



FTC Programming

Presented by

Hadron Knights - Team 12600
Tampa, FL

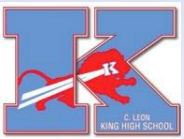


FIRST
LEGO
LEAGUE JR.

FIRST
LEGO
LEAGUE

FIRST
TECH
CHALLENGE

FIRST
ROBOTICS
COMPETITION



Agenda



- Build and Deploy – FTC Code
- Driver Controls
- TeleOp/Driver Controller Programming
- Run FTC Robot
- Daisy Chaining
- Q & A



Build and Deploy FTC Code



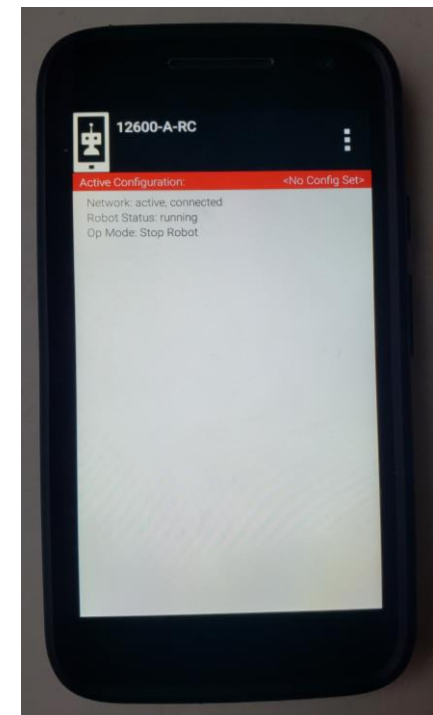
Build



Deploy



Robot Controller Phone
(Android Phone)



Team Code

SkyStone FTC Code
(5.x)



Driver Controls in TeleOp

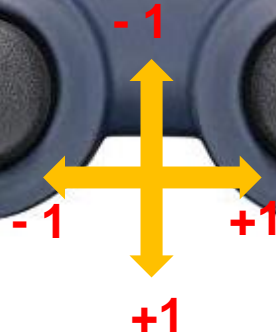


D-pad (boolean) : Up, Down, Left, Right → true (pressed) or false (released)



Left Joy Stick (continuous)

Right Joy Stick (continuous)

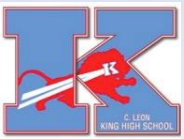


Bumper (boolean) → true (pressed) or false



Trigger (continuous) → 0 (released) to 1 (pressed)

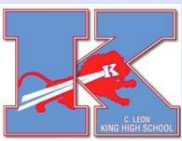
A, B, X, Y buttons (boolean) → true (pressed) or false (released)



TeleOp Demo



- We will now show a sample TeleOp code and demo it on our robot



Run to Control an FTC Robot



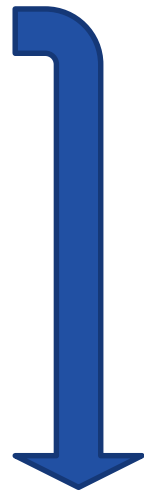
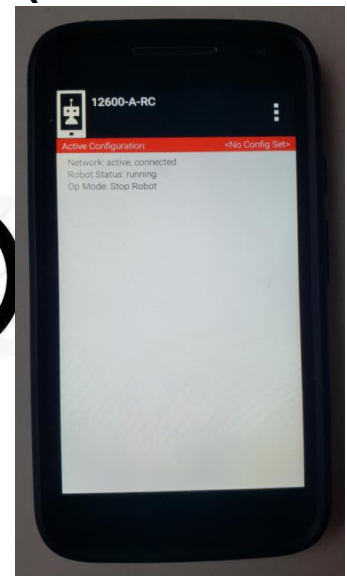
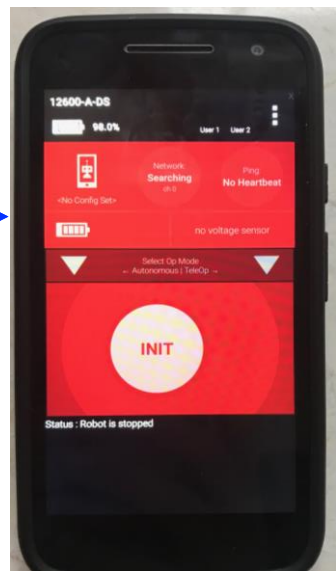
Driver Station Phone
(Android Phone)

Robot Controller Phone
(Android Phone)

