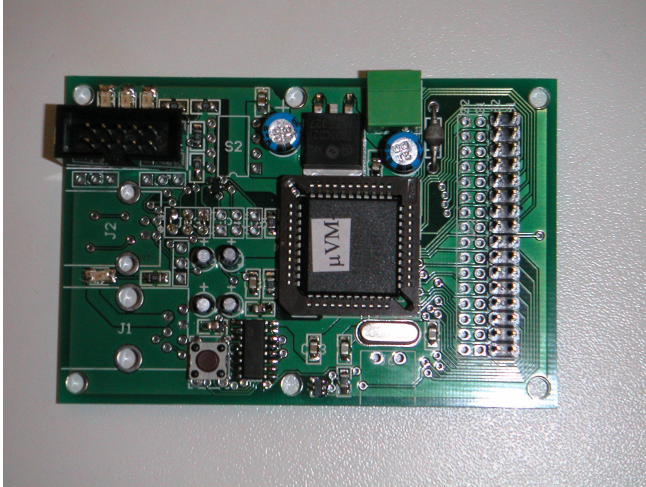


Java Processor Board

The MultiMotions Java Processor Board (JPB) is a special μ Vium based version of the standard UPB PIC board.

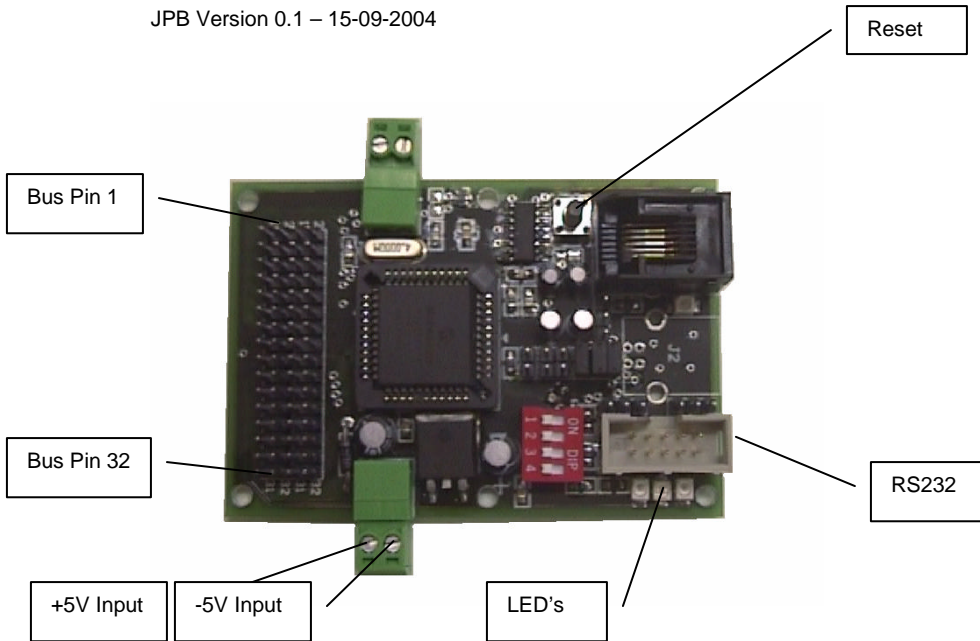


The stripped-down version of the UPB board supports most of the popular UPB functions. In order to keep the cost to a minimum a number of features have been dropped from this board.

