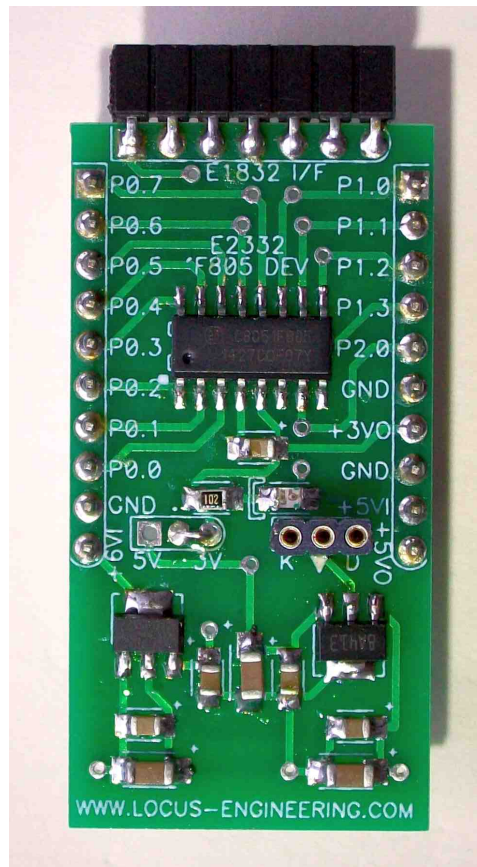


FEATURES

- 25MIPs C8051F805 microcontroller
- +5.0V, +3.3V 150mA regulators with output pins
- 3 pin C2 program interface
- Display + Select & Enter switch interface
- 13 I/O port, 10mA source, 25mA sink
- open drain or push pull outputs
- 0.100" header pin grid
- +3.6V to +12V input
- 256 + 256 bytes RAM
- 16KB Flash program memory, in-system programmable
- internal 24.5MHz oscillators
- (3) 16 bit timer/counters
- 16 bit programmable counter array
- watchdog timer
- UART to 230.4Kbaud
- 10 bit ADC @500Ksamples/s
- 12 channel analog multiplexer
- analog comparator
- 1.65V, 1.2V, 2.4V analog reference
- temperature sensor



DESCRIPTION

The E2332 Silicon Labs™ C8051F805 Microcontroller Breakout Board uses a low cost, 24MIPs high speed 8051 architecture, mixed signal microcontroller on a simple to use board including voltage regulators, test LED, and a 3 pin C2 program interface. All port I/O pins are available and a connector is provided for the Locus Engineering E1832 Display Switch Interface with options for 5V or 3.3V operation. This development board is ideal for mixed signal projects as it includes analog multiplexer, ADC, and reference voltages.

Table 1. Absolute Maximum Ratings

Parameter	Rating
V_{in} or $+5V_{in}$ to GND	-0.3 to +16.0V
Port pin input voltage to GND	-0.3 to +5.8V
Port pin output current	100mA
Supply current through Vdd or GND	500mA
Storage temperature range	-65 to +150°C

Table 2. Electrical Characteristics

Test Conditions: Supply Voltage $V_{in} = +6.0V$, $T_{ambient} = 25^{\circ}C$, unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{in}	Supply voltage @150mA	6.0	5-6	9.0	V
$+5V_{in}$	Supply voltage @150mA	4.8	5-6	7.3	V
I_{dd}	Supply current @3.3V, see C8051F805 datasheet for specifics			6.5	mA
V_{IH}	Digital high input voltage	2.48V			V
V_{IL}	Digital low input voltage			0.99	V
V_{OH}	Digital high output voltage	2.5V @Iout -10mA			V
V_{OL}	Digital low output voltage			1.0V @Iout 25mA	V
$T_{operate}$	Operating temperature	-40		+85	°C

General Precautions

Charged devices and circuit boards can discharge without warning. Proper ESD precautions should be followed to avoid failure.

This device is not authorized for use in any product where the failure or malfunction of the product can reasonably be expected to cause failure in a life support system or to significantly affect its operation.

