Getting Started with AUTOSAR MCAL

Steve Mihalik

Senior Field Application Engineer

October 2018 | AMF-AUT-T3380

SECURE CONNECTIONS FOR A SMARTER WORLD

Abstract

This session is intended for engineers either getting started or are interested in seeing how to use AUTOSAR MCAL to generate and implement code.

“Hello world” level examples are presented using Tresos configuration tool to generate AUTOSAR defined structures.

These structures are combined with NXP written drivers and user code to build an application.

Agenda

- Introduction
- Recommended workflow
- Port module – Port pin configurations (GPIO)
- Dio module - Add Digital I/O to control GPIO
- Gpt module - General Purpose Timer (RTC)
- Interrupt Ap - Add Interrupt capability to GPT
- Reference: NXP AUTOSAR Installation

Introduction

NXP AUTOSAR Licensing Summary

rev. Sept 07 2018

Feature		Evaluation	DISM	Expired	Production[4]
MCAL, OS	Latest updates[1] for that version put in your NXP account	Yes	Yes	No	No
	Installation license for your current or new PC	Yes	Yes	No	Yes
	Generated code can be used by application code	Yes	Yes	Yes	Yes
Tresos	Version used for testing is in your account	Yes	Yes	Yes but[2]	Yes
	Use license[3] put in your account (renewed quarterly)	Yes	Yes	No	Yes
	Generated code's configuration can be modified	Yes	Yes	No	Yes
Support	On-line support	No	Yes	No	No

[1] Updates include Hot Fixes & RTM releases for that version. New AUTOSAR versions, e.g., 4.2 to 4.3, require additional license

[2] You can still download Tresos from your account but not use it due to expired license.

[3] Notes: 1.) Tresos license only works with NXP products.
2.) Tresos license for versions 17.0 or later is an “activation code”; earlier versions is a “license file”.

[4] Production licenses for licensed version do not expire

Installation Process

1. Get AUTOSAR installation SW to your NXP account

2. Download MCAL / OS installation SW from your NXP account

3. Download, install / renew Tresos & license code or file

4. Download, install make utility

5. Install MCAL (and/or OS)

6. Sample application installation & build configuration

7. Additional SW: Compiler, Java

Recommended workflow

Recommended Workflow

* First time only

Windows:

1. Duplicate & rename sample application’s folder*

Tresos:

1. Close any previous projects (reduces risk of configuring module of wrong project)
2. Import (copy) sample application’s Tresos project*
3. Rename project to same name as sample application’s folder*
4. Load project’s configuration
5. Sanity check: Generate and ensure no errors
6. Modify as desired
7. Generate

Windows:

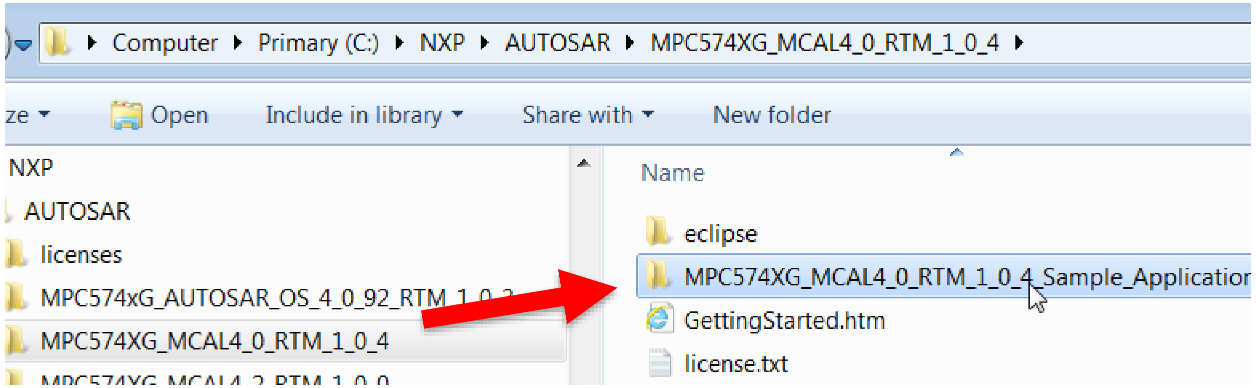
1. Copy output (.c and .h files) from Tresos project’s output folder to sample application’s folder
2. Modify application code as desired
3. Build

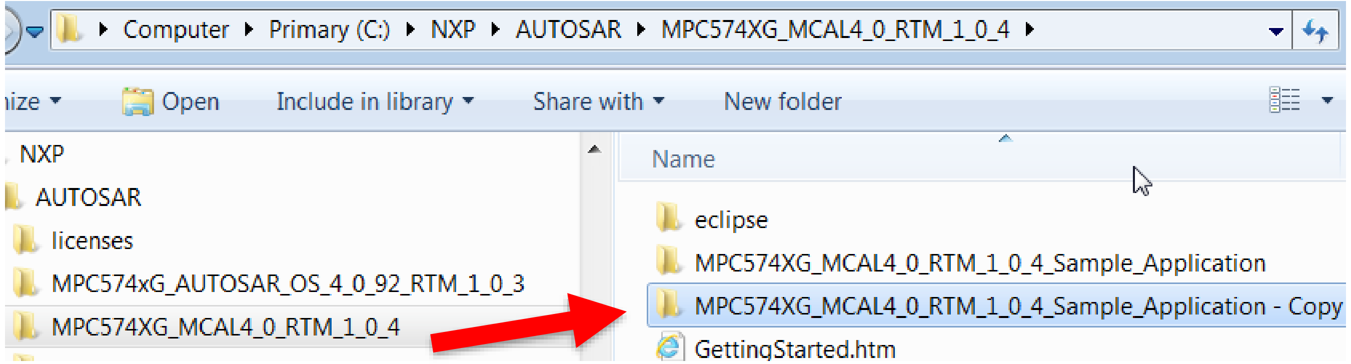
Duplicate & Rename Sample Application

- Copy an MCAL sample application folder. Examples: MPC5748G_MCAL4_0_sample_ap_devkit or

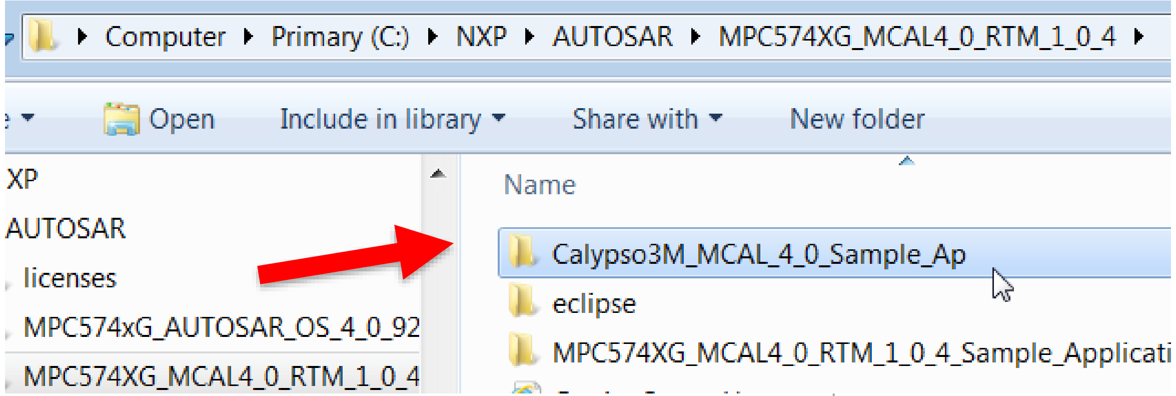
MPC574XG_MCAL4_0_RTM_1_0_4_Sample_Application_6M

- Paste


Computer ▸ Primary (C:) ▸ NXP ▸ AUTOSAR ▸ MPC574XG_MCAL4_0_RTM_1_0_4 ▸
ze ▾
Open
Include in library ▾
Share with ▾
New folder
NXP
AUTOSAR
licenses
MPC574xG_AUTOSAR_OS_4_0_92_RTM_1_0_3
MPC574XG_MCAL4_0_RTM_1_0_4
MPC574XG_MCAL4_2_RTM_1_0_0
Name
eclipse
MPC574XG_MCAL4_0_RTM_1_0_4_Sample_Application
GettingStarted.htm
license.txt


Computer ▸ Primary (C:) ▸ NXP ▸ AUTOSAR ▸ MPC574XG_MCAL4_0_RTM_1_0_4 ▸
ize ▾
Open
Include in library ▾
Share with ▾
New folder
NXP
AUTOSAR
licenses
MPC574xG_AUTOSAR_OS_4_0_92_RTM_1_0_3
MPC574XG_MCAL4_0_RTM_1_0_4
Name
eclipse
MPC574XG_MCAL4_0_RTM_1_0_4_Sample_Application
MPC574XG_MCAL4_0_RTM_1_0_4_Sample_Application - Copy
GettingStarted.htm

- Rename to Calypso6M_MCAL4_0_sample_ap_devkit
- Note: slides show alternate name: ***Calypso3M_MCAL_4_0_Sample_Ap***


Computer ▸ Primary (C:) ▸ NXP ▸ AUTOSAR ▸ MPC574XG_MCAL4_0_RTM_1_0_4 ▸
Open
Include in library ▾
Share with ▾
New folder
XP
AUTOSAR
licenses
MPC574xG_AUTOSAR_OS_4_0_92
MPC574XG_MCAL4_0_RTM_1_0_4
Name
Calypso3M_MCAL_4_0_Sample_Ap
eclipse
MPC574XG_MCAL4_0_RTM_1_0_4_Sample_Applicati

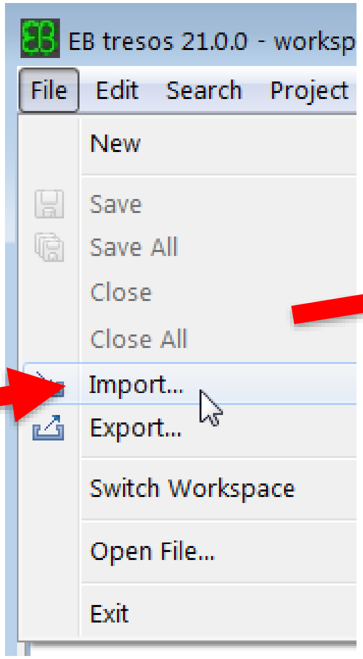
Importing Sample Application into Tresos

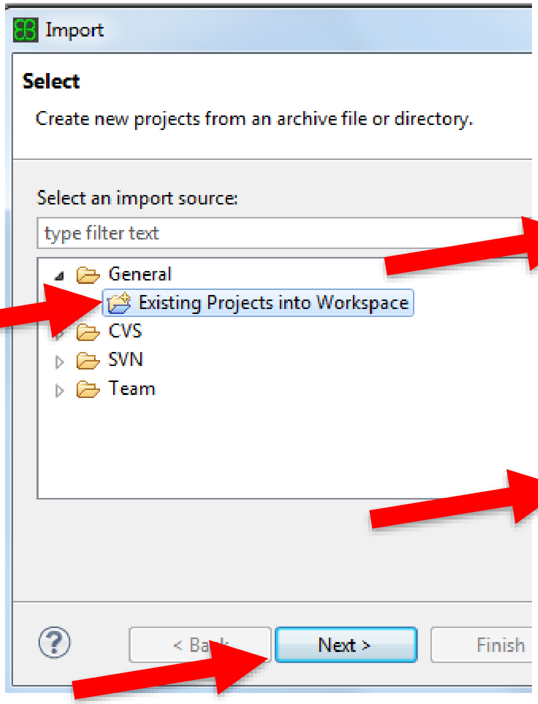
1. Start Tresos. Use 64 bit if there is an option and you have Windows 64 bit. (First time: click yes to create workspace directory)

File** - **Import** - **General** - **Existing Projects into Workspace** -> Click **Next

2. First time: Check “**Copy**” box to copy workspace from NXP folder to EB folder.)
***3. Browse** to root directory (**Tresos folder**). Example:*
C:\NXP\AUTOSAR\MPC574XG_MCAL4_0_RTM_1_0_4\ Calypso6M_sample_ap_devkit ***Tresos***

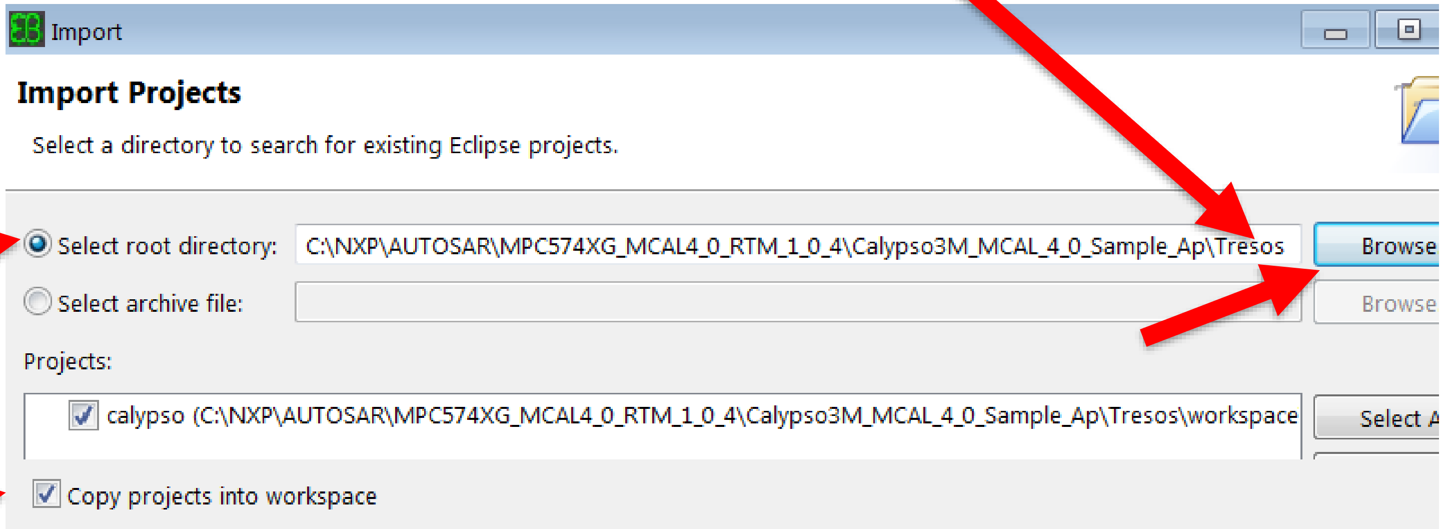
*4. Click **OK** -> Click **Finish***





Create new projects from an archive file or directory.

Select an import source:



Select a directory to search for existing Eclipse projects.

● Select root directory: C:\NXP\AUTOSAR\MPC574XG_MCAL4_0_RTM_1_0_4\Calypso3M_MCAL_4_0_Sample_Ap\Tresos

○ Select archive file:

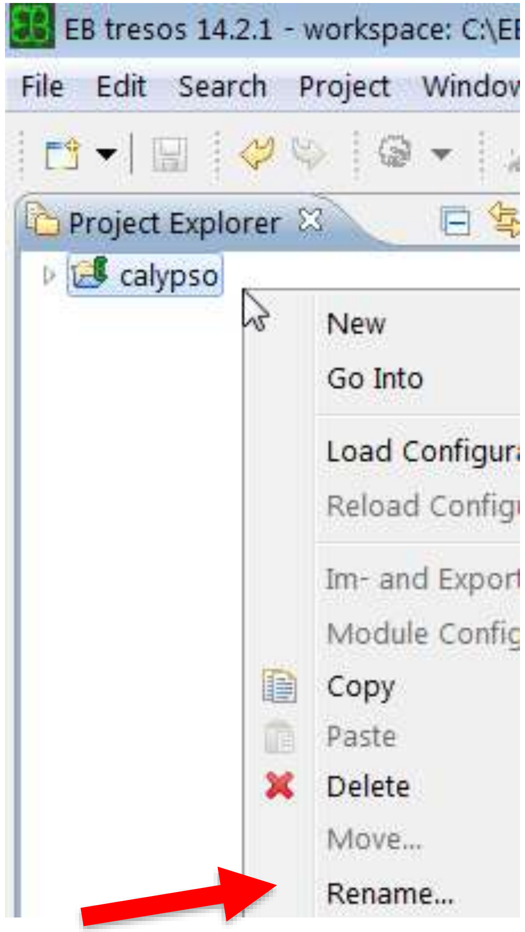
Projects:

☑ calypso (C:\NXP\AUTOSAR\MPC574XG_MCAL4_0_RTM_1_0_4\Calypso3M_MCAL_4_0_Sample_Ap\Tresos\workspace

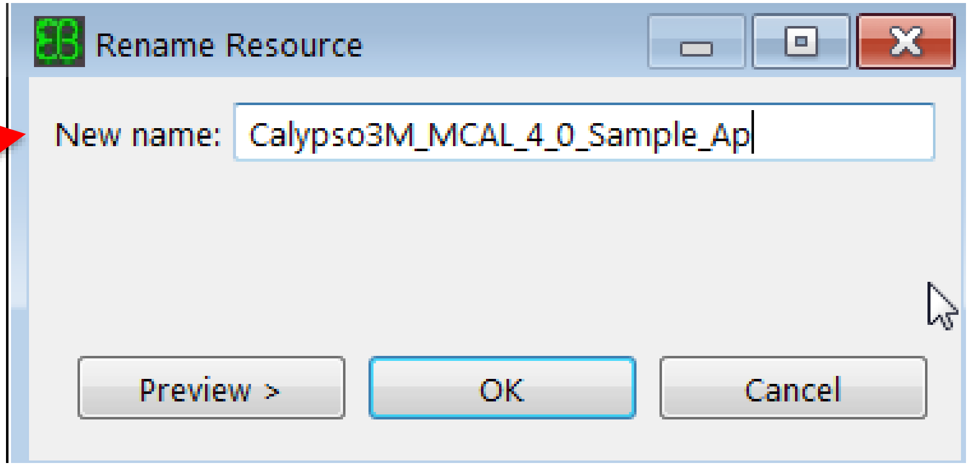
☑ Copy projects into workspace

Suggestion: Rename Tresos Project

- Right click on project – Rename (optional).

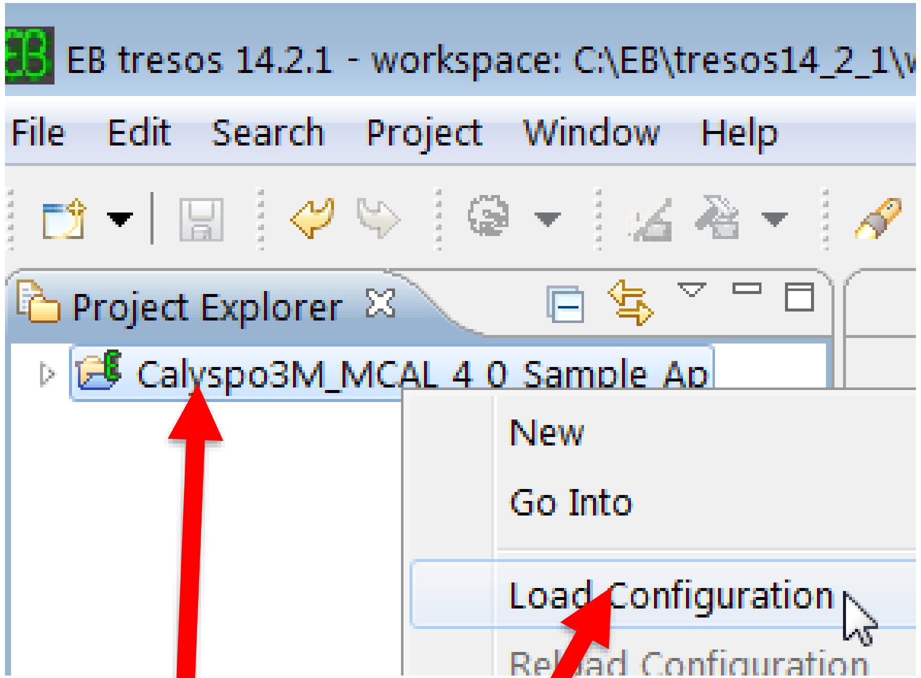


- Enter new name. Example: Calypso6M_MCAL4_0_sample_ap



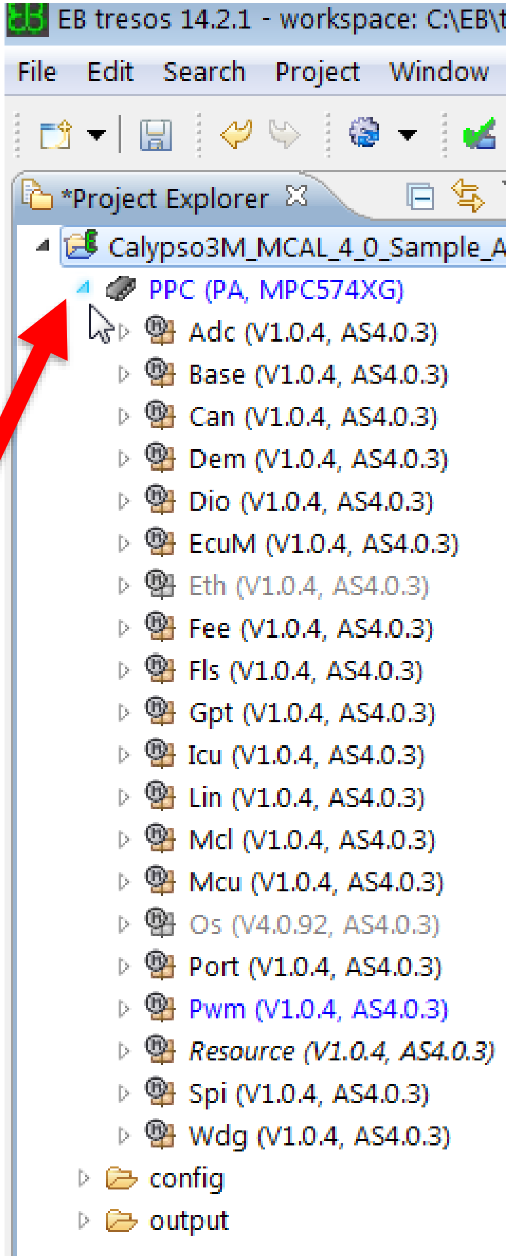
New name: Calypso3M_MCAL_4_0_Sample_Ap

Opening a Sample Application Project


EB tresos 14.2.1 - workspace: C:\EB\tresos14_2_1\w
File Edit Search Project Window Help
Project Explorer
Calyspo3M_MCAL_4_0_Sample_Ap
New
Go Into
Load Configuration
Reload Configuration

Right click on Calypso6M_sample_ap
*-> select **Load Configuration***
-> click OK

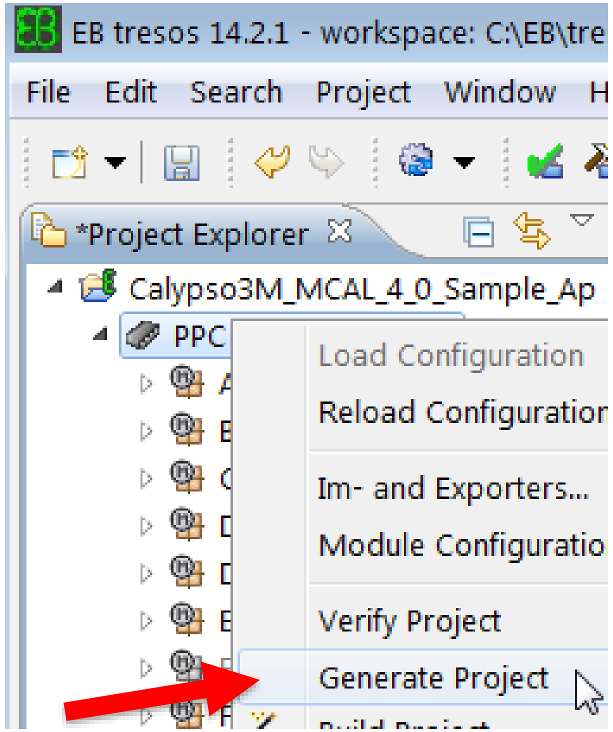
-> expand project to see modules in project

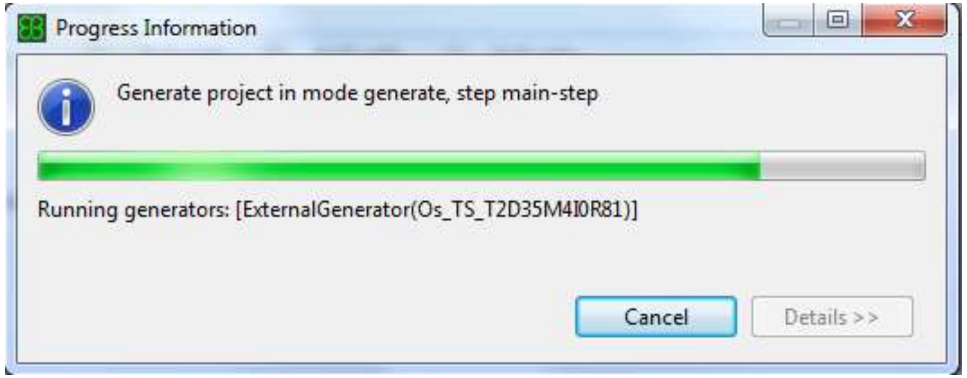

EB tresos 14.2.1 - workspace: C:\EB\t
File Edit Search Project Window
*Project Explorer

```
Calypso3M_MCAL_4_0_Sample_A
  PPC (PA, MPC574XG)
    Adc (V1.0.4, AS4.0.3)
    Base (V1.0.4, AS4.0.3)
    Can (V1.0.4, AS4.0.3)
    Dem (V1.0.4, AS4.0.3)
    Dio (V1.0.4, AS4.0.3)
    EcuM (V1.0.4, AS4.0.3)
    Eth (V1.0.4, AS4.0.3)
    Fee (V1.0.4, AS4.0.3)
    Fls (V1.0.4, AS4.0.3)
    Gpt (V1.0.4, AS4.0.3)
    Icu (V1.0.4, AS4.0.3)
    Lin (V1.0.4, AS4.0.3)
    Mcl (V1.0.4, AS4.0.3)
    Mcu (V1.0.4, AS4.0.3)
    Os (V4.0.92, AS4.0.3)
    Port (V1.0.4, AS4.0.3)
    Pwm (V1.0.4, AS4.0.3)
    Resource (V1.0.4, AS4.0.3)
    Spi (V1.0.4, AS4.0.3)
    Wdg (V1.0.4, AS4.0.3)
  config
  output
```

Code Generation

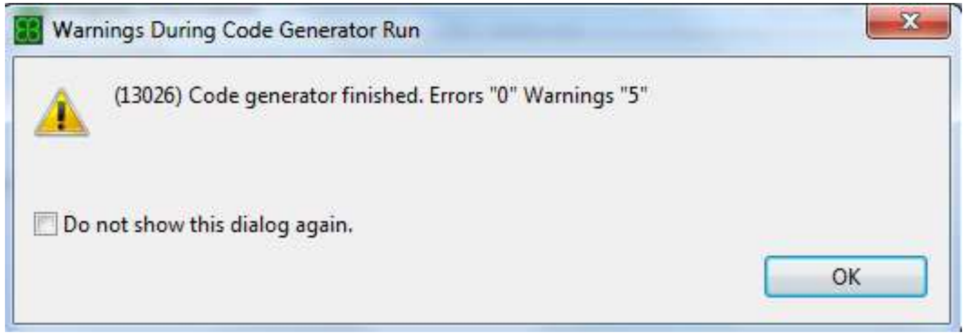
- Right Click on configuration (under project name) and select ***Generate Project***





Generate project in mode generate, step main-step

Running generators: [ExternalGenerator(Os_TS_T2D35M4I0R81)]

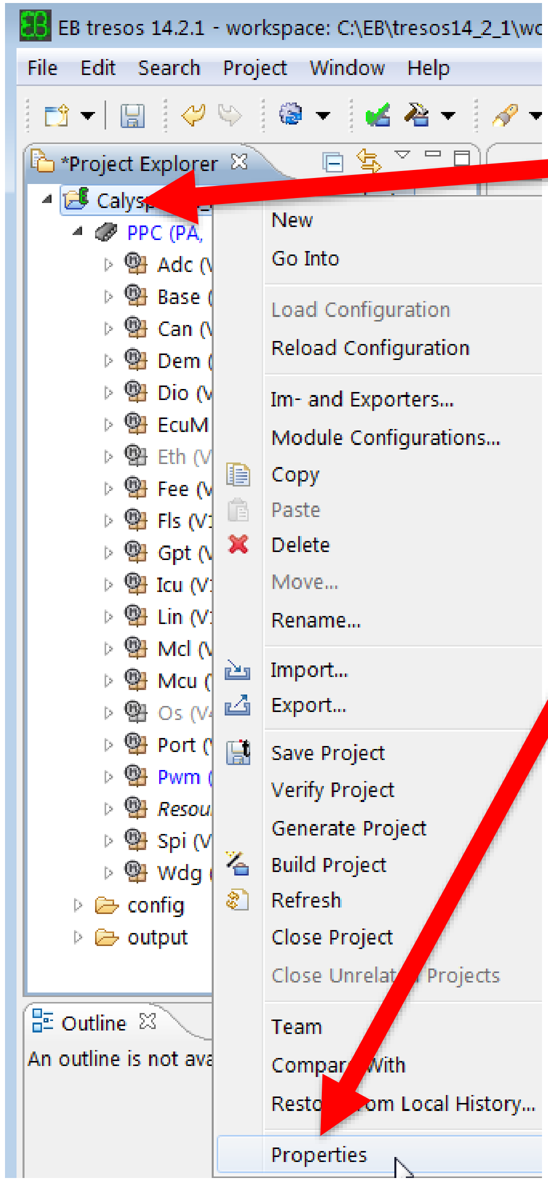


(13026) Code generator finished. Errors "0" Warnings "5"

□ Do not show this dialog again.

- Note: If there are generation errors be sure the Os module is disabled and not enabled to Generate. (Right click on configuration [PPC] & select Module Configs). Os modules requires AUTOSAR OS for this example.
- Click OK when done

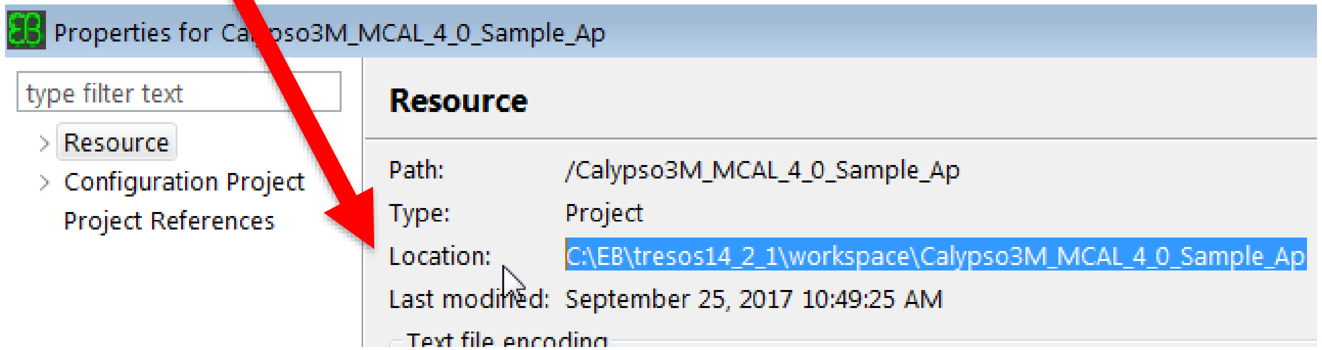
Locate generated Tresos output files (to be copied to ap)



1. Right click on project

2. Select properties

3. Select Resource, & note Location



Path: /Calypso3M_MCAL_4_0_Sample_Ap

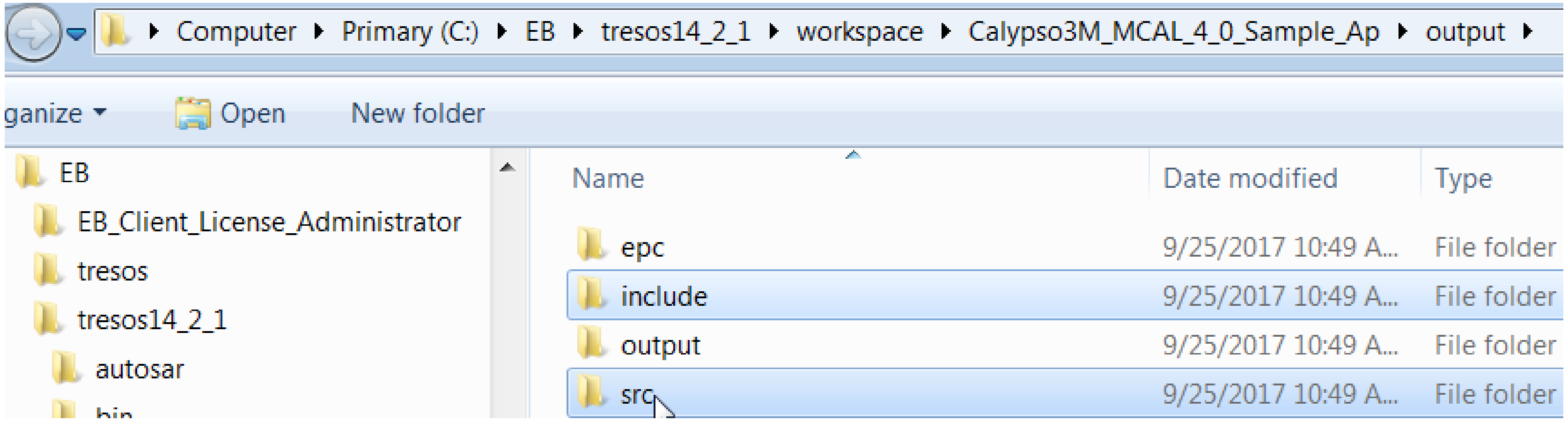
Type: Project

Location: C:\EB\tresos14_2_1\workspace\Calypso3M_MCAL_4_0_Sample_Ap

Last modified: September 25, 2017 10:49:25 AM

After generation, copy new generated files to application

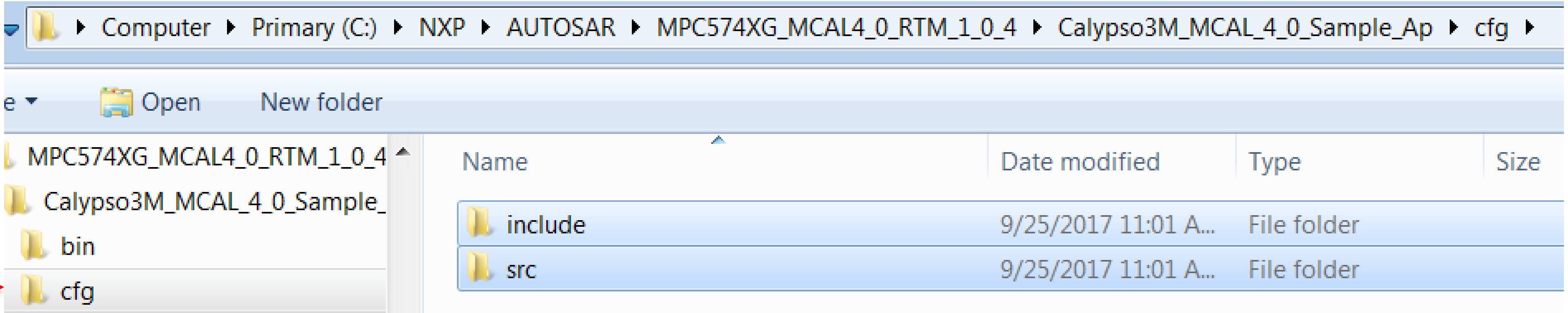
- **Copy** include & src folders **from the EB Tresos** generated folder location:
  - **Delete prior folders** & **paste new into application's cfg folder** (not tresos folder) (May need to create cfg folder in application folder)



Computer ▸ Primary (C:) ▸ EB ▸ tresos14_2_1 ▸ workspace ▸ Calypso3M_MCAL_4_0_Sample_Ap ▸ output ▸

EB
EB_Client_License_Administrator
tresos
tresos14_2_1
autosar
bin

Name	Date modified	Type
epc	9/25/2017 10:49 A...	File folder
include	9/25/2017 10:49 A...	File folder
output	9/25/2017 10:49 A...	File folder
src	9/25/2017 10:49 A...	File folder



Computer ▸ Primary (C:) ▸ NXP ▸ AUTOSAR ▸ MPC574XG_MCAL4_0_RTM_1_0_4 ▸ Calypso3M_MCAL_4_0_Sample_Ap ▸ cfg ▸

MPC574XG_MCAL4_0_RTM_1_0_4
Calypso3M_MCAL_4_0_Sample_
bin
cfg

Name	Date modified	Type	Size
include	9/25/2017 11:01 A...	File folder	
src	9/25/2017 11:01 A...	File folder	

Build MCAL project – Windows Option

- If needed, update **launch.bat** as done previously with installation for path names and adding “pause” at end.
  - Example application folder path: C:\NXP\AUTOSAR\MPC574XG_MCAL4_0_RTM_1_0_4\Calypso6M_sample_ap

- Build: Double click on **launch.bat** file in your application folder from Windows explorer.
  - If build aborts at adc.c (1st module in list), then the compiler path may be the problem. Verify the path in launch.bat. Make sure your compiler license is valid too.

Example sample application launch.bat paths

```
::TRESOS
SET TRESOS_DIR=C:\EB\tresos14_2_1
::GHS (recommend comp_201416 since MCAL and OS ver 4.0 were tested with it)
SET GHS_DIR=C:\ghs\comp_201714
::DIAB
::SET DIAB_DIR=C:/Tools/WindRiver/diab/5.9.4.8
::Path to the plugins folder
SET PLUGINS_DIR=C:\NXP\AUTOSAR\MPC574XG_MCAL4_0_RTM_1_0_4\eclipse\plugins
SET MAKE_DIR=C:\gnuwin32
::SSC is required when OS is used
::SSC can still be defined if OS is not installed or not defined at all
SET SSC_ROOT=C:\NXP\AUTOSAR\MPC574xG_AUTOSAR_OS_4_0_92_RTM_1_0_3
```

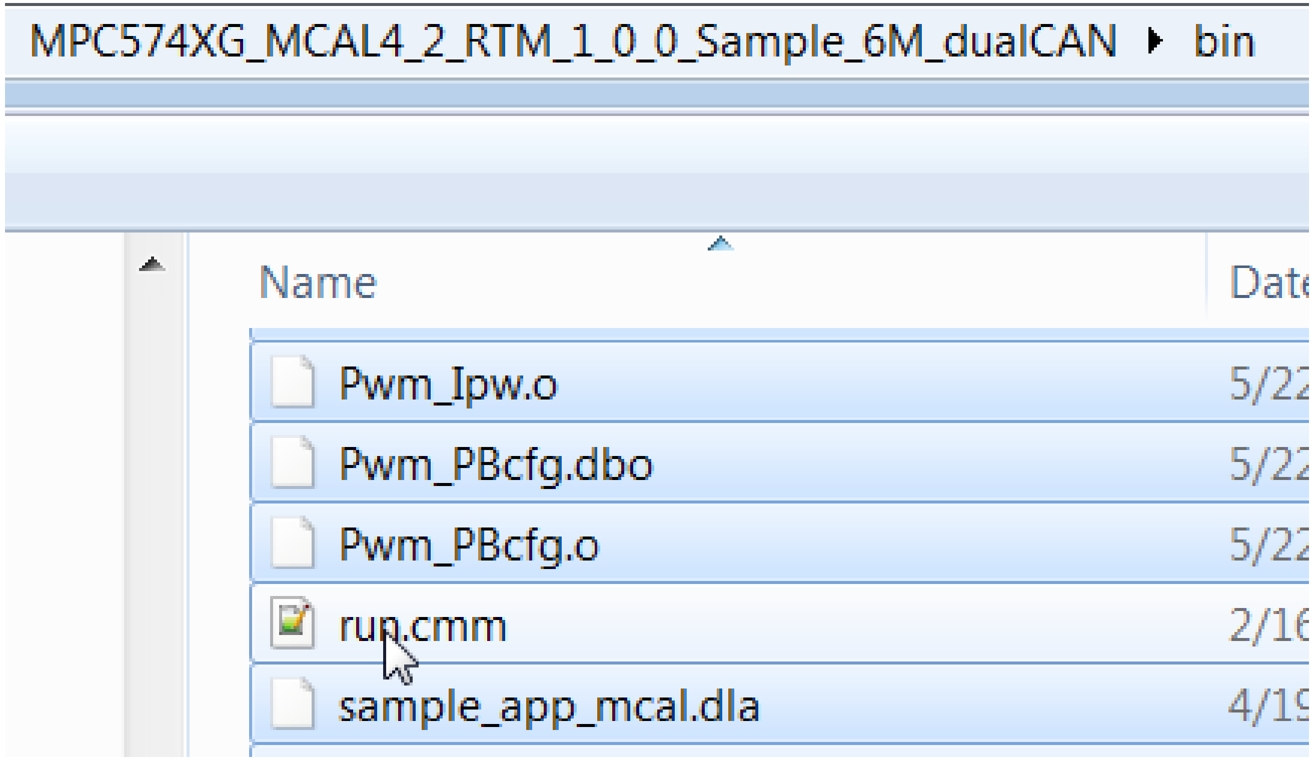
Tip: add “pause” to the last line in the launch.bat file

Build project –

- **launch.bat**

Method to clean project

- In the project's **bin directory**, select all files **except if there are debugger files like run.cmm or any other .cmm file** and then delete those selected files. Example:



MPC574XG_MCAL4_2_RTM_1_0_0_Sample_6M_dualCAN ▸ bin

Name	Dat
Pwm_Ipw.o	5/22
Pwm_PBcfg.dbo	5/22
Pwm_PBcfg.o	5/22
run.cmm	2/16
sample_app_mcal.dla	4/19

- If you do a clean of the project, be sure to rebuild by executing launch.bat to prepare for the next exercise, download and debug.

Port module

Port and Dio example: GPIO

A simple GPIO application will be created that reads a pushbutton swtich and outputs its state to an LED. Overall summary:

- Tresos:
  - Port Module: Add two GPIO pin configurations for LED output and switch input on EVB (done)
  - Dio Module: Name the two port pins
- Application code:
  - Code loop: read switch when write switch state to LED
- Ports to be used on MPC5748G Mother-Daughter EVB are:
  - Switch 2: **PA2**
  - LED 4: **PG5**

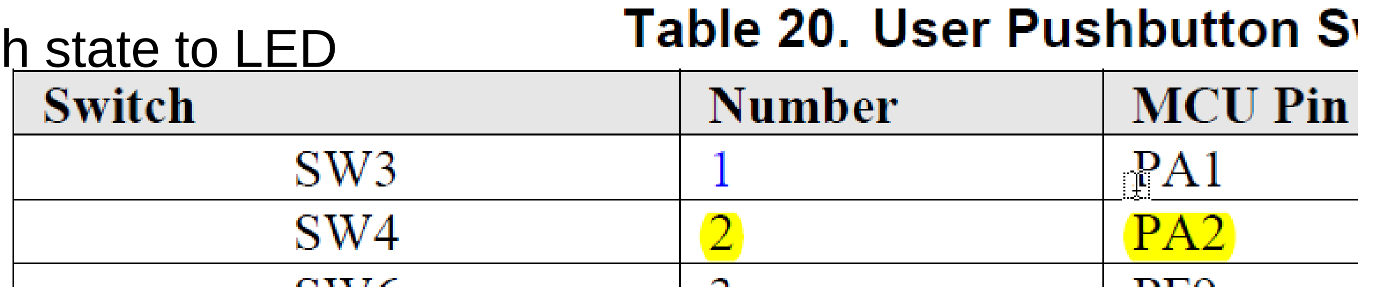


Table 20. User Pushbutton S

Switch	Number	MCU Pin
SW3	1	PA1
SW4	2	PA2
[illegible]	[illegible]	[illegible]

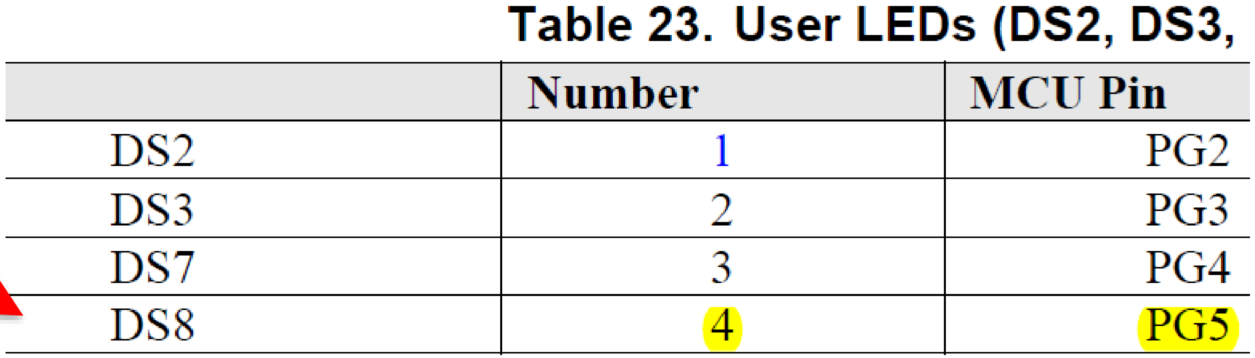


Table 23. User LEDs (DS2, DS3,

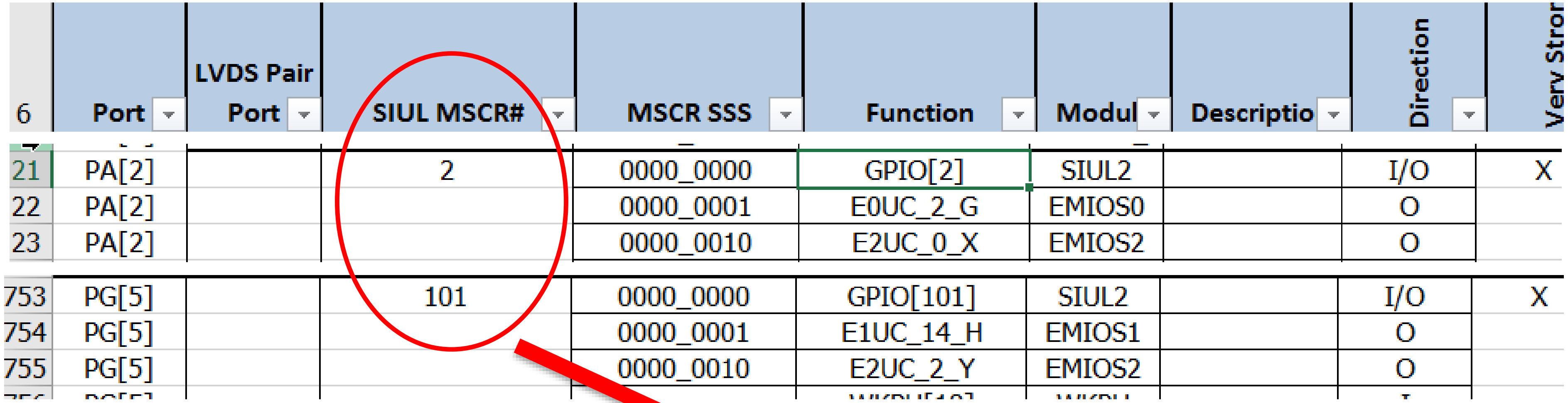
	Number	MCU Pin
DS2	1	PG2
DS3	2	PG3
DS7	3	PG4
DS8	4	PG5

Port APIs

```
void Port_Init( const Port_ConfigType* ConfigPtr )
void Port_SetPinDirection( Port_PinType Pin, Port_PinDirectionType Direction )
void Port_RefreshPortDirection( void )
void Port_GetVersionInfo( Std_VersionInfoType* versioninfo )
void Port_SetPinMode( Port_PinType Pin, Port_PinModeType Mode)
```

Mapping pins to Port module

- From the I/O spreadsheet attached to the MPC5748G reference manual, MSCR numbers and function’s SSS values are listed for ports:



6	Port	LVDS Pair Port	SIUL MSCR#	MSCR SSS	Function	Modul	Descriptio	Direction	Very Stron
21	PA[2]		2	0000_0000	GPIO[2]	SIUL2		I/O	X
22	PA[2]			0000_0001	E0UC_2_G	EMIOS0		O	
23	PA[2]			0000_0010	E2UC_0_X	EMIOS2		O	
753	PG[5]		101	0000_0000	GPIO[101]	SIUL2		I/O	X
754	PG[5]			0000_0001	E1UC_14_H	EMIOS1		O	
755	PG[5]			0000_0010	E2UC_2_Y	EMIOS2		O	

- Example’s GPIO pins:

Description	Use	Port and Channel (Used for Dio port and channel identification	SIUL_MSCR# (Used for Port pin identification)
Switch2	GPIO input	PA2	2
LED4	GPIO output	PG5	101

Port Module Example Project Workflow

Use a minimal application to duplicate. Go up to Tresos Step 6.

* First time only

1. **Windows:**
    1. Duplicate & rename sample application's folder* to Calypso6M_MCAL4_0_gpio_ap
2. **Tresos**:
    1. Close any previous projects (reduces risk of configuring module of wrong project)
    2. Import (copy) mcu application's Tresos project* (Import application's **Tresos** folder). Example:
       C:\NXP\AUTOSAR\MPC574XG_MCAL4_0_RTM_1_0_4\ Calypso6M_MCAL4_0_mcu\Tresos
    3. Rename project to Calypso6M_mcal4_0_gpio_ap
    4. Load project's configuration
    5. Sanity check: Generate and ensure no errors
    6. Modify as desired
    7. Generate
3. **Windows**:
    1. Copy output (.c and .h files) from Tresos project's **output** folder to sample application's **cfg** folder
    2. Modify application code as desired
    3. Build

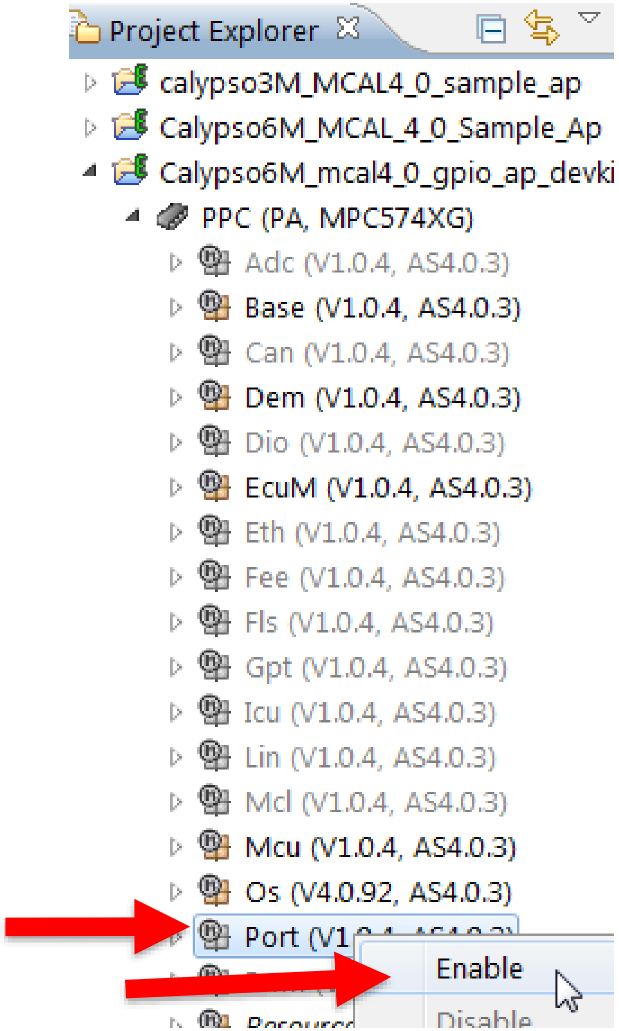
Summary 1: Remove PortPins except JTAG; add 2 GPIO

Port module

- Tab: PortConfigSet
  - Index 0: PortConfigSet_0
    - Tab: PortContainer
      - Index 0: PortContainer_0
        - Tab: PortPin
          - Index n: PortPin names (remove all port pins **except JTAG (DCI) pins**, add 2 PortPins)
          - Index of 1st added PortPin
            - Tab: General (name LED4, PCR 101, output, GPIO mode, portpin high level)
          - Index of 2nd added PortPin
            - Tab: General (name Switch2, PCR 2, input, GPIO mode)

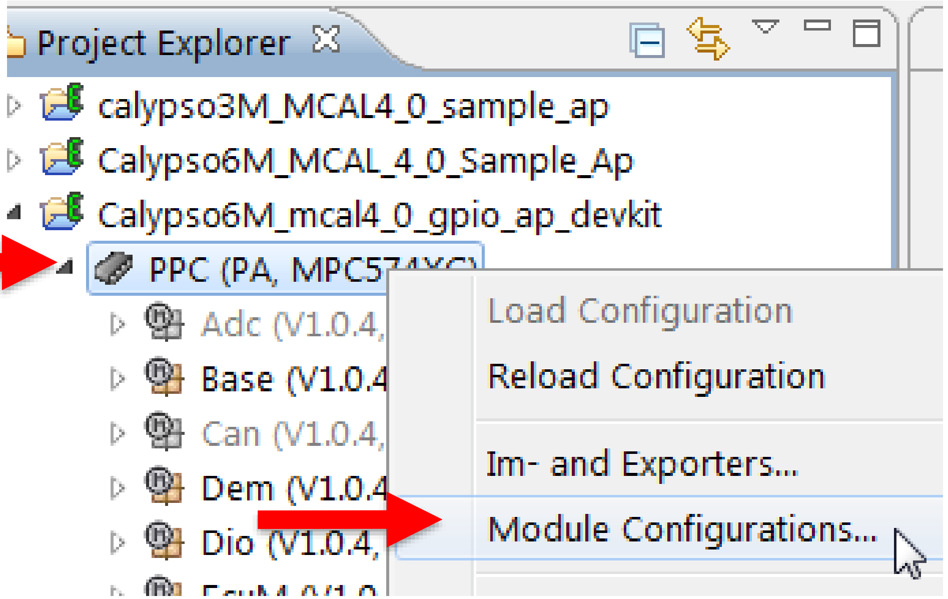
Port (1): Enable Port module

- Enable Port module (if not already enabled) for configuration in Tresos project:
  - Right click on Port module
  - Click on Enable



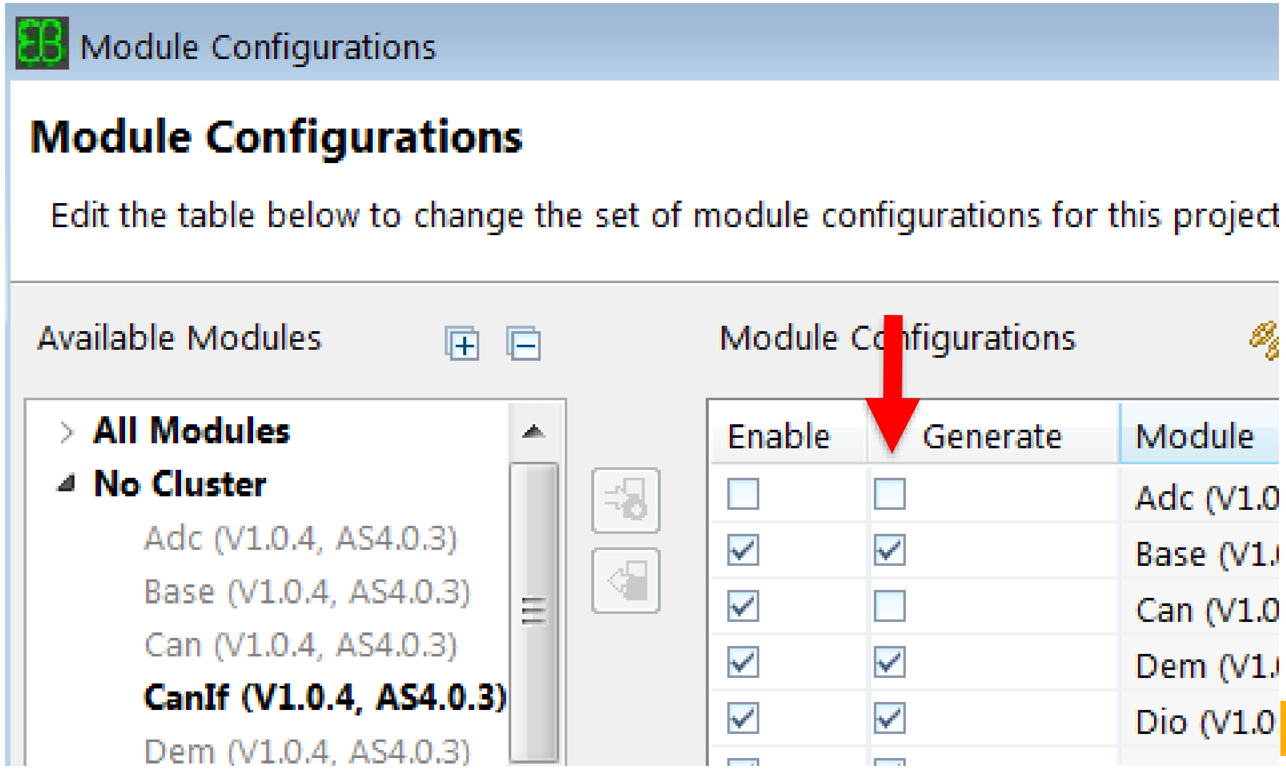
Port (2): Enable code generation

- Enable modules as needed that will be configured to generate code:
  - Right click on PPC
  - Select Module Configurations….
  - In Generate column, check box for:
    - Port
  - Click OK



Project Explorer

- calypso3M_MCAL4_0_sample_ap
- Calypso6M_MCAL_4_0_Sample_Ap
- Calypso6M_mcal4_0_gpio_ap_devkit
  - PPC (PA, MPC574XC)
    - Adc (V1.0.4,
    - Base (V1.0.4
    - Can (V1.0.4,
    - Dem (V1.0.4
    - Dio (V1.0.4,



Module Configurations

Module Configurations

Edit the table below to change the set of module configurations for this project

Available Modules

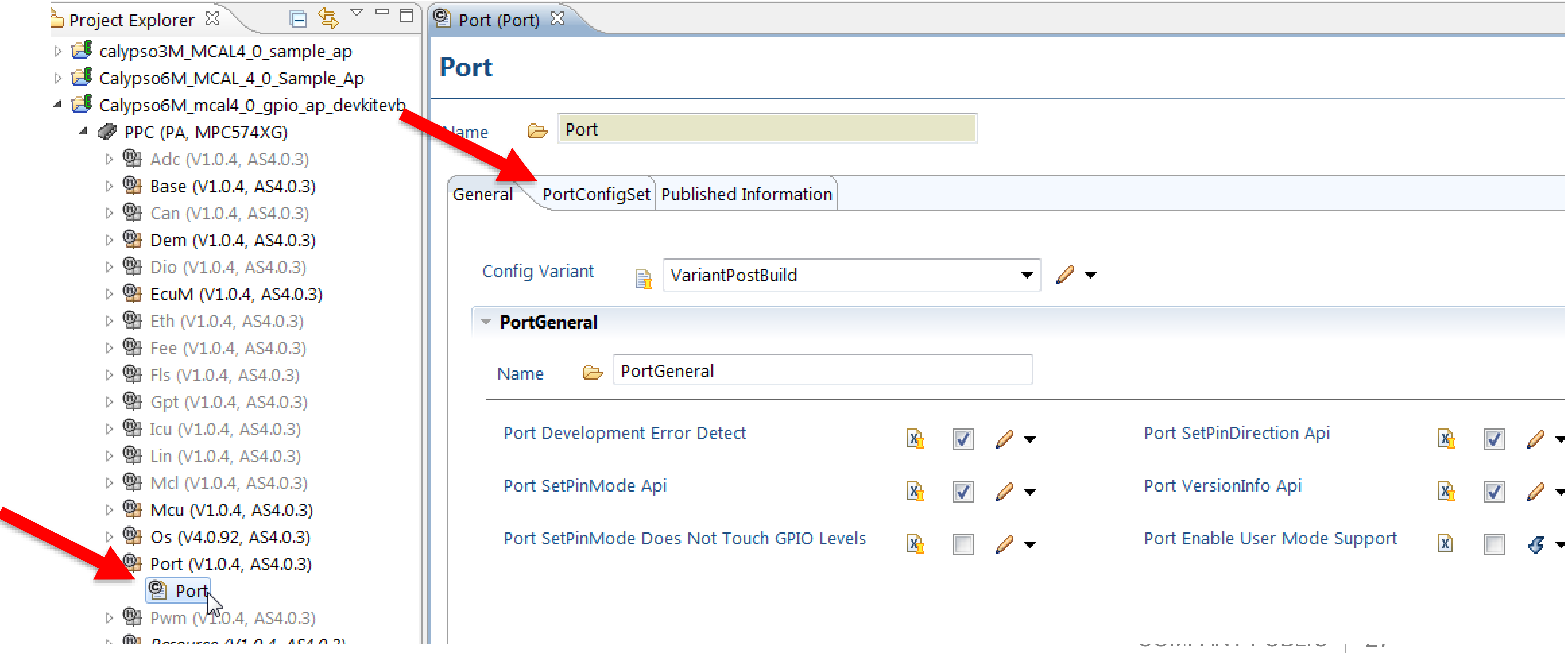
- **All Modules**
- **No Cluster**
  - Adc (V1.0.4, AS4.0.3)
  - Base (V1.0.4, AS4.0.3)
  - Can (V1.0.4, AS4.0.3)
  - **CanIf (V1.0.4, AS4.0.3)**
  - Dem (V1.0.4, AS4.0.3)

Module Configurations

Enable	Generate	Module
☐	☐	Adc (V1.0
☑	☑	Base (V1.
☑	☐	Can (V1.0
☑	☑	Dem (V1.
☑	☑	Dio (V1.0

Port (3): Select PortConfigSet 0 1

- Double click on Port module’s configuration (“Port”)
- Click on PortConfigSet tab



