

# mbedの世界を探検しよう

TSUBOI Yoshihiro (@ytsuboi)

# 自己紹介



坪井義浩 (つぼいよしひろ) @ytsuboi  
薬屋、ときどきインフラ屋やライター  
Make:は趣味



2009



2010-



2012-



# 主な活動



Massimo Banzi @Arduino



Eric Pan @Seeed Studio



Nathan Seidle @Sparkfun



Pt, Ladyada @Adafruit



# 主な活動



Chris Styles @mbed



Simon Ford @mbed  
Toyomasa Watarai @mbed



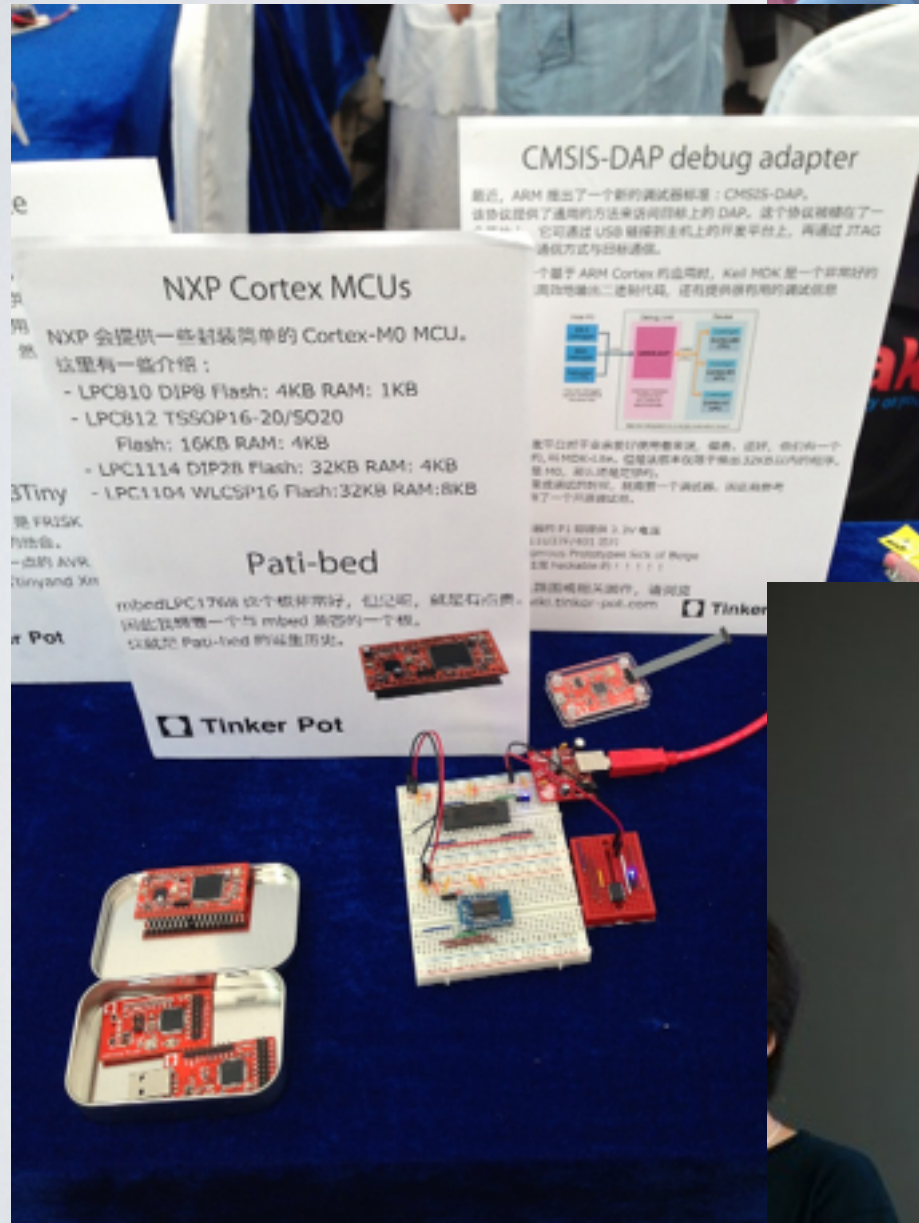
Emilio Monti @mbed



Dan Ros @mbed  
Sam Grove @mbed



# 主な活動



I ❤️ NXP



# NXPの良いところ

- ホビーユーザーの相手をしてくれる  
SNSなどでのコミュニケーションもバッチリ
- バカみたいに安い値段でボードを出していない  
サードパーティーベンダがボードを出す余地がある
- データシートが読みやすい (700-1,000ページも無い！)  
[nxp-lpc.com](http://nxp-lpc.com)
- I/Oレジスタが大体同じ
- 5Vトレラント

# mbedのporting


Home Handbook Cookbook **Platforms** Components Code Questions Forum

**mbed** Search mbed.org... **Go**

Platforms » LPC1114FN28

## LPC1114FN28

The LPC1114FN28 is an ARM Cortex-M0 based, low-cost 32-bit MCU, designed for 8/16-bit microcontroller applications, offering performance, low power, simple instruction set and memory addressing together with reduced code size compared to existing 8/16-bit architectures.



**Warning**

Note that support for this target is a beta release from the mbed community, and is not currently supported by the mbed team



# よくある間違い(0)

秋月電子通商



クイック注文：通販コードを入力  
(アルファベット+数字)

-  数量

[通販コード一括入力フォーム](#)

[商品カタログ](#) | [新商品](#) | [お知らせ](#) | [注文方法](#) | [振込先](#) | [よくある質問](#) | [ダウンロード](#) | [トラ技広告\(PDF\)](#) | [配送状況確認](#) | [ログイン](#)

[トップ](#) > [マイコン関連](#) > [LPC](#) > mbed NXP LPC1768評価キット



## mbed NXP LPC1768評価キット

[OM11043,598]

通販コード M-03596

発売日 2010/02/23

メーカーカテゴリ [NXP Semiconductors NV](#)



[この商品を友達に教える](#)

[お気に入りに追加する](#)

NXPセミコンダクターズ (オランダ) のUSB内蔵マイコン、LPC1768の評価ボードです。

■クロック：72MHz~96MHz

(72MHz設定から96MHz設定に変わったため、LPC1768自体はMax100MHz)。

■フラッシュ：512KB

■SRAM：64KB

■コアはARM社のCortex-M3を採用

■超低消費電力 (LPC1768単体)：

7mA@12MHz

50mA@100MHz

■お買い上げ後本体をUSBポートにさしてすぐに認識されますので、はじめての使用でも安心です。

■Human Interface Deviceとしても利用可能。

■本体下部はピンヘッダがついています。

■RS232、RS485、JTAG

■8ch 12bit A/D、1ch 10bit D/A

■USBまたはRS232経由で書き込み可能

■電源不要 (USBより給電)

■内容物：本体、USBケーブル

※LPCXpresso NXP LPC1768評価キット [M-04117](#) と同じマイコンを搭載しているため、バイナリレベルで互換性があります。

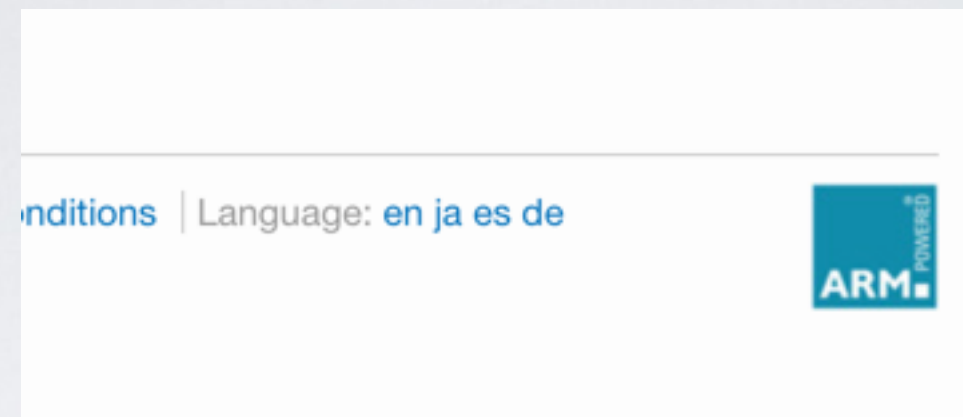
[LPC1768.pdf](#) 英文マニュアル

[製品添付資料](#)

参考資料

[LPC1768 LPC11U24セットアップガイド\(585KB\)](#)

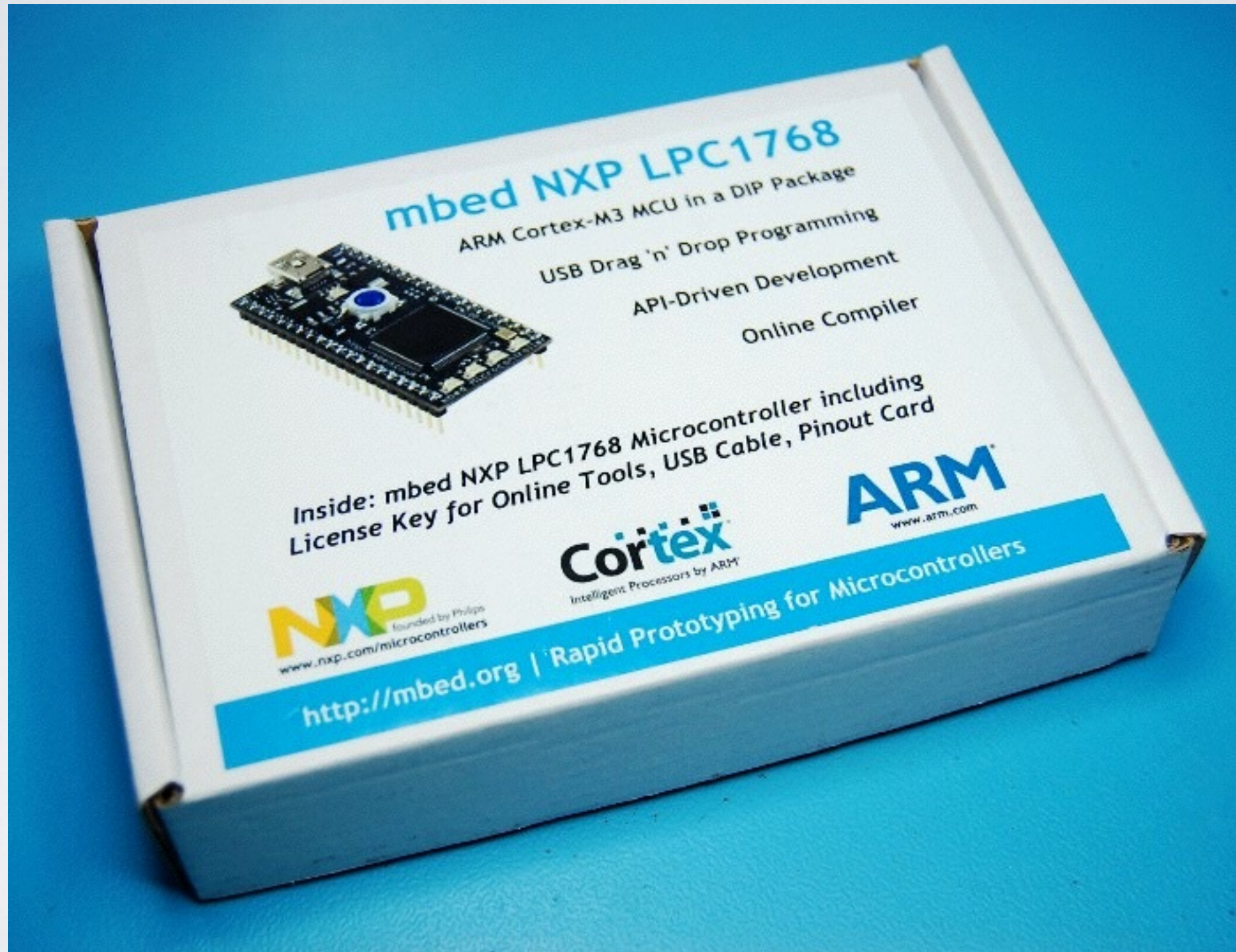
# よくある間違い(0)