Locus Engineering Inc. reserves the right to make changes at any time without notice to improve product features or reliability.

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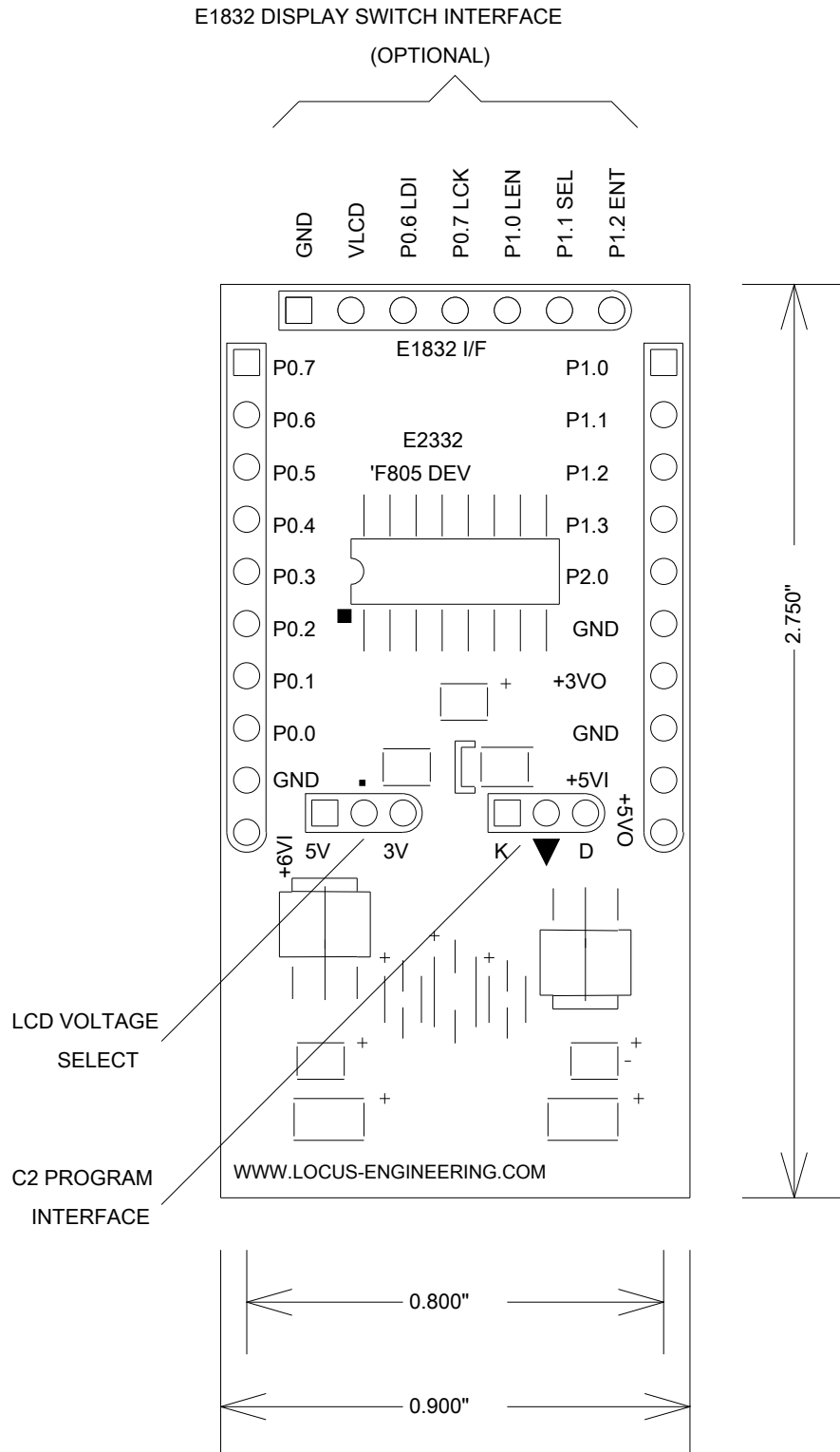