Project Explorer

- calypso3M_MCAL4_0_sample_ap
- Calypso6M_MCAL_4_0_Sample_Ap
- Calypso6M_mcal4_0_gpio_ap_devkitevb
  - PPC (PA, MPC574XG)
    - Adc (V1.0.4, AS4.0.3)
    - Base (V1.0.4, AS4.0.3)
    - Can (V1.0.4, AS4.0.3)
    - Dem (V1.0.4, AS4.0.3)
    - Dio (V1.0.4, AS4.0.3)
    - EcuM (V1.0.4, AS4.0.3)
    - Eth (V1.0.4, AS4.0.3)
    - Fee (V1.0.4, AS4.0.3)
    - Fls (V1.0.4, AS4.0.3)
    - Gpt (V1.0.4, AS4.0.3)
    - Icu (V1.0.4, AS4.0.3)
    - Lin (V1.0.4, AS4.0.3)
    - Mcl (V1.0.4, AS4.0.3)
    - Mcu (V1.0.4, AS4.0.3)
    - Os (V4.0.92, AS4.0.3)
    - Port (V1.0.4, AS4.0.3)
      - Port
    - Pwm (V1.0.4, AS4.0.3)
    - Resource (V1.0.4, AS4.0.3)

Port (Port)

Port

Name: Port

General | PortConfigSet | Published Information

Config Variant: VariantPostBuild

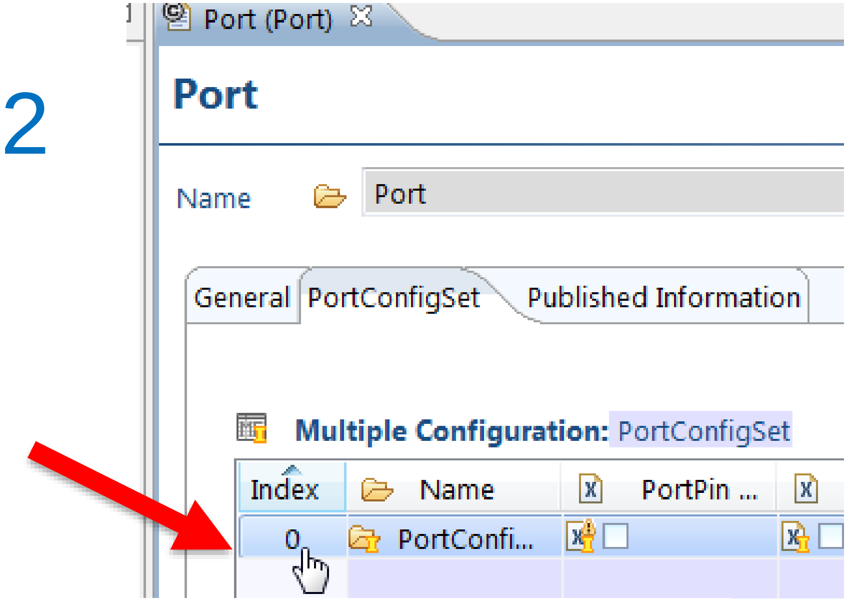
PortGeneral

Name: PortGeneral

Port Development Error Detect	☑	Port SetPinDirection Api	☑
Port SetPinMode Api	☑	Port VersionInfo Api	☑
Port SetPinMode Does Not Touch GPIO Levels	☐	Port Enable User Mode Support	☐

Port (4): Select PortConfigSet 0 2

- Double click on PortConfigSet’s Index 0



Port (Port)

Port

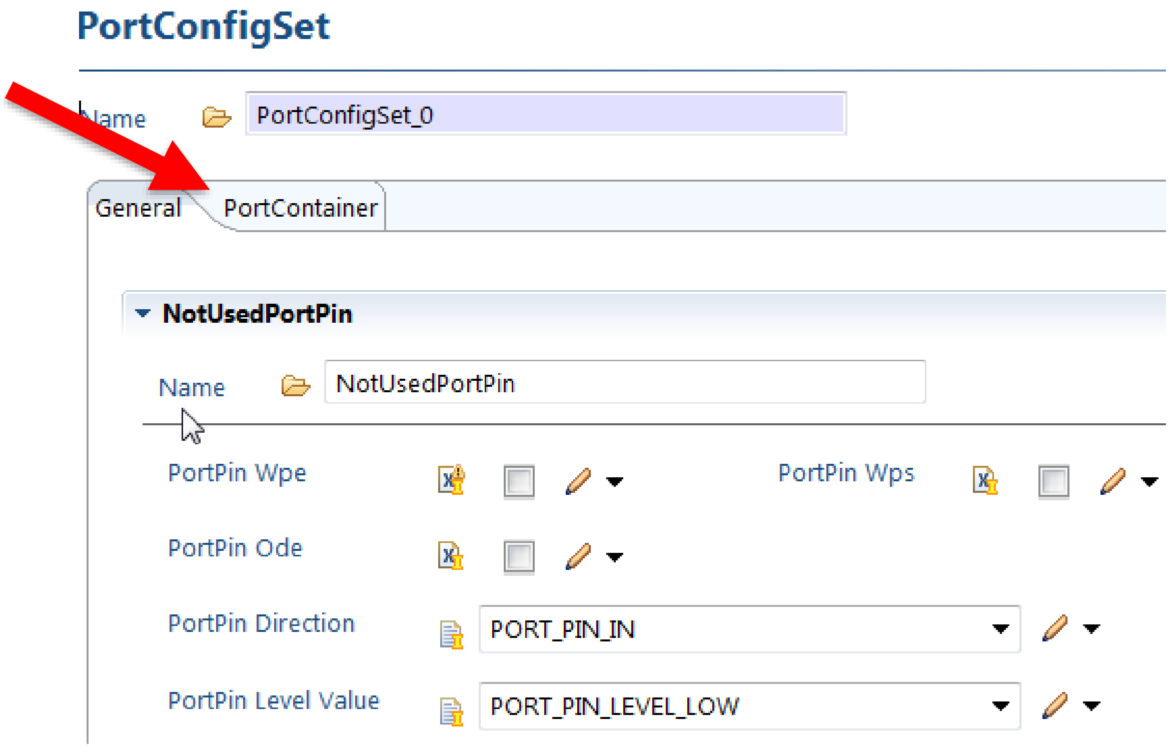
Name: Port

General | PortConfigSet | Published Information

Multiple Configuration: PortConfigSet

Index	Name	PortPin ...
0	PortConfi...	□

- Click on PowerConfigSet_0’s PortContainer tab



PortConfigSet

Name: PortConfigSet_0

General | PortContainer

NotUsedPortPin

Name: NotUsedPortPin

PortPin Wpe □ PortPin Wps □

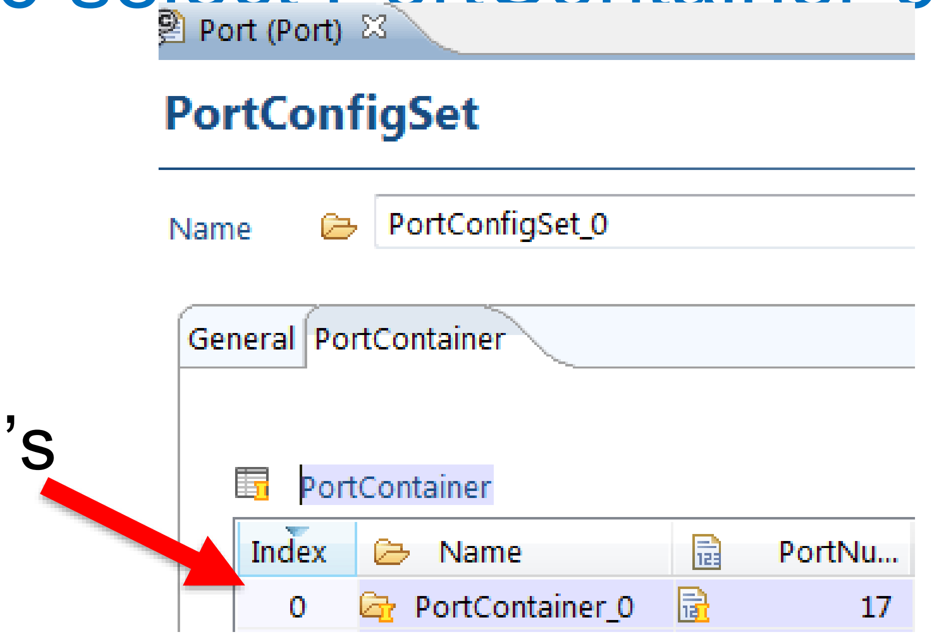
PortPin Ode □

PortPin Direction: PORT_PIN_IN

PortPin Level Value: PORT_PIN_LEVEL_LOW

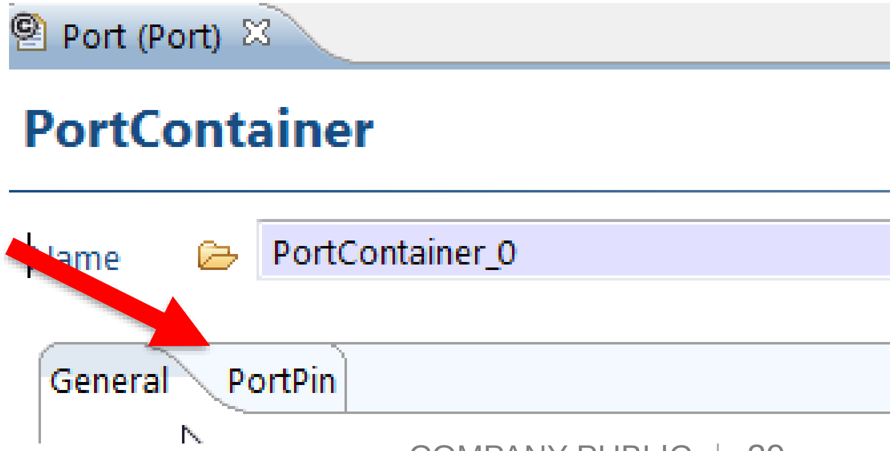
Port (5): In PortConfigSet 0 select PortContainer 0

- Double click PortConfigSet_0's Index 0



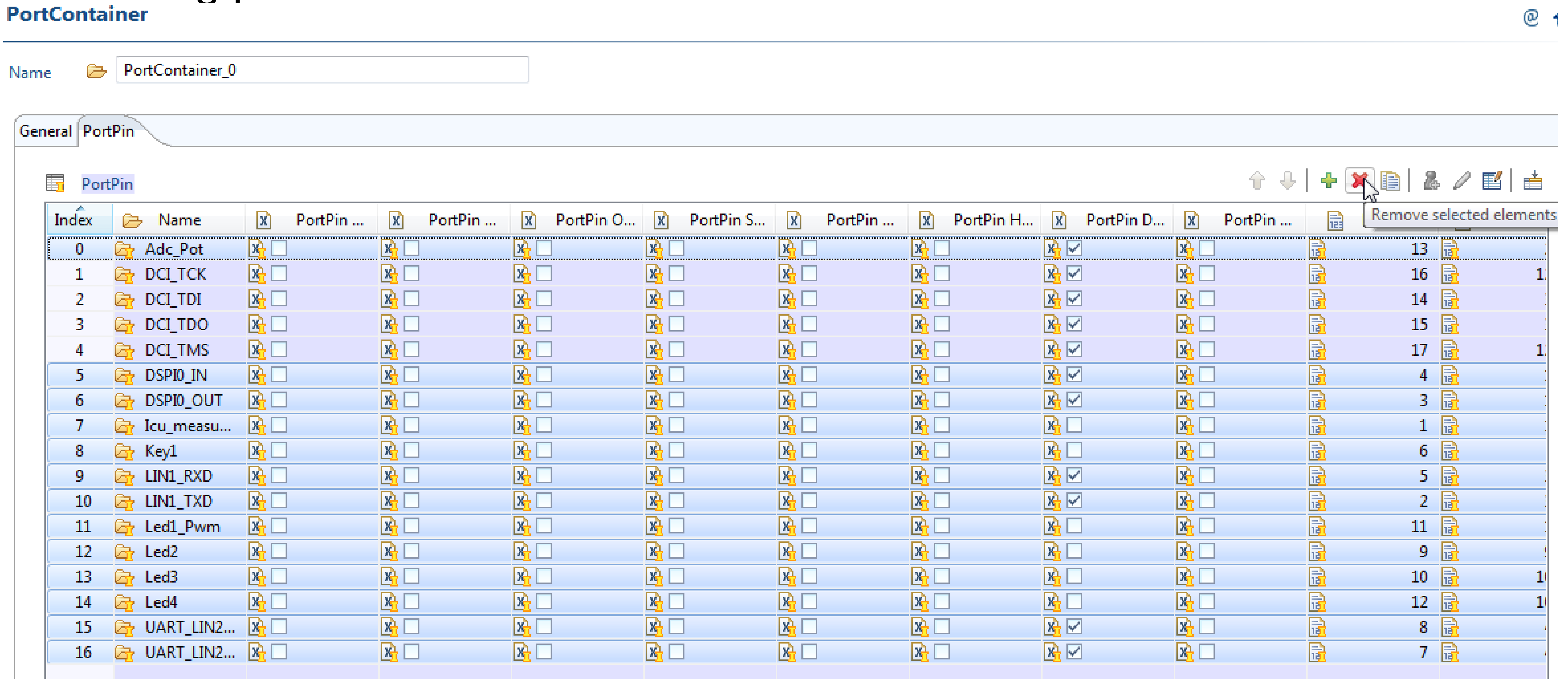
Index	Name	PortNu...
0	PortContainer_0	17

- Click on the PortPin tab



Port (6): Delete all current PortPins in PortContainer

- Select all Indices (in Index column) **EXCEPT JTAG**, and click X to remove all existing pins



PortContainer

Name: PortContainer_0

General | PortPin

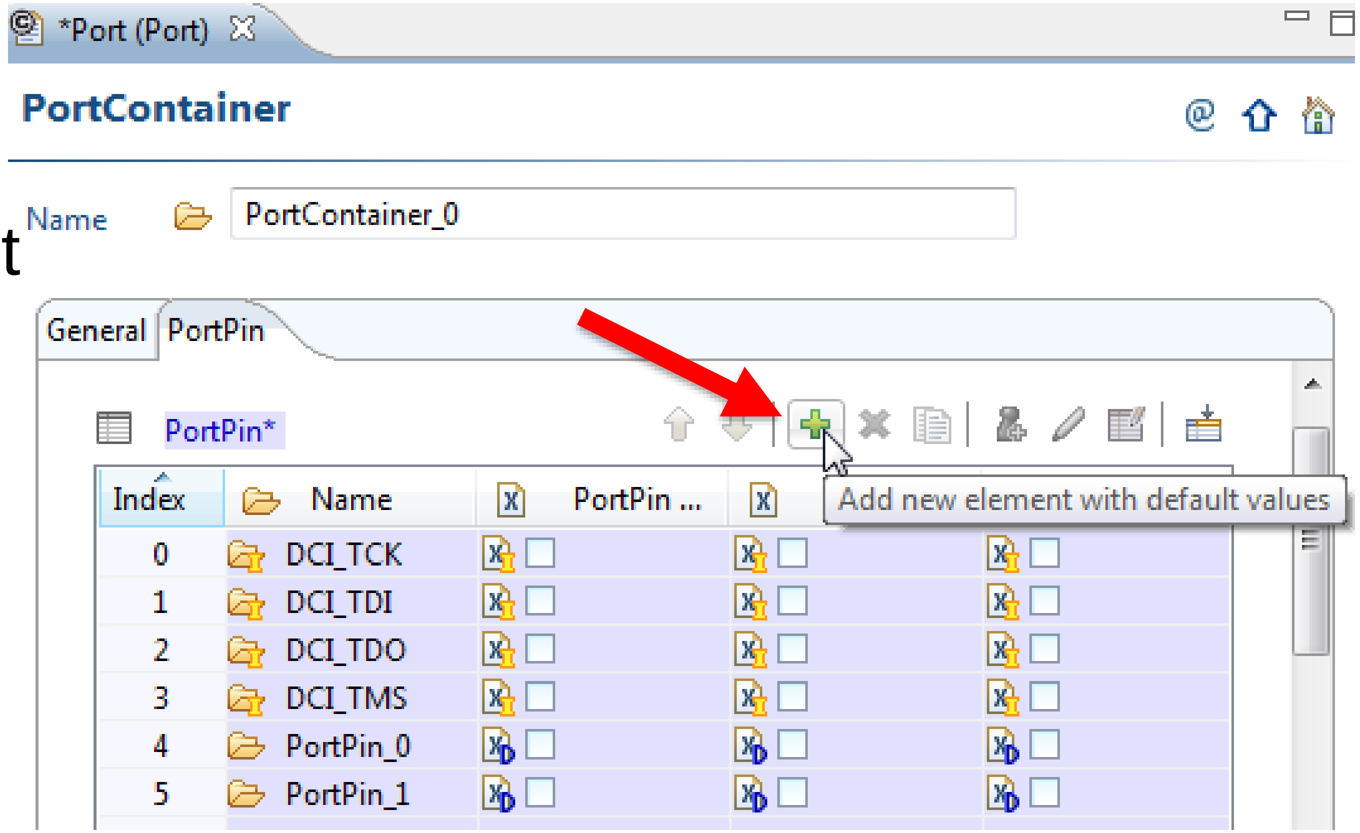
PortPin

JTAG Port Pins

Index	Name	PortPin ...	PortPin ...	PortPin O...	PortPin S...	PortPin ...	PortPin H...	PortPin D...	PortPin ...		
0	Adc_Pot	□	□	□	□	□	□	☑	□	13	
1	DCI_TCK	□	□	□	□	□	□	☑	□	16	1
2	DCI_TDI	□	□	□	□	□	□	☑	□	14	
3	DCI_TDO	□	□	□	□	□	□	☑	□	15	
4	DCI_TMS	□	□	□	□	□	□	☑	□	17	1
5	DSPI0_IN	□	□	□	□	□	□	☑	□	4	
6	DSPI0_OUT	□	□	□	□	□	□	☑	□	3	
7	Icu_measu...	□	□	□	□	□	□	□	□	1	
8	Key1	□	□	□	□	□	□	□	□	6	
9	LIN1_RXD	□	□	□	□	□	□	☑	□	5	
10	LIN1_TXD	□	□	□	□	□	□	☑	□	2	
11	Led1_Pwm	□	□	□	□	□	□	□	□	11	
12	Led2	□	□	□	□	□	□	□	□	9	
13	Led3	□	□	□	□	□	□	□	□	10	1
14	Led4	□	□	□	□	□	□	□	□	12	1
15	UART_LIN2...	□	□	□	□	□	□	☑	□	8	
16	UART_LIN2...	□	□	□	□	□	□	☑	□	7	

Port (7): Add two PortPins

- Click + twice to add two new port pins
  - PortPin_0 and PortPin_1 are added



*Port (Port)

PortContainer

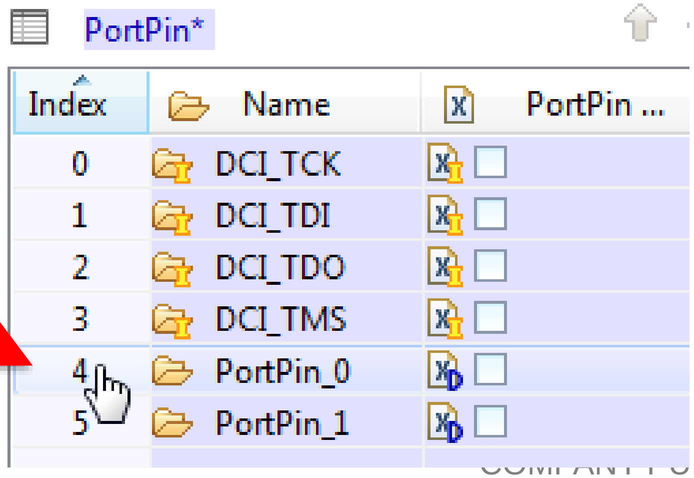
Name: PortContainer_0

PortPin*

Add new element with default values

Index	Name	PortPin ...		
0	DCI_TCK	☐	☐	☐
1	DCI_TDI	☐	☐	☐
2	DCI_TDO	☐	☐	☐
3	DCI_TMS	☐	☐	☐
4	PortPin_0	☐	☐	☐
5	PortPin_1	☐	☐	☐

- Double click on Index of the first added PortPin to configure it

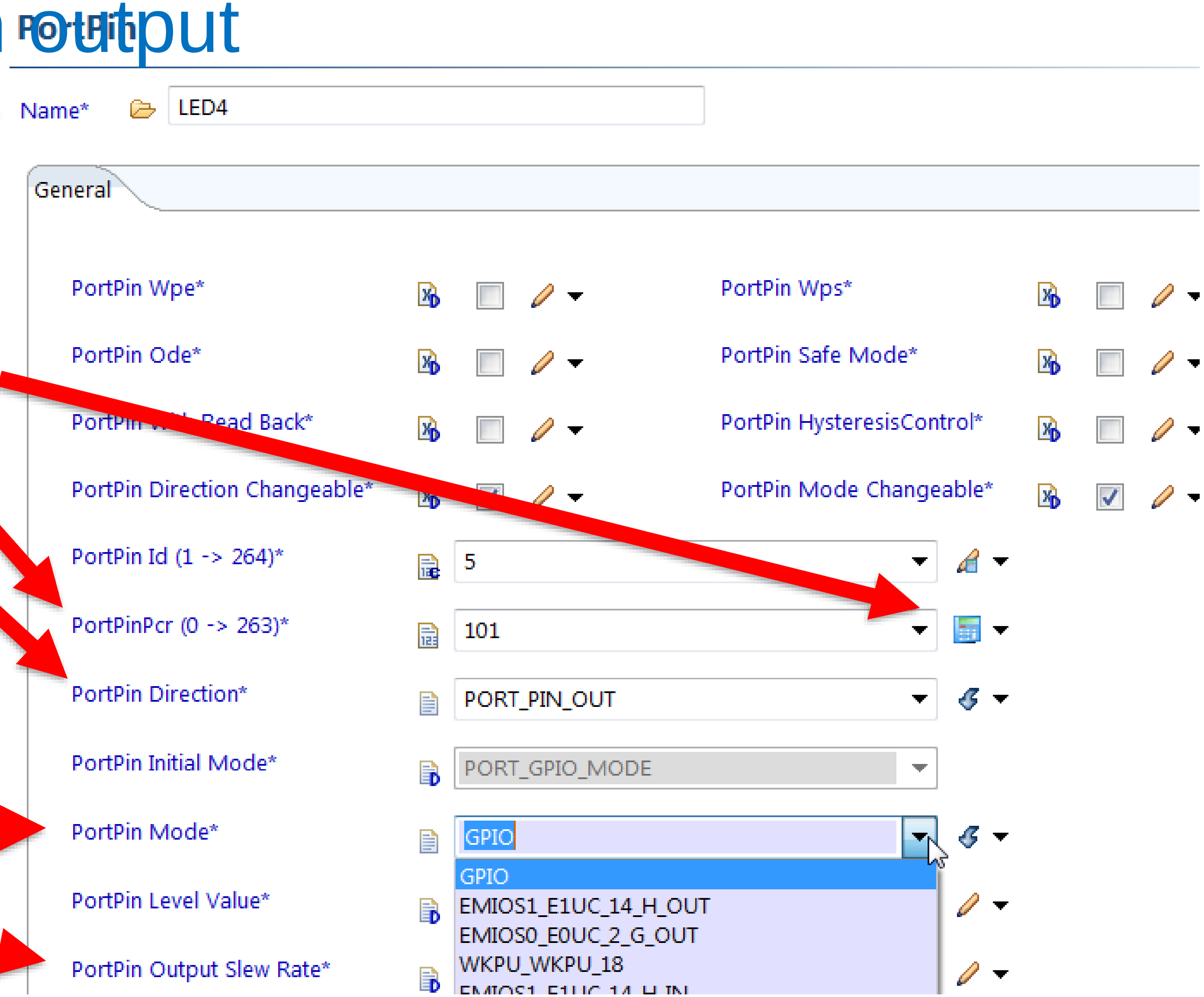


PortPin*

Index	Name	PortPin ...
0	DCI_TCK	☐
1	DCI_TDI	☐
2	DCI_TDO	☐
3	DCI_TMS	☐
4	PortPin_0	☐
5	PortPin_1	☐

Port (8) Configure PortPin output

- Name: LED4
- PortPin ID: PortPin Ids are a unique number used to identify the port configuration
  - Click on the “Calculate Value” icon to automatically get a unique number.
- PortPinPcr: (SIUL_MSCR#) **101**
- PortPin Direction: PORT_PIN_OUT
  - _OUT sets MSCR bits IBE=0,OBE=1
    _IN sets MSCR bits IBE =1, OBE =0
    _Disabled sets MSCR both IBE,OBE=0
- PortPin Mode: GPIO
- PortPin Level Value: PORT_PIN_LEVEL_HIGH



PortPin

Name* LED4

PortPin Wpe* □

PortPin Wps* □

PortPin Ode* □

PortPin Safe Mode* □

PortPin [illegible] Read Back* □

PortPin HysteresisControl* □

PortPin Direction Changeable* ☑

PortPin Mode Changeable* ☑

PortPin Id (1 -> 264)* 5

PortPinPcr (0 -> 263)* 101

PortPin Direction* PORT_PIN_OUT

PortPin Initial Mode* PORT_GPIO_MODE

PortPin Mode* GPIO

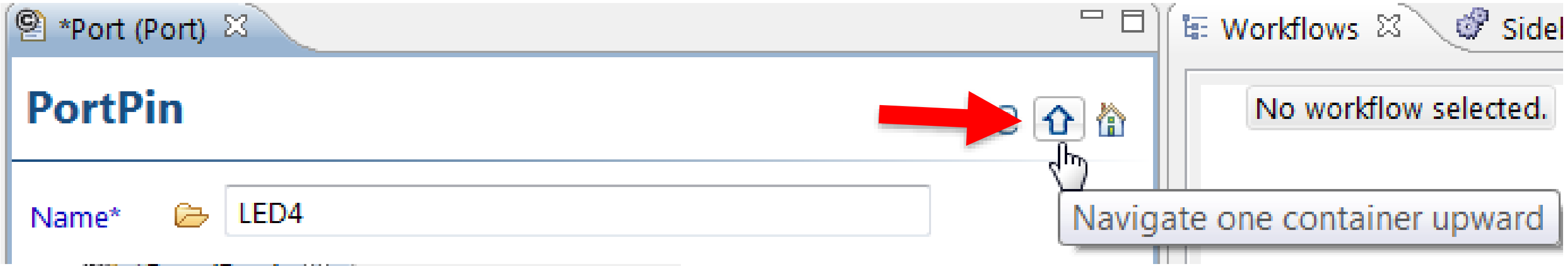
GPIO
EMIOS1_E1UC_14_H_OUT
EMIOS0_E0UC_2_G_OUT
WKPU_WKPU_18
EMIOS1_E1UC_14_H_IN

PortPin Level Value*

PortPin Output Slew Rate*

Port (9) Go back to prior container & select other port pin

- Navigate back a container by clicking on up arrow



*Port (Port)

Workflows

Sidel

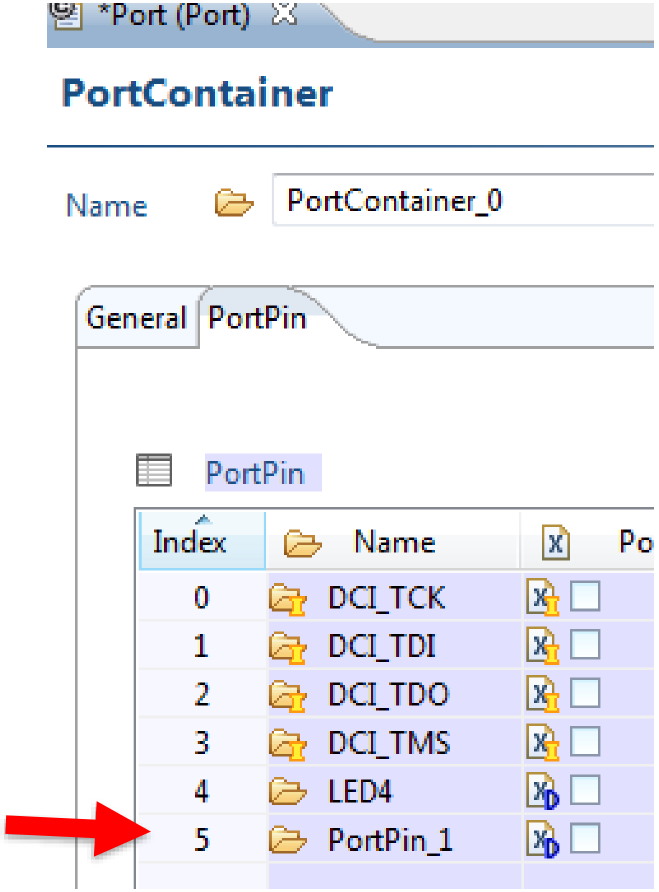
PortPin

No workflow selected.

Name* LED4

Navigate one container upward

- Double click on other added PortPin's index to configure it



*Port (Port)

PortContainer

Name PortContainer_0

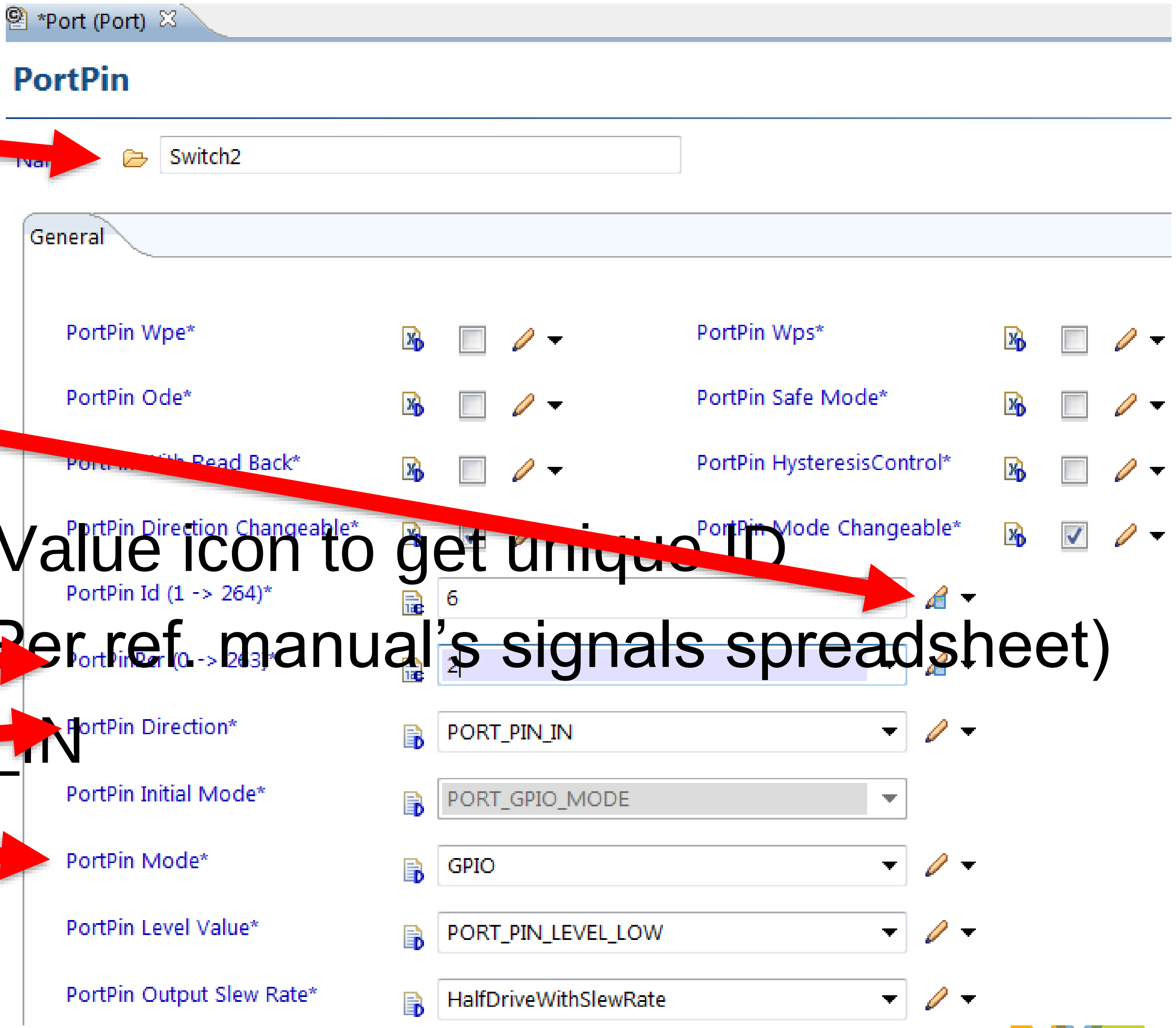
General PortPin

PortPin

Index	Name	Po
0	DCI_TCK	□
1	DCI_TDI	□
2	DCI_TDO	□
3	DCI_TMS	□
4	LED4	□
5	PortPin_1	□

Port (10) Configure PortPin input

- Name: Switch2
- PortPin Id: Click on Calculate Value icon to get unique ID
- PortPinPcr: **2** (SIUL MSCR#. Per ref. manual’s signals spreadsheet)
- PortPin Direction: PORT_PIN_IN
- PortPin Mode: GPIO



*Port (Port)

PortPin

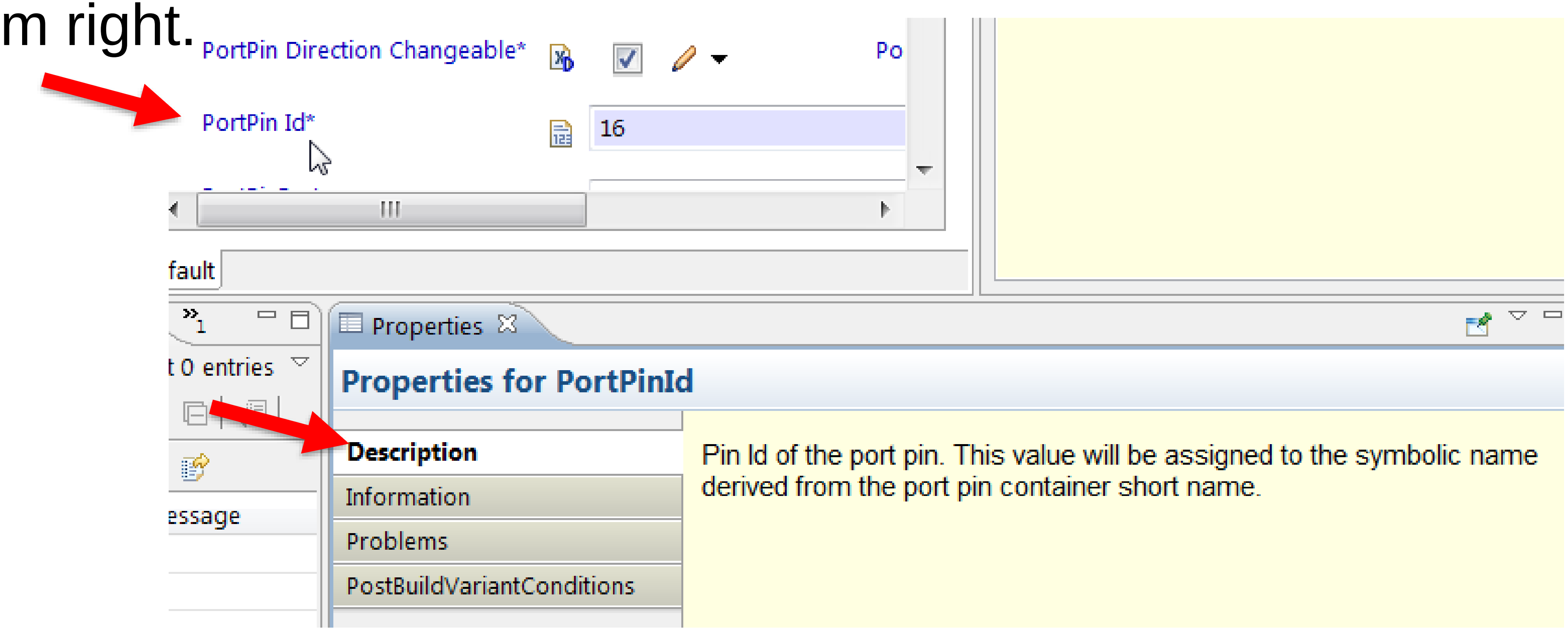
Name: Switch2

General

PortPin Wpe*	□	PortPin Wps*	□
PortPin Ode*	□	PortPin Safe Mode*	□
PortPin With Read Back*	□	PortPin HysteresisControl*	□
PortPin Direction Changeable*	☑	PortPin Mode Changeable*	☑
PortPin Id (1 -> 264)*	6		
PortPinPcr (0 -> 263)*	2		
PortPin Direction*	PORT_PIN_IN		
PortPin Initial Mode*	PORT_GPIO_MODE		
PortPin Mode*	GPIO		
PortPin Level Value*	PORT_PIN_LEVEL_LOW		
PortPin Output Slew Rate*	HalfDriveWithSlewRate		

Need help?

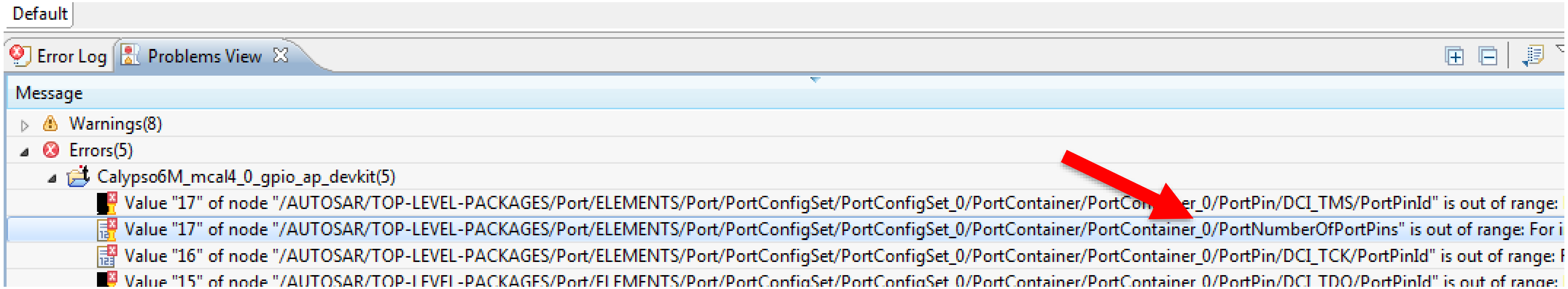
- Need help? Click on a configuration and see help box in workspace bottom right.



Pin Id of the port pin. This value will be assigned to the symbolic name derived from the port pin container short name.

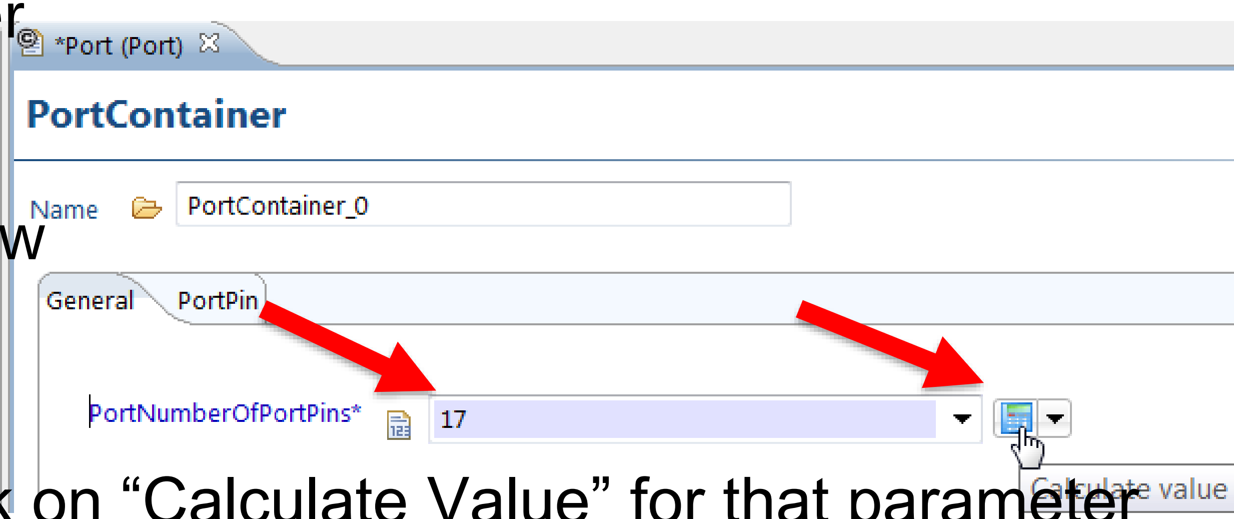
Port (11): There will be an error, like below……

- Click in problems view window to expand the errors



```
▷ Warnings(8)
◢ Errors(5)
  ◢ Calypso6M_mcal4_0_gpio_ap_devkit(5)
      Value "17" of node "/AUTOSAR/TOP-LEVEL-PACKAGES/Port/ELEMENTS/Port/PortConfigSet/PortConfigSet_0/PortContainer/PortCon er_0/PortPin/DCI_TMS/PortPinId" is out of range:
      Value "17" of node "/AUTOSAR/TOP-LEVEL-PACKAGES/Port/ELEMENTS/Port/PortConfigSet/PortConfigSet_0/PortContainer/PortContainer_0/PortNumberOfPortPins" is out of range: For i
      Value "16" of node "/AUTOSAR/TOP-LEVEL-PACKAGES/Port/ELEMENTS/Port/PortConfigSet/PortConfigSet_0/PortContainer/PortContainer_0/PortPin/DCI_TCK/PortPinId" is out of range: F
      Value "15" of node "/AUTOSAR/TOP-LEVEL-PACKAGES/Port/ELEMENTS/Port/PortConfigSet/PortConfigSet_0/PortContainer/PortContainer_0/PortPin/DCI_TDO/PortPinId" is out of range:
```

- Note 2nd error has message port number of pins is out of range
- Click on 2nd error
- This brings up the Port Container window
  - Click the pencil then calculate icon for PortNumberOfPortPins
  - Double click to automatically get the proper #
- Click on each remaining error, then click on “Calculate Value” for that parameter

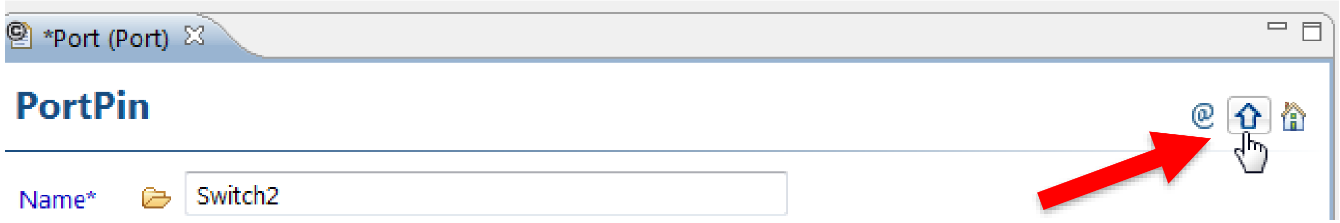


Name: PortContainer_0

PortNumberOfPortPins*: 17

Port (12): Navigate back

- Go back to prior container

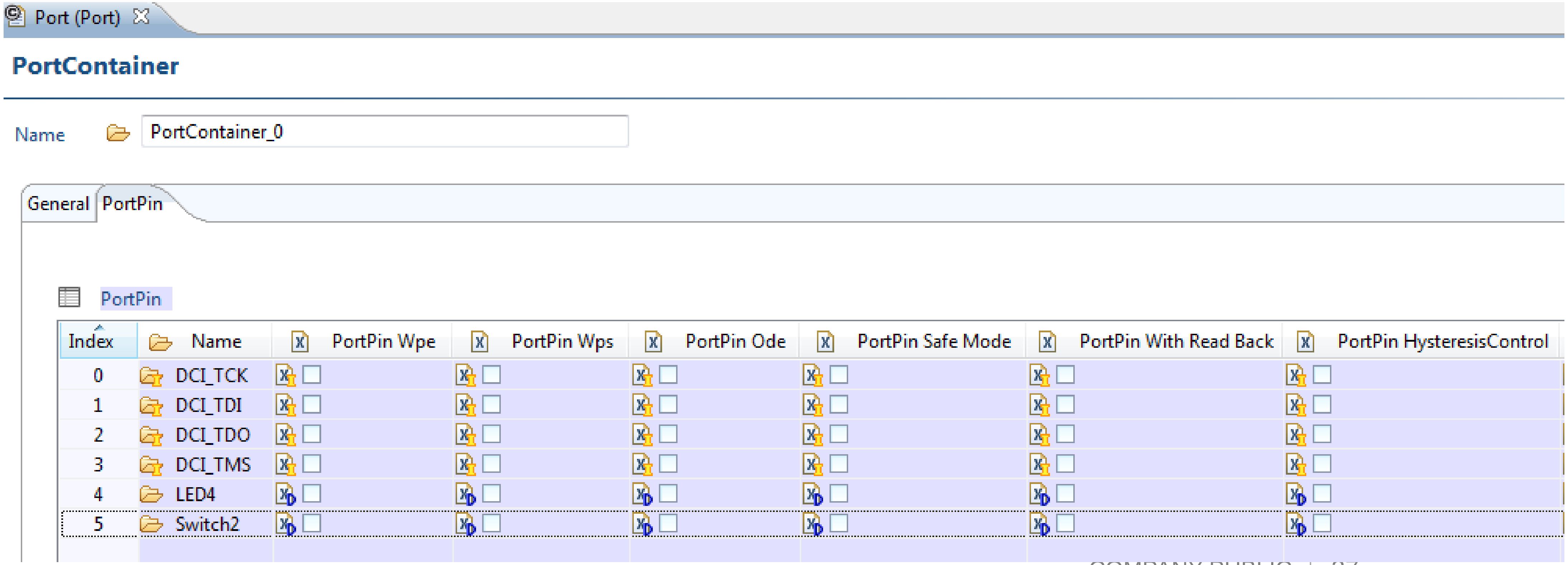


*Port (Port)

PortPin

Name* Switch2

- Note PortPins at a glance (D by the box means default value) :



Port (Port)

PortContainer

Name PortContainer_0

General | PortPin

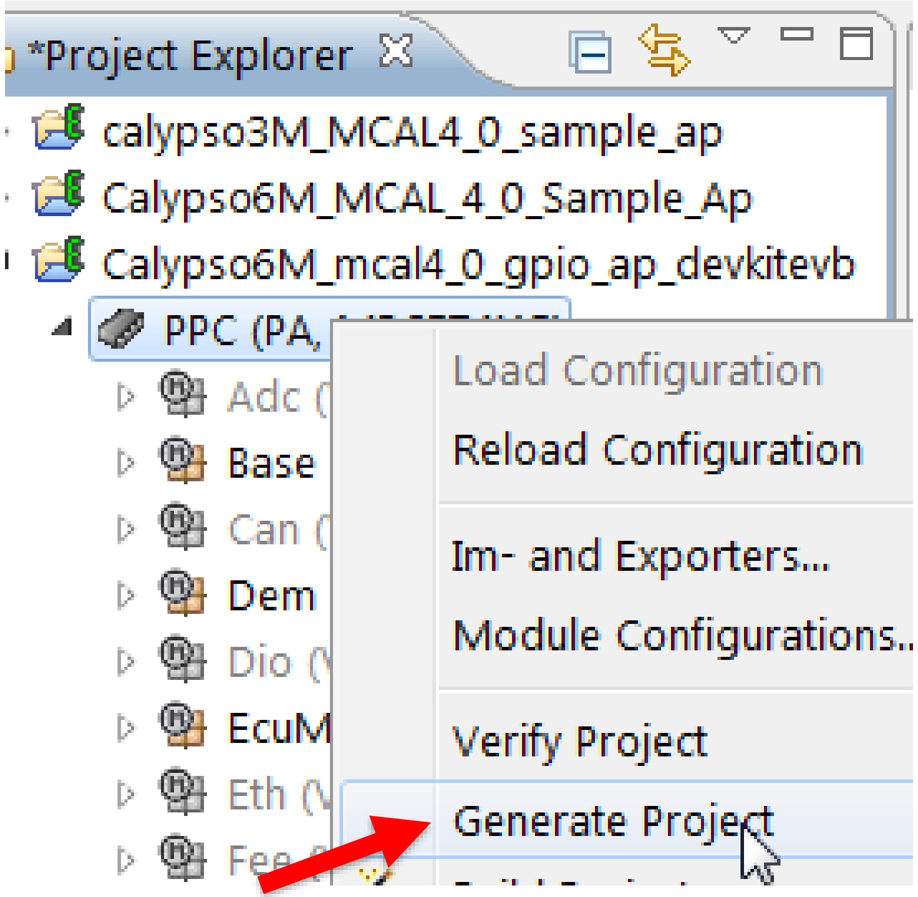
PortPin

Index	Name	PortPin Wpe	PortPin Wps	PortPin Ode	PortPin Safe Mode	PortPin With Read Back	PortPin HysteresisControl
0	DCI_TCK	☐	☐	☐	☐	☐	☐
1	DCI_TDI	☐	☐	☐	☐	☐	☐
2	DCI_TDO	☐	☐	☐	☐	☐	☐
3	DCI_TMS	☐	☐	☐	☐	☐	☐
4	LED4	D ☐	D ☐	D ☐	D ☐	D ☐	D ☐
5	Switch2	D ☐	D ☐	D ☐	D ☐	D ☐	D ☐

Port (13): Generate

- As a check, Generate project (right click on PPC, select Generate Project) to ensure no errors occurred.

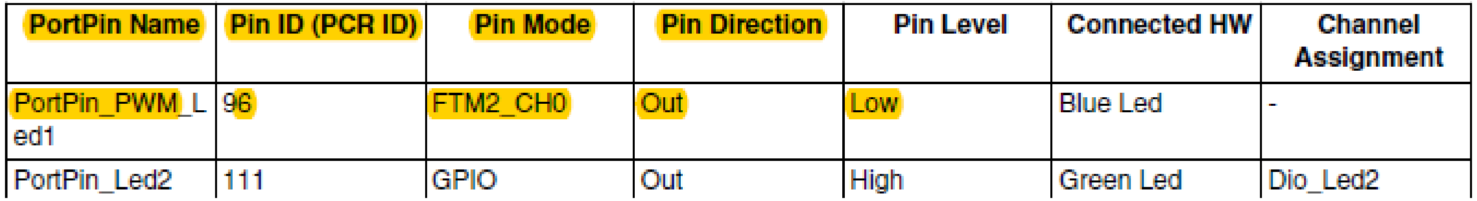
- Click Save icon (disk icon in upper left)



S32K14x Port Mapping Example - 1

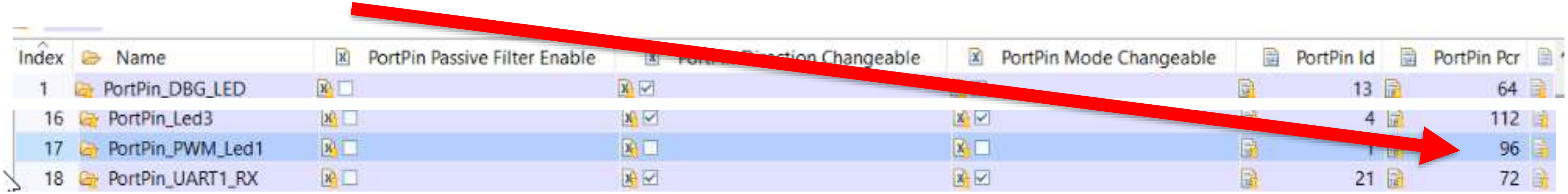
- From the Sample Application User Manual: Use highlighted port, with PCR ID 96

Table 4-1. PORT and DIO Modules - Pin Configuration and DioChannel Assignment



PortPin Name	Pin ID (PCR ID)	Pin Mode	Pin Direction	Pin Level	Connected HW	Channel Assignment
PortPin_PWM_Led1	96	FTM2_CH0	Out	Low	Blue Led	-
PortPin_Led2	111	GPIO	Out	High	Green Led	Dio_Led2

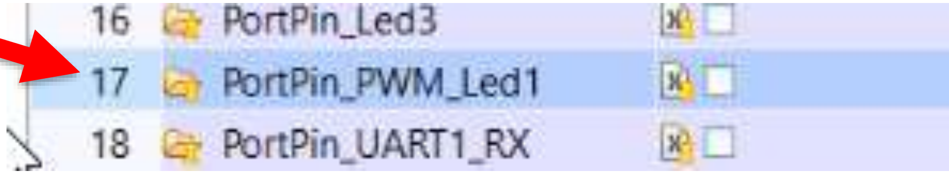
- Tresos Sample Application project: Open
  Port Module – Port Container tab – Double click on Index 0 (PortContainer_0)
  - click on PortPin tab –



Index	Name	PortPin Passive Filter Enable	PortPin Direction Changeable	PortPin Mode Changeable	PortPin Id	PortPin Pcr
1	PortPin_DBG_LED	☐	☑		13	64
16	PortPin_Led3	☐	☑	☑	4	112
17	PortPin_PWM_Led1	☐	☐	☐	1	96
18	PortPin_UART1_RX	☐	☑	☑	21	72

S32K14x Port Mapping Example - 2

- Double click on that port pin's index, 17

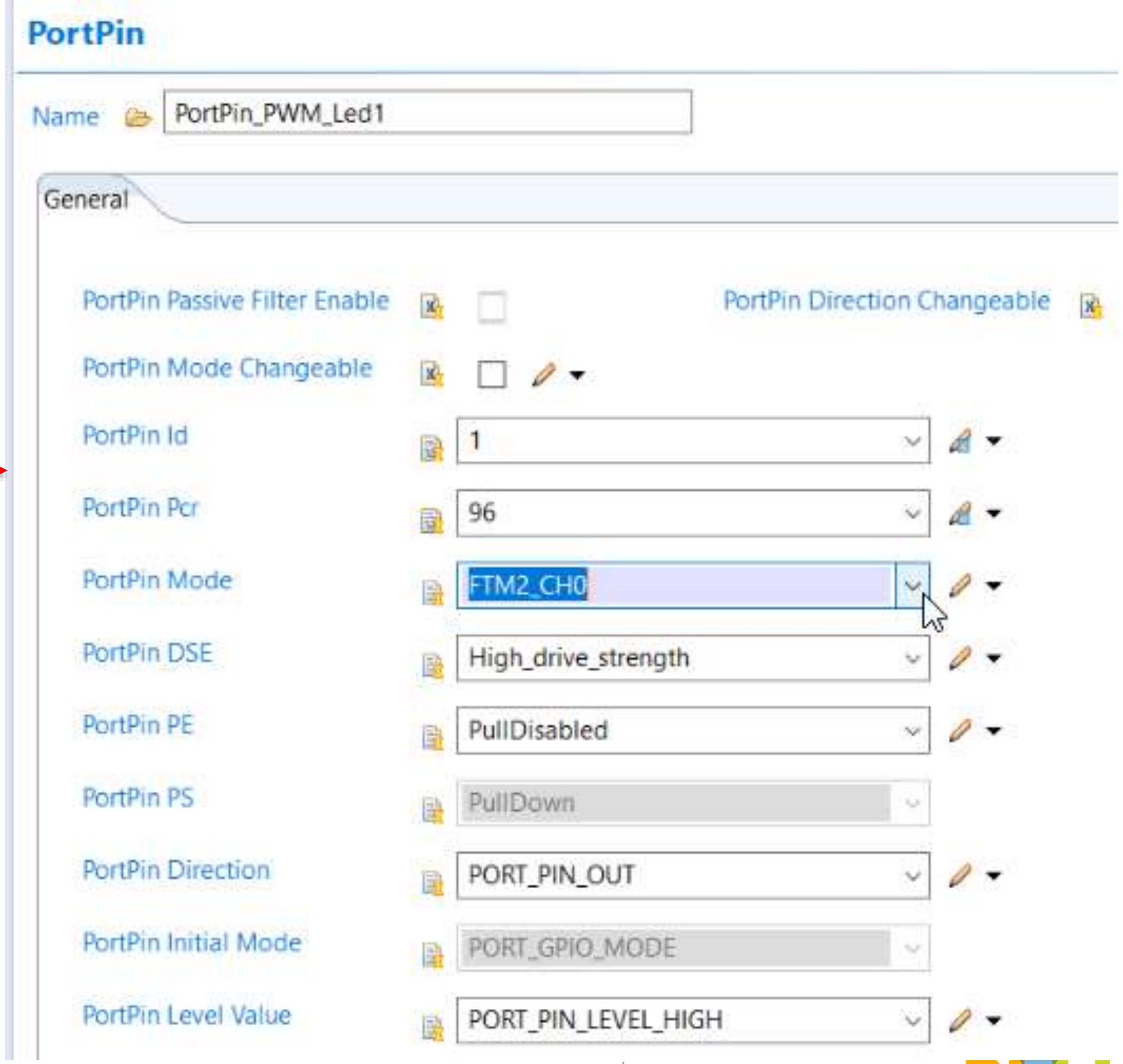


16 PortPin_Led3

17 PortPin_PWM_Led1

18 PortPin_UART1_RX

- Port pin parameters can be configured



PortPin

Name: PortPin_PWM_Led1

General

PortPin Passive Filter Enable	□
PortPin Direction Changeable	
PortPin Mode Changeable	□
PortPin Id	1
PortPin Pcr	96
PortPin Mode	FTM2_CH0
PortPin DSE	High_drive_strength
PortPin PE	PullDisabled
PortPin PS	PullDown
PortPin Direction	PORT_PIN_OUT
PortPin Initial Mode	PORT_GPIO_MODE
PortPin Level Value	PORT_PIN_LEVEL_HIGH

DIO module

DIO Example Introduction

- Dio module is used for controlling simple Digital I/O – General Purpose I/O
- This module adds to the prior PORT module example

Dio APIs

Dio_LevelType Dio_ReadChannel(Dio_ChannelType ChannelId)

void Dio_WriteChannel(Dio_ChannelType ChannelId, Dio_LevelType Level)

Dio_PortLevelType Dio_ReadPort(Dio_PortType PortId)

void Dio_WritePort(Dio_PortType PortId, Dio_PortLevelType Level)

Dio_PortLevelType Dio_ReadChannelGroup(const Dio_ChannelGroupType* ChannelGroupIdPtr)

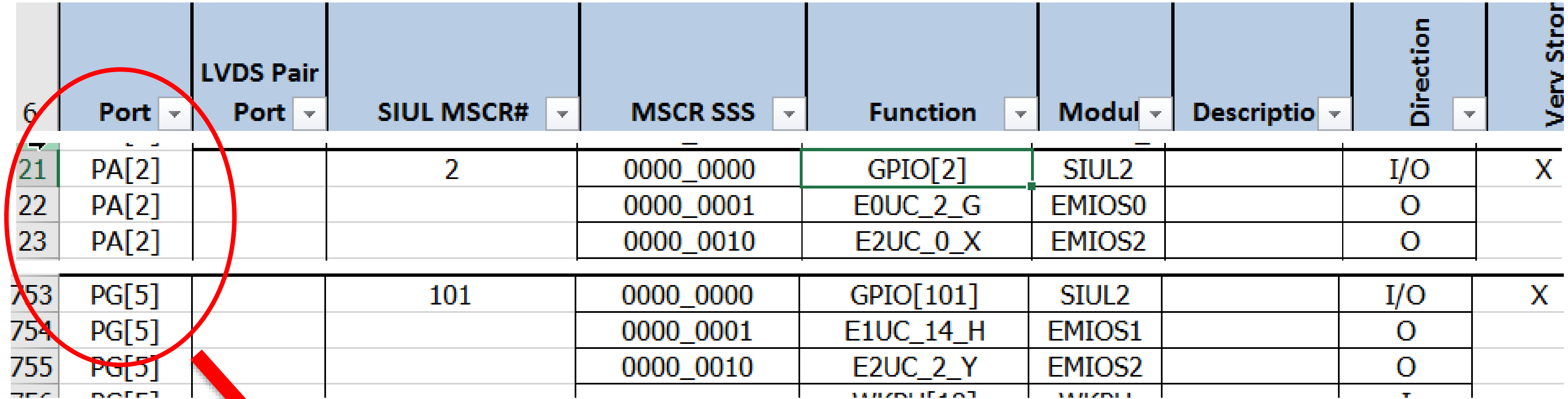
void Dio_WriteChannelGroup(const Dio_ChannelGroupType* ChannelGroupIdPtr, Dio_PortLevelType Level)

void Dio_GetVersionInfo(Std_VersionInfoType* VersionInfo)

Dio_LevelType Dio_FlipChannel(Dio_ChannelType ChannelId)

Mapping pins to Dio modules

- From the I/O spreadsheet attached to the MPC5748G reference manual, MSCR numbers and function's SSS values are listed for ports:



6	Port	LVDS Pair Port	SIUL MSCR#	MSCR SSS	Function	Modul	Descriptio	Direction	Very Stror
21	PA[2]		2	0000_0000	GPIO[2]	SIUL2		I/O	X
22	PA[2]			0000_0001	E0UC_2_G	EMIOS0		O	
23	PA[2]			0000_0010	E2UC_0_X	EMIOS2		O	
753	PG[5]		101	0000_0000	GPIO[101]	SIUL2		I/O	X
754	PG[5]			0000_0001	E1UC_14_H	EMIOS1		O	
755	PG[5]			0000_0010	E2UC_2_Y	EMIOS2		O	

- Example's GPIO pins:

Description	Use	Port and Channel (used for Dio port and channel identification	SIUL_MSCR# (Used for Port pin identification)
Switch2	GPIO input	PA2	2
LED4	GPIO output	PG5	101

Summary: Remove Dio Ports; add 2 ports/channels

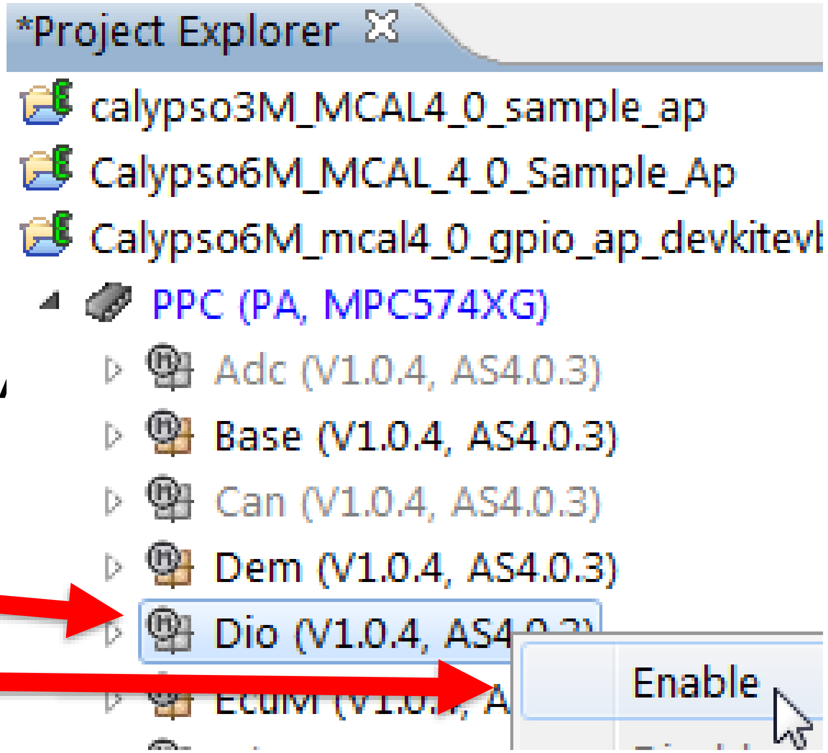
Dio module (DioPorts and DioChannels shown for Mother-Daugher EVB – add PA[2], PG[5])

