

## SOURCEPOINT™ FOR ARM® ARCHITECTURES

SOURCEPOINT™ IS AMERICAN ARIUM'S FLAGSHIP SOFTWARE DEBUGGER FOR ARM®, INTEL® XSCALE™, AND TI OMAP™ PROCESSORS. THE SOFTWARE, VERSATILE, CUSTOMIZABLE, AND RELIABLE, OFFERS EXCELLENT VISIBILITY TO C AND C++ CODE AND ITS EXECUTION. IT EXECUTES UNDER MICROSOFT® WINDOWS® AND LINUX PLATFORMS.

ARIUM TOOLS OFFER FAST, FEATURE-RICH, REAL TIME DEBUG, FROM THE WAY SOURCEPOINT VIEWS ARE RENDERED TO COMMAND LANGUAGE SCRIPTING THAT MINIMIZES MUNDANE TASKS, TO THE SPEED WITH WHICH TASKS EXECUTE. RUN CONTROL IS STATE OF THE ART. TRACE IS INTEGRATED. PERFORMANCE ANALYSIS DATA MATCH THE REAL EXECUTION TIME OF THE PROGRAM BEING RUN. SOURCEPOINT™ IDE OFFERS

A SEAMLESS INTERFACE BETWEEN THE DEBUGGER AND THE EDITOR. AND IT'S ALL SO EASY TO USE.

SOURCEPOINT OFFERS A NUMBER OF UNIQUE BUT HIGHLY INTUITIVE FEATURES, MAKING IT AN EXCEPTIONAL DEBUGGER FOR TODAY'S ARM-ARCHITECTURE PROJECTS.

### Code Window

- Displays C and C++ source, assembly code, comments, symbols, and breakpoints
- Display modes easily selected
- Step in C and/or assembly code
- Set breakpoints from this window
- View data values

### Trace Window

- Provides record of real-time ETM events; data can be used to determine exact path of code execution
- Intel XScale embedded instruction trace support
- In multi-processor environments, disassembled code displayed using different color for each processor

### Breakpoints Window

- Set, edit, remove, enable, and disable breakpoints
- Set complex, multi-level sequences
- View hardware decodes and resources
- Lets the user select pre - center - post trigger position

### Registers Window

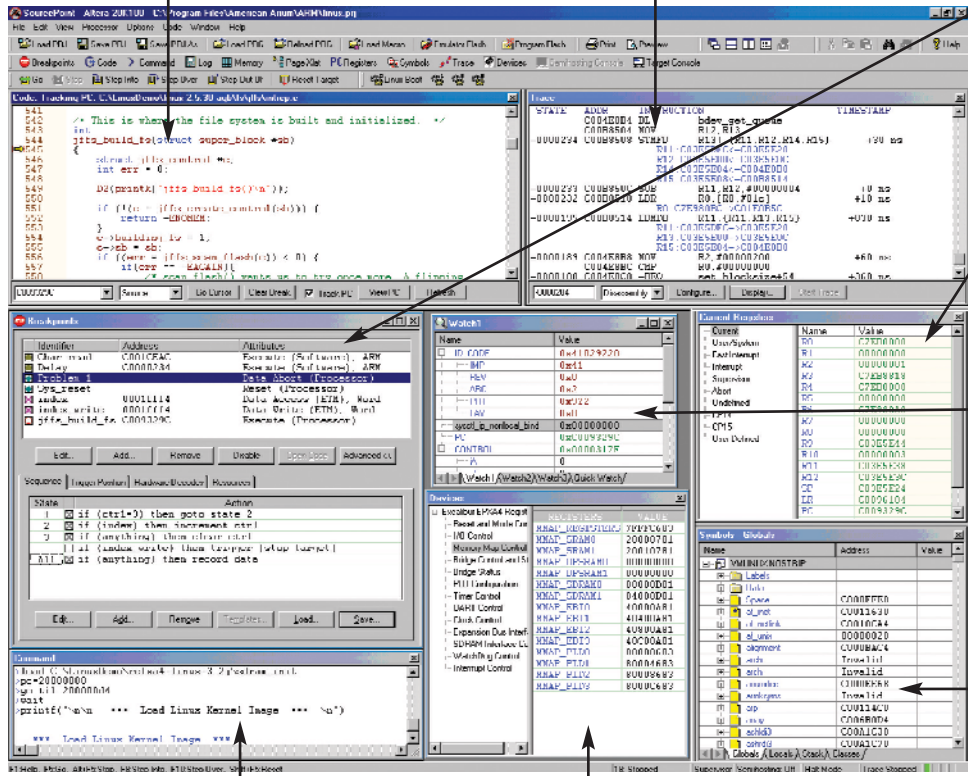
- Displays processor registers
- Registers can be edited; values change color
- Flyovers show labeled bit fields
- Allows user-defined register groups

