How to Update a Common Sense 3 Controller

With the PICkit4





1. Download the Update Application

Download the MPLAB X IDE from the microchip website (the MPLAB X IPE is packaged with it):

Click, copy and paste, or google <u>https://www.microchip.com/mplab/mplab-x-ide</u>



Scroll down to the download section, and click on the little zip icon for the version which matches your computer's operating system *(for this manual, Windows 10 64-bit - but yours might be different)*

MICROCHIP Products Applications	Tools and Software	Support and Training	Order Now	About			±	ì	۹
Home / MPLAB / MPLAB® X IDE									
Title					Date Published	Size	D/L		
Windows (x64)									
MPLAB [®] X IDE v5.40 SHA-256: c27a9f0286277bf2e9acfad5a5d2db04b8	76018205c55438	390408a1c29d84f6i	D		5/15/2020	988 MB	电		
MPLAB [®] X IDE Release Notes / User Guide v5.40					5/15/2020	11.1 MB	1		
Linux 64-Bit									
MPLAB [®] X IDE v5.40 SHA-256: 17f04a312a3720782c8130296eb3d3fd70	05ba76cf4cb6e24	71c5af05ee466d79	Э		5/15/2020	888 MB	a]		
MPLAB [®] X IDE Release Notes / User Guide v5.40					5/15/2020	11.1 MB	%]		
Mac (10.X)									
MPLAB [®] X IDE v5.40 SHA-256: 00f582ff074845260c7d2474c92a99b0f0f	1cb4e16a7e6d17	73c5cabd27da0fa3			5/15/2020	875.0 MB	4 []		<

Then navigate to wherever you downloaded it to, extract the file, and click the installer file.

2. Download the New CS3 Software Version

You should have an email from Greenhouse Technology Inc. (greenhousetechnology.com) with a ".HEX" file. This is your new CS3 software! Download it, and maybe save a copy somewhere.

3. Connect the CS3 Controller to Your Computer

If the controller is assembled inside the plastic enclosure

- Connect the power cable to an outlet
- Open the enclosure lid
- Be careful not to touch the board while it is powered



If the board is on its own

- Place it on a clean surface with absolutely no metal pieces or shavings these might short the board
- Connect a keypad
- Connect a power cable to the board
- *Lastly*, connect the power cable to an outlet
- Be careful not to touch the board while it is powered

Connect the PicKit4 to your Computer

Here's the PICKit4:



It's packaged with a USB-C cable. Connect one end of the cable to the PICkit4, and the other end to a computer.





Connect the PICkit4 to the Common Sense 3 Circuit Board

Pay special care to align the triangle on PICKit4 with the pin marked '1' on the circuit board:





The board only has (6) pins, and the PICKit4 has (8) pin sockets, so the (2) sockets furthest from the triangle are not used.



Once your PICkit4 is connected to the CS3 and your computer, and the light on the PICkit4 is blue, you are ready to program!

(If the light isn't blue after a few seconds, call GTI Tech support)



4. Update the CS3 Controller

Open the MPLAB X IPE application on your computer.

Click the desktop icon for MPLAB X IPE (shown for version 5.40):



This is different from the MPLAB X I<u>D</u>E, which is a development tool.

😰 MPLAB X	IPE v5.40		- 🗆 ×
ile Settings \	View Tools Window Help		
Operate			
Device and To	ool Selection	Results	
Family:	All Families 👻	CRC32: N/A	
Device:	11AA010 Apply 	Pass Co 3	
Tool:	Select Tool Connect	Fail Count: 0	
		Total Count: 3	
Pr	ogram	Verify	
Hex File: (Click on browse to select a hex file	Browse Clear sele	
SQTP File: (Click on browse to select a SQTP file	Browse Clear sele	
			1
Autout - TPF	×		E

Select the Device

Pick **dsPIC33EP512GM306** in the drop-down (you might have to scroll a bit).

