Evaluation Board and Kit

Getting Started

TLE985x EvalBoard
TLE9855 EvalKit

April 2019

Agenda

1. Evaluation Board and Kit Overview
2. Product Information and Available Documentation
3. Toolchain Installation
4. Getting Started

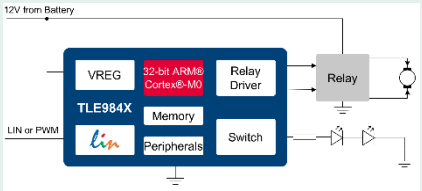
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TLE985x Overview

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Infineon Embedded Power ICs Product Portfolio based on Arm® Cortex®-M processor

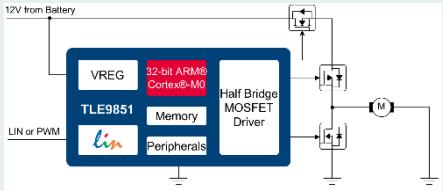
Smart Relay IC DC Motor



TLE9842/3/4

- Window Lift
- Sunroof
- Wiper

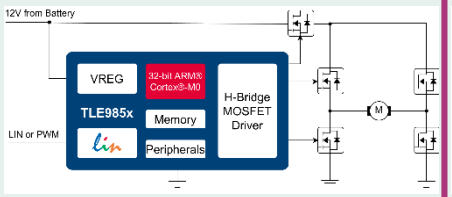
Smart Half Bridge



TLE9845/TLE9851

- HVAC Fan
- Engine Cooling Fan
- Fuel Pump
- Water Pump

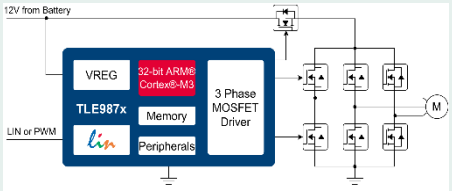
Smart H-Bridge Driver



TLE985x/TLE986x

- Window Lift
- Sunroof
- Wiper
- Power Folding Roof
- Power Sliding Door
- Power trunk/ tailgate

Smart BLDC Driver IC



TLE987x

- Fuel Pump
- HVAC Fan
- Engine Cooling Fan
- Water Pump
- Oil Pump
- Sunroof
- Wiper

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Evaluation Board and Kit Overview

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TLE985x – Evaluation Board

- 2-Phase N-MOS Bridge
- Single Shunt in GND path
- Integrated LIN transceiver
- 4 push buttons
- Debug LEDs
- Onboard Segger J-Link Debugger
- EvalBoard-PC connector: USB
- uIO stick connector



TLE9855 – Evaluation Kit

- 2-Phase N-MOS Bridge
- Single Shunt in GND path
- Integrated LIN transceiver
- Debug LEDs
- Onboard Segger J-Link Debugger
- EvalKit-PC connector: USB

