

zxCSP – Chip Support Package



KEY FEATURES

- ❑ *Single Software Framework for Multiple Microcontroller Platforms*
- ❑ *Ultra Compact High Performance Real Time Operating System*
- ❑ *Extensive Library of Pre-Tested and Pre-Integrated Software*
- ❑ *Innovative Licensing Terms*
- ❑ *Reduces Time-To-Market and Development Costs*
- ❑ *Increases Product Performance and Reliability*

DESCRIPTION

zxCSP is a family of chip support packages with a common framework and function library that supports various microcontroller platforms. Over the past 30 years, the principals of ZXTECH have developed well over 100 microcontroller designs that perform very diverse functions on a wide variety of microcontroller platforms. Early on in their development efforts, they determined that they could produce better and more reliable applications in shorter periods of time if they based their designs on a well thought out and thoroughly tested common framework and function library. Accordingly, they began their efforts by first developing a high quality reusable code library for effective frameworks and common functions. Over the years, they have continued to build on that framework, amassing and refining a substantial broad-based library that includes real time operating systems, file systems, device drivers, protocol stacks, error detection-correction algorithms, encryption-decryption algorithms and much more. As a result, they have been able to focus on client applications and spend less time rebuilding (and reinventing) foundational software for each project. ZXTECH has begun to externalize and encapsulate its libraries with platform-specific

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frameworks and chip device drivers so that others can enjoy the same benefits of rapid, reliable application development. zxCSP libraries are provided as software object libraries for use with a particular software tool chain. Having had its share of frustrations with software licensing agreements, ZXTECH has developed an innovative licensing program that is simple, inexpensive and very attractive for embedded development. With zxCSP, embedded developers can focus on their applications, where the real value is, and not on endlessly creating and rebuilding foundational elements.

What the zxCSP Packages Include –

ZxCSP packages contain copyrighted and patented works that are licensed for use by particular licensees following execution of a licensing agreement. Each zxCSP package includes:

Framework Files A set of application framework files are included to serve as templates for building zxCSP-based embedded applications. As templates, they facilitate the platform configuration process and they assist the developer in ensuring that all salient platform requirements have been addressed.

Library File A software object library file is included that can be used to generate zxCSP-based applications. It is comprised of three groups of functions:

zxRTOSpico A set of functions associated with the powerful ultra compact high performance real time operating system that serves as the runtime framework for zxCSP-based applications.

Chip Device Drivers A collection chip-specific device drivers and interface functions for the target platform. These include functions like UART drivers, I2Cdrivers, etc.

Function Library A collection of generally useful functions for building applications. These include pre-tested and pre-integrated functions like debug monitors, switch debounce routines, keyboard decoding routines, display handling routines, CRC calculation routines, communication processing functions, off-chip peripheral drivers, etc.

NOTE: zxCSP Library Files are uniquely coded and generated for each zxCSP licensee.

zxTOOL One zxTOOL device is provided. The zxTOOL is a flexible device that can be used for bootloading, debugging and product serialization. It is also used as a hardware device for authenticating licensees and for applying license keys to licensed products. Licensees may purchase additional zxTOOL devices.

License Keys Each zxCSP package comes with an initial allotment of 100 license keys. Licensees may purchase additional license keys from ZXTECH.

Support Each zxCSP package comes with three months of support, which entitles the licensee to e-mail support and library updates for the covered period of time. After that time, licensees can purchase annual extensions to their support agreement, continuing their access to e-mail support and library updates. Licensees may also purchase other customized support services from ZXTECH.

About the zxRTOSpico Real Time Operating System –

zxRTOSpico is a powerful ultra compact high performance real time operating system that serves as the runtime framework for embedded applications. The kernel is priority driven and fully preemptive. It inherently supports nested interrupts. Interrupts are seldom turned off. When they are, it is only for very short periods of time during critical code execution. (With typical clock rates, this is usually less than 1µS and always less than 4 µS.) zxRTOSpico was