Device and To	ool Selection	Results	
Family:	All Families 🔹	CRC32: N/A	
Device:	dsPIC33EP512GM306	Apply Pass Co 3	
Teel	dsPIC33EP32MC204	Fail Count: 0	
1001:	dsPIC33EP32MC502	Total Count: 3	
	dsPIC33EP32MC504	Total Count.	
	dsPIC33EP512GM304		
Pr	dsPIC33EP512GM306	Verify Verify Blank Che	eck
addam	dsPIC33EP512GM310		
lex File:	dsPIC33EP512GM604	Browse C	lear sele
	dsPIC33EP512GM/06		
SQTFTIN.		DIOWSE	
utput - IPE	x		

Press "Apply" to finish selecting the processor

😰 MPLAB)	(IPE v5.40			- 🗆 ×
ile Settings	View Tools Window Help			
Operate				
Device and	Tool Selection	Results		
Family:	All Families	CRC	:32: N/A	
Device:	dsPIC33EP512GM306	Pass Co	3	
Tool:	Select Tool Connect	Fail Co	unt: 0	
		Total Co	unt: 3	
F	Program	Verify	Blank Check	
Hex File:	Click on browse to select a hex file		Browse Clear sele	
SQTP File:	Click on browse to select a SQTP file		Browse Clear sele	

The 'Apply' button should be ghosted. This means that the device has been selected!

Device:	dsPIC33EP512GM306	-	Apply

Make the Connection

Press the 'Connect' button here:

Device and T	ool Selection		Results	
Family:	All Families	•	Checks	sum: E271 62
Device:	dsPIC33EP512GM306	 Apply 	Pass C	0 7
Tool:	PICkit 4 S.No : BUR202272213	Connect	Fail Co	ount: 0
			Total Co	ount: 7
Pi	rogram	Read	Verify	Blank Check
Hex File:	Click on browse to select a hex	file		Browse Clear sele
	Click on browse to select a SO	[P file		Browse Clear sele

You should see the 'waiting' circle - this may take a while

perate						4 >
Device and	Tool Selection			Results		
Family:		Ŧ		Check	sum: E27	1 62
Device:		*	Apply	Pass (Co 7	
Tool:		2213 💌	Connect	Fail C	ount: 0	
				Total C	ount: 7	
3	Program		Read	Verify	Blank	Check
lex File:	Click on browse to select a l	hex file			Browse	Clear sele
	Click on browse to select a	SOTP file			Browse	Clear sele

The log tells you if you successfully connect

Device and 1	Tool Selection	Results			
Family:					
ranniy.	Airrannies	Checksu	um: E271 😥		
Device:	dsPIC33EP512GM306 Apply	Pass Co	3		
Task	DICK/2 S No - PLID194972729 = Disconnect	Fail Cou	unt: 0		
1001:	PICKICS 3.NO . DUR 104073736 + DISCUMPECT	Tatal Car	t. 2		
		Total Cot	ant. 3		
P P	Program - Frase - Read	Vorify	Directo Obrasta		
0000000		Verity	Blank Check		
		wenny	Blank Check		
ex File:	Click on browse to select a hex file	werny	Browse Clear sele		
lex File:	Click on browse to select a hex file Click on browse to select a SQTP file	wenny venny	Browse Clear sele Browse Clear sele		
lex File:	Click on browse to select a SQTP file	ommo Volny	Browse Clear sele Browse Clear sele		
ex File:	Click on browse to select a SQTP file	or the second se	Browse Clear sele Browse Clear sele		
ex File:	Click on browse to select a SQTP file	weiny veiny	Browse Clear sele Browse Clear sele		
ex File:	Click on browse to select a SQTP file	Veny	Browse Clear sele		
lex File:	Click on browse to select a SQTP file		Browse Clear sele		
lex File:	Click on browse to select a SQTP file		Browse Clear sele		
lex File: [sQTP File:] utput - 1PE Connecting	Click on browse to select a bex file Click on browse to select a SQTP file	• veny	Browse Clear sele Browse Clear sele		
ex File: [QTP File:] htput - 1PE	Click on browse to select a hex file Click on browse to select a SQTP file	• • • • • • • • • • • • • • • • • • •	Browse Clear sele Browse Clear sele		
lex File: [QTP File:] stput - 1PE Connecting Currently Firmmare S	Click on browse to select a hex file Click on browse to select a SQTP file t x g to MPLAB PICkt 3 Loaded firmware on PICkt 3 Luite Version	• • • • • • • • • • • • • • • • • • •	Browse Clear sele		
<pre>dex File: [GATP File:] GATP File:] Gate file: [Gate file: [Gate file:] Gate file: [Gate file:] Gate file: [G</pre>	Click on browse to select a hex file Click on browse to select a SQTP file t x t of the MPLAB PICktt 3 loaded firmware on PICktt 3 bitte Version	• • • • • • • • • • • • • • • • • • •	Browse Clear sele Browse Clear sele		