### Watch Window

- Displays symbols and their values as set by user via drop and drag
- Quick watches designed to display data temporarily
- Data in views are dynamic; as values are updated, updates are made in views

### Symbols Window

- Access to all symbols and source code
- Composite variables, including arrays, structures, and unions, expandable to show their sub-elements



### Command Window

- Runs robust C-like command language for run control, loop execution, data and array variable use, file I/O access, and more
- Lets the user write sophisticated macros for testing or set up

### Devices Window

- Lets the user define a grid in which to view memory-mapped I/O devices and related registers and areas of memory
- \* Lets the user view everything on one window, saving space on the screen
- Popular SoC devices come standard



# SOURCEPOINT SOFTWARE FOR ARM ARCHITECTURES

A good debug solution offers the programmer or developer layers of debugging options - from the simple break-down of code into ever smaller iterations for examination to the ability to capture and analyze huge amounts of execution history in a single run. To meet end users' needs, American Arium offers several solutions, all of which employ the company's flagship SourcePoint debugger.

## MANAGING RUN CONTROL

The key to a successful run control debug strategy lies in the ability to set accurate breakpoints and step through code. SourcePoint offers processor breaks and unlimited soft breaks via simple GUIs. Breaks can also be set from the Code window or a command line.

SourcePoint uses the usual stepping commands along with go and halt to step through source or assembly-level code. SourcePoint's C-like command language includes not only excellent run control commands, but lets the developer execute loops, use data and array variables, access file I/O, and more. Unlike some command languages, SourcePoint is intuitive; developers do not need to know a two-letter code for each command.

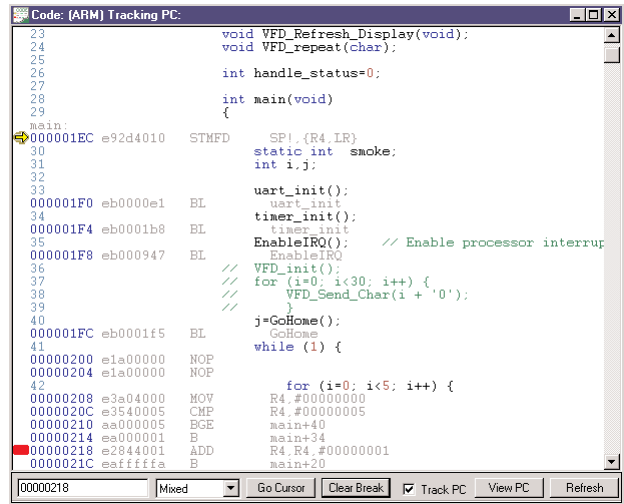
One of the newer features of the software is a handy symbols finder that displays any program symbol and its memory address. A dialog can be summoned by selecting a program from within a Symbols window Global tab and pressing CTRL-F, or by pressing CTRL-S from anywhere within SourcePoint.

Intuitive windows can be opened to view the state of the processor and make modifications to values, including Symbols windows, Registers windows, Memory windows, and user-defined Watch windows.

Arium's debug solutions are designed with time in mind. Whether downloading files or images, stepping through code, or coming back after hitting stop, the event executes with incredible speed.

