HyperBlade Saber Blade System
LED Driver Unit – Version 2
Hyperdyne Labs, © 2006
http://www.hyperdynelabs.com

Congratulations on your purchase of a HyperBlade saber blade kit! This kit is the ultimate saber upgrade for saber collectors, enthusiasts, role players, and costumers.

Your saber kit was manufactured using the highest-grade components available, please handle it with care as not to damage any of the components from static electricity. If you are not familiar with static electricity handling procedures, please refer to ESD procedures. Basic information on ESD can be found here:
http://en.wikipedia.org/wiki/Electrostatic_discharge

NOTICE: There is no warranty on kits. It is your responsibility to install the board. Opened kits cannot be returned. Be careful if you use a battery source that is capable of delivering a lot of current. Contact a professional if you need assistance. Hyperdyne Labs assumes no responsibility for the misuse of this kit.

**HyperBlade LED Blade Driver Unit – Version 2**

Our proprietary saber blade driver is plug-and-play compatible with all our blade colors. The driver unit also incorporates several "never-before" seen features that is unique to our HyperBlade system – including our ClashEffect™ , CorePulse™, and MovieFlicker™ lighting effects.

The version 2 blade driver board has the following improvements

1) It can handle higher current loads for brighter blades.
2) It works with a 7V up to an 11V battery source for increased blade brightness
3) Selectable brightness control via the user pushbutton (up to 12 levels)
4) Improved ClashEffect™ feature with a dual-brightness clash.
5) New MovieFlicker™ blade shimmering effect .
6) Three settings for changing the blade ignition speed.
7) Onboard LED responds to button presses with heartbeat blinking every 5 sec.

On the version 2 driver unit, the Bluetooth power relay and power header selector have both been removed. Now power is automatically routed to the bluetooth board or the in-hilt sound module on powerup.

Here is a pic of the version 2 HyperBlade driver board:
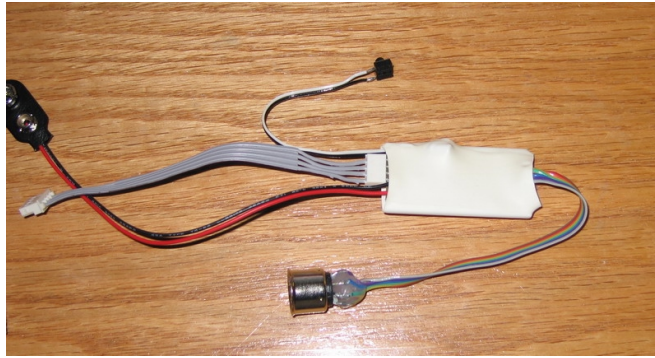
Blade connection

To connect your blade assembly to the driver unit, simply hook together the 2 DIN connectors. The DIN connectors are keyed and can only be plugged in one way. Be careful not to force the connection, rotate one of the plugs until it engages the other connector, then push gently to make a firm connection. Here is a pic of the connection:

That is it!

Battery connection

All of our blades are made to work off 7.2-11.1V DC only. We suggest the use of a 7.2V or an 11.1V lithium-ion battery pack for maximum performance. You can also use 5-8 AA or AAA batteries with the system.
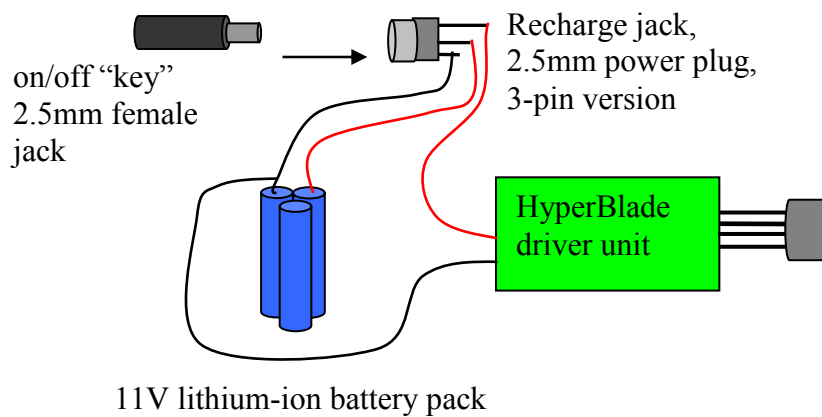
WARNING: Any battery voltage over 12V risks damage to both the driver unit and blade assembly. The 9V snap connector on the driver board is for convenience to connect up different battery holders that commonly have 9V snap connectors. Note that a normal 9V battery will not last long if you use one as a battery source. You will get more battery life using a lithium 9V or a battery pack.

