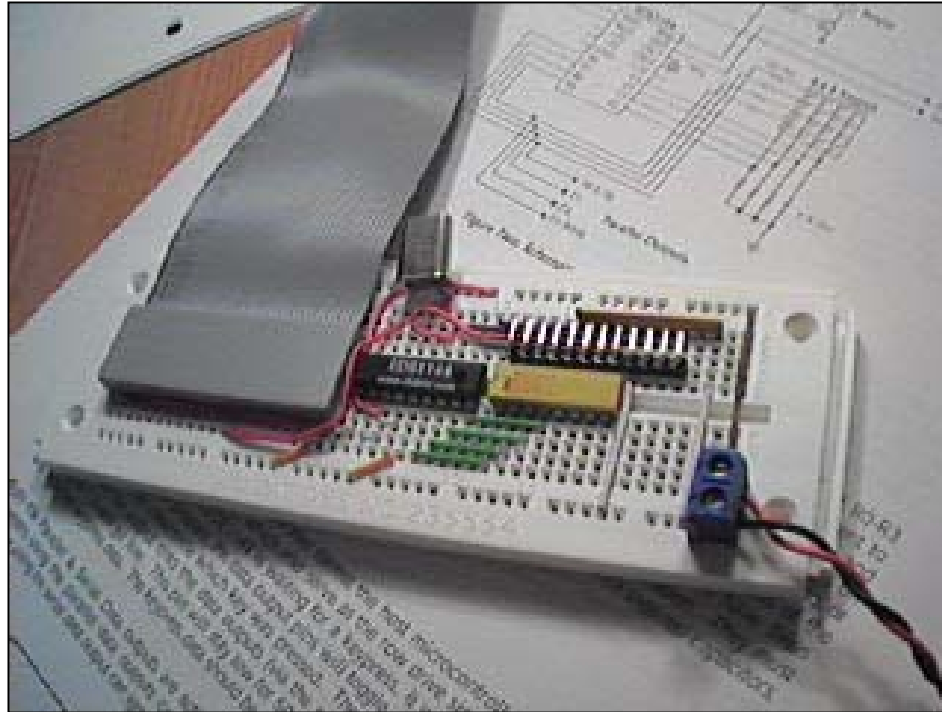
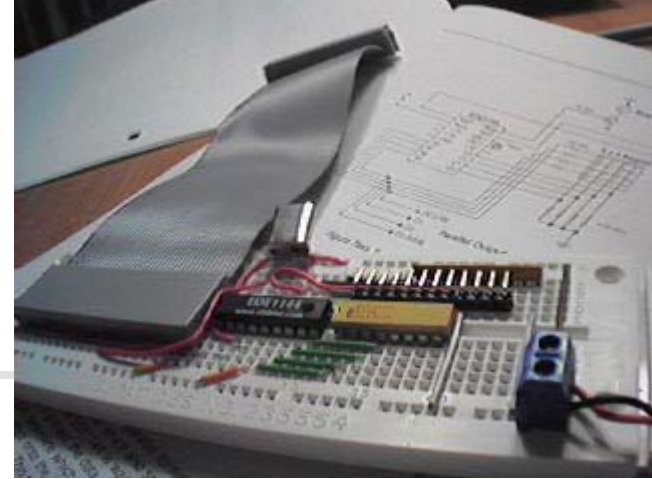


