Slot Tech Magazine

Slot Machine Technology for the International Casino & Gaming Industry

September 2013

An official publication of

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Randy Fromm

Hey, Randy. Where can I get my stuff fixed?

Honestly, at least half of all the electronics that fail in a casino should be able to be fixed in-house. Electronic repair is often really easy. Just replace a few components (mostly electrolytic capacitors, semiconductors and/or resistors) and you're good to go.

But what happens when you attempt to repair but fail (or realize from the "get go" that you'd be in over your head and you never try to effect the repair)? Don't fret. The casino industry has a handful of repair facilities that can help you and they all advertise in Slot Tech Magazine. Thanks for supporting our slot repair community. If not for these folks, STM would not be able to publish and I appreciate your support of these repair facilities.

Suzo-Happ and Patriot gaming offer power supply and LCD repair services as well as repairing BVs and printers. CasinoTech fixes CRT monitors, LCD monitors and power supplies. On page 11, you'll find a new power supply repair service called InverterPower. Don't get me wrong, I'd love to come to your casino and teach you how to repair power supplies and monitors. However, it's nice to know you can rely on these folks to help you out when you're stuck.

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The Light Fantastic

New Technology Drives Slot Machine Lighting

By George Hoehne

Editor's Note: *I have known George Hoehne for more that a dozen years now. He was one of the first "real" electronic engineers I met in the gaming industry and I am grateful for his expertise. For those of you who remember coins (we used to use 'em in the business here in USA), George was responsible for the development of the Micro Comparitor and Intelligent Comparitor Products. Now, he has turned his attention to lighting for slot machines with a sweet little system for slot machine illumination that takes the load off of our OEMs so they don't have to reinvent the wheel when it come to general or even "event-based" illumination. Read-on about the "Infinilite" RGB Controller.*

Cabinet lighting is a very effective stimulus to the player to indicate that a particular condition or event has occurred in the game that they are playing. Commercially available LED lighting controllers are designed to run pre-programmed routines. The gaming machine manufacturer can select the routine from a limited menu of patterns using dip-switches or some other similar method of configuration. Once power is applied, the selected routine runs in a continuous loop.

Wouldn't it be nice to have a device that allowed the gaming machine to easily activate a lighting routine that corresponded to each unique game event? Wouldn't it also be nice to create custom lighting routines that combine side trim lighting, top box lighting and button panel lighting, and select them on demand to give each game event its own personality?

Elite Gaming Technology realized this need and set out to design a lighting controller that made other lighting controllers obsolete. As a designer and producer of gaming cabinets for several gaming machine manufacturers, Elite Gaming Technology understands the importance of making products easy to use and easy for game machine manufacturers to integrate into their games.

The new InfiniLite™ RGB LED Controller was designed exclusively for the casino industry and makes creating custom lighting

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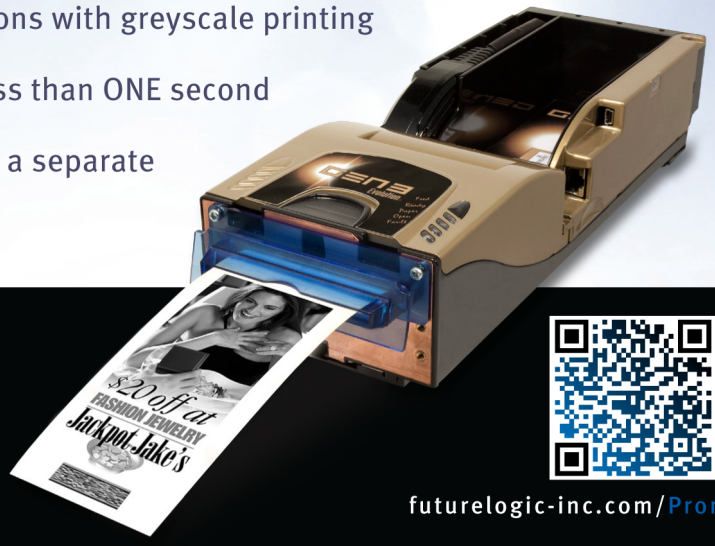

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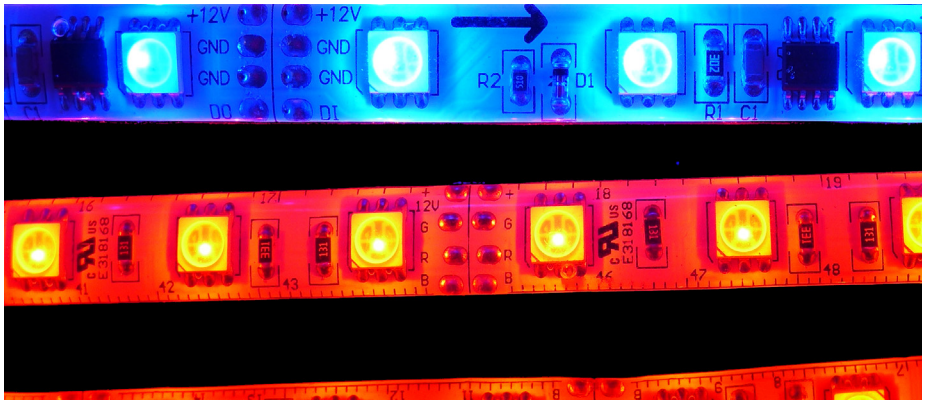
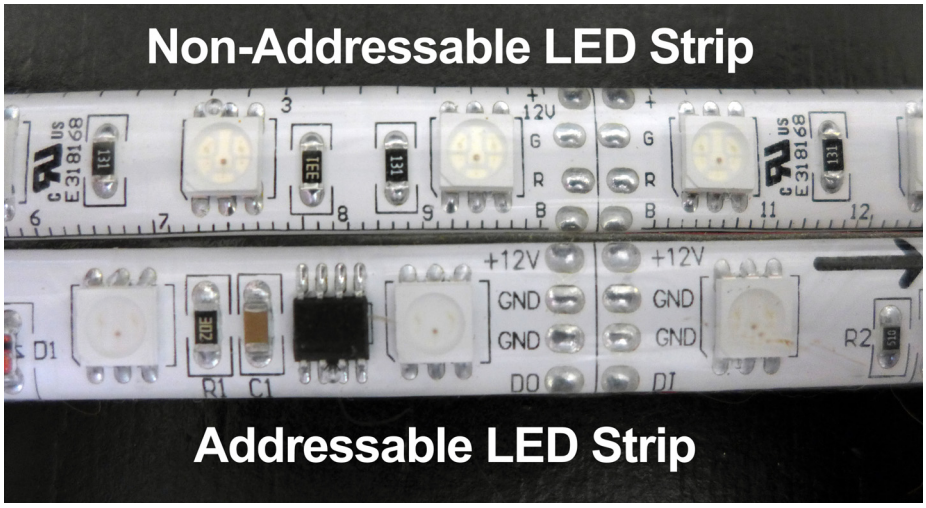
routines and activating those routines simple. The InfiniLite™ controller is an intelligent device that understands how to control LEDs so that programmers are not burdened with this task. InfiniLite™ can control multiple lighting devices: up to six addressable strips (these are strips that have a serial driver chip for every three RGB LEDs), six non-addressable strips (these are strips that have all of the LEDs wired in series), and 12 Gamesman brand halo LED boards (halo is a feature that allows the bezel of the lighted pushbutton to illuminate. Halo boards have their own drivers that communicate via serial peripheral interface protocol).

