

Java Processor Board 2.0

The MultiMotions Java Processor Board (JPB) is a new, muVium based processor board and a new version of the earlier UPB PIC board.

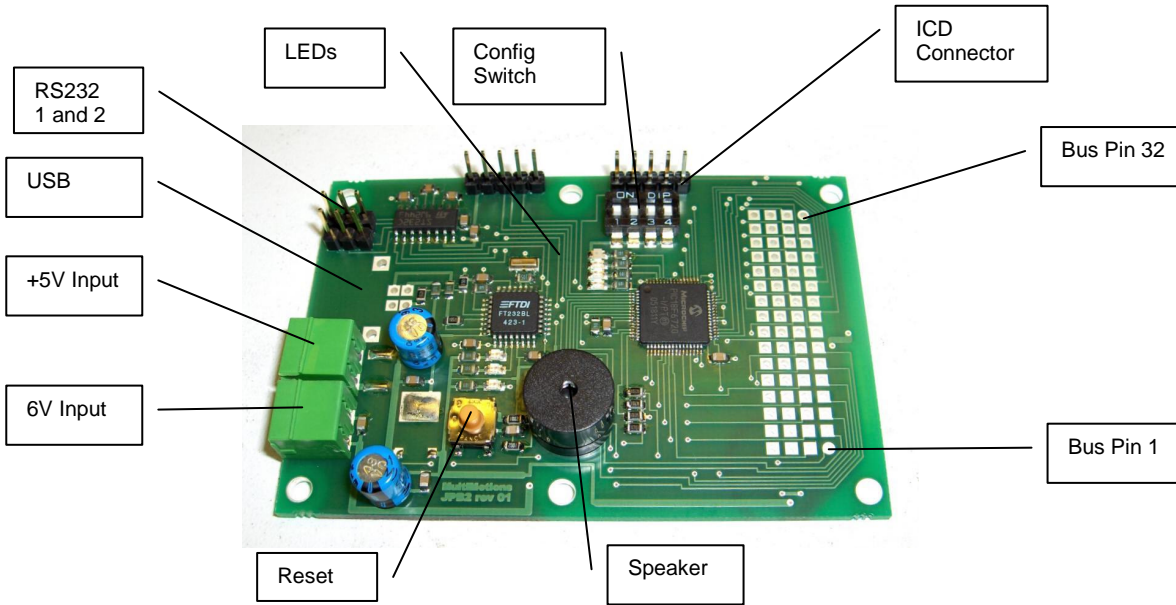


This new JPB-2 board has the same mounting layout as the current UPB and JPB boards and the bus layout is very similar.

The Java version of the popular UPB board now features a more powerful PIC18F6720 device, which allows for 128 Kb of program memory and 3840 bytes of RAM and 1024 bytes of EEPROM.

It features the same bus layout with some additional features like external interrupts and a serial port connected to the bus.

1. Standard USB interface with a Virtual Serial Port driver for the PC
2. Dual RS232 interface, one of which is connected to the bus
3. An inter-processor bus SPI or I²C interface.
4. Four indicator leds (red, yellow, green, blue)
5. On-board 5V 1A regulator, accepting 6 - 12V as input.
6. Eight 10 bits A/D inputs with 3 pin connections for standard 5v sensors like IR or PID sensors or potentiometers.
7. Power monitor facility on both power inputs to check battery levels from software
8. On-board mini-speaker, controlled by on-board PWM facility
9. The A/D pins 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.
10. Full SMD version. Through-hole only for bus connectors and external connectors
11. ICD connector for programming of processor when no muVium based processor is desired.
12. A total of 13 general purpose digital I/O pins are available. Some of them have multiple functions: 4 Timer/counters and/or 4 PWM outputs for motor control or signal timing.



