



New VEX Robotics Competition Smart Field Control System

This year at the VEX Robotics World Championship we are rolling out our new Smart Field control system. This new system will be used on both the Skills and Division fields. The goal of this system is to allow our Referees, Field Operators, and Field Technicians to make division and skill matches run as smoothly as possible. The additional data that is collected from the robots on the field will help our staff and volunteers quickly troubleshoot issues with teams. This system will also allow us to control the competition VEXnet radio channels better than ever before. That means less interference and less radio drops for divisional matches.

How do the new Smart Field controllers work?

The old field control system uses discrete digital logic to signal the states of the field. A single pin on the RJ45 connector would toggle from high to low to signal that the field was changing from “Disabled” to “Enabled”. There was no real data passed between the robots and the field. The new Smart Field controllers use special software running on a V5 brain. The field brain connects to the smart port on the V5 controllers to pass not only the same field state information as the old system but also additional data like the match clock time. The V5 controller can also pass information to the field controller about that state of the robot (radio link info, battery levels, is the user app running...). This information can be used to quickly troubleshoot issues with robots on the field. The field brain also connects to the Tournament Manager software so all this information can now be displayed on the field monitor to allow the referees to know if all systems are good to go before the match starts.

How do I connect my V5 controller to the new Smart Field controllers?

For VRC matches, each driver's station will have two smart cables. It does not matter which cable you use. Blue team cables will be at the blue team's driver station and the red team's cables will be at the red team's driver station. You can connect one of the smart cables to either of the two smart ports on your V5 controller.

NOTE: Make sure not to plug the cable into the legacy field controller port. This could damage your controller.

You should always connect the field control cable to the V5 controller that has the radio connection to the robot. So if you are using a dual controller setup make sure you plug the field's smart cable into the controller that is paired with the robot. Once you connect the cable to your controller you will see the field symbol show up on the status bar of the controller and you are officially connected to the field.

For VEX Robotics Competition Skills attempts, there will be one smart cable at the blue alliance driver's station and one smart cable at the red alliance driver's station. Based on the chosen starting position the team can use the closest smart cable to connect their V5 controller to the field control system. Once connected the field control icon should show on the controller screen and the robot is ready to start the skills run.

Will my robot act differently with the new Smart Field system?

As far as the control of your robot and how the match goes, there will be no difference. The only thing that you will notice is how the radio connections work with the new system. With the legacy system, as soon as you connect your controller to the field the controller jumps to a competition channel and then reconnects to the robot. With the new system that will not be the case. When you first connect the Smart Field cable to your controller you may see a radio drop but it will connect on a pit channel instead of a competition channel. We do this to make sure we do not have too many robots on the competition channels at any one time. Once the field operator is ready, they will "activate" your field. The activation will only happen once all other matches in your division are complete. When your field is activated your V5 controller will jump to a specific competition channel and reconnect with your robot. So, it is possible that your radio link will drop a couple times before the match starts. But don't worry, the field operator will not start the match until every robot is connected on the correct channel and all teams are set and ready to go.

Also, shortly after the match completes, the field will be deactivated by the operator. This will cause your controller to jump off of the competition channel and jump back to a pit channel, freeing up the channel for the next match. When this happens, your robot will no longer link to your controller, and you will need to power cycle the brain on the robot to regain link.