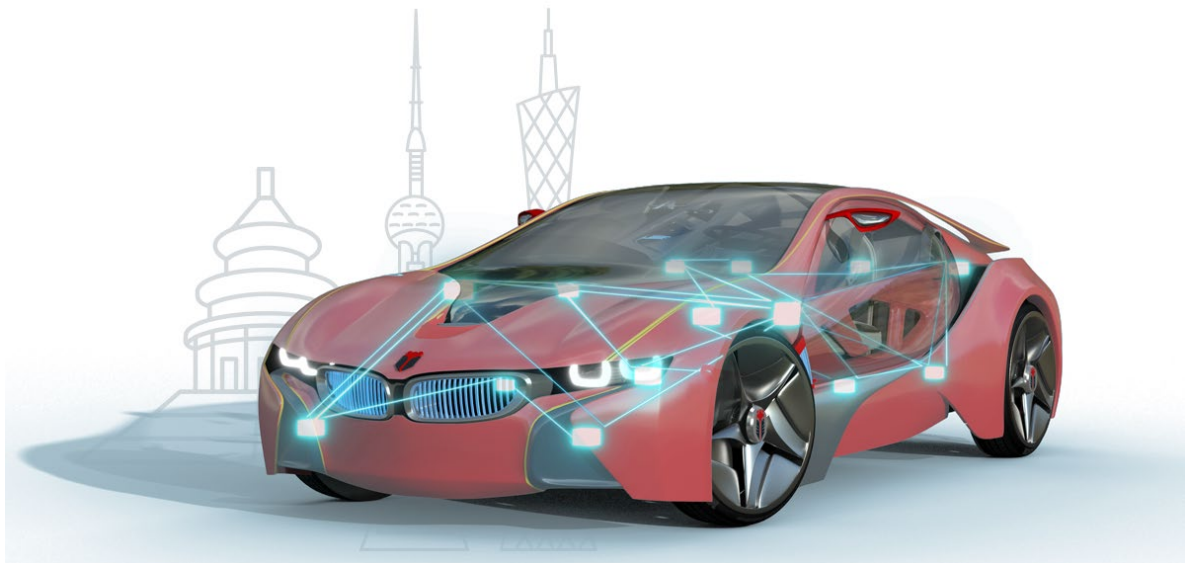




知从木牛旗芯微 FC7300 MCAL 配置工具产品手册
ZC.MUNIU MCAL CONFIGURATION TOOL
PRODUCT MANUAL BASED ON FLAGCHIP FC7300
知从木牛基础软件平台
ZC.MuNiu Basic Software Platform