- Tab: DioConfig
  - Index 0: DioConfig_0
    - Tab: DioPort (remove all DioPorts; add 2 DioPorts)
      - Index of 1st added DioPort: DioPort_0
        - Tab: General (Name DioPA, Dio Port Id = 0)
        - Tab: DioChannel (Add channel)
          - Index 0: DioChannel_0
            - Tab: General (Name Switch2, Chan Id 2)
      - Index of 2nd added DioPort: DioPort_1
        - Tab: General (Name DioPG, Dio Port Id = 6)
        - Tab: DioChannel (Add channel)
          - Index 0: DioChannel_0 (Name LED4, Chan Id 5)

DioPorts are containers

Dio (1): Enable module for configuration

- Note: Dio module enables writing to Power registers
- Right click on Dio module
- Click Enable to enable configuration

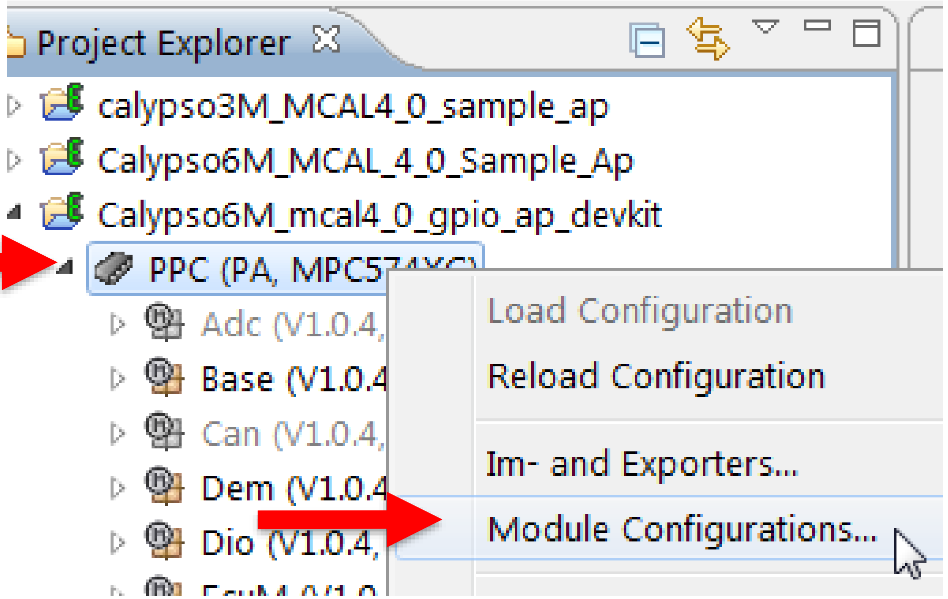


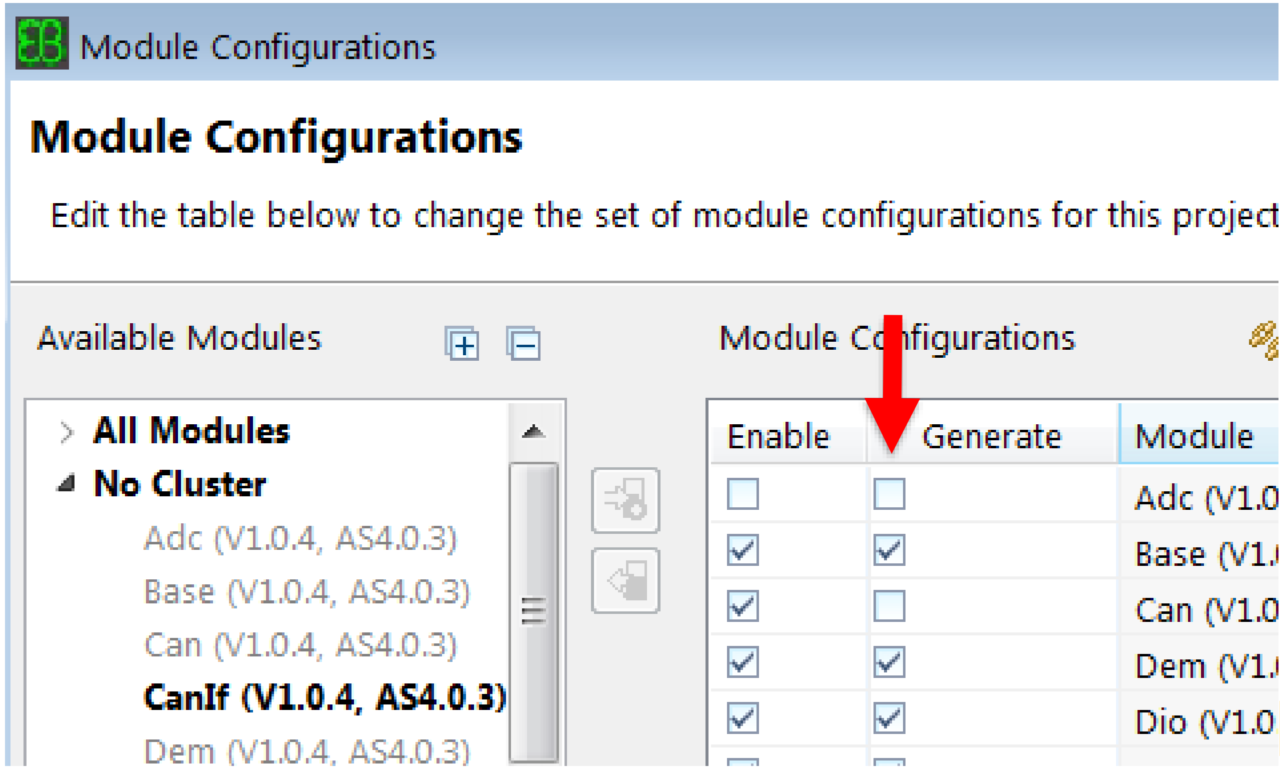
*Project Explorer

calypso3M_MCAL4_0_sample_ap
Calypso6M_MCAL_4_0_Sample_Ap
Calypso6M_mcal4_0_gpio_ap_devkitevl
PPC (PA, MPC574XG)
Adc (V1.0.4, AS4.0.3)
Base (V1.0.4, AS4.0.3)
Can (V1.0.4, AS4.0.3)
Dem (V1.0.4, AS4.0.3)
Dio (V1.0.4, AS4.0.3)
EcuM (V1.0.4, A

Dio (2): Enable code generation

- Enable modules that will be configured
  - Right click on PPC
  - Select Module Configurations….
  - In Generate column, check box for:
    - Dio
  - Click OK





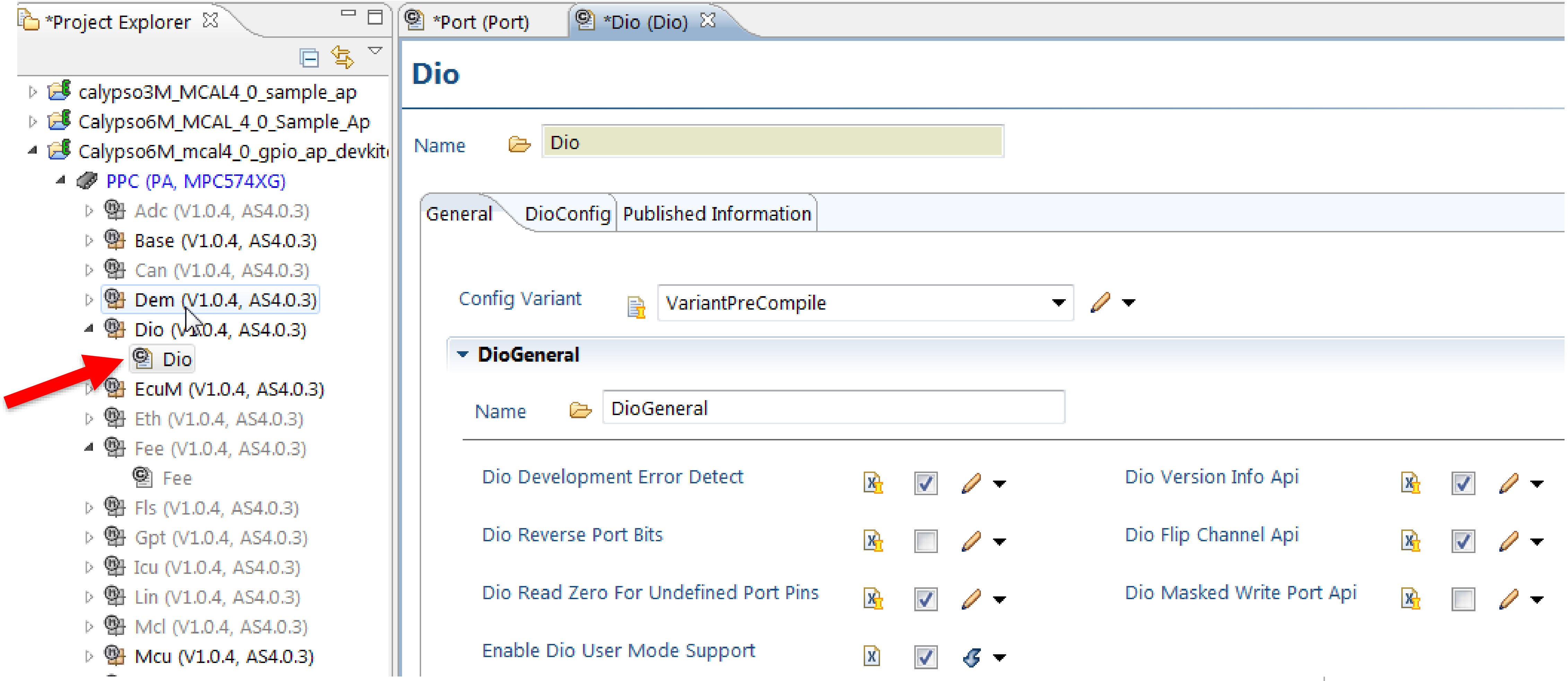
Module Configurations

Edit the table below to change the set of module configurations for this project

Enable	Generate	Module
☐	☐	Adc (V1.0
☑	☑	Base (V1.
☑	☐	Can (V1.0
☑	☑	Dem (V1.
☑	☑	Dio (V1.0

Dio (3): Open Dio configuration

- Double click on Dio’s configuration. Dio module’s General settings



Dio

Name: Dio

Config Variant: VariantPreCompile

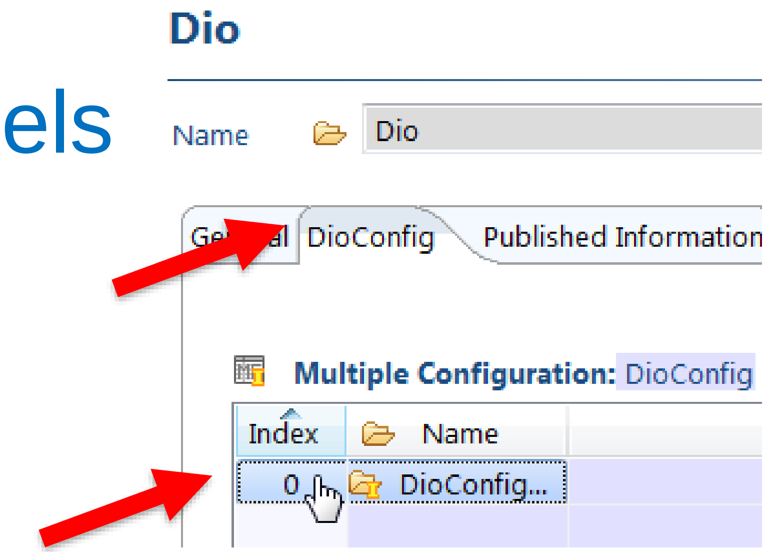
DioGeneral

Name: DioGeneral

Dio Development Error Detect	☑	Dio Version Info Api	☑
Dio Reverse Port Bits	□	Dio Flip Channel Api	☑
Dio Read Zero For Undefined Port Pins	☑	Dio Masked Write Port Api	□
Enable Dio User Mode Support	☑		

Dio (4): Remove all Dio ports & channels

- Click on DioConfig tab



Dio

Name Dio

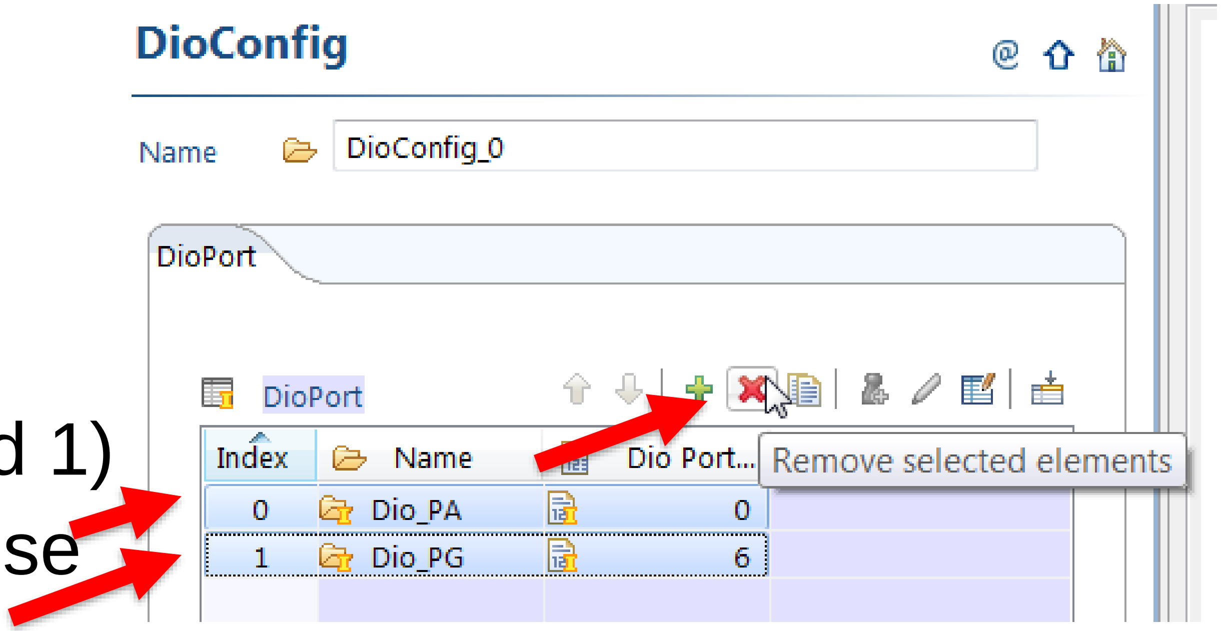
General | DioConfig | Published Information

Multiple Configuration: DioConfig

Index	Name
0	DioConfig...

- Double click on Index 0 of DioConfig

- Select all indices (index 0 and 1)
- Click the red X to remove those elements



DioConfig

Name DioConfig_0

DioPort

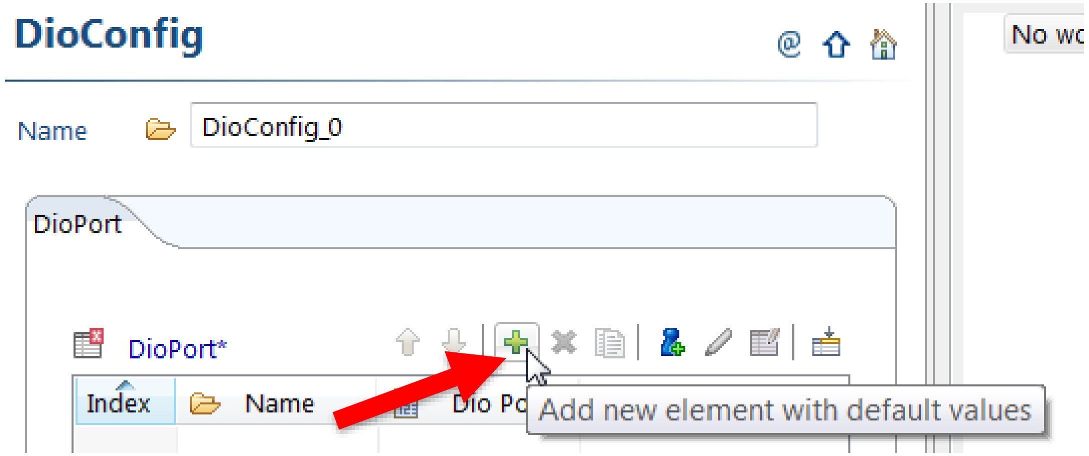
DioPort

Remove selected elements

Index	Name	Dio Port...
0	Dio_PA	0
1	Dio_PG	6

Dio (5): Add a DioPort

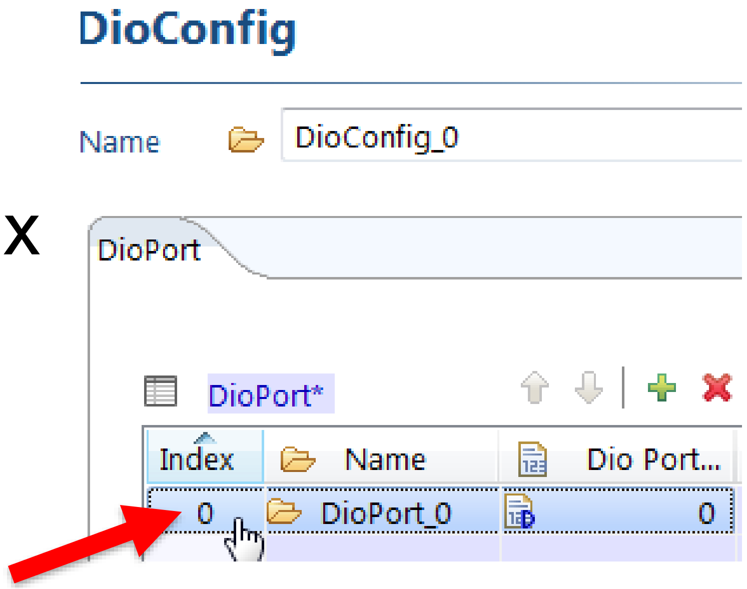
- Click on the green **+** to add a port



Name: DioConfig_0

Index	Name	Dio Po

- Double click on the new port's index

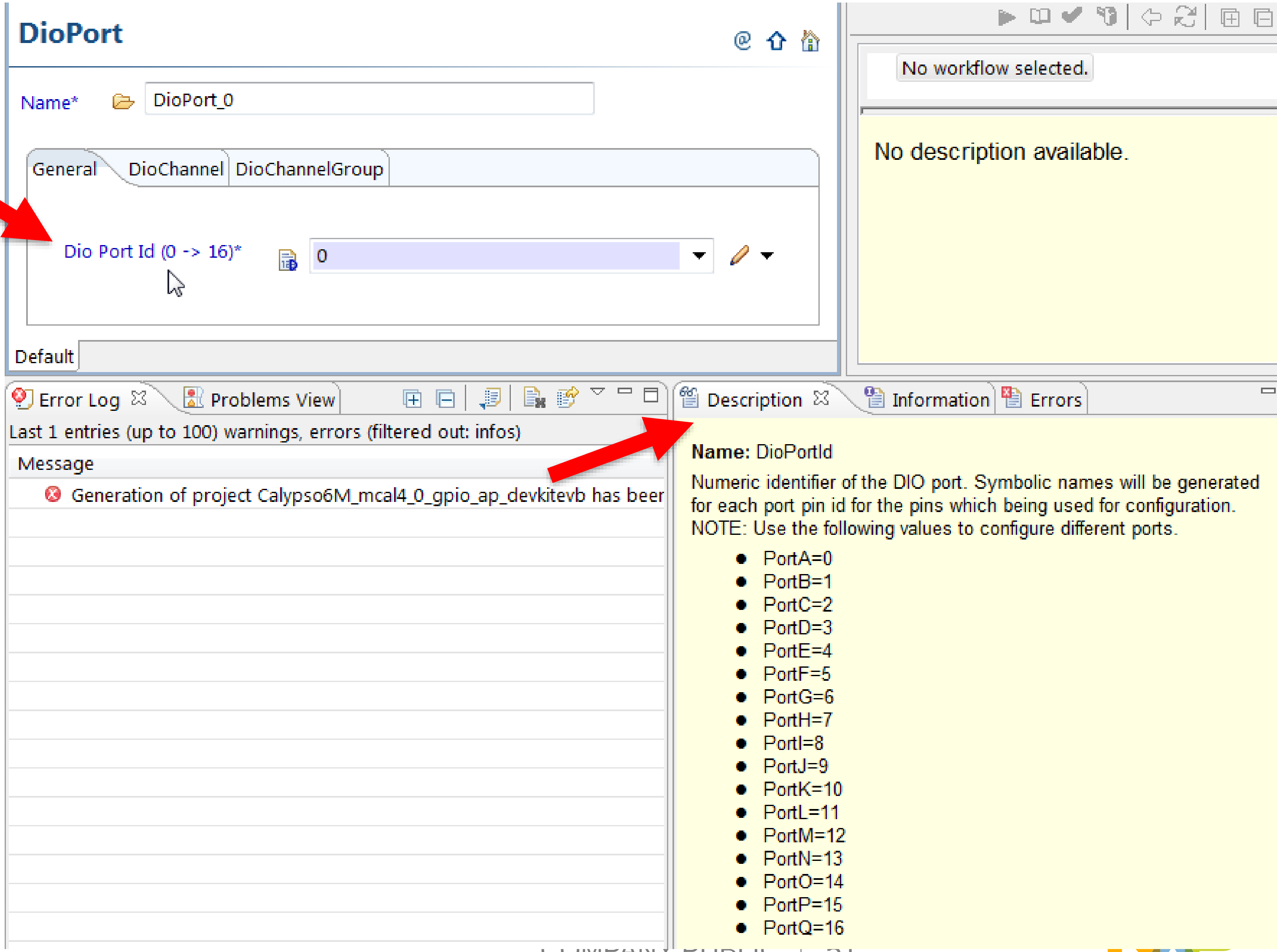


Name: DioConfig_0

Index	Name	Dio Port...
0	DioPort_0	0

Dio (6): Configure a DioPort - 1

- Click on
  Dio Port Id (0 -> 16)*
- Note description for the Dio Port Id. The value corresponds to Port A, B, C, etc.



Name* DioPort_0

Dio Port Id (0 -> 16)* 0

No workflow selected.

No description available.

Last 1 entries (up to 100) warnings, errors (filtered out: infos)

Message

Generation of project Calypso6M_mcal4_0_gpio_ap_devkitevb has beer

Name: DioPortId

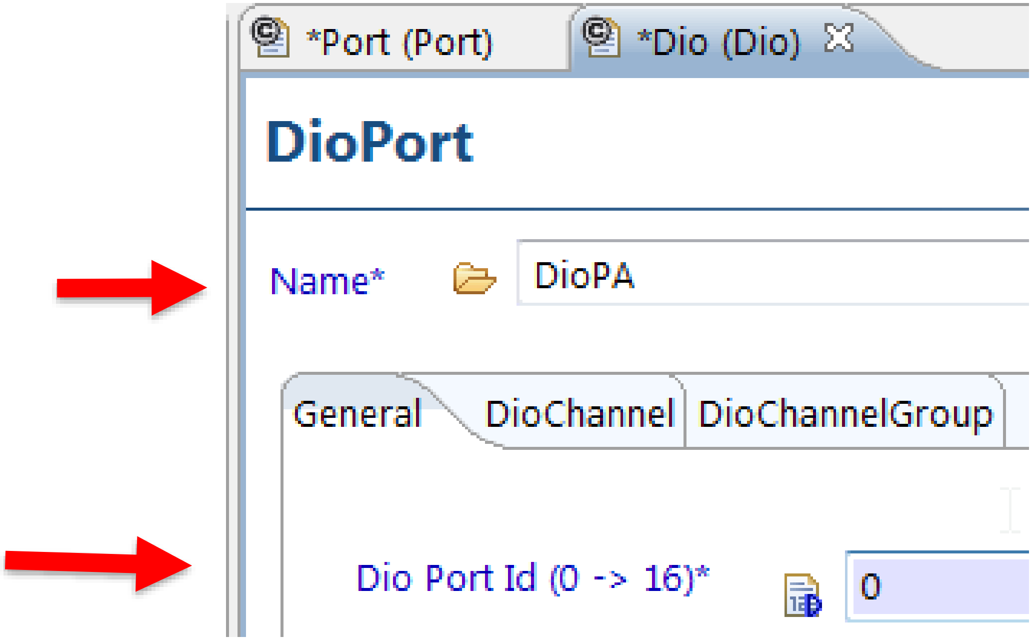
Numeric identifier of the DIO port. Symbolic names will be generated for each port pin id for the pins which being used for configuration. NOTE: Use the following values to configure different ports.

- PortA=0
- PortB=1
- PortC=2
- PortD=3
- PortE=4
- PortF=5
- PortG=6
- PortH=7
- PortI=8
- PortJ=9
- PortK=10
- PortL=11
- PortM=12
- PortN=13
- PortO=14
- PortP=15
- PortQ=16

Dio (7) Configure a DioPort - 2

Description	Use	SIUL_MSCR# (Used for Port pin identification)	Port and Channel (used for Dio port and channel identification
Switch2	GPIO input	2	PA2
LED4	GPIO output	101	PG5

- Dio Port Id: **0** (for Port A)



*Port (Port) | *Dio (Dio)

DioPort

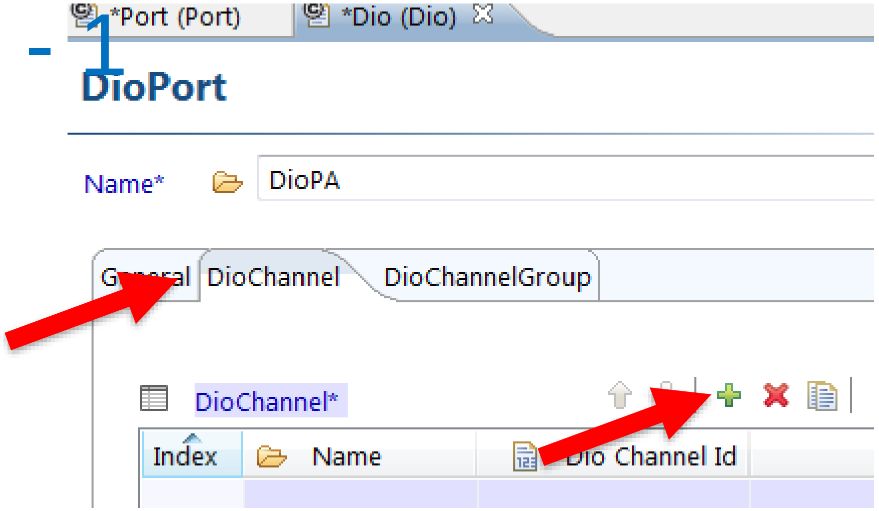
Name* DioPA

General | DioChannel | DioChannelGroup

Dio Port Id (0 -> 16)* 0

Dio (8) Add channel to DioPort - 1

- Click on DioChannel tab
- Click on green + to add new DioChannel



*Port (Port)

*Dio (Dio)

DioPort

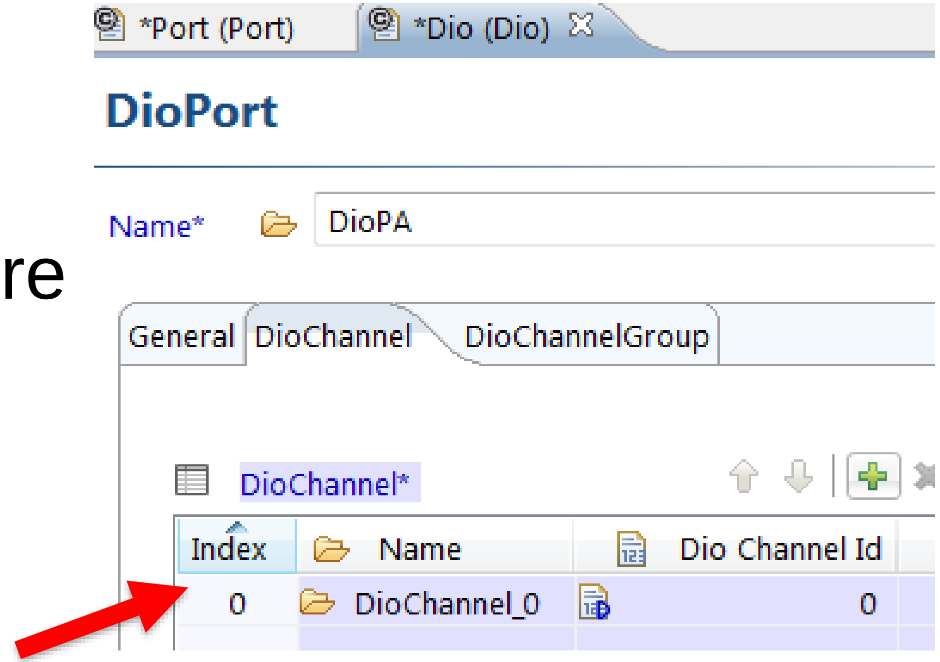
Name* DioPA

General | DioChannel | DioChannelGroup

DioChannel*

Index	Name	Dio Channel Id

- Double click on index 0 to configure the first channel



*Port (Port)

*Dio (Dio)

DioPort

Name* DioPA

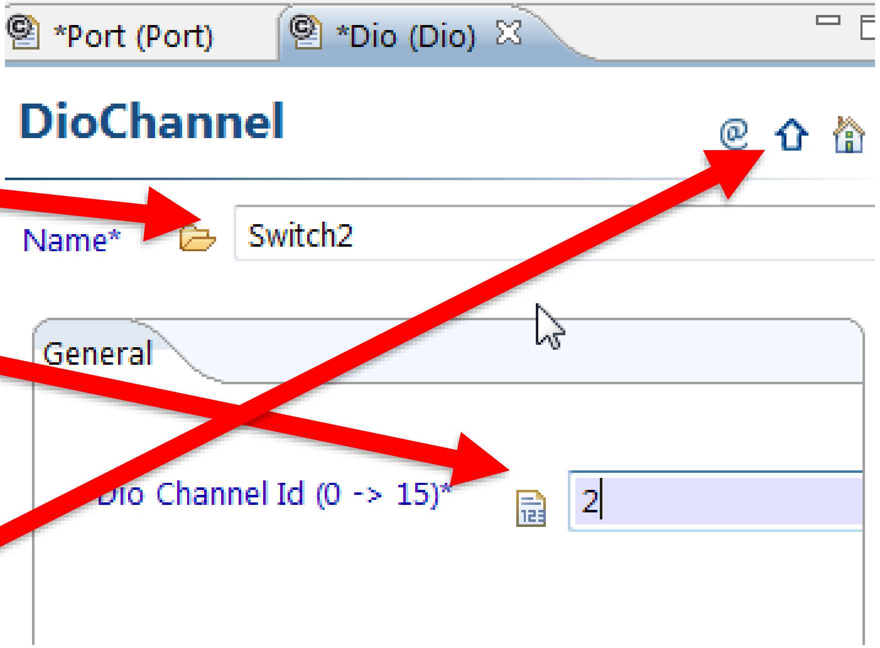
General | DioChannel | DioChannelGroup

DioChannel*

Index	Name	Dio Channel Id
0	DioChannel_0	0

Dio (9) Add channel to DioPort - 2

- Name: Switch2
- Dio Channel Id: 2
- Now we have configured channel 2 on Port A.
- Click the up arrow to navigate one container upward



DioChannel

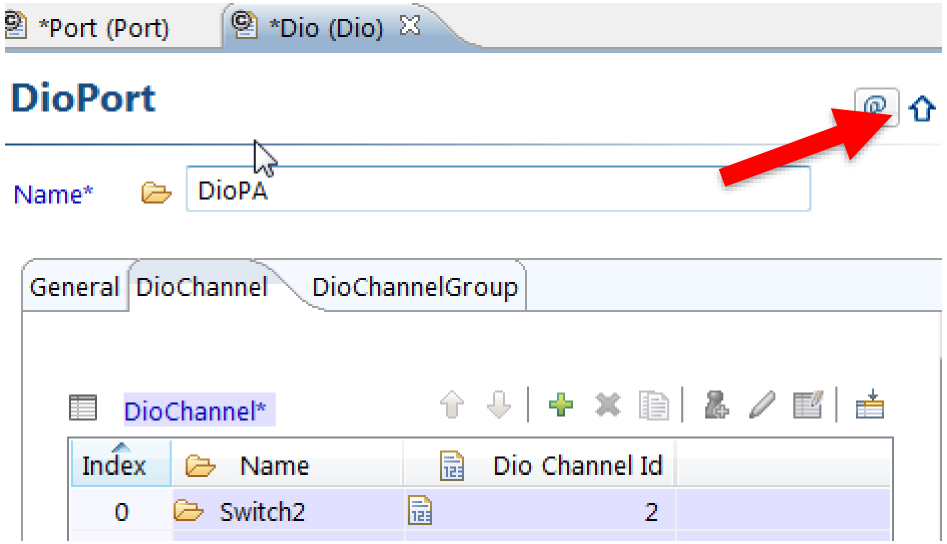
Name* Switch2

Dio Channel Id (0 -> 15)* 2

Description	Use	SIUL_MSCR# (Used for Port pin identification)	Port and Channel (used for Dio port and channel identification)
Switch2	GPIO input	2	PA2
LED4	GPIO output	101	PG5

Dio (10) Add additional port

- We are done configuring channels (pins) on Port A. Now we need to add Port G and then a channel on Port G.
- Click on the up arrow to navigate upward a container



*Port (Port) | *Dio (Dio)

DioPort

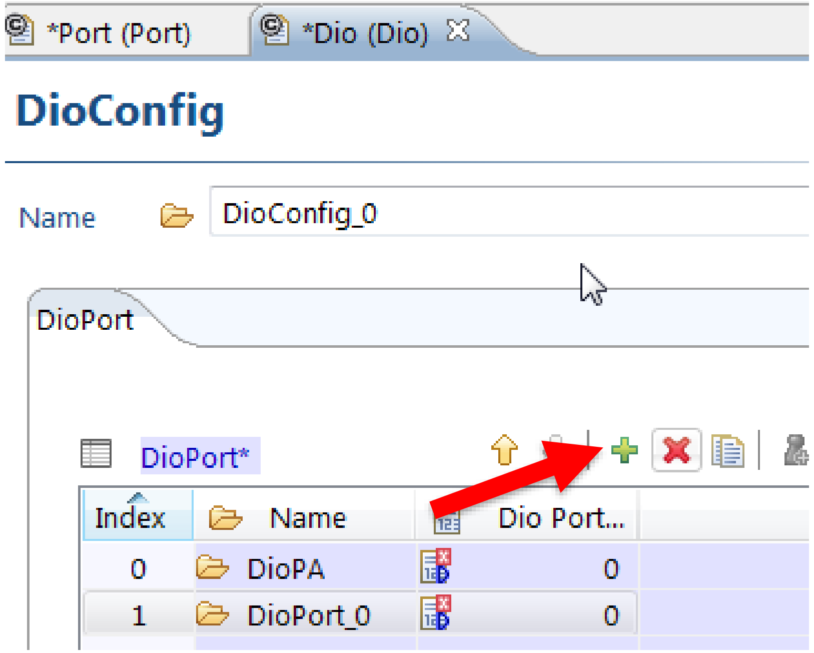
Name* DioPA

General | DioChannel | DioChannelGroup

DioChannel*

Index	Name	Dio Channel Id
0	Switch2	2

- Click on the green + to add a new port.
- A new port with Index 1 is created
- Double click on Index 1 to configure the new port



*Port (Port) | *Dio (Dio)

DioConfig

Name DioConfig_0

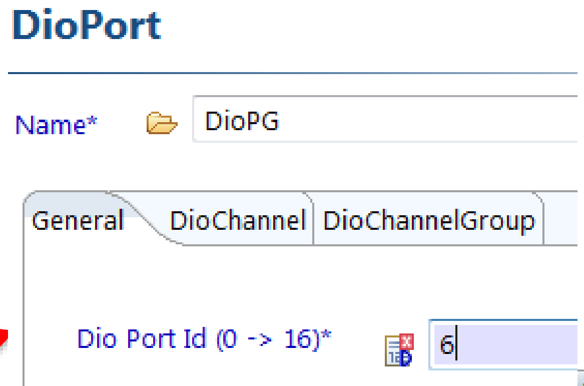
DioPort

DioPort*

Index	Name	Dio Port...
0	DioPA	0
1	DioPort_0	0

Dio (11) Configure new port, add channel

- Configure Port:
  - Name: DioPG
  - Dio Port Id: **6** (for port G)

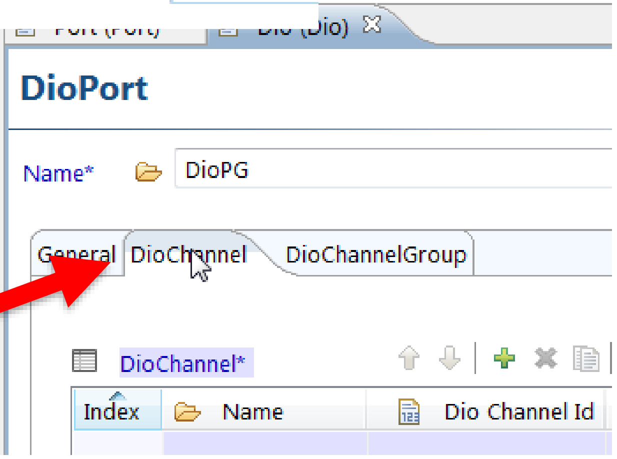


DioPort

Name* DioPG

Dio Port Id (0 -> 16)* 6

- Configure Channel:
  - Click on DioChannel tab

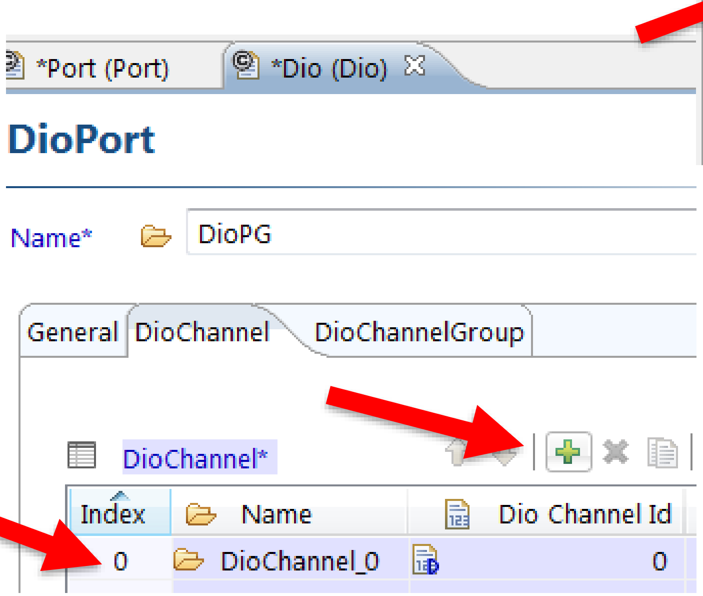


DioPort

Name* DioPG

Index	Name	Dio Channel Id

  - Click on + to add channel
  - Double click on the channel's index to bring up its configuration



DioPort

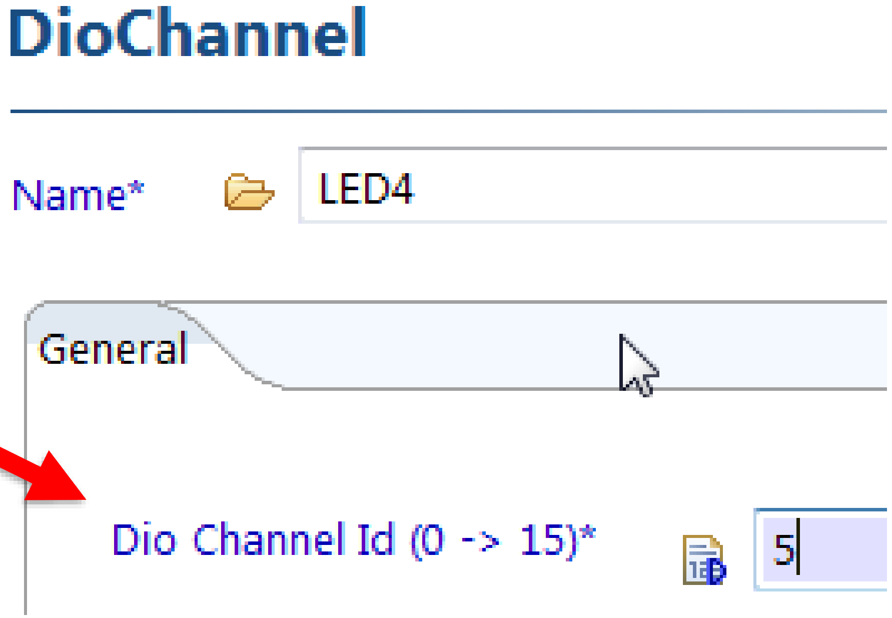
Name* DioPG

Index	Name	Dio Channel Id
0	DioChannel_0	0

Dio (12) Channel configuration

- Name: LED4
- Dio Channel Id: **5**

- Now we have configured channel 5 on Port G



DioChannel

Name* LED4

General

Dio Channel Id (0 -> 15)* 5

Description	Use	SIUL_MSCR# (Used for Port pin identification)	Port and Channel (used for Dio port and channel identification
Switch2	GPIO input	2	PA2
LED4	GPIO output	101	PG5

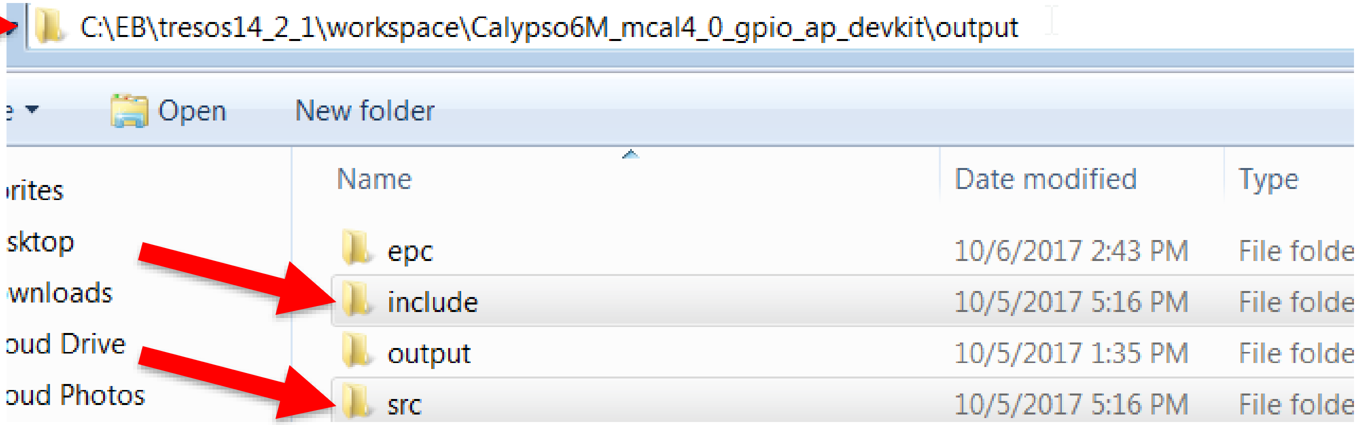
Dio (13): channel symbolic names

- AUTOSAR convention requires using the following name format.
- Format: ModulenameConf_Containername_channel name
- **Symbolic names here for coding are generated and placed in Dio_Cfg.h in folder**
  c:\EB\tresos\workspace\your_project**output\include**
- DEVKIT EVB Example (0xa corresponds to MSCR10; 0x4c to MSCR76):

```
#define   DioConf_DioChannel_LED4 ((uint16)0x000aU)
#define   DioConf_DioChannel_Switch2 ((uint16)0x004cU)
```

Copy generated code to application

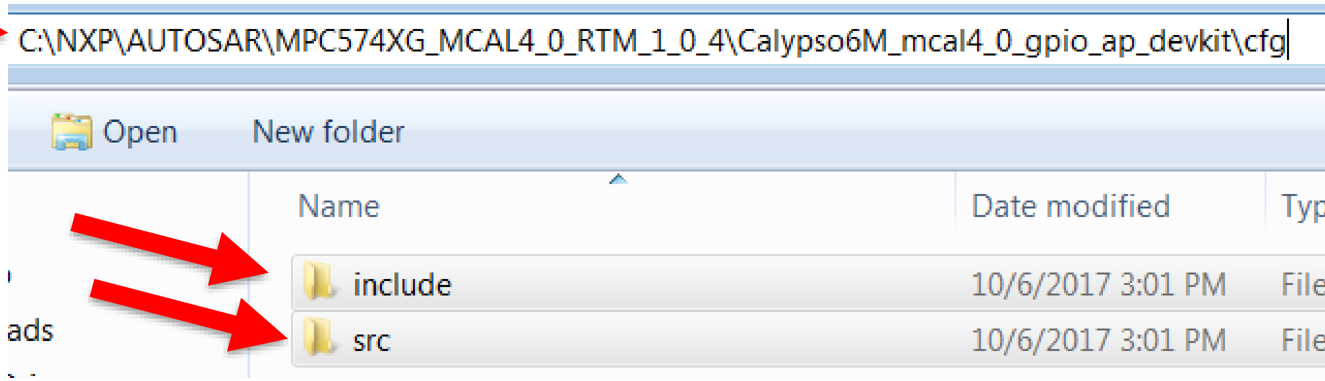
- **Copy** include & src folders from Tresos workspace project’s output folder



C:\EB\tresos14_2_1\workspace\Calypso6M_mcal4_0_gpio_ap_devkit\output

Name	Date modified	Type
epc	10/6/2017 2:43 PM	File folde
include	10/5/2017 5:16 PM	File folde
output	10/5/2017 1:35 PM	File folde
src	10/5/2017 5:16 PM	File folde

- **Delete existing** include & src folder in application project’s cfg folder
- **Paste** in new include & src folders to application project’s cfg folder



C:\NXP\AUTOSAR\MPC574XG_MCAL4_0_RTM_1_0_4\Calypso6M_mcal4_0_gpio_ap_devkit\cfg

Name	Date modified	Typ
include	10/6/2017 3:01 PM	File
src	10/6/2017 3:01 PM	File

Edit Modules file to add newly enabled modules

- In project’s root directory (which has launch.bat):
  - Edit text file “Modules” to add Dio and Port.
    (TIP: Add in alphabetical order – a good habit because it makes it easier to check)

```
# specify modules which will be compiled and linked
MODULE_LIST := Base Det Dem Dio EcuM Mcu Port Rte
```

Add Dio code to main function in main.c ap’s src folder:

Add global variable:

```
VAR(uint8, AUTOMATIC) Level_Switch2 =0;
```

Add code function to main before loop:

```
   Port_Init(&PortConfigSet_0);
```

Add code inside forever loop:

```
   /* Turn off (1) LED4 if Switch 2 is pressed (reads 1 if pressed)*/
   Level_Switch2 = Dio_ReadChannel((Dio_ChannelType)DioConf_DioChannel_Switch2);
   if (Level_Switch2 == 1) {
      Dio_WriteChannel((Dio_ChannelType)DioConf_DioChannel_LED4, 1); /* Off */
   }
   else {
      Dio_WriteChannel((Dio_ChannelType)DioConf_DioChannel_LED4, 0); /* On */
   }
```

Complete GPIO project

- Clean Project
- Run launch.bat
- Download to board
- Run program. Validate LED is on except when switch is pressed.

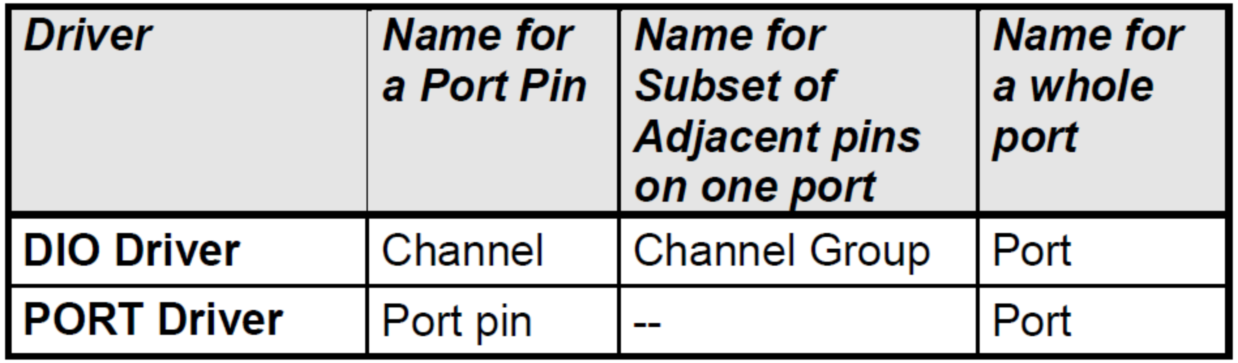
Review: MCAL Modules Used for GPIO

- **PORT**
  - Configures port pins (SIUL2_MCSR and SIUL2_IMSR pad control register initializations)
  - **Pin identification**: Done using Pin Configuration Register numbers (**SIUL_MSCR*x***)
  - Generated code will be put in Port_Init function (name is an AUTOSAR standard). User must call Port_Init

- **DIO**
  - Used for reading and writing GPIO data
  - Configures name to GPIO port pins (e.g. PA1, PA2, …, PB1, PB2, etc.)
  - **Pin identification**:

Dio Port Id number:	Corresponds to port's letter. (PortA=0, PortB=1, PortC=2, etc.)
Dio Channel Id number:	Corresponds to port Port pin's number (0, 1, 2,…)

- References:
  - User Manual for Sample MCAL Application
  - AUTOSAR MCAL Integration and User Manuals for:
    - PORT Driver
    - DIO (Digital I/O) Driver



Driver	***Name for a Port Pin***	***Name for Subset of Adjacent pins on one port***	***Name for a whole port***
DIO Driver	Channel	Channel Group	Port
PORT Driver	Port pin	--	Port

Gpt module

Gpt Example: Timer RTC with SXOSC Overview

Configurations:

- Mcu configurations
  - Set SOSC frequency
  - Enable SOSC
- Gpt configurations for RTC
  - Set prescaler, channel ID, channel (RTC), frequency
- Mcl
  - Enable Mcl (contains eMIOS which is needed for Gpt driver compilation.)

Code:

- Mcu_InitClock: enables SXOSC and other clocks
- GptStartTimer: code to start timer

Suggested Project Workflow

* First time only

Use again a minimal sample ap to duplicate. Go until Tresos Step 5.

1. **Windows:3**
   1. Duplicate & rename Mcu application’s folder to Calypso6M_mcal4_0_soxc_gpt_irq*
2. **Tresos**:
   1. Close any previous projects (reduces risk of configuring module of wrong project)
   2. Import (copy) application’s Tresos project* (Import application’s **Tresos** folder). Example: *C:\NXP\AUTOSAR\MPC574XG_MCAL4_0_RTM_1_0_4\* Calypso6M_mcu_ap\***Tresos***
   3. Rename project to Calypso6M_mcal4_0_sxosc_gpt_irq*
   4. Load project’s configuration
   5. Sanity check: Generate and ensure no errors
   6. Modify as desired
   7. Generate
3. **Windows**:
   1. Copy output (.c and .h files) from Tresos project’s **output** folder to sample application’s **cfg** folder
   2. Modify application code as desired
   3. Build

Timer Summary 1: Configure SXOSC

Mcu module

Tab: McuModuleConfiguation

Index 0: McuConfigPB_0

Tab: General (Verify Slow Crystal Frequency = 32KHz)

Tab: McuClockSettingConfig

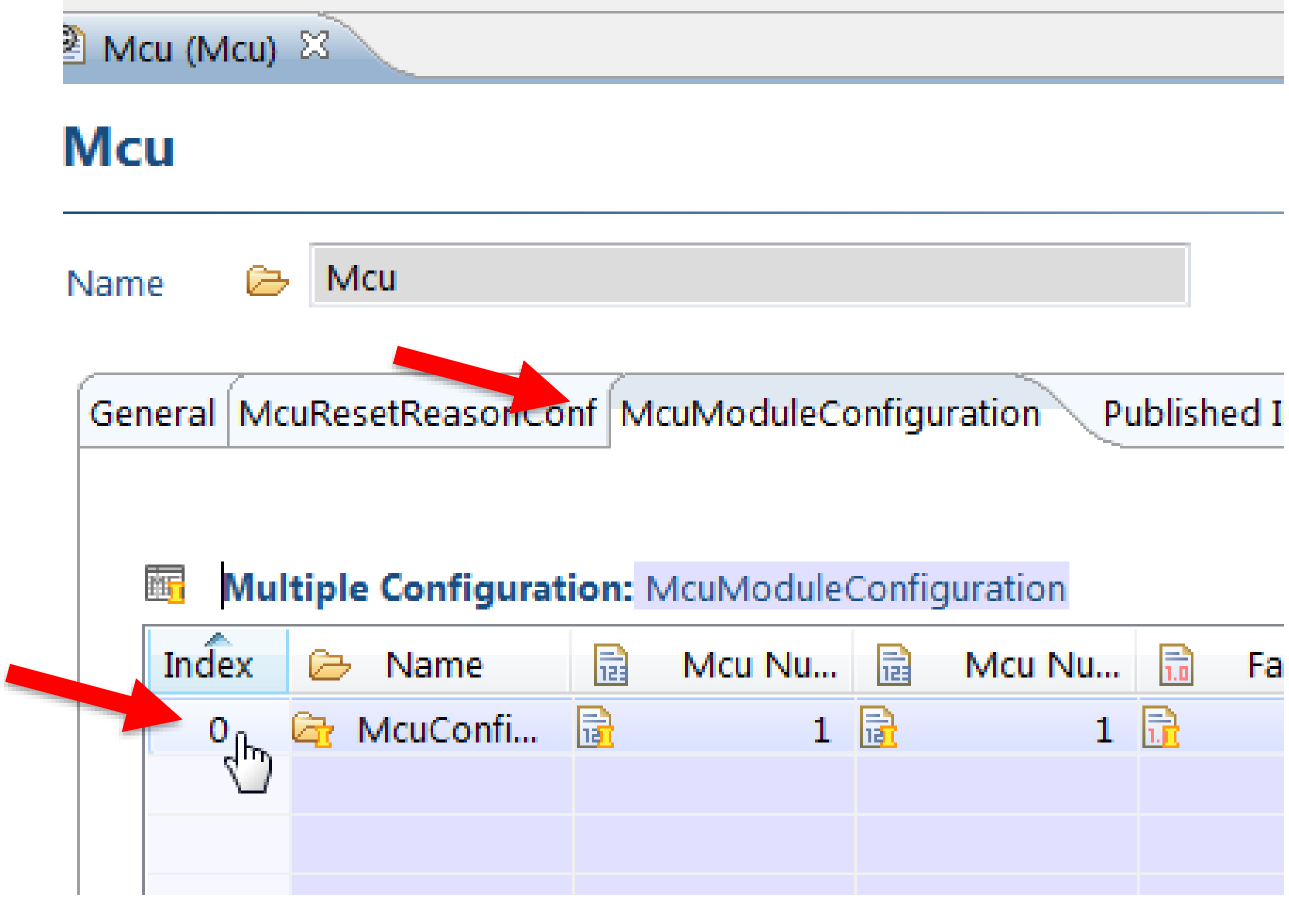
Index 0: McuClockSettingConfig

Tab: General (Enable SXOSC)

Tab: McuSXOSC (set SXOSC divider, etc.)

Mcu (1): SXOSC - verify crystal frequency 1

- Double click Mcu driver configuration
- McuModuleConfiguration tab:
  - Double click on Index 0



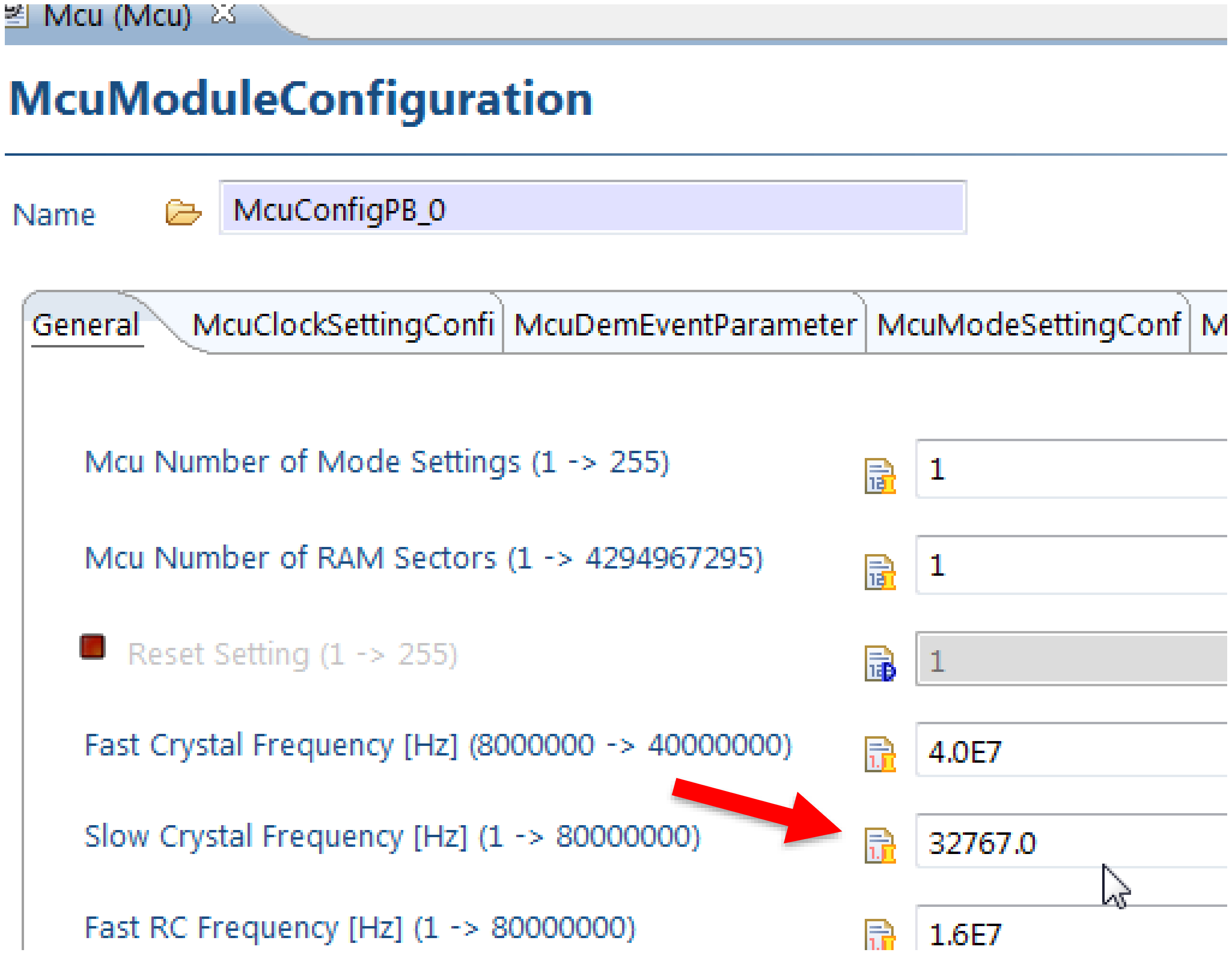
Name: Mcu

Multiple Configuration: McuModuleConfiguration

Index	Name	Mcu Nu...	Mcu Nu...	Fa
0	McuConfi...	1	1	

Mcu (2): SXOSC - verify crystal frequency 2

- On the General tab, verify the Slow Crystal Frequency is 32767 (default).
  - This is the SXOSC crystal.



