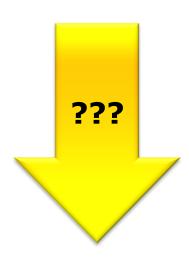# Build and Debug

"Compile, link, debug – then repeat..."

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Learning Goals

- Problem: Need Tools

- Lab Kit & Tools
- Eclipse
- Boards
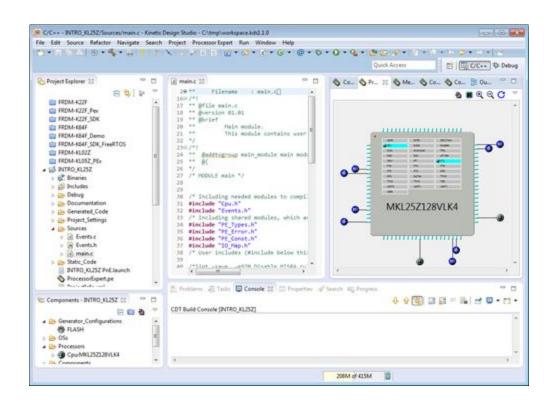- Creating/Build the first project
- Download/Debug

???

Default Lab Kits & Tools

- Kinetis Design Studio
    - Processor Expert
- GIT VCS (GitHub)
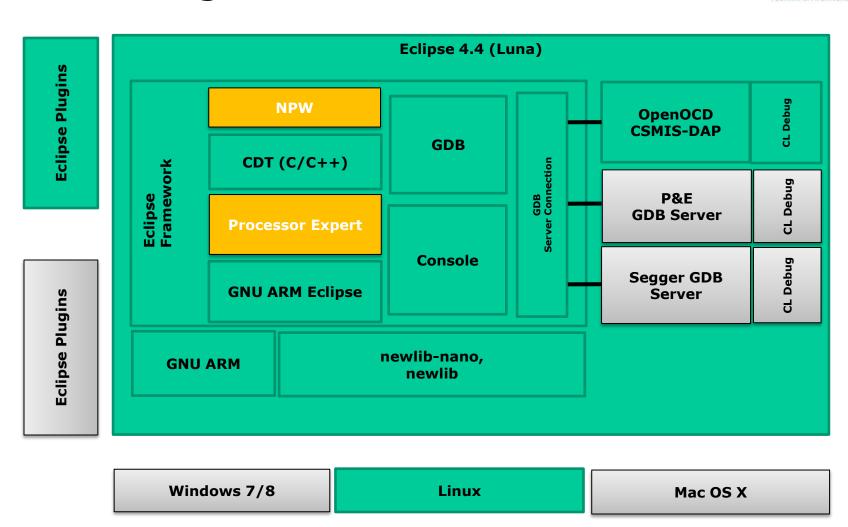- FRDM Board
- Robot Board

Lab Philosophy

- You need to maintain your project!
- Multiple projects: FRDM & Robo
  - FRDM: K25Z128 (ARM Cortex-M0+)
  - Robo: K22FX512 (ARM Cortex-M4F)

- Processor Expert Components
  - Low level functionality
  - Common Utilities

- Your own project
  - Start with new/empty project
  - Add your sources
  - Add/copy/enable instructor files and components

Kinetis Design Studio

Eclipse Plugins

Eclipse 4.4 (Luna)

Eclipse Framework

NPW

CDT (C/C++)

Processor Expert

GNU ARM Eclipse

GDB

Console

GDB Server Connection

OpenOCD CSMIS-DAP

CL Debug

P&E GDB Server

CL Debug

Segger GDB Server

CL Debug

Eclipse Plugins

GNU ARM

newlib-nano, newlib

Windows 7/8

Linux

Mac OS X

Proprietary | Open Source | Freescale
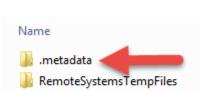
Eclipse Workspace

- Where Eclipse stores the 'meta data'
    - 'global' options across projects
    - NEVER move/share meta data (is like registry)
- Never share a wsp with other Eclipse versions/products
    - Use separate workspaces
- Wsp *could* contain project folders, but
    - Recommendation: keep wsp and projects separate
    - Easier for VCS

