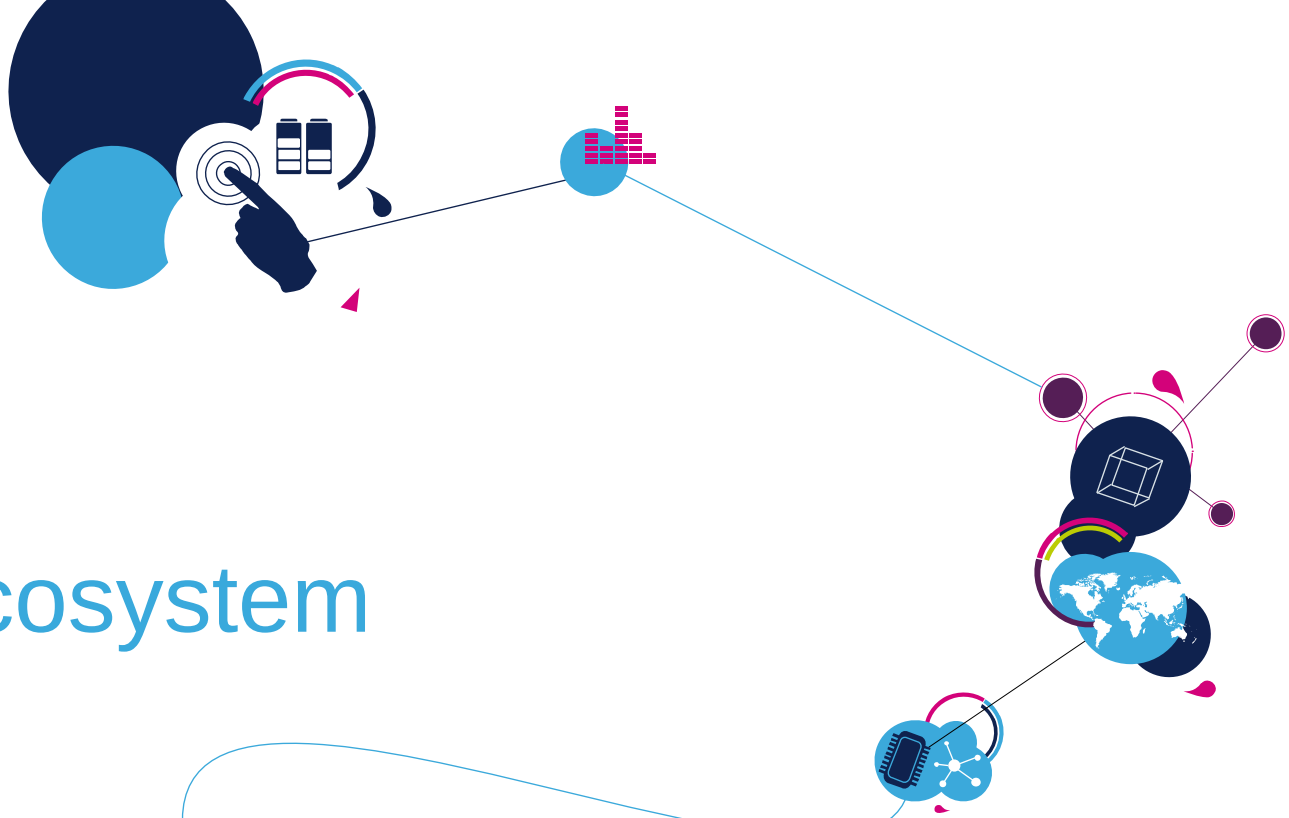
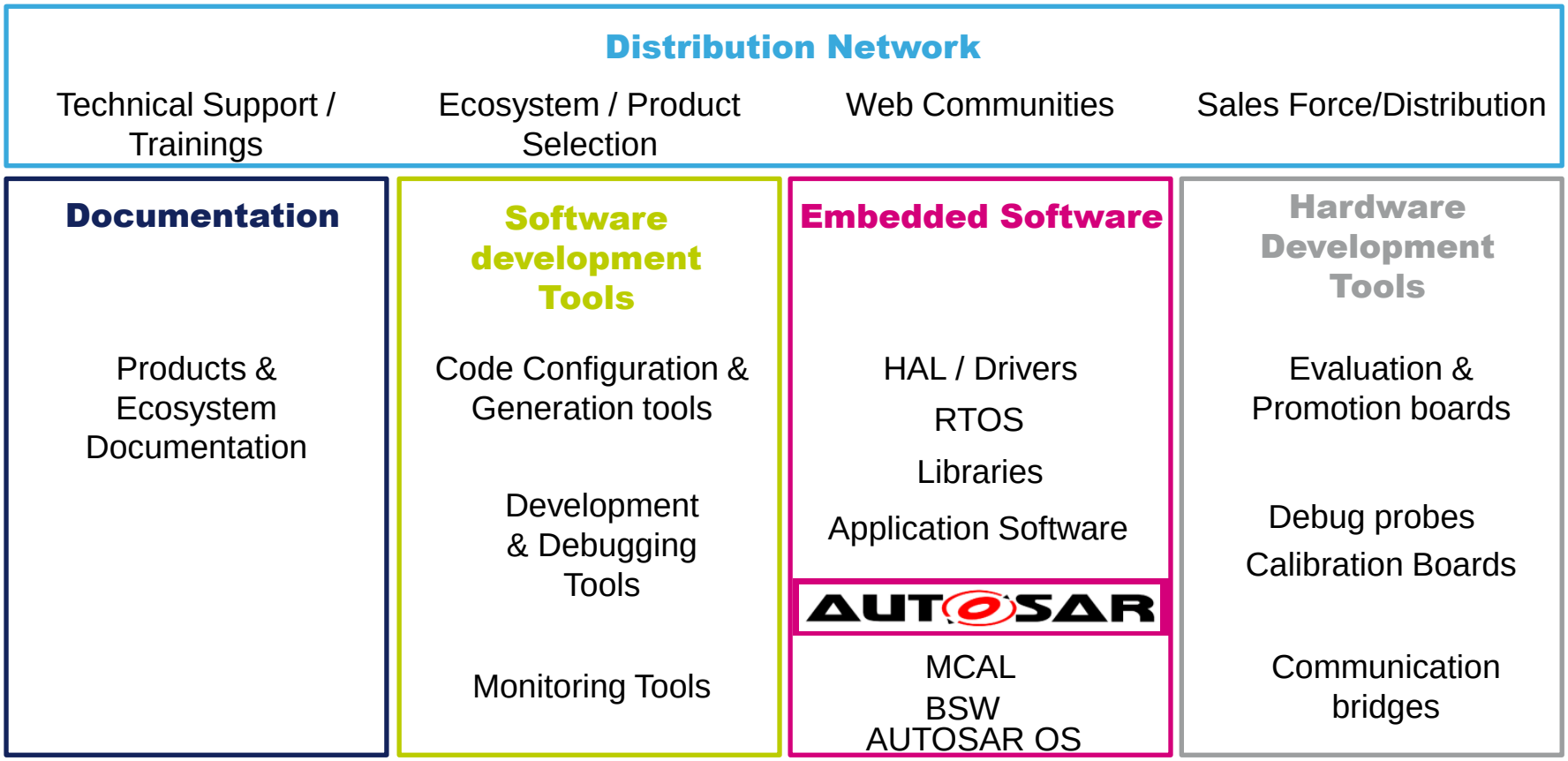


