

SPC5 Development Ecosystem

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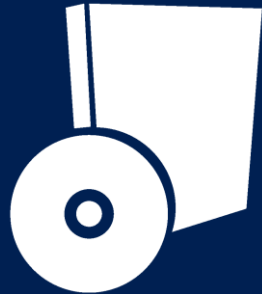
SPC5 Ecosystem

Documentation



Products &
Ecosystem
Documentation

Software Development Tools



Code Configuration &
Generation tools

Development
& Debugging Tools

Embedded Software

HAL / Drivers
RTOS
Libraries
Application Software



MCAL
BSW
AUTOSAR OS

Hardware Development Tools

Evaluation & Promotion
boards

Debug probes

Calibration Boards

Communication
bridges

SW & HW Development Tools

3





SPC5Studio

Release your Automotive Creativity

Visually configurable automotive grade code for real embedded applications

Free, powerful and flexible cross-platform application development tool targeting the complete SPC5 portfolio

Intuitive visual configurable code, from application design to a working app in a few clicks

Extensive range of Automotive Grade application boards to test your ideas



Complexity of configuration has been simplified by intuitive visual application wizards

MISRA 2012 compliant high level quality generated code

Software design cycles based on rigorous continuous integration models

1

Software IDE: SPC5Studio

2

SPC5 SW Products

3

Hardware Development Tools

4

Third Party Development Tools Support

- MCAL- Standard drivers
- Libraries & Complex Drivers

Safety: Core Self Test

Free Entry Toolchain

Collection of Application Examples



Graphic PIN Functionality Configuration

Graphic Clock tree Configuration

Power Estimation Tool

Flasher

Peripherals Drivers

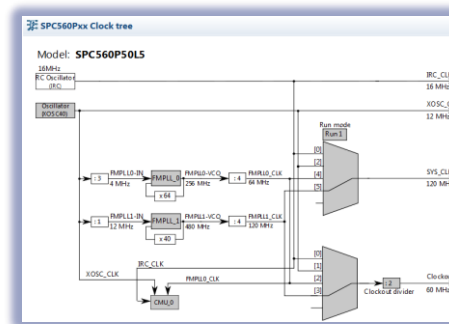
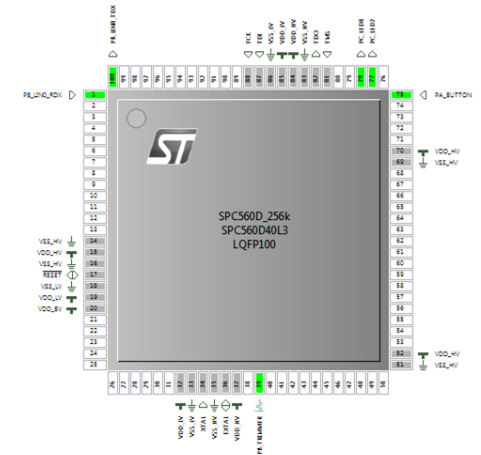
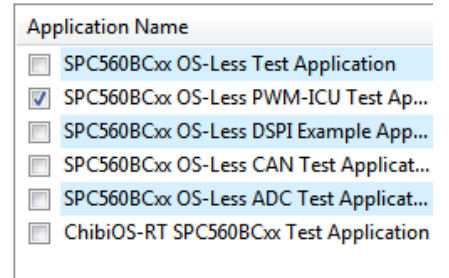
Field Oriented Control Application SW Library & Tools

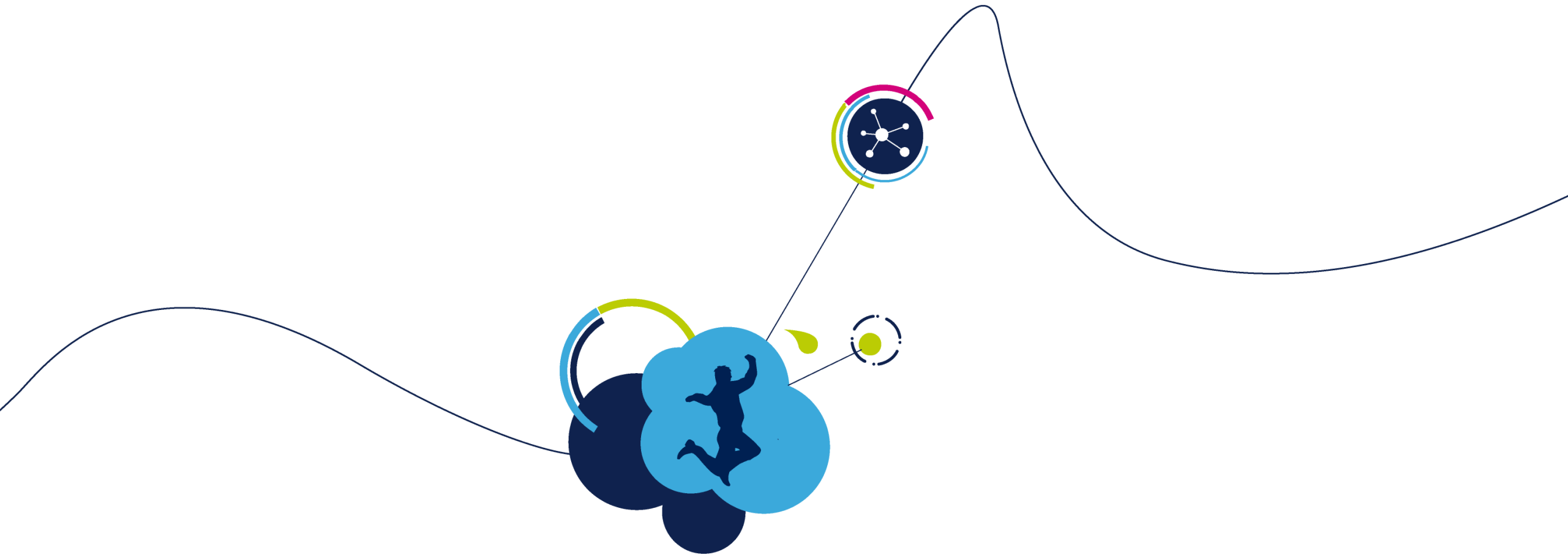
RTOS

Other resources on st.com

- Flash drivers
- Lin Drivers
- SPC56 Crypto Lib
- HSM Test Application

SPC5 MCTK
Motor Control Toolkit



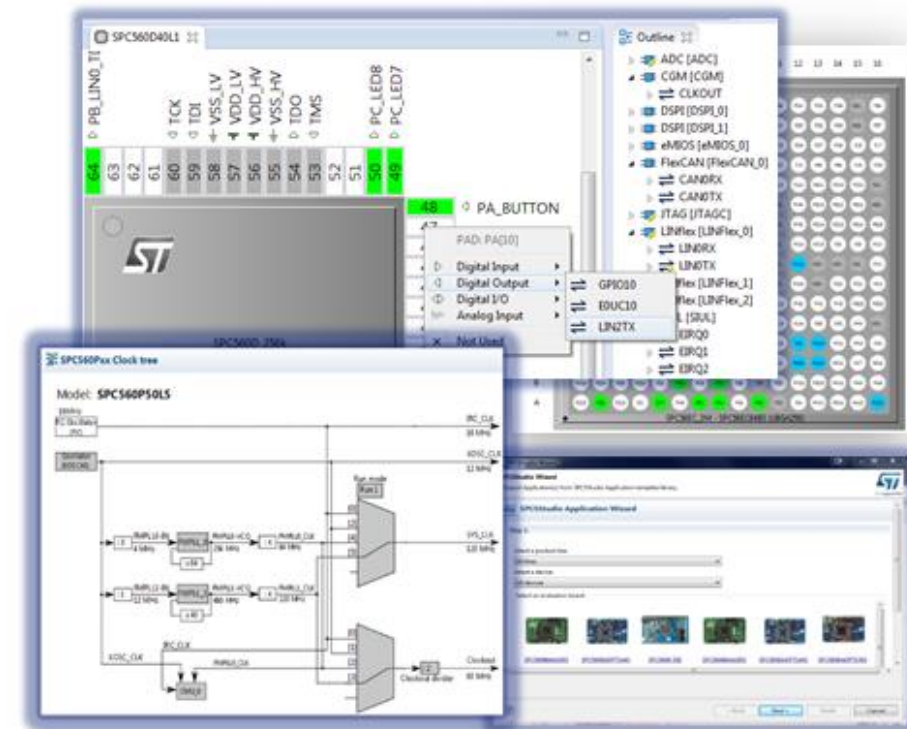


SPC5 Studio IDE



- An integrated development environment
 - Toolchain, debugger, code generation and code analysis, performance tool
 - Visual applications: ClockTree, PinMap wizard, MCU selection
 - Full MISRA 2012 compliant low level drivers
- Visual mapping of customer use cases on top MCU packages portfolio
 - Simplified visual view of packages for package comparison
 - Easy to migrate customer use cases from one package to another
 - Easy to swap between package configuration
- SPC5Studio: container and contents
 - Tool based on Eclipse
 - Extended list of drivers
 - User community feedback via ST External Forum Service

- Availability
 - Currently released version: 5.8.0
 - Free of charge
- See more at <http://www.st.com/spc5studio>





SPC5 Studio Core Features

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- SPC5Studio implements a set of graphical MCU configuration tools
 - Applications are managed as components
 - Each component is defined by a set of properties
 - Each component is able to generate code, based on components properties configuration
- Application development assist wizards
 - MCU selection & IP activation
 - Used to enable/disable and configure a single core e/o peripheral IP
 - PinMap
 - Graphics pin configurator with pads association and **configuration consistency check** as well as code generation
 - ClockTree
 - Graphics clock tree configurator with consistency check and configuration code generation
 - Power Consumption Tool
 - Graphics tool for power consumption estimation and analysis

- Full interoperability and consistency check across configuration tools and component configurators

- Multi compiler support natively embedded

➔ Preferred Compiler:



➔ Basic Compiler:



ST Free GCC

➔ Other Compilers:



- Debugging supported by

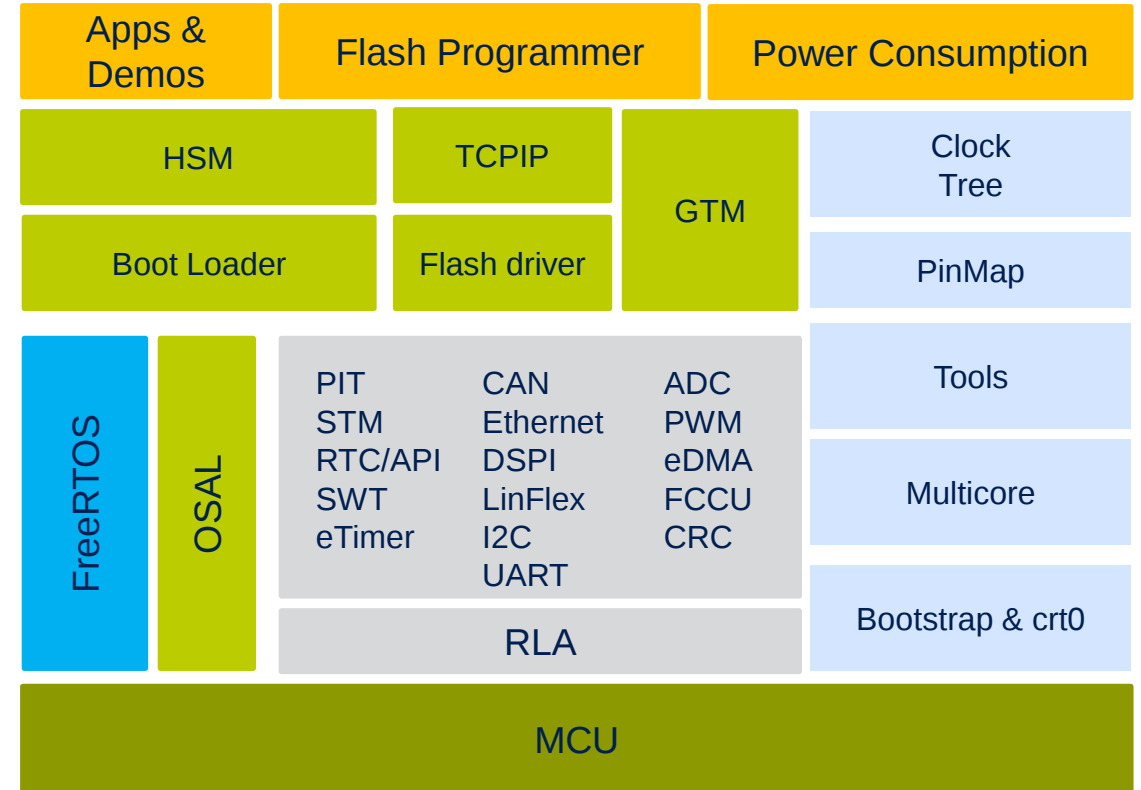




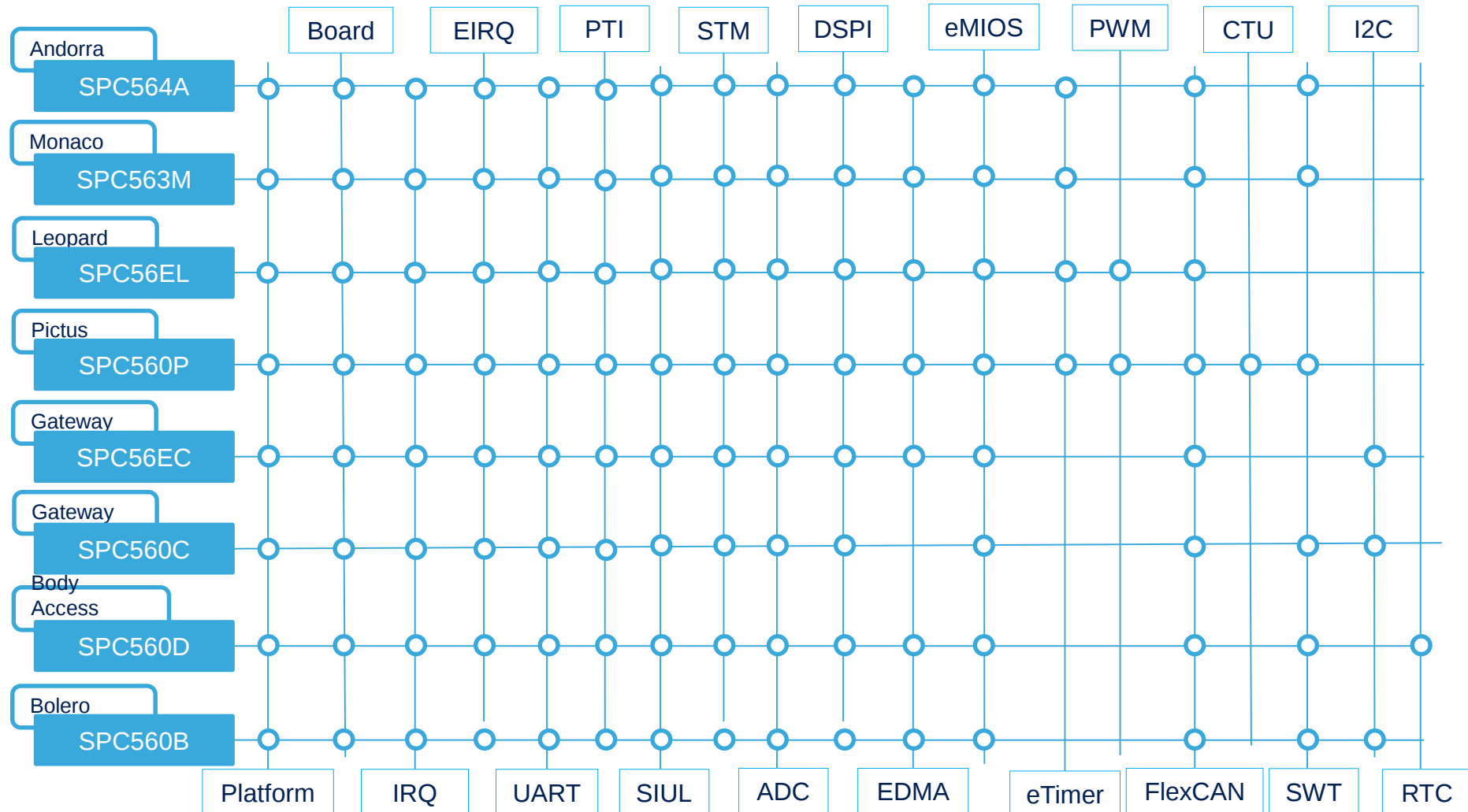
SPC5 Studio Contents

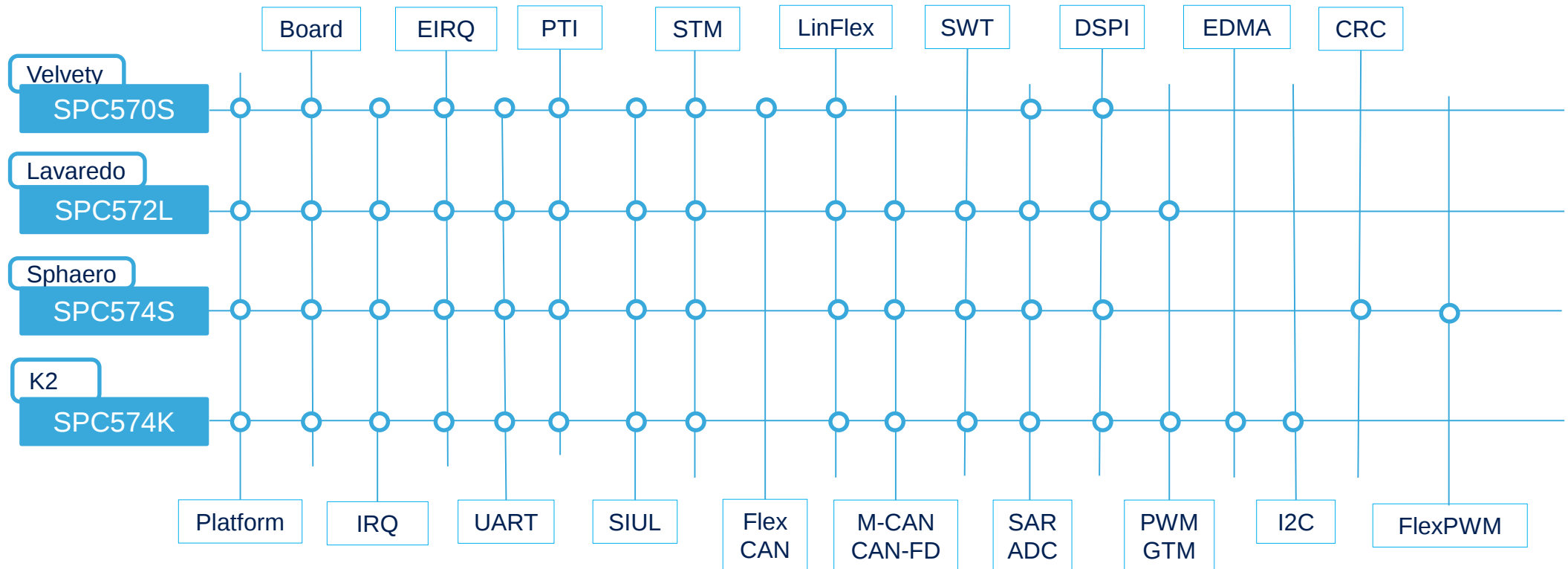
10

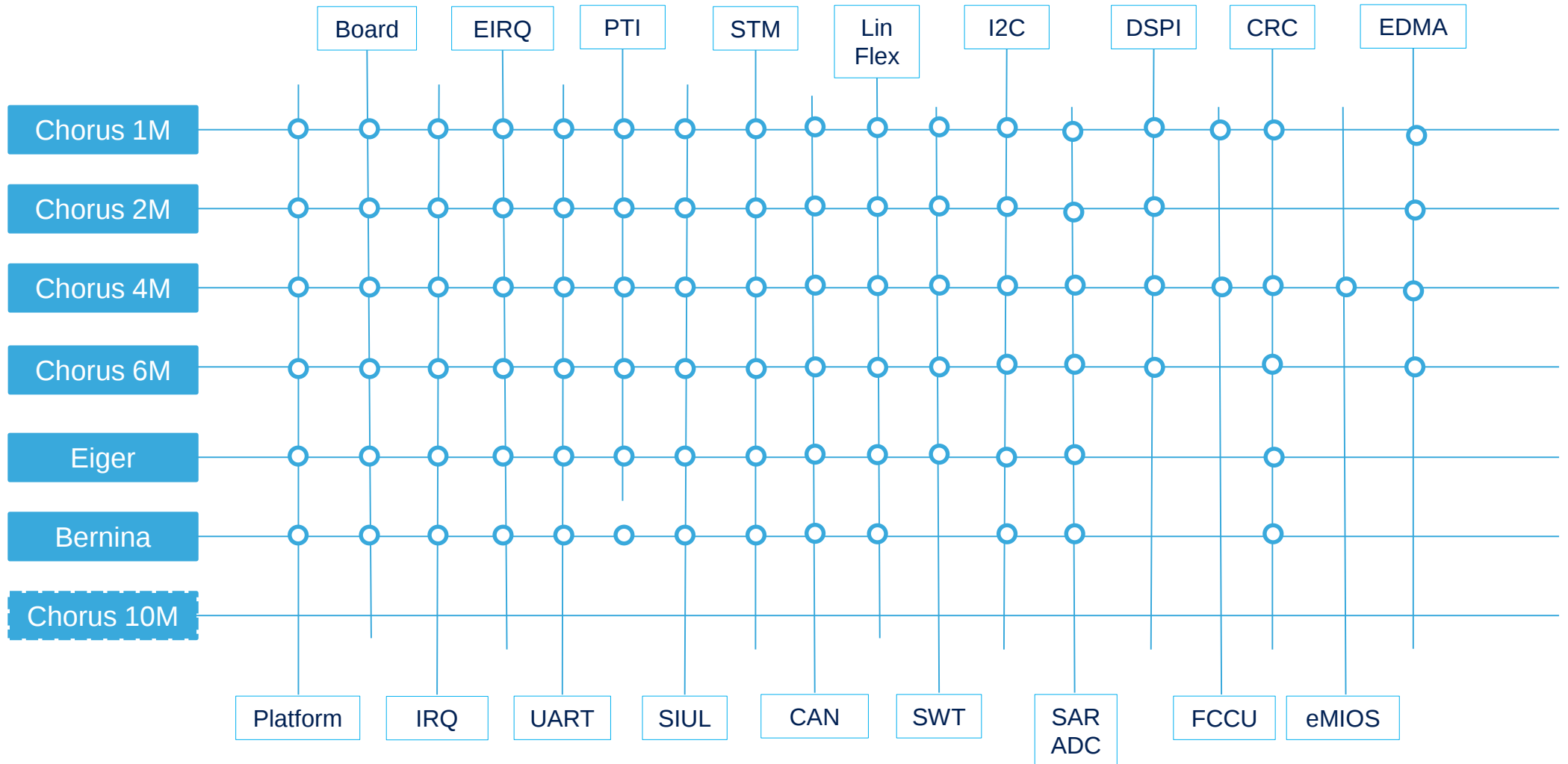
- Integrated development environment
- Visual applications:
 - ClockTree,
 - PinMap wizard,
 - MCU selection,
 - Power Consumption Tool
- Additional software packages:
 - FreeRTOS
 - TCP/IP
 - Bootloader
 - Flash and EEPROM drivers
- Platform Header files
- Multiple toolchain support
- Debugger integration
- Code generation and code analysis
- Driver API documentation
- Full MISRA 2012 compliant



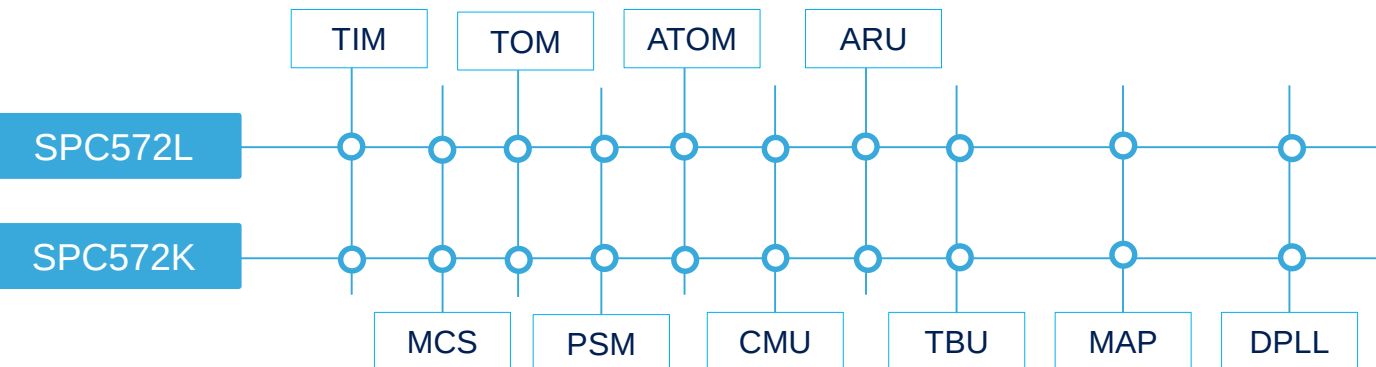
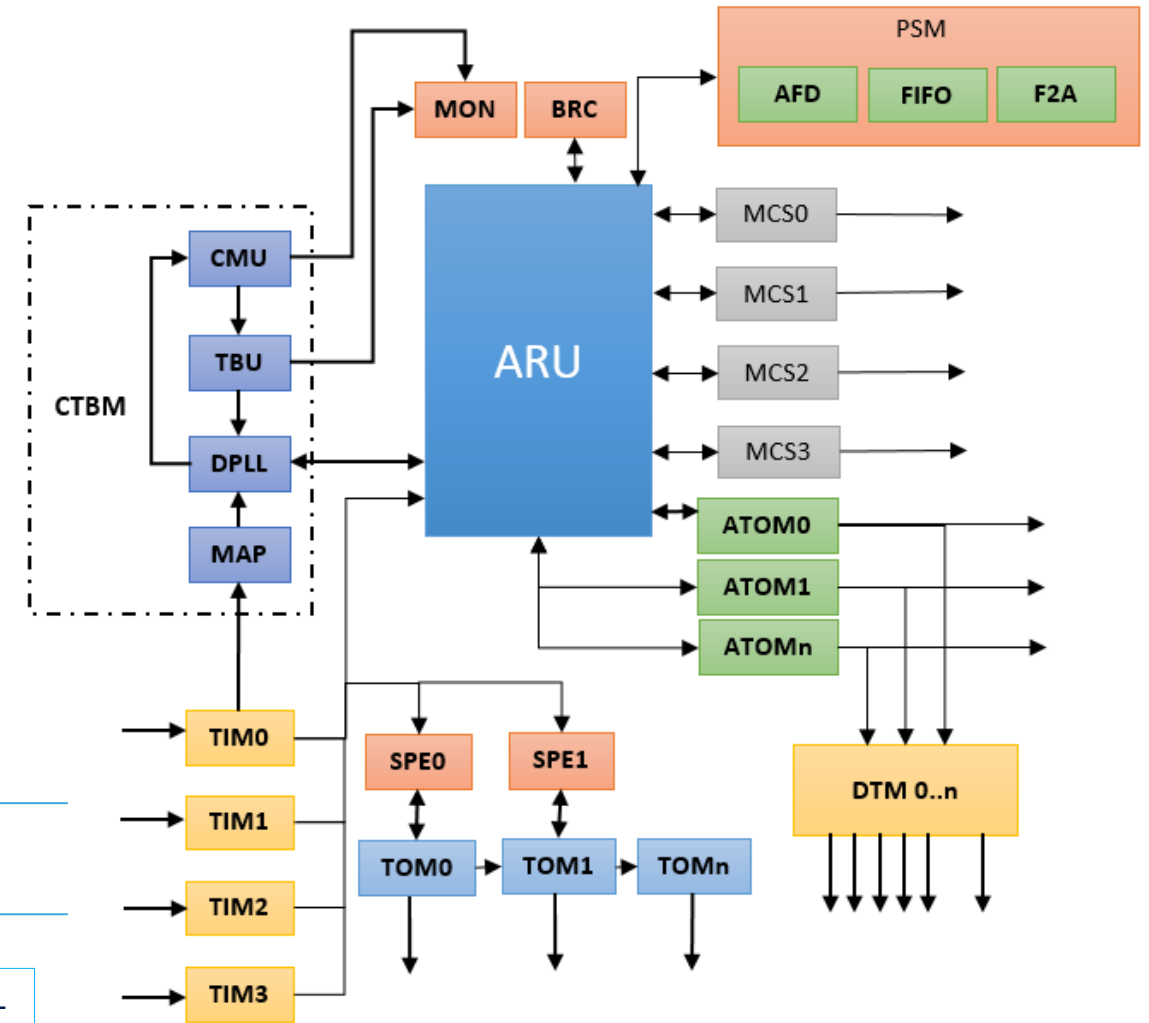
- GTM
 - Full API for GTM submodules
 - MCS toolchain integration
 - Specific demos and applications







- New GTM Component
- Functional level GTM API
- MCS compiler integrated in SPC5Studio
- PWM driver on top of GTM
- Several demos already available
 - ATOM, TOM, MCS, PSM, TIM, ARU
- Available for Lavaredo and K2
 - (SPC58) Eiger and Bernina planned

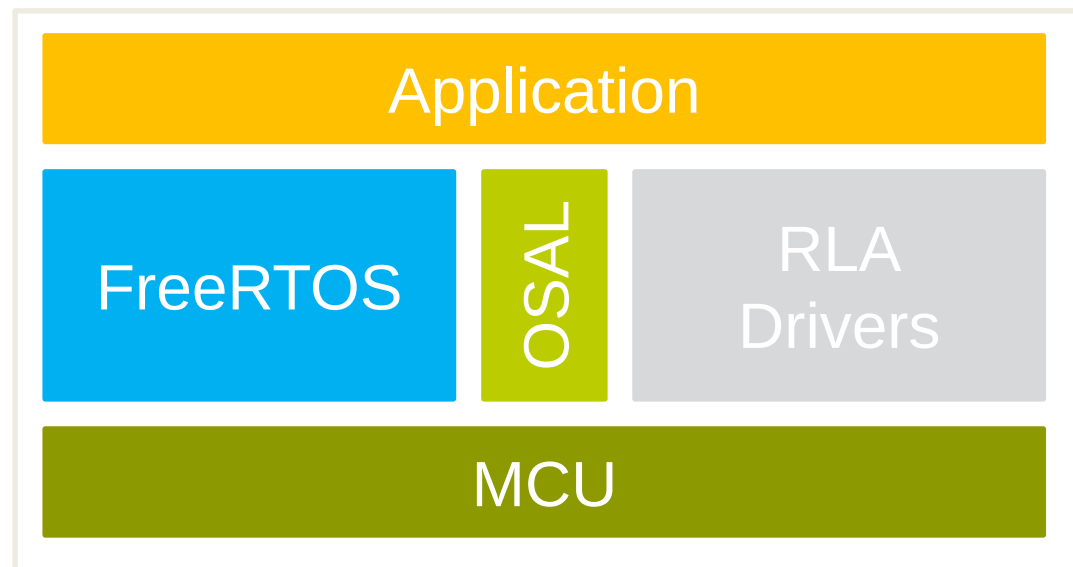
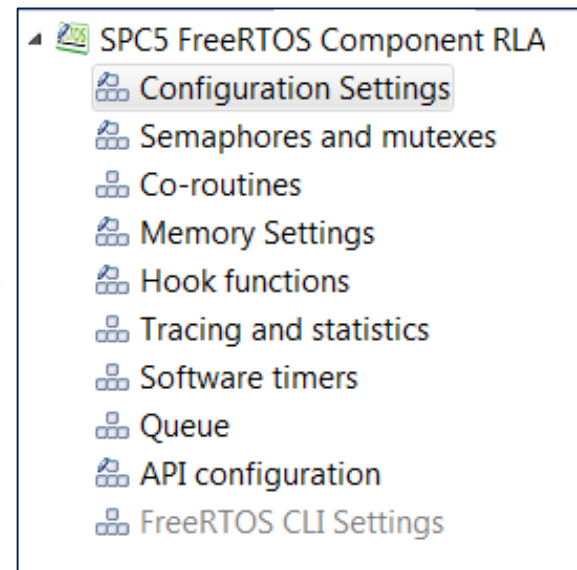


