MPLAB X 3.05 + CCS C コンパイラ・チュートリアル

全て必要なものはMPLABX に既にビルトインされています。

Plug-in は必要ですがMPLABX に含まれていますのでダウンロードもインストールもMPLABX 内のブラ ウザーにより操作されます。*MPLABX 3.05現在

* MPLAB 8.xx 以前の様にCCS 社からダウンロードしてプラグインをインストールする必要は有りません。

** ここでは MINI877_MOD.C というサンプル・ファイルをデスクトップの"CCS Working folder"に置い て、そのコンパイルを例として説明しています。







最初は Update になっていますので Available Plugins をクリックしますと下記の画面にな

ります。

Check for Newest Source Install Name Category mrt.Holer namory conjugurator mrt.Holer namory conjugurator Power Monitor MPLAB Plugin ELFViewer MPLAB Plugin Odde Profiling (Trial Version) MPLAB Plugin ECAN Bit Rate Calculator MPLAB Plugin MPLAB Plugin MPLAB Plugin Digital Compensator Design Tool MPLAB Plugin Digital Compensator Design Tool MPLAB Plugin MemoryStarterkit MPLAB Plugin MemoryStarterkit MPLAB Plugin MPLAB Plugin MPLAB Plugin Better Strüces MPLAB Plugin Plugin Update Services MPLAB Plugin Path Tools Netbeans Plugin Path Tools Netbeans Plugin	earch:
Install Name Category Source Prover Monitor MPLAB Plugin W ELFViewer MPLAB Plugin W Code Profiling (Trial Version) MPLAB Plugin W Code Profiling (Trial Version) MPLAB Plugin W Code Profiling (Trial Version) MPLAB Plugin W Digital Compensator Design Tool_ MPLAB Plugin W Digital Compensator Design Tool_ MPLAB Plugin W Plugin Update Services MPLAB Plugin W Plugin Update Services MPLAB Plugin W Plugin Update Services MPLAB Plugin W Path Tools Netbeans Plugin W Special copy/paste Netbeans Plugin W	
MemoryStarterkit MPLAB Plugin Plugin dsPICWorks MPLAB Plugin SEGGER JLink Probe MPLAB X Tool Plug-in Plugin Update Services MPLAB Plugin SEGGER JLink Probe MPLAB X Tool Plug-in RTOS Viewer (FreeRTOS) MPLAB Plugin MPLAB Plugin Path Tools Netbeans Plugin MPLAB Plugin Special copy/paste Netbeans Plugin MPLAB	
Quick File Chooser Netbeans Plugin Image: CVS CVS Netbeans Plugin Image: CVS PBP Tool Chain Tools Image: CVS PicBasic Language Syntax Tools Image: CVS CCS C Compiler Tools Image: CVS SDCC Toolchain Tools Image: CVS Proteus VSM Viewer Tools Image: CVS	

タブの Available Plugins の CCS C Compiler にチェックを入れます。

odates	Available Plugins (26) Downloade	d Installed (42)	Settings	
Check	< <u>f</u> or Newest			Search:
Install	Name Minunow narmony connigurator	Category MILLAD FIUSIN	Source	CCS C Compiler
	Power Monitor ELFViewer	MPLAB Plugin MPLAB Plugin	**	🙀 Community Contributed Plugin
	MPLABX KeeLoq Plugin Code Profiling (Trial Version)	MPLAB Plugin MPLAB Plugin	** **	Version: 3.0 Author: CCS, Inc.
	ECAN Bit Rate Calculator MPLAB® Code Configurator	MPLAB Plugin MPLAB Plugin	999 999	Date: 15/03/05 Source: Microchip Third Party Plugins
	App Launcher Digital Compensator Design Tool.	MPLAB Plugin MPLAB Plugin	99 99	
	MemoryStarterkit dsPICWorks	MPLAB Plugin MPLAB Plugin	99 99	CCS provides a complete integrated tool suite for developing and debugging
	RTOS Viewer (FreeRTOS)	MPLAB Plugin MPLAB Plugin	99 99 99 99	embedded applications running on Microchip PIC MCUs and dsPIC DSCs. The intelligent code optimizing CCS C compiler frees developers to concentrate on design functionality instead of baying to become an MCU architecture output
	Special copy/paste	Netbeans Plugin	99 99 99	Benefits include maximized code reuse by easily porting from one MCU to another, minimize lines of new code by using provided peripheral drivers, built-in functions
	CVS	Netbeans Plugin	999 999 999	and standard C operators. Our built-in functions are specific to PIC MCU registers, allowing access to hardware features directly from C and we include ready to run examples and tested peripheral drivers allow developer to quick to start their
	PicBasic Language Syntax	Tools		project.
	CCS C Compiler SDCC Toolchain	Tools	100	
	Proteus VSM Viewer	Tools		
[Instal	I 1 plugin selected, 28kB			-