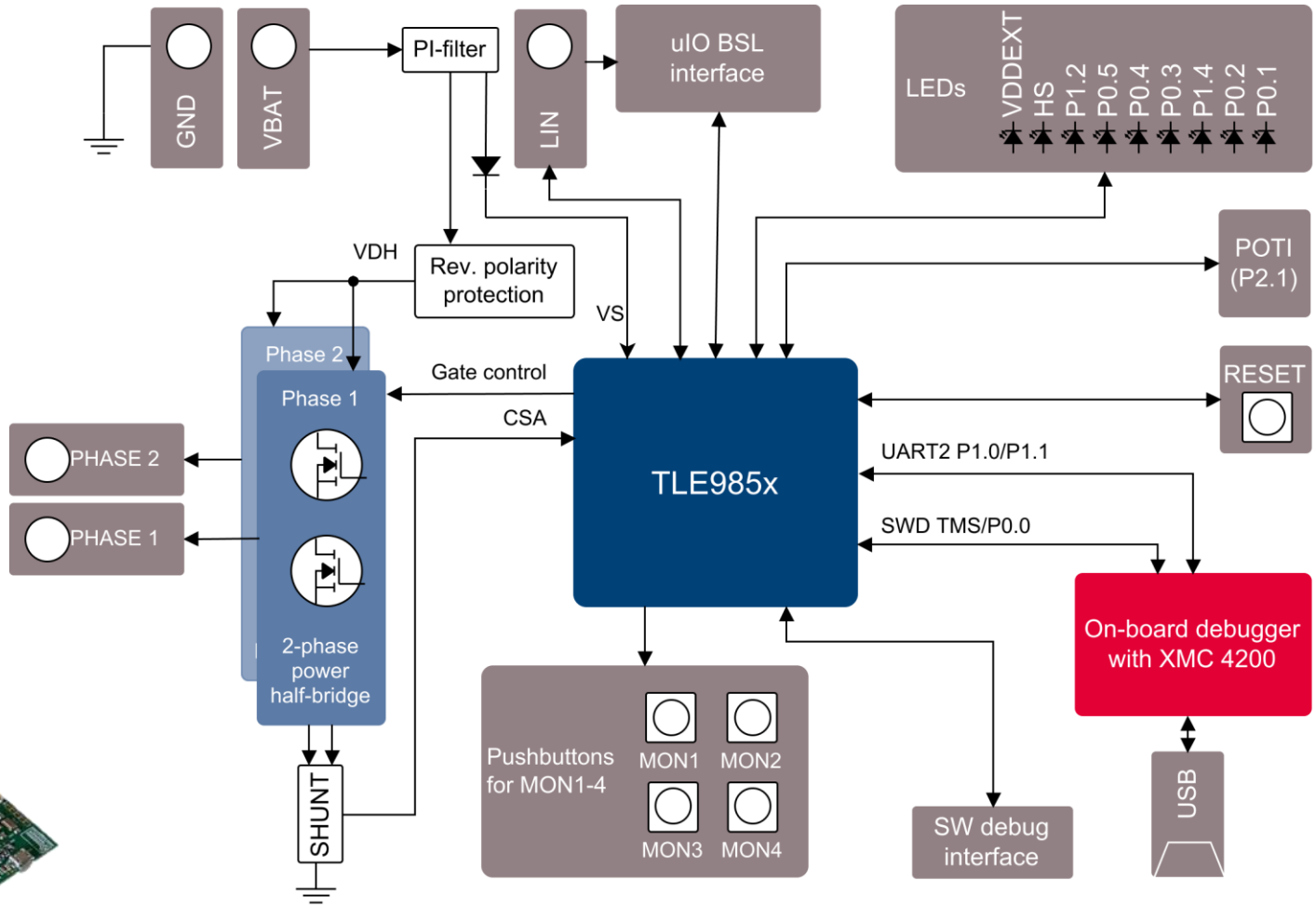


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TLE985x EvalBoard Overview

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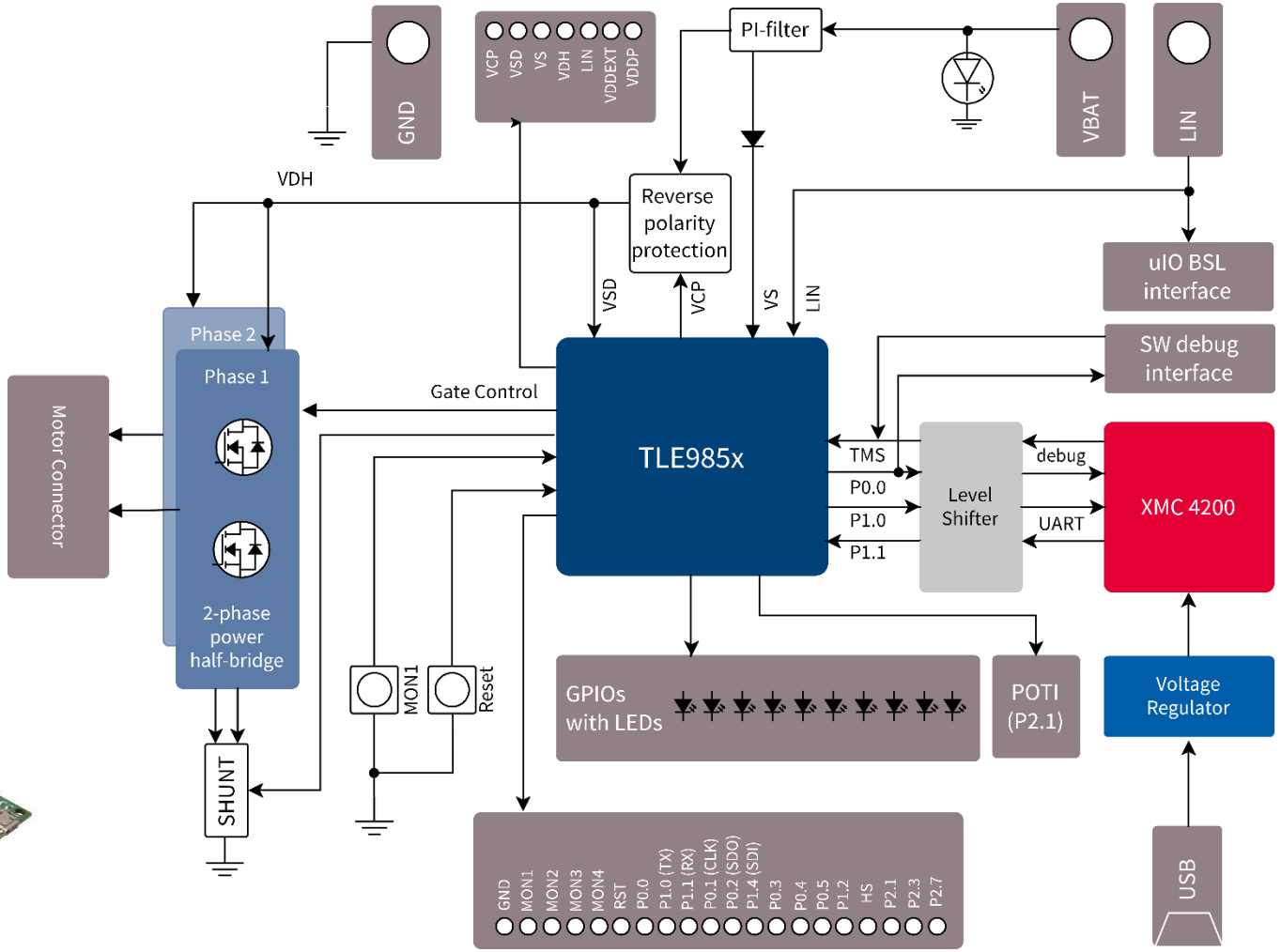


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TLE9855 EvalKit Overview

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TLE985x: Documentation

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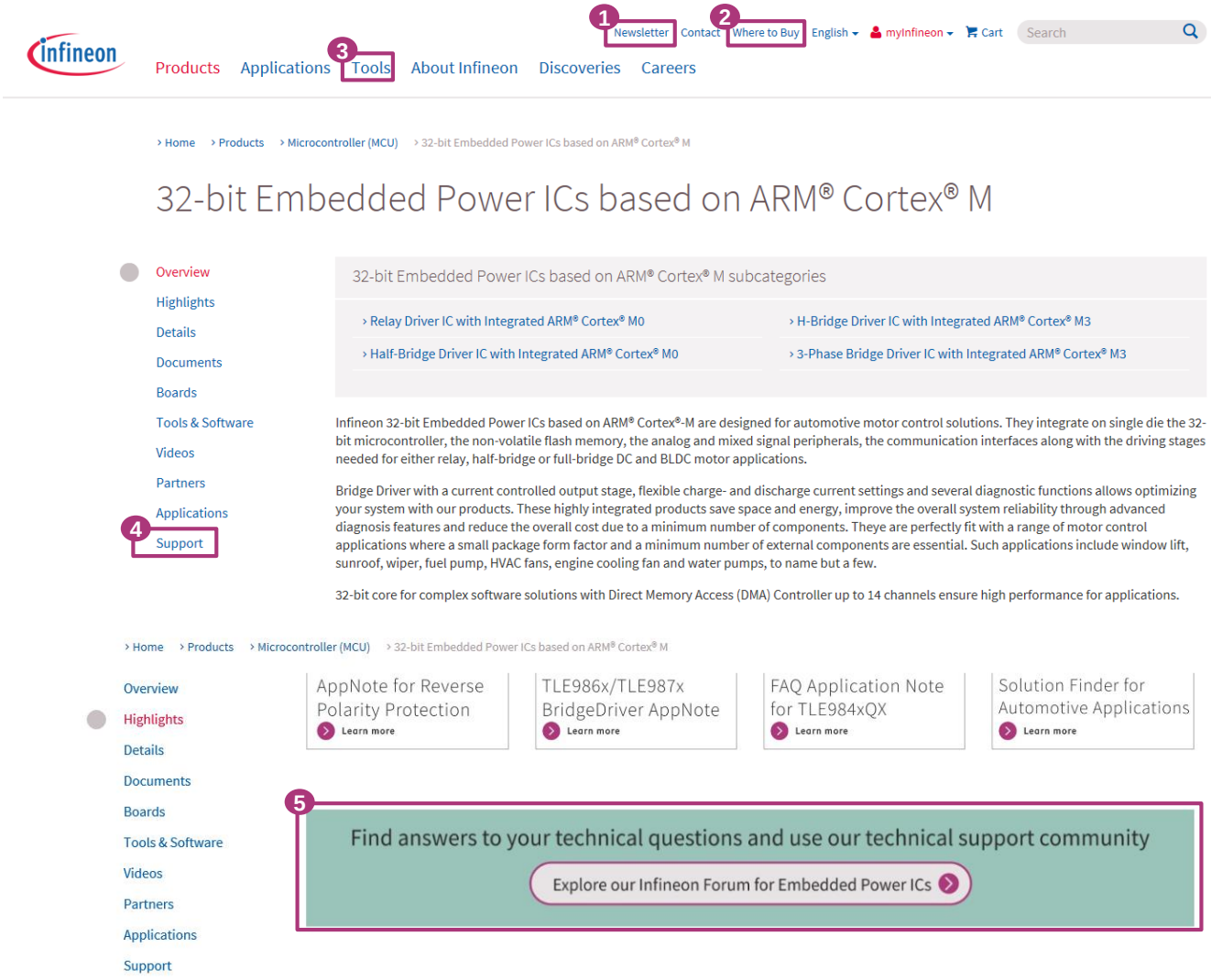
Collaterals and Brochures	– Product Brief – Selection Guides – Motor Drive eBook	– Link to family page
Technical Material	– Datasheet – Application Notes – Getting Started – PCB Design Data – User Manual	– Link to Documents
Evaluation Boards	– Evaluation Board – Evaluation Kit	– Link to Boards
Software & Tools	– Config Wizard – Keil µVision5 – Software Examples – Infineon Toolbox	– Link to Software & Tools