<http://mbed.org/blog/entry/manufacturing-mbed/>



# よくある間違い(1)





# よくある間違い(1)

## Platforms



mbed LPC1768



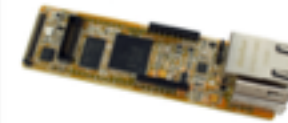
mbed LPC1114U24



Freescale KL25Z



NXP LPC800-MAX



EA LPC4088  
QuickStart Board



DipCortex M0



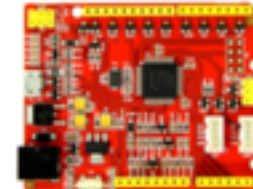
DipCortex M3



BlueBoard-LPC1114U24



WiFi DipCortex



Seeeduino-Arch



LPC1114FN28



u-blox-C027



FRDM-KL46Z



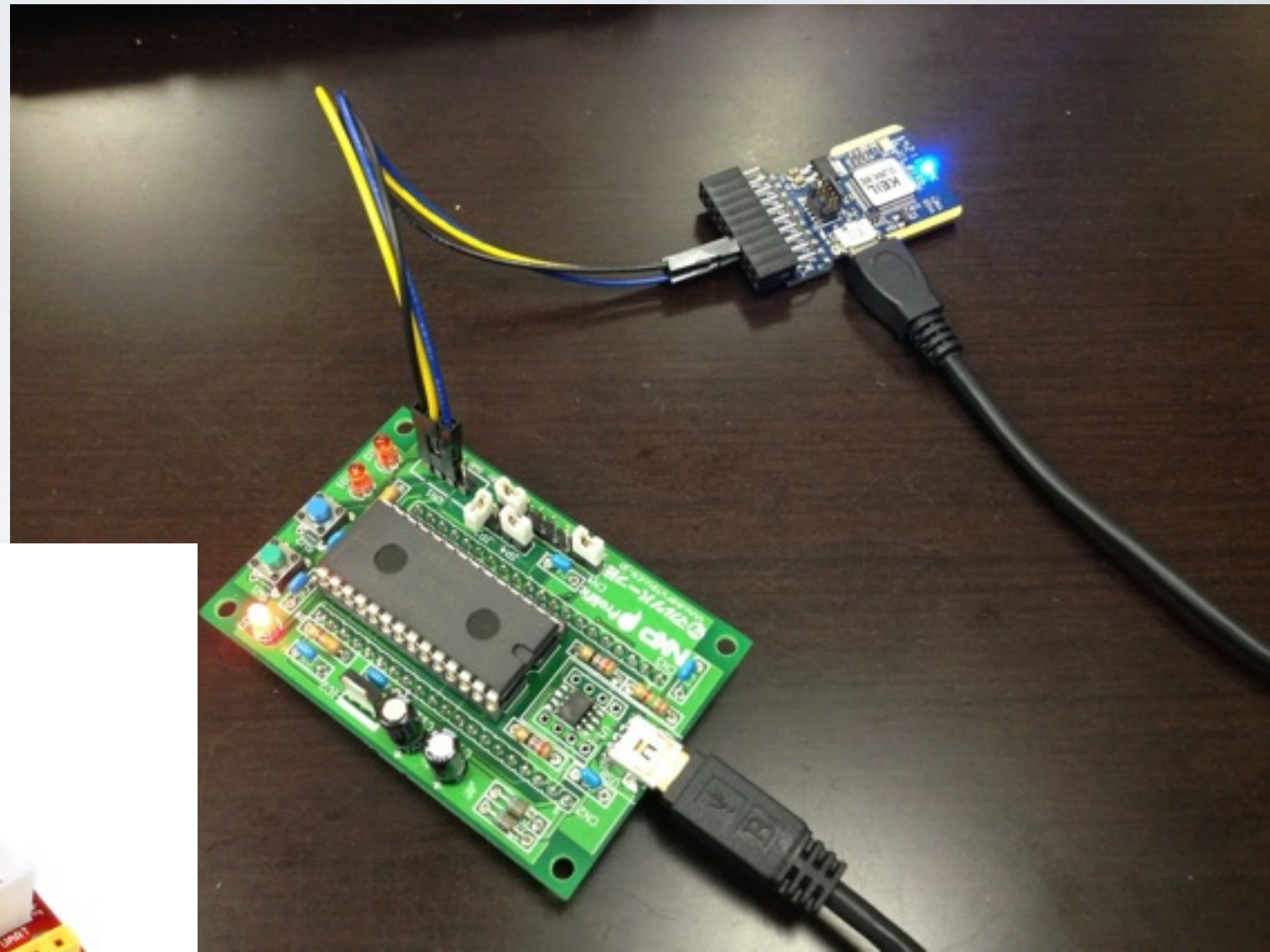
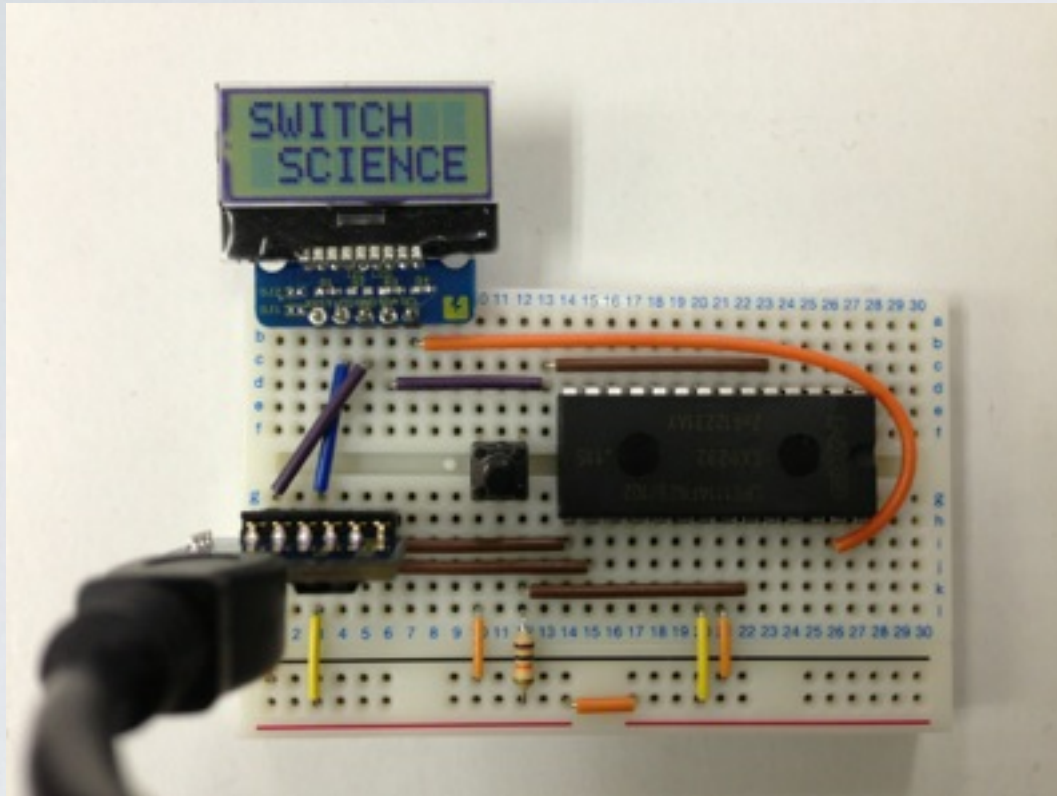
Seeeduino-Arch-Pro



