

Parallel Charging

A safe, easy way to save time

So you get a call from a buddy and he wants to go flying, but you don't have anything charged so you have to take a rain check. Wait just a minute! You could charge six packs at once while you're packing the car. It's called "parallel charging," and it's easy to do.

WHAT IS PARALLEL CHARGING?

It's connecting multiple packs to a single charger and charging them at the same time. It requires a custom charging cord or special parallel board, both of which are readily available. I prefer a board because they include balancing plugs, whereas most charging cords just allow for the charging without balancing. That's fine if you're doing several single cell packs for micros, but I always advocate balance-charging larger packs, especially during parallel charges.

IS IT SAFE?

It is safe, but like everything else, you must do it properly. That is one reason why I advocate the use of a charging board that includes balance plugs. It's as safe as any other method of LiPo charging if you set it up and do it properly. Parallel charge boards come in various plug configurations, and some protect each output with a fuse. Your choice depends on the equipment you have and how much you want to spend.

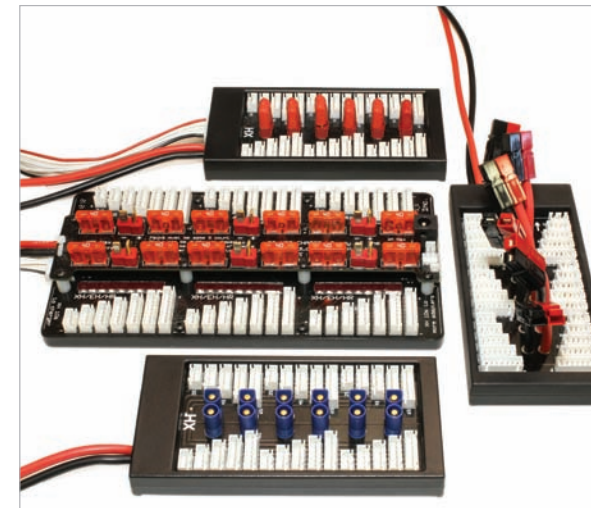
UNDERSTANDING HOW IT WORKS

When multiple packs are connected in parallel, the charger sees them as one big pack that has the capacity of all the packs added together, but the voltage of a single pack. One thing to note is all packs you parallel charge must be the same cell count! You cannot mix 3S packs with 4S packs, etc. The packs don't have to be the same capacity, though: you can put a 2200mAh pack in parallel with an 1800mAh or 1000mAh pack, etc. I usually group mine together according to similar capacities, but it's not crucial.

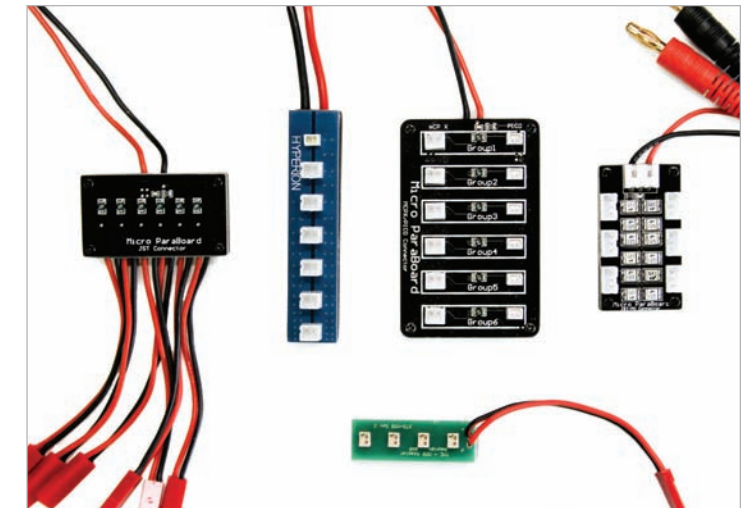
I'll connect all the battery output wires



All electric modelers can benefit from parallel charging, but it's a must for pilots of big planes like this Corsair that use multiple packs.



Parallel charging requires special boards or cables for charging and balancing. These are large-capacity boards with a Revotelectrix high-end version that's fully fuse-protected in the middle.



This assortment of smaller boards handles all the various 1S LiPos for my micro fleet.

to the parallel board before connecting the balance plugs, but I do have one charger that recommends connecting the balance plugs first. Read the instructions for your charger and your board to see if they have a particular recommendation. The logic behind connecting the larger battery wires first is to allow the cells to equalize through that wire if some packs are significantly lower in voltage than the others. It's also best to parallel-charge packs that are close in voltage; don't charge a pack that is almost fully charged in parallel with packs that are fully discharged.

When everything is connected, you must set your charger for the proper charge voltage and current. Remember,

regardless of how many packs you're charging, the voltage is the same as a single pack. If you're working with six 3S packs, then the voltage is still 11.1 volts. If all the packs are 3000mAh, then you must multiply that by the number of packs to get the total capacity. If you're charging six 3S 3000mAh packs, the charger would be set for 3S (11.1V) and 18 amps (6 x 3000mAh = 18 amps). Likewise, if you're charging six 6S 5000mAh packs, the charger would be set for 6S (22.2V) and 30 amps (6 x 5000mAh = 30 amps).

I charge at 1C even if my packs are rated for higher charge rates because it's easier on the pack. I know some of you charge at full rate and that decision is up to you. The same rules apply, so if you're

charging those six 6S 5000mAh cell packs at a charge rate of 2C, you'll need to have a setup capable of providing 60 amps (6 x 5000mAh x 2C = 60 amps).