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Agenda

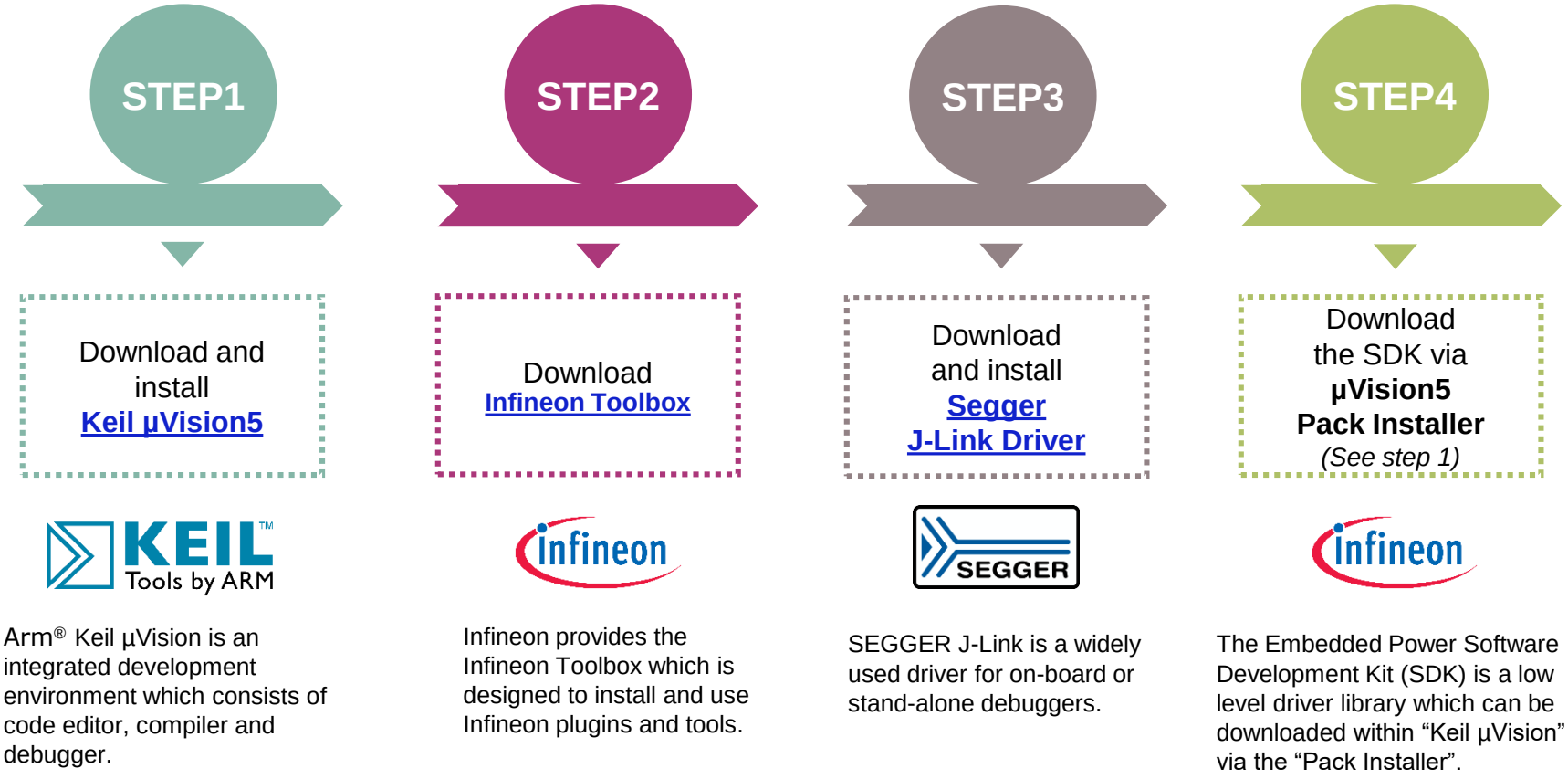
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Toolchain installation: General Overview

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› Infineon Embedded Power ICs are supported by a complete development tool chain provided by Infineon and third party vendors. The tool chain includes compilers, debuggers, evaluation boards, LIN low level drivers and configuration tools as well as a variety of example software code.



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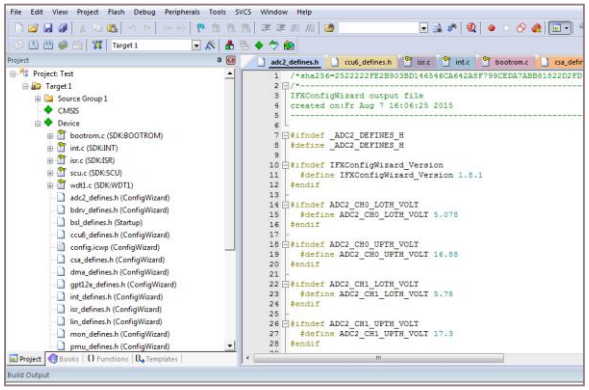
Toolchain installation: 1/4

Keil µVision5

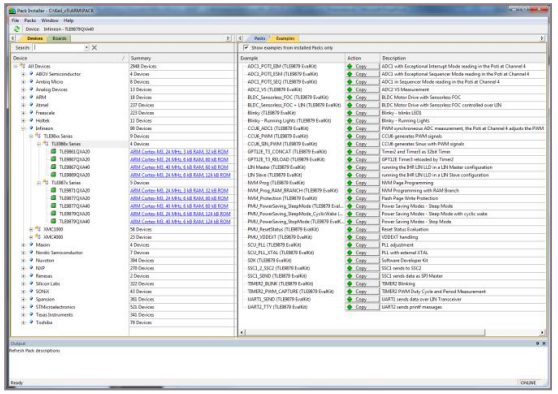
- Code Editor & Online Debugger
  - Evaluation version can handle up to 32K

- Download from: https://www.keil.com/demo/eval/arm.htm

Main Window



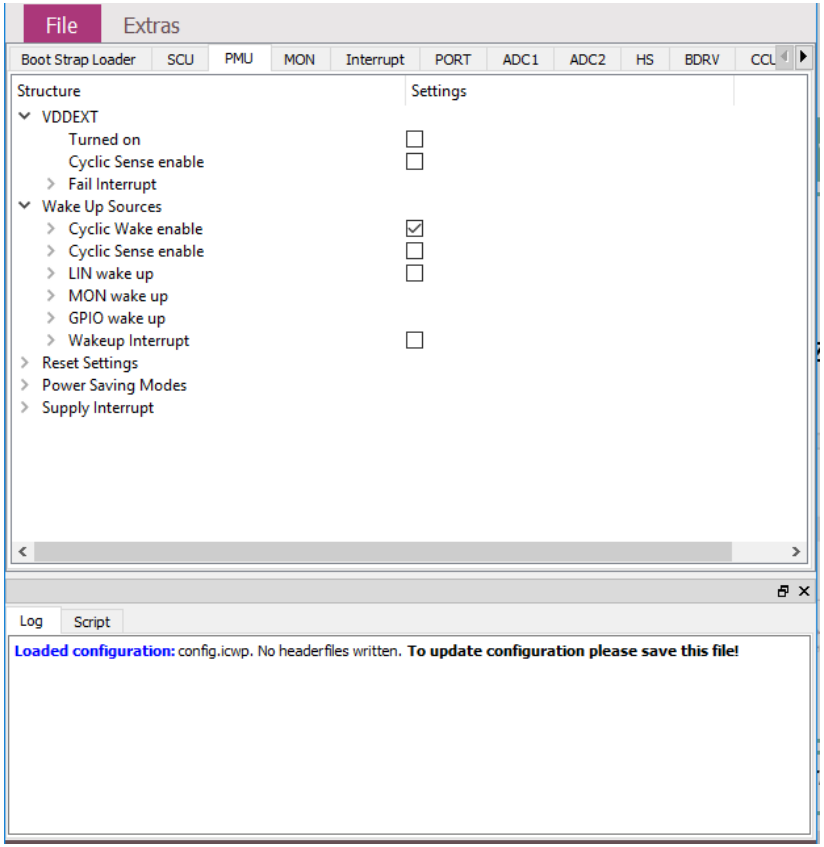
Pack Installer



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Toolchain installation: 2/4

- Infineon **Config Wizard**
- Configuration of chip modules
- Device description for TLE985x included
- Installation from Infineon Toolbox
- TLE985x supported by Keil µVision 5