SPC56 Ecosystem

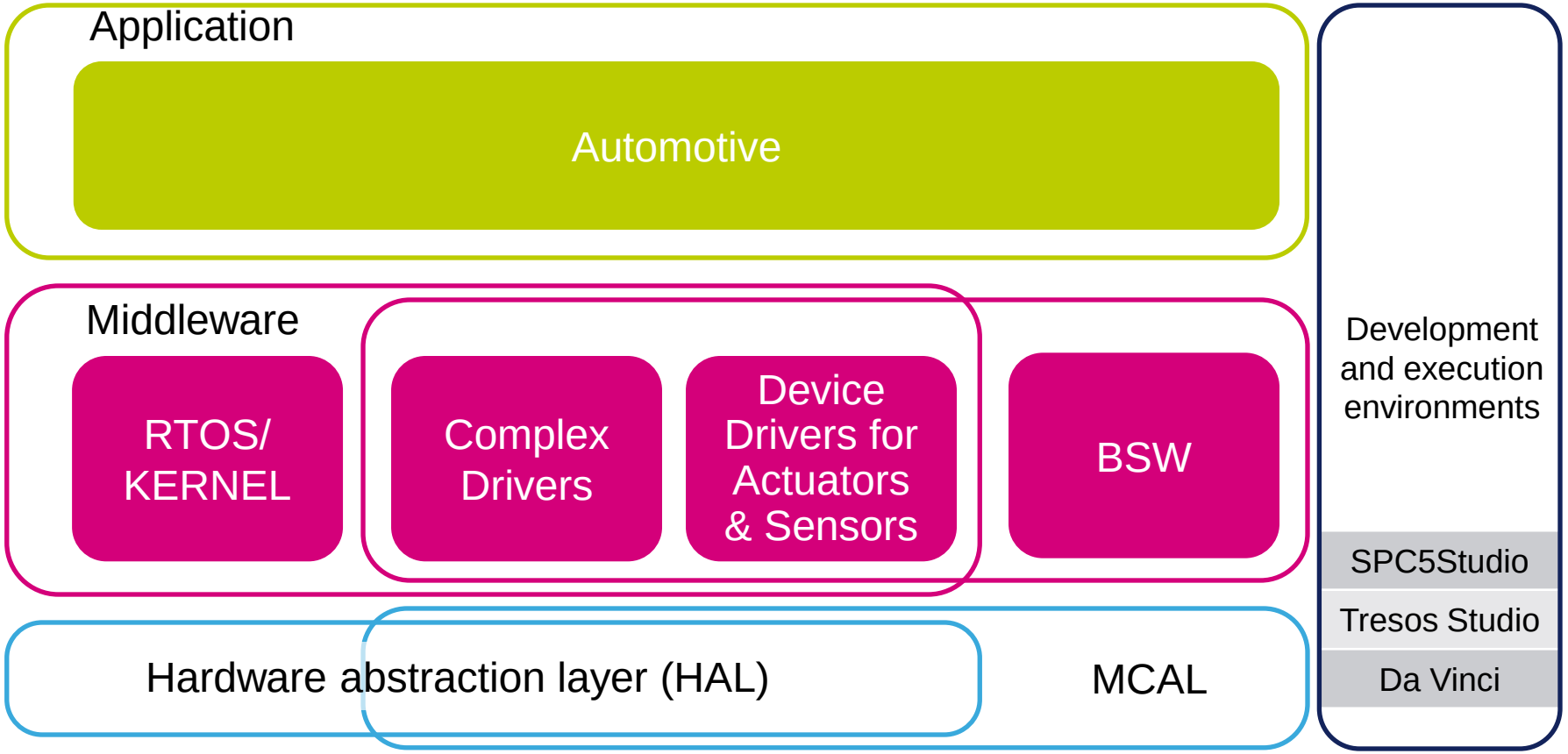
June 2014

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SPC56 Ecosystem



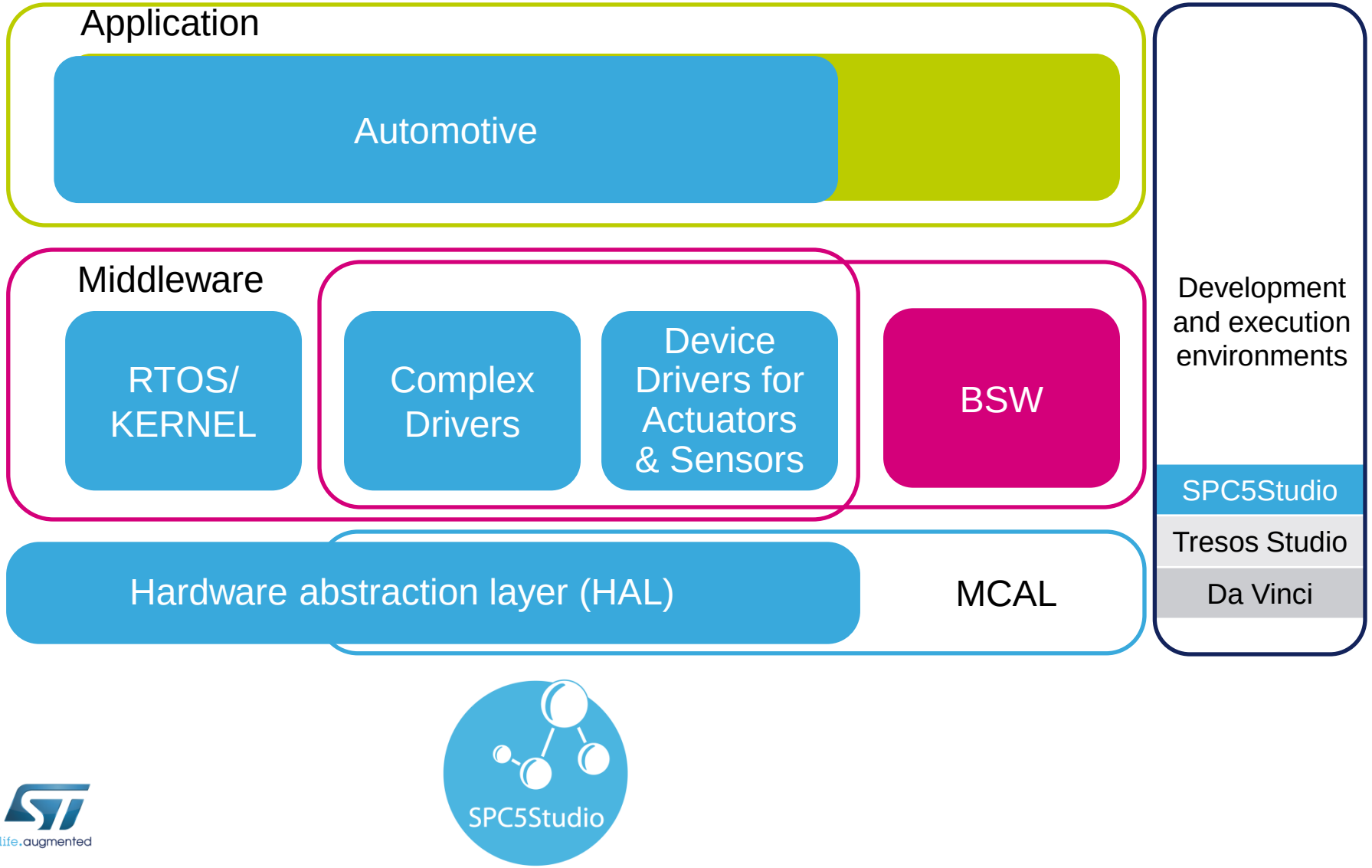
Embedded Software Solutions at all levels



