TASKING
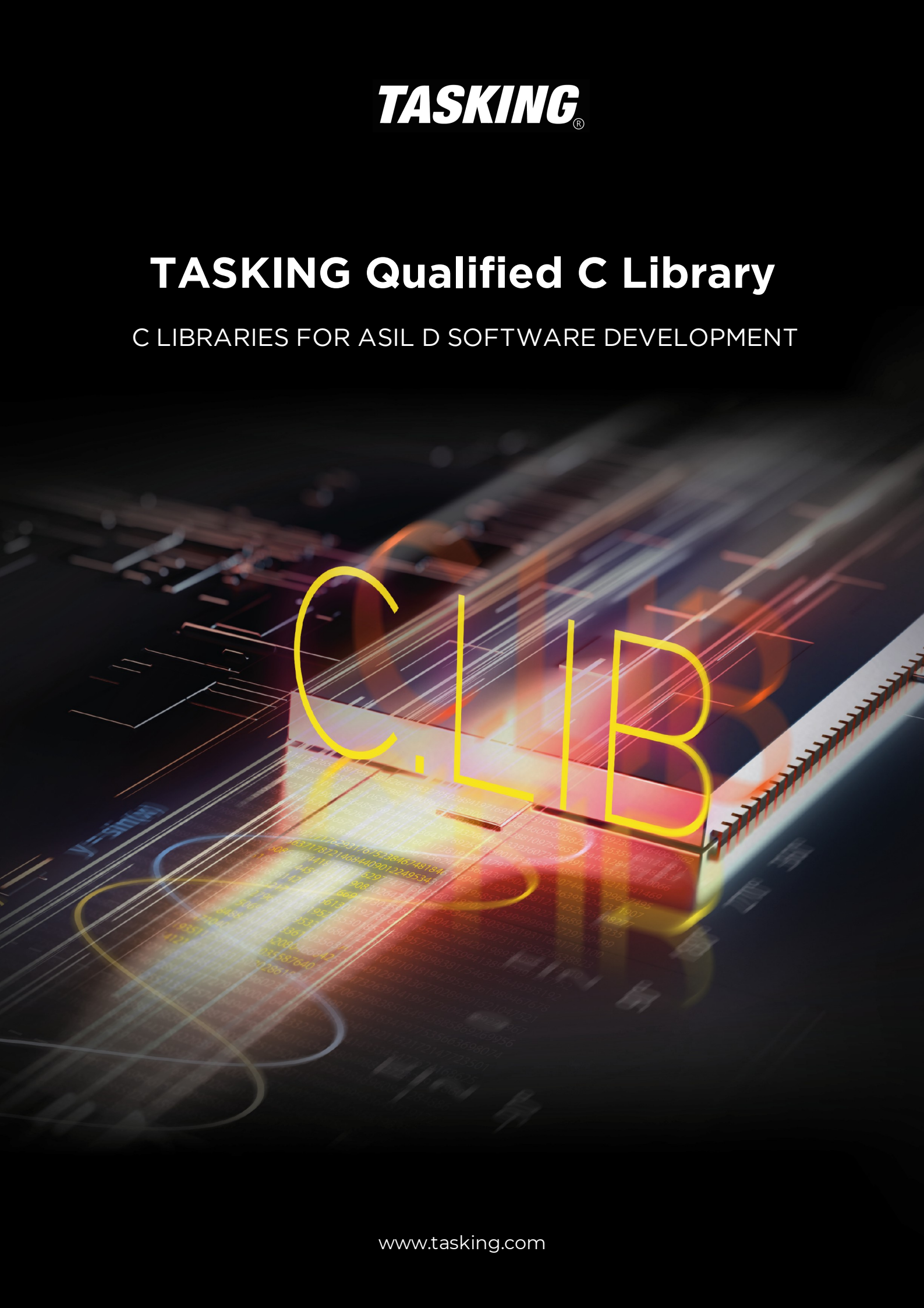
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TASKING Qualified C Library

C LIBRARIES FOR ASIL D SOFTWARE DEVELOPMENT

OVERVIEW

The Qualified C Library (QClib) enables faster development and go-to-market of Functionally Safe (FuSa) related software, at a lower cost and with reduced product liability risks. The library is specifically designed for use in embedded systems and is highly optimized in terms of code size, execution speed, and numerical accuracy of mathematical functions.

