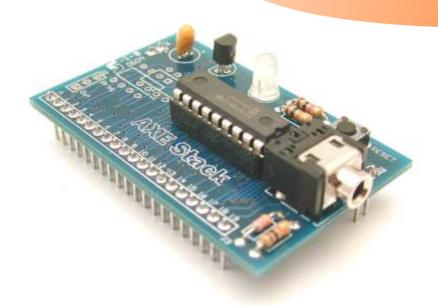# AXE Stack 18

BASIC-Programmable Microcontroller Kit

An inexpensive introduction to microcontroller technology for all ability levels

- Free Windows interface software
- Programmable in BASIC or flowchart
- PICAXE-18X microcontroller included
- Great for robotics
- Easy to assemble

Thank you for purchasing the 'AXE Stack-18. You now own a flexible and highly functional development board suitable for all 18-pin PICAXE ICs. Please read this entire document before you begin assembling and using your 'AXE Stack-18.

Principal Features

✎ High Quality double-sided circuit board with plated-through holes
✎ Robust, reverse-polarity and over-voltage protected on-board voltage regulator
✎ Bi-colour power indicator LED (green = correct; red = reversed)
✎ Mounts on any breadboard for easy prototyping of your circuits
✎ Reset button

A Note for Beginners

To build the 'AXE Stack-18, you need to solder the components to the Printed Circuit Board (PCB). This manual presumes that you already know how to solder. A 25-Watt pencil tip soldering iron is ideal for the job. The soldering iron is HOT and WILL BURN YOU if not handled properly.

Don't know how to solder? No problem!
Download our free soldering tutorial online at:
http://www.hvwtech.com/resources.asp

Assembling the Kit

⚠ CAUTION: Some components are polarized. That is, they have to be installed "the right-way around". Capacitor C1 should be installed so that the "+" on the part aligns with the "+" on the circuit board. The LED (D1) and Voltage Regulator (U4) are installed so that the parts align with the white outline drawn on the circuit board. The PICAXE chip and its' socket both have a small notch at one end. THE END WITH THE NOTCH MUST FACE THE PROGRAMMING CONNECTOR.

The order in which you install the components is not critical but following the order suggested here will make the process a little easier:
1. Resistors
2. 18-Pin Socket
3. RESET Switch
4. All remaining parts

✓ **TIP:** There are 3 Single Inline Package (SIP) pin strips that are mounted on the bottom side of the circuit board. The best way to ensure these are mounted properly is to install them on a breadboard; lay the circuit board on top, and then solder them in place.

Testing

Mount the 'AXE Stack-18 onto a breadboard so that the two 2-pin strips sit in the power rails. Apply power (5 -12 Volts DC) to the rails. The LED should be lit and should be green. If the LED is red, you have the "+" and "-" reversed.

Install the PICAXE Programming Editor software (see the end of this manual on how to download the software for free). Connect a PICAXE programming cable to the connector on the circuit board and to an available serial port on your PC. If you do not have a serial port, you will need a USB-Serial adapter (HVW SKU# 47000). The adapter plugs into a USB port and gives you a serial port. This device has been tested with the 'AXE Stack and works well (not all brands of adapter will work properly).

With the programming editor running, click the *'Options'* button (or select 'Options' from the 'View* ' menu). In the window that appears, click the *'Firmware?'* button. If all is connected properly and there is power to the 'AXE Stack-18 then the PICAXE will respond with its' firmware version.

> **NOTE: The editor defaults to COM1. If you are using a COM port other than COM1 (such as when using a USB to Serial Adapter), you will need to select that COM port from the 'Serial Port' tab of the 'Options' window <u>before</u> clicking the *'Firmware?'* button.**

You are now ready to write your first program.

Programming

Let's start with a simple program to flash an LED, once per second on Pin 0.

Enter the program as shown in Figure 1. Click the RUN button (the small blue arrow in the toolbar) to send your program to the PICAXE chip. A window will appear with a progress bar. Once the download is complete, the program will automatically run.
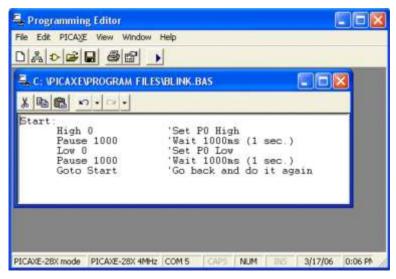

Figure 1.

Connect a resistor (470 Ohms or 1K Ohm is good) to pin 0 of the 'AXE Stack-18. Connect and LED so that the side with the flat on it (cathode) goes to ground and the other (anode) connects to the resistor. The LED will blink on and off once per second.

Going Farther

Try changing the program to make the LED flash at a different rate say, twice per second. This demonstrates the amazing flexibility of microcontrollers to change their behavior with quick changes to software.

