

[Home](#) / [Products](#) / ST7 tools

Cosmic ST7 Cross Development Tools

Cosmic's toolchain for the ST7 family is part of a complete and uniform product line incorporating over 20 years of innovative design and development. All Cosmic products include one year of technical support and updates.

- [Datasheet](#)
 - [Download evaluation](#)
 - [Cosmic Starter Kit for ST7-LITE2 devices](#)
 - [Application Note: writing optimal C code for ST7](#)
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Integrated Development Environment

All Cosmic C Cross Compilers for Windows include IDEA - Cosmic's own integrated development environment which is preconfigured for the ST7 family of processors. IDEA is designed specifically for developing embedded applications with Cosmic compilers. IDEA integrates an editor, project manager, graphical smart build/make facility, program analyzer, link file generator, documentation manager and ZAP debugger into one easy to use environment running under Windows.

[Click here](#) for more information about IDEA.

Third Party IDE Integration

Most Cosmic compilers can be easily integrated in third party IDEs such as [Borland Codewright](#) and [RistanCase Development Assistant for C](#). [Click here](#) for more information. CXST7 is also fully integrated in ST's STVD7 IDE and debugger.

Compiler

The C Compiler package includes: an integrated development environment with optimizing ANSI-C cross compiler, macro assembler, linker, librarian, hex file generator, object format converters, debugging support utilities, run-time library source code, and a multi-pass compiler command driver. The compiler also supports non-intrusive C source-level debugging with Cosmic's line of ZAP debuggers.

[Click here](#) for general information on Cosmic Compilers.

ST7 Specific features include:

- ANSI and ISO C Compiler
The Cosmic ST7 compiler follows ANSI and ISO rules and conventions. All code and

libraries are optimized specifically for the ST7 processor core. All ST7 derivatives and sub-families are supported.

- Reentrant and Recursive
Using the default programming model (stack long), all code is fully reentrant and recursive using standard ANSI stack frame conventions.
- 7 Memory Models
CXST7 supports 7 programming model options to fine tune code optimizations to your application and memory requirements.
- C Support for Zero Page
Compiler source extensions provide efficient use of the ST7 short addressing mode and single byte pointers.
- BIT Variables
In addition to Standard ANSI C bit fields, CXST7 supports single bit variables using the `_Bool` keyword providing an easy and efficient bit packing mechanism for true/false flags.
- In-line Assembly
The compiler provides three convenient methods for adding assembly code inside a C program. Includes an argument passing mechanism.
- Absolute Listings
Optionally produce relocatable and/or absolute C interspersed with the corresponding Assembly listings.
- IEEE-754 Floating Point
Supports IEEE single floating point formats with full ANSI libraries (Source code included).
- Moveable Code Feature
Moveable code feature is designed to make RAM based code like boot loaders and programmers easy to create and maintain. The Linker automatically creates a segment in ROM to store moveable code. Then at run time, use the supplied library function to relocate and copy the moveable code into RAM for execution.
- Check Sum Feature
Easy to use check sum facility and library (Source included) allow users to quickly implement an efficient check sum on any or all sections. Check sum calculation and insertion is transparently managed by the linker.
- Mixed C and Assembly
Cosmic tools support mixed C and Assembly applications. Including Assembler support for C `#defines` and `#includes` so C and assembly language modules may share common constants and macros.
- Host Independent Formats
The Cosmic relocatable and absolute object formats are host independent. This allows user's on PC, SUN and HP to share objects for linking and debugging.
- IEEE-695 and ELF/DWARF Debug Support
The Cosmic compiler suite supports the IEEE and ELF DWARF standard debug formats used by many popular emulators and logic analyzers.
- In-Circuit Emulator Compatibility
CXST7 is compatible with emulators from STMicroelectronics and Hitex.
- Flexible Compiler Interface

Cosmic compilers are designed to be powerful and flexible so they can be used with virtually any environment. Use Cosmic's own IDEA interface or use your favorite editor, make utility and/or source code control system - It's Your Choice!!

- CMX-TINY+
CMX-TINY+ Real-Time Multi-Tasking Operating System is available for CXST7. [\(more\)](#)
- Segger embOS
Segger's embOS Real Time Operating System is available for CXST7 [\(more\)](#).
- OSEK/VDX Certified
OSEK/VDX is an Automotive consortium aiming at an industry standard for an open-ended architecture for distributed control units in vehicles. OSEK is an acronym for a German term which translates to "Open systems and the corresponding interfaces for automotive electronics". VDX stands for Vehicle Distributed eXecutive. Cosmic ST7 compiler is OSEK/VDX Certified with operating systems from ETAS LiveDevices Limited.
- MISRA Checker compatible
IDEA ST7 and CXST7 integrate seamlessly with Cosmic's MISRA checker to aid in the production of well structured and portable C language code using guidelines prescribed by the Motor Industry Software Reliability Association.
See [Cosmic MISRA Checker](#) for more information.

ZAP Debugger

ZAP is a full featured source-level debugger available for Windows. ZAP's intuitive graphical interface is uniform for all targets and execution environments. ZAP is available in 3 versions for the ST7. (1) ZAP SIM Debugger with integrated processor Simulator, (2) ZAP DVP debugger interfaces to STMicroelectronics' Development boards and (3) ZAP HDS debugger provides a convenient high level interface to STMicroelectronics' full featured in-circuit emulators.

[Click here](#) for general information about the ZAP debugger.

ZAP ST7 for DVP specific features include:

- Real-time debugging
ZAP ST7 DVP provides a low cost real-time target debugging environment using the on-board monitor functionality and hardware breakpoints.
- High Speed interface
ZAP DVP uses a fast parallel port connection to provide fast downloads to DVP's emulation memory and efficient debugger response times and single stepping.
- Hardware Breakpoints
ZAP DVP uses the on-board hardware breakpoint mechanism to provide real-time execution and complex breakpoint capabilities.

ZAP ST7 for HDS EMU2 and EMU3 In-Circuit Emulators specific features include:

- Real-time debugging

ZAP ST7 HDS provides a robust full featured real-time debugging environment using a PC parallel port or USB connection (EMU3).

- **Hardware Breakpoints**
ZAP HDS offers an unlimited number of hardware breakpoints using the EMU2 and EMU3 hardware breakpoint facility.
- **Complex Event triggers**
Set multiple complex events and triggers to stop or record real-time execution data. Also records and displays time stamp and logic clip levels.
- **Logic Analysis and Real-time Trace**
Flexible trace feature displays recorded trace in several formats including raw cycle data, C source, disassembly, and C source interspersed with the corresponding disassembly. Export any trace format to a file for post processing and documentation. ST7EMU3 trace buffer can hold 256k-word trace records composed of: address, data and control bus activity, 8-bit analyzer input, 1 trigger input and a 30-bit timestamp extendable by overflow counting.