

# CodeTEST® Software Analysis Tools

For Embedded Software  
Visibility, Analysis and  
Verification



Metrowerks CodeTEST® Software Analysis Tools are the preeminent solution for embedded software developers that require code visibility and precise analysis of their software in order to improve software quality and reduce development costs. CodeTEST SAT is a software analysis toolset that assists you in overcoming complexities of the embedded software environment from host-based design and development to validation and verification.

Build your system with confidence, relying on a solution that will bring you to a whole new level of embedded software excellence.

### Ahead of Schedule

Equipped with CodeTEST SAT, you can tackle the costly "little snags" that frustrate and delay development, test and deployment. CodeTEST SAT is a win/win solution for all teams to get ahead of schedule, meeting time-to-market goals ahead of expectations and ahead of the competition.

### See the Issue Before it is One

CodeTEST SAT supports you every step of the way in identifying issues before they cause problems downstream or for your customer. By giving you visibility of the real-execution history of your code at the source or RTOS levels, CodeTEST SAT helps you find your bugs faster and earlier in the product's development cycle.

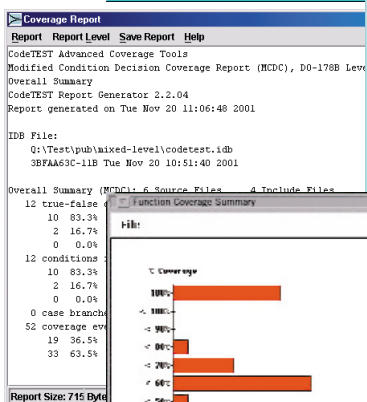
### Deliver your Code with Confidence

CodeTEST SAT gives you an unprecedented level of confidence at code hand-off. From design to development, from development to test, from test to deployment, CodeTEST SAT streamlines transitions, helping you identify unresolved issues as they occur in the cycle. Project managers, engineers and marketing teams have the data they need to feel confident in the quality of their systems. In an industry where product performance and code quality are key, CodeTEST SAT can make all the difference.

**Performance**  
Identify execution bottlenecks

Row	Name	# Instances	# Entries	Minimum(us)	Maximum(us)	Average(us)	Cumulative(us)	% Total Time
0	MemTest0 is mapped to Memory...	1	83,078	40.7	16,502.0	6,829.4	567,378,941.5	22.37%
1	MemTest1 is mapped to Memory...	1	81,401	41.6	16,582.7	4,965.1	404,165,510.1	15.94%
2	MemTest2 is mapped to Memory...	1	77,149	41.0	16,541.6	8,891.1	685,940,179.1	27.05%
3	MemTest3 is mapped to Memory...	1	78,106	40.1	16,509.0	3,768.6	294,352,967.1	11.61%
4	MemTest4 is mapped to Memory...	1	90,528	39.2	16,562.6	6,213.4	509,494,359.7	20.05%
5	MemTask is mapped to The VxWo...	1						
6	Out	1						

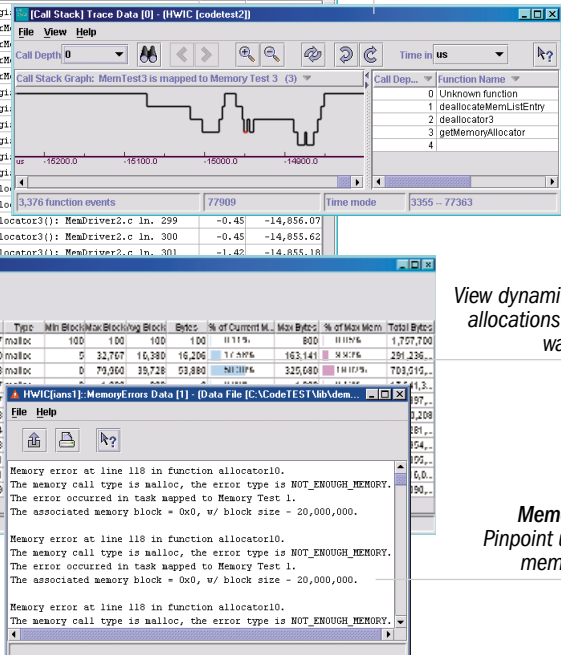
**Trace**  
Gain detailed visibility of software execution history even when your target crashes!



**Coverage**  
Document test completeness with coverage analysis

Row	Function Name	File Name	Line	Count	Type	Min Block	Max Block	Block	Bytes	% of Current M.	Max Block	% of Max Mem	Total Bytes
0	allocator1	MemDriver1.c	130	17,077	malloc	100	100	100	100	0.11%	800	0.11%	1,277,300
1	allocator2	MemDriver1.c	178	17,780	malloc	0	32,767	16,380	16,206	11.89%	163,141	20.2%	291,236
2	allocator3	MemDriver2.c	133	17,708	malloc	0	79,060	39,738	63,880	49.78%	326,680	40.70%	703,016
3	allocator4	MemDriver2.c	186	17,847									413
4	allocator5	MemDriver2.c	207	17,847									327
5	allocator6	MemDriver3.cpp	152	17,013									2,208
6	allocator7	MemDriver3.cpp	243	17,894									54
7	allocator8	MemDriver4.cpp	130	17,078									22
8	allocator9	MemDriver4.cpp	183	17,791									6,0
9	allocator9	MemDriver4.cpp	230	18,031									90
10	allocator9	MemDriver4.cpp	252	18,029									

**Memory**  
View dynamic memory allocations and high-water marks



**Memory Errors**  
Pinpoint untrapped memory errors

## Performance

Whether your concern is meeting real-time deadlines or improving the overall execution speed of your embedded application, CodeTEST Performance Analysis provides you with detailed software timing measurements that enable you to guarantee software performance.

