of the basic formulas contained in the rest of the PAR sheets. Using a couple of simple mathematic equations, you can tie together all of the information quickly and easily.

- John Wilson
jwilson@slot-techs.com

Number 1: 64 stops, VI=12.357				
Coin #	Payout %	Hit Percent	Total Hits	Total Pays
1	85.37	11.64	30,513	223,792
2	88.88	12.36	32,400	465,987
3	91.97	19.34	35,192	723,281

Looking at this game, the payout % increases for each coin. It could be a 3-line game, a multiplier or a Buy-a-Pay. The hit % increases for each game, so that rules out the multiplier and 3-line game. It must, therefore, be a Buy-a-Pay. The total hits for the 3rd coin is incorrect. A 64-stop game will have 262,144 combinations. 19.34% of that is 50,698, which is the correct value. The VI is 12.357, which indicates a moderate spread in payout values. I would guess that this machine has some 2x or 3x multiplier symbols.

Number 2: 64 stops, VI=13.801				
Coin #	Payout %	Hit Percent	Total Hits	Total Pays
1	85.65%	15.51%	57,890	319,686
2	85.78%	15.51%	57,890	640,344
3	92.03%	17.08%	63,750	1,030,500

By examining the total hits we see that they are the same for coins 1 and 2, but different for coin 3. This is likely a 3 coin Buy-a-Pay, with the 2nd coin multiplying the 1st coin pays and the 3rd coin buying different symbols. The second coin pays a slightly higher percent, so it will include a bonus payment. As the 2nd coin payout increases by 0.13%, this would be consistent with a small bonus for one of the pays. The total pays looks more like a 72 stop game (373,248 combinations). 85.65% of 373,248 is 319,686. This game is a 72-stop game, not a 64-stop game.

Number 3: 64 stops, VI=16.669				
Coin #	Payout %	Hit Percent	Total Hits	Total Pays
1	87.94%	11.94%	31,300	230,529
2	88.03%	11.94%	31,300	461,530

Since this is a 2-coin game, it can't be a line game. The hit percentage for each coin is the same, which rules out a Buy-a-Pay. It must be a multiplier. The payout percent is incorrect for coin 2. It can't be lower than the 1st coin. If this is a 64 stop machine, the total coins in are $262,144 \times 2 = 524,288$. 461,530 coins paid divided by 524,288 coins in equals a payout percentage of 88.03, which is correct. The VI is slightly higher than in numbers 1 and 2, so I would guess that there is either a larger jackpot amount, higher payout values for intermediate paying symbols or larger multipliers - 4x or 5x perhaps?

Number 4: 150 Stops, VI=4.2				
Coin #	Payout %	Hit Percent	Total Hits	Total Pays
1	93.90	12.85	433,687	3,169,125
2	93.90	12.85	433,687	6,338,250
3	93.90	12.85	433,687	9,507,375
4	93.90	12.85	433,687	12,676,500
5	93.99	12.99	433,687	15,860,812

This could be a 5-line machine, 5 coin multiplier, or a Buy-a-Pay. The number of hits is the same for each coin, so it's not a Buy-a-Pay. The hit % is identical for each coin. The 5th coin hit percent should match the number of hits, so it should also be 12.85%. The payout percent is the same for each coin, with a bonus for the 5th coin played. This actually is a 5-line game, with the hit % showing the hit per line, not the total game. Do you think this could also be a 5-coin multiplier? Notice the large number of stops per reel and the low volatility index. This would suggest that there might be a few multipliers in the game (perhaps only on one reel) or that there are a lot of symbol combinations. The large number of stops is generally done to create a payout percent that is acceptable while still maintaining a reasonable hit percentage.

Number 5: 196 Stops, VI=32.927, Line Game				
Coin #	Payout %	Hit Percent	Total Hits	Total Pays
1	83.88	35.70	2,688,044	6,315,774
2	87.96	37.36	2,813,034	13,245,959

