

# Tech Talks LIVE Schedule – Presentation will begin shortly



How to Measure and Debug Network Performance - Using Silicon Labs Network Analyzer	Thursday, May 7
RF Regulatory and Qualification Testing for Bluetooth, Zigbee & Z-Wave	Tuesday, May 12
<b>Simplicity Studio Tips &amp; Tricks: Our FAEs Know All The Tricks - Improve Your Life in Simplicity Studio</b>	<b>Thursday, May 14</b>
Wireless Module vs Wireless SoC Tradeoffs and Decision Making Criteria	Tuesday, May 19
Thunderboard BG22 Unboxing. You Have Our Kit... What Can You Do With It?	Thursday, May 21
Designing in Bluetooth using Bluetooth Xpress Modules with Minimal Code Writing	Tuesday, May 26
Overview of Silicon Labs Wi-Fi Solutions (Including Redpine Signals Wi-Fi Solutions)	Thursday, May 28

<https://tinyurl.com/BG22Kit>

Please take the 3 question poll while waiting and be entered to receive a Thunderboard BG22 Kit!



Find Past Recorded Sessions at:  
<https://www.silabs.com/support/training>



# WELCOME



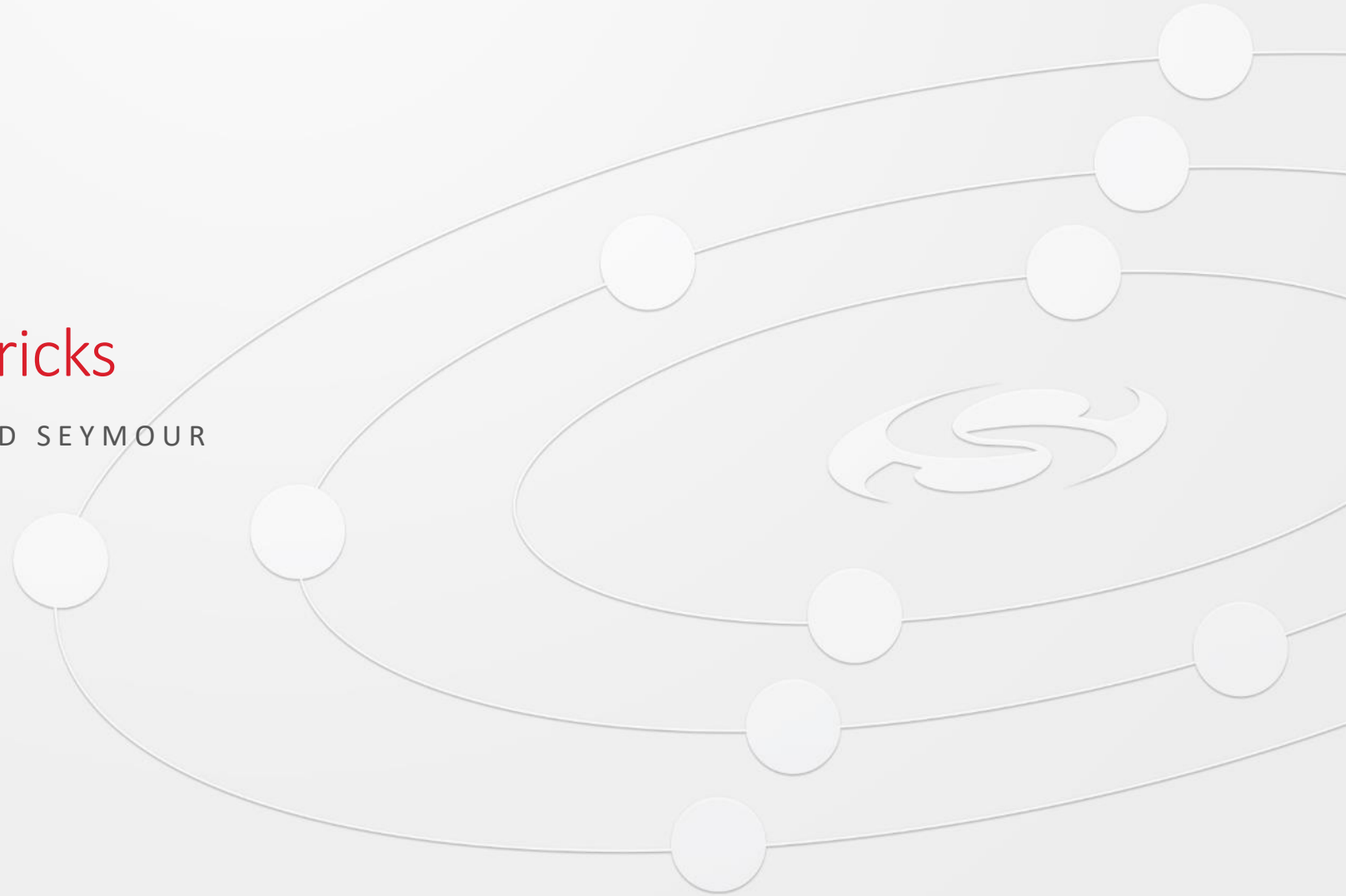
Silicon Labs LIVE:  
Wireless Connectivity  
Tech Talks

A blue background with a pattern of white circuit board traces and code snippets. The code includes comments like '/\* Bluetooth connection', 'static const', and '#if defined', along with function names like 'void init', 'BOARD\_INIT', and 'BTTON\_INIT'. There are also some Chinese characters visible in the background.



# Simplicity Studio Tips-n-Tricks

MAY 2020 | MARK HALLAM AND DAVID SEYMOUR



# Why Simplicity Studio™ ?

## Wireless and MCU design made simple

- Common development environment for MCU and Wireless products
- Eclipse-based IDE with wireless stack support
- Complete Documentation
- Demos/Software Examples
- Advanced Tools
  - Energy Profiler
  - Network Analyzer
  - AppBuilder
  - Hardware Configurator

The image displays the Simplicity Studio software interface, which is an Eclipse-based IDE. The main window shows the 'J-Link Silicon Labs (440063176)' page, indicating the preferred SDK is EmberZNet v5.7.3. Below this, there are sections for 'Started', 'Documentation', and 'Completed'. A large circular callout highlights the 'Energy Profiler' tool, showing a graph of power consumption over time. Another circular callout highlights the 'Network Analyzer' tool, displaying a packet capture table with columns for Time, Duration, Summary, and various protocol details. A third circular callout highlights the 'AppBuilder' tool, showing a 'Data Sheet' for the '8-Bit Busy Bee Family' (EM8BB2). The data sheet includes a table of features and a list of applications.

Time	Duration	Summary	MAC Src	MAC Dest	IP Src	IP Dest	Status
0.000000	0.000	The CPU sends a read request to...	0000	0000	0	0	
0.000000	0.002	Send Request	0000	0000	0	0	
0.000000	0.000	Send Response	0000	0000	0	0	
0.000000	0.000	The CPU sends the leading byte of...	0000	0000	0	0	
0.000000	0.000	Network Address Request	0000	0000	0	0	
0.000000	0.002	Network Address Response	0000	0000	0	0	
0.000000	0.000	The CPU sends an 'OK' command...	0000	0000	0	0	
0.000000	0.000	The CPU sends an 'OFF' command...	0000	0000	0	0	
0.000000	0.000	The CPU sends an 'Toggle'...	0000	0000	0	0	

**8-Bit Busy Bee Family**  
**EM8BB2 Data Sheet**

The EFM8BB2, part of the Busy Bee family of MCUs, is a multi-purpose line of 8-bit microcontrollers with a comprehensive feature set in small packages.

These devices offer high-value by integrating advanced analog and enhanced high-speed communication peripherals into small packages, making them ideal for space-constrained applications. With an efficient 8051 core, enhanced pulse-width modulation, and precision analog, the EFM8BB2 family is also optimal for embedded applications.