Here's a typical log entry for a successful connection:

```
Connecting to MPLAB PICkit 3...
Currently loaded firmware on PICkit 3
Firmware Suite Version....01.56.07
Firmware type.....dsPIC33E/24E
Target voltage detected
Target device dsPIC33EP512GM306 found.
Device Revision ID = 4003
```

Select the Program File

Press the 'Browse' button here:

crice and i		1 Courto	
Family:	All Families 👻	Checksum: E271 62	
Device:	dsPIC33EP512GM306 Apply	Pass Co 6	
Tool	PICkit 4 S.No : BUR202272216	Fail Count: 0	
1001.		Total Count: 6	
P	Program Erase Read	Verify Blank Check	
lex File:	Click on browse to select a hex file	Browse Clear sele	
SQTP File:	Click on browse to select a SQTP file	Browse Clear sele	

Browse to the Program File

It should end with ".hex" or ".HEX"

Operate					()
Device and Tool S	Selection		Results		
Family:	All Families		Checksum	E271	1 52
Device:	dsPIC33EP512GM306	ply	Pass Co	7	
ex file selection				×	
$\rightarrow \land \uparrow \downarrow \rangle$	This PC > Downloads v じ	⊘ Search	Downloads		
Descrite a New fe			8	•	_
Diganize • New Io					Check
PICKit4 Screensh	Name	Date m	nodified	Ty	
OneDrive	✓ Last week (1)				Clear sele
🤙 This PC	CS3 Ver 165 (1).hex	9/18/2	020 3:36 AM	HE	Clear sele
3D Objects	✓ Last month (7)			_	
Desktop	CS3 Ver 165.hex	8/20/2	020 4:44 AM	HE	
Documents	CS3 VER 164B.hex	8/16/2	020 11:54 PM	HE	
Downloads	CS3 Ver 164.hex	8/14/2	020 3:27 AM	HE	
Music	CS3 Ver 163.hex	8/5/20	20 2:27 AM	HE	
Pictures	YAT-2.1.0_x64_(64-bit)	8/22/2	020 5:19 AM	Fil	
Videos	CDM21228_Setup	8/20/2	020 2: <mark>41 PM</mark>	Fil	
UNCC:)	CDM v2.12.28 WHQL Certified	8/20/2	020 2:34 PM	Fil Y	
File r	name: CS3 Ver 165.hex	HEX File (*.H	IEX;*.hex)	~	
		Open	Cancel		
	l	Open	Cancel		

then press 'Open'.

