

Specifications

Key Specifications

- Power Requirements: 3.3 or 4 to 9 VDC, up to 500 mA
- Communication Interface: USB, 3.3 V serial, I2C
- Operating temperature: -40 to +185 °F (-40 to +85 °C)
- Dimensions: 2.0 x 3.0 x 0.36 in (5.0 x 7.6 x 0.84 cm)

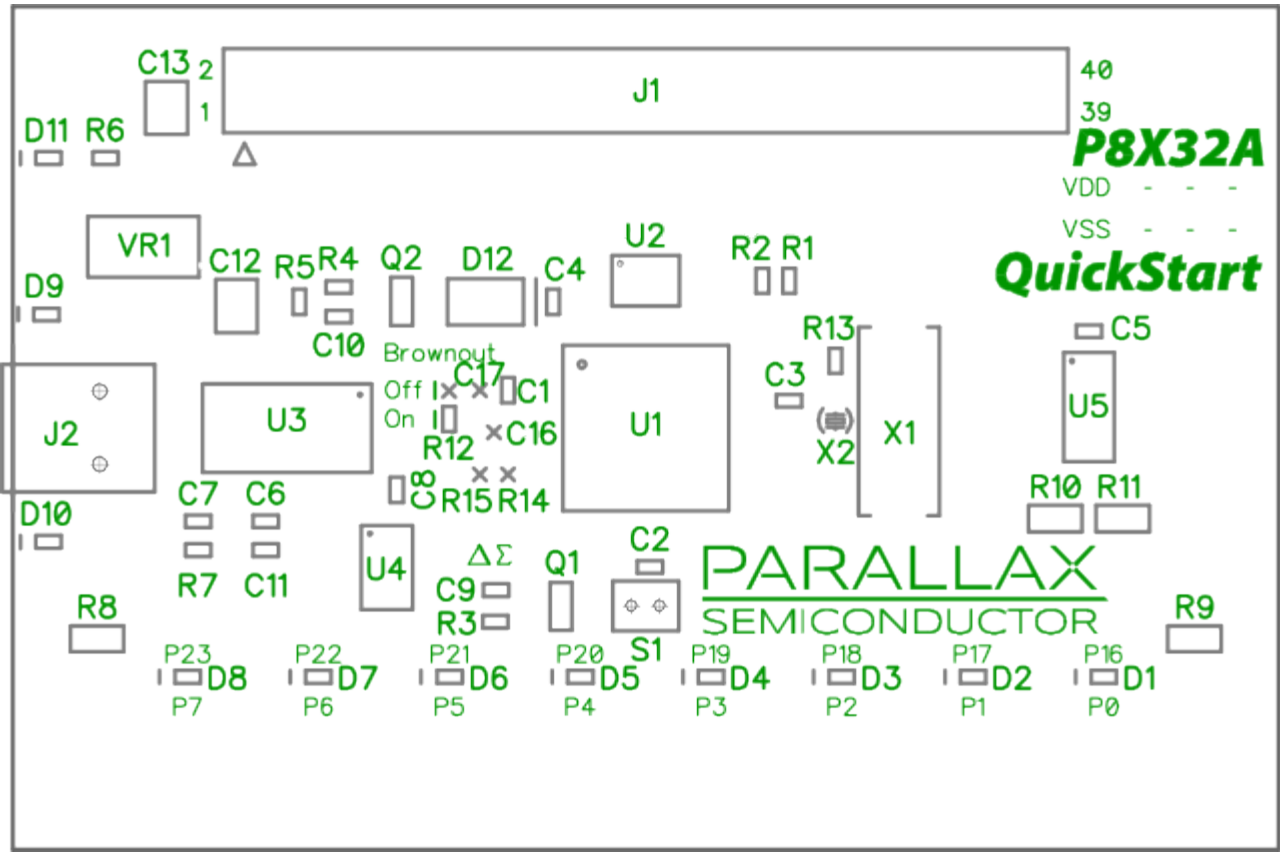
Operating Specifications

Symbol	Parameter	Minimum	Typical	Maximum	Units
Vin	Supply Voltage on J1 pin 40	4.0	5.0	9.0	V
Vdd	Supply Voltage on J1 pin 38	3.0	3.3	3.6	V

