

MICRO-101 Assembly Instruction Manual

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electronic experimental solutions

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Description

The Micro-101 board is a complete, low-cost development platform designed for those interested in learning and using PICAXE® microcontrollers from [Revolution Education \(REV-ED\)](http://www.revolution-education.co.uk). Its compact size, convenient features, and low price make it an ideal tool for the student and educator. The Micro-101 board is a great tool with which to get started with PICAXE® microcontrollers. For more information about PICAXE®, visit <http://www.revolution-education.co.uk/picaxe/>

The Micro-101 board is designed to allow rapid prototyping with all PICAXE 18 pin devices. The board provides a large breadboard area for quick experiments. Also, it provides the connections for eight digital outputs, three analog inputs and five digital outputs.

The board can be powered by USB, a 9V battery or 2.1 mm wall adapter. It is mechanically interlocked to prevent dual connection. Either center-positive or center-negative wall adapter can be used. The board will automatically convert them into the correct polarity. On board 5V regular circuit can draw up to 500mA. The socket connections for VIN, VCC, +3.3V and GND are provided.

This board features innovations that set it apart from others. Innovations feature like USB in-circuit programming. It allows the program to be able to download directly from USB port. Also, equipped with a user-programmable multi-color LED for status indication.

Features

- Triple power input, USB, 9V battery or wall power adapter with 2.1 mm plug.
- On-board regulator delivers up to 500mA of power.
- Large noise filters capacitors.
- Polarity converter circuit.
- Over voltage protection.
- ON/OFF switch with power ON LED.
- Built-in USB interface with low USB bandwidth consumption.
- Enhanced download circuit.
- DIP socket support all PICAXE 18 pins (-18, -18A or -18X).
- Reset switch.
- Four servo motor connection.
- Jumper selection of servo power.
- Large breadboard area.
- Serial TX and RX LED indicators.
- User-programmable multi-color LED for status indication.
- Mounting holes mates to existing hole patterns on Parallax's Boe-Bot®

Applications

- PICAXE microcontroller development, prototype and experiment.

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Interfaces

I/O:

Please refer to PICAXE datasheet for pinout.

- **OUT0-OUT7:** Output pins directly *from* the PICAXE microcontroller. OUT0 and OUT1 connected to LEDs for testing.
- **IN0-IN2 and IN6-IN7:** Input pins directly *into* the PICAXE microcontroller.

Servo:

Four servo output terminals are connected directly to output pin 4-7 as labeled on the board. Use a jumper to select the power provided to servo sockets. The default position is VCC (+5V). You may wish to move this jumper to VIN position to provide extra power to the servos. **When using VIN to power the servos, always check to make sure the voltage supplied does not exceed the specifications of the particular brand of servos you are using.**

- **RED:** Power to the servos – can be select by a jumper. It is usually a red color wire on the servos.
- **BLK:** Ground to the servos – it is usually a black color wire on the servos.

Power:

The Micro-101 board has Triple input power. The board can be power by

USB, using 9V battery or 2.1 mm wall power adapter. It is recommended to keep input voltage under +14VDC when using a wall power adapter. You may use either center-positive or center-negative wall adapter. The board will automatically convert them into the correct polarity. Power ON LED comes on when external power is used, and the ON/OFF switch is ON.

On board 5V regular circuit can draw up to 500mA. This is enough for most of the experiments. However, please use external power supply when drawing more than 500mA.

- **VIN:** is an actual input voltage.
- **VCC:** is a regulated +5VDC. It can be draw up to 500mA.
- **3V3:** is connected to the internal regulator and can source a maximum of 50mA. You may use this pin to power your 3.3V circuit.
- **GND:** is a common ground for every pin. This pin must be connected to ground when using external power supply on the target board.

Others:

Reset switch is for resetting the PICAXE.

The red/green user-programmable LED can be activated by placing the jumper on **LEDs** header. LEDs turn ON by writing a LOW to output 0 for green and output 1 for red. Writing both LOW simultaneously will show, at a distance, as amber.

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TOOLS REQUIRED FOR ASSEMBLY

| QTY | DESCRIPTION |
|-----|---|
| 1 | Wire cutter. Select one small enough to get into tight spots |
| 1 | Nose pliers. Select one small enough to get into tight spots. |
| 1 | Soldering iron, 25 Watt. Select one with a fine tip |
| 1 | Solder. Select the fine size |
| 1 | De-soldering wick |

SOLDERING/ASSEMBLY TIPS

Disclaimer: Take care not to burn your fingers while soldering. Gravitech will NOT be responsible for any injuries that occur during assembly of this board.