The file should now be visible in the MPLAB IPE window Here:

Device and T	Fool Selection	Results
Family: Device:	All Families dsPIC33EP512GM306 Apply	Checksum: C040 62 Pass Co 7
Tool:	PICkit 4 S.No : BUR202272213	t Fail Count: 0 Total Count: 7
P	rogram Erase Read	Verify Blank Check
lex File:	C:\Users\dnwin 8umvhk4\Downloads\CS3 Ver 165.hex	Browse Clear sele
L		
QTP File:	Click on browse to select a SQTP file	Browse Clear sele
***********	×	
Connecting	to MPLAB PICkit 4	
	loaded versions: n version00.06.08	
Application Boot version Script version Script buil	on	
Application Boot version Script vers Script buil Tool pack v	on01.00.00 sion00.03.77 Id number648e375535 version1.1.774	

And the log should confirm that the file has been successfully loaded - here's a typical log entry for a successful file load:

Program

Press the 'Program' Button:

perate				4
Device and T	ool Selection		Results	
Family:	All Families 🔹]	Checksum:	C040 😰
Device:	dsPIC33EP512GM306	Apply	Pass Co	7
Tool:	PICkit 4 S.No : BUR202272213 🔹	Disconnect	Fail Count:	0
			Total Count:	7
Pri Pri	rogram	Read E		Blank Check
lex File:	C:\Users\dnwin_8umvhk4\Downloads\C	33 Ver 165.hex	Bro	Clear sele
			Tanta and	

A blue strobe should flash side-to-side:

Device and T	ool Selection		Results		1
Family:		×	Checksum	C040 62	
Device:		- Apply	Pass Co	6	
Tool:		- Disconnect	Fail Count	0	
			Total Count	6	
P	rogram	Read	Verify	Blank Check	
		(11111111)	minimi v Critiy		
lex File:	C:\Users\dnwin_8umvhk4\Downloa	ads\CS3 Ver 165.hex		Browse Clear sele	
lex File:	C:\Users\dnwin_8umvhk4\Downloa	ads\CS3 Ver 165.hex		Browse Clear sele Browse Clear sele	,
lex File: 3QTP File: utput - IPE	C:\Users\dnwin_8umvhk4\Downloa Click on browse to select a SQTP f	ads\CS3 Ver 165.hex		Browse Clear sele Browse Clear sele	y
lex File:	C:\Users\dnwin_8umvhk4\Downloa Click on browse to select a SQTP f de from C:\Users\dnwin_8umvhk4\Dow 13:29:07 -0400 - Hex file loaded 13:31:11 -0400 - Programming	ads\CS3 Ver 165.hex file		Browse Clear sele Browse Clear sele	,
Hex File:	C:\Users\dnwin_8umvhk4\Downloa Click on browse to select a SQTP f de from C:\Users\dnwin_8umvhk4\Dow 13:29:07 -0400 - Hex file loaded 13:31:11 -0400 - Programming	ads\CS3 Ver 165.hex file		Browse Clear sele Browse Clear sele	,
lex File:	C:\Users\dnwin_8umvhk4\Downloa Click on browse to select a SQTP f de from C:\Users\dnwin_8umvhk4\Dow 13:29:07 -0400 - Hex file loaded 13:31:11 -0400 - Programming	ads\CS3 Ver 165.hex file mloads\CS3 Ver 165.hex successfully.		Browse Clear sele Browse Clear sele	
Hex File: SQTP File: Utput - IPE Loading cos 2020-09-22 2020-09-22	C:\Users\dnwin_8umvhk4\Downloa Click on browse to select a SQTP f de from C:\Users\dnwin_8umvhk4\Dow 13:29:07 -0400 - Hex file loaded 13:31:11 -0400 - Programming	ads\CS3 Ver 165.hex file mloads\CS3 Ver 165.hex successfully.		Browse Clear sele Browse Clear sele	
lex File:	C:\Users\dnwin_8umvhk4\Downloa Click on browse to select a SQTP f de from C:\Users\dnwin_8umvhk4\Dow 13:29:07 -0400 - Hex file loaded 13:31:11 -0400 - Programming	wnloads\CS3 Ver 165.hex successfully.		Browse Clear sele Browse Clear sele	,
Hex File: SQTP File: Loading coo 2020-09-22 2020-09-22	C:\Users\dnwin_8umvhk4\Downloa Click on browse to select a SQTP f de from C:\Users\dnwin_8umvhk4\Dow 13:29:07 -0400 - Hex file loaded 13:31:11 -0400 - Programming	ads\CS3 Ver 165.hex file wnloads\CS3 Ver 165.hex successfully.		Browse Clear sele Browse Clear sele	,

and some new lines should begin appearing in the log.