WHY DO IT?

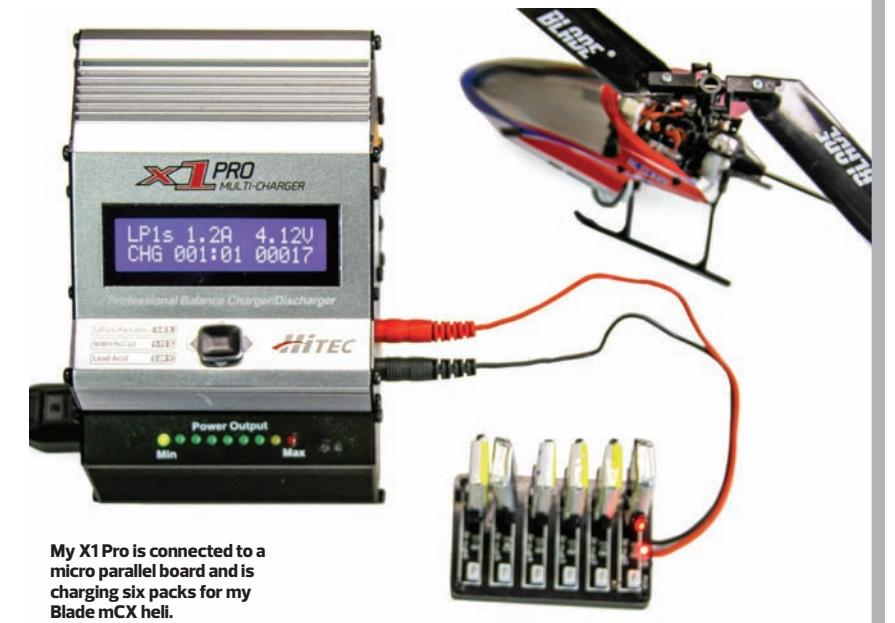
Time and convenience! My chargers can charge, discharge, and provide a storage level charge. I always leave my packs at storage levels (around 3.8 volts per cell). I can charge six packs while I'm loading the car and they'll be ready in the time it would usually take to charge one. If you have multiple chargers, you can do a lot of packs in a short period. When I return from the field, I can set them all to go back to storage level. Storing packs fully discharged or fully charged shortens their

HITEC X1 PRO & EPOWERBOX

Just because you want to parallel charge doesn't mean you need to break the bank for a super megawatt system. The pairing of the Hitec X1 charger and an ePowerbox makes a great system capable of 180 watts of charging power. The ePowerbox exceeds the needs of the charger by producing 230 watts. All of that means your charger won't bog down because of insufficient input power.

Before you look at this compact package and wonder if it will be enough for you, evaluate your needs and do a little math. This will easily charge six 3S 2200mAh packs on a parallel board. You could even do a couple of 5S packs, depending on their capacity.

For my money, it's hard to beat this compact system that handles a huge range of requirements and packs up for easy travel. The innovative mounting of the charger on top of the power supply, complete with an on/off switch and USB port for charging your cell phone, makes it a great choice.



My X1 Pro is connected to a micro parallel board and is charging six packs for my Blade mCX heli.

ULTIMATE ELECTRICS

Different capacity packs can be parallel charged together as long as they're the same cell count. Here are five different 3S packs ranging from 1300 to 3200mAh being charged at the same time. I do try to ensure their voltage levels are similar prior to the charge.



This is The Solution from Progressive RC. Everything is built into the watertight box and it holds a 24-volt power supply, charger and a balance board held to the top with Velcro. There is a solid work platform covering the power supply in the bottom of the box.



life considerably. Treating LiPos gently saves money in the long run. Because I'm bringing the packs up to full charge from storage level, it doesn't take a full hour, either, so it's quicker on flying days.

LITTLE PACKS LIKE IT TOO

Lots of you have several micro-size airplanes and helicopters that use 1-cell packs. These packs don't last long, and leaving them fully charged really

decreases their lifespan. Using a parallel setup and keeping them at storage level until you're ready to charge and fly greatly helps. You can toss six of them on a charge setup and be ready to do multiple flights.

POSSIBLE PITFALLS

The most common problem is not having a setup able to provide the voltage and current required to parallel-charge large packs. Everything looks great until you try

it and don't understand why the charger is only putting out 10 amps when you know you set it for 30. Looking at the big setup referenced earlier, we know six 6S 5000mAh packs require 30 amps from the charger, so it provides 5 amps for each of the six packs. Remembering Ohms law, 30 amps times 22.2 volts equals 666 watts. If you're trying to power your charger with a power supply that is rated for 150 watts, you don't have enough power. At 22.2 volts, that 150-watt charger can only provide 6.7 amps, or 1.13 per pack. For charging multiple large packs, I use a 24-volt power supply and an iCharger 3010b or my Revoltrix PL-8. Doubling the available voltage really helps, and the Mean Well Power Supply is rated for 1000 watts. If you decide to use one of the larger power supplies, ensure your charger is capable of 24-volt input or you'll destroy it. I labeled the output on my charge box to be sure nobody plugs a 12-volt charger into my 24-volt box.

Piloted by Dennis Shrewsbury, this Composite ARF Models 110-inch-span model is powered by a Hacker A200 motor spinning a 28 x 14 prop with 14S LiPos (two 7S packs in series).



CONCLUSION

I love parallel charging! It's safe and efficient. No more charged packs left lying around because I had them charged "just in case." I just toss them on the parallel charger while I'm packing. ✈