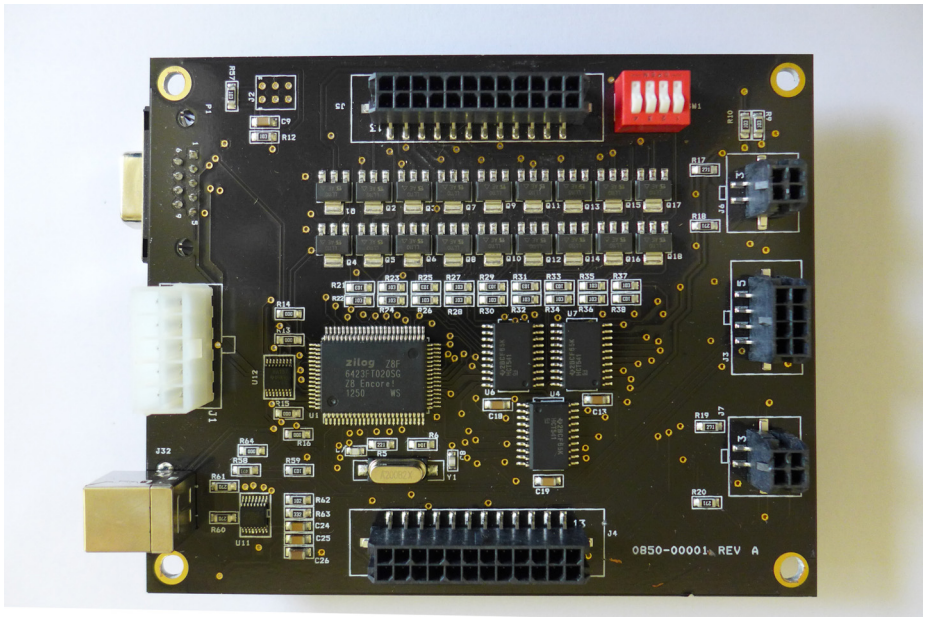
Each lighting device that is connected to the InfiniLite™ controller is individually controlled giving the game designer the ability to create virtually endless combinations of lighting routines that combine color changing along with the lighting effects of blinking, chasing, rotating and breathing as well as control the speed of each of these effects. The InfiniLite™ controller is also compact and easy to locate and mount into your game cabinet. The unit is roughly 7" x 5" x 1" and the multi-layer surface mount component printed circuit board is housed in sturdy steel enclosure that easily mounts to the cabinet using four screws.

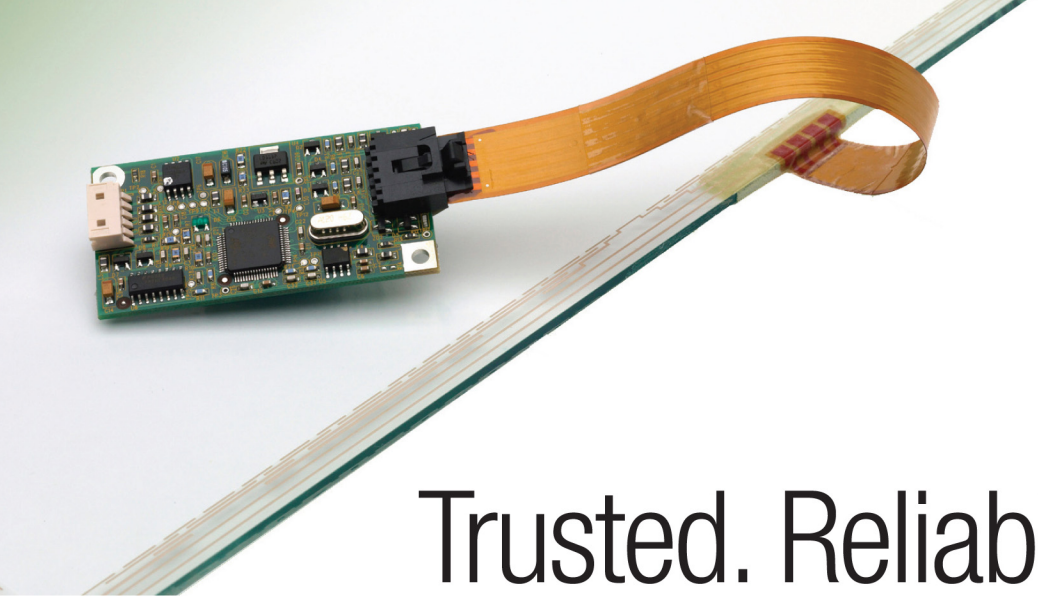
The other thing that Elite





Gaming Technology realized was that creating and defining lighting effects for the game cabinet fell to the responsibility of game designers and that a tool with an easy to use interface that let game designers experiment with lighting options would be the perfect companion to the InfiniLite™ controller. Elite Gaming Technology engineers set out to design an application that would do just that. Command Tool comes free with the InfiniLite™ RGB LED Controller. Command Tool is a Windows® based application that runs on Windows XP or later operating sys-





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tems including Windows 8. The beauty of Command Tool is that it allows game designers to design and view lighting routines without the assistance of the hardware or software engineers. The graphical user interface is easy to use. One begins by defining the lighting devices that you want to control by clicking the appropriate button to choose: addressable, non-addressable, or Gamesman halo LEDs. Next, choose the color and set the brightness slide controls. Choose the effects you want and set the speed by moving the sliders and you've created a routine. In conjunction with creating a routine, Command Tool has automatically created an ASCII command string that can be cut and pasted into the game code to be sent to the InfiniLite™ controller via RS232 to a standard com port or via USB (virtual com port).

Now, save each routine that you have created to the Sequence Creator and sequence up to 21 routines to create a unique profile that you can attach to a game event. InfiniLite™ controllers can be cascaded within a single cabinet (if needed) to manage numerous lighting effects or to synchronize lighting on multiple cabinets and/or accent bank signage. As many as 10 Controllers can be connected to achieve the desired effects. The InfiniLite™ Controller is available as an optional peripheral in all cabinets manufactured by Elite Gaming Technology or sold separately.

Elite Gaming Technology (formerly - Elite Casino Products) has emerged with a new name and a new company identity. EGT is a leading supplier of customizable slot cabinets which include the Nitro™, Nitro EX™, Nitro XL™ and Onyx™ as well as proprietary cabinet designs.

The company designs its products with knowledge and information gained directly from players, assisting clients with innovative designs and custom solutions that please players and game manufacturers alike. EGT's engineering team performs detailed ergonomic and usability studies for all new designs to ensure that its cabinets are class leaders for appearance, performance and serviceability. By using ergonomic studies and data from research NASA conducted into the human form to guide it's design process, EGT's cabinet solutions ensure that your game content will be presented optimally; and that players will remain comfortable and at ease, maximizing playing time.

The company's services include design concept, mechanical and electrical design and engineering, integration of proprietary electronic peripherals, cost reduction engineering, photo-realistic renderings and prototype development.