vector AUTOSAR ETAS Green Hills SOFTWARE, INC. intecs the Brainware company

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Embedded Software with SPC5Studio





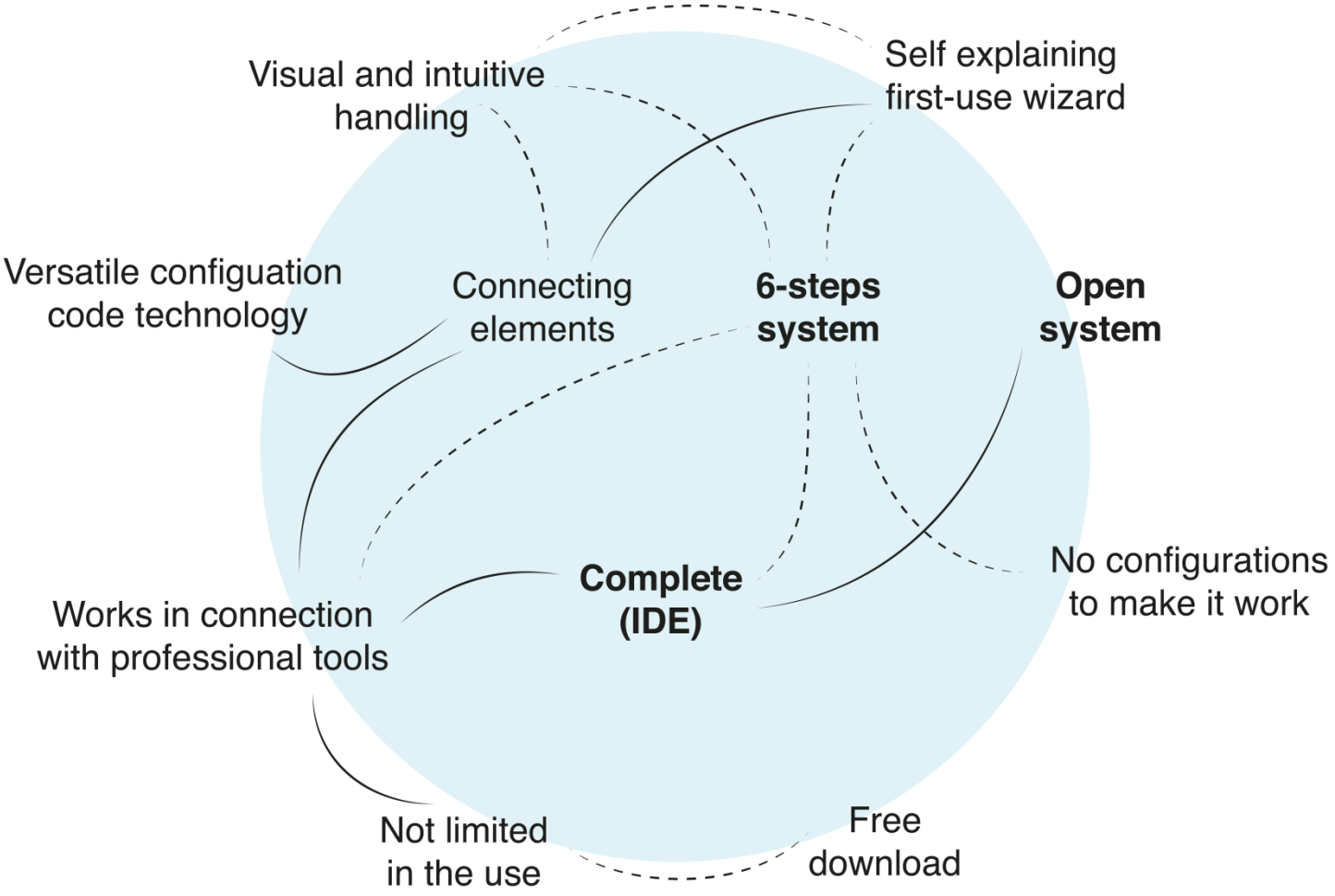
SPC5Studio

- SPC5Studio is an open framework to host several software packages and functionalities to simplify developers evaluation and application start-up
  - Dedicated Eclipse plug-ins
    - Combines, configure and solve dependencies among embedded software modules
    - Includes: Application examples selection Wizard, Pin Map Graphic Wizard, New Project Wizard, New Component Wizard.
  - Embedded Software
    - HAL, RTOS, Platform components, Application Example, Libraries are the key enablers
  - Pre-integrated compiler and debugger view
  - On-line help

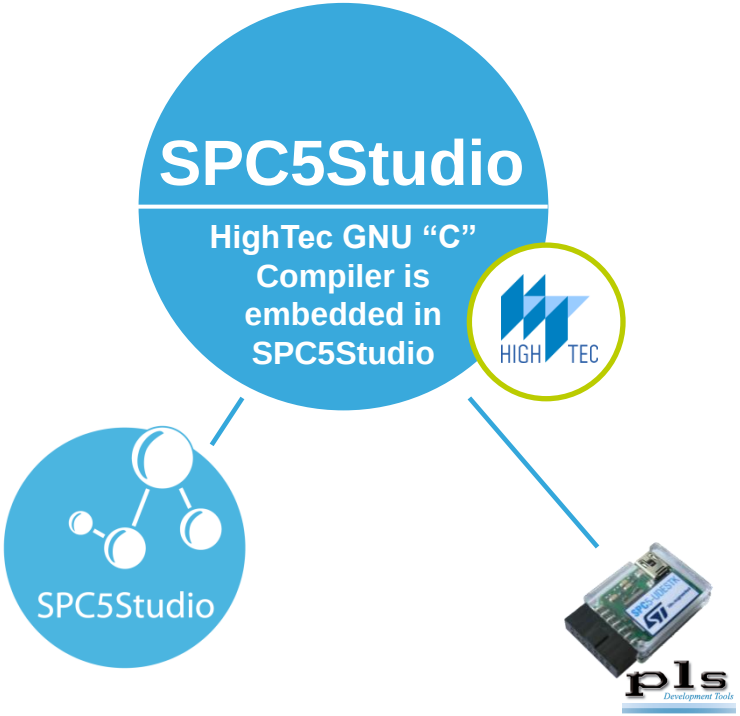
SPC5Studio offers a free, eclipse based, fully integrated development environment with full flexibility to integrate functional extension