EFM8BB2 applications include the following:

- Motor control
- Consumer electronics
- Sensor controllers
- Medical equipment
- Lighting systems
- High-speed communication hub

**KEY FEATURES**

- Pipelined 8-bit 8051 core with 50 MHz maximum operating frequency
- Up to 22 multifunction, 5 V tolerant I/O pins
- On-chip 12-bit Analog-to-Digital Converter (ADC)
- Two Low-current analog comparators with built-in DAC as reference input
- Integrated temperature sensor
- 3-channel PWM / PCA with special hardware kill-safe state capability
- Five 16-bit timers
- Two UARTs, SPI, SMBus/I2C masters and I2C slave
- Priority counter for flexible pin mux

**Core / Memory**

- 8051 Core (MHz)
- External CMOS Oscillator
- High Frequency 48 MHz RC Oscillator
- Internal LP Reduc

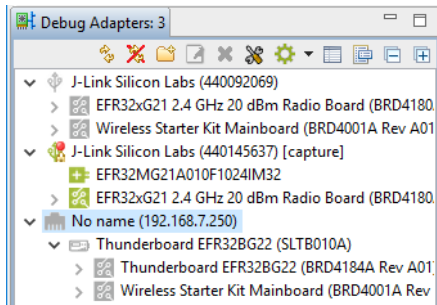
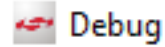
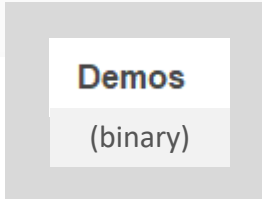
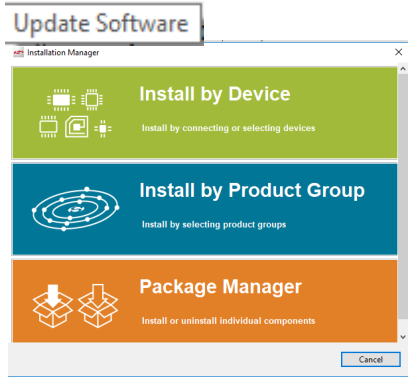
**Clock Management**

- Low Frequency RC Oscillator
- High Frequency 24.5 MHz

**Energy Man**

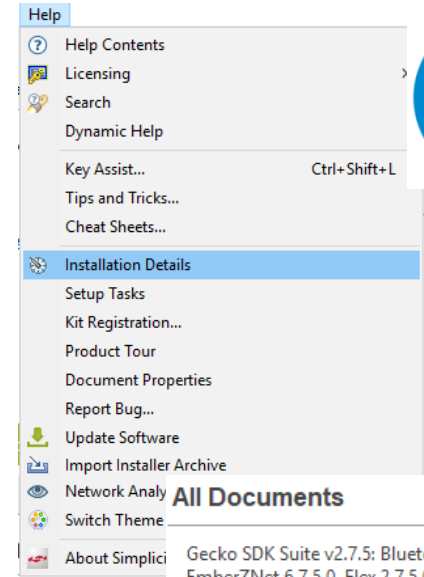
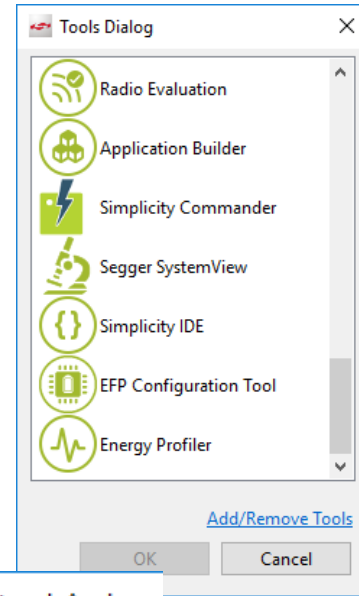


# What is Simplicity Studio? It's Tools, applications, utilities and doc's



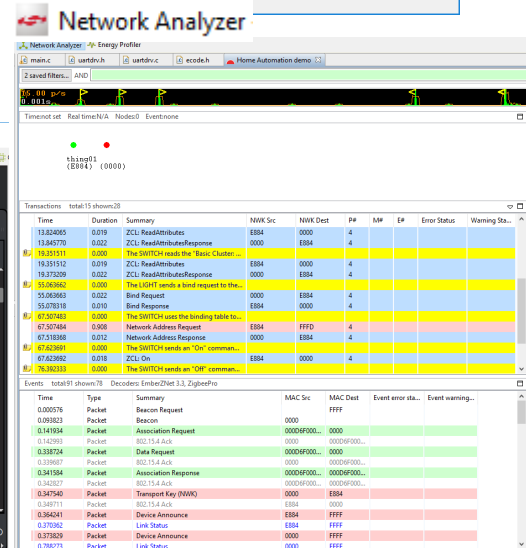
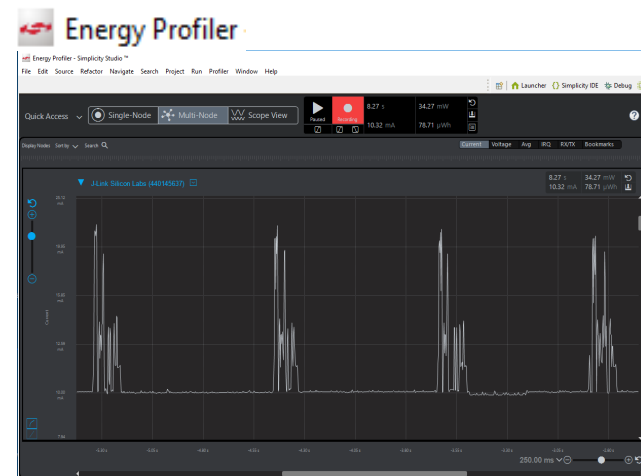
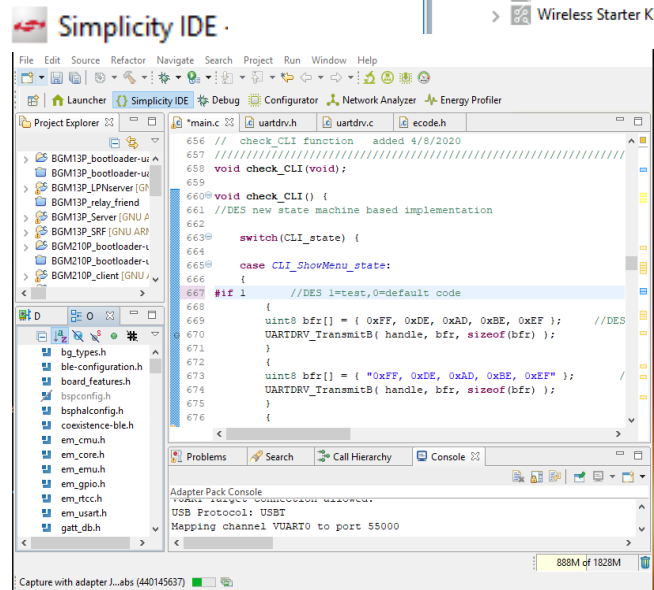
## SDK Documentation

- ▶ Bluetooth SDK 2.13.5.0
- ▶ EmberZNet SDK 6.7.5.0
- ▶ Flex SDK 2.7.5.0
- ▶ Gecko Bootloader 1.10.3
- ▶ Micrium OS Kernel 5.8.2



## Software Examples

(Projects)



Gecko SDK Suite v2.7.5: Bluetooth 2.13.5.0, EmberZNet 6.7.5.0, Flex 2.7.5.0, MCU 5.9.5.0, Micrium OS Kernel, Z-Wave SDK 7.13.5.0 J-Link Silicon Labs (440145637)

- ▶ -> Start Here
- ▶ API References
- ▶ Additional Resources
- ▶ Application Notes
- ▶ Brochures
- ▶ Data Sheets
- ▶ Errata
- ▶ Example Code
- ▶ Fundamentals
- ▶ Getting Started
- ▶ Quick Start Guides
- ▶ Reference Manuals
- ▶ Release Notes
- ▶ Schematic and Layout Files
- ▶ User's Guides
- ▶ White Papers

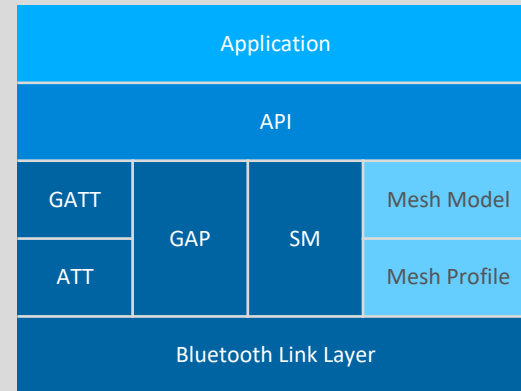
# A Complete Solution for Enabling Bluetooth Products

## SoCS AND MODULES



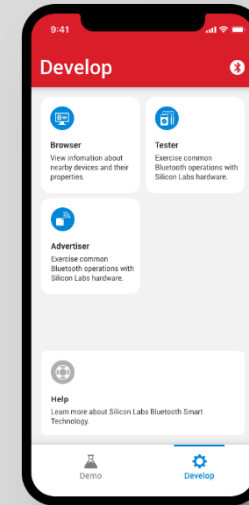
Industry leading Bluetooth 5.1 and 5.2 SoCs and pre-certified modules. Smallest module too @6x6x1.3mm!

