DAVE™ v4 – Quick Start 1

Simple LED Blinky via a generated PWM Signal

February, 2015

Learning Outcome

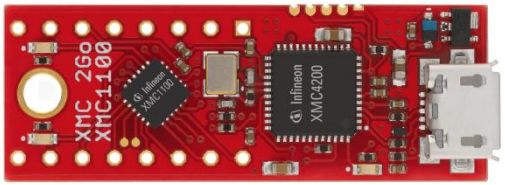
- Learn the basic principles of DAVE™ version 4:
  - Installation
  - Required XMC kit
  - Create DAVE™ Project
  - GUI based DAVE™ APPs configuration
  - Graphical pin mapping
  - One touch code generation
  - Download and debug code
  - DAVE™ updates
  - Expert support

DAVE™ installation and update

- Easy installation

1. Go to www.infineon.com/DAVE and download DAVE™ version 4
2. The downloaded zip file contains all required installation instructions, please follow the instructions described in section 1
3. Then follow the update instructions described in section 2
4. After installation, DAVE™ v4 can be started from the desktop

Required XMC kit

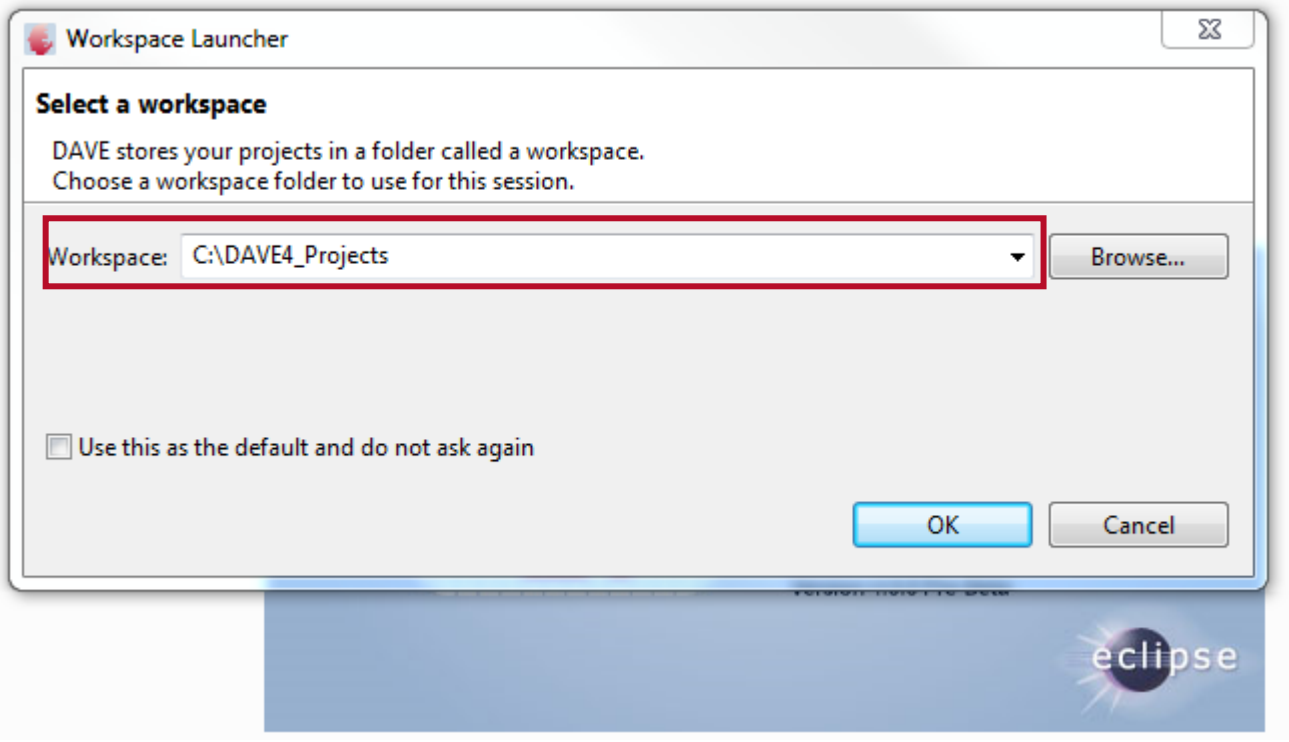


- In this tutorial we use the XMC 2Go kit equipped with an XMC1100-Q024F0064 and a Segger J-Link on-board debugger (OBD)

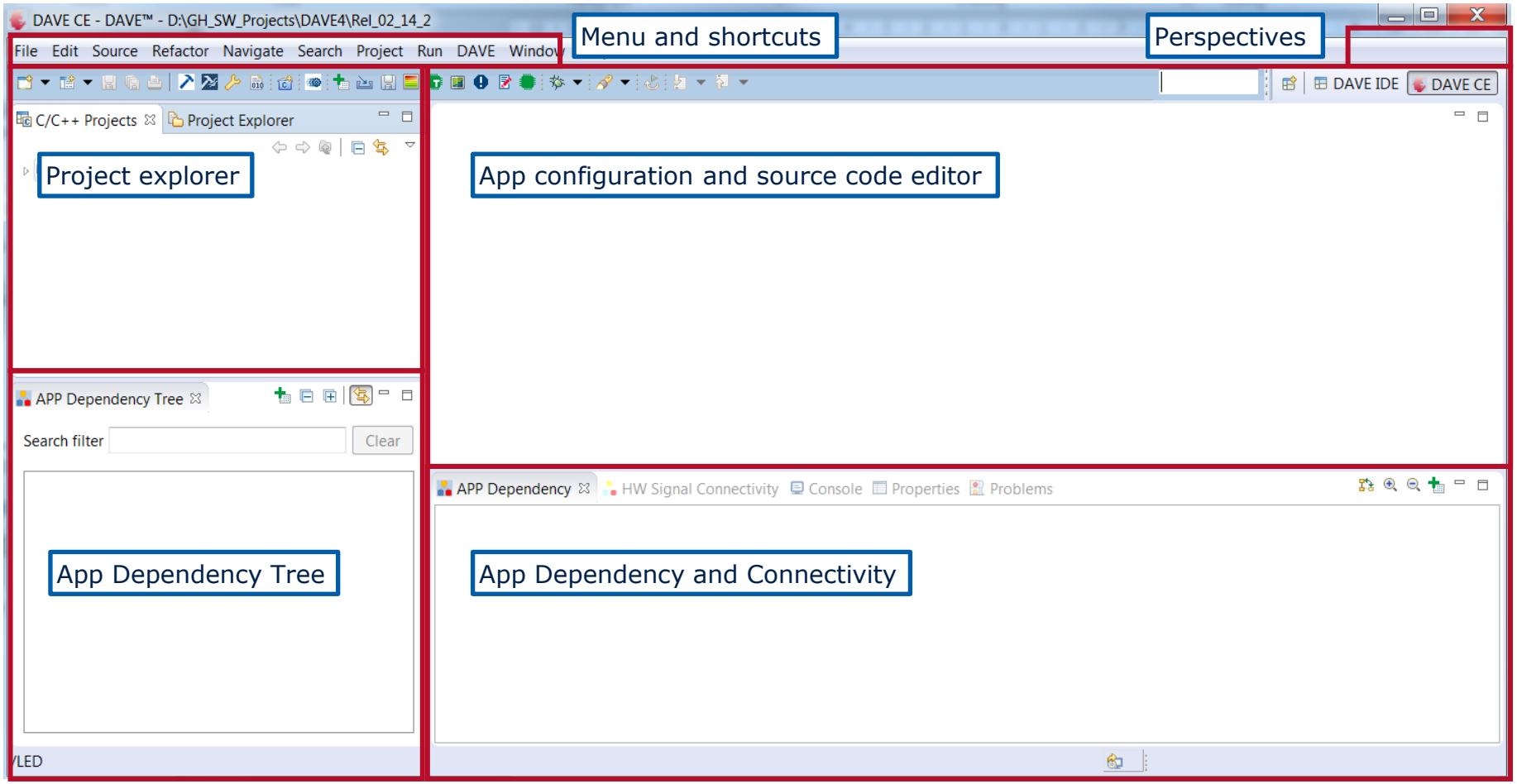
- Also any other XMC1000 or XMC4000 kit can be used. In this case the manual pin assignment described on page 17 and 18 needs to adjusted and the pin that is connected to an LED of the respective board has to be assigned

Starting DAVE™ for the first time

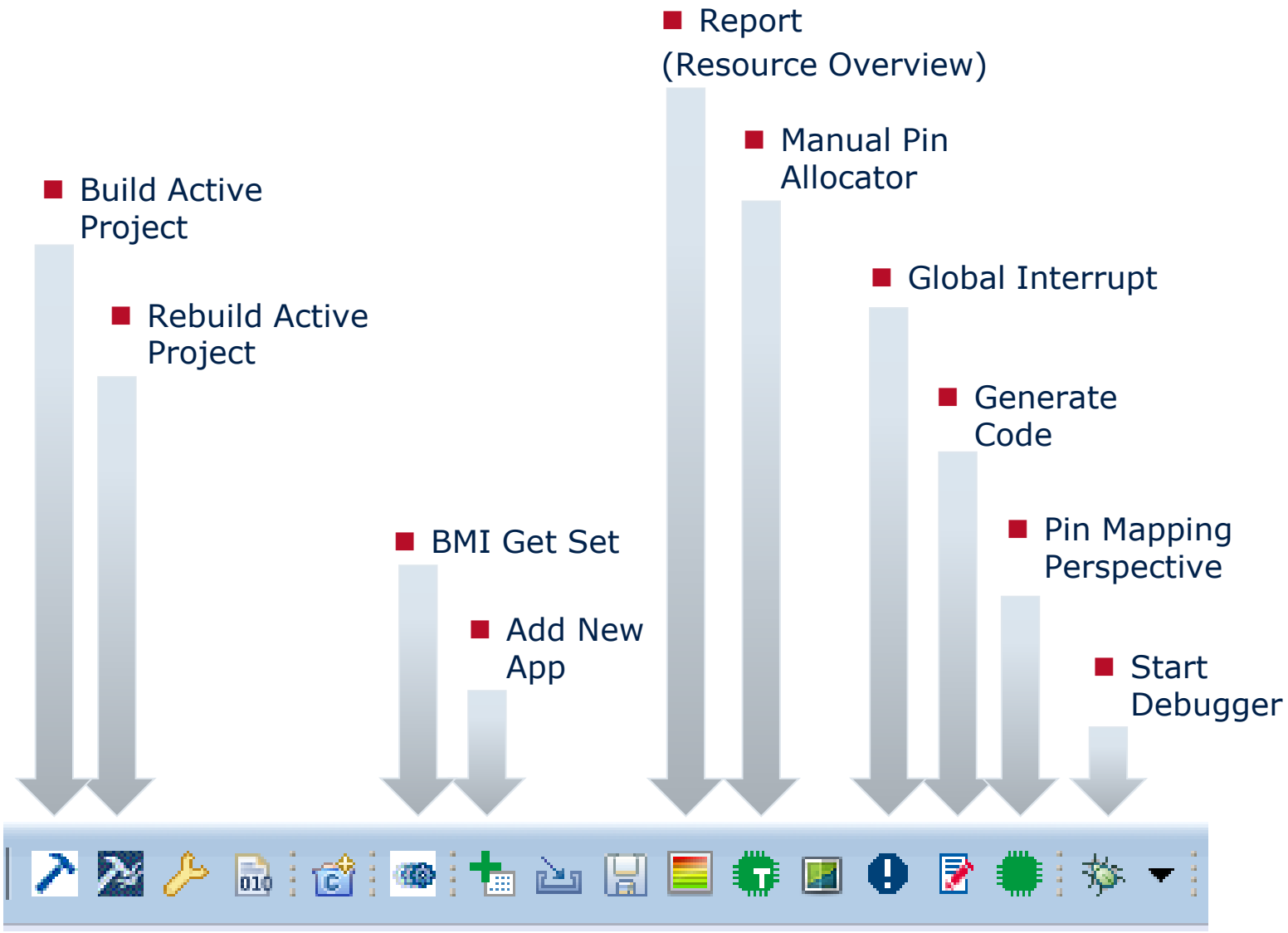
- Start DAVE
- Enter path to workspace folder
  - Please chose a new workspace folder, not an existing workspace folder form an earlier DAVE™ version