CCS C Compiler にチェックを入れて Install をクリックしますと次の画面が現れます。

6	Plugin Installer
Velcome to the l he installer will do	lugin Installer mload, verify and then install the selected plugins.
The following plue	ins will be installed:
ccs c c	ompiler [3.0]
	< <u>B</u> ack <u>N</u> ext > Cancel <u>H</u> elp

Next> をクリックしますと次の画面が現れます。

cense Agreem ease read all of	ent the following licen:	Plugin Installer	r	
In order to contir associated with t	nue with the install the particular plugi	ation, you need to agree ns.	with all of the licer	nse agreements
Plugins: CCS C	Compiler [3.0]			
SOFTWARE LIC	ENSE AGREEMEN	п		1
1. License - C grants you a lice ("Licensed Mate Use of the Licer payment of addi	ustom Computer S ense to use the so erials") on a single nsed Materials on a tional fees.	ervices ("CCS") ftware program -user computer. a network requires		
2. Applications create using the Applications Sof Agreement.	: Software – Deriva Icensed material: ftware, are not sub	ative programs you s, identified as ject to this		
I accept the	terms in all of the	license agreements.		

I accept the terms in all of the license agreements にチェックを入れて

Install をクリックしますと途中で下記の画面になります。

CCS C Compiler
Warning Testalling untrusted pluging is potentially incasure. Use unsigned or
untrusted plugins at your own risk.

£	Plugin Insta	aller	
estart application to	n to complete installation finish plugin installation.		
The Plugin Installer	has successfully installed the folic	wing plugins:	
CCS C Compiler	181		
🖲 <u>R</u> estart Now			
) Restart <u>L</u> ater			

Continue をクリックしますと次の画面に変わります。

Finish をクリックすると再度、MPLABX が自動的に再起動されます。



l.	MPLAB X IDE v3.05	X
le Edit Yiew Navigate Source Ref <u>a</u> ctor Run Debu P 🔁 🔐 🦫 🏷 🥐	Team Iools Window Help	Q< Search (Ctrl+1)
Start Page × MPLAB X Store ×		
Learn & Discover	My MPLAB IDE	What's New
Recent Projects	Microchip Login	
	Already Registered? E-mail Address: Pessword:	New to Microchip? Register now to enjoy the benefits of software update alerts and easy software purchasing, licensing and
<no project="" recent=""></no>	LOGIN Forgot Password?	REGISTER NOW
Extend MPLAB	References & Featured Links	
Selecting Simple or Full-Featured Menus	Data Sheets	Technical Articles and White Papers
Bownload Compilers and Assemblers	Errata	Third Party Tools
Install More Plugins Download and install nlugins that add more	Recently Updated Devices	DIRECT Buy Direct from Microchip
		Q

確認のために再度, Tools--> Plugins -> Installed をクリックしますと下記の画面が現れます。

	Plugins	
pdates Available Plugins (25) Do	wnloaded Installed (43) Settings	
Check <u>f</u> or Updates		Search:
Update Name	Category	
Update		
		Okaa Uuta

