



# CROSSWARE<sup>®</sup>

## Tools for Embedded Development

### 8051 Training Suite

*Compiler   Assembler   Linker   Simulator   Debugger   Environment*

The 8051 Training Suite provides an advanced set of tools specifically targeted at the student writing and debugging software for the 8051 Microprocessor Trainer from Flite Electronics. The Standard Edition is ideally suited to the student learning to program in assembler. The Advanced Edition includes a sophisticated ANSI C compiler. It includes:

- ☐ An advanced optimizing ANSI C compiler and libraries (Advanced Edition only)
- ☐ Relocatable cross assembler, linker and library manager
- ☐ A source level simulator to simulate the 8051 microcontroller and its variants
- ☐ A source level debugger to allow debugging on the Flite 8051 Microprocessor Training Board via a PC serial port
- ☐ A flash microcontroller containing the Crossware debug monitor to replace the factory fitted 8052 chip and a new PAL to allow the board to operate in multiple modes
- ☐ A multi-threaded, multi-target integrated development environment in which to write, edit and debug code, browse high level source code, access electronic copies of the manuals and much more
- ☐ Manuals in printed and electronic form
- ☐ A secure licence server to simplify multi-user licencing across a LAN and VPN



#### C Compiler (Advanced Edition only)

- ☐ Optimizing ANSI C compiler with extensions for embedded development
- ☐ Pre-written library routines including 32-bit and 64-bit floating point arithmetic
- ☐ Smart pointers and other advanced features
- ☐ Comprehensive source level debug output
- ☐ Data output for Embedded Development Studio source code browser
- ☐ Easy-to-use support for interrupt functions
- ☐ Full support for in-line assembler

#### Relocatable Assembler

- ☐ High speed assembly to create relocatable object module
- ☐ Intel mnemonics
- ☐ Nestable macros with argument passing
- ☐ Nestable conditional assembly
- ☐ Comprehensive range of assembler directives and pseudo ops
- ☐ Complex expression evaluation
- ☐ Source level debug output

#### Relocating Linker

- ☐ Links relocatable object modules generated by compiler, assembler and library manager
- ☐ Arranges and positions relocatable segments at appropriate memory locations. Supports multiple regions, supports precise segment location and ordering
- ☐ Finalises the evaluation of incomplete complex expressions
- ☐ Produces the final program output in Intel hex, binary image and IEEE695 format (with full debug records for source level simulation and debugging)

#### Library Manager

- ☐ Combines object modules into object module libraries
- ☐ Allows object modules to be inserted into, extracted from and removed from object module libraries
- ☐ Allows object module libraries to be merged

# 8051 Training Suite

*Compiler*

*Assembler*

*Linker*

*Simulator*

*Debugger*

*Environment*

## Simulator/Debugger

The simulator creates a virtual 8051 chip that runs on your PC. It allows 8051 programs to be run without any hardware.

The debugger downloads and runs your program on a Flite 8051 Trainer board.

The simulator and debugger share a common user interface.

Both the simulator and debugger provide:

- ☐ Source and assembly level debugging
- ☐ Multiple memory views and watch windows
- ☐ Multiple register views with register tooltips
- ☐ Disassembly view
- ☐ Complex heirarchical source level drag-and-drop breakpoints
- ☐ Machine level breakpoints
- ☐ Call stack view

The simulator provides:

- ☐ Simulation of the 8051 instruction set
- ☐ Simulation of in-chip peripherals
- ☐ Simulation of 8051 interrupts
- ☐ State capture
- ☐ Source code profiling
- ☐ Code and data coverage
- ☐ Multiple cycle counters

The debugger provides:

- ☐ Downloading into RAM (via debug monitor)
- ☐ Unlimited software execution breakpoints in RAM
- ☐ Preconfigured to operate with Debug Monitor

## Debug Monitor

- ☐ Interrupt driven serial communications with the PC
- ☐ Supplied pre-programmed into flash microcontroller to replace standard 8051 monitor software
- ☐ A new PAL allows the 8051 Trainer Board to operate in source level debug monitor mode, the original Flite monitor mode and standalone microcontroller mode

## Licensing

The package is supplied with a non-commercial licence and licensing with a USB key.

## Embedded Development Studio IDE

The Embedded Development Studio is the integrated development environment application at the heart of the FLT-68K Training Suite.

It links together the simulator and debugger and also drives the compiler and assembler tool chain.

The Embedded Development Studio also provides other facilities including:

- ☐ Creates new projects with an initial set of default files
- ☐ Allows the organisation of multiple projects into workspaces
- ☐ Context coloured editing of compiler and assembler source code
- ☐ Context coloured views of compiler/assembler listings
- ☐ Scans the project source code to generate dependency information
- ☐ Uses the browse records generated by the compiler to accelerate source code navigation
- ☐ Text file searching
- ☐ Find and Find and Replace in source views
- ☐ Provides access to the electronic manuals including full search capability
- ☐ Integrated terminal emulator facilities
- ☐ Customisable commands allowing the launch of other executables
- ☐ Conversion of bitmaps to C structures
- ☐ Supports multiple Crossware suites and tool chains and third party tool chains

## Printed and Electronic Manuals

User manuals are provided printed and bound so that you can study the features and facilities available at your leisure and away from your computer, and electronically so that you can rapidly locate topics from within the Embedded Development Studio. (Multi-user packages include a single set of printed manuals.)

## Licence Server

- ☐ Allocates licences to any PC connected to LAN
- ☐ Easy to set-up, protocol independent
- ☐ Secure allocation of licences prevents student access to critical licence files
- ☐ Allows allocation of priorities to individual and groups of PC's (ensures sufficient licences are available for specific lectures or training sessions)

## System Requirements

Runs on Windows 9x, Windows NT4.0, 2000, Windows XP, Windows Vista, Windows 7 and Windows 8

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