DAVE™ CE Workspace



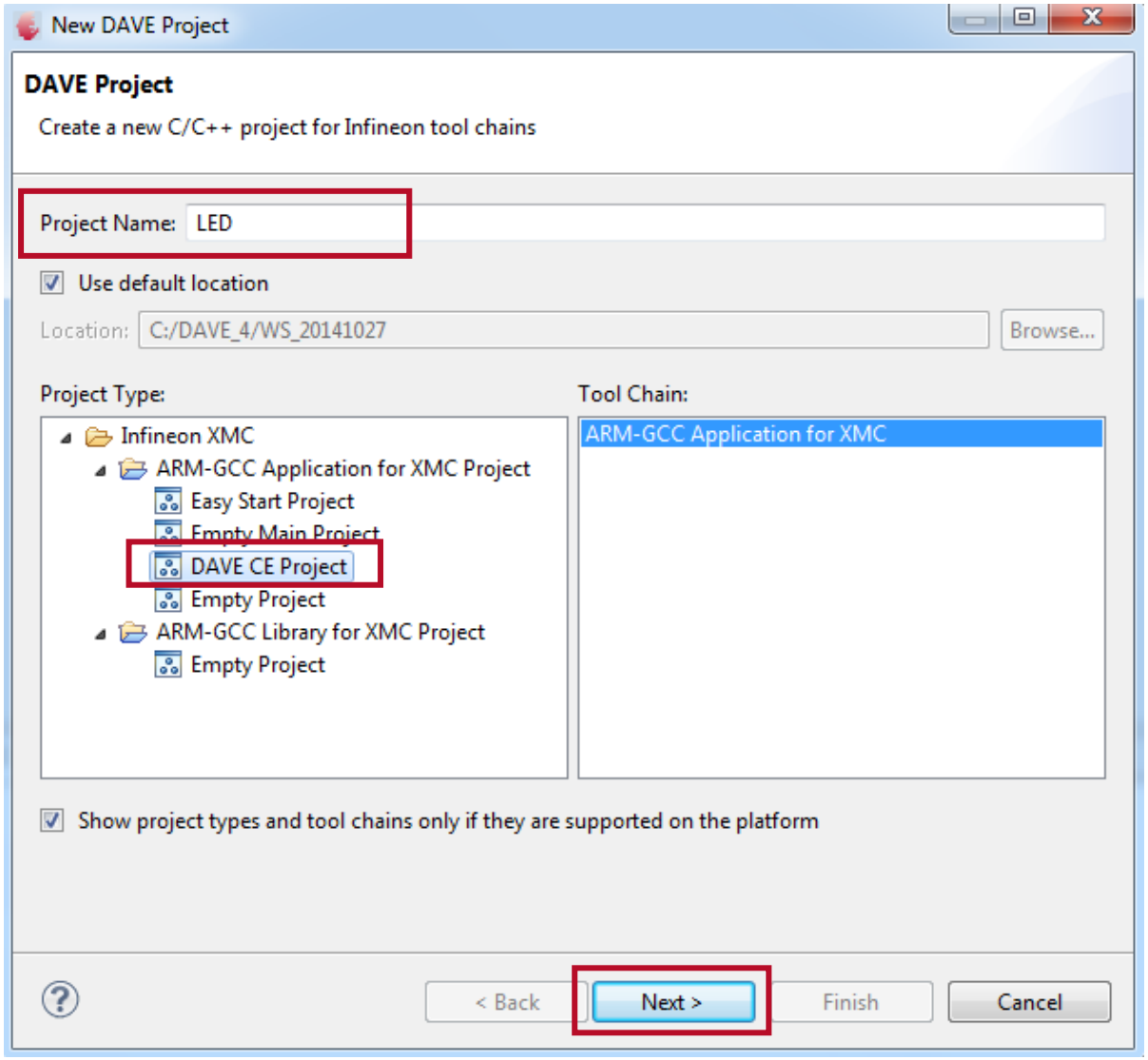
Tool Panel



Create a new DAVE™ CE Project (1/2)

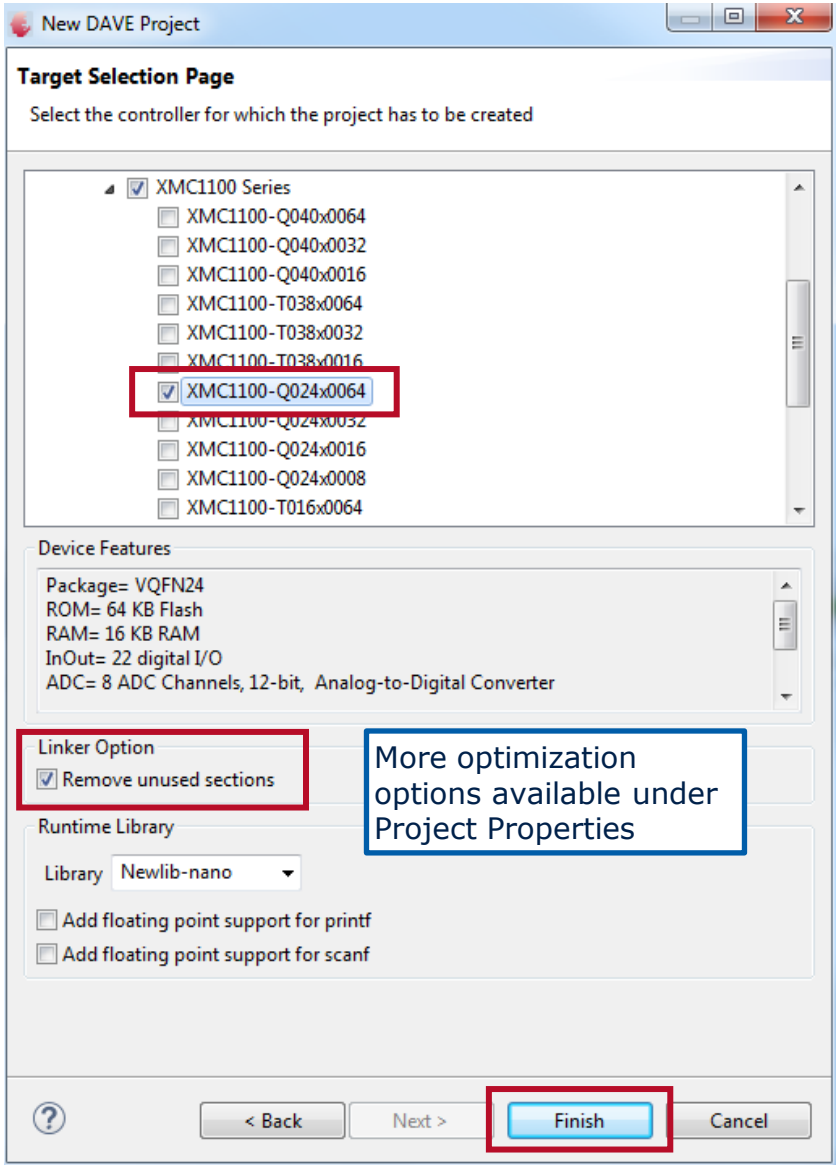
- Create DAVE™ Code Engine (CE) Project
  1. Go to File → New → DAVE Project
  2. Select DAVE CE Project
  3. Click Next

Note, a DAVE CE project is required to use DAVE APPs.

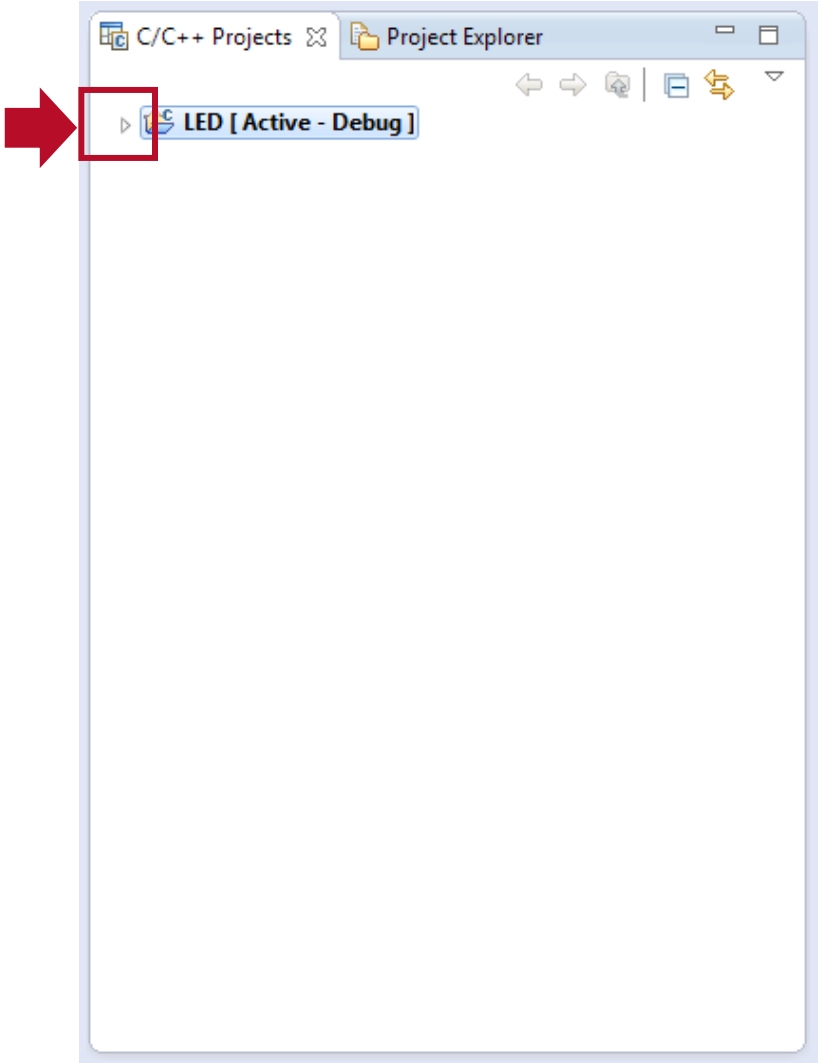


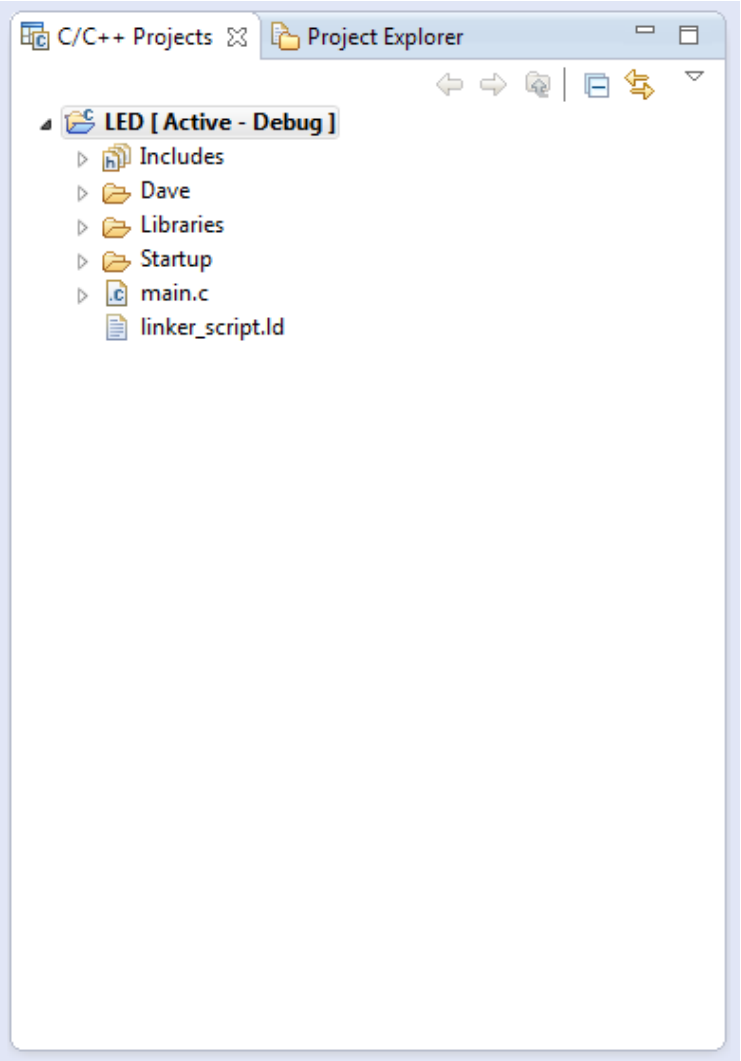
Create a new DAVE™ CE Project (2/2)

