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PicTools Manual 3.0

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TechTools PicTools Introduction

Part



1 TechTools PicTools Introduction

This manual covers information for using the following TechTools products:

QuickWriter (MCU [Programmer](#)^[4]), **ClearView Mathias** (In-Circuit [Emulator](#)^[199]),

CVASM (ClearView [Assembler](#)^[133]), **TDE** (TechTools Design [Environment](#)^[27])

QuickWriter and Mathias are hardware devices that use our CVASM and TDE software. This manual will reference both hardware products in the software sections, so not all features will be available unless you own both products. For example, the debugging features of TDE will not be available if you do not own a ClearView Mathias In-Circuit Emulator.



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QuickWriter MCU Programmer

Part



2 QuickWriter MCU Programmer

QuickWriter



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2.1 HEX File

Overview

QuickWriter accepts INHX8M (INTEL HEX 8 bit merged) and INHX32 HEX files. For the PICmicro MCU microcontroller, these are generally in one of two formats:

Microchip: Includes Code, Data, ID and Configuration Word information. This format is normally saved with a ".hex" extension.

TechTools: Includes Code, Data, ID, Device type, Configuration Word and sometimes Calibration information. This format is normally saved with a ".obj" extension.

QuickWriter will accept the above formats and adjust all relative data according to the type of information found in the HEX file. Any information that is missing from the HEX file (such as the Configuration Word) will be set to defaults unless manually overridden elsewhere in the program. If the MCU type is not specified, then the currently selected MCU will be used.

QuickWriter saves HEX files with the ".hex" extension following Microchip's format. However, it also includes the device type as a comment that can be read by QuickWriter. This allows other products that may not recognize the device type to use the HEX file without experiencing any errors.

Details

Select "**FILE - Open File**". Choose the desired file, then click "Open". The full filename and path will be displayed in the Title Bar of the program, the file will be loaded into memory and all displayed data will be updated with the contents of the HEX file.

Shortcuts

Alt+F, O




2.2 Setting Options


Overview

Options are divided into five categories:

Auto Run Options ^[6] - Enables and disables programming operations and sections of the MCU for "Auto Run" cycles. These selections will enable or disable speed buttons and the associated item in the "Task Tree" on the left of the main window, but will not affect the "MCU SECTION" menu items, which will always be available while "Option Editing" is enabled in General Options.

General Options ^[7] - General options that are not normally needed during development but help when preparing settings for production personnel.

HEX Options  - Provides HEX file Overrides for the specific HEX file and selection of records to include when saving HEX files.

Serial Numbers  - Enable and set Serial Numbering details such as number of locations, area of the MCU and address to place the serial number.

Advanced Options  - Advanced settings mainly related to In-Circuit Programming.

All options are dynamic and take effect immediately when changed. It is NOT necessary to "close" the options window or to "save option settings" in order to "apply" the new settings. QuickWriter was designed with developers in mind and frequent option changes between programming tasks or "auto run" cycles is expected.

Details

Option changes and Editing take effect immediately regardless of whether the Window is closed or remains open.

Options are saved permanently when the application is closed and when "File - Save Option Settings" is selected.

Options are loaded whenever the application starts and when a HEX file is loaded. Options will be restored from the HEX file and the corresponding ".QWC" (QuickWriter Control) file if found, otherwise all options will remain unchanged from the current settings.

NOTE: Some options are Refreshed from permanent settings when the MCU selection is changed. Be sure to save any changes to options before changing the MCU selection.

Shortcuts

Alt+O

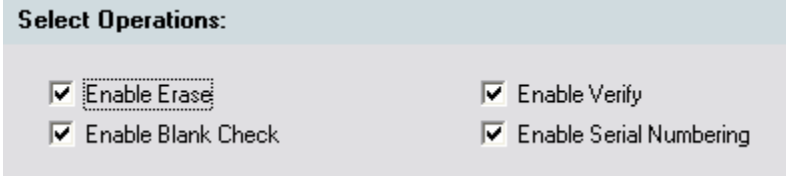
2.2.1 Setting Auto Options

Overview

Enables and disables programming operations and sections of the MCU for "Auto Run" cycles. These selections will enable or disable speed buttons and the associated item in the "Task Tree" on the left of the main window, but will not affect the "MCU SECTION" menu items, which will always be available while "Option Editing" is enabled in General Options.

