Elektrobit

EB tresos® Safety OS release notes
TRICORE TC39XX

product release 2.0

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1. Release Notes

Release:
EB tresos Safety OS 2.0.150 [revision 0000]

Date:
2021-01-19

Supported architecture:
TRICORE/TC39XX

AUTOSAR version and revision:
4.0.3

AUTOSAR SWS version and revision:
5.0.0

Supplier:
Elektrobit Automotive GmbH

1.1. Supported compilers and hardware

For an updated list of supported compilers including supported compiler options and hardware used for testing, please see the quality statement provided with the delivery.

1.2. New features

Multi-core support
The EB tresos Safety OS supports multi-core microcontrollers. This includes the startup of several cores, synchronization mechanisms (spinlocks) and inter-core requests for APIs that affect OS objects on another core like task activations or event handling.

OSEK extensions for asynchronous (non-blocking) inter-core activations
The EB tresos Safety OS provides API functions that implement asynchronous inter-core requests. This improves the performance in the case that the calling core does not need to wait for the result of a request compared to standard AUTOSAR API functions which wait for the result from the other core before they continue.

Inter-process communication and locking mechanisms across core boundaries
The EB tresos Safety OS provides an Inter OS-Application Communicator (IOC) that supports message exchange within and across core boundaries.

AUTOSAR application state support
: The EB tresos Safety OS supports AUTOSAR OS-Application states including the associated access rights from other OS-Applications based on the current application state of the accessed OS-Application.

Lock-free QM-OS
: The EB tresos Safety OS serializes QM-OS API function calls and QM-OS interrupts. The QM-OS API functions and interrupt handlers therefore no longer need to protect themselves from interruption by another QM-OS API/ISR which improves the performance by removing the formerly necessary locks.

Serialized trusted functions
: The EB tresos Safety OS serializes trusted function calls. This means that the nesting of trusted function calls is no longer restricted to two. Instead each task and ISR that can interrupt a trusted function is allowed to make another trusted function call. The trusted functions themselves are serialized and don't really nest each other.

API access protection
: The EB tresos Safety OS supports access protection for the APIs to shutdown a single or all processor cores as well as for terminating an application.

1.3. Migrating EB tresos Safety OS

A migration of the microkernel module *asc_MicroOs* is not required. The module is up-to-date with the regular installation.

For a migration of the OS module *asc_Os*, please refer to the EB tresos AutoCore OS release notes.

1.4. Deviations

Deviations are described in the EB tresos Safety OS User's Guide, section "Deviations".

1.5. Change log

This chapter lists the changes between different versions. Only changes for the current architecture are listed. Please note that a change for the current architecture may also be listed within the version entry for another architecture, if the release of this architecture coincided with the change.

EB tresos Safety OS version 2.0.150

TRICORE TC39XX release

EB tresos Safety OS version 2.0.148

TRICORE TC39XQ release

EB tresos Safety OS version 2.0.146

TRICORE TC36XD release

EB tresos Safety OS version 2.0.145

TRICORE TC39XQ release

EB tresos Safety OS version 2.0.143

ARM ZUXEVCR5 release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.142

TRICORE TC39XQ release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.136

ARM64 RCARM3N release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.135

ARM64 ZUXEV release

NOTE This is a release without safety approval. Do not use in projects with safety requirements!

EB tresos Safety OS version 2.0.134

TRICORE TC37XT release

EB tresos Safety OS version 2.0.132

PA S32R294 release

EB tresos Safety OS version 2.0.131

TRICORE TC36XD release

EB tresos Safety OS version 2.0.130

TRICORE TC33XL release

EB tresos Safety OS version 2.0.129

ARM64 RCARV3M release

NOTE This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.128

PA S32R294 release

NOTE This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.126

TRICORE TC33XL release

- Increased support for the number of code regions to 10 for TC3x derivatives

NOTE This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.125

TRICORE TC37XT release

EB tresos Safety OS version 2.0.123

TRICORE TC36XD release

NOTE This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.120

TRICORE TC277 release

EB tresos Safety OS version 2.0.118

ARM64 RCARV3M release

NOTE This is a release without safety approval. Do not use in projects with safety requirements!

EB tresos Safety OS version 2.0.114

ARM64 RCARV3M release

- ASCMICROOS-5429 Fixed known issue: The OS fails to call ShutdownHook()

NOTE This is a release without safety approval. Do not use in projects with safety requirements!

EB tresos Safety OS version 2.0.111

ARM ZUXEVCR5 release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.108

ARM RCARM3N release

NOTE This is a release without safety approval. Do not use in projects with safety requirements!