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知从木牛基础软件平台

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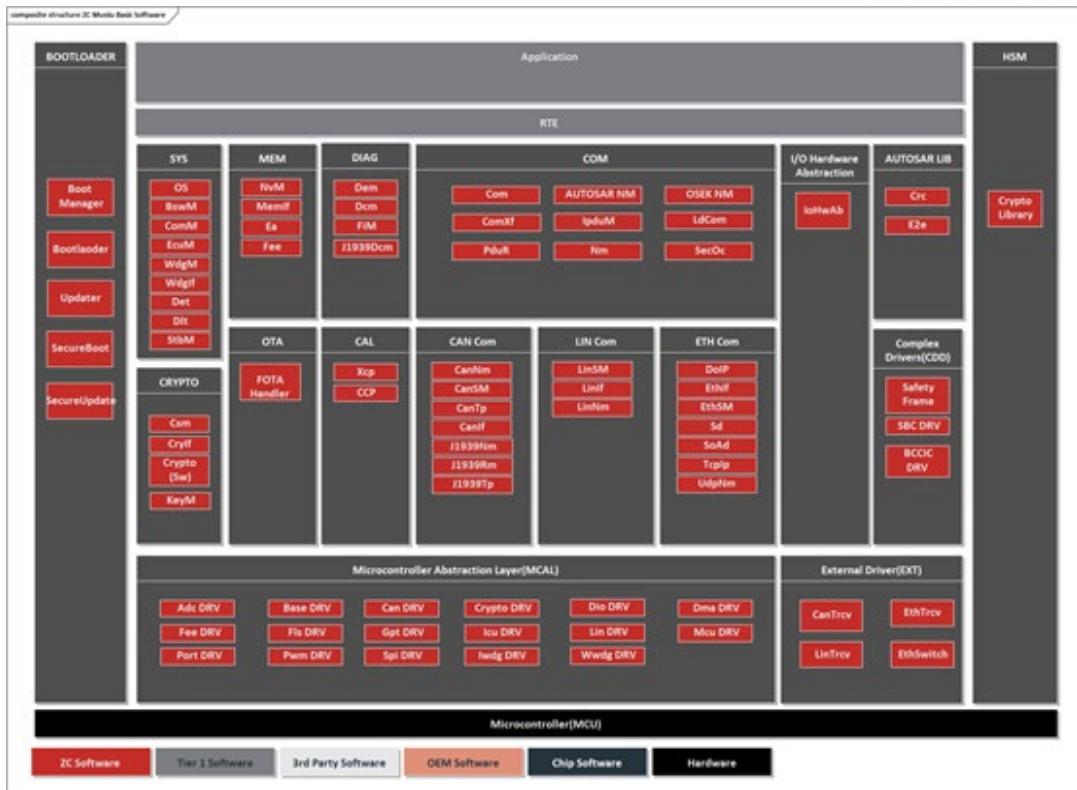
1 功能概述 FUNCTIONAL OVERVIEW

知从木牛基础软件平台(ZC.MuNiu)为汽车电子控制器产品开发，提供完整的基础软件平台解决方案。该产品符合 AUTOSAR、OSEK 等国际规范。

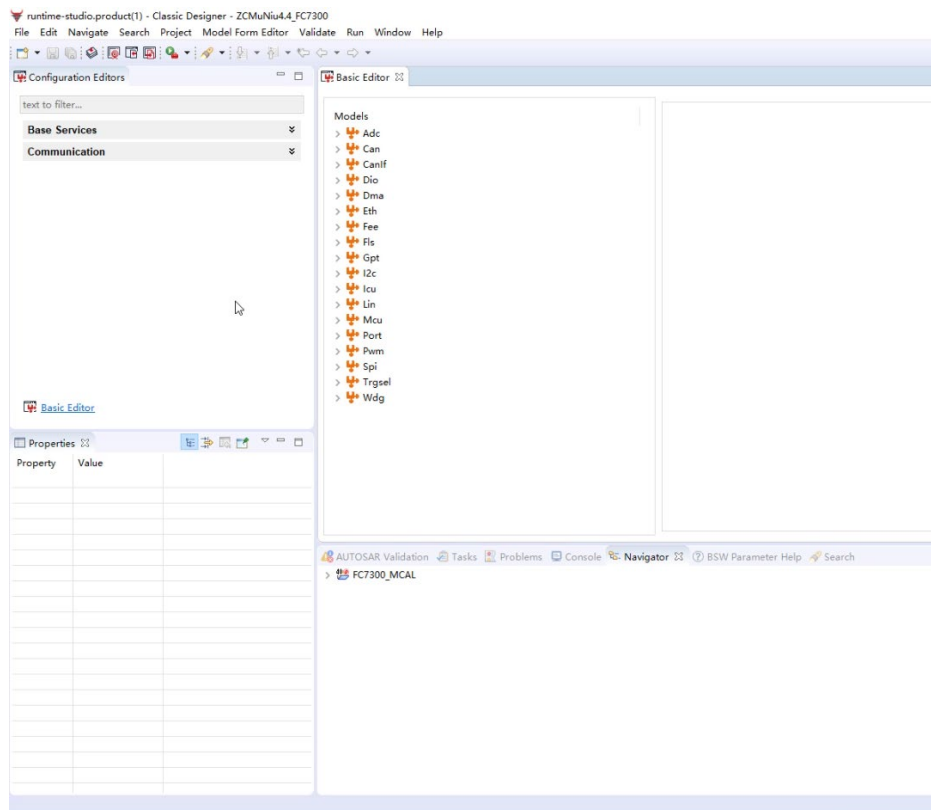
ZC.MuNiu Basic Software Platform (ZC.MuNiu) provides a comprehensive solution for the development of automotive electronic control unit (ECU) products. This product complies with international standards such as AUTOSAR and OSEK.