Details

Operations:



Select Operations:

| | |
|--|---|
| <input checked="" type="checkbox"/> Enable Erase | <input checked="" type="checkbox"/> Enable Verify |
| <input checked="" type="checkbox"/> Enable Blank Check | <input checked="" type="checkbox"/> Enable Serial Numbering |

Enable Erase - If available for the MCU and selected, a bulk erase is performed on the FLASH device during Auto Run cycles.

Enable Blank Check - If selected, a blank check is performed on all enabled areas of the

device during Auto Run cycles. We suggest leaving this option enabled unless reprogramming an MCU that already contains data.

Enable Verify - If selected, a verify will be performed during Auto Run cycles on all selected areas of the MCU (i.e. Code, EE Data, Calibration, ID) before the Configuration Word is programmed. Most programming operations automatically verify during programming, but because some MCU algorithms do not, we suggest always leaving this option enabled.

Enable Serial Numbering - If selected, the MCU will be serialized (just prior to programming the Configuration word) during Auto Run cycles according to the settings in [Serial Number options](#) (also see: [Using Serial Numbers](#)).

MCU Sections:

Select MCU Sections:

| | |
|---|--|
| <input checked="" type="checkbox"/> Enable Code | <input checked="" type="checkbox"/> Enable Calibration (required if FLASH w/CAL) |
| <input checked="" type="checkbox"/> Enable EE DATA | <input checked="" type="checkbox"/> Enable Fuses |
| <input checked="" type="checkbox"/> Enable ID Locations | |

Enable Code - If selected, the Code Space area will be blank checked, programmed and verified during Auto Run cycles according to Operation settings.

Enable EE Data - If selected, the EE Data area will be programmed and verified during Auto Run cycles.

Enable ID Locations - If selected, the ID locations will be blank checked, programmed and verified during Auto Run cycles. ID locations have no bearing on the operation of the MCU and can be ignored if desired.

Enable Calibration - If available for the MCU and selected, the Calibration area will be blank checked, programmed and verified during Auto Run cycles. Some FLASH MCUs with calibration require this option and QuickWriter will automatically select it for you. If the MCU is not a FLASH device, **we strongly advise against selecting this option** unless programming a JW (windowed) device. Attempting to program the calibration area of an OTP (one time programmable) device will result in corrupted calibration data.

Enable Fuses - If selected, the Configuration Word will be programmed and verified during Auto Run cycles.

Shortcuts

Alt+O, O

2.2.2 Setting General Options

Overview

General options that are not normally needed during development but help when preparing settings for production personnel.

Details

Misc. Options:

Misc. Options:

- Skip Blank Locations [Faster]
- Disable Task Confirmation Messages
- Warn If Code/Data Protection is Enabled
- Use High Speed Transfers
- Use Microchip Checksums

Skip Blank Locations - If selected, any "Blank" value will be skipped during programming, which can greatly reduce programming time on large devices that are only using small portions of the Code space. Keep in mind however, that after serializing an MCU in a "Blank" area of the code space, verifying will pass because of skipping over the blank area. Likewise, blank checking will fail because a "non-blank" value is detected. This normally is not an issue but could be confusing when manually selecting individual programming tasks out of sequence. NOTE: This setting has no effect on 18 series MCU's and some newer FLASH MCU's due to multi-word programming algorithms.

Disable Task Confirmation Messages - If selected, all "Are You Sure?" type messages will be disabled. We suggest enabling this option after you are thoroughly familiar with the programs operation.