1. Single RS232 interface
2. A inter-processor bus SPI or I²C interface.
3. Three indicator leds (red, yellow, green)
4. On-board 5V 1A regulator, accepting 6 - 12V as input.
5. Eight 10 bits A/D inputs with 3 pin connections for standard 5v sensors like IR or PID sensors or potentiometers. Power pins have not been installed but may be user-installed later on.
6. Standard RC servo connectors have not been installed but may be installed later on. May be supplied with other voltage than 5v. The A/D may also be used as servo pins. The RC outputs may also be used as digital I/O or as 8 bit parallel port. Separate RW and CS signals are available for this.
7. A total of 13 general purpose digital I/O pins are available. Some of them have multiple functions: 2 Timer/counters and/or 2 PWM outputs for motor control or signal timing

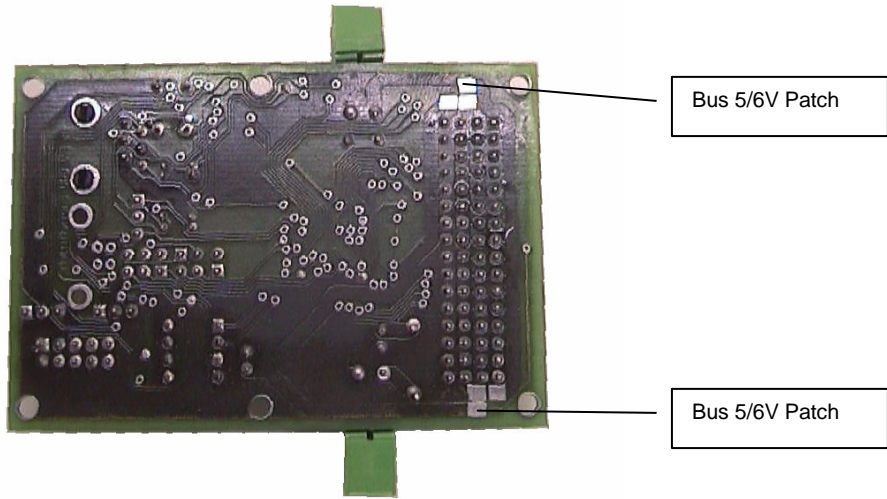
In comparison with the standard UPB board the following items have been dropped, but may all be installed by the user later on:

1. ICD connector
2. Jumpers



Reset	The reset button is only operational when the ICD is not connected.
RS232	Three wire connector for RS232.
LED's	3 LEDs that can be used freely. The standard UPBvm software uses the red led as a heartbeat indicator..
Config Switch	4 switches that may be used freely. When not in use, they should be in the OFF position. In the ON position the inputs of RB4,5,6,7 are connected to ground. In the OFF position these inputs are not connected and may float. Therefore the corresponding inputs should use the internal weak pullups to prevent errors as a result of floating inputs. Remember that when setting the TRISB the outputs must be set high before setting the pin direction. Not doing so will not turn on the weak pull-ups.
5V Input	Main supply connector. There is a single diode to prevent problems with accidental reversal of polarity. The supply may range from 6V to 12V. The supply may sink max 1A. When using servos the second supply may have to be activated.
6/12V Input	This supply connector can be connected to the servo- and sensor pins using solder pads at the bottom of the board. The servo- and sensor supply pins may be connected directly to the 5v or to the extra supply. This is listed as 6v but may also be used at a higher voltage, depending on the used servos, sensors or piggy-back boards.
Bus	The bus consists of two parts, the sensor- and servo lines and the additional lines. The sensor lines are directly connected to the A/D inputs, the servo lines are connected to port D. Next to this row of pins are two more rows with which the I/O pins form a 3-pin connector that will allow standard 3-pin servo connectors to be used.
Sensor/Servo Power	The middle pin is always the power pin, the top row is ground. The supply for the sensors and servos can be connected to the 5v or extra power input using a solder pad. This is done especially with servos to prevent power spikes to enter the processor electronics. When using the sensor pins for servos as well a total of 16 servos may be controlled by the UPB.
Bus 5/6V Patch	To select how the sensors and servos are powered, solder pads are provided on the bottom layer to determine how the pins are connected. The default connection is 5v which puts all sensors and

servos on the main supply line. When this is not desired the solder pads have to be used to change this.



External connections and jumpers

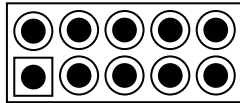
In all jumpers and connectors pin 1 is indicated by a square solder pad, both in the documentation and on the board.