FreeRTOS Component

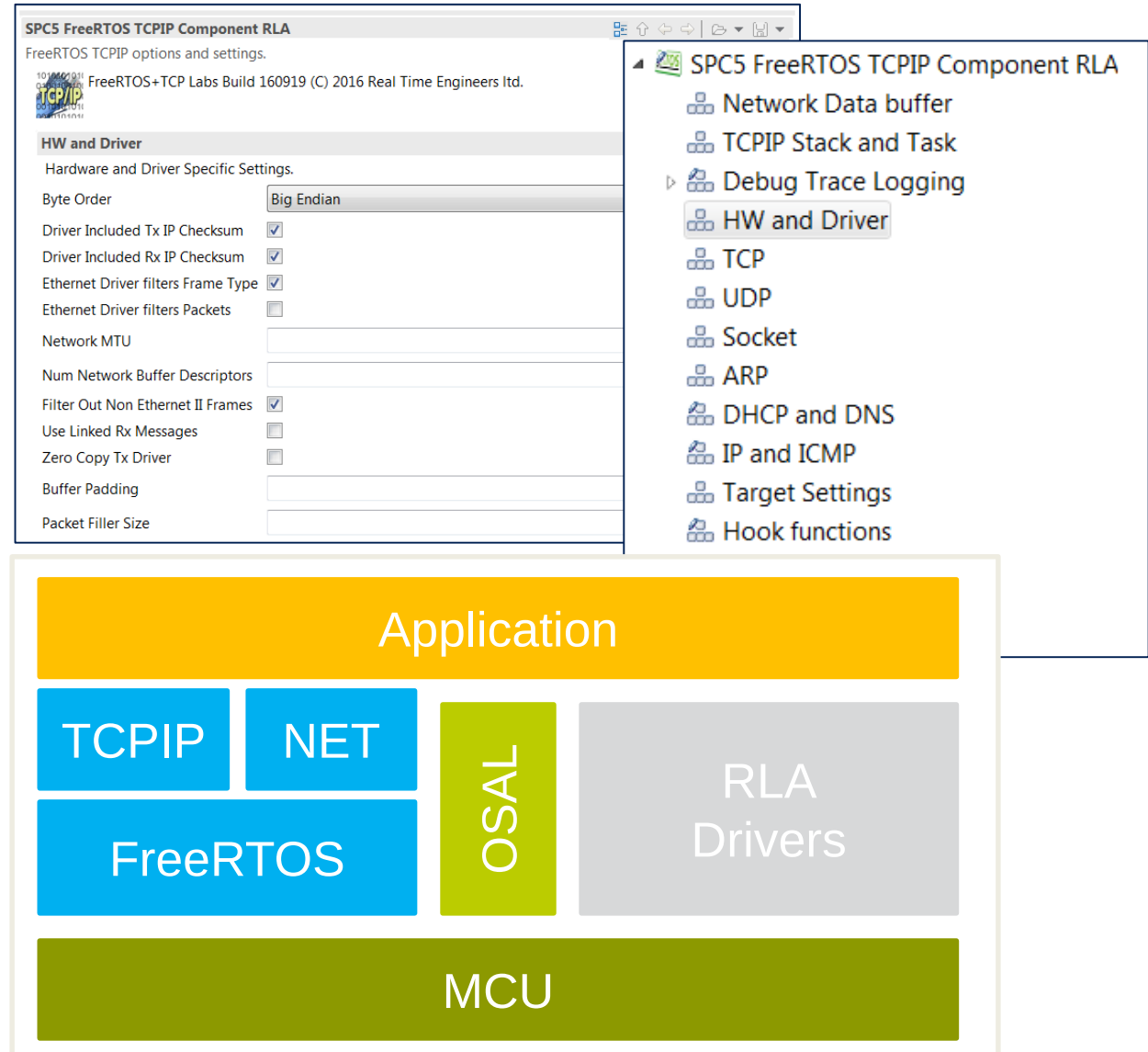
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- New FreeRTOS Component
- Full RTOS functionalities
- Provided for all supported platforms
- Graphical configuration User Interface
- Drivers awareness
- Several demos available

FreeRTOS is supported for all families and all devices



- New TCP/IP Component
- Full network protocol functions
- Support TCP, UDP, ARP
- BSD-like interface
- Graphical User Interface
- Demos available





Power Consumption Tool

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*SPC58ECxx power consumption

Consumption settings

Power consumption settings

General

Specific model: SPC58EC80E3

Chip mode: DRUN

SYS_CLK: 120 MHz

HSM_CLK: 60 MHz

Input

R(theta JA): 28.0 °C/W

Ambient temperature: 25.0 °C

V(DD_HV): 5.0 V

V(DD_LV): 1.2 V

Ballast: External

P(I/O): 0.0 mW

Description

Profile description

Clock tree in default config
PLL0 freq = 180 MHz
The SYSCLK is driven by PLL1
IPs clock enabled but not initialized
Code executed from flash

Computed

Junction Temp.: 32.11 °C

I(DD LV): 99.02 mA

I(HV IO MAIN): 22.8 mA

I(HV ADC): 3.0 mA

I(DD Leakage): 4.83 mA

P(Micro): 253.61 mW

P(Ballast): 394.58 mW

Master

Master blocks

- Core 0 [I(DD LV): 11.58 mA, I(DD HV): 0.0 mA, I(DD HV IO MAIN): 0.0 mA]
- Core 2 [I(DD LV): 11.58 mA, I(DD HV): 0.0 mA, I(DD HV IO MAIN): 0.0 mA]
- HSM [I(DD LV): 0.0 mA, I(DD HV): 0.0 mA]

Core 2

SYS_CLK: 120 MHz ICache: ☐

Pattern: typical Fetch Mode: Flash

I(DD LV): 11.5766 mA I(DD HV IO MAIN): 2.0 mA

Peripherals

Peripherals List

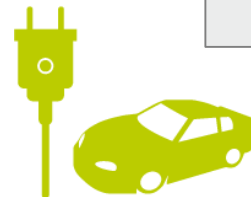
- CAN [I(DD LV): 0.9 mA, I(DD HV): 0.5 mA]
- SARADC [I(DD LV): 1.6 mA, I(DD HV): 0.0 mA]
- DSPI [I(DD LV): 0.8 mA, I(DD HV): 0.9 mA]
- LIN [I(DD LV): 0.7 mA, I(DD HV): 0.5 mA]

CAN

Sysclk freq. 180 MHz, Rate 500K/s

CAN_CLK: 180 MHz Rate: 500 K/s

I(DD LV): 0.9 mA I(DD HV IO MAIN): 0.5 mA



New Visual Power Consumption Tool

- Visual tool for Power Consumption estimation
- Provides a way to evaluate consumption of peripherals under various configurations
- Clock frequency setting to evaluate power consumption constraints
- Low power mode supported

*Chorus 4M available



A Complete Offering

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In collaboration with





HighTec Free Compiler License Application Form

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- Installation plugin of HighTec Free Entry toolchain from <http://hightec.spc5studio.com>
- 1 year free license from HighTec website <http://register.hightec-rt.com/st/spc5x>
 - Fill all information (including PC MAC address)
 - Click **Generate License File**
 - Receive **license.lic** file by email
 - Copy **license.lic** file into **C:\SPC5Studio\licenses**
 - Add the Environment Variable (User Side):
RLM_LICENSE=c:\SPC5Studio\licenses

The screenshot shows a web browser window with the URL <http://register.hightec-rt.com/st/spc5x/index.php>. The page title is "HighTec Free Power Architecture™ Entry Tool Chain". Below the title, it says "The easiest way to start with a C/C++ compiler for ST PowerPC based microcontrollers (SPC5x product lines)" and "Version 4.9.3.0-stm-1.1 (includes support for the newest SPC57 and SPC58 devices)".

Instructions:

1. Please fill out the form to the right
2. You will be sent an e-mail, which contains your license file and the download link
3. Download the installation package
4. Unzip the installation package and start "Setup.exe" to install the toolchain
5. Copy the license file to the folder "C:\HighTec\licenses"
6. Read the "Getting Started" manual for additional information

Getting Started

To get examples for your SPC derivate, please select it here:

Need technical assistance or training?

[Contact support](#)

End User License and Maintenance Agreement:

Upon using the Free Power Architecture Entry Tool Chain you agree to HighTec's [EULA](#).

Form fields:

- Name *
- E-mail address *
- Company *
- Department *
- Job title *
- Phone number *
- MAC-address *
- Enter below text *

alkyne

[Generate License File & Download](#)



SPC5 Studio 5.8.0: What's New

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C/C++ toolchains

- FreeGCC 4.9.4
- Hightec 4.9.3



SPC56

- Bolero3M
 - Fast Ethernet driver
- Demos
 - Ping
 - SWT



SPC57

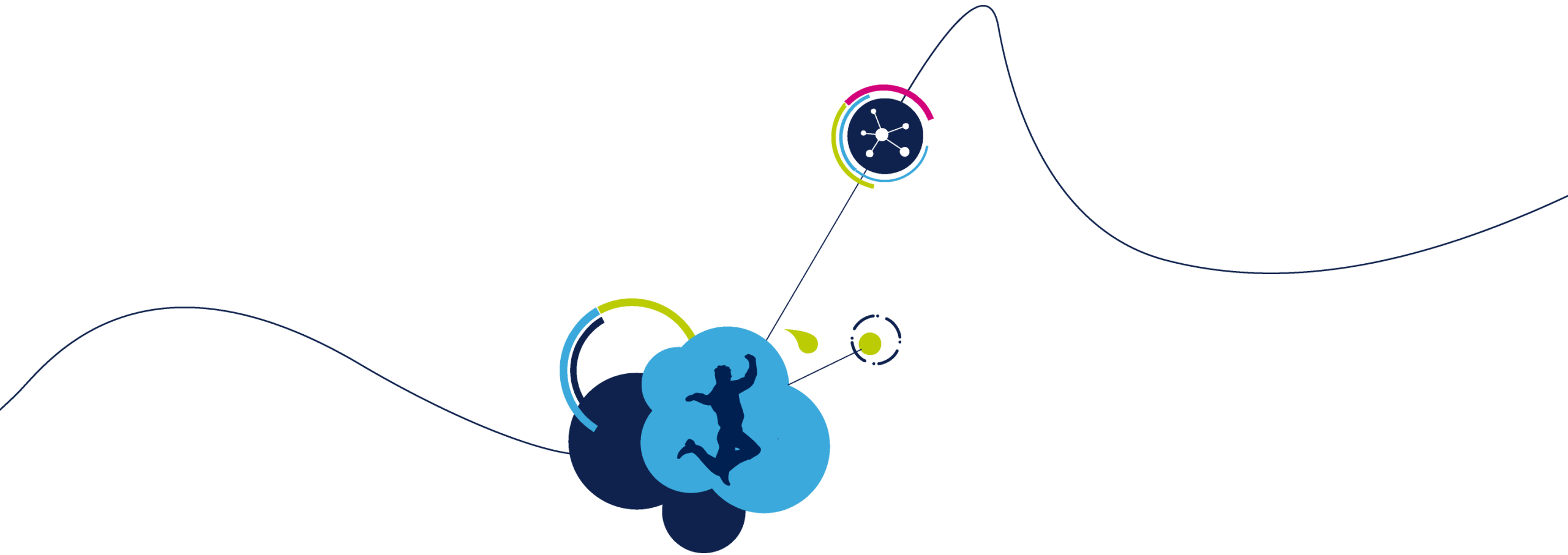
- Sphaero
 - DSPI
 - CAN-FD
- K2
 - CAN-FD
 - I2C demo
 - Cut 2.4 support
- Velvety
 - DSPI
 - SARADC



SPC58

- Chorus 1M
 - CAN-FD
 - eDMA
- Chorus 2M
 - CAN-FD
 - eDMA
 - I2C
- Chorus 4M
 - eDMA
- Chorus 6M
 - CAN-FD
 - eDMA
- Eiger
 - CRC
 - I2C
 - eDMA
- Bernina
 - CAN-FD
 - eDMA



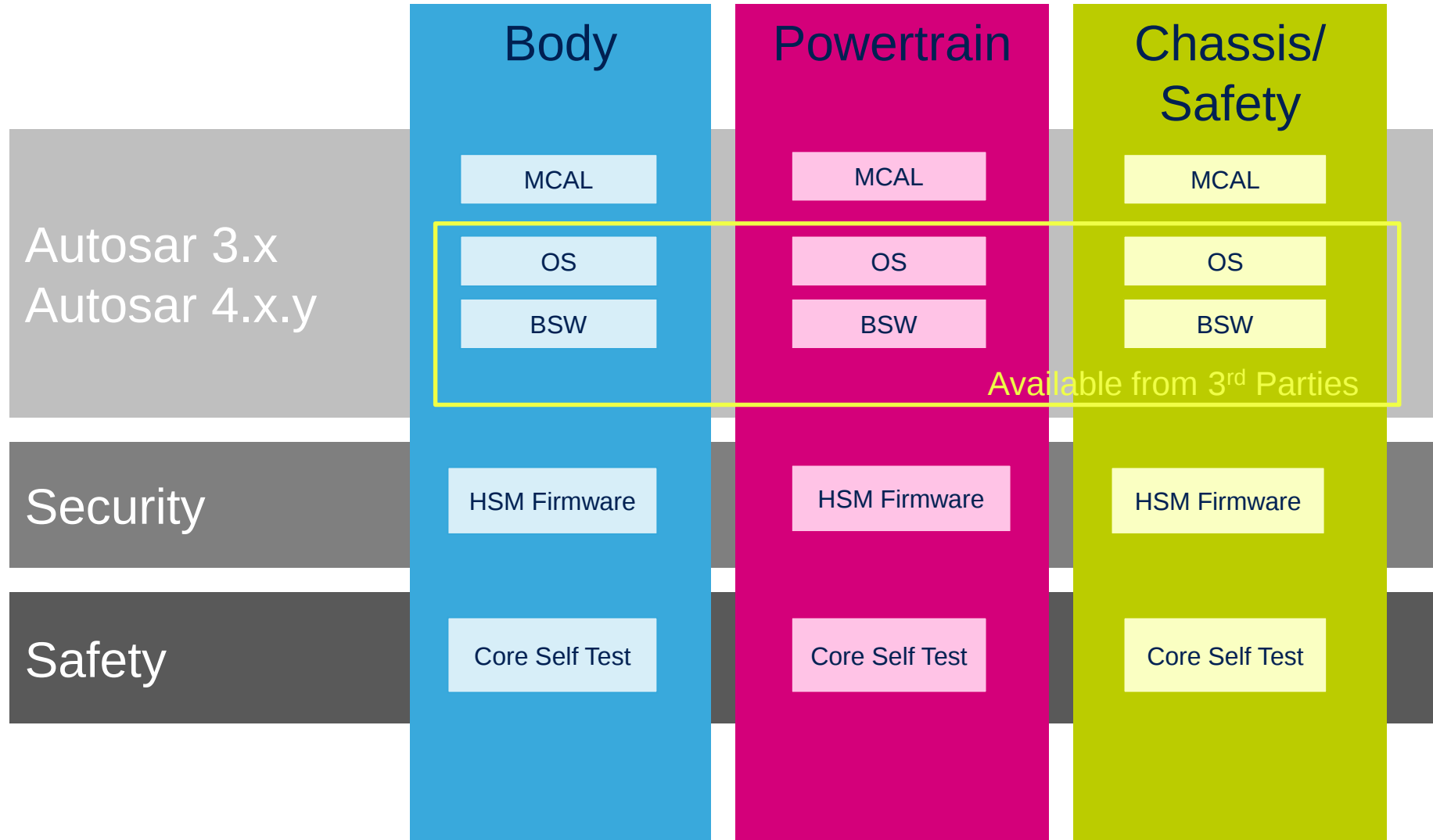


SPC5 SW Product

MCAL / Security / Safety

SW Product Offer

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Relationship with 3rd Parties for SW Product