Warn if CODE/Data Protection is Enabled - If selected, a warning dialog will appear if the Fuse Options are set to "Protect" any area of the MCU. (see: [Setting the Configuration Word \(Fuses\)](#))

Use High Speed Transfers - Select this option to enable higher speed communication between the PC and Quickwriter. This will double the speed of Reading from the device and may reduce total programming time slightly on some MCU's. If any communication errors are detected while this option is enabled, QuickWriter will automatically switch back to the normal transfer speed until "Reset QuickWriter" is selected, a new port is selected, this option is re-selected or the program is restarted.

Use Microchip Checksums - If selected, QuickWriter's buffer checksum calculation will adhere to Microchip's method of calculation which does not include the EEDATA and only includes Code and User IDs depending on the values of the Fuses and the device selected. The resulting calculation is displayed as a 16 bit HEX value.

To match Microchip's "Code Protected" checksum value, enable this option and "Read" a code protected device.

If not selected, QuickWriter's checksum will include all enabled buffers (Code, EEDATA, User IDs and FUSES) and the resulting calculation is displayed as a 32 bit HEX value.

Production Control:

Production Control:

| | |
|---|---|
| <input type="checkbox"/> Disable Option Editing | <input type="checkbox"/> Open in Compact View |
| <input type="checkbox"/> Disable EE Data Editor | Password to Enable Option Editing : |
| <input type="checkbox"/> Disable READ functions | <input type="text"/> |

Disable Option Editing - When this option is selected, all access to change options is hidden when the HEX file is opened. This prevents production personnel from accidentally changing settings and producing "unusable" devices.

To regain access, simply choose "Edit - Enable Option Editing". Entering the correct password will re-enable access to the options and the Editors.

If no password was specified when Option Editing was disabled, then leave the password field blank and select "OK" to re-enable access.

Disable EE Data Editor - When this option is selected, access to the EE Data editor will be disabled.

Disable Read Functions - If selected, all READ functions will be disabled. This will prevent production personnel from accidentally "Reading" the MCU and possibly changing loaded data.

Open in Compact View - When this option is selected, QuickWriter will open in "Compact View" only, regardless of the view selected previously. When this option is left unchecked, the view state is retrieved from the operator's local settings (stored in the Operating System's Registry).

Password to Enable Option Editing - If a password exists in this field and the "Disable Option Editing" option is checked, then this password will be required to re-enable option editing when the current HEX file is re-opened. The password is limited to 32 Alpha-Numeric characters.

(also see: [Setting Options for Production Personnel](#) ¹⁴)

Shortcuts

Alt+O, G

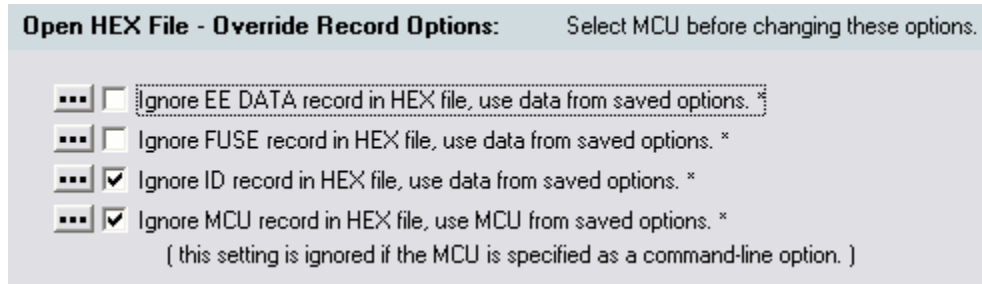
2.2.3 Setting HEX Options

Overview

Provides HEX file Overrides for the specific HEX file and selection of records to include when saving HEX files.

Details

Open HEX File - Override HEX Options:



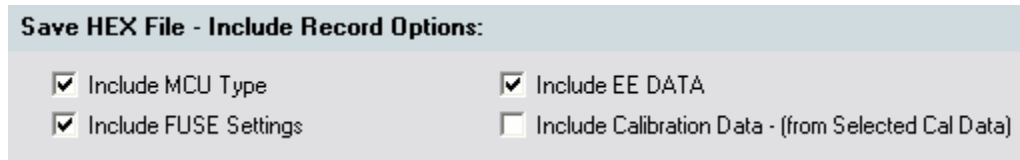
Ignore EE DATA - If selected, data currently displayed in the EE DATA editor will be saved and used whenever this HEX file is re-opened or the MCU selection changes, regardless of the data contained in the HEX file.

