

POINTERS

Fall 1998

Let's Embed the World!

10 Years of C51

Since its market introduction in 1988, the Keil C51 Compiler has become the leading C compiler for the 8051 microcontroller family. No other 8051 C compiler generates more efficient code for your embedded applications. That's why more than 25,000 users worldwide use the Keil advantage for their 8051 projects.

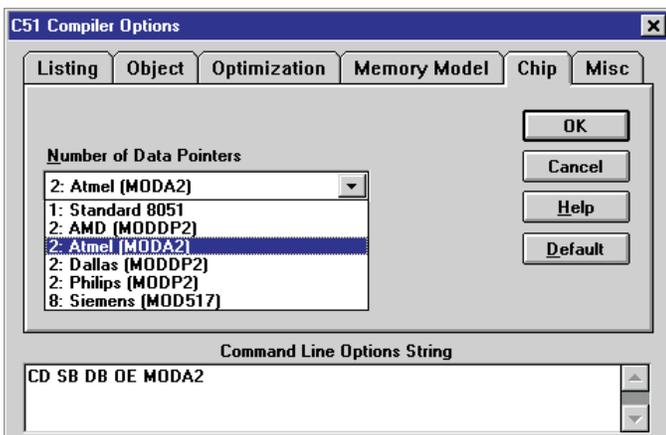
For example,

```
BL51 myfile.obj DW(1,2,3)
```

disables linker warnings 1, 2, and 3.

- Monitor support for code banking target hardware. We have examples and application notes for the new code banking monitor available. We have installed and tested the new monitor on our MCB520 and MCB517 evaluation boards. Check www.keil.com for more details.

If you haven't already updated your V5.x compiler, call our sales department today to find out how.



Web-Based Support

When you need technical support after hours, remember to check the support solutions database on the world wide web at:

<http://www.keil.com/support/>.

Software Versions

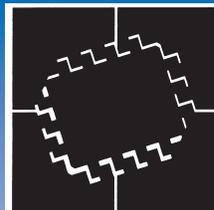
We constantly strive to improve our products by adding enhancements and correcting bugs as quickly as possible. Check our web site at <http://www.keil.com/> for the latest updates.

The following table lists the versions of our 8051, 251, and 166 development tools that we are currently shipping.

C51.....	V5.50a
C251.....	V2.14
C166.....	V3.12
RTX51	V5.10
RTX251	V2.14
RTX166	V3.10a

We are currently shipping C51 Version 5.50. This release integrates several enhancements that make your 8051 application development easier.

- Dual data pointer support for Atmel and Philips devices. Specify **MODA2** for the Atmel AT89S8252 and other compatible devices. Use **MODP2** for Philips devices with dual data pointers.
- The ability to disable specific linker warnings. Use the **DISABLEWARNING** linker control (or **DW** for short) to disable specific linker warnings.