- Select the appropriate microcontroller
- For XMC 2Go kit used in this tutorial
  - XMC1100-Q024F0064
- For a different XMC kit please select the XMC microcontroller that is populated on your board

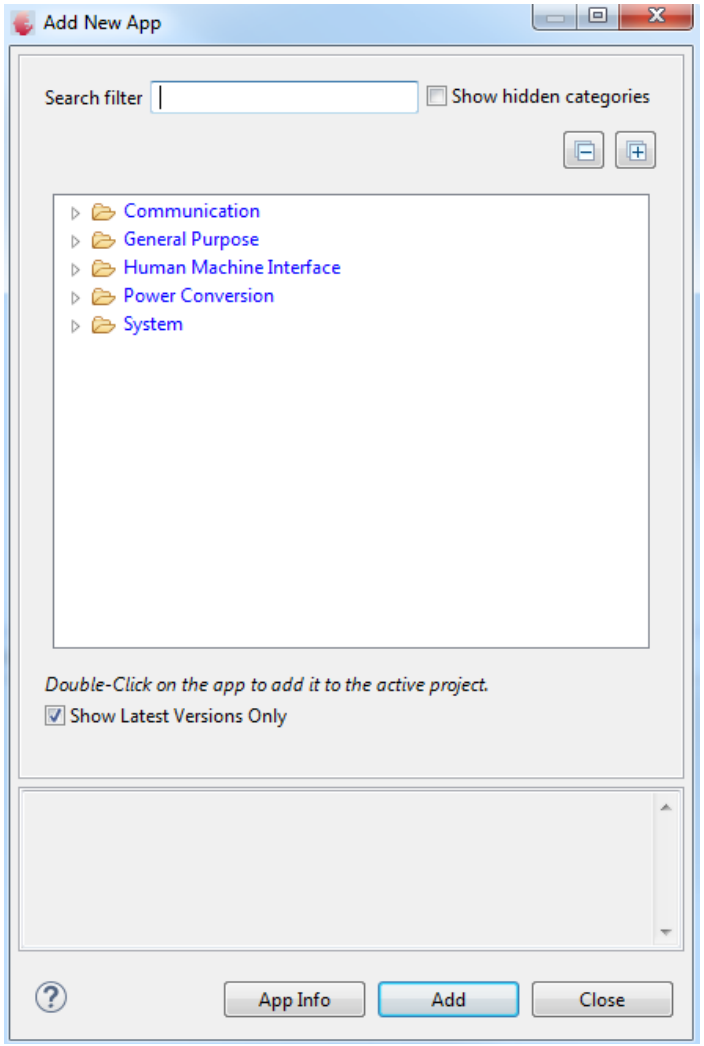


Project View

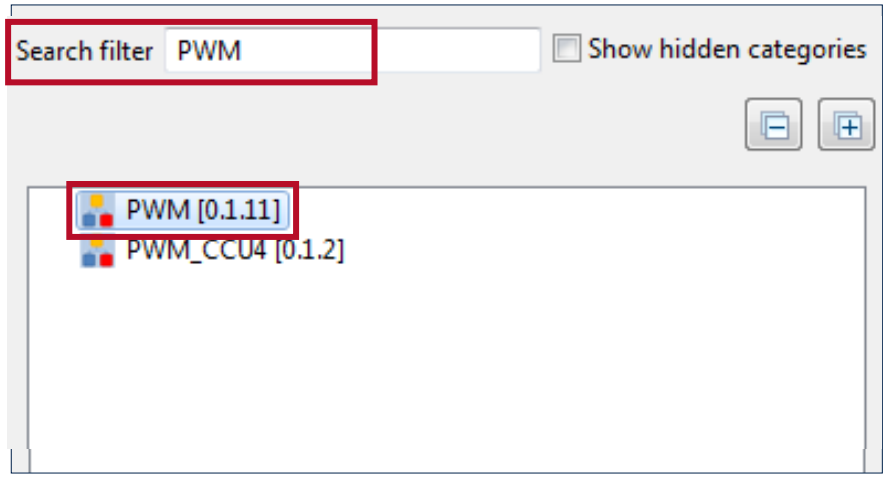




Add DAVE™ APP from the local library store

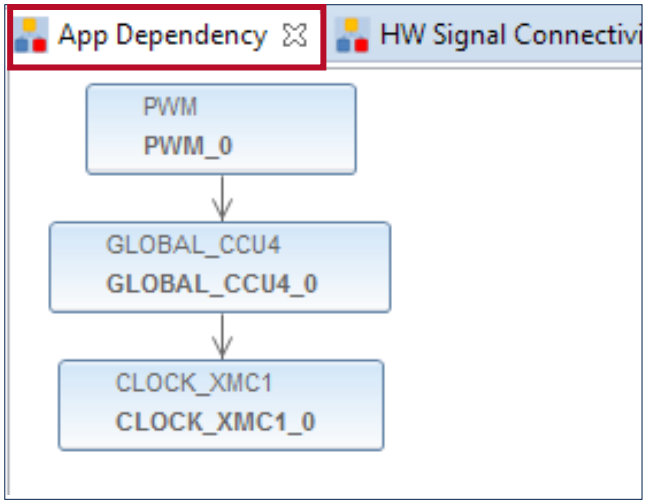


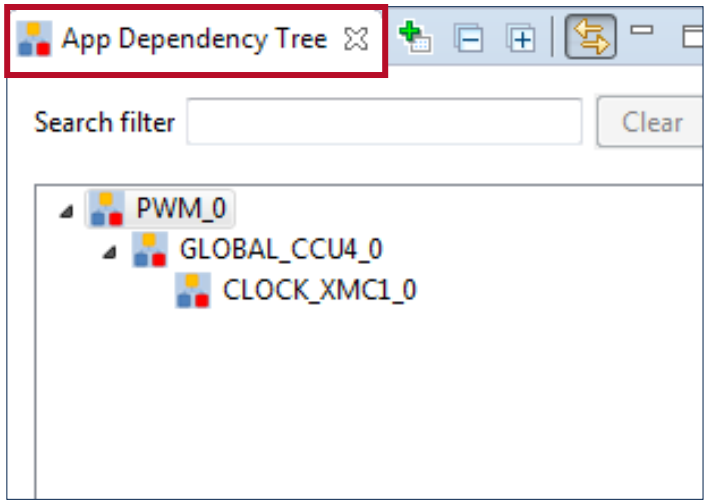
- Add DAVE™ APP to project
  1. Click  in Tool Panel, or
  2. DAVE → APP New APP
  3. Type "PWM" in the search filter field, and double-click PWM APP



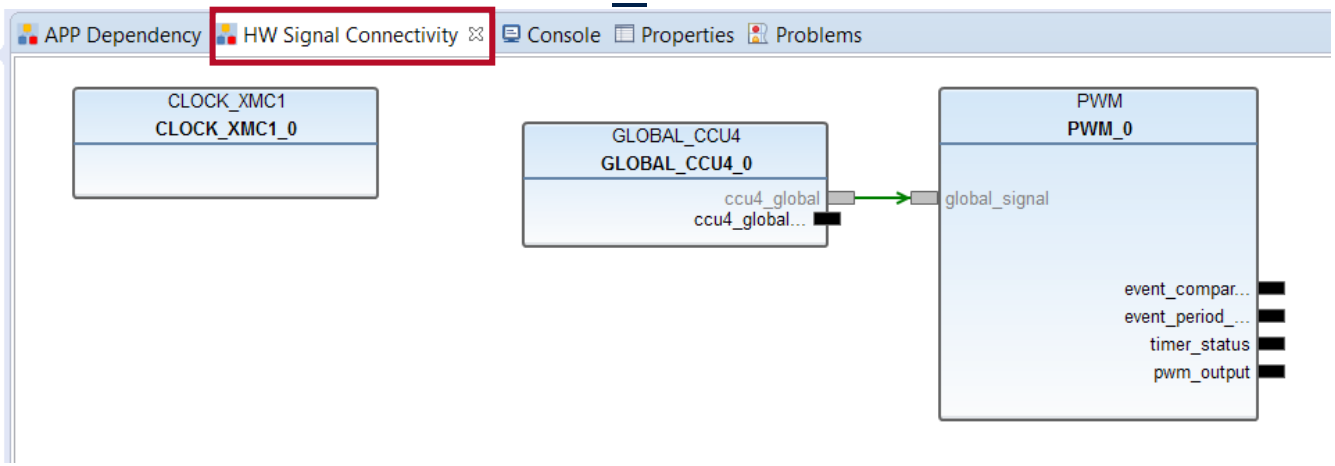
More project views

- All APPs included in the Project are displayed in different views:



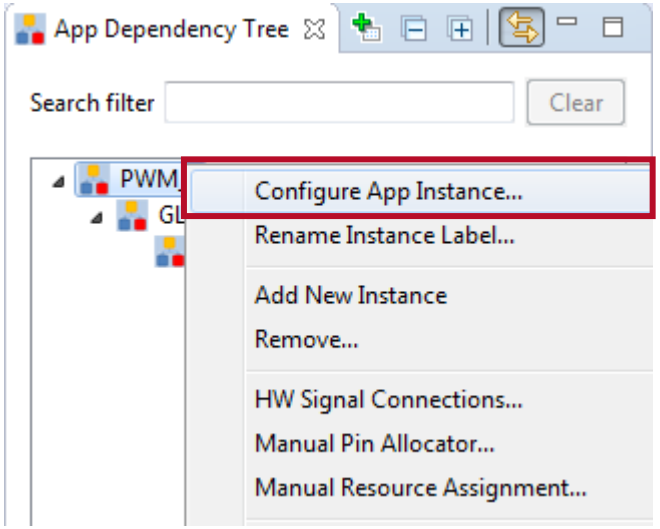


- The number behind "_" identifies the instance of an APP

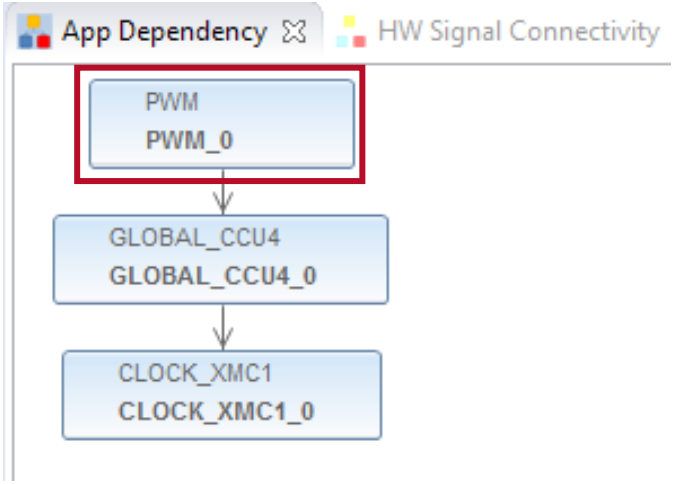


DAVE™ APPs configuration view

- Either
  1. Right-click APP name in the App Dependency Tree view
  2. Select Configure App Instance