The entire PICAXE manual (3 sections) and all datasheets are built-into the editor program. Click the *'Help'* menu to access them. You can now begin exploring all the commands available to you and testing circuits.

Pin Maps

The following table shows how the PICAXE-18 series parts are mapped to the 'AXE Stack-18 I/O pins:

PICAXE-18X	
PICAXE Pin	Stack Pin
Output 0	0
Output 1 / I2C SDA	1
Output 2	2
Output 3 / PWM 3	3
Output 4 / I2C SCL	4
Output 5	5
Output 6	6
Output 7	7
Input 0 / ADC 0 / Infrain	8
Input 1 / ADC 1	9
Input 2 / ADC 2	10
Input 6 / Kbd Clock	11
Input 7 / Kbd Data	12

Table 1.

PICAXE-18A	
PICAXE Pin	Stack Pin
Output 0	0
Output 1	1
Output 2	2
Output 3	3
Output 4	4
Output 5	5
Output 6	6
Output 7	7
Input 0 / ADC 0 / Infrain	8
Input 1 / ADC 1	9
Input 2 / ADC 2	10
Input 6 / Kbd Clock	11
Input 7 / Kbd Data	12

Table 2.

PICAXE-18	
PICAXE Pin	Stack Pin
Output 0	0
Output 1	1
Output 2	2
Output 3	3
Output 4	4
Output 5	5
Output 6	6
Output 7	7
Input 0 / ADC 0	8
Input 1 / ADC 1	9
Input 2 / ADC 2	10
Input 6	11
Input 7	12

Table 3.

Parts List

Qty	Description	Designator	Polarity ?
1	Printed Circuit Board		
1	4.7 uF Tantalum Cap	C1	Yes
1	MIC2954 Voltage Regulator	U4	Yes
1	Bi-Colour LED	D1	Yes
1	1K Ohm Resistor (Brown, Black, Red)	R4	No
2	10K Ohm Resistor (Brown, Black, Orange)	R2, R3	No
1	22K Ohm Resistor (Red, Red, Orange)	R1	No
1	RESET Switch	S1	No
1	3.5mm Stereo Mini Jack	J1	Yes
1	18-Pin Socket	U2	No
1	PICAXE-18X IC	U2	Yes
2	2-Pin SIP Header Strip	J4, J5	No
1	20-Pin SIP Header Strip	J3	No
Note: U1, U3, Y1 and J2 are not used in this kit.			

If you bought the Starter Kit….

Customers who purchased the starter kit will also find included:

- PICAXE Programming Cable
- 2-Panel Solderless Breadboard
- 140 Piece Wiring Kit
- Breadboard Voltage Regulator (BVR) Kit

> **NOTE:** The BVR requires a 9 Volt DC adapter (500 mA or more) to function. Due to different voltages in various countries, the adapter must be purchased separately. For countries with 120 VAC / 60Hz (Canada & USA) use HVW SKU# 34000

The HVWTech.com website features a broad selection of components, accessories and sensors that can be used with your PICAXE. Orders placed by 3pm (Mountain Time Zone) are usually shipped the same day.

Support

Technical support is available if you are having problems. If you need help, please provide as much detailed information as possible.

E-mail: support@hvwtech.com

Phone: (403) 730-8603 or Toll Free: 1-888-448-9832
 (Monday - Friday 9am 5pm Mountain time)

The PICAXE Programming Editor Software

Due to legal restrictions imposed by Revolution Education, we are unable to host the editor software for download in North America. The software can only be downloaded from the Revolution site in England:

http://www.rev-ed.co.uk/picaxe/software.htm

PICAXE is a Trademark of Revolution Education.

Relevant HVW Tech Part Numbers

'AXE Stack-18 Kit: #28570
PICAXE Programming Cable: #28400
PICAXE-18X IC: #28450
PICAXE-18A IC: #28440
140 Piece Wiring Kit: #21010
Breadboard Voltage Regulator Kit: #34020
2-Panel Solderless Breadboard: #21000
9 Volt DC @ 500 mA Adapter (for N. America only): #34000

Inexpensive BASIC Microcontroller

Easy to build, fun to use!
Write simple programs to monitor and control almost anything
Experiment with the latest electronics technology

Industrial • Recreational • Robotics • Science

This Package Contains:
1 'AXE Stack-18 Kit (Assembly Required)
1 PICAXE-18 Microcontroller

Other products from HVW Technologies:

'AXE Stack-18 Starter Kit: The Ultimate PICAXE prototyping tool. A complete PICAXE experimenter system that mounts onto a solderless breadboard. Includes programming cable, power supply, breadboard and wiring kit.

Soldering Equipment: Irons, Stations, desoldering pumps and solder

Plus...
- Microcontrollers
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Visit us online for more info and neat things:

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