**EMBEDDED
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Visit us at **ESC West 1998**
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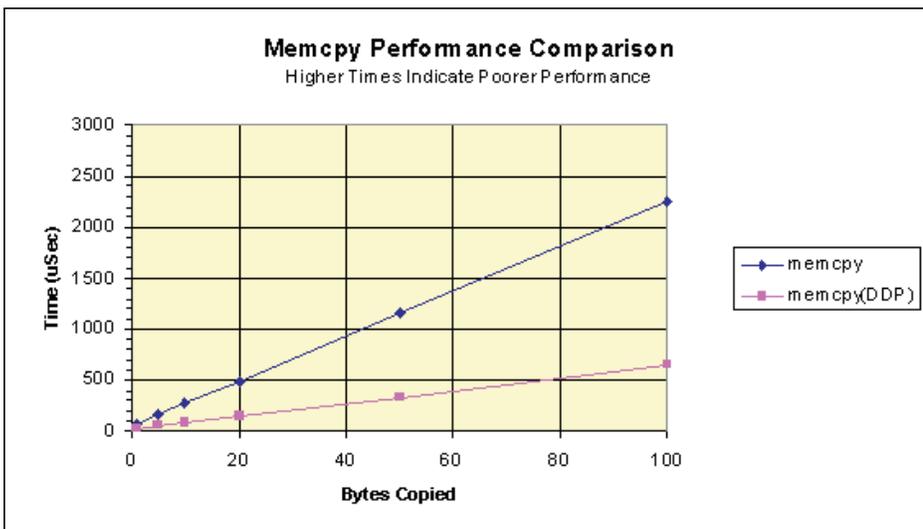
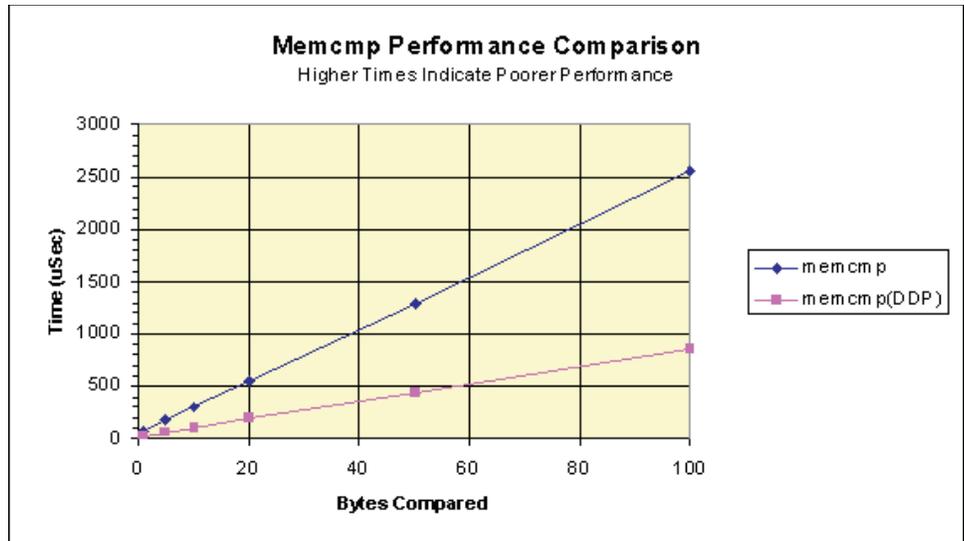
Contact our Dallas
office for
free Passes!
800.348.8051

Dual Data Pointers

One of the slowest operations of the 8051 is accessing XDATA or CODE using the DPTR register. This is especially true if you move memory from CODE to XDATA or even from one XDATA buffer to another XDATA buffer. That's where the dual data pointers offered by Siemens, Dallas Semiconductor, AMD, Atmel, and Philips come in.

Keil C51 V5.5 library routines such as **memcpy** and **memcpy** use dual data pointers whenever possible.

As an example of the performance



improvement, we compared moving memory on a standard 8051 running at 12MHz with a single DPTR to a Dallas Semiconductor 320 running at 12MHz with dual DPTRs. The graphs pictured above show the increase in performance.

When moving large buffers (100 bytes or more), dual data pointers let you move data nearly 4 times faster (on the Dallas Semiconductor 320/520). Results on other chips may vary.

Forthcoming releases of C51 will support optimizations for dual data pointers. Contact our sales department for details.

RTX51 Semaphores

We frequently hear the question, "How can I call **printf** from multiple tasks in my RTX51 application?" Since **printf** is not reentrant, problems arise if it is invoked from more than one task. RTX51 provides binary semaphores which you can use to guarantee exclusive system access.

First, you must define a semaphore for the **printf** function. This is a numeric constant between 8 and 15. We defined ours **SM_PRINTF**.

Next, in your initialization code, you must set the semaphore. The following code shows how.

```
os_send_token (SM_PRINTF) ;
```

This makes sure that the first task to "get" the semaphore succeeds. The following code should be used wherever **printf** is invoked.

```
os_wait (K_MBX + SM_PRINTF,
        255, 0) ;
printf ("...") ;
os_send_token (SM_PRINTF) ;
```

This code "gets" the **printf** semaphore, calls **printf**, and "puts" the semaphore back.

Since the **printf** function is not reentrant, but is invoked from multiple tasks, the linker will complain about multiple calls to the **printf** segment. The problem is that the linker does not know how to overlay the data area. So, you must tell it where the **printf** function fits into the program's call tree. Since it is called from multiple tasks, it does not fit into the call tree of any one task. Therefore, it must be made a separate segment that is not subject to overlaying. The following linker command does the trick.

```
OVERLAY (* !
        ?PR?PRINTF?PRINTF)
```

An example program (**PFSEMA.ZIP**) is available on the Keil FTP site at ftp.keil.com.

MCB517AC Evaluation Board

The MCB517AC single-board computer lets you build and test applications for the Siemens 80C517A. This high-end microcontroller provides the standard 8052 on-chip peripherals plus A/D, 8 data pointers, and a high-speed math unit. All of these features are directly supported by the Keil 8051 development tools.

The board comes pre-configured with MON51 which lets you debug download and test both standard and code banking applications (up to 6 code banks). The Keil 2K-limited evaluation tools for the 8051 are included.

