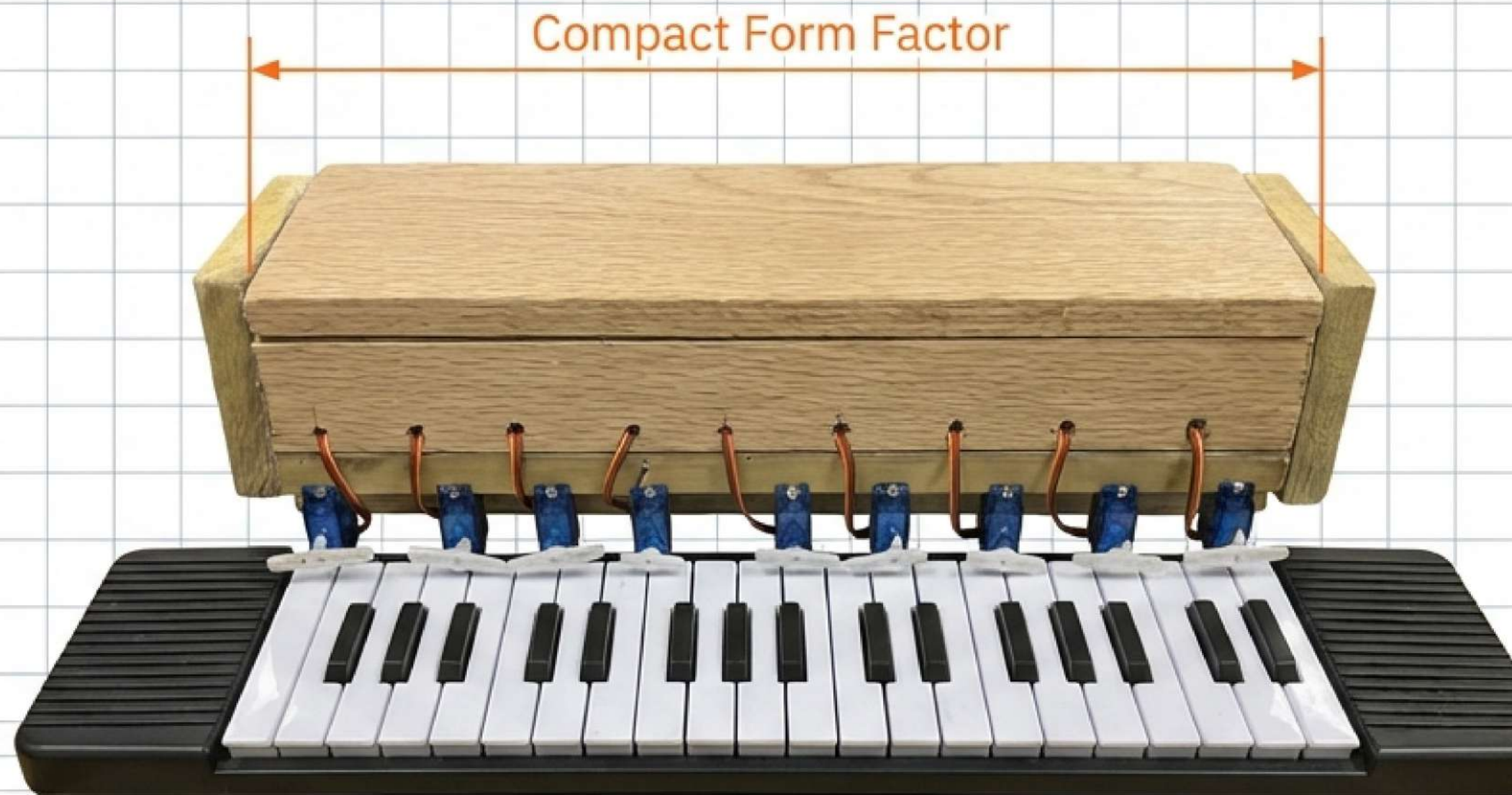


The 9-DOF Wireless Robotic Piano

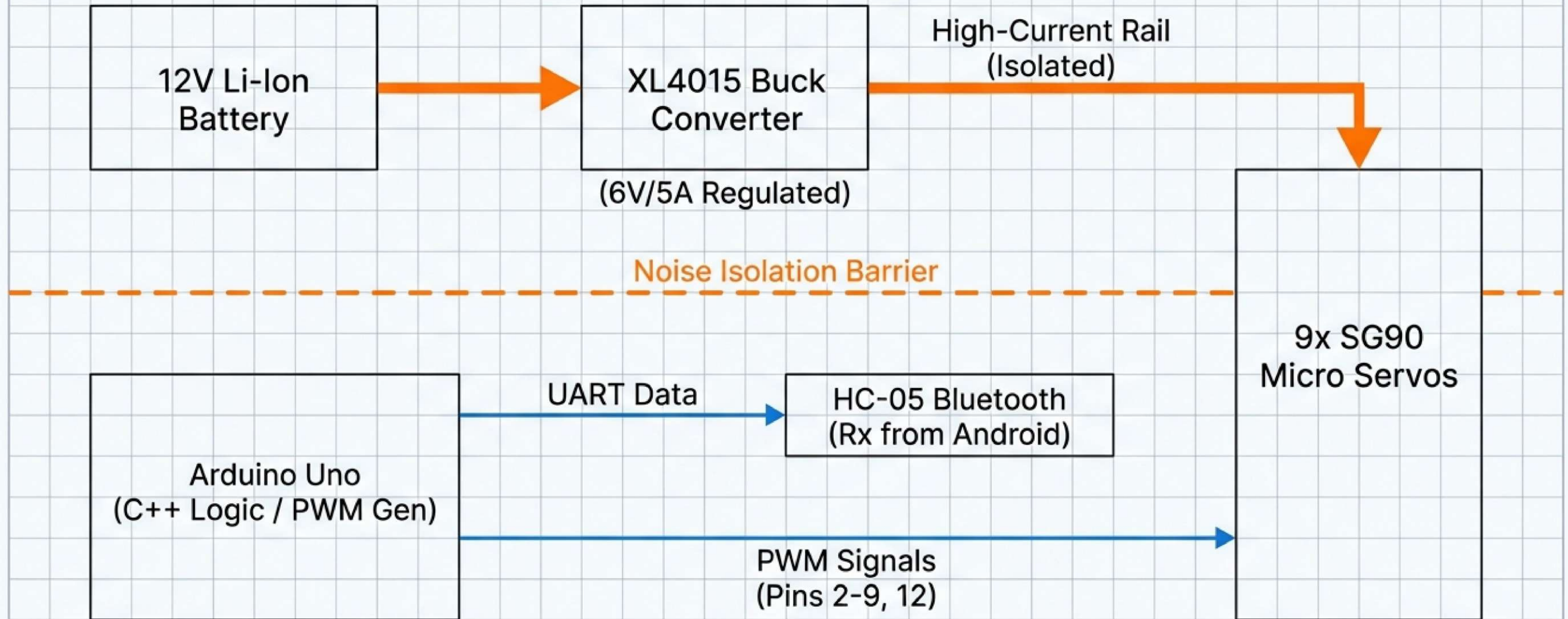


CONSTRAINT:
18 Piano Keys / 9 Motors

LATENCY:
Zero (Real-time)