Absolute Maximum Ratings

Symbol	Parameter	Minimum	Maximum	Units
Vin	Supply Voltage on J1 pin 40	-0.3	18	V
Vdd	Supply Voltage on J1 pin 38	-0.3	4	V

Component Locations



Parallax P8X32A Propeller Microcontroller

The Propeller microcontroller, U1, is an 8-core low power microcontroller with 32 KB SRAM and up to 20 MIPS per core. By partitioning separate tasks into separate cores, the Propeller can load programs and

features and reallocate resources on the fly, without the overhead of an operating system. Features that often require dedicated hardware can be defined in software and run in parallel. When running at a total of 160 MIPS, the power consumption is usually less than 80 mA. For more information, refer to the Propeller P8X32A datasheet.

USB Port

The USB mini B port, J2, connects to an FTDI FT232RL USB to serial converter, U3. The I/O pins from U3 are buffered through U4. The TXD pin from U3 connects to RX, or P31, on the Propeller. The RXD pin from U3 connects to TX, or P30, on the Propeller. The USB circuitry, including U3 and U4, is powered from the USB bus, so when there is no USB connection present, the unpowered buffer's inputs and outputs will float, leaving P30 and P31 available for other uses, included programming the Propeller from an external device.

Power LED

The power LED, D11, will light green with sufficient power on Vdd. It may also light or partially light with insufficient power on Vdd.

LEDs

D1 through D8 indicate the status of P0 through P7, respectively. The LEDs are driven through a buffer, so they do not load the I/O pins. If the P0 through P7 are left floating, the LEDs may light when the respective I/O pin floats high. To ensure that they stay off when the I/O pin is not in use, drive the I/O pin low.

Resistive Touch Buttons

P0 through P7 are connected to resistive touch buttons. Each button is a pad, surrounded by ground pads, connected through a 100 K ohm ESD protection resistor, to the I/O pin. When the buttons are not in use, they will not load the I/O pins. When touched, they will add negligible resistive loading. To read the state of the button, set the I/O pin as a high output, then immediately switch it to an input, then measure the amount of time before the I/O pin falls low. If nothing is touching the pad, the parasitic capacitance of the I/O pin and the PCB will hold the input high for several milliseconds. Alternately, instead of measuring the fall time, measure the input state 1 millisecond after the pin was switched to an input. See the "[Touch Buttons LED Demo](#)" from the Downloads below.

Serial EEPROM

The 64 KB EEPROM is connected to the I2C bus on P27 and P28. The lower 32 KB contain the program that the Propeller loads on reset. The upper 32 KB should be used for non-volatile data storage, such as network settings. For more information, refer to the AT24C512 datasheet.

Crystal

The QuickStart includes a 5 MHz crystal, for use when running at either 5 MHz without the use of a PLL, or 5, 10, 20, 40, or 80 MHz when used with the internal PLL. The Propeller can also run at nominal 20 kHz or 12 MHz using internal RC time constants. The 5 MHz crystal is connected through a surface-mount shunt, R13, which can be removed to disconnect the crystal. For custom crystal frequencies, remove the shunt and add another crystal to the unpopulated crystal socket, X2. The Propeller can also be driven through the X1 line on the accessory connections, with or without the shunt present.

Brownout Detector

The Propeller's built in brownout voltage detector is enabled, by default, through a surface mount shunt, R12. For operation at or lower than 3.0 VDC Vdd, move R12 from the position marked "On" on the PCB to the position marked "Off". To ensure stability, use an external brownout voltage detector rated for 2.7 VDC or higher.

Reset Button

The reset button, when pressed, will force the Propeller to reset which will cause it to reload any code present in the EEPROM.

Delta Sigma ($\Delta\Sigma$) Digital to Analog Conversion

The unpopulated R14, R15, C16, and C17 pads are available for experimenting with Delta Sigma modulation. R15 is the input resistor, R14 is the feedback resistor, and C16 and C17, in parallel, act as the capacitor. The plated-through just below R15 is the input, and the plated-through just below R14 is ground.

Accessory Header

The Accessory Header, J1, includes connections for power, USB signals, and all Propeller I/O pins, included those used in the I2C bus and those used for USB communications.

