

HOW TO SETUP MPLAB TO WORK WITH THE UBW-32

Revision 1.0

In order to build and compile projects for the UBW32 © (developed by Brian Schmalz www.schmalzhaus.com) you must first setup your development environment properly. Brian provides some documentation on how to do this on his website, but I found it hard to follow. As such, I wrote this set of instructions. Hopefully you'll find it helpful if you have not solved your compiling issues yet.

** Note all instructions were tested on a Windows Vista© 32-bit Enterprise Edition Laptop.

1. Go to the following website and download the installer for Microchip's IDE "MPLAB"

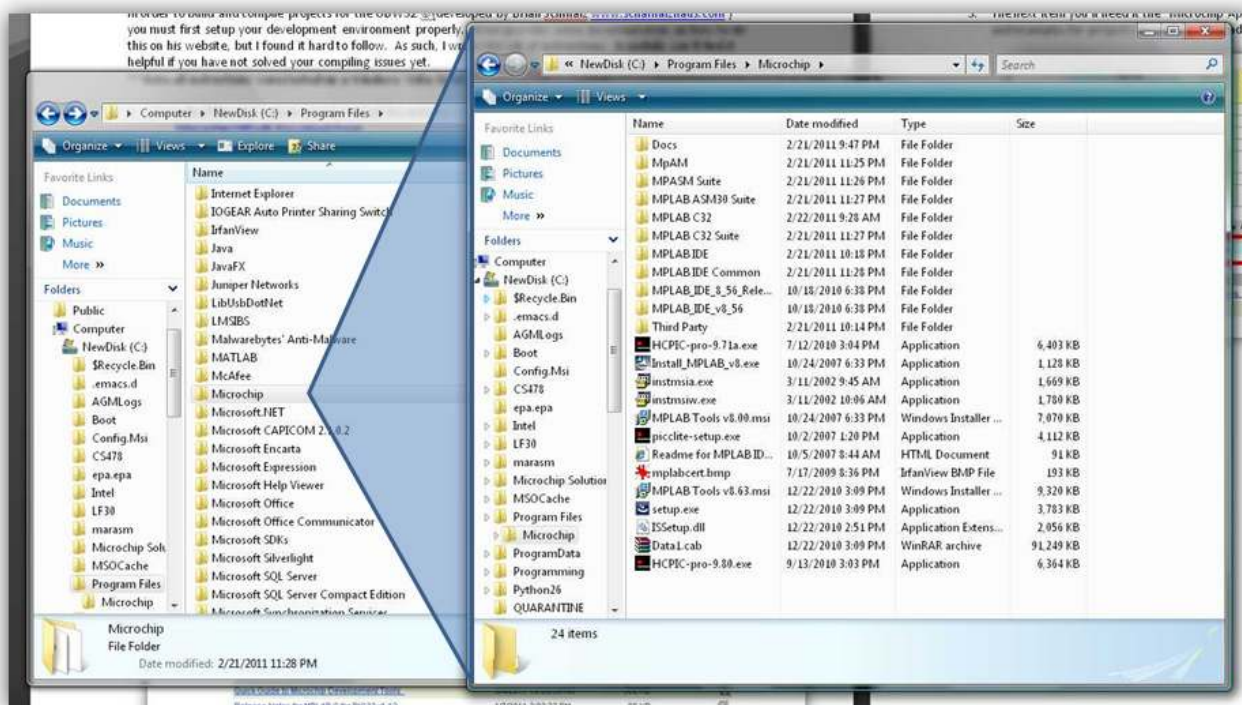
[Microchip MPLAB Download Page](http://www.microchip.com/mplab/Downloads)

Scroll to the bottom and click of the following link.