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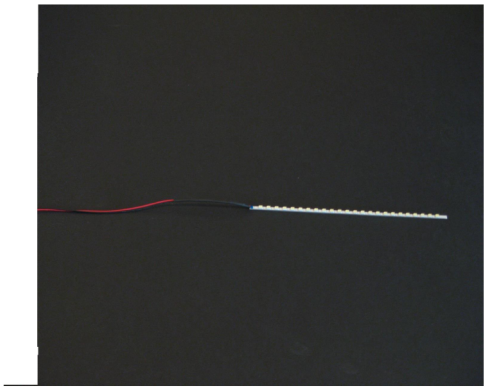

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Ceronix LCD Monitor Repair

By: Jillian Haynes

Ms. Haynes at TechFest 27 where she led our "hands-on" repair lab.

Ceronix has put together a flow chart to help simplify the causes of a no power or video problem on our LCD monitors. This flow chart can be used to quickly determine the root cause of a monitor's problem, enabling you to save valuable time.

Back in the shop, the monitor can be tested by hooking it up to a video source and a power source. A computer's VGA source or a video pattern generator can be used. A monitor with a frame and game harness can easily be tested using the same methods.

Removing the back cover to access the power supply and analog to digital controller board is simple. First, disconnect the touch sensor and power and signal connectors from the touch screen controller board so the cover can be removed without causing damage to the harness wiring. If the unit does not have a controller, disregard this step. (Picture3)

Next remove the two, quarter-inch drive screws and slide the cover back before lifting it off. (Picture 4) To test the unit from a computer or pattern generator, the VGA and power connectors from the game harness have to be disconnected so your own video source and power harness can be used.

The most important tool to utilize here is the indicator light, found adjacent to the on/off button. (Pictures 5 and 6) Using the indicator light, the flow chart and a multi-meter, you can quickly narrow down the problem.

Checking the Power Supply

You've hooked up the malfunctioning monitor to an AC power source and a pattern generator or computer VGA and pressed the pressed the on/off button but the indicator light refuses to come on. The first thing to check when the indicator light is absent will be the power supply. Set your multi-meter for more than 24V and test the power supply at the output connector, as shown. (Picture 7) It should read very close to 24 volts. If it reads 0V or over voltage then you've already diagnosed the problem! Remove it by unscrewing the two screws or nuts holding it to the sub-frame.

Checking the Analog-to-Digital Controller Board

The indicator light is on and it's green but there's no video. This scenario can indicate a bad A to D controller board, a bad inverter or a bad panel.

Checking voltages on the A to D board will determine if the problem originates with the A to D board or the inverter. Using your multi-meter, check the voltage at pin 5 of the inverter connecter. (Picture 8) It should read near three volts. Also check the voltage at pin 1 of the LVDS connector. (Picture 9) It should read near 3.3v, 5v or 12v depending on the size of the panel in the unit being tested. If these voltages are correct then the A to D board can generally be ruled out as the cause of the problem. If either of these voltages is off, the A to D board will need replacing.

On the scalar chip there will be a sticker that identifies the type of board it is and the

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checksum of what is programmed into it. When ordering a new A-to-D board from Ceronix, make sure to reference this sticker or the unit's identification label so that the programming and voltage selection on the board is correct. Damage to the panel can occur if the wrong voltage jumper is selected and if the wrong program is loaded, it will have an incompatible display.

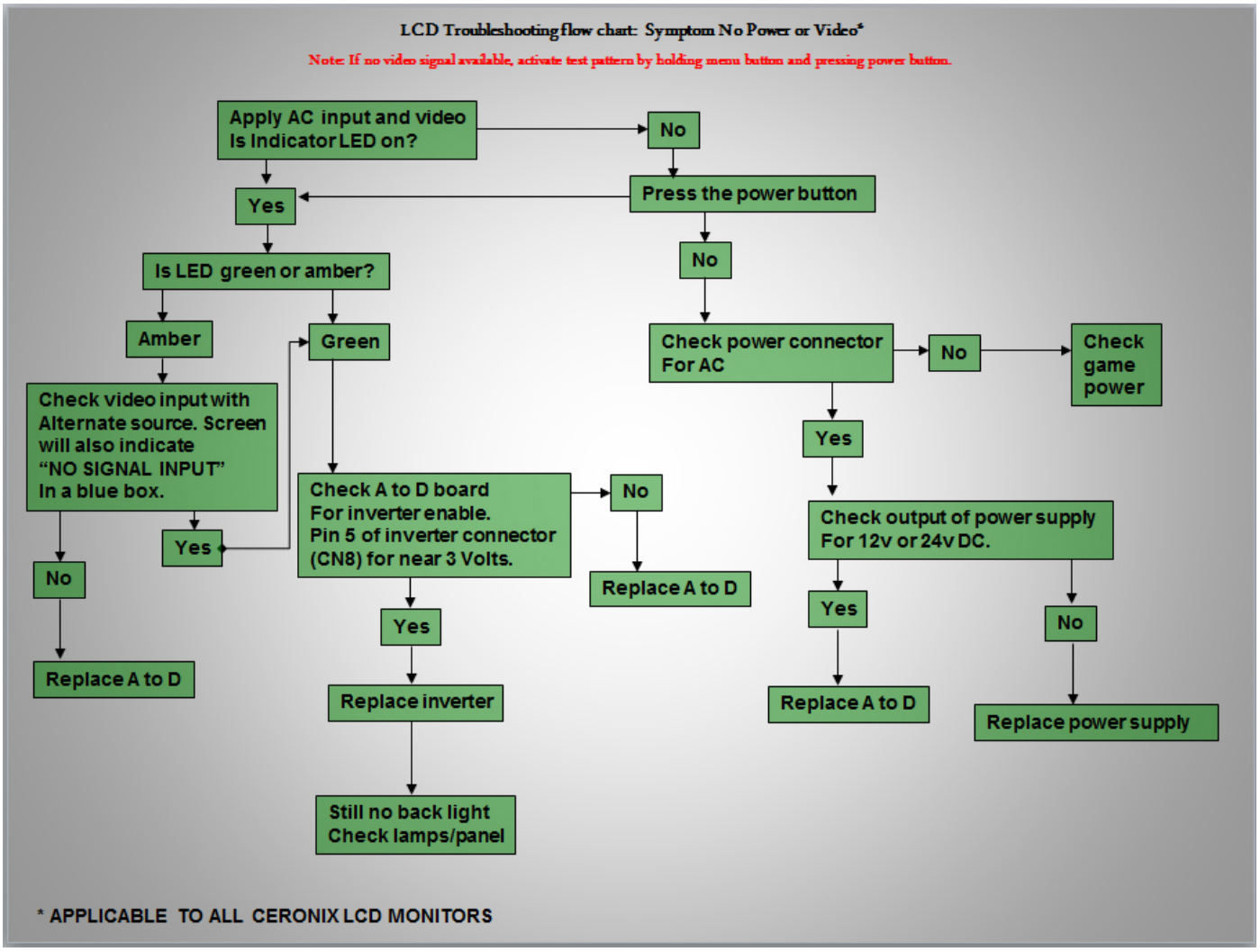
On a related note, here's some good news for techs working on IGT Ceronix monitors. Ceronix has been using the same A to D controller board for the last five years. This board has a two-pin jumper on it for IGT 3800/3900 blanking. You may be familiar with it. It required techs to remove the back cover to get to the jumper. (Picture 10)

This year we have begun rolling out a brand new controller board. This A-to-D controller board has an awesome new trick. The two-pin jumper is gone! It's been integrated into the OSD menu where it is much easier to access. This new controller board also has the capability of reaching higher resolutions. And, as you can see in the pictures, the new A-to-D board is fully compatible with the previous board. (Picture 10 and 11)

Replacing the Inverter
The light is green and the voltage on the A-to-D board checks out but there isn't a picture. First make sure the lamp wiring from the panel is plugged into the inverter and that this wiring is not pinched or cut in any way. If this checks out then there are two possible problems left: Either the inverter is bad or one of the lamps in the panel has broken or burned out. On most Ceronix monitors, the inverter is located on the underside of the sub-frame.