The battery hooks directly up to the driver board. There is no need for an on/off switch as the driver unit is smart enough to go into a power conserve mode on its own.
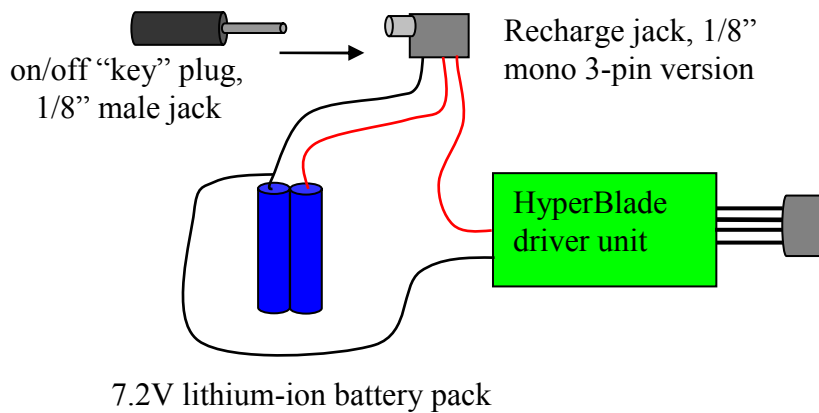
If you are using our battery system, the recharge jack also will act as an on/off "key" switch. That is, if you insert our key plug into the jack, it will physically disconnect the battery from the circuit, therefore turning off power to the saber and saving power. This is a good option for long-term storage of your saber.

You can use our 7.2V or 11.1V battery pack with the version 2 LED driver board. Here are the diagrams of each pack wiring.

**11.1V Battery Diagram w/ Recharge Jack and On/Off Key**

on/off "key"
2.5mm female
jack

Recharge jack,
2.5mm power plug,
3-pin version

HyperBlade
driver unit

11V lithium-ion battery pack

7.2V Battery Diagram w/ Recharge Jack and On/Off Key

on/off "key" plug,
1/8" male jack

Recharge jack, 1/8"
mono 3-pin version

HyperBlade
driver unit

7.2V lithium-ion battery pack

If you are connecting your own battery to the 9V snap connector on the HyperBlade driver board, you need to take another 9V snap connector and wire it to your battery pack. ***NOTE: The polarity of the 2nd 9V snap connector will reverse when you do this.***

The below pic shows the wiring you will need to perform.

9V Snap Attach

+

Connect wires

-

Extra 9V snap

9v snap on LED driver board

Your own 7-11V battery pack

NOTE the polarity change!!!
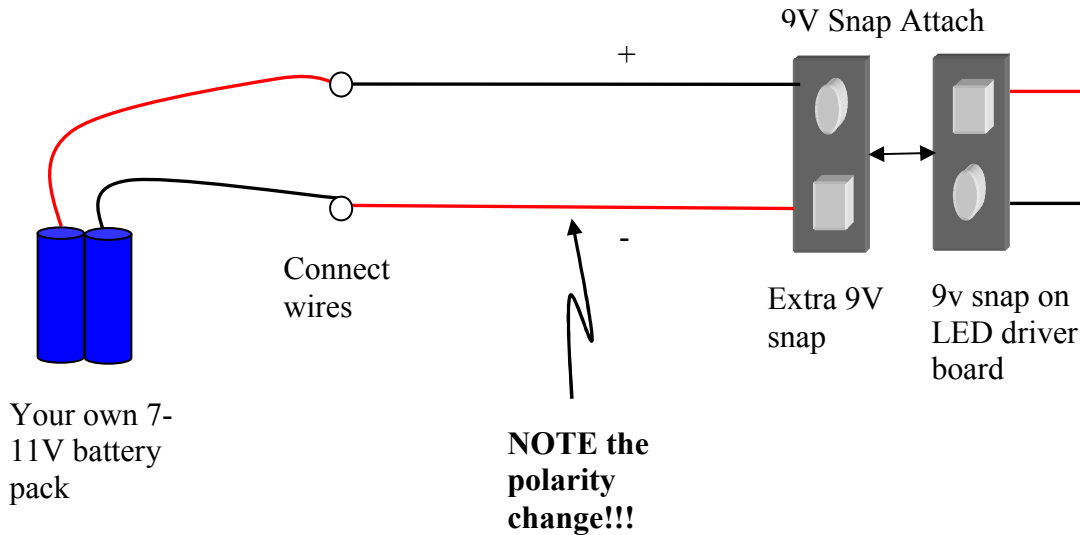
Driver Unit Pushbutton Features