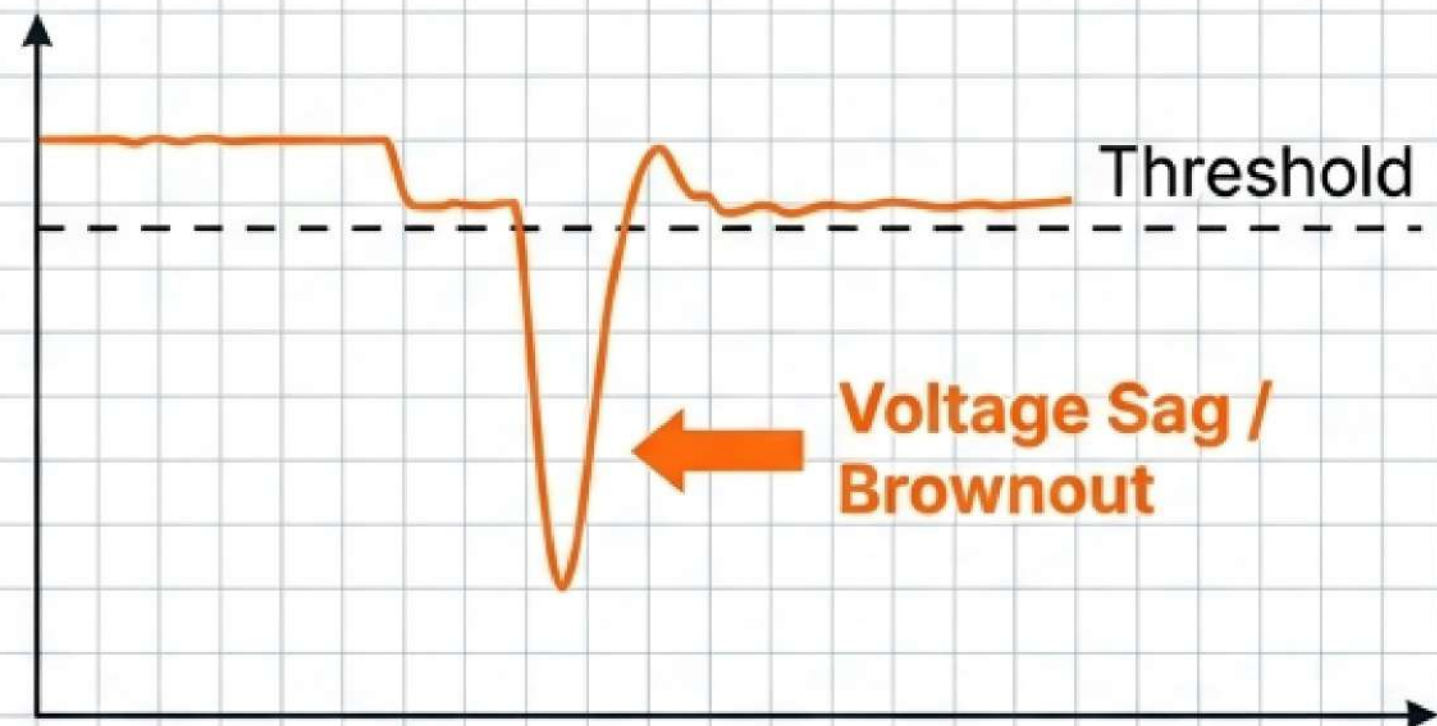
MECHANISM:
Bidirectional Actuation

Architecture: Isolating Power & Logic



Power Integrity: Solving the "Brownout"