Downloads			
Title	Date Published	Size	D.L.
Advanced Debugging Techniques- Lab 1 of 3	11/29/2010 11:39:00 AM	21587 KB	
MATLAB Device Blocks for MPLAB IDE	5/5/2010 2:47:39 PM	36 KB	
MPASM/MPLINK User's Guide	4/8/2009 3:52:41 PM	2896 KB	
MPLAB Assembler, Linker and Utilities for PIC24 MCUs and dsPIC DSCs User's Guide	1/26/2010 10:16:32 AM	1981 KB	
MPLAB IDE Current Release Notes	12/23/2010 4:27:36 PM	252 KB	
MPLAB IDE User's Guide	1/20/2009 12:09:31 PM	4232 KB	
MPLAB IDE v8.63	12/27/2010 5:10:28 PM	113111 KB	
MPLAB IDE v8.63 PIC18F46K22 Family Debug Patch	1/24/2011 3:28:42 PM	452 KB	
Quick Guide to Microchip Development Tools	3/4/2011 10:09:50 AM	582 KB	
The MPLAB IDE Debug Tool API	5/13/2010 5:16:00 PM	171 KB	

You'll need to unzip the folder somewhere and run the "setup.exe" file.

Install MPLAB to the default folder "Microchip" in Program Files. (See below)



Notice that there are C-32 folders in there too. This is also the directory in which you will install the C-32 C-compiler suite (mine are already in there, this is your next step).

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- Next you'll need the C-Compiler for PIC32 devices.

[Microchip C32 Compiler Download Page](#)

Downloads

Sign in required to download content.

Title	Date Published	Size	D.L.
C32 C Compiler Examples	11/19/2009 3:46:13 PM	195 KB	
Fix for Timer Linker Error MPLAB C for PIC32 v1.12a (see readme)	3/2/2011 12:15:06 PM	6 KB	
MPLAB Assembler, Linker and Utilities for PIC32 MCUs User's Guide	5/27/2009 2:43:47 PM	2659 KB	
MPLAB C Compiler for PIC32 v1.12a in LITE Mode	1/13/2011 2:30:32 PM	79235 KB	
MPLAB C Compiler for PIC32 v1.12a upgrade	1/13/2011 2:06:00 PM	79235 KB	
MPLAB C32 C Compiler User's Guide	11/17/2009 2:52:29 PM	1559 KB	
MPLAB C32 C Libraries Manual	11/17/2009 2:54:15 PM	1917 KB	
Quick Guide to Microchip Development Tools	3/4/2011 10:09:50 AM	582 KB	
Release Notes for MPLAB C for PIC32 v1.12	1/7/2011 2:03:23 PM	96 KB	

At this point you'll realize you need an account to download the C32 C-Compiler. Just make an account so you can download it and get the software. Your programs won't compile without it.

*** Install this software into *the same directory in which you installed the MPLAB software!* ***

- The next item you'll need is the "Microchip Applications Library" or the MAL. It contains a bunch of libraries and examples for projects designed to be loaded onto the PIC32 microcontroller.

Library	Current Version	PIC18F (8-bit)	PIC24F (16-bit)	PIC24H (16-bit)	dsPIC (16-bit)	PIC32 (32-bit)
USB Framework	2.8	x	x			x
Graphics Library	2.11		x	x	x	x
Memory Disk Drive (MDD)	1.2.7	x	x	x	x	x
TCP/IP Stack	5.31	x	x	x	x	x
mTouch Capacitive Touch Library	1.21	x	x			x
Smart Card Library	1.02	x	x	x	x	x
MWM™ Development Environment	3.1.4	x	x	x	x	x

Microchip Application Libraries

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[Microchip Application Libraries v2010-10-19](#)