Connect a 8x2 Keypad to the 8031 SDK



Wolf Paulus

Description



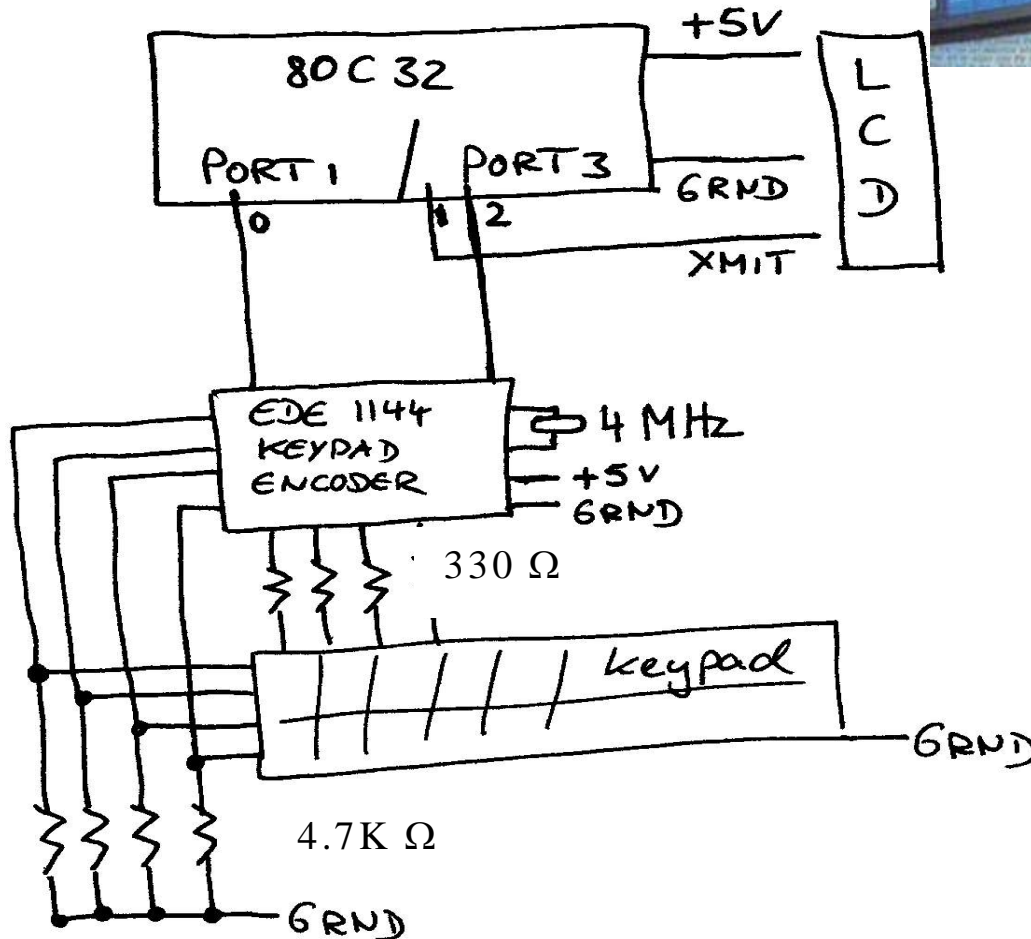
- Connect a 16 key keypad to the 8031SDK.
- Every time a key gets pressed, ASCII-encoded information is send to a serial LCD connected to the SDK's internal serial port.
- To avoid constant keypad polling, an external interrupt notifies about key-press events.
- The main program endlessly prints dots on the LCD.

Hardware



- EDE1144 keypad encoder IC interfaces a 16-key (2 rows 8 columns) keypad to the SDK's 8032 micro controller.
- Reduces the number of required I/O Pins.
- Handles contact debouncing.
- Provides interrupt signal.

Block Diagram



Software 1



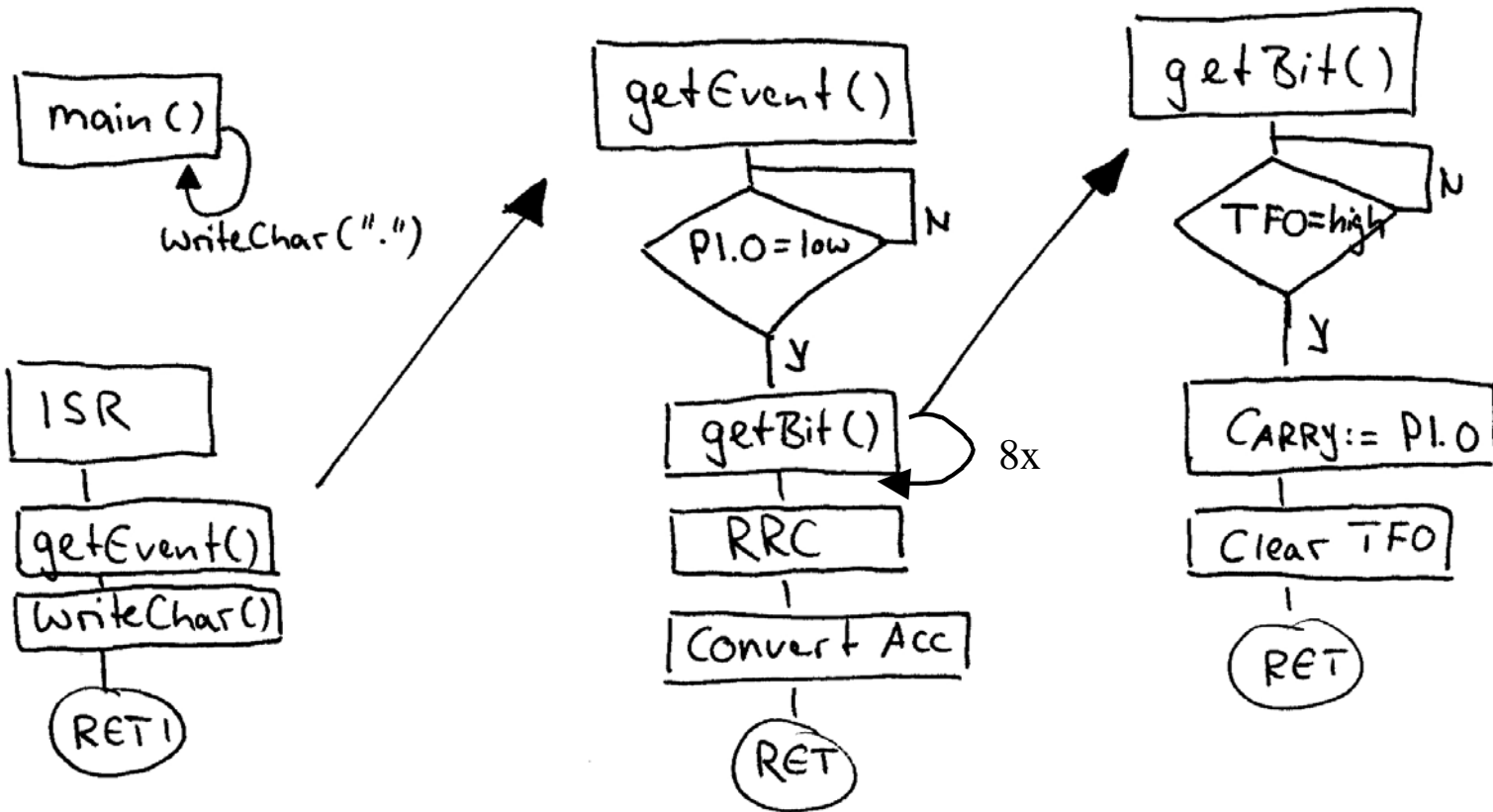
- Using a keypad encoder IC reduces the amount of work that needs to be done through software.
- The software only needs to care about one or two port pins while contact debouncing problems are sufficiently handled by the hardware.