## STACK SOFTWARE



In-house developed stacks with latest Bluetooth 5.2 and mesh features

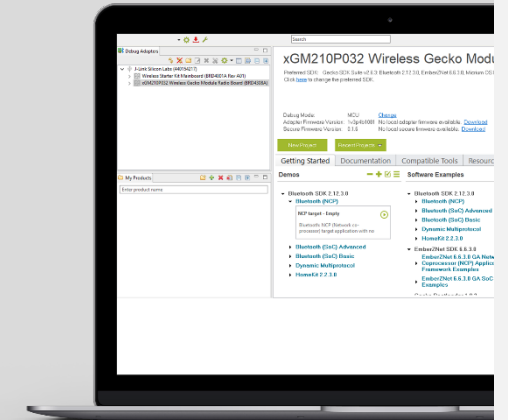
## MOBILE APPLICATIONS



Reference applications and source code for iOS and Android

Phone interoperability test program

## DEVELOPMENT TOOLS



Free-of-charge development and protocol analysis tools to boost productivity

# Simplicity Studio v4 Useful Windows 10 Paths

- Default Install Path

- C:\SiliconLabs\SimplicityStudio ← Single word without spaces as some build systems bark with “spaces” in folder names

- Downloaded location for Thunderboard BG22 Kit resources

- ~\SimplicityStudio\v4\offline\hwtools\boards\BRD4184

- Command line or direct GUI access to “Simplicity Commander”

- ~\SimplicityStudio\v4\developer\adapter\_packs\commander

- Bluetooth Mesh SDK location

- ~\SimplicityStudio\v4\developer\sdk\blemesh

- Protocol SDK locations for bluetooth, flex, zigbee, and z-wave

- ~\SimplicityStudio\v4\developer\sdk\gecko\_sdk\_suite\v2.7\protocol



# Simplicity Studio v4 Useful Mac Paths

- Default Install Path
  - /Applications/SimplicityStudio.app/Contents/Eclipse (recommend changing to one word SimplicityStudio.app)
- Downloaded location for Thunderboard BG22 Kit resources
  - **~offline/hwtools/boards/BRD4184**
- Command line or direct GUI access to “Simplicity Commander”
  - ~developer/adapters/commander
- Bluetooth Mesh SDK location
  - ~developer/sdks/blemesh
- Protocol SDK locations for bluetooth, flex, zigbee, and z-wave
  - ~developer/sdks/gecko\_sdk\_suite/v2.7/protocol





# Simplicity Studio v4 Useful Documentation links:

## ■ Zigbee

➤ ~SimplicityStudio\v4\developer\sdk\gecko\_sdk\_suite\v2.7\protocol\zigbee\documentation

## ■ Flex (aka Proprietary)

➤ ~SimplicityStudio\v4\developer\sdk\gecko\_sdk\_suite\v2.7\protocol\flex\documentation

## ■ Z-Wave

➤ ~SimplicityStudio\v4\developer\sdk\gecko\_sdk\_suite\v2.7\protocol\z-wave\studio-docs

## ■ Bluetooth LE (Low Energy)

➤ ~SimplicityStudio\v4\developer\sdk\gecko\_sdk\_suite\v2.7\app\bluetooth\doc

## ■ Bluetooth Mesh

➤ ~SimplicityStudio\v4\developer\sdk\bluetooth\bluetooth\_mesh\v1.6\app\bluetooth\doc

# Where are my <created> projects located?

## ■ Default project locations in your Windows 10 workspace

- C:\Users\\SimplicityStudio
- Ex: C:\Users\daseymou\SimplicityStudio



## ■ Default project locations in your Mac workspace

- /Users/<user>/SimplicityStudio
- Ex: /Users/mahallam/SimplicityStudio



# Live Tech Talk viewing of Simplicity Studio v4



# Useful Links

- <https://www.silabs.com/products> Silicon Labs Offerings
- <https://www.silabs.com/support/getting-started> Simple Step-by-Step How-To's
- <https://www.silabs.com/support/training> Training Resources
- <https://www.silabs.com/whitepapers> Comfort and Educational Reading
- <https://www.silabs.com/community> Community Support and more
- <https://docs.silabs.com/> Software Developer Docs
- <https://www.silabs.com/support/resources> Document search and filtering options too
- <https://www.silabs.com/products/development-tools> Development and Evaluation Kits
- <https://www.silabs.com/community/software/simplicity-studio> Do we have to explain it ;-)

# BG22 Virtual Workshop



Learn how to develop and deploy more powerful, efficient, and secure IoT products with your own Thunderboard BG22 – free for all registrants!

Sessions filling up!

No worries, we are in the process of adding more.

So, check the link below for newly opening sessions and their dates:

Register today! <https://www.silabs.com/about-us/events/virtual-bluetooth-workshop>

Thank You!

Q & A





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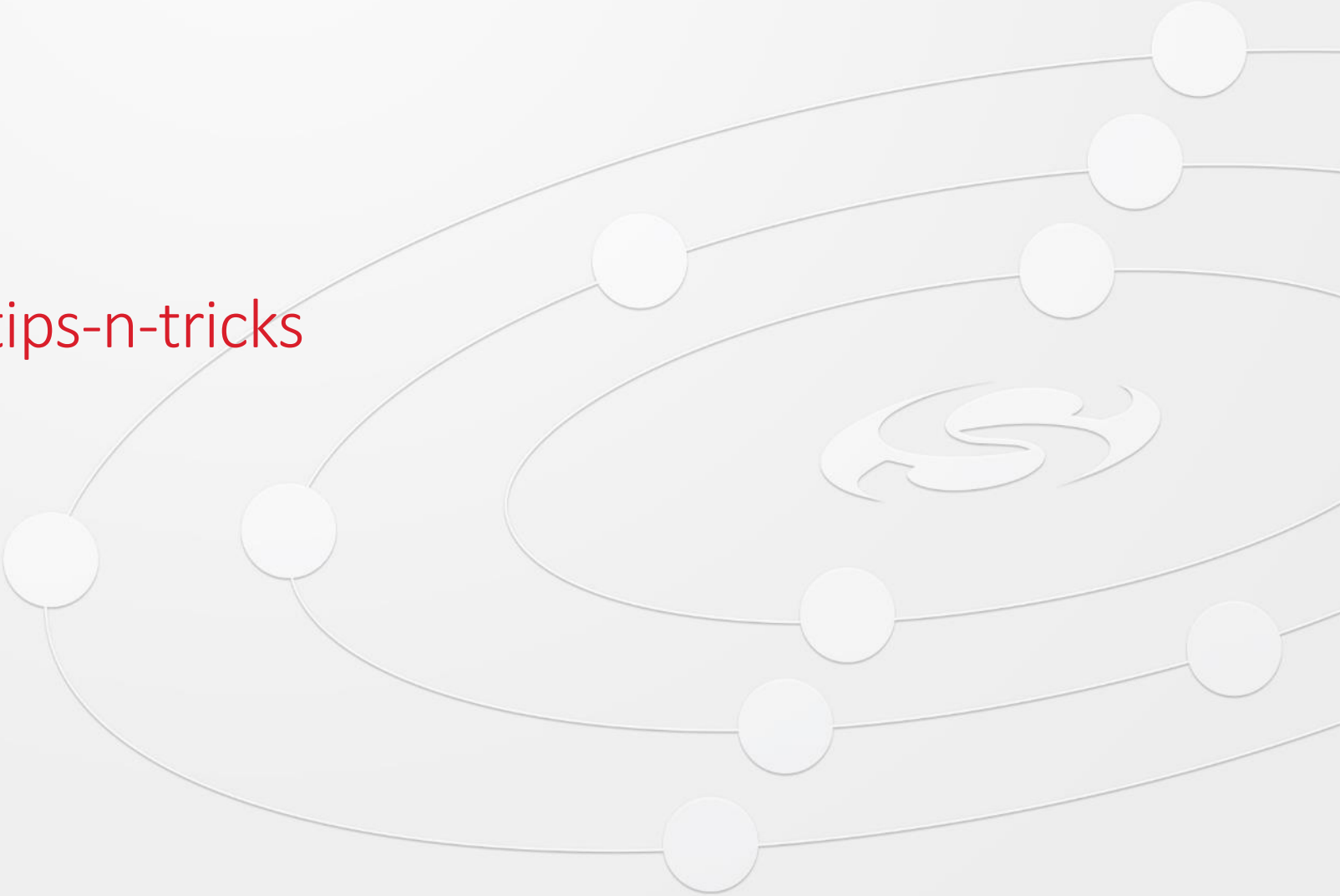
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Find Past Recorded Sessions at:

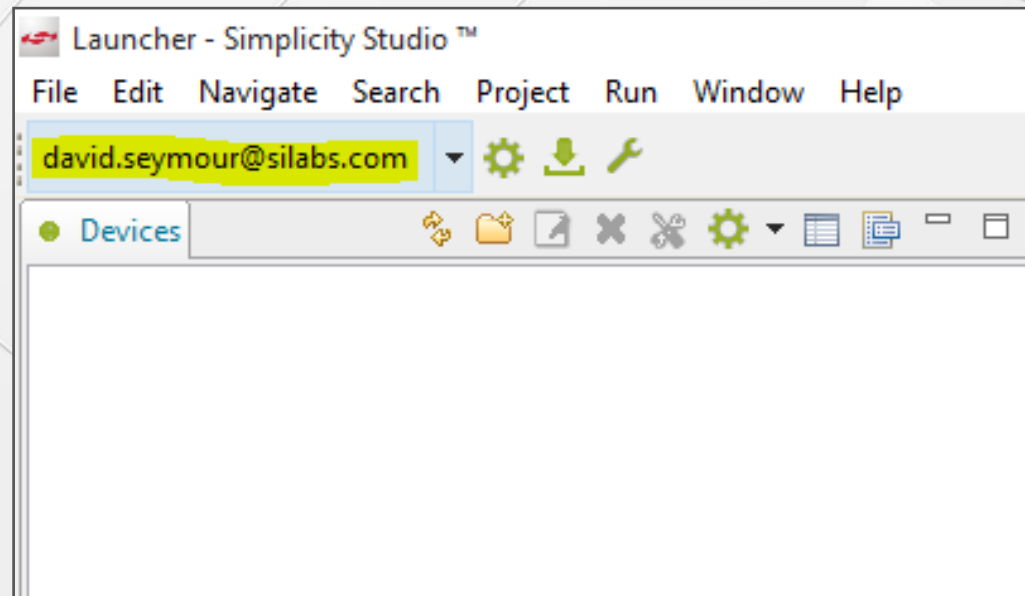
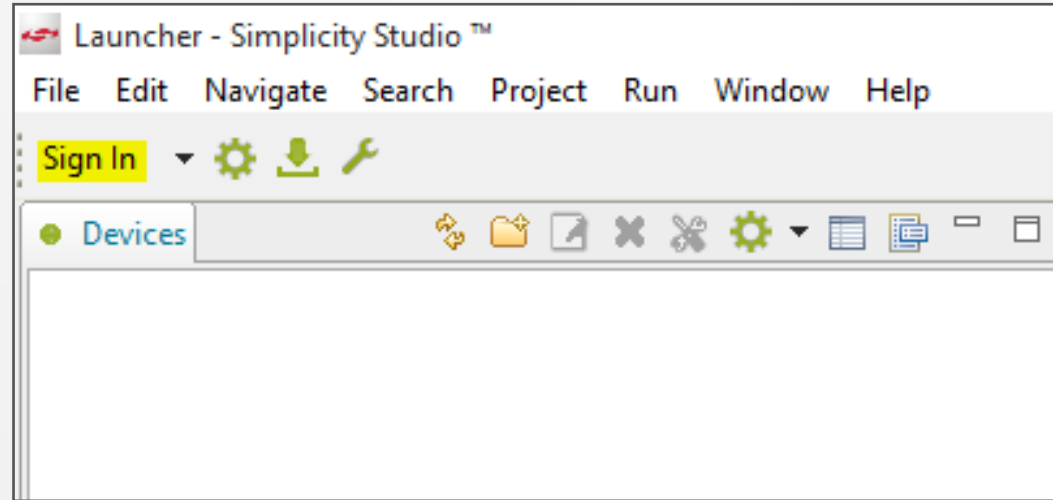
<https://www.silabs.com/support/training>

Backup Slide for the Live tips-n-tricks



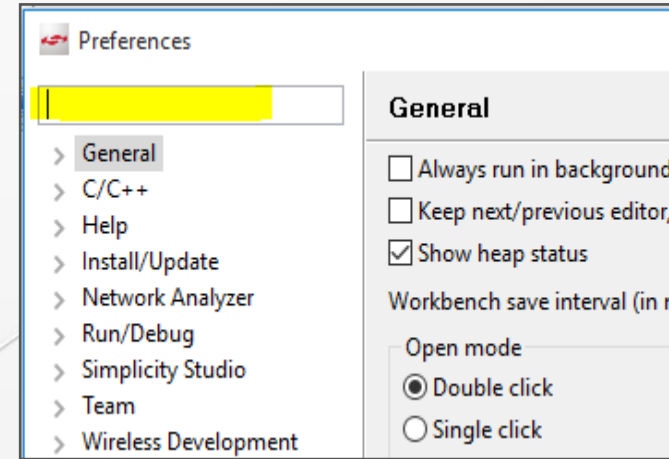
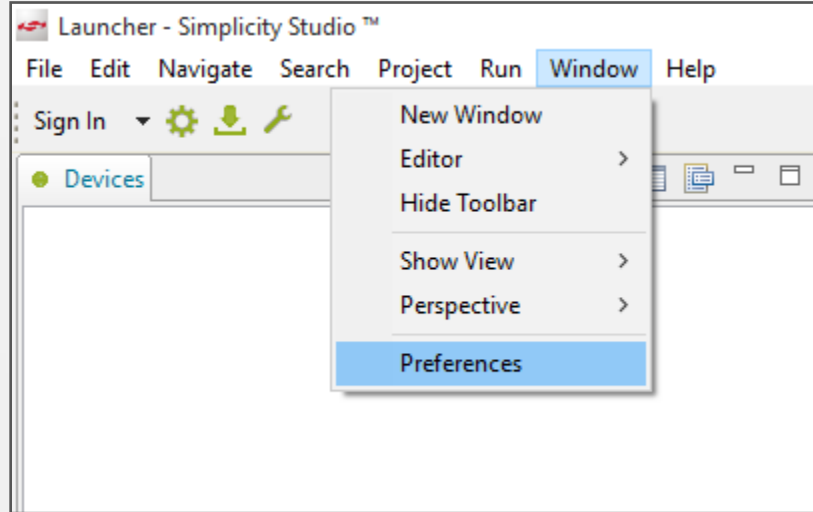
Always sign in to gain access to resources on the silabs.com web site:

Tip#1

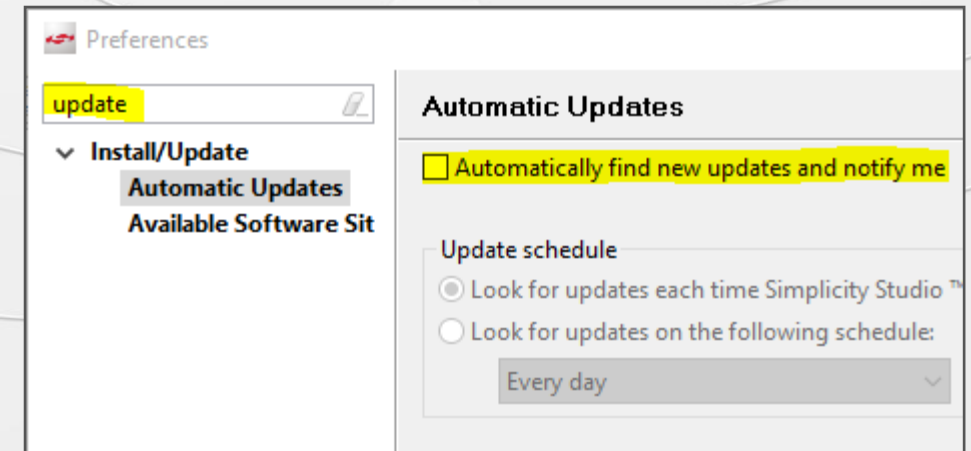


Optionally disable automatic updates as they can be a pain having occur every time Simplicity Studio opens:  
Or at least set to Update schedule to “once a week”.

Tip#2

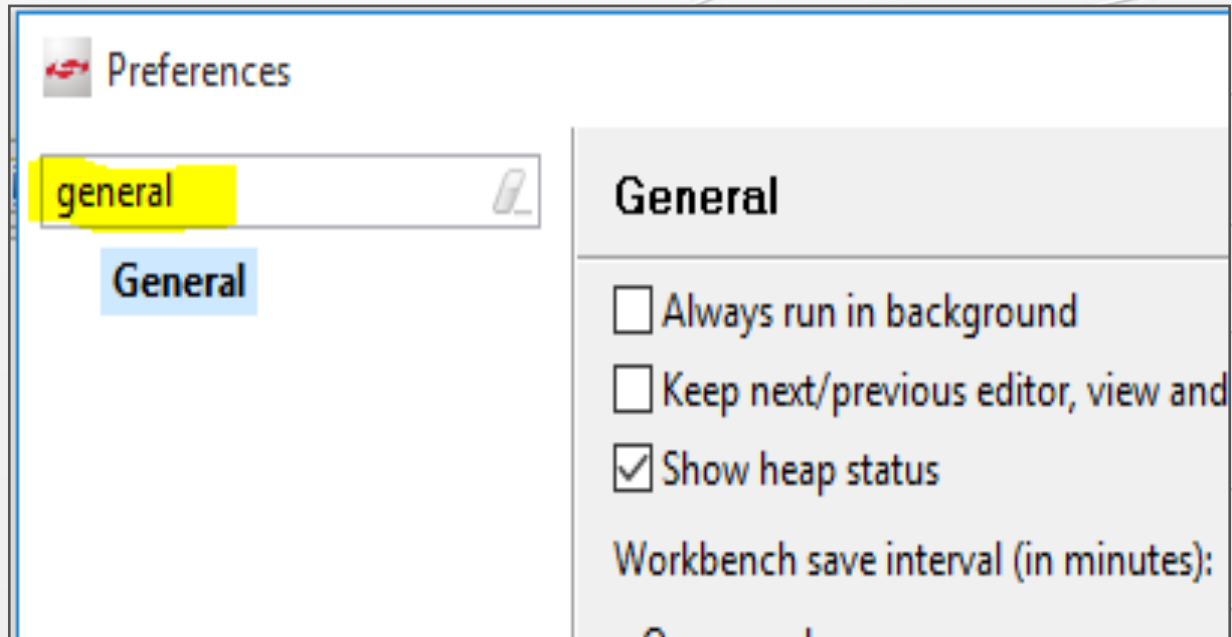


Type “update” in search bar and then uncheck  
“Automatically find new updates and notify me”:



Optionally enable viewing “heap status” in bottom Simplicity Studio bar.