Mcu (Mcu)

McuModuleConfiguration

Name: McuConfigPB_0

Mcu Number of Mode Settings (1 -> 255): 1

Mcu Number of RAM Sectors (1 -> 4294967295): 1

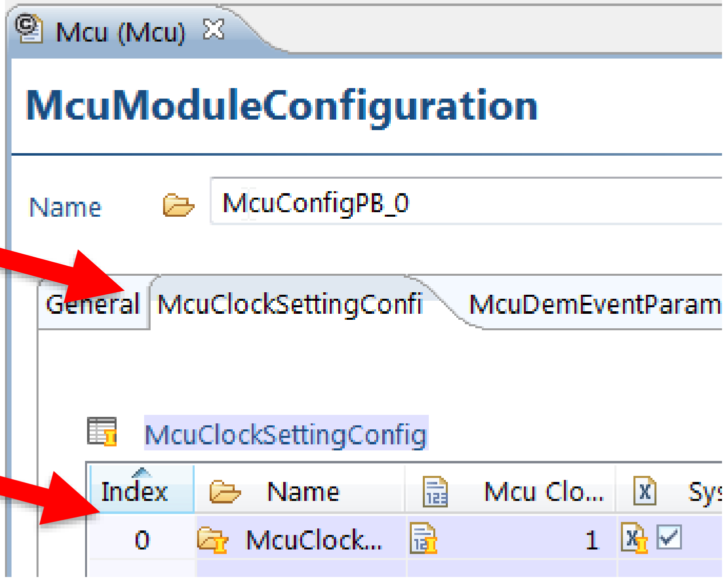
Reset Setting (1 -> 255): 1

Fast Crystal Frequency [Hz] (8000000 -> 40000000): 4.0E7

Slow Crystal Frequency [Hz] (1 -> 80000000): 32767.0

Fast RC Frequency [Hz] (1 -> 80000000): 1.6E7

Mcu (3): SXOSC - Enable



Mcu (Mcu)

McuModuleConfiguration

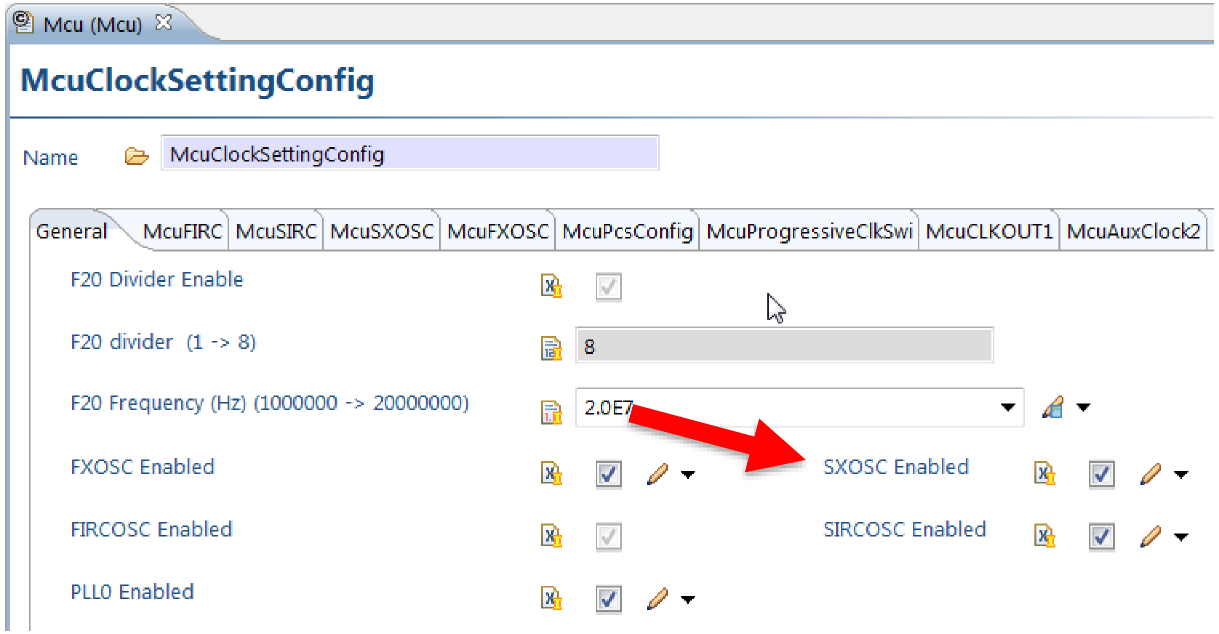
Name: McuConfigPB_0

Tabs: General | McuClockSettingConfi | McuDemEventParam

McuClockSettingConfig

Index	Name	Mcu Clo...	Sys
0	McuClock...	1	☑

- Click on McuClockSettingConfig tab
- Double click on index 0 to open McuClockSettingConfig



Mcu (Mcu)

McuClockSettingConfig

Name: McuClockSettingConfig

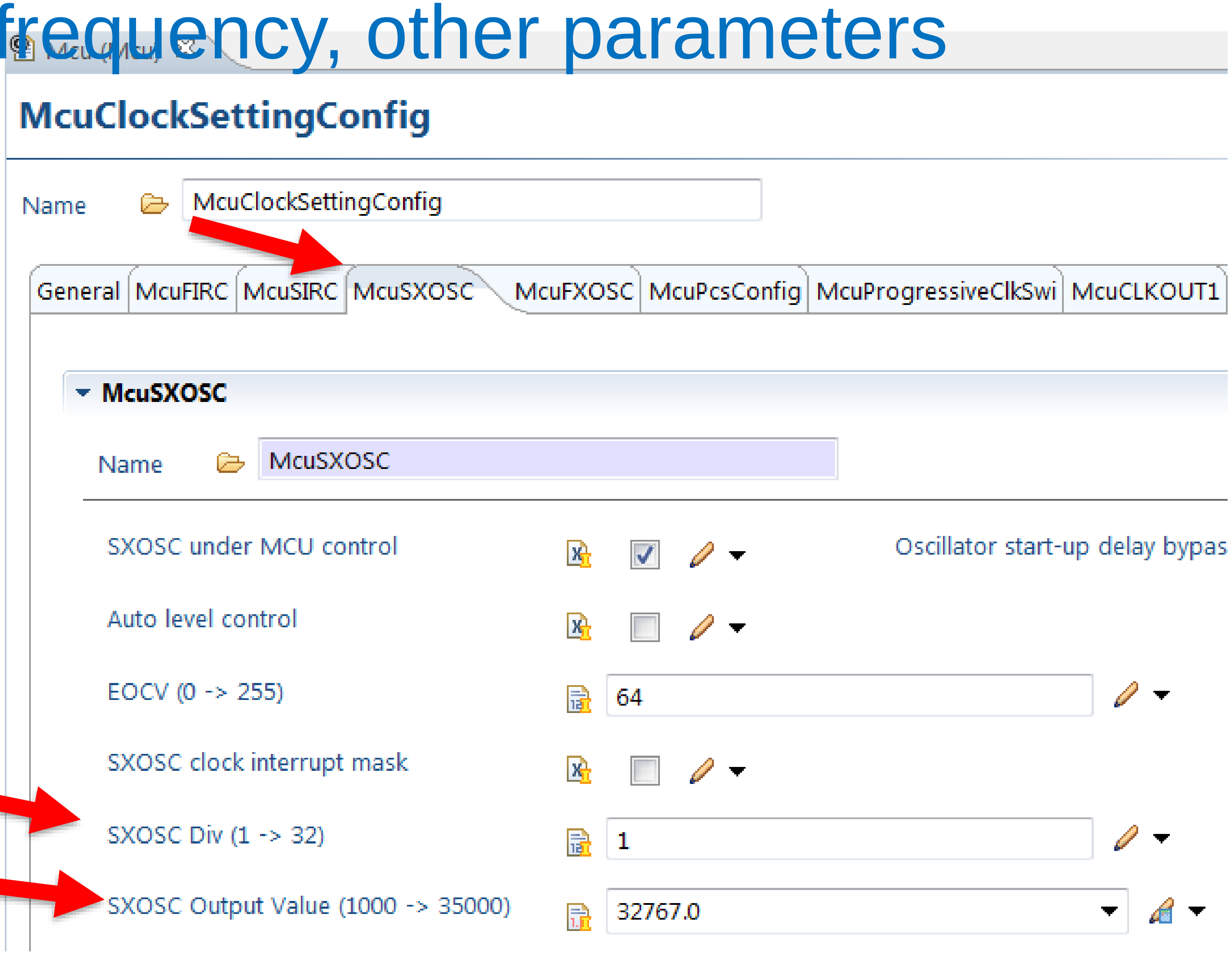
Tabs: General | McuFIRC | McuSIRC | McuSXOSC | McuFXOSC | McuPcsConfig | McuProgressiveClkSwi | McuCLKOUT1 | McuAuxClock2

F20 Divider Enable	☑		
F20 divider (1 -> 8)	8		
F20 Frequency (Hz) (1000000 -> 20000000)	2.0E7		
FXOSC Enabled	☑	SXOSC Enabled	☑
FIRCOSC Enabled	☑	SIRCOSC Enabled	☑
PLL0 Enabled	☑		

- Scroll down to bottom right, click to enable SXOSC (if not enabled already)

Mcu (4): SXOSC - Set frequency, other parameters

- Click on McuSXOSC tab
  - Configure parameters as needed.
  - For this example, the default values are used so no changes are needed
  - Note other parameters
  - Note: You can configure the Mcu driver to not touch SXOSC at all using parameter SXOSC under MCU control
    - Similar capability exists for other Mcu resources



McuClockSettingConfig

Name: McuClockSettingConfig

General | McuFIRC | McuSIRC | McuSXOSC | McuFXOSC | McuPcsConfig | McuProgressiveClkSwi | McuCLKOUT1

McuSXOSC

Name: McuSXOSC

SXOSC under MCU control: ☑

Oscillator start-up delay bypas

Auto level control: □

EOCV (0 -> 255): 64

SXOSC clock interrupt mask: □

SXOSC Div (1 -> 32): 1

SXOSC Output Value (1000 -> 35000): 32767.0

Timer Summary 2: Create timer channel with RTC, SXOSC

Gpt module

Tab: GptChannelConfigSet

Index 0: GptChannelConfigSet_0

Tab: GptChannelConfiguration (delete current configurations, then add new one)

Index 0: GptChannel_0

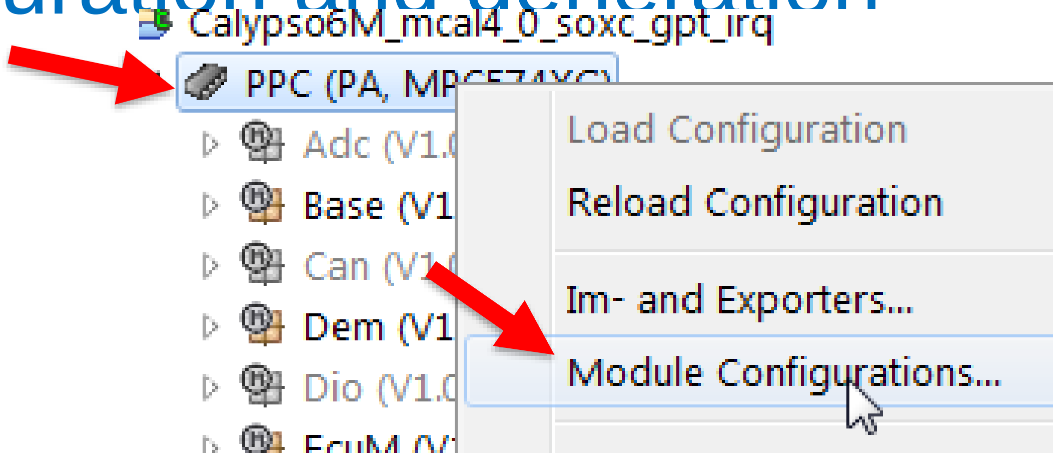
Tab: General (rename channel to RtcTimer, GptHwCh = RTC, continuous mode,

RTC clock source = SXOSC.

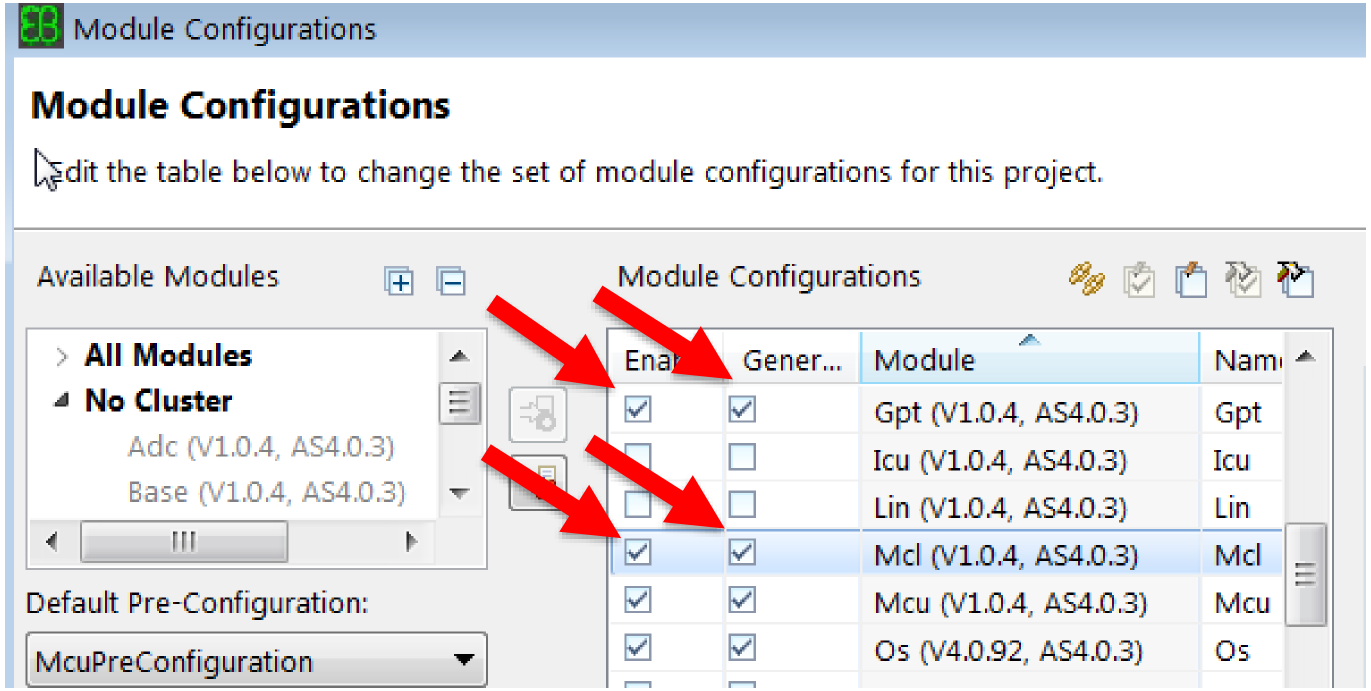
Note: GptChannelTickFrequency will be set/calculated later)

Gpt (1) - Enable Gpt, Mcl configuration and generation

- Right click on PPC
- Click on Module Configurations…



- Click both Enable and Generate to enable Gpt and Mcl (Micro Controller Library) module configurations and code generation.



Module Configurations

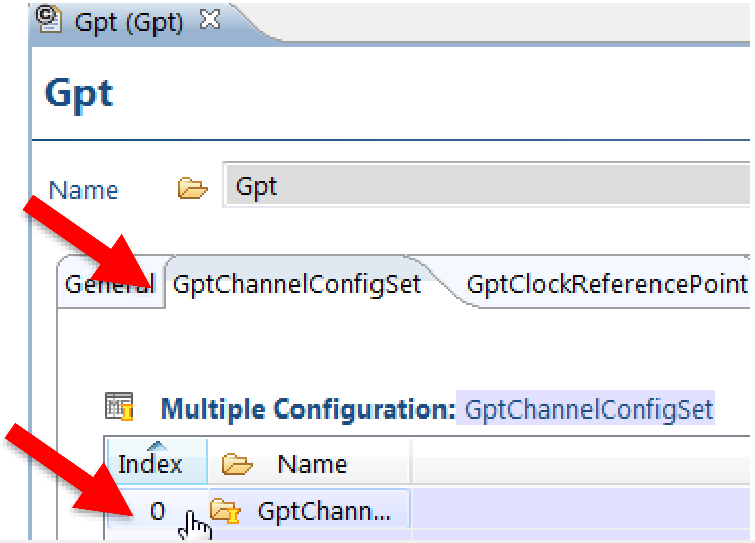
Edit the table below to change the set of module configurations for this project.

Module Configurations

Ena...	Gener...	Module	Nam
☑	☑	Gpt (V1.0.4, AS4.0.3)	Gpt
□	□	Icu (V1.0.4, AS4.0.3)	Icu
□	□	Lin (V1.0.4, AS4.0.3)	Lin
☑	☑	Mcl (V1.0.4, AS4.0.3)	Mcl
☑	☑	Mcu (V1.0.4, AS4.0.3)	Mcu
☑	☑	Os (V4.0.92, AS4.0.3)	Os

Gpt (2) : Delete existing channels

- Click GptChannelConfigSet tab
- Double click on GptChannels's index 0



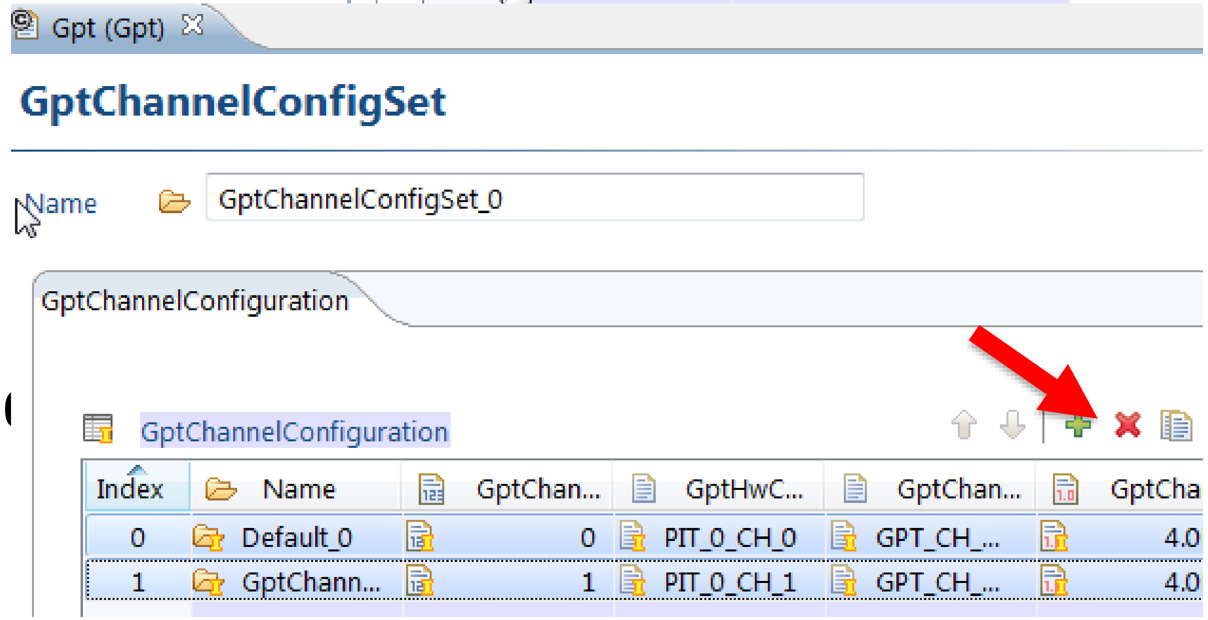
Gpt (Gpt)

Gpt

Name: Gpt

Multiple Configuration: GptChannelConfigSet

Index	Name
0	GptChann...



Gpt (Gpt)

GptChannelConfigSet

Name: GptChannelConfigSet_0

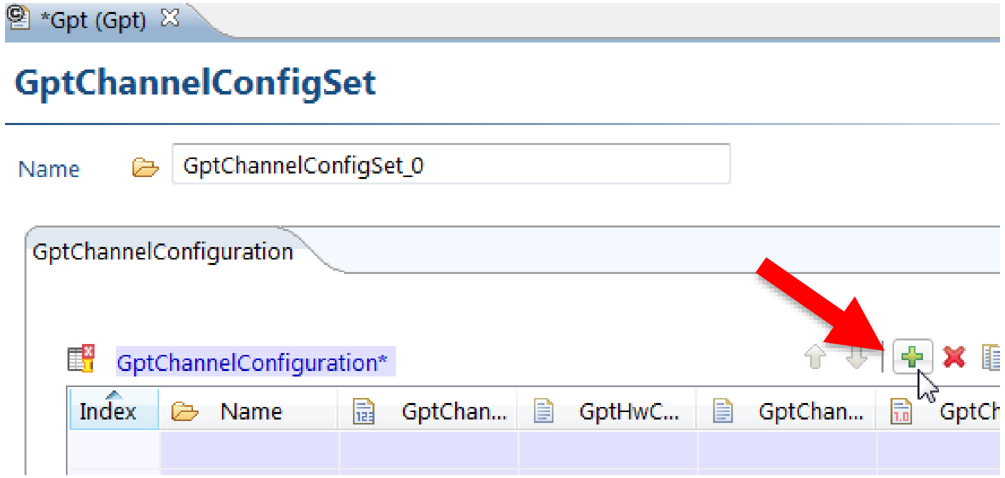
GptChannelConfiguration

Index	Name	GptChan...	GptHwC...	GptChan...	GptCha
0	Default_0	0	PIT_0_CH_0	GPT_CH_...	4.0
1	GptChann...	1	PIT_0_CH_1	GPT_CH_...	4.0

- Select all existing channels
- Click **X** to delete those unneeded channels

Gpt (3) - Add Gpt channel

- Add Channel: Click on Green +



*Gpt (Gpt)

GptChannelConfigSet

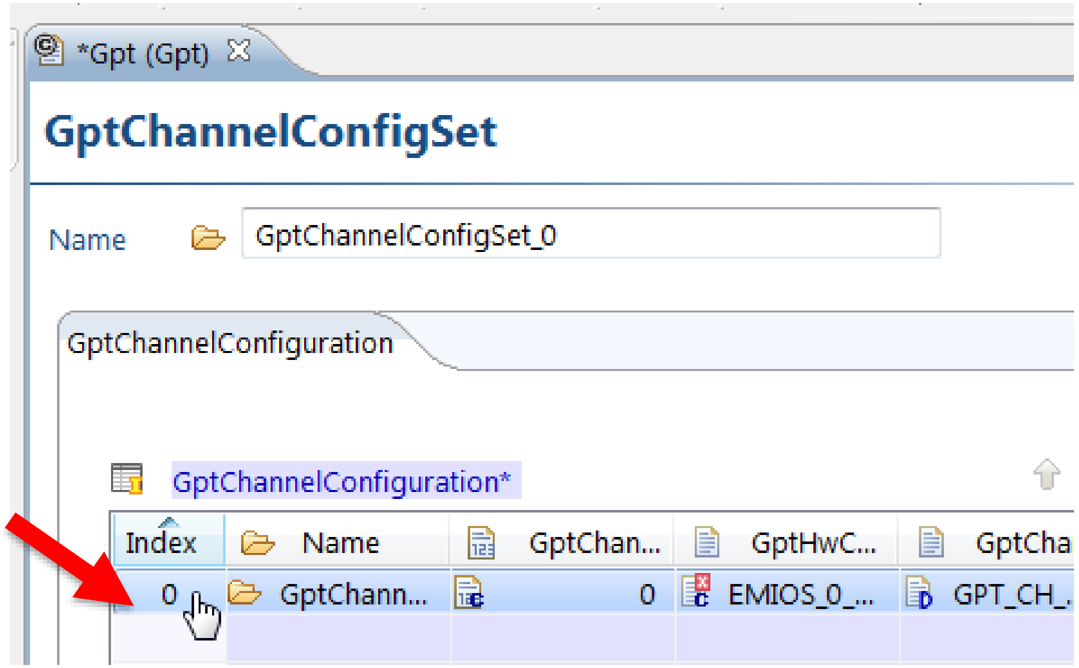
Name: GptChannelConfigSet_0

GptChannelConfiguration

GptChannelConfiguration*

Index	Name	GptChan...	GptHwC...	GptChan...	GptCh

- Double click on new channel's index to configure it



*Gpt (Gpt)

GptChannelConfigSet

Name: GptChannelConfigSet_0

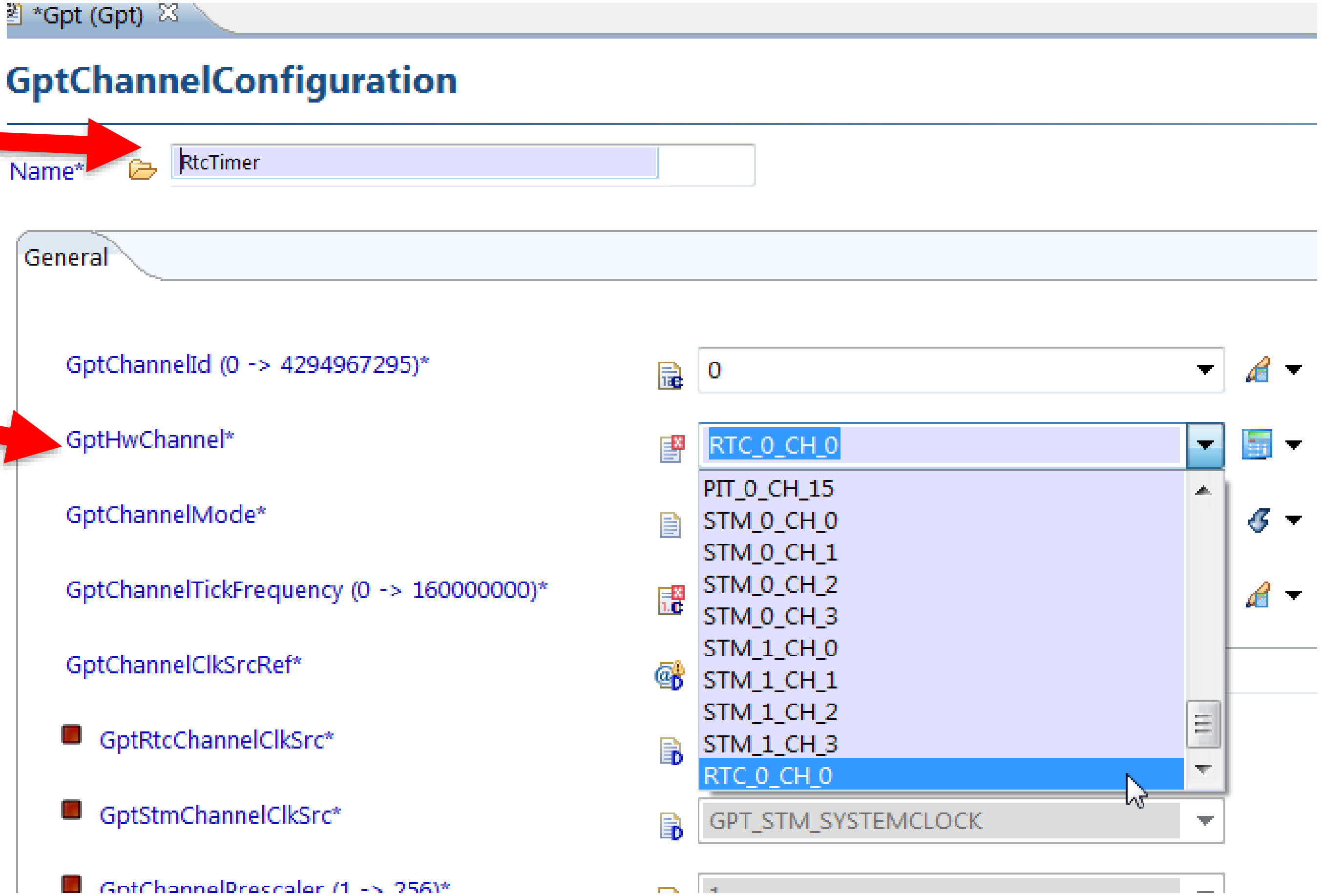
GptChannelConfiguration

GptChannelConfiguration*

Index	Name	GptChan...	GptHwC...	GptCha
0	GptChann...	0	EMIOS_0_...	GPT_CH_.

Gpt (4) – Configure Gpt channel - 1

- Name: RtcTimer
- GptHwChannel: Scroll down selections to enable and select RTC_0_CH_0
- Note some parameters have red boxes in front of them. This means the parameter is disabled.
- Those boxes will have to be checked to enable the parameter for configuration



*Gpt (Gpt)

GptChannelConfiguration

Name* RtcTimer

General

GptChannelId (0 -> 4294967295)* 0

GptHwChannel* RTC_0_CH_0

GptChannelMode*

GptChannelTickFrequency (0 -> 160000000)*

GptChannelClkSrcRef*

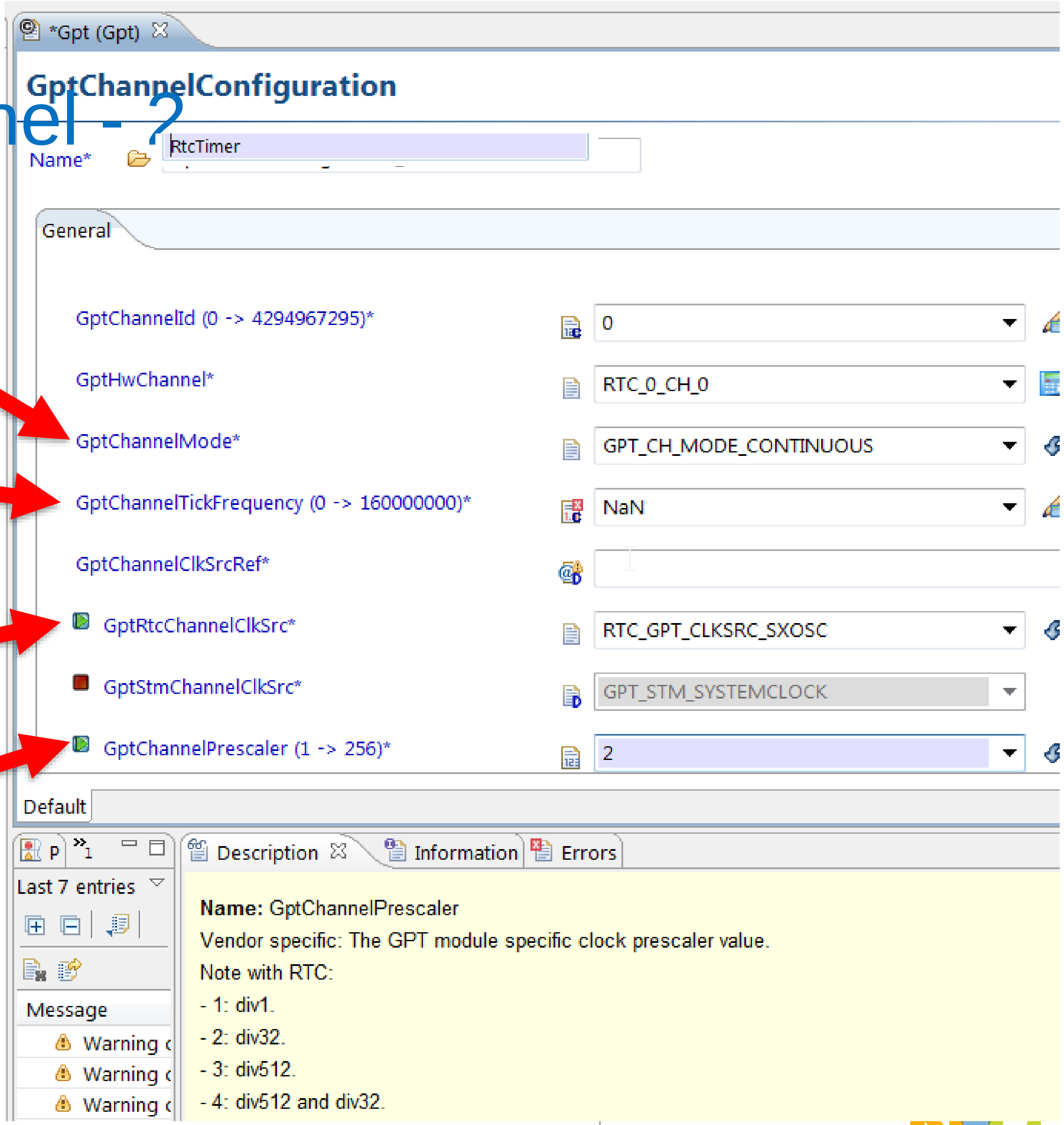
GptRtcChannelClkSrc*

GptStmChannelClkSrc* GPT_STM_SYSTEMCLOCK

GptChannelPrescaler (1 -> 256)* 1

Gpt (5) - Configure Gpt channel - 2

- GptChannelMode: choices are one shot or continuous. Select GPT_CH_MODE_CONTINUOUS
- GptChannelTickFrequency: this can be configured automatically later after configuring clock source references
- GptRtcChannelClkSrc:
  - Click red box to enable configuration
  - Select RTC_GPT_CLKSRC_SXOSC
- GptChannelPrescaler: See Description for prescaler value to divisor. Select “2” for divide the 32KHz SXOSC by 32.
- Other parameters can use default values



*Gpt (Gpt)

GptChannelConfiguration

Name* RtcTimer

General

GptChannelId (0 -> 4294967295)* 0

GptHwChannel* RTC_0_CH_0

GptChannelMode* GPT_CH_MODE_CONTINUOUS

GptChannelTickFrequency (0 -> 160000000)* NaN

GptChannelClkSrcRef*

GptRtcChannelClkSrc* RTC_GPT_CLKSRC_SXOSC

GptStmChannelClkSrc* GPT_STM_SYSTEMCLOCK

GptChannelPrescaler (1 -> 256)* 2

Default

Name: GptChannelPrescaler
Vendor specific: The GPT module specific clock prescaler value.
Note with RTC:
- 1: div1.
- 2: div32.
- 3: div512.
- 4: div512 and div32.

Timer Summary 3: Create SXOSC clock reference point

Mcu module

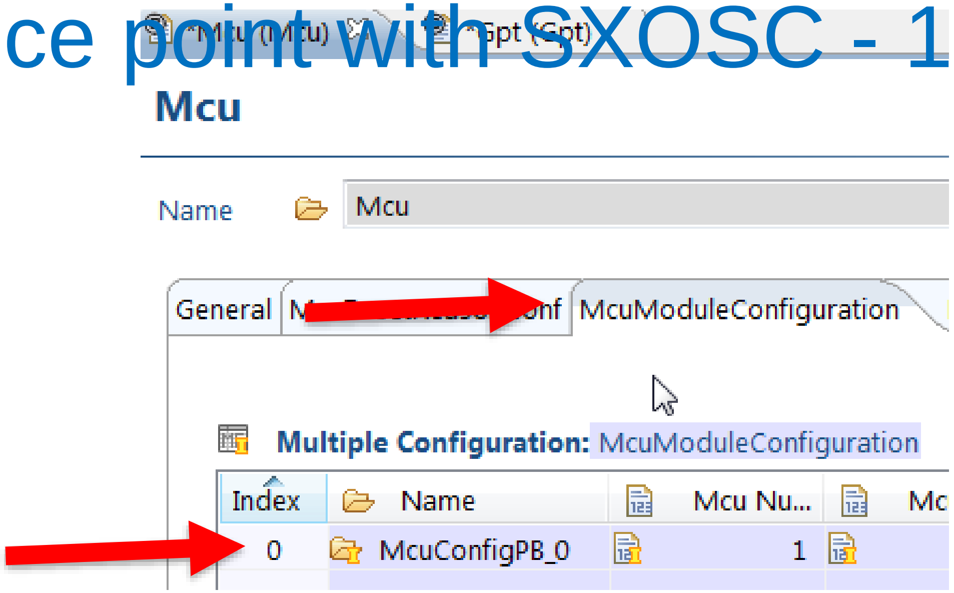
- Tab: McuModuleConfiguration
  - Index 0: McuConfigPB_0
    - Tab: McuClockSettingConfig
      - Index 0: McuClockSettingConfig
        - Tab (far right): McuClockReferencePoint (add new reference point for SXOSC)
          - Index (new one): (name ClkRefPnt_SXOSC,

            freq. select = SXOSC,

            automatically calc ref pt value)

Mcu (1) – Configure clock reference point with SXOSC - 1

- To back to the Mcu configuration
- Click McuModuleConfiguration tab
- Double click index 0



*Mcu (Mcu) *Gpt (Gpt)

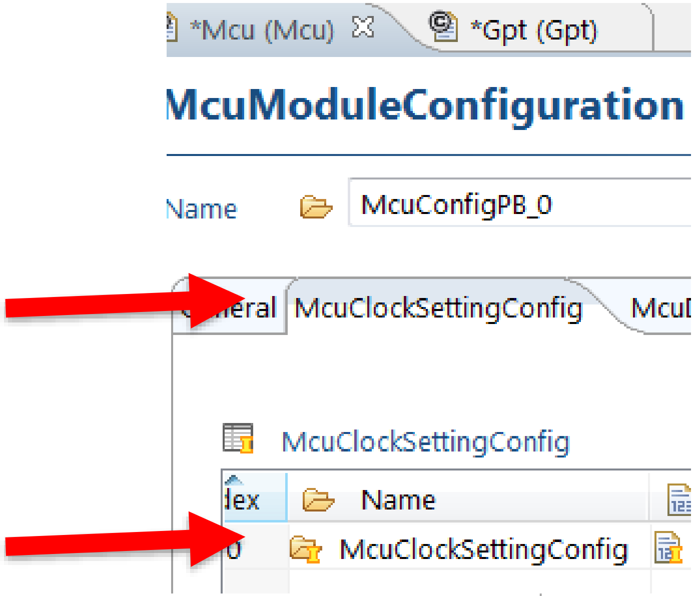
Mcu

Name: Mcu

Multiple Configuration: McuModuleConfiguration

Index	Name	Mcu Nu...	Mc
0	McuConfigPB_0	1	

- Select McuClockSettingConfig tab
- Double click Index 0



*Mcu (Mcu) *Gpt (Gpt)

McuModuleConfiguration

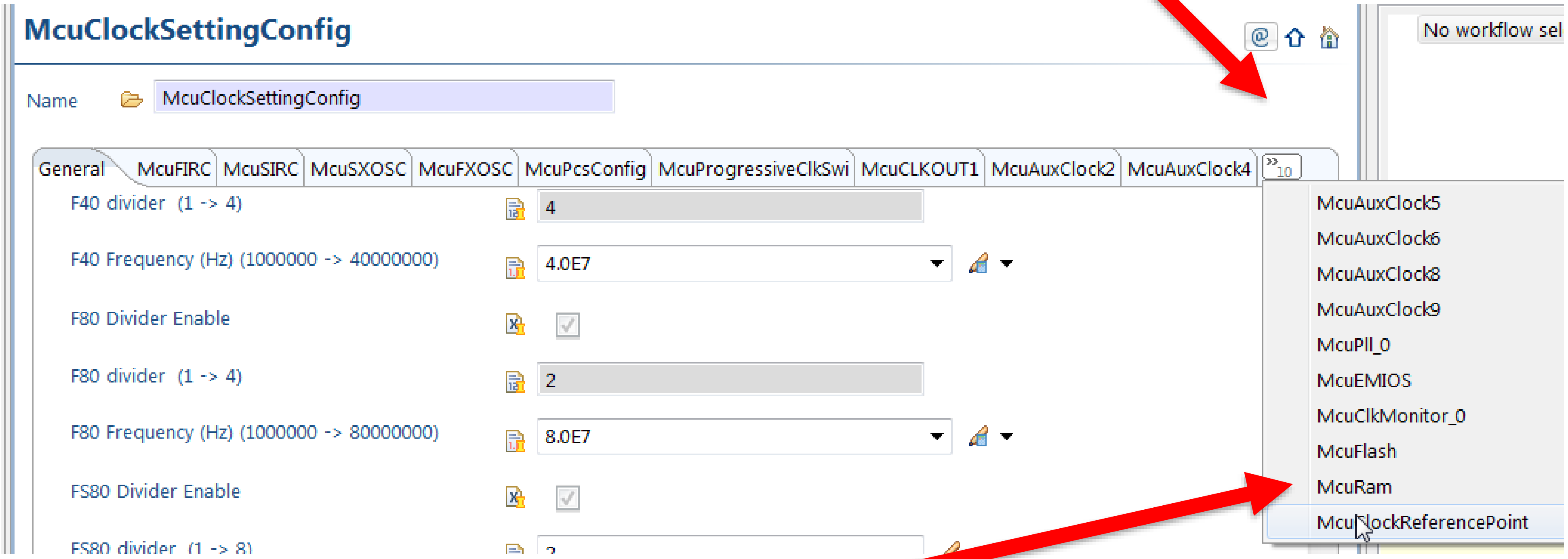
Name: McuConfigPB_0

McuClockSettingConfig

lex	Name
0	McuClockSettingConfig

Mcu (2) - Configure clock reference point with SXOSC - 2

- Click on “10” which indicates there are 10 more tabs



McuClockSettingConfig

Name: McuClockSettingConfig

F40 divider (1 -> 4): 4

F40 Frequency (Hz) (1000000 -> 40000000): 4.0E7

F80 Divider Enable ☑

F80 divider (1 -> 4): 2

F80 Frequency (Hz) (1000000 -> 80000000): 8.0E7

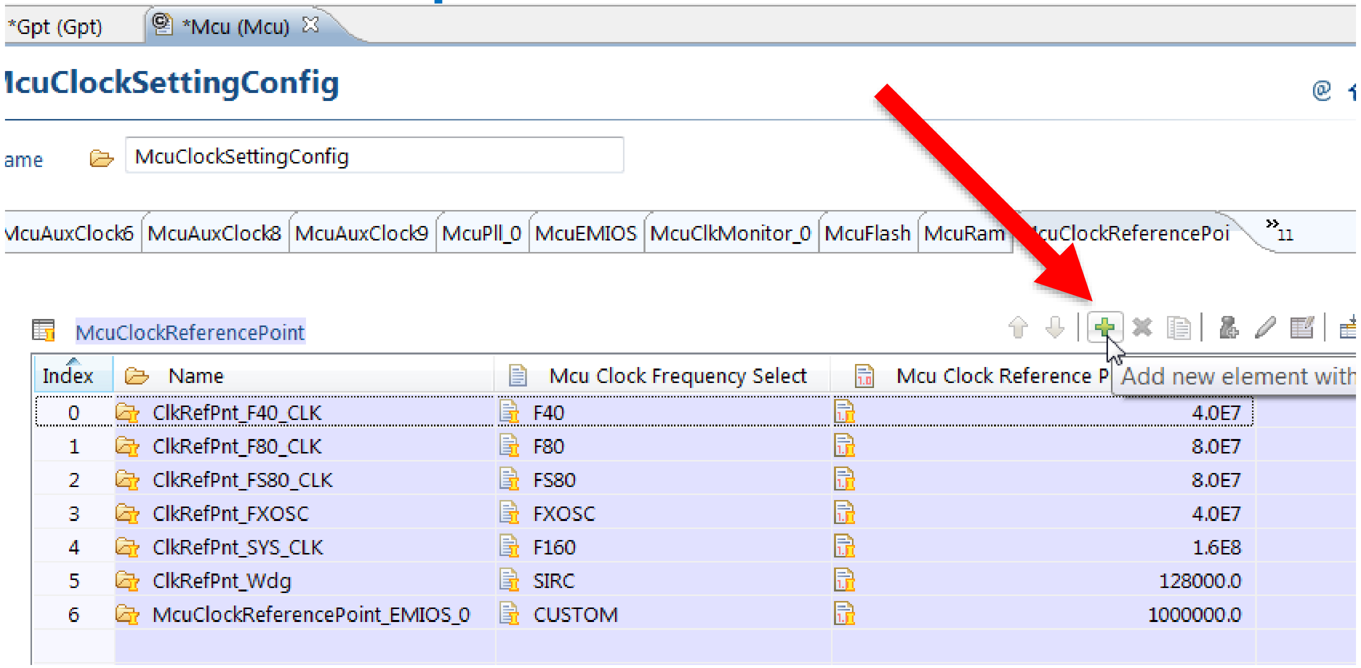
FS80 Divider Enable ☑

FS80 divider (1 -> 8): 2

- Select McuClockReferencePoint

Mcu (3) - Configure clock reference point with SXOSC - 3

- Click green + to add new clock reference point for SXOSC
  - This will be needed for Gpt driver



*Gpt (Gpt) | *Mcu (Mcu)

lcuClockSettingConfig

ame McuClockSettingConfig

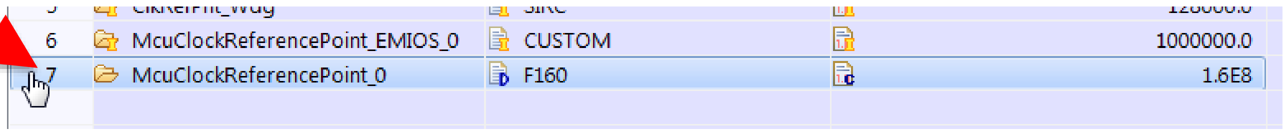
McuAuxClock6 | McuAuxClock8 | McuAuxClock9 | McuPll_0 | McuEMIOS | McuClkMonitor_0 | McuFlash | McuRam | 1cuClockReferencePoi | »11

McuClockReferencePoint

Add new element with

Index	Name	Mcu Clock Frequency Select	Mcu Clock Reference P
0	ClkRefPnt_F40_CLK	F40	4.0E7
1	ClkRefPnt_F80_CLK	F80	8.0E7
2	ClkRefPnt_FS80_CLK	FS80	8.0E7
3	ClkRefPnt_FXOSC	FXOSC	4.0E7
4	ClkRefPnt_SYS_CLK	F160	1.6E8
5	ClkRefPnt_Wdg	SIRC	128000.0
6	McuClockReferencePoint_EMIOS_0	CUSTOM	1000000.0

- Double click on added reference point's index to configure it



5	ClkRefPnt_Wdg	SIRC	128000.0
6	McuClockReferencePoint_EMIOS_0	CUSTOM	1000000.0
7	McuClockReferencePoint_0	F160	1.6E8

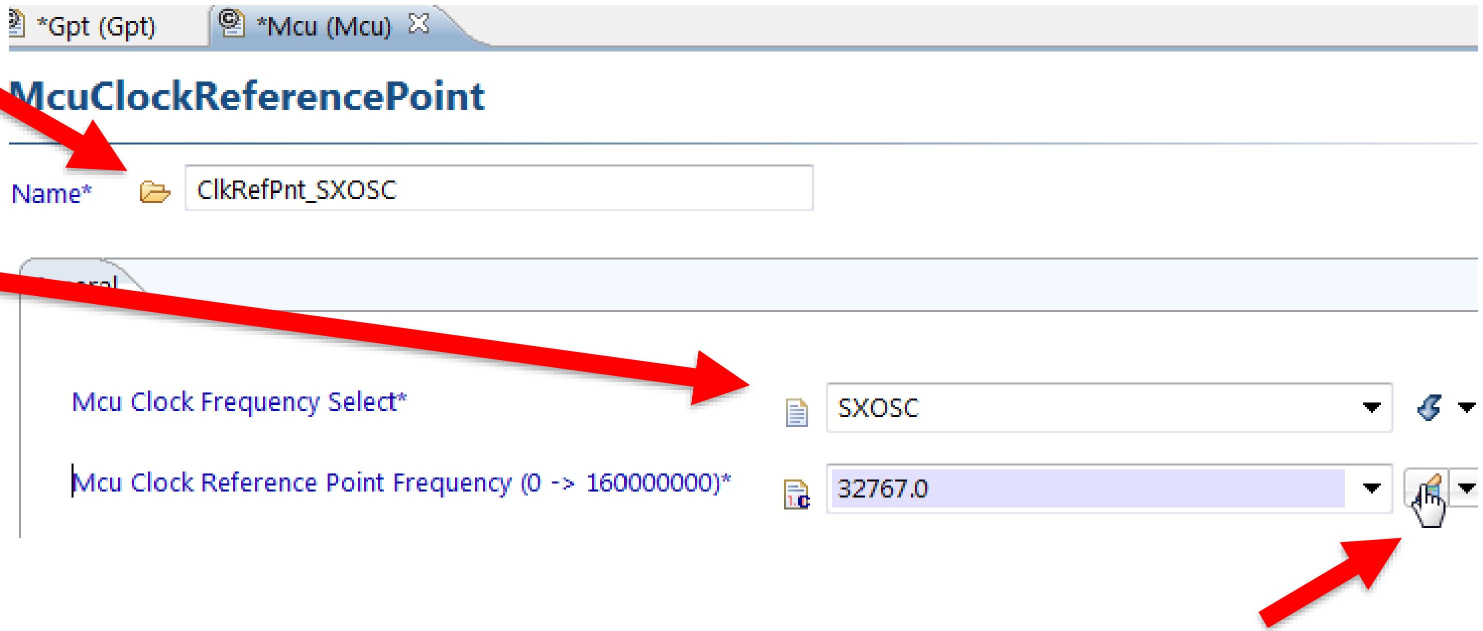
Mcu (4) - Configure clock reference point with SXOSC - 4

- Name: ClkRefPnt_SXOSC

- Mcu Clock Frequency Select: choose SXOSC

- Mcu Clock Reference Point Frequency: Double click on calculate value

- Note:
  - Mcu module configures all clocks.
  - Clock reference points are a mechanism to provide clock information from Mcu module to other modules.



McuClockReferencePoint

Name* ClkRefPnt_SXOSC

Mcu Clock Frequency Select* SXOSC

Mcu Clock Reference Point Frequency (0 -> 160000000)* 32767.0

Timer Summary 4: Configure a GptClockRefPt using RTC/SXOSC

Gpt module

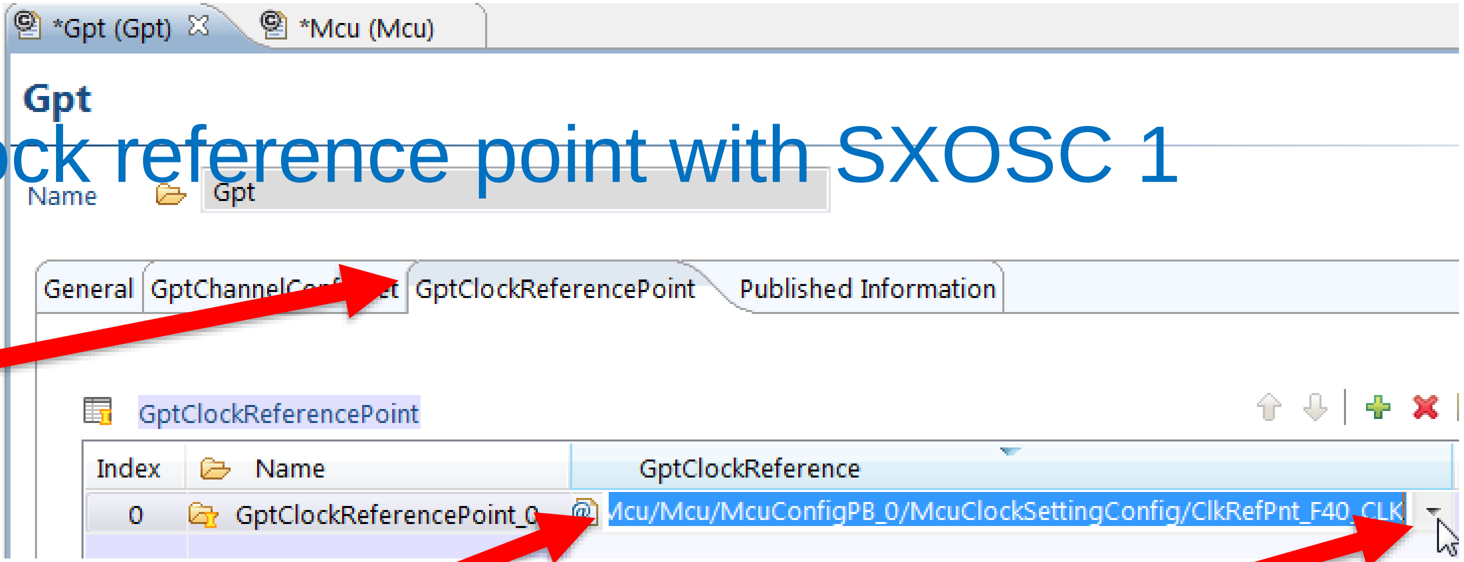
Tab: GptClockReferencePoint

Index 0: GptClockReferencePoint_0

Tab: General (select GptClockReference = ClkRefPnt_SXOSC)

Gpt (1) – Config a Gpt clock reference point with SXOSC 1

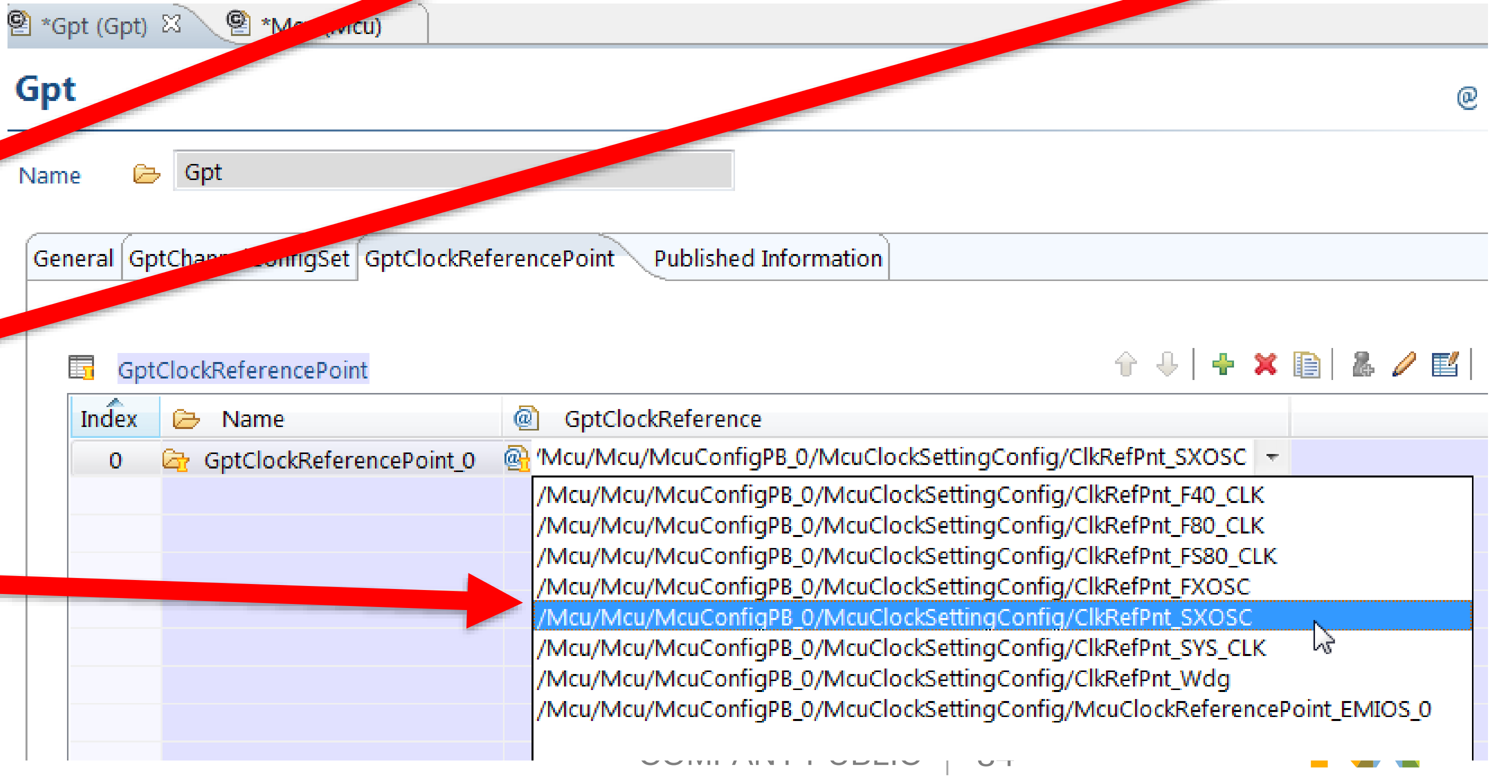
- Go back to Gpt configuration
- If needed navigate to the top of the Gpt container
- Select tab GptClockReferencePoint
- Expand column widths to see all text
- Select GptClockReference of Index 0
  - Down arrow appears
- Click down arrow for GptClockReference options
- Select SXOSC



Name: Gpt

GptClockReferencePoint

Index	Name	GptClockReference
0	GptClockReferencePoint_0	/Mcu/Mcu/McuConfigPB_0/McuClockSettingConfig/ClkRefPnt_F40_CLK



Name: Gpt

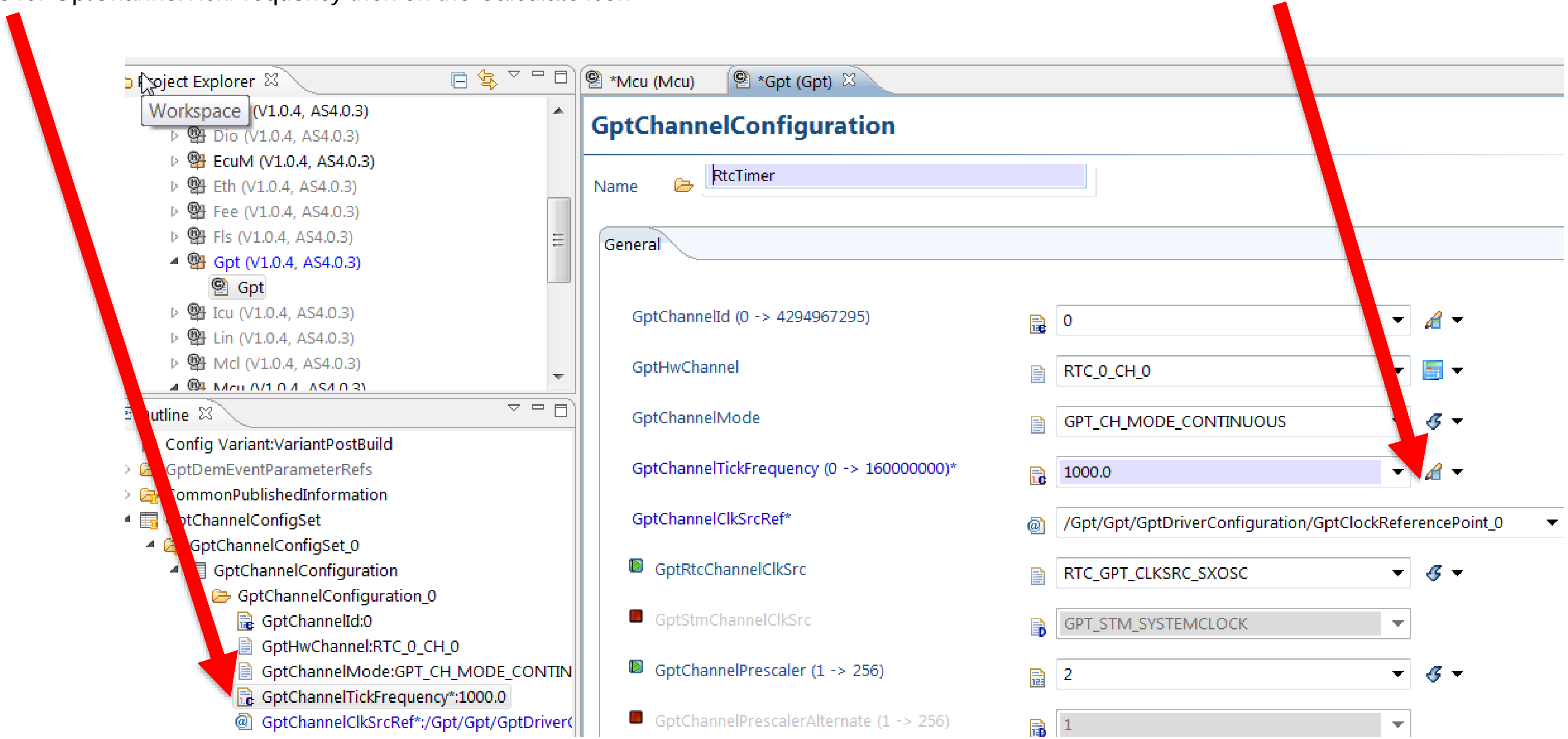
GptClockReferencePoint

Index	Name	GptClockReference
0	GptClockReferencePoint_0	/Mcu/Mcu/McuConfigPB_0/McuClockSettingConfig/ClkRefPnt_SXOSC

/Mcu/Mcu/McuConfigPB_0/McuClockSettingConfig/ClkRefPnt_F40_CLK
/Mcu/Mcu/McuConfigPB_0/McuClockSettingConfig/ClkRefPnt_F80_CLK
/Mcu/Mcu/McuConfigPB_0/McuClockSettingConfig/ClkRefPnt_FS80_CLK
/Mcu/Mcu/McuConfigPB_0/McuClockSettingConfig/ClkRefPnt_FXOSC
/Mcu/Mcu/McuConfigPB_0/McuClockSettingConfig/ClkRefPnt_SXOSC
/Mcu/Mcu/McuConfigPB_0/McuClockSettingConfig/ClkRefPnt_SYS_CLK
/Mcu/Mcu/McuConfigPB_0/McuClockSettingConfig/ClkRefPnt_Wdg
/Mcu/Mcu/McuConfigPB_0/McuClockSettingConfig/McuClockReferencePoint_EMIOS_0

Gpt (2) - Config a Gpt clock reference point with SXOSC 2

- Expand Outline view in bottom left of screen, shown below
  - GptChannelConfigSet – GptChannel ConfigSet_0 – GptChannelConfiguration -RtcTimer
  - <u>GptChannelSrcRef</u>: ensure GptClockReferencePoint_0 is selected
  - Click the calculate for GptChannelTickFrequency then on the Calculate icon



(V1.0.4, AS4.0.3)
Dio (V1.0.4, AS4.0.3)
EcuM (V1.0.4, AS4.0.3)
Eth (V1.0.4, AS4.0.3)
Fee (V1.0.4, AS4.0.3)
Fls (V1.0.4, AS4.0.3)
Gpt (V1.0.4, AS4.0.3)
Gpt
Icu (V1.0.4, AS4.0.3)
Lin (V1.0.4, AS4.0.3)
Mcl (V1.0.4, AS4.0.3)
Mcu (V1.0.4, AS4.0.3)

Outline
Config Variant:VariantPostBuild
GptDemEventParameterRefs
CommonPublishedInformation
GptChannelConfigSet
GptChannelConfigSet_0
GptChannelConfiguration
GptChannelConfiguration_0
GptChannelId:0
GptHwChannel:RTC_0_CH_0
GptChannelMode:GPT_CH_MODE_CONTIN
GptChannelTickFrequency*:1000.0
GptChannelClkSrcRef*:/Gpt/Gpt/GptDriver

GptChannelConfiguration

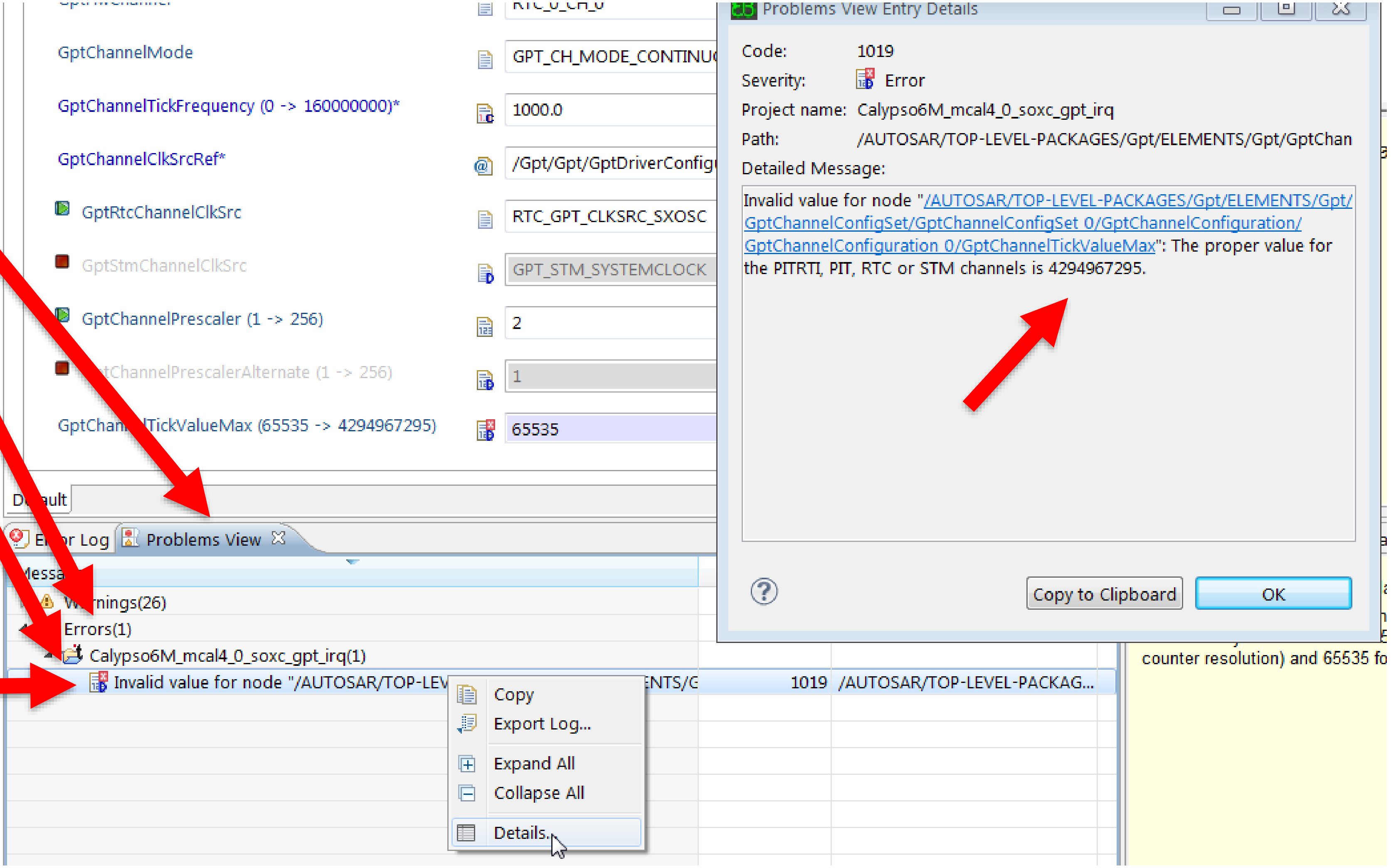
Name: RtcTimer

GptChannelId (0 -> 4294967295)	0
GptHwChannel	RTC_0_CH_0
GptChannelMode	GPT_CH_MODE_CONTINUOUS
GptChannelTickFrequency (0 -> 160000000)*	1000.0
GptChannelClkSrcRef*	/Gpt/Gpt/GptDriverConfiguration/GptClockReferencePoint_0
GptRtcChannelClkSrc	RTC_GPT_CLKSRC_SXOSC
GptStmChannelClkSrc	GPT_STM_SYSTEMCLOCK
GptChannelPrescaler (1 -> 256)	2
GptChannelPrescalerAlternate (1 -> 256)	1

Generate

- Generate to check for errors
- Click on Problems View tab
- Click on Errors to expand it
- Click on Calypso6M_... to expand it
- Right click on expanded error, Invalid value…, select Details

- Details window pops up: details say the maximum count is other than the 65535 value currently entered.
  - Details alternative: See Description window for error information
- Enter new value of 429….
- Generate and there should not be errors.