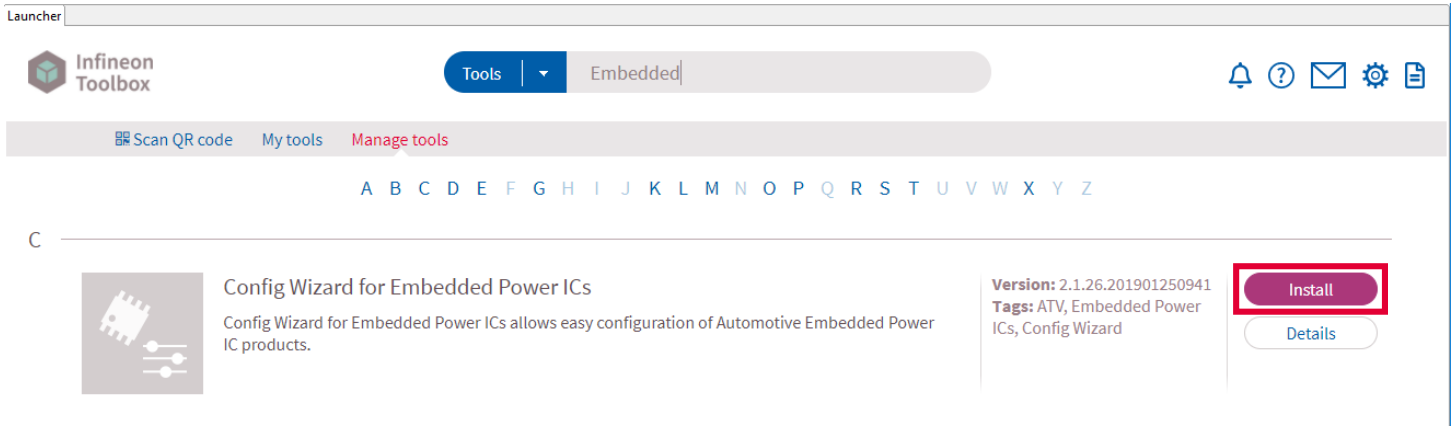
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Toolchain installation: 2/4

Infineon Toolbox: Config Wizard for Embedded Power ICs:

- Install the "Infineon Toolbox" (*) and start the tool
- Within the Infineon Toolbox:

1. Select the tab "Manage tools", search for "Config Wizard for Embedded Power ICs" and click "Install"



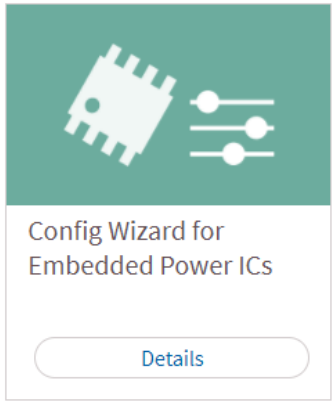
(*) *For more details about the Infineon Toolbox installation, please read the Installation Manual.*

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Toolchain installation: 2/4

Infineon Toolbox: Config Wizard for Embedded Power ICs:

2. Start “Config Wizard for Embedded Power ICs” once to trigger the integration into Keil



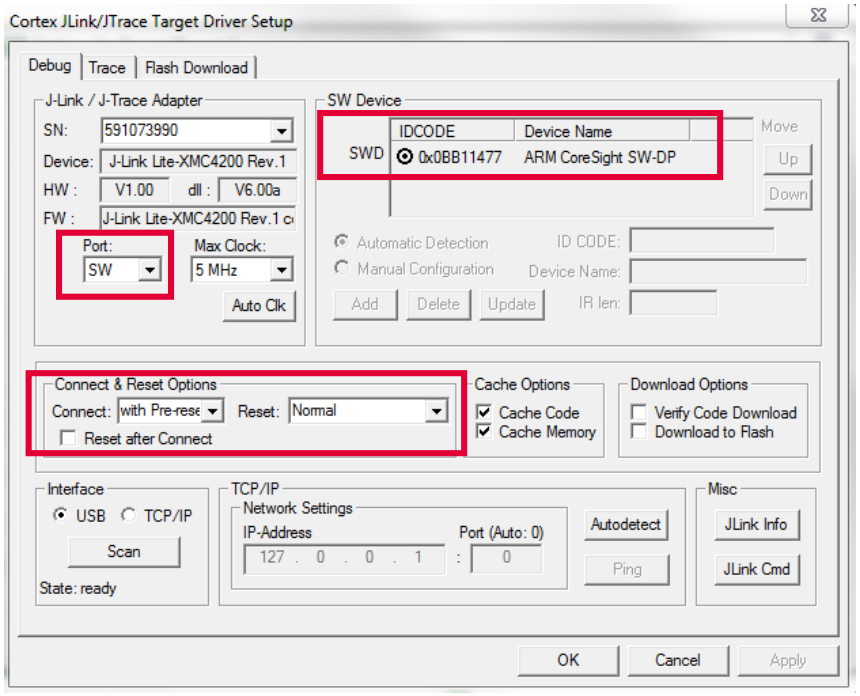
3. Close the Config Wizard and the toolbox

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Toolchain installation: 3/4

Segger J-LINK-Lite driver:

- Driver for 'on-board' or 'stand-alone' debugger
- Install driver from: https://www.segger.com/jlink-software.html

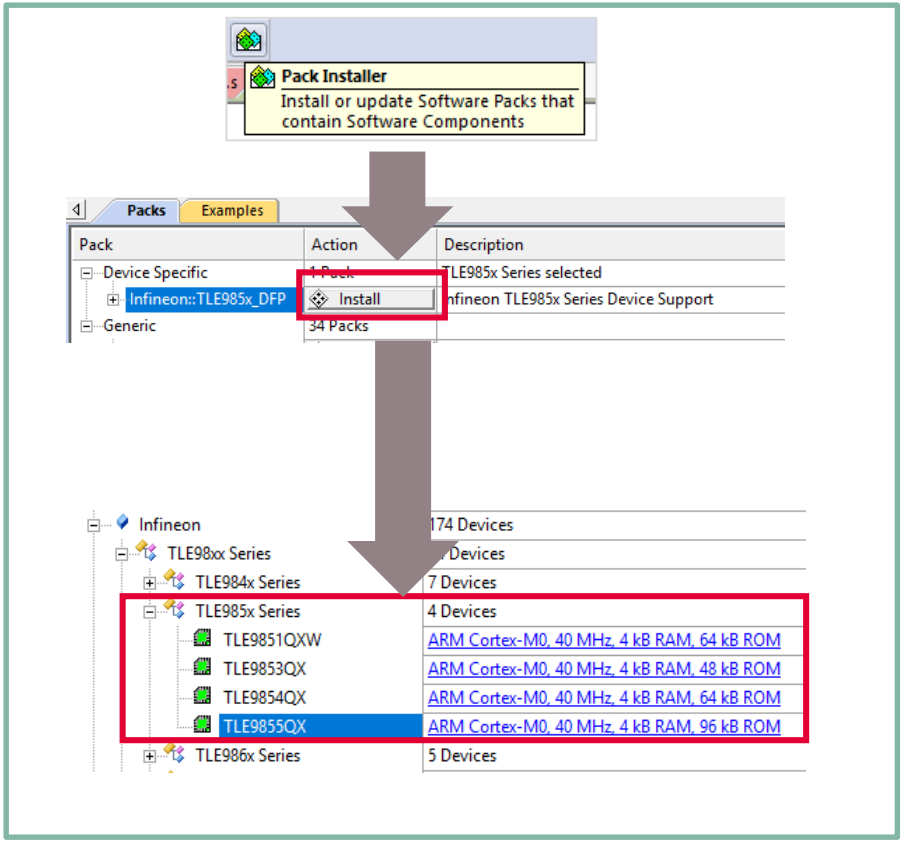


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Toolchain installation: 4/4

PACK-file TLE985x for µVision5:

- Device database for all TLE985x variants
- Device support for flashing/erasing TLE985x
- Device description for TLE985x for Config Wizard
- Includes SDK (Software Development Kit)
- If the TLE985x SDK is not available in the pack installer, you can load it from a local file using the “File->Import” menu.