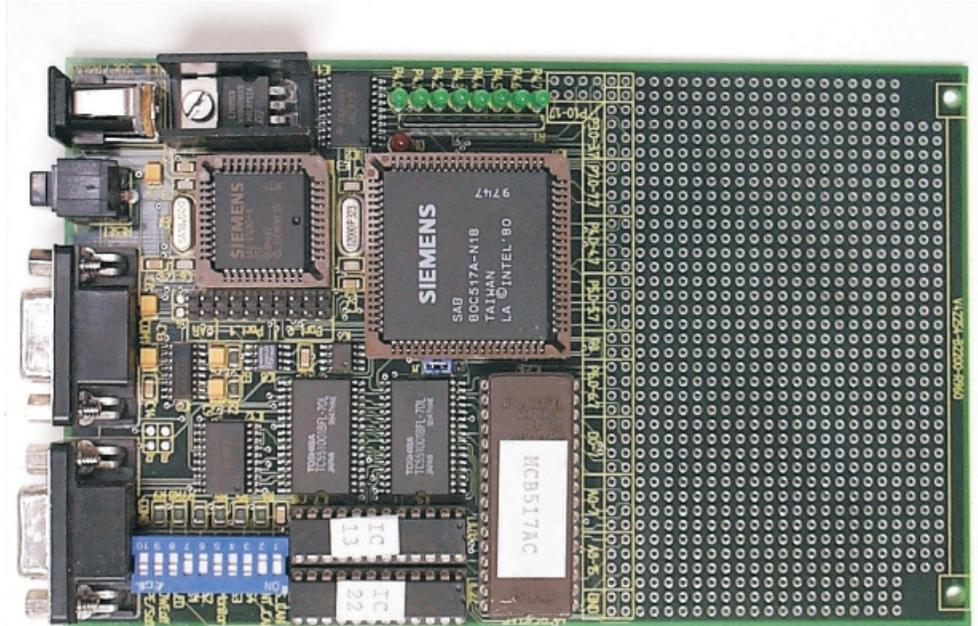
The μ Vision IDE helps you create your applications and the dScope debugger lets you download them and test them on the MCB517AC single-board computer.

The board supports the Controller Area Network (CAN) with an external 80C91 Siemens CAN Controller. Examples on our web site show you how to use the RTX51 Real-Time Kernel to rapidly create working CAN programs.

Y2K Compliance

As you are all aware, there is a great deal of concern regarding the possible effects of date-related computer crashes at the turn of the millennium. The severity of these effects range from none to the catastrophic depending on which reports you review and your level of reliance on computer-based devices and software.

We have reviewed our dependence on computer systems and software here at Keil and have come to the conclusion that the millennium change will have little or no impact



MCB517AC Evaluation Board with Code-Banking and CAN

on our key in-house systems.

The software currently in use has been tested and non-compliant systems will be updated prior to the middle of 1999. Key suppliers, while possibly being affected, have limited impact on our ability to ship product. In addition, our ability to access customer and vendor data will not be affected by the date change. This includes our ability to provide technical support to end users of our products.

For a complete report on this topic, visit our web site or contact your technical support representative for details on how you can obtain the complete Keil Y2K Statement.

Training Courses

When you start a new embedded project, the last things you need are wasted time and costly mistakes that could have been avoided. Enroll in an 8051 or 166 training class from Keil Software and let us show you the tricks and traps of your target architecture while teaching you how to get fully-functional applications up and running.

After attending a Keil training class, you'll know where to start and how to get your project completed.

Our classes are designed for anyone responsible for embedded software development. Engineers as well as managers will learn from these classes. Attendees should have a good working knowledge of programming, however, knowledge of the C language is not required.

You may enroll on the world wide web at <http://www.keil.com/training/>, send e-mail to class@keil.com, or call us at **800-348-8051**.



On-site Training is Available for Large Engineering Groups

Keil Software manufactures embedded development tools for the 8051, 251, and 166.

We believe that technical support and customer service are integral parts of every product we sell. That's why every Keil product comes with 1 year of FREE technical support. These beliefs make Keil Software the tools company of choice for so many silicon vendors and eval board manufacturers.

Keil Software Compilers and Assemblers are supported by every major emulator vendor. When you buy from Keil, you can be assured that you have the industry's best supported development tools.

Come see us at the Embedded Systems Conference in San Jose, CA, to see our latest products and services.



Keil Software, Embedded Systems Conference Fall 1997

Call us at 800-348-8051 for free show passes and information.