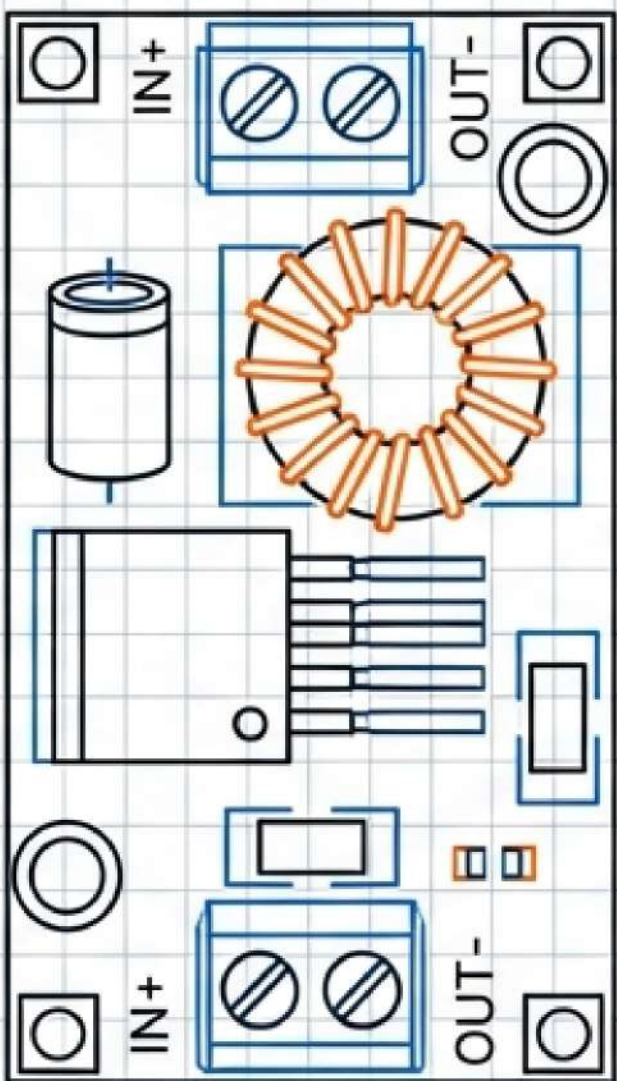
The Problem



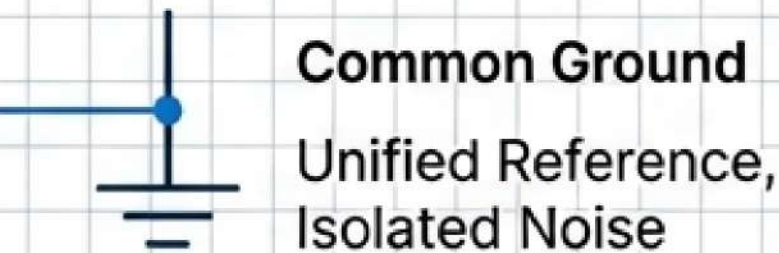
Cause: Simultaneous firing of 9 servos creates current spikes up to 4A.

Effect: Voltage drops reset the microcontroller.