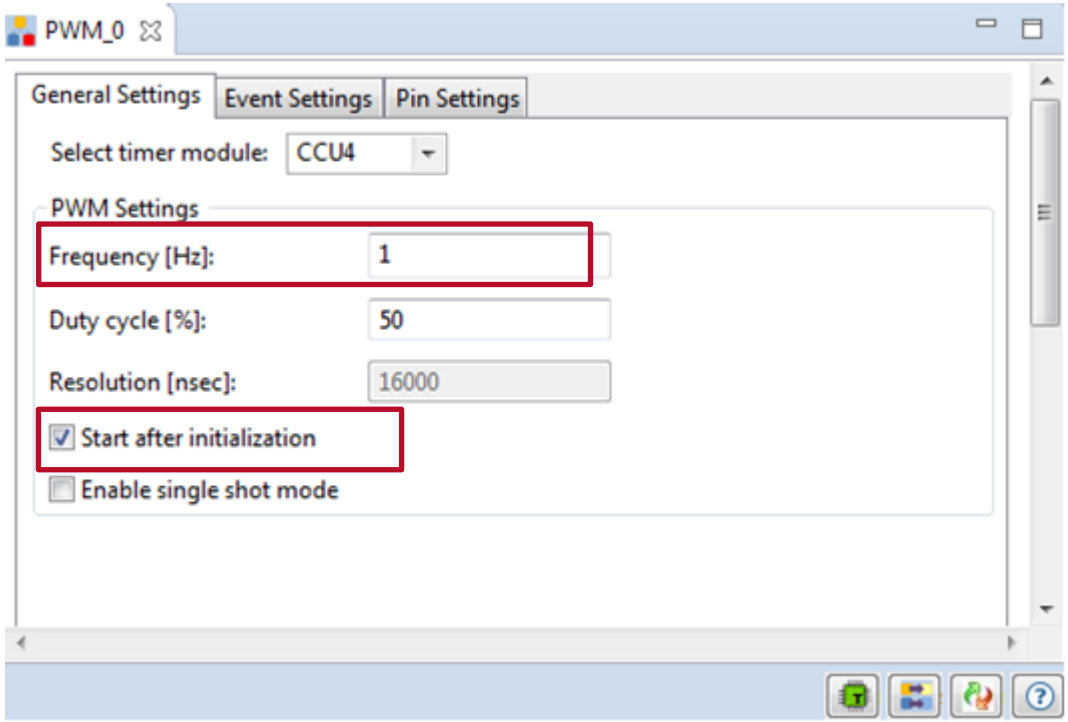


- Or
  - Double-click APP name in the App Dependency view



PWM APP configuration

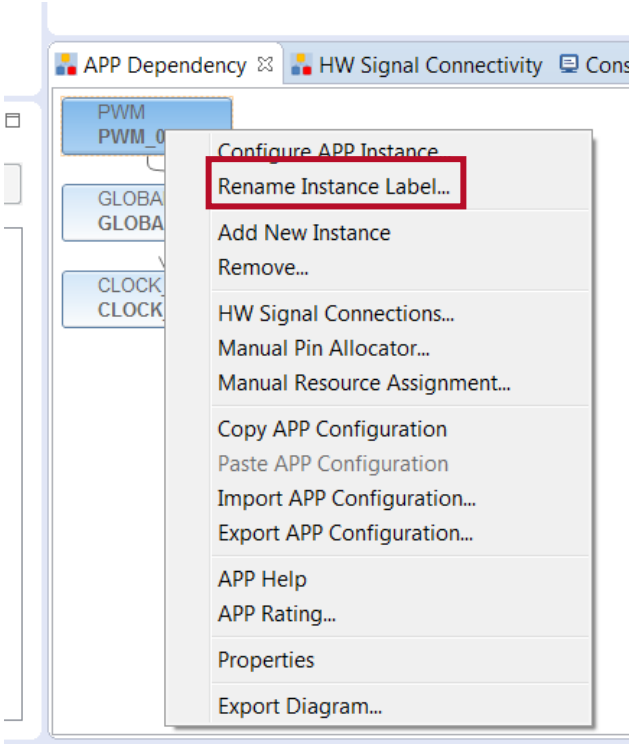
- Configure PWM APP via graphical user interface editor
  1. Set PWM Frequency to 1 Hz
  2. LED blinks every 0.5 second
  3. Check “Start Timer After Initialization”



Rename the Instance Label of the PWM APP

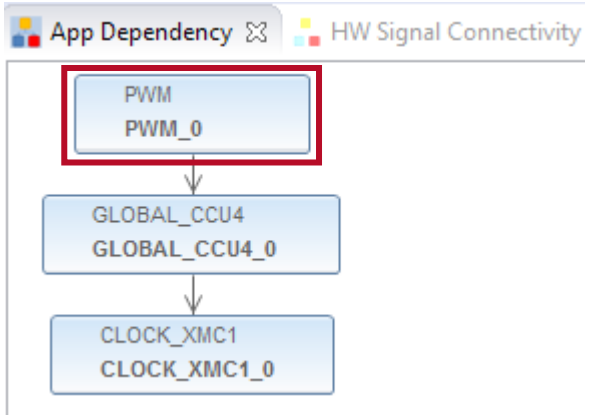
- Right click on the PWM APP
- Select
  Rename Instance Label…
- Type in: MyLED

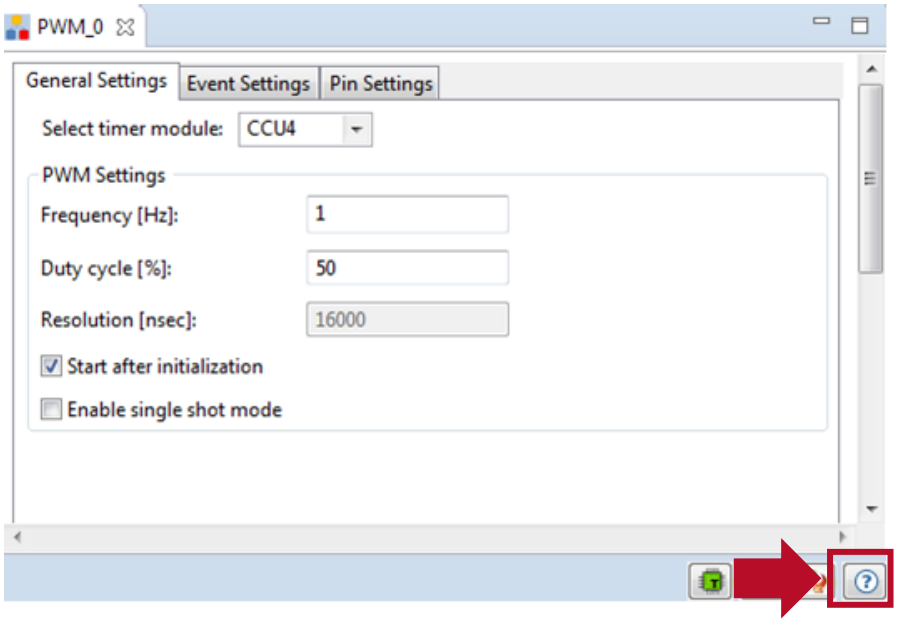
- Now "MyLED" can be used as handler in the APIs of the PWM APP to reference this instance

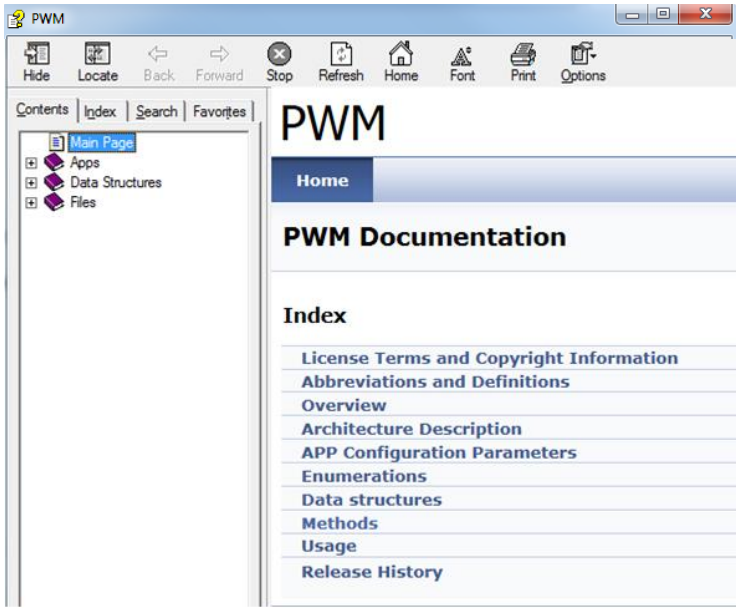


Hint: Additional Information about APPs

- Reference to DAVE™ APP information
  1. Double-click DAVE™ APP (e.g. PWM_0) in App Dependency View
  2. Click Help icon