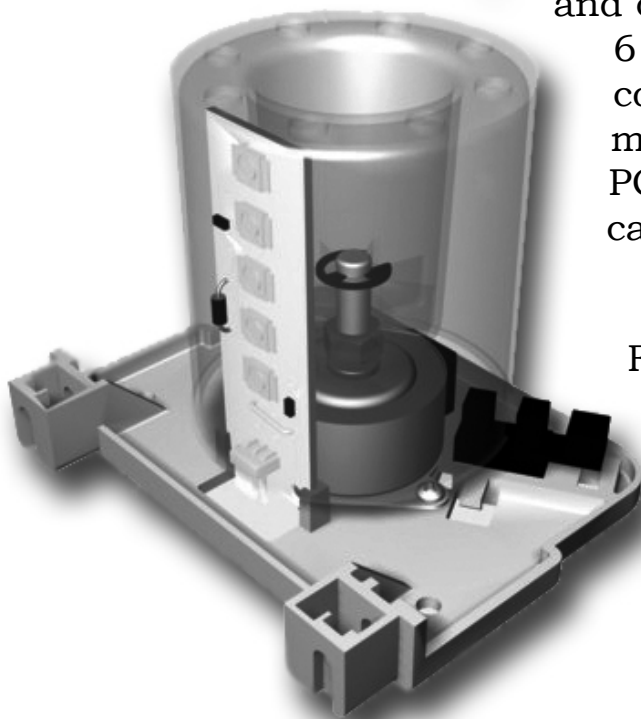
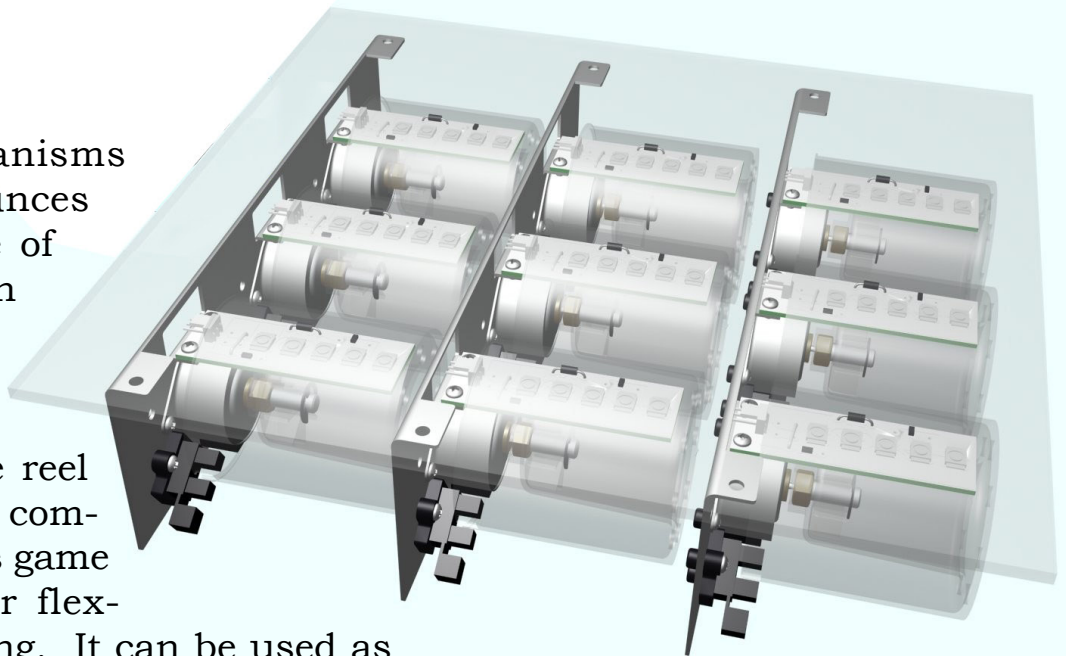
As this is a 2-coin game, it can't be a line game. The 196 stops indicate that there are some multipliers, perhaps a lot of symbol combinations or perhaps it has a bonus game in the machine? The volatility index is quite high, indicating a wide range of pays. Perhaps there is a large jackpot or bonus game, or a number of small pays for a single symbol? As the hit percent is different for each coin, it must be a Buy-a-Pay. Also note the hit percentage of the 2nd coin relative to the first. The first coin has a hit frequency of 35.70%. The second coin is only 1.66% higher. Therefore, there is a large amount of payment for the second coin in only 1.66% of the winning spins. This would indicate some very large pay combinations for the 2nd coin. If there is only 1 jackpot payment per cycle, then it exists in only 1 out of every 7,529,536 games. It could be quite a large jackpot amount.