# よくある間違い(2)



# よくある間違い(2)





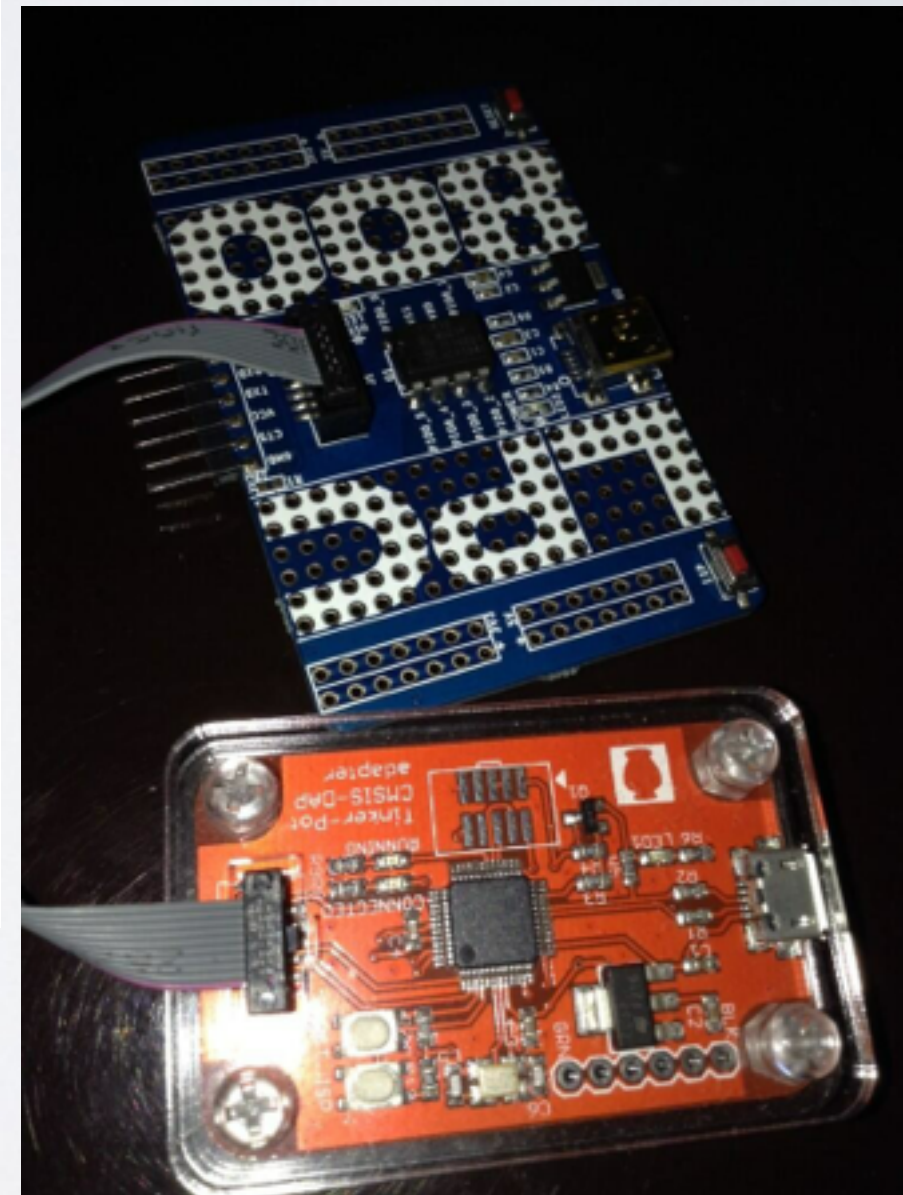
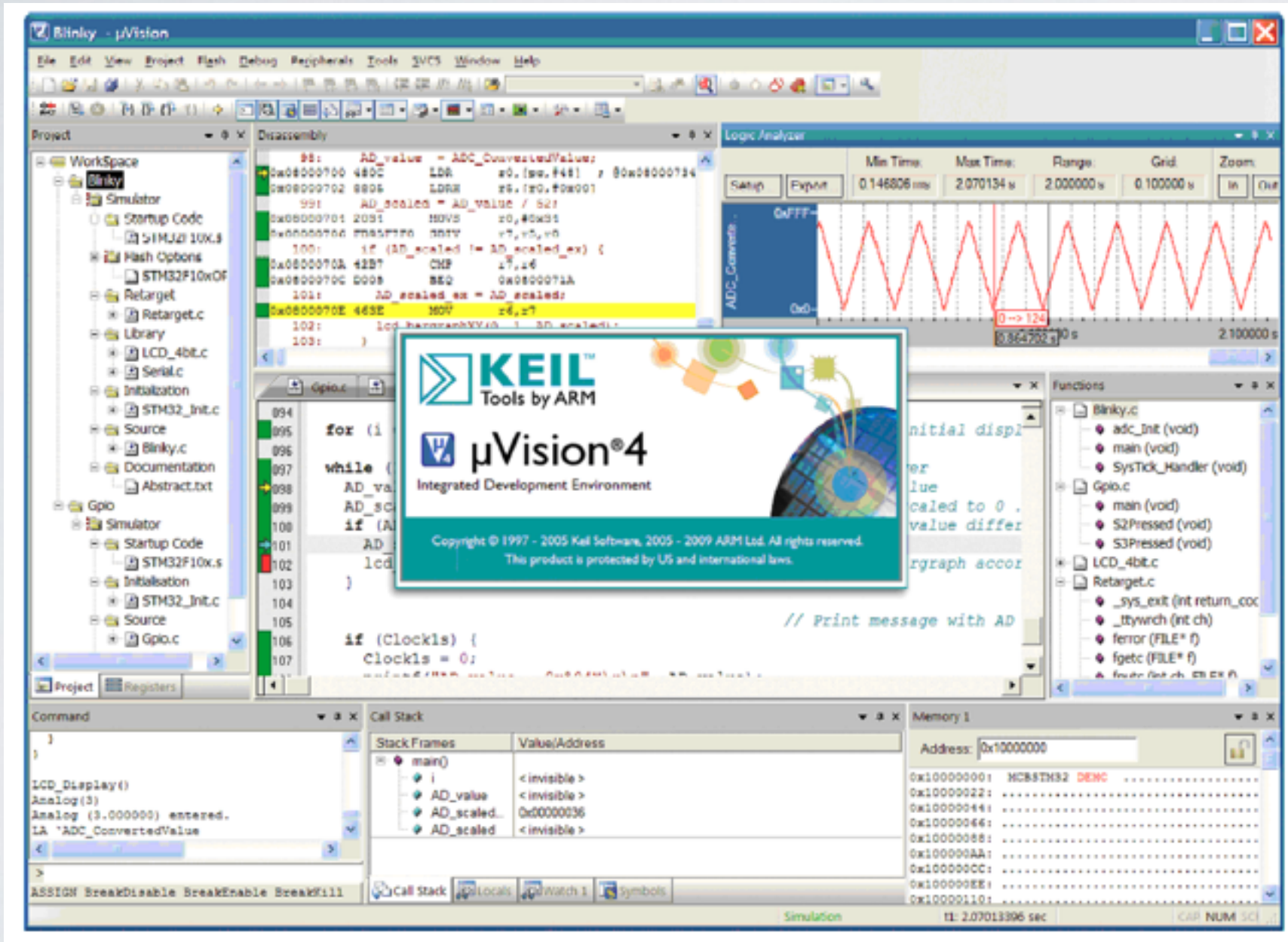
# よくある間違い(3)

The screenshot shows the mbed Compiler web interface. The browser address bar displays <https://mbed.org/compiler/>. The page title is "mbed Compiler - /program0/main.cpp". The interface includes a menu bar with options: New, Import, Save, Save All, Compile, Undo, Redo, Find, and Format. On the left, the "Program Workspace" shows a tree view with "My Programs" containing "program0" and "main.cpp", and "mbed". The main editor displays the following C++ code:

```
1 #include "mbed.h"
2
3 DigitalOut myled(LED1);
4
5 int main() {
6     while(1) {
7         myled = 1;
8         wait(0.2);
9         myled = 0;
10        wait(0.2);
11    }
12 }
13
```

Below the code editor, the "Compiler Output for Program: 'program0'" panel shows "Errors: 0" and "Warnings: 0". The status bar at the bottom indicates "Ready." and "INS".

# よくある間違い(3)





# そもそもそもそもmbedって？

C/C++ プログラム

ランタイムプラットフォーム  
(Java ME Embedded,  
.NET MF, eLua, etc)

mbed コンポーネント  
加速度センサー, GPS, Wi-Fi, セルラー, コンパス ...

mbed SDK  
ランタイム, メモリモデル, ペリフェラルAPI,  
STDIO, RTOS API...