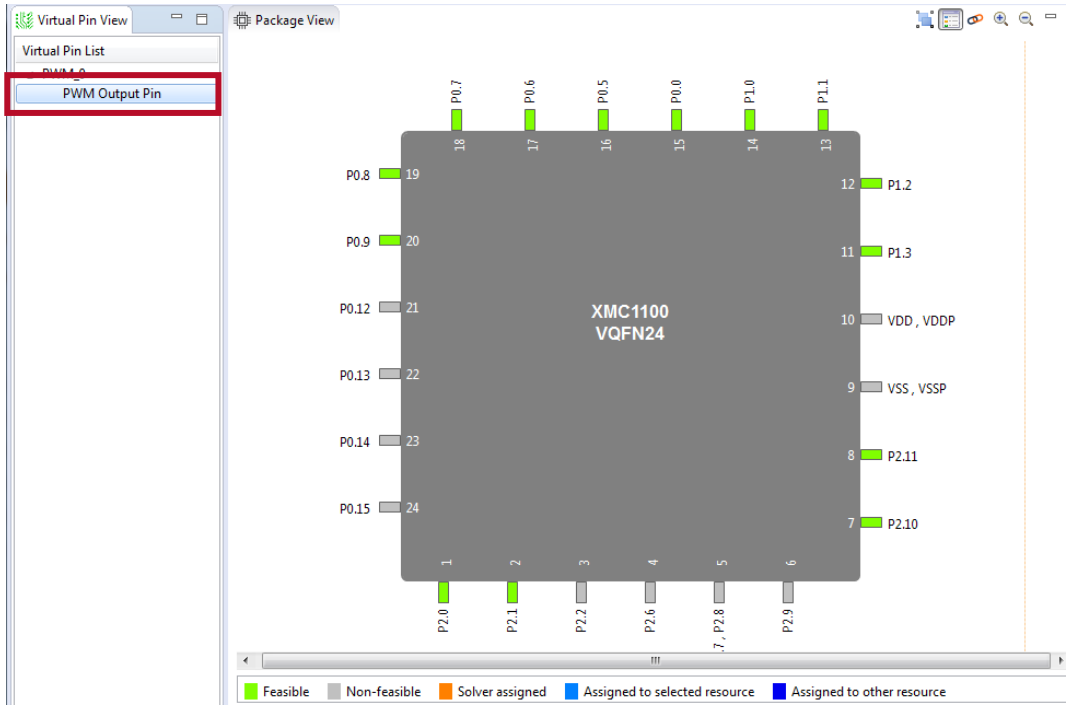






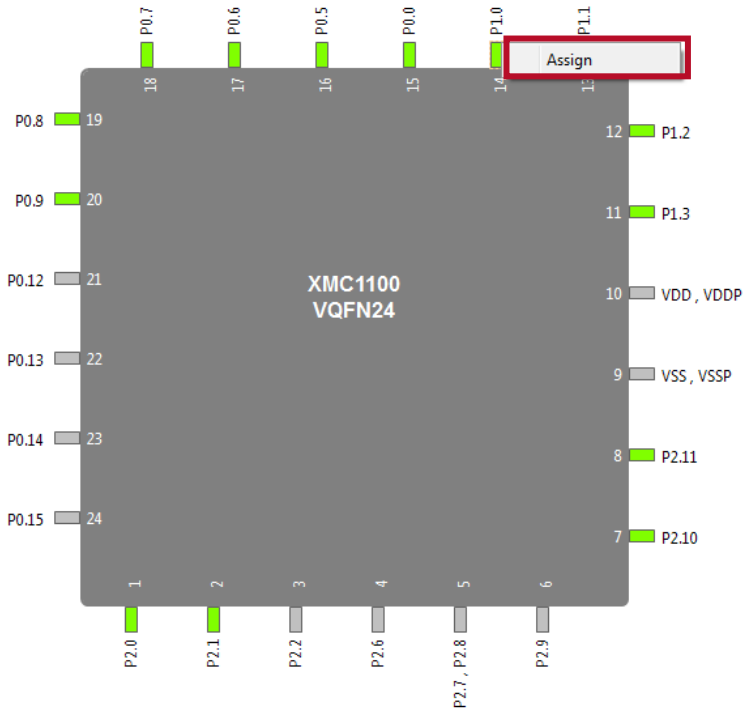
Pin Mapping for PWM App (1/2)

- Assign signal to pin with graphical pin mapping view
  1. Click  to open Pin Mapping Perspective
  2. Under Virtual Pin List, select PWM Output Pin
     - Green pin: All possible pins for selected signal
     - Blue pin: User assigned pin

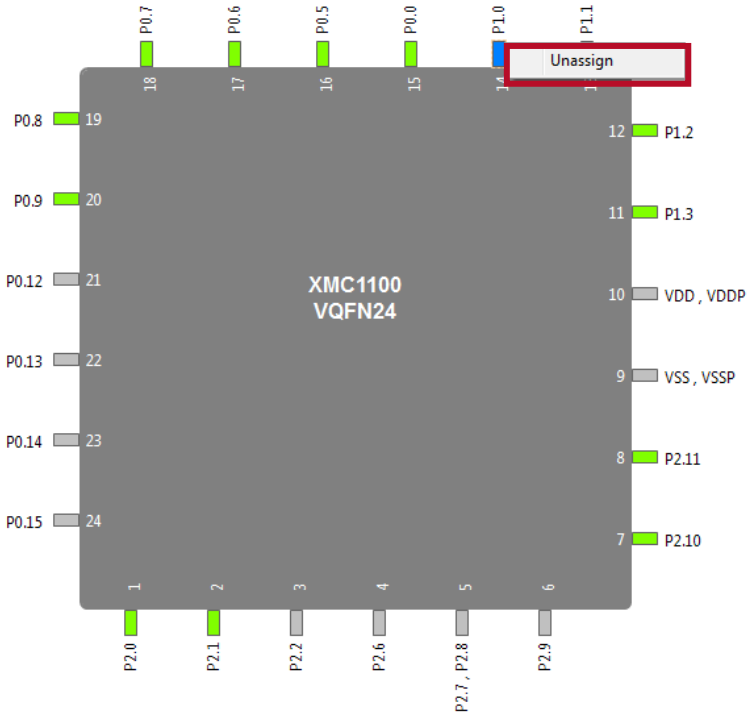


Pin Mapping for PWM App (2/2)

- To assign pin:
  - Right-click on a green pin → Assign

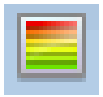


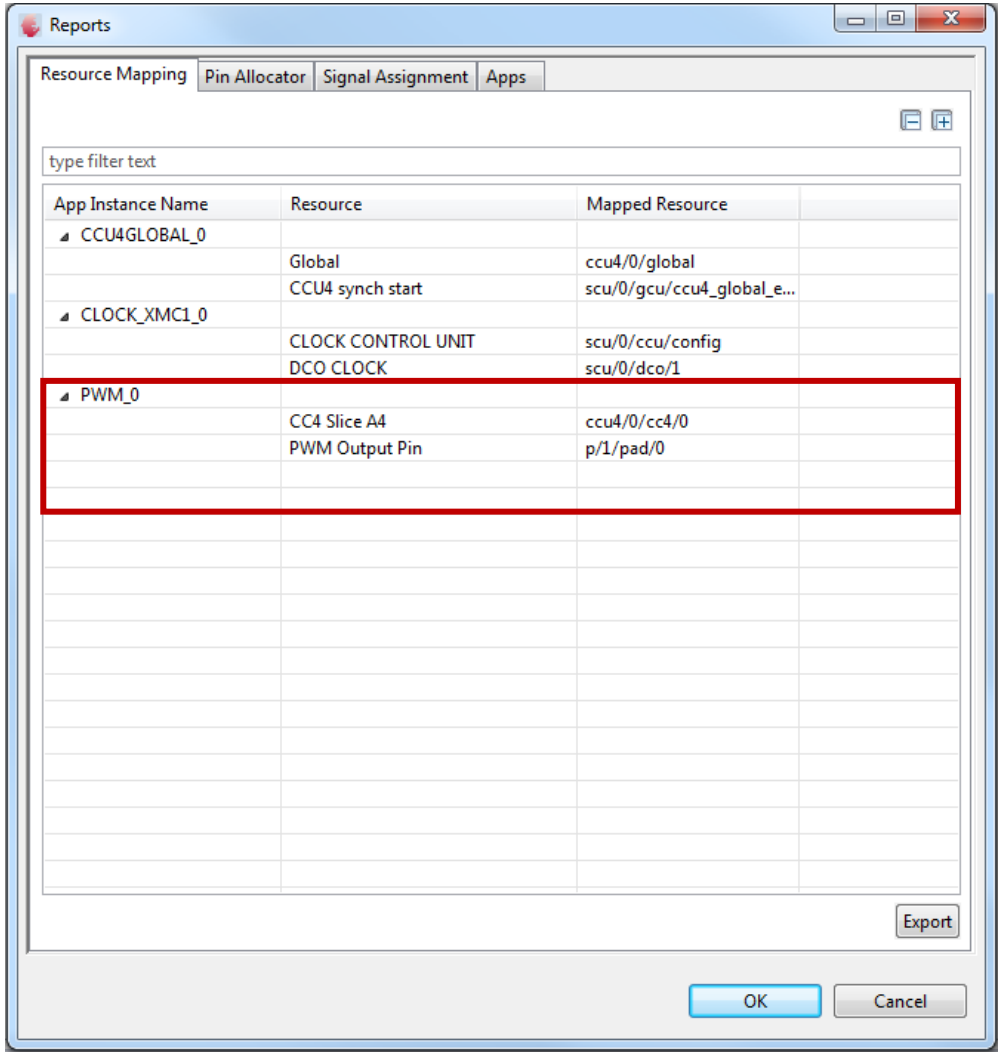
- To unassign pin:
  - Right-click on a blue pin → Unassign



- Assign PWM Output Pin to User LED1 at P1.0/#14
  - Right-click on pin 14 → Assign
  - In case you use a different board / device please select a pin that is connected to a LED

Hint: Check correct Resource Mapping

- Check resource mapping
  - Click  to open Reports in DAVE CE perspective



Generate Code and add a few lines of code to change the Duty Cycle of the PWM and compile code

- One touch code generation
  1. Click  in the tool panel
  2. Generated code can be found under C/C++ Projects window, DAVE → Generated
- Open main.c and Add the following lines

PWM_SetDutyCycle(&MyLED, 1000); // set duty cycle to 10%

PWM_SetDutyCycle(&MyLED, 9000); // set duty cycle to 90%

Note: you may use the eclipse code completion features (SRTG SPACE) to support correct coding.

```
28  if(status == DAVE_STATUS_FAILURE)
29  {
30    /* Placeholder for error handler code. The while loop below
31    XMC_DEBUG(("DAVE Apps initialization failed with status %d\n
32    while(1U)
33    {
34    }
35  }
36
37  /* Placeholder for user application code. The while loop below
38
39  PWM_SetDutyCycle(&MyLED, 1000); // set duty cycle to 10%
40  PWM_SetDutyCycle(&MyLED, 9000); // set duty cycle to 90%
41
42  while(1U)
43  {
44  }
45 }
```

- Start Compiler tools to build the project
  - Click  in the tool panel

Check compiler results

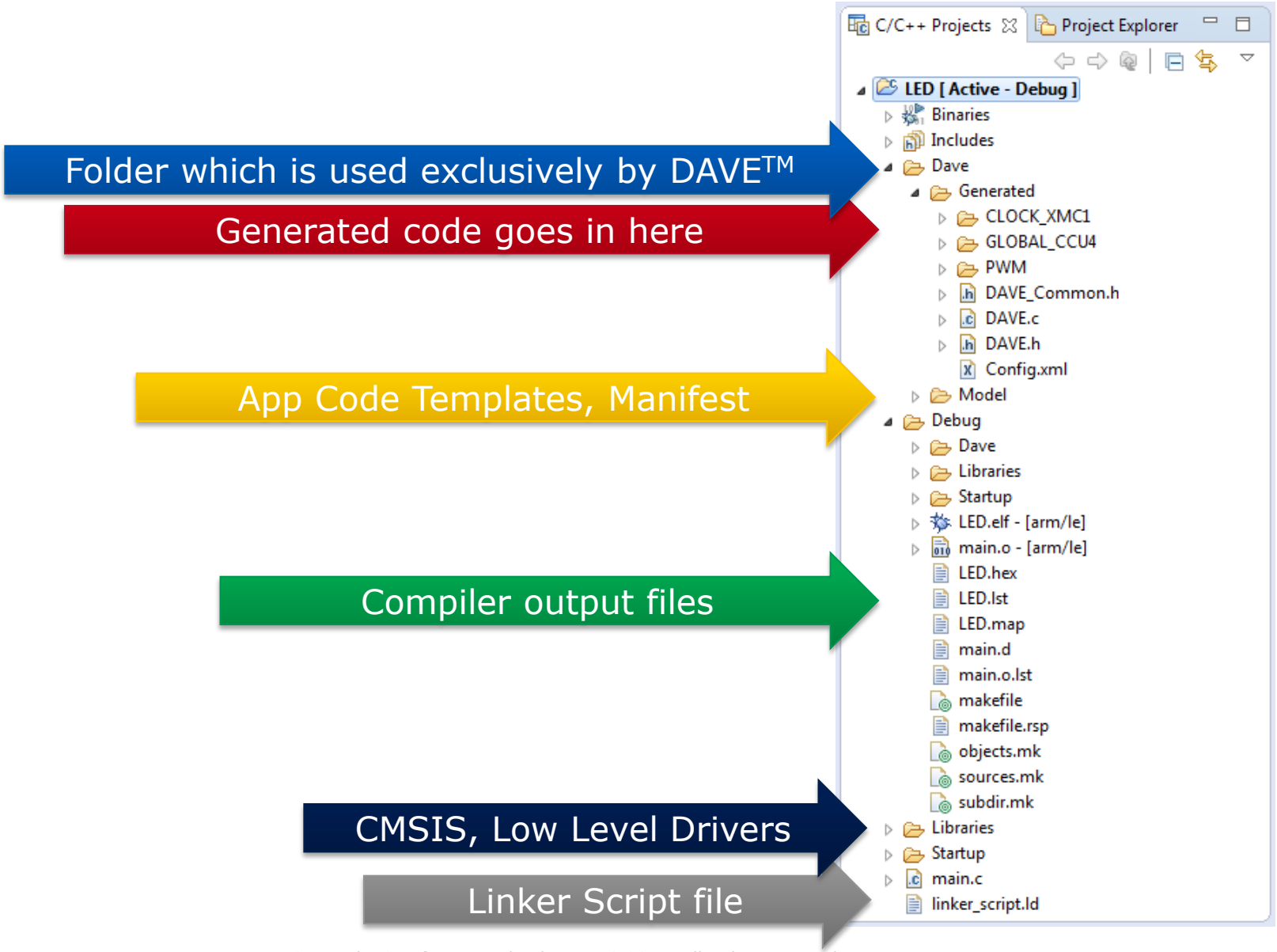
- Ensure that Compiler finished building in Console window