GameMech 6000 Micro-Mech

Coin Mechanisms Inc. announces the release of the GameMech 6000 Micro-Mech, the latest product development in feature reel mechanisms. Its compact nature allows game designer's greater flexibility in positioning. It can be used as

a single reel, or is ideal in a matrix combination where multiple reel configurations are required. The reel is a clear molded piece 66mm wide with a diameter of 60mm,

and can accommodate either a 4 or 6 symbol reel tape. It uses a compact 48-step motor, is illuminated by 5 white LED's on a PCB, and the entire mechanism can mount directly onto glass.



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GLI Australia Granted First-Ever Testing Facilities License in New South Wales

Gaming Laboratories Australia has been granted a Testing Facilities License for the state of New South Wales by the Licensing Court of New South Wales. GLI Australia is currently the only Testing Facility to be issued a license in the NSW region. The company is also listed on the Victorian Casino and Gaming Authority's Role of Suppliers and is an Accredited Testing Facility (ATF) for all other jurisdictions in Australia and New Zealand.

The license comes in fulfillment of legislation requiring testing facilities obtain a license similar to that required by manufacturers. Previously GLI Australia operated under a temporary permit.

Managing Director of Gaming Laboratories Australia Ian Hughes said, "This license clearly demonstrates GLI Australia's commitment to the country's gaming industry and its regulatory bodies. We work diligently with all sides of the industry, and our compliance with recent legislation and our gaining approval to be licensed is a strong signal of both our commitment and expertise."

GLI Australia is the largest

and most experienced gaming test laboratory in the region and tests for jurisdictions across the Australian region, which includes South Australia, Queensland, New South Wales, Western Australia, Northern Territory, Tasmania, Victoria and New Zealand.

Gaming Laboratories International, Inc. currently operates wholly owned and fully staffed gaming test laboratories in Lakewood, N.J.; Golden, Colo.; Las Vegas, Nev.; GLI Europe, B.V. in Hillegom, The Netherlands; GLI Africa in Midrand, South Africa. Gaming Laboratories Australia operates fully accredited test laboratories in Sydney and Adelaide under license to Gaming Laboratories International, Inc. GLI employees number approximately 275 worldwide, providing more than 76,000 certifications annually to over 360 gaming regulatory bodies worldwide. GLI was founded in 1989 by James R. Maida and Paul J. Magno and was the first independent laboratory of its kind.



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MCM Adds to Gaming Lineup With New Products & Services

MCM, an InOne company has added several new lines of products and services specifically for the gaming and gaming repair industry.

Included in the new lines are replacement CRT tubes, mini coax connectors and cables, Twin-Task and the flexible Stylus Reach flashlights both by Streamlight and several new lines of capacitors. The new capacitors, which are supplied by Nichicon, United Chemicon and Panasonic, include low ESR, high temperature (105°C), high frequency radial electrolytic capacitors. MCM stocks the complete series of these capacitor lines from 6.3V to 450V including every available value. Several new LED replacement bulbs for bill validators and slot machines, which can be used to replace incandescent bulbs, have also been added.

MCM has developed a new Circuit Board Repair Program. MCM has an authorized facility for repairing most of the name brand gaming systems in the market. Contact your MCM representative for full details on this service.

Additionally, MCM now has two dedicated account managers for the gaming market. MCM continues to have a sales manager located in the Las Vegas area for immediate customer service.

About MCM, an InOne Company

MCM, an InOne Company deploys the power and resources of the global business locally and appropriately for each of its customers, offering exceptional one-to-one service, the broadest selection of electronic products and unique value-added services. MCM was founded in 1976 as an electronics service company in Dayton, Ohio. In June 1984, Premier Industrial Corporation acquired MCM Electronics. Then in 1995 Farnell Electronics acquired Premier Industrial and together they formed Premier Farnell plc. Today Premier

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FutureLogic Opens 11,000 Sq. Ft. Distribution Center in Las Vegas to Serve Gaming OEMs Worldwide



FutureLogic, Inc. announced the opening of its 11,000 sq. ft. distribution center in Las Vegas, built to meet demand for its PSA-66 line previously sold through Seiko Instruments.

The new facility is the shipping hub for FutureLogic's OEM customers worldwide, though primarily focused on the Las Vegas area where many gaming OEMs are based. Those local OEMs will benefit from lower freight costs and easy access to FutureLogic's inventory.