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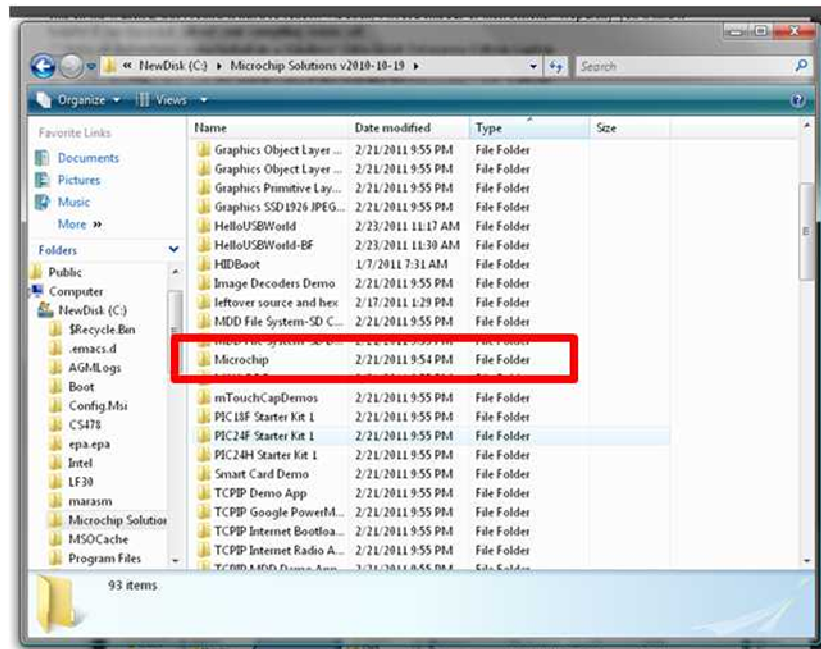
Title	Date Published	Size	D.L.
Microchip Application Libraries Release Notes	11/9/2010 12:41:38 PM	8 KB	
Microchip Application Libraries Help Files	11/9/2010 12:46:29 PM	19484 KB	

This needs to install to your C: directory, which should be the default location.

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Install it and verify that there is a folder in there named “Microchip.” This folder is referenced by the various software examples in that folder.

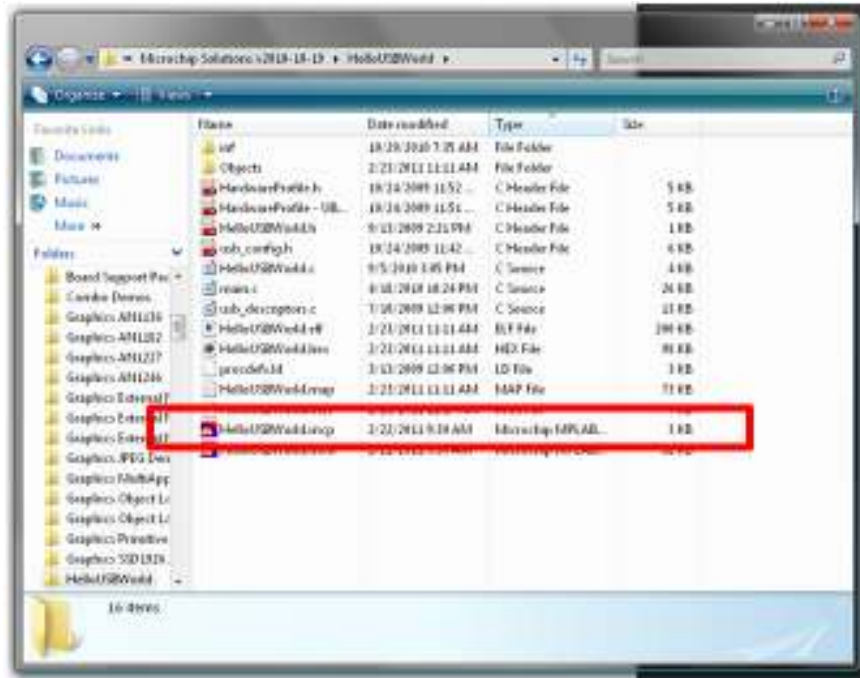


Now, any new projects you wish to start should be saved to this “Microchip Solutions v2010-10-19” folder for the relative path references to work properly.

