

Rob Craig's

Tales of the Silverball

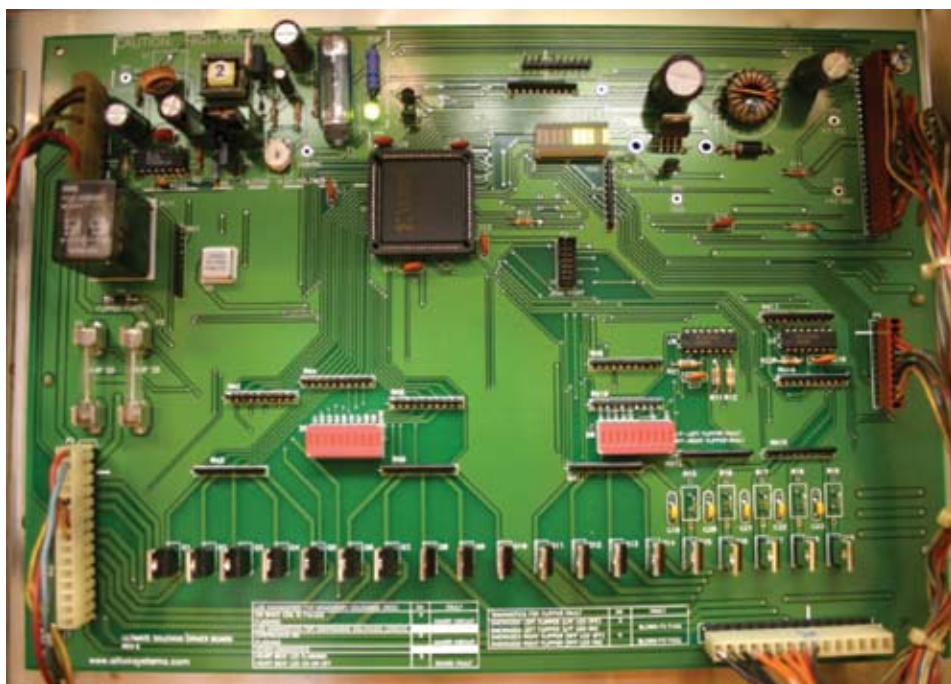
FREE PLAY.

The Ultimate Driver Board — Alltek Systems

Just when you thought things were getting quiet in the pinball reproduction circuit board scene, here comes the mega hitter Alltek with another Ultimately designed board!

Staying with the same Bally / classic Stern system from the late 70's and early 80's, the company has produced another solution to a growing problem with this board system. Another more 'likely to die and a pain to fix' board is the Voltage Regulator /Solenoid Driver board (simply referred to as the VR/SD throughout the rest of this article). This is the board that sits to the right of the MPU board. It has two separate jobs to perform. One is to supply several final stage voltages to the system, the other being the MPU commanded coil firing for things like slingshots, popbumpers, kick-out holes, and drop target resets. While the legacy VR/SD board isn't nearly as complex as the MPU board, it's still a source of contention due to its old-school design and age. Not everyone will need to rush out to buy a new driver board for every Bally / Stern machine they own. But, any collector that has even one of the compatible machines will reap the benefit of owning an Ultimate Driver Board for immediate diagnostics and eventual replacement. Let me tell you the story on how I came to this conclusion...

I was contacted by Dave at Alltek Systems some months ago about his new design to replace the VR/SD board. I was *elated!* Why? Because I have pulled several of these machines from storage and opened them up only to find this solenoid board missing—more often than missing MPU boards. My theory behind this mass removal is related to the operator "pull-and-plug" mentality. These boards failed and were often swapped



around—rarely replaced unless the particular game was a money earner at the time. But even if it was present, I don't particularly like the toaster oven heat that the old board generates. More importantly, the original boards have issues. There are voltage supply and grounding issues that require the end user to solder jumper wires all over the place in order to make it work reliably (not delightful to the non-techie). A new capacitor is always in order to provide a reliable +5 volt output for the CPU. High voltage supplied to the display's can go crazy, creating un-tweakable overages that can harm these hard-to-replace displays. While all of these problems can be fun for those who enjoy wielding a soldering iron, I can certainly understand the perspective of collectors who simply want to play their games. This is certainly a solution for

them. But there's still more as to why I was so excited—notably the reputation that precedes Alltek systems. I expected that the new board would be innovative, have 'dumb user' protection (that's me from time to time), and I expected several easy to see status points to indicate good voltage outputs. So I eagerly accepted this invitation to play with one of the ten boards made in their late revision beta test. I waited for the arrival of the Ultimate Driver Board, and pondered how Dave had dared me to run it hard.