Ignore FUSE record - If selected, data currently displayed in the FUSES editor will be saved and used whenever this HEX file is re-opened or the MCU selection changes, regardless of the data contained in the HEX file.

Ignore ID record - If selected, data currently displayed in the ID Locations editor will be saved and used whenever this HEX file is re-opened or the MCU selection changes, regardless of the data contained in the HEX file.

Ignore MCU record - If selected, the currently displayed MCU will be saved and used whenever this HEX file is re-opened, regardless of the data contained in the HEX file.

Save HEX File - Include Record Options:



Include MCU Type - If selected, a "device" record will be included in the generated HEX file during a save.

Include FUSE Settings - If selected, a "Configuration Word" record will be included in the generated HEX file during a save.

Include EE Data - If selected, the EE Data will be included in the generated HEX file during a save.

Include Calibration Data - If selected, the Calibration Data will be included in the generated HEX file during a save. When multiple MCU devices with configuration data are present (i.e. using a 4-gang adapter), the configuration data will be saved from the current selection in the Calibration Editor.

Shortcuts

Alt+O, H

2.2.4 Setting Serial Number Options

Overview

Enable and set Serial Numbering details such as number of locations, area of the MCU and

address to place the serial number.

Serial Number Options:

... Enable Serial Numbering

... Use Existing Microchip SQTP File

SQTP File: C:\pictools\ANYSQTPFILE.NUM

Log File: C:\pictools\ANYSQTPFILE.QWL

Place Serial Number in CODE Memory Encode each location as RETLW

Place Serial Number in EEPROM Memory

Number of Locations to use: Place Serial Number at Address:

Details

Serial Number Options:

Enable Serial Numbering - If selected, the MCU will be serialized during Auto Run cycles.

Use Existing Microchip SQTP file - When selected, use the button to the left of the option to choose an SQTP file (*.num). A log file will automatically be created with the same name but with a "QWL" extension.

Each serial number is marked as "used" when it is retrieved from the SQTP file to prevent using the same number twice. As each number is programmed into a PICmicro MCU, the results are stored in the log file, including Pass or Fail, the QuickWriter used, the Socket used and the time in ms.

The SQTP file can reside anywhere on a local network as QuickWriter fully implements file sharing mechanisms for the SQTP file and the corresponding LOG file.

Microchip SQTP files can be generated using the MPLAB environment provided by Microchip Technology Inc. To generate this file from MPLAB, the appropriate tool (such as a Pro version programmer) must be selected (see the Help information provided with MPLAB). Or an equivalent HEX file can be generated manually with an identical address specified for each HEX line.

NOTE: When this option is selected, the "Locations" and "Address" options are disabled since this information is retrieved from the SQTP file.

Place in Code Memory - If selected, the Serial number will be programmed into the Code area of the MCU. This also enables access to the Encode as RETLW option.

Encode as RETLW - This option is only available if the CODE memory option is selected. If selected, each Serial number location will be converted into the proper RETLW OPCODE (return literal in W) for the currently selected MCU.

Place in EEPROM Memory - If selected, the Serial number will be programmed into the EE DATA area of the MCU. This also Disables access to the Encode as RETLW option.

Number of Locations - Enter the maximum number of locations the serial number will need (from 1 to 8). Each byte of the serial number will use 1 location in the memory area specified.

Place at Address - Enter the address in the selected memory area to place the serial number. This can be from 0 to the highest available address, minus the number of locations specified. If an address higher than the maximum valid address is specified, QuickWriter will notify you and automatically reduce the address to the highest valid address for the selected memory area and number of locations.