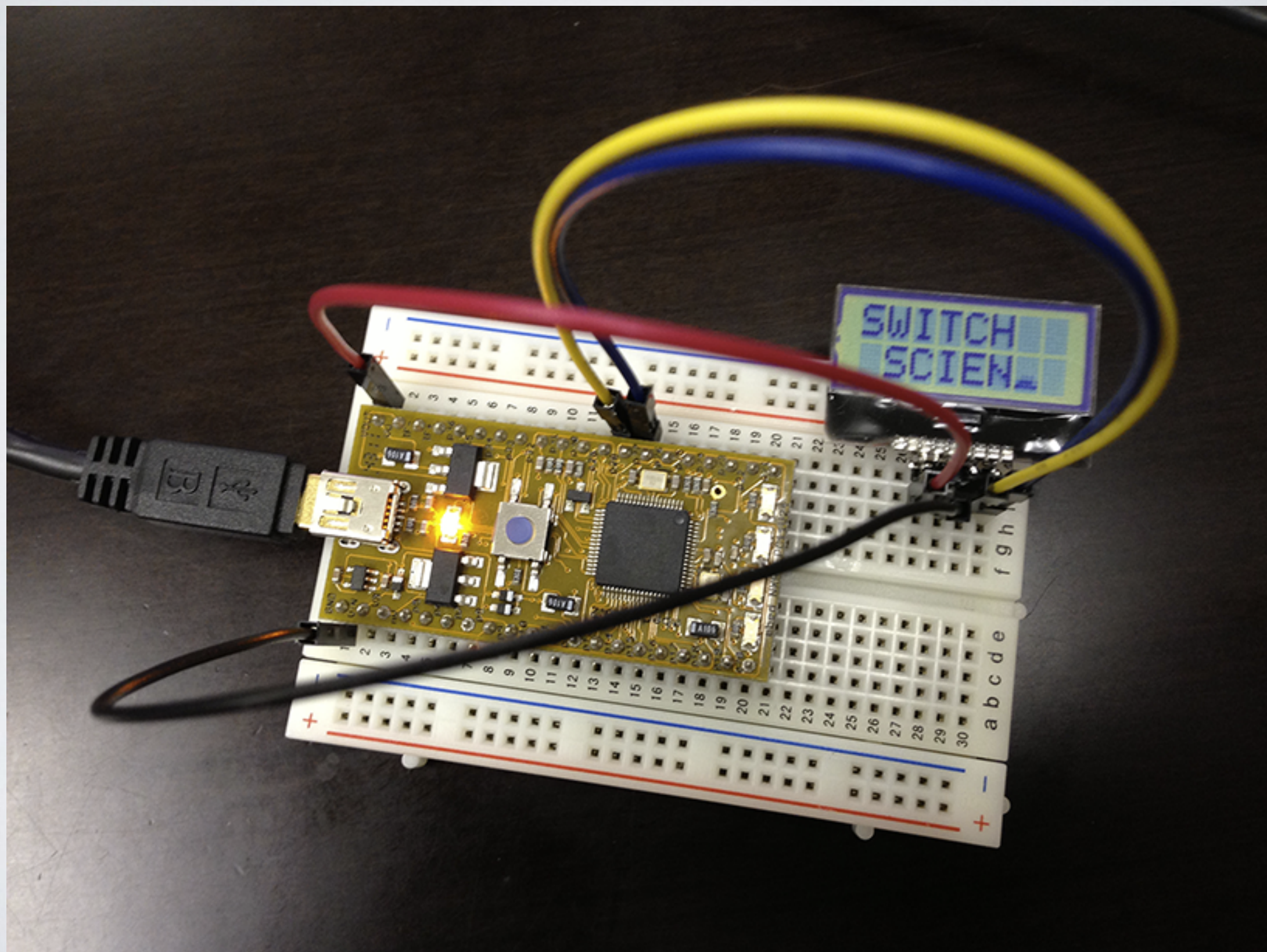
MCU ベンダー依存  
ドライバ

ツールチェイン  
C ライブラリ

RTOS

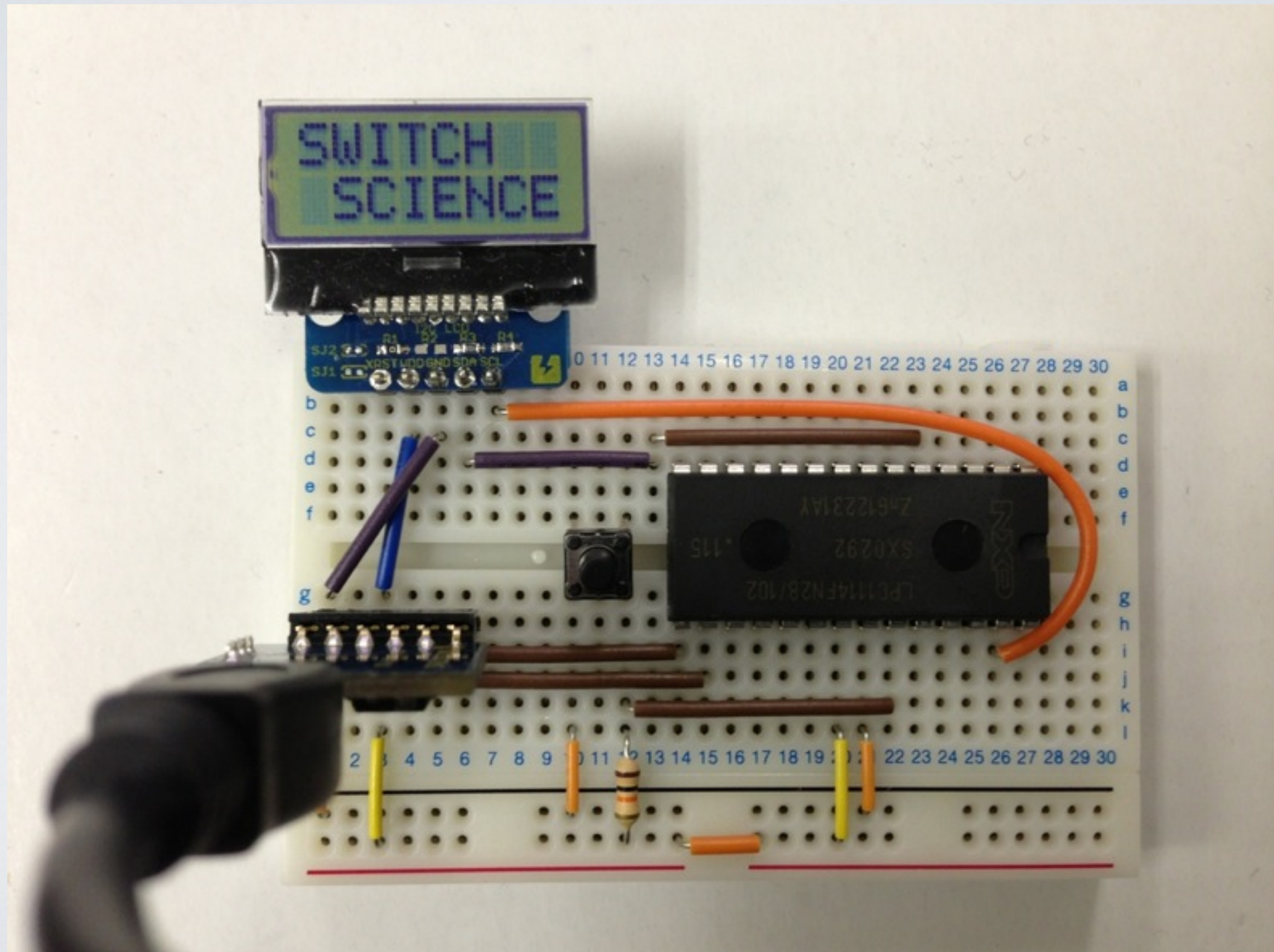
CMSIS-CORE

mbed 凄いい！





# 10秒で移植可能



# そもそもmbedって？

This repository

Search or type a command

Explore Gist Blog Help

ytsuboi

PUBLIC mbedmicro / mbed

Watch 65 Unstar 107 Fork 97

mbed libraries and tools

851 commits 3 branches 11 releases 26 contributors

branch: master mbed

Merge pull request #145 from Sissors/master

bogdanm authored 2 days ago latest commit 8ef99f8562

libraries	Merge pull request #145 from Sissors/master	2 days ago
travis	Use only GCC_ARM toolcahin for Travis CI	2 months ago
workspace_tools	file type support	4 days ago
.gitattributes	Added .gitattributes for automatic LF line ending conversion	5 months ago
.gitignore	Restructuring	3 months ago
.travis.yml	Added build script for travis (build_travis.py)	2 months ago
LICENSE	Add Apache v2 LICENSE file	5 months ago
MANIFEST.in	mbed-tools package improvements	a month ago
README.md	changes	8 days ago
setup.py	mbed-tools package improvements	a month ago

README.md

## mbed SDK

Code

Issues 7

Pull Requests 0

Wiki

Pulse

Graphs

Network

HTTPS clone URL

https://github.com/

You can clone with HTTPS, SSH, or Subversion.

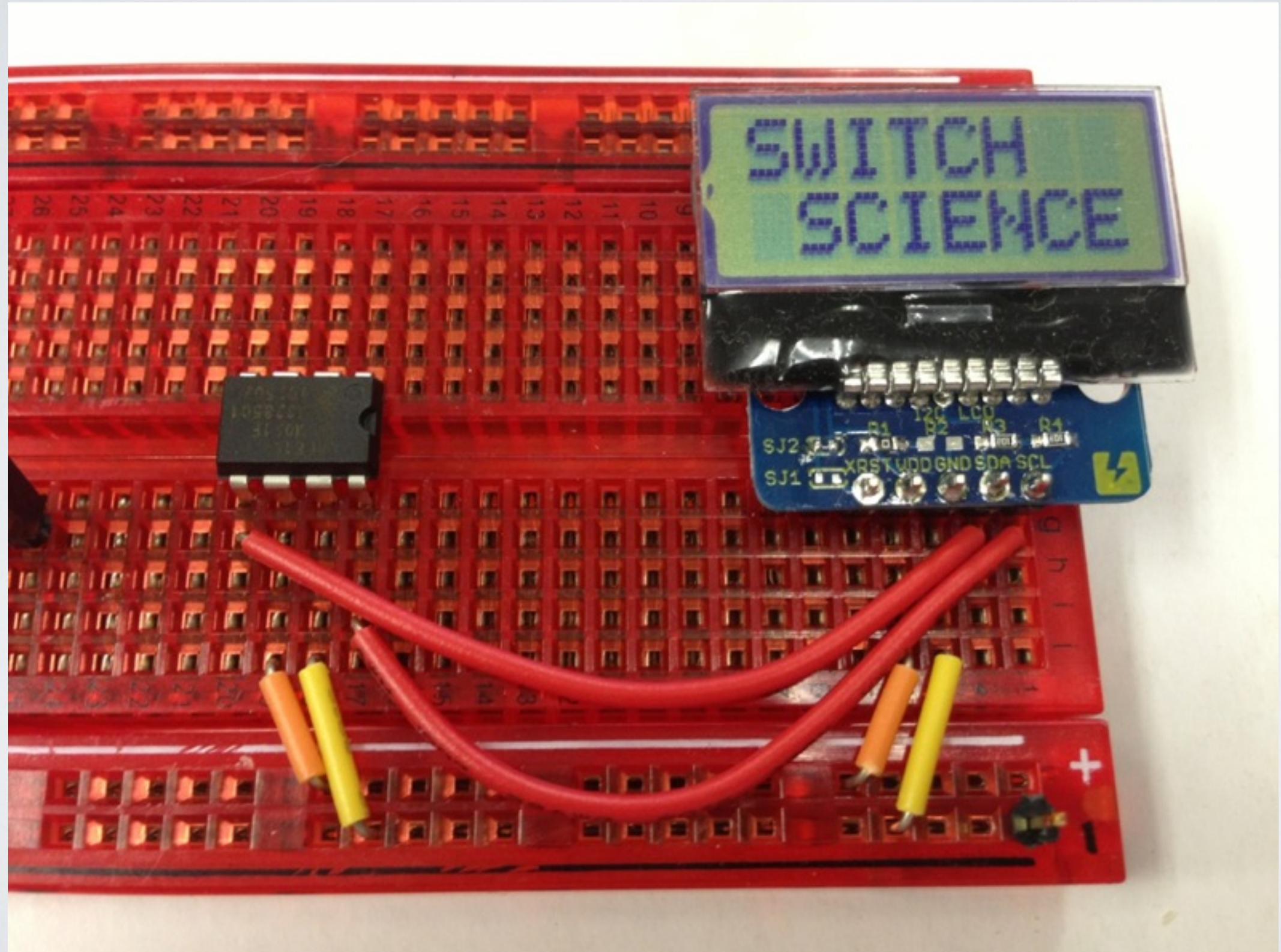
Clone in Desktop

Download ZIP

<https://github.com/mbedmicro/mbed>



# どんぐりにも移植



# merged!!



ytsuboi opened this pull request 10 days ago

Edit

## Added LPC810 support

No one is assigned

No milestone

No description given.

2 participants



🔗 ytsuboi added some commits

22 days ago

	ytsuboi	[LPC1114] fixed simple bugs on export templates	<a href="#">9ae383f</a>
	ytsuboi	[LPC810] add LPC810 support	<a href="#">8dd6bdb</a>
	ytsuboi	[LPC810] fixed scatter file	<a href="#">2e54966</a>
	ytsuboi	Merge remote-tracking branch 'upstream/master'	<a href="#">0718c76</a>
	ytsuboi	Merge remote-tracking branch 'upstream/master'	<a href="#">46003d4</a>



🔗 bogdanm referenced this pull request from a commit

9 days ago

bogdanm Merge pull request #54 from ytsuboi/master ... [233979e](#)

Merged



bogdanm merged commit [233979e](#) into [mbedmicro:master](#) from [ytsuboi:master](#) 9 days ago

Closed



bogdanm closed the pull request 9 days ago



# merged!!



ytsuboi opened this pull request 16 days ago

Edit

## [LPC812] Add SPISlave function

No one is assigned

No milestone

No description given.