Upon arrival, I managed to sneak out to my shop early in the evening and give the new board some careful attention. At first glance, I noticed that it was quite a bit lighter than the original due to the absence of the large heat sinks that once surrounded Q20 and Q21 (Low & High Voltage Regulators).

Unlike Alltek's Ultimate MPU board, this new VR/SD is the same size as the original. Another thing you'll notice is that the coil driver circuitry is greatly simplified. Previously we had a ceramic cap, diode, and resistor packed neatly with the driver transistor which eventually led to the CA3081's that finally ran into U2. This new design just has a MOSFET that receives its signal through a couple of resistor networks, and into the brain of the board—a CPLD (Complex Programmable Logic Device) which is similar to a PAL. On the voltage regulation side, everything is smaller with the 5V & 190V supply's being generated through modern switching power supply circuits. The high voltage for the displays has a regular size fuse along with a smaller footprint on the board. There are also a couple of fuses that isolate the flipper coils—something we've never had before. Even better than all of this was the LED's which provide all kinds of status for the end user. There are Green LED's that let you know that 190V, 12V, 43V, and 5V are healthy. There's also a ticker LED for the heartbeat of the CPLD. Then there's an LED labeled "MPU Fault", designed to get your attention if the MPU is sensing faulty data to the Ultimate VR/SD. You will also find LED's providing status for the output MOSFET's (15 Red, 4 Green). There's still other goodies, like the LED's that signal a left or right flipper fault, clear silk-screened text labeling everything, large test points for 240V, 190V, 12V unregulated, 5V, and 43V, thick PCB stock, and overall solid board construction.

My first test was the installation of the Ultimate Driver Board in a freshly restored Bally Paragon. Within 3 minutes I had the old driver board removed and Alltek's VR/SD installed. Everything fit in similar if not exact locations. There was no strain on connectors and mounting points were right on. I powered up and was waiting for the LED's to show their stuff. Right away I received feedback as the MPU board counted up to 6 and then 7 blinks which sends a signal to the driver board to energize the driver board's relay (click), energize the coin door's lockout for coin drops (green status LED for continuous coil turns on), and clear out any potential balls left in kick-out holes (code specific red LED's flicker in time with the pops). I powered up a game and tried to focus on the new status LED's while I played. You see what looks like a kiddie piano playing notes as the ball slams into popbumpers, slingshots, kickout holes, drop targets resetting, and finally into the outhole. There is



Old vs. New: The original solenoid driver board (top) and the Alltek board (bottom)

another flicker as the coil pops the ball back into the shooter lane for ball 2. After a few more games, I put the board into the coil test mode and took a break for dinner. A couple of hours later the Alltek board was still sending signals to the table of coils, one by one.

The next day, I felt compelled to drop Alltek a line and tell Dave just how impressed I was with the board. And the question came back to me... "have you tried shorting a coil yet? Did you install the board in a known dead game?" I was catching on to his

hints. I needed to find a 'left for dead' Bally or classic Stern machine to breathe some life into. But I was stuck in my tracks. My seemingly never ending restoration list had not a single Bally or classic Stern in the lineup. So I called an operator friend who could fill this need. And feeling good about Alltek's chances (and mine to work a miracle), I grabbed an Ultimate MPU as well.

