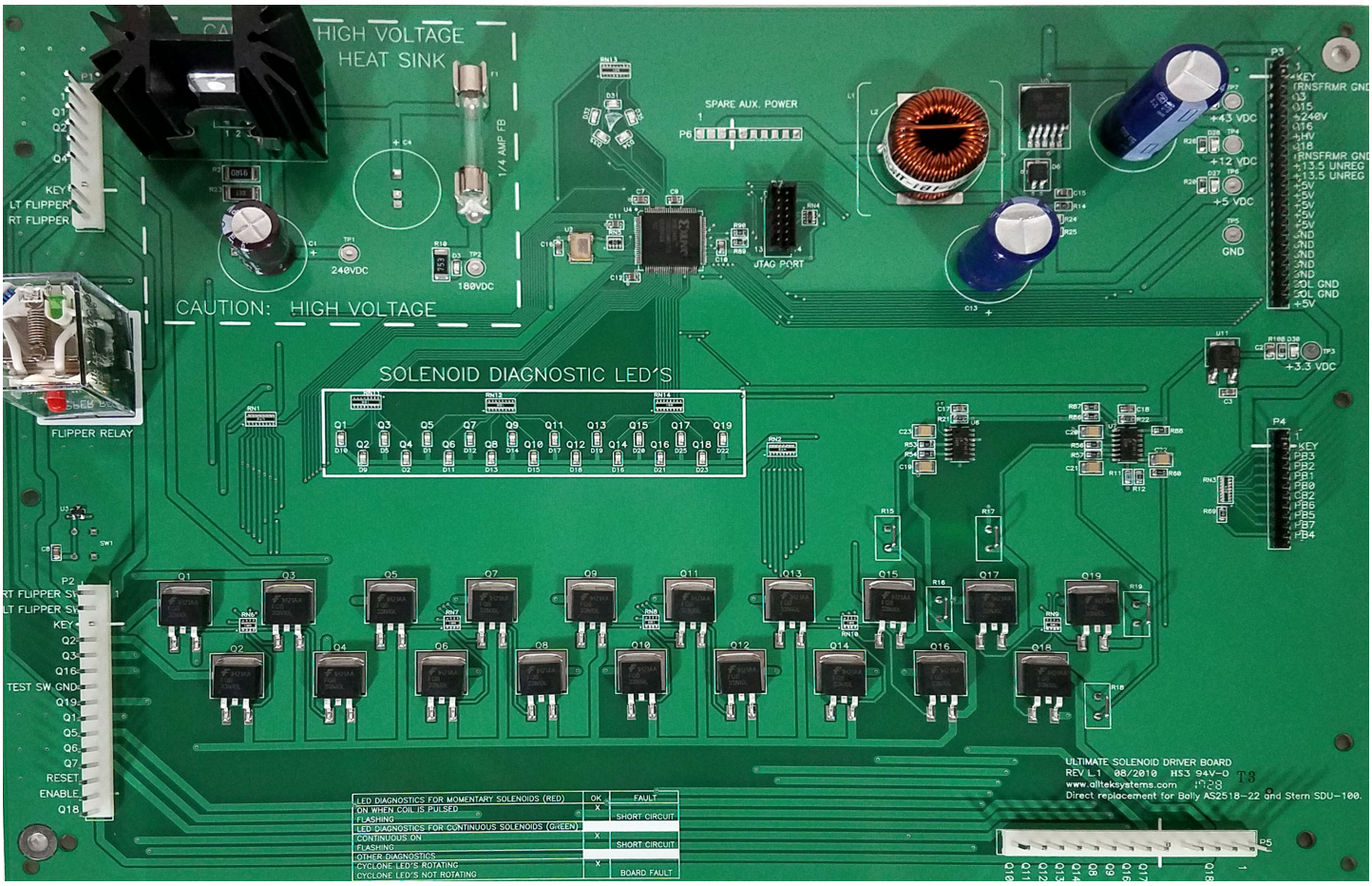

The Ultimate Solenoid Driver Board

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Manual and Users Guide
Version B.4

Thank you for purchasing The Ultimate Solenoid Driver Board (SDB).