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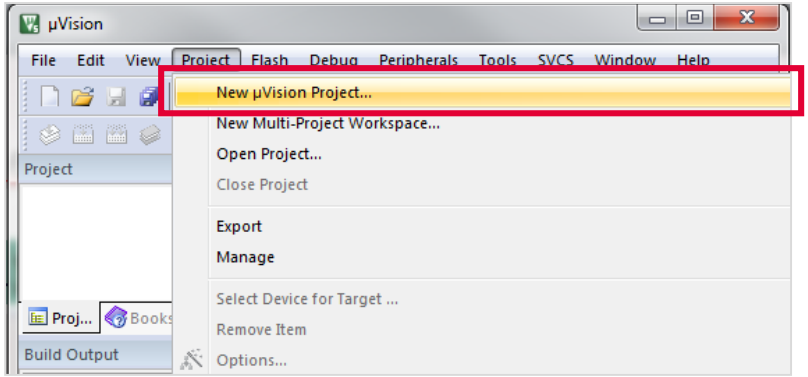
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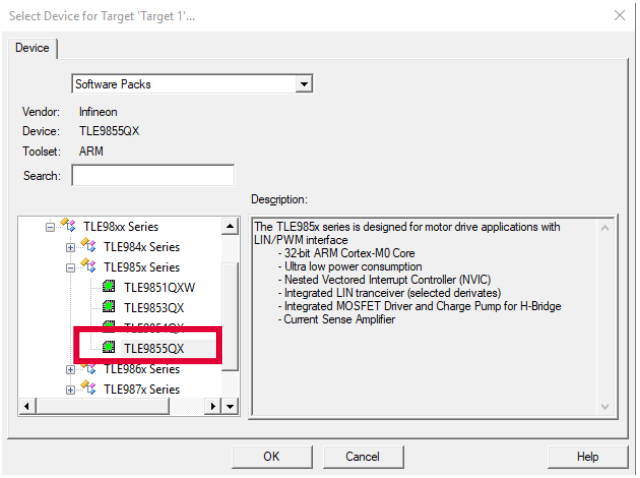
Getting Started: Infineon Embedded Power SDK Keil µVision5 Template

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1) Create a new Project

- Open Keil mdk
- Go to → Project
  → new µVision Project
- Name project: “TLE9855QX_test”
- Select Device:
  - Infineon
    - TLE98xx Series
      - TLE985x Series
        - TLE9855QX



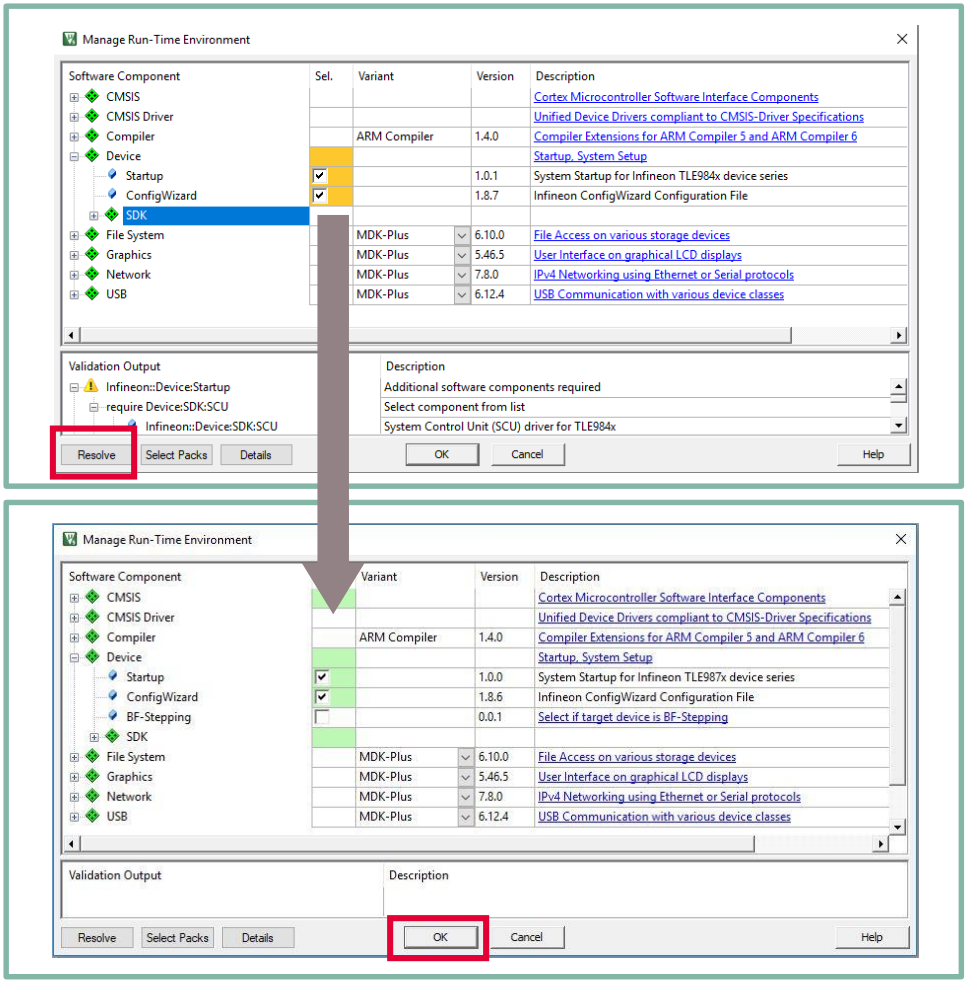


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Getting Started: Infineon Embedded Power SDK Keil µVision5 Template

2) Configuration of Run-Time Environment

- Expand: “Device”
  - Check: Startup
  - Check: ConfigWizard
- “Sel.” window background is **orange**
- Press: “Resolve”
- “Sel.” window background is now **green**
- Expand “SDK”
  - Check “TIMER2x”
- Continue with “OK”