Dedicated eclipse plug-ins inside SPC5Studio wrap software packages and libraries into Solutions

SPC5Studio concept map



SPC5Studio associated tools



- SPC5Studio framework include
  - HighTec GCC Compiler
  - PLS UDE low cost Debugger

To facilitate user in getting started at budget price

Download: SPC5Studio
www.st.com/spc5studio

↓

Install SPC5Studio and Activate Compiler

↓

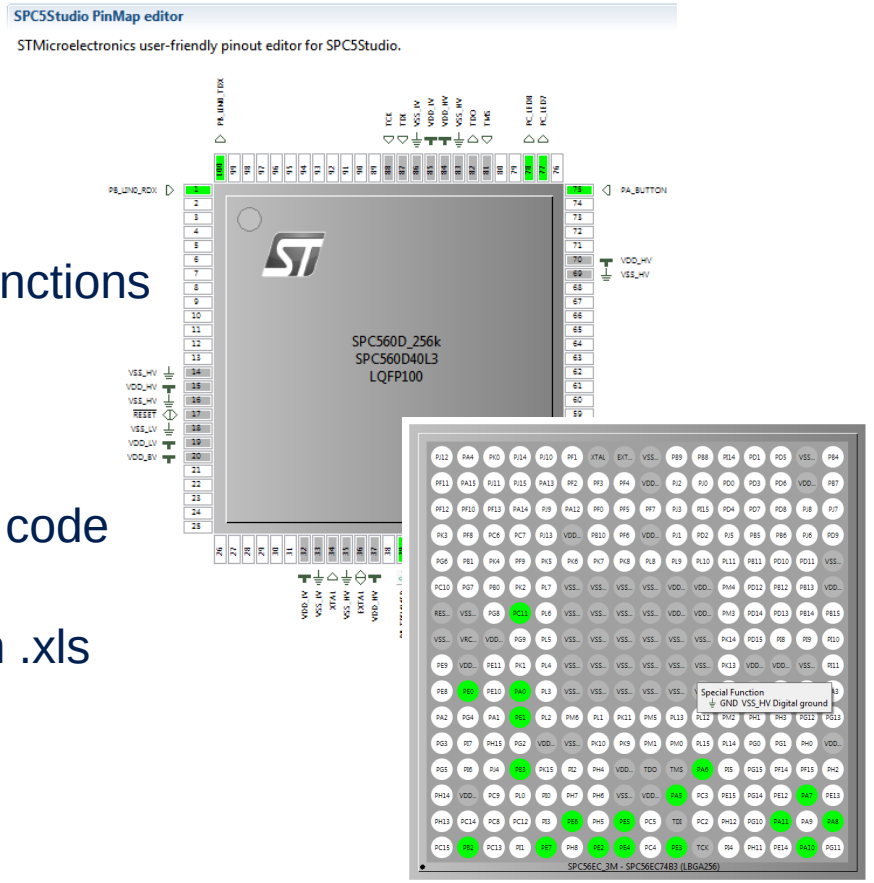
Download: Debugging software
www.pls-mc.com/spc5-udestk

↓

Install the UDE SW and add provided keys into UDE License Manager

New!

Pin Map Wizard



- Visual configuration of I/O alternate functions
- Automatic conflict checker
- Automatic generation of configuration code
- Stand-alone configuration summary in .xls format for customer application's PCB consistency check

Name	Model	Cost	Availability								KODO READY
			D	0B/0C	4B/EC	P	AP	L	M	A	
PIN MAP	Source	Free	Y	Y	Y	Y	Y				Y

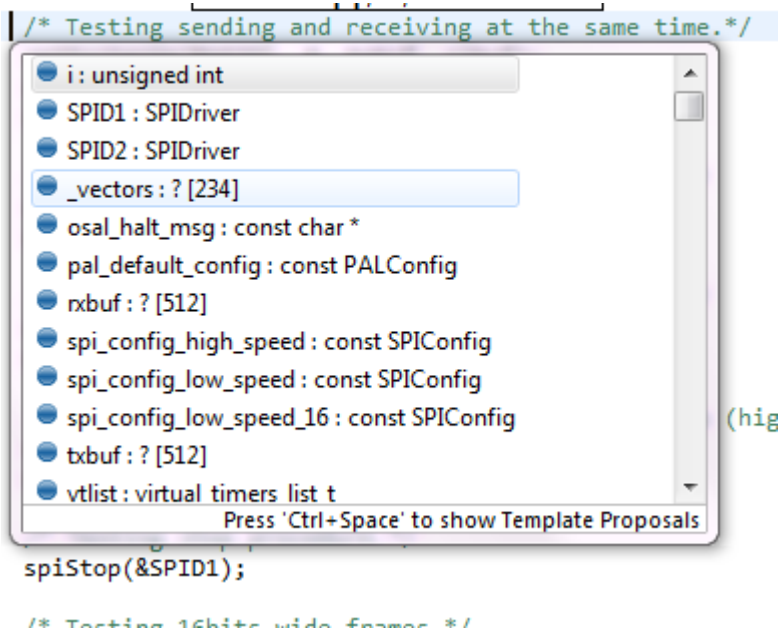
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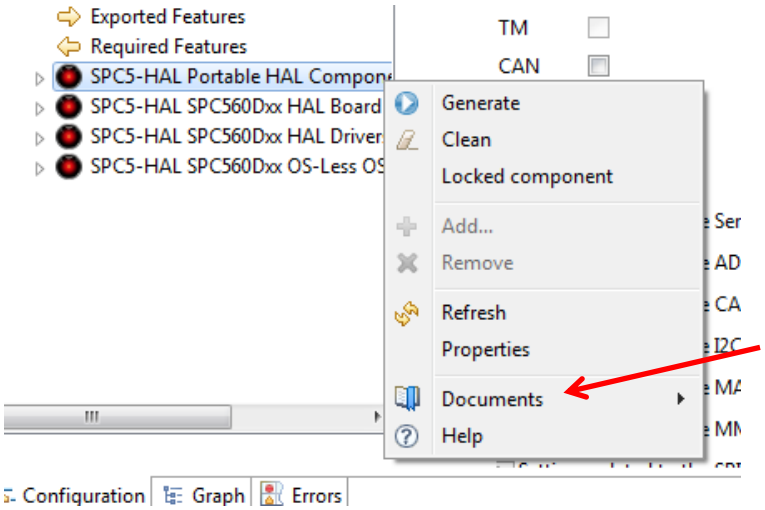
New!