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- ST has a very strong relationship 3rd parties for AUTOSAR, Safety and Security
 - Periodic management review for delivery plan alignment
 - Periodic technical meeting for technology roadmap review
 - Reciprocal access to internal and confidential contents/information
 - Shared bug tracking system
 - ST customer support engineer assigned to 3rd parties for ticket analysis
 - Availability in ST of the 3rd parties environment for a quick analysis of the customer defects



Elektrobit



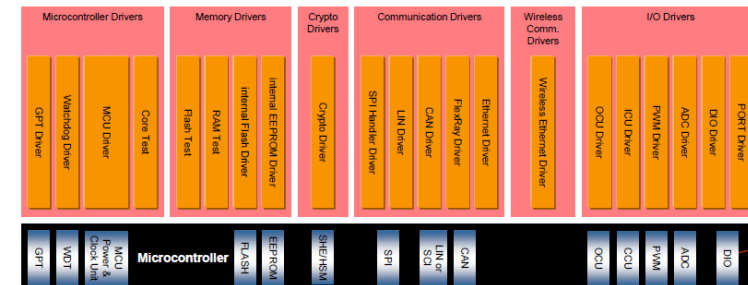
- MCAL Configuration

- The EB TRESOS Studio (*) configuration tool is used to develop the MCAL
- ST delivers the MCAL with and without signature
 - Customer using the EB TRESOS Studio Full shall use the version without signature
 - Customer not using the EB TRESOS Studio shall use the version with signature
 - ST delivers the EB TRESOS Studio Basic for the configuration of the MCAL before the integration with BSW form any of the SW vendor (Vector, ETAS, ArcCore, KPIT,)
 - ST supports the customer in the integration activity
 - BSWMD files are delivered for easy integration with BSW



- Compiler

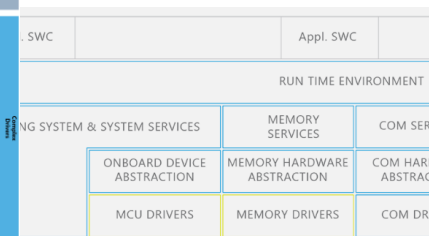
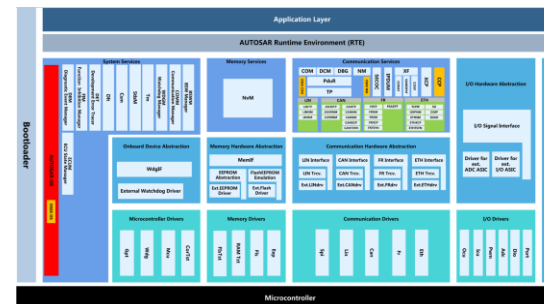
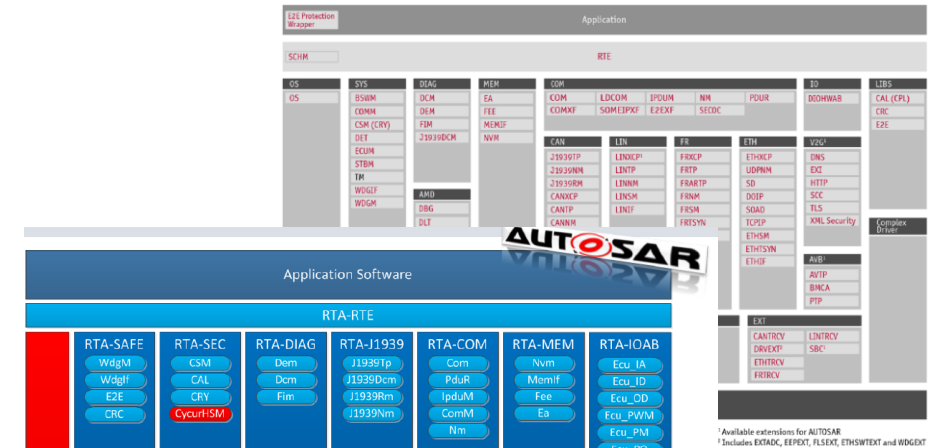
- Starting with the first BETA release the MCAL is tested with the latest version of 3 compilers (*):
 - HIGHTEC (Preferred Compiler)
 - Green Hills
 - Wind River – DIAB
- The testing with Customer specific compiler version is provided as service



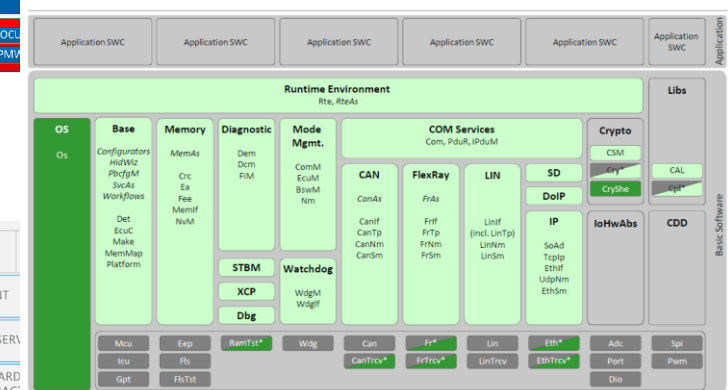
AUTOSAR BSW from 3rd Parties

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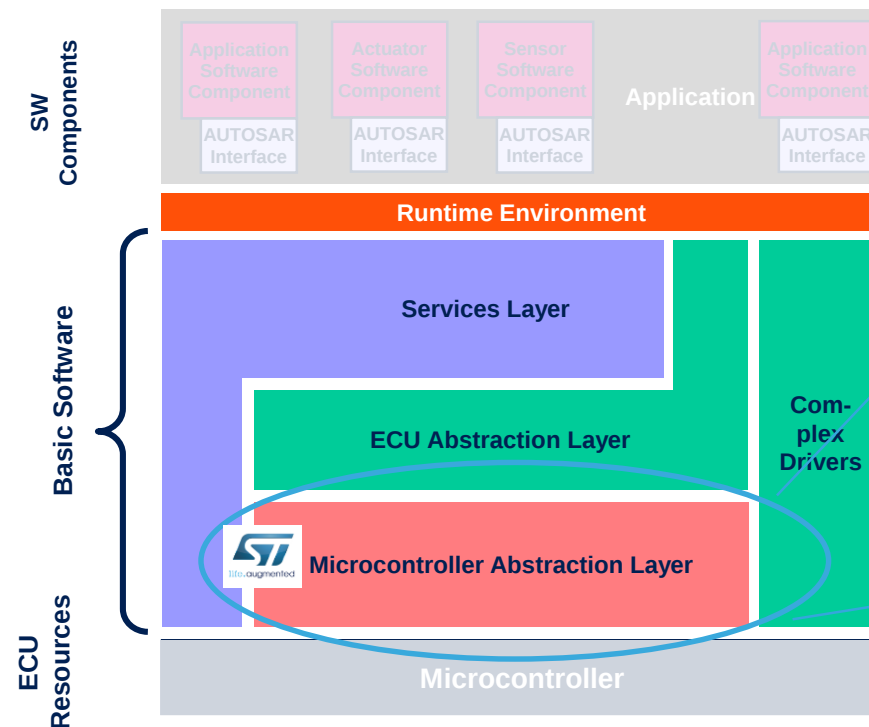
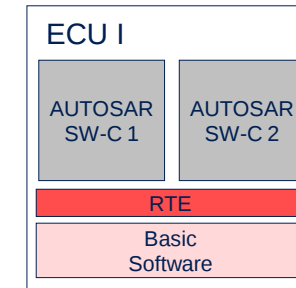
- Vector, EB, ETAS, ARCCORE, KPIT and iSOFT deliver BSW validated with ST MCAL
- Joint integration plan review
- Sharing of defect database
- Availability in ST of the 3rd parties development environment to quick reproduce and fix issues during the Acceptance Testing phase



EB tresos AutoCore 7 based on AUTOSAR 4.0.3 & RFCs and AUTOSAR 3.2

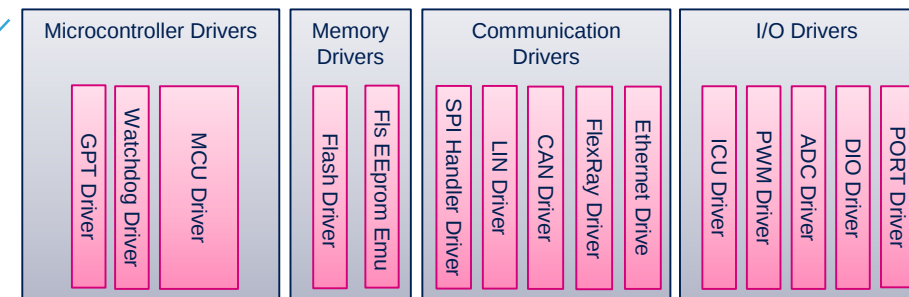


- Basic Software is based on standard
 - Run-Time Environment (RTE) for separation of system into its ECU (plus common infrastructure)



- MCAL (Microcontroller Abstraction Layer)

- the lowest software layer of the Basic Software
- It contains internal drivers, which are software modules with direct access to the μ C and internal peripherals



SPC56 SW Support

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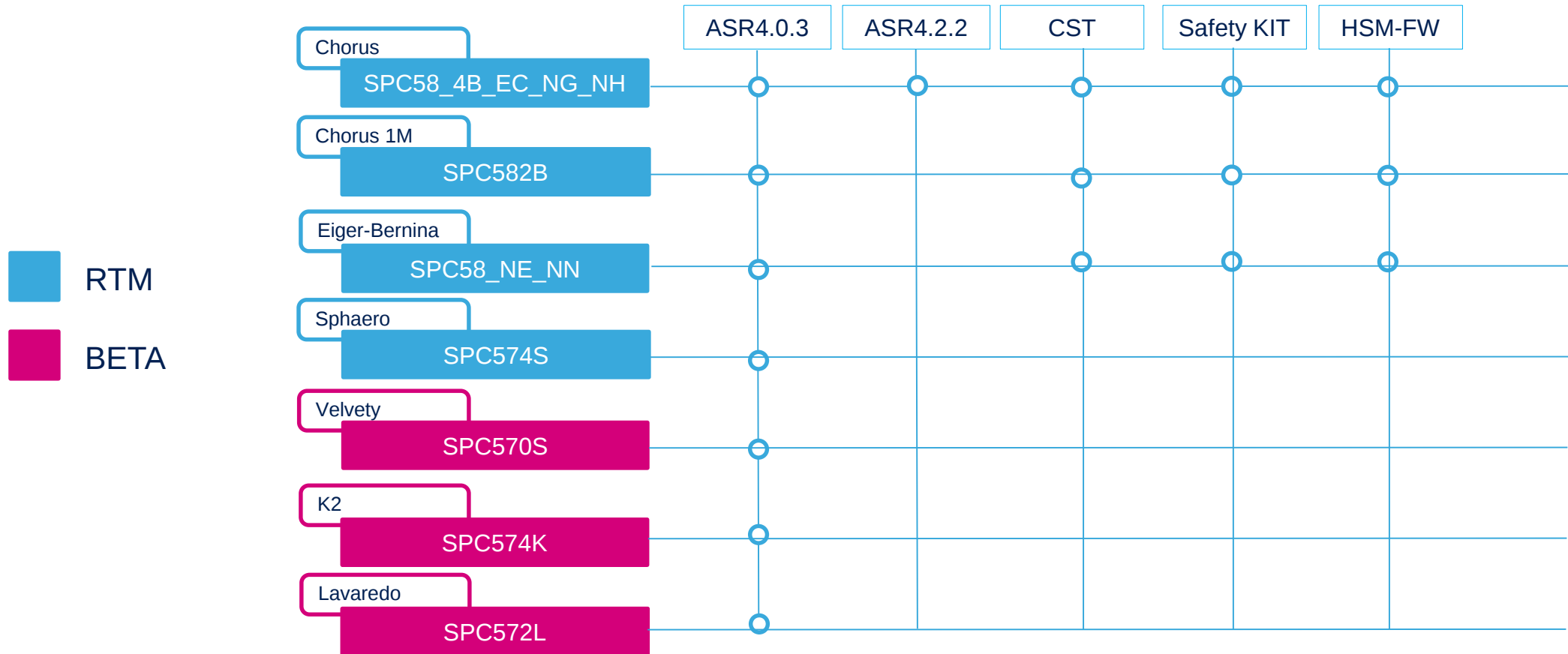
	ASR2.1	ASR3.0	ASR3.2	ASR4.0.3	CST	IST
Andorra SPC564A		○		○	○	○
Monaco SPC563M		○				
Leopard SPC56EL		○		○		
Pictus SPC560P		○		○	○	○
Bolero 3M SPC56EC		○	○	○	○	○
Bolero SPC560C	○	○	○	○	○	○
Bolero SPC560D	○	○	○	○	○	○
Bolero SPC560B	○	○	○	○	○	○

RTM

- The SPC58xx MCALs are built on a very solid “code based” inherited from the SPC56xx MCAL already delivered for several customer project.
 - More than 200 projects (ST + FSL) in 10 years (ASR2.1, ASR3.x, ASR 4.0.3)
- The MCAL is designed and implemented taking in consideration the concept of the IP-Reuse
 - The defects reported in one platform (e.g. Eiger) for a give IP (e.g. M-CAN) are analyzed to evaluate the impact in another platform (e.g. Chorus).
 - If the defect impact the other platform the ticket of the first platform is cloned for all the other affected platform
 - The code is consistently updated through all the platform shorting the time to have mature SW (RTM)
- The SPC58xx MCAL could be applied for the “**proven-in-use**” safety criteria (ISO 26262- Part8-Chapter14).