Additionally, the new facility gives worldwide Manufacturers Representative AESI the convenience of a local replacement parts supply

for its Las Vegas service center, which became an authorized service and warranty facility for FutureLogic in November 2003.

"Our distribution center improves the value and level of service we provide to all of our customers," said FutureLogic CFO Jon Huntley. "Now we can better identify what they need, want and expect."

Sonnie Wilf, who brings more than ten years of facility management with him, will manage the new facility, which is located at 900 W. Warm Springs, Suite 111, Henderson, NV 89015
Tel: 702-558-7309
Fax: 702-558-8464

About FutureLogic

FutureLogic, founded in 1983 and headquartered in Glendale, Calif., provides electromechanical assembly solutions for nearly every engineering need. FutureLogic found a particular niche for itself in the thermal printer market and today supplies thermal printers for equipment where reliability is critical. This includes casino gaming, POS equipment, industrial, agricultural, and medical applications. In August 2003, the company ended an agreement with Seiko Instruments for the exclusive distribution of FutureLogic's PSA-66 line of thermal printers that are found in cashless casino games worldwide.

IGT Taps Microcoin QL

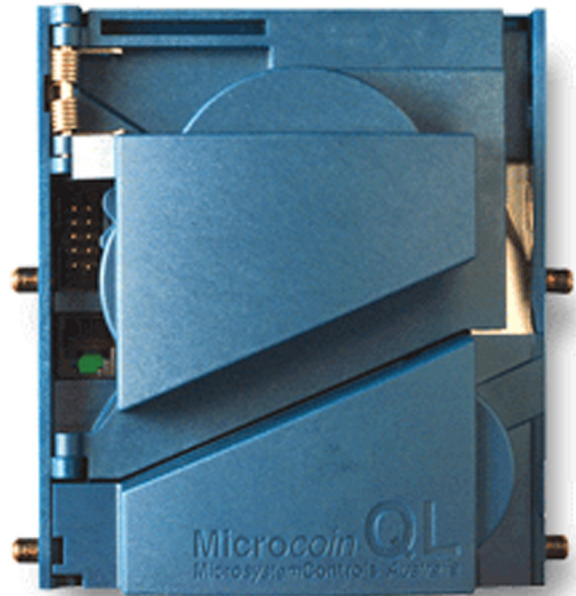
Astrosys International Ltd announced the selection by IGT of its Microcoin QL coin acceptor as the new default unit for IGT's small coin offering. After an intensive and exhaustive selection process, involving all major coin acceptors currently available to the Gaming market, the Microcoin QL has been chosen by IGT as the replacement for the coin comparator.

"This has been an extremely thorough and important project, as it forms the corner-stone of our future coin strategies", states Randy Hedrick, Sr. Vice President, Product Development. "We require the security and scope of fully electronic coin validation technology to complement the advancements in technology within all aspects of our Gaming platforms", he adds. "The most comprehensive package, comprising not only a coin acceptor but encompassing our demands in warehousing, production and field support, is the Microcoin QL".

"Although TITO/cashless is

an emerging technology, there continues to be demand for coin-in functionality," said Ed Rogich, Vice President of Marketing, IGT. "The Microcoin QL is a perfect fit for our coin acceptor offering."

"Microcoin has long been the default acceptor for IGT-Australia and we have been quietly working with IGT-Reno for a number of years to develop a coin acceptor solution which meets the demands of the US domestic Gaming market and beyond" states Robert Bird, Group Marketing Manager, Astrosys International Ltd. "Microcoin invented high speed multi-coin acceptance over 10 years ago and we were the first company to create a secure Gaming solution where one acceptor can hold multiple coin denominations and securely switch from one denomination to another" continues Bird, "Using our Casinamate handheld device, we also have a suite of additional diagnostics features to support the



QL in the field ".

Astrosys International Ltd is a subsidiary of the Hong Kong based Astrotech Group and specializes in the design, manufacture and distribution of cash handling products. The company provides dedicated solutions to its clients across a range of markets including Gaming, Vending and Amusement. It services its diversified world-wide markets by an international network of offices in Australia, the United States and the United Kingdom, supported by representation in other key global markets.