Consult the parts list and identify the parts to be soldered on the board. Most of the parts are very small, such as C1, C3, C4, and C5 so make sure you do not drop them on the floor and lose them. Some of the parts are polarized. These parts need to be soldered correctly; otherwise they will damage the entire board. The polarized parts are the following:

- **100uF electrolytic capacitor (C2):** The negative lead is marked with several (-) signs on the side of the cap. The positive lead is longer than the negative lead. Make sure you solder the capacitor correctly, with the (+) lead in the hole marked with (+) and the (-) lead accordingly.
- **D1, D2, D3, and D4 Rectifier diodes:** One end of the diode is marked with a silver band. This band corresponds to the vertical bar on the symbol on the board. The band must be soldered on the same side with the vertical bar. Two diodes are soldered with the band on the left side, and two with the band on the right side. With the nose pliers, bend each lead of each diode to a 90-degree angle and pass it through the appropriate hole.
- **LEDs:** The negative end of each LED (cathode) has a flat designator on the casing. The positive end (anode) has a longer lead than the negative lead.

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PARTS LIST

| Item | Qty | Reference | Part |
|------|-----|---------------------|---------------------------------------|
| 1 | 1 | BD1 | Breadboard, 300 term. |
| 2 | 4 | D1,D2,D3,D4 | 1N4005 Rectifier Diode |
| 3 | 5 | C1,C2,C3,C4,C7 | 0.1uF Capacitor (miniature) |
| 4 | 1 | C5 | 1000uF/16V Electr.Cap. |
| 5 | 1 | J1 | USB Con., already soldered |
| 6 | 2 | 12BC210 | 9-volt connectors |
| 7 | 2 | J4,J5 | Header, 13 x 2 |
| 8 | 6 | J6,J7,J8,J9,J10,J13 | Header, 3 x 1 |
| 9 | 1 | J11 | Header,2 x 1 |
| 10 | 1 | J12 | Power Jack |
| 11 | 3 | LD1,LD4,LD6 | LED, Green, 5mm |
| 12 | 2 | LD5,LD7 | LED, Red, 5mm |
| 13 | 5 | R1,R2,R9,R10,R11 | Resistor,330-ohm(orange-orange-brown) |
| 14 | 1 | R3 | Res.,180-ohm(brown-gray-brown) |
| 15 | 1 | R4 | Res.4.7K(yel-burg-red) |
| 16 | 1 | R5 | Res.22K(red-red-orange) |
| 17 | 1 | R6 | Res.10K(brn-blk-orange) |
| 18 | 1 | SW1 | Pushbutton switch(RESET) |
| 19 | 1 | SW2 | Slide switch (ON/OFF) |
| 20 | 1 | U1 FT232RL | USB already soldered |
| 21 | 1 | U2 socket | For 18X |
| 22 | 1 | U3 7805 | Voltage Regulator, already soldered |
| 23 | 1 | PCB | Printed Circuit Board |
| 24 | 4,4 | Standoffs & nuts | 6-32 standoffs & nuts |

