

## **FIRST Tech Challenge Control Hub Pilot (Phase II)**

The next phase of *FIRST* Tech Challenge robotics platform evolution will combine the functionality of the Android handset into the REV Robotics Hub. The resulting product is referred to as the “REV Control Hub” or simply Control Hub.



Over the last 12 months a custom system on module (SOM) has been developed that better serves the purpose of replacing functionality of the Android handset used in the *FIRST* Tech Challenge platform. This new version will be used in *FIRST* Global’s 2019 competition and in *FIRST* Tech Challenge and *FIRST* Education moving forward.

*FIRST* Tech Challenge is pleased to expand the pilot into the 2019-2020 season using this new SOM combined into the Control Hub.

### **What are some of the benefits of using the Control Hub?**

- Smaller footprint by avoiding the need for an Android handset mounted to the robot
- One less USB connection (eliminates the connection between the Android handset and REV Expansion Hub)
- Ability to use a USB connected camera for Vuforia and Tensorflow use (as opposed to Android handset mounted camera)
- Opportunity to have firmware and software preloaded into Control Hub making setup easier
- The programming tools, languages and driver controls will remain the same as teams are accustomed to now.

Some user interface changes will be required to accommodate lack of graphical user interface on the robot; however, these changes will be well documented.

There are no other benefits to teams using Control Hubs that could create an uneven playing field between teams with the Control Hub and ones continuing to use the present Expansion Hub setup.

The Expansion Hub will not become obsolete. We expect many teams may continue using the Android handset/Expansion Hub current setup.

Teams that choose to use the Control Hub option in both the 2019-2020 pilot and beyond will still require an Expansion Hub if they plan to use more than 4 DC drive motors and/or more than 6 servo motors.

Teams agreeing to pilot the Control Hub in 2019-2020 will be allowed to use them throughout the season in all official *FIRST* Tech Challenge events in pilot participating

regions only and at World Championships. They will also be given access to a pilot team only forum for questions and feedback (<https://ftcforum.usfirst.org/forum/control-hub-pilot-forum>).

### **What is the cost of the Control Hub?**

Teams agreeing to the pilot will be able to purchase one Control Hub at a reduced cost of \$175/ea. plus applicable shipping and taxes. Additional units may be purchased through REV at the retail price.

### **How do teams apply to participate in the pilot?**

Teams located in the pilot participating region will apply via Submittable (<https://usfirst.submittable.com/submit/69f974f8-05f7-4a31-9d3f-51787e71bb53/2019-2020-first-tech-challenge-control-hub-pilot>).

Teams that meet the eligibility criteria will receive an email from *FIRST* with a coupon code that is redeemed in the checkout process on the REV website ([www.revrobotics.com](http://www.revrobotics.com)).

Control Hubs will be available for shipment mid-June 2019. An option to place a pre-order will be available.

Pilot teams will have access to a forum specifically set up for Control Hub related questions and support. FTA training and team support will be provided by *FIRST* Tech Challenge.

Pilot teams will be asked to provide feedback to *FIRST* Tech Challenge on the Control Hub in both informal (phone and forum) and more formal (survey) as part of their participation. These pilot teams will purchase the Control Hubs and will use them in future years beyond the pilot season.

**Important Note:** In the 2019-2020 *FIRST* Tech Challenge season, the Control Hub will only be allowed for use in competition by *FIRST* Tech Challenge teams based in test pilot regions, and will be illegal for competition use outside of test pilot regions. The only exception to this rule is in-school classes who purchased Class Pack robot kits and wish to extend that experience, create a *FIRST* Tech Challenge team, and compete. Those teams may use the Control Hubs provided in the Class Pack robot kits in competition in any region, but should not expect specific FTA support should there be issues specific to the Control Hub. The Control Hub is being piloted in competition for the 2019-2020 season and is expected to become available to all teams next season.

## FAQ's

**Q: How do I apply to be a pilot team and obtain the Control Hub?**

A: Teams interested will be able to apply via a [Submittable link](#). There are no qualification criteria other than the interested team is located in one of the pilot regions and has already registered for the 2019-2020 season.

**Q: Can rookie and veteran teams apply to be pilot teams?**

A: Yes, both may apply. The only requirements are they are based in the chosen pilot regions, and they register for the 2019-2020 season with *FIRST* Tech Challenge prior to their application as a pilot team.

**Q: Does this make my investment in Expansion Hub and Android handsets obsolete?**

A: No, the Control Hub can handle up to 4 DC Drive Motors and 6 Servo Motors, the same that an Expansion Hub allows. FTC rules allow up to 8 DC Drive Motors and 12 Servo Motors. Expansion Hubs will still be required for teams who wish to use more than 4 DC Drive Motors and/or more than 6 Servo Motors. The Expansion Hub is daisy chained to the Control Hub for these purposes. Teams will still require an Android handset at the driver control side. The second Android device that had been on the robot, can be used as a spare for this purpose. Finally, the present configuration of two Android Handsets is forward compatible with the Control Hub option. We expect that over the next 4-5 years veteran teams may continue to use the present configuration.