Documentation Wizard

- On line help for
  - SPC5Studio components API
  - Hal drivers API and functionality

Eclipse built-in Template Proposals





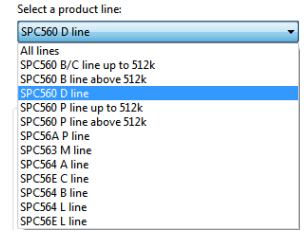
Right click on a component for documentation in chm format side by side with source code

Application examples Wizard

- Facilitate the selection of one or more fully working application examples for Evaluation boards
- More than 50 Application examples to jump-start the project
- Built with HAL drivers
- Added in from 2.0 release onward



Add product line filter





SPC560D-DIS

Select a target board

Select your search parameters:

Device	Drivers	RTOS
SPC560B50L5	PAL	ChibiOS/RT
SPC560B40L1	Serial	OSLess
	ADC	
	CAN	
	SPI	
	ICU	

Select
- a **Device** or
- a **Driver** or
- an **RTOS**

Select an example

Application Name	Description	Device	Drivers	RTOS
SPC560BCxx OS-Less Test Application	Test application for the SPC560BCxx created using th...	SPC560B5...	PAL Serial	OSLess
SPC560BCxx OS-Less PWM-ICU Test Ap...	Test application for the SPC560BCxx created using th...	SPC560B5...	PAL ICU P...	OSLess
SPC560BCxx OS-Less DSPI Example App...	Test application for the DSPI unit on the SPC560BCxx.	SPC560B5...	PAL SPI	OSLess
SPC560BCxx OS-Less CAN Test Applicat...	Test application for the SPC560BCxx created using th...	SPC560B5...	PAL CAN ...	OSLess
SPC560BCxx OS-Less ADC Test Applicat...	Test application for the SPC560Bxx created using the...	SPC560B4...	PAL ADC S...	OSLess
ChibiOS-RT SPC560BCxx Test Application	Test application for the SPC560B/Cxx created using t...	SPC560B5...	PAL Serial	ChibiOS/RT

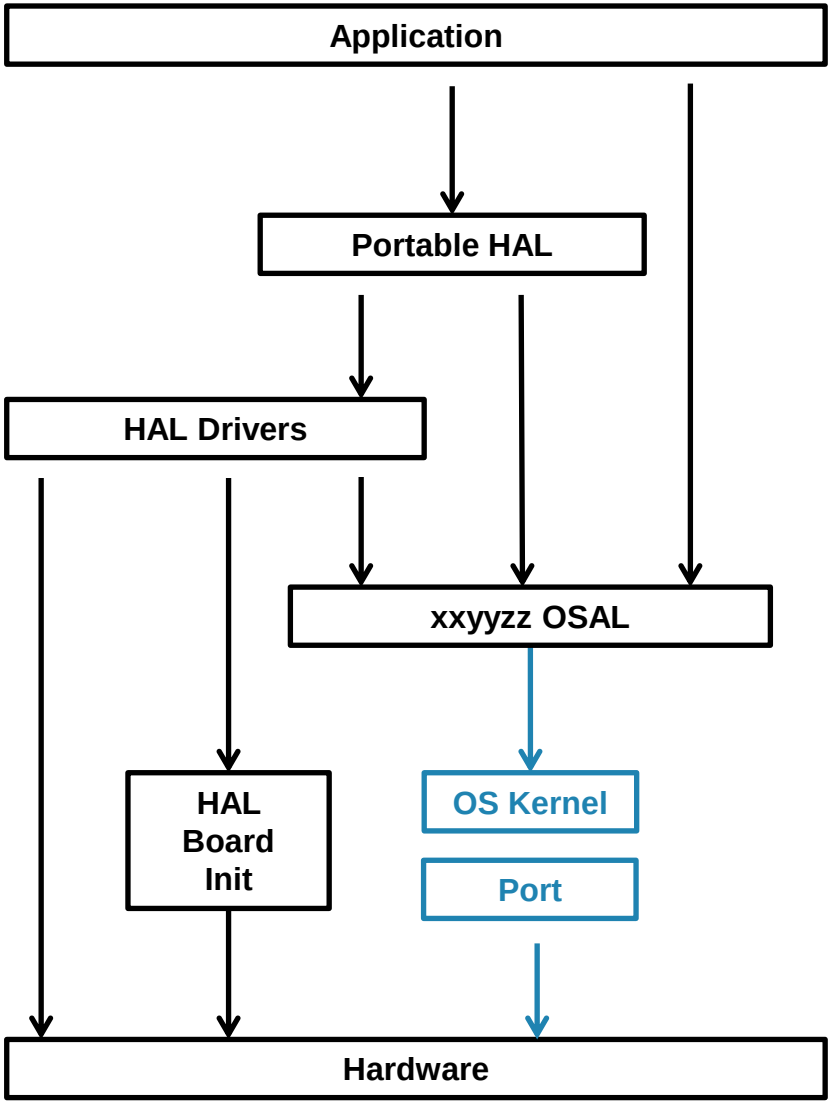
Embedded Software inside SPC5Studio framework

- HAL Drivers
  - Consistent programming interface across product lines
    - **Consistency**: Unique set of Application programming Interfaces (API) to abstract hardware dependent functionalities
    - **Portability**: no customer application changes with every SPC5 family microcontroller
  - Key peripherals supported
    - General Purpose timer, ADC,ICU/PWM, SPI, Timers, CAN, Serial Interface
  - Delivered inside SPC5Studio:
    - Drivers configuration & code generation enabled by SPC5Studio plug-in's
    - Code Portable to Professional tool chains
  - On line help for API and functionality description
  - Operating system independent / can be used without any operating system

Provider	Name	Model	Cost	Availability								KODO READY
				D	0B/0C	4B/EC	P	AP	L	M	A	
ST	GPIO	Source	Free	Y	Y	Y	Y	Y	Y	Y	Y	Y
ST	ADC	Source	Free	Y		Y	Y	Y	Y	Y	Y	Y
ST	ICU/PWM	Source	Free	Y	Y	Y	Y	Y	Y	Y	Y	Y
ST	SPI	Source	Free	Y	Y	Y	Y	Y	Y	Y	Y	Y
ST	TM	Source	Free			Y			Y	Y	Y	Y
ST	Can	Source	Free	Y	Y	Y	Y	Y	Y	Y	Y	Y
ST	SCI	Source	Free	Y	Y	Y	Y	Y	Y	Y	Y	Y