Now for the fun part: opening up the monitor to get to the inverter. First things first, always remember to disconnect the touch screen sensor from whatever it's connected to, e.g. NovRam, extension harness or touch screen controller board. (It's important not to damage the touch screen sensor as it's an expensive part and any physical damage is not covered under Ceronix's four year warranty.) Also, disconnect the LVDS cable from the A-to-D board and unscrew the grounding screw from the sub-frame. (Picture 12)

Next, unscrew the four side



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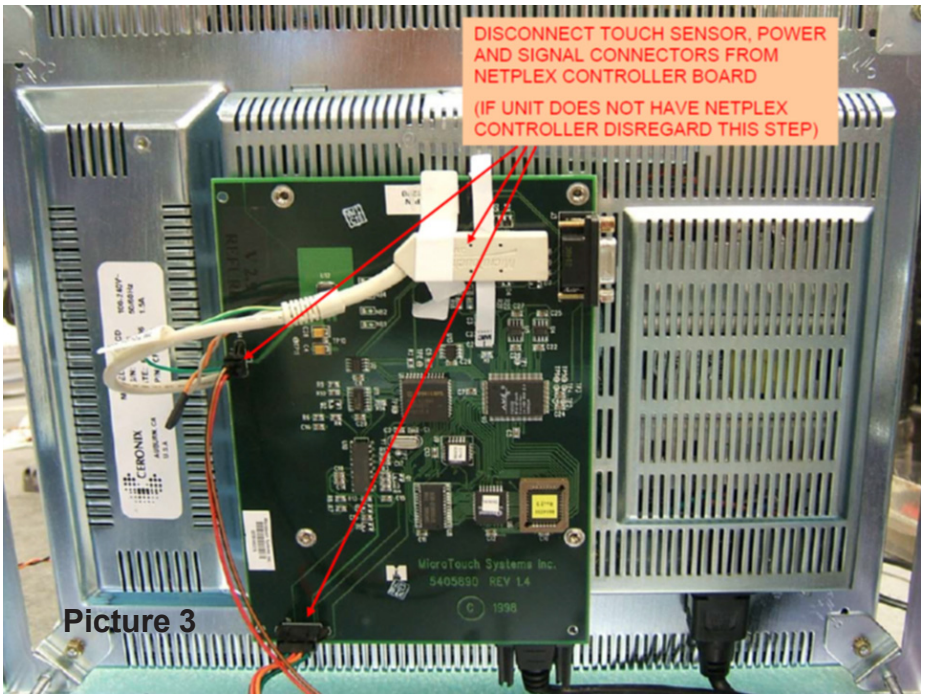
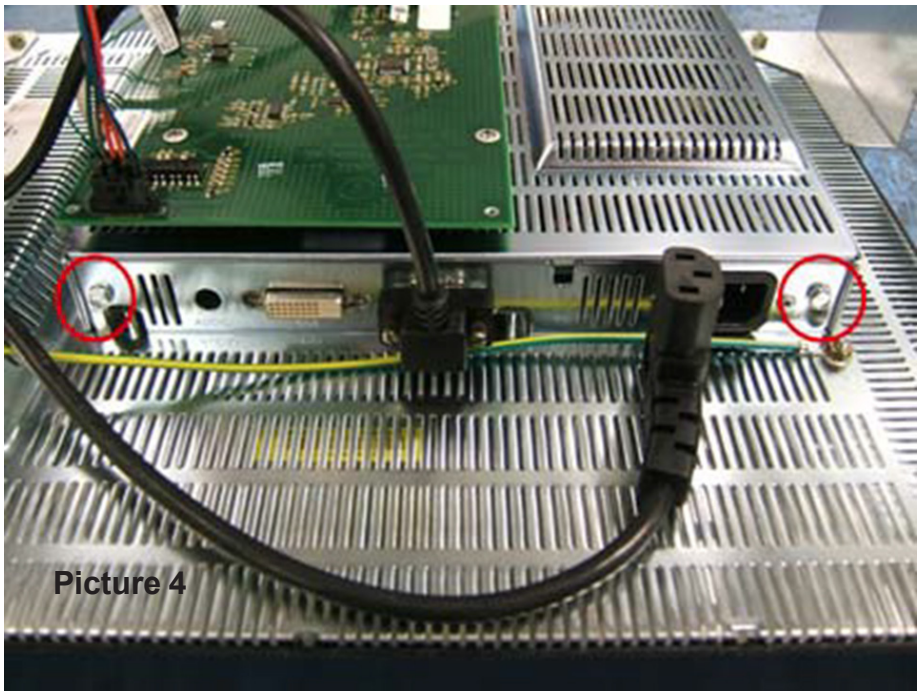
screws holding the plastic bezel and touchscreen onto the sub-frame. There are also six locking tabs on the plastic bezel, on top and bottom, which have to be pulled off the metal sub-frame. (Picture 13) Pull the touch screen sensor out of the sub-frame, carefully so the connecter doesn't get damaged. (Picture 14) Remember how you did all this so re-assembly will be easier!

Carefully pull the sub-frame slightly up and out of the bezel, and then away from the panel and touch screen, into an L shape as shown (Picture 15) being extremely careful not to pull on the panel wiring that is connected to the inverter. Disconnect the wiring and unscrew the inverter from the sub-frame. Install a new inverter and reassemble the unit.
If the unit still has no picture or an on/off condition after re-assembly then the lamps on the panel have gone out. This requires nother disassemble to access and remove the panel.



Picture 3

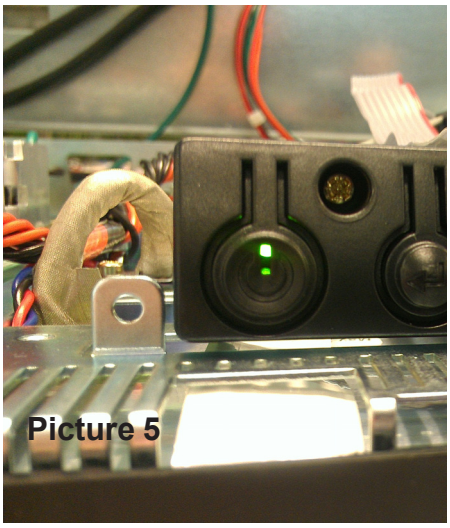

Picture 4

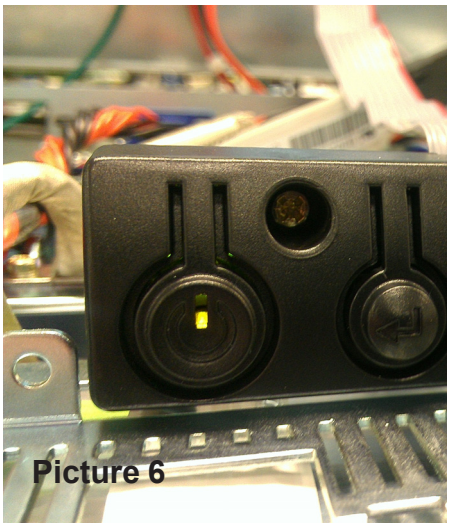
Miscellaneous Problems

There are some common problems that can't be diagnosed with the handy flow chart. Listed below are some known problems and their causes.