### Code Window

- Displays C or C++ source or assembly code, or allows the user to see both; also displays comments, symbols, and breakpoints
- Allows single stepping (in C or assembly code)
- Offers breakpoint setting from this window
- Makes register or variable values visible via flyover help
- Works with multi-processor systems via multiple Code windows



## CAPTURING, FILTERING, ANALYZING EXECUTION HISTORY

For developers who want more than run control, SourcePoint offers some of the best trace functionality on the market today. The debugger handles trace via the Embedded Trace Macrocell (ETM) in ARM processors and produces solid execution history from Intel XScale processors. Several features make SourcePoint a true "solutions" debugger, including integrated trace, trace buffer depth, easy multi-level triggering, and performance analysis.

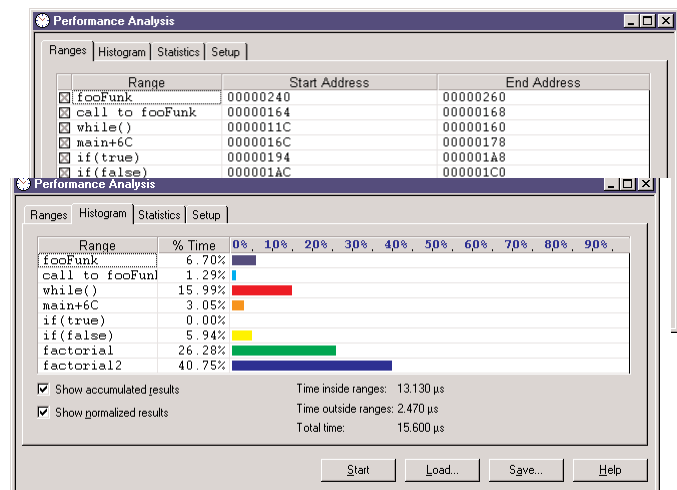
**Integration.** SourcePoint trace is integrated into the software package; it is not an "add on." Advantages? There's the obvious - developers do not have to deal with (or pay for) a separate trace port analyzer. There is no new

software to load. Users do not have the integration problems that plague add-on solutions. Apart from the obvious, the greatest advantage is being able to open a Code window and scroll through the collected trace, examining the actual code and how the compiler compiled it, with correlated code and trace.

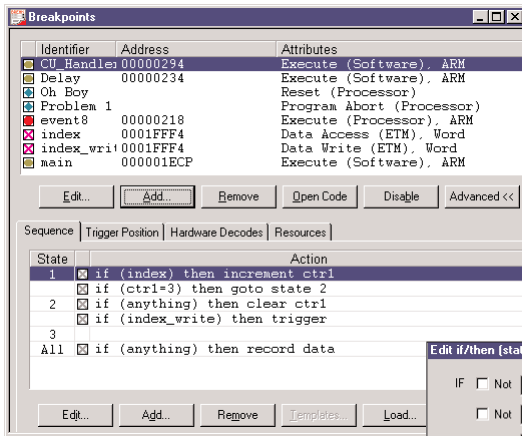
**Deep trace.** With Arium's SC-1000A emulator, SourcePoint offers trace depth up to 4 M samples, depending on the application. A triggering mechanism in the SourcePoint Breakpoints window allows users to determine where in the run the fill begins. In addition, an Arium proprietary trace buffer compression technology can be enabled to increase samples up to 15 times standard ETM trace depths to provide up to 60 M samples of trace.

### Performance Analysis Window

- Helps find bugs, profile functions, and gain better understanding of code coverage
- Setup is easy and intuitive
- Not limited to functions; any address range may be specified
- Not limited to specific compilers; no need to recompile code
- Does not alter the code or timing of experiment

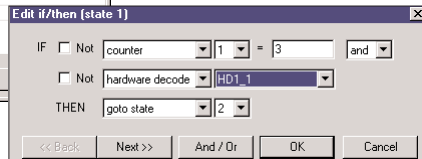


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## Complex Triggering

- User friendly dialog boxes let the user set/edit multi-level if/then clauses to create complex triggering sequences
- Unlike many other applications, the user does not need to know the details of the ETM registers when programming sequences



- Process breakpoints stop the execution of a process without stopping the processor or causing it to enter debug mode.
- Linux console devices can be hosted from within SourcePoint (the Target Console window), eliminating the need for a serial port or video device on the target and simplifying the debugging of "headless" systems.