(also see: [Using Serial Numbers](#) ⁽¹⁷⁾)

Shortcuts

Alt+O, N

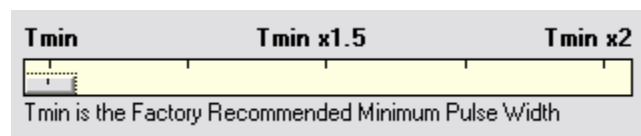
2.2.5 Setting Advanced Options

Overview

Adjust the Programming Pulse Width of FLASH MCUs and choose Target Power Options for ICP (In-Circuit Programming).

Details

FLASH Programming Pulse Width:



Modify this setting in "Less than Optimal" situations to ensure successful programming over voltage, temperature, device and circuit variations.

The default value of Tmin is preset to the Factory Recommended Value that already accounts for temperature and device variations. However if errors occur when programming In-circuit, this value may need to be adjusted to account for Voltage and Circuit variations.

Each step in the selector (shown above) will increase the duration of the programming pulse by 1/4 of the Factory Recommended Value. The 5 steps are as follows:

PPW = Tmin or **1 PPW**

PPW = (Tmin + (Tmin /4)) or **1.25 PPW**

PPW = (Tmin + ((Tmin /4) * 2)) or **1.50 PPW**

PPW = (Tmin + ((Tmin /4) * 3)) or **1.75 PPW**

PPW = (Tmin * 2) or **2 PPW**

If the calculated value exceeds factory specifications or a maximum of 255 ms, it will be adjusted appropriately.

Target Voltage Option:

| Target Voltage Options: | |
|--|--|
| <input type="checkbox"/> Target VDD Option <input type="radio"/> Monitor and Power the Target <input checked="" type="radio"/> Monitor a Self Powered Target | Selecting the Self Powered Target option will disable QuickWriter's Busy LED and enable the TVDDEN signal function. |
| <input checked="" type="checkbox"/> Skip Power Cycles if Possible <input type="checkbox"/> Override Power OFF Requirement | Multiple task operations will cycle the power between each task on some MCUs. Select the Skip option to reduce the number of power down/up cycles when possible. |

Modify this setting for In-Circuit Programming to select whether QuickWriter supplies the power for the target circuit or whether the Target circuit will supply its own power. (see: [ICP with Self Powered Targets](#) ^[21])

Skip Power Cycles:

Select this option to have QuickWriter reduce the number of Power OFF/ON cycles during "Auto" cycles. This option is not recommended, but may be needed for some in-circuit configurations.

Override Power Off Requirement:

Select this option if it is necessary to have power present in the target circuit before starting any "Auto" cycle. When selected, this option also will not require the target power to be removed when the cycle has been completed. NOTE: This option is not recommended, but has been added due to popular request.

Shortcuts

Alt+O, A

2.2.6 Setting I.D. Locations

Overview

PICmicro MCU's have four or eight ID locations reserved for the customer's use. Although each location may be 12, 14 or 16 bits in length (depending on the MCU), the manufacturer recommends using the 4 least significant bits of each location. Common industry practice has offered the ability to use the 7 least significant bits of each location therefore, we provide both options.

If your HEX file does not include ID information or you would like override the ID with a different value whenever the HEX file is opened, select the "Override" check box after changing the ID values.

Details

| | |
|---|------|
| <input checked="" type="radio"/> Use 4 Bit HEX Values | FFFF |
| <input type="radio"/> Use 7 Bit ASCII Values | 0000 |

Select "Edit - ID Locations". If the values displayed do not reflect those desired, simply select and edit the appropriate field (4 bit or 7 bit). Any changes take effect immediately and will be implemented with the next programming action (i.e. Autorun, program ID locations, etc.).

(see also: [Setting HEX Options](#)^[9])

Shortcuts

Alt+E, I

2.2.7 Setting Options for Production Personnel

Overview

Sometimes it is desirable to block access to option settings for a HEX file in order to prevent undesired changes. Whether this is for archiving "released" code or for the production department, QuickWriter provides a simple method of protecting your settings from accidental changes. This is accomplished through a "control" file.

The control file contains all option settings for QuickWriter, is saved in the same directory as the HEX file and is created with the same name as the HEX file except the file extension is changed to ".QWC". One of the options in the control file instructs QuickWriter to DISABLE option editing.