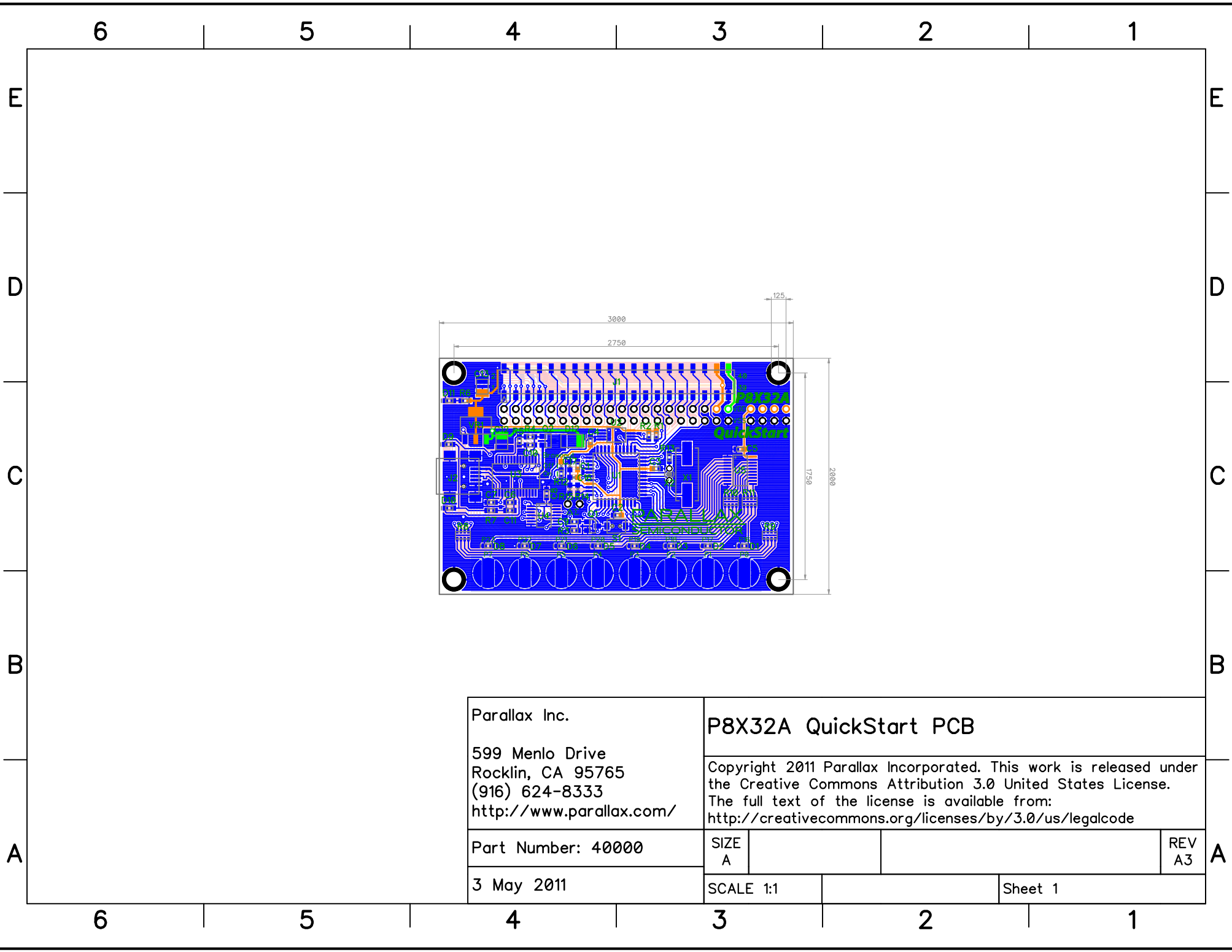
Accessory Header Connections

Bottom Row			Top Row		
Pin	Connections	Functions	Pin	Connections	Functions
1	P0	I/O Pin	2	P1	I/O Pin
3	P2	I/O Pin	4	P3	I/O Pin
5	P4	I/O Pin	6	P5	I/O Pin
7	P6	I/O Pin	8	P7	I/O Pin
9	P8	I/O Pin	10	P9	I/O Pin
11	P10	I/O Pin	12	P11	I/O Pin
13	P12	I/O Pin	14	P13	I/O Pin
15	P14	I/O Pin	16	P15	I/O Pin
17	P16	I/O Pin	18	P17	I/O Pin
19	P18	I/O Pin	20	P19	I/O Pin
21	P20	I/O Pin	22	P21	I/O Pin
23	P22	I/O Pin	24	P23	I/O Pin
25	P24	I/O Pin	26	P25	I/O Pin
27	P26	I/O Pin	28	P27	I/O Pin