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specifically designed to be simple to understand, configure and use. Depending on the platform, the entire kernel can use less than 2KB of ROM, 16 bytes of RAM and 10 bytes of RAM per Thread. To minimize Thread Stack sizes, zxRTOSpico uses a System Stack, which can be as small as 16 bytes of RAM. Thread Stacks can be as small as 36 bytes of RAM, since they do not need to accommodate interrupts, nested or otherwise. All system time is specified in milliseconds, independent of the clock tick input rate. This allows clock rate and platform changes without requiring wholesale code changes. The core kernel functions include:

zxRTOSinitialization	Initializes zxRTOSpico for use.
zxRTOSstartup	After initialization and user configuration, starts up zxRTOSpico.
zxThreadStart	Initializes and makes a thread ready to run.
zxThreadSleep	Causes a thread to sleep a specified amount of time.
zxThreadSleepUntil	Causes a thread to sleep until a specified “system time”.
zxThreadPrioritySet	Changes the priority of a specified thread to a specified value.
zxThreadSuspend	Suspends execution of a specified thread.
zxThreadResume	Resumes execution of a specified thread.
zxThreadTerminate	Terminates a specified thread.
zxThreadExit	Causes the calling thread to terminate and exit.
zxMutexObtain	Obtains a specified mutex or blocks up to a specified wait time.
zxMutexRelease	Releases a specified mutex.
zxEventWait	Waits up to a specified time for a specified event to occur.
zxEvent	Declares a specified event.
zxEventReset	Resets the declaration of a specified event.
zxSemaphoreSetWait	Waits up to a specified time for a specified semaphore to be set.
zxSemaphoreClearWait	Waits up to a specified time for a specified semaphore to be clear.
zxSemaphoreSet	Sets a specified semaphore.
zxSemaphoreClear	Clears a specified semaphore.
zxSystemTime	Gets the current “system time”.
zxMemoryGet	Gets a specified amount of “system memory”.
zxInterruptEnable	Enables interrupts.
zxInterruptDisable	Disables interrupts.
zxInterruptSet	Gets current interrupt enable state and sets the state as specified.
zxSystemTimeInput	Declares a clock tick input to zxRTOSpico.
zxReboot	Causes a platform reboot.

All blocking functions include a “wait time limit” parameter, which can be set to zero, making the function call effectively non-blocking. All library functions rely and build upon the core primitive kernel functions listed above.

Beyond application code, applications must include the following basic functions:

zxRTOShardware	Provides for basic hardware initialization.
zxRTOSsoftware	Provides for initial application software startup.
zxFatalError	Provides for application treatment of fatal errors, should they occur.

Further, applications must provide (or modify supplied) interrupt service routines for any specialized application requirements. Templates are provided for all of the foregoing user-provided functions.

About Our Libraries –

There are a few important operational considerations regarding the zxCSP libraries that prospective licensees should be aware of:

1. zxCSP libraries are uniquely coded to particular licensees. This means that coding is tied to the zxTOOLS provided to the licensee. Only affiliated zxCSP libraries and zxTOOLS can be used together.

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2. zxCSP libraries, zxTOOLS and license keys are all coded with respect to software versions. If a licensee chooses not to extend the support agreement, they may continue to use, in perpetuity, the last authorized library version that they received, however, they will be unable use newer library versions. Further, existing licensed devices will not be able to use software based on any newer library versions without a license key upgrade. As a practical matter, this should not create any problems since licensees with expired support agreements would not have access to any newer libraries anyway.
3. ZXTECH is in the early stages of porting its extensive software library to various platforms and tool chains. Therefore, the zxCSP libraries are expected to undergo substantial expansions in 2006. The expansions are expected to include file systems, encryption-decryption, error detection-correction, various protocol stacks and some off-chip wireless device drivers.

What zxCSP Packages Are Available –

zxCSP packages are supplied as a linkable object library for a particular target platform family using a particular development tool chain. The available zxCSP packages include:

zxCSPmsp1XX-IAR For Texas Instruments MSP430F1XX Family using IAR 3.X tool chain.

zxCSPlpc21XX-IAR For Philips LPC21XX Family using IAR 3.X tool chain.

NOTE: The zxCSP packages listed above are those that were available at the time of this printing. Visit www.zxtechnologies.com to obtain an updated list of available packages.

How Our Innovative Licensing Works –

1. Become a zxCSP licensee by signing our license agreement and purchasing zxCSP packages for each platform and tool chain that you will use for development. There is a minimal cost for this. There are no “per developer” costs, only the “per licensee” cost.
2. Register with ZXTECH all product types (not individual products) that you will be applying license keys to. There is no cost for this.
3. Use zxTOOLS to serialize and apply license keys to your licensed products. Use your zxTOOL to purchase additional license keys from ZXTECH as required. The cost of additional license keys is a function of the quantity of license keys being purchased from ZXTECH. License keys can be applied to any registered product in any mix. There is no licensing distinction among product types.
4. Maintain adequate auditable records that identify the quantity and type of licensed products that have been produced.
5. Licensing is that simple!

For additional licensing information, contact Joel Sandahl at (817) 251-6303 x-211.

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