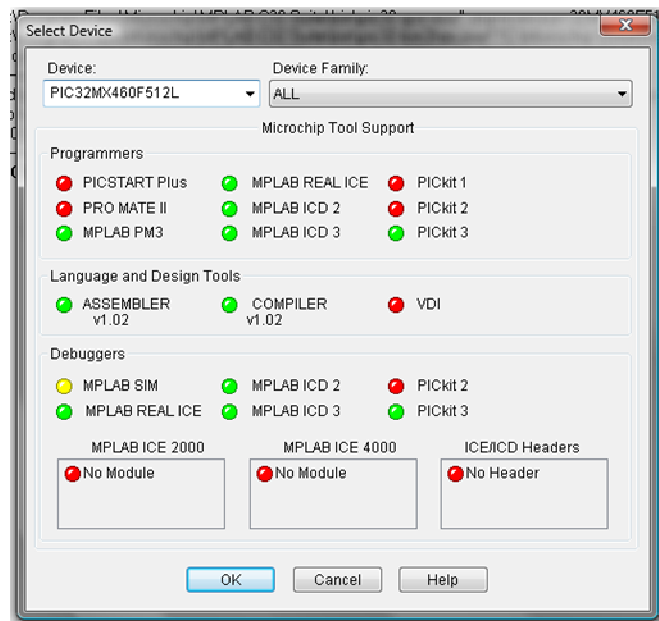
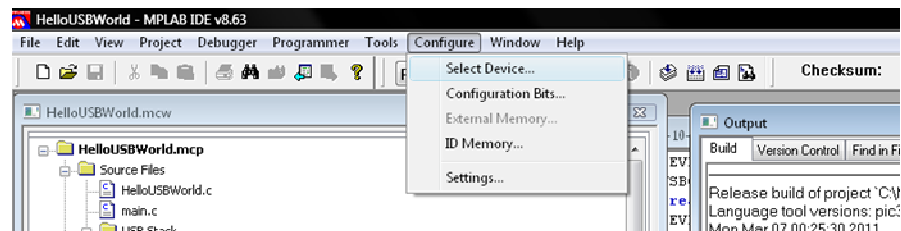
4. Download one of Brian Schmalz’s projects, “HelloUSBWorld”, by clicking on the following link.
<http://www.schmalzhaus.com/UBW32/FW/HelloUSBWorld/HelloUSBWorld.zip>
Download it to the “Microchip Solutions v2010-10-19” folder that is now in your C: drive directory.
Open up the “HelloUSBWorld.mcp” project file. This is the main project file type for MPLAB.

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5. This should open up MPLAB.
First select the proper device you are attempting to program.



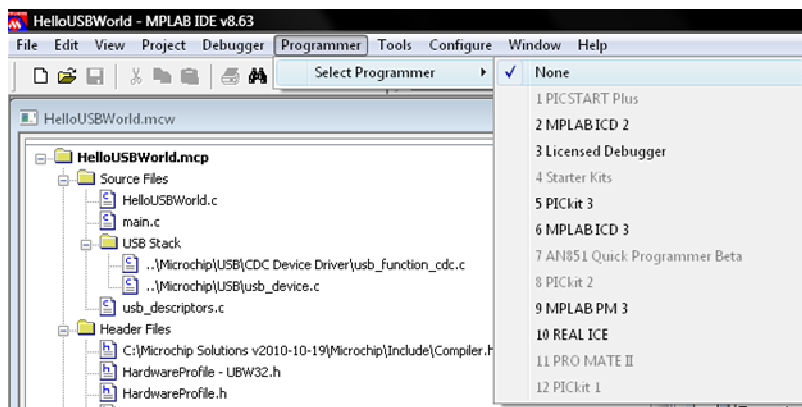
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Select the device from the drop down box. A cool little feature, this window will also show you the kind of hardware programmers you may use to program the device...

HOWEVER: Should you wish not to lose Brian Schmalz's bootloader that should be loaded onto your UBW-32, DO NOT USE A HARDWARE PROGRAMMER. (PicKit2, PicKit3, RealIce, etc.) I'll get back to this at the end...

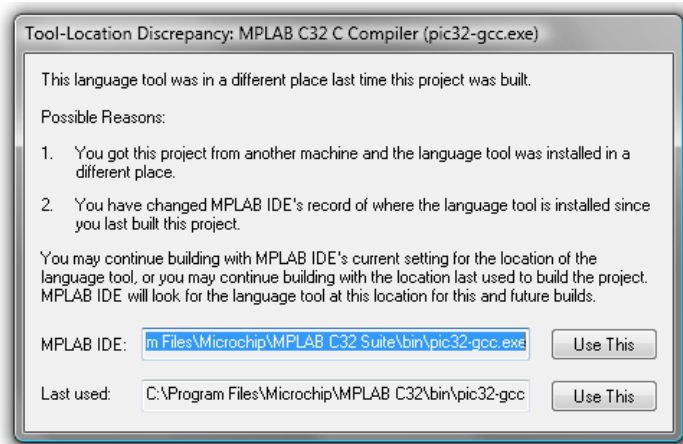
Now select the "Programmer" Tab and select "None".