29	SDA	I2C Serial Data	30	/USB_PWR_EN	Allow Power Sourcing from the USB Port
	P29	I/O Pin			
31	SCL	I2C Serial Clock	32	XI	Propeller Clock Input Pin for External Driving
	P28	I/O Pin			
33	TX	Propeller Transmit Pin at Start Up	34	/RTS	Inverted RTS Signal from USB to Serial Converter
	P30	I/O Pin			
35	RX	Propeller Receive Pin at Start Up	36	/CTS	Inverted CTS Signal from USB to Serial Converter

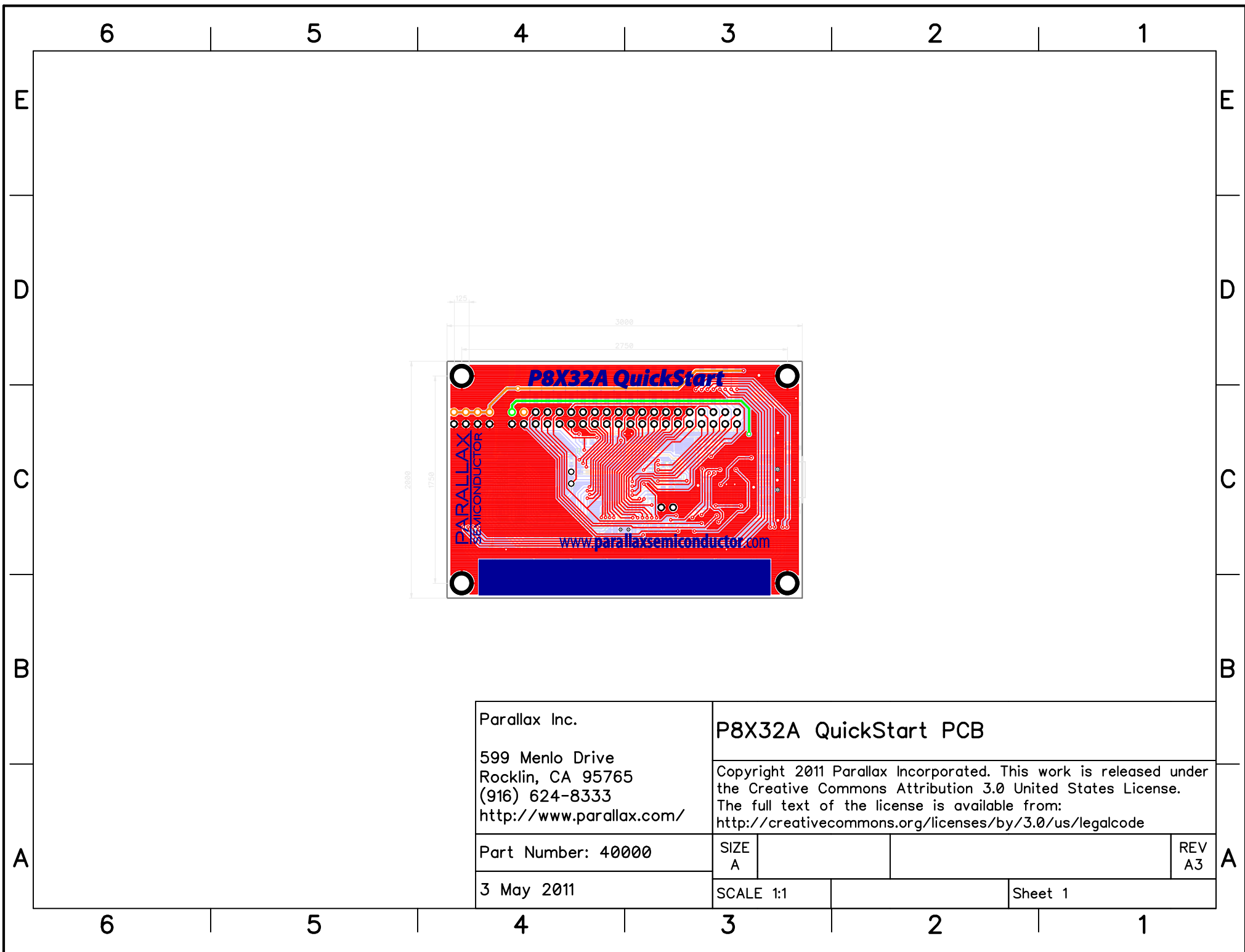
	P31	I/O Pin			
37	RESn	Propeller Reset Pin	38	Vdd	Regulated 3.3 VDC Input
39	Vss	Ground	40	Vin	Unregulated 4 to 9 VDC Input