GptChannelMode: GPT_CH_MODE_CONTINU

GptChannelTickFrequency (0 -> 160000000)*: 1000.0

GptChannelClkSrcRef*: /Gpt/Gpt/GptDriverConfig

GptRtcChannelClkSrc: RTC_GPT_CLKSRC_SXOSC

GptStmChannelClkSrc: GPT_STM_SYSTEMCLOCK

GptChannelPrescaler (1 -> 256): 2

GptChannelPrescalerAlternate (1 -> 256): 1

GptChannelTickValueMax (65535 -> 4294967295): 65535

Problems View Entry Details

Code: 1019

Severity: Error

Project name: Calypso6M_mcal4_0_soxc_gpt_irq

Path: /AUTOSAR/TOP-LEVEL-PACKAGES/Gpt/ELEMENTS/Gpt/GptChan

Detailed Message:

Invalid value for node "/AUTOSAR/TOP-LEVEL-PACKAGES/Gpt/ELEMENTS/Gpt/GptChannelConfigSet/GptChannelConfigSet 0/GptChannelConfiguration/GptChannelConfiguration 0/GptChannelTickValueMax": The proper value for the PITRTI, PIT, RTC or STM channels is 4294967295.

Warnings(26)

Errors(1)

Calypso6M_mcal4_0_soxc_gpt_irq(1)

Invalid value for node "/AUTOSAR/TOP-LEV ENTS/G 1019 /AUTOSAR/TOP-LEVEL-PACKAG...

counter resolution) and 65535 fo

Modules– Add new modules to be built to ap’s list

- If present, remove Gio and Port modules (used in prior project)
- Add Gpt and Mcl (GPT requires Mcl to build) modules which will be compiled and linked. In Modules file of application’s root folder:

MODULE_LIST := Base Det Dem EcuM **Gpt Mcl** Mcu Rte

SXOSC Code

- SXOSC and other clocks are already enabled by function Mcu_InitClock

- To get the timer to run, two functions must be added to main:

```
    Gpt_Init(&GptChannelConfigSet_0);
    Gpt_StartTimer(GptConf_GptChannelConfiguration_RtcTimer, 512 - 1);
```

  - The 512-1 value is the timeout value until the flag is set.

- Application code can only basically read the timer value.
- Next section will show how to use the timer as an interrupt.

Clean, build, download, debug

- Run program and verify RTC increments

Interrupt Ap

Introduction

- This project adds to the previous Calypso6M_MCAL4_0_sxosc_rtc_irq project.
  - Same Tresos workspace is used (no need to import)
  - Same application folder is used

Enable Timer (RTC) interrupt

Enable Timer Interrupt (RTC) Example Overview

Configuration:

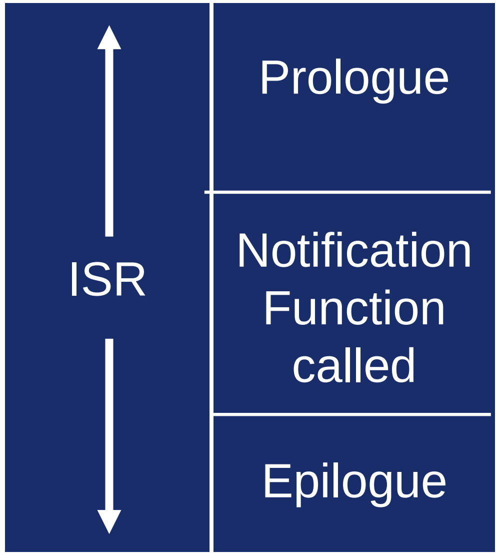
- Add GPT channel (done)
- Configure GPT channel for RTC_0_CH_0 and set other parameters for this channel (done)
  - MCAL supports API wakeup only, not RTC wakeup
- Configure (name) notification function (to be executed in ISR between prologue and epilogue)
- Enable the GPT channel in GptHwConfiguration (Only required for MCAL 4.2 and later)

Code:

- Install interrupt service routine Gpt_RTC_0_Ch_0_ISR on vector 225
  - Vector_vle_mcal.s file: use name from GPT Integration Manual
- Enable interrupt in initialization task (if OS used then ISR needs to be configured in OS configuration)
- If not done, call Gpt_StartTimer() using either the timer's ID number or symbolic name
- Write notification function (called by driver ISR) for interrupt [see main.c]

Summary of MCAL interrupt steps

	Step		Where	Notes
Tresos	1	**Name notification function**	Module container. Example: *Gpt-GptChannelConfiguration -Channel’s Index*	Notification function is user code
Code	2	**Install provided ISR name at IRQ vector**	Folder: toolchains File: vector_vle_mcal.s	Get ISR name and vector from module’s integration manual
	3	**Enable interrupt: priority > 0, core#**	File: your initialization code	Write IRQ vector’s priority & core # (INTC_PSRx)
	4	**Enable notification**	File: your initialization code	Sets software flag to make notification function called in ISR
	5	**Add notification function**	File: your application code	MCAL driver will clear peripheral flag



Interrupt Summary: Name Notification for timer example

Gpt module

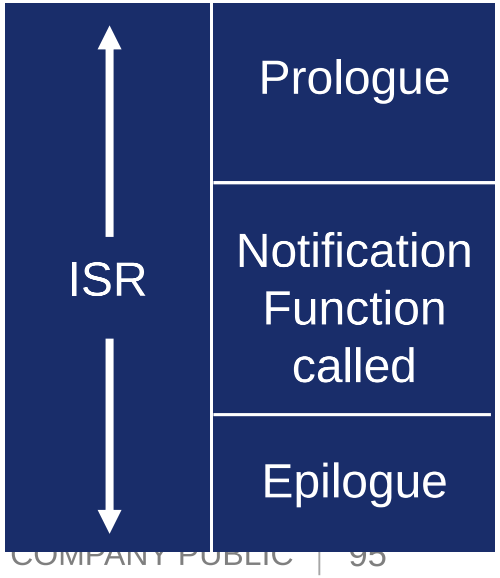
Tab: GptChannelConfigurationSet

Index 0: GptChannelConfigSet_0

Tab: GptChannelConfiguration

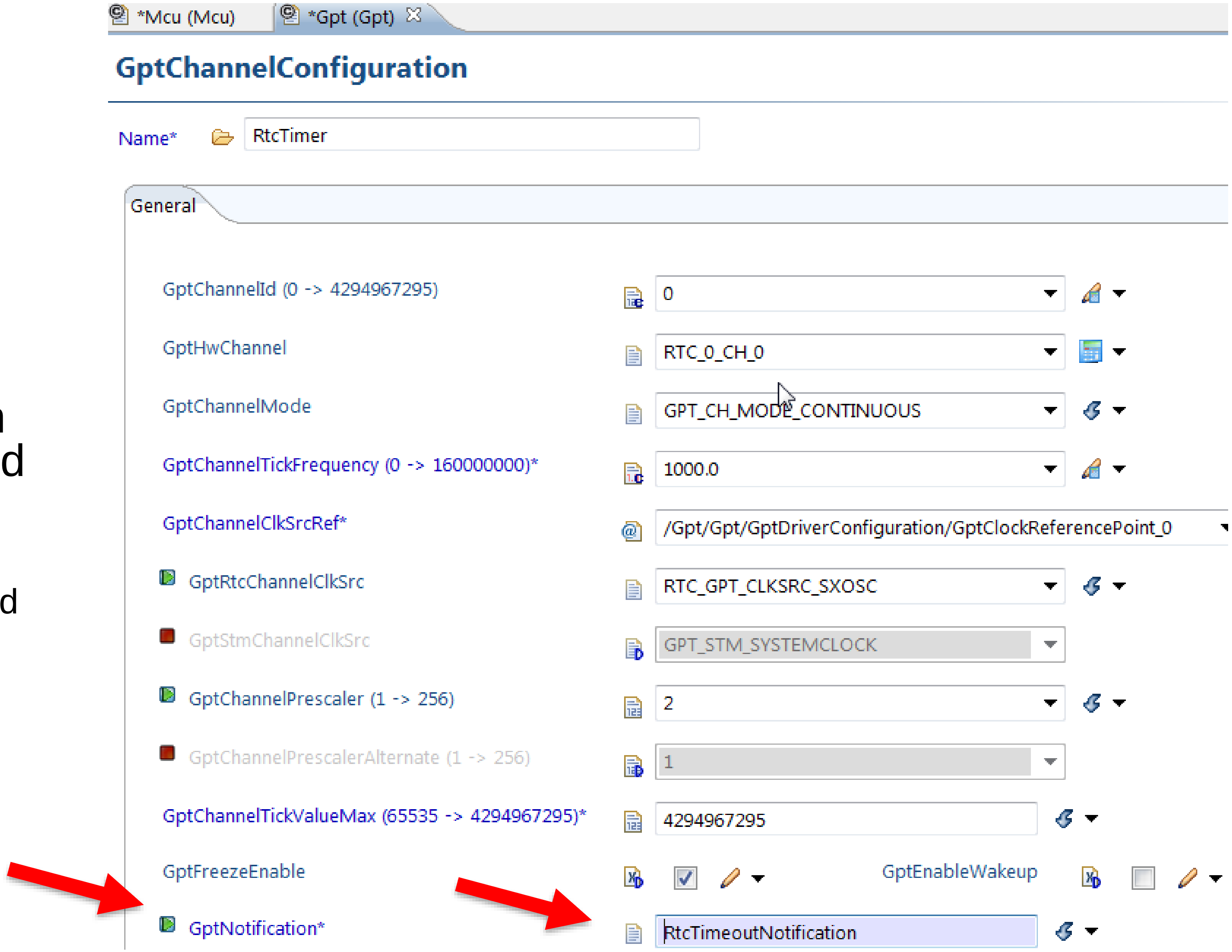
Index 0: RtcTimer

Tab: General (Name: RtcTimeoutNotification)



Gpt 2- Name notification 2

- Click on red box before GptNotification to enable naming notification
- Enter name for notification function (name will be used in your code): RtcTimeoutNotification
  - Notification function will be called from the ISR.
  - Notification function is for user code in ISR
- Save
- Generate



GptChannelConfiguration

Name* RtcTimer

GptChannelId (0 -> 4294967295): 0

GptHwChannel: RTC_0_CH_0

GptChannelMode: GPT_CH_MODE_CONTINUOUS

GptChannelTickFrequency (0 -> 160000000)*: 1000.0

GptChannelClkSrcRef*: /Gpt/Gpt/GptDriverConfiguration/GptClockReferencePoint_0

GptRtcChannelClkSrc: RTC_GPT_CLKSRC_SXOSC

GptStmChannelClkSrc: GPT_STM_SYSTEMCLOCK

GptChannelPrescaler (1 -> 256): 2

GptChannelPrescalerAlternate (1 -> 256): 1

GptChannelTickValueMax (65535 -> 4294967295)*: 4294967295

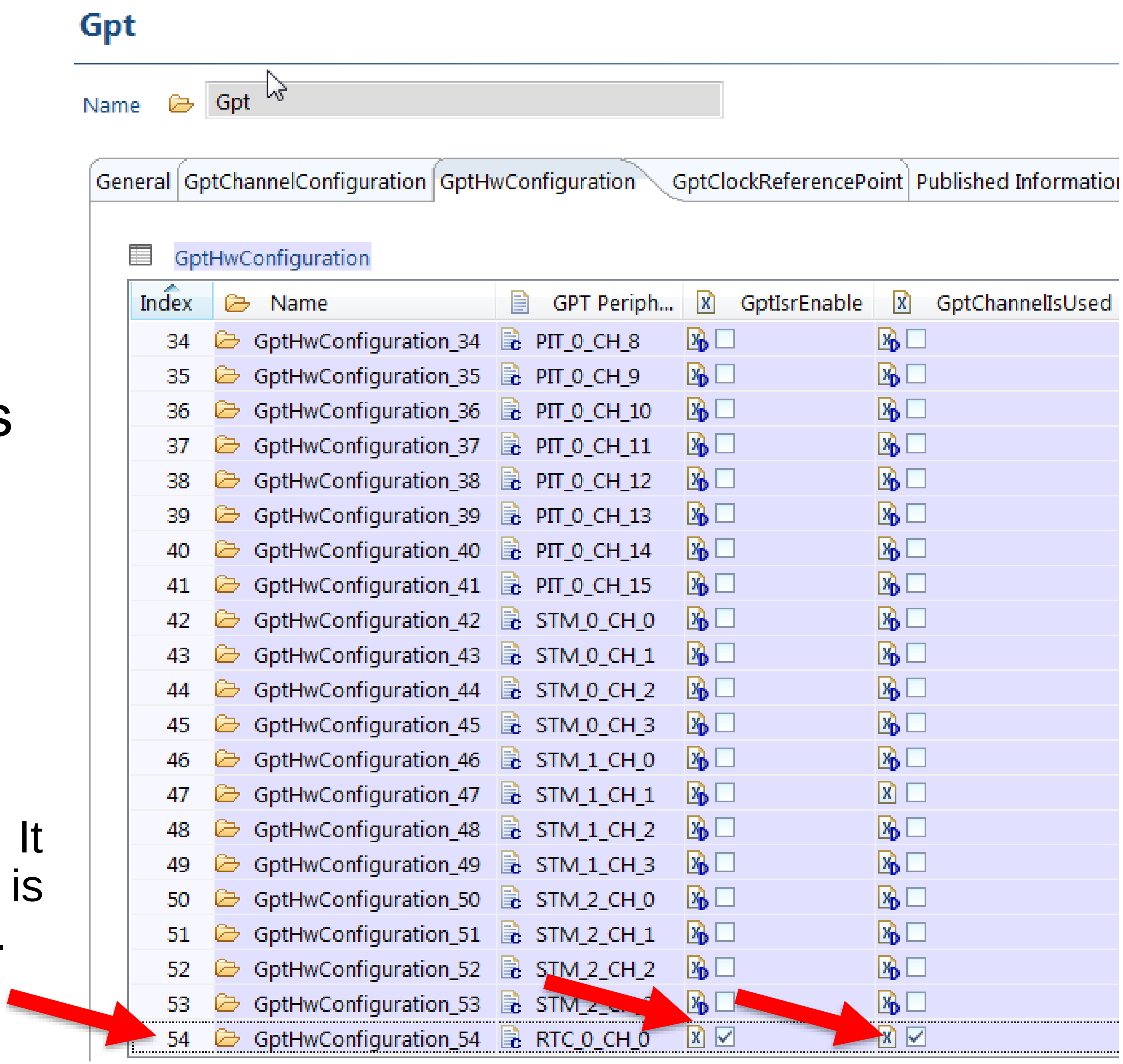
GptFreezeEnable ☑ GptEnableWakeup □

GptNotification*: RtcTimeoutNotification

Enable GPT + ISR channel

<u>MCAL4.2 ONLY</u>:

- GptHwConfiguration tab: Check the RTC timer’s boxes for:
  - GptIsrEnable
  - GptChannelIsUsed
- Save
- Generate
  - <u>Note</u>: screenshot is from MCAL4.2. It is not present in MCAL4.0 since this is done automatically with that version.



Gpt

Name: Gpt

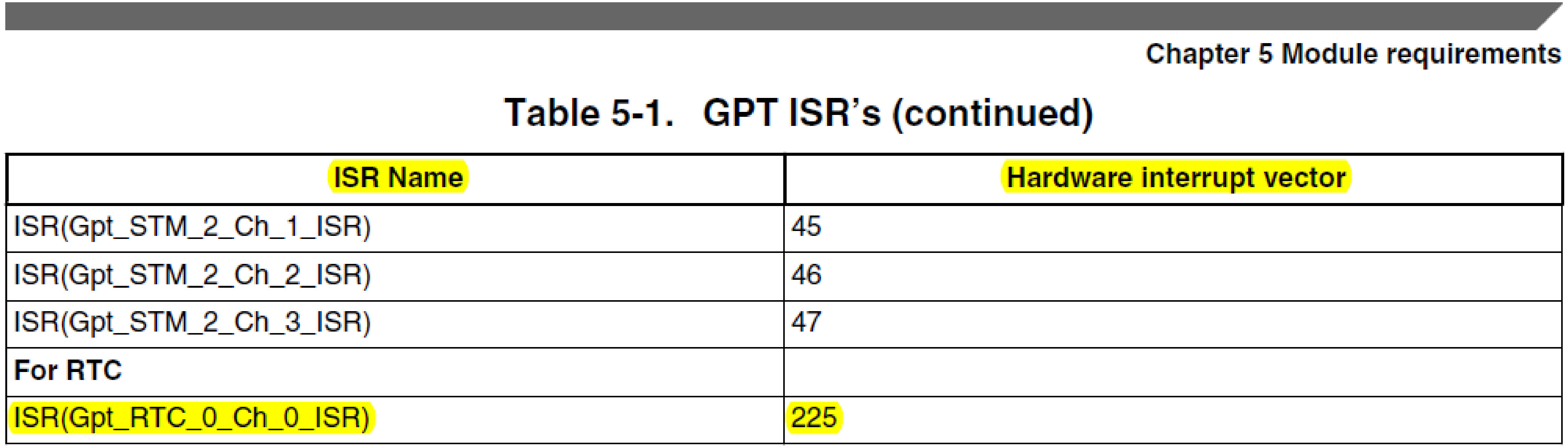
GptHwConfiguration

Index	Name	GPT Periph...	GptIsrEnable	GptChannelIsUsed
34	GptHwConfiguration_34	PIT_0_CH_8	□	□
35	GptHwConfiguration_35	PIT_0_CH_9	□	□
36	GptHwConfiguration_36	PIT_0_CH_10	□	□
37	GptHwConfiguration_37	PIT_0_CH_11	□	□
38	GptHwConfiguration_38	PIT_0_CH_12	□	□
39	GptHwConfiguration_39	PIT_0_CH_13	□	□
40	GptHwConfiguration_40	PIT_0_CH_14	□	□
41	GptHwConfiguration_41	PIT_0_CH_15	□	□
42	GptHwConfiguration_42	STM_0_CH_0	□	□
43	GptHwConfiguration_43	STM_0_CH_1	□	□
44	GptHwConfiguration_44	STM_0_CH_2	□	□
45	GptHwConfiguration_45	STM_0_CH_3	□	□
46	GptHwConfiguration_46	STM_1_CH_0	□	□
47	GptHwConfiguration_47	STM_1_CH_1	□	□
48	GptHwConfiguration_48	STM_1_CH_2	□	□
49	GptHwConfiguration_49	STM_1_CH_3	□	□
50	GptHwConfiguration_50	STM_2_CH_0	□	□
51	GptHwConfiguration_51	STM_2_CH_1	□	□
52	GptHwConfiguration_52	STM_2_CH_2	□	□
53	GptHwConfiguration_53	STM_2_CH_3	□	□
54	GptHwConfiguration_54	RTC_0_CH_0	☑	☑

Interrupt code (RTC)

Get ISR name and interrupt vector number

- See *Integration Manual* in MCAL's eclipse/plugins/module/doc folder.
- Example from MPC574xG MCAL integration manual:
  C:\NXP\AUTOSAR\MPC574XG_MCAL4_2_RTM_1_0_0\eclipse\plugins\Gpt_TS_T2D35M10I0R0\doc



Chapter 5 Module requirements

Table 5-1. GPT ISR's (continued)

ISR Name	Hardware interrupt vector
ISR(Gpt_STM_2_Ch_1_ISR)	45
ISR(Gpt_STM_2_Ch_2_ISR)	46
ISR(Gpt_STM_2_Ch_3_ISR)	47
For RTC	
ISR(Gpt_RTC_0_Ch_0_ISR)	225

Install interrupt service routine

- Edit Vector_vle_mcal.s file in the application’s “toolchains” folder using integration manual’s name and interrupt number:

```
------------------------------------
# Gpt related
  .globl Gpt_PIT_0_TIMER_0_ISR
  .globl Gpt_PIT_0_TIMER_1_ISR
  .globl Gpt_RTC_0_Ch_0_ISR
------------------------------------
IRQ225:
    e_b Gpt_RTC_0_Ch_0_ISR            #interrupt 225
    .align ALIGN_SIZE
```

Interrupt sequence (shown with RTC)

- RTC interrupt is recognized in hardware
- Execution starts at peripheral’s vector (#225 for RTC)
- ISR for vector, **`Gpt_RTC_0_Ch_0_ISR`**, is executed
- Executes generated prologue
  - If notification is configured, then ISR will call notification function.
    - In this example **`RtcTimeoutNotification`** is has been configured
    - Notification function will include user application code, such as incrementing counter, writing outputs, etc.
  - Executes generated epilogue

Enable interrupt for RTC

- Example- sample_app_mcal_initialization_task.c
  - Enable core for interrupt and assign priority

```
FUNC (void, SAMPLE_APP_CODE) SampleApp_Int_Init(void)
{
    /* Setup all the needed interrupts(and their priorities) */
#if (USE_GPT_MODULE==STD_ON)
    /* Gpt interrupts*/
    REG_WRITE16(INTC_PSR(225), 0x8006);
                           /* Gpt_RTC_0_CH_0_ISR : Core 0, priority 6 */
#endif
```

Enable Notification for ISR and Start Timer

- Add code to start RTC (32KHz divided by 32 here = 1KHz) timer. 2 second timeout.
- Example- main.c (RTC timer is index 2 in Gpt configuration)

```
void SampleApp_Int_Init(void);   /* Local function prototype*/
```

Add before endless loop in main:

```
    Gpt_Init(&GptChannelConfigSet_0);
    SampleApp_Int_Init();          /* Call function to enable interrupts */
    Gpt_EnableNotification(GptConf_GptChannelConfiguration_RtcTimer);
    Gpt_StartTimer(GptConf_GptChannelConfiguration_RtcTimer, 2000-1);
```

Add notification function for RTC (executed after timeout)

- File main.c - define variable(s) for notification function:

```
/*===================================================================
                           GLOBAL VARIABLES
===================================================================*/
 VAR(uint8, AUTOMATIC) GptRtcCounter = 0;
```

- Define notification function that will be called in ISR (for example, add to LOCAL FUNCTIONS):

```
FUNC (void, SAMPLE_APP_CODE) RtcTimeoutNotification(void)
{
     GptRtcCounter++;
}
```

Complete project

- If not done, save and generate code in Tresos
- Copy include and src folders from Tresos to application's cfg folder
- Clean
- Run launch.bat
- If no errors, download and run.
- Verify `GptRtcCounter` increments

Reference:
NXP AUTOSAR Installation

1. Get AUTOSAR installation SW to your NXP account

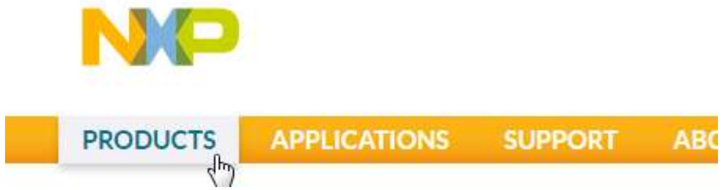
1A. Get AUTOSAR installation SW from web to your NXP account

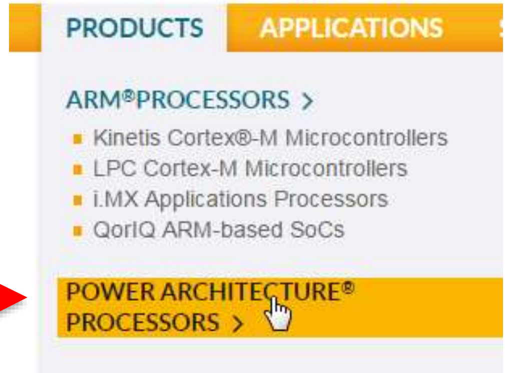
Get AUTOSAR installation SW from web to your account 1

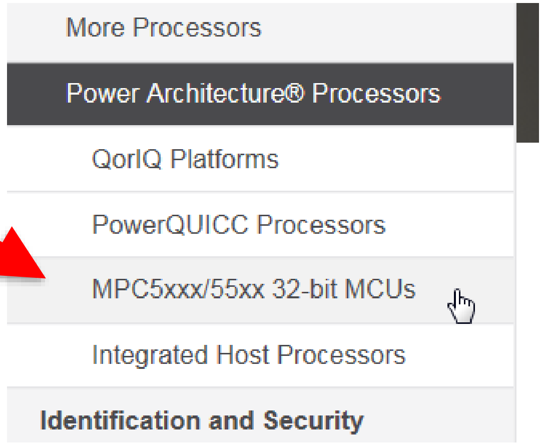
- Go to nxp.com Click on desired product”. Example: MPC5748G:

1. Click on PRODUCTS
2. Click on POWER ARCH….
3. Click on MPC5xxx/55xx 32-bit MCUs

*Note The ISO26262 MCAL version is developed according the SEooC requirements of ISO26262. NXP supplies a FMEA and a Safety Manual for this MCAL. The Safety Manual will state the MCAL’s ASIL level.

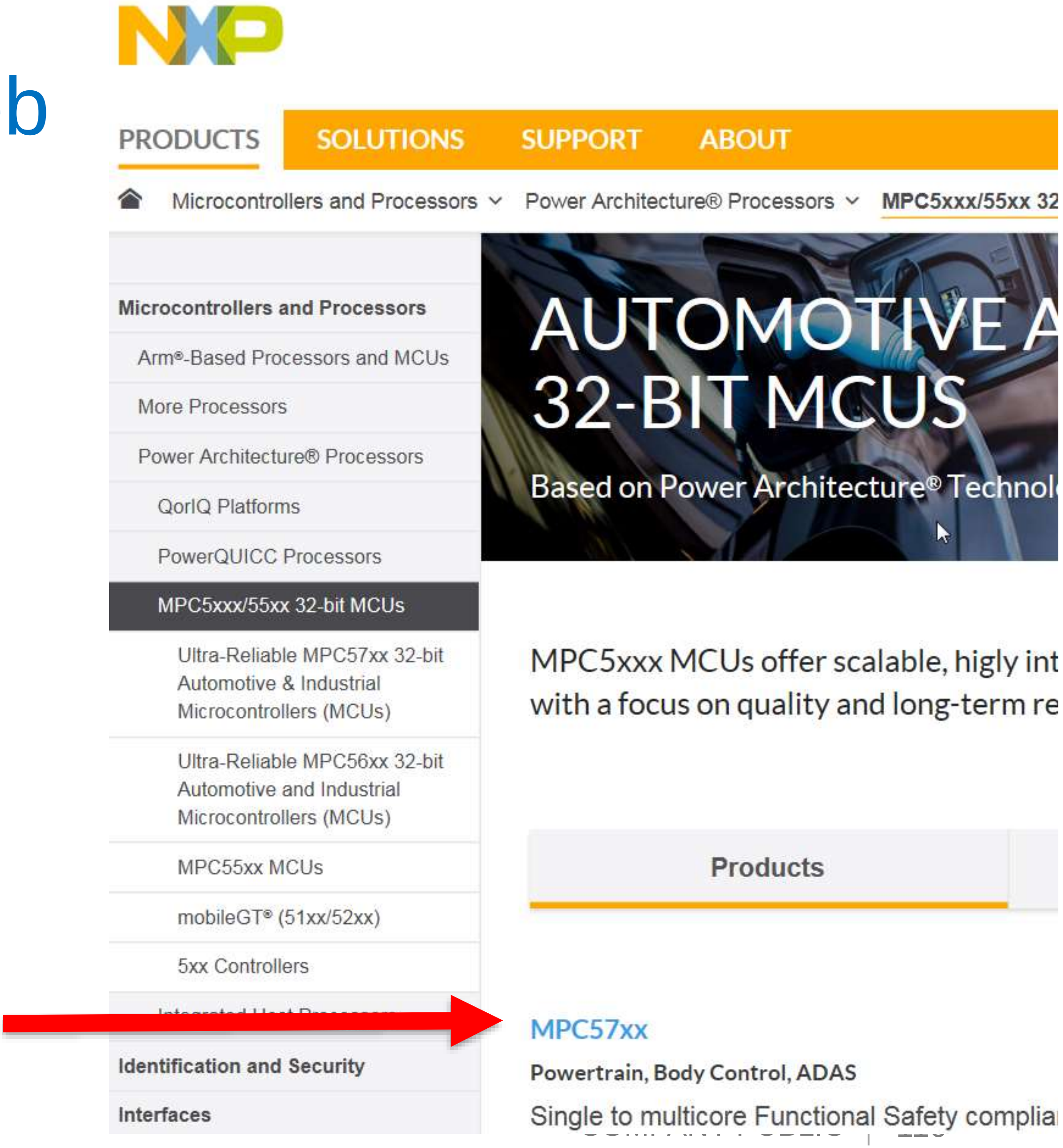



PRODUCTS
APPLICATIONS
ARM®PROCESSORS >
Kinetis Cortex®-M Microcontrollers
LPC Cortex-M Microcontrollers
i.MX Applications Processors
QorIQ ARM-based SoCs
POWER ARCHITECTURE® PROCESSORS >


More Processors
Power Architecture® Processors
QorIQ Platforms
PowerQUICC Processors
MPC5xxx/55xx 32-bit MCUs
Integrated Host Processors
Identification and Security

Get AUTOSAR installation SW from web to your account 2

- Click on MPC57xx



PRODUCTS SOLUTIONS SUPPORT ABOUT

Microcontrollers and Processors ⌄ Power Architecture® Processors ⌄ MPC5xxx/55xx 32

Microcontrollers and Processors

Arm®-Based Processors and MCUs

More Processors

Power Architecture® Processors

QorIQ Platforms

PowerQUICC Processors

MPC5xxx/55xx 32-bit MCUs

Ultra-Reliable MPC57xx 32-bit Automotive & Industrial Microcontrollers (MCUs)

Ultra-Reliable MPC56xx 32-bit Automotive and Industrial Microcontrollers (MCUs)

MPC55xx MCUs

mobileGT® (51xx/52xx)

5xx Controllers

Identification and Security

Interfaces

AUTOMOTIVE A
32-BIT MCUS

Based on Power Architecture® Technol

MPC5xxx MCUs offer scalable, higly int
with a focus on quality and long-term re

Products

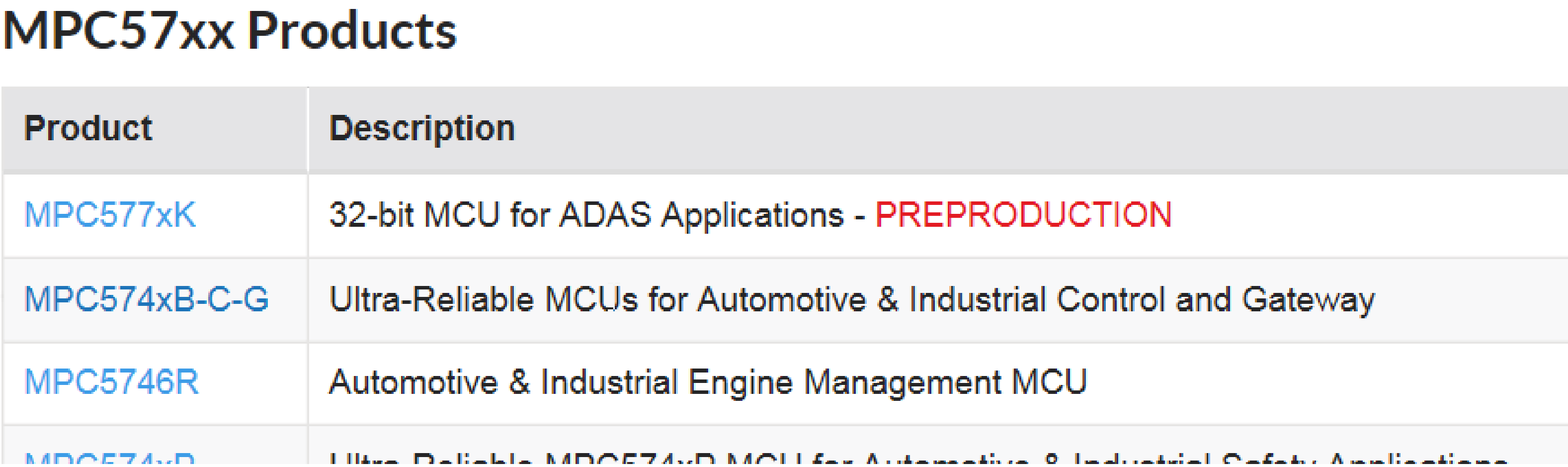
MPC57xx

Powertrain, Body Control, ADAS

Single to multicore Functional Safety complia

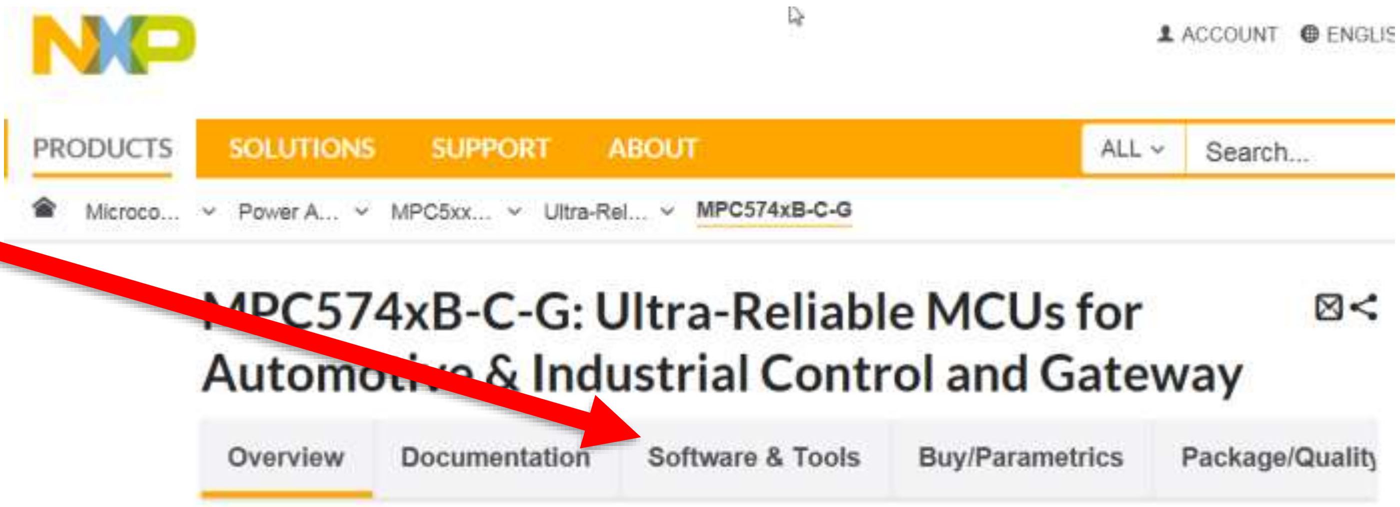
Get AUTOSAR installation SW from web to your account 3

- Scroll down on next page
- Click MPC574xB-C-B
- Click on Software & Tools



MPC57xx Products

Product	Description
MPC577xK	32-bit MCU for ADAS Applications - PREPRODUCTION
MPC574xB-C-G	Ultra-Reliable MCUs for Automotive & Industrial Control and Gateway
MPC5746R	Automotive & Industrial Engine Management MCU
MPC574xP	Ultra-Reliable MPC574xP MCU for Automotive & Industrial Safety Applications



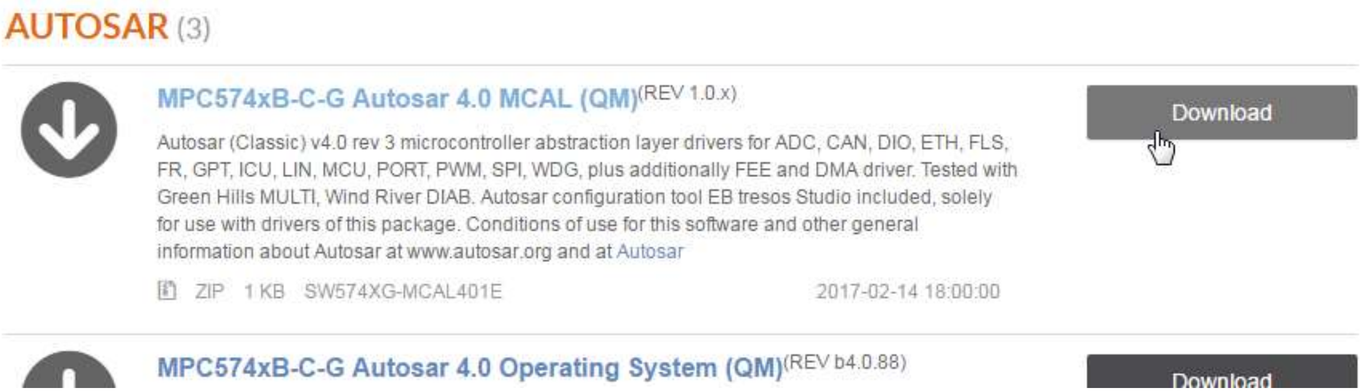
MPC574xB-C-G: Ultra-Reliable MCUs for Automotive & Industrial Control and Gateway

Get AUTOSAR installation SW from web to your account 4

1. Scroll down to AUTOSAR and click on desired Download

2. Sign in with name and password
   - If you do not have an account, register
     - NXP & new employees use NXP ID and NXP password
     - (Legacy Freescale employees use core ID and oneIT password)

3. Select desired product. Depending on product age, a registration code may be needed to add installation software to your account. Contact local sales office if needed.



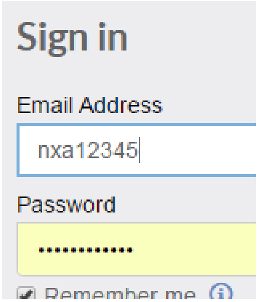
AUTOSAR (3)

MPC574xB-C-G Autosar 4.0 MCAL (QM)(REV 1.0.x)

Autosar (Classic) v4.0 rev 3 microcontroller abstraction layer drivers for ADC, CAN, DIO, ETH, FLS, FR, GPT, ICU, LIN, MCU, PORT, PWM, SPI, WDG, plus additionally FEE and DMA driver. Tested with Green Hills MULTI, Wind River DIAB. Autosar configuration tool EB tresos Studio included, solely for use with drivers of this package. Conditions of use for this software and other general information about Autosar at www.autosar.org and at Autosar

ZIP 1 KB SW574XG-MCAL401E 2017-02-14 18:00:00

MPC574xB-C-G Autosar 4.0 Operating System (QM)(REV b4.0.88)



Sign in

Email Address: nxa12345

Password: ••••••••••••

☑ Remember me

1b. Get AUTOSAR installation SW from NXP sW marketing to your NXP account

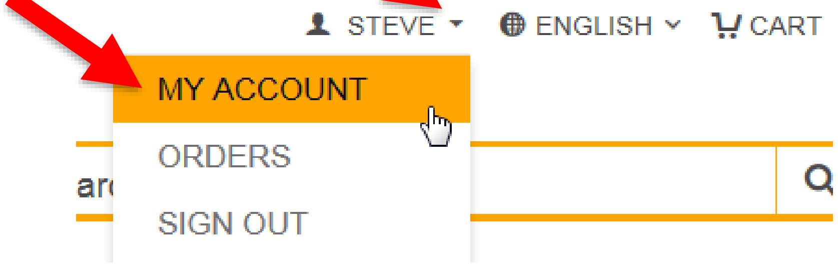
Get AUTOSAR installation SW from marketing to your account

- Some new version of MCAL, OS are not on the NXP public web site
- Customers can request these newer versions by:
  - Create an account a nxp.com if they do not have one:
    - Go to www.nxp.com
    - Click on ACCOUNT in upper right corner
    - Click on REGISTER and fill in the fields
  - Provide their name(s), project, requested software (version and chip) to the local sales office
  - The sales representative will forward the request to NXP software marketing.
  - When approved, a registration code will be provided to customer(s). A code is good for one PC.

2. Download MCAL / OS installation from your NXP account

Download installation SW from your NXP account 1

- Sign in to your account at nxp.com
- Click on drop-down arrow next to your name, then click on “MY ACCOUNT”



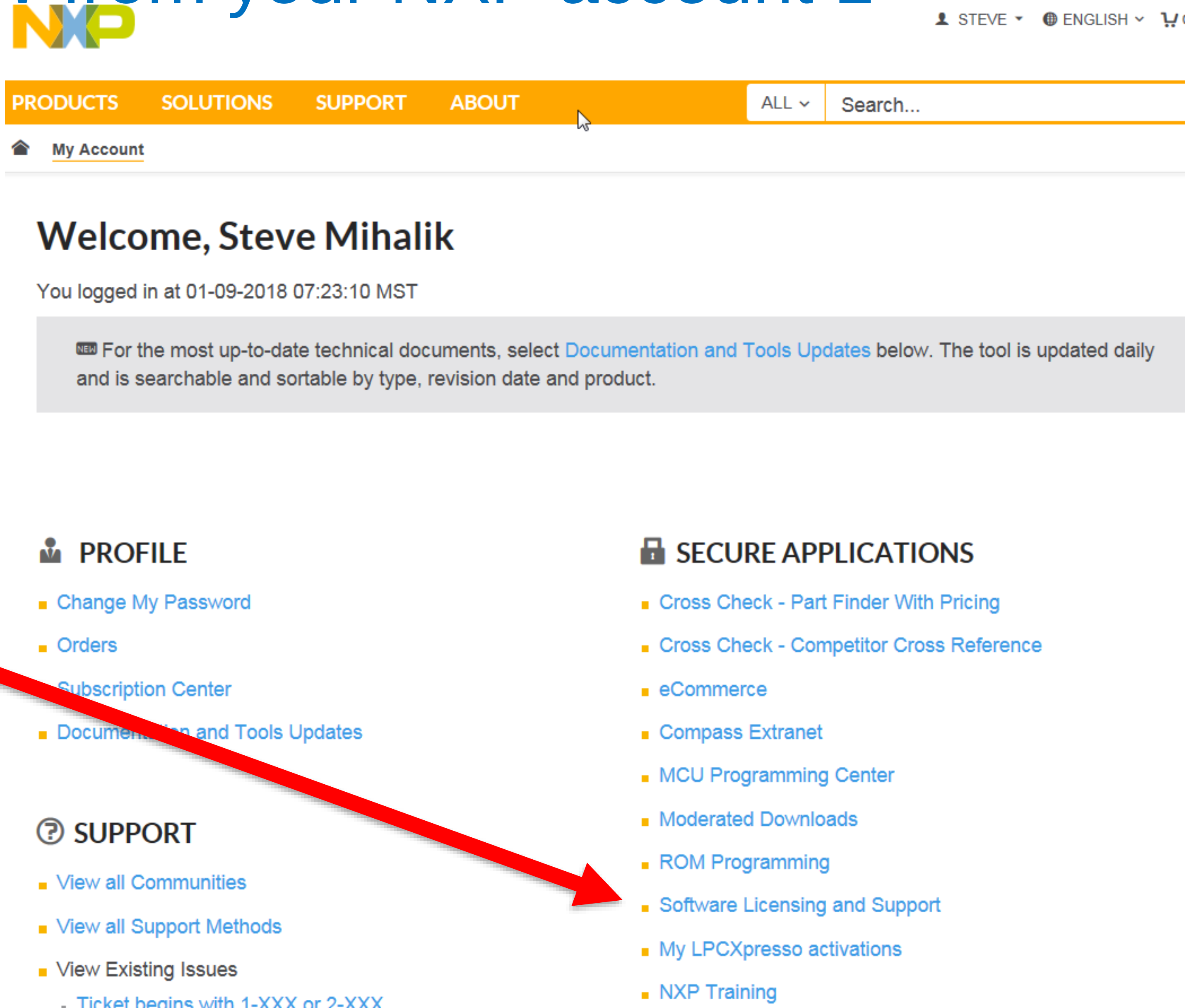
STEVE ▾ ENGLISH ⌄ CART

MY ACCOUNT

ORDERS

SIGN OUT

- Click “Software Licensing and Support”
- **NOTE**: customers usually need a unique registration code to download a software product



Welcome, Steve Mihalik

You logged in at 01-09-2018 07:23:10 MST

NEW For the most up-to-date technical documents, select Documentation and Tools Updates below. The tool is updated daily and is searchable and sortable by type, revision date and product.

PROFILE

- Change My Password
- Orders
- Subscription Center
- Documentation and Tools Updates

SUPPORT

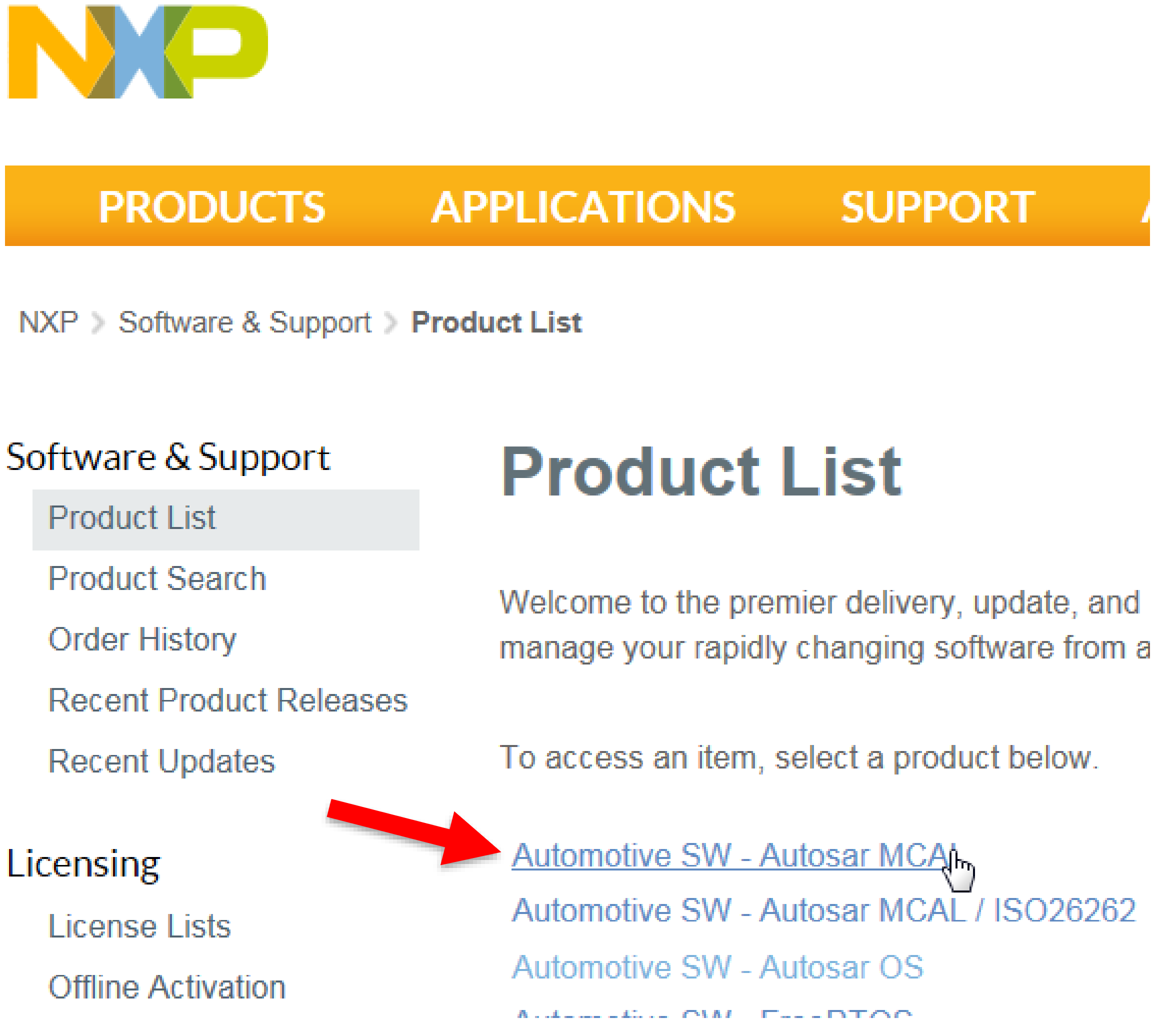
- View all Communities
- View all Support Methods
- View Existing Issues
  - Ticket begins with 1-XXX or 2-XXX

SECURE APPLICATIONS

- Cross Check - Part Finder With Pricing
- Cross Check - Competitor Cross Reference
- eCommerce
- Compass Extranet
- MCU Programming Center
- Moderated Downloads
- ROM Programming
- Software Licensing and Support
- My LPCXpresso activations
- NXP Training

Download installation SW from your NXP account 2

- Click on desired category (the first time you will have only one category)
  - Example:
    Automotive SW – Autosar MCAL



Product List

Welcome to the premier delivery, update, and manage your rapidly changing software from a

To access an item, select a product below.

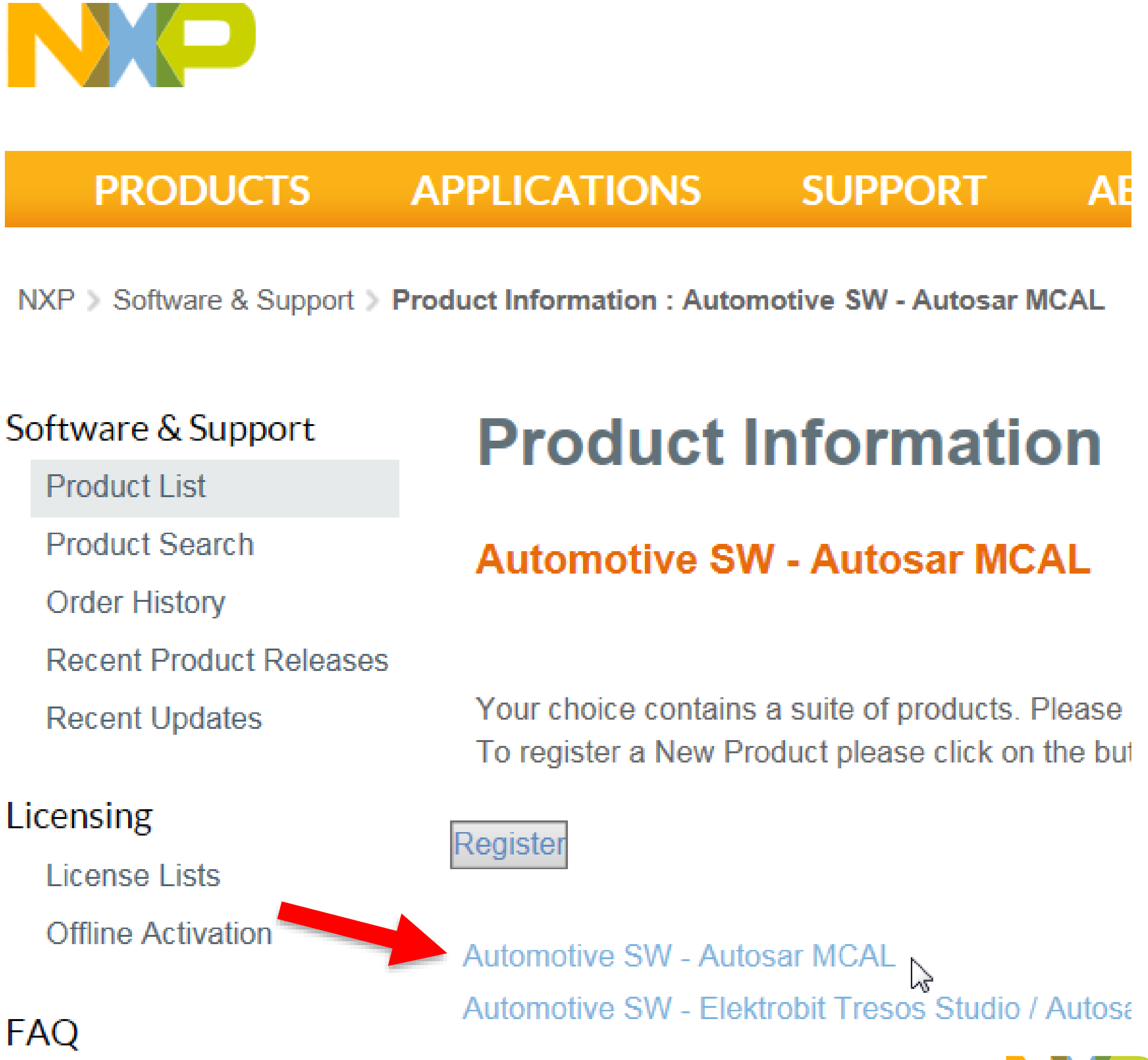
Automotive SW - Autosar MCAL

Automotive SW - Autosar MCAL / ISO26262

Automotive SW - Autosar OS

Download installation SW from your NXP account 3

- Click in software you want to dowı
  - Example:
    Automotive SW – Autosar MCAL
- Note: Register button is for custor



NXP › Software & Support › Product Information : Automotive SW - Autosar MCAL

Software & Support
- Product List
- Product Search
- Order History
- Recent Product Releases
- Recent Updates

Licensing
- License Lists
- Offline Activation

FAQ

Product Information

Automotive SW - Autosar MCAL

Your choice contains a suite of products. Please
To register a New Product please click on the but

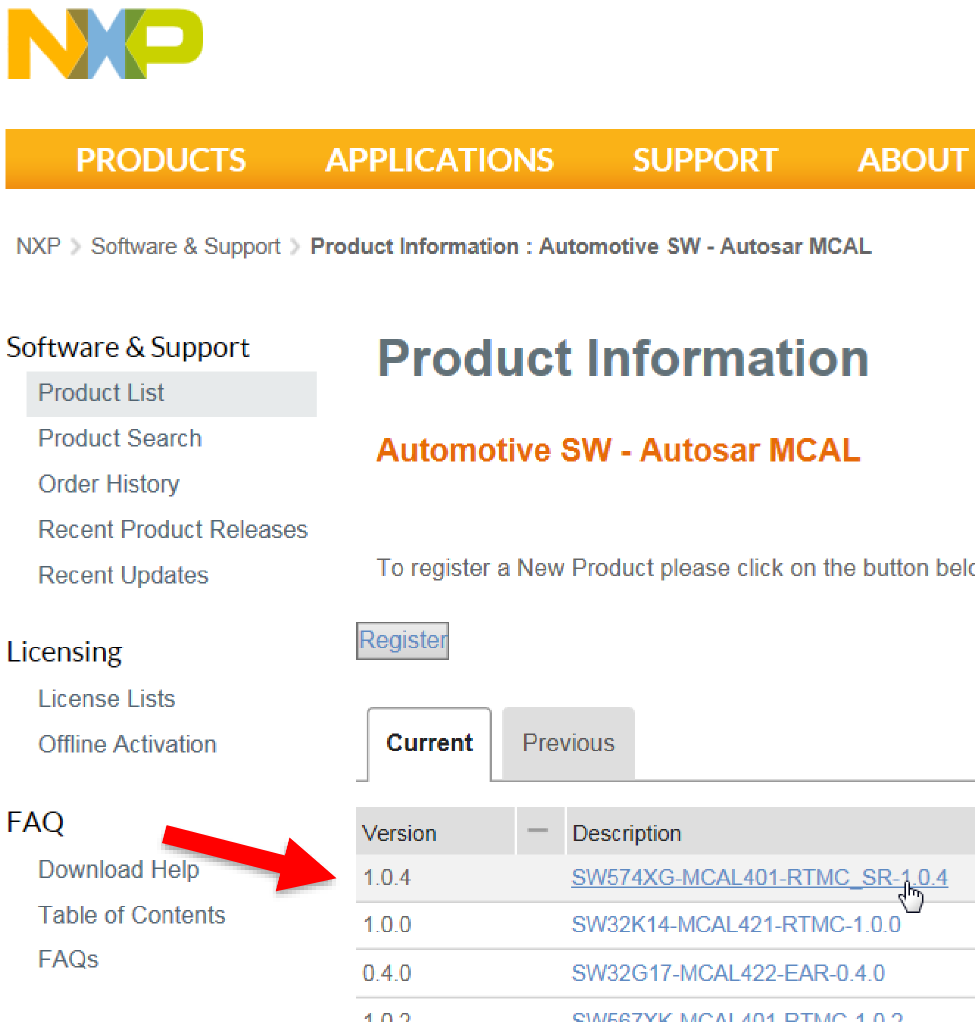
Register

Automotive SW - Autosar MCAL

Automotive SW - Elektrobit Tresos Studio / Autosa

Download installation SW from your NXP account 4

- Click on desired version. Examples – MCAL 4.0, MCAL 4.3:



NXP > Software & Support > **Product Information : Automotive SW - Autosar MCAL**

Software & Support
- Product List
- Product Search
- Order History
- Recent Product Releases
- Recent Updates

Licensing
- License Lists
- Offline Activation

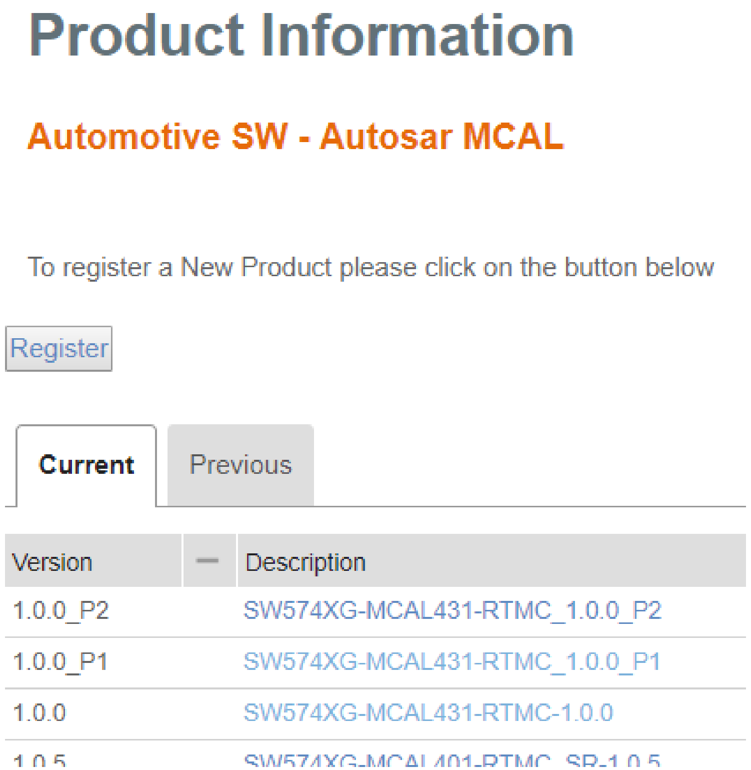
FAQ
- Download Help
- Table of Contents
- FAQs

Product Information

Automotive SW - Autosar MCAL

To register a New Product please click on the button belc

Version	—	Description
1.0.4		SW574XG-MCAL401-RTMC_SR-1.0.4
1.0.0		SW32K14-MCAL421-RTMC-1.0.0
0.4.0		SW32G17-MCAL422-EAR-0.4.0
1.0.2		SW567XK-MCAL401-RTMC-1.0.2



Product Information

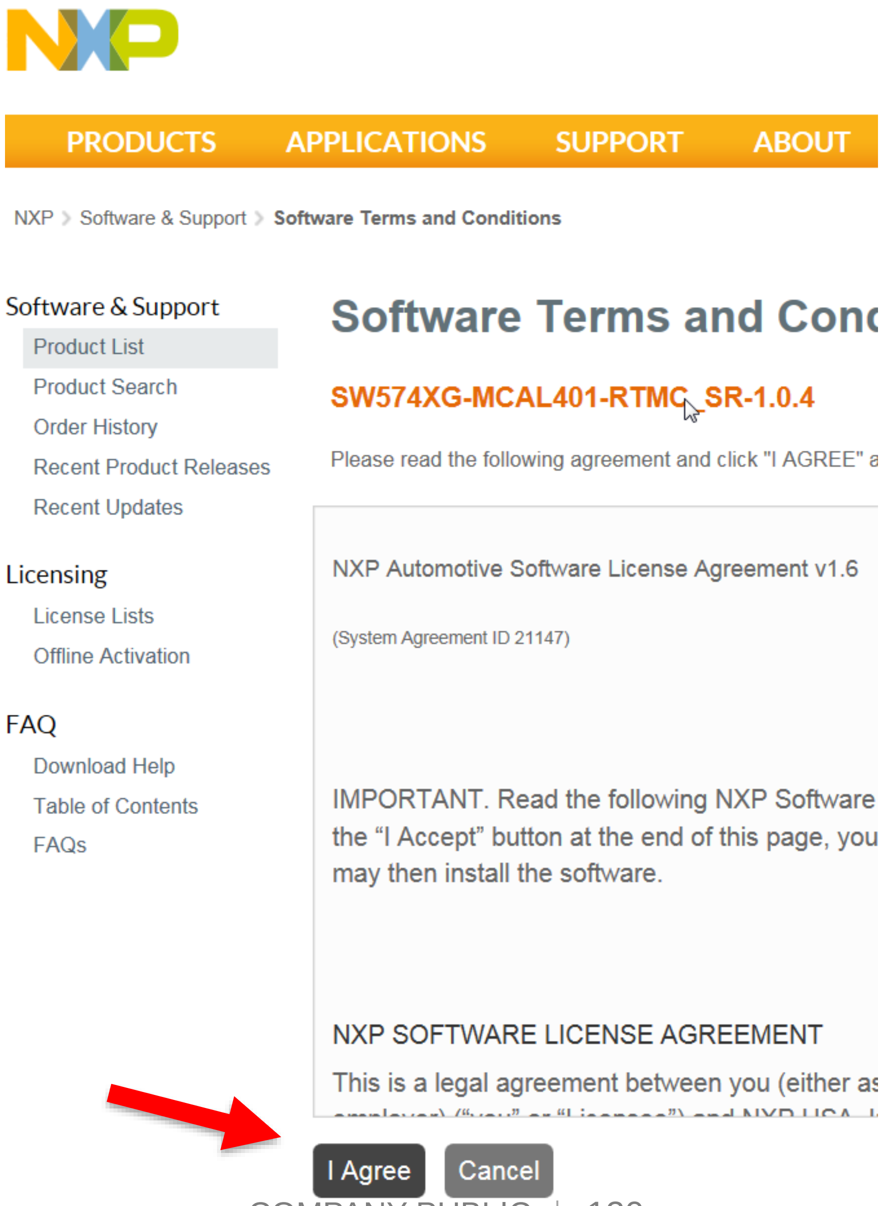
Automotive SW - Autosar MCAL

To register a New Product please click on the button below

Version	—	Description
1.0.0_P2		SW574XG-MCAL431-RTMC_1.0.0_P2
1.0.0_P1		SW574XG-MCAL431-RTMC_1.0.0_P1
1.0.0		SW574XG-MCAL431-RTMC-1.0.0
1.0.5		SW574XG-MCAL401-RTMC_SR-1.0.5

Download installation SW from your NXP account 5

- Click on I Agree to SW terms and conditions



Software Terms and Conc

SW574XG-MCAL401-RTMC_SR-1.0.4

Please read the following agreement and click "I AGREE" a

NXP Automotive Software License Agreement v1.6

(System Agreement ID 21147)

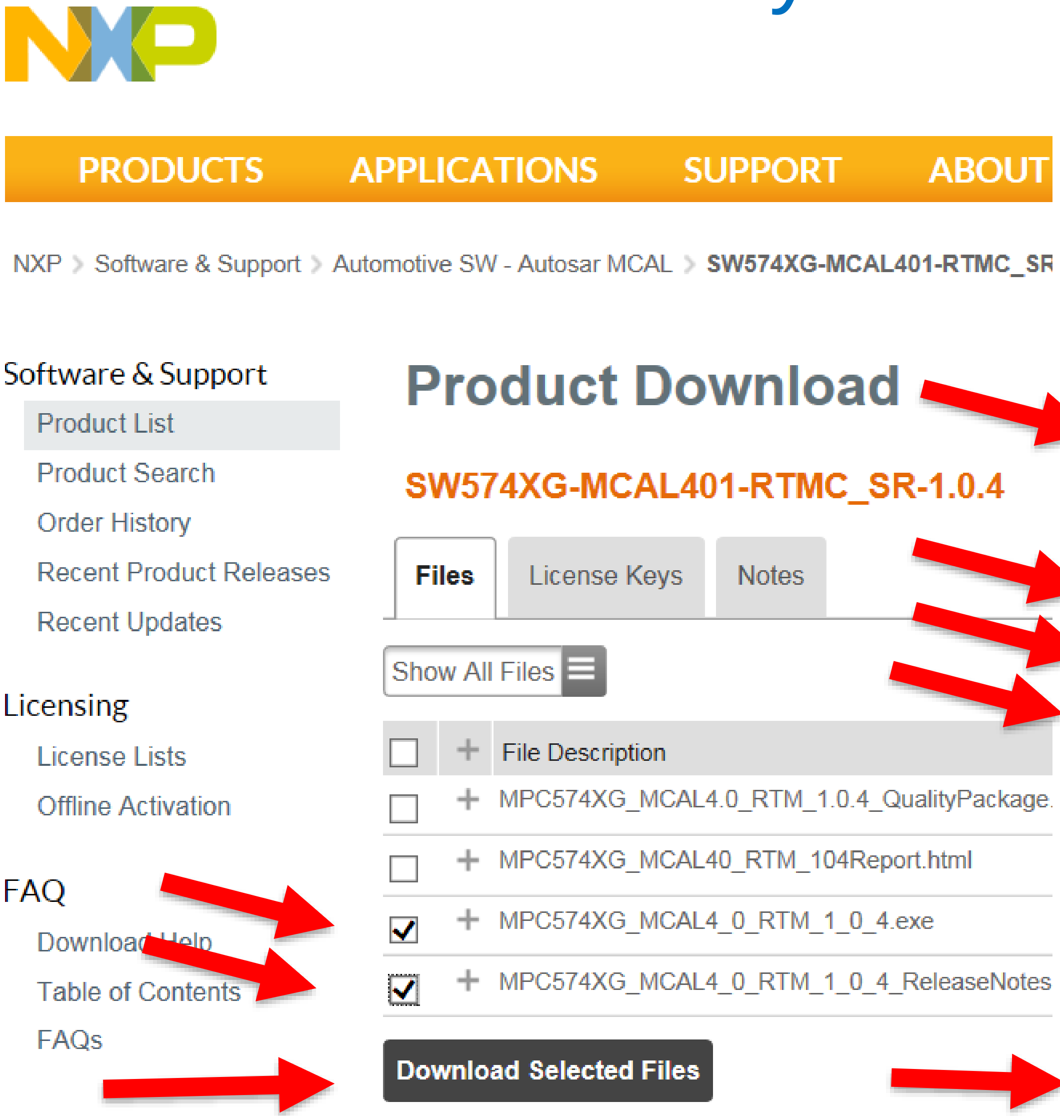
IMPORTANT. Read the following NXP Software the "I Accept" button at the end of this page, you may then install the software.