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E-mail : sales@microcoin.com

For additional information on
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GSA Submits Best of Breed & S2S Standards for Review

After a full year of strong membership growth around the world, industry advocate Gaming Standards Association (GSA) has kicked off what promises to be its "Year of Delivery" at the International Casino Exposition (I.C.E.) Show in London. The Technical Committee of the non-profit organization recently submitted drafts of two groundbreaking standards to the GSA membership for review and approval.

The first, Best of Breed, or BOB as it is commonly referred to, is a worldwide protocol for secure communication between gaming devices and gaming systems. The BOB standard encompasses the function of existing best of breed protocols and will be free of third-party licensing requirements.

GSA BOB Committee Co-Chairman James Morrow of Bally Gaming and Systems said, "The BOB standard draft is the result of an unprecedented cooperative effort between operators and manufacturers to deliver the most feature-rich messaging set employing the latest in Internet and PC industry standards for communicating between the slot floor and slot operations. It is also the most capable and extendable. This standard sets a foundation for industry growth on a par with such consumer stan-

dards as TCP/IP, HTTP, and the like. We expect to see an explosive increase in innovation in the gaming industry with the release of the BOB protocol.

The second is the System-to-System (S2S) Standard and presents a solution for gaming operators and game and system manufacturers for communicating information between applications, projects and/or systems. Both the BOB and S2S standards focus on utilizing existing and commonly acceptable computer industry standards such as TCP/IP, HTTP, XML, Telnet, Ethernet and others.

GSA S2S Committee Chairman David Nehra of Mandalay Resort Group said, "We are on the verge of revolutionizing the industry. S2S will provide a standard for communicating information between applications, projects and/or systems, and will eliminate the need for unnecessary, proprietary development. The result will be dramatic savings in labor hours for both manufacturers and operators, and it also increases speed to market for new products. Additionally, the standard is forward-thinking - standardizing communication protocols allows for creative application without the need for patchwork 'translators.' This makes the

future of gaming very exciting."

The BOB and S2S committees submitted drafts to the organization's global membership in mid-January for review and will submit final drafts for vote in the first quarter of 2004.

GSA Board Chairman Gregg Solomon of Mandalay Resort Group said, "The future is now. For more than five years, GSA has been working toward the day when standards will provide both operators and manufacturers the freedom to conceive and design products for the industry that ultimately entertain and benefit the end consumer, our customers. That day is here. The BOB and S2S standards are landmark achievements, and we will one day look back and wonder how the industry survived without them."

Members and non-members of GSA are recognizing that standards have the potential to grow the market for the entire industry and provide an opportunity for companies to take advantage of the development and research taking place in GSA. GSA demonstrated its progress when it successfully showed BOB, GDS and the SAS(tm) Tool Kit at the Global Gaming Expo in September 2003.

Writing the Book In Support of Technical Writers

By Chris Appoldt

Manager of Technical Publications - WMS Gaming Inc.

Every tech has likely seen the support manual for a gaming machine, muttered as they browsed for a tilt code, and either praised or swore about the organization of the book's content. It doesn't matter if it's a manual for a DVD player or a video slot machine - behind that manual there are technical writers pinning away on keyboards, trying their best to make an understandable support product for their audience.

It's a complex job; the technical writer needs to understand the design and functionality of the device from a user and repair point-of-view and translate it into a guide that becomes as useful a tool as a screwdriver or a nut driver. They need to start with techno-babble, or "engineer speak," and bring to the target audience, in language they can understand, an organized, comprehensive guide. Sound easy? Read on.

A gaming user manual is born with the announcement of a manufacturer's plan to produce a product that will need to be supported by techni-

cians. In gaming, that means that the technical writer needs to begin a relationship with the engineering and development departments at a stage that has the game's design "final" enough to write something down about it without the fear that dozens of man-hours will be wasted if it all needs to be re-written, the game's design again changed or altered. From there, the idea that has come to life from a concept or design schematic goes through many phases

during its growth into a full-grown game that can go out and play on its own - and the technical writer is watching, monitoring this growth cycle, writing down everything that happens for possible inclusion in the manual or user guide.



English major turned technical writer Jana Pospichal tests her latest manual chapter's advice against the reel slot she's written it about

A typical day may start with the tech writer as a “news reporter,” scheduling an interview with an engineer or subject matter expert (SME) who has designed, say, the game’s CPU, cabling, player tracking, etc. The technical writer has never seen the game before, so must pay close attention to the introduction and photograph, tape record, and write notes on everything they’re shown by the SME. This process occurs with the safety departments as well, and then the peripheral engineers and testing department.

