

PICAXE-X2 Conversion Wizard

Beta-Release Version 0.1.x

2009-02-16

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The image shows a screenshot of a software dialog box titled "PICAXE-X2 Conversion Wizard". The dialog box has a light gray background and a title bar with an orange gradient. Inside the dialog, there is a section labeled "Options" with a thin border. This section contains three radio button options and two checked checkbox options. The radio buttons are for "Convert for 28X2 and 40X2" (selected), "Convert for 28X2", and "Convert for 40X2". The checkboxes are for "Inline Pin Number conversion" and "Inline Pin Variable conversion". At the bottom of the dialog, there are two buttons: "Cancel" and "Convert".

PICAXE-X2 Conversion Wizard

Options

- Convert for 28X2 and 40X2
- Convert for 28X2
- Convert for 40X2
- Inline Pin Number conversion
- Inline Pin Variable conversion

Cancel Convert

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Using the PICAXE-X2 Conversion Wizard

Introduction

The PICAXE-X2 Conversion Wizard is a tool to automatically upgrade existing PICAXE programs for use with the new PICAXE-28X2 and 40X2 products.

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Warranty, Licensing and Copyright

The current status of PICAXE-X2 Conversion Wizard is that of a Beta-Release.

While having undergone rigorous testing, not all advertised functionality of PICAXE-X2 Conversion Wizard may be available for all operating systems or for all configurations. Associated documentation may be incomplete and contain errors and omission.

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System Requirements

Programming Editor

The PICAXE-X2 Conversion Wizard is integrated into the Programming Editor development system and can be launched through the *PICAXE, Wizards, Convert to X2...* menu option.

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Windows 2000 or later, including Windows XP, Windows Vista

AXEpad

The PICAXE-X2 Conversion Wizard is integrated into the cross-platform AXEpad development system and can be launched through the *PICAXE, Wizards, Convert to X2...* menu option.

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Latest Documentation

The latest version of this document can be downloaded from Revolution Education Ltd's web site at -

<http://www.rev-ed.co.uk/docs/x2w001.pdf>

The X2 Conversion Process

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Inline Conversion and Non-Inline Conversion

Using 'Inline Pin Number Conversion' and 'Inline Pin Variable Conversion' will replace a pre-X2 pin number or pin variable with the equivalent pin number or pin variable name as required for the X2 PICAXE in the place where it was originally used. Inline conversion is convenient for simple and short programs and those which will not likely be modified after conversion.

For greater flexibility and convenience, pin numbers and pin variables can be replaced by a symbol defined name which indicates the pin that symbol refers to. This is convenient where the program is to be changed and pins are to be re-mapped to different hardware pins, and supports the use of software which can be used with both the PICAXE-28X2 and 40X2.

Note that it is only possible to perform inline conversion when a specific PICAXE-28X2 or 40X2 target is selected. The default input ports are different on each and it is not possible to generate code compatible with both PICAXE's when performing inline conversion.

Pin Number Conversion

For pre-X2 PICAXE's, pin numbers were a simple number 0 to 7 which indicated the pin on the default input or output port for that PICAXE; a "HIGH 0" would set Output Pin 0 high, a "COUNT 0,100,w0" would count pulses on Input Pin 0.

For the X2, because each pin can be either an input or output, it is necessary to define exactly which pin is being used; a simple pin number of 0 would be the same pin when used in an input or output command.

For a 28X1 the default output port is Port B and the default input port is Port C so "HIGH 0" and "COUNT 0,100,w0" would become "HIGH B.0" and "COUNT C.0,100,w0" for a 28X2 used in the same hardware.

For a 40X1 the default output port is Port B and the default input port is Port D so "HIGH 0" and "COUNT 0,100,w0" would become "HIGH B.0" and "COUNT D.0,100,w0" for a 40X2 used in the same hardware.

Pin numbers for analogue input pins (used in READADC and READADC10 commands) do not need to change and nor do pin numbers for PWM output pins (used in PWMOUT and PWMDUTY commands) except when converting software for an 18X to an X2 when the PWM output pin must change from 3 to 1 or 2.

PICAXE-X2 Conversion Wizard Mechanism

The PICAXE-X2 Conversion Wizard will automatically upgrade a pre-X2 PICAXE program to be used with an X2 and update pin numbers as required based upon whether a pin number is used as an input or output pin.

When 'Inline Pin Number Conversion' is specified the pin number will be replaced in situ in the command it appears in, otherwise the pin number will be replaced by a symbol name which will be defined at the top of the converted program.

The symbol name for a default input or output port will take the form "IO_inN" or "IO_outN" where 'N' is the pin number of that port, 0 to 7. For specific ports the symbol name will take the form "IO_inPN" or "IO_outPN" where 'P' is the port referenced, 'a' to 'd'.

For example, an original PICAXE-28X1 program -

```
High 0
Count 0, 100, w0
High PortC 1
```

With 'Inline Pin Number Conversion' would become -

```
High B.0
Count C.0, 100, w0
High C.1
```

And without 'Inline Pin Number Conversion' would become -

```
Symbol IO_out0 = B.0           ' Output Pin, Default Port, Pin 0
Symbol IO_in0  = C.0           ' Input Pin,  Default Port, Pin 0
Symbol IO_outc1 = C.1           ' Output Pin, Port C, Pin 1

High IO_out0
Count IO_in0, 100, w0
High IO_outc1
```

Pin Variable Conversions

On pre-X2 PICAXE pin variables are in the form of "pin0" to "pin7" and all pins collectively are "pins" which would refer to the default input or output port depending upon context; "LET pins = pins" would copy the input pins to the output pins "LET pin0 = pin0" would set Output Pin 0 to the state of Input Pin 0, "DO : LOOP WHILE pin0 = 0" would loop until Input Pin 0 became high.

