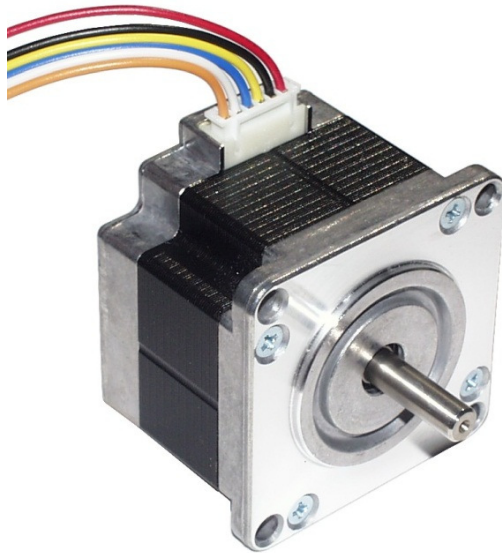


STEPPER MOTOR SPEED AND POSITION CONTROL

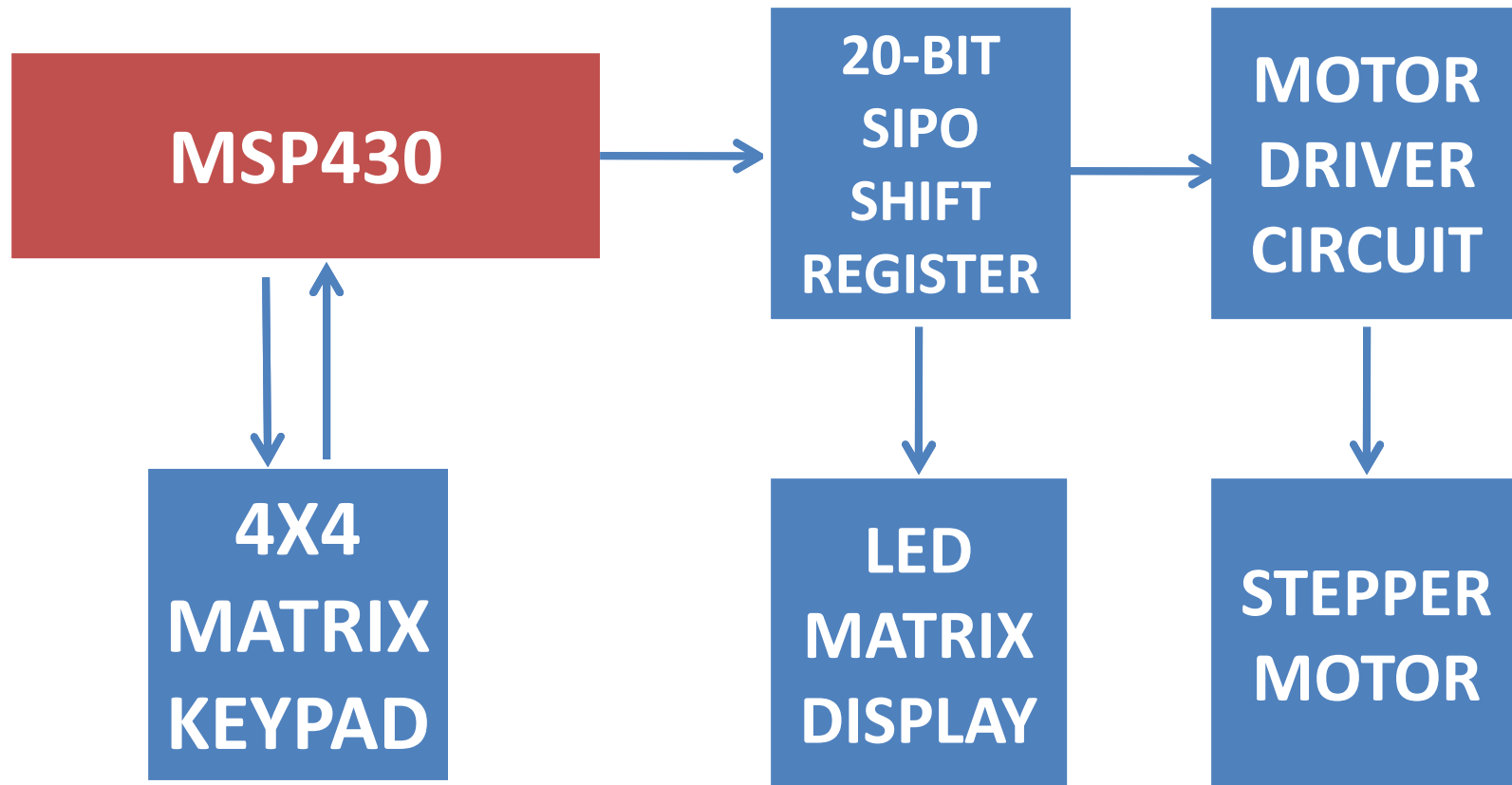


1. Subash Anigandla
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OVERVIEW

- The project aims to build a Stepper Motor Controller with speed and position control.
- The Stepper Motor Controller finds its applications in Robotics, Laboratory Positioning Equipment's, Multi Axis positioning Systems.

