

revolution

PICAXE Newsletter - Q1 2009

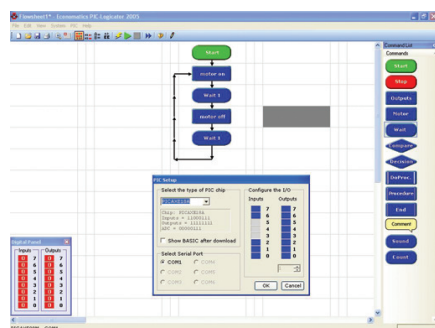
Unit 2 Industrial Quarter, Bath Business Park, Foxcote Ave, Bath, BA2 8SF, UK
 T: +44 1761 430044 F: +44 1761 430045 www.picaxe.co.uk
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In this issue:

- In-circuit emulation
- New PICAXE-28X2 chip
- New project kits and modules
- AXEpad for Linux and Mac
- Logicator goes shareware
- PICAXE VSM simulator
- PICAXE microcomouse & oscilloscope
- PICAXE 'cut out & keep' bookmark below!

PICAXE GETS ICE (In Circuit Emulation)...

IN-CIRCUIT EMULATION



ICE (in circuit emulation) allows a program to be 'stepped' through on-screen whilst real life inputs and outputs interact with the on-screen simulation. So if your on-screen simulation switches on an output the real life output will also switch on! Although on-screen simulations naturally run slower than programs downloaded into the chip, they provide an invaluable way of 'debugging' programs and testing them prior to the final download.

To use the ICE feature simply click the 'Connect' menu within the Simulate menu.

The PICAXE chip will then start to communicate with the on-screen simulation, so that the real-life inputs

and outputs are activated when the on-screen simulation is run. No special hardware is required as all communication is via your existing PICAXE download cable.

After on-screen testing is complete simply click 'Run' to download the final program into the PICAXE chip. The PICAXE will then disconnect from the computer and run the program internally as normal.

ICE is now available in both the 'PICAXE Programming Editor' and 'Logicator for PIC' software products. Free upgrades are available for download from www.picaxe.co.uk

PICAXE 'M' SERIES PARTS!

Remember the new 14M, 18M, 20M chips are the recommended replacement for the older 18 and 18A chips. New technology means:

- a lower per unit cost
- more inputs/outputs on the 20M
- easier to use pinout layout on 14M/20M
- increased functionality such as the ring tone tune command on any output pin
- support for in-circuit emulation

The 08M, 14M and 20M, are all available at under £1 each at UK full tube educational prices.

PICAXE SOFTWARE

Revolution now publish 4 different software titles to support the PICAXE microcontroller range:

PICAXE Programming Editor is the free Windows application for developing PICAXE programs in BASIC or as flowcharts. Supports on-screen simulation and in-circuit emulation.

AXEpad is the free 'cut-down' version of the Programming Editor for those who would like to use a cross-platform interface for BASIC programming. AXEpad is available in 3 different variants to support all of the Linux, Mac OSX and Windows operating systems. See page 3 for more details.

Logicator for PICAXE is a flowcharting application widely used within education for developing control programs for PICAXE microcontrollers. Logicator is now available as shareware for student/hobbyist home use – see page 3 for details.

PICAXE VSM (Virtual System Modelling) is our high end product – a complete Berkeley SPICE circuit simulator that combines a 'virtual' PICAXE chip with animated components and SPICE circuit analysis to produce a simulation of a complete PICAXE project – and it operates in real time on most modern PCs! See page 3 for more details.

NEW SIMPLE PICAXE KIT - SEE PAGE 4!