Merged

+ 8 additions

- 4 deletions



ytsuboi added some commits 18 days ago



ytsuboi [LPC812] enable SPISlave

0a11767



ytsuboi [LPC812] change ssp\_busy() to check RX0V

✓ 4fbf286



bogdanm referenced this pull request from a commit 16 days ago



bogdanm Merge pull request #138 from ytsuboi/master ...

✓ b311c56

Merged

bogdanm merged commit b311c56 into `mbedmicro:master` from `ytsuboi:master` 16 days ago

Closed

bogdanm closed the pull request 16 days ago

# そもそもmbedって？

The screenshot shows the mbed.org website interface. At the top, there are navigation links: Handbook, Cookbook, Platforms, Components, Code, Questions, Forum, Dashboard, and Compiler. The main header features the 'mbed' logo, a search bar, and a 'Go' button. A user is logged in as 'ytsubo'. The main content area displays the repository 'mbed official / mbed' with a search bar and an 'Embed' button. Below this, there is a description: 'The official mbed C/C++ SDK provides the software platform and libraries to build your applications.' A navigation bar includes links for Home, History, Graph, API Documentation, Wiki, Issues, and Pull Requests. The main section is titled 'Files at revision 76:824293ae5e43' and shows a table of files. To the right, there are sections for 'Repository actions' (Import latest build, Following) and 'Repository details' (Type: Library, Created: 15 5月 2012, Imports: 226435, Forks: 4, Commits: 77, Dependents: 4458, Dependencies: 0, Followers: 459, Issues: 4). At the bottom right, there is a 'Builds' section showing the latest build: Release 76 of the mbed library Main changes: - enabled SPI.

Name	Size	Actions
[up]		
TOOLCHAIN_ARM_MICRO		
TOOLCHAIN_ARM_STD		
LPC11Uxx.h	42211	Revisions Annotate
PeripheralNames.h	1452	Revisions Annotate
PinNames.h	3019	Revisions Annotate
PortNames.h	847	Revisions Annotate
cmsis.h	285	Revisions Annotate
cmsis_nvic.h	544	Revisions Annotate
core_cm0.h	33042	Revisions Annotate
core_cm0plus.h	40429	Revisions Annotate

[https://mbed.org/users/mbed\\_official/code/mbed/](https://mbed.org/users/mbed_official/code/mbed/)



mbedmicro / mbed

Watch 64 Unstar 107 Fork 99

branch: master mbed / libraries / mbed / targets / hal

History

Table of commit history for the 'hal' directory, including merge pull request #145 and sub-targets like TARGET\_Freescale.

mbedmicro / mbed

Watch 64 Unstar 107 Fork 99

branch: master mbed / libraries / mbed / targets / hal / TARGET\_Freescale























History

Table of commit history for the 'TARGET\_Freescale' directory, including merge pull request #145 and sub-targets like TARGET\_K20D5M.

Vertical sidebar with navigation icons for code, info, search, and other repository actions.

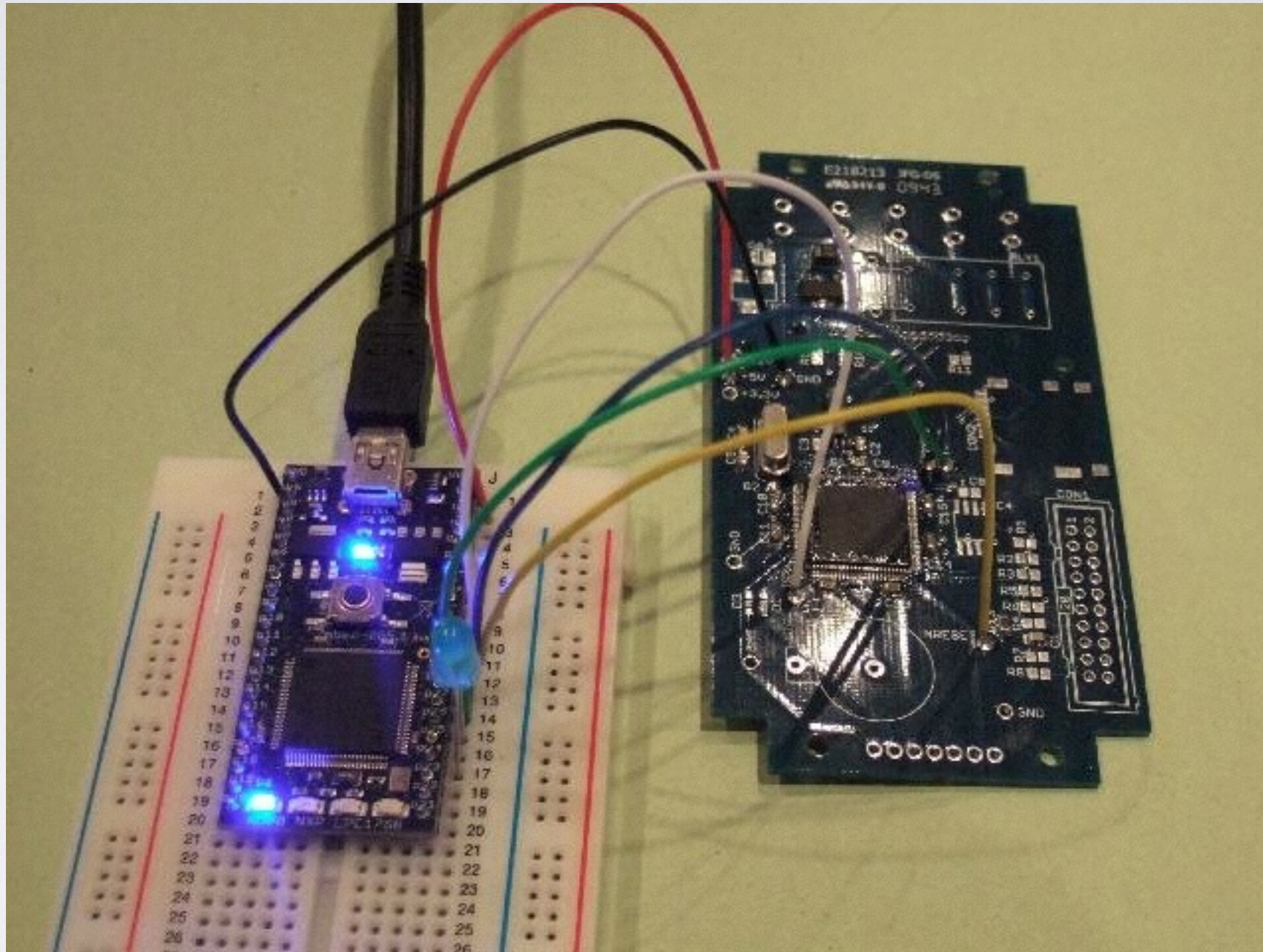
# そもそもmbedって？

## Builds of **mbed**:

Revision	Revision date	Change message	Actions
 <a href="#">76:824293ae5e43</a>	3 days ago	Release 76 of the mbed library Main changes: - enabled SPI slave on LPC812 - the ...	 <a href="#">Import</a>
 <a href="#">75:dc225afb6914</a>	19 12月 2013	Release 75 of the mbed library Main changes: - added UART flow control API and implementation ...	 <a href="#">Import</a>
 <a href="#">74:a842253909c9</a>	13 12月 2013	Release 74 of the mbed library Main changes: - added Embedded Artists LPC11U35 quick start board ...	 <a href="#">Import</a>
 <a href="#">73:1efda918f0ba</a>	09 12月 2013	Release 73 of the mbed library Main changes: - added support for KL46Z and NUCLEO_F103RB - ...	 <a href="#">Import</a>
 <a href="#">72:4096f863f923</a>	05 12月 2013	Release 72 of the mbed library This is a bugfix release of release 71, it contains ...	 <a href="#">Import</a>
 <a href="#">71:8fabd470bb6e</a>	03 12月 2013	Release 71 of the mbed library Main changes: - fix scatter file for LPC4088 - sleep/deepsleep ...	 <a href="#">Import</a>
 <a href="#">70:673126e12c73</a>	18 11月 2013	Release 70 of the mbed library This release is a bugfix release for release 69, it ...	 <a href="#">Import</a>
 <a href="#">69:4a7918f48478</a>	18 11月 2013	Release 69 of the med library Changes: - CAN API for filters - exporter fixes and ...	 <a href="#">Import</a>
 <a href="#">68:f37f3b9c9f0b</a>	23 10月 2013	Bug fixes and new features Many changes in this release, including: - The new RawSerial class ...	 <a href="#">Import</a>
 <a href="#">67:a9913a65894f</a>	19 9月 2013	New mbed build with various bugfixes and improvements on all platforms. Built from github tag 'mbed_lib_rev67'.	 <a href="#">Import</a>
 <a href="#">66:9c8f0e3462fb</a>	19 8月 2013	New mbed library build with support for LPC1114. Built from github tag 'mbed_lib_rev66'	 <a href="#">Import</a>