- Measure up to 128,000 functions simultaneously to the highest levels of timing resolution
- Identify exactly where the system is spending its time
- Monitor specific sections of code with point-to-point timing measurements
- Determine interrupt service routine execution time
- Use call-pair data to optimize cache usage

## Trace

CodeTEST Trace makes it easy to validate execution of your design flow and specifications.

- Achieve unmatched accuracy in tracing execution history
- Track execution at RTOS, control-flow and source levels
- Locate, view and analyze problem areas quickly and easily

## Memory

CodeTEST Memory tracks dynamic memory allocations, and reports memory errors associated with the original source. Save time, resources and money by pinpointing system bugs caused by memory leaks or errors.

- Isolate memory leaks and errors
- Optimize memory allocation
- Improve system throughput and efficiency

## Coverage

CodeTEST Coverage gives you complete confidence in delivering your code by providing the most comprehensive code coverage used in the industry today.

You can measure the effectiveness of your testing using statement coverage (SC), decision coverage (DC) and modified condition/decision coverage (MC/DC) criteria. One of the few tools qualifiable under the safety-critical FAA-recommended guideline (DO-178B), it reports the percentage of coverage achieved at the function, file and application levels.

Verify how much of the program has been executed, reducing your risk factor by exposing problems arising from untested code.

- Find out what percentage of code executed in your tests
- Avoid statistical sampling and get actual coverage measurements
- Pinpoint untested or dead code

### SC verifies that:

- Each statement has been executed at least once

### DC verifies that:

- Each statement has been executed at least once
- Each decision in the program has taken all possible outcomes at least once

### MC/DC verifies that:

- Each decision in the program has taken all possible outcomes at least once
- Every point of entry and exit in the program has been invoked at least once
- Each condition in a decision has been shown to independently affect that decision's outcome

CodeTEST Coverage is available with an optional DO-178B Tool Qualification Package. This package includes documentation to help you expedite DO-178B tool qualification.

© Copyright, 2003. Metrowerks Corp. ALL RIGHTS RESERVED. Metrowerks, the Metrowerks logo, CodeWarrior, CodeTAP, CodeTEST, CodeICE, NetROM, SuperTAP and PowerTAP are trademarks or registered trademarks of Metrowerks Corp. in the U.S. and/or other countries. All other tradenames and trademarks are the property of their respective owners and are hereby recognized. Printed in U.S.A.

The reproduction and use of this document and related materials are governed by a license agreement between Metrowerks Corp. and its licensee. Consult that license agreement before use or reproduction of any part of this document. If you do not have a copy of the license agreement, contact your Metrowerks representative or call 800-377-5416 or 512-997-4700.


Metrowerks reserves the right to make changes to any product described or referred to in this document without further notice. Metrowerks makes no warranty, representation or guarantee regarding the merchantability or fitness of its products for any particular purpose, nor does Metrowerks assume any liability arising out of the application or use of any product described herein and specifically disclaims any and all liability.

Metrowerks software is not authorized for and has not been designed, tested, manufactured, or intended for use in developing applications where the failure, malfunction, or any inaccuracy of the application carries a risk of death, serious bodily injury, or damage to tangible property, including, but not limited to, use in factory control systems, medical devices or facilities, nuclear facilities, aircraft or automobile navigation or communication, emergency systems, or other applications with a similar degree of potential hazard.

Documentation stored on electronic media may be printed for non-commercial personal use only, further to the license agreement related to the product associated with the documentation. Subject to the foregoing non-commercial personal use, no portion of this documentation may be reproduced or transmitted in any form or by any means, electronic or mechanical, without prior written permission from metrowerks.

USE OF ALL SOFTWARE, DOCUMENTATION AND RELATED MATERIALS ARE SUBJECT OF THE METROWERKS END USER LICENSE AGREEMENT FOR SUCH PRODUCT.

921-75037-00

Metrowerks United States	Metrowerks Europe	Metrowerks Japan	
9801 Metric Blvd.	Riehenring 175, CH-4058	Shibuya Mitsuba Bldg. 5F Udagawa-cho 20-11	
Austin, Texas 78758 USA	Basel, Switzerland	Shibuya-ku Tokyo 150-0042 Japan	
Phone: +1.512.997.4700	Phone: +41.61.690.7500	Phone +81.3.3780.6091	
Fax: +1.512.997.4901	Fax: +41.61.690.7501	Fax +81.3.3780.6092	
E-mail: info@metrowerks.com	E-mail: info_europe@metrowerks.com	E-mail: asia-sales@metrowerks.com	