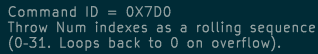


Throw Command (To Ball Butler)



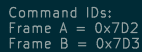
(x, y, z, t) describe the landing/target state of the ball.
x, y, z are 0.1 mm/LSB, giving a maximum value of ~6.5 m
t is 1 ms/LSB, giving a maximum time of ~1.09 min

```
Command ID = 0X7D1
Throw Num reports back the commanded Throw Number
```

(v_x, v_y, v_z) describe the landing state of the ball and allows Jugglebot to orient itself correctly. These values are 0.2 mm/LSB, giving a max value of ~13.1 m/s

```
Checksum:
CRC16 (int16) requires CRC-16/CCITT-FALSE over 'Throw Command' data (bytes 0-7)
[Allows Jugglebot to confirm catch vel pairing with throw command]
```

Pose data to be sent from Jetson at 1-10 Hz



Orientation:
q0 .. q4 (all int16) describe the orientation to approx 0.005°

```
Checksum:
CRC16 (int16) requires CRC-16/CCITT-FALSE over Frame A bytes 0-5 + Frame B bytes 0-7
[Ensures the correct pair of frames is matched]
```



```
"Set_Input_Pos" (0x0C) for Pitch ODrive (Micro)
Vel_FF and Torque_FF = 0
```

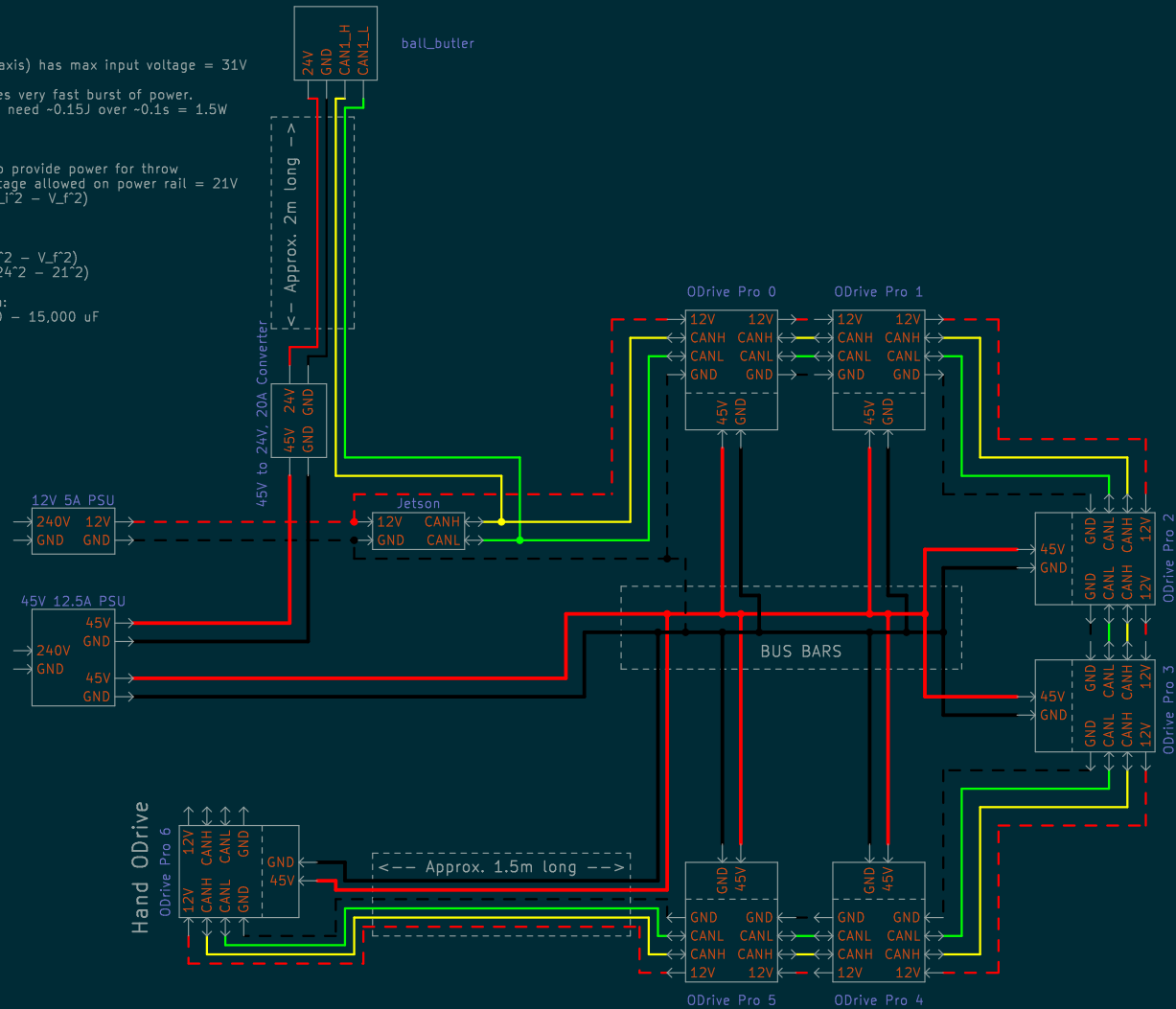
```
"Set_Input_Pos" (0x0C) for Hand ODrive (S1)
Input_Pos, Vel_FF and Torque_FF as calculated by planner
```

ODrive Micro (BB pitch axis) has max input voltage = 31V

Hand motor (S1) requires very fast burst of power.
From simulation, should need ~0.15J over ~0.1s = 1.5W

Solution:

- 45V to 24V converter
 - Say minimum voltage allowed on power rail = 21V
 - $E = 0.5 * C * (V_i^2 - V_f^2)$
 - $V_i = 24 \text{ V}$
 - $V_f = 21 \text{ V}$
 - $E = 0.15 \text{ J}$
 - $C = 2 * E / (V_i^2 - V_f^2)$
 - $= 2 * 0.15 / (24^2 - 21^2)$
 - $= 2222 \text{ uF}$
 - Allow ~5x margin:
 - $C = 10,000 - 15,000 \text{ uF}$



Sheet: /Power and CAN Schematic/
File: Power and CAN.kicad_sch

Title: Power CAN Wiring

Size: A4 Date: 2025-09-04

KiCad E.D.A. kicad (6.0.9)

Rev: 2

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