Now, attempt to build the project by pressing the "Build-All" button or pressing ctrl+F10.

It may ask you which C-Compiler to use depending on whether or not you've used it before.

CHOOSE THE FOLDER CONTAINING THE "C-32 SUITE" IN YOUR PROGRAM FILES FOLDER ON THE C: DRIVE!

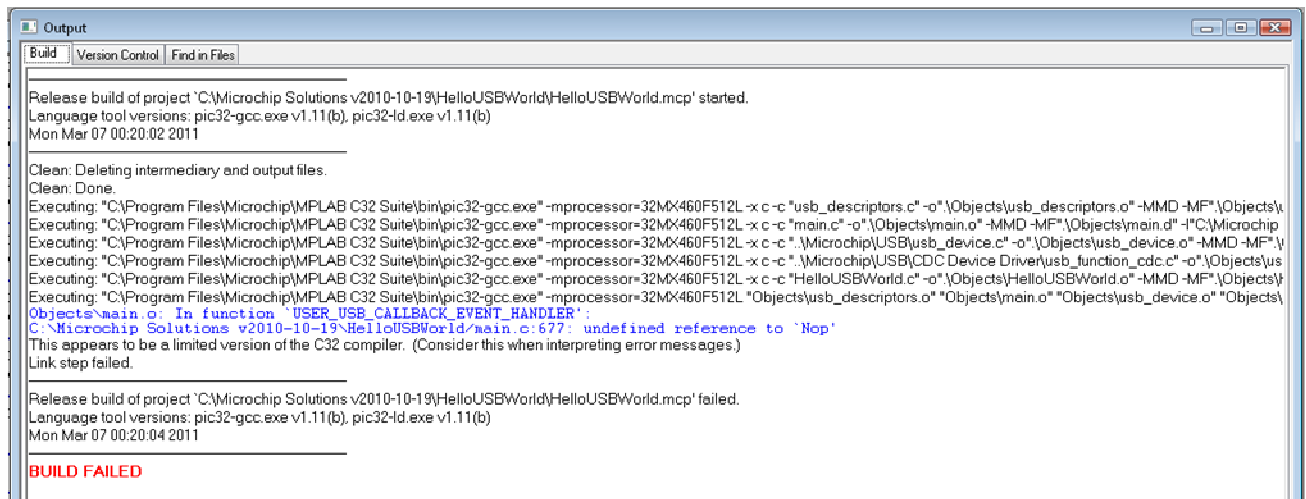


Click the "Use This" button and it will attempt to compile. It will ask this for each file where the build reference is ambiguous.

Now, more than likely it will throw an error (listed in blue print) and mention that the build failed (listed in red print)

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```
Output
Build Version Control Find in Files

Release build of project 'C:\Microchip Solutions v2010-10-19\HelloUSBWorld\HelloUSBWorld.mcp' started.
Language tool versions: pic32-gcc.exe v1.11(b), pic32-ld.exe v1.11(b)
Mon Mar 07 00:20:02 2011