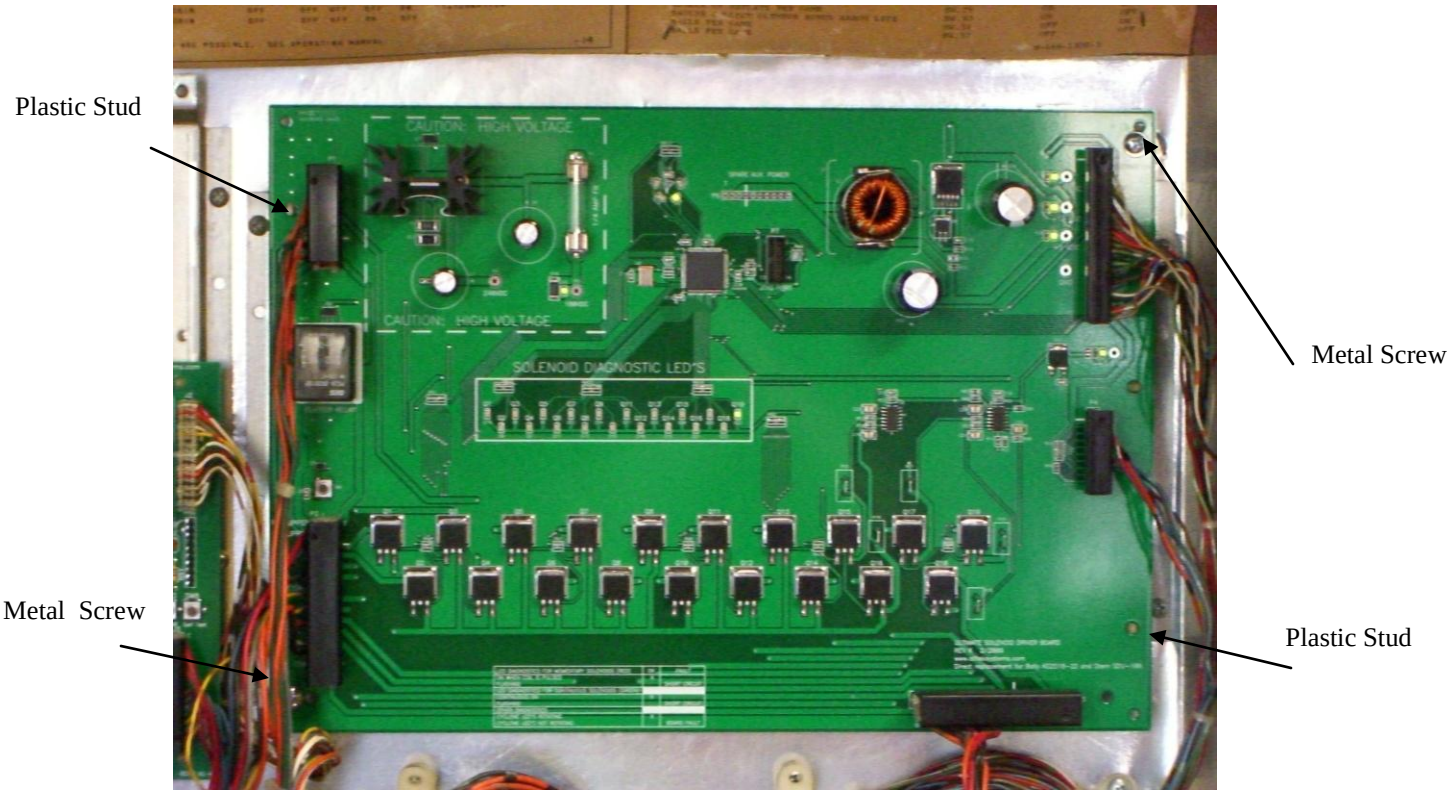
The SDB includes a lifetime warranty. For more info on our warranty procedures or any of our other great products, please refer to our website. Always email us before sending in a board for repair so we can issue you an RMA.