On to the software development department, a technical writer then starts collecting information about how to configure a game for operation. Touch screens make the job interesting in that the writer can “capture” or “grab” the screen digitally and transfer it directly to their computer for later insertion into the manual. The accuracy of the step-by-step “how-to” of the game’s setup is one of the most important facets of the job, and checks and re-checks for accuracy of the notes must take place with the SMEs.

That’s merely phase one. In reality, those interviews have taken a few dozen hours over the course of a month. The “manual” is now a pile of handwritten notes, electronic files,

images, and collected emails. The game design has likely changed a little since the writer began, and now they have to back up and re-verify content or update images and procedures, all the while attending meetings and hoping to catch another interesting tidbit for the book’s pages.

Phase two begins at the computer, which has one of the past decade’s greatest innovations: desktop publishing software. Once a general layout and graphic design is designed with the software the project is ready to move forward.

Care must be taken during the layout, as the text and images chosen for the first draft need to be placed on

pages in such a way that information is “clumped” instead of scattered about randomly or in a manner hard to read or decipher. Not as easy as it sounds, this actually takes up most of the time in manual creation. It’s like putting together a puzzle that no one has seen before, and every time you decide to add or take away contents the layout changes - a great way to go bald early as you yank out hair in frustration.

Several weeks later, a rough draft emerges and is circulated back to the SMEs for content verification. Typos, updates, and further suggestion are all sought during this first feedback stage. When all drafts are returned and marked up with the edits, the



Technical writers Ken Drews and Jana Pospichal confer on a service bulletin’s content regarding the hopper in Jana’s lap.

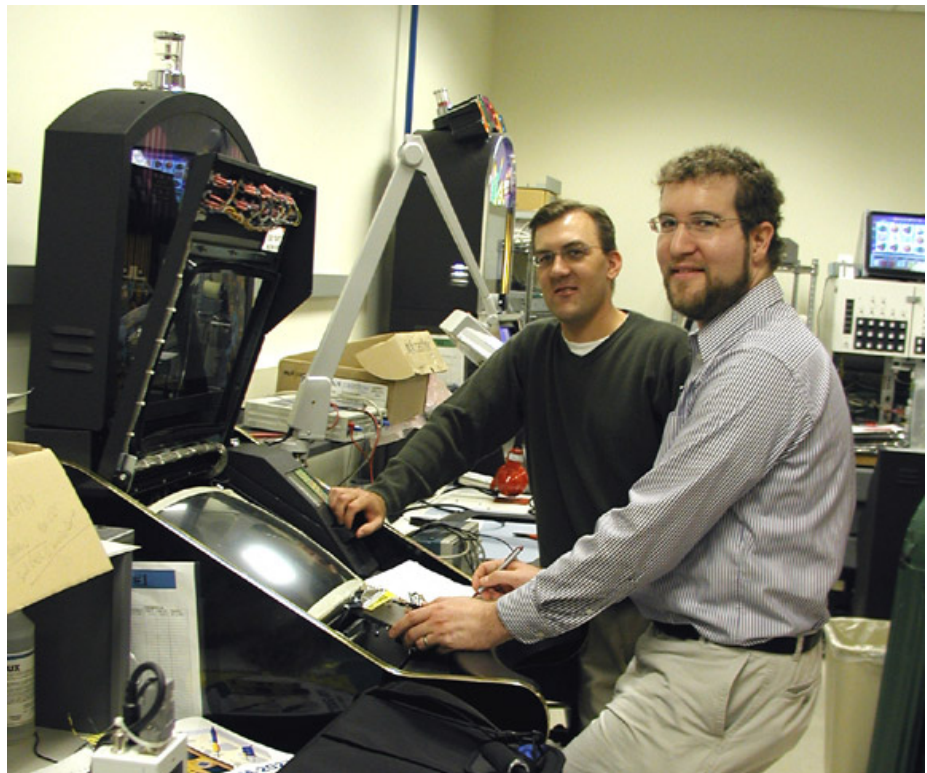
writer again sits down at the computer and attempts to make sense of it all, again playing with the puzzle pieces to make sure that sense can be made of the draft, then crawling over a game prototype to ensure that what's been written is accurate.