タブ Installed をクリックしますと下記の画面が現れます。

CCS C Compiler が表示されていることを確認して Close をクリック

Jpdates	Available Plugins (25) Download	ied Installed (43)	Settings		
					Search:
Select	Name	Category	Acti		CCS C Compiler
	Local History	Base IDE	0	^	
	Local Tasks	Base IDE	0	- California	Version: 3.0
	Mercurial	Base IDE	0		Source: Microchip Third Party Plugins
	Database	Base IDE	0		constructioners - presentation and an end of the second
	Hudson UI	Base IDE	0		Plugin Description
	Subversion	Base IDE	0		
	Spellchecker	Base IDE	0		CCS provides a complete integrated tool suite for developing and debugging
	IDE Platform	Base IDE	0		Intelligent code optimizing CCS C compiler frees developers to concentrate on
	Spellchecker English Dictionaries	Base IDE	0		design functionality instead of having to become an MCU architecture expert.
	Hudson	Base IDE	0		Benefits include maximized code reuse by easily porting from one MCU to another,
	Git	Base IDE	0		minimize lines of new code by using provided peripheral drivers, built-in functions
	CSS Source Model	Base IDE	0		and standard C operators. Our built-in functions are specific to FIC MCD registers,
	Bugzilla	Base IDE	0		examples and tested peripheral drivers allow developers to quickly start their
	Embedded Browser UI - JavaFX	Bridges	0	project.	
	COS C Compiler	CCS, Inc.	0		
	Knockout HTML Editor	Editing	0		
	Angular JS Editor	Editing	0		
	HTML Custom	HTML5	0		
	Single Sign On	Libraries	0		
	TestNG	Libraries	Ø		
	Power Data Processing	MPLAB DBCore	0		
	toolchainGeneric	MPLAR IDE	0	Y	
Activ	vate <u>D</u> eactivate U <u>h</u> in:	stall			

MPLAB X IDE v3.05の画面が再度現れます。

×	MPLAB X IDE v3.05	- 🗆 ×
File Edit View Navigate Source Refactor Run Debug	Team Tools Window Help	Q - Search (Ctrl+1)
Start Page × WPLAB X Store ×		
Learn & Discover	My MPLAB IDE	What's New
Recent Projects	Microchip Login	
	Already Registered? E-mail Address:	New to Microchip? Register now to enjoy the benefits
<no project="" recent=""></no>	Pessword:	of software update alerts and easy software purchasing, licensing and account viewing.
	LOGIN Forgot Password?	REGISTER NOW
Extend MPLAB	References & Featured Links	
Selecting Simple or Full-Featured Menus	Data Sheets	Technical Articles and White Papers
Download Compilers and Assemblers	Errata	Third Party Tools
Install More Plugins Download and install olugios that add more	Recently Updated Devices	DIRECT Buy Direct from Microchip
		Q

上記画面の File を右クリックしますと下記の New Project が選択出来るようになります。

Edit View Navigate Source Refactor Run Debug Team Tools Window Help	PLAB X IDE v3.05 - C			
New File Ctrl+N Open Project Ctrl+Shift+0 Open Recent Project Import Import Import Close Project My MPLAB IDE Close All Projects Close All Projects Close All Projects Open Recent File Open Recent File Import Project Groups Project Properties Save All Ctrl+Shift+S Save As Save As Save All Ctrl+Shift+S Page Setup Print Print Ctrl+Alt+Shift+P Print Ctrl+Alt+Shift+P Print Ctrl+Alt+Shift+P Print to HTML nus Witz Data Sheets Print to HTML Errata Witz Third Party Tools Print to HTML Project Frouperties	Cools Window Help Q Search (Ctrl+D) * * * * * * * * * * * * * * * * * * *	un Debug	Source Refactor R Ctrl+Shift+N	Edit View Navigate New Project
Open Project Ctrl+Shift+0 Open Recent Project Import Import My MPLAB IDE Close Project My MPLAB IDE Close Other Projects Microchip Login Open Recent File Microchip Login Open Recent File Microchip Login Project Groups Project Groups Project Properties Save Save Ctrl+Shift+S Page Setup Print Print Ctrl+Alt+Shift+P Print Ctrl+Alt+Shift+P <td></td> <td></td> <td>Ctrl+N</td> <td>New File</td>			Ctrl+N	New File
Import My MPLAB IDE White Close Project Close Other Projects Close All Projects Microchip Login Open Recent File Microchip Login Registered? New to Microchip? Project Groups Project Properties Save As Save As Save As Save As IOGIN Forgot Password? Register now to enjoy the of software update alerts software updates alerts software update alerts software updates alerts software update software update alerts software update software update software update software update software updates Exit </td <td></td> <td></td> <td>Ctrl+Shift+O ⊧</td> <td>Open Project Open Recent Project</td>			Ctrl+Shift+O ⊧	Open Project Open Recent Project
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Project Groups Project Properties Register now to enjoy the of software update alerts software u	ready Registered? New to Microchip?		Þ	Open Recent File
Save Ctrl+S Save As Save All Ctrl+Shift+S Page Setup Print Ctrl+Alt+Shift+P Print to HTML Exit Save All Ctrl+Alt+Shift+P Print to HTML Exit Save All Ctrl+Alt+	neil Address: Register now to enjoy the ben of software update alerts and sword: software purchasing, licensing account viewing		Project Groups Project Properties	
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K	New Proje	ct					
Steps	Choose Project	Choose Project					
1. Choose Project	Q Filter:						
	<u>C</u> ategories:	Projects:					
	Other Embedded	Existing MPLAB IDE v8 Project Prebuilt (Hex, Loadable Image) Project User Makefile Project Library Project					
	 Description:						
	Creates a new standalone applicat project.	ion project. It uses an IDE-generated makefile to build your					
	< <u>B</u> ac	k Next > Einish Cancel <u>H</u> elp					

