Grand Blanc High School Robotics Team

Initial Member Level Deliverables
Electrical Component Board Wiring

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Mentor(s) who can sign off on this Challenge: Clinton Bolinger, Cathy Fillwock and Marty Ray

If you get stuck, ask a Veteran Student member on your VEX Team (especially one who has electrical knowledge) to assist you BEFORE you ask a Mentor.

BEFORE GETTING STARTED:

1. Check the board in the conference room to see if a Kit is available to check out for this Deliverable Training.
2. Reference the Recommended Completion Schedule calendar (located on the board) to see if this Deliverable is featured for your Team this month:
    a. If your VEX Team is the featured Team, then proceed with the instructions below.
    b. If not, ask a Veteran Student Team Member to go with you to ask the Team Captain of the featured Team if they plan to use the materials at tonight's meeting:
        i. If the materials will NOT be used by that Team, then proceed with the instructions below.
        ii. If the materials WILL be used tonight, please choose a different training to complete today.
3. You will be working with one partner on this Deliverable. Please make a valiant effort to seek out another first-year Student who has not completed this Deliverable **BEFORE** you ask a Veteran Student to partner with you.
    a. You need to know who you're working with BEFORE you check out materials, so you can sign out the kit together.
    b. You must work TOGETHER on this challenge.
    c. You should NOT "divide and conquer" to have one person do all of the assembly work, while the other takes notes.
    d. BOTH students should work on the assembly, BOTH should take notes.
4. Follow the directions listed on the board in the Conference Room to check-out a Kit (if available):
    a. Visit www.team2337.com/checkout on an internet connected device (yours or the Team's).
5. Take an inventory of the components **BEFORE** you leave the Conference Room, using the photo checklist on the lid of the components box.
    a. You will also need a wiring board:
        i. Boards are located to the left of the Deliverables Materials Shelf in the conference room.
        ii. Please take the CORRECT board (labeled in the upper left corner)
    b. If any materials are missing, please inform one of the Mentors listed above BEFORE you get started.
6. The wireless internet password is: 2337is1337
7. Print one copy of the Electrical Board Layout Wiring Diagram Template for each person, using the Conference Room EngiPrinter (Brother HL-3170CDW series). The file is available here: http://www.team2337.com/uploads/8/2/9/1/8291371/2337_-_kop_chassis_electrical_layout_-_2015.pdf

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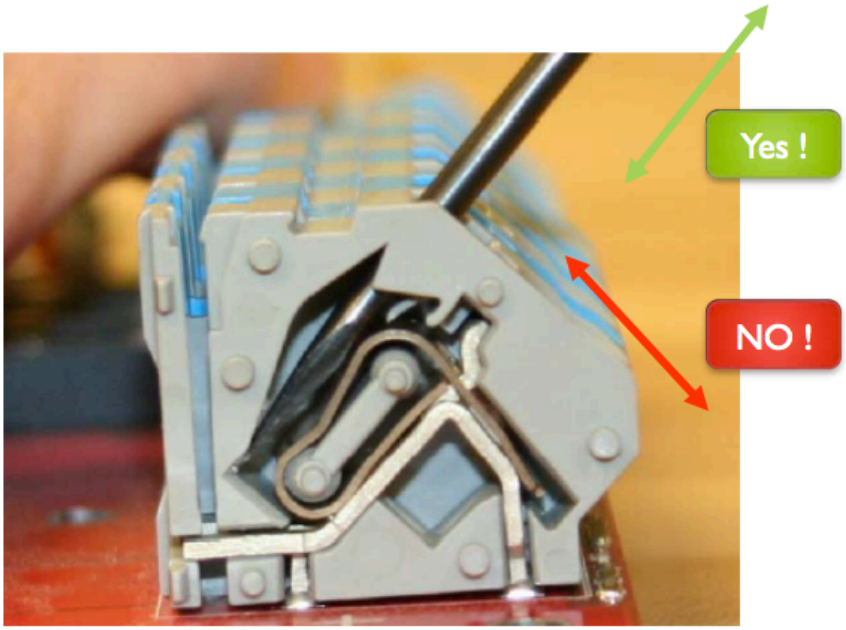
IMPORTANT Challenge Information:

1. *Students must work collaboratively on this Deliverable. It should NOT be that one person does all of (or even most of!) the work. Collaboration must be evident in work and notebook entries.*
2. You may build in the Wood Shop, Back Room, or Lunch Room.
3. Document your progress in your Engineering Notebook as you work.
4. FOLLOW THESE INSTRUCTIONS BEFORE ATTEMPTING TO USE THE WAGO TOOL:
    a. Watch this video: https://www.youtube.com/watch?v=t-zb7j4ikHM
    b. Take care to insert directly at a fixed angle, pressing straight in.
    c. Do not pry.
    d. The goal is to open the spring by pressing the tool in, **NOT** by prying.