目前，知从木牛基础软件平台已经支持旗芯微的 FC7300 芯片，并且集成了 FC7300 的 MCAL 软件包，同时，知从木牛 MCAL 配置工具可以适配旗芯微的 FC7300 的 MCAL 软件包的配置，用户就可以立即启动自己的项目，无需任何前置时间或投入额外的精力，就能够集成基础标准软件和特定硬件的驱动程序及操作系统。

Currently, ZC.MuNiu Basic Software Platform has already supported the FC7300 chip from QiXin Microelectronics and has integrated the FC7300 MCAL software package. At the same time, ZC.MuNiu MCAL Configuration Tool can adapt to the configuration of the FC7300 MCAL software package from Flagchip Microelectronics. Users can immediately initiate their own projects without any lead time or additional effort, enabling the integration of basic standard software and specific hardware drivers as well as operating systems.



知从木牛基础软件平台
ZC.MUNIU BASIC SOFTWARE PLATFORM



知从木牛 MCAL 配置工具
ZC.MUNIU MCAL CONFIGURATION TOOL

搭载木牛基础软件平台(ZC.MuNiu)的旗芯微 FC7300 芯片，能够提供完整的 Classic AUTOSAR 解决方案，满足整车各个域中的汽车电子控制器开发需求。可广泛应用于车身、中控、域控、底盘、安全、动力、电池管理等领域。

The FC7300 series chips, equipped with ZC.MuNiu Basic Software Platform, can provide a complete Classic AUTOSAR solution, meeting the development requirements of automotive electronic controllers across various vehicle domains. It can be widely applied in areas such as body control, central control, domain control, chassis, safety, power, and battery management.

为了提供符合 AUTOSAR 标准的全套的解决方案，知从木牛 MCAL 配置工具可以无缝集成到现有工具链中，实现基础软件模块与已有成熟软件组件的集成，从而用于 OEM 和 Tier1 专用模块的开发，同时缩短上市时间并降低集成成本。

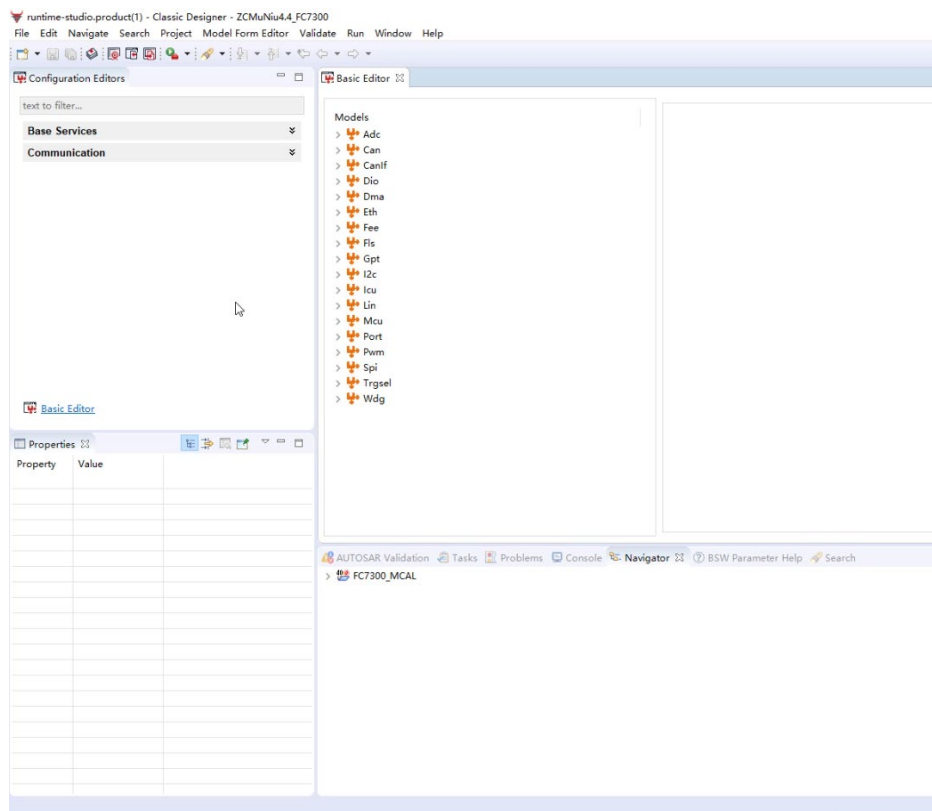
To provide a full set of solutions compliant with the AUTOSAR standard, ZC.MuNiu MCAL Configuration Tool can be seamlessly integrated into the existing toolchain, achieving the integration of basic software modules with existing mature software components. This is used for the development of OEM and Tier1-specific modules, while also reducing time-to-market and lowering integration costs.