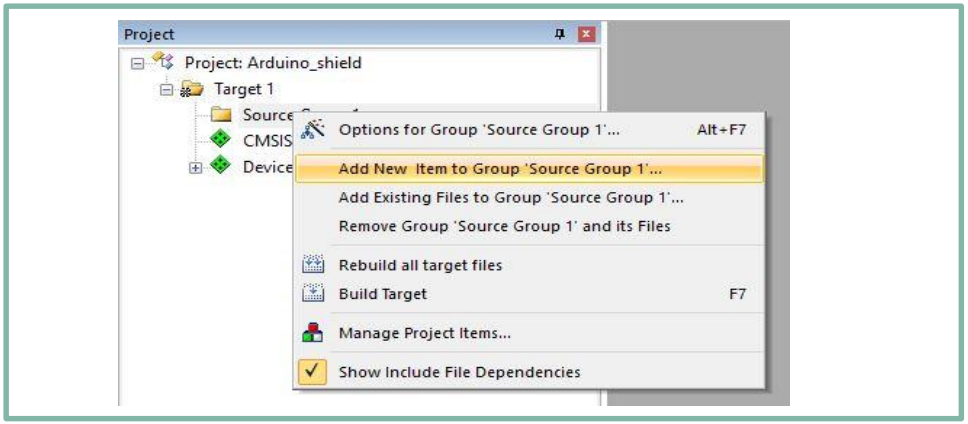
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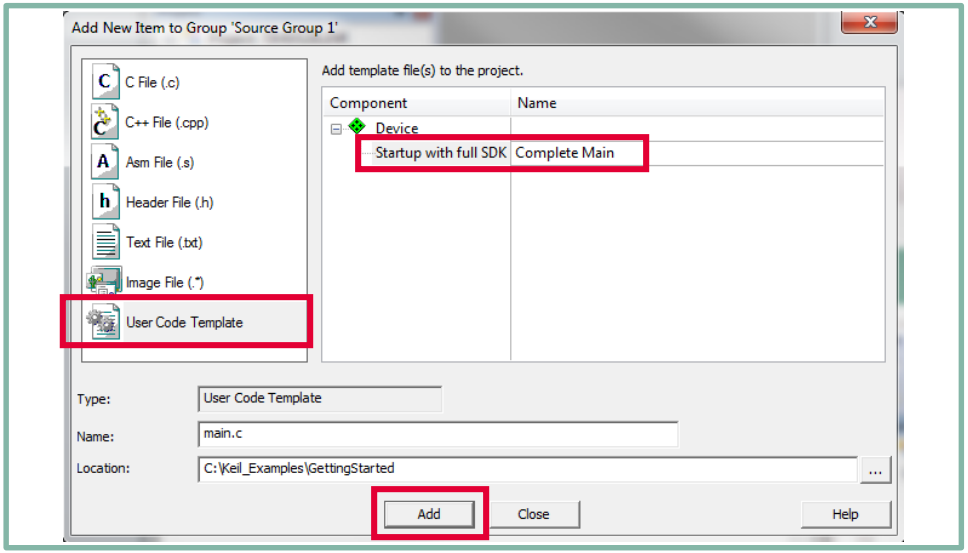
Getting Started: Infineon Embedded Power SDK Keil µVision5 Template

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3) Using 'Main' template

- Expand: “Target 1”
- Right click on: “Source Group 1”
- Choose: Add New Item to Group “Source Group 1”
- Choose “User Code Template”
- Expand “Device”
- Choose: “Startup”
- Continue with “Add”

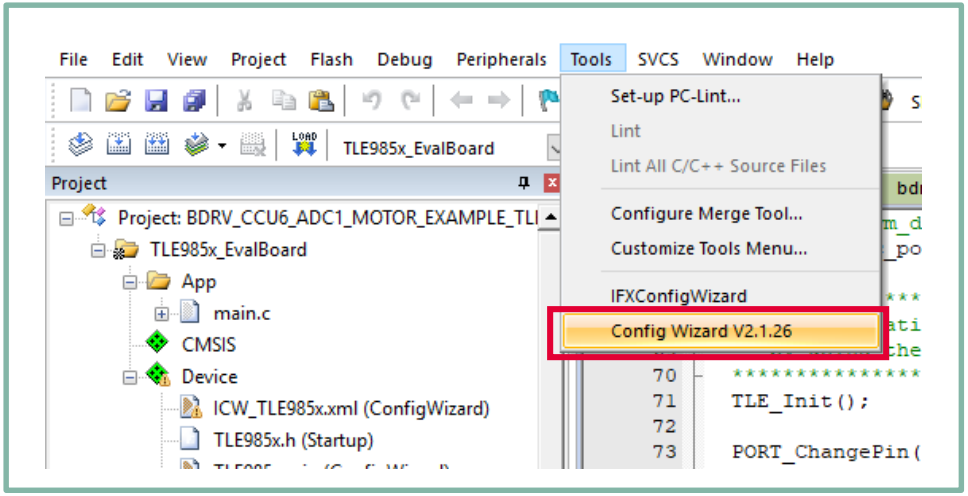


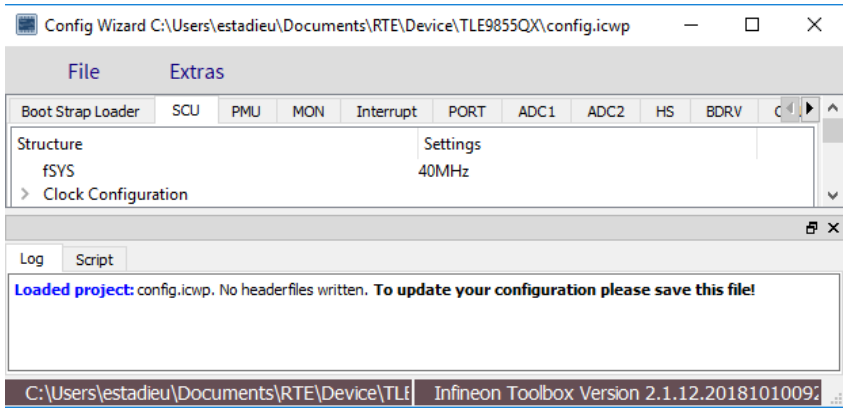


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4) Using Config Wizard V2

- Open Config Wizard by choosing Tools > Config Wizard V2
- Config Wizard will open in a separate window

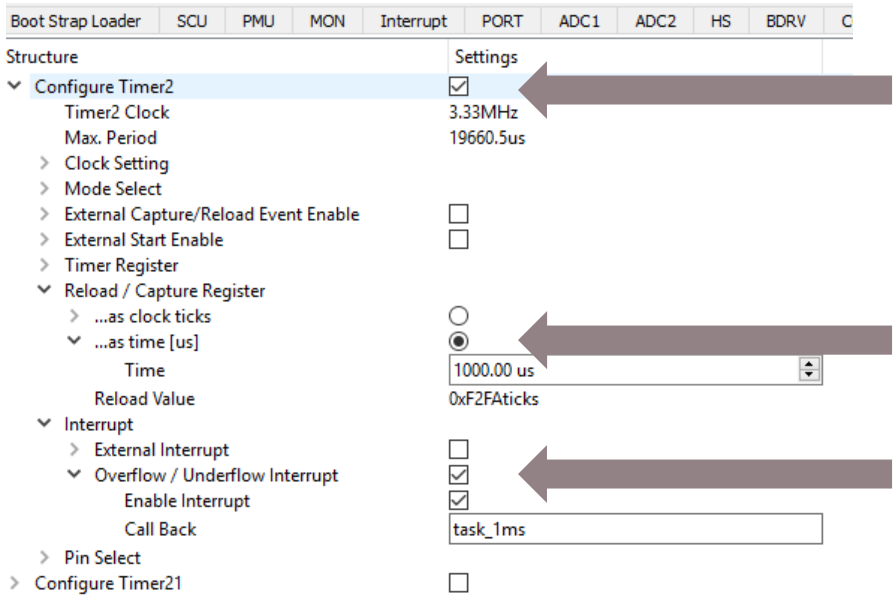




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5) Using Config Wizard V2: Timer2 Configuration

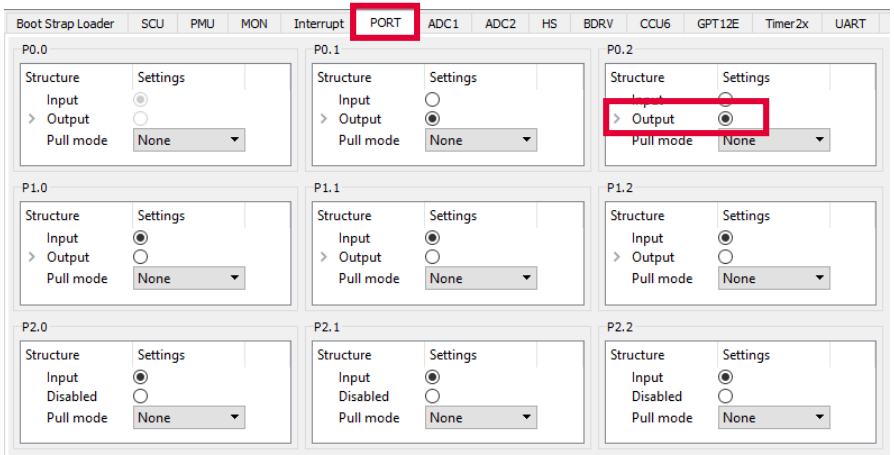
- Open “Timer 2x” section
- Enable “Configure Timer” checkbox
- Go to:
  “Reload / Capture Register”
  - Enter “1000” µs
- Go to: “Interrupt”
  - Enable Overflow Interrupt
  - Type “task_1ms” in “Call Back” line