SourcePoint allows concurrent debugging of Linux kernel code and Linux application processes. Within SourcePoint, two new views provide the user interface to Linux-aware debugging features. The Operating System window lists Linux processes and serves as the primary interface for task debugging. The Target Console window emulates multiple terminals which serve as the Linux system console and as the standard input and output device for processes launched for debugging.

**Multi-level triggering.** When used with the SC-1000A and a target with ETM, SourcePoint offers superb complex sequencing via a series of user friendly GUIs. Based on breakpoints and other user-defined events, trigger parameters can be qualified or refined. For example, an event may occur thousands of times in a program. A user can set up a breakpoint to trigger only after the first thousand times it occurs and only if it occurs after a particular address. Unlike other debuggers, SourcePoint does not require "rocket science" to set up the triggering sequence.

**Performance analysis.** SourcePoint includes performance analysis for use with ARM9™ cores. While most development tools rely on a compiler to handle performance analysis, SourcePoint uses the ARM ETM to mine data from code. The ETM has up to 16 address comparators that can be programmed with function entry and exit points.

Trace qualification is used to record only those addresses in the trace buffer. This gives the software designer approximately 140,000 real time entry and exit points in a 1 MB trace buffer (each address generating a 5-byte broadcast address consuming 7 cycles), resulting in a single trace capture that can contain thousands of instances of each address range. This solution requires no changes to the user's program, and measured performance data match the real execution time of the program being run.

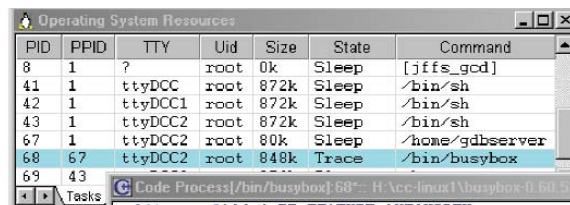
Arium also offers code profiling for targets without processors with ETM.

## SOURCEPOINT ON A LINUX PLATFORM

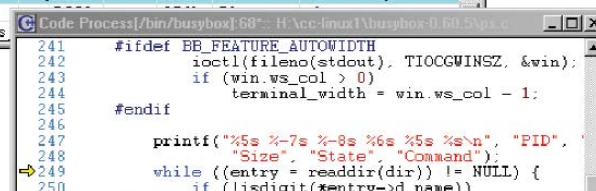
The Linux-aware feature of SourcePoint provides a number of important new capabilities for users who are working on Linux-based embedded systems:

- Allows full symbolic, source-level debugging of Linux kernel code.
- Allows source-level debugging of Linux embedded applications, including the ability to start or stop a Linux process, attach to a process, view source and symbols within a process.

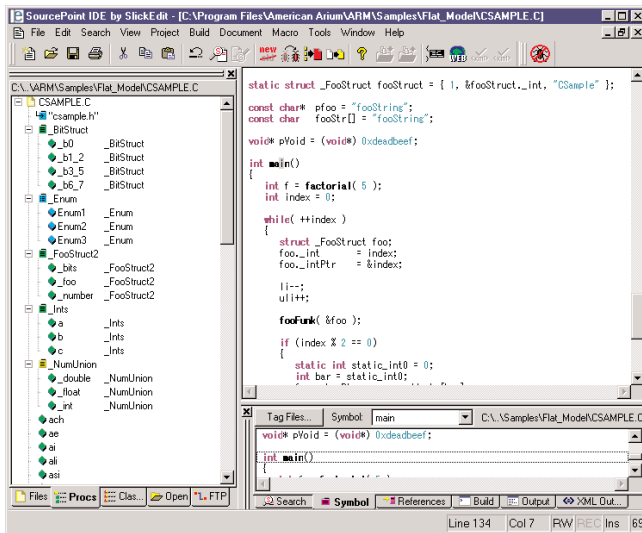
SourcePoint utilizes the ARM Debug Communication Channel (DCC) hardware to communicate over the JTAG port with code on the target, eliminating the need for any serial or network hardware as a prerequisite for debugging. As a result, the console is available from power-up without any other hardware dependencies except the processor core and the JTAG debug port.



