Protective Circuit Board (PCB) Manual

PCB V4.X

The information presented in this manual is applicable only to the PCB listed above, if your PCB is not listed above; please contact me for the correct manual.

Sales@ProjectWolfDragon.com

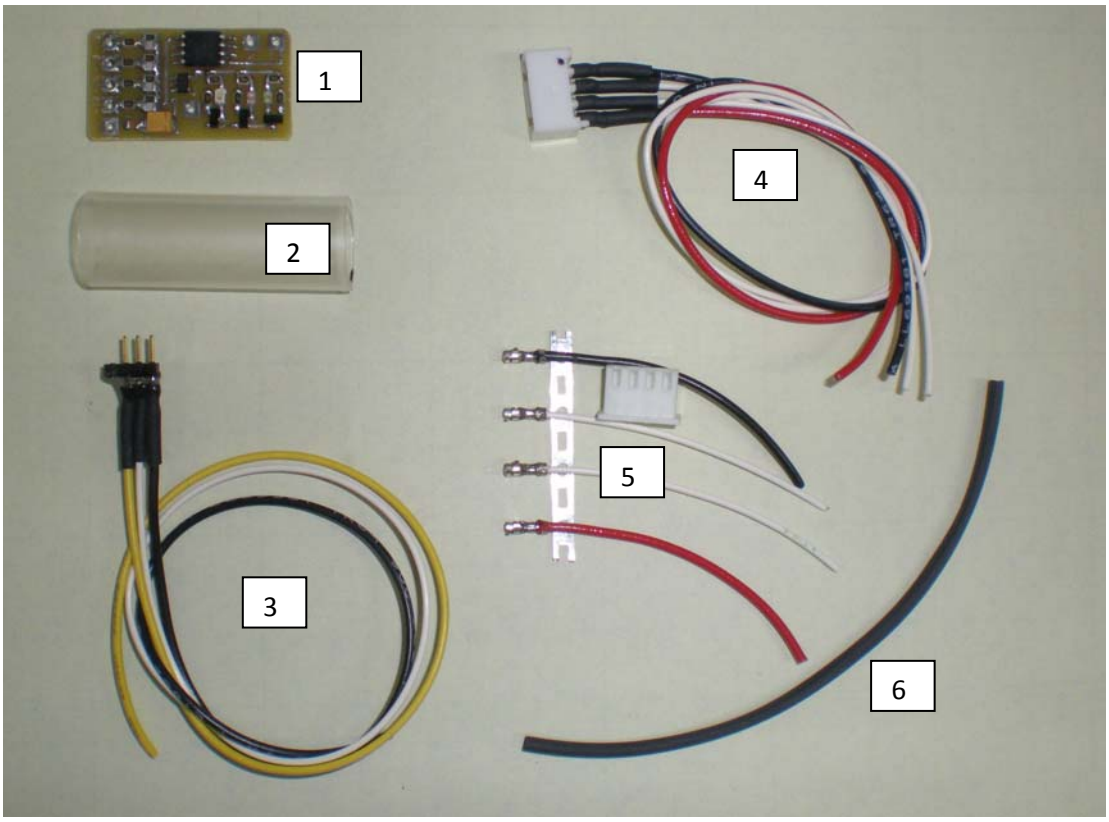
This PCB is designed to prevent damage to battery packs due to discharge beyond safe voltage levels by stopping an airsoft gun (AEG) from firing, thus preventing the main power draining activity from occurring.

This PCB does NOT protect the pack from OVERCURRENT draw, ALWAYS USE A PROPERLY RATED FUSE TO AVOID THE RISK OF PACK DAMAGE AND/OR FIRE.

This PCB is designed to be used primarily with the SW-COMPUTER by Gandolf at www.Extreme-Fire.com. Typical applications also include the Trigger Master MOSFET Trigger as well as all other Computerized MOSFET Triggers derived from Gandolf's designs. Since all of these MOSFET Triggers are functionally identical, the term SW-COMPUTER refers to all of these products.

Special Note: This product assumes the buyer is able to disassemble and reassemble the AEG and possibly the mechbox fairly easily. Rewiring, soldering, and heat shrinking are necessary skills for installation of this product.