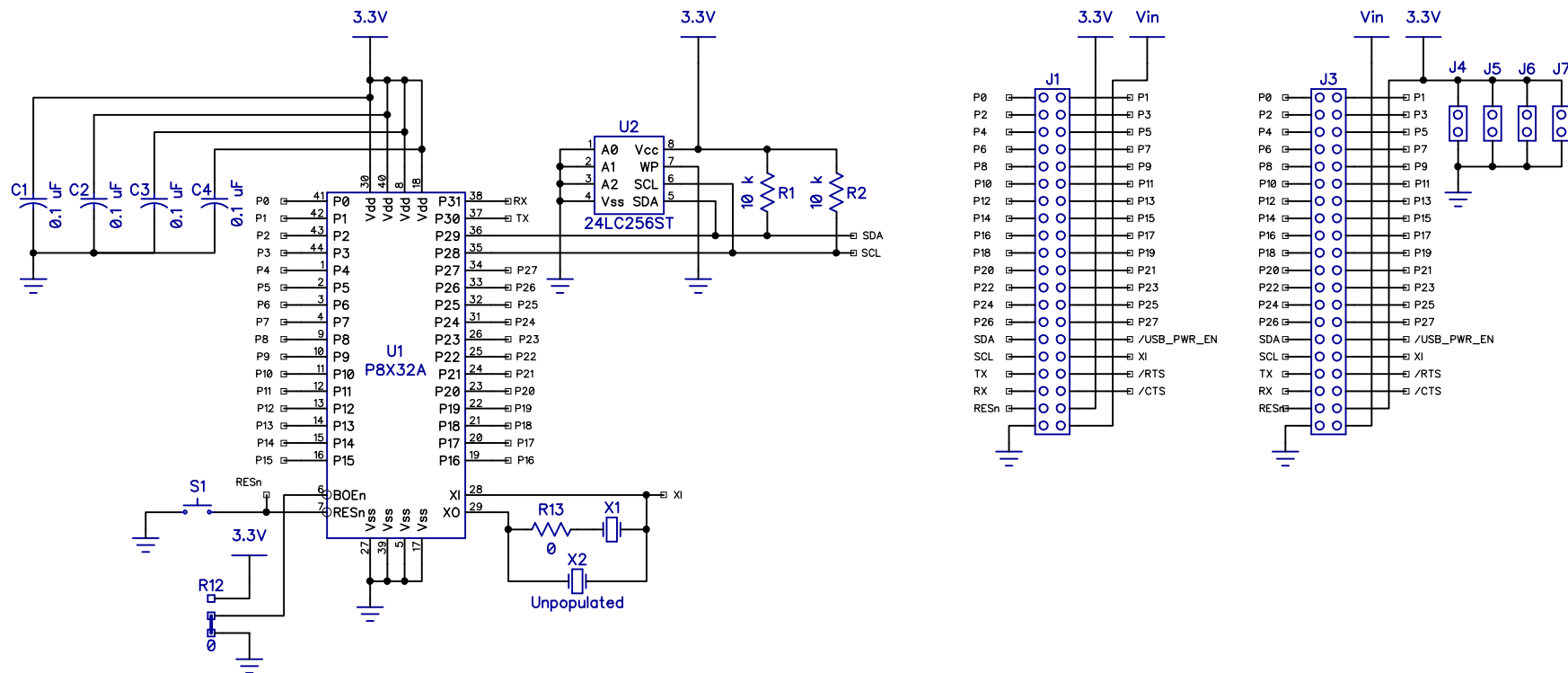
I/O Pin Functions

- P0 through P7 —General purpose input/output pins. Also connected to the resistive touch buttons. When not in use, the buttons will not load the I/O pins. When touched, they will add negligible resistive loading.
- P8 through P15 —General purpose input/output pins.
- P16 through P23 —General purpose input/output pins. Signals are buffered and displayed on D1 through D8, with the most-significant bit on the left.
- P24 through P27 —General purpose input/output pins.
- P28, SCL —I2C serial clock pin. Pulled to Vdd. Connected to the built-in EEPROM. Can be connected to external I2C devices.
- P29, SDA —I2C serial data pin. Pulled to Vdd. Connected to the built-in EEPROM. Can be connected to external I2C devices.
- P30, TX —Propeller transmit at start-up. General purpose input/output pin after start-up. Connected to the USB to serial converter receive pin.
- P31, RX —Propeller receive at start-up. General purpose input/output pin after start-up. Connected to the USB to serial converter transmit pin. Do not drive when the USB circuitry is powered.
- RESn —Propeller reset pin, inverted. Pulled to Vdd. Driven low on internal reset. Drive low to externally reset the Propeller.
- /USB_PWR_EN —USB power enable pin, inverted. Pulled to USB 5 V supply. Internally driven low after successful USB power negotiation. Can be externally driven low to force the USB power input to drive the QuickStart power supply, such as when powering from a USB charger.
- XI —Propeller clock input. Do not load when not in use. Can drive the Propeller clock from an external signal, using the XINPUT directive.
- /RTS —USB to serial converter Request To Send output, inverted.
- /CTS —USB to serial converter Clear To Send input, inverted.
- Vdd —Propeller power supply. Drive with 2.7 to 3.6 volts. Internally driven to a nominal 3.3 volts with sufficient voltage on the Vin pin, or from the USB bus when /USB_PWR_EN is low.
- Vin —Voltage regulator input. Drive with 4 to 9 volts. Internally driven to a nominal 5 volts, from the USB bus when /USB_PWR_EN is low.
- Vss —Ground



Parallax Inc.		P8X32A QuickStart PCB		
599 Menlo Drive Rocklin, CA 95765 (916) 624-8333 http://www.parallax.com/		Copyright 2011 Parallax Incorporated. This work is released under the Creative Commons Attribution 3.0 United States License. The full text of the license is available from: http://creativecommons.org/licenses/by/3.0/us/legalcode		
Part Number: 40000	SIZE A			REV A3
3 May 2011	SCALE 1:1	Sheet 1		