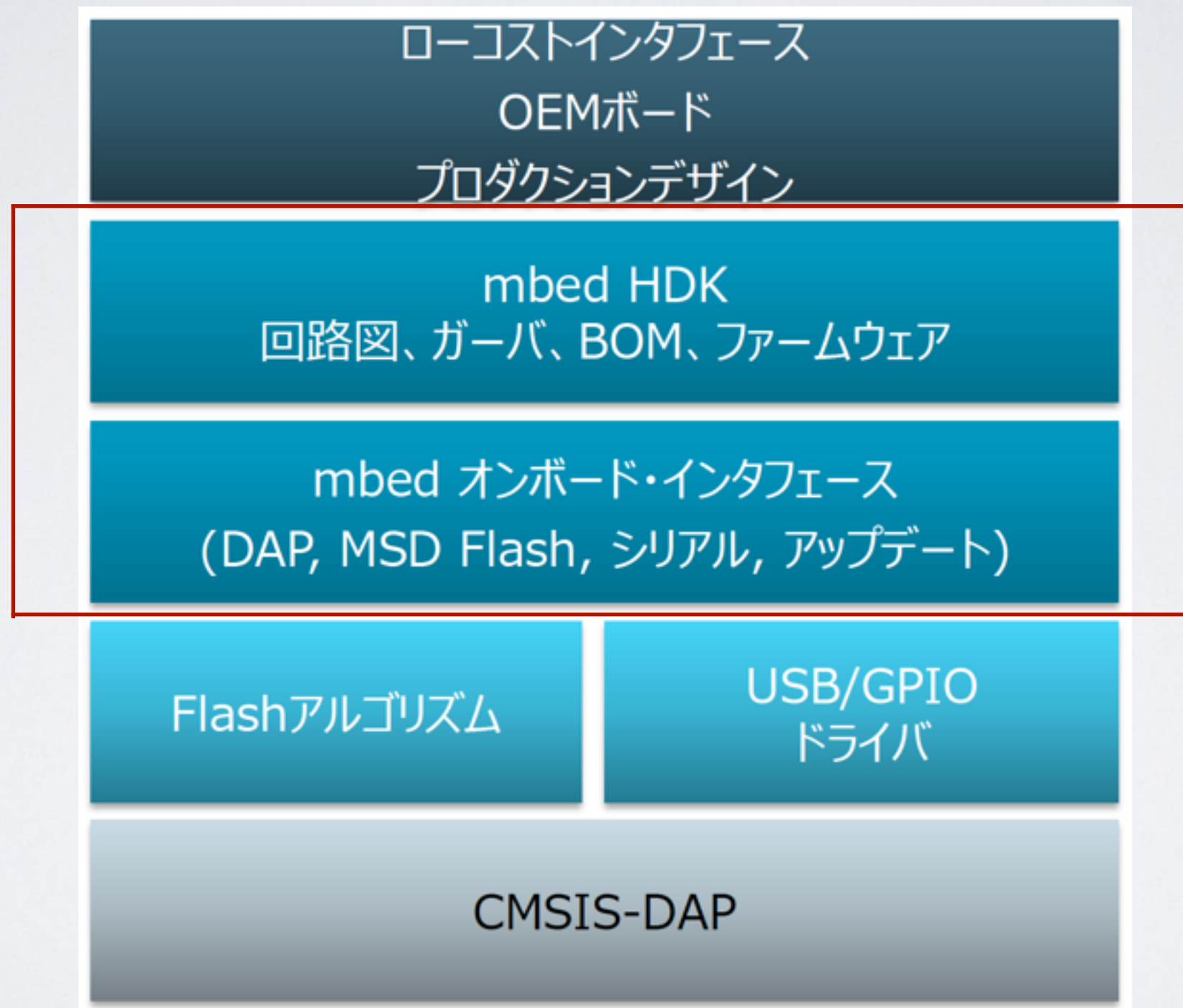


そもそもmbedって？



<https://mbed.org/users/chris/notebook/prototype-to-hardware/>

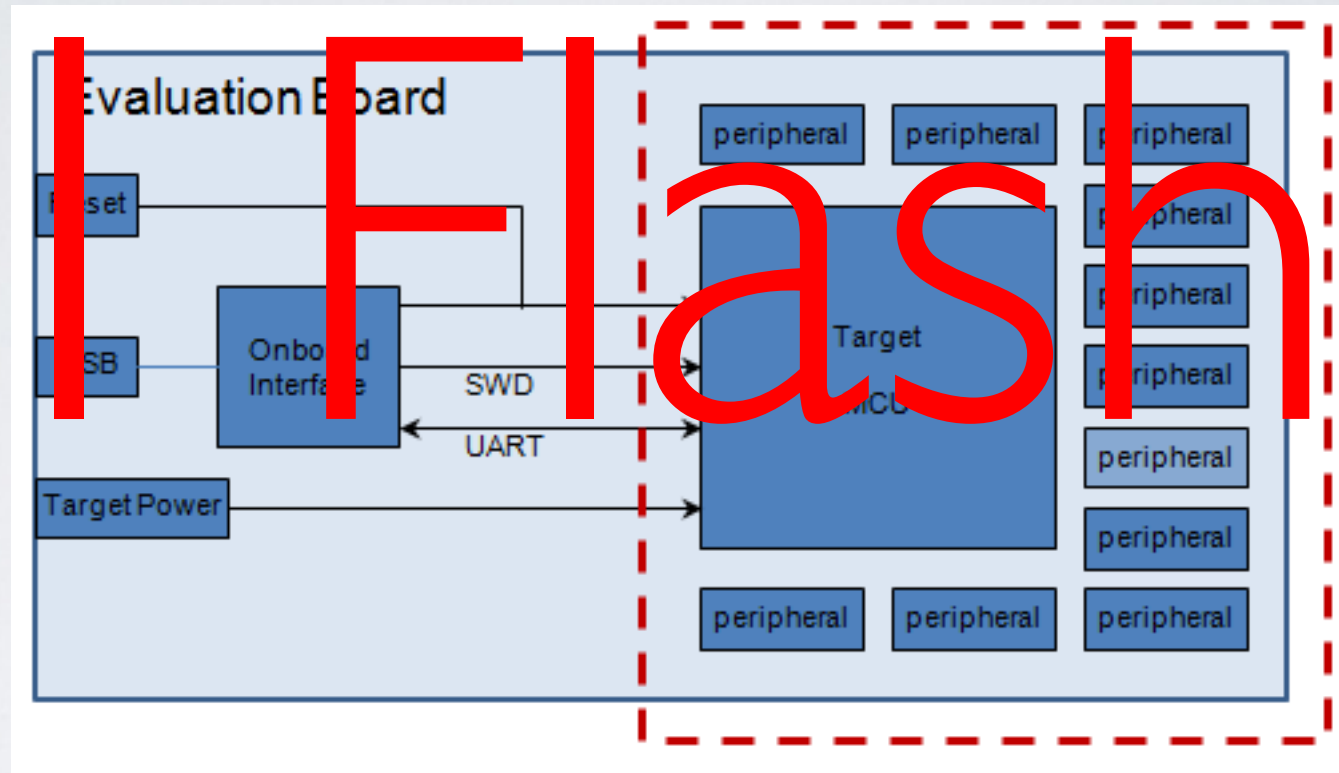
# そもそもそもそもmbedって？



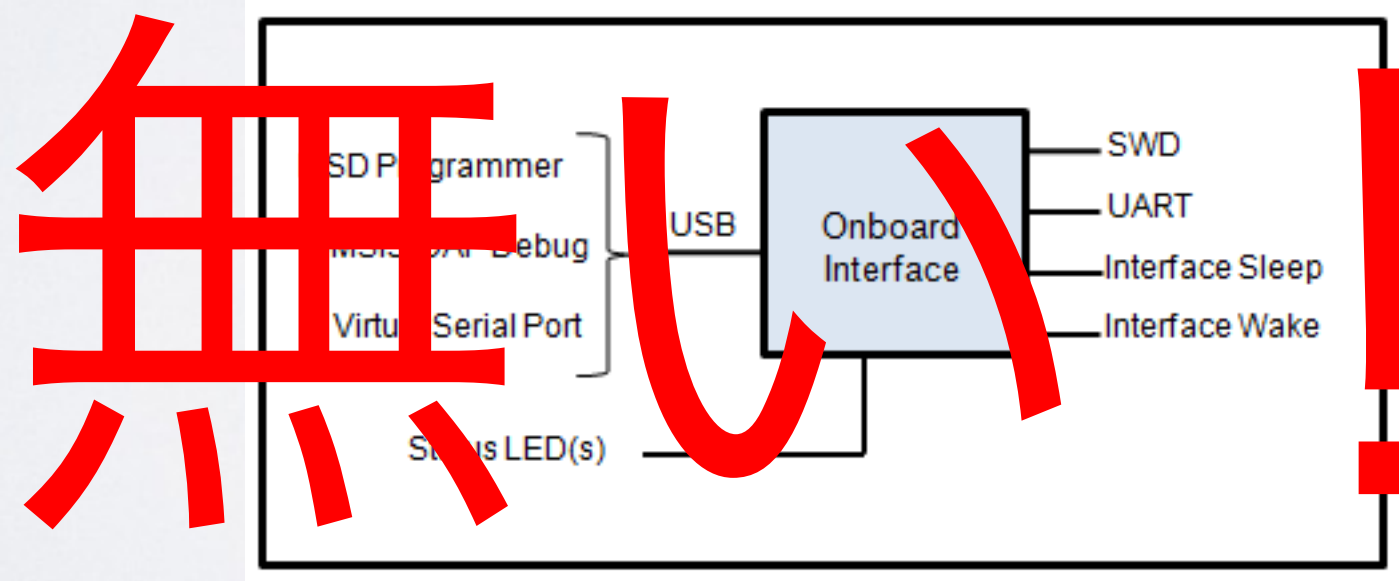


そもそもそもそもmbedって？

SPI





Flashは




<https://mbed.org/handbook/mbed-HDK>

# mbed HDK

Users » mbed\_official » Code » mbed-HDK



 mbed official /  mbed-HDK

Last commit 12 11月 2013  HDK

**Description:** The HDK is used for creating mbed enabled hardware. Give your hardware project the power of mbed!

[Home](#) [History](#) [Graph](#) [API Documentation](#) [Wiki](#) [Issues](#) [Pull Requests](#)

## HDK

Download repository:  zip  gz









- [About the HDK](#)

## CMSIS-DAP

- [CMSIS-DAP readme](#)

## Files at revision 10:bc96cec5b238









/ [default](#) [tip](#)

Name	Size	Actions
 [up]		
 <a href="#">Freescale</a>		
 <a href="#">NXP</a>		
 LICENSE-2.0.txt	11526	<a href="#">Revisions</a> <a href="#">Annotate</a>
 ReadMe.txt	476	<a href="#">Revisions</a> <a href="#">Annotate</a>
 license.txt	7544	<a href="#">Revisions</a> <a href="#">Annotate</a>
 mbed-HDK.lbr	1161643	<a href="#">Revisions</a> <a href="#">Annotate</a>
 mbed-enabled-logo.png	32634	<a href="#">Revisions</a> <a href="#">Annotate</a>


### Repository actions


[Import this program](#)

### Repository details

Type:	 Program
Created:	13 9月 2013
Imports:	 97
Forks:	 0
Commits:	 11
Dependents:	 0
Dependencies:	 0
Followers:	 17
Issues:	 0

### Developers

 mbed official

 Chris Styles

[http://mbed.org/users/mbed\\_official/code/mbed-HDK/](http://mbed.org/users/mbed_official/code/mbed-HDK/)



# mbed HDK

This repository

Search or type a command

Explore Gist Blog Help

ytsuboi

mbedmicro / CMSIS-DAP

Watch 30 Unstar 20 Fork 13

Interface Firmware providing USB CMSIS-DAP for debugging, USB MSD for programming, USB Serial for communication.