The HyperBlade LED driver board controls all the features of your blade. These features are accessed by the momentary pushbutton connected to the board. The driver board functions are directly accessible by holding the pushbutton down for the desired amount of time then releasing it. Any of the functions can be controlled when the blade is powered on or off. Here is a table of the included driver features:

Button activity	Event
Press less than ½ sec	Activate/retract saber blade
Press for 1 sec and release	Change blade lighting mode
Press for 2 sec and release	Increase brightness of blade by one level
Press for 4 sec and release	Toggle battery mode
Press for 8 sec and release	Change the blade ignition speed

- Any button push that lasts between ½ sec and 1 sec will cycle through the different blade lighting modes (see below for modes).
- Any press greater than 2 sec but less than 4 sec will increase brightness to the blade. After the max brightness setting is reached the next button press will cycle back to the minimum brightness level (see below for details).
- Any press greater than 4 sec but less than 8 sec will toggle the battery mode.
- Any press greater than 8 sec will change the blade ignition speed.
- Short button presses activate and deactivate the saber blade.

Selecting blade lighting mode:

As mentioned above, there are 6 lighting modes to choose from. Each 1 sec button press cycles to the next mode. Here is a summary of the special blade lighting modes:

1) Constant on (default)
2) MovieFlicker™ mode*
3) CorePulse™ slow pulse rate**
4) CorePulse™ medium pulse rate
5) CorePulse™ fast pulse rate
6) CorePulse™ rapid pulse rate

*The MovieFlicker™ mode emulates an onscreen blade flickering effect that is commonly seen in the OT movies when saber rotoscoping was done by hand.

NOTE: The MovieFlicker™ blade shimmer effect is also a function of the current blade brightness setting. The brighter the blade setting results in a more subtle shimmering effect. The lower the blade brightness results in a more noticeable shimmering effect.

**The CorePulse™ modes emulate an onscreen blade pulsing aura that gives the effect of a glowing blade core.

The current lighting mode is automatically remembered by the driver unit. So once a mode is selected it will remain in that state until you change it! The default mode is 1) and the default brightness is the lowest setting.

Selecting battery mode/blade brightness:

Pressing the button for 2 sec will increase the brightness to the blade by one level. There are a limited number of brightness levels (*nine levels in 11V battery mode and twelve levels in 7V battery mode*). After the max brightness level is reached in either battery mode, the next brightness setting will cycle back to the minimum brightness setting. You can increase brightness once again up to the max on successive button presses.

Pressing the button greater than 4 seconds and releasing it will toggle the battery mode. The available battery modes are 7V and 11V. The default mode is 11V. *The battery mode is very important with regards to the max blade brightness the driver will allow you to select.*

Battery mode verification: To make it easier to know which battery mode is currently selected, the blade will notify you when you change this mode.

When the 11V battery mode is selected, the blade will blink 2x after you release the button to let you know it is now in 11V mode. When you have selected the 7V battery mode, the blade will blink once after you release the button to let you know the 7V mode is now active.

In the 11V battery mode, you will only be able to increase the blade brightness up to nine times – which is short of the maximum battery potential. In the 7V battery mode, you will be able to increase the blade brightness up to the full battery potential (up to twelve button presses). After the max brightness level is reached, the next brightness setting with cycle back to the minimum brightness.

This battery mode feature is included since for a larger battery, you should not set the blade brightness to the max battery potential. Doing so will result in a very high current draw from the Li-ion battery - which can damage the battery pack. The driver board can handle increased current draw (up to 4A), so using a different battery source is a way to circumvent this issue.