This ritual continues throughout the cycle of the game's development, and finally, after the final version of the game is sent to the assembly line, a hard copy of the manual can be printed. The technical writers are then tasked with keeping up-to-date with any changes as the game's releases are updated, and either manual updates or service bulletins are required.

Oh yes, those perky service bulletins. Keep in mind that depending upon the size of a technical writing department, the writer(s) working on the user manuals are also constantly cranking out service bulletins as well. Constant release of new peripherals, new software options, and jurisdictional matters pertinent to the manufacturer all need to be transmitted to the relevant field service and technician audiences . . .this guarantees to keep the keyboard warm, and the printer churning.

It's a busy life, keeping abreast of such things. Never forget, too, that your average corporation holds mandatory meetings for staffs, and that each interview or content verification relies on the co-operation and efforts of others taking time, dedication, and resources. And, very now and then, the writer likes to eat and sleep as well - it may be asking a lot when they're at the end of the information cycle as they are, with product launch deadlines looming. From the request of the document to the published, finished product there is usually too little time to do anything but angst over its priority.

Where do tech writers come from? Commonly they are English or journalism majors who found themselves in the technology business. With a flair for the creative and a love of literature and the arts, it seemed natural to exercise their writing skills somehow. Are they approachable? They should be as they're a great support resource. You can usually find them attached to an engineering group or a marketing group, and as they spend their entire day talking with SMEs about the product a tech is working on, they're a good source of information when all else fails.



Technical writer Same Leopold (foreground) takes notes for a service bulletin from subject matter expert and peripherals engineer Greg Klosterman.

Tech writers are writing the materials FOR the technician, but often spend very little time with them. This is a disconnect that may cause some of the swearing mentioned in this article's first paragraph, as the writers cannot know what you like or do not like about their product unless you tell them. Tech writers should appreciate the feedback, for better or for worse. So if the opportunity arises to speak with them, jump on the chance to let them know how they're doing - they'll appreciate it, and you should get what you ask for. -

- **Chris Appoldt**
Manager of Technical Publications
WMS Gaming Inc.

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Slot Tech Event - Vic Fortenbach Visits WIGC

I was on a mission, a mission to seek out the newest and coolest technical products at the 9th annual Western Indian Gaming Conference held January 14 and 15 2004 in Palm Springs Ca. The event is sponsored by the California Nations Indian Gaming Association, a non-profit group of tribal governments dedicated to the protection of tribal sovereignty and the right of tribes to game on Indian lands.



It was easy to spot the Gary Platt booth. I was almost blinded by the way cool, full color fiber optic chair back that could be customized for any casino. The chair back was totally portable since it was battery powered. Another chair in the booth vibrated and massaged your bottom and back as you played your favorite machine. Maybe this is the key to getting casino guests to stay longer and spend more. One drawback, the chair has to be hard wired to a power source.



I moved on to the Cole industries cabinet booth. What struck my eye were two different styles of cabinets: one slimline slant cabinet and a 30-inch LCD monitor slot cabinet.

Both cabinets are only eighteen inches deep. Other slant top cabi-

nets as well as other upright slot machine cabinets are much deeper; some are over 30 plus inches. The slimline slant provides very easy access to the LCD screen by way of a fold down frame. The LCD also folds down and is removed easily to provide access to the machine's hardware, mounted in the upper back portion of the cabinet. The button panel also folds up so printer paper fills are effortless. Button repairs are likewise easy to perform.



WMS had their much-talked about bluebird cabinets displayed. Three different configurations are available: upright video, upright reel and slant top cabinets. The bluebird cabinets are causing a lot of rethinking in the casino industry. Gone are any hard drives and CD ROM drives. They have been replaced by a small flash card. There is one flash card for the Linux operating system and a second flash card for the game program.

RAM clears are easier now that there are no clear chips required, just one RAM clear flash card. The graphics are unbelievably full and bright with every detail clean and crisp. The game sounds are superb since the speaker assembly is designed by Bose and placed right at ear height so all the sounds come out crystal clear with deeper bass.

The upright reel and video functions of the cabinets are interchangeable. Remove the LCD screen and game flash card, install three reels and you're done.

Reverse the procedure for converting a three-reel bluebird cabinet to video.

Many options are available for the bluebird cabinets. Some include a large LCD header and special game bonus devices for overhead use.