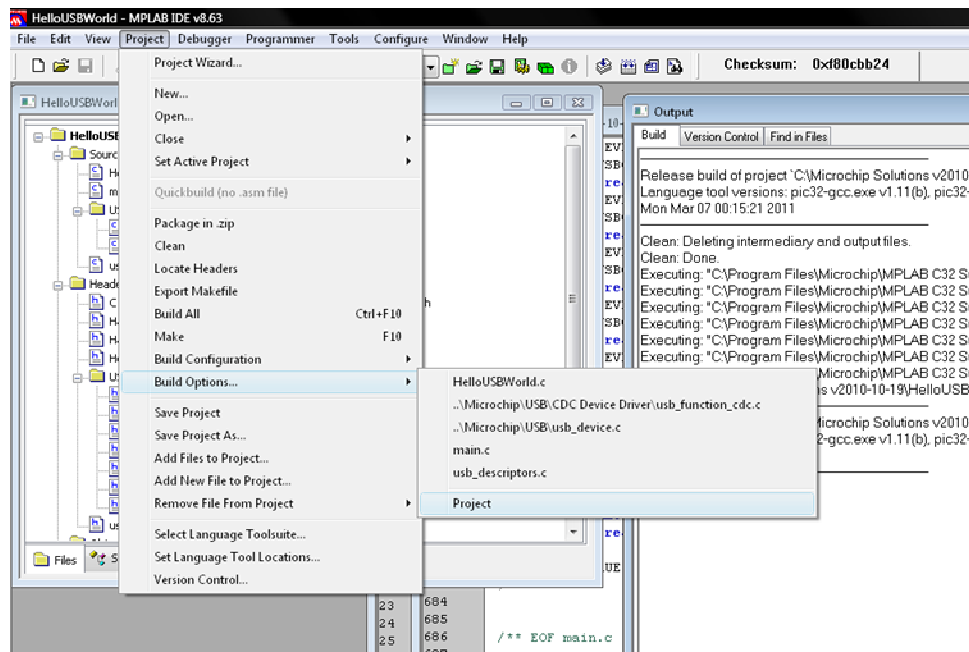
Clean: Deleting intermediary and output files.
Clean: Done.
Executing: "C:\Program Files\Microchip\MPLAB C32 Suite\bin\pic32-gcc.exe"-mprocessor=32MX460F512L -x c -c "usb_descriptors.c" -o "\Objects\usb_descriptors.o" -MMD -MF "\Objects\
Executing: "C:\Program Files\Microchip\MPLAB C32 Suite\bin\pic32-gcc.exe"-mprocessor=32MX460F512L -x c -c "main.c" -o "\Objects\main.o" -MMD -MF "\Objects\main.d" -I "C:\Microchip
Executing: "C:\Program Files\Microchip\MPLAB C32 Suite\bin\pic32-gcc.exe"-mprocessor=32MX460F512L -x c -c ".\Microchip\USB\usb_device.c" -o "\Objects\usb_device.o" -MMD -MF "\
Executing: "C:\Program Files\Microchip\MPLAB C32 Suite\bin\pic32-gcc.exe"-mprocessor=32MX460F512L -x c -c ".\Microchip\USB\CDC Device Driver\usb_function_cdc.c" -o "\Objects\us
Executing: "C:\Program Files\Microchip\MPLAB C32 Suite\bin\pic32-gcc.exe"-mprocessor=32MX460F512L -x c -c "HelloUSBWorld.c" -o "\Objects\HelloUSBWorld.o" -MMD -MF "\Objects\
Executing: "C:\Program Files\Microchip\MPLAB C32 Suite\bin\pic32-gcc.exe"-mprocessor=32MX460F512L "Objects\usb_descriptors.o" "Objects\main.o" "Objects\usb_device.o" "Objects\
Objects\main.o. In function 'USER_USB_CALLBACK_EVENT_HANDLER':
C:\Microchip Solutions v2010-10-19\HelloUSBWorld\main.c:677: undefined reference to `Nop`
This appears to be a limited version of the C32 compiler. (Consider this when interpreting error messages.)
Link step failed.