The Solution

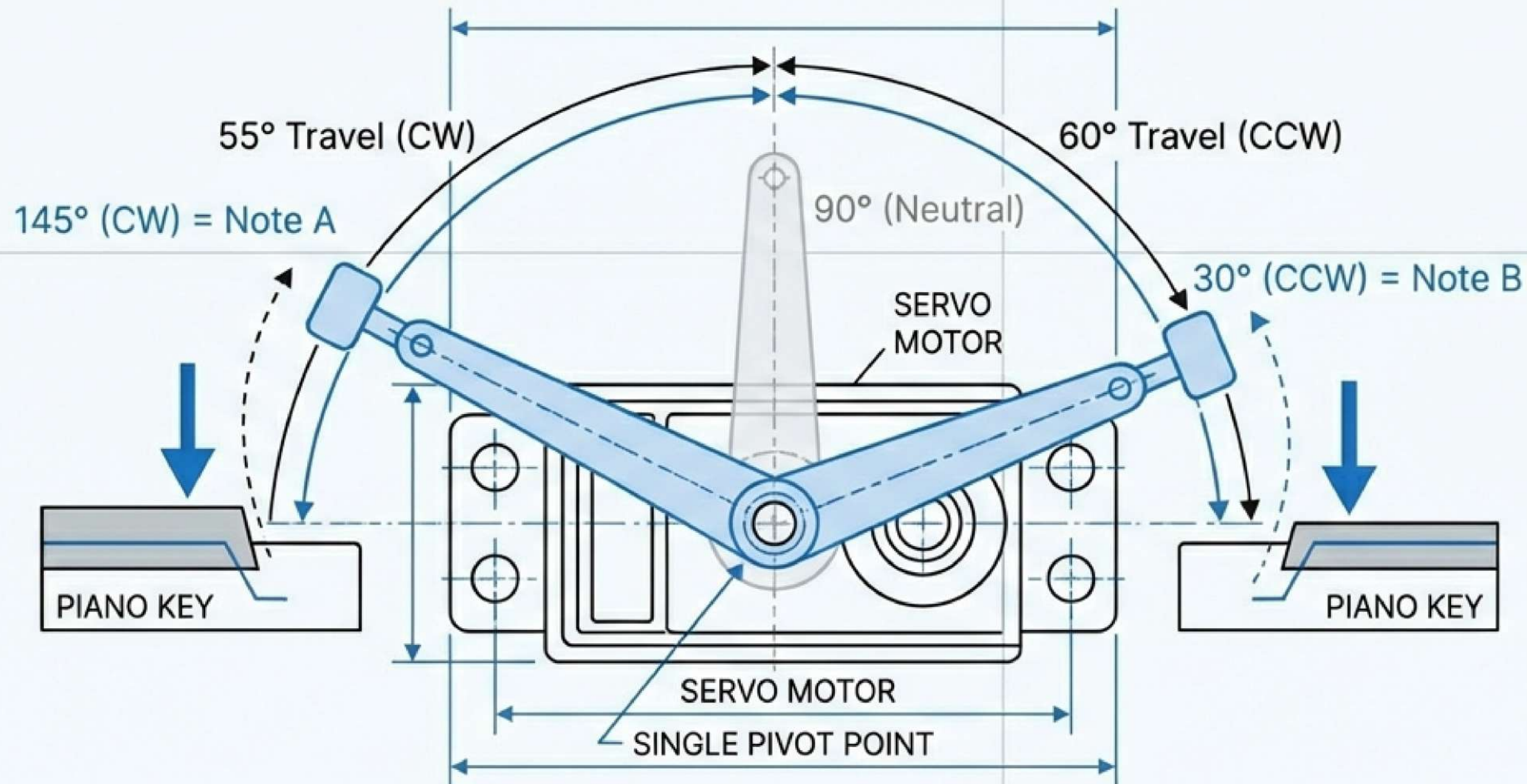


Component	XL4015 Buck Converter
Output	6V / 5A Constant
Efficiency	>90% vs. Linear Regulators



Kinematics: Bidirectional Actuation

Doubling mechanical resolution with 50% hardware.