Input Commands



Driver 1 Driver 2
Controllers

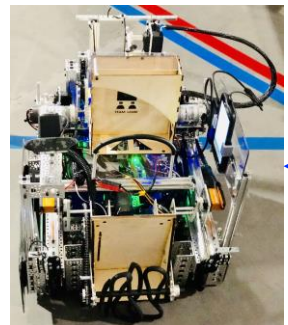


Over USB

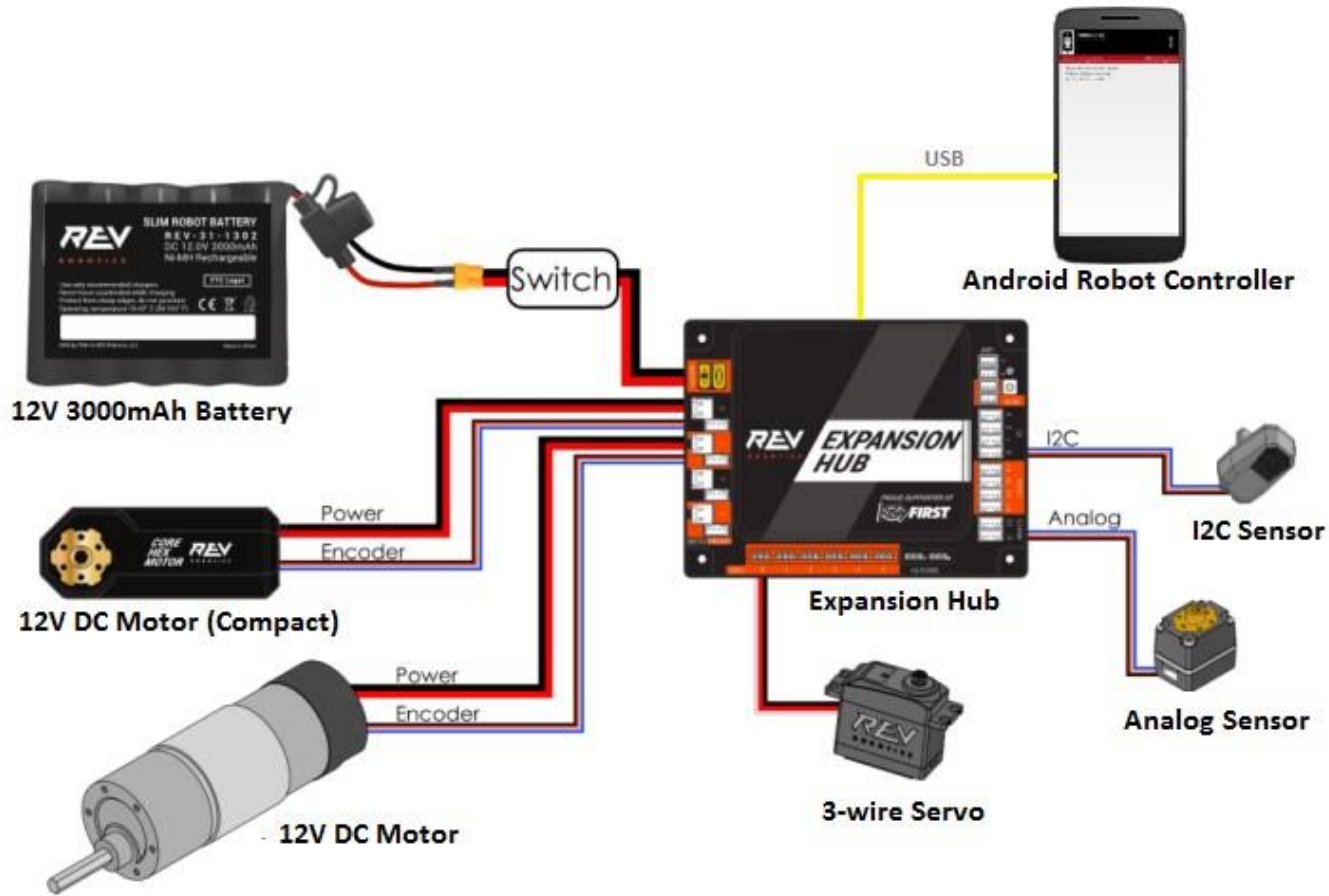
Electronic
Input /
Output
(I/O)
Signals



Robot &
Mechatronics



Robot Control





TeleOp Summary



```
@TeleOp(name = "Kickoff TeleOp", group = "HKTeleOp")
public class KickoffTutorialTeleOp extends OpMode {

    private DcMotor leftMotor;
    private DcMotor rightMotor;
    private DcMotor slideMotor;

    private final static double TICKS_PER_ROTATION = 1120;
    private static final double PULLEY_DIAMETER_IN_INCHES = 1.25;
    private static final double PULLEY_CIRCUMFERENCE_IN_INCHES = PULLEY_DIAMETER_IN_INCHES * Math.PI;
    private static final double TICKS_PER_INCH = TICKS_PER_ROTATION / PULLEY_CIRCUMFERENCE_IN_INCHES;

    public KickoffTutorialTeleOp() { super(); }

    @Override
    public void init() {
        leftMotor = hardwareMap.dcMotor.get("LeftMotor");
        rightMotor = hardwareMap.dcMotor.get("RightMotor");
        slideMotor = hardwareMap.dcMotor.get("SlideMotor");
    }
}
```