- Reset
 RS232
 LED's
 Config Switch
 Speaker
 USB
 5V Input
 4.8-6V Input
- The reset button is only operational when the ICD is not connected.
- Double three wire connectors for RS232.
- 4 LEDs that can be used freely. The standard UPBvm software uses the red led as a heartbeat indicator.
- 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.
- A small speaker, connected to one of the chip's PWMs which allows tones of varying frequencies to be generated
- USB interface, acting in the PC as a Virtual Serial Port (VSP) allowing full backward compatibility with earlier serial port interfaces over a standard USB port.
- 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. The input of this supply is connected to the A/D converter AN8 to allow battery monitoring.
- 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 4.8-6v but may also be used at a higher voltage, depending on the used servos, sensors or piggy-back boards. This input is connected to A/D converter AN9 to allow battery monitoring.

JPB Bus architecture
 Bus

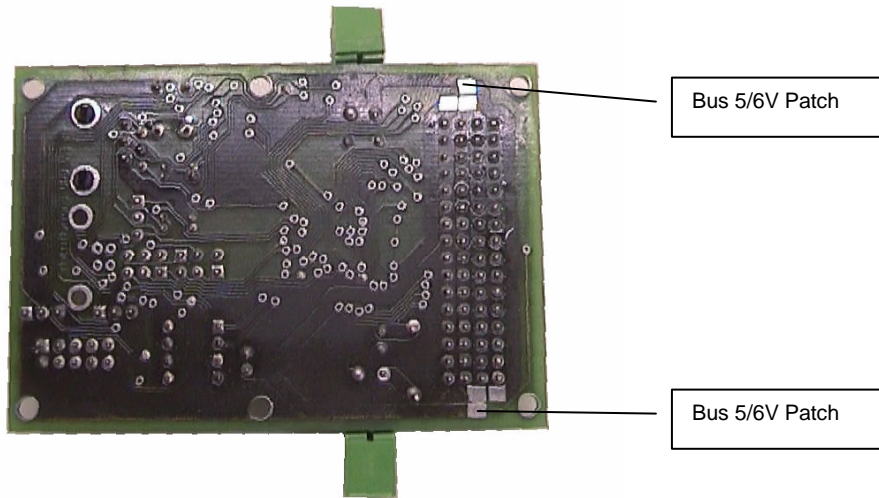
The bus consists of two parts, the sensor- and servo lines and the additional lines. The sensor lines are directly connected to the A/D inputs, the servo lines are connected to port D. Next to this row of pins are two more rows with which the I/O pins form a 3-pin connector that will allow standard 3-pin 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 JPB.





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.