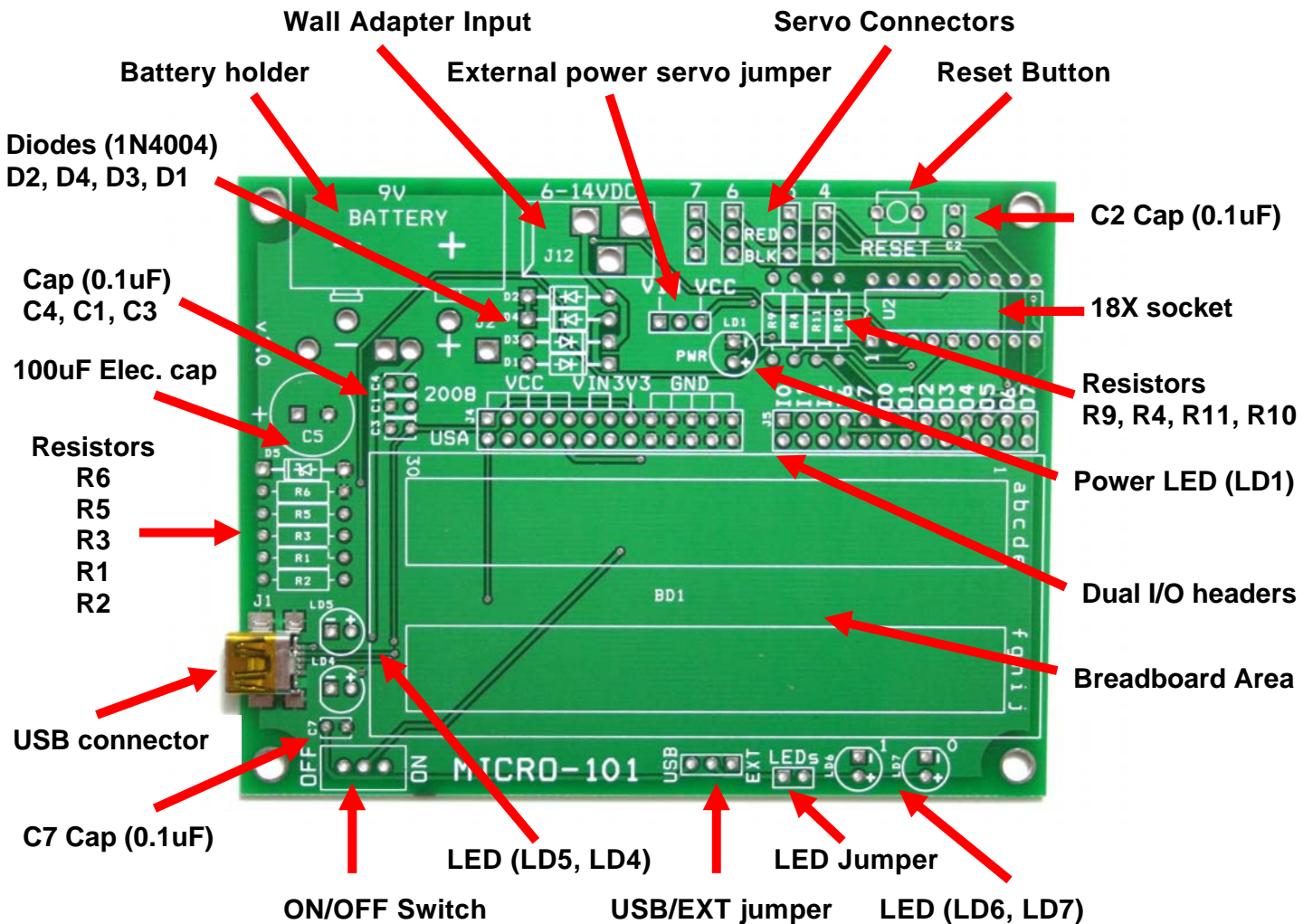
Note: D5 Diode on the board not used.

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ASSEMBLY

The location of the parts on the board is shown below.



Soldering order is not particularly strict. However, some parts are more difficult to solder than others. Solder the following parts in the order recommended below:

- (1) All LEDs. Place each LED in the correct hole, turn the board over and press the LED against a table surface to keep it from moving around. Solder in place. Do not use excessive heat.

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- (2) All three-pin headers. Place each header in the appropriate hole, turn it over and hold it against a table surface and solder only one pin. Then turn it over and make sure that the header is at 90 degrees to the board. Finally, solder the other two pins. Repeat for the rest of the headers.
- (3) Solder the four diodes, making sure they are oriented correctly. Bend their leads at a 90-degree angle. Do not use excessive heat. You may hold them against a table top so that they do not move around while you solder them. Do not use excessive heat.
- (4) Solder the 100uF capacitor, making sure it is oriented correctly.
- (5) Solder all the resistors in their correct location. Bend their leads at a 90-degree angle.
- (6) Find a 9-volt battery and snap the connectors to it. Solder the connectors (J2) to the board. Remove the battery after soldering.
- (7) Solder J4 and J5. You may have to hold them against a table top. Solder only two pins, making sure that the connector rests correctly and tightly on the board. Solder the remaining pins.
- (8) Solder the remaining parts as desired.
- (9) Peel off the back of the breadboard and align it correctly on location BD1. Make sure it rests squarely on BD1 before you press it down.

Your board is ready to be used. Proceed now with the driver installation!

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USB Driver Installation

Download:

Go to the FTDI website www.ftdichip.com and click on the "Drivers" tab. Choose VCP (Virtual COM Port) drivers.

Save the appropriate exe or zip file for your operating system. For an exe file, double click on the file to install the driver.

PICAXE® Programming Editor

Go to the REV-ED website at <http://www.rev-ed.co.uk/picaxe/> and click on the "Software" tab. Download the Programming Editor to your computer.

Install the Programming Editor in a suitable directory. After you finish installation process, there will be three manuals within the installation directory. It is recommended for new users to go through those documents.

Downloading program to MICRO-101

Verify that the power to the board is turn OFF. Insert 18-PIN PICAXE microcontroller into the DIP socket. Connect the USB cable and turn on the power.

Start the Programming Editor and select appropriate PICAXE chip and COM port number.

Start writing your code and when you are ready to download press F5. During the download, the TX and RX status LEDs should be flashing.

Accessories

All of the accessories are available for purchase via our website. If you don't see the item you need, please contract our sales department at sales@gravitech.us

- **USB A-B**
6Ft 4 pin male A type to 5 pin mini B type. The cable is use to connect to USB-SER board.



- **9V-ADP**
9 VDC 1A 2.1 mm wall power adapter.



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Notes

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