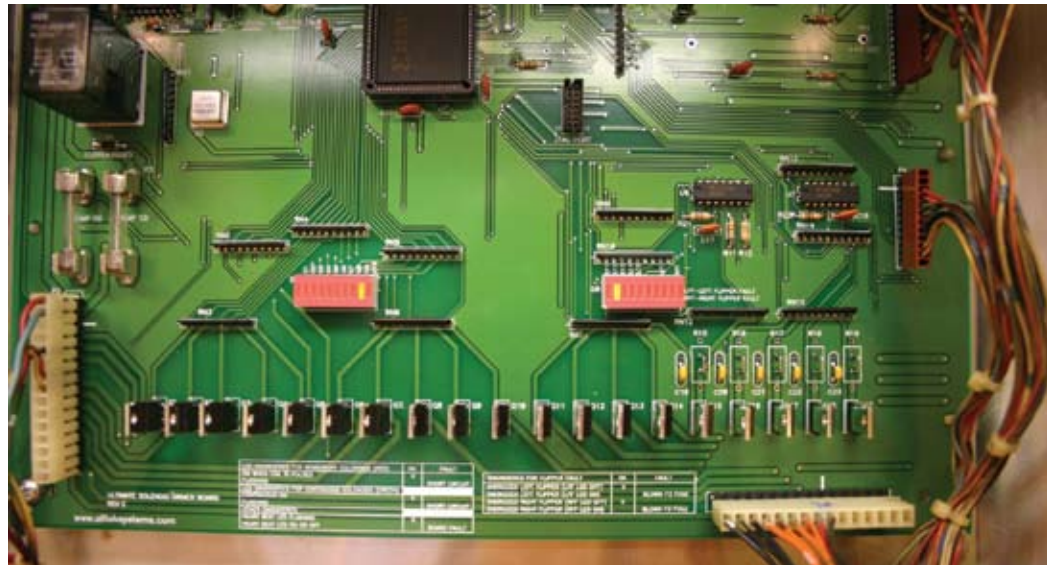
I arrived at the operator's old warehouse with only the Ultimate duo (MPU & newcomer driver board) and a ratcheting screw-

driver set. I spouted that my intention was to demonstrate to the operator that any Bally or classic Stern machine with a fully populated playfield would miraculously flip and pop within 15 minutes with these two boards. Willing to prove me wrong, he selected a web infested Bally Skateball that hadn't seen a public location in the last 25 years.

We pulled out the playfield glass as chunks of crud fell on the floor—a chore in itself. Underneath was a completely populated playfield with it's share of crud. Lifting the playfield revealed a thin film of rust on just about everything except the mouse droppings. We then removed the backglass to find no MPU board, no VR/SD board and no lamp driver board. I was stuck without a lamp driver and I had my doubts about the rectifier board being able to provide anything at all to the system. With plenty of old machines handy, we quickly found a lamp driver board. The clock was now running and I had to work some magic if I didn't want to be laughed out the door.

I started snapping in boards and deducting which connector went to where as the harness was a mess. Then to the Ultimate MPU board document to determine what the DIP switch settings were for Skateball. In less than 10 minutes the boards were mounted and the game was ready to power up. I said a quick prayer, flicked the switch, and counted MPU blinks. 1,2,3,4,5,6, relay click, 7, kickout holes were cleared, and finally an attract mode. Some of the score displays were not working (player 1 and the credit / match display). But the game was definitely in attract mode with 80% of the playfield lamps putting on their little show.

As amazed as we were, it was time for some playtesting. Sticking in the ball trough was a single rusty ball which pried free and sort-of rolled. I tried to get the game to coin-up and start but it completely refused. So I jumped into test mode and found that parts of the



The Ultimate Driver Board, including status indicator LEDs, in action.

switch matrix were a bit confused. With a short amount of time left for testing, I decided to give the old timer a break. It had been sitting for 25 years, was robbed of boards, and basically left for dead. It was alive, yet in desperate need of some TLC. Since there was no time for any of that, I moved on to the coil test, the most important in this evaluation of the new board. Click, pop, click, click, pop... the board delivered its path to each rusty solenoid device. With a mini-pooof of brown dust, they responded.

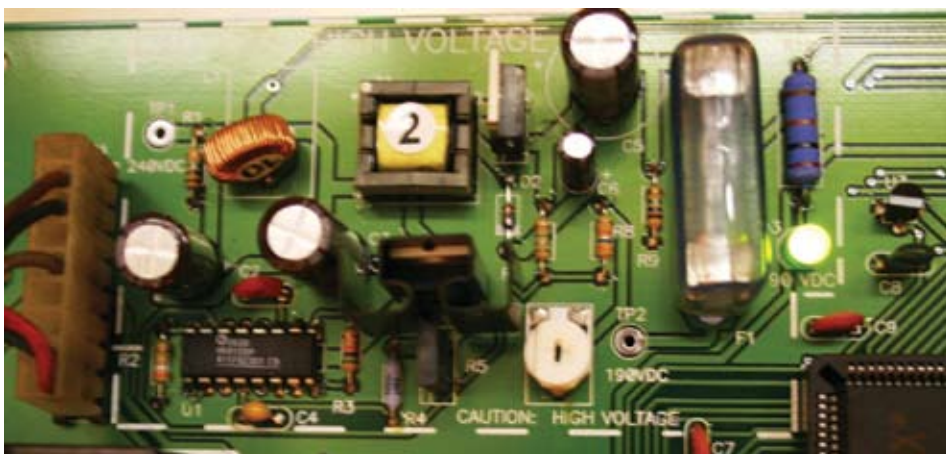
I had two people impressed at this point (three if you count me), one was asking about how he could buy a few of these and how much they cost. But the neat feature was still to come. I explained that I needed a wire, screw, something metal to short out a couple of these coils. Within a few minutes a screw, pair of pliers, and a puzzled look was handed to me. While the game was on and in coil test, I nervously held the screw to both lugs of a slingshot coil. As its turn in the coil test arrived, I was sure to see shards of plastic fly from the Ultimate Driver board's MOSFET. Nope, just a bright red blinking LED (the