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Assembly Instructions:

1. Attach the red "dynamite sticks" to the underside of the component board; it should look like a small table.
2. Using appropriately sized zip-ties, attach all of the components in the kit to their appropriate location(s) on the component board, using the diagram on the lid of the box to help you learn the names of the components.
3. Using the wire provided in the kit, effectively and efficiently wire all of the components:
    a. Connect the Talon SRX to the 40 amp circuits on the Power Distribution Panel (PDP). You will use the Wago tool to do this.
    b. Connect the Victor SP to the 40 amp circuits on the Power Distribution Panel (PDP).
    c. Connect the Pneumatic Control Module (PCM) to the PDP.
    d. Connect the Voltage Regulator Module (VRM) to the PDP.
    e. Connect the RoboRIO to the PDP.
    f. Connect the main Power Breaker to the PDP.
    g. Connect the Radio to the RoboRIO.
    h. Connect the Anderson Battery Connector to the Main Breaker.
    i. Connect the the Victor SP PWM wires to the RoboRIO.
    j. Create a Daisy Chain using CAN Bus to connect:
        i. Robo Rio > PCM
        ii. PCM > Talon
        iii. Talon > PDP
    k. **You will NOT attach a battery.**
4. Once you have wired all of the above components, begin your Engineering Notebook Entry.
5. If you are NOT done with your training by at least 15 minutes before the end of the meeting:
    a. Return all unused materials to the bin, leave any components that you've attached to the board assembled.
    b. Clean your workspace AND the floor around you:
        i. Check the floor for any parts (washers, nuts, bolts, etc.) or trash
        ii. Wipe off tables
        iii. Push in Chairs
        iv. Sweep the floor
    c. Write BOTH of the names of the Students who are working on this Deliverable on a post-it (available on the cart next to the Deliverables shelf in the Conference Room), and attach it to the outside the bin (over the laminated label), and attach another post-it to the board.
    d. Return the bin to the shelf in the Conference Room, with the label facing outward and return the board to the area where you found it.
    e. DO NOT complete the online check-in form!
    f. This kit will be held for you for one additional meeting. If you do not show up for the next two meetings, your work will be disassembled and the kit will be given to someone else.

6. If you have finished your training, Complete Your Challenge:
    1. Both Students who worked on this Deliverable must be present at the time the Engineering Notebooks are validated.
    2. Ensure that your Engineering Notebook entries are completed (see below for questions).
    3. Find one of the Mentors listed at the top of this Deliverable and escort them to your workstation to inspect your completed work.

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4. Ask one of the Mentors listed on this deliverable to approve your Engineering Notebook entry and have your deliverables checklist validated.
5. After you have completed the task and your Engineering Notebook has been validated, please:
    a. Detach all wires from the components (do not cut wires),
    b. Cut zip-ties to remove components from the board. Throw away used zip-ties.
    c. Detach the "Dynamite Sticks" from the component board.
    d. Return all components and tools to the box.
    e. Ensure that all of the items on the list are in the box. If anything is missing, please find it, because you had it when you started this deliverable.
    f. Count the number zip-ties that need to be replaced, and refill from the bin in the Conference Room.
6. Follow the directions on the board in the conference room to check the kit in, and:
    a. Check the kit in using the online form, available at www.team2337.com/checkin
    b. Return the bin to the shelf in the Conference Room, with the label facing outward,
    c. Erase both of your names from the sign-out board, using a tissue and hand sanitizer.

Engineering Notebook Entry Instructions:

Note: each Student must complete an Engineering Notebook entry and while you may work together, you may NOT create identical or nearly identical entries. Mentors who validate Engineering Notebooks will be looking for unique entries and evidence of learning from ***both*** *Students.*

1. Scissors, Glue Sticks, Colored Pencils and Markers are available for use in the conference room. If these resources start to disappear or are left laying around, we will stop providing them… so please make sure you return them when you're done.
2. Trim the Electrical Board Layout Wiring Diagram Template to fit into your Engineering Notebook, glue it down, before or after you:
    a. Draw a color-coded illustration of the final result of your wiring,
    b. Label all components,
    c. Label all wires (including type and gauge)
3. Answer the following questions in complete sentences, and/or copy down the questions:
    a. What difficulties did you run into while wiring the components?
    b. What did this task teach you about wiring that may assist you if you are a member of the *programming* or *mechanical* team?
    c. Why are proper wiring techniques important?
    d. Why is it important to use the right tool and the right materials for each job?
    e. Did completing this task increase your interest in the Electrical Section of the FRC Team? Why or why not?