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P8X32A QuickStart Schematic

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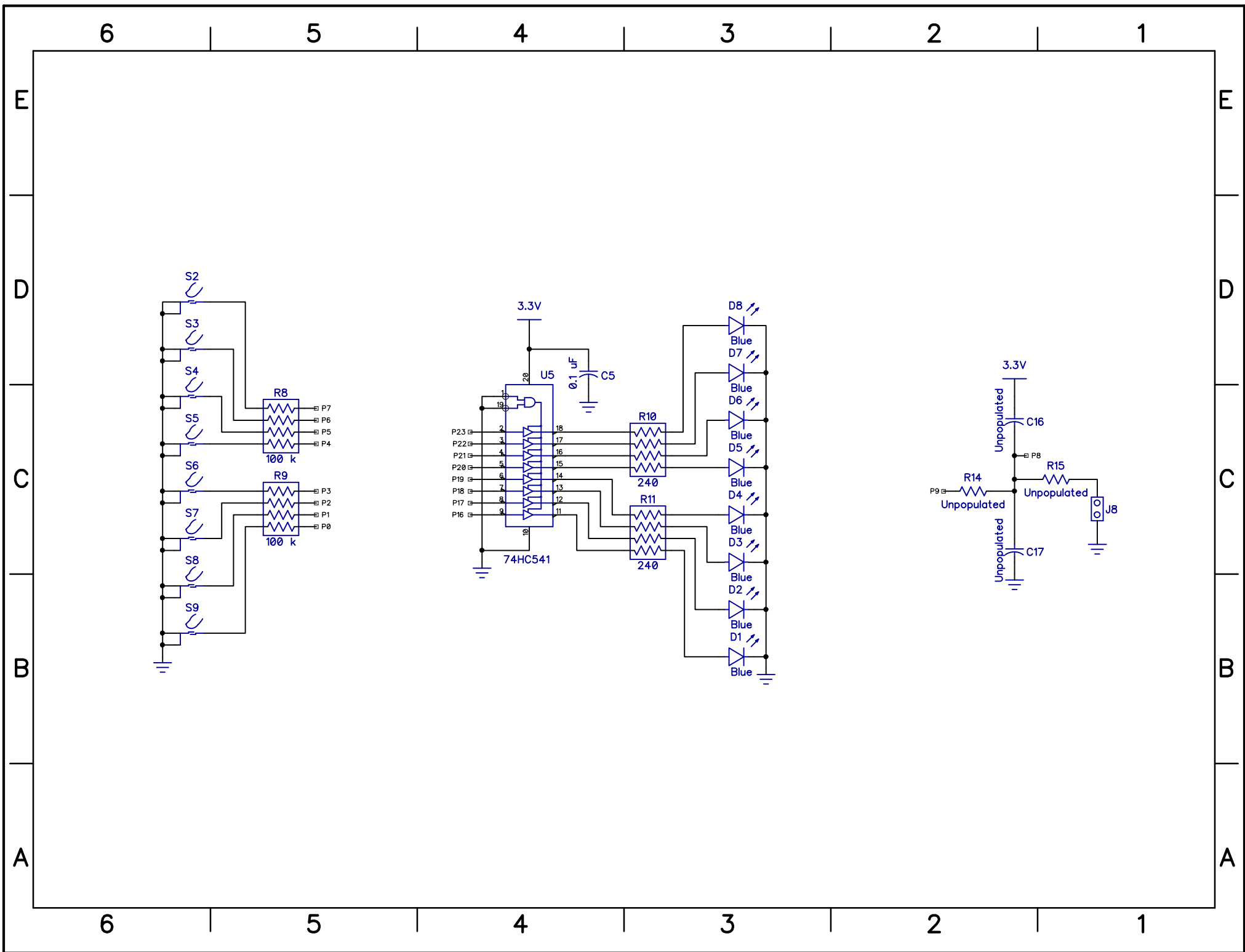