Clicking on the Task tab brings up the attendant code in the Code window and makes available for display the associated symbols.



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## WORKING WITH SOURCEPOINT IDE

SourcePoint offers source code editing "on the fly" through the SourcePoint IDE (Integrated Development Environment), powered by Visual SlickEdit®, that ships under a separate license on the SourcePoint CD. The tight coupling of the debugger and editor allows the developer to move back and forth between them with ease, seamlessly editing source code, recompiling it, loading and running it on the target, and debugging it again.

SourcePoint IDE offers full project management support including project and make-file generation and build, an easily configurable environment, direct invocation of SourcePoint from within SourcePoint IDE with current project files loaded and ready for debug, and easy browsing for tool error output.

Editor features include syntax expansion and indenting, aliases, path/file-name completion, symbol listing and replacement, Context Tagging™ auto list members/parameters, auto parameter information, tag preview, and source code navigation. SourcePoint IDE also supports a class browser, version control management, and workspaces and projects supporting multiple configurations.

## SHORTCUTS WITHIN SHORTCUTS

SourcePoint incorporates hundreds of options, commands, and functionalities designed to spur the debug process forward. Windows are designed to be intuitive. They can be docked, floated, or minimized. Commands are available from multiple locations - menu bars, icon bars, context menus, a command line. Symbols and their values are easy to find and change.

Items are grouped logically in intuitive windows and dialog boxes. For example, target configuration options exist under a single view. From the dialog, the memory map of the target can be defined, the type and address range of flash memory devices declared, and target flash operations performed. Target configurations can be loaded from a user's target database file and saved to SourcePoint and/or the target database file.

SourcePoint offers a number of user-defined options. These include a window that allows definition of memory-mapped I/O devices and related registers and areas of memory in one view. Users can keep track of multiple devices without having to keep multiple views on their screen.

## SourcePoint IDE Window

- Quick and easy movement back and forth between debugger and editor
- Includes full project management support
- Easy integration of third-party development (e.g., compiler and linker) tools
- Ability to view differences between source files, directories, source trees, or symbols
- Multiple file and directory search and replace functionality

SourcePoint offers Linux Target Console and Semihosting Console views. A Target Console window works like the Linux console running on the target. Information normally seen on a serial terminal displays in this window. The Semihosting Console window displays messages to and from the target via ARM semihosting in the user's debug environment.

With SourcePoint, the user can connect to the SC-1000A or set up a simulated environment to simultaneously track and display multiple processors through one interface at any given time. No more resetting the system every time a user wants to view a different processor or use multiple instances of the debugger.

## OUTSTANDING SUPPORT

American Arium offers exceptional service and support for all of its debug solutions. Highly qualified technical support staff are available during regular working hours, and delays getting to them are minimal. Often they can pinpoint a problem immediately or on review of a dump of the log and project files. Support staff can also troubleshoot particularly difficult problems via WebEx™, an online, interactive solution that lets them see a developer's code but lets the developer control the session. Arium will also send out its engineers and support staff to a customer's site - at no cost to the customer - if that appears to be the best solution to the problem. Additionally, there are downloads and technical documentation available on the Arium Web site.

*SourcePoint ships with Arium hardware or separately as upgrades to previously purchased hardware-assisted solutions. For more information, contact your sales representative or Arium tools distributor or visit our Web site at [www.arium.com](http://www.arium.com).*



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