# Propeller™ Professional Development Board (#32111)

Introduction

The Propeller Professional Development Board (PPDB) is a high-quality, fully-integrated development platform for the Propeller microcontroller. A wide variety of typical I/O (LEDs, Buttons, etc.) devices and circuitry are built into the PPDB, providing the developer with an ideal platform for rapid Propeller project development.

Features

- 40-pin DIP socket for P8X32A-D40 Propeller microcontroller
- 24LC256 32K EEPROM included
- 5 MHz crystal included
- 5V and 3.3V regulators on board
- Built-in USB programming interface
- Six blue 16-segment LED displays (5V & 3.3V compatible)
- Sixteen blue discrete LEDs (5V & 3.3V compatible)
- L293D high-current driver for motors, solenoids, etc.
- Eight active-low push-buttons with 3.3V pull-ups
- Eight active-low DIP switches with 3.3V pull-ups
- Two 10K potentiometers
- Eight servo headers with selectable on-board/external power source
- DS1302 real-time clock with battery backup/charging capability
- MAX4411 headphone amplifier with 1/8" stereo phone jack
- MAX3232E RS-232 DCE interface
- RCA jack for broadcast TV or composite video
- Two PS/2 ports with 5V power and 3.3V pull-ups on clock/data lines
- 15-pin HD D-sub connector for VGA monitor
- Ground terminal for oscilloscope ground clip

Propeller Professional Development Board (#32111)
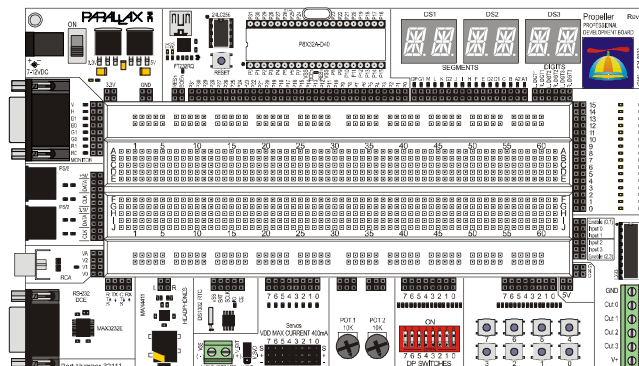
Connections and Devices
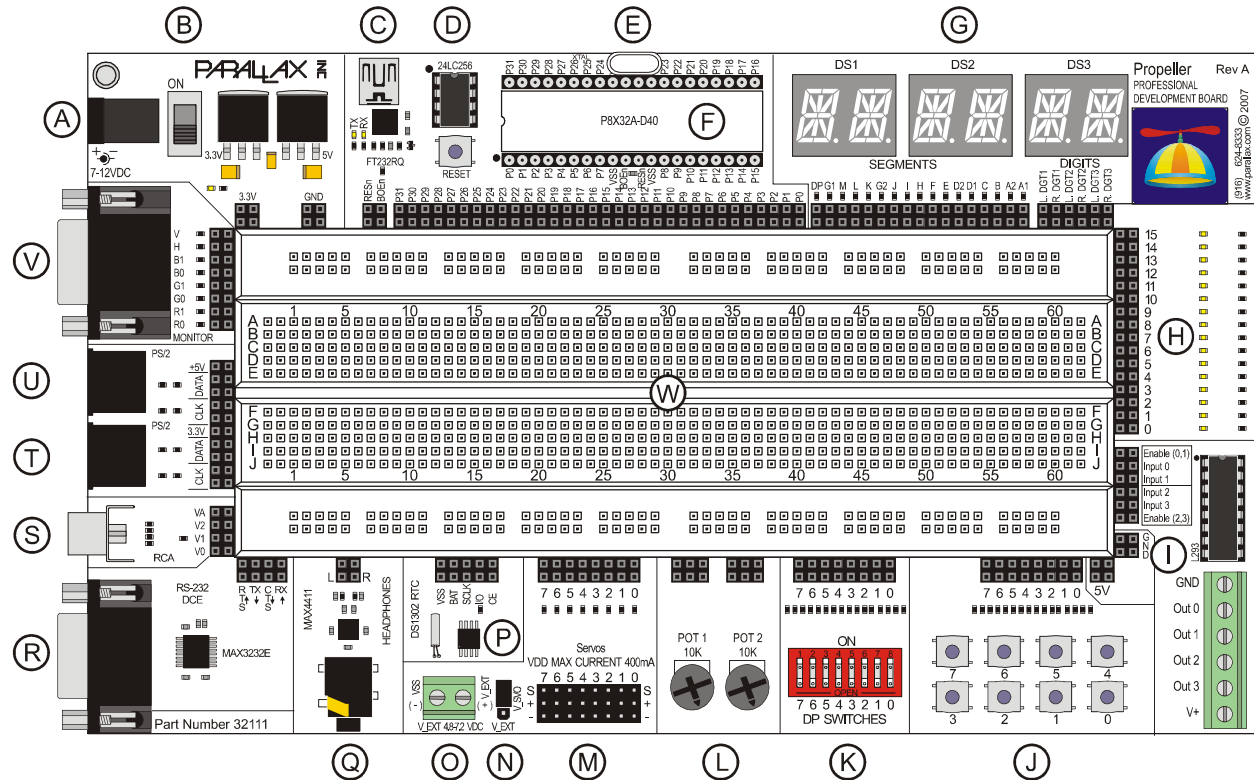
A) 2.1 mm barrel power connector, center positive, input voltage range 7-12 VDC
B) Power switch
C) USB programming interface, 5-pin mini-B connector
D) 24LC256 EEPROM
E) 5 MHz crystal
F) 40-pin machined socket for P8X32A-D40
G) Six blue 16-segment LED displays (5V & 3.3V compatible)
H) Sixteen blue discrete LEDs (5V & 3.3V compatible)
I) L293D high-current quad half-H driver
J) Eight active-low push-buttons with 3.3V pull-ups
K) Eight active-low DIP switches with 3.3V pull-ups
L) Two 10K potentiometers
M) Eight servo headers
N) On-board/External voltage selection jumper for servo power
O) External voltage terminal for servo power
P) DS1302 real-time clock (external battery connection available)
Q) MAX4411 headphone amplifier with 1/8" stereo phone jack
R) MAX3232E RS-232 DCE line driver
S) RCA jack for NTSC/PAL composite/broadcast video/audio
T) PS/2 connector (5V power, 3.3V pull-ups on clock/data)
U) PS/2 connector (5V power, 3.3V pull-ups on clock/data)
V) 15-pin HD D-sub connector for VGA monitor
W) Solderless breadboard for connecting external components