EB tresos Safety OS version 2.0.105

TRICORE TC275 release

EB tresos Safety OS version 2.0.104

TRICORE TC37XT release

WARNING This is a development drop. Do not use for production!

- Added Advanced Logical Core Identifiers feature.

EB tresos Safety OS version 2.0.103

TRICORE TC29XT release

EB tresos Safety OS version 2.0.102

ARM64 RCARV3M release

EB tresos Safety OS version 2.0.101

TRICORE TC29XT release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.100

TRICORE TC23XL release

EB tresos Safety OS version 2.0.98

ARM RCARV3MCR7 release

EB tresos Safety OS version 2.0.94

TRICORE TC38XQ release

EB tresos Safety OS version 2.0.93

TRICORE TC39XX release

- ASCMICROOS-5199 Fixed known issue: Invalid and missing interrupt source symbols for TC39XX.

EB tresos Safety OS version 2.0.92

PA SPC58XG release

EB tresos Safety OS version 2.0.90

ARM RCARM3CR7 release

NOTE This is a release without safety approval. Do not use in projects with safety requirements!

EB tresos Safety OS version 2.0.88

TRICORE TC23XL release

EB tresos Safety OS version 2.0.87

ARM RCARM3NCR7 release

EB tresos Safety OS version 2.0.86

ARM64 RCARV3H release

EB tresos Safety OS version 2.0.84

ARM RCARV3HCR7 release

EB tresos Safety OS version 2.0.83

TRICORE TC38XQ release

EB tresos Safety OS version 2.0.82

TRICORE TC39XX release

EB tresos Safety OS version 2.0.81

ARM RCARV3MCR7 release

EB tresos Safety OS version 2.0.80

TRICORE TC39XX release

EB tresos Safety OS version 2.0.79

ARM ZUXEVCR5 release

EB tresos Safety OS version 2.0.77

ARM64 RCARV3H release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.76

TRICORE TC39XX release

EB tresos Safety OS version 2.0.75

ARM RCARV3HCR7 release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.74

TRICORE TC39XX release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.70

TRICORE TC39XX release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.67

ARM64 RCARM3N release

EB tresos Safety OS version 2.0.62

RH850 RH850P1HC release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.61

TRICORE TC29XT release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.60

TRICORE TC277 release

EB tresos Safety OS version 2.0.59

TRICORE TC22XL release

EB tresos Safety OS version 2.0.58

TRICORE TC277 release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.57

PA QUASAR3 release

- Harmonize system call parameter handling and improve it with respect to AAPCS64 (for ARM64).

EB tresos Safety OS version 2.0.56

RH850 RH850D1X release

EB tresos Safety OS version 2.0.55

TRICORE TC22XL release

WARNING This is a development drop. Do not use for production!

- Implemented refilling of execution time budget for `WaitEvent()`, `MK_WaitGetClearEvent()`, and `MK_GetClearEvent()`, when tasks don't wait at all

- Added state tracing via `MK_TRACE_STATE_THREAD()` for `WaitEvent()`, `MK_WaitGetClearEvent()`, and `MK_GetClearEvent()`, when tasks don't wait at all
- Data type mk_tick_t was replaced with the data type mk_uint32_t in the following APIs:
  - MK_DiffTime32()
  - MK_ElapsedTime32()
  - MK_ElapsedMicroseconds()
  - MK_ElapsedTime1u()
  - MK_ElapsedTime10u()
  - MK_ElapsedTime100u()

EB tresos Safety OS version 2.0.54

RH850 RH850F1H release

EB tresos Safety OS version 2.0.53

ARM RCARM3CR7 release

- Added feature `MK_GetPanicExceptionInfo()` for TRICORE.

