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/**
 * @file motors.h
 * @brief Motor structure and a motor handler
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 *
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 */

#ifndef CARL_MOTORS_H_
#define CARL_MOTORS_H_
#include "API.h"
#include "sensors.h"
#include "debug.h"

#define clipNum(input, high, low) \
    ((input > high) ? high : (input < low) ? low : input)
#define sgn(input) ((input > 0) ? 1 : (input < 0) ? -1 : 0)
#define deadBand(input, \
    dead) ((input - dead > 0 || input + dead < 0) ? input : 0)
#define expand(input, tip, high, low) ((input > tip) ? high : low)
#define new(type) ((type *)malloc(sizeof(type)))
#define delete(pointer) free((void *)pointer)
#define create(type, name, value) new(type); *name = value

/**
 * A convenience to distinguish tasks from regular functions
 */
typedef void Task;

/**
 * A motor structure, containing a motor's port, invertation, and power
 */
typedef struct Motor {
    /** The child in the linked list of Motors */
    struct Motor *child;

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    /** The controlling Sensor to be used by default for PID */
    Sensor *sensor;

    /** Cortex port, 1-10 that the motor is plugged in to */
    unsigned char port;

    /** Whether or not the Motor is inverted */
    bool isInverted;

    /** Motor power */
    int power;

    /** Deadband for the Motor power */
    int deadband;

    /** Recalculation function */
    float (*recalc)(int);

    int          _power;
    int          _lastPower;
    unsigned long _lastTime;
    Mutex        _mutex;
} Motor;

/**
 * Configure a Motor
 *
 * @param port      the port that the motor is in
 * @param isInverted whether or not the motor is isInverted
 */
Motor motorCreate(unsigned char port,
                  bool          isInverted);

/**
 * Update and set a motor
 *
 * @param m the Motor to update
 */
void motorUpdate(Motor *m);

#endif // CARL_MOTORS_H_

```