The following will be disabled when a HEX file is opened, if the "Disable Option Editing for this file" option has been selected:

MCU selection.
Auto Options, HEX Options and General Options.

Code, FUSE, ID and Calibration editors.

Manual access to tasks in the "Programming Tasks" tree or MCU Section menu.

ALL programming functions except Auto Run, Erase, Blank Check and Verify.

A detailed procedure for setting options for production personnel is described below but the general procedure is to Open the HEX file, set all desired options, select "Disable Option Editing" in "General Options", then select "File - Save Option Settings". The control file has now been created and modified (resides in the same directory as the HEX file), and is now ready for the production department.

Details

To configure a HEX file for archiving or production use, follow the procedure described here.

1. Open the desired HEX file from the directory it will be used in if possible.
2. Verify the MCU, Configuration Word and ID location settings. If the MCU and Configuration Word are incorrect you will need to make the necessary changes, then **save the HEX file with ALL "Save Hex Options" enabled or select the proper overrides in HEX Options**. After saving the hex file, re-open it and re-verify the MCU, Configuration Word and etc. If everything is correct, proceed with the next step.
3. Go to the "Options - Auto Options" and select each option to be performed during programming. Each selected item will be performed when the production department chooses "Auto Run" (or F4 or Alt+A).
4. If you have enabled Serialization, verify the serial number length and address settings to prevent overlapping valid code or EE data. Also verify the "last serial number" and "Auto Increment" settings (see: [Using Serial Numbers](#)^[17]).

5. After all settings have been verified, select "Disable Option Editing.." in the "Misc. Options" section of the "General Options". You may also want to select "Disable Read Functions" in this same location.
6. Select "File - Save Option Settings" from the main menu, then close the program.
7. Copy the HEX file and the corresponding control file (hexfilename.QWC) to the desired location for production accessibility. The production department can now open the HEX file without fear of accidental changes.

Shortcuts

Alt+E, i (disable option editing for testing)

Alt+E, E (enable option editing for further editing)

2.3 Operation

Operation

[Selecting the MCU](#) ^[15]

[Setting the Configuration Word \(Fuses\)](#) ^[15]

[Using Gang Adapters](#) ^[17]

[Using Serial Numbers](#) ^[17]

[Reading the MCU Contents](#) ^[19]

2.3.1 Selecting the MCU

Overview

Some HEX files will not contain the MCU type or you may want to select a different MCU to program. When the MCU type changes, QuickWriter will adjust many aspects of the software to match the capabilities of the selected device. Because of this it is very important to select the proper MCU type (including prefixes such as 'A','B' and etc.).

Details

Select "Options - Select MCU Type". When the MCU dialog opens use the cursor keys or the mouse to select the desired MCU, then click the 'OK' button (or press the 'Enter' key) or "DBL-Click" on the desired MCU.

(see also: [Setting HEX Options](#) ^[9])

Shortcuts

Alt+O, S



2.3.2 Setting the Configuration Word (Fuses)

Overview

The configuration Word is set according to data stored in the HEX file when it is opened. However, you are free to change this information in the program before programming the MCU, provided "Option Editing" is enabled for this HEX file (see: [Setting General Options](#) ^[7]; see also: [Setting Options for Production Personnel](#) ^[14]).

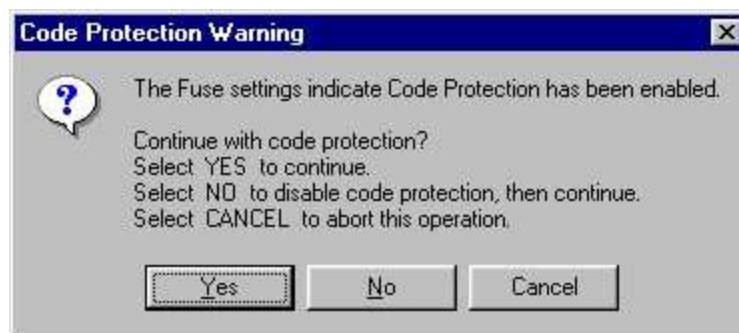
Specific bits in each Configuration Word control available MCU options when programmed.