57 commits 1 branch 0 releases 5 contributors

branch: master CMSIS-DAP

Merge pull request #15 from 0xc0170/dev\_issue#11\_2

emilmont authored 9 days ago latest commit a554e66afc

bootloader	Created common disable/enable usb irq for all targets.	12 days ago
interface	INTERFACE_GEN_32KHZ for targets which needs it	9 days ago
shared	k20 - interface new startup file addition, VTOR to 0x5000 for interface	12 days ago
tools	k20 - interface new startup file addition, VTOR to 0x5000 for interface	12 days ago
.gitignore	Improve Flash Algorithm Generation script	2 months ago
LICENSE	Initial commit	3 months ago
README.md	Initial Release	3 months ago

README.md

## CMSIS-DAP Interface Firmware

Interface firmware providing USB CMSIS-DAP for debugging, USB MSD for programming, USB Serial for communication.

Code

Issues 1

Pull Requests 0

Wiki

Pulse

Graphs

Network

HTTPS clone URL

https://github.com/

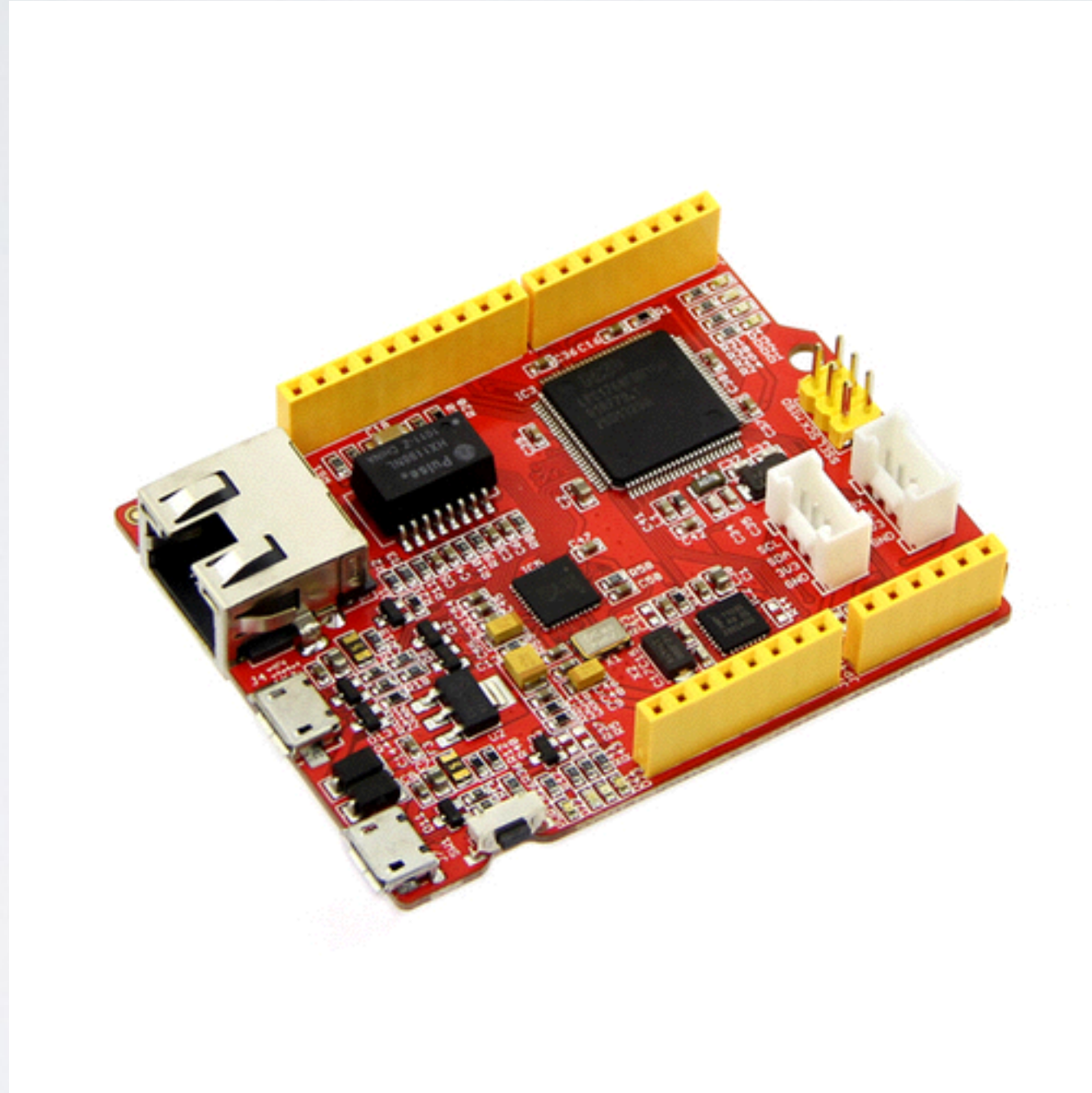
You can clone with HTTPS, SSH, or Subversion.

Clone in Desktop

Download ZIP

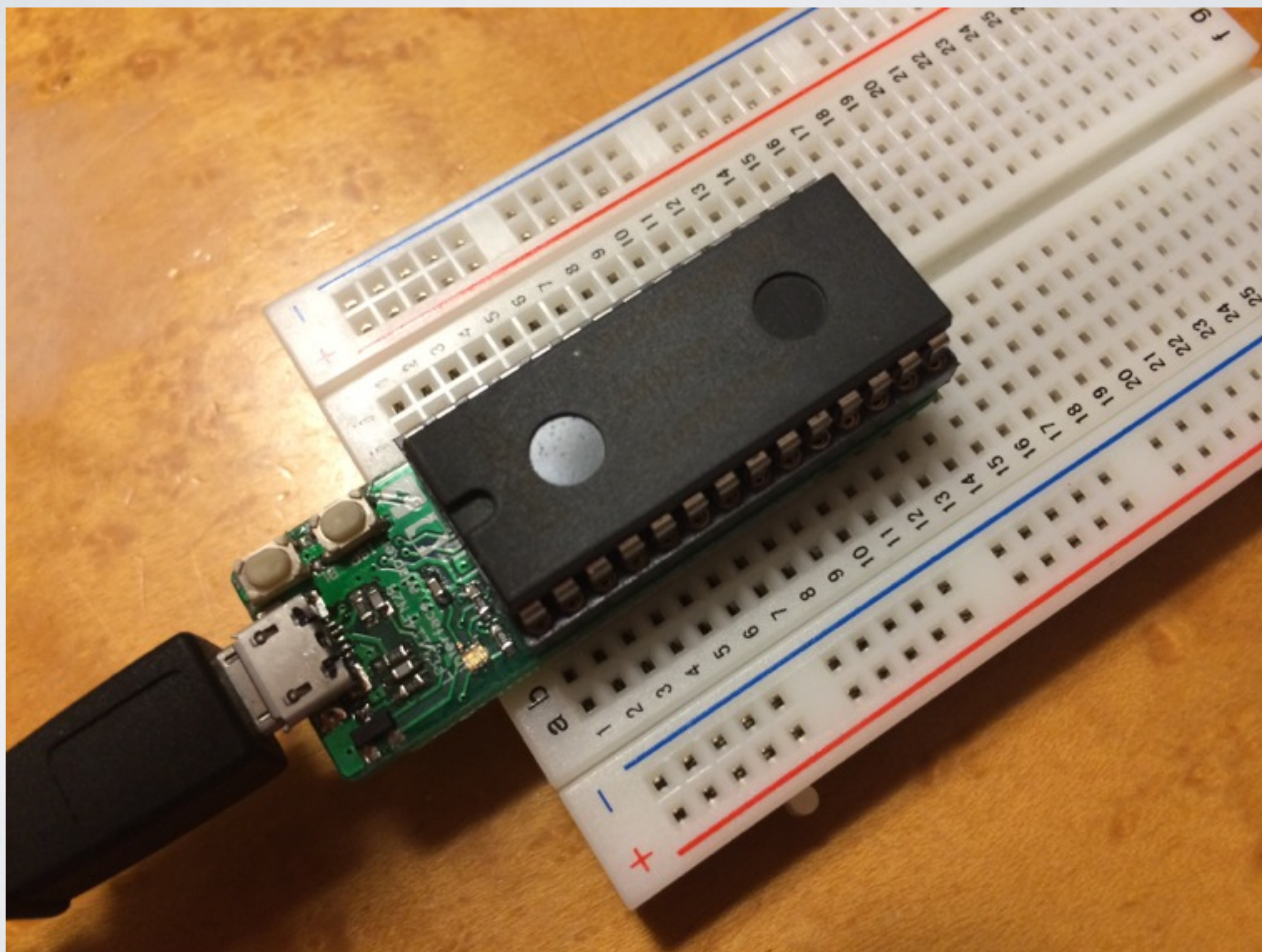
<https://github.com/mbedmicro/CMSIS-DAP>

# HDK使用例





# HDK使用例



つまり mbed って

Cortex-M マイコンをメチャ手軽に  
使える便利なツール群



つまり mbed って

アレがあるとか無いとか  
ケチ臭いことは問題では無い

# mbedチームのゴール

”テクノロジーを皆にとって  
身近なものにすること”



# 困ったら

The screenshot shows the mbed Forum page. At the top, there is a navigation bar with tabs for Handbook, Cookbook, Platforms, Components, Code, Questions, Forum (selected), Dashboard, and Compiler. Below the navigation bar is the mbed logo, a search bar with the text "Search mbed.org...", a "Go" button, and a "Login or signup" button. A "Cookie notice" link is also present.

Below the search bar, there are four sub-navigation tabs: Global discussions, Team discussions, Component discussions, and Platform discussions. The main heading is "mbed Discussions".

The main content area features a table of discussion topics. The table has four columns: Forum, Topics, Posts, and Last post. The rows list various forums such as "Hello World!", "mbed", "Electronics & Hardware", "Bugs & Suggestions", "News & Announcements", "Component and Library Development", and "日本語フォーラム / Japanese Forum".

On the right side of the page, there are two informational boxes. The first is titled "About the Forums" and explains that the forums are for general discussions or open-ended questions. The second is titled "About mbed" and describes mbed as a tool for Rapid Prototyping with microcontrollers, with a "Take the tour..." link.

