MnSGC Community College Quadcopter Project – Things to Purchase

“v2” – Updated 9/25/2014

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Required:

* Parallax ELEV-8 v2 quadcopter kit – cheapest to buy directly from Parallax, not from JameCo ($499, see <http://www.parallax.com/product/80200>)
* Radio transmitter – we recommend a Spektrum DX6i (read more under Air – Radios at <http://www.spektrumrc.com/Products>)

(at <http://www.horizonhobby.com/dx6i-6-channel-dsmx-reg%3B-transmitter-with-free-ar610-receiver-spmr6630> this currently costs $129.99 and comes with a free Spektrum AR610 Receiver (read more under Air – Receivers at <http://www.spektrumrc.com/Products>))

* Radio receiver – the Spektrum AR610 that comes with the DX6i (above) is probably fine but we’ve been borrowing a Spektrum AR6210 (read more under Air – Receivers at <http://www.spektrumrc.com/Products> which has a satellite antenna, possibly making it slightly more robust – we’ll play with both and try to make some comments at the kick-off about whether or not we believe it is worth spending the extra $69.99)
* LiPo battery – we recommend a 3850mAh 3S 11.1V G8 Performance Pro 45C LiPo battery by ThunderPower RC (see <http://www.horizonhobby.com/ProductDisplay?product_identifier_token=product&urlRequestType=Base&productId=694817&catalogId=10001&categoryId=11154&errorViewName=ProductDisplayErrorView&urlLangId=-1&langId=-1&top_category=10001&parent_category_rn=11022&storeId=10151> for $92.99 but currently on backorder) (note: Parallax recommends the much-cheaper 3300 MAh liPo battery <http://www.parallax.com/product/752-00010> (only $29.99) in which case you might want to purchase more than one)
* LiPo battery charger – we recommend a TP610C-ACDC 1-6 Cell LiPo AC/DC Charger w/Balancer  by ThunderPower RC (<http://www.horizonhobby.com/products/tp610c-acdc-1-6-cell-lipo-ac-dc-charger-w-balancer-THP610CACDC> for $119.99) (note: Parallax recommends a Tenergy TB6B Balance Charger <http://www.parallax.com/product/752-00009> which costs $89.99)
* LiPo battery safety bag – we recommend a LiPo Safety Charge Sack, Large by Venom Group <http://www.horizonhobby.com/ProductDisplay?product_identifier_token=product&urlRequestType=Base&productId=731981&catalogId=10001&categoryId=11157&errorViewName=ProductDisplayErrorView&urlLangId=-1&langId=-1&top_category=10001&parent_category_rn=11022&storeId=10151> ($19.99 but also on backorder)
* Soldering station (not just a soldering iron)(at least 45W) – we recommend Xytronic LF-369D ($49.00 from <http://www.howardelectronics.com/xytronic/lf369D.html>)
* Radio solder (not plumbing solder!) – decide whether to use leaded solder (we do) or lead-free solder (harder to work with) (we buy ours from Radio Shack – they sell it on-line too – much cheaper to buy in bulk rolls then wind onto pencils for use)
* “Helping Hands” (component vise) (we buy locally from AxMan Surplus for about $8 but these are also easy to find on-line)
* #1 Phillips screwdriver – we recommend a full set of small screwdrivers, not just this one
* ¼ inch and 11/32 inch wrench or socket – we recommend a full set of small sockets plus an adjustable wrench
* Wire strippers – need to handle 12-16 AWG for the kit – for the competition you’ll probably end up using 22 AWG wire as well, which might need a second, smaller, wire strippers
* Scissors
* Needle-nose pliers
* Ruler or tape measure
* Heat gun for heat-shrink tubing – you can manage with a hair dryer or a soldering iron, but a real heat gun really is better
* Hardware to accomplish competition goals (not yet finalized): compact video camera, Arduino microcontroller with sensors and servos, 22 AWG wire, etc.

Recommended:

* Digital multimeter (quite cheap at Radio Shack, also available on-line or at hardware stores)
* A second pair of Helping Hands (component vise)
* Safety goggles – the kit comes with two, you will probably want more
* Cutting boards, to protect the work surface (and you will need a work surface – at least one bench or table – preferably one that can be dedicated to this team)
* Second soldering set-up (soldering station, wire strippers, two Helping Hands, etc) to get more students involved in soldering
* Wire sponge for soldering station(s), if they didn’t come with one (preferred over wet sponges)
* Extra soldering iron tips
* Tip tinner (to chemically clean the end of your soldering iron occasionally)
* Tool box (possibly lockable)
* Permanent markers
* Desk lamp, to get good lighting on your work
* Propeller balancer (and weighting tape), we recommend a Du-Bro Tru Spin Percision Prop/Wheel Balancer ($22.99 from Horizon Hobby <http://www.horizonhobby.com/products/tru-spin-prop-balancer-DUB499>)
* Bungee cords and weights (to try quadcopter in a tethered mode)
* Some spare parts for the kit: e.g spare propellers, spare ESCs, etc.; we recommend at least one ELEV-8 “Crash Pack” <http://www.parallax.com/product/80080>
* RC Eye One S quadcopter toy (you’ll get something similar at the kick-off – you might want a second one) (see <http://www.rclogger.com/RC-EYE/RC-EYE-One/RC-EYE-One-S-Mode-2.html>)

Also consider purchasing (if the budget will support it): *(we’ll have these things at the kickoff so that you can see them before needing to decide about buying them)*

* Parrot AR Drone (quadcopter) – more expensive but does show utility of on-board video
* Flight simulator with quadcopter mode such as RealFlight 7 – Transmitter Interface Edition <http://www.realflight.com/products/gpmz4504.html>
* Tachometer, to measure spin rate of the propellers
* First person video (live video) system – might help accomplish certain competition tasks, but probably won’t be required