After getting my fill of the new offerings from WMS gaming, I made my way over to the Advanced Electronic Systems inc. (AESI) booth. They represent MEI bill acceptors, Starpoint buttons and Futurelogic printers. The new GEN 2 printer from Futurelogic also known as the PSA-66-ST2 is what caught my attention. The GEN 2 is a totally redone printer following in the footsteps of the Seiko PSA-66 printer. The GEN 2 printer has many new features including a coiled "spring" cord that eliminates any pinching or breaking of the large ribbon cable that was common on the PSA-66 printer. Totally encased paper path and print head design with an easy to release lever. As you may recall the PSA-66 printers had a thumb-screw that was often left unscrewed causing paper jams. It also sports a larger paper tray, able to hold 300 tickets compared to 200 ticket stack holders present on many printers in use today.

Since this was my first gaming show I must say I was impressed. There were over 150 booths with companies displaying several models of class 2 machines and LCD terminals for every casino use. Over all it was a good day.

- Vic Fortenbach
Vic@410bach.com

February 2004

TECHFEST 8 - CLINTON, IA - MARCH 9, 10, 11 2004

TECHFEST 9 - MINNEAPOLIS, MN - MAY 4, 5, 6 2004

Make plans today to join the gaming industry's top engineers, technicians, technical writers and instructors for 3 days of technical seminars and presentations that will enhance your performance as a technician and dramatically increase your value to your employer.

TechFest 8 will be held March 9-11, 2004 at The Franciscan University in Clinton, Iowa. TechFest 9 will be held May 4-6, 2004 at Mystic Lake Casino Hotel, 2400 Mystic Lake Blvd, Prior Lake MN 55372. Registration fee for TechFest is \$450.00 per person and includes lunch each day.

This is a technical presentation. The TechFest is geared for working slot techs and technical managers who are looking for a way to make a dramatic improvement in their understanding of video slot monitors, touchscreens, bill validators, hoppers and more with no-nonsense technical presentations from:

- Asahi Seiko - Coin Hoppers
- Coin Mechanisms, Inc. - Coin Comparitors
- MEI - Bill Validators
- 3M Touch Systems - Touchscreens
- Sencore - Test Equipment
- FutureLogic (formerly Seiko) - Ticket Printers
- IDX - Coin Validator
- Money Controls - Coin Validator/Coin Hoppers
- JCM - Bill Validators
- Ithaca - Ticket Printers
- WMS Gaming - Slot Machines

- PLUS - A special instructional series on video slot monitor repair presented by Randy Fromm



BE A BETTER SLOT TECH

Come and spend 3 days at TechFest. With engineering and technical representatives on hand from the gaming industry's leading suppliers of touchscreens, bill validators, coin comparitors, hoppers and monitors, YOU

have a chance to ask about YOUR problems. You have a chance to get REAL answers to your questions, face-to-face with some of the most qualified technical experts in the industry.

TechFest is for slot techs of all skill levels, from novice techs who want to learn the basics of BV and hopper maintenance to advanced techs that need to brush up on monitor repair.

SCHEDULE OF EVENTS

Events subject to change

Day One

9:00 am - 12:00pm

How Monitors Work - Part 1
Theory of Operation - Beginning level

1:15pm - 3:15pm

Mars Electronics, Inc. - BV troubleshooting and repair

3:30pm - 5:30pm

FutureLogic Printers - Printer troubleshooting and repair

Day Two

9:00 am - 12:00pm

How Monitors Work - Part 2
Narrow Down the Problem - Intermediate Level

1:15pm - 3:15pm

Asahi Seiko - Hopper troubleshooting and repair

3:30pm - 5:30pm

Coin Mechanisms, Inc. - Coin Comparitor technology and repair

Day Three

9:00 am - 12:00pm

How Monitors Work - Part 3
Circuit Analysis and Component Level Troubleshooting - Advanced Level

1:15pm - 3:15pm

Money Controls - Coin validator and coin hopper maintenance and repair.

3:30pm - 5:30pm

JCM - Bill Validator Troubleshooting and Repair

PLUS - Bonus sessions from 3M Touch Systems (MicroTouch) IDX (coin validators) Ithaca (ticket printers) Sencore (Test equipment for monitors) & WMS Gaming
Dates and times to be announced



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Randy Fromm's

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