EB tresos Safety OS version 2.0.52

RH850 RH850D1X release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.51

ARM S32S247 release

EB tresos Safety OS version 2.0.50

CORTEXM BCM89107 release

EB tresos Safety OS version 2.0.49

ARM RCARM3CR7 release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.48

ARM RCARV3MCR7 release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.47

PA SPC58XG release

EB tresos Safety OS version 2.0.46

TRICORE TC38XQ release

EB tresos Safety OS version 2.0.45

ARM S32S247 release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.44

TRICORE TC38XQ release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.43

TRICORE TC29XT release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.42

ARM RCARM3CR7 release

EB tresos Safety OS version 2.0.41

CORTEXM BCM89107 release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.40

PA QUASAR3 release

EB tresos Safety OS version 2.0.39

PA QUASAR3 release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.38

ARM RCARM3CR7 release

EB tresos Safety OS version 2.0.37

ARM RCARM3CR7 release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.36

TRICORE TC39XX release

EB tresos Safety OS version 2.0.35

ARM RCARV3MCR7 release

EB tresos Safety OS version 2.0.34

ARM64 RCARV3M release

EB tresos Safety OS version 2.0.33

RH850 RH850F1H release

EB tresos Safety OS version 2.0.32

TRICORE TC39XX release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.30

ARM AR1642 release

EB tresos Safety OS version 2.0.28

PA SPC58XC release

EB tresos Safety OS version 2.0.27

ARM S32V234AA32 release

EB tresos Safety OS version 2.0.26

ARM64 RCARV3M release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.24

RH850 RH850F1H release

EB tresos Safety OS version 2.0.22

PA SPC58XG release

WARNING This is a development drop. Do not use for production!

- Mk_board.h now defines MK_CFG_Cy_MPU_REGISTER_CHECK to 1 for the non-lockstep cores. (y=2 for TC27x, y=0,2 for TC29x).

EB tresos Safety OS version 2.0.20

PA SPC58XC release

WARNING This is a development drop. Do not use for production!

- Added MK_InterruptLockingHook.

EB tresos Safety OS version 2.0.19

RH850 RH850F1H release

EB tresos Safety OS version 2.0.18

TRICORE TC29XT release

- Removed StartNonAutosarCore.
- Extended MK_IRQCFG macro. This breaks hand-written configurations.
- Added support for compiler options which limit the width of enumerations to 16 bit. This imposes limitations on the arguments of MK_ReportError.
- ASCMICROOS-3555 Fixed known issue: Interrupt sources SRC_QSPI2HC and SRC_QSPI3HC can't be used on TC23XL.
- The generator now prevents that the initilization core for a memory region is a core that has no write access to that region.

EB tresos Safety OS version 2.0.17

ARM S32V234AA32 release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.16

PA QUASAR3 release

WARNING This is a development drop. Do not use for production!

EB tresos Safety OS version 2.0.15

TRICORE TC29XT release

- Added configuration parameters for call depth counting and FPU rounding mode in EB tresos Studio.

EB tresos Safety OS version 2.0.14

RH850 RH850F1H release

WARNING This is a development drop. Do not use for production!

- Added support the simple schedule table (SST) addon.
- ASCMICROOS-3360 Fixed known issue: Calling TerminateApplication from the ProtectionHook may cause kernel panic.
- ASCMICROOS-3360 Fixed known issue: Calling TerminateApplication from the ProtectionHook may cause kernel panic.

- The OS service TerminateApplication() is no longer rejected in the ProtectionHook(), however, please use the return value of the ProtectionHook() instead if possible.
- ASCMICROOS-3359 Fixed known issue: Result of ProtectionHook is ignored if causing application is terminated by another core.

EB tresos Safety OS version 2.0.13

TRICORE TC277 release

- ASCMICROOS-3229 Fixed known issue: Incorrect task or application terminated as result of ProtectionHook.
- The OS service TerminateApplication() is rejected in the ProtectionHook(), if the culprit belongs to the same OS application as the one to be terminated. In this case, please use the return value of the ProtectionHook() instead.
- ASCMICROOS-3309 Fixed known issue: Kernel panics when trusted functions are nested.
- ASCMICROOS-3191 Fixed known issue: The APIs MK_EnableInterruptSource() and MK_DisableInterruptSource() are not available.

EB tresos Safety OS version 2.0.12

TRICORE TC29XT release

EB tresos Safety OS version 2.0.11

TRICORE TC277 release

EB tresos Safety OS version 2.0.10

TRICORE TC29XT release

EB tresos Safety OS version 2.0.9

TRICORE TC277 release

- NMI traps are now reported via `ProtectionHook()`.

- It is now possible to initialize the stacks with a magic pattern for determining the stack usage at runtime from ORTI or the program. The demo comes with two sample functions to determine the stack usage and size of tasks and ISRs.

EB tresos Safety OS version 2.0.8

TRICORE TC29XT release

- NMI traps are now reported via `ProtectionHook()`.

EB tresos Safety OS version 2.0.7

TRICORE TC29XT release

- ASCMICROOS-2841 Fixed known issue: Safety Manual: Verification criterion VC.Mk_gen_config.ISR.4.-15 not strict enough.

EB tresos Safety OS version 2.0.6

TRICORE TC29XT release

WARNING This is a development drop. Do not use for production!

