

the receiver regulator going below 4.75 volts is the input voltage to the receiver regulator has dropped below 5.35 volts. This means the input voltage on the Deans connectors is probably below 5.8 volts for some reason.

#### **Optional Failsafe-switch**

The PowerExpander Competition 12 supports the addition of a failsafe switch (optional package). The PowerExpander Competition 12 supports 5-cell NiCd/NiMH or 2-cell A123 battery packs. When using the failsafe-switch, the switch lead is plugged into the input marked “Sw” near the top left of the servo connections as shown on the reference drawing.

Smart-Fly can supply two types of failsafe switches. First is the standard slide switch that most people are familiar with. This is a small slide switch with out a charge jack. The second failsafe-switch is the Pin & Flag switch, where a pin, with a flag on it, is inserted into the switch to turn the system off. To fly, the pin is pulled out of the switch. The advantage of the Pin & Flag switch is that the system cannot accidentally be turned off, as can be the case with a slide switch. The failsafe switch lead can be extended using a standard Futaba extension.

The PowerExpander Competition 12 also supports charging the batteries through the two charge connections denoted by the “Chg” next to the battery input ports, one on the top of each servo output rail as shown on the reference drawing. The optional failsafe-switch package includes two charge leads and two Ernst charge jack mounts. The charge leads have a Futaba male on one end and a JR male on the other end. You may use these by plugging either end into the PowerExpander Competition 12 and the other end into the charge jack holder.

The charge jacks on the PowerExpander Competition 12 can also be used to connect to a battery meter. One thing to keep in mind when using a battery meter and the failsafe-switch is that the jacks are not switched off when the unit is off so the battery meter will continue to draw power even when the unit is turned off.

#### **Ignition Cutoff**

A separate manual is supplied to instruct you on the use of the Ignition Cutoff. The Cutoff channel is determined by using the six-inch jumper supplied. The Futaba male end should be plugged into the port marked “IC”. The other side of the jumper can be inserted in any servo output channel or it can be connected directly to the receiver, for example, on channel nine of a nine-channel receiver.

Additional information and technical help can be found at [www.Smart-Fly.com](http://www.Smart-Fly.com)

Quest Engineering & Development, Inc.  
6125 South Ash Avenue, Suite B-8  
Tempe, AZ 85283  
Ph: (480) 460-2652 Fax: (480) 460-2653

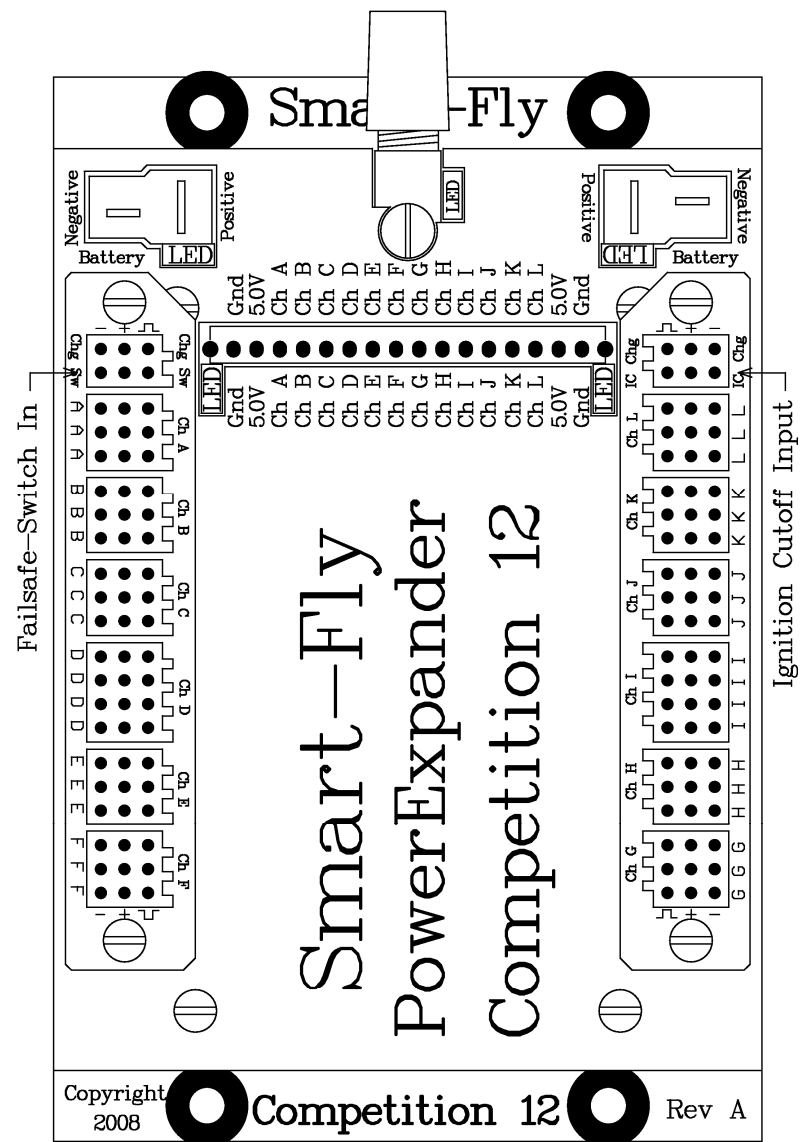


# ***PowerExpander Competition 12 User Guide***

***Thank you for purchasing the Smart-Fly  
PowerExpander Competition 12!***

This manual takes you through the installation and operation of the Smart-Fly PowerExpander Competition 12. Features of the PowerExpander Competition 12 are:

- **For use on any size plane**
- **Light weight, 1.9oz, 54g**
- **Compact design, footprint is 3.0” x 4.5”**
- **Uses 5-cell NiCd/NiMH or 2-cell A123 battery packs**
- **Inputs protect against cell failure or power shorts**
- **Filtered and regulated 5.0V power to the receiver**
- **LED power indicators for input and receiver power**
- **Fully buffered outputs on all channels**
- **Full filtration of all signals in and out of the unit**
- **Integrated Ignition Cutoff**
- **Can be used with optional failsafe switch**



Reference Drawing

### Receiver Mounting

The receiver mounts in the center of the unit. 3M dual-lock mounting tape has been supplied to mount the receiver. This tape's holding power is extremely strong. It is recommended that the whole 1"x2" piece not be used, instead cut some 1"x 1/2" strips and use these on either end of the receiver.

We also have available an "L" shaped receiver mount that will mount the receiver at a sixty degree angle and get the antenna(s) up, away from the unit. While we have not found this to be necessary some pilots like to get the short 2.4GHz antennas up off the unit towards the canopy. In general, pilots use this receiver mount with 2.4GHz receivers.

### Receiver Connections

**CAUTION: Do not plug any receiver pigtails into the battery input of your receiver. On PCM it will put your receiver into DSC mode, on 2.4GHz receivers it may cause your receiver to unbind. All connections from the PowerExpander are meant to plug into servo outputs ONLY.**

The receiver servo outputs are connected to the pigtails coming out of the PowerExpander Competition 12 in the area with the notations "Ch A" through "Ch L" on the reference drawing. The two channels on the end ("Chan A" and "Chan L") have power connections to the receiver in addition to the signal connection. If you have a receiver that has less than twelve channels, you should still use both the end connections as this will provide you with power redundancy to the receiver in the event that a power or ground lead should fail.

The unit will accommodate both end-loading receivers and top-loading receivers. All signals from the receiver into the PowerExpander Competition 12 are RF filtered. This prevents noise from the servos entering the receiver connections to the receiver. If all channels are not going to be used, then the unused pigtail can be tucked away.

### Connections Directly To Receiver

If you want to connect a device directly to the receiver instead of going through the PowerExpander Competition 12, make sure the current draw of the receiver and the device is less than one amp. We recommend you do not connect servos directly to the receiver

There are several reasons that a device might be connected directly to the receiver instead of going through the PowerSystem Competition 12. The most likely would be if you had a fourteen channel receiver and needed to use the extra channels. Items such as jet ECUs and smoke pump control do not draw much current and could be used.

### Servo Connections

Servos are connected to the PowerExpander Competition 12 along the two rails on either side of the receiver. The servo connectors are universal in that they will work with Futaba or JR connectors. When using a JR connector, be careful to observe the polarity of the connection. The ground lead (black on Futaba, brown on JR) is

indicated by the "minus" sign, the positive power lead (red on Futaba and JR) is indicated by the "plus" sign and the signal line (white on Futaba, orange on JR) is indicated by the "top hat" symbol.

All receiver channels have each servo signal output individually buffered. If a servo were to short its signal wire, the other servos on that channel would not be affected. Ten of the channels have three servo outputs while two channels have four servo outputs.

The unit also RF filters each signal output and matches line impedance resulting in a cleaner signal down long servo leads. The impedance matching reduces the electrical "ringing" that can occur on long servo leads. Ringing can generate RF interference and can reduce receiver range.

### Power Connections

5-cell NiCd/NiMH or 2-cell A123 batteries should be used with this unit although the inputs will tolerate voltages up to 8.5V (lithium-ion or lithium-polymer 2-cell packs). The power inputs are protected from each other in case of a dead cell or short. There is about a half-volt drop between the input and the servos. If lithium packs were used the servos would see 8.0V for fully charged packs which is generally not advisable. For A123 packs this means that after they flatten out at 6.6V the servos will see about 6.1V.

**CAUTION: Input voltage to the PowerExpander Competition 12 should be at least 5.8V. This is due to the 0.45V drop across the "BatShare" and the 0.35V dropout voltage of the receiver regulator to maintain a 5.0V output to the receiver.**

It is highly recommended that you use two battery packs for redundancy and to provide extra current to the unit. Power is supplied to the unit through the two Deans Ultraplug connectors at the top of the servo block.

### Servo Power LEDs

The servo power LEDs are next to the Deans Ultraplug connectors and indicate power is present on that connector. These do not indicate the voltage input is above the minimum required.

### Receiver Power LEDs

The receiver power LEDs show the receiver is getting voltage greater than 4.75V. If the receiver regulator output voltage drops below 4.75 volts the LEDs will go out. There are two possible causes of the receiver voltage going below 4.75 volts. First the load the receiver is presenting to the regulator is greater than one amp causing the regulator output to droop. This could be caused by directly plugging something into the receiver that is overloading the circuit. The second cause of