App Dependency | HW Signal Connectivity | Console | Properties | Problems

CDT Build Console [LED]

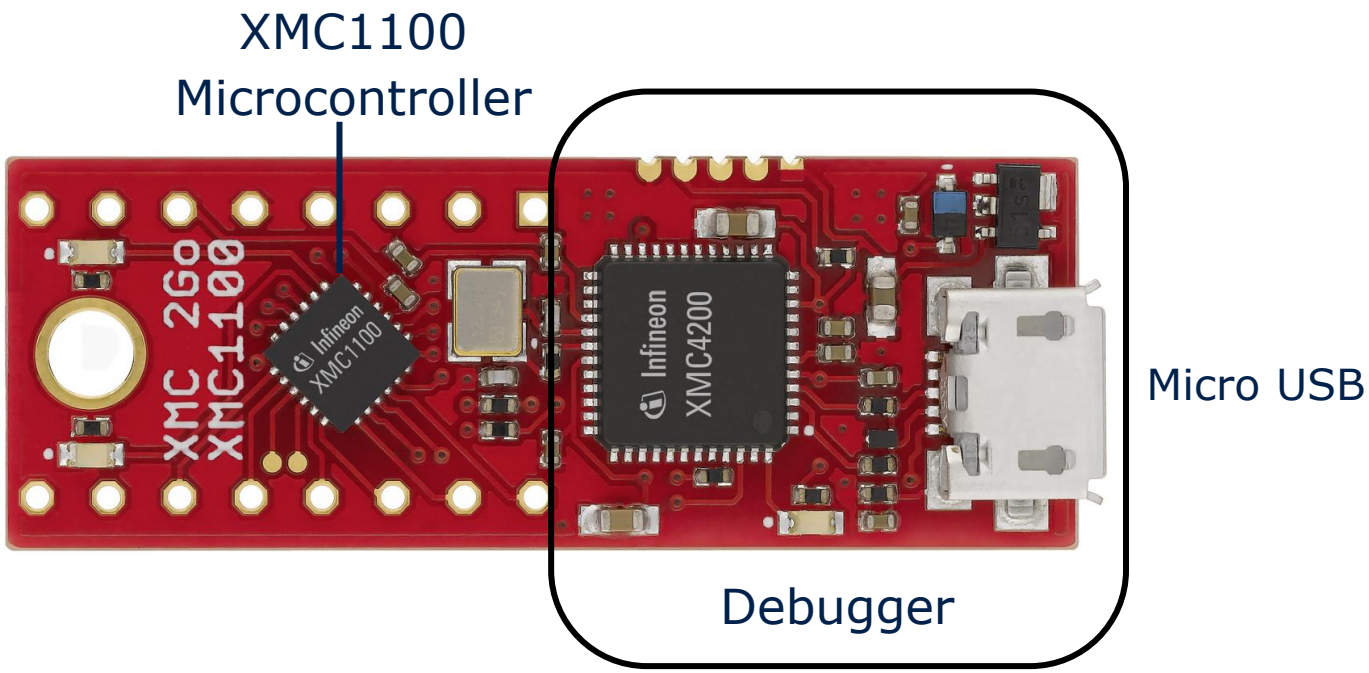
```
'Invoking: ARM-GCC Create Listing'
"C:\DAVE-4.0.0\eclipse\ARM-GCC-49/bin/arm-none-eabi-objcopy" -O ihex "LED.elf"  "LED.hex"
'Invoking: ARM-GCC Print Size'
"C:\DAVE-4.0.0\eclipse\ARM-GCC-49/bin/arm-none-eabi-objdump" -h -S "LED.elf" > "LED.lst"
"C:\DAVE-4.0.0\eclipse\ARM-GCC-49/bin/arm-none-eabi-size"  --format=berkeley "LED.elf"
   text    data     bss     dec     hex filename
   3412      40    1028    4480    1180 LED.elf
'Finished building: LED.hex'
'Finished building: LED.siz'
'Finished building: LED.lst'


10:42:53 Build Finished (took 4s.774ms)
```

The Project Folder



Flash and Debug (1/3)

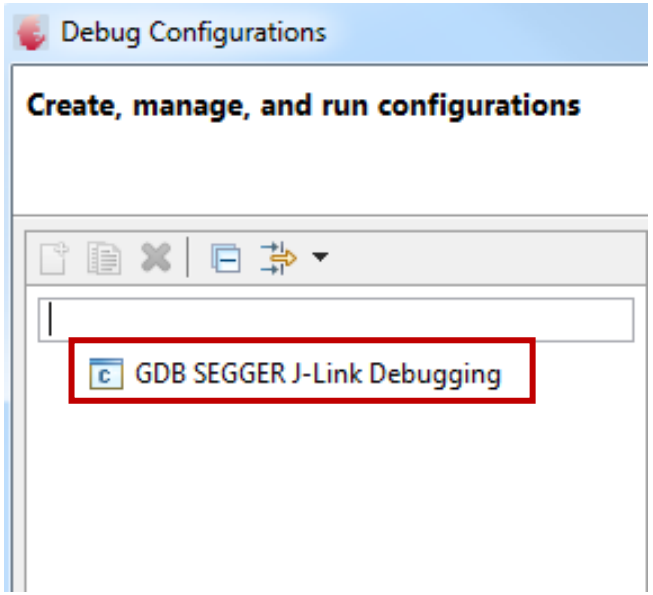
- Ensure the Debugger of the XMC 2Go Kit is connected to your PC via USB



Flash and Debug (2/3)

- Start Debug Session
  - Click  in the tool panel

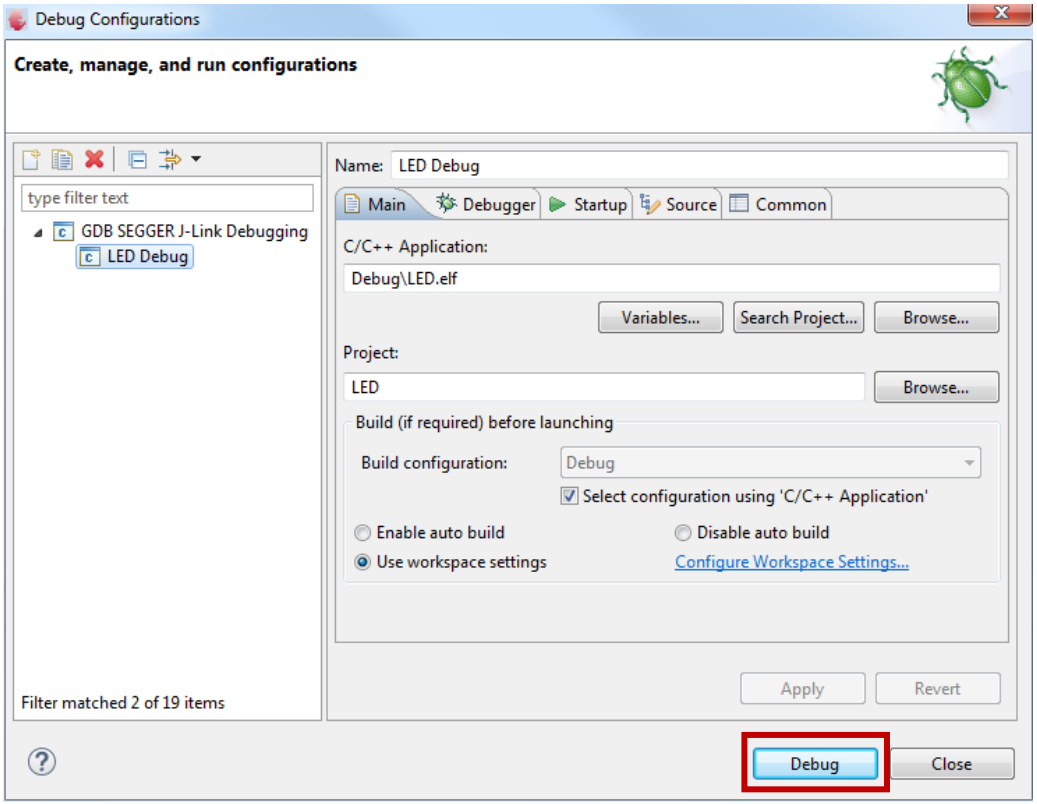
- Create a new Debug Configuration
  - Double-click "GDB SEGGER J-Link Debugging"



Segger J-link Driver software 4.96h or above needs to be installed

Flash and Debug (3/3)

- Click "Debug"
- The flashing process is started and DAVE automatically switches to Debug Perspective



- Hint: To switch to Project Workspace Perspective, click DAVE CE at upper right corner of window

The Debug Perspective (1/6)
Debug Workspace

Debug - LED/main.c - DAVE™ - C:\DAVE4_Projects

File Edit Source Refactor Navigate Search Window Help

Debugger actions

Quick Access | DAVE IDE | DAVE CE | Debug

Debug

- LED Debug [GDB SEGGER J-Link Debugging]
  - LED.elf
    - Thread #1 <main> (Suspended : Breakpoint)
      - main() at main.c:27 0x100010a2
  - JLinkGDBServerCL
  - arm-none-eabi-gdb
  - Semihosting and SWV

Variables | Breakpoints | Peripherals

Inspection controls

Name	Type	Value
status	DAVE_STATUS_t	DAVE_STATUS_SUCCESS
MyLED	PWM_t *	0x0

Breakpoint automatically set in main()

```
27  status = DAVE_Init();     /* Initialization of DAVE Apps  */

29  if(status == DAVE_STATUS_SUCCESS)
30  {
31    XMC_DEBUG("DAVE Apps initialization success\n");
32  }
33  else
34  {
35    /* Placeholder for error handler code. The while loop below can be replaced with an user error handler */
36    XMC_DEBUG(("DAVE Apps initialization failed with status %d\n", status));
37    while(1U)
38    {
```