Figure 1. Module Pinout

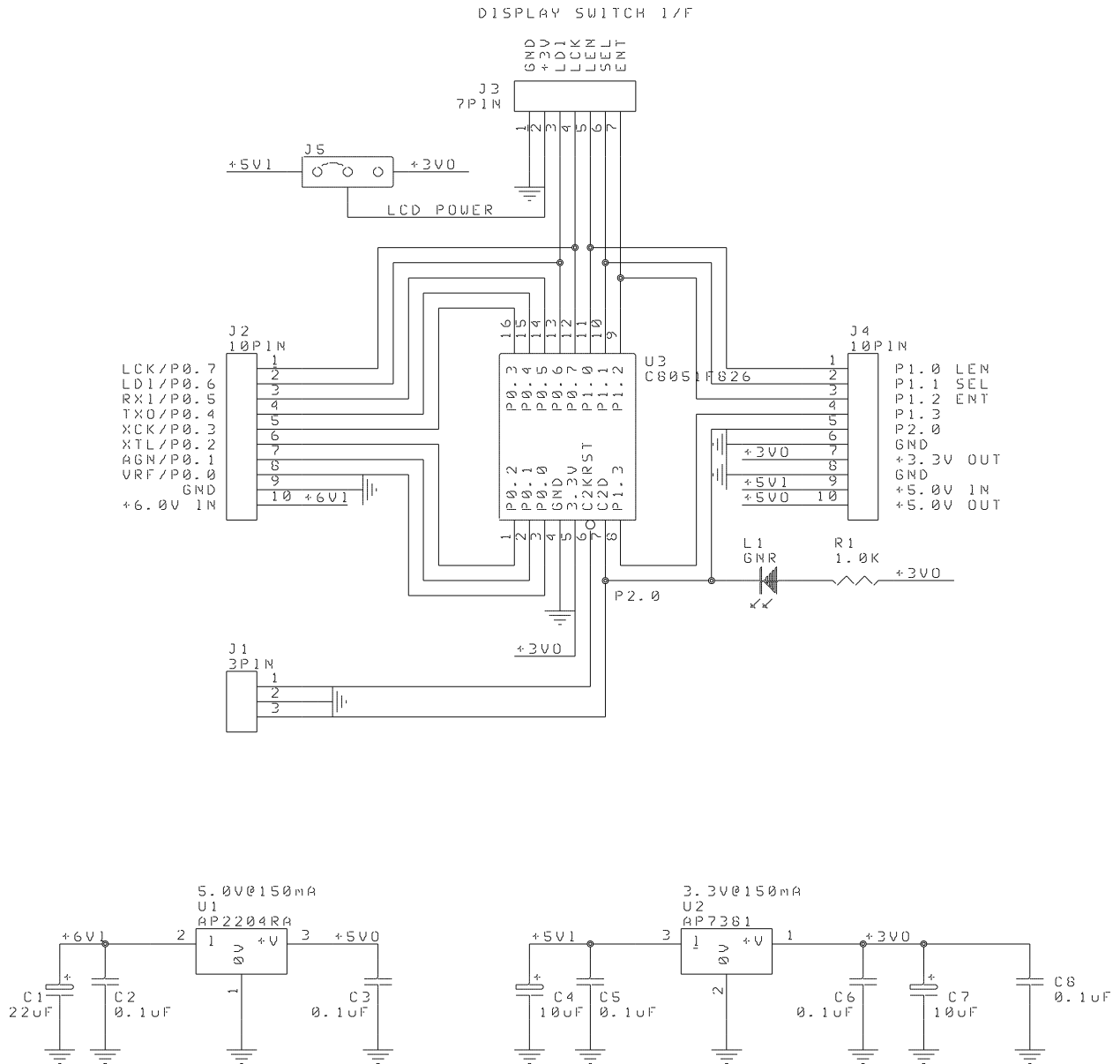


Figure 2. Schematic

Installation

The module is easiest installed on a breadboard with a 0.100" grid. There are two power supply options depending on which of 5V or 3.3V is needed for the LCD interface.