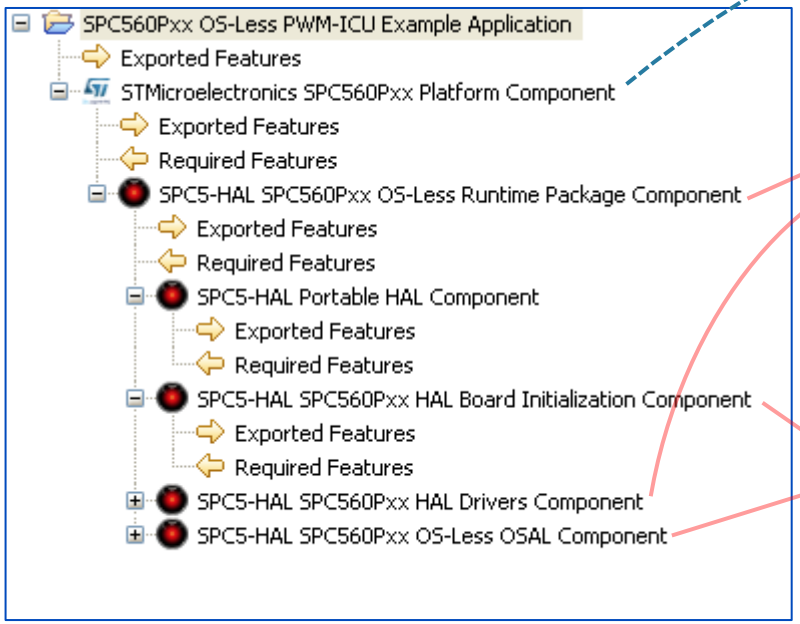
SW architecture overview

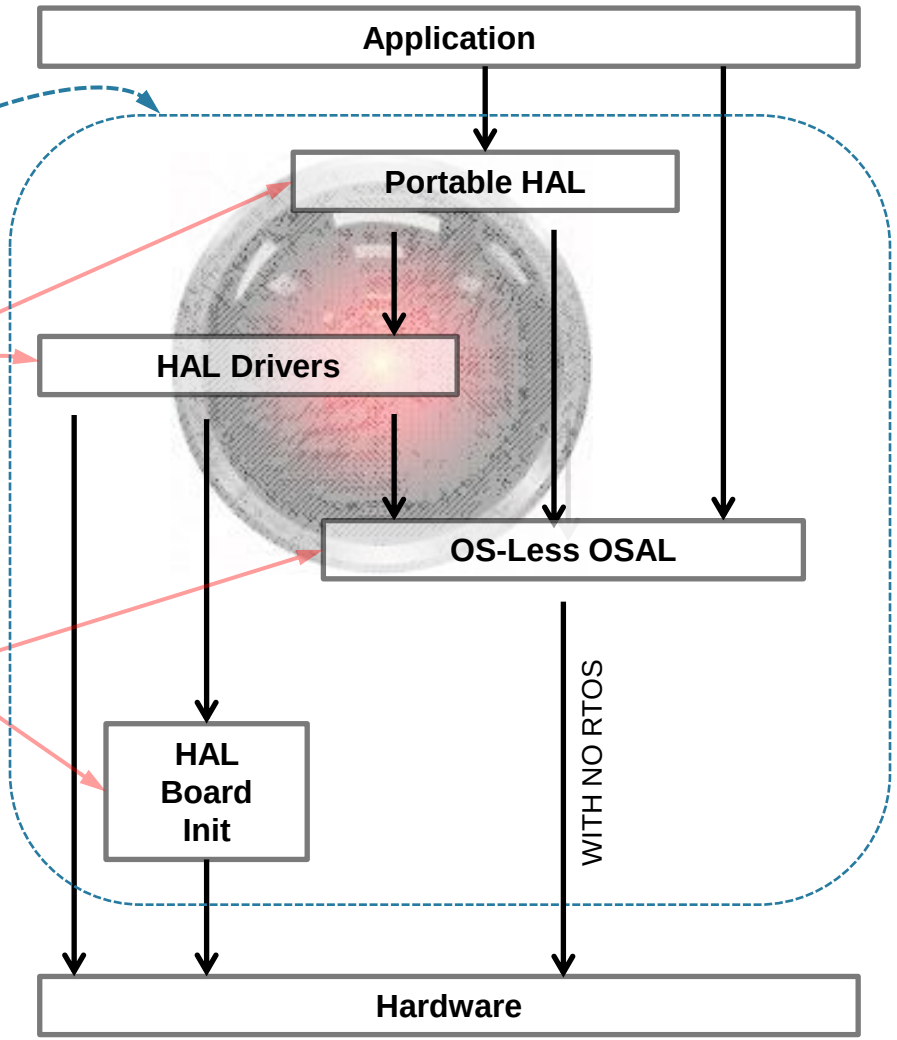
- **Application**: High level application code abstracted from hardware details
- **Portable HAL**: High level, cross platform, drivers API layer
- **OSAL**: Operating system Abstraction Layer
- **HAL Drivers**: Low level, platform-specific, drivers layer
- **OS Kernel**: Portable RTOS kernel layer
- **Port**: Kernel port layer for a specific Architecture
- **Board**: Board-specific description and initialization code
- **Hardware**: The HW platform



= Present ONLY if RTOS component added

Software Architecture vs. components mapping







Embedded Software inside SPC5Studio framework

- Platform Components
  - include startup code, interrupt handling framework I/O configuration and drivers required for debug (TIMER, UART, DMA, I/O)
  - All SPC56 product line supported
- Libraries
  - Flash drivers
  - Lin Drivers (RPN: STSW-SPC56002FW)
  - Cryptography library for SPC5 MCU's (RPN: SPC5-CRYP-LIB)
- RTOS
  - ChibiOS: Portable, open source, compact and extremely fast RTOS. Designed for deeply embedded real time applications, where timings and code size are key factors. Is available for all platforms.
  - mOSEK: Real-Time and networked Operating System compliant to the Osek/Vdx standard and suitable for the development of embedded real-time applications. Available for Monaco platform

Compiler and Debugger

Compiler

- GNU “C” compiler for SPC56 MCU’s
- Book E, VLE and SPE Instruction set with GPL3 open source libraries
- 30 days free trial, full feature
- Integrated inside SPC5Studio
- Designed by HighTec, Distributed by ST or ST franchised distributors

Order code	
SPC5-HTCOMP-NLTL	1 year node-locked support

Debugger

- JTAG Debugger for SPC56 MCU’s



- Compliant with IEEE1149.1 specification
- Designed by PLS, Distributed by ST or ST franchised distributors
- Free software download: http://www.pls-mc.com/spc5-udestk

Order code	Description
SPC5-UDESTK-EVAL	PLS USB/JTAG adapter and time unlimited software license up to 128 KB code
SPC5-UDESTK-FULL	Include PLS USB/JTAG adapter and 1-year license with full memory access
SPC5-UDEDEBG-TL	1-year license with full memory access

Compiler Options





Make file compatibility

Distributed by ST node locked option only	Distributed by HighTec Multiple licensing options
Inside SPC5Studio	Part of HighTec development environment
GCC compiler + GPL3 libraries	Commercial compiler and libraries, no open source
	ISO 26262 certified
With support from ST and bug fixing support	Professional support from HighTec
Ultra low cost	Lower cost compared to other professional products

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Evaluation / Development

Production

SPC5 studio suite use cases

- Low cost / Features rich development suite

Key functionalities

- Use SPC5Studio wizards to leverage on all plug-ins, embedded software content and embedded compiler
- Use SPC5Studio just as eclipse project Editor and build environment to leverage on GCC compiler

- Productivity tool **adding** features to your professional development environment

Key functionalities

- Explore quickly microcontroller features.
- Reuse code of application examples
- Manage I/O configuration
- Configure Software libraries with SPC5studion plug-in before importing them in your project
- Compiler activation not required

If compiler is HighTec Pro

- Share code and projects with SPC5Studio with Full make file and build settings compatibility
- Optimized costs having a mix of Pro IDE and low cost (SPC5studio) IDE

Software solutions: Autosar

- STMicroelectronics develops off the shelf software products in accordance with CMMI and AUTOMOTIVE SPICE Level 3 quality standards.