one associated with that coil). After the short was removed, the board wouldn't allow a call from the CPU to attempt firing the faulted coil. We tried it again, and again, until all reachable coils were in fault mode (LED's blinking red). The Ultimate Driver Board had shut down nearly every coil from firing. So would cycling the power on the game bring them back? Absolutely, as if nothing ever happened.

Does this board work miracles? Well, that largely depends upon the condition of your specific machine. You will certainly eliminate a lot of issues with bad or intermittent voltages—both present and future. If you add the Ultimate MPU into your setup, you further bullet-proof your game. There are other things to do, like beef up the rectifiers and connector pins on your rectifier boards. Without a reliable feed to the VR/SD (whether original or Ultimate) you have no chance of bringing your game to life. Undoubtedly, this board will make your machine more reliable. The Ultimate Driver board comes with a 5 year warranty!

So, if you're looking for a board to replace the missing or hacked up original Bally and classic Stern machines in your collection, the solution is now available for the first time. Even if you are an electronics guru, you still might have one machine that's VR/SD board is a thorn in your side. Here's an easy solution for you.

If you are one that prefers to stay away from molten solder, this board is definitely for you. The board will sell initially for under \$150. No matter what your intention, the Ultimate Driver board will add a lot to your ability to diagnose problems and greatly help your restoration effort. **GR**



NEW!

The Ultimate Solenoid Driver Board

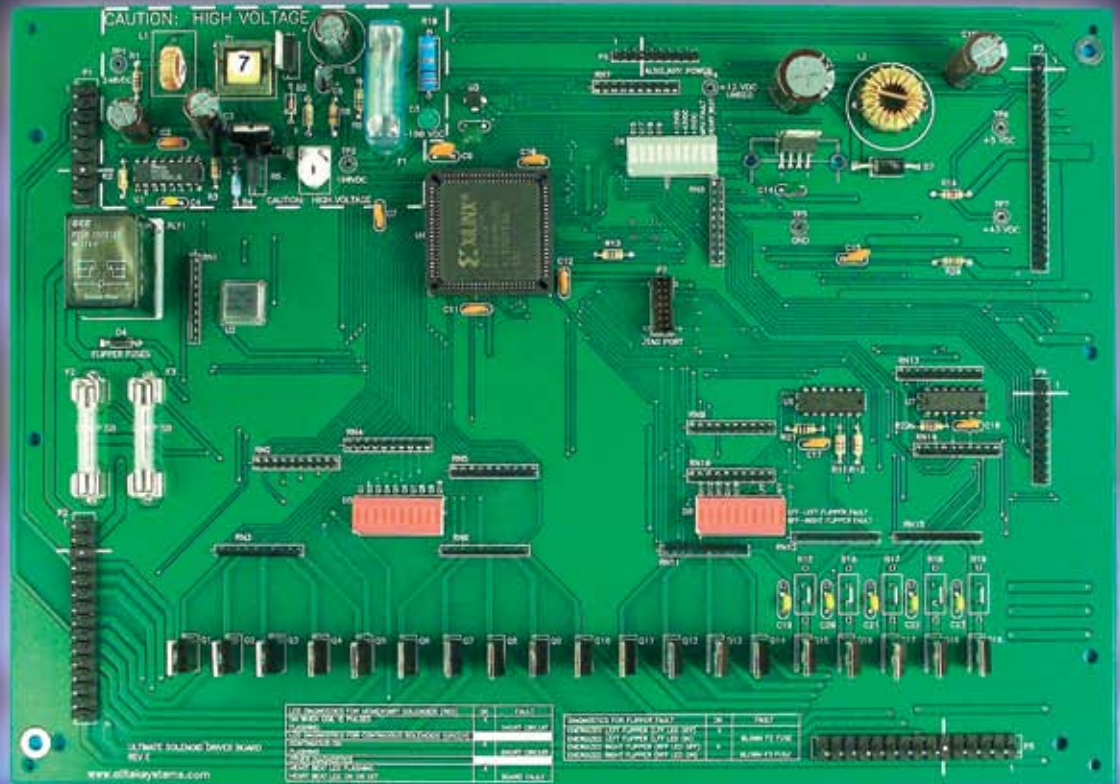
Alltek's Newest Universal Bally/Stern Replacement Product!