- The Safety OS no longer starts cores by itself. The user is now responsible for starting all cores, which are meant to be controlled by the Safety OS, and for setting their program counter to MK_entry2.
- Adapted StartCore API to AUTOSAR SWS.
- Added support for DONOTCARE.

EB tresos Safety OS version 2.0.5

TRICORE TC277 development release

EB tresos Safety OS version 2.0.4

TRICORE TC29XT development release

- Thread stack identifiers (emitted by the generator) now contain the index of the threads' core.

- ASCMICROOS-2579 Fixed known issue: Safety Manual: Missing verification criterion for `MK_MEM-PART_GLOBAL_SIZE`.
- Added support for IOC (prototype). Group communication is not yet supported.

EB tresos Safety OS version 2.0.3

TRICORE TC277 prototype release

WARNING This is a prototype release. Do not use for production!

- EB tresos Safety OS is now delivered containing a multi-core demo.
- Support for QM-OS application modes added.
- The configuration options MkOsLow, MkTfLow, MkOsHigh and MkTfHigh have been removed. MkOs and MkTf are meant to be used instead.
- Threads now drop all spinlocks they held, when they are terminated.

EB tresos Safety OS version 2.0.2

TRICORE TC277 prototype release

WARNING This is a prototype release. Do not use for production!

- Global registers can now be initialized via linker symbols.
- Fixed default level of built-in threads, to allow cross-core replies.

EB tresos Safety OS version 2.0.1

TRICORE TC29XT prototype release

WARNING This is a prototype release. Do not use for production!

EB tresos Safety OS version 2.0.0

TRICORE TC297 prototype release

WARNING This is a prototype release. Do not use for production!

EB tresos Safety OS version 1.1.22

PA development release

- ASCMICROOS-1812 Fixed known issue: GetApplicationID() may return spurious application IDs for application-less tasks/ISRs.
- ASCMICROOS-1894 Added the MK_WaitGetClearEvent feature.
- ASCMICROOS-1927 OS_WaitGetClearEvent and OS_HAS_WAITGETCLEAREVENT are now defined by the QM-OS, not by the microkernel. This change should be transparent to most users, but users of a pure-microkernel system or who are including MicroOs.h need to use the microkernel's API instead. The existence macro is called MK_HAS_WAITGETCLEAREVENT. The API (which was already defined) is called MK_WaitGetClearEvent.
- ASCMICROOS-1894 MK_WaitGetClearEvent now records the correct service ID (MK_sid_WaitGetClearEvent) when an error is reported. There is no AUTOSAR equivalent for thie service ID.
- The files shipped with the application template now take make.exe from the installed Make-plugin instead of `TRESOS_BASE/bin/make.exe`.

EB tresos Safety OS version 1.1.21

RH850 development release

EB tresos Safety OS version 1.1.20

PA development release

EB tresos Safety OS version 1.1.19

PA prototype release

EB tresos Safety OS version 1.1.18

TRICORE development release

EB tresos Safety OS version 1.1.17

ARM development release

EB tresos Safety OS version 1.1.16

ARM prototype release

EB tresos Safety OS version 1.1.15

PA development release

EB tresos Safety OS version 1.1.14

V850 mass production release

- The files shipped with the application template now take make.exe from the installed Make-plugin instead of `TRESOS_BASE/bin/make.exe`.

EB tresos Safety OS version 1.1.13

ARM development release

EB tresos Safety OS version 1.1.12

TRICORE prototype release

- ASCMICROOS-1927 OS_WaitGetClearEvent and OS_HAS_WAITGETCLEAREVENT are now defined by the QM-OS, not by the microkernel. This change should be transparent to most users, but users of

a pure-microkernel system or who are including MicroOs.h need to use the microkernel's API instead. The existence macro is called MK_HAS_WAITGETCLEAREVENT. The API (which was already defined) is called MK_WaitGetClearEvent.

- ASCMICROOS-1894 MK_WaitGetClearEvent now records the correct service ID (MK_sid_WaitGetClearEvent) when an error is reported. There is no AUTOSAR equivalent for thie service ID.

EB tresos Safety OS version 1.1.11

ARM prototype release

WARNING This is an untested release. Do not use for production!

- ASCMICROOS-1735 The microkernel now correctly configures interrupt sources, even when not running on the first core of a multicore processor.
- ASCMICROOS-1812 Fixed known issue: GetApplicationID() may return spurious application IDs for application-less tasks/ISRs.
- ASCMICROOS-1894 Added the MK_WaitGetClearEvent feature.