Forum	Topics	Posts	Last post
<a href="#">Hello World!</a> New to mbed? Don't be afraid to ask your beginner level questions here, from C++ syntax questions to hardware issues.	958	4585	a day ago by <a href="#">Dave</a> °
<a href="#">mbed</a> General discussion about working with mbed, programming and development.	2513	13560	2 days ago by <a href="#">jim hamblen</a>
<a href="#">Electronics &amp; Hardware</a> From breadboarding and circuit basics to PCB design, this is the forum for discussing electronics, whatever your level of skill.	240	1383	10 days ago by <a href="#">EmbeddedArtists AB</a>
<a href="#">Bugs &amp; Suggestions</a> Found bugs? Got suggestions? Post them here and help improve mbed.	756	3074	21 minutes ago by <a href="#">Neil Thiessen</a>
<a href="#">News &amp; Announcements</a> Got something to share? Tell us about mbed projects, products, workshops, etc.	104	307	7 days ago by <a href="#">Amy B</a>
<a href="#">Component and Library Development</a> For discussing the creation, development and testing of different component libraries in the component database.	4	87	8 days ago by <a href="#">Kevin Townsend</a>
<a href="#">日本語フォーラム / Japanese Forum</a> For discussing all matters mbed in Japanese.	37	167	16 12月 2013 by <a href="#">Toyomasa Watarai</a>

# 困ったら

Navigation: [Home](#) [Handbook](#) [Cookbook](#) [Platforms](#) [Components](#) [Code](#) **Questions** [Forum](#) [Dashboard](#) [Compiler](#)

Search:  [Go](#) [Login or signup](#) [Cookie notice](#)

## Questions

### Active Questions

Filter: **Active** [Newest](#) [Top Voted](#) [Answered](#) [Unanswered](#) [Ask a question](#)

0 answers	DSP on 11u24	<a href="#">Antreas Antoniou</a> 1 時間, 36 分 ago
1 answer	Connecting USBSerial to LPC11u24 ?? <a href="#">debugging</a> , <a href="#">LPC11U24</a> , <a href="#">usbserial</a>	<a href="#">Niels Buch</a> 1 時間, 58 分 ago
1 answer	Why would a timer value be different when printed? <a href="#">mbed</a> , <a href="#">timer</a>	<a href="#">Eric Fossum</a> 8 時間, 57 分 ago
0 answers	Asking for using ADJD-S371_ColourSens library <a href="#">ADJD-S371_ColourSens</a>	<a href="#">chiaki kubo</a> 10 時間, 14 分 ago
2 answers	Reset Button <a href="#">Seeeduino-Arch-Pro</a>	<a href="#">Kean Maizels</a> 12 時間, 7 分 ago
3 answers	mbed serial driver cannot install <a href="#">debugging</a> , <a href="#">driver</a> , <a href="#">mbed</a> , <a href="#">Serial</a> , <a href="#">USB</a>	<a href="#">Niels Buch</a> 19 時間, 2 分 ago

#### About Questions

The Questions section of mbed is designed to provide a high quality resource of common (and not so common) questions and answers. This means that instead of searching long [forum](#) threads for the answer to a query or problem, both the question and answer will hopefully be captured succinctly on a single page.

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# 問題を見つけたら

Forum » Bugs & Suggestions

## Forum: Bugs & Suggestions

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Topic	Replies	Last post
 <a href="#">Embedded Artists LPC11U35 QuickStart Board Support</a>  64KB, Board, EmbeddedArtists, LPC11U24, LPC11U35, Support	12	19 minutes ago by <a href="#">Neil Thiessen</a>
 <a href="#">Compile Regression?</a>	0	about an hour ago by <a href="#">Toby Harris</a>
 <a href="#">Suggestion: Hard to read full "Change message"</a>  revision, website	0	3 days ago by <a href="#">Yoshihiro TSUBOI</a>
 <a href="#">gcc export compile fails</a>  gcc	8	3 days ago by <a href="#">Martin Kojtal</a>
 <a href="#">Search result order</a>	0	7 days ago by <a href="#">Erik Olieman</a>
 <a href="#">Wrong SRAM definition in the LPC4088.ld linker script</a>  linker, LPC4088, script, sram	1	10 days ago by <a href="#">EmbeddedArtists AB</a>

# いろいろご相談



**@toyowata**



**@nxpfan**



**@ytsuboi**



**@jksoft913**



CALL FOR MAKERS

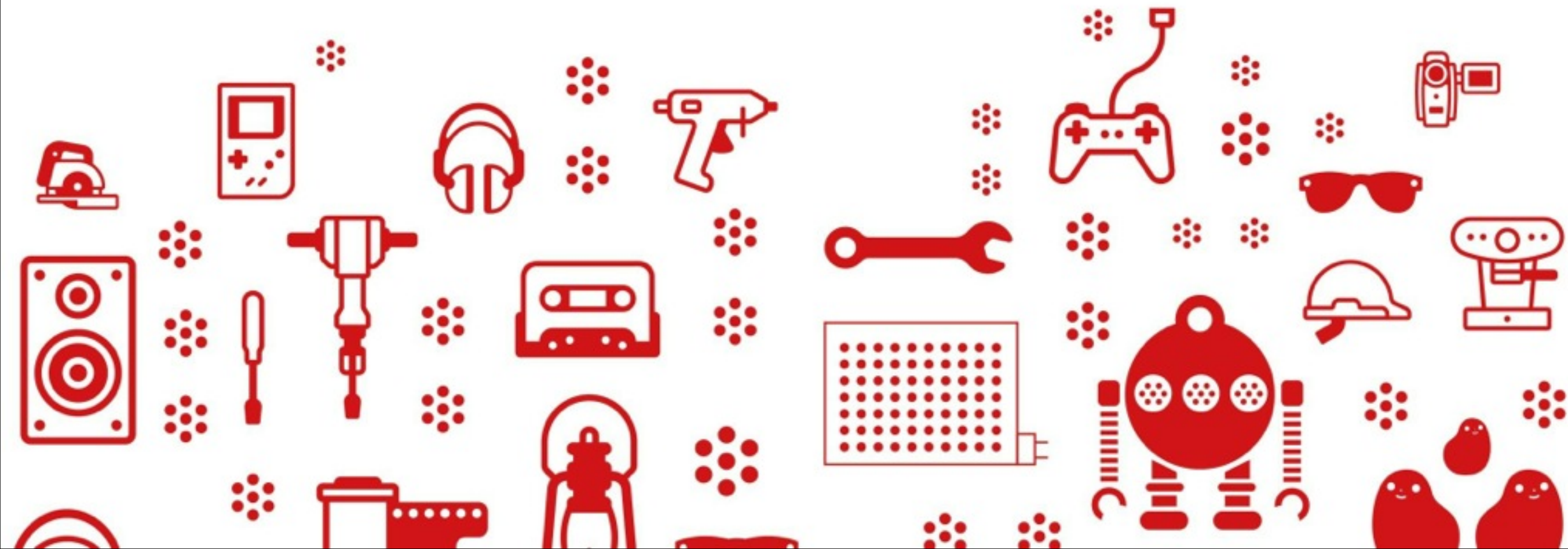
**Maker Faire Shenzhen**

# Maker Faire Shenzhen 2014

**CALL**

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**4/06 ~ 4/07**





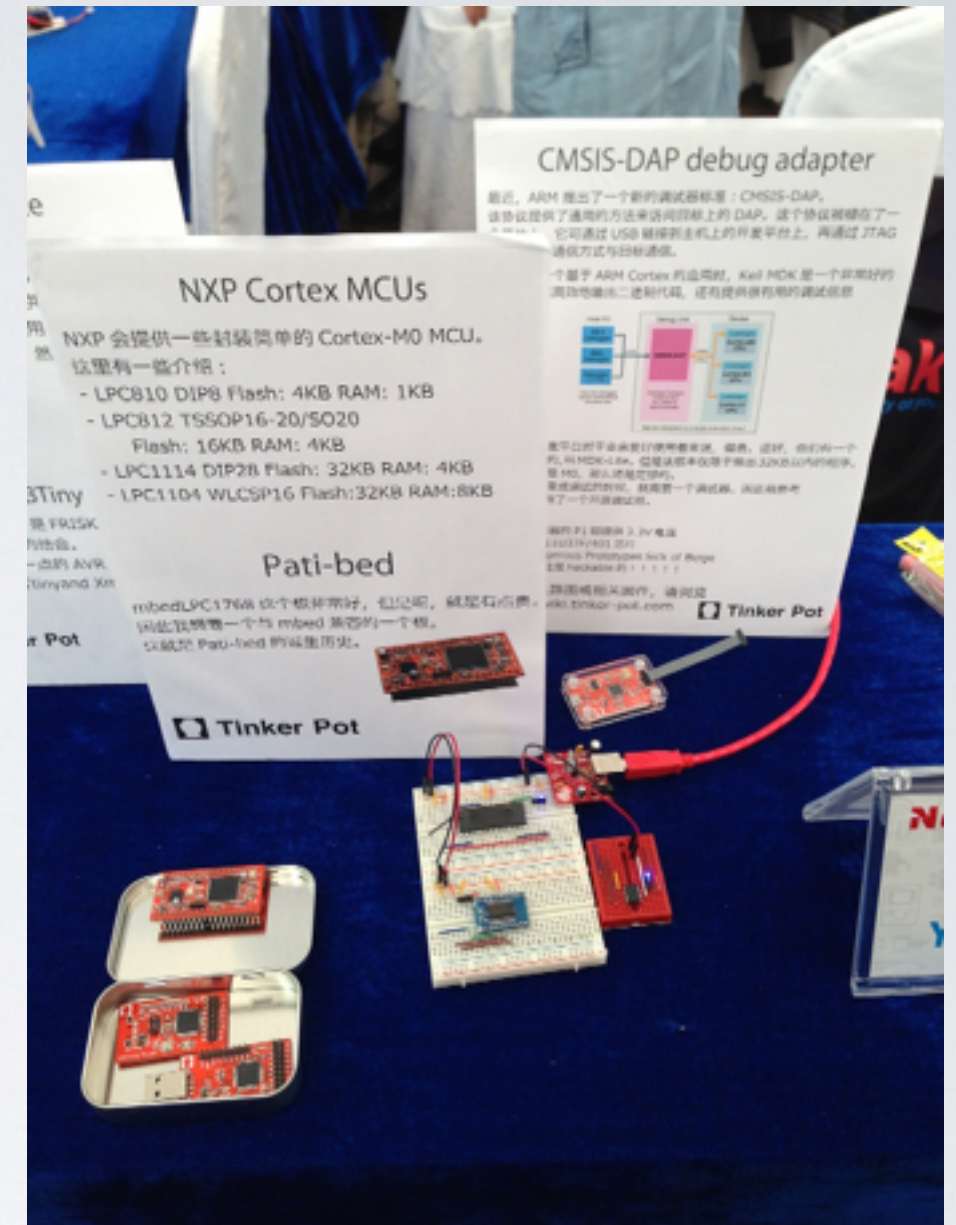


# 03 Reviews Shenzhen Mini Maker Faire 2013



The Shenzhen Mini Maker Faire 2013 included over **100 booths** from different makers. There were approximately **5,000 people** in attendance in one day. Featured guests included PCH INTERNATIONAL, SWITCH SCIENCE, WEISTEK, SEED STUDIO and so on...







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