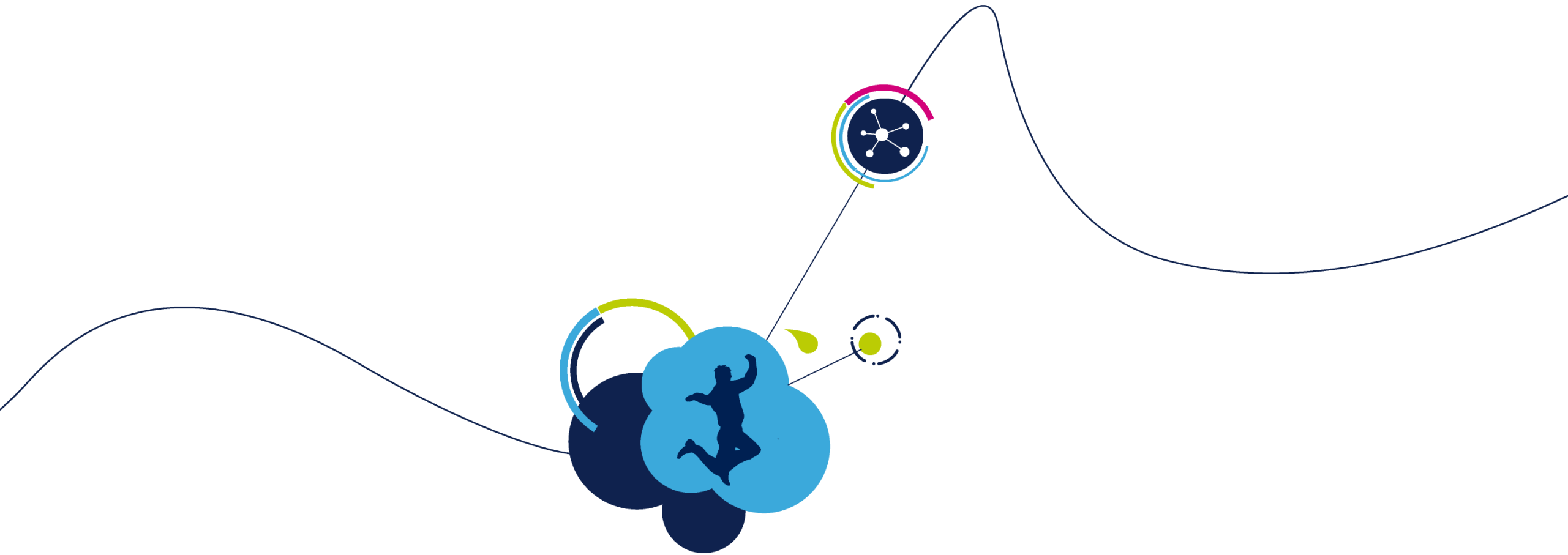
SPC57 and SPC58 SW Support

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- The **Core Self Test** is a test program that implements a software-based self-test (SBST) that is able to check whether a fault (stuck-at) is affecting or not the processor core during the normal operational life
 - The set of tests contains a subset runnable at run-time (non-intrusive test) that could be scheduled by an OS task for run-time test
 - A signature mechanism is implemented for each class of instructions and processor elements
 - Fault Coverage metric package (CST)
 - The “stuck-at” fault coverage is measured by using a fault simulation method, the result is a fully “fault graded” library. Coverage > 80%
- Delivery format
 - The CST is delivered as binary array with the full compatibility with EABI standard. Then it can be linked with any application SW

CST is a SEOOOC to design application up to ASIL B (not lock-step microcontroller)



Hardware Development Tools

Wide offer of hardware tools

ST offers a comprehensive choice of hardware tools from starter kits to evaluation kits to emulation systems

Modular approach for maximum scalability

The hardware modular approach guarantee high flexibility in development and application scalability

The SPC5 kits are the reference system for the automotive family of microcontrollers.

From first evaluation to application specific development, SPC5 kits allow full access to CPU's signals and motherboard's peripherals such as CAN, SCI, LIN and Flex-Ray

**Easily prototype
your application
on device and
system platforms**

Smart
Driving



Comprehensive Offer

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Discovery

All-in-One solution for evaluation and basic prototyping

Premium

Complete system for advanced evaluation and professional development

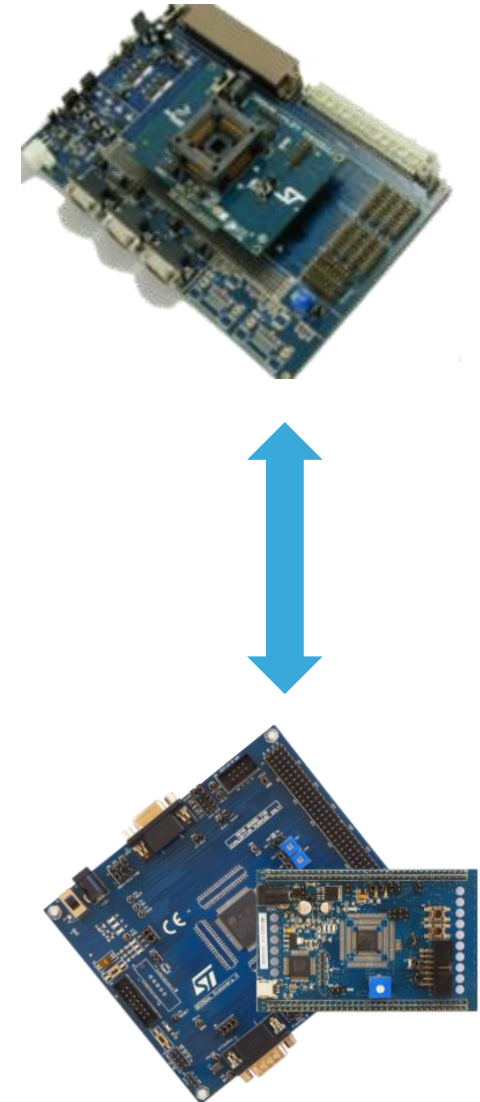
Emulation

Full solution for advanced monitoring and emulation

Promotion and Evaluation Boards

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- Two levels of boards to satisfy all needs
 - Premium Evaluation boards
 - Access all peripherals, change MCU using socket and mini-modules
 - Port for JTAG and Nexus trace debuggers
 - Discovery/Discovery+ Boards
 - IC soldered on PCB with customer option to change it
 - Embedded debugger
 - Legacy Automotive connector
 - Connectivity Ports (Can / LIN)
 - Arduino-Compatible (Pictus Discovery+ only)



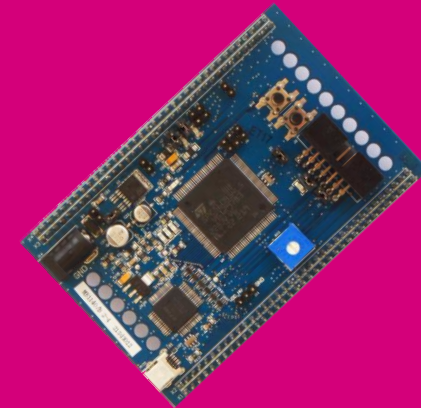
Promote the solution enabling immediate user operation
Connect to other system in automotive environment
Debug your application
Connect extension modules with ST smart power devices
Connect ARDUINO World

An entry-level solution with integrated debugger to enable a quick evaluation of main functionalities at an affordable cost *

The expansion connector makes it easy to plug in application and extension modules for rapid prototyping, while Arduino-compatible connectors allow the use of a wide choice of specialized shields

Developers benefit from the fully customizable SPC5Studio development environment with its intuitive user interface

**Evaluate SPC5
MCUs at a budget
price**



SPC56 Discoveries World

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SPC56D-Discovery with SPC560D40L1

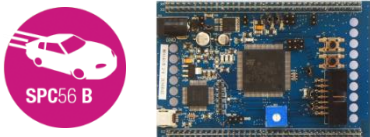
- order code: SPC560D-DIS



- Embedded debugger (up to 128Kbyte free)
- Optocoupler for USB isolation,
- All I/O accessible on connectors
- Standard connector (type B)

SPC56B-Discovery with SPC560B54L5

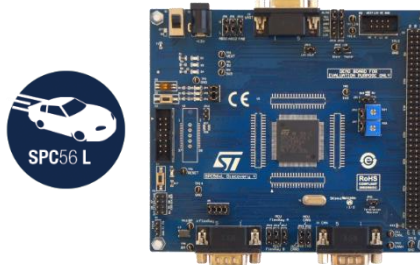
- order code: SPC560B-DIS



- Embedded debugger (up to 128Kbyte free)
- Optocoupler for USB isolation,
- All I/O accessible on connectors
- Standard connector (type B)

SPC56L-Discovery with SPC56EL60L5

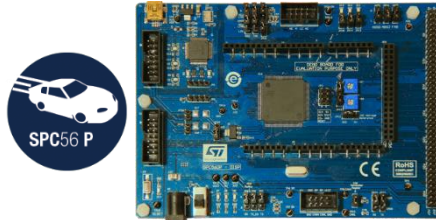
- order code: SPC56EL70-DISP



- Can, Lin Connectivity on board (included transceivers)
- Standard connector (type A)

SPC56P-Discovery with SPC560P50L5:

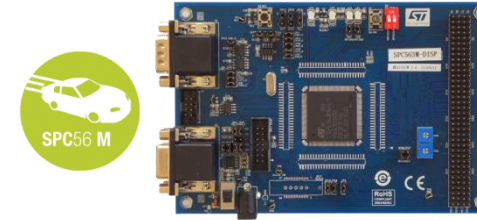
- order code: SPC560P-DISP



- Embedded detachable on board JTAG debugger (up to 128Kbyte free)
- Can, Lin Connectivity on board (included transceivers)
- Connector Arduino-Compatible
- Standard connector (type A)

SPC56M-Discovery with SPC563M64L5

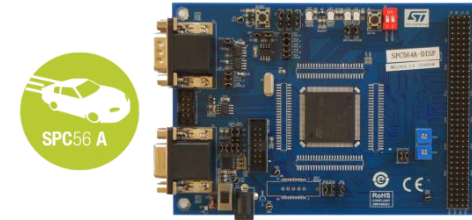
- order code: SPC560M-DISP



- Can, Lin Connectivity on board (included transceivers)
- Standard connector (type A)

SPC56A-Discovery with SPC563A70L5

- order code: SPC564A-DISP



- Can, Lin Connectivity on board (included transceivers)
- Standard connector (type A)

SPC57 Discoveries World

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SPC57S-Discovery with SPC570S50E1

- order code: SPC570S-DISP



- Embedded debugger (up to 128Kbyte free)
- Can, Lin Connectivity on board (included transceivers)
- Standard connector (type A)

SPC57K-Discovery with SPC574K72E5

- order code: SPC574K-DISP



- Embedded debugger (up to 128Kbyte free)
- Can, Lin Connectivity on board (included transceivers)
- Ethernet 10-100Mbps on board

SPC572L-Discovery with SPC572L64E3

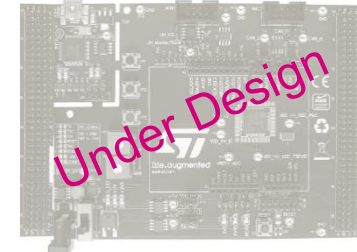
- order code: SPC572L-DISP



- Embedded debugger (up to 128Kbyte free)
- Can, Lin Connectivity on board (included transceivers)
- Standard connector (type A)

SPC574S-Discovery with SPC574S60E5D

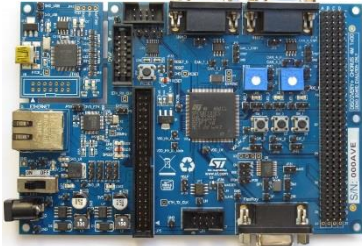
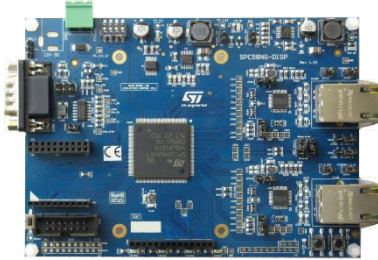
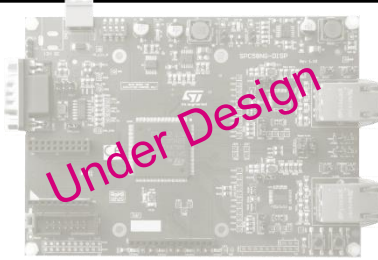
- order code: SPC574S-DISP



- Focused for Motor control Application
- Dual 4x37 connector
- Can, Lin Connectivity on board (included transceivers)

SPC58 Discoveries World

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SPC582B-Discovery with SPC582B60E1 • order code: SPC582B-DIS	SPC58EC-Discovery+ with SPC58EC80E • order code: SPC58EC-DISP	SPC58NG-Discovery+ with SPC58NE84E7 • order code: SPC58NG-DISP
 • Embedded debugger (up to 128Kbyte free) • I/O accessible on connectors • Standard connector (type A)	 • Embedded debugger (up to 128Kbyte free) • Can, Lin Connectivity on board (+ transceivers) • Ethernet 10-100Mbps on board	 • Can Connectivity on board (+ transceivers) • Dual Ethernet 10-100Mbps on board • Display (option)
SPC584B-Discovery with SPC584B70E1 • order code: SPC584B-DIS	SPC584B-Discovery+ with SPC584B70E5 • order code: SPC584B-DISP	SPC58NH-Discovery+ with SPC58NH92C5
 • Embedded debugger (up to 128Kbyte free) • I/O accessible on connectors • Standard connector (type A)	 • Embedded debugger (up to 128Kbyte free) • Can, Lin Connectivity on board (+ transceivers) • Ethernet 10-100Mbps on board	 • Ethernet 1000Mbps on board • Ethernet 10-100Mbps on board • eMMC+HyperBus • CanFD Connectivity on board (+ transceivers)

SPC57/58 Discovery Kits

40

Product Line	EVB board P/N	Supported Packages	Description	Support device
K2	SPC574K-DISP	E5	Discovery Kit for SPC574 K line. Includes one evaluation board with SPC574K72E5.	SPC574K72E5
Lavaredo	SPC572L-DISP	E3	Not available – (in production)	SPC572L64E3
Velvety	SPC570S-DISP	E1 & E2	Discovery Kit for the SPC57 S line. Includes one evaluation board with SPC570S50E1	SPC570S50L1
Sphaero	SPC574S-DISP	E5	Not available – Under Design	SPC574S60E5D
Chorus 1M	SPC582B-DIS	E1	Discovery Kit for SPC58 B line. Includes one evaluation board with SPC582B60E1.	SPC582B60E1
Chorus 2M	SPC584B-DIS	E1 & E5	Discovery Kit for SPC58 B line. [Coming soon] Includes one evaluation board with SPC584B70E1	SPC584B70E1 SPC584B70E5
Chorus 4M	SPC58EC-DISP	E5	Discovery Kit for SPC58 C line. Includes one evaluation board with SPC58EC80E5	SPC58EC80E5
Chorus 6M	SPC58NG-DISP	E7	Discovery Kit for SPC58 NG line. Includes one evaluation board with SPC58NE84E7	SPC58NE84E7

SPC5 Premium Evaluation Boards

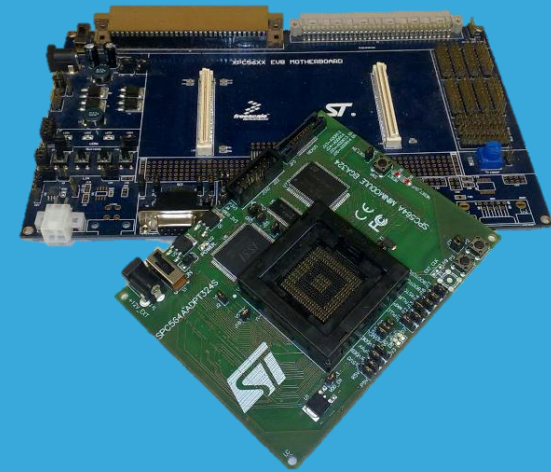
41

With SPC5 Premium boards developers can quickly evaluate all the functionalities of SPC5 automotive MCUs.

Adapter boards are available for each specific device line and package granting full access to all of the CPU's signals and motherboard peripherals for advanced development.