PICAXE-08M

+V	1	8	0V
Serial In	2	7	Out0 / Serial Out
In 4 / Out4 / ADC4	3	6	In1 / Out1 / ADC1
In3 / Infrain	4	5	In2 / Out2 / ADC2

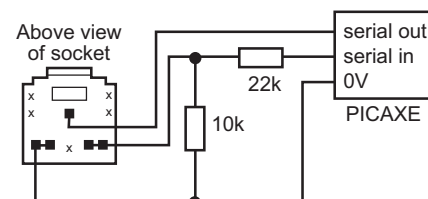
PICAXE-14M

+V	1	14	0V
Serial In	2	13	Out 0 / Serial Out
ADC 4 / Input 4	3	12	Output 1
Infrain / Input 3	4	11	Output 2
Input 2	5	10	Output 3
Input 1	6	9	Output 4
ADC 0 / Input 0	7	8	Output 5

PICAXE-20M

+V	1	20	0V
Serial In	2	19	Serial Out
ADC7 / Input 7	3	18	Output 0 / Infraout
Input 6	4	17	Output 1
Input 5	5	16	Output 2
Input 4	6	15	Output 3
ADC 3 / Input 3	7	14	Output 4
ADC 2 / Input 2	8	13	Output 5
ADC 1 / Input 1	9	12	Output 6
Infrain / Input 0	10	11	Output 7

Download Circuit

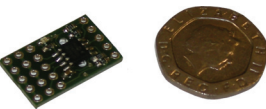


Revolution Education Ltd
 Unit 2 Industrial Quarter, Bath Business Park,
 Foxcote Avenue, Bath, BA2 8SF, UK
 Tel: 01761 430044 Fax: 01761 430045
www.picaxe.co.uk www.rev-ed.co.uk

PICAXE Modules

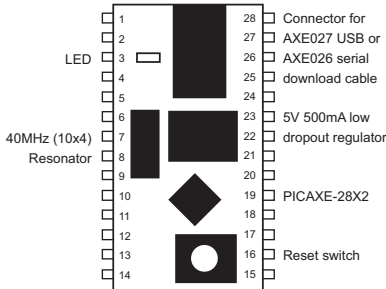


It has an on-board PICAXE chip (28X1 or 28X2), reset switch, resonator, LED, download circuit and socket for the AXE027 USB download cable. Part AXE200

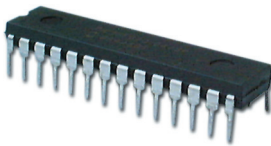


The **PICAXE-08M module** is our smallest PICAXE module ever! It is designed for users who want to use a tiny PICAXE circuit for projects such as radio-control models and Xbox controller mods. Part AXE230

The **PICAXE-28 module** is a complete PICAXE circuit for users who want an easy-to-use 'drop in' module for their project. The module is designed in a wide 28 pin format, so will fit in any standard 28 pin turned pin socket.