For the X2, because each pin can be either an input or output, it is necessary to define exactly which pin is being used; a simple pin variable of 'pin0' would be the same pin when used in an input or output command.

For a 28X1 the default output port is Port B and the default input port is Port C so "LET pins = pins" would become "LET pinsc = pinsa" and "LET pin0 = pin0" would become "LET pinc.0 = pina.0" for a 28X2 used in the same hardware.

For a 40X1 the default output port is Port B and the default input port is Port D so "LET pins = pins" would become "LET pinsd = pinsa" and "LET pin0 = pin0" would become "LET pind.0 = pina.0" for a 40X2 used in the same hardware.

PICAXE-X2 Conversion Wizard Mechanism

The PICAXE-X2 Conversion Wizard will automatically upgrade a pre-X2 PICAXE program to be used with an X2 and update pin variables as required based upon whether a pin variable references input or output pins.

When 'Inline Pin Variable Conversion' is specified the pin variables will be replaced in situ in the command it appears in, otherwise the pin variable will be replaced by a symbol name which will be defined at the top of the converted program.

The symbol name for a default input or output port will take the form "IO_inpinN" or "IO_outpinN" where 'N' is the pin number of that port, 0 to 7. For specific ports the symbol name will take the form "IO_inpinPN" or "IO_outpinPN" where 'P' is the port referenced, 'a' to 'd'.

For example, an original PICAXE-28X1 program -

```
Let pins = pins
Do
  pin0 = pin0
Loop Until PortA pin1 = 0
```

With 'Inline Pin Variable Conversion' would become -

```
Let pinsb = pinsc
Do
  pinb.0 = pinc.0
Loop Until pina.1 = 0
```

And without 'Inline Pin Variable Conversion' would become -

```
Symbol IO_inpins = pinsb
Symbol IO_outpins = pinsc
Symbol IO_outpin0 = pinb.0
Symbol IO_inpinc0 = pinc.0
Symbol IO_inpinal = pina.1

Let IO_inpins = IO_outpins
Do
  IO_outpin0 = IO_inpin0
Loop Until IO_inpinal = 0
```

Symbol Definitions

Where symbol definitions are used to specify a pin number or a pin variable there may be ambiguity when using an X2 PICAXE. For example, consider the following 28X1 code ...

```
Symbol myPin = 1

High myPin
High PortC myPin
```

In this case 'myPin' is used to refer to an output pin in both the default port and Port C.

To correctly convert the 'myPin' usage in both "HIGH" commands it is necessary to create two separate symbol definitions for 'myPin'. For the 28X2 the default output port is Port B and so a suitable conversion would be -

```
Symbol myPin_out1 = B.1
Symbol myPin_outc1 = C.1

High myPin_out1
High myPin_outc1
```

The PICAXE-X2 Conversion Wizard will automatically update such symbol definitions, with 'Inline Pin Variable Conversion', giving the result as above, and without as below -

```
Symbol IO_out1 = B.1
Symbol IO_outc1 = C.1

Symbol myPin_out1 = IO_out2
Symbol myPin_outc1 = IO_outc1

High myPin_out1
High myPin_outc1
```

Output Format

Where a program is converted for a specific 28X2 or 40X2 the converted program will consist of a

"#picaxe28X2" or "#picaxe40X2" definition, followed by the converted program. For a source program of -

```
Do
  pins = pins          ' Copy input pins to output pins
Loop
```

Converted for a PICAXE-28X2 (with default inputs on Port C) this will become -

```
#picaxe28x2

symbol IO_inpins  = pinsc      ; Get Input Pins, Default Input Port
symbol IO_outpins = pinsb      ; Set Output Pins, Default Output Port

Do
  IO_outpins = IO_inpins
Loop
```

Converted for a PICAXE-40X2 (with default inputs on Port D) this will become -

```
#picaxe40x2

symbol IO_inpins  = pinsd      ; Get Input Pins, Default Input Port
symbol IO_outpins = pinsb      ; Set Output Pins, Default Output Port

Do
  IO_outpins = IO_inpins
Loop
```

When converted for use with both PICAXE-28X2 and 40X2 two sets of symbol definitions will be created for the 28X2 and 40X2. The converted program will become -

```
#define for28X2
' #define for40X2

#ifdef for28x2
  symbol IO_inpins  = pinsc      ; Get Input Pins, Default Input Port
  symbol IO_outpins = pinsb      ; Set Output Pins, Default Output Port
#endif

#ifdef for40x2
  symbol IO_inpins  = pinsd      ; Get Input Pins, Default Input Port
  symbol IO_outpins = pinsb      ; Set Output Pins, Default Output Port
#endif

Do
  IO_outpins = IO_inpins
Loop
```

Uncomment the "#define for28X2" or "#define for40X2" as appropriate for the PICAXE to be compiled for and comment out the other prior to compilation. The "IO_inpins" definition for the default input pins will be selected as appropriate, "pinsc" for the 28X2 and "pinsd" for the 40X2. Note that the PICAXE-28X2 target will be selected by default.

Using the PICAXE-X2 Conversion Wizard

The PICAXE-X2 Conversion Wizard is integrated into the Programming Editor and cross-platform AXEpad development system and can be launched through the *PICAXE, Wizards, Convert to X2...* menu option.

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