NOTE: If you are using a 7V battery pack (including our 7.2V Li-ion pack), you should set the battery mode to the 7V mode. This will allow you to increase the blade brightness to max battery potential – which will give your blade board the same brightness as you would normally achieve with our version 1 LED driver board.

WARNING: Using an 11V battery pack and setting the driver battery mode to 7V will allow you to increase blade brightness to the max battery potential of the 11V battery! Do this at your own risk, as the increased current draw can cause damage to the battery or the blade boards over time. Increasing the brightness over the recommended values can decrease the lifetime of the blade LEDs and the Li-ion battery pack. If you choose to use an 11V battery with the 7V battery mode, any warranty will be voided.

Battery life: Also note, increasing the blade brightness DECREASES the battery life of the Li-ion pack. With a 7V battery and the 7V battery mode, battery life between charges is anywhere from 45-60 minutes. Increasing the blade brightness decreases this time, since a brighter blade requires more current draw from the battery pack. At max brightness, the battery life between charges can be as little as 10 minutes. But we feel that such a dramatic increase of blade brightness for this small time is well worth it, should the user choose to use this feature. At the greater brightness settings, it is better to use the blade sparingly, turning it on only for minutes at a time. This will maximize the battery life.

Selecting blade ignition speed:

Pressing the button for 8 sec will change the speed at which the blade ignites. There are 3 speeds that are selectable (slow, medium, fast). The default speed is medium. Successive button presses cycle through all 3 modes. For example, the very first button press will change the ignition speed to fast. The next press chooses slow ignition speed. The next press cycles back to medium speed, and so on. As with the other parameters, the ignition speed is remembered when power is removed from the blade.

Special overload protection battery mode:

The driver unit also features an internal mechanism to limit the blade brightness over time when using a larger battery. If you have the 11V battery mode selected, then the driver continuously monitors the current brightness of the blade.

If the current blade brightness setting surpasses a predetermined amount (three levels below the allowed max), the driver will only allow you use this brightness for 2 minutes continuous when the blade is on. That is, if the blade is on for more than 2 minutes at this high brightness, the driver will then drop the brightness down to help protect the battery and blade boards.

When you power off the blade and wait for more than 20 secs (the cooldown period), the blade brightness will be reset to the stored high brightness level – and you will get another 2 minutes of high brightness. If you do not wait the full cooldown period, the blade brightness on the next powerup will still be at the reduced brightness level. The only way to auto reset the brightness level is to wait the cooldown period before igniting the blade again, or inserting and removing the power key jack to reset the system. This mechanism is automatically triggered to help protect the blade boards against heat soak and damage using larger batteries with very high brightness settings (and high current draw).

If you use your blade in a manner than only ignites the blade for a max of 2 minutes at a time, then you should never even see this mechanism in action. However, if you typically have your blade on for more than 2 minutes at a time, expect to see the mechanism trigger after 2 minutes of blade ignition.

NOTE: This feature is not enabled in the 7V battery mode.

Improved v2 ClashEffect™ feature

The ver 2 driver board also features an improved ClashEffect feature. Now when a clash event is detected, the blade boards will now flicker at a low and high intensity. This results in a more faithful representation of 2 saber blades contacting one another. In either the 7V or 11V battery mode, the ClashEffect feature will flicker the blade at max battery potential for a short time to emulate the proper clash effect.

NOTE: If your blade brightness is set anywhere below the maximum setting, the ClashEffect will give you a dual-intensity flash effect. Otherwise if the blade brightness is set to the max level, the ClashEffect will be the same effect seen in our version 1 blade driver unit – which is a single intensity shimmer effect.

External power for optional sound modules

If you are using a Hyperdyne sound board in conjunction with the driver unit, then the entire system is plug and play. Just plug the gray cable from the driver board into the female header on one of our compatible sound modules.

Special Technical Notes:

- The driver board automatically routes power to the sound board whenever the driver unit also has power. This allows both modules to come up at the same time and stay on. When the saber is in the "off" state, both the driver board and in-the-hilt standalone sound board go into a special sleep mode to conserve battery life. So you don't need an extra on/off switch – but you can still use the "key" plug described earlier to physically remove power from the circuit.

- For the wireless Bluetooth sound board, the driver board also powers the bluetooth radio and sound module. The bluetooth radio does not have any sleep mode available, so removing power with the "key" plug is the preferred method to conserve battery life.