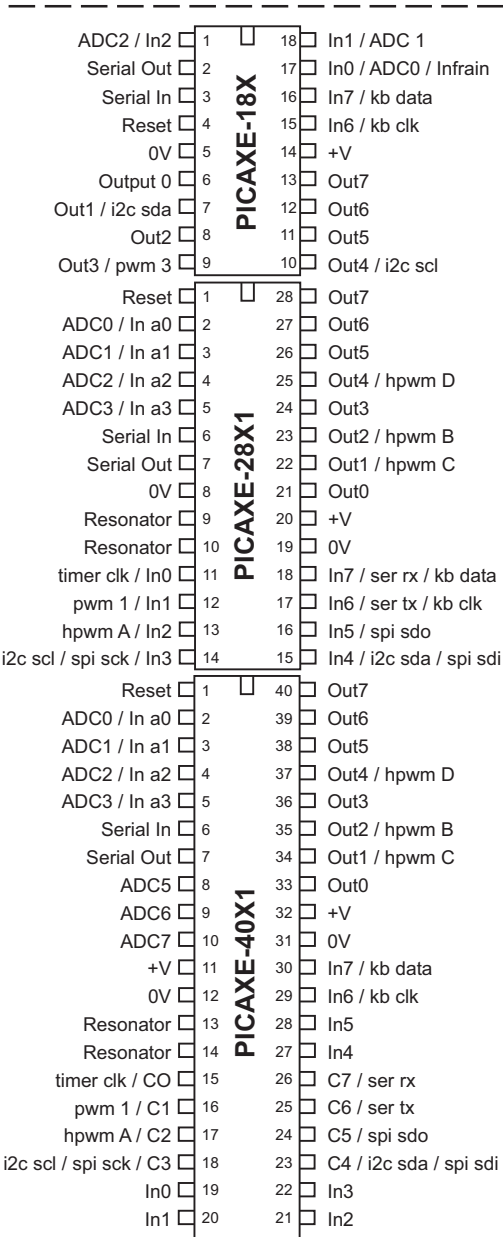
New PICAXE-28X2 & 40X2



The new PICAXE X2 range (28X2 and 40X2) is a complete new generation of the PICAXE chip, making use of the advanced features and architecture of the 18F series of PIC microcontrollers. The entire PICAXE bootstrap core has been rewritten to make use of this enhanced architecture.

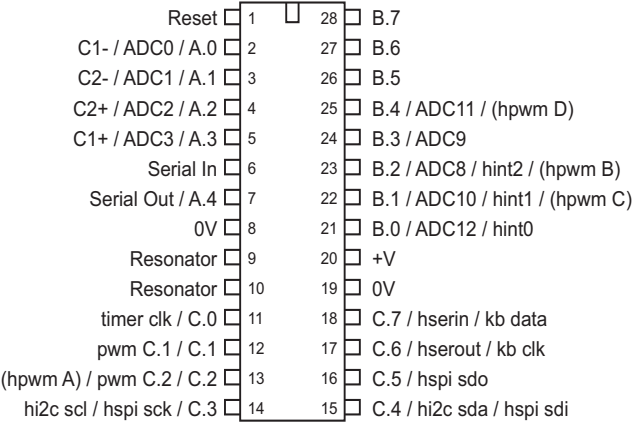
Overview (compared to 28X1):

- Each pin can be individually configured as input or outputs
- Up to 12 internal ADC channels available
- 256 general purpose RAM
- Further 1024 additional bytes in the RAM scratchpad
- Indirect RAM access to support easier use of arrays
- Clock speed up to 40MHz
- Power supply down to 1.8V
- Up to 4 internal program slots – up to 4000 lines of code with 1000 sub-procedures!
- Also supports programs stored in external EEPROM chips
- Support for UNIO brand EEPROM chips using a single i/o line
- New hardware interrupt pins
- New comparator functions
- Supports in-circuit emulation with the Programming Editor software



Bookmark - Cut here!

PICAXE-28X2

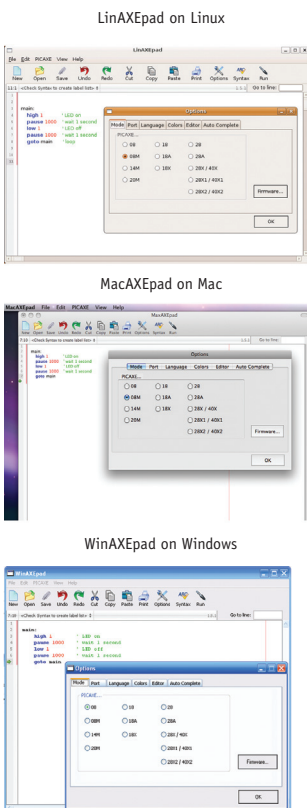


X2 PARTS IN MORE DETAIL:

- Resonator Speed – the X2 parts can now work up to 64MHz, 16x faster than 4MHz!
- For the first time the X2 chips are available in two formats, standard (2.5V - 5.5V) and low power (1.8V - 3.3V).
- Each pin on the X2 parts can be individually configured to be an input or output, and, where applicable, as an analogue input. Almost all i/o type command, (e.g. high/low/serout/pulsin/count etc.) can act on all pins.
- The 28 pin devices have 20 configurable pins, plus the serial output pin which can also be used as an extra general purpose output. Up to 9 ADC are supported.
- The 40 pin devices have 31 configurable pins, plus the serial output pin which can also be used as an extra general purpose output. Up to 12 ADC are supported.
- The X2 parts supports 1280 RAM general purpose variables. These are arranged as a bank of 256 general purpose bytes and a scratchpad memory area of 1024 bytes.
- The X2 parts have 4 internal program memory slots. Each program can be run completely separately, e.g. have its own gosubs/interrupt. Each program slot is also downloaded individually and so can be updated without changing the other 3 programs currently in memory. The separate programs can also be, with care, interlinked to form one 'long program'. Use of all 4 internal program slots could in theory give one long program made up of almost 4000 lines of BASIC code with over 1000 sub-procedures!
- The X2 also supports running of up to 4 additional programs from an external i2c 24LCxx EEPROM chip. Programs can also be copied from external EEPROM into internal memory.
- Two new internal comparator functions can compare the two external ADCs or an external ADC and an internal voltage reference.
- There are 3 new 'interrupt' pins (INT0-2) which can be used to directly trigger an interrupt.

Support for Linux & Mac

With the introduction of many low-cost 'netbook' computers such as the Asus eeePC / Inspire One many schools are seeing the benefits of using these machines with their students. It's hardly surprising they appeal when they cost only £150 each and weigh less than 1kg!



Due to their low cost these machines often run Linux and have a limited size screen and memory capacity.

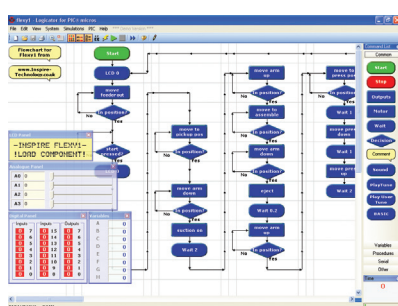
Therefore over the last few months Revolution Education have successfully ported their software, compilers and USB drivers to both Linux and Mac formats, and we are pleased to announce the new AXEpad Editor, specifically designed for this type of low-cost 'netbook' computer (of course the software will also run on higher specification machines!).

The software is available in 3 variants so that all three major operating systems are now supported. All variants support the common PICAXE features such as colour highlighting of BASIC programs, support for downloading via the AXE027 USB cable, and in-built testing features such as the 'Debug' and 'Terminal' functions.

AXEpad is completely free of charge from www.picaxe.co.uk for
Linux - any modern x386 distribution with GTK2.8+
Mac - OSX (10.3 or later) on PowerPC or Intel machines
Windows - 2000 / XP / Vista

Logicator is now shareware!

Logicator for PICs is a flowcharting application widely used within education for developing control programs for PIC and PICAXE microcontrollers. It is extremely easy to use and supports an on-screen simulation and ICE mode that allows students to easily test and debug their flowcharts.

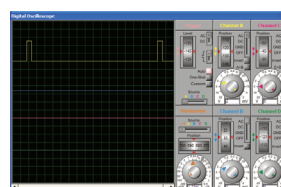
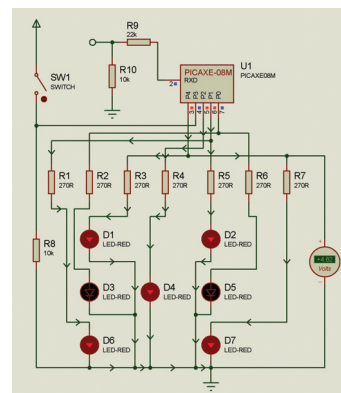


We are pleased to announce that Logicator for PICs and PICAXE is now available as **shareware** for students/hobbyists to use at home. This means that students can install the software without charge on their home computer to finish homework/school projects etc. (if they use the software for more than 30 days they should register). The shareware version is not restricted or time limited in any way, all features including downloading and printing are fully functional.