The Constraint:

18 Keys to hit, but only space for 9 motors.

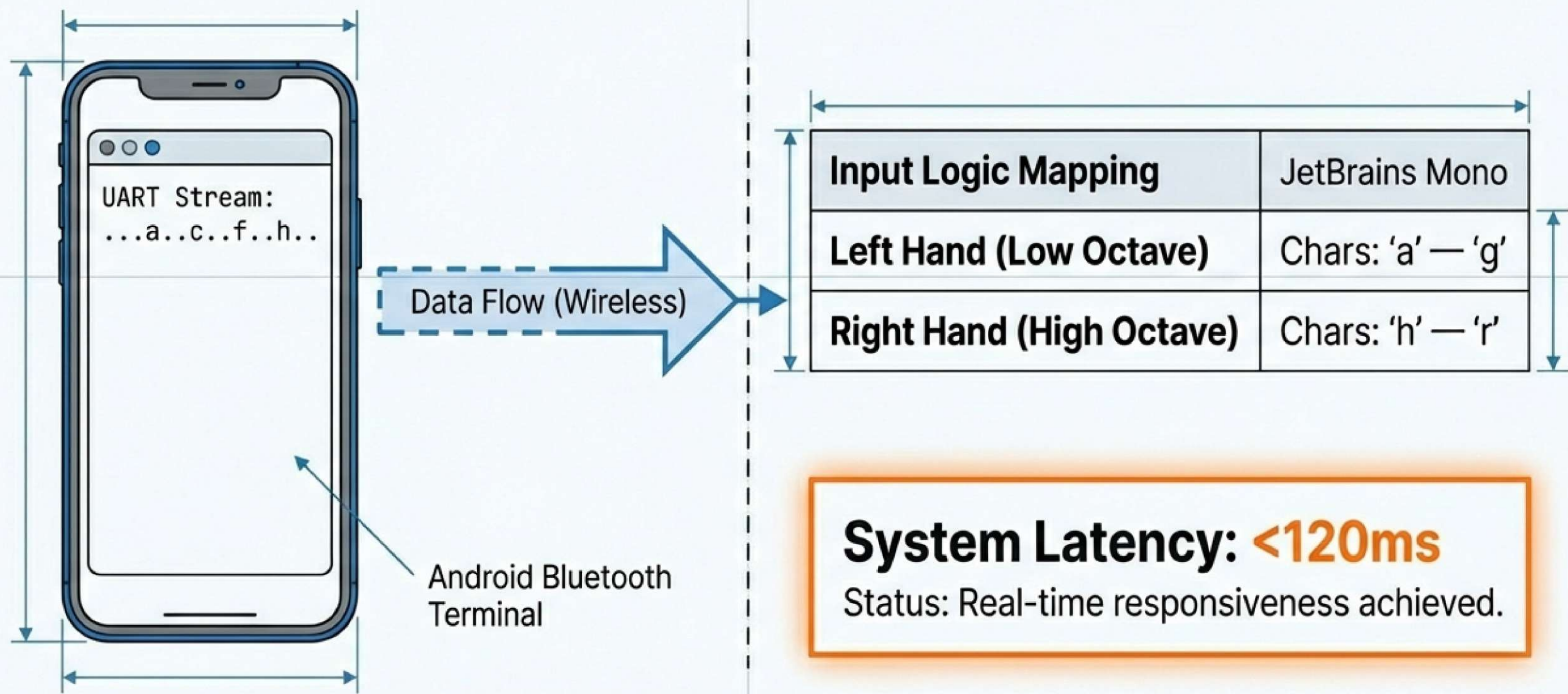
The Mechanic:

Utilization of full servo range to actuate two distinct targets from a single pivot point.

