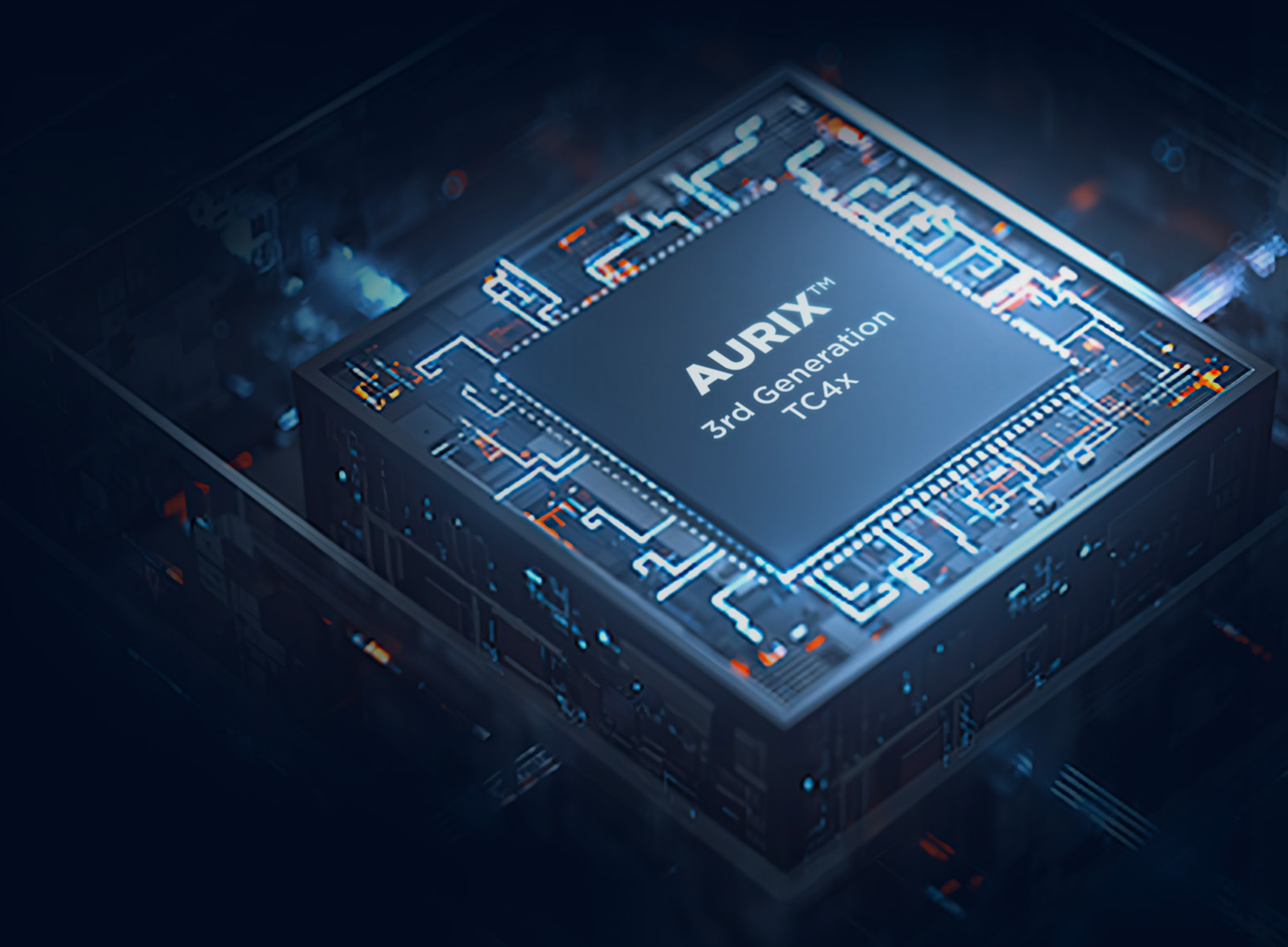
TASKING®

TASKING SMARTCODE

A MULTICORE SOFTWARE
DEVELOPMENT ENVIRONMENT
FOR INFINEON AURIX™ TC4X
MICROCONTROLLERS



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TASKING SMARTCODE
FOR INFINEON AURIX™ TC4X MICROCONTROLLERS

A COMPLETE DEVELOPMENT SOLUTION

TASKING® SmartCode is a complete development solution for the Infineon® AURIX™ TC4x microcontroller family. SmartCode produces fast and compact code and fully supports all architectures and microprocessor cores integrated in the TC4x. SmartCode provides compiler support for the TriCore TCv1.8, Parallel Processing Unit (PPU), the latest GTM IP, SCR (XC800) and the cybersecurity real time module (CSRM) based on the TCv1.8.

Like its predecessors, SmartCode offers unparalleled code optimization, advanced multi-core support, guaranteed compatibility with leading third-party tool suppliers*, flexible memory allocation, static code analysis, and seamless integration with previous TASKING VX-toolsets.

The newest version of SmartCode is available in two flavors. The Base Edition provides support for the TriCore toolset only (excluding hardware debugger support). The Performance Edition supports all toolsets and features including hardware debugger support and the PPU Run-Time Environment library.

The PPU Run-Time Environment library provides a mechanism for exchanging data between the TriCore and the PPU. This allows TriCore to offload or speedup calculations by using the vector processing capabilities (Vector DSP Unit) of the PPU.

SmartCode also comes with the Eclipse plug-in which allows the user to take advantage of the versatile and powerful winIDEA IDE. SmartCode can now connect to your target hardware via the family of TASKING BlueBox Debuggers or the Infineon miniWiggler.