2 支持模块 SUPPORT MODULE

知从木牛 FC7300 MCAL 配置工具支持 MCAL 版本：FC7300 MCAL V0.1.0 及以上版本，支持可配置的模块如下：

ZC.MuNiu FC7300 MCAL Configuration Tool supports MCAL versions: FC7300 MCAL V0.1.0 and above. The configurable modules supported are as follows:

- ADC Module
- CAN Module
- DIO Module
- ETH Module
- FEE Module
- FLS Module
- GPT Module
- I2C Module
- ICU Module
- LIN Module
- MCU Module
- PORT Module
- PWM Module
- SPI Module
- WDG Module



知从木牛 MCAL 配置工具
ZC.MUNIU MCAL CONFIGURATION TOOL

3 开发背景 DEVELOPMENT BACKGROUND

在 2023 年 7 月，苏州旗芯微半导体有限公司（旗芯微）正式发布基于 AUTOSAR Classic Platform (CP) 4.3.1 的 FC7300 MCAL 驱动软件。目前，知从科技为该驱动开发了第三方 AUTOSAR 配置工具木牛配置工具进行配置并生成代码。知从木牛配置工具是汽车应用广泛使用的 AUTOSAR 图形配置及代码生成工具。

In July 2023, Suzhou QiXin Micro Semiconductor Co., Ltd. (Flagchip) officially released the FC7300 MCAL driver software based on the AUTOSAR Classic Platform (CP) 4.3.1. Currently, ZC Technology has developed a third-party AUTOSAR configuration tool, ZC.MuNiu Configuration Tool, for configuring and generating code for this driver. ZC.MuNiu Configuration Tool is a widely used graphical configuration and code generation tool for AUTOSAR in automotive applications.

目前，国内符合 AUTOSAR 开发方法的软件开发平台和 ECU 配置工具非常少。因此，研发和实现一套符合 AUTOSAR 标准开发流程的开发工具，提供一个支持多厂商多平台的基础软件实现的 ECU 配置环境，对于国内芯片公司在汽车领域的 AUTOSAR 生态构建上有着重大推动作用，不仅如此，对于我国的汽车电子软件发展也具有重要的意义。

At present, there are very few software development platforms and ECU configuration tools in China that comply with the AUTOSAR development method. Therefore, the development and implementation of a set of development tools that conform to the AUTOSAR standard development process, providing an ECU configuration environment that supports the implementation of basic software from multiple manufacturers and platforms, has a significant promotional effect on the construction of the AUTOSAR ecosystem in the automotive field for domestic chip companies. Moreover, it is also of great significance to the development of automotive electronic software in China.