Next をクリックしますと次の画面が現れますので、Device からドロップ・ダウンで ターゲットのデバイス・ファミリーを選択して下さい。PIC16F877A は Mid-Range 8-bit MCUs です。



例として、ここでは PIC16F877A を選択しました。

×		New Project	×
Steps	Select Devi	ce	
Choose Project Select Device Select Header Select Tool Select Plugin Beard	Family:	ange 8-bit MCUs (PIC10/12/16/MCP) 🧹	
 b. Select Compiler c. Select Project Name and Folder 	Device:	PIC 16F877A PIC 16F873A PIC 16F873A PIC 16F874A PIC 16F876A PIC 16F877A PIC 16F877A	
	2017-	< Back Next > Einish Cancel	Help

Next をクリックしますと以下の画面になりますので、Simulator を選択して下さい。

×	New Project ×
Steps 1. Choose Project 2. Select Device 3	Select Tool Hardware Tools OPICkit2 OPICkit3 OPIM3 OR Real ICE
	Simulator Microchip Starter Kits Other Tools Licensed Debugger
MPLRE	X
	< <u>B</u> ack Next > Einish Cancel <u>H</u> elp

ĸ	New Project ×
Steps	Select Tool
1. Choose Project 2. Select Device 3	Hardware Tools
<u>MF/6/16</u>	Cancel Help

Next をクリックしますと以下の画面になりますので、CCS C Compiler[C¥PROGRA...を

選択して下さい。



K	New Project		
Steps 1. Choose Project 2. Select Device 3. Select Header 4. Select Tool 5. Select Plugin Board 6. Select Compiler 7. Select Project Name and Folder	Select Compiler Compiler Toolchains CCS C Compiler CCS C Compiler HT-TECH PICC (None found) mpasm Compasm Compasm (v5.62) [C:#Program Files (x86)#Microchip#MPLABX#v8.05#mpasmx] XC8 (None found)		
MPLABX	< <u>B</u> ack Next > Einish Cancel <u>H</u>	slp	

Next>をクリックしますと以下の画面になりますので、例えば、TEST と入れます。

6		New Project	
<u>Steps</u>	Select Project Name	e and Folder	
 Choose Project Select Device Select Header Select Tool Select Tool Select Plugin Board Select Compiler Select Project Name and Folder 	Project Name: Project Location: Project Folder:	TEST C¥Users¥Owner¥MPLABXProjects C¥Users¥Owner¥MPLABXProjects¥TESTX	Browse
	Overwrite existin Also delete sourc Set as main proje Use project locat	ig project. bes. act ion as the project folder	
NPLABX	Encodine: ISO-88	59-1	
		< <u>B</u> ack Next > <u>Finish</u> Can	cel <u>H</u> elp