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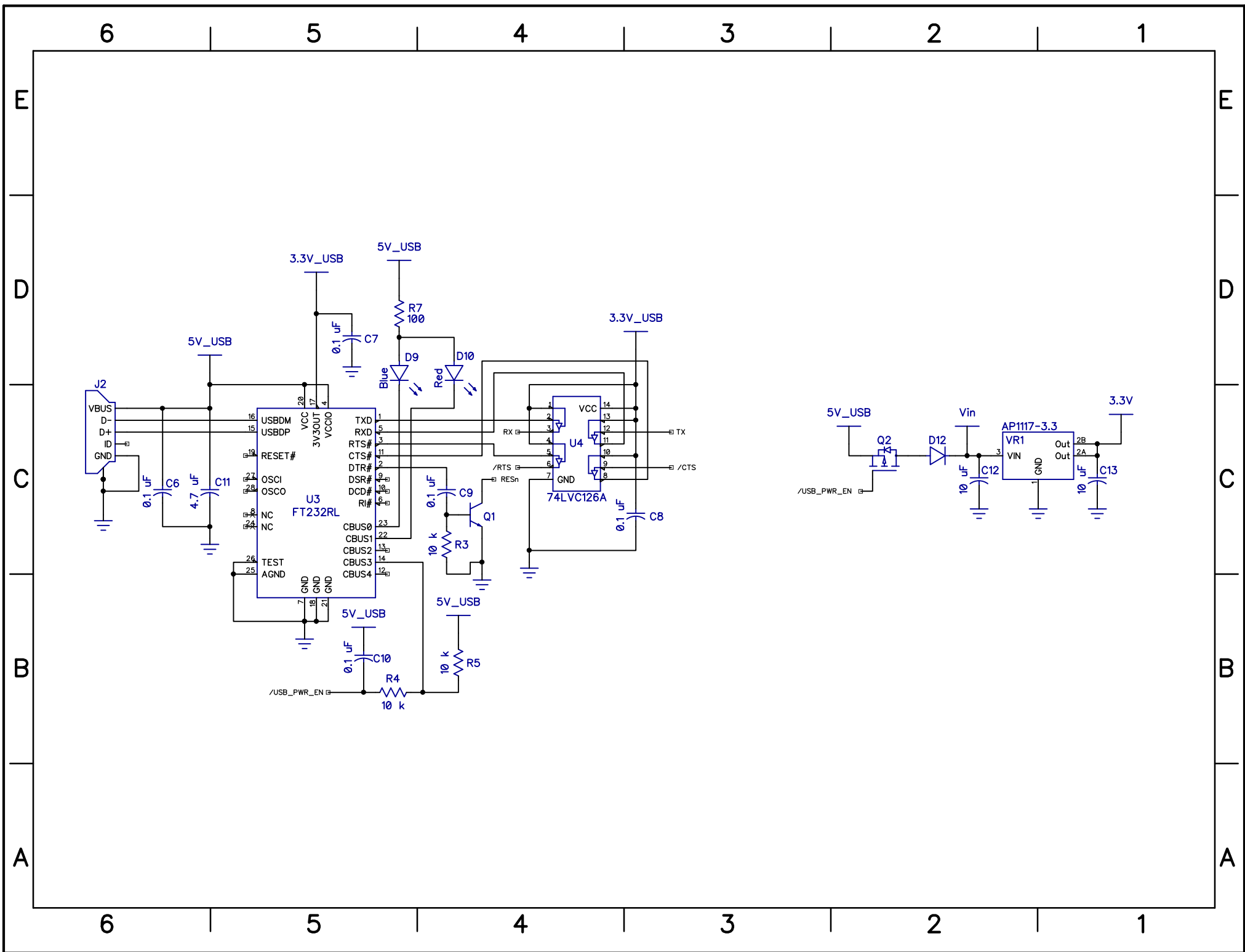
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QuickStart.dch