Type “general” in the Preferences search bar and check “Show heap status”:



Tip#3

Optionally disable SDKs not being used to improve Simplicity Studio performance.

Type “sdk” in the Preferences search bar and uncheck SDKs not being used:

Tip#4

Preferences

sdk

▼ Simplicity Studio

SDKs

Check the SDKs available for project build configurations.

Checked entries are displayed when configuring projects.

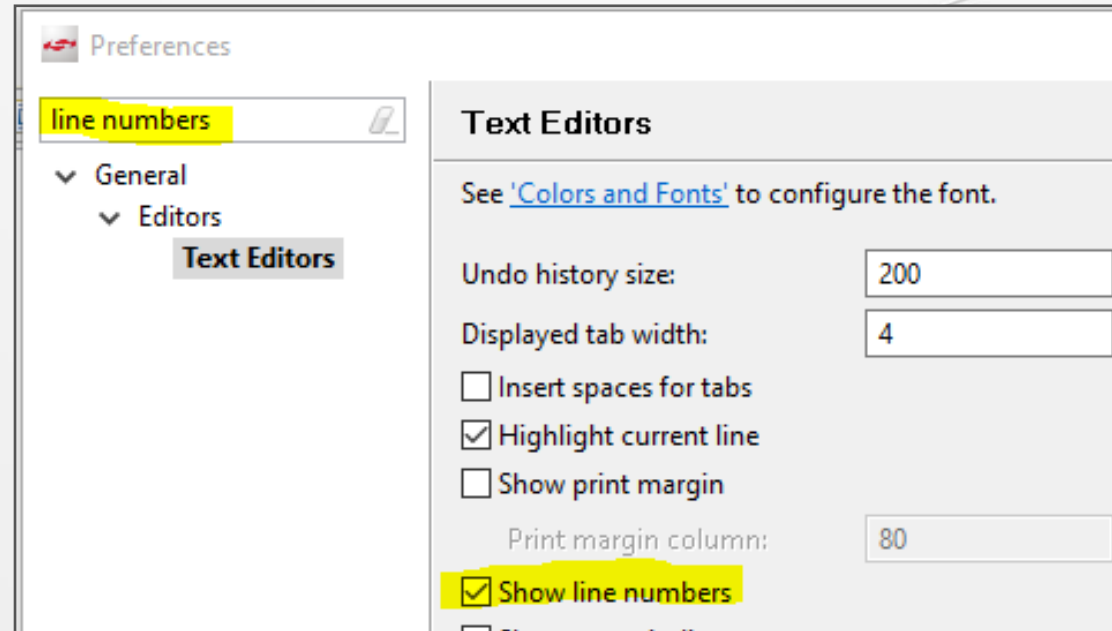
Name	Versi...	Location
<input type="checkbox"/> 8051 SDK	4.0.6	C:\SiliconLabs\SimplicityStudio\v4_2\devel...
<input type="checkbox"/> 8051 SDK	4.0.7	C:\SiliconLabs\SimplicityStudio\v4_2\devel...
<input type="checkbox"/> 8051 SDK	4.0.8	C:\SiliconLabs\SimplicityStudio\v4_2\devel...
<input type="checkbox"/> 8051 SDK	4.0.9	C:\SiliconLabs\SimplicityStudio\v4_2\devel...
> <input checked="" type="checkbox"/> 8051 SDK	4.1.0	C:\SiliconLabs\SimplicityStudio\v4_2\devel...
<input type="checkbox"/> Bluetooth Mesh: Bluetooth, Mesh 1.0.1.0	1.0.1	C:\SiliconLabs\SimplicityStudio\v4_2\devel...
> <input checked="" type="checkbox"/> Bluetooth Mesh: Bluetooth, Mesh 1.1.0.0	1.1.0	C:\SiliconLabs\SimplicityStudio\v4_2\devel...
> <input checked="" type="checkbox"/> Bluetooth SDK Lite	2.2.0	C:\SiliconLabs\SimplicityStudio\v4_2\devel...
> <input checked="" type="checkbox"/> EmberZNet	5.7.3	C:\SiliconLabs\SimplicityStudio\v4_2\devel...
> <input checked="" type="checkbox"/> Gecko SDK Suite: Bluetooth 2.4.2.0, EmberZNet 5.10.1.0,	1.1.1	C:\SiliconLabs\SimplicityStudio\v4_2\devel...
> <input checked="" type="checkbox"/> Gecko SDK Suite: Bluetooth 2.6.0.0, EmberZNet 6.0.0.0, F	2.0.0	C:\SiliconLabs\SimplicityStudio\v4_2\devel...
> <input checked="" type="checkbox"/> Stackless applications	1.0.0	(none)



Optionally enable “Show line numbers” in source code. Note this is the default but if needing re-enabling do following.

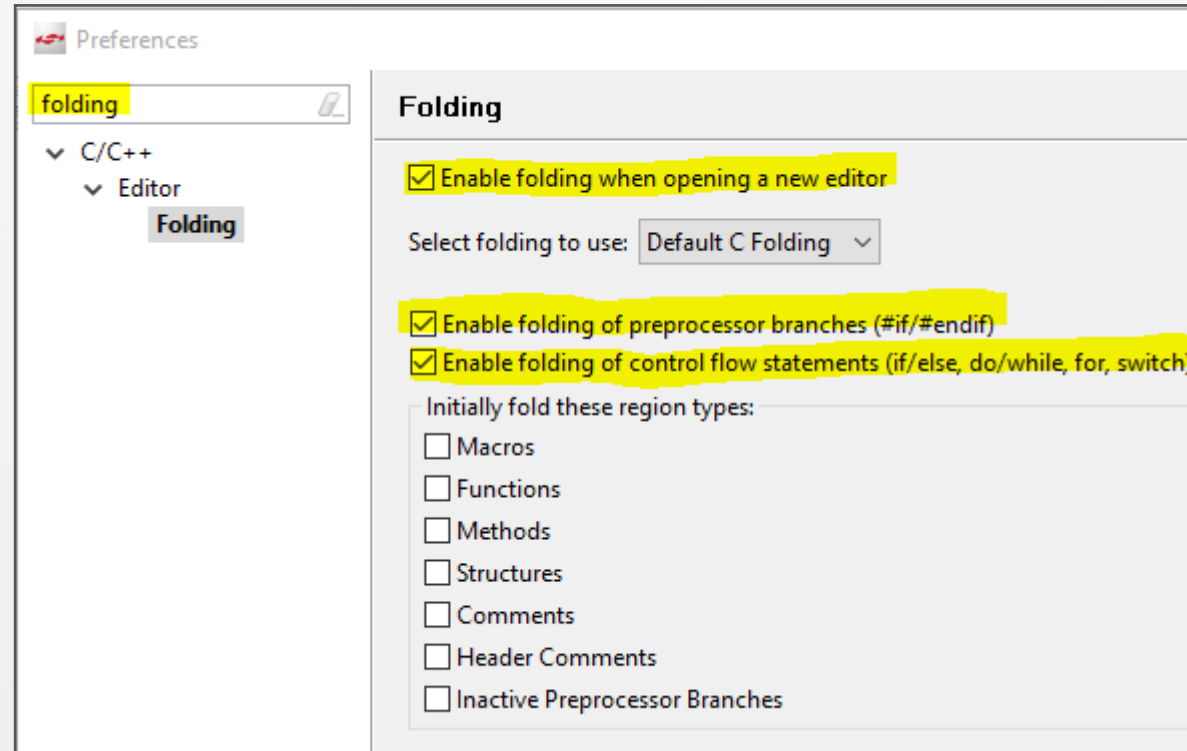
Type “line numbers” in the Preferences search bar and check the “Show line numbers”:

Tip#5



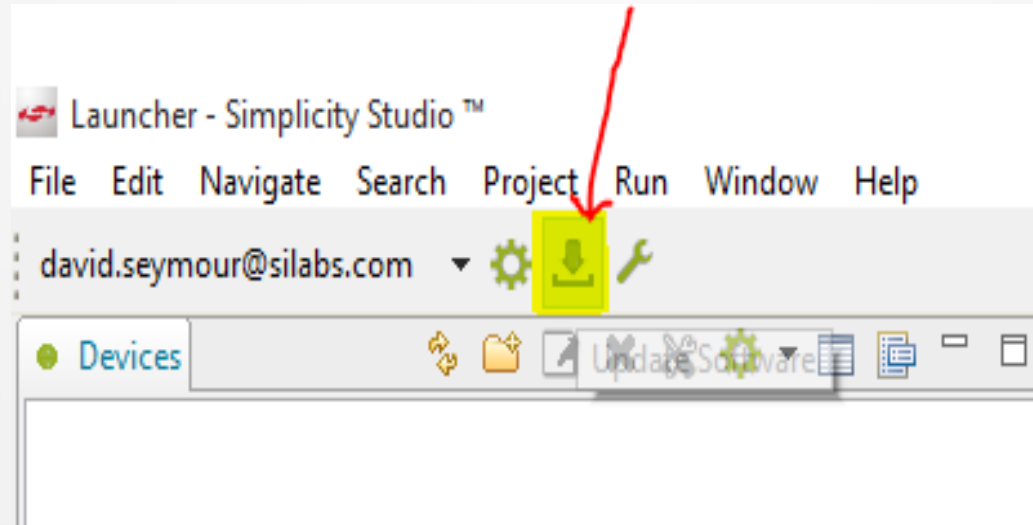
Optionally enable folding of #if/#ifdef's and if/else, do/while, for, switch statements in source code. Type "folding" in the Preferences search bar and check the three "Enable folding ... ": It can speed up the reading of large source files.