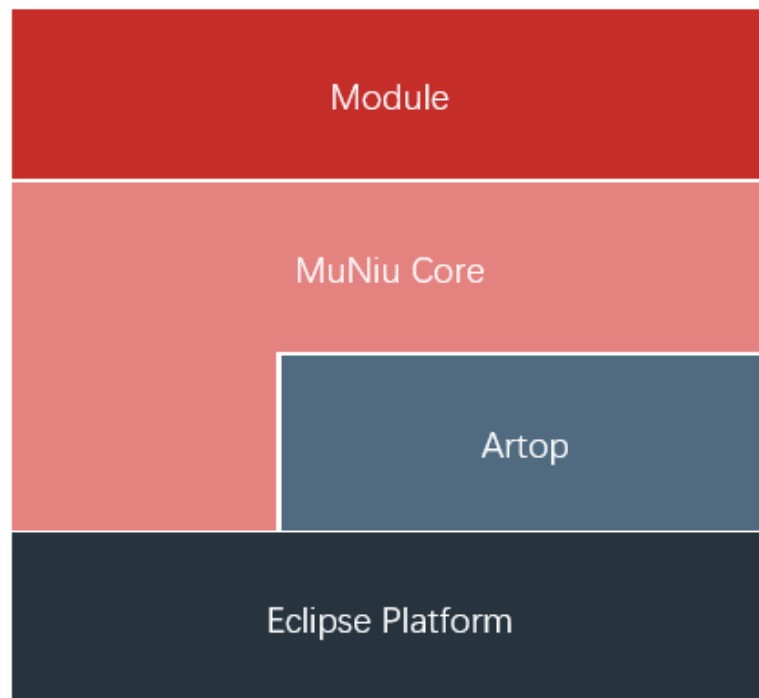
知从木牛配置工具是符合国产汽车电子系统架构标准的 ECU 开发解决方案。该方案兼容业界主流的 AUTOSAR 标准，包括从系统功能设计，ECU 功能映射和组件配置，运行时环境自动代码生成等一系列的工具套件，提供了一套经过实践验证的，开发可重用 ECU 应用软件的基础。

ZC.MuNiu Configuration Tool is an ECU development solution that complies with the domestic automotive electronic system architecture standards. This solution is compatible with the mainstream AUTOSAR standards in the industry, including a series of tool kits from system function design, ECU function mapping and component configuration, to automatic code generation of the runtime environment, providing a foundation for developing reusable ECU application software that has been verified by practice.

4 功能描述 FUNCTIONAL DESCRIPTION

木牛 MCAL 配置工具是基于 Eclipse 平台，并基于 ARTOP 架构，实现 AUTOSAR 模型和 ARXML 的解析。MuNiu Core 完成配置工具的 UI 界面，在 MuNiu Core 之上的 Module，实现 AUTOSAR 各个 Module 的配置。配置完成后，可生成各个 Module 的配置代码。

ZC.MuNiu MCAL Configuration Tool is based on the Eclipse platform and is implemented based on the ARTOP architecture, enabling the parsing of AUTOSAR models and ARXML. MuNiu Core completes the UI interface of the configuration tool. Above the Core, the Module realizes the configuration of various AUTOSAR Modules. After the configuration is completed, the configuration code for each Module can be generated.



知从木牛 MCAL 配置工具架构
ZC.MUNIU MCAL CONFIGURATION TOOL ARCHITECTURE

4.1 产品特点 Product Feature

知从木牛 MCAL 配置工具特点如下:

The features of the ZC.MuNiu MCAL Configuration Tool are as follows:

- 基于 Eclipse 平台和 Artop 架构, 插件化开发, 可扩展性强
Based on the Eclipse platform and Artop architecture, it is developed in a plugin-based manner, offering strong scalability.
- 支持对 AUTOSAR 4.4.0 标准各个 MCAL Module 的配置
Supports the configuration of various MCAL Modules in accordance with the AUTOSAR 4.4.0 standard.
- 支持配置数据的一致性校验
Supports consistency checks for configuration data.
- 产品级的自动代码生成
Product-level automatic code generation.
- 支持 ARXML 格式数据交换
Supports data exchange in the ARXML format.
- 可以根据客户需要灵活配置和裁减功能组件
Capable of flexible configuration and tailoring of functional components according to customer requirements.
- 强大的错误检查和提示纠正机制
A powerful error-checking and prompt-correction mechanism.
- 支持多种格式数据文件(DBC, ODX)的导入
Supports the import of various format data files (DBC, ODX).
- 支持各种主流的汽车 ECU 芯片
Compatible with a variety of mainstream automotive ECU chips, such as FlagChip's FC4150、FC7300、AutoChips' AC7801x、AC781x, NXP's S32K1XX、S32K3XX、MPC5744P、MPC5746C、MPC5748G, Infineon's TC275、TC397, TI's TMS320f280048, AWR1642 etc.