Supported by both SPC5 Studio and 3rd party software tools

**Modular approach
saves
development time
and costs**



Premium Evaluation Board Features

42

- Modular evaluation system for the SPC5 microcontroller's families
- Single 12V external power supply
- Four on-board regulators
- 5.0 V, 3.3 V and 1.25 V switching regulators
- 5 V linear regulator for the ADC supplies and references
- Master power switch and regulator status LEDs
- Two 240-way high-density expansion connectors for MCU daughter cards
- All MCU signals readily accessible at a port-ordered group of 0.1" pitch headers
- RS232/SCI physical interface and standard DB9 female connector
- FlexRAY channels interface with a DB9 connector (for both transceivers) and alternative connectors
- LINFlexD interface with two different style connectors
- High speed CAN channels and two female standard DB9 connectors
- Ethernet interface with a standard RJ45 Ethernet connector
- Potentiometer for analog voltage input
- User switches and LED's freely configurable

Premium Evaluation Boards

SPC56 Family, B, C and D Lines

43

Line	Part number	Description	Supported devices
B line	SPC560B64A100S	Socketed mini module for B-Line, C-Line and D-Line in LQFP100 package.	SPC560B40L3 SPC560B50L3 SPC560B54L3 SPC560B60L3 SPC560C40L3 SPC560C50L3 SPC560D30L3 SPC560D40L3
	SPC560B64A208S	for B-Line in BGA208 package.	SPC560B50B2 SPC560B64B2
	SPC560BADPT144S	for B-Line in LQFP144 package.	SPC560B40L5 SPC560B50L5 SPC560B54L5 SPC560B60L5 SPC560B64L5
	SPC560BADPT176S	for B-Line in LQFP176 package	SPC560B64L7
	SPC560BADPT64S	for B-Line in LQFP64 package.	SPC560D30L1 SPC560D40L1
C line	SPC56EC74A176S	for Bolero 3M in LQFP176 package..	SPC56EC74L7
	SPC56EC74A208QS	for Bolero 3M in BGA208 package	SPC56EC74B1
	SPC56EC74A256S	for Bolero 3M in BGA256 package	SPC56EC74B2
	SPC560B64A100S	for B-Line, C-Line and D-Line in LQFP100 package.	SPC560B40L3 SPC560B50L3 SPC560B54L3 SPC560B60L3 SPC560C40L3 SPC560C50L3 SPC560D30L3 SPC560D40L3

*Socketed mini module Requires SPC56XXMB

Premium Evaluation Boards

SPC56 Family, B, C and D Lines

44

Line	Part number	Description	Supported devices
D line	SPC560B64A100S	for B-Line, C-Line and D-Line in LQFP100 package.	SPC560B40L3 SPC560B50L3 SPC560B54L3 SPC560B60L3 SPC560C40L3 SPC560C50L3 SPC560D30L3 SPC560D40L3
	SPC560BADPT64S	for B-Line in LQFP64 package. Requires SPC56XXMB.	SPC560D30L1 SPC560D40L1
All lines	SPC56XXMB	Motherboard for all SPC56x microcontrollers. Includes: universal power supply, USB cable, documentation CD.	SPC56 family

Premium Evaluation Boards

SPC56 Family, M and A Lines

45

Line	Part number	Description	Supported devices
M line	SPC563M64A100S	Socketed mini module for M-Line in LQFP100 package.	SPC563M64L3
	SPC563M64A176S	for M-Line and A-Line in LQFP176 package.	SPC563M60L7 SPC563M64L7 SPC564A80L7 SPC564A70L7
	SPC563MADPT144S	for M-Line in LQFP144 package.	SPC563M60L5
	SPC563MADPT176S	for M-Line and A-Line in LQFP176 package.	SPC563M60L7 SPC563M64L7 SPC564A80L7 SPC564A70L7
	SPC563MADPT208S	for M-Line in BGA208 package.	SPC563M60B2 SPC563M64B2
A line	SPC563M64A176S	for M-Line and A-Line in LQFP176 package.	SPC563M60L7 SPC563M64L7 SPC564A80L7 SPC564A70L7
	SPC564AADPT208S	for Andorra/Monaco in BGA208 package.	SPC563M60B2 SPC563M64B2 SPC564A80B2
	SPC564AADPT324S	for Andorra in BGA324 package.	SPC564A70B4 SPC564A74B4 SPC564A80B4
All lines	SPC56XXMB	Motherboard for all SPC56x microcontrollers. Includes: universal power supply, USB cable, documentation CD.	SPC56x

Premium Evaluation Boards

SPC56 Family, P and L Lines

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Line	Part number	Description	Supported devices
P line	SPC560PADPT100S	Socketed mini module for P-Line single and dal core in LQFP100 package.	SPC560P34L3 SPC560P40L3 SPC560P44L3 SPC560P50L3 SPC560P60L3 SPC56AP54L3 SPC56AP60L3
	SPC560PADPT144S	for P-Line single and dal core in LQFP144 package.	SPC560P50L5 SPC560P60L5 SPC56AP60L5
	SPC560PADPT176S	for P-Line dual core in LQFP176 package.	SPC56AP60L7
	SPC560PADPT64S	for P-Line in LQFP64 package.	SPC560P34L1 SPC560P40L1 SPC560P50L1
L line	SPC56ELADPT100S	for L-Line in LQFP100 package.	SPC56EL54L3 SPC56EL60L3 SPC56EL70L3
	SPC56ELADPT144S	for L-Line in LQFP144 package.	SPC56EL60L5
All lines	SPC56XXMB	Motherboard for all SPC56x microcontrollers. Includes: universal power supply, USB cable, documentation CD.	SPC56x

Premium Evaluation Boards

SPC57 Family, L, K and S Lines

47

Line	Part number	Description	Supported devices
S line	SPC570SADPT100S	Socketed mini module for SPC57 V and S lines in eLQFP100 package.	SPC570S50E3 SPC574S60E3
	SPC570SADPT64S	for SPC57 V line in eLQFP64 package.	SPC570S50E1
	SPC574SADPT144S	for SPC57 S line in eLQFP144 package.	SPC574S60L5
	SPC574SADPT244S	for SPC57 S line in BGA244 package.	SPC57 S line
L line	SPC572LADPT100S	for SPC57 L line in eLQFP100 package.	SPC572L64E3
	SPC572LADPT80S	for SPC57 L line in eLQFP80 package.	SPC572L64E2
K line	SPC574KADPT144S	for SPC57 K line in eLQFP144 package.	SPC574K7XE5
	SPC58XXADPT176S	for SPC57 K line and SPC58 E/G/N lines in eLQFP176 package.	SPC574K7XE7
All lines	SPC57XXMB	Motherboard for all SPC57xx microcontrollers. Includes: universal power supply, documentation CD.	SPC57x SPC58x

Premium Evaluation Boards

SPC58 Family, E and N Lines

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Line	Device	Part number	Product
E line	SPC58xExxC3	SPC58XXADPT292S	Socketed mini module for SPC58 E/G/N lines in BGA292 package. Requires SPC57XXMB.
	SPC58xExxE7	SPC58XXADPT176S	Socketed mini module for SPC57 K line and SPC58 E/G/N lines in eLQFP176 package. Requires SPC57XXMB.
	SPC58xExxE5	SPC58XXADPT144S	Socketed mini module for SPC58 B/C/E/G lines in eTQFP144 package. Requires SPC57XXMB.
N line	SPC58xNxxC3	SPC58XXADPT292S	Socketed mini module for SPC57 M and SPC58 E/G/N lines in BGA292 package. Requires SPC57XXMB.
	SPC58xExxE7	SPC58XXADPT176S	Socketed mini module for SPC57 K/M line and SPC58 E/G/N lines in eLQFP176 package. Requires SPC57XXMB.
SPC58 family	SPC57 and SPC58 families	SPC57XXMB	Motherboard for all SPC57 and SPC58 microcontrollers.

Premium Evaluation Boards

SPC58 Family, B, C, G and H Lines

40

Line	Device	Part number	Description
G line	SPC58xGxxC3	SPC58XXADPT292S	Socketed mini module for SPC58 E/G/N lines in BGA292 package. Requires SPC57XXMB.
	SPC58xGxxE7	SPC58XXADPT176S	Socketed mini module for SPC57 K line and SPC58 E/G/N lines in eLQFP176 package. Requires SPC57XXMB.
	SPC58xGxxE5	SPC58XXADPT144S	Socketed mini module for SPC58 B/C/E/G lines in eTQFP144 package. Requires SPC57XXMB.
C line	SPC58xCxxC3	SPC58XXCDPT292S	Socketed mini module for SPC58 C line in BGA292 package. Requires SPC57XXMB.
	SPC58xCxxE7	SPC58XCADPT176S	Socketed mini module for SPC58 B/C line in eLQFP176 package. Requires SPC57XXMB.
	SPC58xCxxE5	SPC58XXADPT144S	Socketed mini module for SPC58 B/C/E/G lines in eTQFP144 package. Requires SPC57XXMB.
	SPC58xCxxE3	SPC58XXADPT100S	Socketed mini module for SPC58 B/C lines in eTQFP100 package. Requires SPC57XXMB.
B line	SPC584BxxE7	SPC58XXCDPT176S	Socketed mini module for SPC57 B/C line in eLQFP176 package. Requires SPC57XXMB.
	SPC584BxxE5	SPC58XXADPT144S	Socketed mini module for SPC58 B/C/E/G lines in eTQFP144 package. Requires SPC57XXMB.
	SPC584BxxE3 SPC582BxxE3	SPC58XXADPT100S	Socketed mini module for SPC58 B/C lines in eTQFP100 package. Requires SPC57XXMB.
	SPC584BxxE1 SPC582BxxE1	SPC58XXADPT64S	Socketed mini module for SPC58 B line in eTQFP64 package. Requires SPC57XXMB.
	SPC582BxxQ2	SPC58XXADPT48S	[Available soon] Socketed mini module for SPC58 B line in QFN32 package. Requires SPC57XXMB.
	SPC584BxxE7	SPC584BADPT176S	Socketed mini module for SPC58 4B line in QFP176 package. Requires SPC57XXMB.
H line	SPC58NHxxC5	SPC58NHADPT386S	Socketed mini module for SPC58 H line in BGA386 package. Works with SPC57XXMB
	SPC58NHxxE7	SPC58NHADPT176S	[Available soon] Socketed mini module for SPC58 H line in QFP176 package. Works with SPC57XXMB
SPC58 family	SPC57 and SPC58 families	SPC57XXMB	Motherboard for all SPC57 and SPC58 microcontrollers.

*Socketed mini module Requires SPC57XXMB

STMicroelectronics and third parties solutions enable full speed tracing, monitoring and calibration of SPC5 microcontrollers

A comprehensive set of emulation boards and accessories allows emulation of all SPC5 high-level devices

ST and third parties offer complete solutions as Memory/Debug Top Boards, Poly-Pod and interposers complete the offer

**High speed
solutions for
tracing,
monitoring and
bypassing**



What is Emulation for?

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- **Calibration**
Allows to “configure” ECU parameters and adapt them to a specific controlled system
- **Monitoring**
Allows to monitor ECU parameters and values at runtime to observe the system
- **Bypassing**
Allows to bypass the algorithms of the ECU with data computed on an external host
- **Advanced development**
Allows to perform code and data tracing to analyze issues, validate behavior or measure performances

SPC56 Emulation Solution

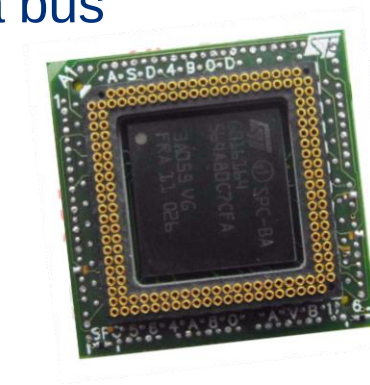
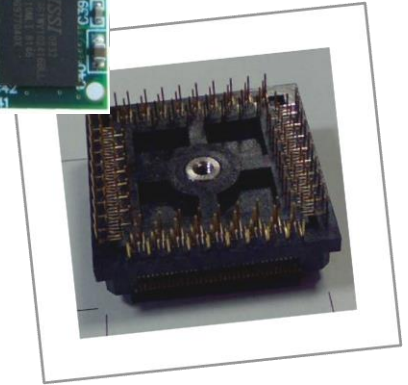
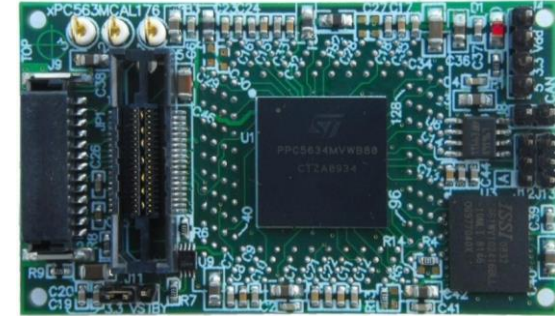
52

- **Serial Calibration**

- JTAG: using Debug Interface
- CAN: Using CCP/XCP
- Dual Port RAM for memory emulation

- **Parallel Calibration :Vertical**

- Direct Access to ECU memory with parallel Address/Data bus
- Dual Port RAM for memory emulation



SPC56 Emulation Boards

SPC56 Family, A and M Lines

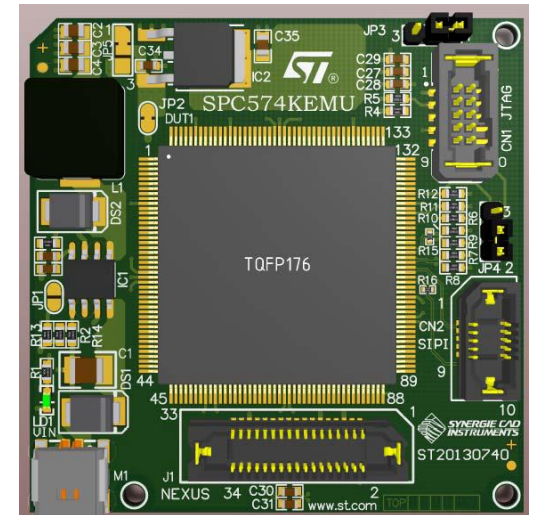
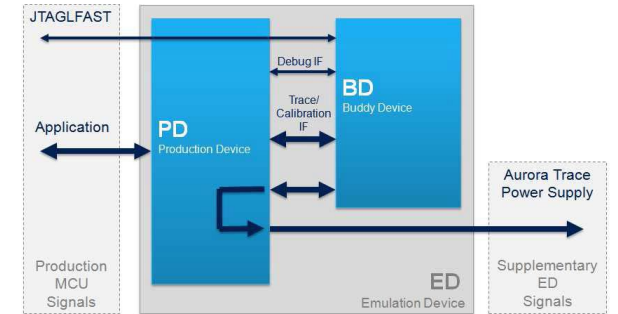
53

Line	Device	Part number	Description
M line	SPC563M64L5	SPC563M64AVB144	VertiCal Base Board for M-Line target in LQFP144 package.
	SPC563M64L7	SPC563M64AVB176	VertiCal Base Board for M-Line target in LQFP176 package.
	SPC563M64L5	SPC563M64CAL144	Calibration System for Monaco 1M5 in LQFP144 target package.
	SPC563M64L7	SPC563M64CAL176	Calibration System for Monaco 1M5 in LQFP176 target package.
	SPC563M64L5 SPC563M64L7	SPC56XVTOP-M	RAM/Debug Top Board for Monaco VertiCal Base boards.
A line	SPC564A70L7	SPC564A70AVB176	VertiCal base board for A-Line 2M in LQFP176 target package.
	SPC564A70L7	SPC564A70CAL176	Calibration system for A-Line 2M in LQFP176 target package.
	SPC564A80L7	SPC564A80AVB176	VertiCal base board with Advanced Interconnect socket for Andorra 4M in LQFP176 target package.
	SPC564A80B4	SPC564A80AVB324	VertiCal base board for Andorra 4M in BGA324 target package.
	SPC564A80L7	SPC564A80CAL176	Calibration system for target Andorra 4M in QFP176 package.
	SPC564A70L7 SPC564A80L7 SPC564A80B4	SPC56XVTOP-A	RAM/Debug Top Board for Andorra VertiCal Base boards.
All lines	All devices	POLYPOD-BGA324	TQ-PolyPod for BGA324 targets.
	All devices	POLYPOD-TQ144	TQ-PolyPod for QFP144 targets.
	All devices	POLYPOD-TQ176	TQ-PolyPod for QFP176 targets.