## Tip#6



NOTE: Either click the "Apply" button after each step above or on final edit of Preferences before clicking "OK" button to close window.

To manually check for updates click the “Update Software” icon/button as shown below:



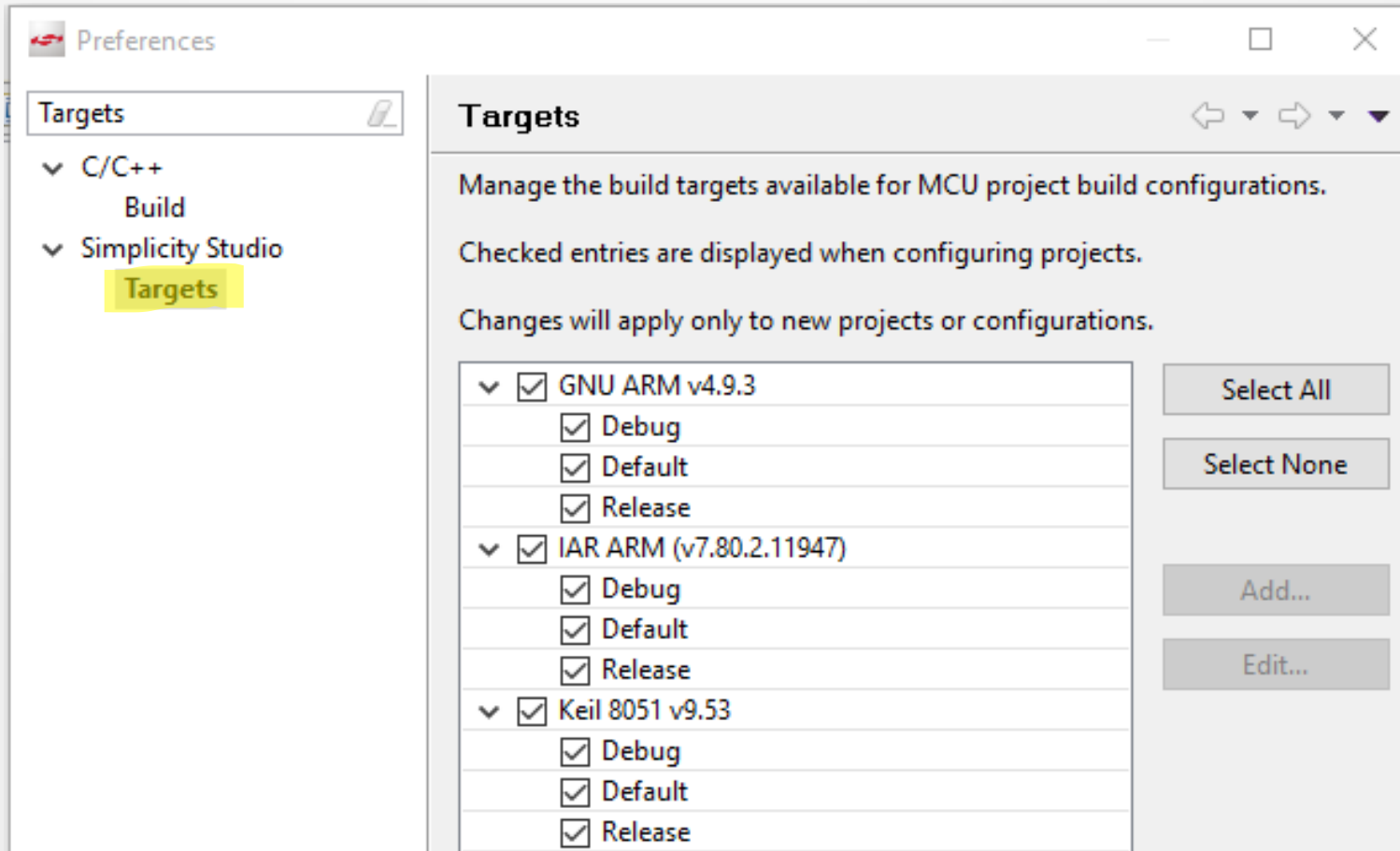
Tip#7

Optionally disable “Targets” not used.

If certain build tools will not be used, disable them.

Type “Targets” in the Preferences search bar and uncheck any tool chains you will not use:

Tip#8

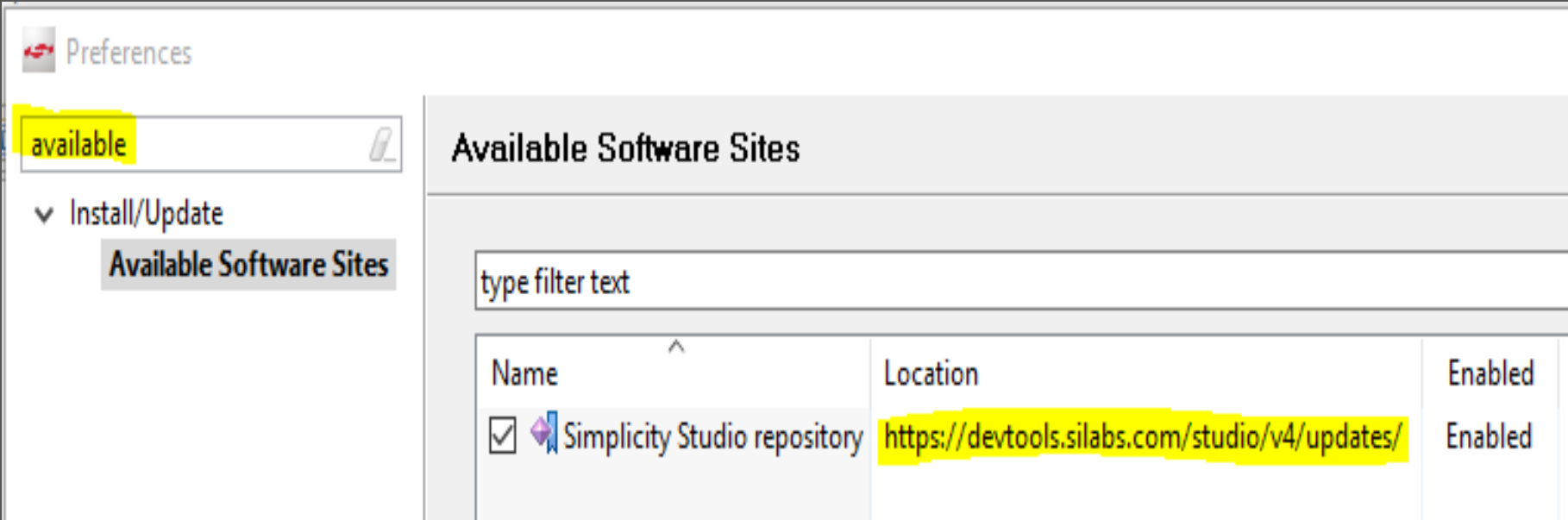


If updates do not work it could be your IT department not allowing access to Silabs update site.

Workarounds:

1. Get IT department to allow URL
2. Use a network that allows access to update URL (ex: home network)

Tip#9



Preferences


available

Install/Update

Available Software Sites

Available Software Sites

type filter text

Name	Location	Enabled
<input checked="" type="checkbox"/>  Simplicity Studio repository	<a href="https://devtools.silabs.com/studio/v4/updates/">https://devtools.silabs.com/studio/v4/updates/</a>	Enabled