Electronic Specifications

Blade connector type: 8-pin female DIN
Battery type: 7.2V DC nominal, 12V DC max
Blade current consumption: 700mA @ 7.2V, 2.8A @ 12V (blade color dependent)
Driver unit dimensions: 1.7" L x 1" W
Button type: Normally-open (NO) momentary pushbutton

ADVANCED OPERATION / EXTERNAL CONTROL PINS
(do not read if using a HyperBlade plug-and-play sound module)
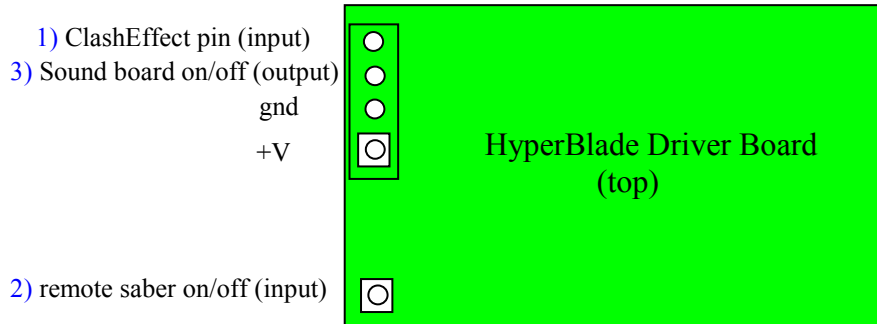

LED Driver Unit External Controls

The saber driver board also has some external TTL (+5V) inputs and outputs that interface with our family of saber sound modules. These include:

1) TTL input: ClashEffect pin to tell the driver board to flicker the blade in the event of a clash. (can be connected to a momentary pushbutton).

2) TTL input: For the wireless sound module, there is also an input that remotely turns the saber on and off without using the pushbutton. This feature is useful for remote control of the saber. (can be connected to a momentary pushbutton).
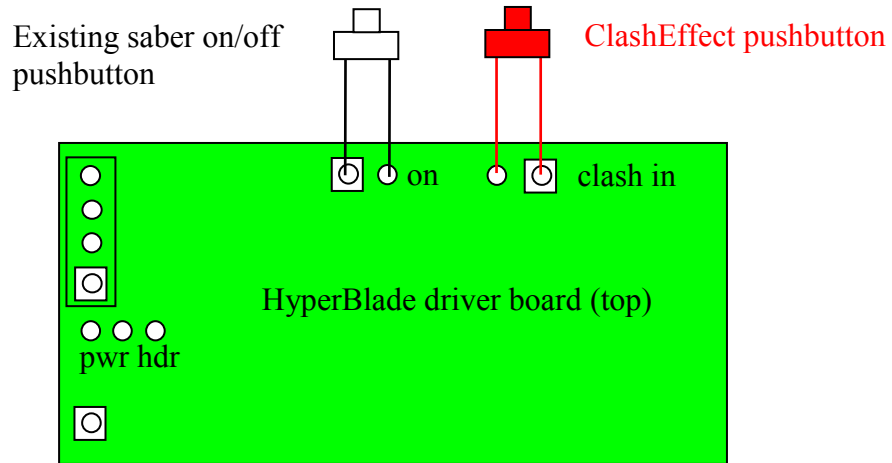3) TTL output: activate/deactivate the sound board playback.

If you are *not* interfacing with one of our sound boards, these additional inputs are accessible off the driver board's header or the 4-pin sound board cable. Otherwise if you are using one of our sound boards, the cabling between the HyperBlade driver board and a Hyperdyne saber sound board is plug and play.

HyperBlade Driver Board External Control Lines

1) ClashEffect pin (input)
3) Sound board on/off (output)
gnd
+V

HyperBlade Driver Board
(top)

2) remote saber on/off (input)

HINT: If you are not using our sound module and still want the ClashEffect feature to operate, you can hook the clash input control line to a manual pushbutton. This will allow you to activate the clash blade effect at will. You can also emulate long blade "lockup" effects by keeping this button pressed down for some time.

Here is the wiring diagram to accomplish this (red shows added wires/parts):

Existing saber on/off pushbutton

ClashEffect pushbutton

on

clash in

HyperBlade driver board (top)

pwr hdr