QuickWriter identifies each set of bits by labels provided in the manufacturers datasheet. If you are not familiar with a particular reference, such as WDT (Watch Dog Timer), you will need to see the datasheet which will give a full explanation of the configuration option and its meaning. Do not change the configuration word unless you are fully aware of each options function. Selecting the wrong configuration can make the MCU operation undesirable or unreliable, which renders the device unusable.

Details

Select "Edit - Configuration Word". To change FUSES in the configuration word, use the selection arrow beside each Fuse option to select from its available settings (or use the TAB and CURSOR keys).

WARN if Code Protection Enabled - If selected and one of the Configuration Fuses indicate that the Code or Data Protection fuse(s) have been enabled, you will be presented with three options before programming the MCU.



This warning will help remind you that the protection fuses are about to be enabled.

Once the Code or Data protection fuses have been enabled on a device, the contents of the protected section is no longer accessible for READING or VERIFYING.

NOTE: Code Protection will prevent erasing on most JW (Windowed, erasable) devices.

If setting the Protection fuse was unintentional, then select NO to have QuickWriter automatically disable the Protection and continue with the operation in progress. Otherwise choose YES to continue "AS IS" or CANCEL to completely abort the operation.

NOTE: Each MCU has different Configuration options. If the MCU type is changed, you will need to review changes in the Configuration Word options before programming the MCU.

(see also: [Setting HEX Options](#) ⁹⁴)

Special Consideration

Some PICmicro MCUs have Fuse options to "turn off" the external MCLR signal and others may have options to set the Oscillator to "internal". On older MCUs with these options and a "Power First" requirement of VDD (such as the 12C508/12C509), QuickWriter may have problems re-programming or reading the contents once the fuses have been programmed. This normally does not become an issue since the devices are OTP (one time programmable).

Newer MCUs with these fuse options allow a "Power first" of VPP (programming Voltage), which ensures the device can re-enter programming mode and be read after the fuses have been programmed.

During an "Auto Run" programming cycle, QuickWriter always verifies all sections of the MCU before programming the Fuses. Programming the fuses last allows QuickWriter to perform a full verification of all areas of the MCU regardless of the fuse settings.

Shortcuts

Alt+E, W

2.3.3 Using Gang Adapters

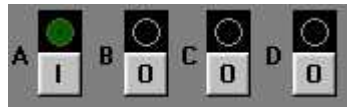
Overview

When using Gang adapters, each device is programmed and verified independently, but at the same time. Because of this, QuickWriter is able to save time while also tracking individual errors that may occur for each device being programmed.

Gang adapters are available for all serially programmed devices that are supported by QuickWriter. Multiple devices can be programmed at once without costing additional time except for the minor delay while Serializing.

Details

After connecting a gang adapter, you will want to enable multiple device support by selecting multiple sockets in the QuickWriter software.



The Socket LED Indicators (shown above), will change states when "clicked" as shown below.



Socket B disabled.



Socket A enabled

This can be done manually by toggling the button beneath each Socket LED Indicator or by using the Main Menu: "Options - Programming Sockets - Gang" , which will select all 4 sockets.

Shortcuts

Alt+O, P, G

2.3.4 Using Serial Numbers

Overview

QuickWriter programs serial numbers in Little Endian format. Any unused locations specified for serial numbering will be set to '00'. Therefore, the HEX serial number "FFFE" programmed into 8 locations of EE Data will be stored as "FE FF 00 00 00 00 00 00". If auto increment is selected, the next four incremented serial numbers will be stored as:

| | |
|---------------------------|-------------------|
| "FF FF 00 00 00 00 00 00" | (FFFFh or 65535) |
| "00 00 01 00 00 00 00 00" | (10000h or 65536) |
| "01 00 01 00 00 00 00 00" | (10001h or 65537) |
| "02 00 01 00 00 00 00 00" | (10002h or 65538) |

Stored Format in EE DATA:

The serial number 62449988134764293 (DDDDEEEEEFFF05h) will be stored as:

```
"05 FF FF EE EE DD DD 00"
```