NXP SOFTWARE LICENSE AGREEMENT

This is a legal agreement between you (either as

Download installation SW from your NXP account 6

- Check boxes for software to download
  - Examples: MCAL4.0, MCAL 4.3
- Click Download Selected Files
- Note: some versions have “hot fixes” to enhance a version. Hot fixes are cumulative – only need to install the last one after installing the released SW. See hotfix’s release notes to see if there is any impact to your application.



PRODUCTS APPLICATIONS SUPPORT ABOUT

NXP > Software & Support > Automotive SW - Autosar MCAL > SW574XG-MCAL401-RTMC_SR

Software & Support
- Product List
- Product Search
- Order History
- Recent Product Releases
- Recent Updates

Licensing
- License Lists
- Offline Activation

FAQ
- Download Help
- Table of Contents
- FAQs

Product Download

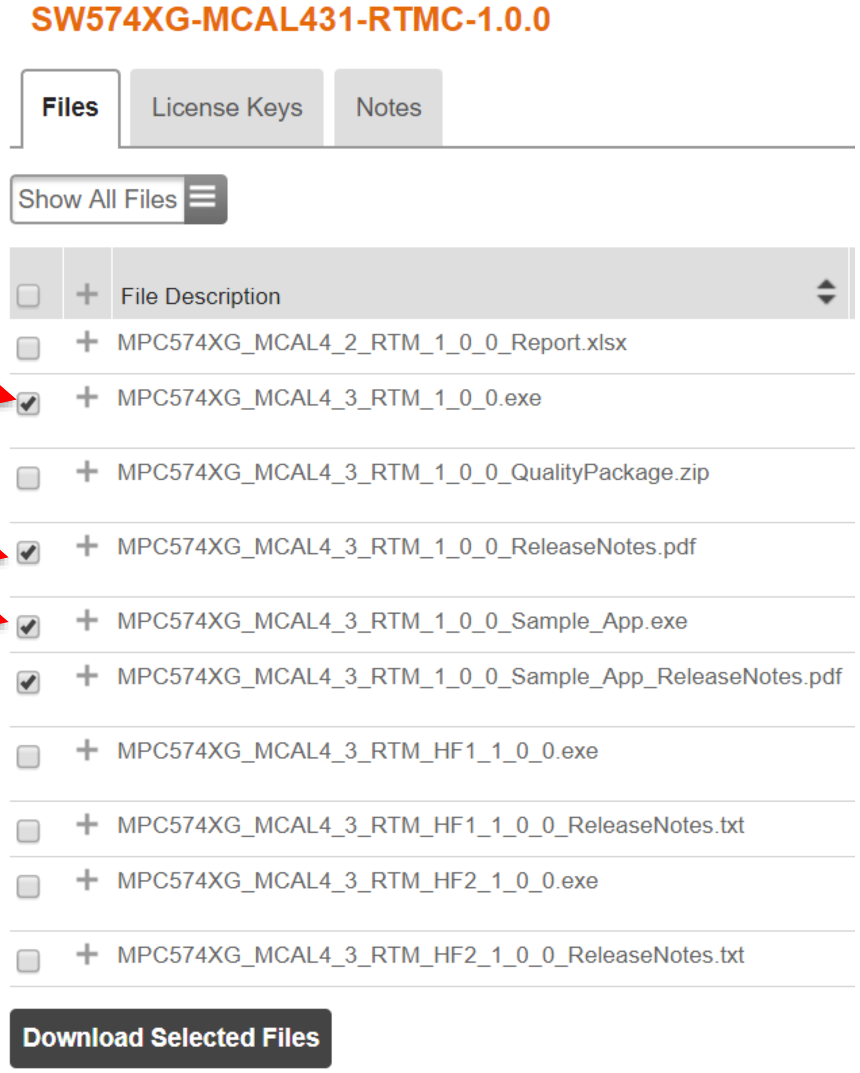
SW574XG-MCAL401-RTMC_SR-1.0.4

Files | License Keys | Notes

Show All Files

□	+	File Description
□	+	MPC574XG_MCAL4.0_RTM_1.0.4_QualityPackage.
□	+	MPC574XG_MCAL40_RTM_104Report.html
☑	+	MPC574XG_MCAL4_0_RTM_1_0_4.exe
☑	+	MPC574XG_MCAL4_0_RTM_1_0_4_ReleaseNotes

Download Selected Files



SW574XG-MCAL431-RTMC-1.0.0

Files | License Keys | Notes

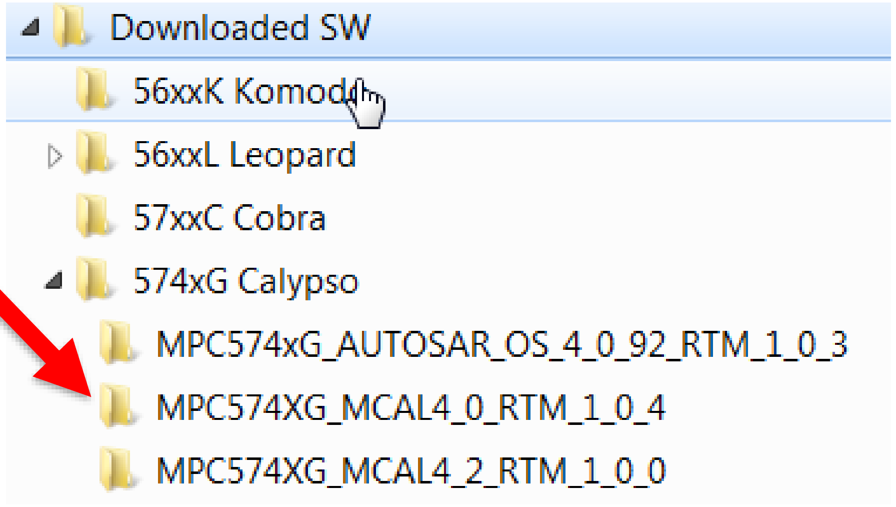
Show All Files

□	+	File Description
□	+	MPC574XG_MCAL4_2_RTM_1_0_0_Report.xlsx
☑	+	MPC574XG_MCAL4_3_RTM_1_0_0.exe
□	+	MPC574XG_MCAL4_3_RTM_1_0_0_QualityPackage.zip
☑	+	MPC574XG_MCAL4_3_RTM_1_0_0_ReleaseNotes.pdf
☑	+	MPC574XG_MCAL4_3_RTM_1_0_0_Sample_App.exe
☑	+	MPC574XG_MCAL4_3_RTM_1_0_0_Sample_App_ReleaseNotes.pdf
□	+	MPC574XG_MCAL4_3_RTM_HF1_1_0_0.exe
□	+	MPC574XG_MCAL4_3_RTM_HF1_1_0_0_ReleaseNotes.txt
□	+	MPC574XG_MCAL4_3_RTM_HF2_1_0_0.exe
□	+	MPC574XG_MCAL4_3_RTM_HF2_1_0_0_ReleaseNotes.txt

Download Selected Files

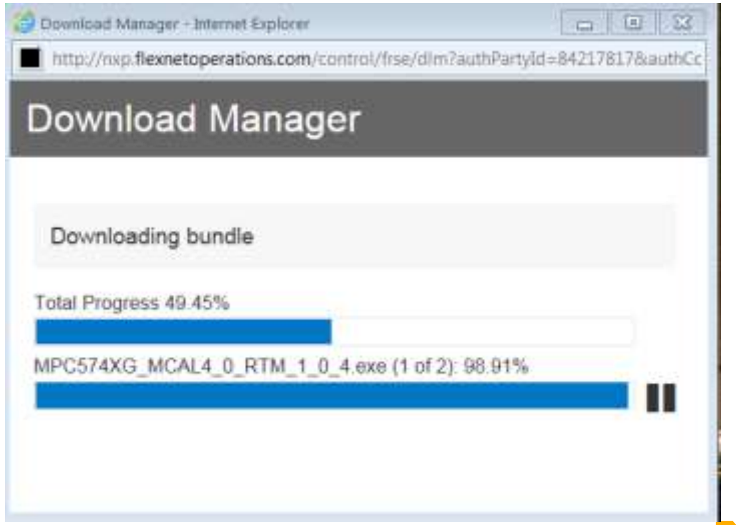
Download installation SW from your NXP account 7

- Select folder (create if needed) to download installation software and click OK.
  This folder can be anywhere, e.g., when you later run the install software, you can choose a path for the actual software package.



Downloaded SW
56xxK Komodo
56xxL Leopard
57xxC Cobra
574xG Calypso
MPC574xG_AUTOSAR_OS_4_0_92_RTM_1_0_3
MPC574XG_MCAL4_0_RTM_1_0_4
MPC574XG_MCAL4_2_RTM_1_0_0

- Download progress is shown



Download Manager - Internet Explorer
http://nxp.flexnetoperations.com/control/frse/dlm?authPartyId=84217817&authCc

Download Manager

Downloading bundle

Total Progress 49.45%

MPC574XG_MCAL4_0_RTM_1_0_4.exe (1 of 2): 98.91%

- Close window when download completes.

Download AUTOSAR OS if needed

- If you also received a license code for the OS, follow the same steps to download the OS

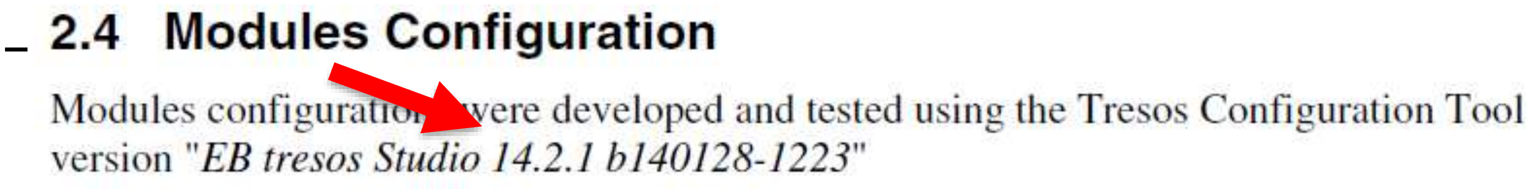
- **NOTE: You must install TRESOS before MCAL or OS!!**

- **You must find the Tresos version needed for your MCAL or OS. See release notes for MCAL or OS. Search for Tresos.**

3. Download, Install / renew Tresos

Tresos Versions

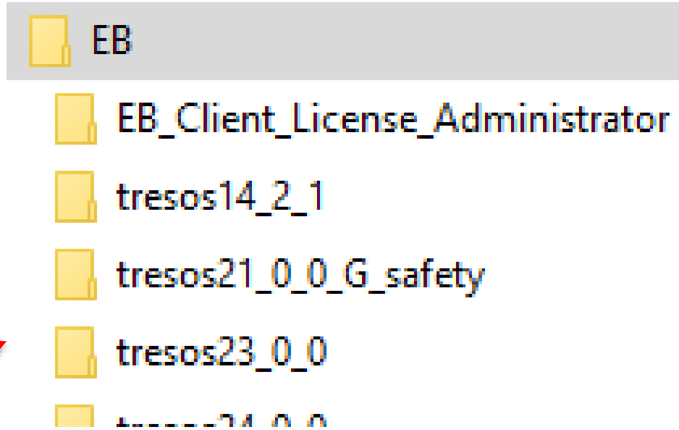
- The Tresos version used for testing an MCAL version is put in your NXP Account with your requested MCAL version.
- To determine or verify what Tresos version an MCAL used, search for “Tresos” in MCAL’s or OS’s Release notes. (Normally higher number versions will work fine.)



_ 2.4 Modules Configuration

Modules configuration were developed and tested using the Tresos Configuration Tool version "*EB tresos Studio 14.2.1 b140128-1223*"

- **INSTALLATION TIP**: When installing Tresos <u>include the version number in the Tresos folder name</u>. This prevents confusion when another Tresos version is installed for a different MCAL version. Example:



EB
EB_Client_License_Administrator
tresos14_2_1
tresos21_0_0_G_safety
tresos23_0_0
tresos24_0_0

Tresos Licensing: License File vs Activation Code

- Tresos version requirements:
  - Tresos versions before 17.0.0 require Tresos **license files** –for older MCALs
  - Tresos versions 17.0.0 & after require Tresos **activation codes** –for newer MCALs
  - Examples:

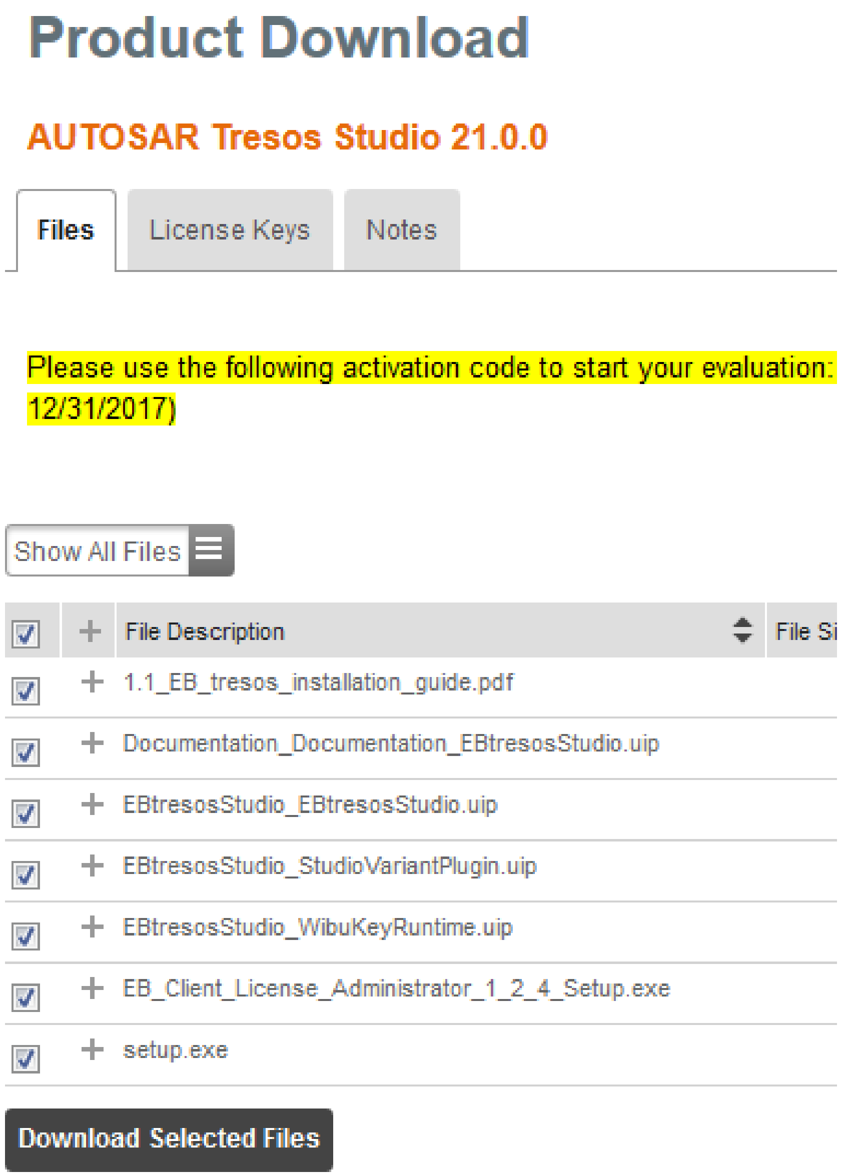
Tresos Version	Requirement	MCAL Version
14.2.1	License File	MPC574xG MCAL 4.0
21.0	Activation Code	MPC574xG MCAL 4.2
23.0	Activation Code	S32K14x MCAL 4.2
24.0	Activation Code	MPC574xG MCAL 4.3 S32K14x MCAL 4.3

- Tresos license codes & activation codes are good for one calendar quarter (3 months)
- If you have a valid license in your account, a new license file or activation code is automatically added to your account by the end of the quarter

3A. Download, Install / renew Tresos with activation code (versions 17 & after)

Install Tresos – Versions 17.0.0 and after (1 of 5)

- Go to Product Download for Tresos (example v21.0.0):
  - Sign in to your account at nxp.com
  - Click the following: Software Licensing and Support → Autosar SW – Autosar MCAL → Autosar SW – Elektrobit Tresos Studio / Autosar Configuration Tool → AUTOSAR Tresos Studio 21.0.0 → I agree
- Select all files and download to any folder. Be sure to use “Download Selected Files” which uses the Download Manager or else files will be compressed in the wrong format.



Product Download

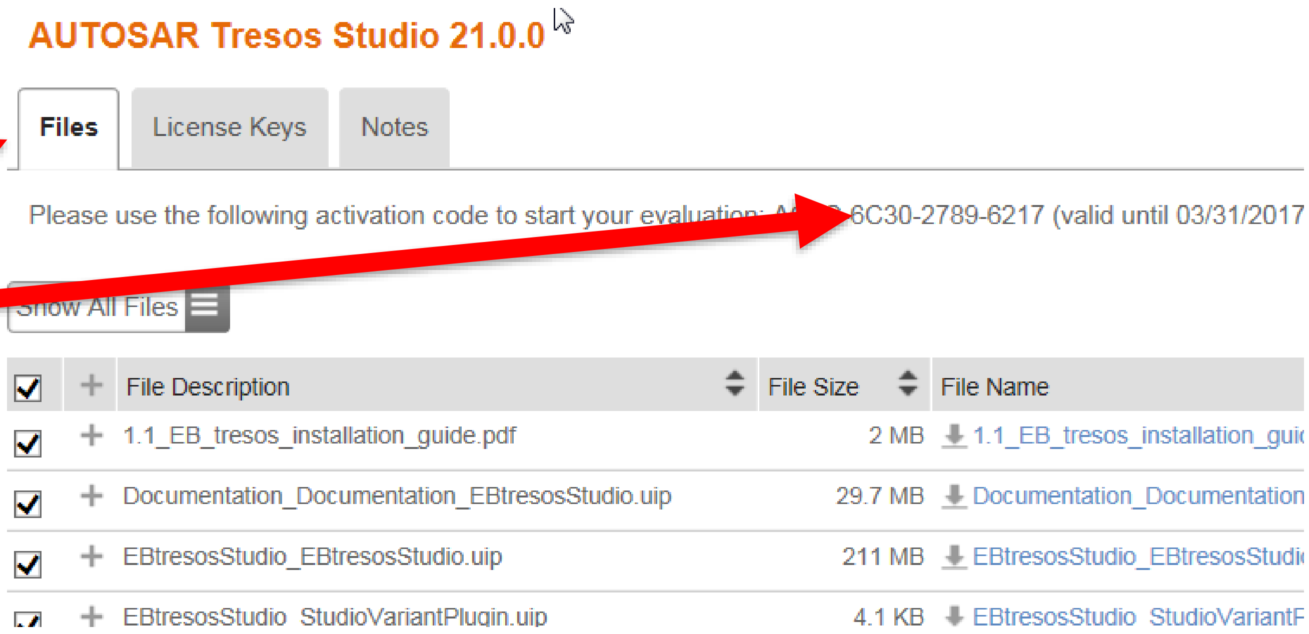
AUTOSAR Tresos Studio 21.0.0

Please use the following activation code to start your evaluation:
12/31/2017)

☑	+	File Description	File Si
☑	+	1.1_EB_tresos_installation_guide.pdf	
☑	+	Documentation_Documentation_EBtresosStudio.uip	
☑	+	EBtresosStudio_EBtresosStudio.uip	
☑	+	EBtresosStudio_StudioVariantPlugin.uip	
☑	+	EBtresosStudio_WibuKeyRuntime.uip	
☑	+	EB_Client_License_Administrator_1_2_4_Setup.exe	
☑	+	setup.exe	

Install Tresos – Versions 17.0.0 and after (2 of 5)

- Note the activation code will be needed in subsequent steps
  - Codes are updated every 3 months.
  - See “Files” tab of Product Download in
    your account.
  - Copy and paste Tresos activation code to some temporary location for use later.



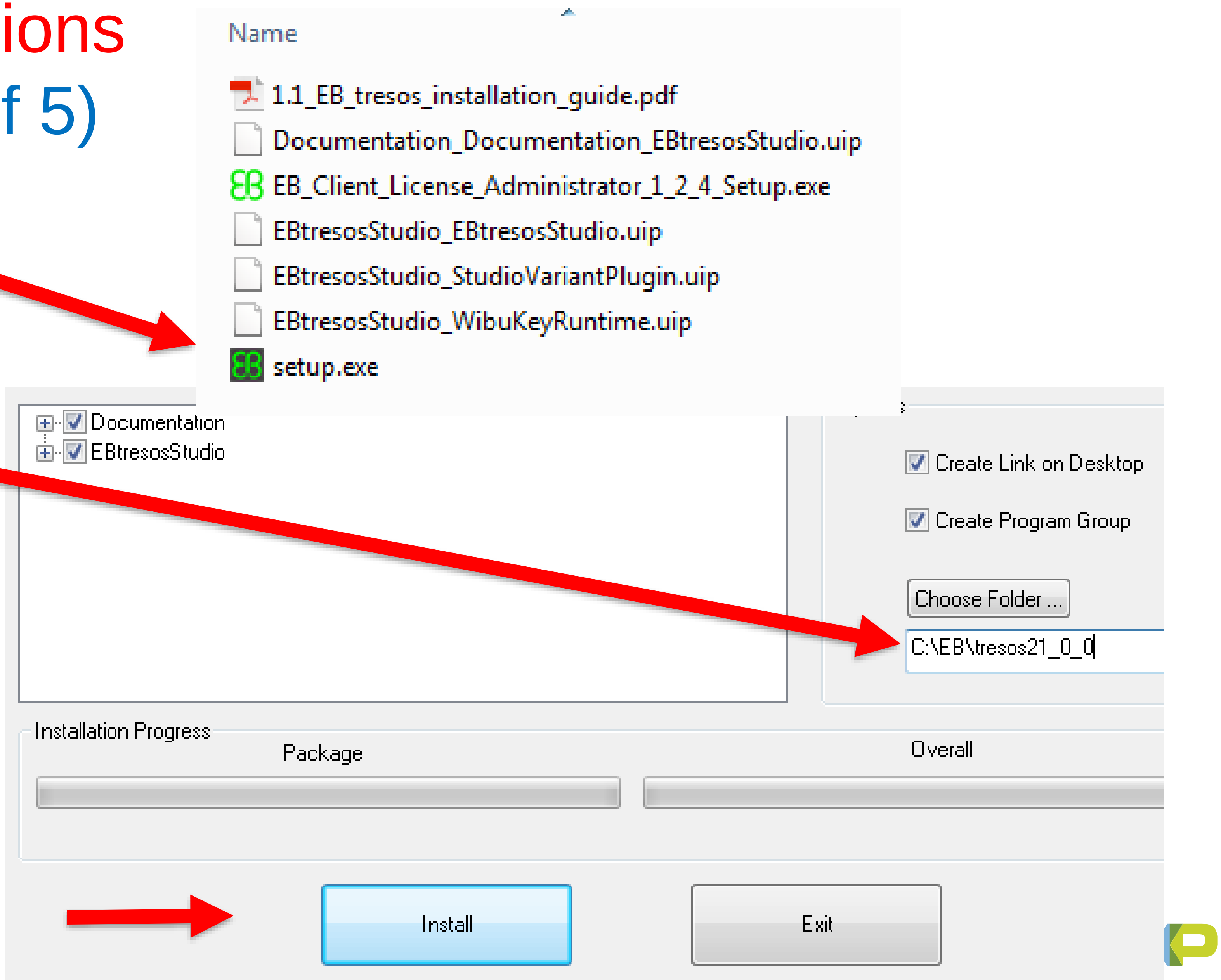
AUTOSAR Tresos Studio 21.0.0

Please use the following activation code to start your evaluation: A[illegible]6C30-2789-6217 (valid until 03/31/2017

☑	+	File Description	File Size	File Name
☑	+	1.1_EB_tresos_installation_guide.pdf	2 MB	1.1_EB_tresos_installation_gui
☑	+	Documentation_Documentation_EBtresosStudio.uip	29.7 MB	Documentation_Documentation
☑	+	EBtresosStudio_EBtresosStudio.uip	211 MB	EBtresosStudio_EBtresosStudi
☑	+	EBtresosStudio_StudioVariantPlugin.uip	4.1 KB	EBtresosStudio_StudioVariantP

Install Tresos – Versions 17.0.0 and after (3 of 5)

- Run **setup.exe** from the downloaded folder
- Choose unique folder (Tip: include Tresos version # in the name)
- Click Install



Name

1.1_EB_tresos_installation_guide.pdf
Documentation_Documentation_EBtresosStudio.uip
EB_Client_License_Administrator_1_2_4_Setup.exe
EBtresosStudio_EBtresosStudio.uip
EBtresosStudio_StudioVariantPlugin.uip
EBtresosStudio_WibuKeyRuntime.uip
setup.exe

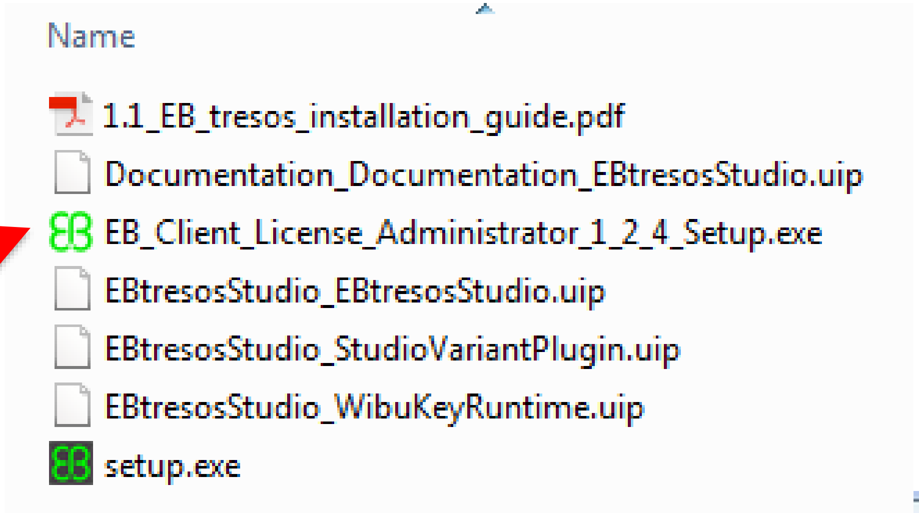
☑ Documentation
☑ EBtresosStudio

☑ Create Link on Desktop
☑ Create Program Group

Choose Folder ...
C:\EB\tresos21_0_0

Install Tresos – Versions 17.0.0 and after (4 of 5)

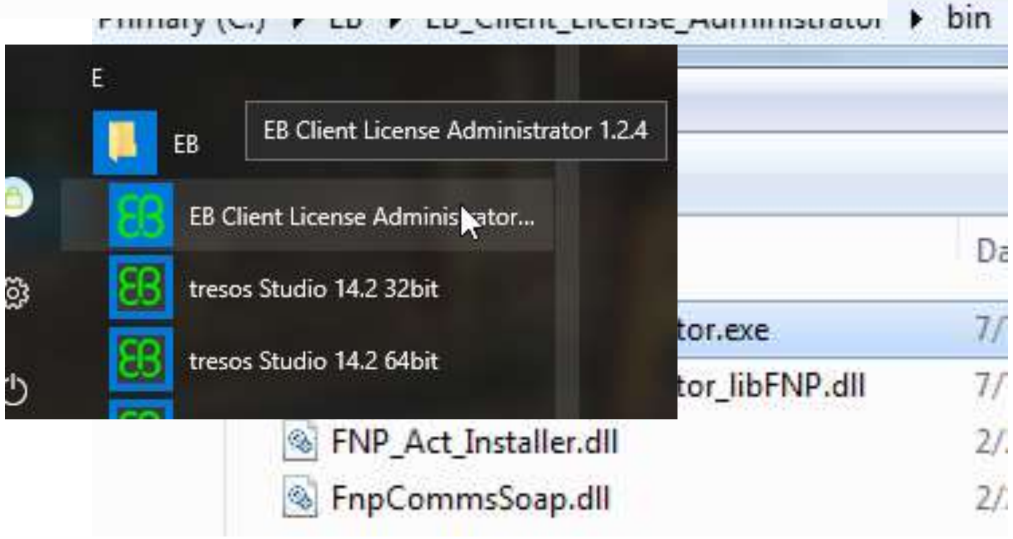
- If EB Client License Administrator is not already on your PC, install it.
  - Look for the program in the Windows program menu
  - To install, start the EB Client Administrator setup program from your downloaded folder.



Name

1.1_EB_tresos_installation_guide.pdf
Documentation_Documentation_EBtresosStudio.uip
EB_Client_License_Administrator_1_2_4_Setup.exe
EBtresosStudio_EBtresosStudio.uip
EBtresosStudio_StudioVariantPlugin.uip
EBtresosStudio_WibuKeyRuntime.uip
setup.exe

- Start EB Client Administrator program from Start menu

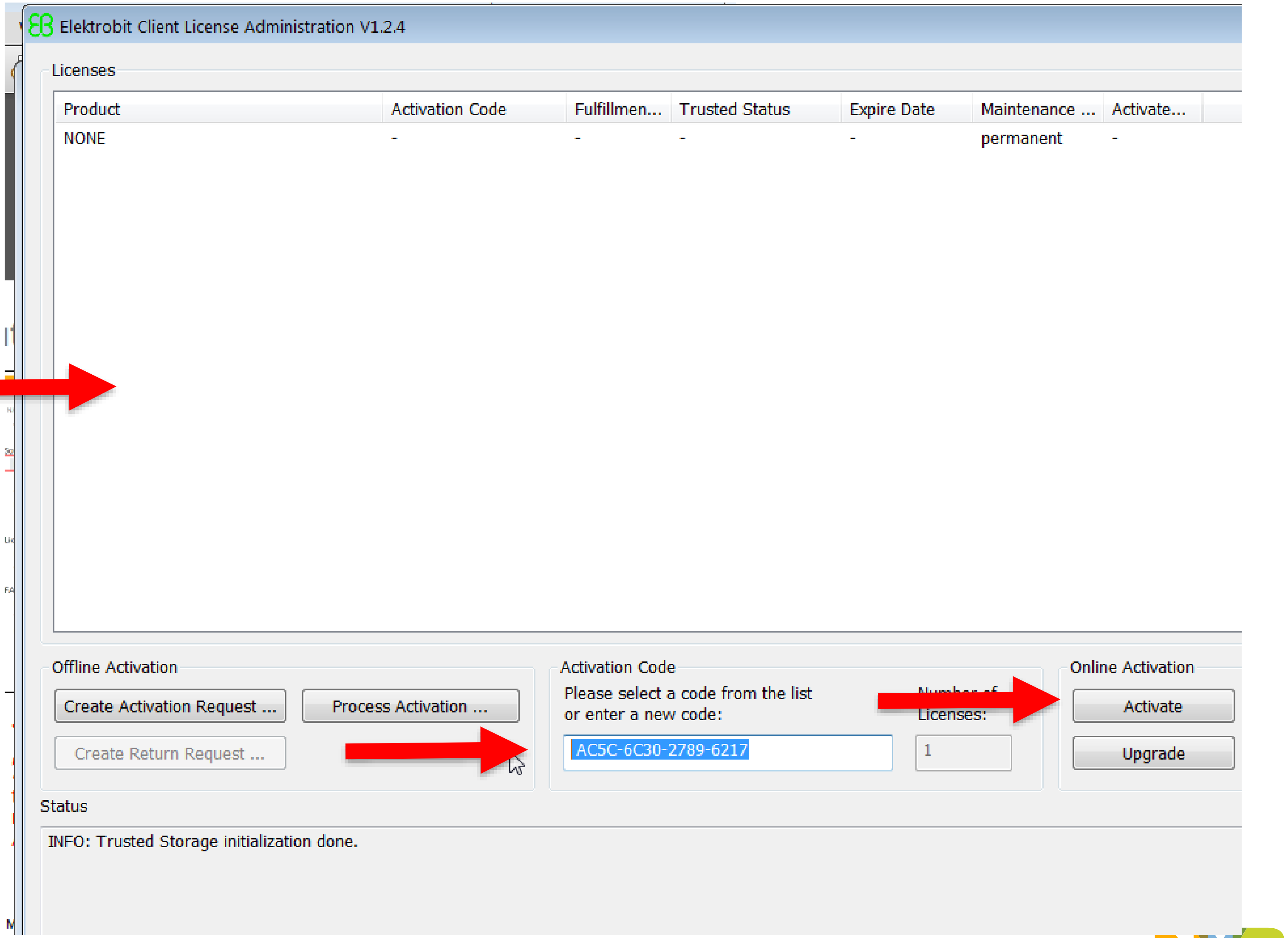


E
EB
EB Client License Administrator 1.2.4
EB Client License Administrator...
tresos Studio 14.2 32bit
tresos Studio 14.2 64bit
Primary (C:) ▸ EB ▸ EB_Client_License_Administrator ▸ bin
Da
tor.exe
tor_libFNP.dll
FNP_Act_Installer.dll
FnpCommsSoap.dll
7/
7/
2/
2/

- If necessary, click Next to get thru dialog boxes until you get to **FlexLM License information**
  - Click Use License Activation Codes
  - Click Next

Install Tresos – Versions 17.0.0 and after (5 of 5)

- You will be prompted for one of the following dialog boxes:
  - Click Install
    or
  - Enter Tresos activation code (stored earlier; see slide 2 of 5)
  - Click Activate (You must be on line to activate



Product	Activation Code	Fulfillmen...	Trusted Status	Expire Date	Maintenance ...	Activate...
NONE	-	-	-	-	permanent	-

Please select a code from the list or enter a new code:

AC5C-6C30-2789-6217

Number of Licenses: 1

INFO: Trusted Storage initialization done.

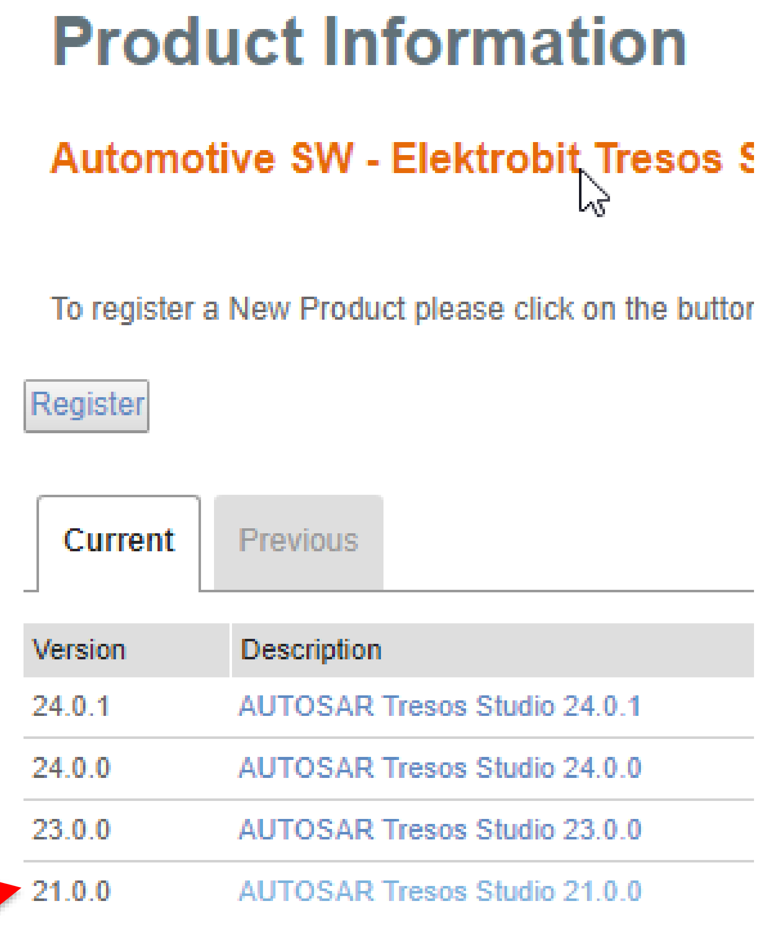
Tresos is now activated

Tresos Activation Code Renewal 1
(For versions 17.0.0 and after)

- Every 3 months the Tresos activation codes expire
- Customers with an active MCAL license (such as DISM or evaluation), will automatically get a new activation code in their account.
- Obtaining new Tresos activation code (for Tresos 17.0.0 or later):

1. Go to Tresos in your nxp account:
   - Sign in to your account at nxp.com
   - Click the following: Software Licensing and Support → Autosar SW – Autosar MCAL → Autosar SW – Elektrobit Tresos Studio / Autosar Configuration Tool

2. Select the Tresos version for your MCAL or OS. Example:



Product Information

Automotive SW - Elektrobit Tresos S

To register a New Product please click on the buttor

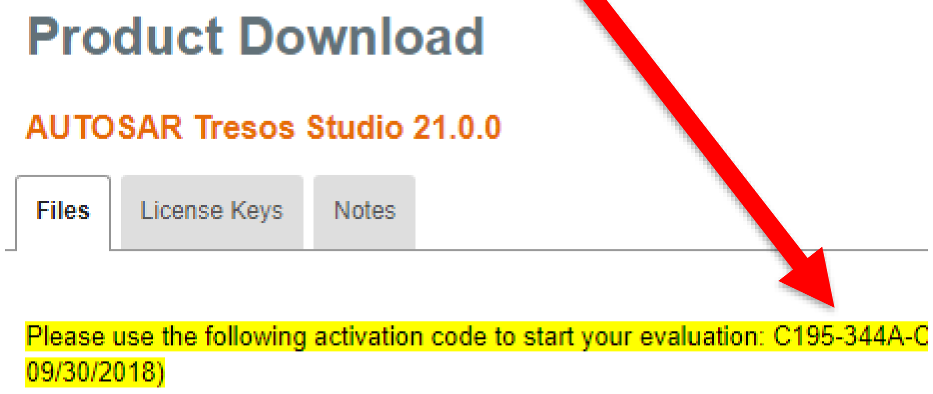
Version	Description
24.0.1	AUTOSAR Tresos Studio 24.0.1
24.0.0	AUTOSAR Tresos Studio 24.0.0
23.0.0	AUTOSAR Tresos Studio 23.0.0
21.0.0	AUTOSAR Tresos Studio 21.0.0

Tresos Activation Code Renewal 2

(For versions 17.0.0 and after)

3. Agree to SW terms and conditions.

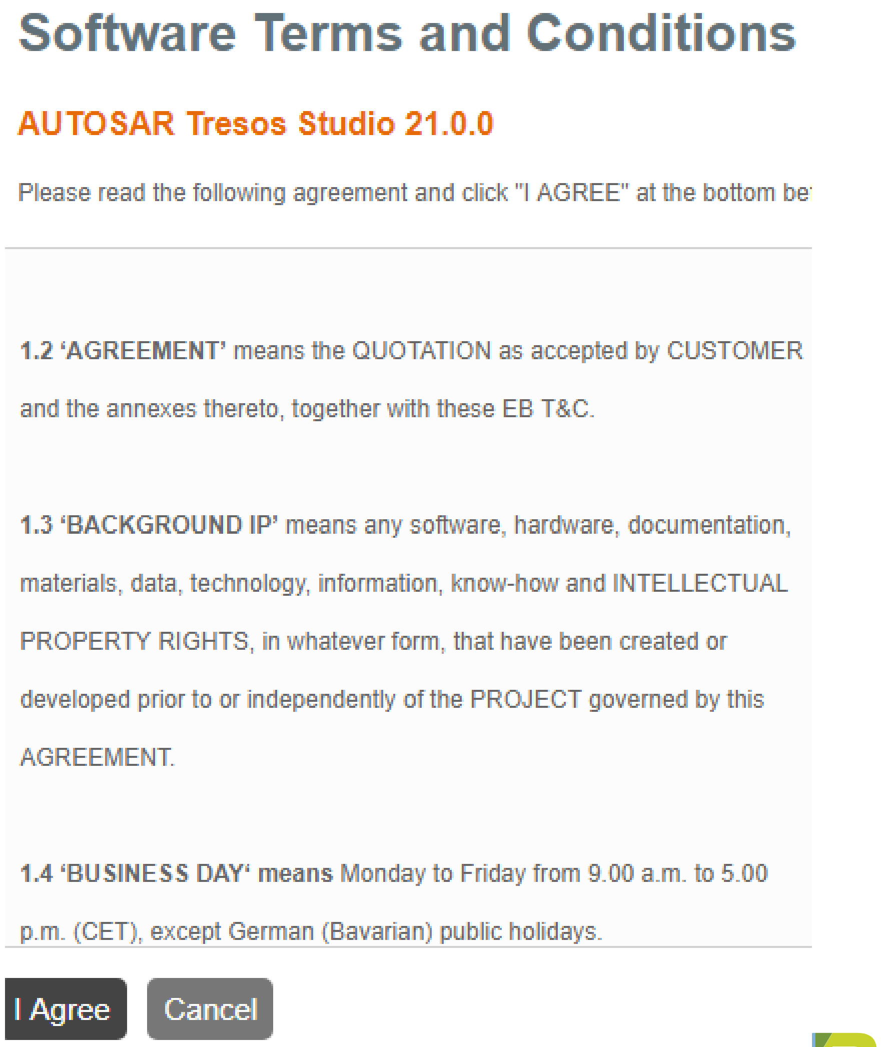
4. Copy activation code



Product Download

AUTOSAR Tresos Studio 21.0.0

Please use the following activation code to start your evaluation: C195-344A-C
09/30/2018)



Software Terms and Conditions

AUTOSAR Tresos Studio 21.0.0

Please read the following agreement and click "I AGREE" at the bottom be

1.2 'AGREEMENT' means the QUOTATION as accepted by CUSTOMER and the annexes thereto, together with these EB T&C.

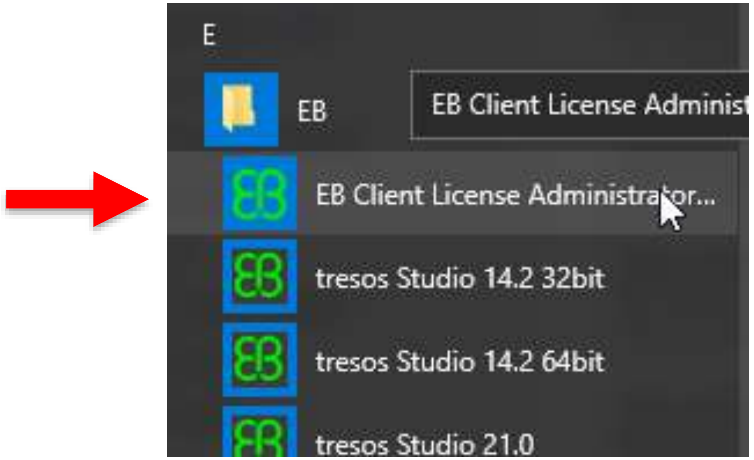
1.3 'BACKGROUND IP' means any software, hardware, documentation, materials, data, technology, information, know-how and INTELLECTUAL PROPERTY RIGHTS, in whatever form, that have been created or developed prior to or independently of the PROJECT governed by this AGREEMENT.

1.4 'BUSINESS DAY' means Monday to Friday from 9.00 a.m. to 5.00 p.m. (CET), except German (Bavarian) public holidays.

Tresos Activation Code Renewal 3

(For versions 17.0.0 and after)

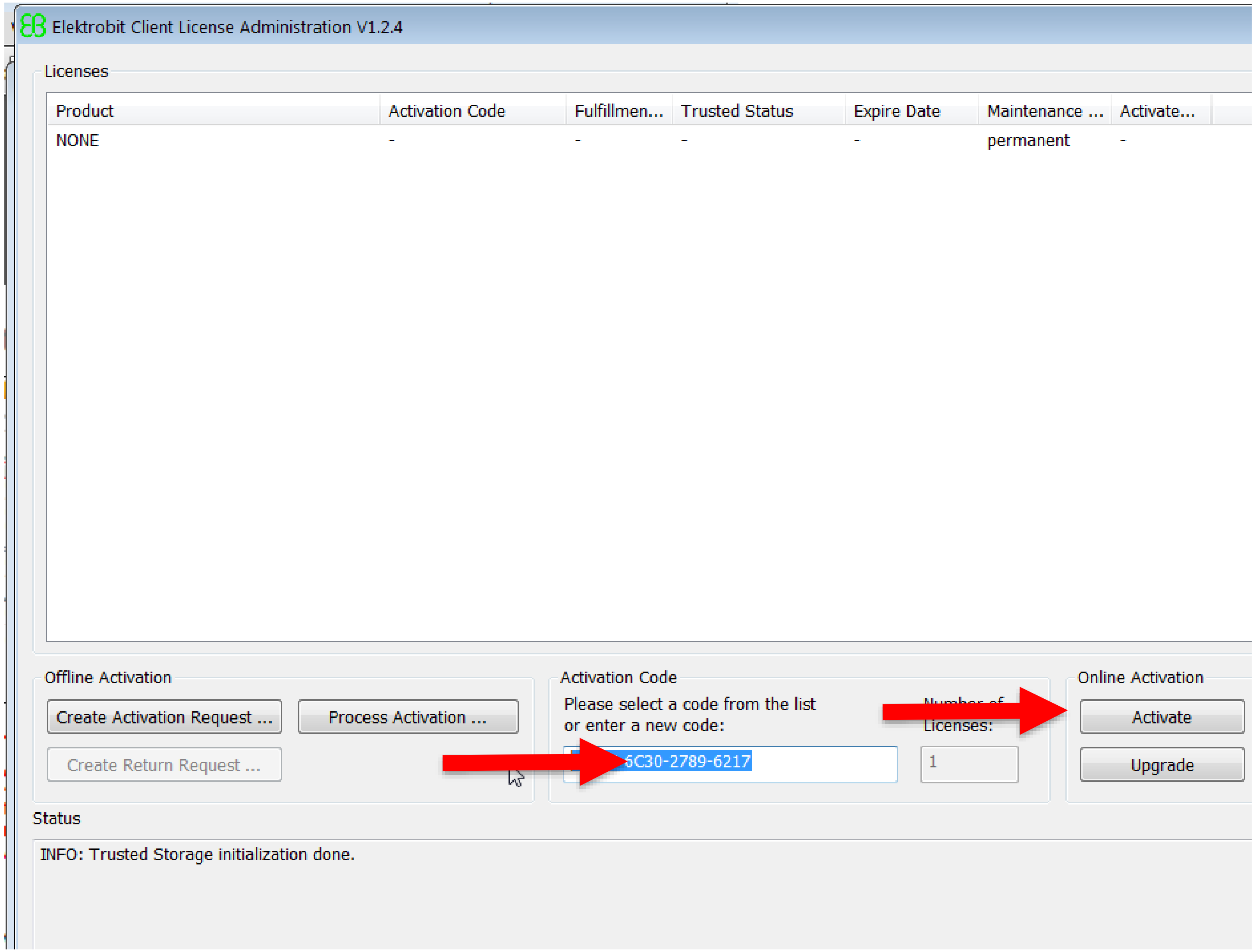
5. From the Windows start menu, start EB Client License Administrator



Tresos Activation Code Renewal 4 (For versions 17.0.0 and after)

6. In the dialog box:
   - Enter (paste) the new Tresos activation code. (Note: you must be on line to activate.)
   - Click Activate

Tresos is now activated



Elektrobit Client License Administration V1.2.4

Licenses

Product	Activation Code	Fulfillmen...	Trusted Status	Expire Date	Maintenance ...	Activate...
NONE	-	-	-	-	permanent	-

Activation Code

Please select a code from the list or enter a new code: 5C30-2789-6217

Number of Licenses: 1

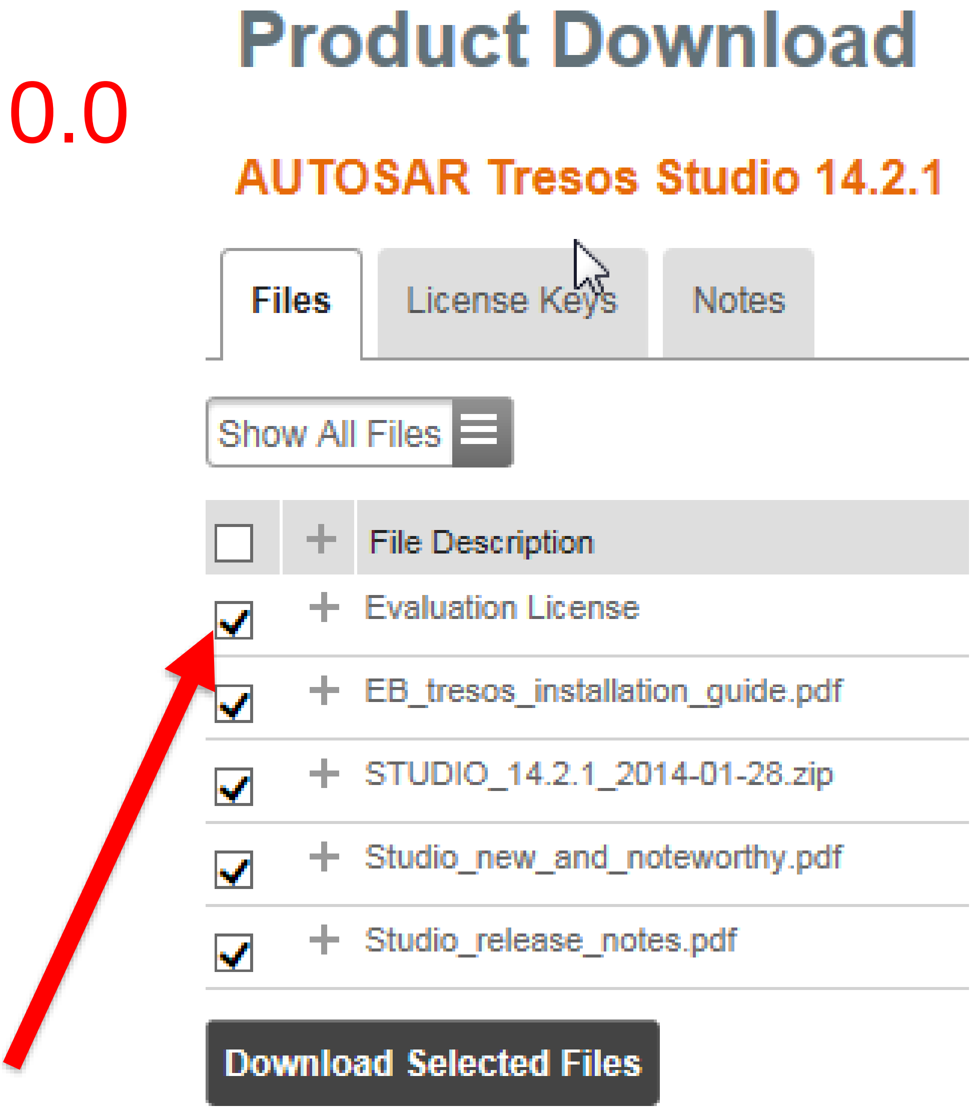
Status

INFO: Trusted Storage initialization done.