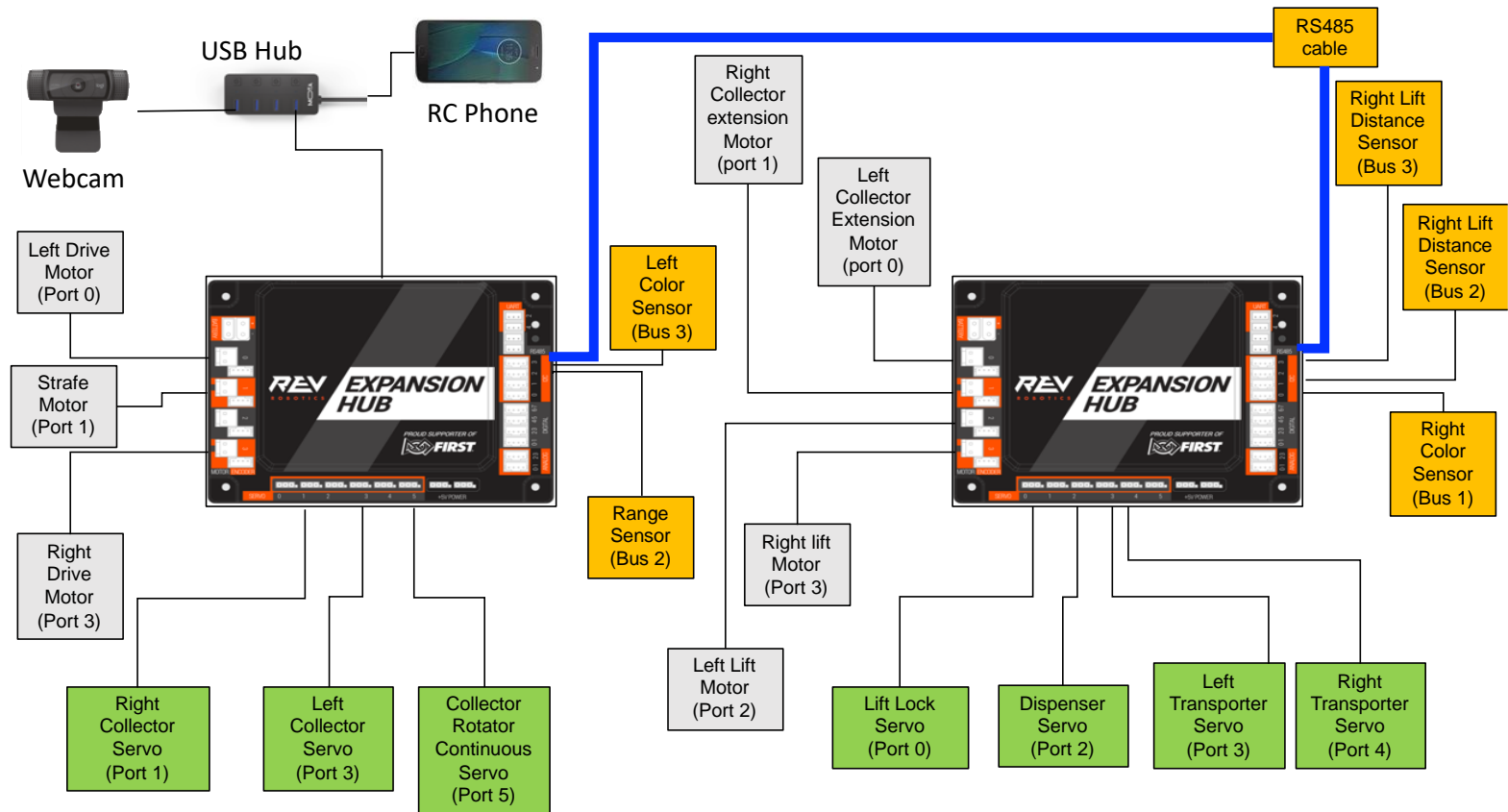
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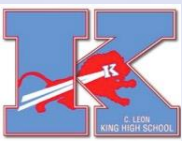
@Override
public void loop() {
    telemetry.addData("caption: "Loop", value: "Starting teleop loop");
    telemetry.update();

    /**
     * Robot Movement (i.e. forward/backward, turning)
     */
    double leftPower = -gamepad1.left_stick_y + gamepad1.left_stick_x;
    double rightPower = -gamepad1.left_stick_y - gamepad1.left_stick_x;
    leftPower = Range.clip(leftPower, min: -1, max: 1);
    rightPower = Range.clip(rightPower, min: -1, max: 1);
    leftMotor.setPower(leftPower);
    rightMotor.setPower(rightPower);
}
```




Daisy Chaining of REV Expansion Hubs





Q & A



Contact:
hadronknights@gmail.com