A line in the screen is a panel issue. Some assume the issue is with the A-to-D board but lines in a screen have to do with the buffer board connected to the panel malfunctioning.

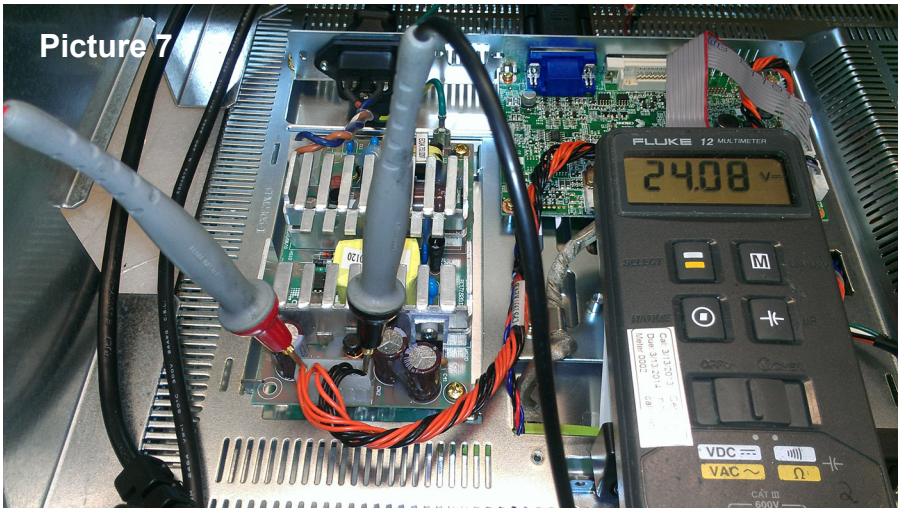
A white or gray screen can be one of a few issues. The simplest issue would be an LVDS connector that isn't seated correctly or an LVDS cable that's damaged. If reseating or replacing the LVDS doesn't solve the problem, check the output volt-

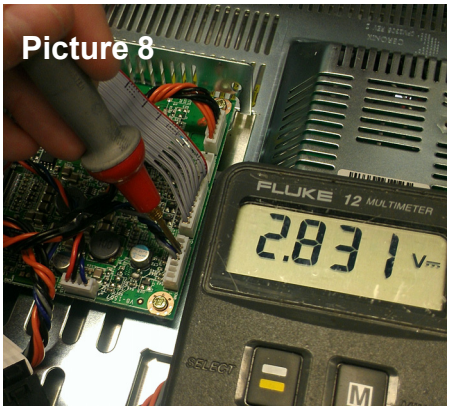

Picture 5

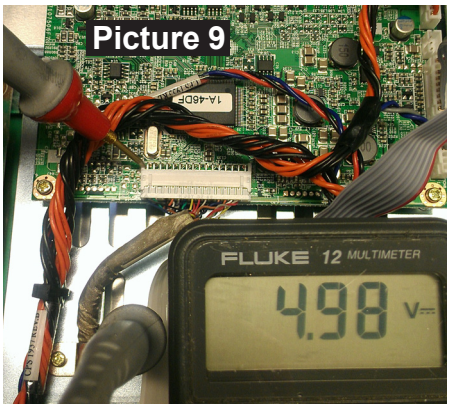

Picture 6

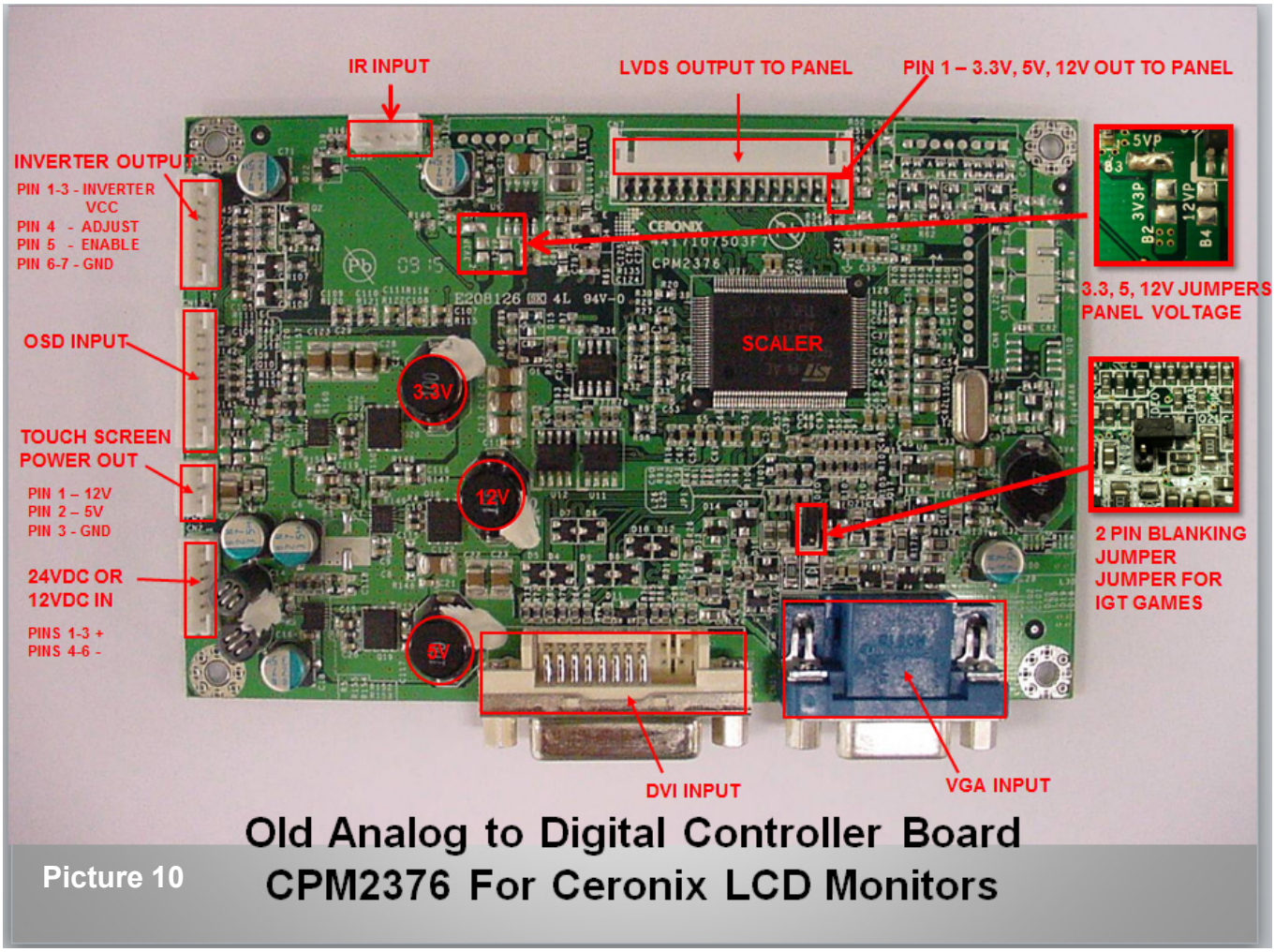
age to the panel on pin 1 of the LVDS connector on the A-to-D controller board. If the panel is being supplied the correct amount of voltage from the A to D board then the panel's buffer board is causing the problem. On the other hand, if the A-to-D board's output voltage is too low, the panel will not function properly.