PICAXE VSM simulator

PICAXE Virtual System Modelling (VSM) is a new software circuit simulator that combines a 'virtual' PICAXE chip with animated components and SPICE circuit analysis to produce a simulation of a complete PICAXE project – and it operates in real time on most modern PCs!

To use the system simply draw your circuit schematic on screen, using the automated wiring and library of over 10,000 popular analogue / digital components to build up your circuit.

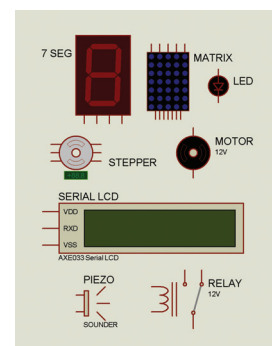


Add voltage/current probes to any point in the circuit, and then connect any virtual instruments (e.g. a voltmeter or oscilloscope) as required. Then associate your PICAXE BASIC program to the PICAXE chip component and click 'Play' to watch the circuit in operation.

The on-screen output components (e.g. LEDs, motors and displays) animate as the PICAXE program runs, and input devices such as temperature sensors, switches and keypads can be activated by clicking on the animated model in the circuit simulation.

PICAXE VSM also provides extensive debugging facilities – the PICAXE program can be stepped through line by line, breakpoints can be set in the program, and the variable values can be displayed.

Virtual instruments such as ammeters, voltmeters and oscilloscopes can be connected to study circuit operation. Voltage and current can also be highlighted by various animation options, for instance by adding 'voltage indicators' to component pins.



PICAXE VSM also supports traditional components such as 555 timers, op-amps etc. These components can be simulated in circuits by themselves, or combined into a PICAXE circuit.

PICAXE VSM KEY FEATURES:

- Berkeley SPICE and digital circuit simulation for all PICAXE chips
- Library of over 10,000 components
- Sample files include simulations of many Revolution PICAXE kits
- Many animated output components, including LEDs, 7 segment displays, serial LCDs, motors, servos, stepper motors etc
- Many animated input components including switches, LDRs, thermistors, digital temperature sensors, keypads, iButtons etc
- Piezo sounders and speakers simulate via the computer's soundcard
- On screen animation of voltage bar and current arrows, and an unlimited number of current / voltage probes may be added
- Virtual instruments include voltmeter, ammeter, oscilloscope, etc.
- Support for all major protocols, including RS232, spi, i2c, 1-wire
- Can simulate traditional circuits (e.g. 555 timers, op-amps, logic)
- Set of free 'electronic principles' tutorial animations included
- Users can develop their own models and animations
- Export net lists for use in a dozen different PCB applications

More details at: www.picaxeism.com

New PICAXE Student Kits

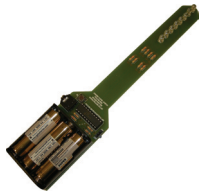
SIMPLE PIC KIT

This is our cheapest PICAXE kit ever! An ideal introduction to PIC microcontrollers, with 3 LED outputs and a switch and LDR as inputs. Easy to assemble with large and well spaced solder pads – the professional quality PCB has a solder resist lacquer layer to ensure solder only sticks where it should! Part number AXE130. The components are also laid out in the recognised INPUT-PROCESS-OUTPUT sequence for block diagram teaching.



SPACE-WRITER

The Spacewriter kit lives up to its name – it writes messages in thin air! A PICAXE-20M controls 8 LED outputs and when waved back and forth the human eye's POV (persistence of vision) sees messages written in the air. Easy to assemble and programmable with your own message. Part number AXE135S.