Getting Started

The following instructions should have your pinball machine setup and ready to play quickly. If at any time you are unsure of how to proceed or have a question, STOP. We offer e-mail support at mpusupport@allteksystems.com with an ever improving technical support page on our website at www.allteksystems.com.

Before Initial Setup

It is important to do several things **before you plug in the Ultimate SDB**. First, get a flashlight and inspect the connectors that are located in the top right corner in the head of the game. Visually inspect the connectors for broken wires, burnt housings, and burnt or broken pins. If you see any damage you will need to repair this before continuing. Pins, connectors and required crimpers are available from our distributors.



Now let's talk about safety issues. If you look at the SDB you will notice a section labeled High Voltage in the upper left corner. The games use a high voltage power supply to power the displays. NEVER put your hands in this area when power is applied. Allow time for capacitors to discharge before handling the board. If in doubt please contact customer service.

Connecting Up

Now install the new SDB. At this time use the two mounting screws to secure the SDB to the mounting rails. Plug in the connectors. Make sure you have the connectors plugged in correctly. Do not rely on the connectors having the proper key because over the years they may have been replaced without the key. Connectors should fit in one direction but verify that you didn't miss a pin. If it feels like you have to bend a connector in a direction that it doesn't want to go, STOP. Verify you are plugging the connector in correctly. P7 is for manufacture use only.

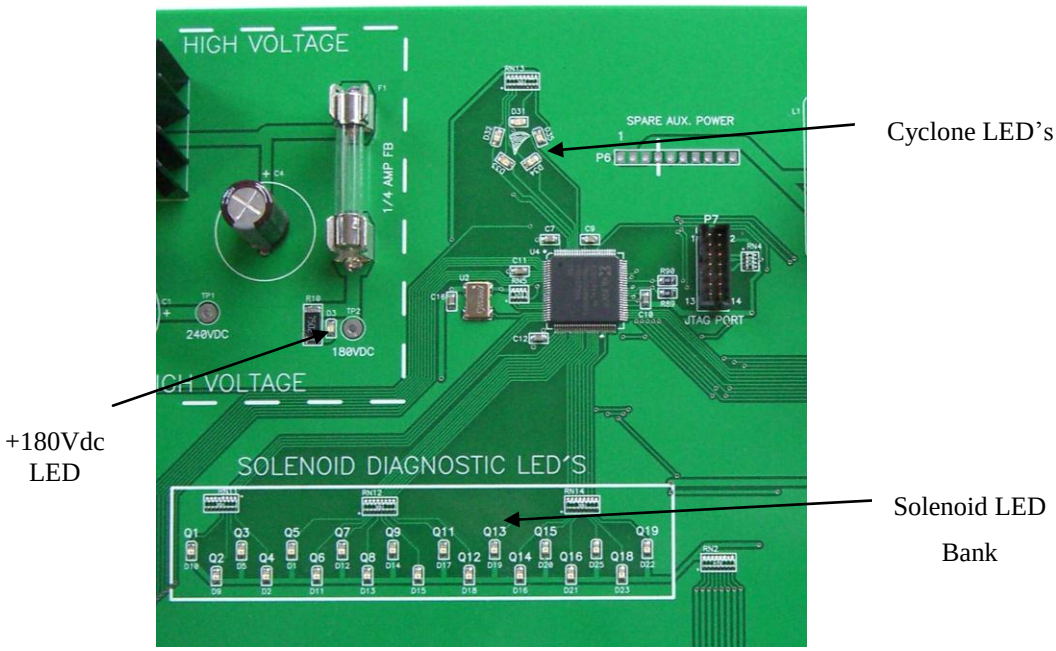
Power Up

Once everything is checked, set, and plugged in, its time for power up. Turn on the machine. Once the machine is on you will notice several things on the SDB. The SDB goes through a self-test by flashing on all of the LED's. Notice the +12v, +43v, +5v, 3.3v, and +180v power LED's are lit. Verify that the MPU cyclone LED's are rotating. At any time, you notice a problem refer to the troubleshooting section of this manual.