Name

📁 .metadata
📁 RemoteSystemsTempFiles

**C:\user\dev\wsp_kds
   .metadata**

**C:\user\projects
   Project1
   Project2
   ...**
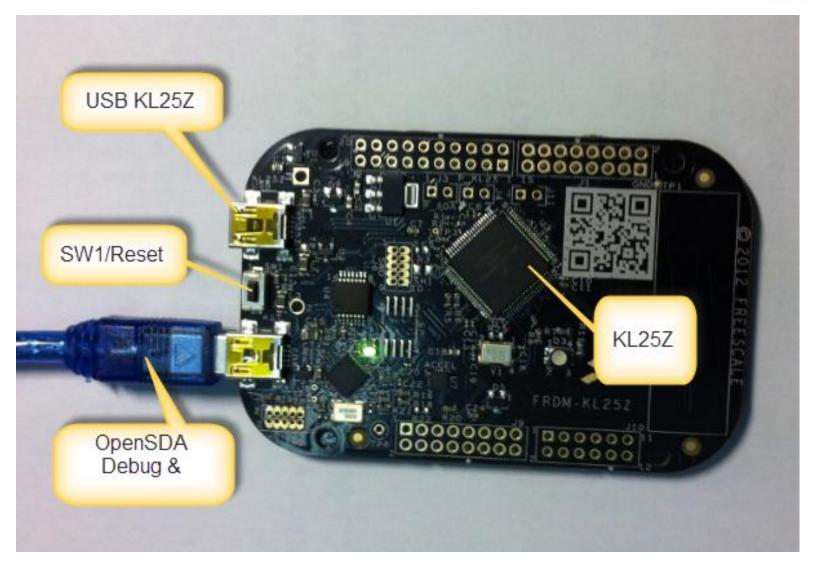
FRDM: Power and Debug Connections
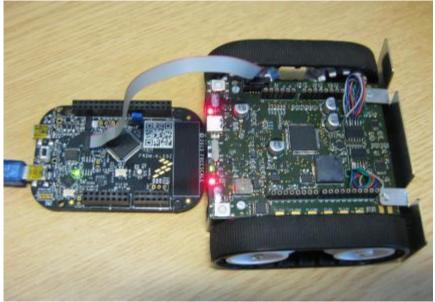
USB KL25Z

SW1/Reset

OpenSDA
Debug &

KL25Z

Robo: Power Debug Connection

- Board Power: USB/Batteries
- Motor Power: Batteries
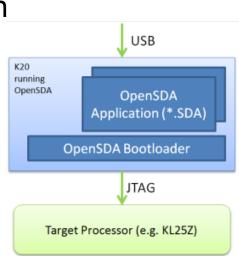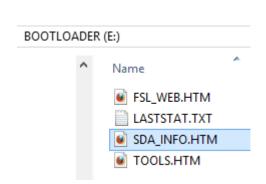- Debug with P&E Multilink or with FRDM board

OpenSDA and Debug

- http://mcuoneclipse.com/2012/09/20/opensda-on-the-freedom-kl25z-board/
- Default is SDA **MSD Bootloader** Application
  - MSD-FRDM-KL25Z_Pemicro_*.SDA
  - Enumerates as ,memory stick'
  - Accepts S19 file for loading
- **Debugging**: run debug SDA Application
  - DEBUG-APP_Pemicro_*.SDA
- Firmware V1.14
  - On distributed software/stick: OpenSDA
  - http://mcuoneclipse.com/2013/12/14/new-pe-opensda-firmware-v114/

USB

K20
running
OpenSDA

OpenSDA
Application (*.SDA)

OpenSDA Bootloader

JTAG

Target Processor (e.g. KL25Z)

OpenSDA and Debug

- Win 8.x: Problem with original bootloader
- To enter MicroBoot, power board with SW1 pressed
    - Enumerates as Bootloader device
    - SDA_INFO.HTM shows board details

BOOTLOADER (E:)

Name
FSL_WEB.HTM
LASTSTAT.TXT
SDA_INFO.HTM
TOOLS.HTM

Your Hardware Information

Board Name is: FRDM-KL25Z
MicroBoot Kernel Version is: 1.01
Bootloader Version is: 1.01
Installed Application: PEMicro Debug App
Application Version is: 1.02
DUID is: 74823937-473181B7-3783F805-B66DE678
EUID is: 6AE3D036-A84B8755-1884DA22-947668D6
TUID is: 74823938-4732819C-3726E804-A46CDC77
TOA is: 86B6E505-53EC6972-637FDE17-F8068DDA
TOA2 is: 86B6E505-BFED3DE6-16D2E1CF-A6E26061
SUID is: 86B6E505-6C47961D-37239804-8003EC65

- To change SDA Application
    - Plug in board with SW1 pressed
    - Green LED blinks
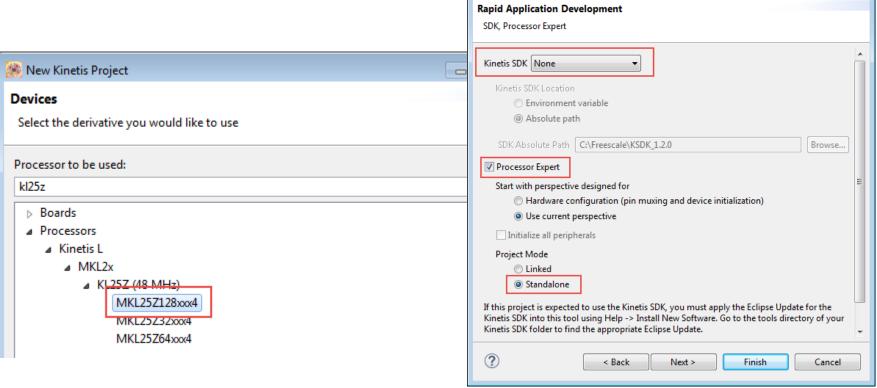   - Copy *.SDA application to device