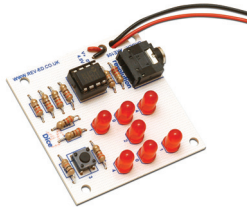
NURSERY MONITOR

By adding a highly accurate DS18B20 digital temperature sensor to the spacewriter kit a baby's nursery monitor is created. The 8 LEDs can be programmed to indicate the appropriate temperature - as maintaining the correct temperature in nursery's is highly recommended by health care professionals to help reduce the risk of cot death amongst young babies. Part number AXE136S.



PIC+PCB FOR UNDER £1

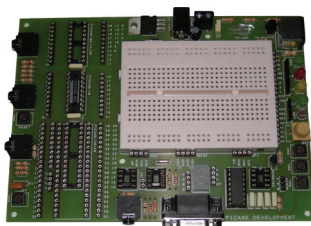
Our ever popular 'PIC+PCB' pairs are still available in Simple PIC, Dice, Cyberpet, Alarm and Steady Hand Game formats.



New Development Board

Have you ever wondered how the PICAXE development team test all the various PICAXE hardware and software features? The answer is the AXE091 Development Board, which is now available for purchase.

The development board features turned pin sockets to allow all 8,14,18,20,28 and 40 pin PICAXE chips to be tested. Up to 3 different PICAXE chips can be used on the board at the same time, and all download circuits are in-built. The board can be powered by batteries or 9V DC supply. Part number AXE091.



- 3 LED indicators
- 7 Segment Display
- Servo Header
- DS1307 Temperature Sensor
- Light Dependent Resistor
- Push Switches
- Preset potentiometer
- Large bread-boarding area
- Infra red sensor & LED
- 6pin DIN keyboard connector
- Socket for i2c EEPROMs
- Socket for DS1307 RTC
- Socket for SPI EEPROMs
- Connectors for serial cables

PICAXE User Projects

We often have PICAXE enthusiasts send us very interesting projects built with PICAXE chips. Two of these projects have caught our eye and have now been released as kits - Micromouse and Oscilloscope

PICAXE MICROMOUSE -

Jim Chidley and Derek Hall are the 'kings' of the micromouse competition, having won the title for many years. The competition is based around building an 'electronic mouse' that can negotiate an unknown maze in the fastest time. Mazes are easily constructed from strips of timber bought from any DIY store, but building a mouse is quite a technically challenging task.



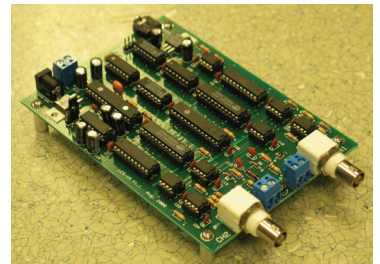
Jim and Derek have now built a PICAXE based mouse 'nicknamed PICone' to demonstrate how to build the electronics, hardware and program a true 'maze solving algorithm' to those who want to start off in the competition. This is a true maze solving mouse – not a

simple 'wall follower kit' as produced by others! It is also a very competitive mouse – taking third place at the 2008 UK finals – not bad considering there were dozens of entries as seen in the photo above!

The mouse is provided as a self assembly kit (part KIT110) including all parts and very detailed instructions and sample programs. A moderate soldering ability is required.

PICAXE OSCILLOSCOPE -

Wolfgang Maichen has produced a wonderful open-source PICAXE based oscilloscope for those who want to both build a useful piece of test equipment – and understand how it works! The Windows software that displays screen-traces etc. is naturally also included free of charge.



Some of the main features are:

- Two independent input channels
- Sample rate up to 1 MSample/sec (good enough for signals up to approx. 150 kHz)
- Analog bandwidth approx. 400 kHz
- Input impedance > 100 kOhm
- Sensitivity from 20mV/div to 1V/div (20 vertical divisions).
- Trigger on CH1 (rising or falling edge, selectable) or autotrigger
- Record length 256 samples per channel
- Vertical offset 0 - 20 divisions

The oscilloscope is supplied in pre-soldered, partially assembled kit form (part KIT120, probes and power supply not included).