To use the 5V regulator to supply a 5V LCD, connect a power supply providing 6V to 9V with a minimum of 200mA to Vin and 0V of J2.10 and J2.9 respectively (bottom left hand side of the module). Place an external jumper to the 5Vin to 5Vout (J4.9 and J4.10 respectively on the bottom right hand side of the module). To route the 5V to the LCD, solder a jumper between the 5V and center pad of the LCD Voltage Select. Check the regulator output on the module for 5.0V and 3.3V.

To use only the 3.3V regulator, connect a 5V power supply to the 5Vin and 0V (J4.9 and J4.8 respectively on the bottom right hand side of the module) and leave the 5Vout pin unconnected. To route the 3.3V to the LCD, solder a jumper between the 3.3V and center pad of the LCD Voltage Select. Check the regulator output on the module for 3.3V.

Port I/O

The port pins can sink 25mA or source 10mA, the total of which should not exceed the 150mA regulator current limit. Input voltages should be limited to 5.8V for the port pins. Input voltages are typically CMOS with <0.99V for a guaranteed low and >2.50V for a guaranteed high. Port pins used as outputs should be configured appropriately with pullup resistors for open drain, or set as push-pull.

The following table summarizes the module pinouts and some of the special functions associated with some port pins:

Table 3. Pin Descriptions

Left Module Connector J2		Display Switch Interface Connector J3		Right Module Connector J4	
J2.1	P0.7, LCD serial clock	J3.1	LCD Ground	J4.1	P1.0, LCD enable
J2.2	P0.6, LCD serial data	J3.2	LCD supply voltage	J4.2	P1.1, Select switch
J2.3	P0.5, serial port receive	J3.3	P0.6, LCD serial data	J4.3	P1.2, Enter switch
J2.4	P0.4, serial port transmit	J3.4	P0.7, LCD serial clock	J4.4	P1.3
J2.5	P0.3, external clock input	J3.5	P1.0, LCD enable	J4.5	P2.0, C2D, LED
J2.6	P0.2	J3.6	P1.1, Select switch	J4.6	Ground
J2.7	P0.1, ADC analog ground	J3.7	P1.2, Enter switch	J4.7	+3.3Vout
J2.8	P0.0, ADC reference			J4.8	Ground
J2.9	Ground			J4.9	+5Vin
J2.10	6V to 9V input			J4.10	+5Vout

C2 Program Interface

The C2 Program Interface requires the Silicon Labs™ USB Debug Adapter and the Locus Engineering E1947 3 Pin C2 Program Interface Adapter, the latter converting between the 10 pin IDC connector to a 3 pin 2mm connector. The latest Silicon Labs™IDE can be downloaded from their website. The LED is connected to P2.0 which is also the C2 serial data during debug. If P2.0 is to be used, no additional load should be added unless the LED is disconnected otherwise the device will not program.

Display Switch Interface

The module includes a connector compatible with the E1832 Display Switch Interface which has a three wire serial LCD and Select & Enter switches. Port pins P0.6 to P1.2 are reserved for these functions if the display switch interface is used.

Table 4. Display Switch Interface Port Pin Allocation

P0.6	P0.7	P1.0	P1.1	P1.2
LCD Serial Data	LCD Serial Clock	LCD Enable	Select Switch	Enter Switch

The E1832 supply voltage is selected with a jumper to the center pad of the LCD Voltage Select J5; this allows 5V or 3.3V LCDs to be used. Ensure that the LCD backlight current doesn't add to exceed the maximum regulator current.

Voltage Regulators

The module uses two voltage regulators, one at 5V and one at 3.3V. The 5V regulator is rated at 150mA with a dropout voltage of 0.27V. The 3.3V voltage regulator is a low dropout type with $V_{do}=0.17V @ 100mA$. Both regulator outputs are available to power the LCD interface or external circuitry, keeping in mind the maximum current ratings.