Release build of project 'C:\Microchip Solutions v2010-10-19\HelloUSBWorld\HelloUSBWorld.mcp' failed.
Language tool versions: pic32-gcc.exe v1.11(b), pic32-ld.exe v1.11(b)
Mon Mar 07 00:20:04 2011

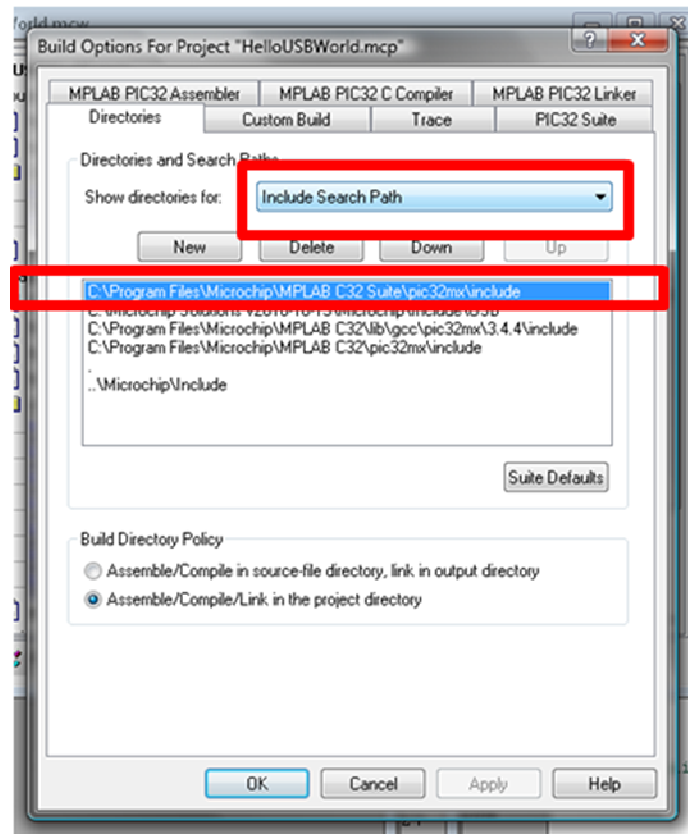
BUILD FAILED
```

(see next page)

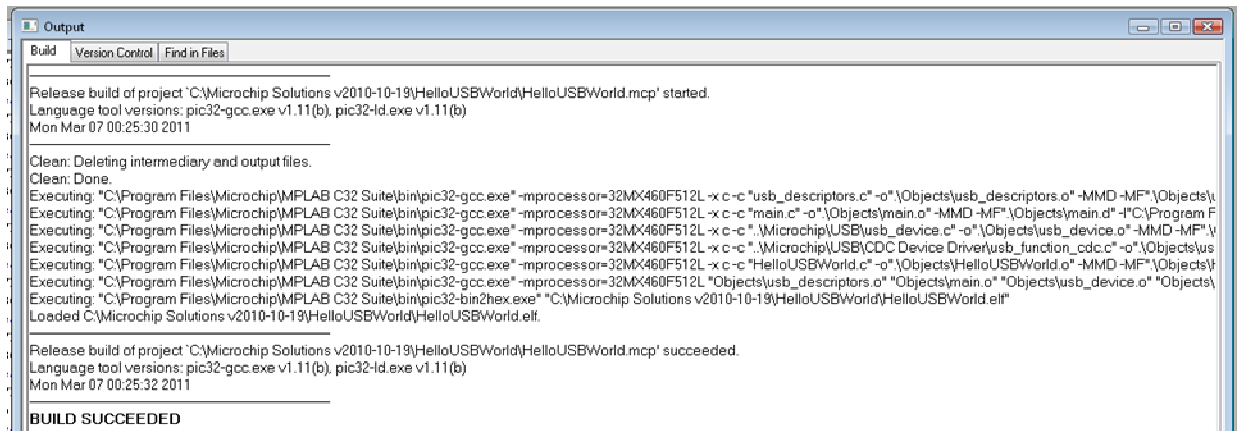
IF THIS IS THE CASE, REFERENCE THE PROPER “INCLUDE” FOLDER IN THE PROJECT BUILD OPTIONS
C:\Program Files\Microchip\MPLAB C32 Suite\pic32mx\include
(as shown below)



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- Now hit "Build All" or ctrl+F10 to compile, and it should compile.



(If not, check the environment path variable for Windows to ensure the following references are there)

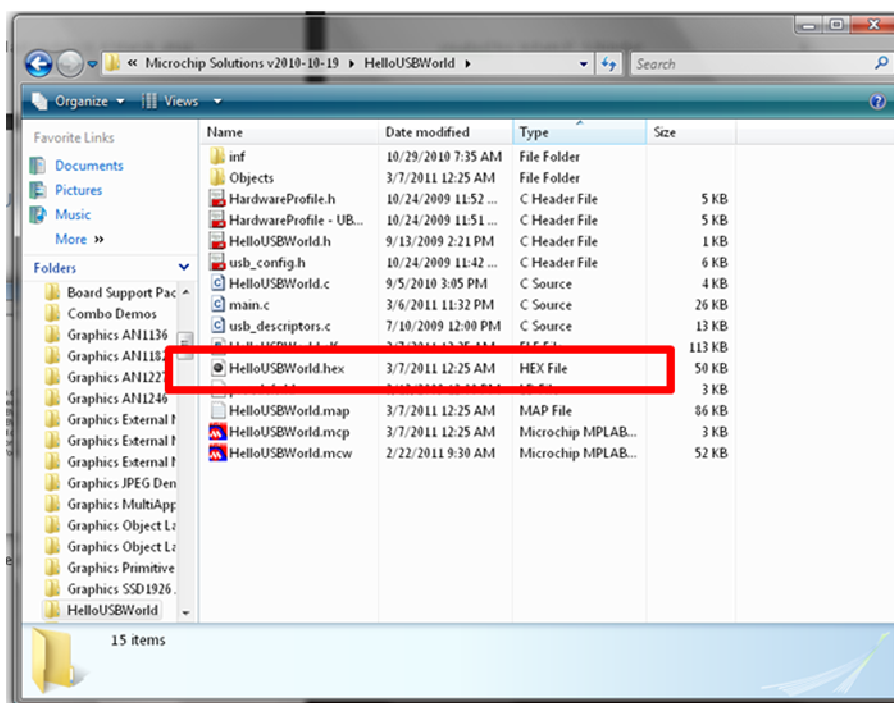
```
C:\Program Files\Microchip\MPLAB C32\bin;  
C:\Program Files\Microchip\MPLAB C32 Suite\bin;  
.;  
..;  
C:\Windows\system32;  
C:\Windows;  
C:\Program Files\HI-TECH Software\PICC\LITE\9.60\bin;
```

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C:\Program Files\HI-TECH Software\PICC\9.80\bin

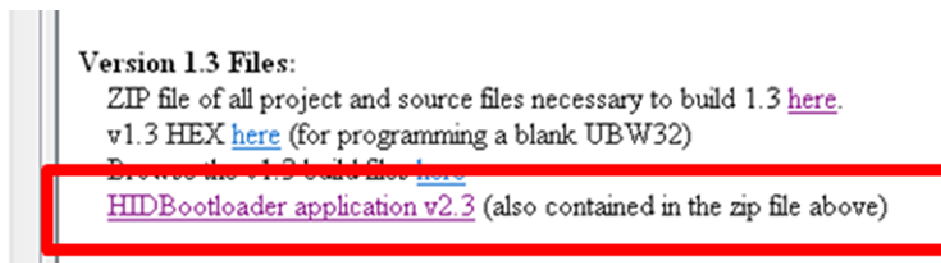
7. Sweet! This means all of the object files have been created and a loadable hex file dumped into the folder.



This is the file you will load onto the UBW32 to make it work.

8. Now you need Brian Schmalz's HIDBootloader.exe file (used in loading the hex files onto the UBW32). Information about the HIDBootloader.exe can be found here:
[UBW32BootloaderDocumentation](#)

Now all you really need is the executable bootloader file, which can be downloaded at the bottom of the documentation page. Save it anywhere you want.



NOTE: This bootloader only works if you don't clobber the bootstrap loaded into the memory onboard the device when you got it. This clobbering occurs when you use a hardware programmer such as the PickIt2, PickIt3, or Realice.

9. Now you're ready to load the program and test to see if it worked! Open the HIDBootloader.exe.

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Now another member of the team, Stephen Semmelroth, put together some great videos showing exactly how to program the device and load HelloUSBWorld, available here:

[Bootloader Tutorial](#)

[HelloUSBWorld Demo](#)

10. Smile. You're done!