The standard QM C library that is shipped with the TASKING VX-Toolsets can be upgraded to an ASIL D-qualified C library with the purchase of a separate license. The QClib is designed and optimized for safety-critical systems and contains about 200 functions plus program startup code qualified for use at the highest automotive safety integrity level (ASIL D).

The QClib comes with a safety manual in both human-readable (pdf) and machine-readable (ReqIF) format. The ReqIF format makes it possible to automatically import the guidelines from the safety manual into the user's requirements management system. The structure of the ReqIF file is such that all safety requirements are uniquely identifiable and allows reuse and sharing of safety analyses performed by different development teams, as well as the (partial) reuse of safety analyses performed on different versions of the QClib product.

Safety Qualifications & Features

- The library is designed, tested, and qualified to comply with functional safety standards such as IEC 61508 and ISO 26262. The QClib was developed as a Safety Element out of Context (SEooC) using an ASPICE CL2-compliant software development process.
- The library is qualified for use with specific versions of the TASKING VX-Toolset for TriCore and its use does not affect the qualification and certification status of the compiler toolset.
- The library helps to improve software performance with highly optimized and performant library code which reduces the memory footprint, reduces the execution time, and provides excellent accuracy of math functions.
- The library is a full-featured ISO C library that provides approximately 600 functions, of which approximately 200 functions are suitable for use in ASIL D software. The remaining functions are qualified for use in lower-level ASIL or QM software, which allows for easy integration into existing projects, interfacing with third-party operating systems, and enables the use of printf-style debugging and logging.
- The library is fully documented including details about the library's functions, safe usage, and safety qualifications. The safety documentation is provided in both human-readable (pdf) format and in machine-readable ReqIf format.

Benefits of using the Qualified C Library

Helps to ensure compliance with regulations and standards — **Compliance with Regulations**

Risk Reduction — Helps to reduce the risk of failure and improves the overall safety of your software and strengthens your position in product liability claims

Helps to reduce the costs of software development, qualification, and certification activities — **Efficiency**

Quality Assurance — Can help to assure your software is reliable and meets its safety requirements

Qualified C Library

Figure 1: Rationale for using the Qualified C Library

LICENSING

A flexible licensing model supports the requirements of all parties in the automotive software supply chain.
- Time-limited and Perpetual Development licenses are available with the option to limit the license to a specific project.
- Perpetual Reproduction licenses are available with the option to limit the license to a particular project and/or to a specific number of ECUs to be produced.
- Software Maintenance licenses are available that meet the lifecycle requirements of the various FuSa standards.

TECHNICAL SPECIFICATIONS

Product name	Qualified C Library
Product versions	TriCore v6.3r1 Qualified C Library version v3.0r4
Compatible compiler toolsets	TASKING VX-Compiler Toolset for TriCore v6.3r1, including patches based on v6.3r1
Supported languages	ISO C11, ISO C99
Supported devices	Infineon TC2xx and TC3xx devices
Deliverables	For a **development** license: • The license to install and use the Qualified C Library, solely for the development of Licensed User Products • Pre-compiled C library archive files • Header files • Safety Manual in both pdf and ReqIF* • User Guide • Access to TASKING Issues Portal For a **reproduction** license: • The license to distribute products that incorporate all or portions of the Qualified C Library to your global customers. • Safety Manual in both pdf and ReqIF*

*ReqIF – Requirements Interchange Format

> **i** Periodic updates of the QClib will occur at scheduled intervals.
> A Qualified C Library for the SmartCode compiler toolset and for TASKING VX-Compiler Toolset for TriCore v6.2r1 is planned.