Software 2

- main routine loops endlessly.
- interrupt service routine
(waits for P3.2 turning low)
- manually receiving serial data
(polling Pin P1.0)
- accessing external memory (Lookup Table)
- sending ASCII encoded char. through
internal serial port



Software 3

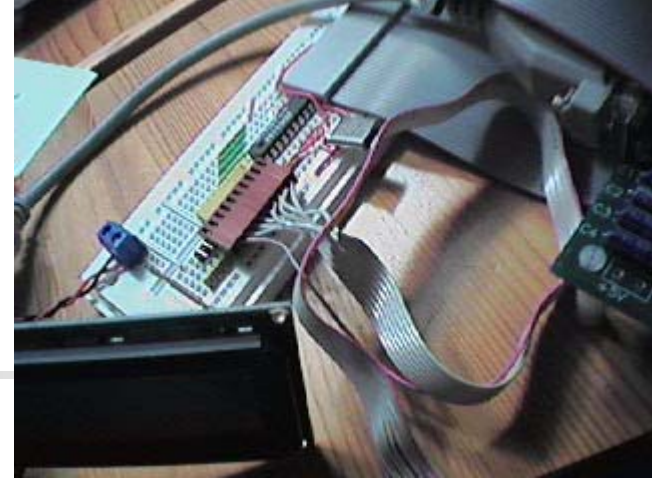




Lookup Table

| Keypad Label | EDE1144 Output | Lookup Table | Comments |
|-----------------|----------------|--------------|---------------------------------------|
| 1 | 0x30 | #'1' | |
| 2 | 0x31 | #'2' | |
| 3 | 0x32 | #'3' | |
| ↑ | 0x33 | #'U' | <i>Display 'U' (up)</i> |
| 4 | 0x34 | #'4' | |
| 5 | 0x35 | #'5' | |
| 6 | 0x36 | #'6' | |
| ↓ | 0x37 | #'D' | <i>Display 'D' & Exit main ()</i> |
| 7 | 0x38 | #'7' | |
| 8 | 0x39 | #'8' | |
| 9 | 0x41 | #'9' | |
| 2 nd | 0x42 | 0x01 | <i>LCD-Cursor Home</i> |
| Clear | 0x43 | 0x0C | <i>LCD-Clear Display</i> |
| 0 | 0x44 | #'0' | |
| Help | 0x45 | #'?' | |
| Enter | 0x46 | 0x0D | <i>LCD-Carriage Return</i> |

Analysis



- Three software version were written
- 1. Test external interrupt line P3.2
- 2. Receive data from encoder chip through P1.0
- 3. Put everything together and add Lookup-Table
- Test for odd behavior, like pressing multiple keys at the same time

Summary

- Only a few lines of code to write.
- Elegant solution, efficient, only 1 pin required.
- Expansive (encoder IC costs more than the MC).