PCB V4.X Item List



Items shown:

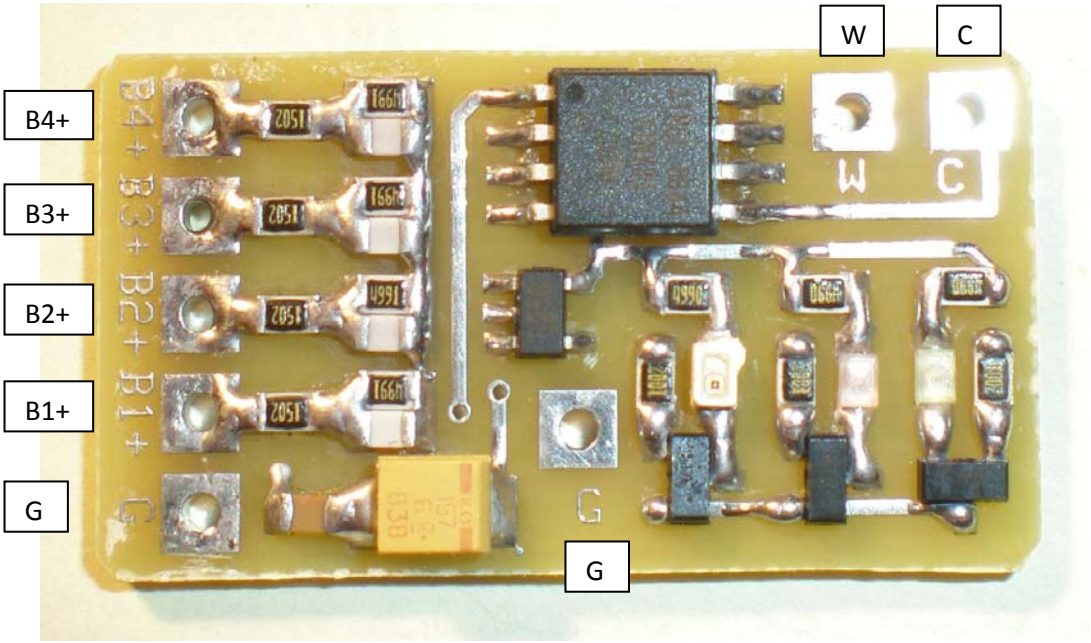
1. PCB V4.X
2. Clear heat shrink tubing for PCB (after all wires are connected)
3. SW-LINK Cable (If you ordered your PCB with the Trigger Mod, this is replaced with a single green wire)
4. JST XH Male Connector with leads attached (PCB Side of Battery Pack Connection)
5. JST XH Female Sockets with leads attached and click-in housing (Battery Pack Connection “Balance Tap”)
6. Black heat shrink tubing for miscellaneous wire connections

The JST XH Connector included matches that which you selected on the order form.

Items not shown but included:

Labels, Water Soluble Flux Solder

PCB V4.X Wiring and Installation Notes



Connect the PCB V4.X as follows; voltages given are nominal for each cell, your may differ slightly.

Normal Installation

B4+	14.8V (Cell 4)	W	SW-LINK Yellow Wire – AUXPORT 1
B3+	11.1V (Cell 3)	C	SW-LINK White Wire – AUXPORT 0
B2+	7.4V (Cell 2)	G	SW-LINK Black Wire – AUXPORT GND
B1+	3.7V (Cell 1)		
G	0V (Same as Black wire for Pack Main Plug)		

Notes:

Two cell packs will have B3+ and B4+ not connected to anything.
Three cell packs will have B4+ not connected to anything.
Four cell packs will have all “Bx+” pads connected to the pack.

Trigger Mod Installation

B4+	14.8V (Cell 4)	W	To one side of AEG Trigger Contacts
B3+	11.1V (Cell 3)	C	Not Connected
B2+	7.4V (Cell 2)	G	Not Connected
B1+	3.7V (Cell 1)		
G	0V (Same as Black wire for Pack Main Plug)		

Notes:

Two cell packs will have B3+ and B4+ not connected to anything.
Three cell packs will have B4+ not connected to anything.
Four cell packs will have all “Bx+” pads connected to the pack.

Your MOSFET Trigger Wire connects to the other side of the AEG Trigger Contacts, PCB supplies power instead of the battery pack.