Creating the Project(s)

- Menu *File > New > Kinetis Project*
- Provide Project Name
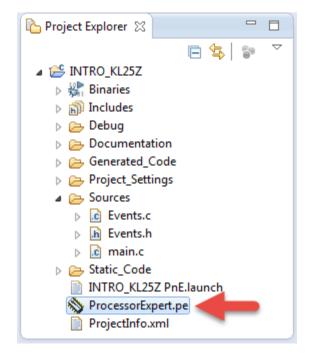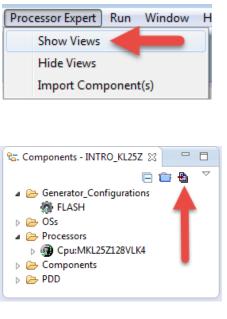- Device: Kinetis L, MKL2x, KL25Z ➜ MKL25Z128xxx4
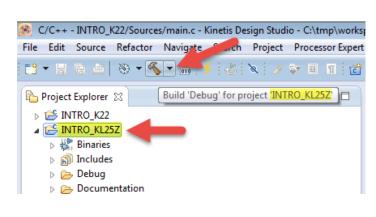- No SDK, Processor Expert

Generating and Building

- ProcessorExpert.pe XML file
- *Processor Expert > Show Views*
- ‚Generate code' button
- Generated_Code folder contains generated code ☺
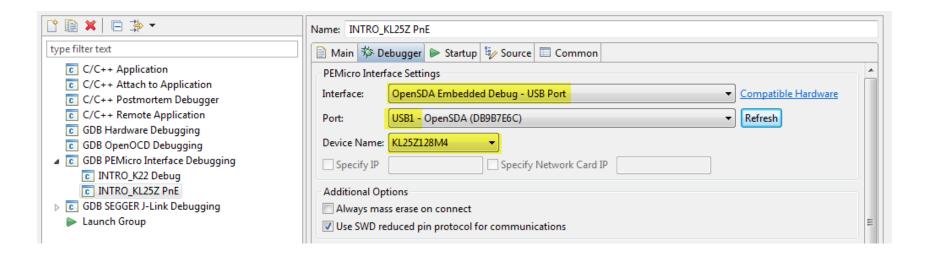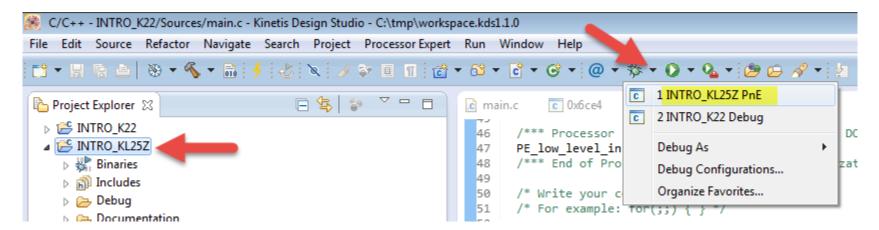- Select project and build

Debugging

- Creating Debug Configuration
  - Select project
  - Run > Debug Configurations
  - Double click GDB PEMicro Interface Debugging (only to create new Launch Configuration)
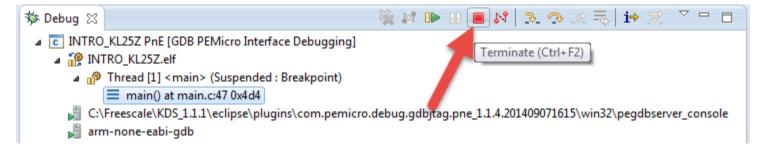 - OpenSDA, Port and Device (KL25Z128M4)

GDB Debugging

- Select Project, then use drop down entry
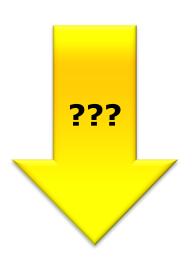   - Or: go to debug configurations, then Debug

- Always terminate debug session before starting new one

Summary

- *Problem: Need Tools*

- Eclipse
    - Build
    - Debug
- Hardware Kits
    - Robo
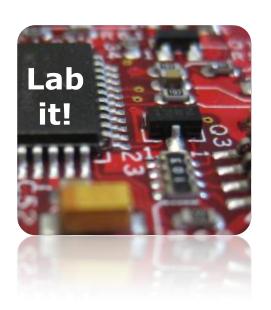   - FRDM
- General System Setup

???

Lab 4: First Projects (30")

- Installation of Kinetis Design Studio

- Wizard Processor Expert project
  - FRDM: KL25Z128
  - Robo: K22FX512

- Build, download, debug
  - FRDM with OpenSDA
  - Robo with P&E Multilink

- Customize
  - Share debug configuration
  - Parallel Build

Lab it!

Lab #4