Stored Format in CODE memory:

The serial number 62449988134764293 (DDDDEEEEEFFF05h) will be stored as:

```
"0005 00FF 00FF 00EE 00EE 00DD 00DD 0000"
```

Stored Format in Code memory as RETLW in a PIC16F873:

The serial number 62449988134764293 (DDDDEEEEEFFF05h) will be stored as:

```
"3405 34FF 34FF 34EE 34EE 34DD 34DD 3400"
```

Details

To enable Serialization, select the "Serial Numbers" section of the "Options" window, then select the "Enable Serial Numbering" option (see: [Setting Serial Number Options](#)^[10]):

Serial Number Options:

Enable Serial Numbering

Number of Locations to use: Place Serial Number at Address:

Place Serial Number in CODE Memory Encode each location as RETLW

Place Serial Number in EEPROM Memory

The last step is to set the beginning serial number and whether to have QuickWriter "Auto increment" before programming each device.

Auto Increment Serial Number

Last Number in HEX Last Number in Decimal

Disable "Auto Increment" to manually enter serial numbers or to edit the Last Serial Number.

Auto Increment - When selected, this option reads and stores the serial number indicated in the "LAST HEX" field as the last serial number used. The incremented value of this number will be programmed in the next device. The number used for each device will be displayed in HEX and Decimal beside the socket identifier and the results displayed on the right. The results field will indicate one of the following:

Manual - Serial numbering preferences have changed to Manual mode.

Auto - Serial numbering preferences have changed to Auto Mode.

Skipped - An earlier error has dictated skipping serialization for this socket. The serial number is not incremented for skipped sockets.

Passed - Serialization was successful for this socket.

Failed - An error occurred while serializing this socket. When a device fails to properly serialize, its serial number is not used for the next device.

| | |
|--|--|
| Socket A [HEX] <input type="text" value="A1B2C3D4E5F748"/> [Decimal] : <input type="text" value="45514025410623304"/> <input checked="" type="checkbox"/> Auto | Socket C [HEX] <input type="text" value="A1B2C3D4E5F74A"/> [Decimal] : <input type="text" value="45514025410623306"/> <input checked="" type="checkbox"/> Auto |
| Socket B [HEX] <input type="text" value="A1B2C3D4E5F749"/> [Decimal] : <input type="text" value="45514025410623305"/> <input checked="" type="checkbox"/> Auto | Socket D [HEX] <input type="text" value="A1B2C3D4E5F74B"/> [Decimal] : <input type="text" value="45514025410623307"/> <input checked="" type="checkbox"/> Auto |

Manual Serial Numbers - Serial numbers can be entered manually for each device by unselecting the "Auto" check box and editing the HEX or Decimal field beside each socket identifier. The "Last HEX" and "Last Decimal" fields will reflect the last value used to serialize a device.

| | |
|---|---|
| Socket A [HEX] <input type="text" value="A1B2C3D4E5F748"/> [Decimal] : <input type="text" value="45514025410623304"/> <input type="checkbox"/> Manual | Socket C [HEX] <input type="text" value="A1B2C3D4E5F74A"/> [Decimal] : <input type="text" value="45514025410623306"/> <input type="checkbox"/> Manual |
| Socket B [HEX] <input type="text" value="A1B2C3D4E5F749"/> [Decimal] : <input type="text" value="45514025410623305"/> <input type="checkbox"/> Manual | Socket D [HEX] <input type="text" value="A1B2C3D4E5F74B"/> [Decimal] : <input type="text" value="45514025410623307"/> <input type="checkbox"/> Manual |

Shortcuts

Alt+E, S - Opens the Serial Number Editor (shown above).

Alt+O, N - Opens the Serial Number Options.

Alt+R, S - performs a "Serialize Only" programming task.

2.3.5 Reading the MCU Contents

Overview

Sometimes it may be desirable to "reproduce" an MCU that has already been programmed or to visually verify the contents. To do this, you will need to read the contents of the MCU instead of opening a HEX file.