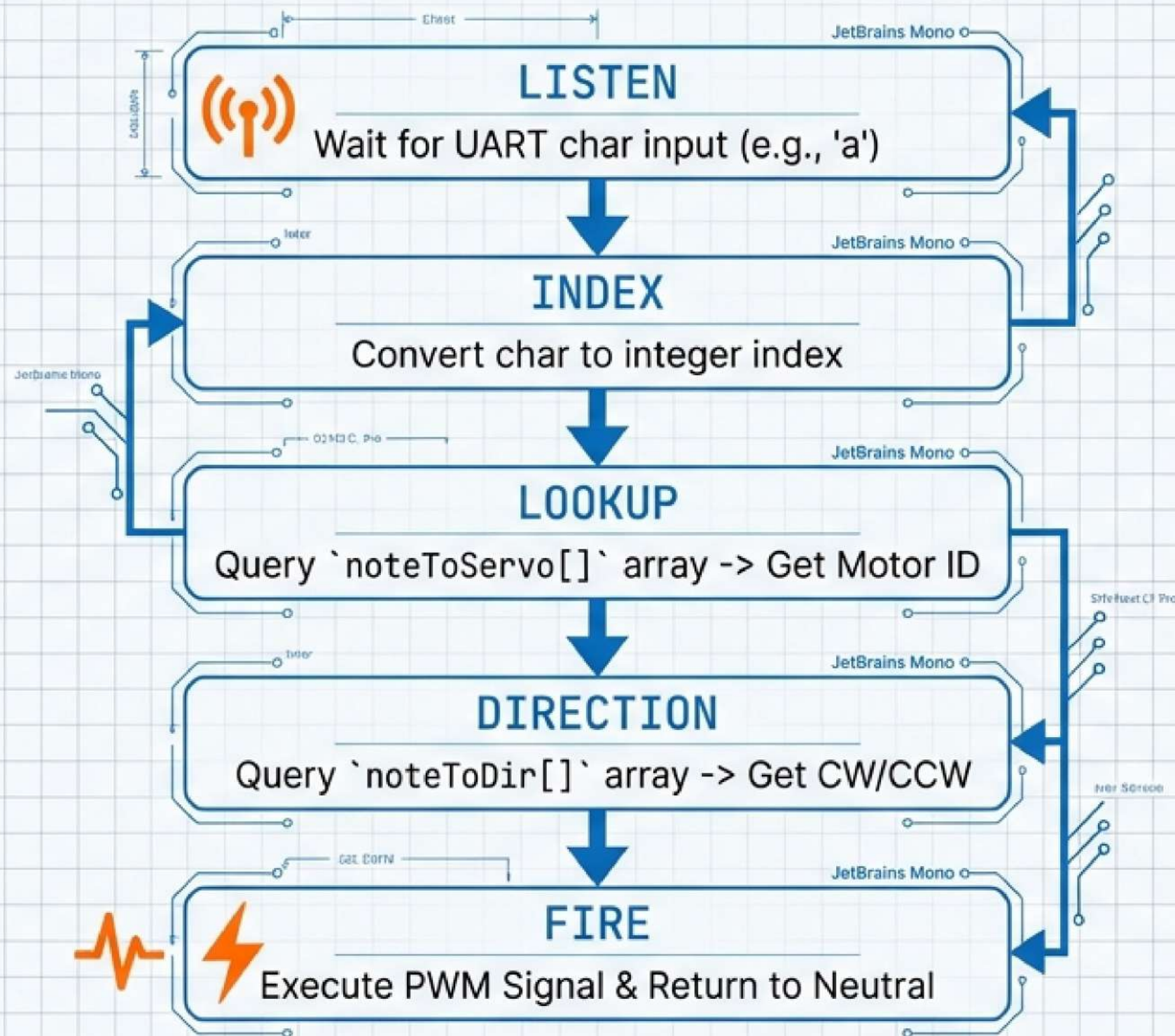
Result:

2x Resolution.

Wireless Tele-operation & Latency



Inside the Loop: Embedded C++ Logic



Efficient code meets efficient hardware.