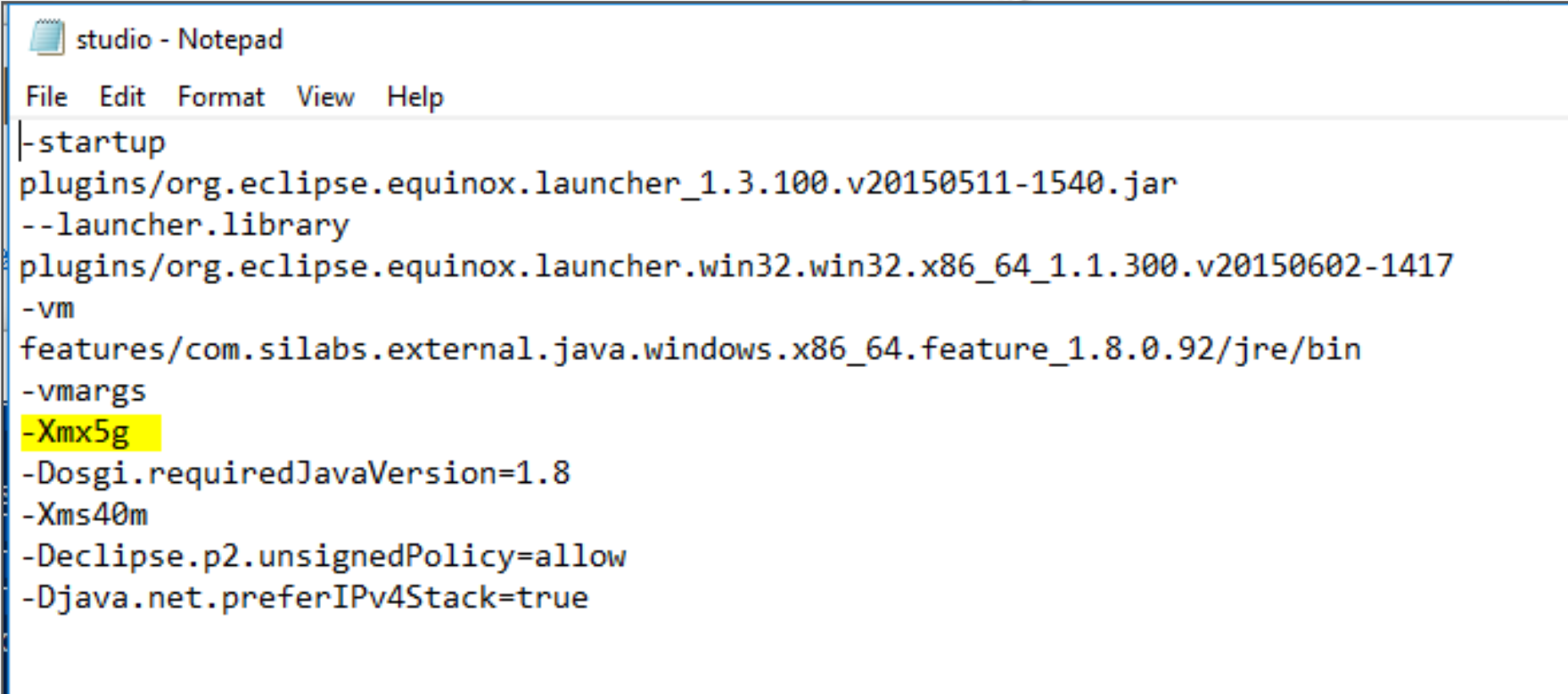
Optionally increase the heap used by Simplicity Studio to increase performance.  
Must close Simplicity Studio.

Use text editor to open following file within the Simplicity Studio root path

Ex: C:\SiliconLabs\SimplicityStudio\v4\studio.ini

The “-Xmx960m” was changed to increase the heap from 960MB to 5GBytes! Choose larger or smaller depending on your system resources:

## Tip#10



```
studio - Notepad
File Edit Format View Help
|-startup
plugins/org.eclipse.equinox.launcher_1.3.100.v20150511-1540.jar
--launcher.library
plugins/org.eclipse.equinox.launcher.win32.win32.x86_64_1.1.300.v20150602-1417
-vm
features/com.silabs.external.java.windows.x86_64.feature_1.8.0.92/jre/bin
-vmargs
-Xmx5g
-Dosgi.requiredJavaVersion=1.8
-Xms40m
-Declipse.p2.unsignedPolicy=allow
-Djava.net.preferIPv4Stack=true
```

Save the file after edits. Once Simplicity Studio re-opens the new heap size will be used.



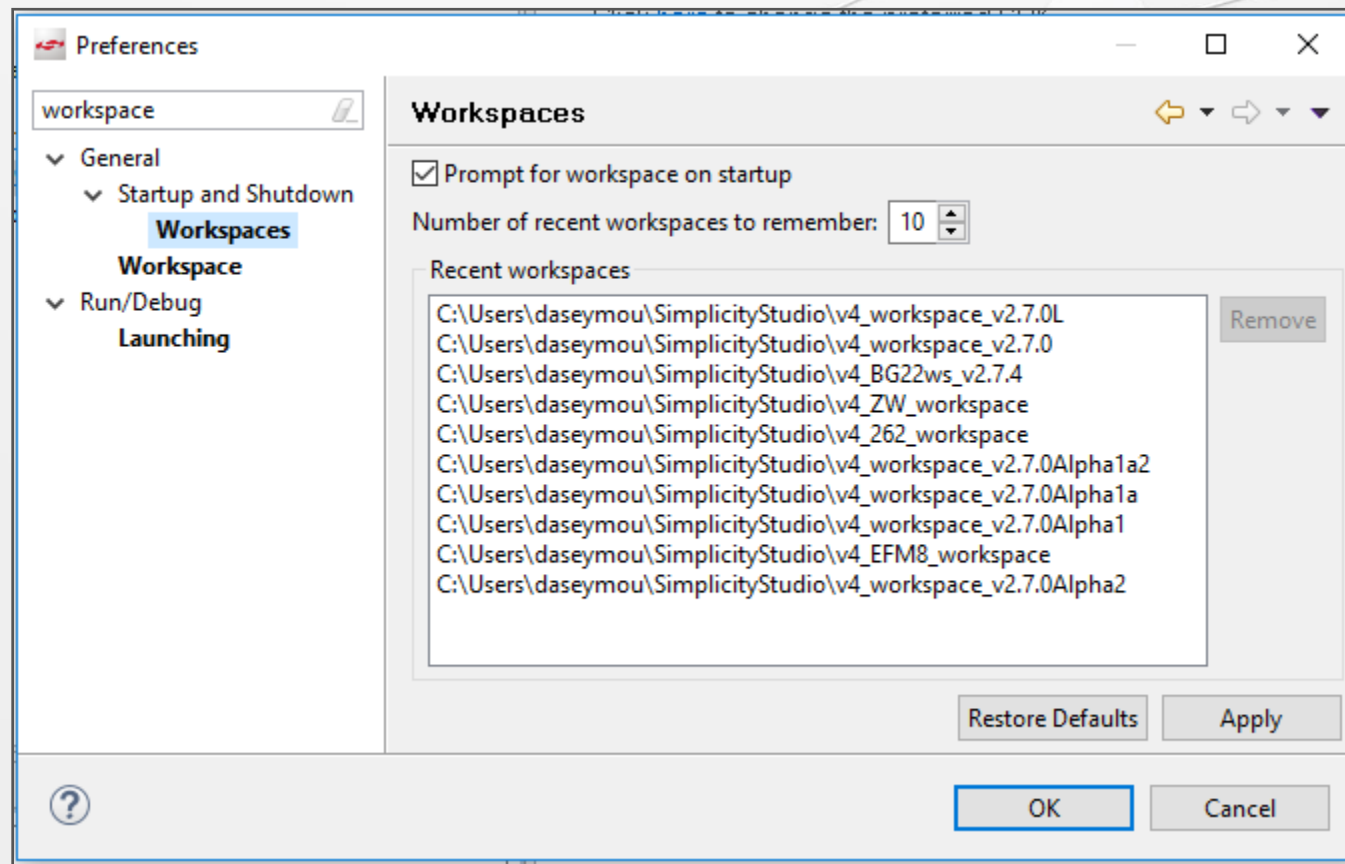
Overloading a workspace with projects and different versions of SDK can slow down Simplicity Studio operations.

Keep workspaces for specific project and/or SDK versions helps keep the size of workspace smaller to allow zippiest Simplicity Studio operations.

So instead of having a bunch of SDKs enabled in one workspace, use multiple workspaces with just one Gecko SDK version and one or two toolchain (so one IAR and one GCC) versions enabled in the preferences (reference Tip#8).

This is also necessary if different versions of the IAR compiler need to be used.