The TASKING SmartCode compilers now have ISO-C 2018 language standard support, and the updated C++ front end supports C++17, C++14, and C++11. The TASKING SmartCode compilers are tested for ISO C99/C11 and ISO C++ conformity against authoritative validation suites, such as Perennial® and Plum Hall®.

Product Features

- **Integrated 64-bit Development Environment (IDE) based on Eclipse v4.27**
- **C/C++ Compiler toolset for TriCore TC v1.8**
  - C compiler function qualifiers and flexible ISR return sequence for HyperVisor
  - Assembler and Linker LSL support for Hypervisor instructions and trap tables
  - Conforms to TriCore EABI v3.1
  - Supports HW debugging via TASKING BlueBox Debuggers and IFX miniWiggler
  - Improved Floating Point run-time library
- **C/C++ Compiler toolset for Parallel Processing Unit**
  - Vector DSP Instruction Set Architecture (Single Instruction Multiple Data)
  - Provides support for intrinsic Vector DSP instructions, Auto Vectorization, Auto Bundling and Vector ABI
  - Provides PPU Run-Time Environment libraries and optimized library functions
  - Conforms to Infineon PPU EABI
  - Supports hardware debugging via TASKING BlueBox Debuggers and winIDEA
- **C Compiler toolset for Generic Timer Module 'GTM' (Bosch GTM IP v4.1) and Standby Controller 'SCR' (XC800)**
- **C/C++ Compiler toolset for Cyber Security Realtime Module 'CSRM' (Previously HSM)**
- **The PPU Run-Time Environment library makes use of the ARC/PPU to offload the TriCore or speedup calculations**
- **Eclipse plug-in allowing use with either the familiar Eclipse based TASKING Embedded Debugger or winIDEA IDE**
- **C/C++ compilers have integrated static code analysis for MISRA C and CERT C**
- **Conforms to industry-leading standards: ISO/IEC 9899:1999(E), ISO/IEC 14882:2011, MISRA C, CERT C, Infineon TriCore EABI, (PPU) Synopsis ARC EV7xFS EABI, ANSI/IEEE-754, and ELF/DWARF**

* AUTOSAR RTOS (Vector, EB, ETAS), Infineon MCAL Drivers

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LATEST ADVANCEMENTS FOR SAFETY AND CYBERSECURITY

TASKINGs SmartCode will continue to provide industry leading safety features as the toolset has been developed with Automotive SPICE® Level 2 certification and is planned for TÜV certification (ISO26262 up to ASIL D / IEC61508 up to SIL 3) and provides full ISO/SAE 21434:2021 cybersecurity conformance.

SmartCode comes with a Safety and Security manual that describes how to configure the tool chain for safety-related projects, including recommended use cases and mitigation strategies for potential errors. The safety manual includes a description of how the tool chain was qualified, shows the validation test results, and includes qualification information for each toolset build option.

Product Features

- **Safety and Cybersecurity Features**
  - Qualified run-time libraries according to ISO26262 (up to ASIL D)
  - Safety Manual for TCv1.8 and PPU toolset (ISO26262 up to ASIL D, IEC61508 up to SIL3)
  - Cybersecurity conformance according to ISO/SAE 21434:2021 Road vehicles including Security Manual including Security Manual
  - Competitive cost advantage for MCAL Support

The security manual provides details on which TARA databases were used for security conformance testing; what security related requirements are implemented by TASKING and which security related guidelines need to be implemented by the toolset user. Additional information is provided on new SmartCode compiler warnings that highlight potential cybersecurity weaknesses in the user application.

The following table highlights the TASKING SmartCode feature set:

TASKING SmartCode *for AURIX™ TC4x*

Toolset Features	TASKING SmartCode
TECHNOLOGY	**Proprietary**
AURIX™ TC4X family device support	✓
Reuse of existing TC2xx/TC3xx code	✓
TriCore v1.8 C/C++ compiler toolset including CSRM	✓
PPU C/C++ compiler toolset (Synopsys ARC EV7x)	✓
GTM/MCS v4.x C compiler toolset	✓
SCR (XC800) C compiler toolset	✓
PPU optimized library functions	✓
PPU Run-Time Environment library	✓
Hardware debug support via TASKING BlueBox or Infineon miniWiggler	✓
Advanced multi-core support with Flexible memory allocation	✓
Integration into the Eclipse™ IDE	✓
winIDEA integrated debugger with simulator for TriCore TC1.8	✓
Supports Cross-Linking with previous toolset versions	✓
Integrated static code analysis (MISRA and CERT C)	✓
PPU hardware debug support	✓
Windows/Linux OS support	✓

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TASKING SmartCode *for AURIX™ TC4x*

Safety Features	TASKING SmartCode
Developed with Automotive SPICE ® Level 2 processes	✓
Safety Manual for TCv1.8 and PPU toolset *	✓
Combined Safety & Security Manual for TriCore TCv1.8*	✓
Qualified run-time libraries according to ISO26262 (up to ASIL D)	✓
Qualified PPU run-time library (ISO26262 up to ASIL D)	✓
TUV Certification for SmartCode V10.2r1	✓
Cybersecurity conformance according to ISO/SAE21434:2021 Road Vehicles including Security Manual	✓
Competitive cost advantage for MCAL Support	✓
Additional Qualification Kit is no longer required (Safety/Security Manual will be part of license)	✓

DEVICE SUPPORT

The TASKING SmartCode development environment supports all AURIX™ TC4x derivatives, as well as the Infineon Virtual Development Kit (VDK).

EVALUATION LICENSE & ADDITIONAL INFORMATION

For additional information on the TASKING SmartCode toolset including Evaluation Licenses, Product Pricing, Supported License Models, Product Demonstrations and/or Product Usage please contact us at **www.tasking.com/contact** or visit our support page at **www.tasking.com/support**.

*ISO 262626 up to ASIL D and IEC 61508 up to SIL3