3B. Download, Install / Renew Tresos with License File (versions before 17)

Install Tresos – Versions before 17.0.0 (1 of 4)

- Go to Product Download for Tresos:
  - Sign in to your account at nxp.com
  - Click the following: Software Licensing and Support
    → Autosar SW – Autosar MCAL
    → Autosar SW – Elektrobit Tresos Studio / Autosar Configuration Tool
    → AUTOSAR Tresos Studio 14.2.1
    → I agree
- Select all files and download to any folder. Be sure to use "Download Selected Files" which uses the Download Manager or else files will be compressed in the wrong format.
  - Versions before 17.0.0: also download license (versions 17.0.0 and later use activation codes)



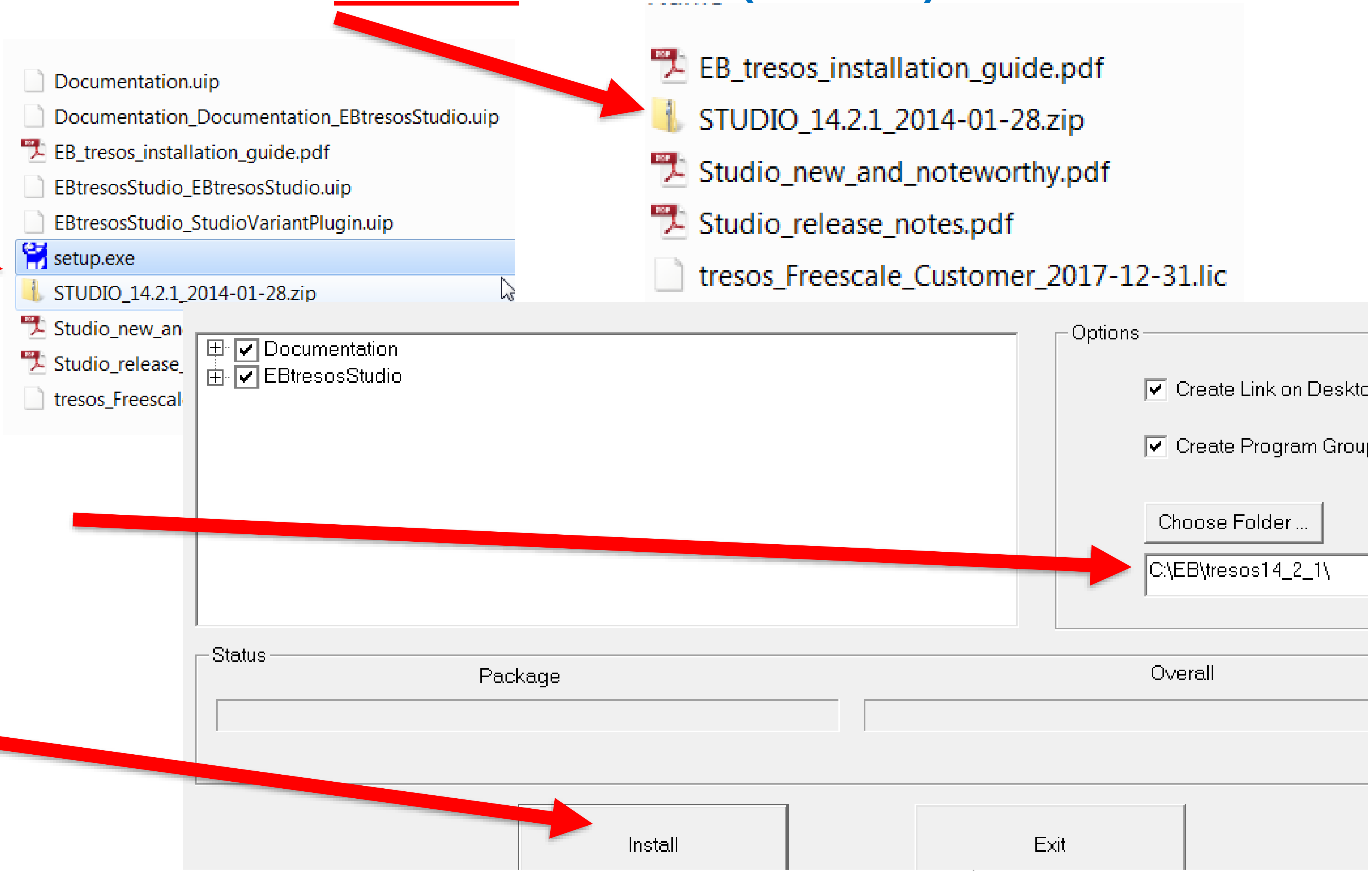
Product Download

AUTOSAR Tresos Studio 14.2.1

☐	+	File Description
☑	+	Evaluation License
☑	+	EB_tresos_installation_guide.pdf
☑	+	STUDIO_14.2.1_2014-01-28.zip
☑	+	Studio_new_and_noteworthy.pdf
☑	+	Studio_release_notes.pdf

Install Tresos – Versions before 17.0.0 (2 of 4)

- **Unzip** the downloaded Tresos file
- Run **setup.exe**
- Choose unique folder
- Click Install



Documentation.uip
Documentation_Documentation_EBtresosStudio.uip
EB_tresos_installation_guide.pdf
EBtresosStudio_EBtresosStudio.uip
EBtresosStudio_StudioVariantPlugin.uip
setup.exe
STUDIO_14.2.1_2014-01-28.zip
Studio_new_an
Studio_release_
tresos_Freescal

EB_tresos_installation_guide.pdf
STUDIO_14.2.1_2014-01-28.zip
Studio_new_and_noteworthy.pdf
Studio_release_notes.pdf
tresos_Freescale_Customer_2017-12-31.lic

☑ Documentation
☑ EBtresosStudio

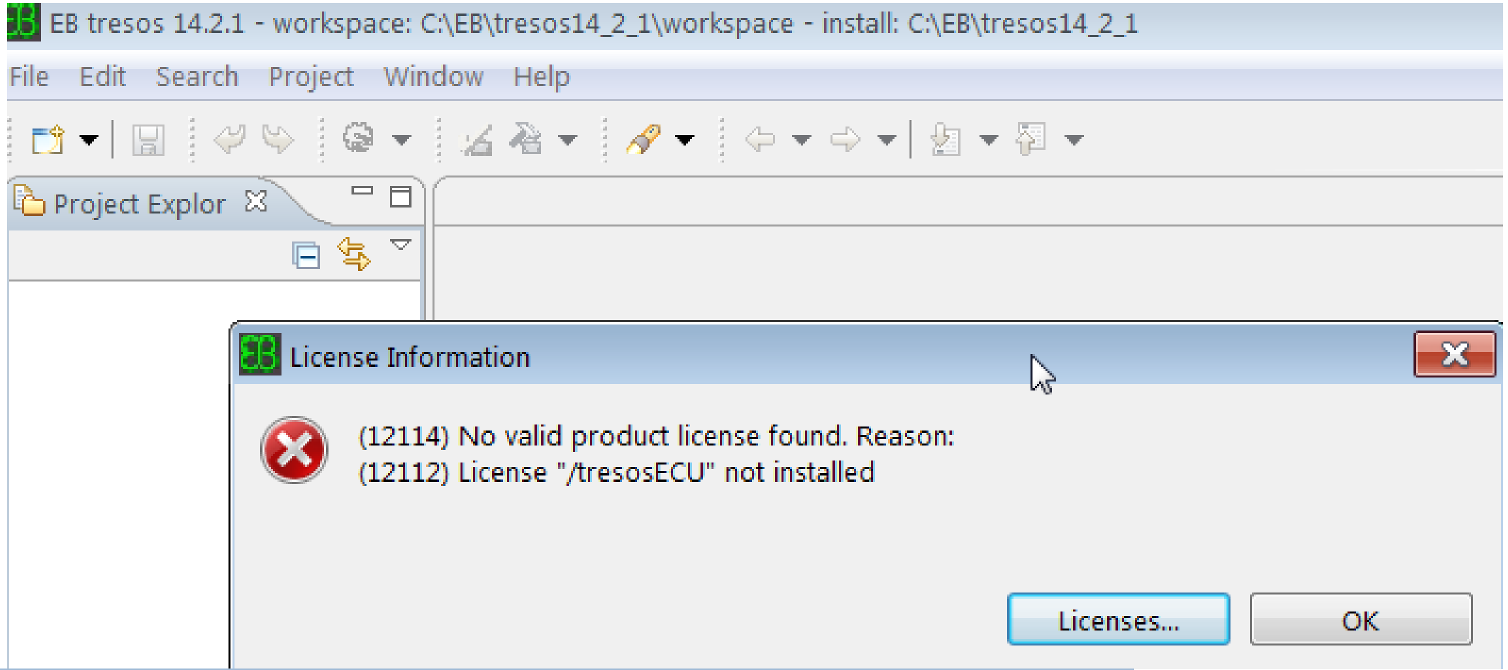
Options
☑ Create Link on Deskto
☑ Create Program Grou
Choose Folder ...
C:\EB\tresos14_2_1\

Status
Package
Overall

Install
Exit

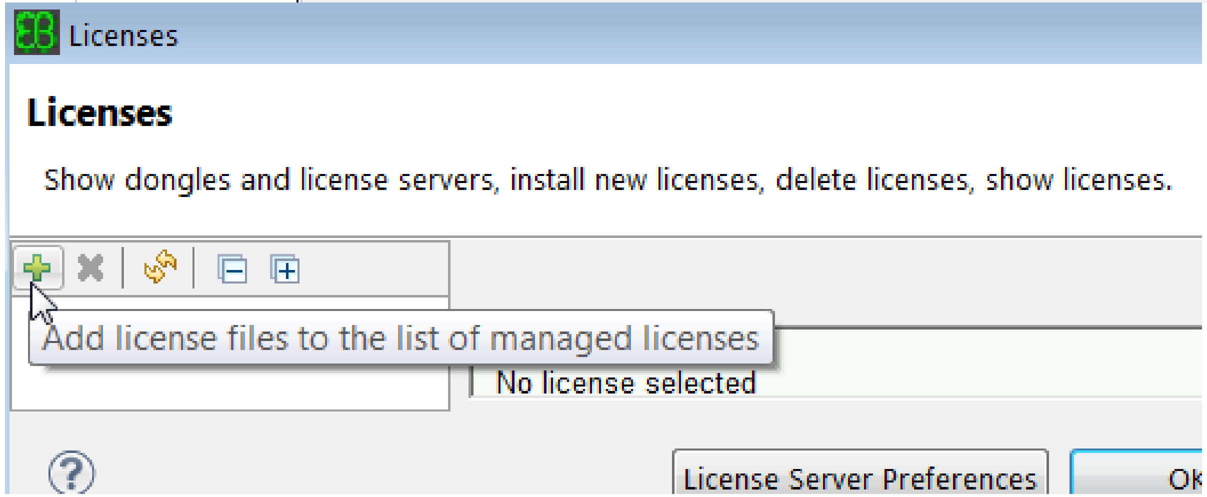
Install Tresos – Versions before 17.0.0 (3 of 4)

- Start Tresos
- First time: a workspace needs to be created.
  - Click Yes.
- Close Welcome screen
- After several seconds, the License Information window appears
  - Click Licenses..


EB tresos 14.2.1 - workspace: C:\EB\tresos14_2_1\workspace - install: C:\EB\tresos14_2_1
File
Edit
Search
Project
Window
Help
Project Explor
License Information
Licenses...
OK

(12114) No valid product license found. Reason:
(12112) License "/tresosECU" not installed

- Click "+"


Licenses
Add license files to the list of managed licenses
License Server Preferences
Ok

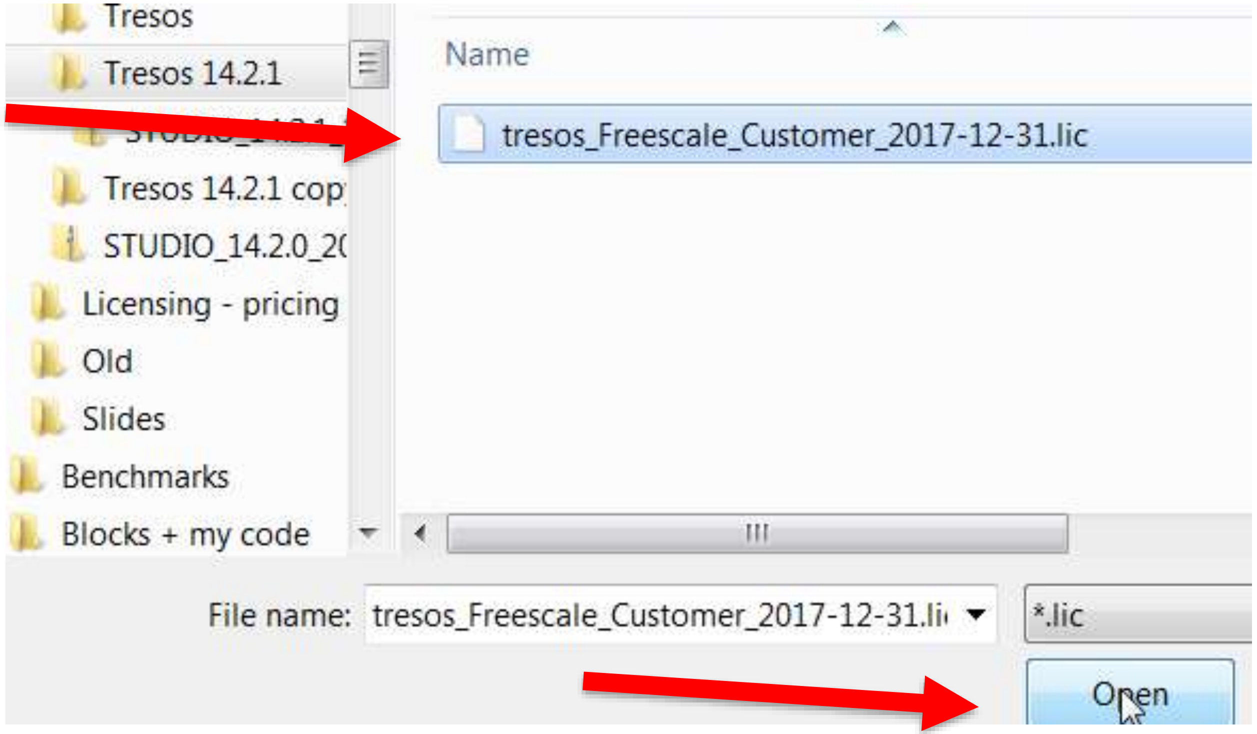
Licenses

Show dongles and license servers, install new licenses, delete licenses, show licenses.

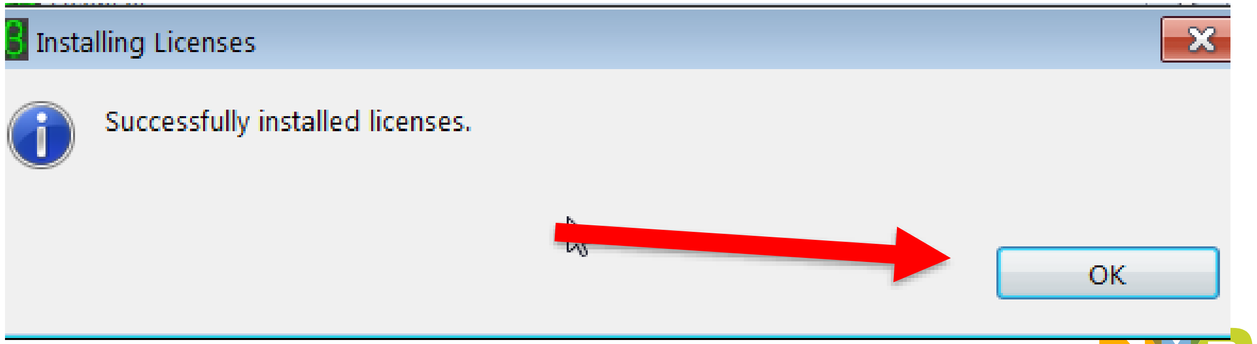
No license selected

Install Tresos – Versions before 17.0.0 (4 of 4)

- Navigate to where you downloaded the Tresos license file (probably with other Tresos installation files from your account
- Select license file
- Click Open
- Click OK



File name: tresos_Freescale_Customer_2017-12-31.lic

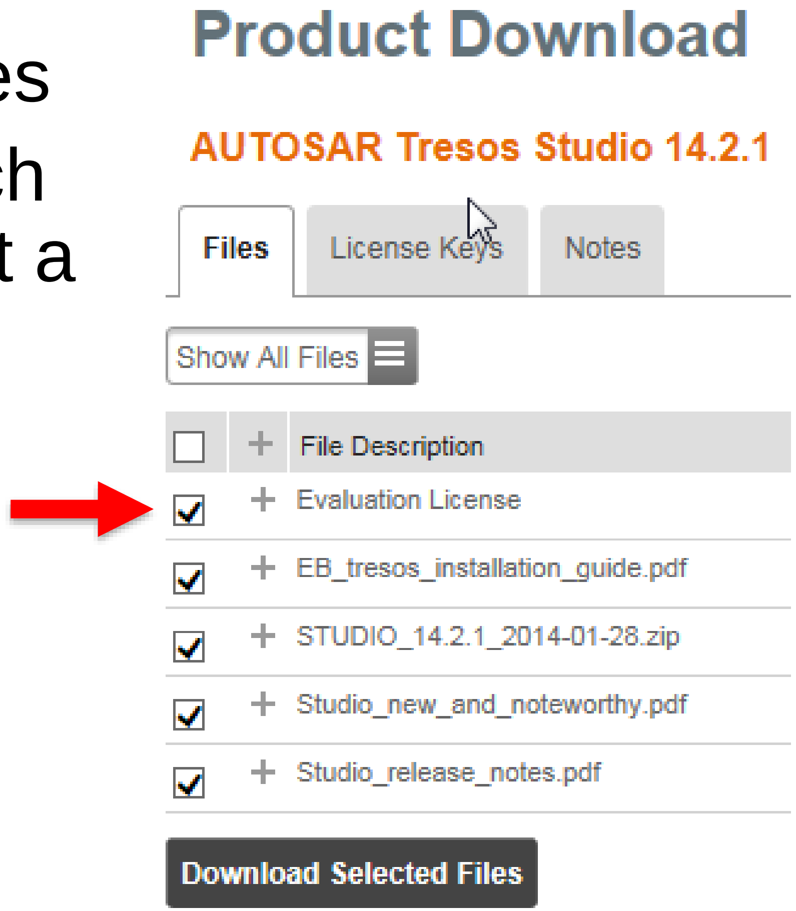


Installing Licenses

Successfully installed licenses.

License File Renewal 1 – Tresos versions before 17.0.0

- Every 3 months the Tresos license file expires
- Customers with an active MCAL license (such as DISM or evaluation), will automatically get a new license file in their account.
- Obtaining new Tresos license:
  - Sign in to your account at nxp.com
  - Click the following: Software Licensing and Support → Autosar SW – Autosar MCAL → Autosar SW – Elektrobit Tresos Studio / Autosar Configuration Tool
  - Download the most recent license to a file



Product Download

AUTOSAR Tresos Studio 14.2.1

□	+	File Description
☑	+	Evaluation License
☑	+	EB_tresos_installation_guide.pdf
☑	+	STUDIO_14.2.1_2014-01-28.zip
☑	+	Studio_new_and_noteworthy.pdf
☑	+	Studio_release_notes.pdf

License File Renewal 2 – Tresos versions before 17.0.0

- Start Tresos
- Go to Help – Licenses
- Select the downloaded license.

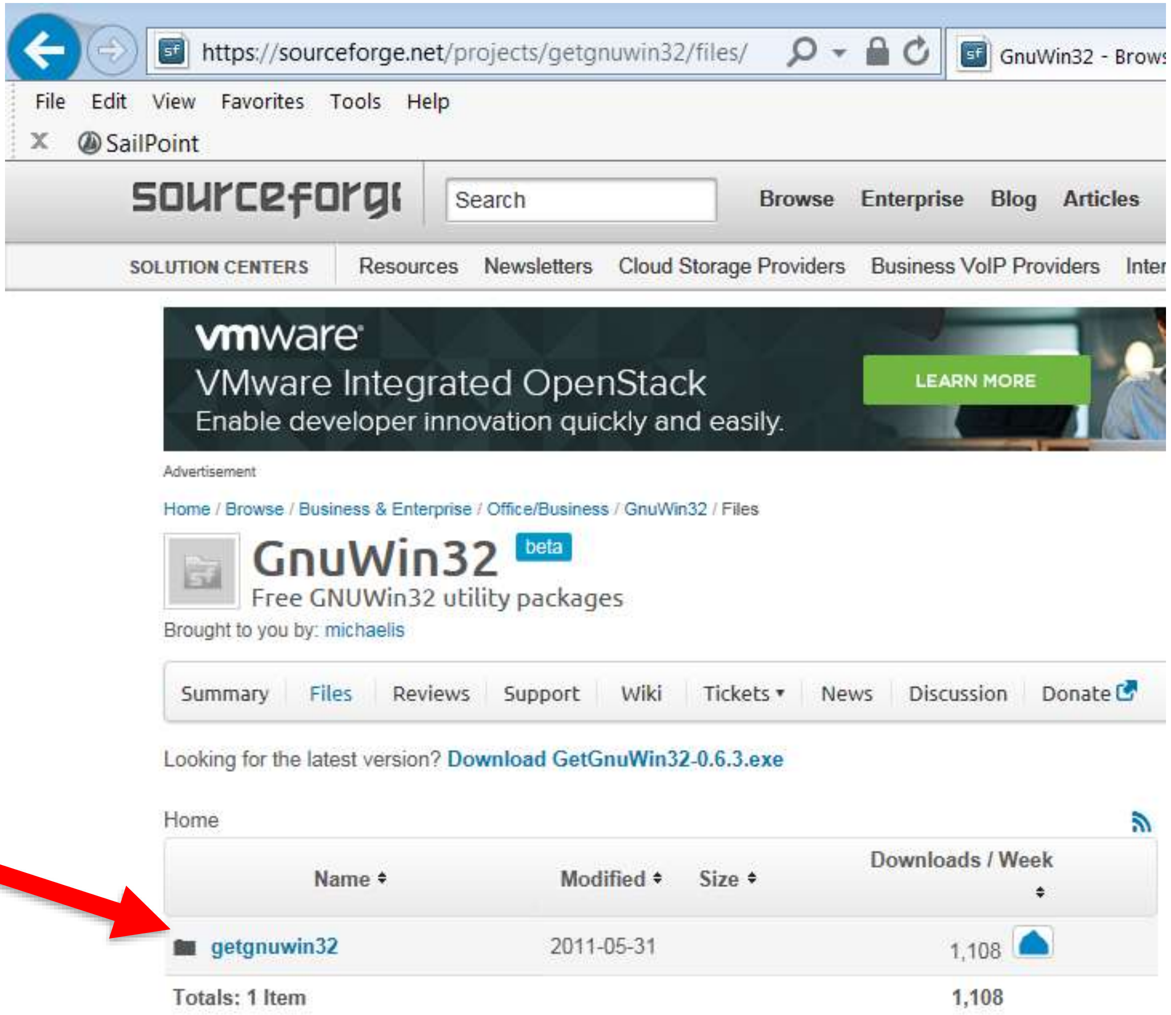
4. Download, Install Make utility

Make from GnuWin32 1

- Go to https://sourceforge.net/projects/getgnuwin32/files/

- Note – screenshots are done with Windows 7. Windows 10 may differ.

- Click on getgnuwin32



Home / Browse / Business & Enterprise / Office/Business / GnuWin32 / Files

GnuWin32 beta

Free GNUWin32 utility packages

Brought to you by: michaelis

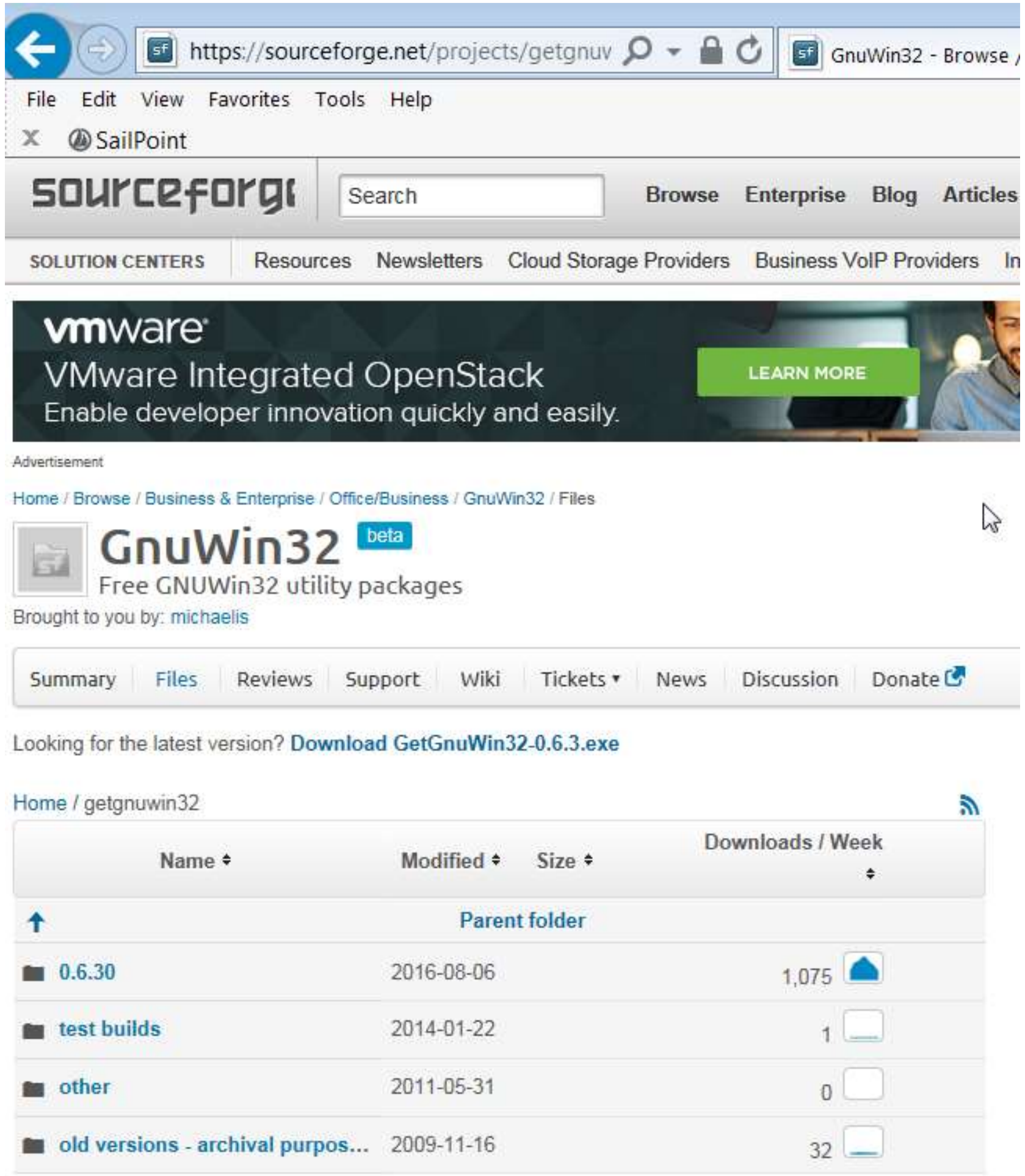
Looking for the latest version? Download GetGnuWin32-0.6.3.exe

Home

Name ⬍	Modified ⬍	Size ⬍	Downloads / Week ⬍
getgnuwin32	2011-05-31		1,108
Totals: 1 Item			1,108

Make from GnuWin32 2

- Click on the recent version



https://sourceforge.net/projects/getgnuw
GnuWin32 - Browse /
File Edit View Favorites Tools Help
SailPoint
sourceforge
Search
Browse Enterprise Blog Articles
SOLUTION CENTERS Resources Newsletters Cloud Storage Providers Business VoIP Providers In

Home / Browse / Business & Enterprise / Office/Business / GnuWin32 / Files

GnuWin32 beta

Free GNUWin32 utility packages

Brought to you by: michaelis

Summary Files Reviews Support Wiki Tickets ▾ News Discussion Donate

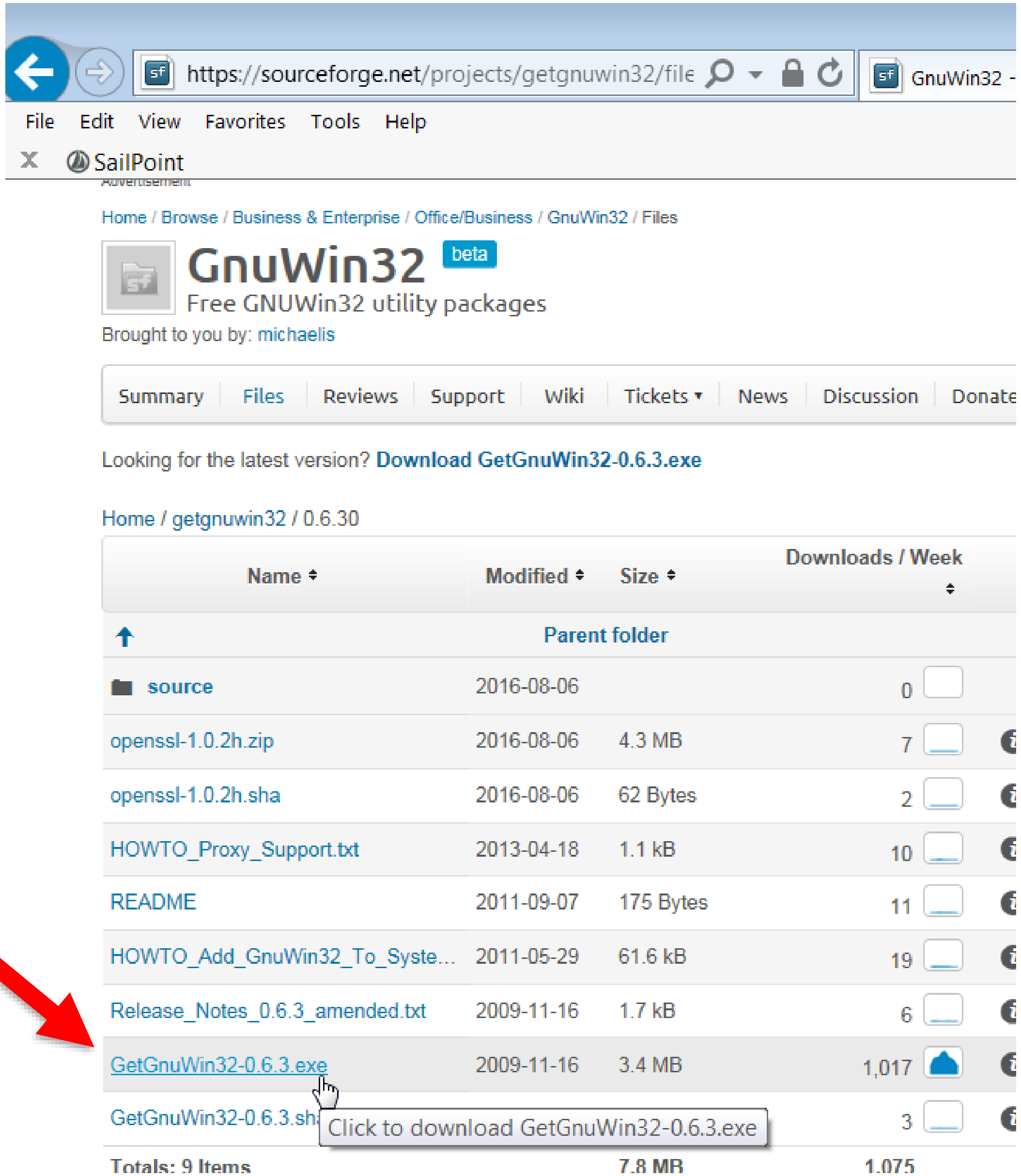
Looking for the latest version? Download GetGnuWin32-0.6.3.exe

Home / getgnuwin32

Name ♦	Modified ♦	Size ♦	Downloads / Week ♦
Parent folder			
0.6.30	2016-08-06		1,075
test builds	2014-01-22		1
other	2011-05-31		0
old versions - archival purpos...	2009-11-16		32

Make from GnuWin32 3

- Click on version to download
- Wait for download to complete



Home / Browse / Business & Enterprise / Office/Business / GnuWin32 / Files

GnuWin32 beta

Free GNUWin32 utility packages

Brought to you by: michaelis

Looking for the latest version? **Download GetGnuWin32-0.6.3.exe**

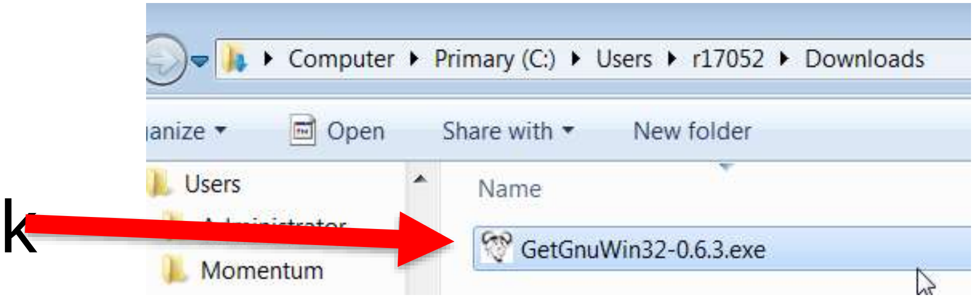
Home / getgnuwin32 / 0.6.30

Name ⬍	Modified ⬍	Size ⬍	Downloads / Week ⬍
Parent folder			
source	2016-08-06		0
openssl-1.0.2h.zip	2016-08-06	4.3 MB	7
openssl-1.0.2h.sha	2016-08-06	62 Bytes	2
HOWTO_Proxy_Support.txt	2013-04-18	1.1 kB	10
README	2011-09-07	175 Bytes	11
HOWTO_Add_GnuWin32_To_Syste...	2011-05-29	61.6 kB	19
Release_Notes_0.6.3_amended.txt	2009-11-16	1.7 kB	6
GetGnuWin32-0.6.3.exe	2009-11-16	3.4 MB	1,017
GetGnuWin32-0.6.3.sh			3
Totals: 9 Items		**7.8 MB**	**1,075**

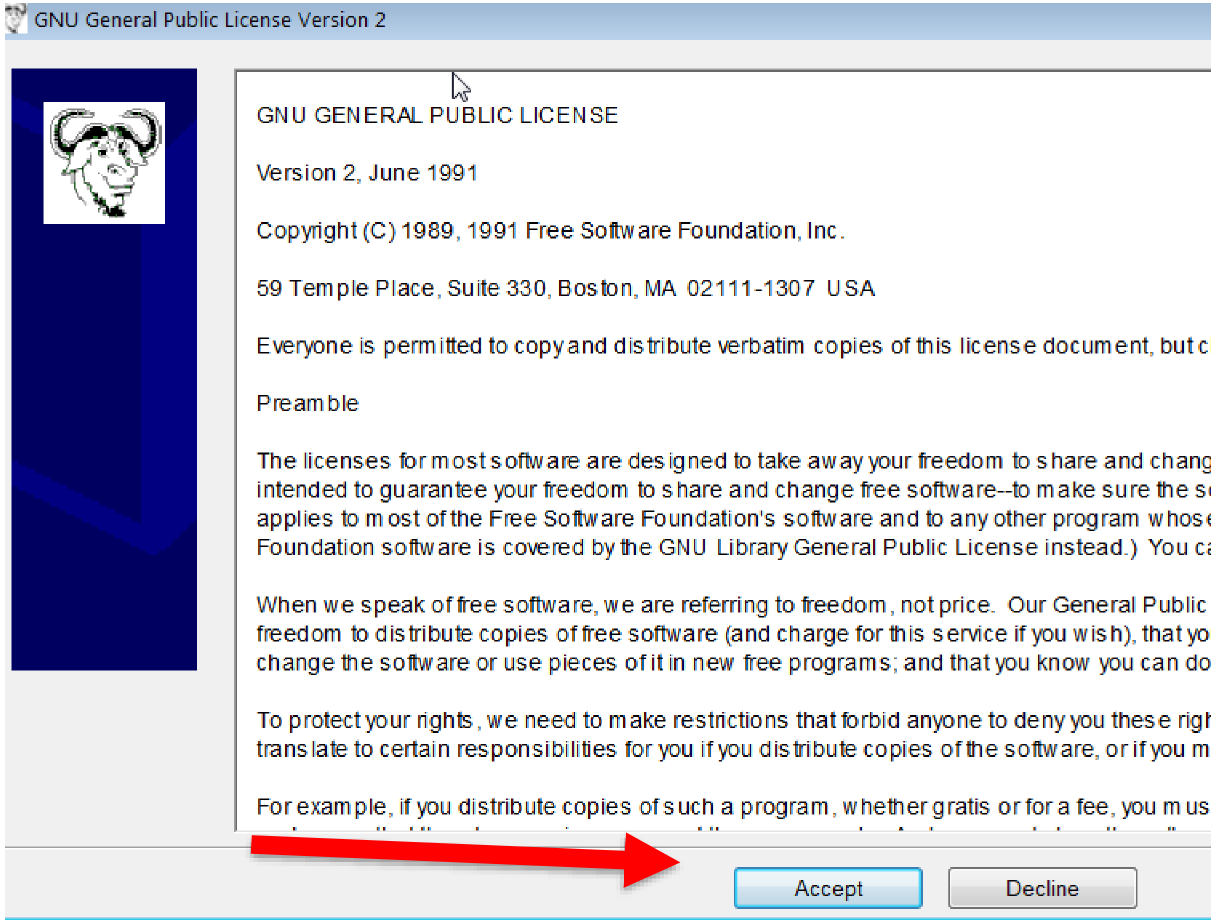
Click to download GetGnuWin32-0.6.3.exe

Make from GnuWin32 4

- Go to your download file and double click on it to start installation



- Click Accept



GNU GENERAL PUBLIC LICENSE

Version 2, June 1991

Copyright (C) 1989, 1991 Free Software Foundation, Inc.

59 Temple Place, Suite 330, Boston, MA 02111-1307 USA

Everyone is permitted to copy and distribute verbatim copies of this license document, but c

Preamble

The licenses for most software are designed to take away your freedom to share and chang
intended to guarantee your freedom to share and change free software--to make sure the s
applies to most of the Free Software Foundation's software and to any other program whose
Foundation software is covered by the GNU Library General Public License instead.) You ca

When we speak of free software, we are referring to freedom, not price. Our General Public
freedom to distribute copies of free software (and charge for this service if you wish), that yo
change the software or use pieces of it in new free programs; and that you know you can do

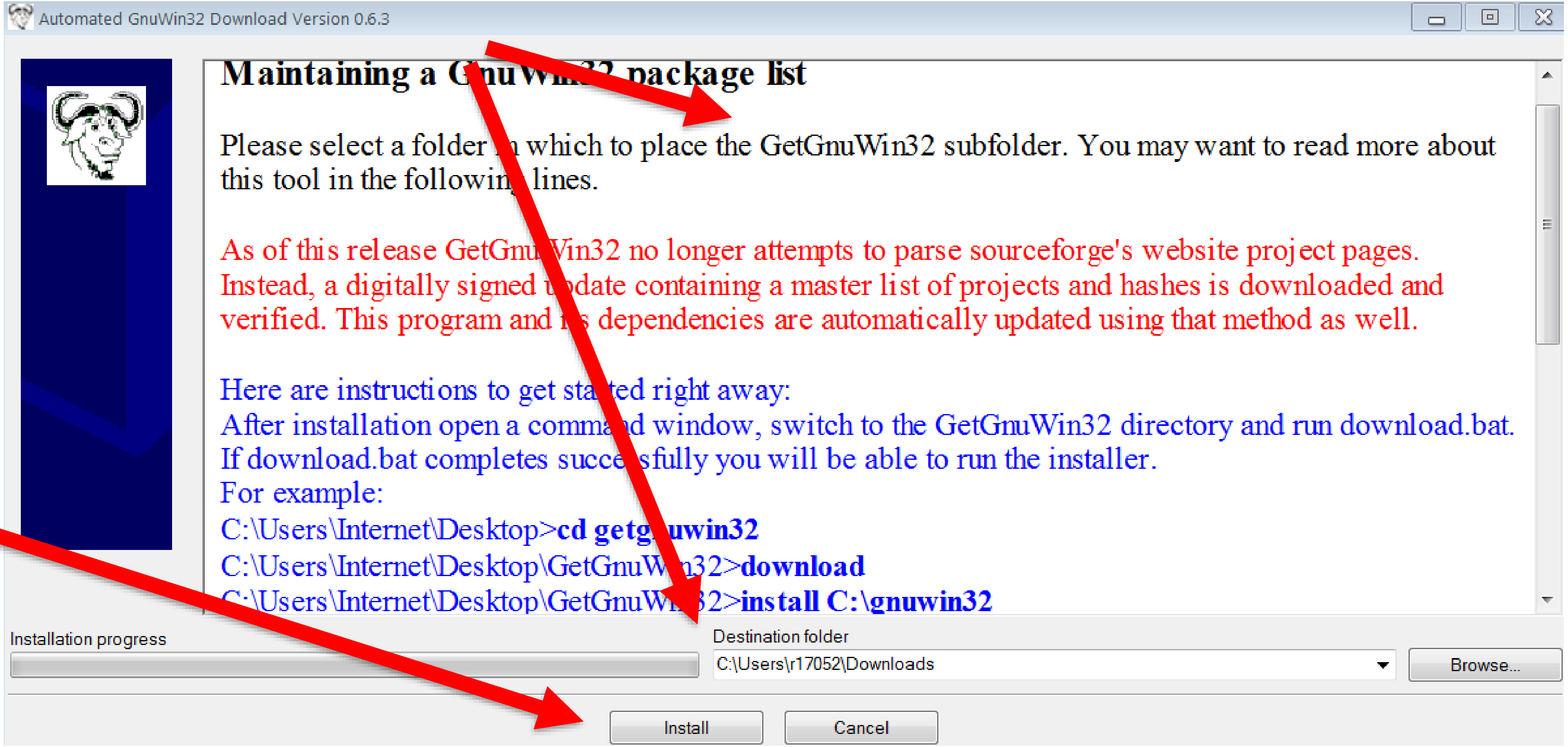
To protect your rights, we need to make restrictions that forbid anyone to deny you these righ
translate to certain responsibilities for you if you distribute copies of the software, or if you m

For example, if you distribute copies of such a program, whether gratis or for a fee, you mus

Make from GnuWin32 5

- If desired, change GetGnuWin subfolder location. (Steve's default folder is shown)

- Click Install
- A subfolder is created called GetGnuWin32



Automated GnuWin32 Download Version 0.6.3

Maintaining a GnuWin32 package list

Please select a folder in which to place the GetGnuWin32 subfolder. You may want to read more about this tool in the following lines.

As of this release GetGnuWin32 no longer attempts to parse sourceforge's website project pages. Instead, a digitally signed update containing a master list of projects and hashes is downloaded and verified. This program and its dependencies are automatically updated using that method as well.

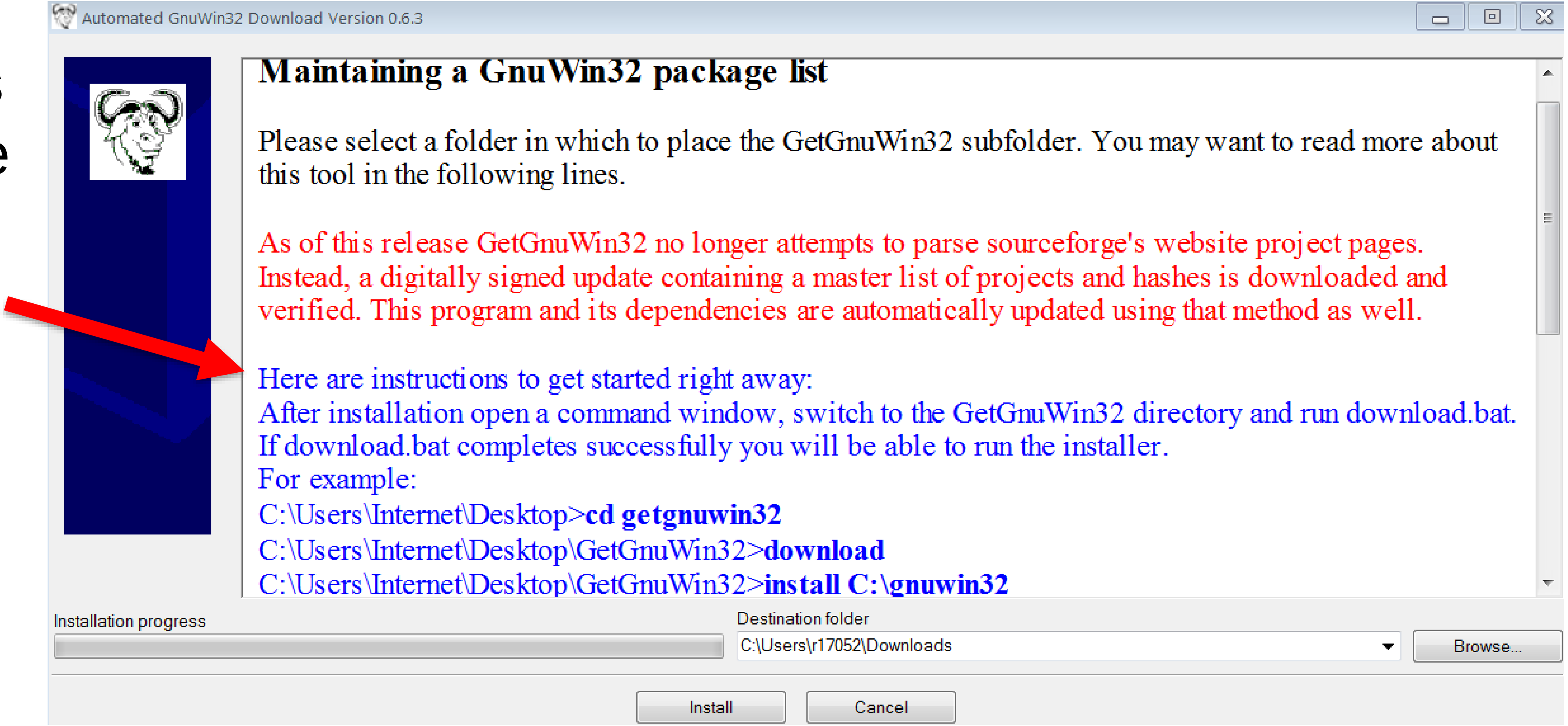
Here are instructions to get started right away:
After installation open a command window, switch to the GetGnuWin32 directory and run download.bat.
If download.bat completes successfully you will be able to run the installer.
For example:

```
C:\Users\Internet\Desktop>cd getgnuwin32
C:\Users\Internet\Desktop\GetGnuWin32>download
C:\Users\Internet\Desktop\GetGnuWin32>install C:\gnuwin32
```

Destination folder: C:\Users\r17052\Downloads

Make from GnuWin32 6

- Follow instructions to complete installation as shown on the following slides



Maintaining a GnuWin32 package list

Please select a folder in which to place the GetGnuWin32 subfolder. You may want to read more about this tool in the following lines.

As of this release GetGnuWin32 no longer attempts to parse sourceforge's website project pages. Instead, a digitally signed update containing a master list of projects and hashes is downloaded and verified. This program and its dependencies are automatically updated using that method as well.

Here are instructions to get started right away:
After installation open a command window, switch to the GetGnuWin32 directory and run download.bat.
If download.bat completes successfully you will be able to run the installer.
For example:

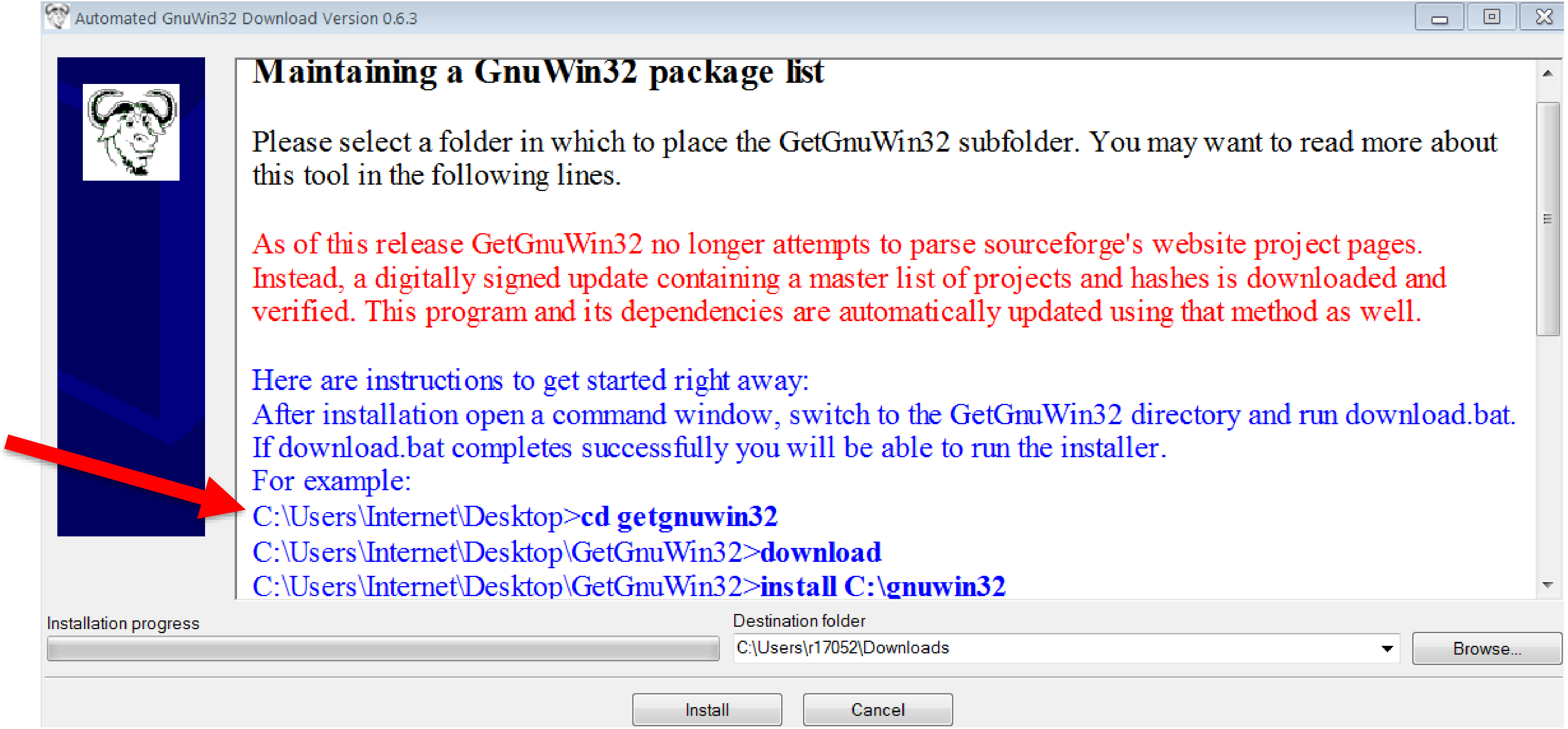
```
C:\Users\Internet\Desktop>cd getgnuwin32
C:\Users\Internet\Desktop\GetGnuWin32>download
C:\Users\Internet\Desktop\GetGnuWin32>install C:\gnuwin32
```

Installation progress

Destination folder: C:\Users\r17052\Downloads

Make from GnuWin32 7

- Change directory to the subfolder created in your download folder



Maintaining a GnuWin32 package list

Please select a folder in which to place the GetGnuWin32 subfolder. You may want to read more about this tool in the following lines.

As of this release GetGnuWin32 no longer attempts to parse sourceforge's website project pages. Instead, a digitally signed update containing a master list of projects and hashes is downloaded and verified. This program and its dependencies are automatically updated using that method as well.

Here are instructions to get started right away:
After installation open a command window, switch to the GetGnuWin32 directory and run download.bat.
If download.bat completes successfully you will be able to run the installer.
For example:

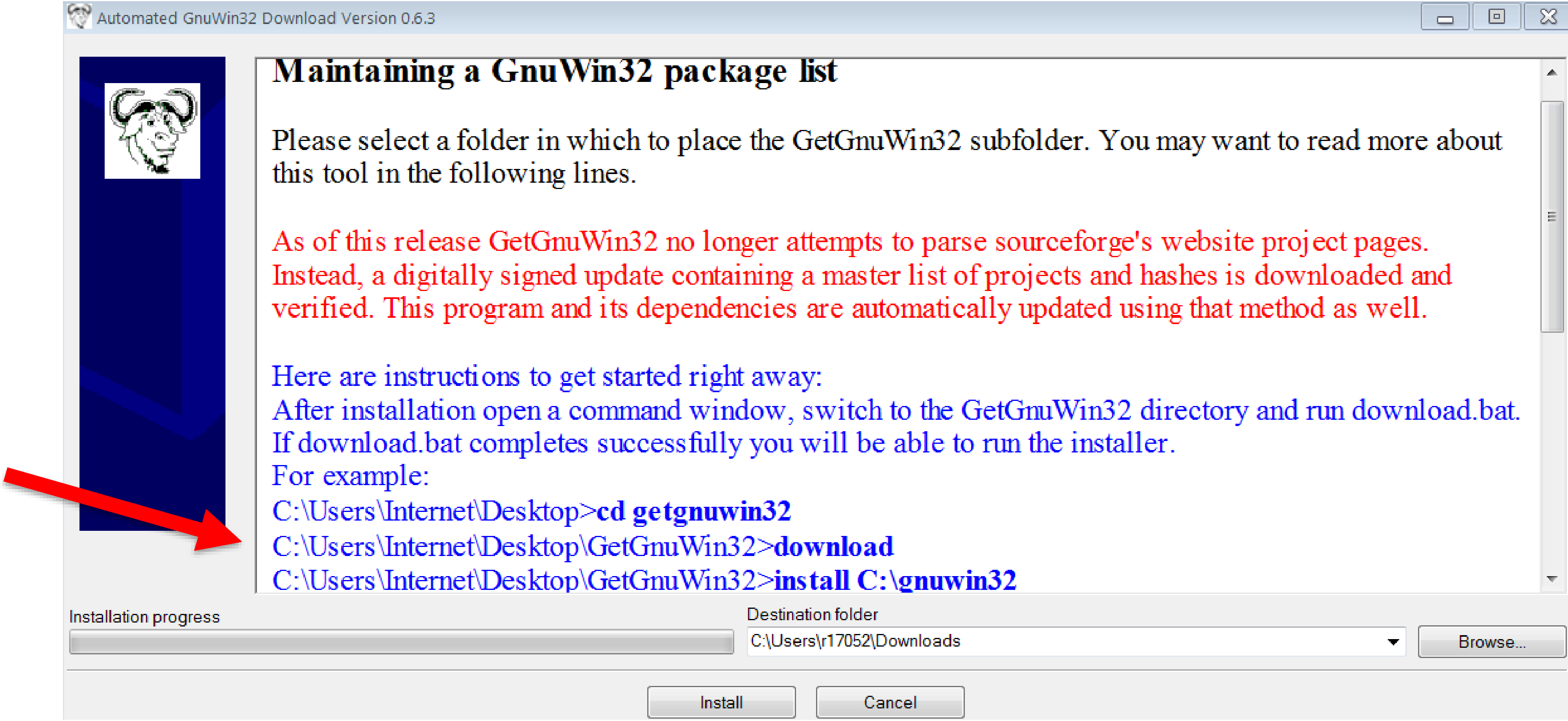
```
C:\Users\Internet\Desktop>cd getgnuwin32
C:\Users\Internet\Desktop\GetGnuWin32>download
C:\Users\Internet\Desktop\GetGnuWin32>install C:\gnuwin32
```

Installation progress

Destination folder: C:\Users\r17052\Downloads

Make from GnuWin32 8

- Run “download”



Maintaining a GnuWin32 package list

Please select a folder in which to place the GetGnuWin32 subfolder. You may want to read more about this tool in the following lines.

As of this release GetGnuWin32 no longer attempts to parse sourceforge's website project pages. Instead, a digitally signed update containing a master list of projects and hashes is downloaded and verified. This program and its dependencies are automatically updated using that method as well.

Here are instructions to get started right away:
After installation open a command window, switch to the GetGnuWin32 directory and run download.bat.
If download.bat completes successfully you will be able to run the installer.
For example:

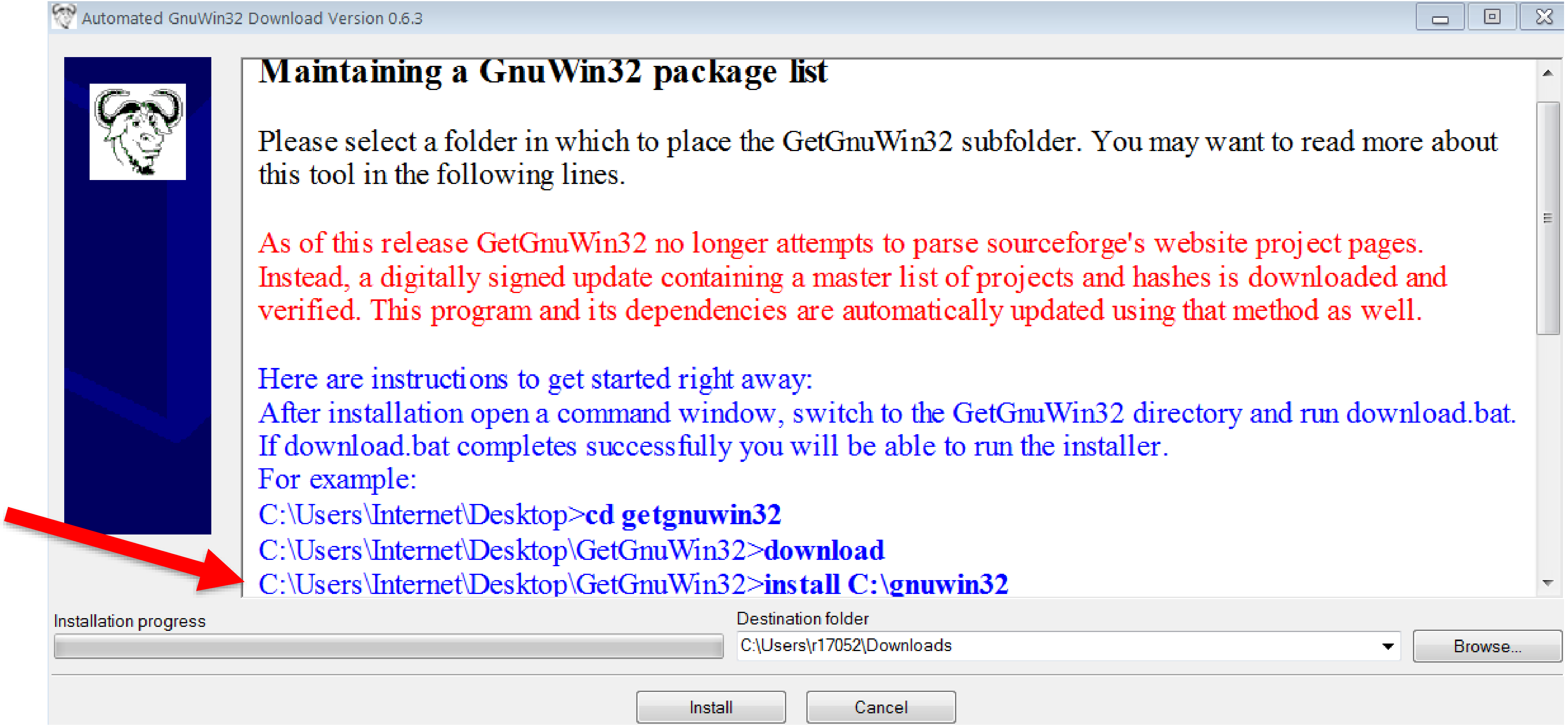
```
C:\Users\Internet\Desktop>cd getgnuwin32
C:\Users\Internet\Desktop\GetGnuWin32>download
C:\Users\Internet\Desktop\GetGnuWin32>install C:\gnuwin32
```

Installation progress

Destination folder: C:\Users\r17052\Downloads

Make from GnuWin32 9

- Run install command with proper path (default shown is fine)



Maintaining a GnuWin32 package list

Please select a folder in which to place the GetGnuWin32 subfolder. You may want to read more about this tool in the following lines.

As of this release GetGnuWin32 no longer attempts to parse sourceforge's website project pages. Instead, a digitally signed update containing a master list of projects and hashes is downloaded and verified. This program and its dependencies are automatically updated using that method as well.

Here are instructions to get started right away:
After installation open a command window, switch to the GetGnuWin32 directory and run download.bat.
If download.bat completes successfully you will be able to run the installer.
For example:

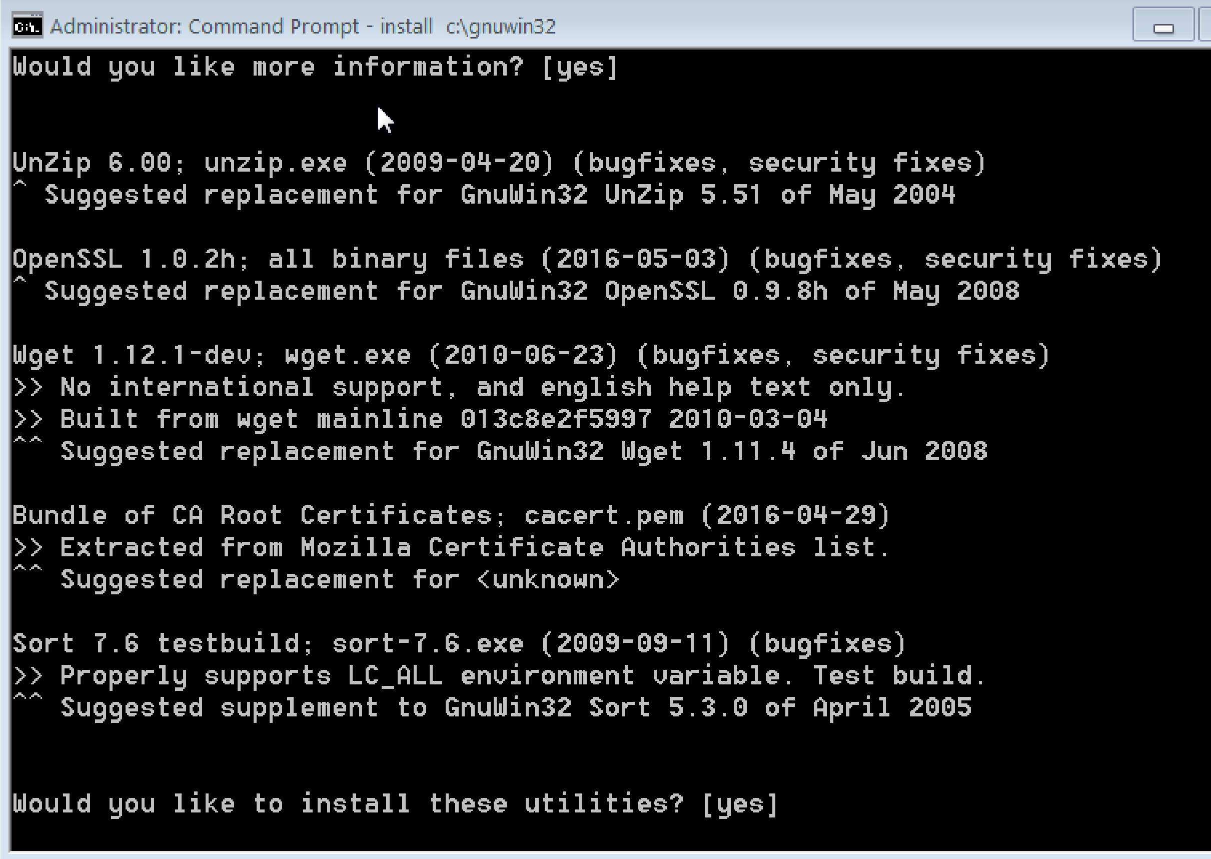
```
C:\Users\Internet\Desktop>cd getgnuwin32
C:\Users\Internet\Desktop\GetGnuWin32>download
C:\Users\Internet\Desktop\GetGnuWin32>install C:\gnuwin32
```

Destination folder: C:\Users\r17052\Downloads

Make from GnuWin32 10

- During installation you may get a message that utilities are outdated, and given the opportunity to update.
  - IMPORTANT: Hit return for every prompt --
    anything else may cancel installation

- The make utilities by default will be in:
  C:\gnuwin32\bin

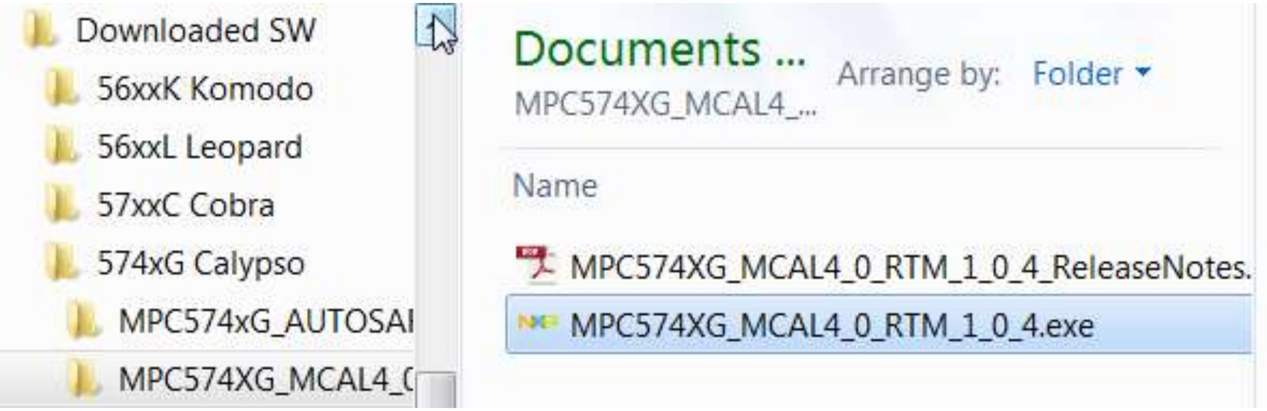


```
Would you like more information? [yes]


UnZip 6.00; unzip.exe (2009-04-20) (bugfixes, security fixes)
^ Suggested replacement for GnuWin32 UnZip 5.51 of May 2004

OpenSSL 1.0.2h; all binary files (2016-05-03) (bugfixes, security fixes)
^ Suggested replacement for GnuWin32 OpenSSL 0.9.8h of May 2008

Wget 1.12.1-dev; wget.exe (2010-06-23) (bugfixes, security fixes)
>> No international support, and english help text only.
>> Built from wget mainline 013c8e2f5997 2010-03-04
^^ Suggested replacement for GnuWin32 Wget 1.11.4 of Jun 2008

Bundle of CA Root Certificates; cacert.pem (2016-04-29)
>> Extracted from Mozilla Certificate Authorities list.
^^ Suggested replacement for <unknown>

Sort 7.6 testbuild; sort-7.6.exe (2009-09-11) (bugfixes)
>> Properly supports LC_ALL environment variable. Test build.
^^ Suggested supplement to GnuWin32 Sort 5.3.0 of April 2005


Would you like to install these utilities? [yes]
```

5. Install MCAL (and/or) OS

Install MCAL or OS Software 1

- If you plan to use MCAL, just install MCAL.
  - If you also plan to use OS, then install OS also.
- Double click on the installation SW that you downloaded.
  - Example organization of download folders

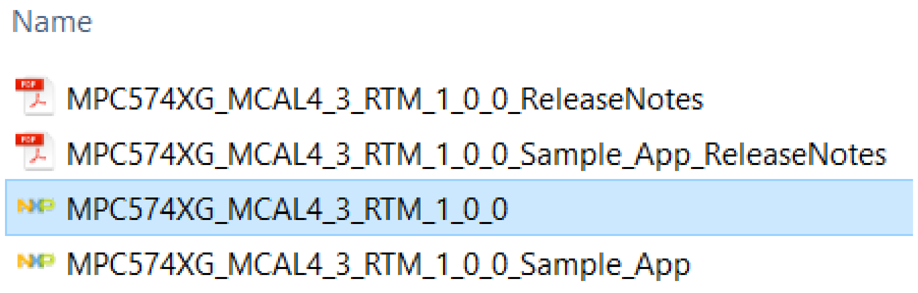


Downloaded SW
- 56xxK Komodo
- 56xxL Leopard
- 57xxC Cobra
- 574xG Calypso
  - MPC574xG_AUTOSAI
  - MPC574XG_MCAL4_(

Documents ...
MPC574XG_MCAL4_...
Arrange by: Folder

Name
- MPC574XG_MCAL4_0_RTM_1_0_4_ReleaseNotes.
- MPC574XG_MCAL4_0_RTM_1_0_4.exe

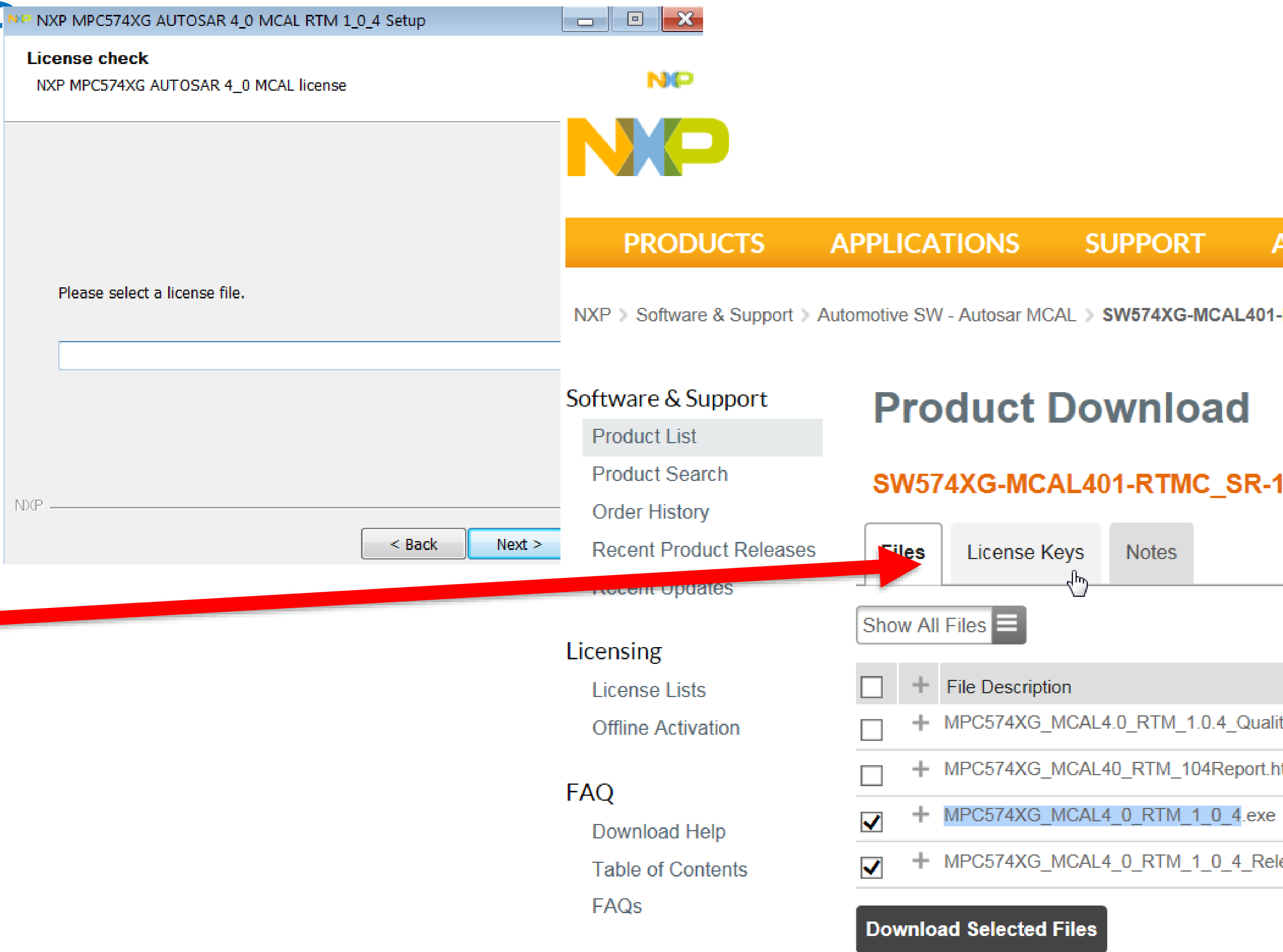
- Note: some versions have an installation for MCAL and an installation for the MCAL sample application. Both need to be installed.