**Q: Can I purchase the Control Hub through the *FIRST* Tech Challenge storefront?**

A: No, the Control Hub is offered directly through the REV storefront at a special price for pilot teams using a coupon code that will be provided to teams accepted for the pilot. In future seasons it is expected that the Control Hub will be made available through the *FIRST* Tech Challenge storefront.

**Q: If I am a pilot team, what are my options in terms of the *FIRST* Tech Challenge storefront?**

A: You will have exactly the same options as a non-pilot team in the *FIRST* Tech Challenge storefront. Veterans must register, then may purchase whatever options they want in the storefront. Rookies must register, then purchase whatever options they want in the storefront. We realize that the sensors are combined with the Expansion Hub, however rookies will likely need the Expansion Hub and the Control Hub as they design their robots. We realize rookies may only want a single Android handset since the Control Hub includes the functionality of the on-robot Android handset. Rookies can choose Control and Communications Set 2 and get both handsets and have a spare, or one of

the other options and source a single Android handset outside of the *FIRST* Tech Challenge storefront.

**Q: How many Control Hub units can my team purchase?**

A: Eligible teams that participate in the pilot may only purchase 1 Control Hub at the discounted price. If a team is interested in purchasing additional units, they may do so at the retail price through REV. Participating regions may have a limited quantity of spare Control Hubs available at events, should a team experience any non-warranty related issue.

**Q: What is included with the Control Hub?**

A: Teams accepted for the pilot will be able to purchase the Control Hub from the REV Robotics storefront which will include three cables: a power cable, USB type C cable to connect to a computer, and a 485 cable to daisy chain to an Expansion Hub. No sensors or other accessories are included with the Control Hub. Teams can use the same sensors and motors used with the Expansion Hub presently.

**Q: If a pilot team competes in a non-pilot region, can they use the Control Hub?**

A: No, a pilot team can use the Control Hub in their region and use the Control Hub if they earn a spot at World Championships. They can't use the Control Hub in sister regional events since those FTA's and other volunteers will not have been trained in supporting the Control Hub.

**Q: Is there a warranty on the Control Hub for pilot teams?**

A: Yes, the warranty for the Control Hub is the same as the warranty on all REV products. That is a 30-day warranty for any manufacturing defect or issue found with the REV products. REV has committed to work directly with any teams in the pilot effort for any issues discovered in addition to the forum and support provided by *FIRST* for this pilot effort.

**Q: Are there team grants available for this pilot effort?**

A: No, unless you have an unrestricted team grant, there are no *FIRST* administered grants for this effort. Pilot teams are eligible for any grants non-pilot teams are eligible for, however none are connected to the pilot effort.

**Q: If I am accepted as a pilot team, and decide I prefer the Expansion Hub and robot mounted Android handset instead, can I switch back to that configuration?**

A: Yes, while pilot teams commit to adopting the Control Hub, if for some reason they prefer the Expansion Hub they can use that configuration. If such a situation does arise, we ask that you document the reasons for such a switch as part of the feedback on the pilot effort. Assuming the Control Hub is fully functional (no warranty issues), you will still own the Control Hub and will not be able to return it.

**Q: What if a team in a pilot region, who did not apply to participate in the pilot purchases a Control Hub via retail ordering, and uses it to compete in the pilot region?**

A: We can't control that situation and will not ask Affiliate Partners to monitor that. If teams in a pilot region purchase a Control Hub, they will be allowed to compete with it. As with pilot teams, they may not use it in non-pilot region events.

**Q: Can I use a USB camera via the Control Hub for vision processing?**

A: Yes, Logitech UVC cameras will work with the Control Hub. It can plug directly into the Control Hub and allow teams to use Tensorflow, Vuforia, OpenCV. This model has been tested (and will be used by FIRST Global teams in 2019). The recommended method to purchase this is directly. Link: [https://www.amazon.com/gp/product/B004FHO5Y6/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o02\\_s00?ie=UTF8&psc=1&pldnSite=1](https://www.amazon.com/gp/product/B004FHO5Y6/ref=ppx_yo_dt_b_asin_title_o02_s00?ie=UTF8&psc=1&pldnSite=1)

**Q: If my team started as an in-school activity, that decided to use their in-school equipment to start the team, can we use the Control Hub in our region?**

A: Yes, we believe there is a slight chance that schools who have started with *FIRST* as part of the *FIRST* Education, Class Pack effort, could create a team as a result of that effort in the 2019/2020 season. In that case, yes, those teams could register and pay for a *FIRST* Tech Challenge team registration and use the Control Hub in their local competitions and would get a special waiver to do so. Any teams competing under this approach would have to buy additional parts as well since Class Pack education robots are much simpler than typical competition robots. Those teams should not expect local FTA support unless they happen to also be pilot test regions. These Education teams will be given access to the forum and other support resources.

**Q: What kind of support is available to Control Hub pilot teams?**

A: Pilot teams have access to a dedicated Control Hub forum for questions and support (<https://ftcforum.usfirst.org/forum/control-hub-pilot-forum>). In addition, pilot teams may email [FTCTech@firstinspires.org](mailto:FTCTech@firstinspires.org).