Installing and Using your PCB

1. PCB V4.X + TRIGGER MOD CANNOT be used with SW-COMPUTER MOSFET Triggers via SW-LINK connections to the AUX PORT of the SW-COMPUTER. The SW-COMPUTER will be confused and the PCB will NOT stop the SW-COMPUTER from firing your AEG. Conversely, a non-TRIGGER MOD PCB, cannot be used in a TRIGGER MOD application.
2. A PCB Lite cannot be used SW-COMPUTER MOSFET Triggers nor can they be converted to use the TRIGGER MOD.

Connect your PCB to your Battery Pack and AEG using the figures and text from the previous two pages as your guide. If you are not electronically inclined, do yourself a favor and mock up the whole thing and use a meter to check out the connections from one end to the other BEFORE you solder and especially before you connect the battery to the PCB and your AEG. The PCB is rather tolerant of being hooked up incorrectly (should not smoke) but it not work correctly unless properly connected. If you still need help, email me and send pictures as well as describe your problem (sales@projectwolfdragon.com).

After you have made all of your connections, run a test of the startup sequence. This initial startup test should only be performed with a fully charged battery and the PCB connected only to the battery, not to the SW-COMPUTER or AEG. As soon as you plug the PCB up to the battery, you should see the following LED sequence:

1. Red/Green LED Blink Alternately
2. Red LED On While Yellow LED Blinks the Number of Cells in your Pack
3. Only Green LED ON

If you got that startup sequence, your PCB is functioning properly. If not, email me and I can help you (sales@projectwolfdragon.com).

After all wires are soldered to their proper places on the PCB (and of course trimmed to your desired lengths), use the clear heat shrink to protect the PCB from shorts and make everything look nice. (Optimal temperature for shrinkage is ~250°F (~120°C), I use a hot hairdryer).

Startup Procedure:

1. Connect the PCB to the battery pack (Do NOT plug in AEG or pull the Trigger at this time).
2. The PCB will boot up and go through its startup sequence (given above).
3. Upon successful completion of the startup sequence, you can connect the battery pack to the AEG (and wait for the SW-COMPUTER to finish its startup, listen for LONG* buzz).
4. Your AEG is now ready to fire.

*NOTE:
The typical “ready to fire” vibration length of the SW-COMPUTER is significantly longer when the PCB is properly started and installed. Familiarize yourself with the normal “short” vibration length by powering up the SW-COMPUTER with the SW-LINK Cable disconnected from the AUX Port of the SW-COMPUTER prior to using your AEG with the PCB.

Always unplug the AEG before powering down the PCB. Do not leave the PCB connected to the pack when not in use, it draws a very small current and can drain the battery if you leave it on for an extended period of time.

LED Codes For PCB V4.X:

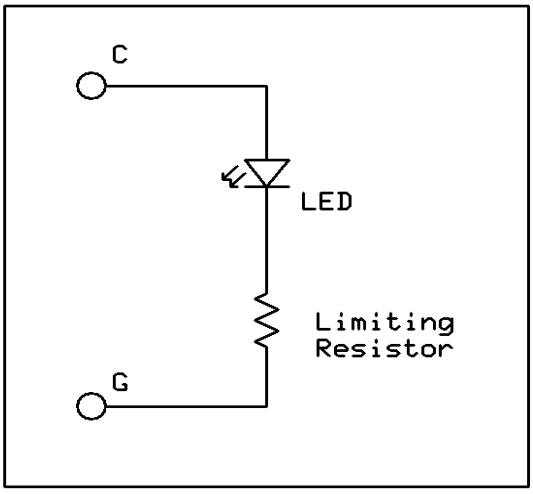
Green ON, Yellow OFF, Red OFF – Normal State, Battery OK, GO Fire
Green ON, Yellow ON, Red OFF – A cell has gone below 3.2 V, Caution Indication (Weak), GO Fire
Green OFF, Yellow ON, Red ON – A cell has gone below 3.0V, Warning Indication (Dead), NO-GO Fire