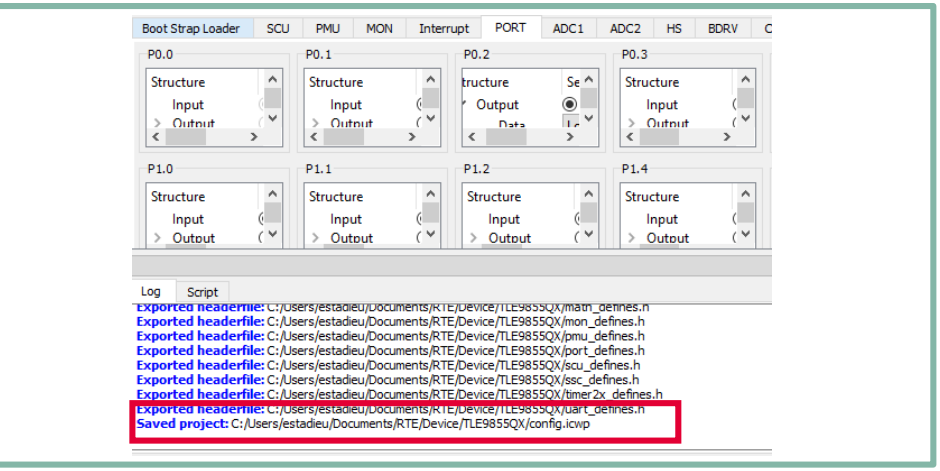
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6) Using Config Wizard V2: Port Configuration

- Select “PORT” section
- Go to the “P0.2” section
- Configure pin to “Output” mode



- Save with “File” -> “Save”



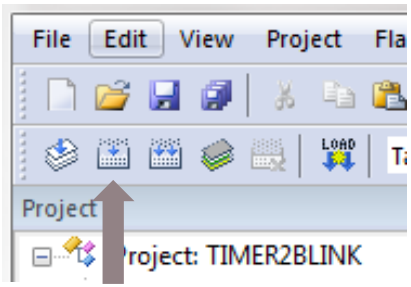
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Getting Started: Infineon Embedded Power SDK Keil µVision5 Template

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7) Finish Code in “main.c”

- Go to Keil MDK
- Start Timer2 before the “for(;;)” loop
- Write function definition of interrupt callback
- Use API function “PORT_ChangePin()”
- “Save” and “Build” project




```
82  /*****************************************************
83  ** place your application code here
84  *****************************************************
85  TIMER2_Start();
86  /*****************************************************
87  ** main endless loop
88  *****************************************************
89  for (;;)
90  {
```

```
55  /*****************************************************
56  ** Private Function Declarations
57  *****************************************************
58  void task_1ms(){
59    PORT_ChangePin(0x02, PORT_ACTION_TOGGLE);
60  }
```

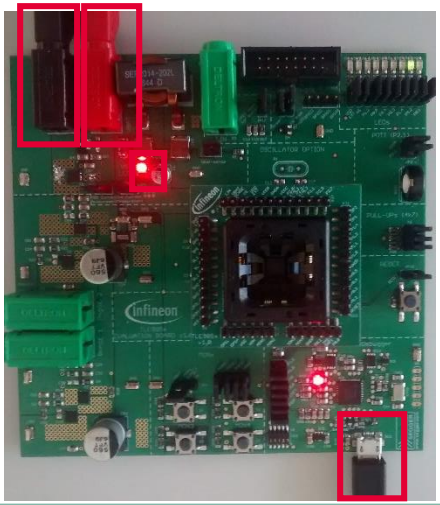

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Getting Started: Infineon Embedded Power SDK Keil µVision5 Template

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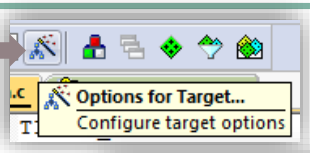
8) Power up Evaluation board

- Connect micro USB cable
- Supply board via banana jacks (VBAT, GND)
- Debug LED lights up

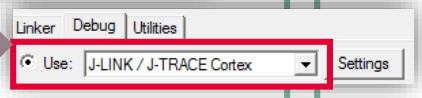


9) Connect Debugger

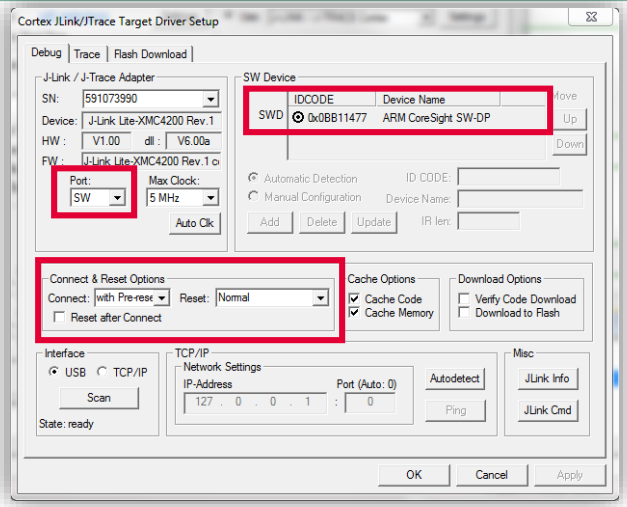
- Go to



- Choose:
  - Debug->use: J-Link
  - Go to “Settings”



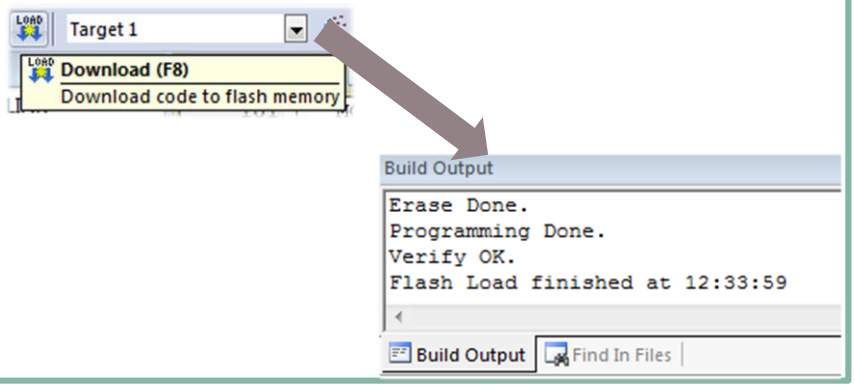
- SWD connection established when “IDCODE” is visible



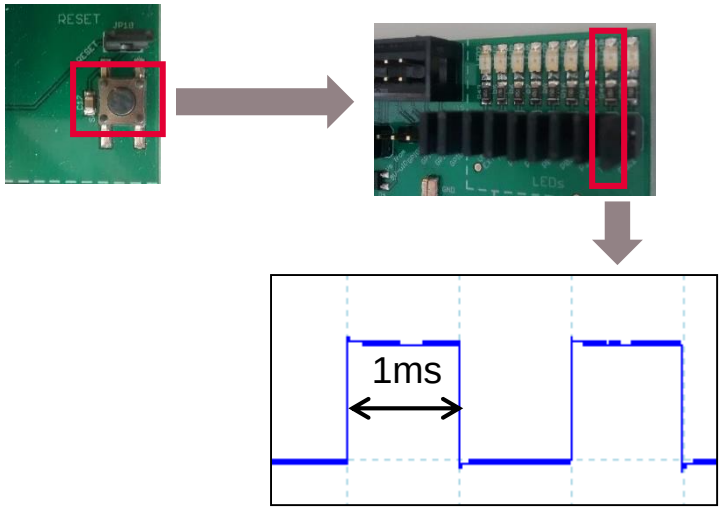
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10) Download and run code