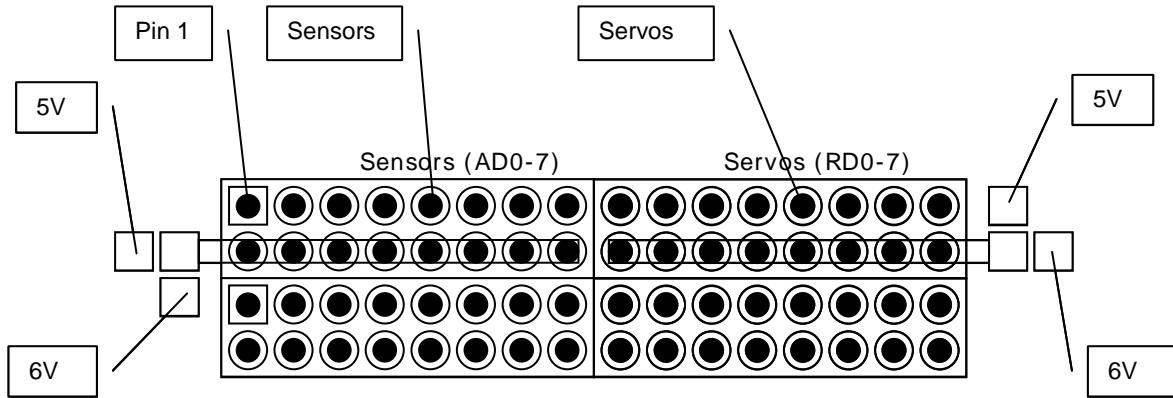
External connections and jumpers

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

- RS232-2  Upper connector, pin 1 is on right side
 Pin 1 – TXD
 Pin 2 – RXD
 Pin 3 – Ground
- RS232-1  Lower connector, pin 1 is on right side
 Pin 1 – TXD
 Pin 2 - RXD
 Pin 3 - Ground
- EXT  Left connector, pin 1 is on left side
 Pin 1 – +5v
 Pin 2 – RD
 Pin 3 – WR
 Pin 4 – CS
 Pin 5 - Ground
- ICD  Right connector, pin 1 is on left side
 Pin 1 – +5v
 Pin 2 – VPP
 Pin 3 - RB4
 Pin 4 – RB5
 Pin 5 - Ground

The EXT connector is used to connect the processor to external parallel devices. The 8 bit parallel bus pins that are otherwise used for the servos may be used to connect for instance external memory or a device that needs a parallel interface. Please note that in that case the servos cannot be used.

Bus layout



The upper rows of the bus form the power supply for the sensors and servos. The even row is the +5V of +4.8/6V 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 6V connector, the solder pads need to be desoldered and connected to the other pad. The Servos and Sensors may be powered independently using these pads.

RS232	INT	CS	SPI	+ -
3 - 5	7 - 9 - 11 - 13	15 - 17 - 19 - 21	23 - 25 - 27	29-31

The bus pins 1 thru 31 have a different layout on the JPB-2 and now contains the signals listed underneath. For more details check the UPB bus layout scheme.

- 1 +5v
- 3-5 RS232 connection directly from processor (3= rx, 5=tx)
- 7-13 Four interrupt lines, 7 is INT0. All pins may also be used as digital I/O pins
- 15-21 Four Chip Select pins, intended to be used with the SPI interface but may also be used as independent I/O pins
- 23-27 SPI or I2C interface pins
- 29-31 +5v and Ground connection for external devices like the DCU display unit.

Programming the muVium processor

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

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The table underneath lists the bus layout and pin connections used on the processor.

JPB Bus Signal	Pin	Chip Signal	Pin	Comment	Location	JPB	Chip	Pin
+5V	1	10,26,38,57			DIP	DIP1	RB4	44
RG1-RS232-2 TX	3		4			DIP2	RB5	43
RG2-RS232-2 TX	5		5			DIP3	RB6	42
CCP1	7		33			DIP4	RB7	37
CCP2	9		29		Leds	LED1	RE4	62
CCP3	11		3			LED2	RE5	61
CCP4	13		6			LED3	RE6	60
CS0	15	RB0	48			LED4	RE7	59
CS1	17	RB1	47		Speaker	SPKR	RG4	8
CS2	19	RB2	46		ICD conn	+5v		
CS3	21	RB3	45			ICDM	PGM	7
SCK	23		34			ICDC	PGC	42
SDI	25		35			ICDD	PGD	37
SDO	27		36			ICDG	GND	
+5v	29				Ser Conn 1	SR1-TX	RS-232-1	31
GND	31	9,25,41,56,20				SR1-RX	RS-232-1	32
AN0	2		24			SR1-G	GRND	
AN1	4		23		Ser Conn 2	SR2-TX	RS-232-2	4
AN2	6		22			SR2-RX	RS-232-2	5
AN3	8		21			SR2-G	GRND	
AN4	10		27		Power In1	PWR1	AN8	15
AN5	12		18		Power In 2	PWR2	AN9	14
AN6	14		17		Ext conn	+5v		
AN7	16		16			RD		2
IO0	18		58			WR		1
IO1	20		55			CS		64
IO2	22		54			GND		
IO3	24		53					
IO4	26		52					
IO5	28		51					
IO6	30		50					
IO7	32		49					