BLOCK DIAGRAM



KEYPAD

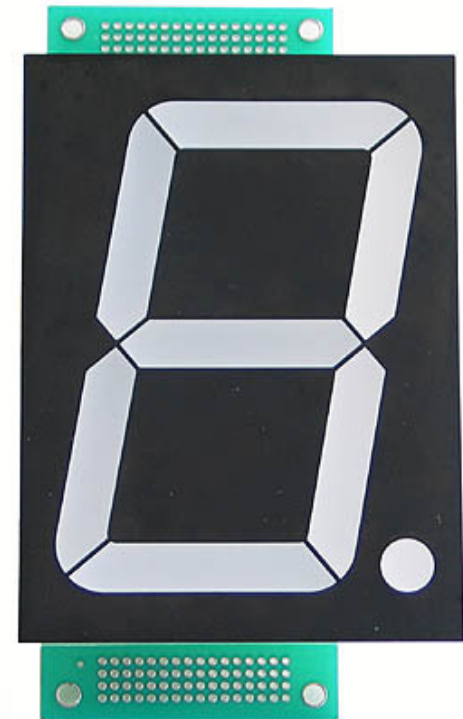
- 4 X 4 Matrix keypad is used as our input device.
- The interfacing is done via one of the multiplexed port of MSP 430 in which 4 pins are used as input and 4 pins as output.
- The keypad is used to select the speed/position mode and input the value of the speed/position.



COMPONENT ORDERED

DISPLAY

- A Seven segment display is used as an output to display the speed/position depending on user selection.
- Each seven segment display is interfaced with MSP 430 using one multiplexed port with all 8 pins configured as output.



COMPONENT ACQUIRED

STEPPER MOTOR & DRIVER

- A 24 step unipolar motor is being used for the present project application.
- The motor driver circuit consists of Darlington Transistor array with clamping diodes to isolate effects of motor transients from the Microcontroller MSP 430 and also to provide the motor with the rated current.

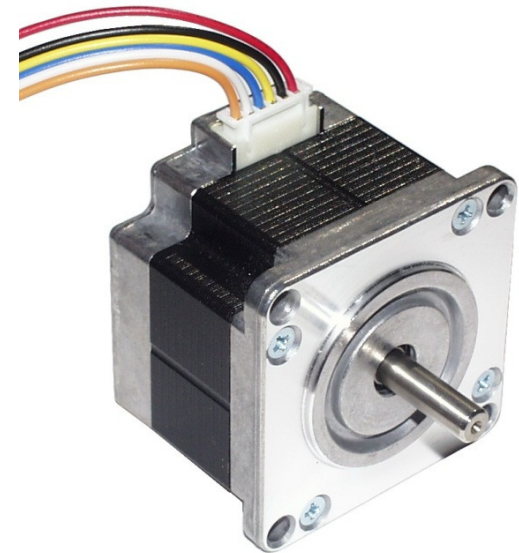


COMPONENT ACQUIRED

5v, 250mA, 24 step unipolar

STEPPER MOTOR & DRIVER

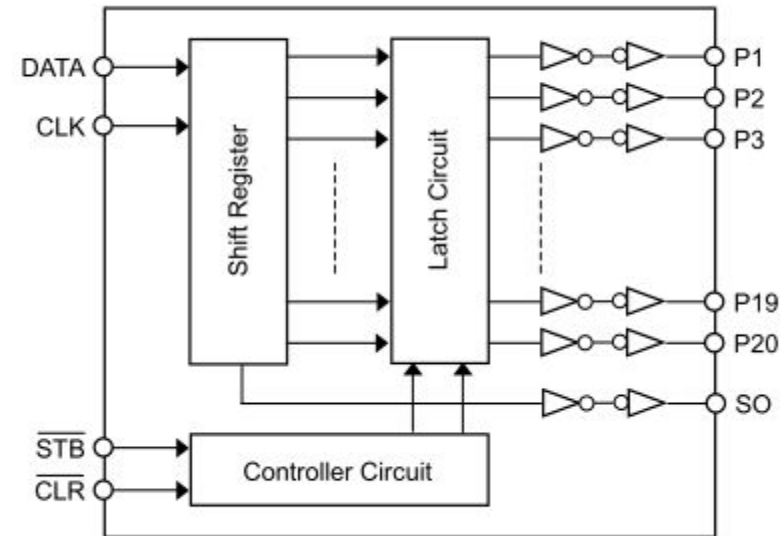
- The motor driver circuit is interfaced with the MSP 430 using 4 pins of one expanded port configured as output per motor.
- The motor speed and position control pulses are given via these four interfaced pins.



COMPONENT ACQUIRED

PORT EXPANSON

- A 20 bit Serial-in Parallel-out Shift Register with Latched Outputs is used to expand the limited ports of the MSP430.
- This expands 4 pins of MSP430 configured as output to 20 output ports.



PROJECT PROGRESS

PRESENTLY WORKING ON:

- Coding for individual components without expanded ports.

NEXT STAGE OF WORK:

- Integrating the code modules and programming using expanded ports.

CHALLENGES

- Interfacing high pin count peripherals with limited number of microcontroller I/O pins.
- Controlling the motor with overshoot/slippage due to excessive speed.
- Keeping track of Motor position during the run time without a feedback loop.

POSSIBLE ADDITIONS

- LED matrix display
- Dual motor control for Two Axis Position Control.
- Possible application as pick and place robot.
- Interactive User Interface for Robot Control using MSP430 Capacitive Touch Booster Pack.



Thank you!