- Press: “Load”- button or Press: “F8”
- “Flash Load finished” is shown in “Build Output” window



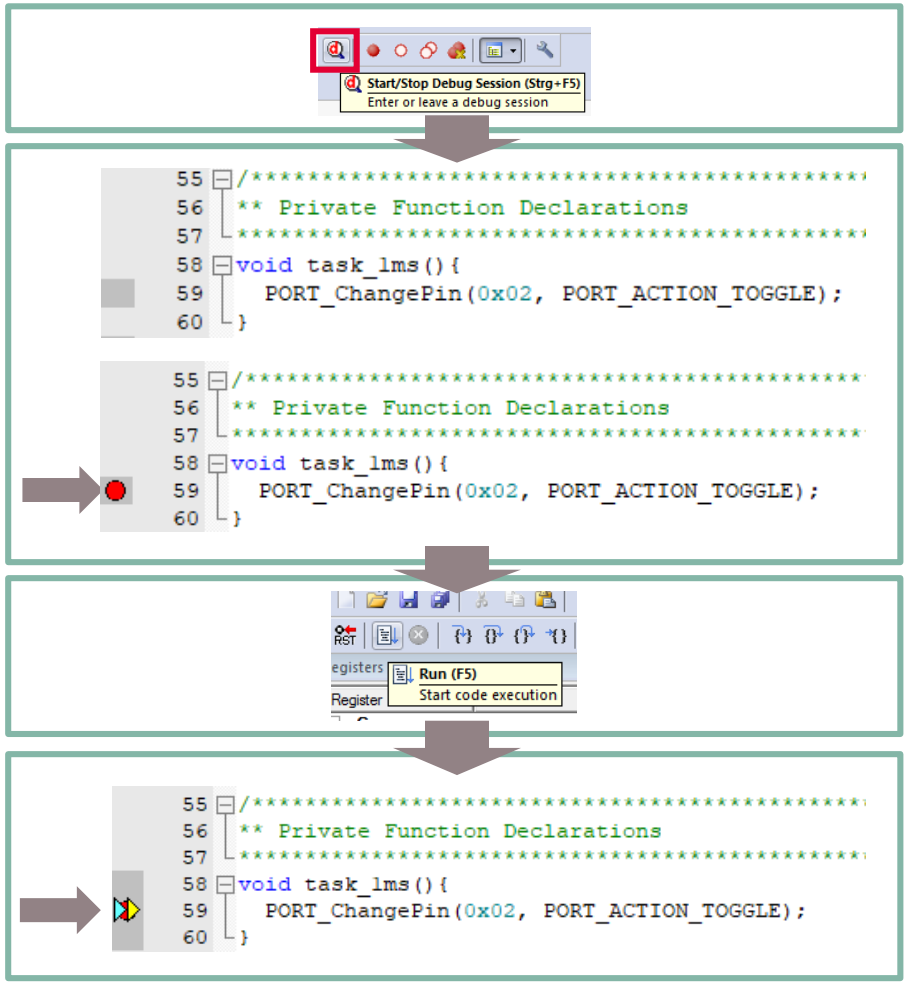
- Press: “Reset” button on Evaluation Kit
- LED on Port “P0.2” will light up
- Port toggle every 1ms



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11) Use Runtime Debug

- Enter “Debug Session”
- Left click at the dark grey area left of the code, to place a “breakpoint”
- Hit “Run” or press “F5” to start execution
- Code execution stops at breakpoint
- In this example:
  - Every time “Run” is pressed: “P0.2” toggles

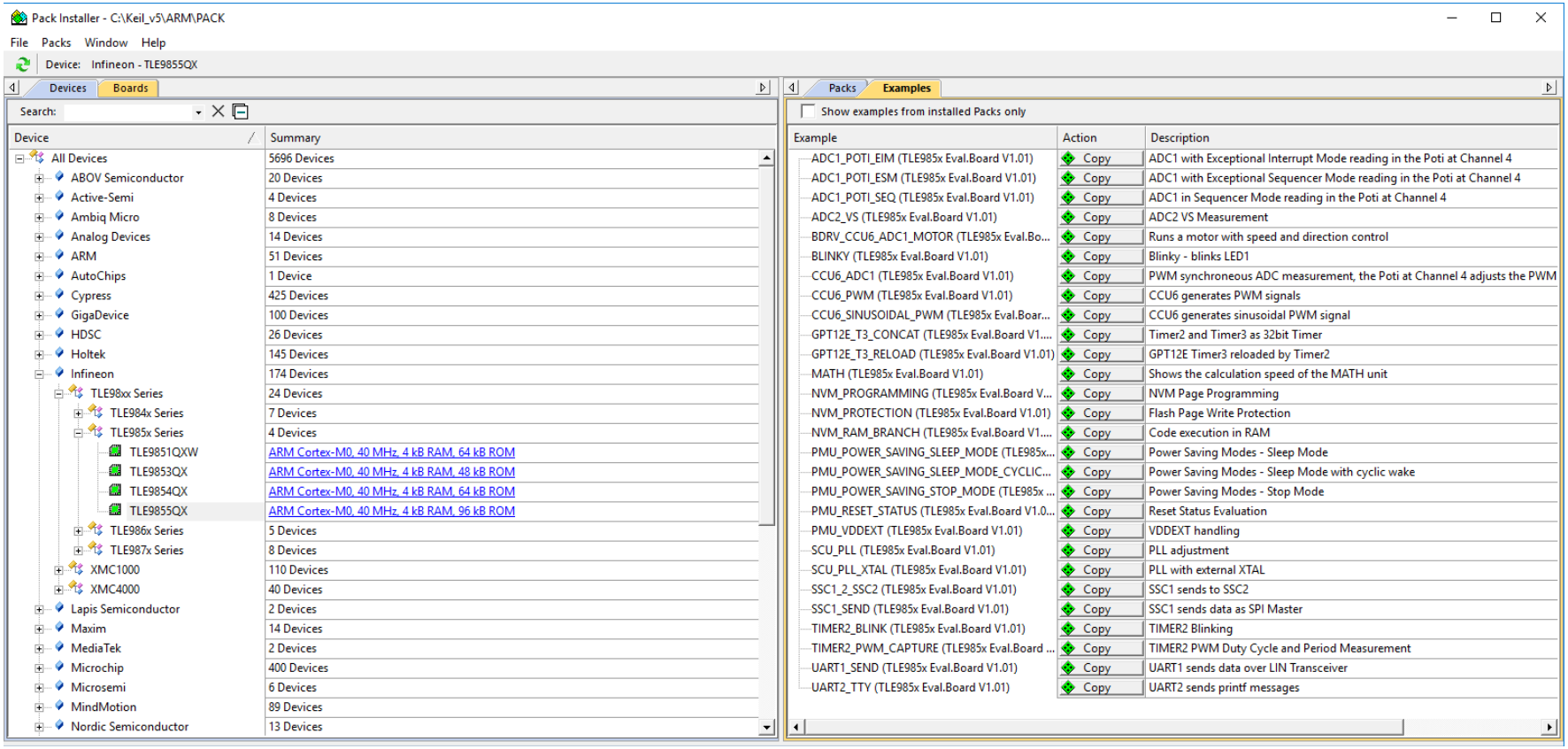


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Getting Started: Infineon Embedded Power SDK Example Code

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Infineon Example Code available in “Pack Installer”



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