4.2 技术架构 Technical Architecture

知从木牛 MCAL 配置工具基于 AUTOSAR 配置工具最新架构开发。

ZC.MuNiu MCAL Configuration Tool is developed based on the latest AUTOSAR configuration tool architecture.

- Eclipse Oxygen.3a Release (4.7.3a)
- ARTOP-SDK-4.13.0 (supports the latest AUTOSAR releases 4.4.0)
- ARTEXT-SDK-1.7.2 1.6.0.
- CDT 8.1.2

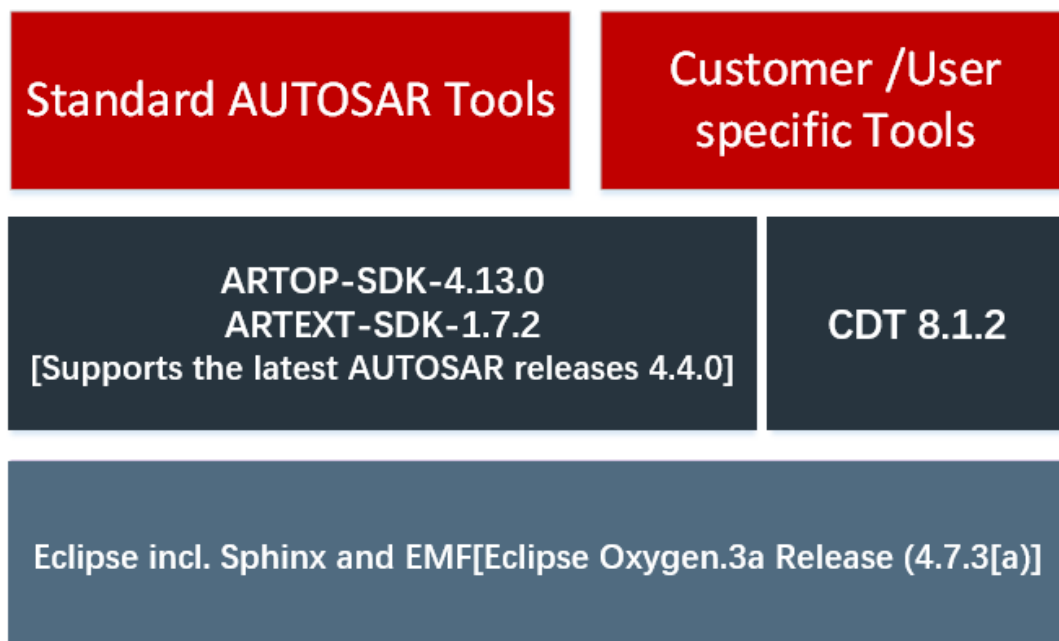


FIG 4 - 2 架构图
 FIG 4 - 2 ARCHITECTURE DIAGRAM

4.3 运行环境 Run Environment

配置环境 Configuration Environment	
Software (Configuration Tools)	Win7/10 64bit
Hardware (Chip)	FC7300
MCAL Version	FC7300 MCAL V0.1.0

5 证书 CERTIFICATE



木牛软件著作权登记证书
ZC.MUNIUI SOFTWARE COPYRIGHT REGISTRATION CERTIFICATE



木牛基础软件配置工具软件产品登记证书
MUNIUI SOFTWARE PRODUCT REGISTRATION CERTIFICATE



成为全球领先的**汽车基础软件**公司
To Be the Global Leading **Automotive Basic Software** Company