Name
- MPC574XG_MCAL4_3_RTM_1_0_0_ReleaseNotes
- MPC574XG_MCAL4_3_RTM_1_0_0_Sample_App_ReleaseNotes
- MPC574XG_MCAL4_3_RTM_1_0_0
- MPC574XG_MCAL4_3_RTM_1_0_0_Sample_App

Install MCAL or OS Software 3

- A license file is needed. Go back to Product Download Page and click on License Keys tab.
  (If logged off, go to nxp.com & sign in ACCOUNT, then click, e.g.:
  Software Support and Licensing →
  Automotive SW – Autosar MCAL→
  Automotive SW – Autosar MCAL→
  SW574xG-MCAL401-RTMC_SR 1.0.4 → I agree)
- Click on License Keys tab



NXP MPC574XG AUTOSAR 4_0 MCAL RTM 1_0_4 Setup

License check

NXP MPC574XG AUTOSAR 4_0 MCAL license

Please select a license file.

NXP > Software & Support > Automotive SW - Autosar MCAL > SW574XG-MCAL401-

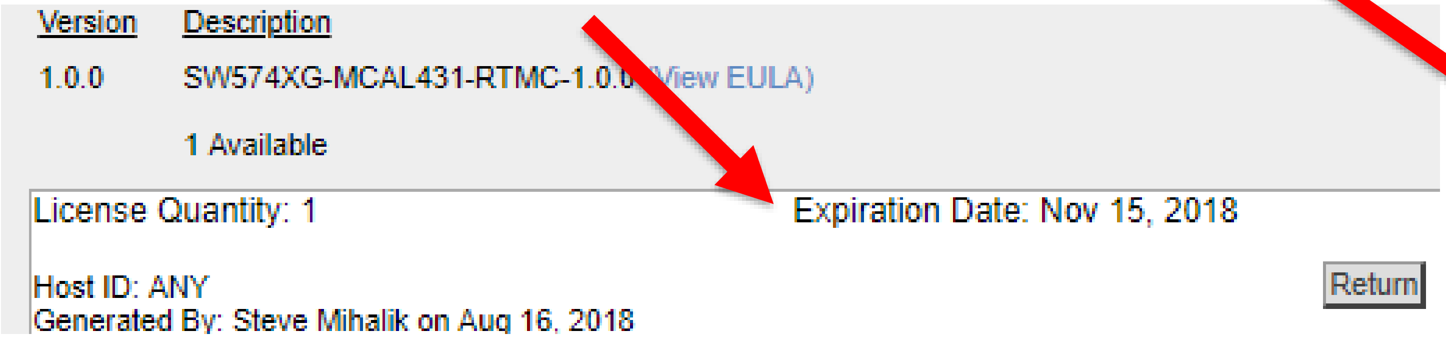
Product Download

SW574XG-MCAL401-RTMC_SR-1

☐	+	File Description
☐	+	MPC574XG_MCAL4.0_RTM_1.0.4_Qualit
☐	+	MPC574XG_MCAL40_RTM_104Report.ht
☑	+	MPC574XG_MCAL4_0_RTM_1_0_4.exe
☑	+	MPC574XG_MCAL4_0_RTM_1_0_4_Rele

Install MCAL or OS Software 4

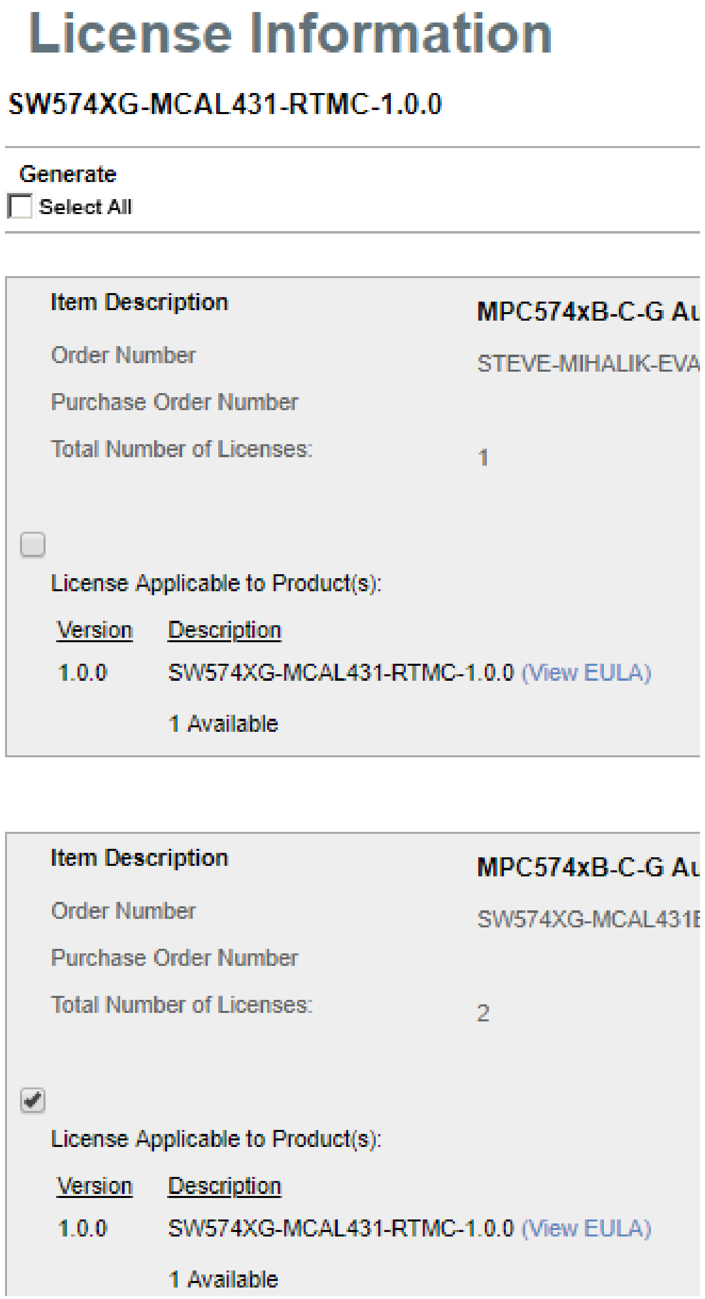
- If more than one license is shown, find the one that shows an expiration date that is in the future by checking the displayed Expiration Date after generating. Example:
  - Click on one license check box
  - Click on Generate Generate
  - View expiration date (licenses cannot be generated after expiration date!)



Version Description
1.0.0 SW574XG-MCAL431-RTMC-1.0.0 (View EULA)
1 Available

License Quantity: 1 Expiration Date: Nov 15, 2018

Host ID: ANY
Generated By: Steve Mihalik on Aug 16, 2018



License Information

SW574XG-MCAL431-RTMC-1.0.0

Generate
□ Select All

Item Description	MPC574xB-C-G Au
Order Number	STEVE-MIHALIK-EVA
Purchase Order Number	
Total Number of Licenses:	1

□

License Applicable to Product(s):

Version	Description
1.0.0	SW574XG-MCAL431-RTMC-1.0.0 (View EULA) 1 Available

Item Description	MPC574xB-C-G Au
Order Number	SW574XG-MCAL431E
Purchase Order Number	
Total Number of Licenses:	2

☑

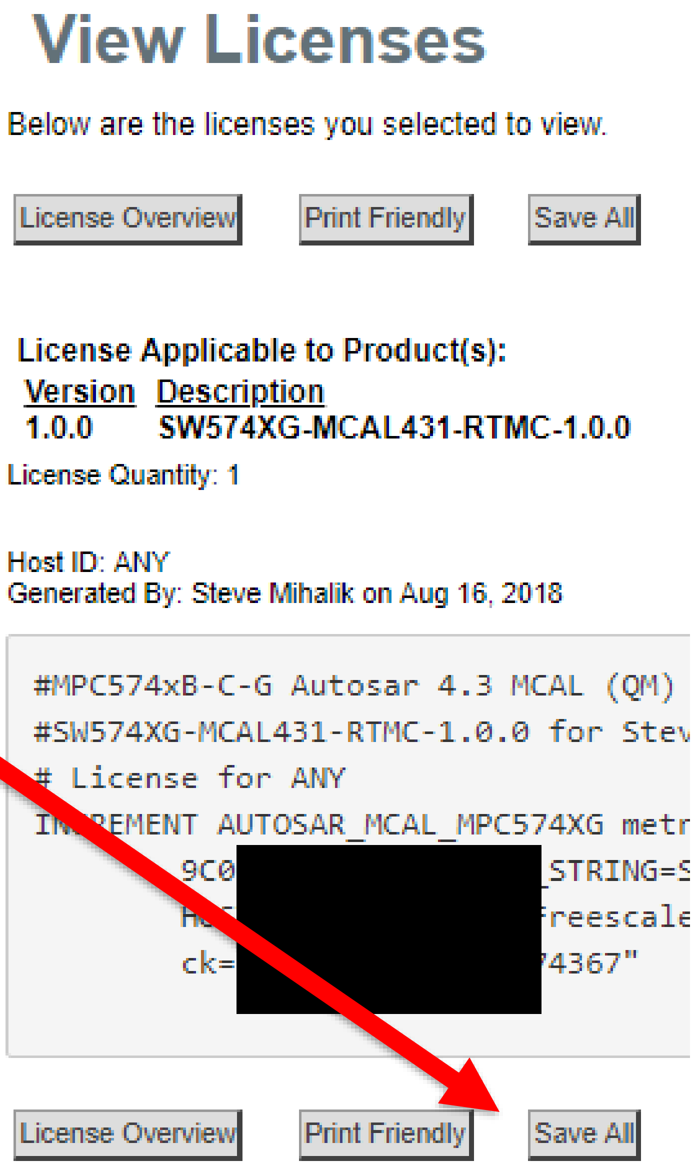
License Applicable to Product(s):

Version	Description
1.0.0	SW574XG-MCAL431-RTMC-1.0.0 (View EULA) 1 Available

Install MCAL or OS Software 5

- Click “Save All”

- Save generated license to a file. Suggestions:
  - Provide a common license folder. Example
    C:/NXP/AUTOSAR/licenses
  - Choose a name with identification and .dat extension. Example:
    license_MPC574xG_MCAL4_3.dat



View Licenses

Below are the licenses you selected to view.

License Applicable to Product(s):

Version	Description
1.0.0	SW574XG-MCAL431-RTMC-1.0.0

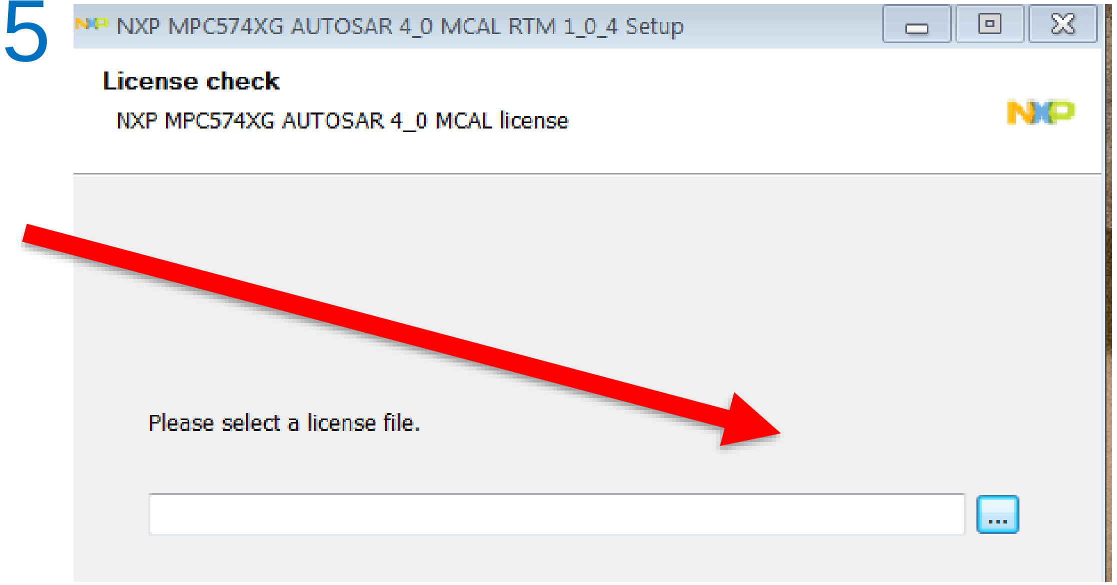
License Quantity: 1

Host ID: ANY
Generated By: Steve Mihalik on Aug 16, 2018

```
#MPC574xB-C-G Autosar 4.3 MCAL (QM)
#SW574XG-MCAL431-RTMC-1.0.0 for Stev
# License for ANY
INCREMENT AUTOSAR_MCAL_MPC574XG metr
        9C0[redacted]_STRING=S
        H       freescale
        ck=       4367"
```

Install MCAL or OS Software 5

- Go back to the MCAL installation program and click on the navigate button to locate your license file



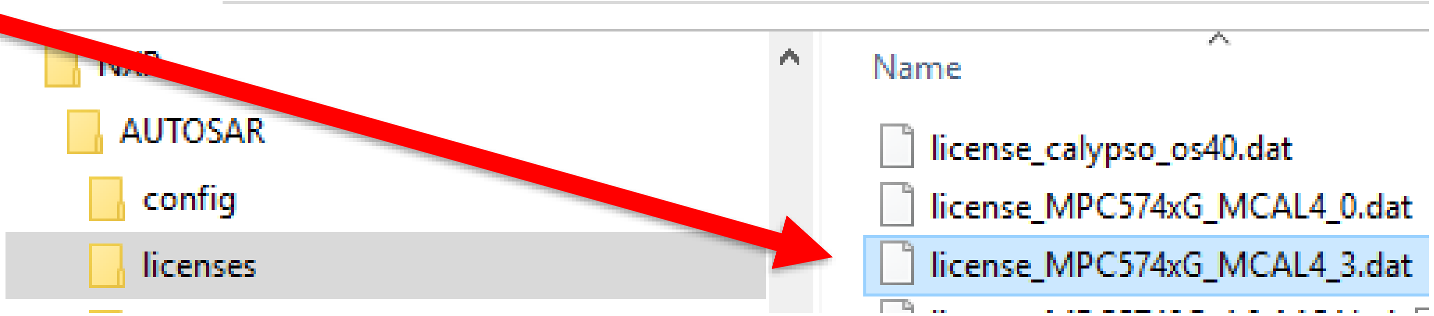
NXP MPC574XG AUTOSAR 4_0 MCAL RTM 1_0_4 Setup

License check

NXP MPC574XG AUTOSAR 4_0 MCAL license

Please select a license file.

- Select your license file



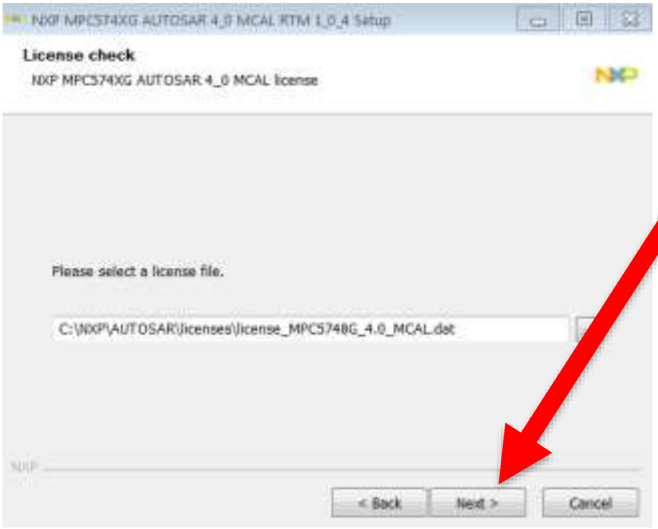
NXP
AUTOSAR
config
licenses

Name

license_calypso_os40.dat
license_MPC574xG_MCAL4_0.dat
license_MPC574xG_MCAL4_3.dat

- Click on “Open”

Install MCAL or OS Software 6



NXP MPC574XG AUTOSAR 4_0 MCAL RTM 1_0_4 Setup

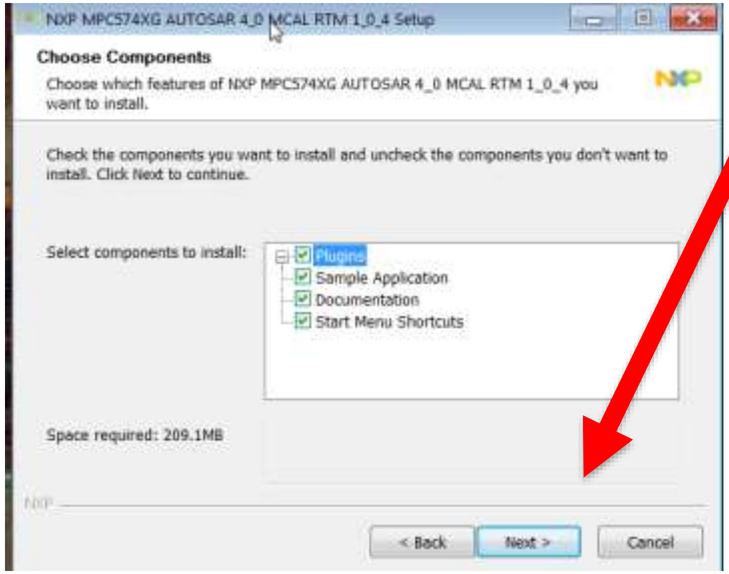
License check

NXP MPC574XG AUTOSAR 4_0 MCAL license

Please select a license file.

C:\NXP\AUTOSAR\licenses\license_MPC5748G_4.0_MCAL.dat

- Click Next



NXP MPC574XG AUTOSAR 4_0 MCAL RTM 1_0_4 Setup

Choose Components

Choose which features of NXP MPC574XG AUTOSAR 4_0 MCAL RTM 1_0_4 you want to install.

Check the components you want to install and uncheck the components you don't want to install. Click Next to continue.

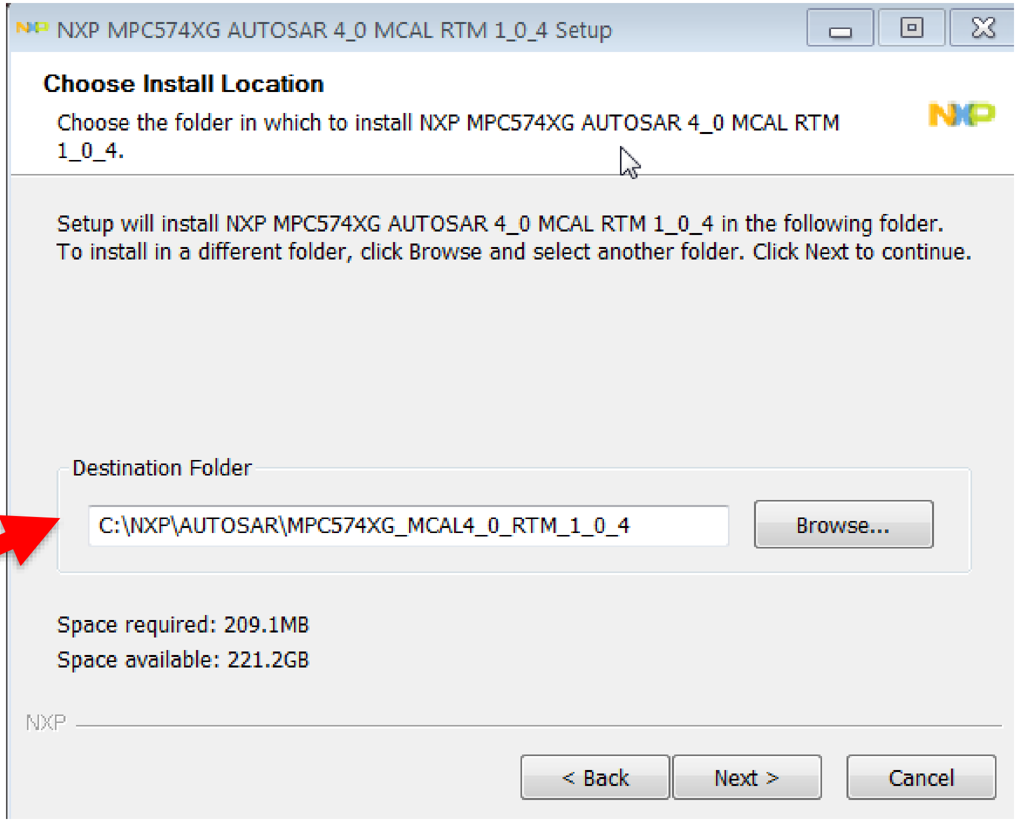
Select components to install:

- ☑ Plugins
  - ☑ Sample Application
  - ☑ Documentation
  - ☑ Start Menu Shortcuts

Space required: 209.1MB

- Click Next to install selected components

- Chose destination folder (default shown) and click Next



NXP MPC574XG AUTOSAR 4_0 MCAL RTM 1_0_4 Setup

Choose Install Location

Choose the folder in which to install NXP MPC574XG AUTOSAR 4_0 MCAL RTM 1_0_4.

Setup will install NXP MPC574XG AUTOSAR 4_0 MCAL RTM 1_0_4 in the following folder. To install in a different folder, click Browse and select another folder. Click Next to continue.

Destination Folder

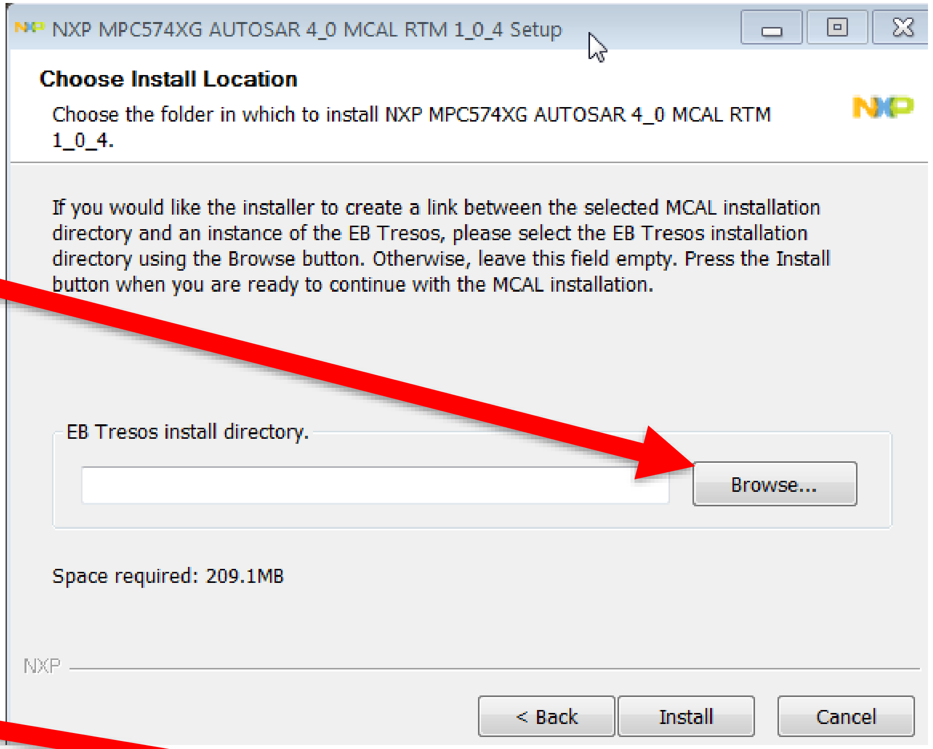
C:\NXP\AUTOSAR\MPC574XG_MCAL4_0_RTM_1_0_4

Space required: 209.1MB

Space available: 221.2GB

MCAL Installation only – specify path 7a

- EB Tresos install directory: Click to location where Tresos is installed
- Select proper Tresos directory **(If you have multiple“Tresos” folders, select the right one!)**
- Click OK
- Click Install
- When done, click Finish



NXP MPC574XG AUTOSAR 4_0 MCAL RTM 1_0_4 Setup

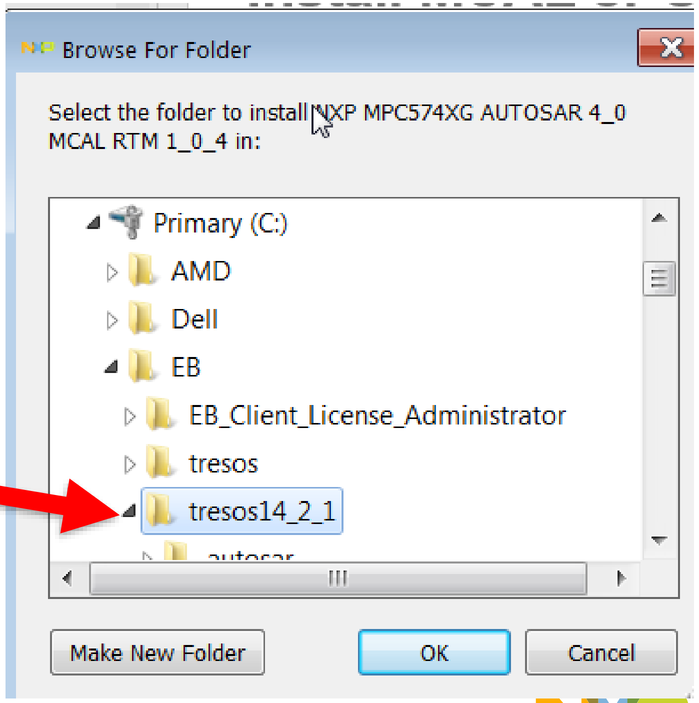
Choose Install Location

Choose the folder in which to install NXP MPC574XG AUTOSAR 4_0 MCAL RTM 1_0_4.

If you would like the installer to create a link between the selected MCAL installation directory and an instance of the EB Tresos, please select the EB Tresos installation directory using the Browse button. Otherwise, leave this field empty. Press the Install button when you are ready to continue with the MCAL installation.

EB Tresos install directory.

Space required: 209.1MB

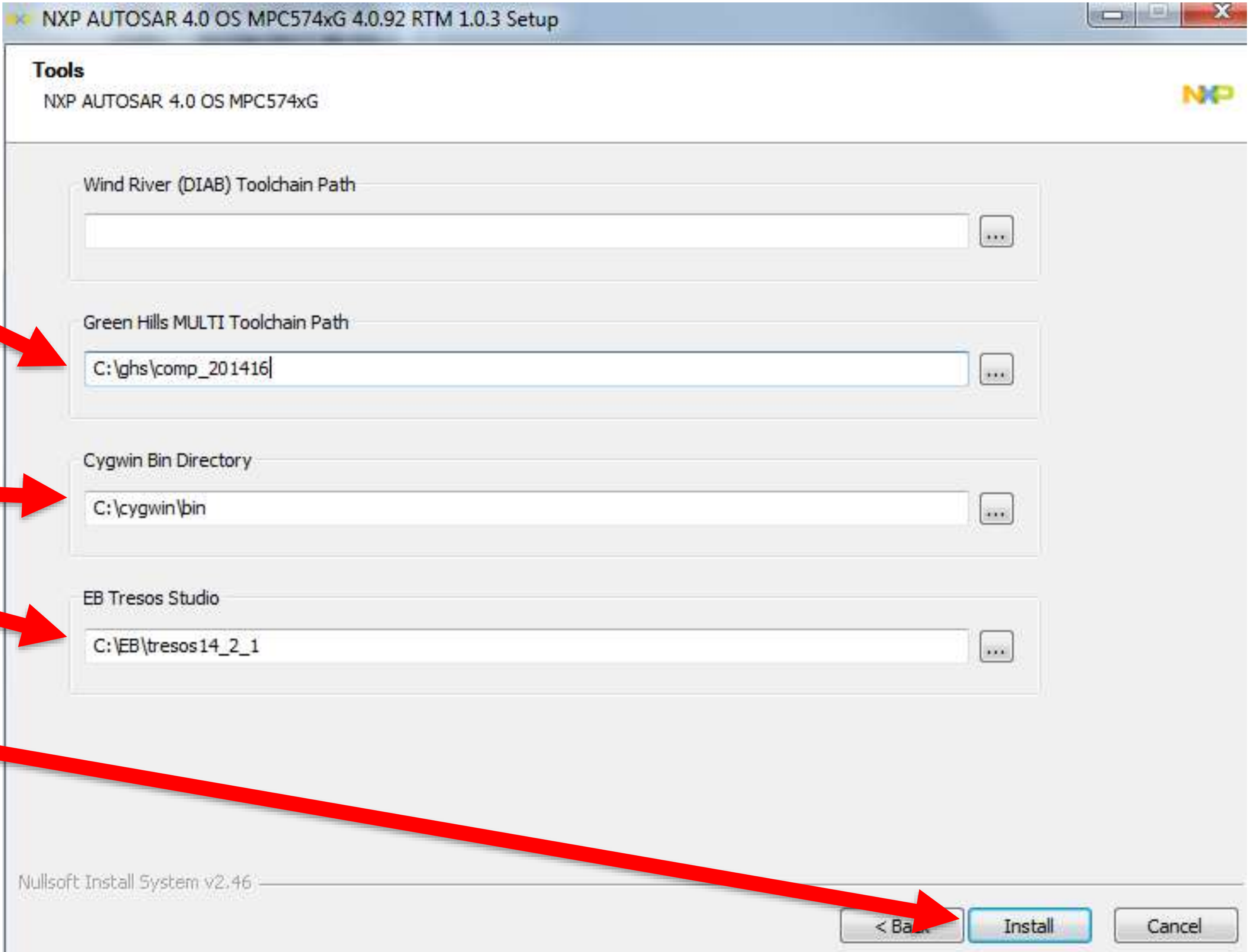


Browse For Folder

Select the folder to install NXP MPC574XG AUTOSAR 4_0 MCAL RTM 1_0_4 in:

OS Installation only – specify paths 7b

- Browse to and specify required paths. Example:
- GHS 201416 is recommended (it was validated with this version)
- Cygwin is required if using OS Sample Application from OS installation
- Tresos path is mandatory
- Click Install
- Click Finish when done



NXP AUTOSAR 4.0 OS MPC574xG 4.0.92 RTM 1.0.3 Setup

Tools

NXP AUTOSAR 4.0 OS MPC574xG

Wind River (DIAB) Toolchain Path:

Green Hills MULTI Toolchain Path: C:\ghs\comp_201416

Cygwin Bin Directory: C:\cygwin\bin

EB Tresos Studio: C:\EB\tresos14_2_1

Nullsoft Install System v2.46

AUTOSAR OS

- If the OS is to be installed, repeat prior installation steps for OS

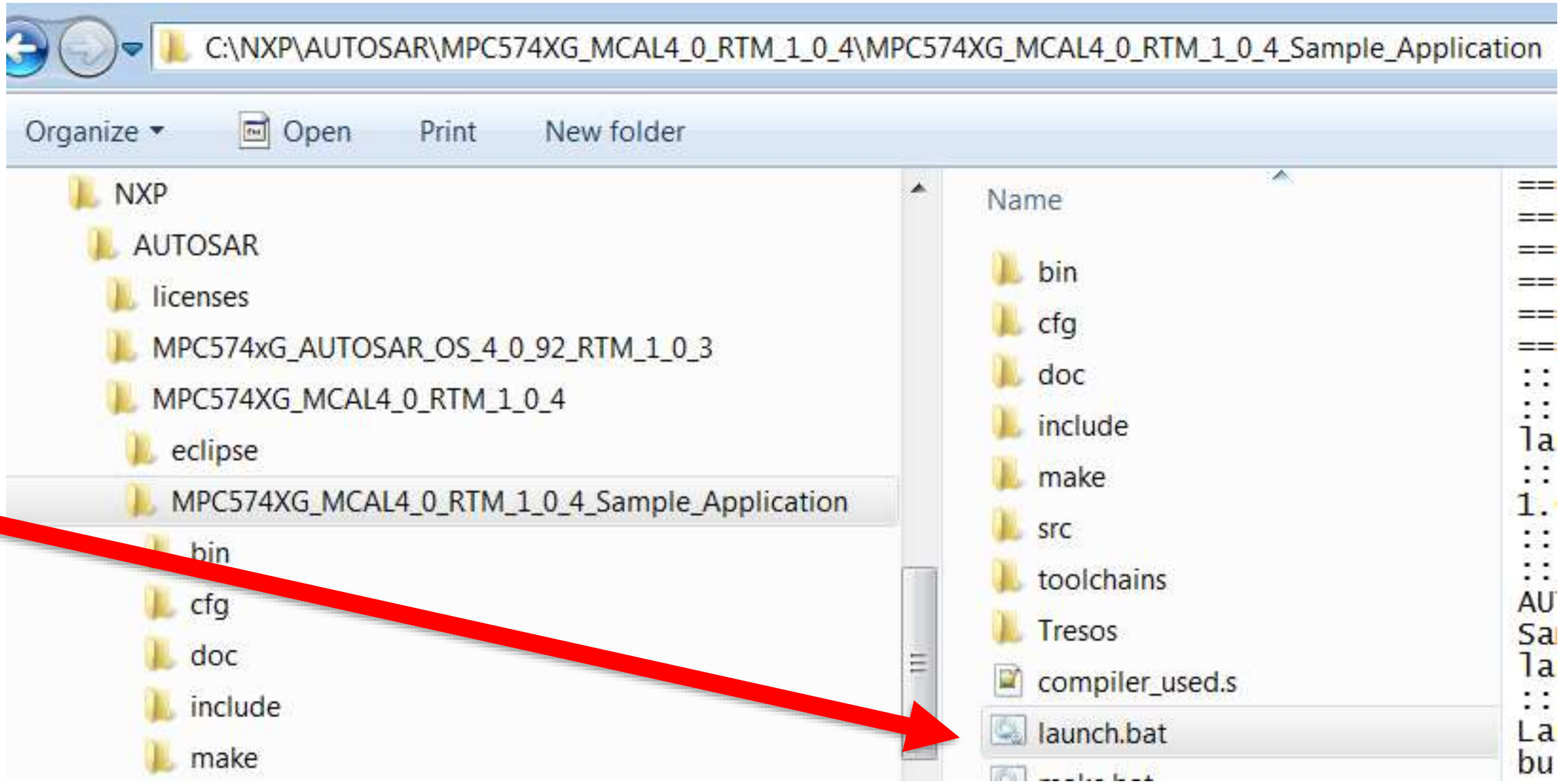
6. Sample Application Installation & build Configuration

6A. Sample Application Installation & Configuration MPC574xG MCAL 4.0

MCAL 4.0: Edit sample application launch.bat 1

- Edit the launch.bat file in MCAL’s sample application file to provide proper paths for your PC.

- The launch.bat location will be in the sample application folder



C:\NXP\AUTOSAR\MPC574XG_MCAL4_0_RTM_1_0_4\MPC574XG_MCAL4_0_RTM_1_0_4_Sample_Application

MCAL 4.0: Edit sample application launch.bat 2

```
::TRESOS
SET TRESOS_DIR=C:\EB\tresos14_2_1
::GHS (recommend comp_201416 since MCAL and OS ver 4.0 were tested with it)
SET GHS_DIR=C:\ghs\comp_201714
::DIAB
::SET DIAB_DIR=C:/Tools/WindRiver/diab/5.9.4.8
::Path to the plugins folder
SET PLUGINS_DIR=C:\NXP\AUTOSAR\MPC574XG_MCAL4_0_RTM_1_0_4\eclipse\plugins
SET MAKE_DIR=C:\gnuwin32
::SSC is required when OS is used
::SSC can still be defined if OS is not installed or not defined at all
SET SSC_ROOT=C:\NXP\AUTOSAR\MPC574xG_AUTOSAR_OS_4_0_92_RTM_1_0_3
```

Example launch.bat changes for NXP S32 Design Studio (gcc like)

- Change MAKE_DIR path:

  SET MAKE_DIR=c:/NXP/S32DS_ARM_v2018.R1/utils/msys32/usr

- Change compiler path:

  SET LINARO_DIR=C:\NXP\S32DS_ARM_v2018.R1\Cross_Tools\gcc-6.3-arm32-eabi

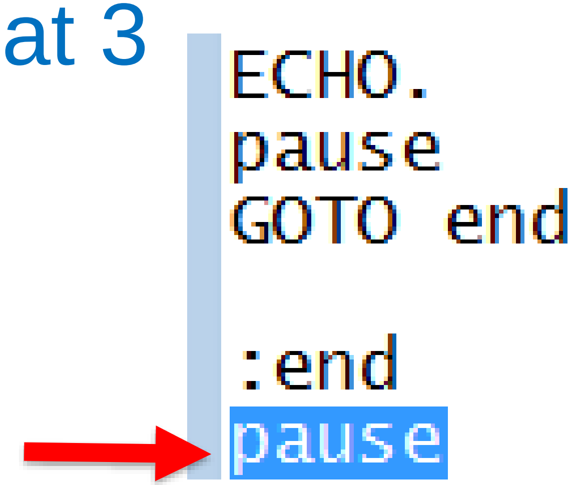
- Invoke launch.bat with a non-default tool chain. Example: using TOOLchain=linaro. Either:
  - Enter from DOS command prompt

    launch.bat TOOLCHAIN=linaro
  - Or create new file with a name like launch_linaro.bat which includes one line:

    launch.bat TOOLCHAIN=linaro

MCAL 4.0: Edit sample application launch.bat 3

- **TIP:** Add a **pause** command at the very end of the launch.bat file:



```
ECHO.
pause
GOTO end

:end
pause
```

  - Now when you can use launch.bat by double clicking on it from a Windows browser. The batch file executes but after completion it does not automatically immediately exit back to windows. The pause command allows you to see if the make file worked or had errors.

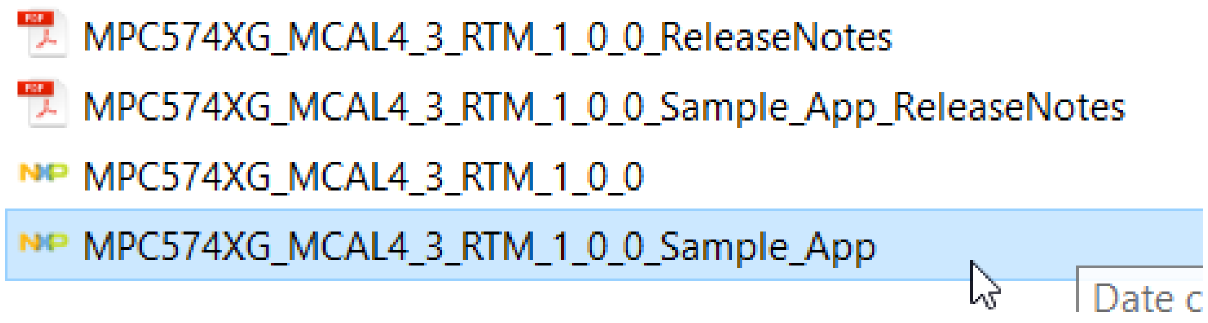
  - Note: GHS is the default compiler. If you use a different compiler you must invoke launch.bat a compiler option. Example for WindRiver compiler:

    launch.bat TOOLCHAIN=diab

6b. Sample Application Installation & Configuration MPC574xG MCAL 4.3

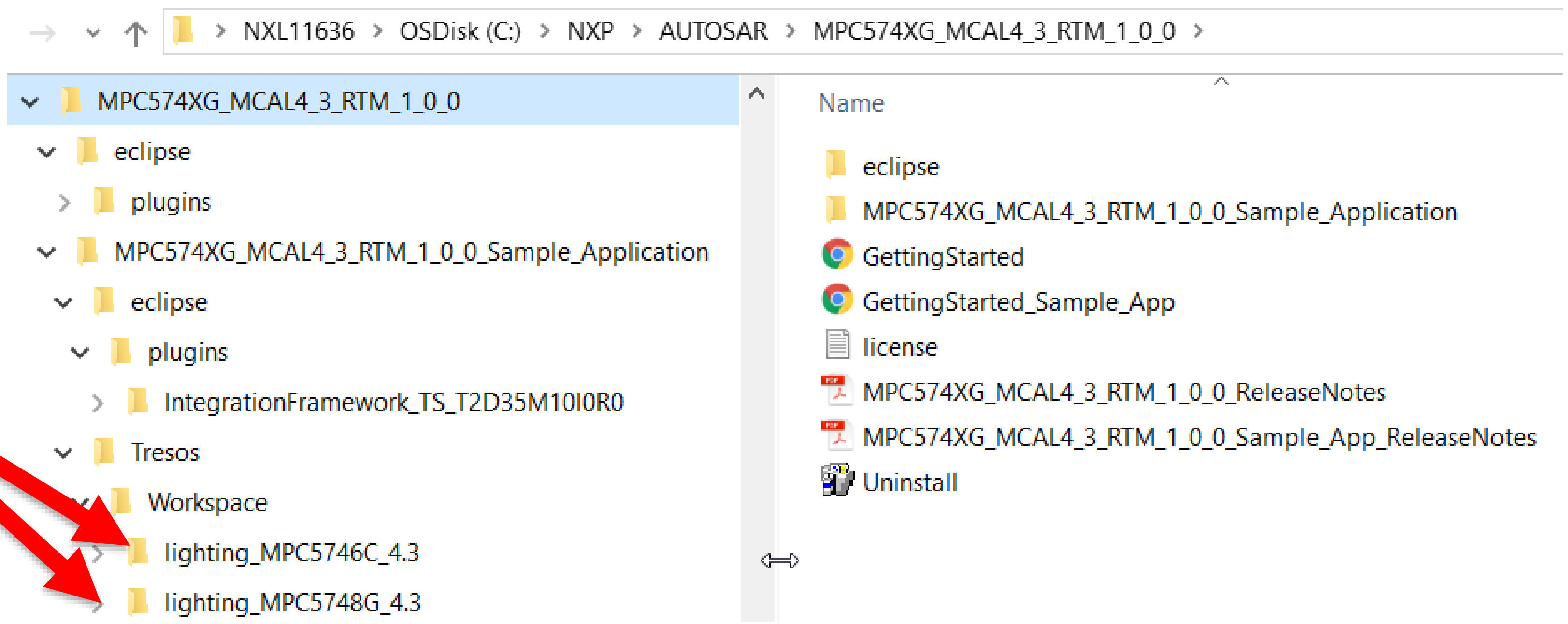
MCAL 4.3: Separate Sample Application Installation

- MCAL 4.3 downloaded software has a separate sample application installation, repeat prior installation steps for it
  - Example of separate installation:



MPC574XG_MCAL4_3_RTM_1_0_0_ReleaseNotes
MPC574XG_MCAL4_3_RTM_1_0_0_Sample_App_ReleaseNotes
MPC574XG_MCAL4_3_RTM_1_0_0
MPC574XG_MCAL4_3_RTM_1_0_0_Sample_App
Date c

- Example of completed installation of MCAL and sample application.
  - Note Tresos workspaces for different chip versions



NXL11636 › OSDisk (C:) › NXP › AUTOSAR › MPC574XG_MCAL4_3_RTM_1_0_0 ›

MPC574XG_MCAL4_3_RTM_1_0_0
- eclipse
  - plugins
- MPC574XG_MCAL4_3_RTM_1_0_0_Sample_Application
  - eclipse
    - plugins
      - IntegrationFramework_TS_T2D35M10I0R0
  - Tresos
    - Workspace
      - lighting_MPC5746C_4.3
      - lighting_MPC5748G_4.3

Name
eclipse
MPC574XG_MCAL4_3_RTM_1_0_0_Sample_Application
GettingStarted
GettingStarted_Sample_App
license
MPC574XG_MCAL4_3_RTM_1_0_0_ReleaseNotes
MPC574XG_MCAL4_3_RTM_1_0_0_Sample_App_ReleaseNotes
Uninstall

MCAL 4.3: MPC574xG Sample Application Initial Structure

Sample Application Package plugin folder

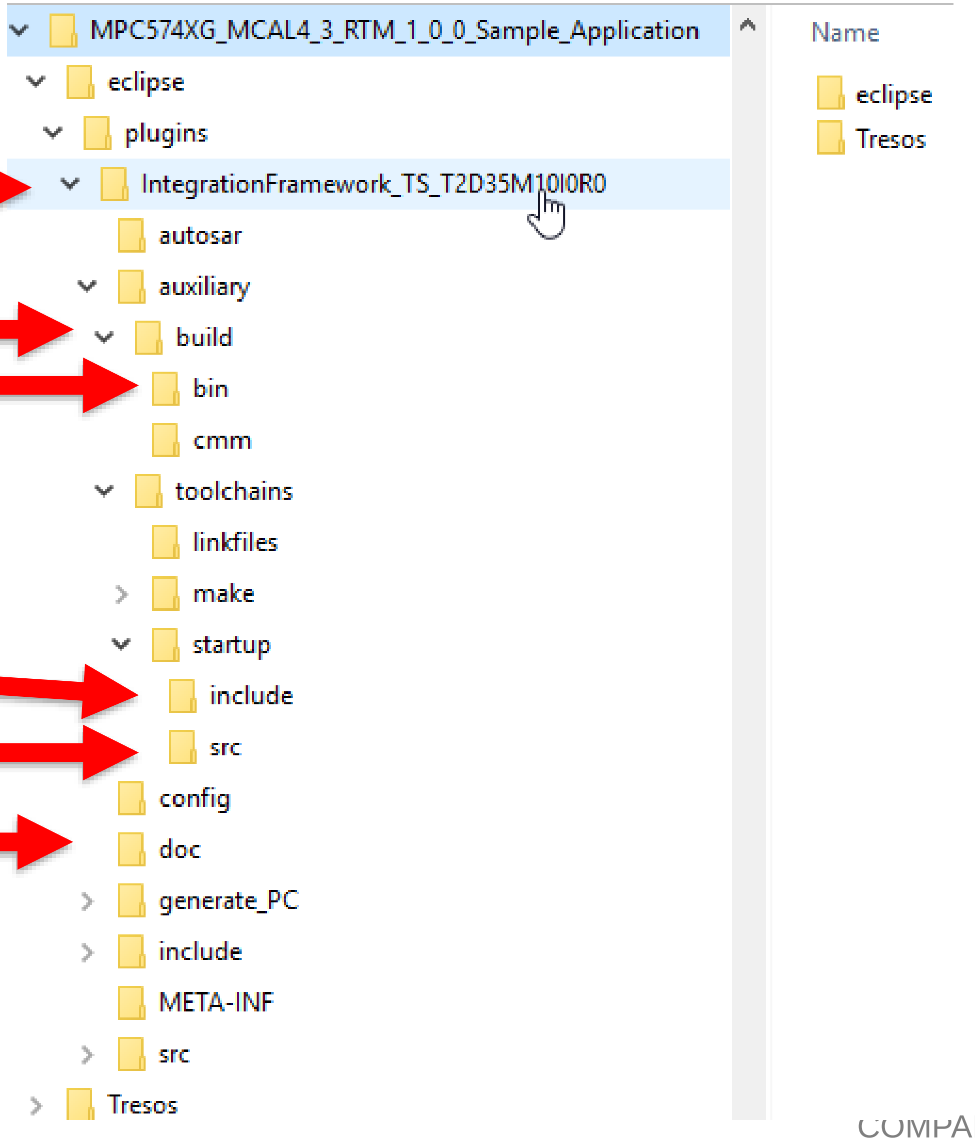
launch.bat

compiled output

Chip header files

Application code

Documentation



```
MPC574XG_MCAL4_3_RTM_1_0_0_Sample_Application
  eclipse
    plugins
      IntegrationFramework_TS_T2D35M10I0R0
        autosar
        auxiliary
          build
            bin
            cmm
          toolchains
            linkfiles
            make
          startup
            include
            src
        config
        doc
        generate_PC
        include
        META-INF
        src
  Tresos
```

```
Name
eclipse
Tresos
```

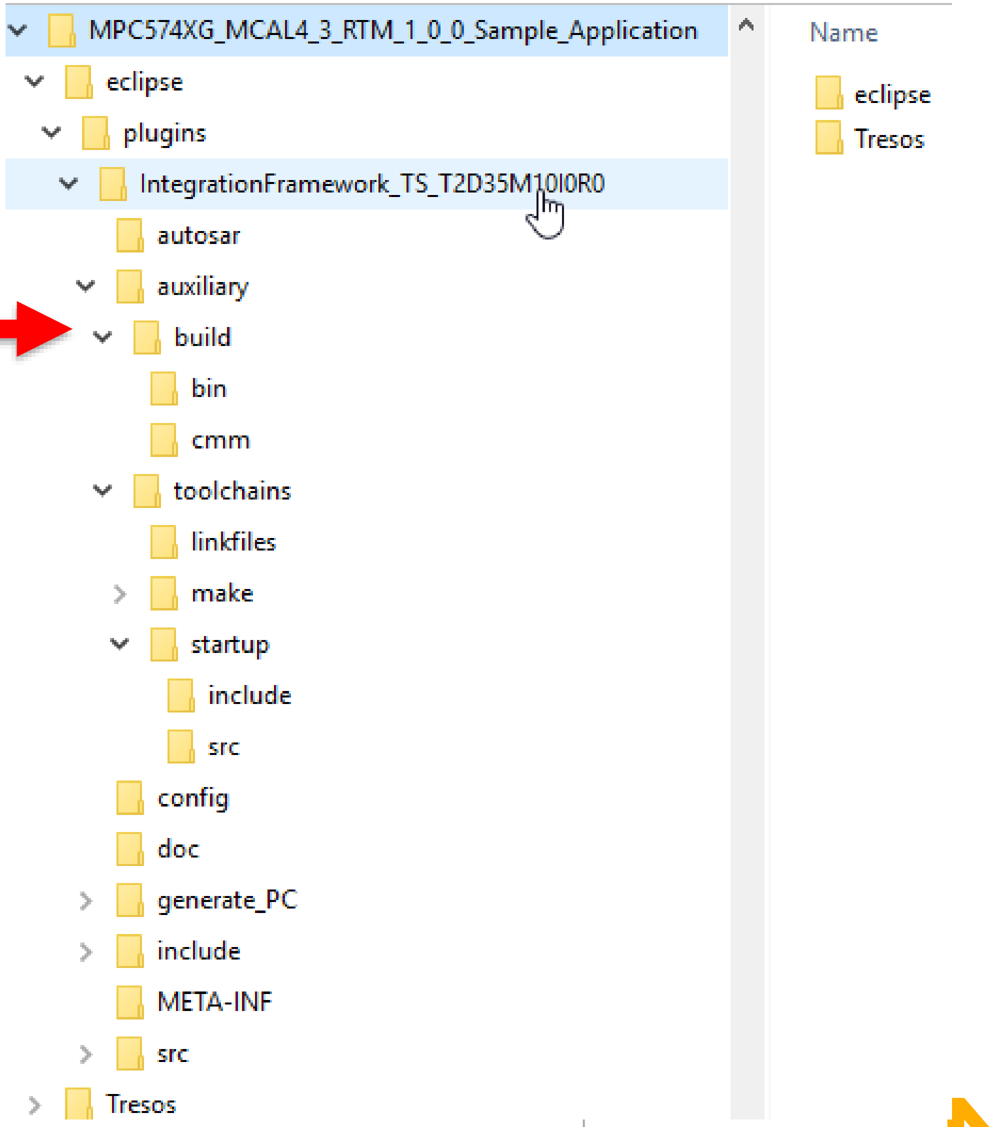
MCAL 4.3: Edit sample application launch.bat 1

The sample application includes a batch file to build the application.

It must be modified for your paths

- Open launch.bat in the build folder
- Modify path names for your PC (see example on next slide)

launch.bat



MCAL 4.3: Edit sample application launch.bat 2

- Example launch.bat with modified path names and using Green Hills compiler:

```
::TRESOS
SET TRESOS_DIR=C:\EB\tresos24_0_0
::GHS
SET GHS_DIR=C:\ghs\comp_201754
::DIAB
::SET DIAB_DIR=C:/Tools/WindRiver/diab/5.9.4.8
::SET LINARO_DIR
SET PLUGINS_DIR=C:\NXP\AUTOSAR\MPC574XG_MCAL4_3_RTM_1_0_0\eclipse\plugins
SET MAKE_DIR=C:\gnuwin32
::SSC is required when OS is used
::SSC can still be defined if OS is not installed or not defined at all
SET SSC_ROOT=C:\NXP\AUTOSAR\MPC574xG_AUTOSAR_OS_4_0_92_RTM_1_0_3
SET TRESOS_WORKSPACE_DIR= C:\EB\tresos24_0_0\workspace\MPC574XG_MCAL4_3_RTM_1_0_0_Sample_Ap\output
```

Note: this folder name will change for each Tresos project

Example changes when using NXP S32 Design Studio (gcc like)

- Modify make\linaro\build_cfg.mak file by adding the last LDOPT line (in red):

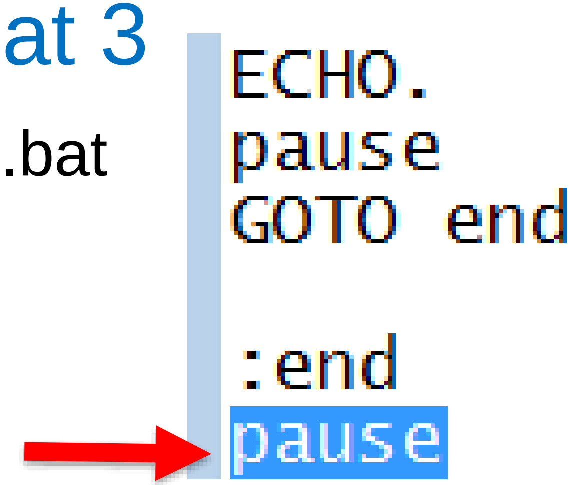
```
 LDOPT           :=  -mcpu=cortex-m4 \
                 -msoft-float \
                  -mthumb \
                  -e _start \
                  -nostartfiles  -static -lc -lm -lgcc -lnosys \
                  --sysroot=$(LINARO_DIR)/arm-none-eabi/newlib
```

- Modify launch.bat:
  - Change MAKE_DIR path:
    ```
    SET MAKE_DIR=c:/NXP/S32DS_ARM_v2018.R1/utils/msys32/usr
    ```
  - Change compiler path:
    ```
    SET LINARO_DIR=C:\NXP\S32DS_ARM_v2018.R1\Cross_Tools\gcc-6.3-arm32-eabi
    ```

- Invoke launch.bat using MODE=USER TOOLchain=linaro.   Either:
  - Enter from DOS command prompt
    ```
    launch.bat MODE=USER TOOLCHAIN=linaro
    ```
  - Or create new file with a name like launch_linaro.bat which includes one line:
    ```
    launch.bat MODE=USER TOOLCHAIN=linaro
    ```

MCAL 4.3: Edit sample application launch.bat 3

- **TIP:** Add a **pause** command at the very end of the launch.bat file:



```
ECHO.
pause
GOTO end

:end
pause
```

  - Now when you can use launch.bat by double clicking on it from a Windows browser. The batch file executes but after completion it does not automatically immediately exit back to windows. The pause command allows you to see if the make file worked or had errors.

  - Note: GHS is the default compiler. If you use a different compiler you must invoke launch.bat a compiler option. Example for WindRiver compiler:
    launch.bat TOOLCHAIN=diab

7. Additional SW: Compiler, Java

Compiler for MCAL, OS

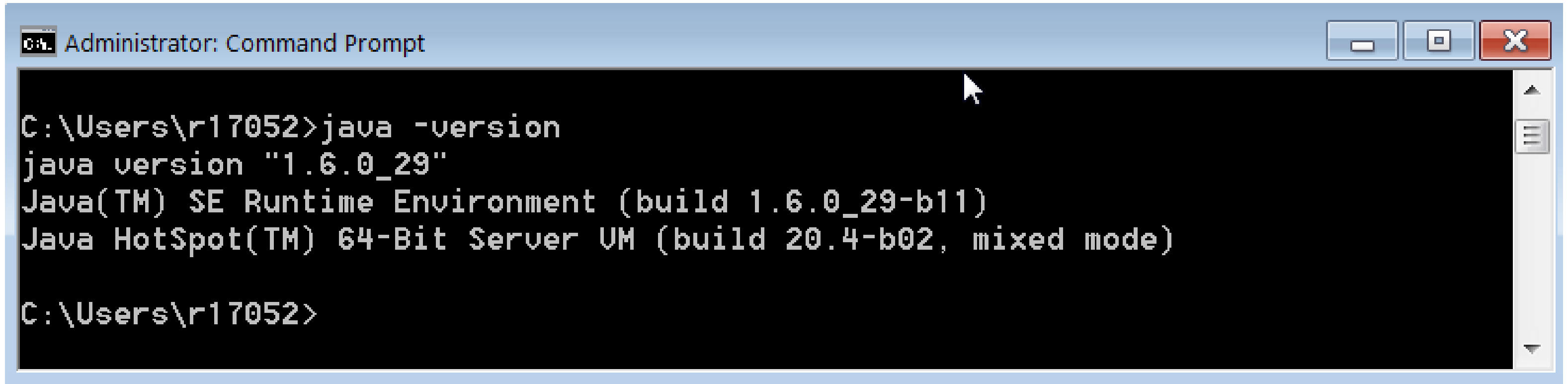
- NXP’s MCAL and OS products are tested using multiple compilers.
  - See the release notes for versions.

- Examples in this presentation are based on MPC574xG MCAL & OS version 4.0.3 using Green Hills Software compiler version 201416.
  - Later versions have not been known to be a problem.

- Obtain and install the compiler if you have not done so.

OS installation only: Java

- If using Autosar OS, a Java version 1.6 or higher is required for the Autosar OS system generator
  - Usually it is already installed in windows
- To determine if Java is installed and the version, go to the DOS command prompt and enter: java –version
  - Example:



```
C:\Users\r17052>java -version
java version "1.6.0_29"
Java(TM) SE Runtime Environment (build 1.6.0_29-b11)
Java HotSpot(TM) 64-Bit Server VM (build 20.4-b02, mixed mode)

C:\Users\r17052>
```

- If you do not have version 1.6 or higher, it can be obtained at https://java.com/en/download/
  - Caution: sometimes installing a new Java version can affect other programs! Suggest not installing it if AUTOSAR OS is not needed.

SECURE CONNECTIONS
FOR A SMARTER WORLD

www.nxp.com