## Tip#11



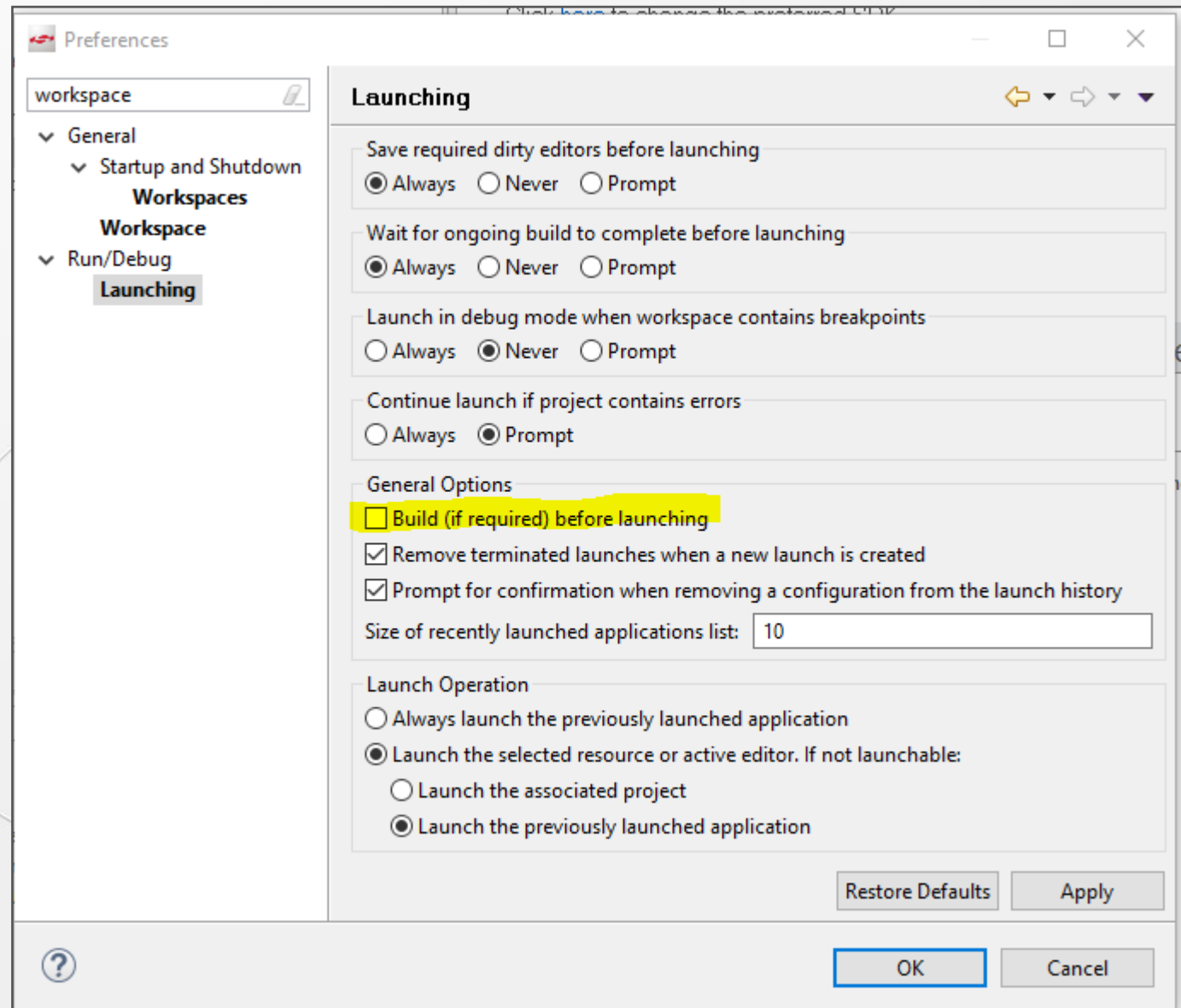
## Tip#12

Change the debugger auto-build option to disabled.

[Preferences] > [Run/Debug] > [Launching] and uncheck “Build (if required) before launching.”

This speeds up debug session startup.

I know some people rely on the auto-build, so they make edits and just click debug, but they could adjust their development flow (or ignore the recommendation).

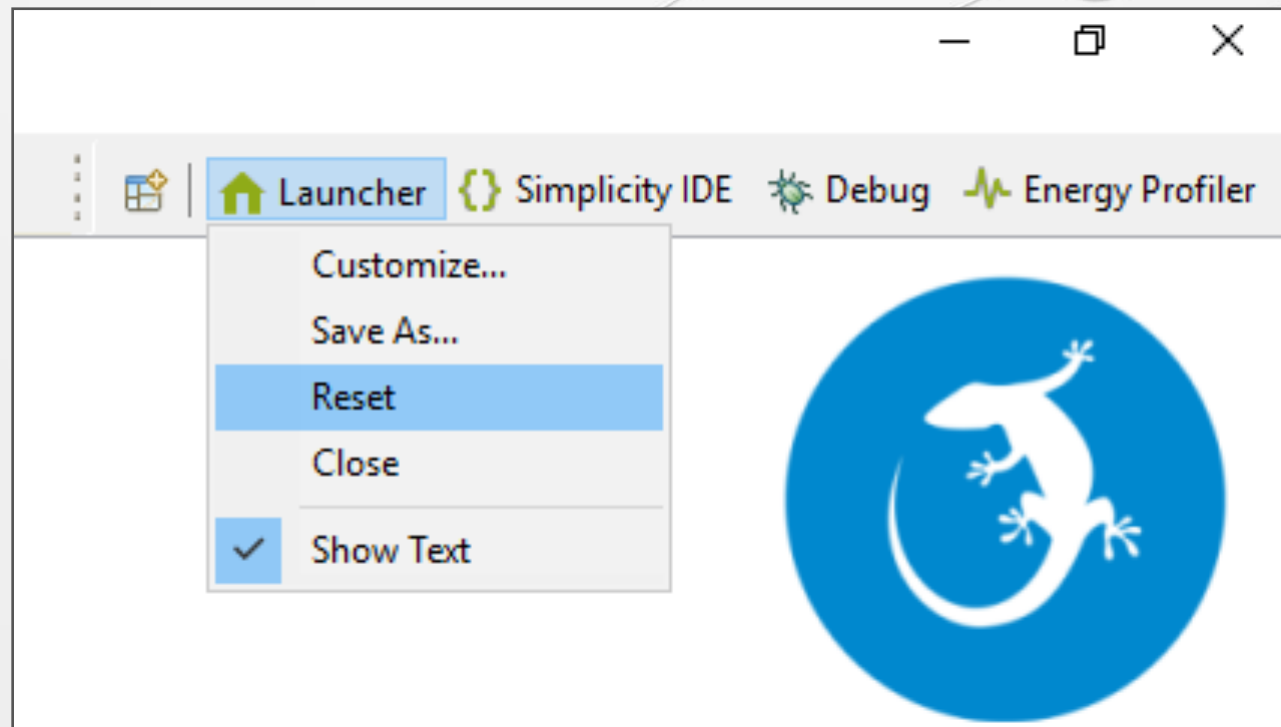


I just messed up my Perspective view and cannot find the missing window. How to I recover from this?

Simply right click on the active Perspective and click “reset”.  
Life will be much better now 😊

Ex: “Launcher” is the active Perspective with the blue background. Right click on it and select “Reset” to reset the perspective view.

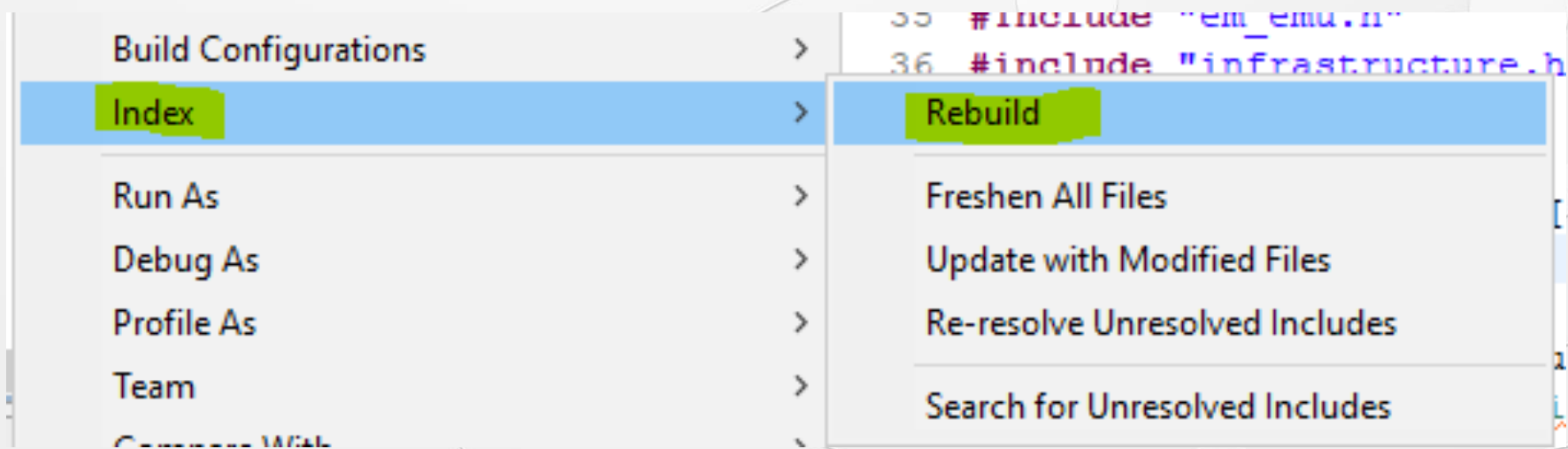
## Bonus Tip#13



If finding the Indexer is taking a long time to run,  
then

- make sure to close other projects and
- possibly do an Right click the project and select Index -> Rebuild

## Bonus Tip#14



# Useful Links

- <https://www.silabs.com/products> Silicon Labs Offerings
- <https://www.silabs.com/support/getting-started> Simple Step-by-Step How-To's
- <https://www.silabs.com/support/training> Training Resources
- <https://www.silabs.com/whitepapers> Comfort and Educational Reading
- <https://www.silabs.com/community> Community Support and more
- <https://docs.silabs.com/> Software Developer Docs
- <https://www.silabs.com/support/resources> Document search and filtering options too
- <https://www.silabs.com/products/development-tools> Development and Evaluation Kits
- <https://www.silabs.com/community/software/simplicity-studio> Do we have to explain it ;-)

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Thank You!

Q & A