Finish をクリックしますと以下の画面になります。

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ile <u>E</u> dit <u>V</u> iew <u>N</u> avigate <u>S</u> ource Ref <u>a</u> ctor	Run Debug Team Iools Window Help	C : ₩0x0 : bank 0 P Keyword(s)
Projects × Files Classes — TEST Header Files Girl Library Files Classes —	Start Page × W MPLAB X Store ×	
Cobject Files Cobject Files	Learn & Discover Recent Projects	My MPLAB IDE
avigator TEST - Dashboard × - % TEST - Dashboard × - % TEST - Project Type: Application - Config Device ■ Device ■ PIC 16F877A	≺no recent project>	Already Registered? E-mail Address: Pessword: LOGIN Forgot Password?
Checksum: 0x0FCF Compiler Toolchain CCSC [C4PROGRA ² 24PICC] Production Image: Optimizatio Memory Usage Symbols disabled. Click	Extend MPLAB Selecting Simple or Full-Featured Menus Download Compilers and Assemblers	References & Featured Links Data Sheets Errata

Source Files にカーソルを持って行き、マウスを右クリックしますと以下の様になりますの

で、ここで既に作成してあるソースを指定します。



Add Existing Item...をクリックしますと次の様な画面になりますので、一番上の"ふぁいるの場所"でドロップ・ダウンを使って任意のソースの場所を選択して下さい。

×		Select Item		×
ファイルの場所(1):	🔒 TEST X		v 👌 📁 🛄 -	
Examples	bebug broject Makefile			
最近使った項 目				
へ ネットワーク				Store path as:
PC				 <u>A</u>uto <u>B</u>elative Absolute Copy
	ファイル名(N):			Select
	ファイルのタイプ(<u>T</u>):	すべてのファイル	¥	取消

ソース・ファイルの場所を選択し、下記になるようにします。例として、ここではデスクトップ上の CCS Working folder と言う名前のフォルダーの中に PIC16F877A のソースを

指定しています。

		Select Item		
ファイルの場所(1):	🔒 CCS Working	folder	v 🦸 📁 🖽 -	
Examples Examples 最近使った項 引 ネットワーク PC	history 16F684 18F452_TES 876A_B.c C EX_SQW.C	T.c IOD.C		Store path as Auto ● Belative Absolute
	· ファイル名(<u>N</u>):	MINI877A_MOD.C		Select
	ファイルのタイプ(工):	すべてのファイル	v	取消

Select をクリックしますと下記の画面の様に Source Files にソースが表示されます。

×	MPLAB X IDE v3.05 - TEST : default	- 🗆 🗙
Eile Edit View Navigate Source Ref <u>a</u> ctor	Run Debug Team Iools Window Help	Q Search (Ctrl+D) c c : W0x0: bank 0 Image: Keyword(s)
Projects × Files Classes — TEST Header Files Fil	Start Page X MPLAB X Store X	My MPLAB IDE
Navigator TEST - Dashboard × -	<pre></pre>	Password: LOGIN Forgot Password?
Concersum toxuror Compiler Toolchain Compiler Toolchain CCSC [C#PROGRA"2#PICC] Production Image: Optimizatio Hemory Usage Symbols disabled. Click Data 388 (0x170) bytes Program 8192 (0x2000) words Debug Tool	Output - TEST (Clean, Build) X 	aurr/productions_aktwiresossizs

Source files のソースにカーソルを持って行き右クリックしますと以下の様な画面になりま

File Edit View Navigate Sou Projects × Files Classes TEST	rce Refactor Run I	Debug Tea	m Tools Window Help		Q - Search (OtrI+I)
Projects × Files Classes	default	~	10 - 100 - N - Y 100 00		
Projects × Files Classes	_ Sta			z dc c :W:0x0:bank 0	How do I? Keyword(s)
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← 🔐 Header Files ⊕ 🞯 Important Files ⊕ 📴 Library Files					
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Memory Usage Symbols dis Data 368 (0x170) t Program 8192 (0x2	abled. Click nytes 000) words	Me O Build Su BUILD SI	amory usage: ROM=6% RAM=3% · Errors, 1 Warnings. µccessful. µCCESSFUL (total time: 3s)	- 6%	
		<			

ここで Compile Files をクリックしますと次の画面が一瞬出てコンパイルされます。



ソース上の右クリックで下記の様に Open をクリックしますと画面のソースファイルが 表示されます。