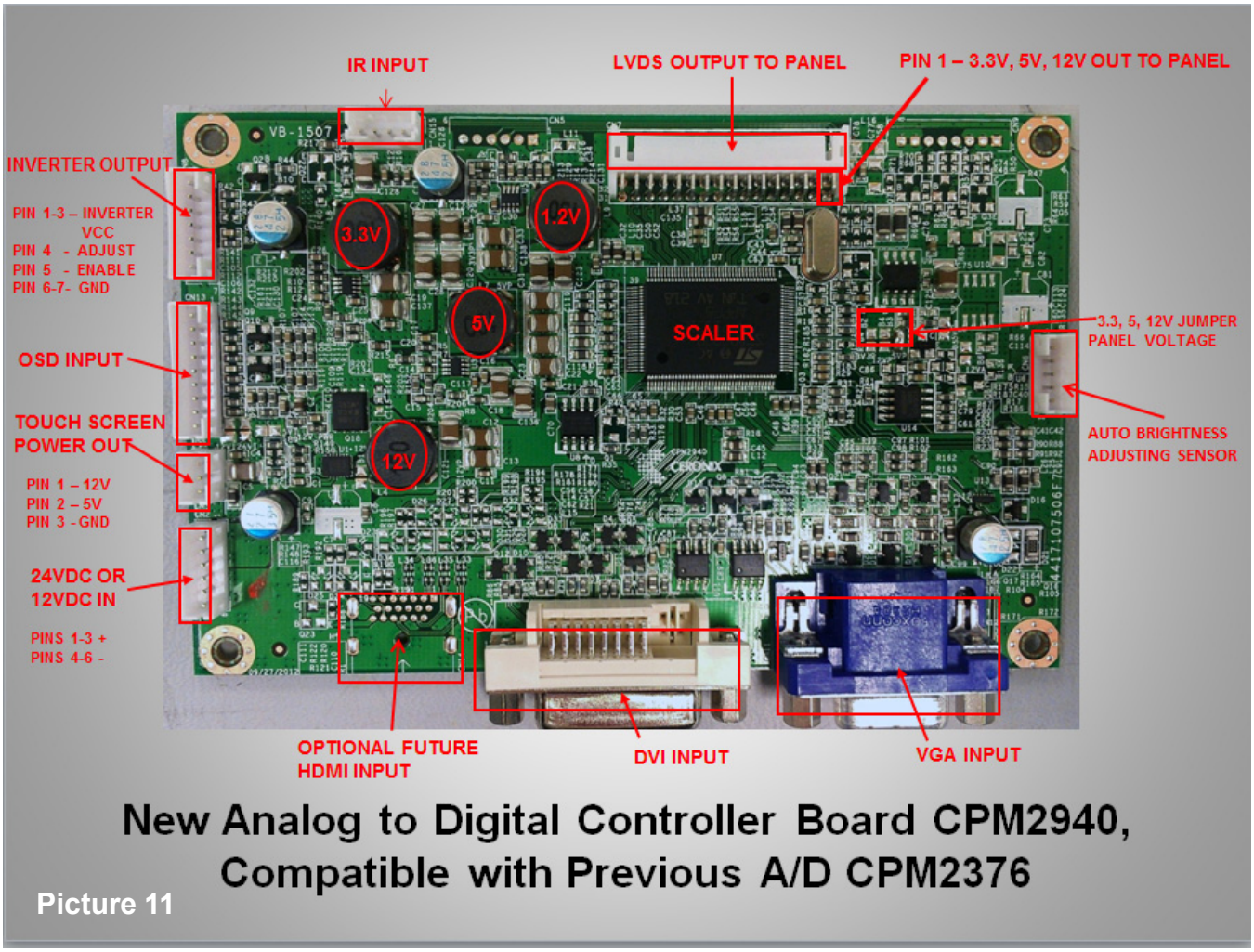
Another known issue we get calls about is the panel flashing factory mode colors or a "No Signal Input" display. This can be a couple of different issues. The most common cause is the video source from the game not working properly. Infrequently the A-to-D board's SCALAR chip malfunctions, causing the programming to be wiped out. If you've determined this to be the problem, Ceronix can send you a replacement A-to-D board.