When you are finished, the log should look something like this:

```
Device Erased...

Programming...

The following memory area(s) will be programmed:

program memory: start address = 0x0, end address = 0x1b7ff

configuration memory

Programming/Verify complete

2020-06-22 01:32:31 -0400 - Programming complete
```

Verify

After waiting for Programming to finish, press the 'Verify' button:

MPLAB X IPE v5.40	-	· 🗆 ×
File Settings View Tools Window Help		
Operate		
Device and Tool Selection	Results	
Family: All Families	Checksum: ACAA E2	
Device: dsPIC33EP512GM306 Apply	Pass Co 3	
Tool: PICkil3 S.No : BUR184873738	Fail Count: 0 Total Count: 3	
Program	Verify Blank Check	
Hex File: C:\Users\Daniel Winterbottom\Downloads\CS3 Ver 163.hex	Browse Clear sele	
SQTP File: Click on browse to select a SQTP file	Browse Clear sele	
Autout TRF v		
Output - IPE ×		

Connecting to MPLAB PICkit 3		
Currently loaded firmware on PICkit 3		
Firmware Suite Version01.56.07 Firmware typedsPIC33E/24E		
Target voltage detected Target device dsPIC33EP512GM306 found.		
Device Revision ID = 4003 Loading code from C:\Users\Daniel Winterbottom\Downloads\CS3 Ver 163.hex.	x	
2020-06-22 01:24:41 -0400 - Hex file loaded successfully.		
		~
Tool: PICkit3 S.No : BUR1848	873738 Device: dsPIC33EP512GM306 Environment: NA dsPIC33E-GM-GP-MC-GU-MU_DFP 1.2.58 To	ool Pack Version:Latest

Once again, you should see a blue strobe:

Device and Tool Selection Family: All Families Device: dsPIC33EP512GM306 Apply Pass Co Fail Count: 0 Tool: PICkit 4 S No : BUR202272213 Disconnect Fail Count: 7 Total Count: Total Checks Blank Check	perate						
Family: All Families Device: dsPIC33EP512GM306 Tool: PiCkit 4 S No : BUR202272213 Disconnect Fail Count: Total Count: 7 Total Count: 7	Device and T	Fool Selection			Results		
Device: dsPIC33EP512GM306 Apply Pass Co 7 Fail Count: 0 Total Count: 7	Family:		-		Checksum:	C04	0
Tool: PICkit 4 S.No : BUR202272213 Disconnect Fail Count: Total Count: 7 Total Count: 7 Program Erase Read Verify Blank Check	Device:		•	Apply	Pass Co	7	
Program Erase Read Verify Blank Check	Tool:		*	Disconnect	Fail Count:	0	
Hex File: C:\Llsers\dnwin_8umyhk4\Downloads\CS3.Ver 165 hex	Hex File:	rogram Erase	de\CS3	Read	Verify	Blank	Clear sele

and new lines appearing in the log. After a successful verification, the strobe should disappear, and the log should look something like this:

Verifying... The following memory areas(s) will be verified: program memory: start address = 0x0, end address = 0x557eb configuration memory User Id Memory Verification successful.

5. If Verification Fails

This might mean that MPLabX IPE is writing to the wrong memory regions. From the Support menu, select 'Advanced Mode':

ile Set	ttings View Tools Window Hel		
Ор	Advanced Mode		
D v	Auto Download Firmware Manual Download Firmware Save Firmware onto SD Card	Results	cksum: E271 62
C • T	Hold in Reset Release from Reset PM3 Communication	 Apply Pass Fail Total Total Connect Total Tota	Count: 0 Count: 3
	Program	Read Verify	Blank Check
Hex Fi	le: Click on browse to select a	hex file	Browse Clear sele
SQTP	File: Click on browse to select a	SQTP file	Browse Clear sele