SPC57K&SPC58E/N Emulation Concept

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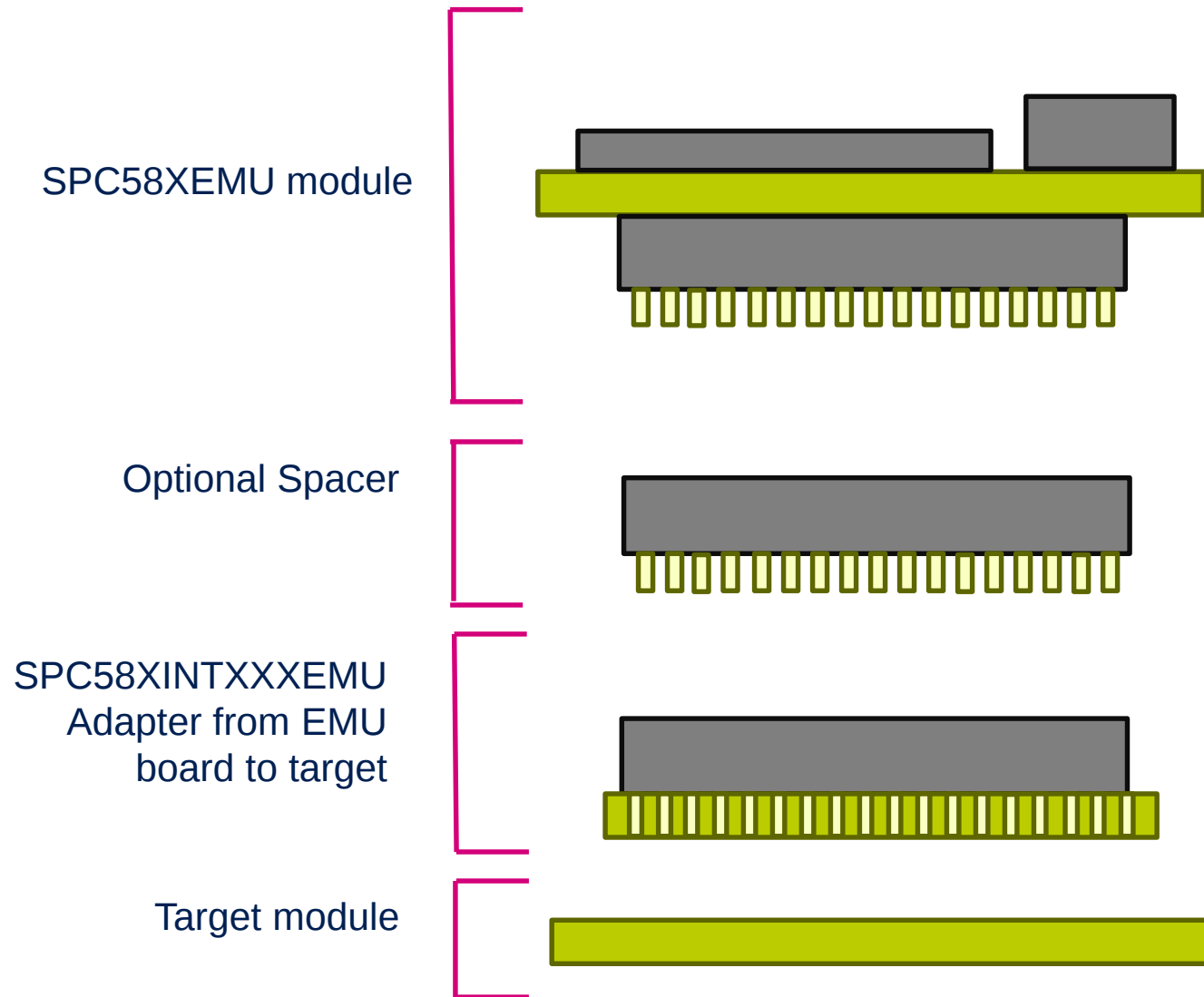
- Present a new strategy for debug and calibration operations.
- Emulation Board is for Emulation and Calibration purpose.
- The product is designed by using an Emulation Device (ED) to substitute the Production Device (PD) on an ECU version used during engine calibration.
- The buddy device integrates additional RAM, faster interfaces and improved debug features.
- The emulation/calibration board do not need external SRAM, since it is included in the Emulation Device.
- The K2 Emulation board is designed to Emulate both eTQFP176 and eTQFP144 production devices. The different footprint target will impact the choice of the adapter to buy.
- The Emulation Device in FQ216 package is mounted on board.



Target board adapter

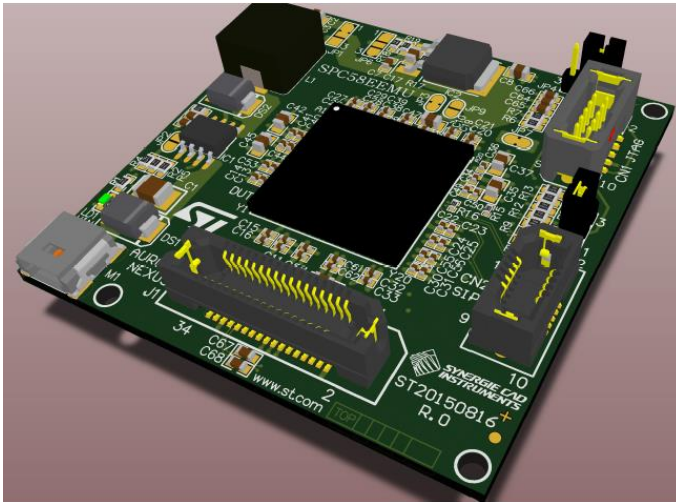
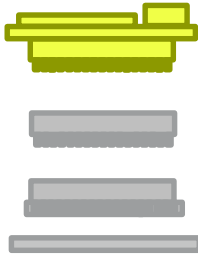
SPC58 E/G/N Lines Emulation System

55



SPC58XEMU Emulation Boards

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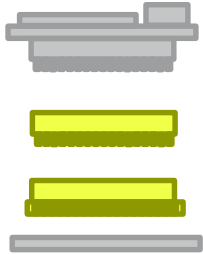
Main Features

- Allow to emulate SPC58 E/G and N line devices.
- Dual supply: from target or 12V external.
- Onboard 5V regulator for Buddy device.
- JTAG, LFAST and High speed Nexus serial (Aurora) interfaces.
- SIPI connector.
- Optional target adapters for mounting.

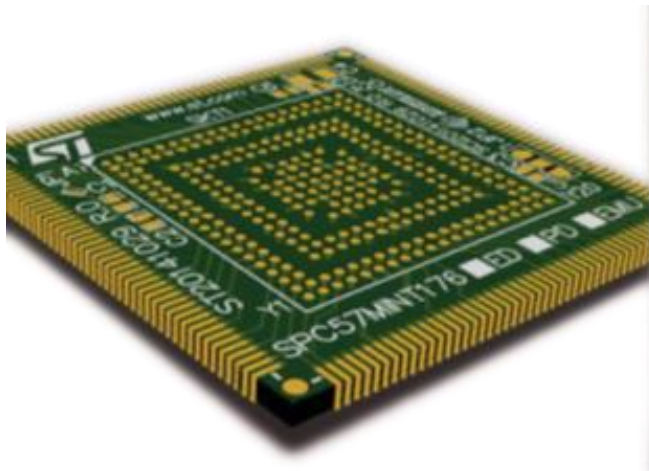
Line	Part number	Description
SPC58 E line	SPC58EEMU	Emulation module for SPC58 E lines.
SPC58 G line	SPC58GEMU	Emulation module for SPC58 G lines.
SPC58 N line	SPC58NEMU	[Emulation module for SPC58 N Line.

SPC58xEMU Mounting Options

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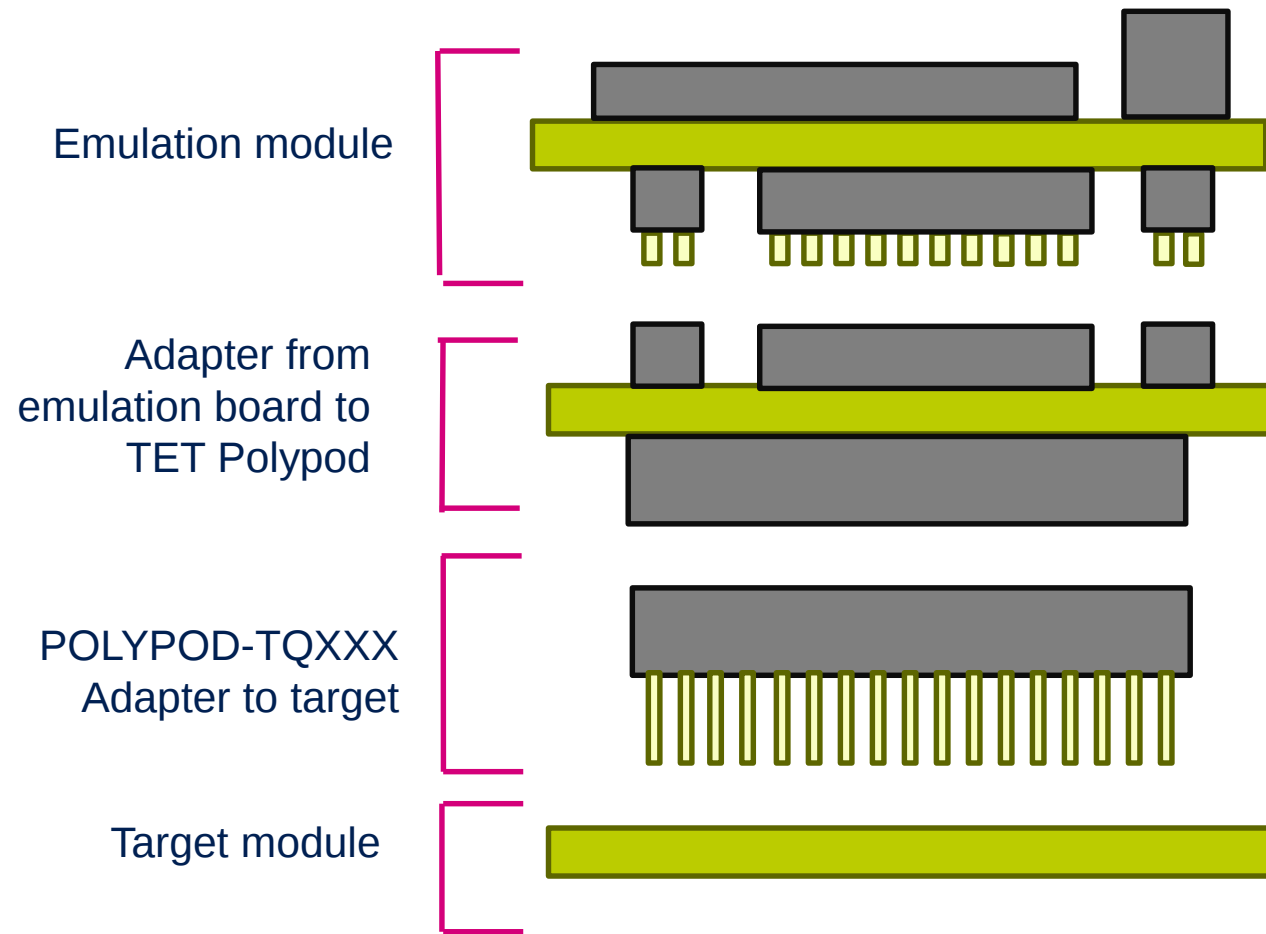
- The SPC58XEMU can be easily mounted on customer's module using an adapter.
- ST offers a specific adapter for each supported target.
- To increase height over PCB a compatible interposer can be used, directly available from socket manufacturers.



Part Number	Description
SPC57MINT292EMU	Interposer for SPC58E/G/NEMU emulation modules targeting BGA292 packages.
SPC57MINT176EMU	Interposer for SPC58E/G/NEMU emulation modules targeting eQFP176 packages.
SPC58XINT144EMU	Interposer for SPC58GEMU emulation modules targeting eQFP144 packages.

SPC58 B/C Lines Emulation System

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SPC58 ISystem Emulation Adapters

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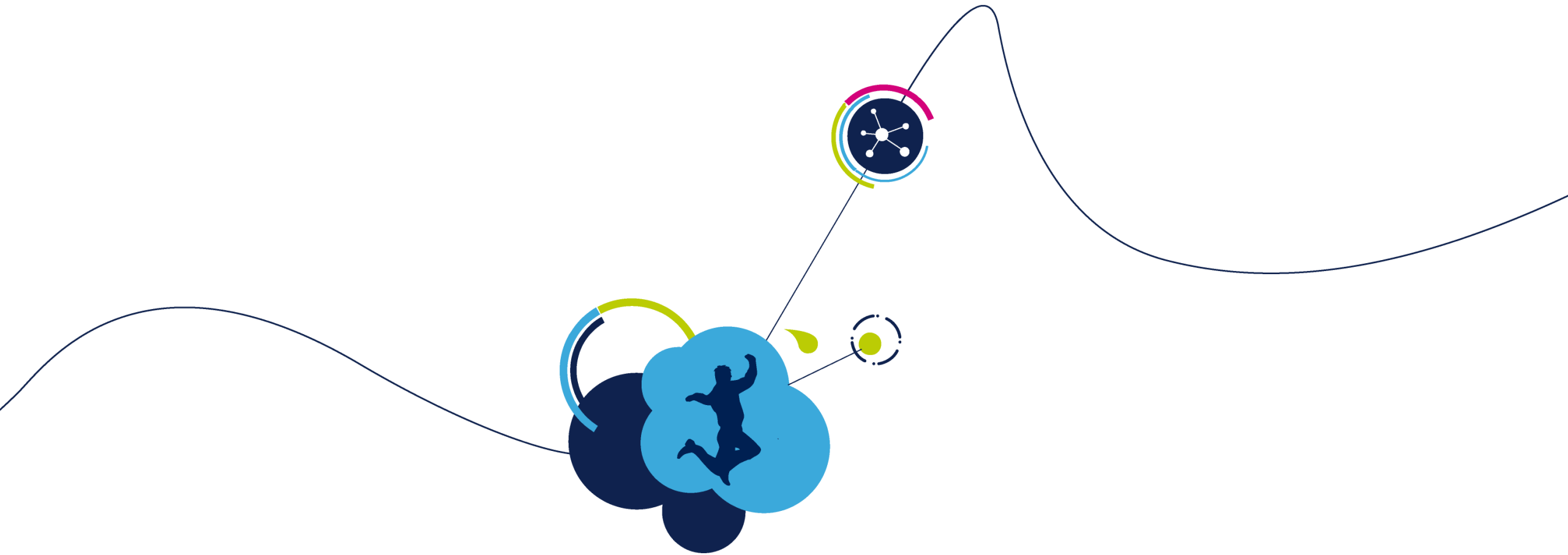
- Directly available from iSYSTEM
- iSystem has released their first emulation adapters for the SPC58xB/C line of automotive microcontrollers.
- The emulation adapter primary use case is **providing Nexus trace functionality** for SPC58xB/C line devices in the packages where Nexus trace port is not available.
- The emulation adapter is based on the superset device and provides the adaptation to the other target packages.
- <https://www.isystem.com/mcu-search/stm-mcus/st-microelectronics-power-architecture-overview.html>
- <https://www.isystem.com/products/hardware/emulation-debug-adapters/emulation-adapters.html>

Line	Part number	Description
SPC58 C line	IEA-SPC58EC	Emulation adapter for SPC58 C line.
SPC58 2B line	IEA-SPC582B	Emulation module for SPC58 2B line.
SPC58 4B line	-	[Available soon] Emulation module for SPC58 4B line.