SPI



- Pin 1 – SCK/VUSB
- Pin 2 – SDI/D-
- Pin 3 - SDO/D+

RS232



- Pin 1 – Connected with 2 + 7
- Pin 2 – Connected with 1 + 7
- Pin 3 – TXD
- Pin 4 - Connected with 5
- Pin 5 - Connected with 4
- Pin 6 – RXD
- Pin 7 – Connected with 1 + 2
- Pin 8 – Not Connected
- Pin 9 – Ground
- Pin 10 – Not Connected

2° RS232



- Pin 1 – TXD
- Pin 2 - RXD
- Pin 3 - Ground

RS232 Link

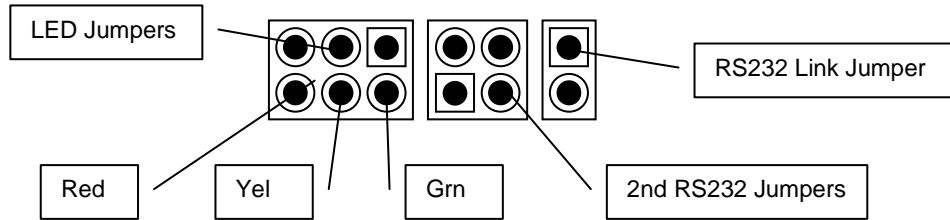


- Pin 1 – TXD
- Pin 2 – RXD
- Pin 3 - Ground

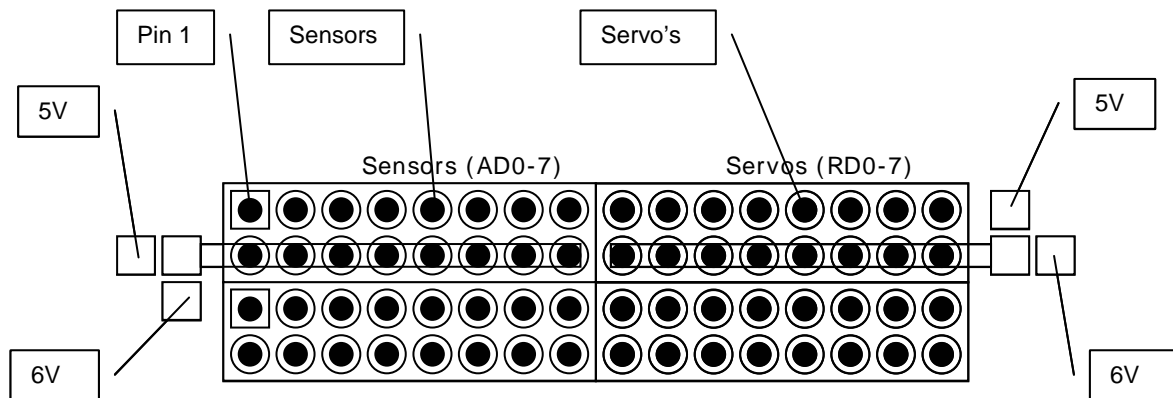
Jumpers

The LED jumpers are placed for each of the 3 LEDs when they are used. If the second RS232 port is used, both jumpers for resp. TXD and RXD must be placed, connecting RB6,7 with the second RS232 port.

If the RS232 Link is used, one of the boards needs to set the RS232 Link Jumper. The other boards are connected using the RS232 Link connector.



Bus layout



The upper rows of the bus form the power supply for the sensors and servos. The even row is the +5V of +6/12V row, the odd row is ground. The print has the 5V connected to the sensor and servo sections. When the power pins need to be connected to the 6/12V connector, a sharp knife needs to be used to cut the connection to the solder pads and a new connection needs to be made with the 6/12V pad. Do NOT solder the pads without first cutting the connection between the 5v pads. The Servos and Sensors may be powered independently using these pads.

Programming the muVium processor

To program the JPB board, the serial port is used, together with the muVium software. Detailed information can be found at www.muvium.com

For documentation and examples of the usage of the JPB board check the information about the Java based Omnidirectional robot – joBot.

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