A login window pops up:

-		
-	Advanced Mode	×
	Log on to advanced mode	
Ch	Password: Hint: Default password is microchip	
С	Change Password Log in	
0	Reset Password Forgot Password	_
	Keep me logged in	_

Enter 'microchip' as indicated,

-	Advanced	Mode		\times
	Log on to advan			
h	Password:	Hint: Default pa	ssword is microchip	
С	Change P	assword	Log in	
c	Reset Passv	vord	Forgot Password	_
	Keep me logg	ged in		

And press 'Log in'.

Welcome to Advanced Mode - it looks the same as normal mode, but has an extra sidebar:

C MPLAB X IPE V	5.40		- o ×
File Settings View	Operate		
00	Device and Tool Selection	Results	
Operate	Family: All Families •	CP=OFF Check E271	
- Ci	Device: dsPIC33EP512GM306 Apply	Pass Co 3	
Power	Tool: Select Tool Connect	Fail Count: 0	
an.		Total Count: 3	
Hemory	Program 🔄 Erase 🖳 Read	Verify Blank Check	
æ	Hex File: Click on browse to select a hex file	Browse Clear sele	
Environment	SQTP File: Click on browse to select a SQTP file	Browse Clear sele	
51510			
SQTP			
	Output - IPE ×		
Production			
X Settings			
Logout			
			 ~

From this sidebar, select 'Memory', and make sure the:

- Configuration Memory
- ID
- Program Memory

Are all selected.

MPLAB X IPE v5.40

File Settings View Tools Window Help

Options		Operate Memory Settings ×					
		Memory Settings					
Operate		Auto select memories and ranges Configuration Memory	Allow PM3 to Select Memories				
പ		ID	\checkmark				
Power		Program Memory	\checkmark				
		Program Memory Range(s)(hex)	0-557eb				
		Preserve Program Memory					
Memory		Preserve Program Memory Range(s)(hex)	0-557eb				
		Preserve ID Memory					
Environmer	nt		Reset to defaults				
007							
SQTP							

If they are checked as shown, and verification failed, then memory ranges might not be the problem. Call GTI Tech Support: 859.626.3001

If they aren't checked, click the drop-down right above the checkmarks,

DIFFERENCE MANAGEMENT	E v5.40 iew Tools Window Help			- a ×
Opti	Operate Memory Settings ×			
	Memory Settings			
Operate	Auto select memories and ranges Configuration Memory ID	Allow PICkit 3 to Select Me Allow PICkit 3 to Select Memories Manually select memories and ranges	1	
Power	Program Memory	\checkmark		
Memory	Program Memory Range(s)(hex) Preserve Program Memory (not available with pro Preserve Program Memory Range(s)(hex) Preserve ID Memory (not available with programm	0-557eb		
Environment		Reset to defaults		
007 SQTP				
	Output - IPE ×			
Production				
X Settings				
Logout				
				~

and select the 'Manually select memories and ranges' option,



then check all three boxes. DON'T CHANGE ANYTHING ELSE!

😰 MPLAB X IF	PE v5.40		– o ×
File Settings	View Tools Window Help		
opu E	Memory Settings ×		
Operate	Auto select memories and ranges	Manually select memories a *	
	Configuration Memory	×	
e	D	×	
Power	Program Memory	×	
	Program Memory Range(s)(hex)	0-557eb	
0	Preserve Program Memory (not available with pro		
Memory	Preserve Program Memory Range(s)(hex)		
	Preserve ID Memory (not available with programm		
#		Reset to defaults	
Environment			
007			
SQTP			
	Output - IPE ×		-
61			
Production			
*			
Settings			
R			
Logout			
			~
		Ted: NA. Devce: dsPIC33EF912GM306 Environment: NA dsPIC33E-GM-GP-MC-GU-MU_DFP 1.2	58 Tool Pack Version:Latest

From here, press the 'Operations' button:



Proceed as before.