Supported Bally® Games

Baby Pac-Man
 Black Jack
 Black Pyramid
 BMX
 Centaur
 Centaur II
 Cybernaut
 Dolly Parton
 Eight Ball
 Eight Ball Deluxe
 Eight Ball Deluxe Ltd
 Elektra
 Embryon
 Evel Knievel
 Fathom
 Fathom (New)
 Fireball II
 Fireball Classic
 Flash Gordon
 Freedom
 Frontier
 Future Spa
 Gold Ball
 Grand Slam
 Granny & the Gators
 Harlem GlobeTrotters
 Hotdoggin'
 KISS
 Kings of Steel
 Lost World
 Mata Hari
 Medusa
 Mr. & Ms. Pac-Man
 Mystic
 Night Rider
 Nitro GroundShaker
 Paragon
 Playboy
 Power Play
 Rapid Fire
 Rolling Stones
 Silverball Mania
 Six Million Dollar Man
 Skateball
 Space Invaders
 Speakeasy 2&4 Player
 Spectrum
 Spy Hunter
 Star Trek
 Strikes and Spares
 Super Sonic
 Vector
 Vector (New)
 Viking
 Voltan
 X's and O's
 Xenon

Supported Stern® Games

Ali
 Big Game
 Catacomb
 Cheetah
 Cosmic Princess
 Dracula
 Dragonfist
 Flight 2000
 Freefall
 Galaxy
 Hot Hand
 Iron Maiden
 Lazer Lord
 Lectronamo
 Lightning
 Magic
 Memory Lane
 Meteor
 Nine Ball
 Nugent
 Orbitor 1
 Pinball
 Quicksilver
 Seawitch
 Split Second
 Star Gazer
 Stars
 Stingray
 Trident
 Viper
 Wild Fyre



An Astounding List of Features!

- Modern switching power supplies: High efficiency, less heat, no more big heat sinks, keeps the backbox cooler. Upgrade your game with modern technology!
- Short circuit protection on the high and low voltage power supplies: Forget about blowing and replacing every part in the old high voltage power supply because of one bad display!
- +5vdc @ 5amp low voltage power supply: extra power for popular LED style displays – there is even an extra connector for auxiliary +5vdc power!
- LED status indicators on all voltages.
- Using the latest MOSFET devices for solenoid drivers.
- Lower on resistance MOSFET drivers means more responsive coils – better, faster pinball action!
- All Solenoid MOSFET drivers have dual function LED indicators that indicate proper operation as well as indicating a fault condition such as a shorted coil. Makes game repairs fast and easy – this is a must have diagnostics board!
- Fused flippers for added flipper circuit protection – no more blown board traces from a miswired coil.
- MPU fault protection circuit. Protects solenoid drivers and coils from shorts caused by a faulted MPU locking on a solenoid.
- Heartbeat status LED.
- No obsolete components used.
- Designed by Engineers who are pinball experts.
- The best support, hands down, in the business – email, web, and phone!
- Another great plug and play product from www.allteksystems.com

The Ultimate Solenoid Driver Board — Special Introductory Price: \$149.95

Can be purchased direct from Alltek Systems - www.allteksystems.com

Or send payment to Alltek Systems, 1300 Woody Ridge Ct, Chesapeake, VA 23322
(Int'l orders must pay applicable postage via air)

Also available from our Ultimate MPU Board distributors:
The Pinball Resource (845) 473-7114 or Marco Specialties (803) 957-5500

**Available
in October**