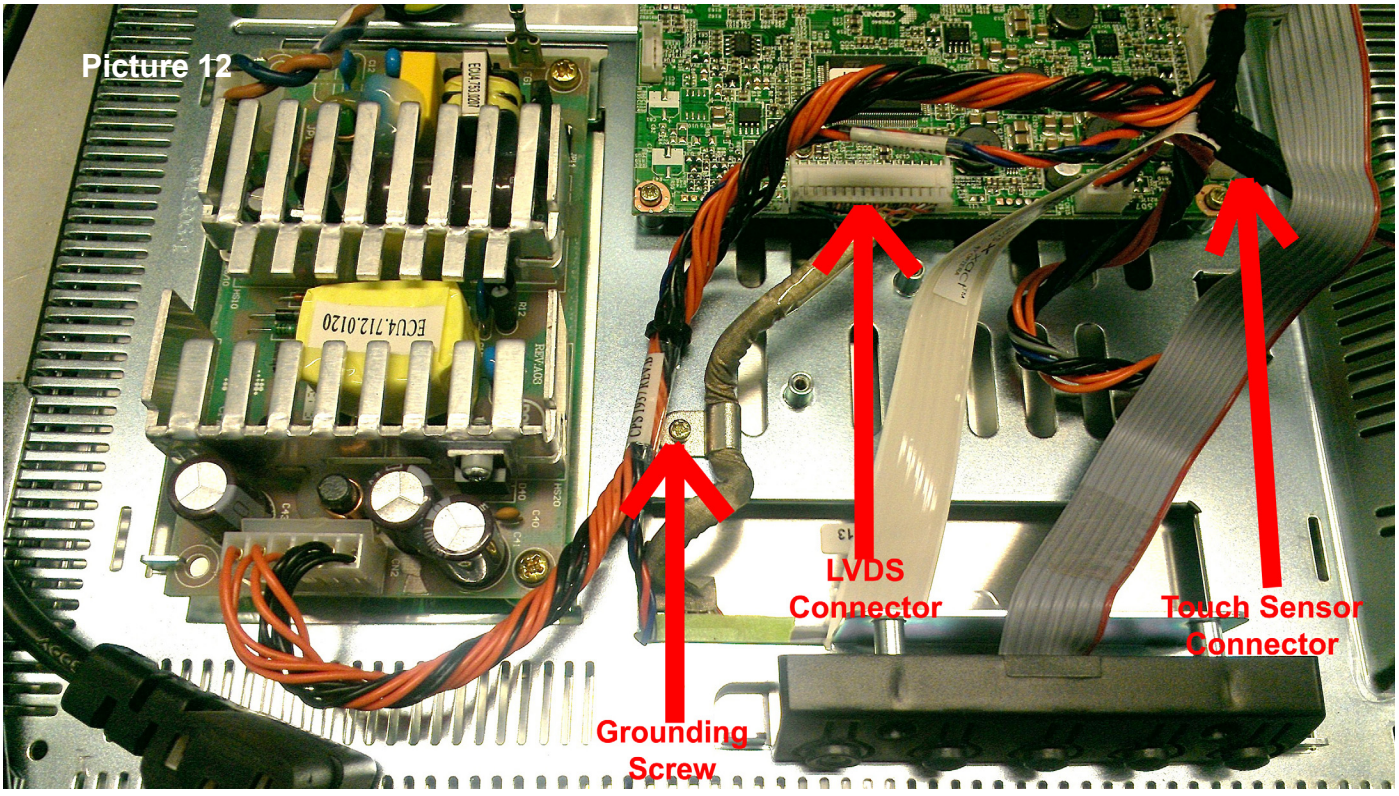


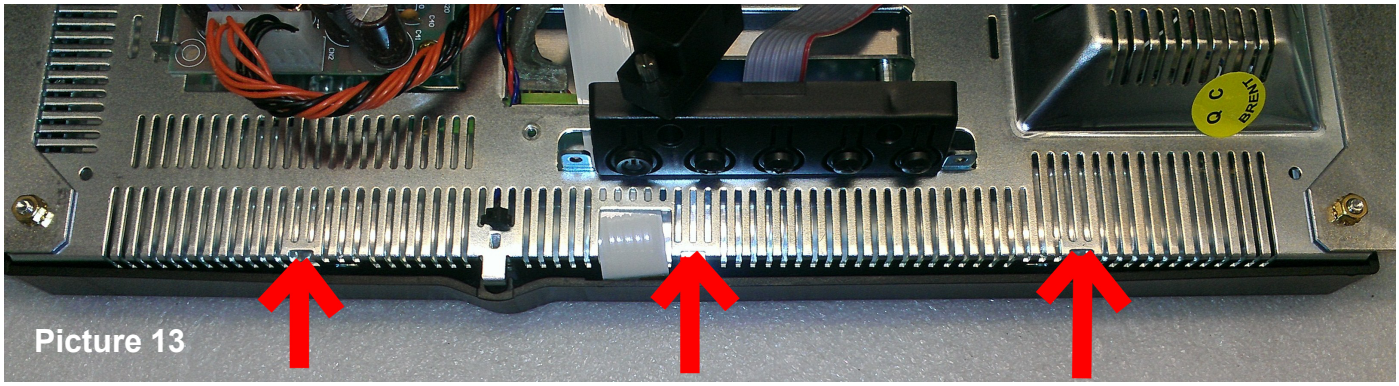


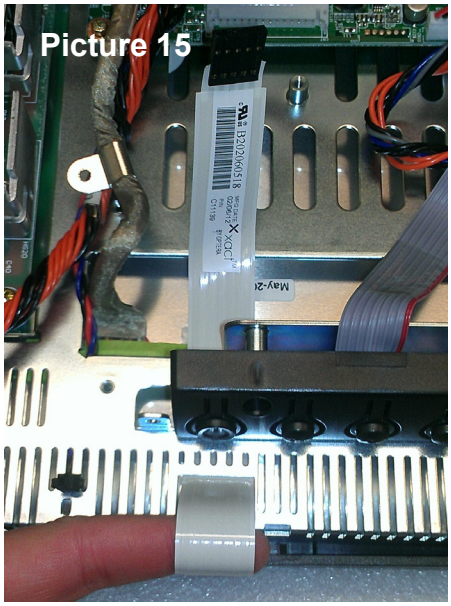
New Analog to Digital Controller Board CPM2940, Compatible with Previous A/D CPM2376

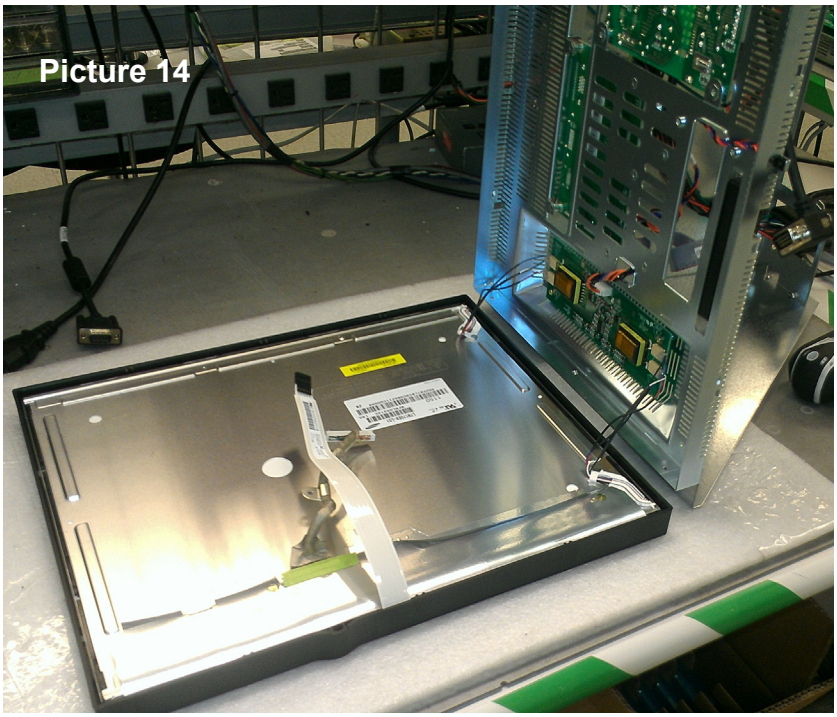
Picture 11

Remember, Ceronix has a four year warranty on our products. If you've determined by the date on the identification label that the unit you're working on is still under warranty, please contact us at (530)886-6400 and we can replace any part you need. Alternatively, you can send the entire unit in and we will fix it and return it to









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Quick & Simple Repairs #99

By Pat Porath

Bally Alpha 2 "Assert Failure"

When I first arrived, near the area where we sign our keys out, I noticed a Bally "Alpha 2" upright video slot that had an error. When I arrived the screen showed "assert fail. Turn reset key to reboot." So I did turn the jackpot reset key twice to reboot the game. Afterward, the same error appeared so a power cycle was done. Yet again the error appeared. This time I turned the key once and read the fine print within the error, all the text when the key is turned once to show what the error exactly is.

Among the text a "light bezel error" was in there. What the heck? A faulty light bezel was making a machine not work? I traced some of the lighting wiring back to a board located on the left upper side of the game. It had an LED on it that was flashing twice, then it would stop. A working game next door had the LED on the board steadily flashing once, not twice. Maybe it was a bad light board? I looked in our shop but didn't see one. An idea was brought up to unplug all of the connections on the board, then plug them all back in (of course with power off). When they were all plugged back in and game power was turned back ON once again, presto! The game was fine. Possibly one of the connections were a little bit loose. Hard to say.