Bill of Materials — P8X32A QuickStart

Part Number: 40000

Latest Revision: A3

Product Owner: David Carrier

Last Updated: 5/6/2011

Stock Code	Quantity	Reference Designator	Description	Manufacturer or Supplier	Orderable Part Number	Notes
124-40000	1		Box Sleeve, QuickStart			
150-11031	5	R1-R5	RES,10K,5%,0603			
150-11045	1	R6	RES,220,5%,0603			
172-01010	1	R7	RES,100,5%,0603			
172-15007	2	R12-R13	RES,0 OHM,0603, 1/10W	Digi-Key	RMCF0603ZT0R00TR-ND	
179-10610	2	R8-R9	RES-NTWK,100K,0612	Digi-Key	YC164J-100KTR-ND	
179-10611	2	R10-R11	RES-NTWK,240,0612	Digi-Key	YC164J-240TR-ND	
210-10001	2	C12-C13	CAP-CER,10uF,16V,Y5V,1210	Digi-Key	445-1597-6-ND	
213-01040	10	C1-C10	CAP-CER,0.1uF,20%,25V,Y5V,0603			
213-04761	1	C11	CAP-CER,4.7uF,20%,10V,X5R,060			
251-15000	1	X1	CRYSTAL 5.000 MHZ 18PF SMD			
300-40000	1		Raw, PCB, QuickStart			
350-10001	1	D10	LED 0603, Super Red Clear-LF			
350-10003	1	D11	LED 0603, Green Clear-LF			
350-10004	9	D1-D9	LED 0603, Blue Clear LF			
400-10003	1	S1	Tact Switch SMD-LF			
452-10006	1	J2	CON,USB Mini-B,SMD			
452-11001	1	J1	COM-HDR,2X20,SMD,0.1"	Digi-Key	68046-620LF-ND	
500-10011	1	Q2	MOSFET P-CH 20V 3.7A SOT-23			
500-10019	1	Q1	TRN-NPN 2N3904,SOT-23			
501-10018	1	D12	DIODE,SCHOTTKY,20V,1A,DO-214AC	Digi-Key	641-1014-6-ND	
601-10335	1	VR1	IC-REG,3.3V,1A,SOT223			
602-10017	1	U2	IC Microchip 24LC256-I/ST - LF			
603-10008	1	U4	74LVC126A	Digi-Key	568-2288-6-ND	
603-10009	1	U5	74HC541	Digi-Key	296-8335-6-ND	
604-00043	1	U3	FTDI 232 RL			
P8X32A-Q44	1	U1	P8X32A-Q44 (QFP)			
X10-00300	1		Bag ESD Heat Pink 6x4			