SPC 57/58 Emulation Boards

SPC57 Family K Lines, SPC58 Family E/G and N Lines

Line	Device	Part number	Description
SPC57 K line	SPC574KxxE7 SPC574KxxE5	SPC574KEMU	Emulation module for SPC57 K Line.
	SPC574KxxE7	SPC57KINT176EMU	Interposer for SPC574KEMU emulation module targeting eQFP176 packages.
	SPC574KxxE5	SPC57KINT144EMU	Interposer for SPC574KEMU emulation module targeting eQFP144 packages.
SPC58 E line	SPC58xExxC3 SPC58xExxE7	SPC58EEMU	Emulation module for SPC58 E/G lines.
	SPC58xExxC3	SPC57MINT292EMU	Interposer for SPC57EEMU and SPC58EEMU emulation modules targeting BGA292 packages.
	SPC58xExxE7	SPC57MINT176EMU	Interposer SPC57EEMU and SPC58EEMU emulation modules targeting eQFP176 packages.
SPC58 G line	SPC58xGxxC3 SPC58xGxxE7	SPC58GEMU	Emulation module for SPC58 E/G lines.
	SPC58xGxxC3	SPC57MINT292EMU	Interposer for SPC57EEMU and SPC58EEMU emulation modules targeting BGA292 packages.
	SPC58xGxxE7	SPC57MINT176EMU	Interposer for SPC57EEMU and SPC58EEMU emulation modules targeting eQFP176 packages.
SPC58 N line	SPC58xNxxC3 SPC58xNxxE7	SPC58NEMU	Emulation module for SPC58 N Line.
	SPC58xNxxC3	SPC57MINT292EMU	Target board adapter for SPC57EEMU and SPC58EEMU emulation modules and BGA292 packages.
	SPC58xNxxE7	SPC57MINT176EMU	Target board adapter for SPC57EEMU and SPC58EEMU emulation modules and BGA292 packages

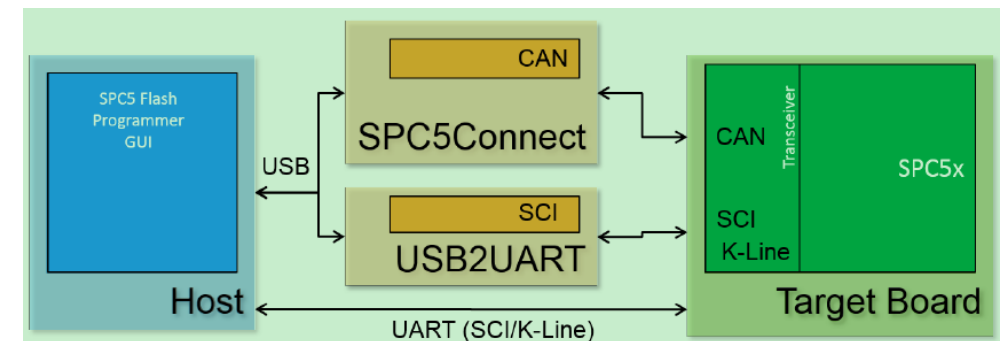
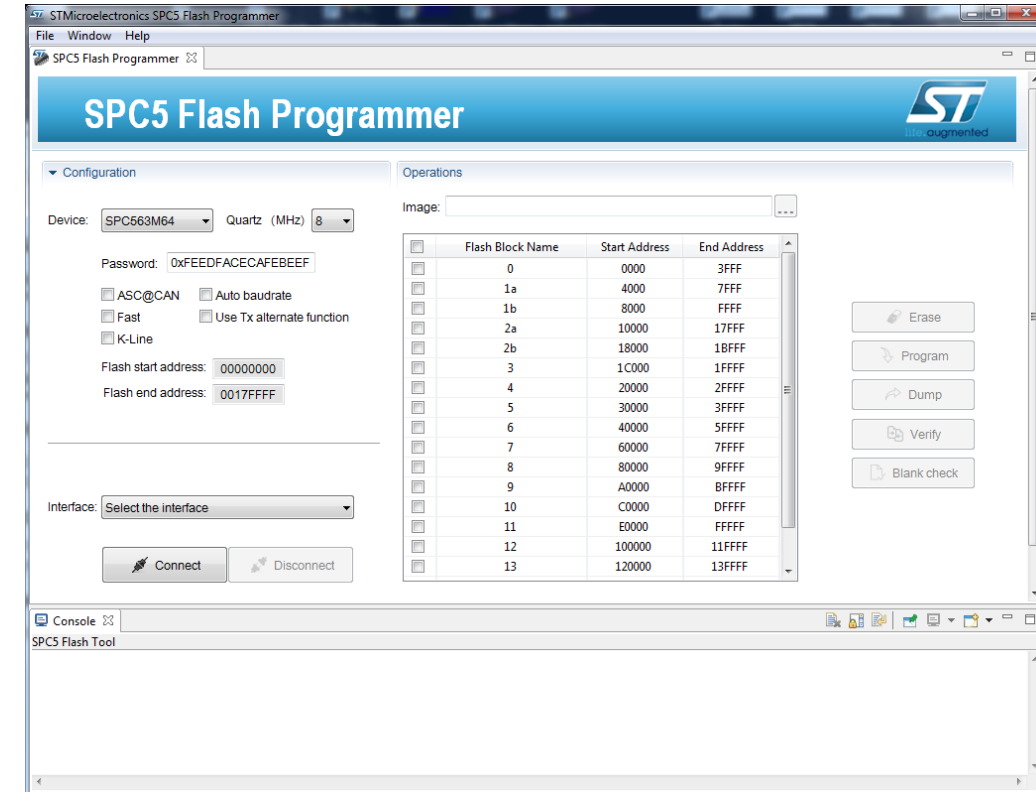


ST Flash Programmer Tools

SPC5 Flash Programmer

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- SPC5-Flash Programmer application manages flash operations on SPC5 MCU using the BAM/BAF functionality.
- The tool features are:
 - SPC56, SPC57 and SPC58 families support.
 - All operations supported: program, dump, erase, verify and blank check.
 - Multiple binary image format (s19, run, hex).
 - All memory sectors addressable separately.
 - Memory dump in hex format.
 - Censorship management.
 - SCI, K-Line and CAN interfaces.
- The top level diagram of the SPC5 Flash Programmer.
- The latest version is V2.7.1



SPC5 Flash Programmer

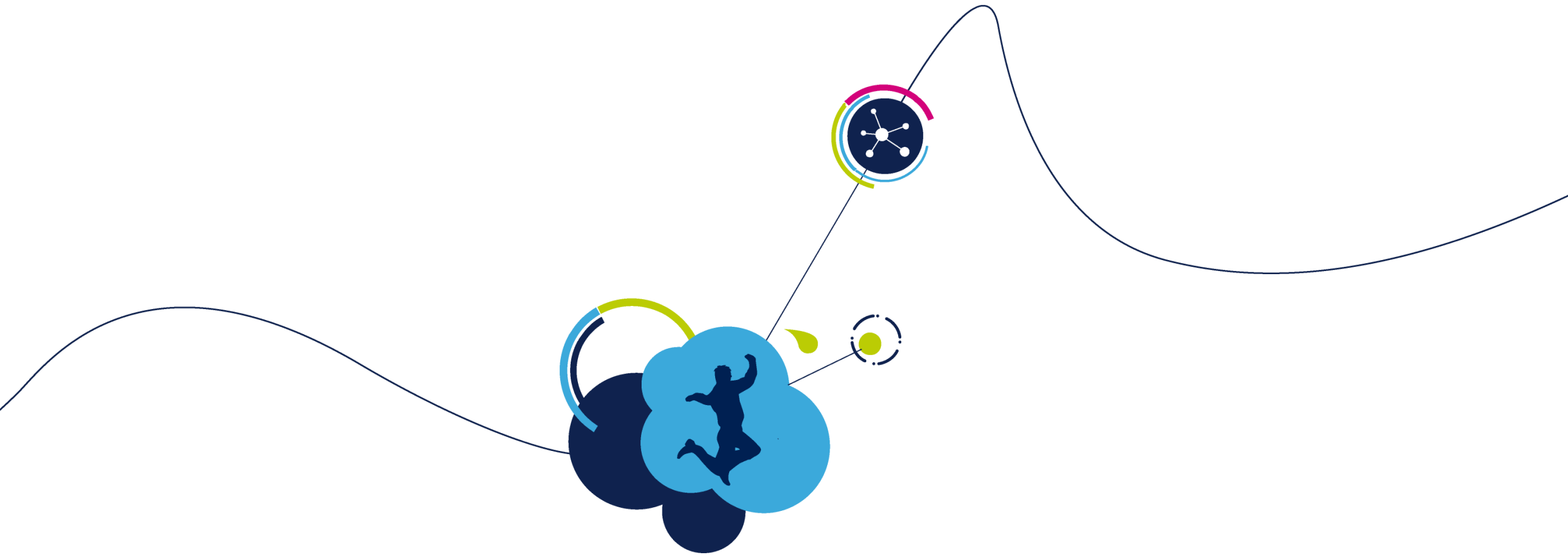
Supported Devices

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Line	Target	CAN	SCI	K Line
L line	SPC56ELxx	Y	Y	N
	SPC564Lxx	Y	Y	N
P line	SPC560P34	N	Y	Y
	SPC560P4x	Y	Y	Y
	SPC560P50	Y	Y	Y
	SPC56AP60	Y	Y	Y
D line	SPC560D30	N	Y	Y
	SPC560D40	Y	Y	Y
B/C lines	SPC560Bxx	Y	Y	Y
	SPC560Cxx	Y	Y	Y
	SPC564B64	Y	Y	N
	SPC564B7x	Y	Y	N
	SPC56EC64	Y	Y	N
	SPC56EC7x	Y	Y	N
	SPC563M64	Y	Y	Y
K2	SPC574K72	N	20, 40 MHz (ASC@CAN)	N
Eiger	SPC58NE84	N	20, 40 MHz (ASC@CAN)	N
Bernina	SPC58NN84	N	20, 40 MHz	N
Chorus 4M	SPC58xC80	N	20, 40 MHz	N
	SPC58xC74	N	20, 40 MHz	N
	SPC58xC70	N	20, 40 MHz	N
Chorus 1M	SPC582B60	N	20, 40 MHz	N
	SPC582B54	N	20, 40 MHz	N
	SPC582B50	N	20, 40 MHz	N

- A programmable USB interface designed to connect a PC to development hardware via automotive communications channels such as CAN, SCI, LIN and K-Line.
- The included extension flat cable with the 14 pin header connector and the DB9 connector makes possible to easily connect a daughter board or wrapping board for a specific application.
- SPC5Connect can be used together with SPC5Flashprogrammer to realize the Serial boot from CAN interface.





3rd Party Development Tools Support

HighTec Technology for 32-bit Automotive MCUs

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HighTec has been selected by ST as Only Preferred Partner to support the current and the next generation of 32-bit Automotive Microcontrollers



Free Entry Toolchain
Automotive Graded Commercial Toolchain

- The **Free Entry Toolchain** offers to the customer a complete evaluation KIT for all the microcontroller
- The **Commercial Toolchain** supports the customer for the production



Ecosystem of 3rd Party Partners

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IDE/Compilers

- HighTec Compiler
- Green Hills MULTI
- Wind River Compiler

Debuggers/Emulators

- Lauterbach PowerTools
- PLS UDE/UADx
- iSystem ic3000/5000
- Entry level solutions from PLS, P&E and Keolabs

Calibration tools

- ETAS
- Vector
- dSPACE

Operating systems and software

- ElektroBit
- ArcCore
- ETAS
- Vector
- KPIT
- i-Soft

Security Solution

- ARGUS
- ESCRYPT

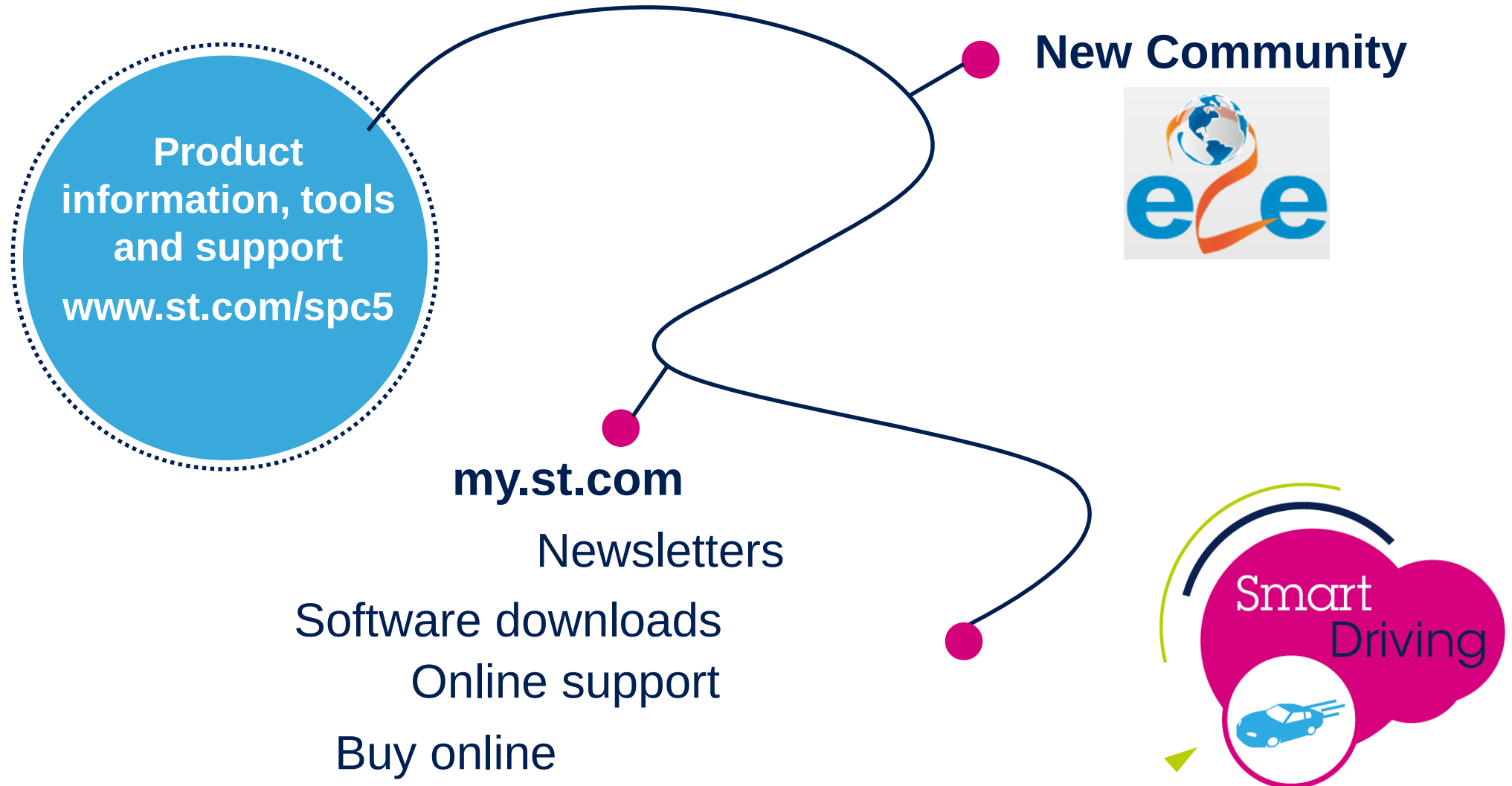
Visit also "ST Partner program" web page

- http://www.st.com/content/st_com/en/partner/partner-program.html



SPC5 Development Support

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Thank You!

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели,
кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



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