Now, let's point out some features. Refer to the silk screened legend on the SDB for an explanation of the LED functions summarized here. The green solenoid diagnostics LED's, representing Q15, Q17-Q19 are considered continuous coils. These are coils that can remain on all the time, 100% duty cycle. An example of this is the coin lockout coil. So when a continuous coil is on, the green LED will remain on.

The solenoid diagnostics LED's that are red represent the momentary coils Q1-Q14 and Q16. These coils only work for a split second like pop bumpers and sling shots. When one coil is activated you will notice the associated LED will flash for a split second. These coils should never be on for more than a fraction of a second or else they will burn out.

If any of the Solenoid Diagnostics LED's is flashing, it means the corresponding coil is bad on the playfield and needs to be replaced.



Troubleshooting Section

I turn on the game and nothing happens. None of the LED's on the SDB come on.
This is most likely a power related problem. Verify all connectors are connected properly. Inspect the games power rectifier board and verify its putting out the correct voltages.

I turn on the game and nothing happens. I do have game GI lights but no displays, no feature lamps.
Verify you have 12VDC and 5VDC on the SDB. If not check the rectifier board and verify it is supplying the SDB with ~12-15VDC. There are status LED's for the +5VDC and +12VDC on the SDB. This problem is usually related to burnt/corroded connector pins or a corroded/faulty MPU. If the 12VDC and 5VDC is good, verify the MPU is booting.

I turn on the game, the feature lamps are flashing in attract mode but one or more displays are not working.
Check the SDB and verify the +180VDC LED is lit, if lit you have one or more bad displays. If the LED is not lit, power off the game and give the HV time to discharge. Check the fuse on the rectifier board for 240VDC. If it's blown replace and power back up. If it blows immediately check the diodes on the rectifier board for shorts. If the fuse on the rectifier board is good check fuse F1 under the plastic cover on the SDB. If it is blown, you have a shorted display. Disconnect all displays, replace fuse. Power on and verify the 180VDC LED is now lit. If so power off, now connect one display at a time and power on. When you get to the bad display the fuse will blow again.

I turn on the game and one or more solenoids immediately fire.
This should never happen with the built in short circuit protection, but if it does, immediately turn off the machine to prevent the coil from burning up. Contact us for repair/replacement.

The Cyclone LED's are not rotating.
If you have 5VDC and the cyclone LED's is not rotating, the board could be defective. Contact us to see how to proceed.

All of the solenoids are not working.
Most games do not use all the solenoid circuits, Use the games self test to verify the coils work for your particular game, and the solenoid number matches the actual solenoid being energized. If the solenoid number does not match, check the J4 connector on the MPU and the P4 connector on the SDB. A faulty MPU board can also cause this fault.

The solenoid number in self test does not match the coil according to my game manual.
First check the MPU-J4 connector and the SDB-P4 connector for corrosion and/or broken pins and wires. If the wiring looks good, try another MPU. In rare cases a defective sound board can cause this also by loading the data lines. If the problem goes away when the sound board is disconnected, it is most likely at fault.

Only the free game and flipper solenoids are working.
Check the fuse under the playfield. Most likely it is blown. Only replace with a 1amp slow blow. Also take this time to inspect all of your coils to see if anything needs to be replaced.

One or more solenoids are not working but some do.
First verify there is a coil installed and its wiring is good. Measure the voltage on coil to ground, it should be ~45VDC. If not, check the under playfield fuse and replace if necessary, do not over fuse. If there is still no +45VDC on the coil check game wiring, there is most likely a wire that has come loose from an upstream solenoid which feeds the power. The +45VDC normally is daisy chained from coil to coil, so if an upstream coils power wire comes loose, all downstream coils now will not work. Verify the proper LED is flashing for the coil; you may need the game manual for this.

Two or more solenoids fire at the same time.
This problem is normally found in games with an expander relay. Most likely someone has replaced a coil and not put the required extra diode on the coil that isolates the two buses. Refer to your game schematic and verify all solenoids that are on the expander have the extra diode and are wired correctly.

One or several of the solenoid LED's are continuously flashing.
The SDB has detected a short circuit condition on the corresponding solenoid circuit. Check the associated solenoid to see if it's burnt or shorted. Check the game wiring.