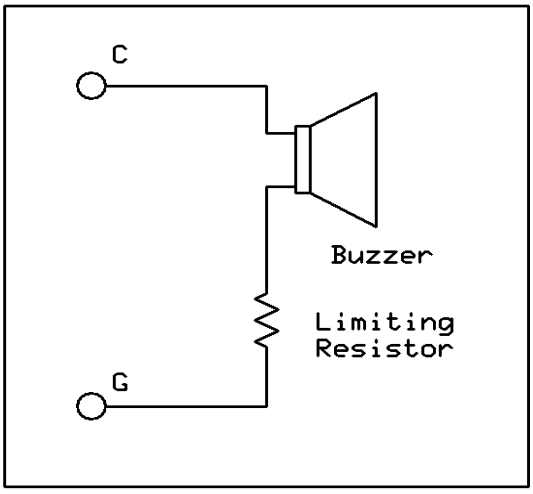
Special Note on Internal Operations:

The CPU on the PCB uses a rolling average method of determining cell voltage, meaning that the cell has to present low voltages for a dynamically determined period of time before the error condition is indicated; this will help keep you firing when you need it and only stop you when there is a real problem. If you notice that after an extended burst of Full Auto fire, you get a dead battery indication and it goes away after a short time, something is wrong in your AEG. Typically this means that your cells are nearing the end of their lifetimes, and/or your cells cannot safely keep up with the demands of your AEG. Contact me and I can help you come up with a solution (sales@projectwolfdragon.com).

TRIGGER MOD LOW BATTERY ALARM:

These two schematics outline how to add a low battery Caution to the Trigger Mod version of the PCB. The limit for power consumption from pad C is 30mA. This is plenty of power for running a LED or buzzer (I stock these for use with the PCB Lites). Switches can be added to turn off the LED or buzzer after you have been alerted to the low battery state and not blow your cover. Be sure to match the limiting resistor to your LED or buzzer. Voltage at C is either 0 or 5 volts, battery good and low battery respectively. If you do not know how to choose these components, email me at sales@projectwolfdragon.com and I can help you.





Troubleshooting and FAQ's

To date the only issue that has occurred with all of the PCB's is related to the AUX Port of the SW-COMPUTER being dirty. The problem is that the SW-COMPUTER will throw pack weak and pack dead errors when the PCB is showing only a GREEN LED (Pack Good). Mechanically scrubbing the connector by plugging and unplugging the SW-LINK Cable several times seems to resolve this issue.

Contact me (sales@projectwolfdragon.com) if you are having ANY questions/problems about/with your PCB.

90 Day Limited Warranty

ProjectWolfDragon.com warranties its items to be free from manufacturing defects in workmanship and materials for a period of 90 days from the shipping date. This warranty does not cover damage caused by improper installation, abuse, modification, or physical damage. This product requires that the buyer is able to disassemble and reassemble the AEG and/or mechbox fairly easily. Rewiring and soldering are necessary skills for installation of this product. Note that disassembly of Airsoft guns and/or the addition/subtraction of stock/aftermarket components generally voids the AEG manufacturer's warranties.

New, unused items in their original condition and packaging may be returned within 45 days of shipment and a refund will be issued by paypal or other method as necessary. All returns are subject to a $5 restocking fee. Used items will be evaluated on a case-by-case basis.

Under no circumstances, shall ProjectWolfDragon and/or its employees be liable for any incidental, special, or consequential damages that result from the use of these items. Basically, by buying this product you agree that you can't hold me liable or responsible for damages and/or injuries you do to yourself and/or others. Use your head; it's the only thing that makes you unique. Refer all questions/comments to: sales@ProjectWolfDragon.com

Request for Information

I have done the best I can to offer you a high quality product for your AEG. I use my boards in ALL of my AEGs and am arguably their most demanding critic. I request your help to continue to supply a high quality product. If you have any ideas for improving the PCBs, features you would like to see, and/or general comments about my work, please let me know (sales@projectwolfdragon.com).

I also ask for one bit of information in particular, I would like to know what AEG and MOSFET Trigger you are using my PCBs with as well as how much wire you actually needed to install the PCB. Additionally your estimate of lengths necessary for a generic install would be greatly appreciated. Currently I am supplying ~8 inches (~20 cm) of wire for both the SW-LINK and Battery Pack Connectors and ~12 inches (30 cm) of wire for the Trigger Mod Wire and Alarms for the PCB Lites. I hope that this more than enough for your application, personally I find it highly annoying when I order something and the included wiring harnesses are too short.

Thank you for your purchase,

Kevin Stewart (WolfDragon)