Disassembly | Outline

Enter location here

```
100010a2:  adds r4, r7, #7
100010a4:  bl 0x10001a1c <DAVE_Init>
100010a8:  adds r3, r0, #0
100010aa:  strb r3, [r4, #0]
29         if(status == DAVE_STATUS_SUCCESS)
100010ac:  adds r3, r7, #7
100010ae:  ldrb r3, [r3, #0]
100010b0:  cmp r3, #0
100010b2:  beq.n 0x100010b6 <main+26>
39           }
100010b4:  b.n 0x100010b4 <main+24>
44         PWM_SetDutyCycle(&MyLED, 1000); // set
100010b6:  adds r2, r7, #0
100010b8:  movs r3, #250   ; 0xfa
100010ba:  lsls r3, r3, #2
```

Console | Tasks | Problems | Executables

LED Debug [GDB SEGGER J-Link Debugging] JLinkGDBServerCL

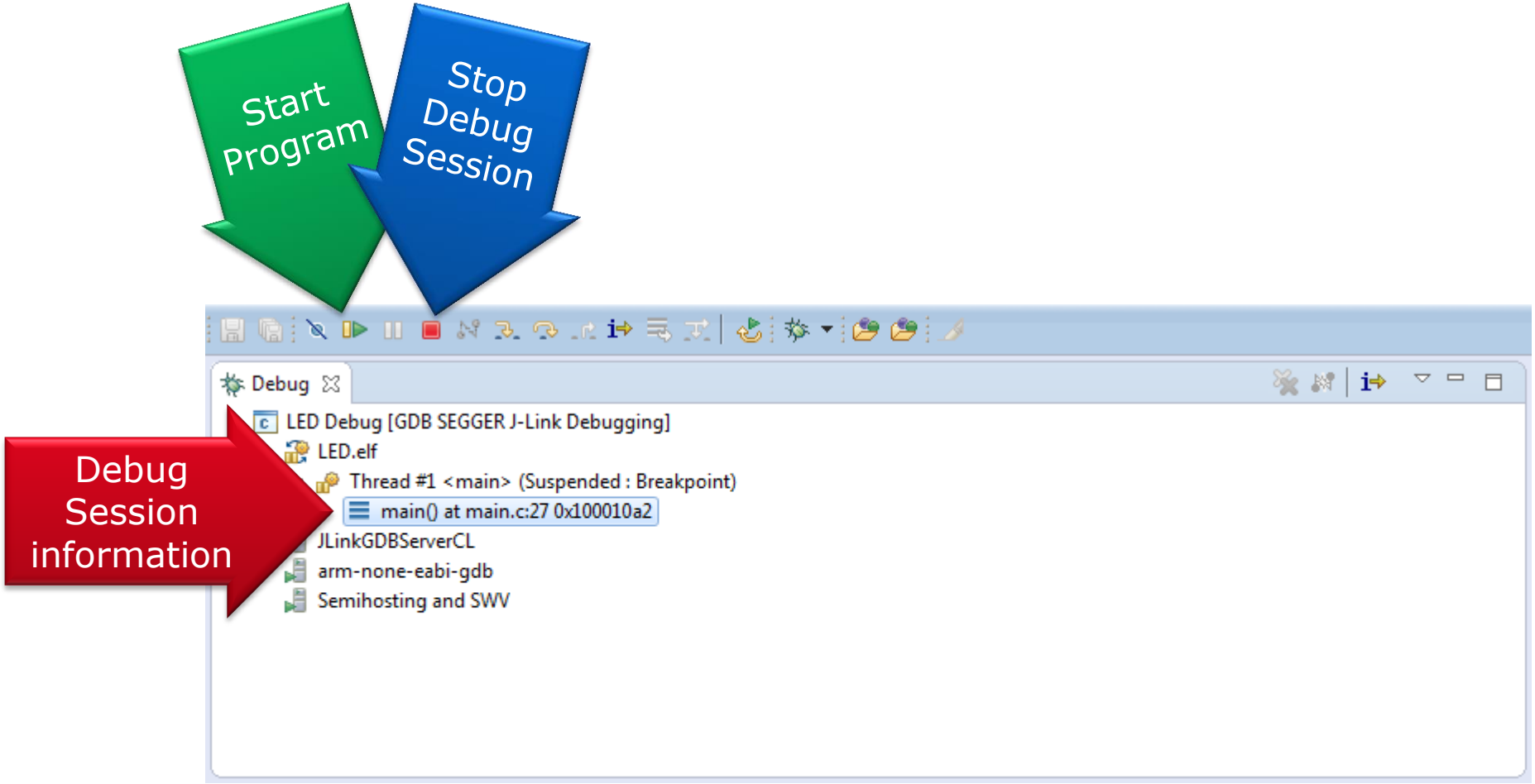
```
Removing breakpoint @ address 0x100010A2, Size = 2
Reading 64 bytes @ address 0x10001080
Reading 64 bytes @ address 0x100010C0
Read 1 bytes @ address 0x2000050F (Data = 0x00)
Read 4 bytes @ address 0x20000508 (Data = 0x00000000)
Read 1 bytes @ address 0x2000050F (Data = 0x00)
Read 4 bytes @ address 0x20000508 (Data = 0x00000000)
```

Memory

Monitors

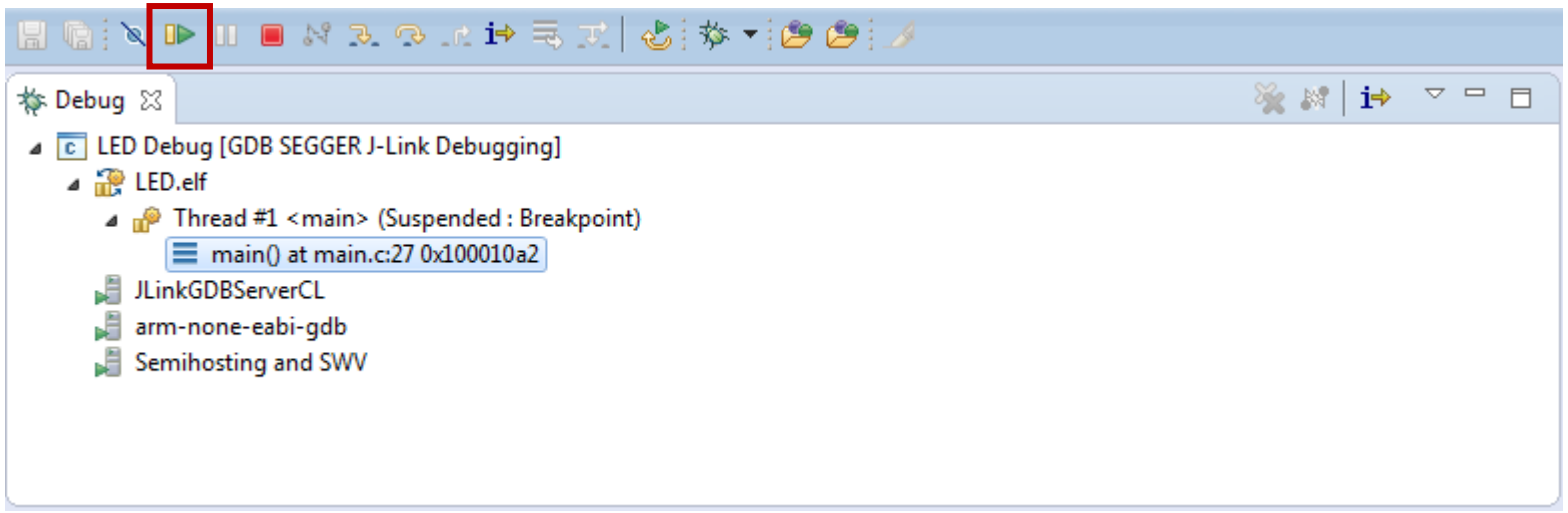
Device memory

The Debug Perspective (2/6)
Debug Window

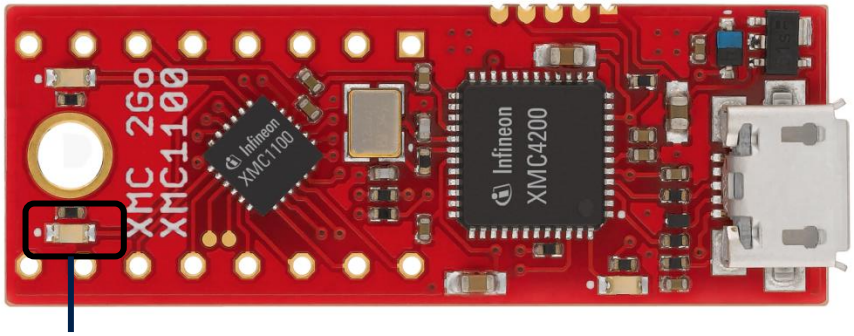


The Debug Perspective (3/6)
Start Program

- Click on the Resume button to start code execution



- User LED1 (P1.0) on XMC2Go board should be blinking



User LED1

The Debug Perspective (4/6)
Breakpoints

- To place a breakpoint, double-click on the blue bar at the line of code

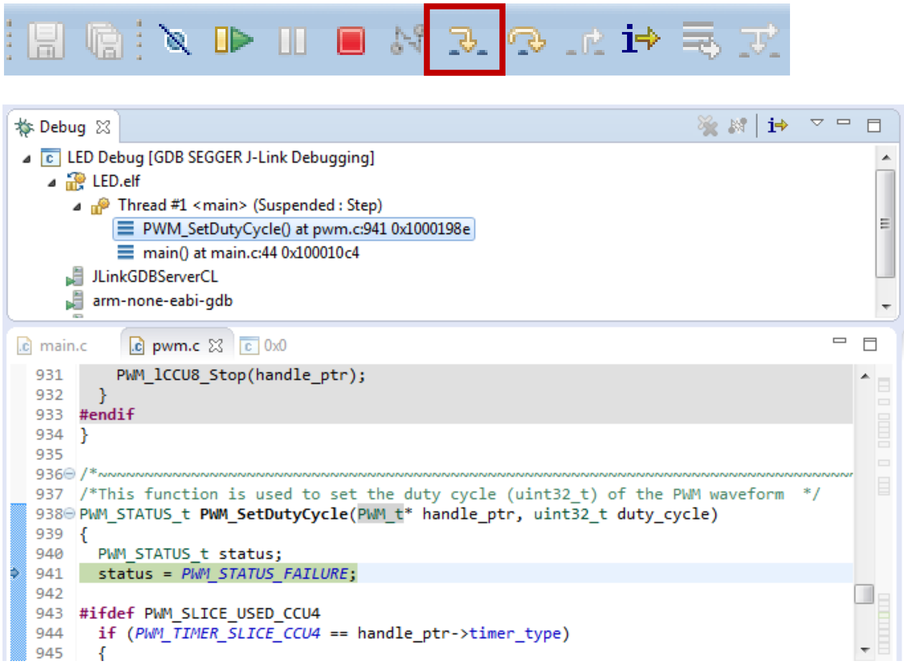
main.c pwm.c

```
36      XMC_DEBUG(("DAVE Apps initialization failed with status %d\n", status));
37      while(1U)
38      {
39      }
40    }
41
42    /* Placeholder for user application code. The while loop below can be replaced with user application code. */
43
44    PWM_SetDutyCycle(&MyLED, 1000); // set duty cycle to 10%
45    PWM_SetDutyCycle(&MyLED, 9000); // set duty cycle to 90%
46
47    while(1U)
48    {
49    }
50
51    return 1;
52  }
```

The Debug Perspective (5/6)
Single Step

- After placing breakpoint, click on Step Into or Step Over button to do single stepping