Provider	Name	STATUS	Model	Cost	Availability							
					D	B/C	B/C	P	AP	L	M	A
ST	MCAL ASR 3.0	RTM	Source	License(*)	Y	Y	Y	Y	Y	Y	Y	Y
ST	MCAL ASR 3.2	RTM	Source	License(*)	Y	Y	Y					
ST	MCAL ASR 4.x	BETA	Source	License(*)	Y	Y	Y	Y	Y	Y		Y
ST	AUTOSAR OS ASR 3.x	RTM	Source	License(*)	Y	Y	Y	Y	Y	Y	Y	Y
ST	AUTOSAR OS ASR 4.0	RTM	Source	License(*)	Y	Y	Y	Y	Y	Y		Y
Elektrobit	AUTOSAR OS ASR 4.0 ISO 26262	RTM	Source	License(*)						Y		
Elektrobit	BSW (ASR3.x)	RTM	Source	License(**)	Y	Y	Y	Y	Y	Y	Y	Y
VECTOR	BSW (ASR3.x)	RTM	Source	License(**)	Y	Y	Y	Y	Y	Y	Y	Y
Elektrobit	BSW (ASR4.x)	RTM	Source	License(**)	Y	Y	Y	Y	Y	Y		Y

Solution for BAC 3.1 release are available from Elektrobit and got SLP10 from Vector
RTM: release to market

(*) contact ST or authorized distributors
(**) contact 3rd party

Promotion and Evaluation Boards

- Two level 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

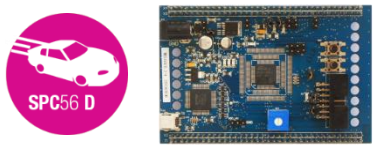


(*) Not available on L, M & A Discovery/+
(**) Not Available on B & D line Discoveries

SPC56 Discoveries World

SPC56D-Discovery with SPC560D40L1

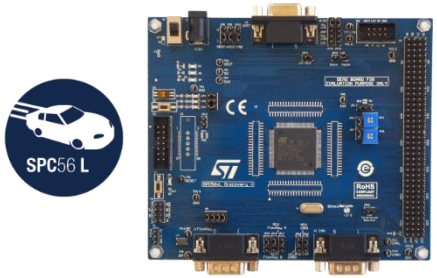
- **order code: SPC560D-DIS**



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

SPC56L-Discovery with SPC56EL60L5

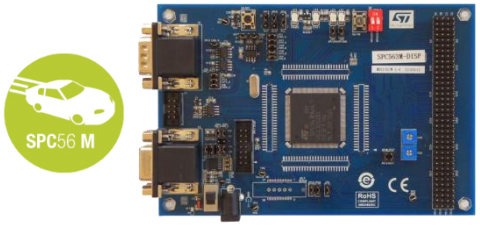
- **order code: SPC56EL70-DISP**



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

SPC56M-Discovery with SPC563M64L5

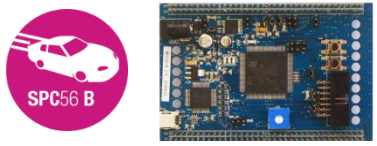
- **order code: SPC560M-DISP**



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

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)

SPC56P-Discovery with SPC560P50L5:

- **order code: SPC560P-DISP**

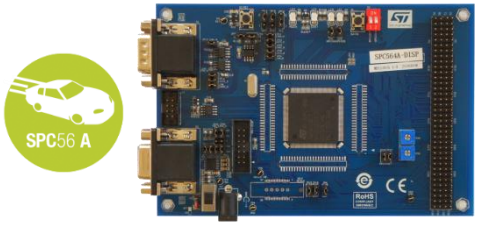


- Embedded detachable on board JTAG debugger (up to 128Kbyte free)
- Can, Lin Connectivity on board (included transceivers)
- Connector Arduino-Compatible
- Standard connector (type A)

New!: Shipping from mid may

SPC56A-Discovery with SPC563A70L5

- **order code: SPC564A-DISP**



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

Functionality Extension boards

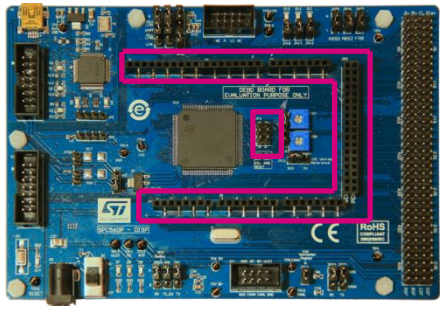
- Connector Type A: 4x37 Pins

MCU Boards	
SPC56EL70-DISP	SPC563M-DISP
SPC560P-DISP	SPC564A-DISP
Extension Boards	
EVAL-L9942	EVAL-L9907
EVAL-L9907-H	EVAL-L9958