Resources and Downloads

You may download the schematic for the PPDB free from our website by typing the product number (32111) into our search box. Please refer to the PPDB schematic for detailed information about each circuit on the board. For additional information on some of the integrated circuits included on the PPDB, such as the L293D, DS1302, MAX4411 or MAX3232E, please download the manufacturer's datasheet from their respective websites. You can also search Google for this information as well as additional application notes.

Solderless Breadboard

Many experiments will involve components placed in the solderless breadboard. Since the power busses do not extend the length of the breadboard it I a good idea to install jumpers using 22 gauge wire as shown below. These power busses can then be connected to the appropriate power supply (3.3V or 5V). If your circuit requires both 3.3V and 5V supplies you can omit the red wire connecting the upper and lower busses and make the top power bus 3.3V (available at top-left above the breadboard) and the bottom buss 5V (available at bottom-right below the breadboard).
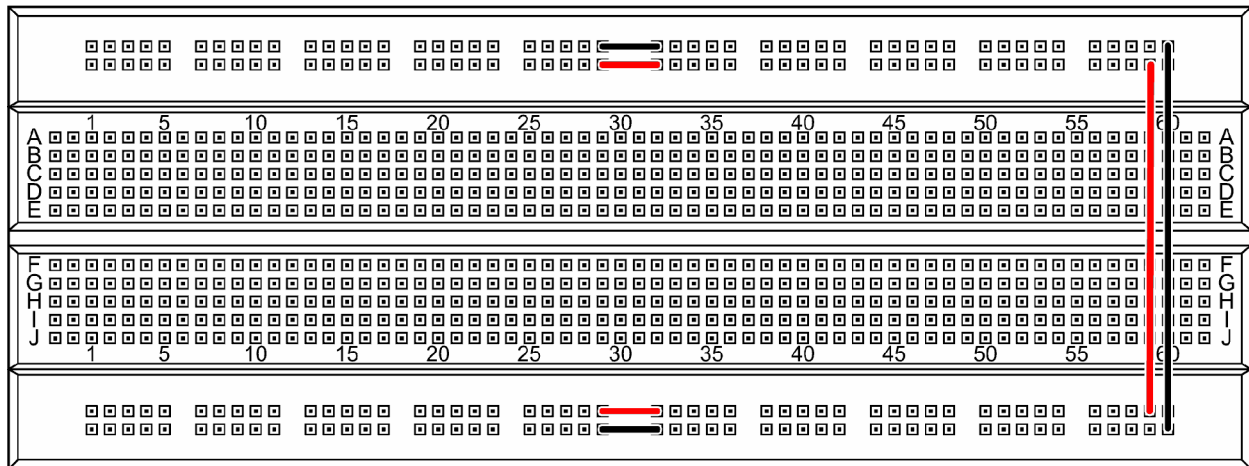
16-Segment Displays