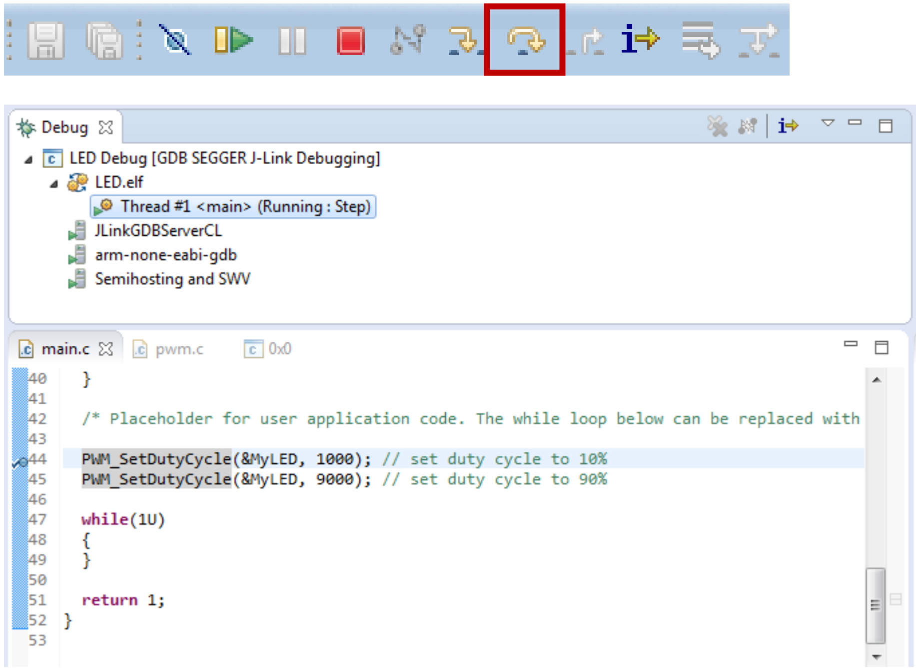
- Step into (F5)



LED Debug [GDB SEGGER J-Link Debugging]
  LED.elf
    Thread #1 <main> (Suspended : Step)
      PWM_SetDutyCycle() at pwm.c:941 0x1000198e
      main() at main.c:44 0x100010c4
  JLinkGDBServerCL
  arm-none-eabi-gdb

```
    PWM_1CCU8_Stop(handle_ptr);
  }
#endif
}

/*~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
/*This function is used to set the duty cycle (uint32_t) of the PWM waveform  */
PWM_STATUS_t PWM_SetDutyCycle(PWM_t* handle_ptr, uint32_t duty_cycle)
{
  PWM_STATUS_t status;
  status = PWM_STATUS_FAILURE;

#ifdef PWM_SLICE_USED_CCU4
  if (PWM_TIMER_SLICE_CCU4 == handle_ptr->timer_type)
  {
```

- Step over (F6)

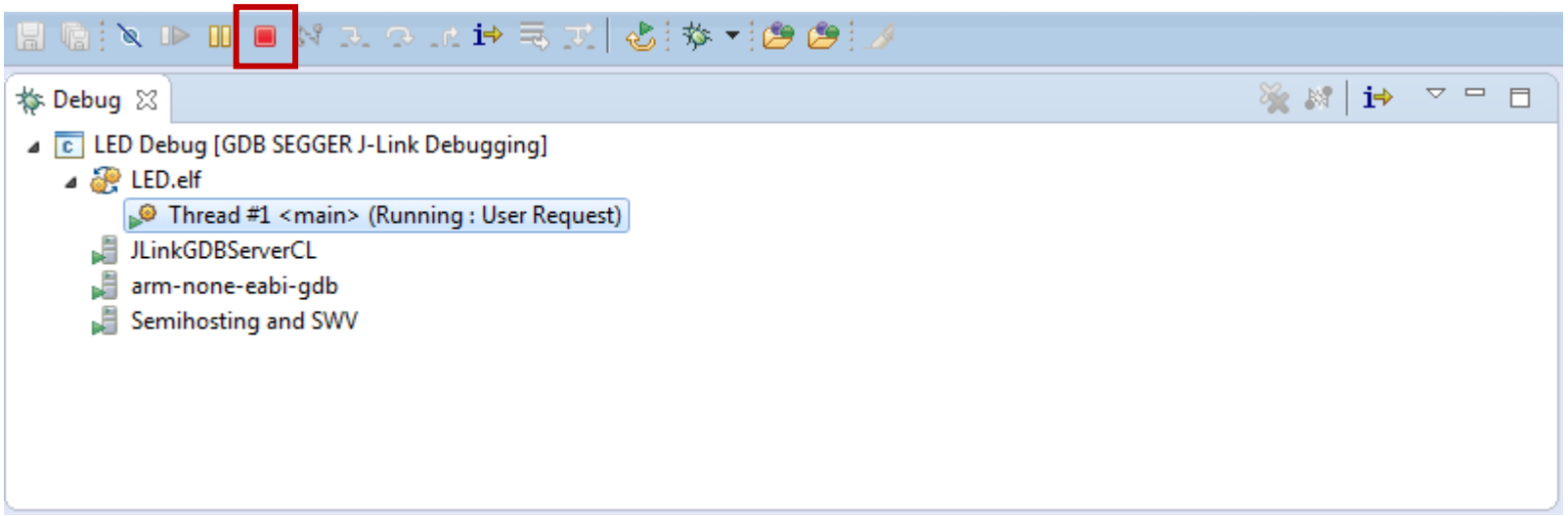


LED Debug [GDB SEGGER J-Link Debugging]
  LED.elf
    Thread #1 <main> (Running : Step)
  JLinkGDBServerCL
  arm-none-eabi-gdb
  Semihosting and SWV

```
  }

  /* Placeholder for user application code. The while loop below can be replaced with

  PWM_SetDutyCycle(&MyLED, 1000); // set duty cycle to 10%
  PWM_SetDutyCycle(&MyLED, 9000); // set duty cycle to 90%

  while(1U)
  {
  }

  return 1;
}
```

The Debug Perspective (6/6)
End Debug Session

- Always end a debug session by clicking the Terminate Button

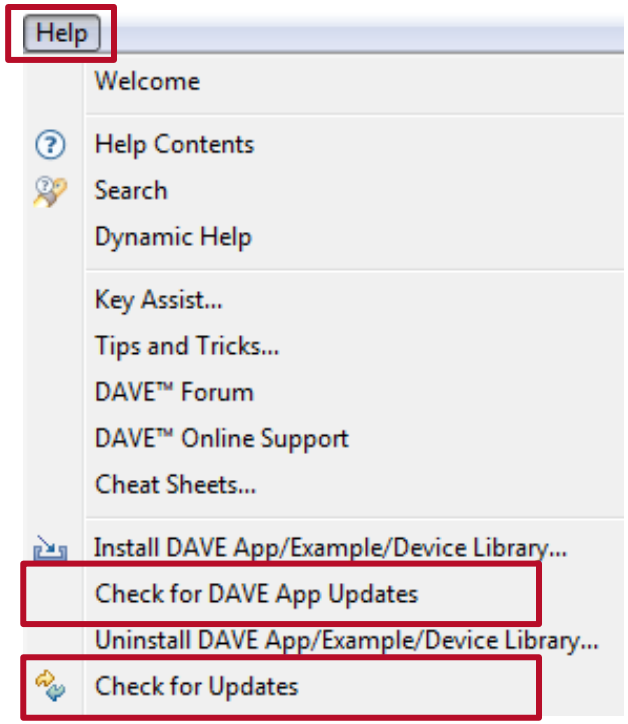


One-click DAVE™ update

- DAVE™ APPs and device support can be updated locally
- Re-installation not required

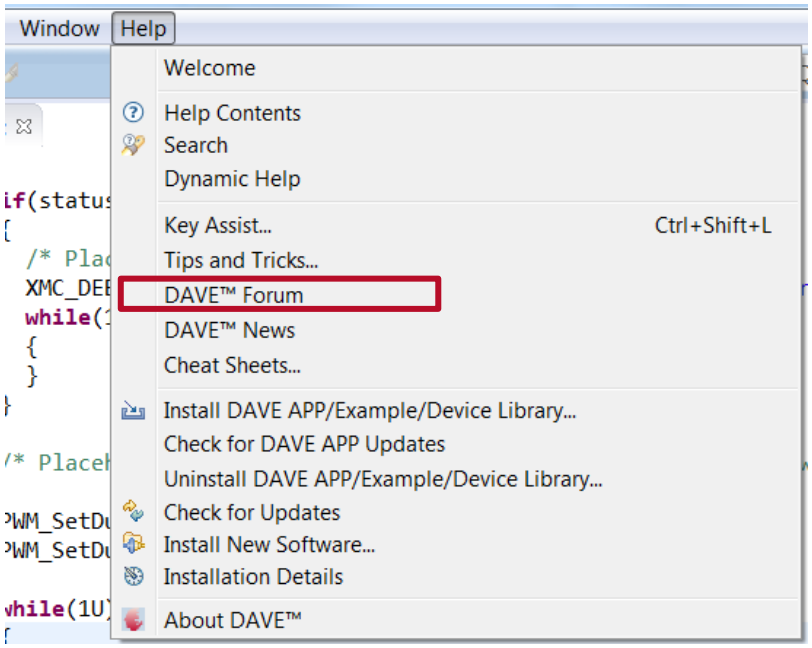
- Update DAVE™ system
  - Help → Check for Updates

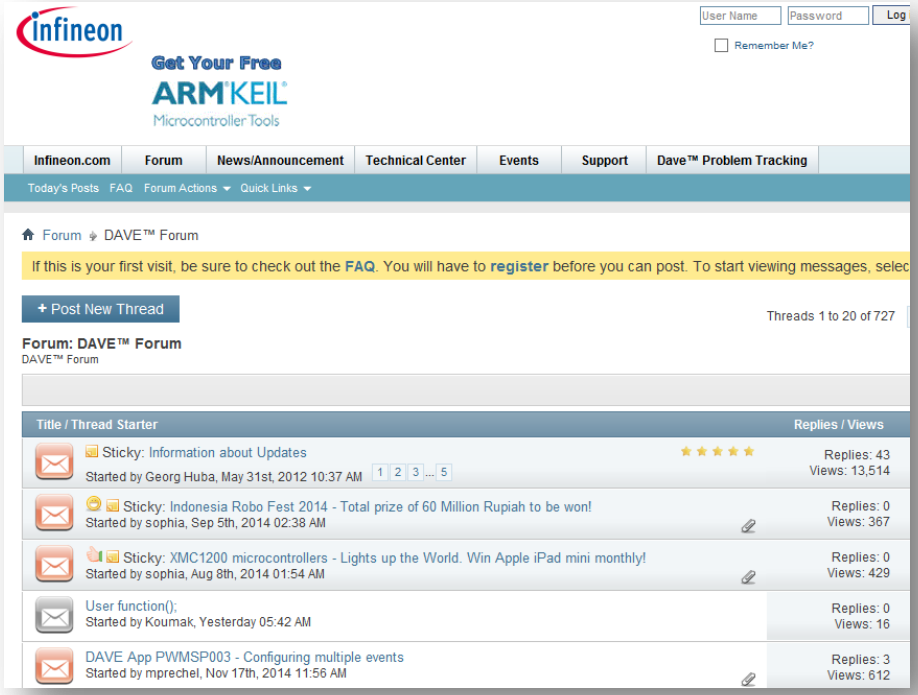
- Update DAVE™ APPs and device support
  - Help → Check for DAVE App Updates



Expert support

- Easy access to DAVE™ technical support, downloads and information updates





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