WMS "Life of Luxury" Missing a Progressive Amount

While looking on the gaming floor for any games that were shut off and not documented, checking out sign lighting to make sure they look OK, also looking for any sign problems, I saw something a bit unusual. Our WMS "Life of Luxury" progressive somehow "lost" the "Opal" amount. To put it another way, where the "Opal" amount is supposed to be on the sign, it was blank. Never having seen this before, I guessed I could try to reboot one of the sign controllers, which I did. All of the games went to "DISABLED" and the sign didn't change. I

rebooted the other sign controller (one is for graphics, the other is for the progressive amount) then the “Opal” meter started incrementing from zero dollars up to the correct amount that appeared on the games. It was funny watching the meter rapidly increment

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when it was "catching up" to the correct amount. I told a slot attendant as a joke, "Look at that!" "A runaway progressive meter!" It was funny. So, if you run across a meter that is blank on a sign, rebooting the sign controller may fix the problem. It worked with this one. As a note: You would not want customers playing one of the progressive games in the bank when rebooting, the games all may "disable" themselves until the controller fully boots up.

IGT SAVP, Dim LCD

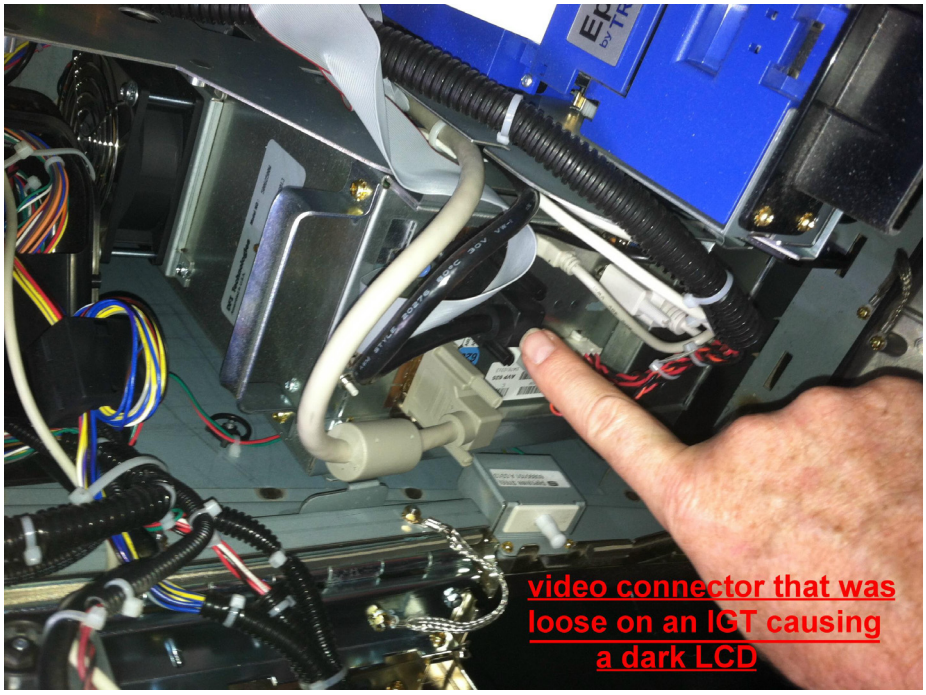
In case anyone is wondering, International Game Technology Stepper Advance Video Platform = IGT SAVP. It has physical reels with a small rectangular LCD in the reel glass section of an upright slot machine. Anyway, I was called to a game where the LCD was quite dim and didn't have much color to it. I checked a few things out and didn't see anything obvious. I tried pressing the "auto" button on the video remote board, I checked a few connections on the door side and power cycled the LCD but nothing worked so I asked for help. At the time, I was busy with a bank of Bally conversions but the game was only on the next bank. A co-worker looked at it and within a minute, the LCD looked perfect so I had to see what fixed the problem. Simply a slightly loose video connection on the brain box was causing it to look dim and discolored.

Aristocrat "Tarzan" Bank Progressive Errors

I had received a concern from a slot attendant where our Aristocrat Viridian "Tarzan" wide area progressive bank would go into a progressive error every couple of minutes or so. When I arrived at the games sure enough, a "progressive amount error" would appear on the games. After watching it for five or ten minutes I called our Aristocrat field tech to see if he knew what the problem could be. He wasn't sure and called me back a few minutes later and told me the issue was regional wide, not just our casino. Possibly there were phone line problems somewhere. So the games were put out of service and I told the next shift what was going on with them. The next morning all of the games were still in "out of service" mode. Figuring whatever problem happened must be fixed by now, I put the games back in play and haven't seen or heard of any problems with them since.

Bally Cinevision, Dead Cooling Fans

While a slot attendant was replacing a worn Sentinel II keypad, he noticed that none of the cooling fans were working on either power supply. He notified his supervisor, then he notified me. Sure enough, NONE of the four fans were spinning on either unit. The 5v/12v has two fans, so does the 24v. None of them were working and the power supplies were pretty darned hot. I turned the game off right away and replaced them with spares. I complimented the atten-

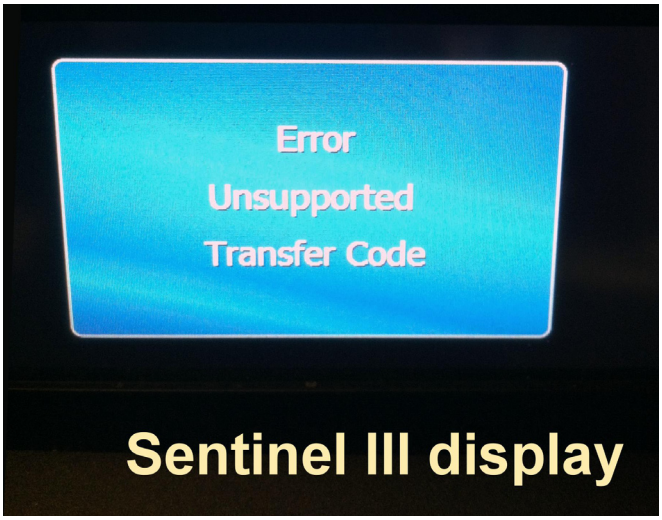

video connector that was loose on an IGT causing a dark LCD

dant that he had a good eye in noticing that the fans had stopped and that he had likely prevented other problems with the game such as the screen freezing up and or the game rebooting itself. I don't remember where I heard it for sure but "A little preventive maintenance goes a long way."

Oasis Sentinel III Promo Download Error

This was a first for me. I had never heard of or seen an "Error Unsupported Transfer Code" on a Sentinel III display. After helping with a bank of Bally conversions, it was time to test the games to make sure they take "promo cash," bills, print tickets, accept tickets and so on ("Promo cash" is "money" a customer can download from their player card to the machine credits. The promo cash cannot be cashed out, only played, of course any and all wins can be cashed out.). When trying to download promo cash, the error appeared. The game was rebooted along with the Sentinel. I've run into situations before where power cycling the Sentinel has fixed a promo error. When comparing game options, under the "cash out options," "restricted Promo credits" was DISABLED on the problem game and it was ENABLED on a working game. Hopefully this was the problem. Sure enough when it was set to ENABLED, the machine finally accepted promo cash.

Pat Porath
pporath@slot-techs.com



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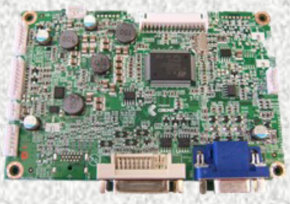

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