EB tresos Safety OS version 1.1.10

TRICORE development release

- ASCMICROOS-1703 Added a check to verify that the software vector table is fully populated. This ensures that problems like ASCMICROOS-1699 cannot happen again
- ASCMICROOS-1605 Removed `main`-function prototype from the microkernel. The user needs to provide the correct prototype in `Mk_board.h`.

EB tresos Safety OS version 1.1.9

ARM development release

EB tresos Safety OS version 1.1.8

ARM development release

EB tresos Safety OS version 1.1.7

PA development release

EB tresos Safety OS version 1.1.6

V850 development release

- ASCMICROOS-1455 Make MK_StartupPanicStop() user-configurable.

EB tresos Safety OS version 1.1.5

PA development release

EB tresos Safety OS version 1.1.4

V850 development release

- ASCMICROOS-1277 Fixed known issue: The microkernel enqueues interrupt threads during interrupt locks.

EB tresos Safety OS version 1.1.3

ARM development release

- ASCMICROOS-1269 Fixed known issue: Undefined system behaviour occurs when more than 63 interrupts are configured.

EB tresos Safety OS version 1.1.2

V850 development release

- ASCMICROOS-1187 Fixed known issue: Possible out-of-bounds array access during microkernel startup.

EB tresos Safety OS version 1.1.1

V850 development release

EB tresos Safety OS version 1.1.0

ARM development release

- ASCMICROOS-1155 Define the AUTOSAR constant `INVALID_OSAPPLICATION` instead of `INVALID_APPLICATION`.

EB tresos Safety OS version 1.0.1

PA mass production release

EB tresos Safety OS version 1.0.0

PA mass production release

- ASCMICROOS-787 Changes resulting from code inspection. The changes that affect the functionality are:
  - `MK_panic_DataSectionsNotInitialised` and `MK_panic_MpuNotInitialisedCorrectly` have been changed to use US spelling (*-ized).
  - Return types of `OSError_GetTaskID_TaskID()` and `OSError_GetElapsedCounterValue_PreviousValue()` have been changed from a data type to the corresponding reference type. The macros are now correct according to the AUTOSAR standard.
  - The prototypes of `MK_LibGetNTasks()` and `MK_LibConditionalGetResource()` have been changed. They now match the implementation exactly.
  - The file `Mk_u_libgetserviceid.c` has been renamed to `Mk_u_liberrorgetserviceid.c`
  - The file `Mk_u_libgetparameter.c` has been renamed to `Mk_u_liberrorgetparameter.c`

EB tresos Safety OS version 0.9.4

PA snapshot release

EB tresos Safety OS version 0.9.3

PA mass production release

- ASCMICROOS-647 The thread's processor mode is now taken into account when testing to see if an exception came from a thread. This prevents a kernel panic if a user-mode thread overflows its stack into the kernel stack.

- ASCMICROOS-681 The MK_errorInfo and MK_protectionInfo structures can now be disabled by defining the macros MK_ERRORINFO_ENABLED and MK_PROTECTIONINFO_ENABLED respectively during the compilation of Mk_configuration.c. If the macro is defined to 0, the corresponding structure is omitted and the constant pointer takes the value 0. The Generator does not define these macros.
- ASCMICROOS-549 Whenever a thread has been terminated, the microkernel now checks the thread queue to ensure that there is still a thread available. If there is no thread, the microkernel shuts down. If configured, ShutdownHook(MK_E_NOMORETHREADS) is called.

EB tresos Safety OS version 0.9.2

PA mass production release

- ASCMICROOS-542 extra tests added to MK_ReleaseResource() and MK_RequeueThread() to cover the possibility that the idle thread might be using resources (or interrupt locking).
- ASCMICROOS-480 determine which direction a division with a negative result rounds.

EB tresos Safety OS version 0.9.1

PA release

- ASCMICROOS-416: A null-pointer dereference in MK_FindFirstThread has been fixed. In the OS alone the dereference was usually harmless but in conjunction with Autocore it occasionally caused read-while-write exceptions and ECC errors in the flash memory that is used by the memory stack. The function is used by GetTaskID() and GetISRID().
- ASCMICROOS-481: MK_SysStartOs() now uses full thread termination in case StartOS is called from a task.

EB tresos Safety OS version 0.9.0

PA release

- ASCMICROOS-283: The plugin does not register a generator and a configuration anymore. Therefore it is not necessary to create an empty microkernel configuration.

EB tresos Safety OS version 0.3.0

PA release

- ASCMICROOS-227: The MK_exceptionInfo structure has been made public via #include <public/Mk_-error.h>

- ASCMICROOS-223: A "safe startup" entry point has been implemented. The recommended entry point for soft boot (from a boot loader or boot manager) is now MK_Entry2.