The PPDB contains six blue 16-segment displays in groups of two. These displays are common cathode and are both 3.3V and 5V compatible. Using the Propeller one could create truly elegant alphanumeric display patterns with scrolling and animation.

LEDs

Sixteen blue discrete LEDs allow for simple debugging, indication or binary display output. These LEDs are configured to be active-high and support both 3.3V and 5V signals using a 470 ohm inline resistor.

L293D 4-Channel Driver

The L293D is a 4-channel push-pull driver or quad half-h bridge. This drive chip could be used to control relays, solenoids, motors, high-current lights and both Unipolar and Bipolar Stepper Motors. This circuit is designed to drive devices that have their own power supply. This power supply should be connected to the GND and V+ terminals. The enable inputs are both 3.3V and 5V compatible.

Push Buttons

These push-buttons are active-low, which means they connect the signal pin to ground when pressed. When not pressed the signal lines are pulled up via 10K resistors to 3.3V making them compatible with both 3.3V and 5V circuits.

DIP Switches

The DIP switches are active-low, which means they connect the signal pin to ground when closed or switched to the 'ON' position. When open or off, they are pulled up via 10K resistors to 3.3V making them compatible with both 3.3V and 5V circuits.

10K Potentiometers

Two 10K potentiometers are available for circuits that require an analog reference or input voltage.

Servo Headers

Eight servo headers are provided for experimenting with servo control and other devices which may connect to a servo header such as Parallax serial LCD displays and even the PING)) sensor. Each signal line has a 150 ohm resistor in series. The servo header voltage can be set by the jumper just to the left to come from either the 5V regulator or an external power source from 4.8-7.2 VDC. When using one or two unloaded servos, a serial LCD or the PING))) sensor you can leave the jumper set to Vdd which will use the on-board 5V regulator. When using multiple or loaded servos you should use an external power supply which you can connect to the terminal block left of the voltage jumper. The voltage coming into this terminal block should be in the range of 4.8-7.2 VDC at sufficient current to power the number of servos connected.

Real-time Clock/Calendar

The DS1302 is a real-time clock calendar IC with battery backup and charging circuitry. It also contains 31 bytes of RAM which is also backed up when an external battery is connected to the BAT connection on X22. The DS1302 is powered internally from 3.3V and the I/O line has a 150 ohm series resistor.

Headphones

For audio the MAX4411 has been configured as a stereo headphone amplifier with a 1/8" stereo phone jack for connecting standard headphones to. As there is no volume control, you should take care to assess the volume level of audio signals before placing the headphones directly on/in your ears.

RS-232 DCE

An RS-232 DCE interface is provide via the MAX3232E line driver. This 3.3V version of the popular MAX232 will make it easy to interface the Propeller to RS-232 level serial devices.

TV / Video Output

The RCA jack can be used by the Propeller to produce either a TV broadcast signal with audio or a standard composite video signal (NTSC or PAL). The required resistors for generating the signal are already included on the PPDB.

PS/2 Connectors

Two PS/2 connectors are provided to connect PS/2 keyboards and mice to the PPDB. Each PS/2 port provides 5V for power and 3.3V pull-ups on the clock and data lines, making them Propeller friendly.

VGA Connector

The 15-pin HB D-sub connector is used to connect a standard VGA monitor to the PPDB. The appropriate resistors required are included on the PPDB already.

Power Connection

The barrel jack power connector on the left of the PPDB uses a center-tip positive power supply with a 2.1 mm inside diameter barrel plug. The input voltage range is 7-12 VDC. The recommended supply is 7.5V @ 1A (#750-00009) for most applications.

Connection Diagrams

Example

Electrical Specifications

Symbol	Quantity	Minimum	Typical	Maximum	Units
Vcc	Supply Voltage	7.0	7.5	12.0 †	V

† Quiescent current 59 mA

Module Dimensions

9" W x 5-1/4" H x ¾" D (23 cm x 13.5 cm x 2 cm)

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Parallax](#):
 [32111](#)