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                                xl320-helloWheel Mode1_0a.nxc
// FILE: xl320-helloWheel Mode1_0a.nxc - Works!
// DATE: 12/23/19 08:38
// AUTH: P. Oh
// DESC: NXT commands Dynamixel XL-320 in wheel mode
// VERS: 1.0a: uses xl320-functions1_0d.h
//          - XL320_TorqueEnable
//          - XL320_ControlMode
// REFS: wheelJointXL320-1.0b.nxc
// NOTE: If factory default XL-320 used, then ID is 0x01
//       ID of 0xFE commands any and all XL-320 motors

#include "xl320-defines1_0a.h"
#include "xl320-functions1_0d.h" // contains XL320_ControlMode function

#define ID_ALL_MOTORS 0xFE // 0xFE commands all XL-320 motors
#define ID_MOTOR01 0X01 // Assumes Motor 1 configured with ID = 1

task main() {

    bool orangeButtonPushed;
    bool leftArrowButtonPushed, rightArrowButtonPushed;

    UseRS485();
    RS485Enable();
    RS485Uart(HS_BAUD_57600, HS_MODE_8N1); //9600 baud, 8bit, 1stop, no parity
    Wait(MS_100);

    // First, home to center position
    TextOut(0, LCD_LINE1, "Homing...");
    XL320_servo(ID_ALL_MOTORS, 512, 200); // 512 should be center position
    Wait(2000);
    TextOut(0, LCD_LINE2, "Homed...");

    // Second, turn XL-320 torque enable OFF (ON/OFF = 1/0)
    XL320_setTorqueEnable(ID_ALL_MOTORS, 0);
    Wait(20);

    // Third, select Wheel Mode
    XL320_controlMode(ID_ALL_MOTORS, 1); // 1 = Wheel Mode; 2 = Joint Mode
    Wait(20);
    ClearScreen();
    TextOut(0, LCD_LINE2, "In Wheel mode");
    TextOut(0, LCD_LINE4, "<-/->/ORG CW/CCW/QUIT");

    do {
        rightArrowButtonPushed = ButtonPressed(BTNRIGHT, FALSE);
        if(rightArrowButtonPushed) {
            TextOut(0, LCD_LINE6, "CCW");
            XL320_servo(ID_ALL_MOTORS, 0, 250); // Continuous CCW rotation
            // Section 2.4.21 says 0-1023 is CCW; 1024-2047 is CW
            // http://manual.robotis.com/docs/en/dxl/x/xl320/#moving-speed
            Wait(2000);
        };
        leftArrowButtonPushed = ButtonPressed(BTNLEFT, FALSE);
        if(leftArrowButtonPushed) {
            TextOut(0, LCD_LINE6, "CW");
            XL320_servo(ID_ALL_MOTORS, 0, 1024 + 250); // Continuous CW rotation
            Wait(2000);
        };
        orangeButtonPushed = ButtonPressed(BTNCENTER, FALSE);
    } while(!orangeButtonPushed);

    // Turn XL-320 torque enable ON (ON/OFF = 1/0)

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XL320_setTorqueEnable(ID_ALL_MOTORS, 0);
Wait(200);
TextOut(0, LCD_LINE1, "Torque Enable: OFF...");

// Return back to Joint Mode
XL320_controlMode(ID_ALL_MOTORS, 2); // 1 = Wheel Mode; 2 = Joint Mode
Wait(200);
ClearScreen();
TextOut(0, LCD_LINE3, "Joint mode...");
TextOut(0, LCD_LINE4, "Homing...");
XL320_servo(ID_ALL_MOTORS, 512, 200); // 512 should be center position
Wait(2000);
TextOut(0, LCD_LINE6, "Quitting");
PlaySound(SOUND_DOWN);

} // end main
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