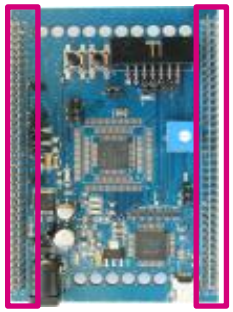
- Arduino-Compatible

MCU Boards
SPC560P-DISP
Extension Boards
EVAL-VNH5019-P2



- Connector Type B: 2x2x36 Pins

MCU Boards	
SPC560D-DIS	SPC560B-DIS



Several solutions in design to extend the microcontroller board functionality

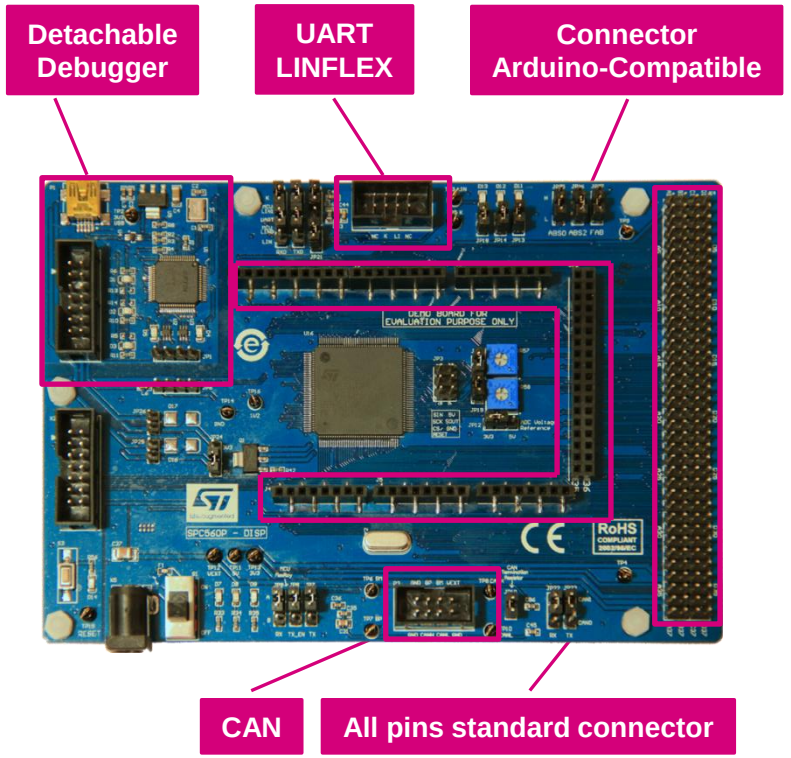
The addition of a connector Arduino-Compatible multiply the number of options

All ST Nucleo expansion boards will fit as well

Available In design

Discovery Boards: Special Innovation

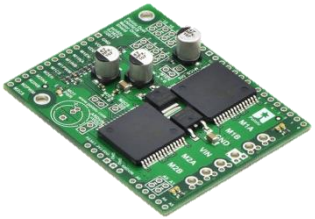
- SPC560P-DISP Arduino-Compatible
  - Leverage on Arduino Community functional modules such as:
    - Arduino Proto Shield
    - Display Modules
    - Communication Modules
    - Motor drivers modules (with ST VNH H-Bridges)



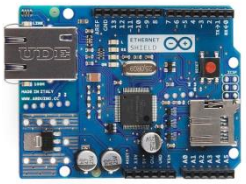

CAN

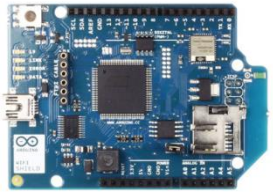

VNH2SP30

Available in ST e-store


VNH5019


LCD Button Shield

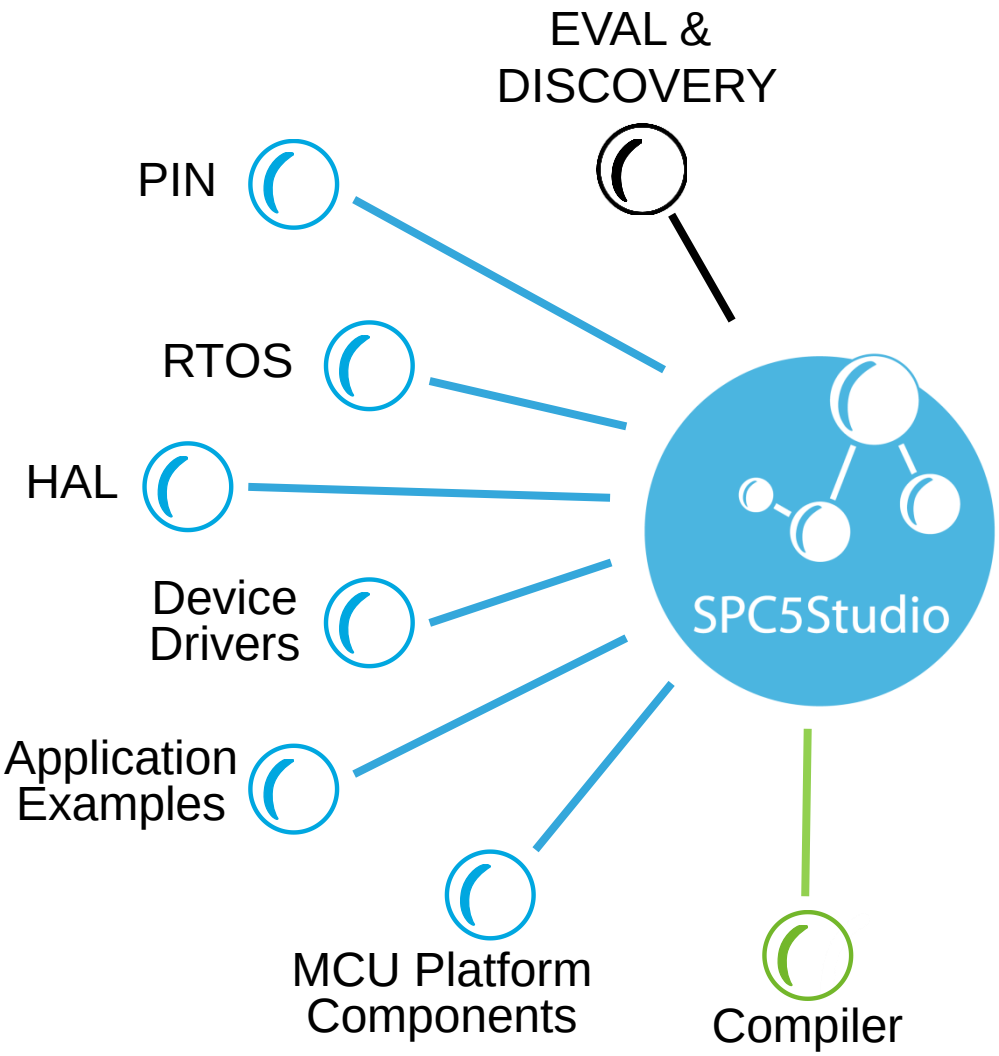

Ethernet


WIFI

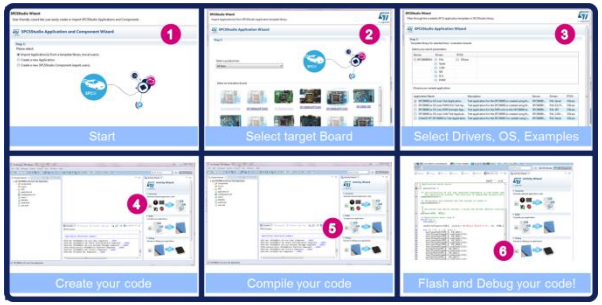
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Note: expansion boards could be purchased in web from 3rd parties

A feature and software rich environment



Build & Debug your application



In few steps

SPC56 New Getting Package **it's available**

SPC5 developers world

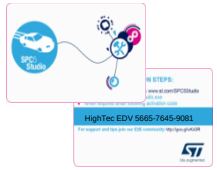
Buy

st.com e-Store



SPC56L-Discovery+







SPC56D/B-Discovery



SPC56A/M-Discovery+



SPC56P-Discovery+

Contribute

Open Source Community

source forge

http://sourceforge.net/projects/spc5-hal

st.com Software Store

Download

SPC5 Studio

Software examples

Libraries

HIGH TEC

HighTec C/C++ Compiler open source for ST

Support

Video /e-learning on

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Thank You!

