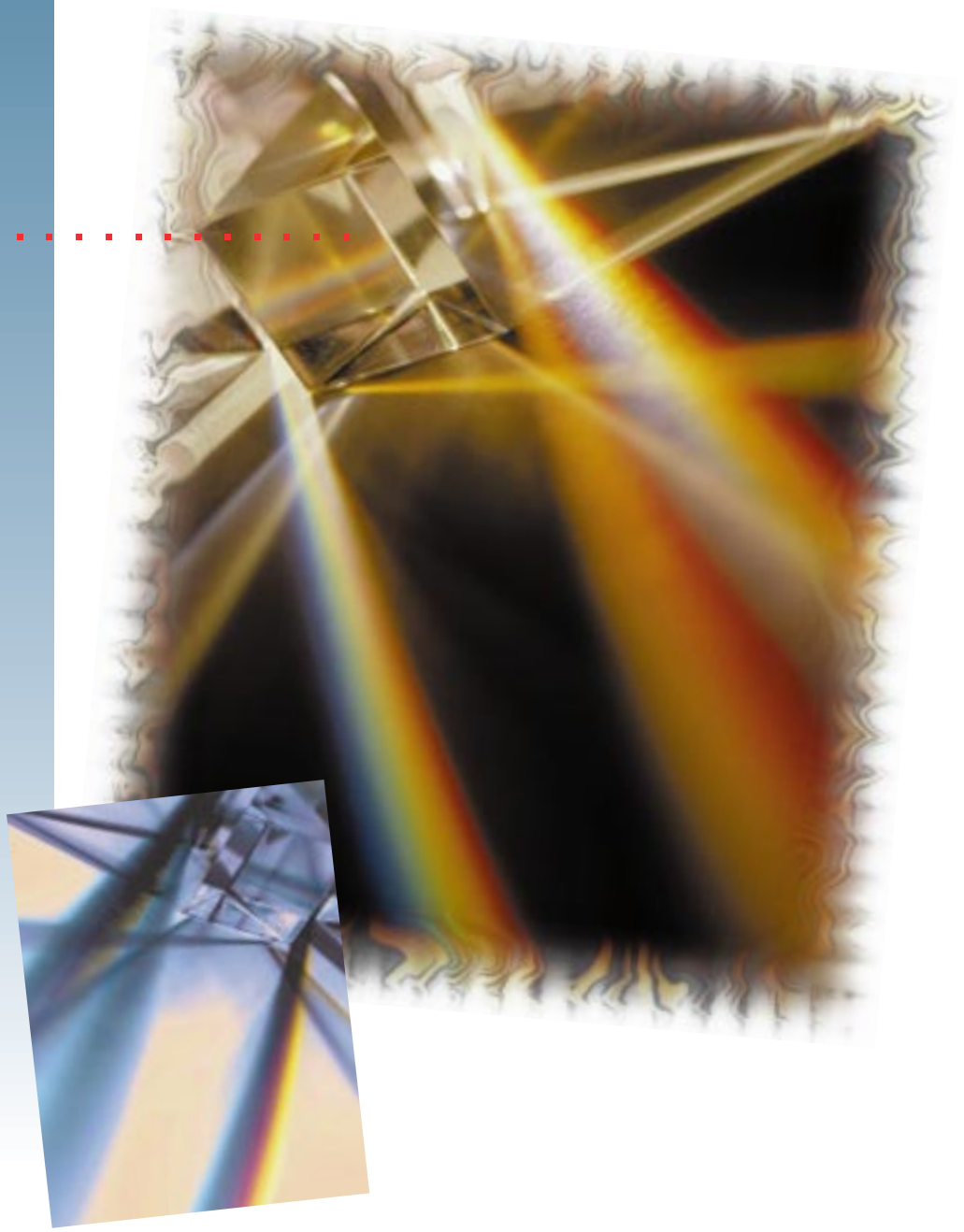
pRISM+

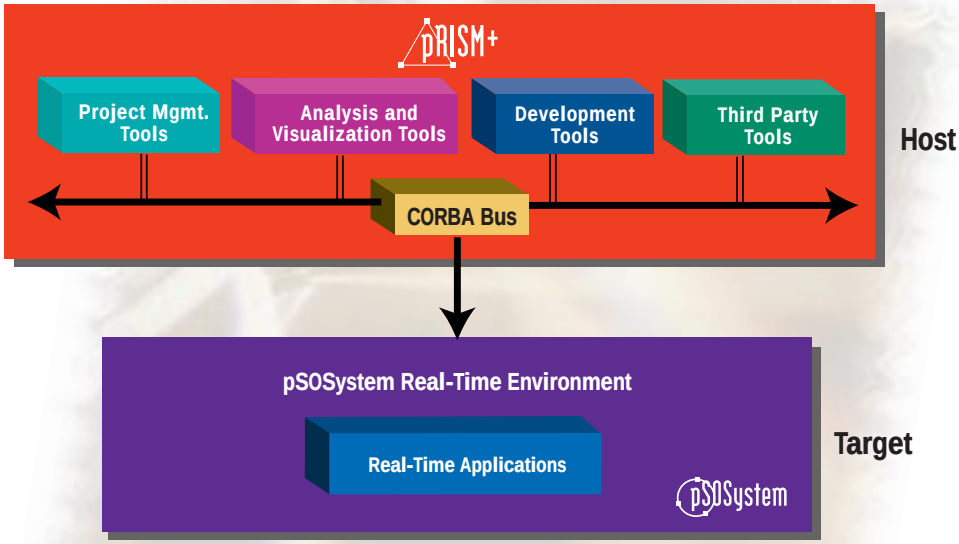
Real Tools for Real-Time
Technical Overview



scaleability
integrity
reliability
performance
time-to-market
open

integrated systems

Embedded Solutions



The pRISM+ development environment is composed of four main categories of tools; Project Management Tools, Analysis & Visualization Tools, Development Tools and Third Party Tools.

Project Management
- Project Editor
- SNiFF+

Analysis & Visualization
- ESp
- SNiFF+
- Object Browser
- Debugger

Development Tools
- pRISM+ Manager
- pRISM+ Wizard
- SNiFF+
- Compiler
- Debugger

Third Party Tools
- Your Tools
- Compilers
- Debuggers

pRISM+ Highlights
- Increases developer productivity
- Simplifies team development
- Seamlessly integrated with pSOSystem RTOS
- Extensible to third party tools through industry standard CORBA architecture
- A greater choice of tools to speed embedded development

The pRISM+ Environment

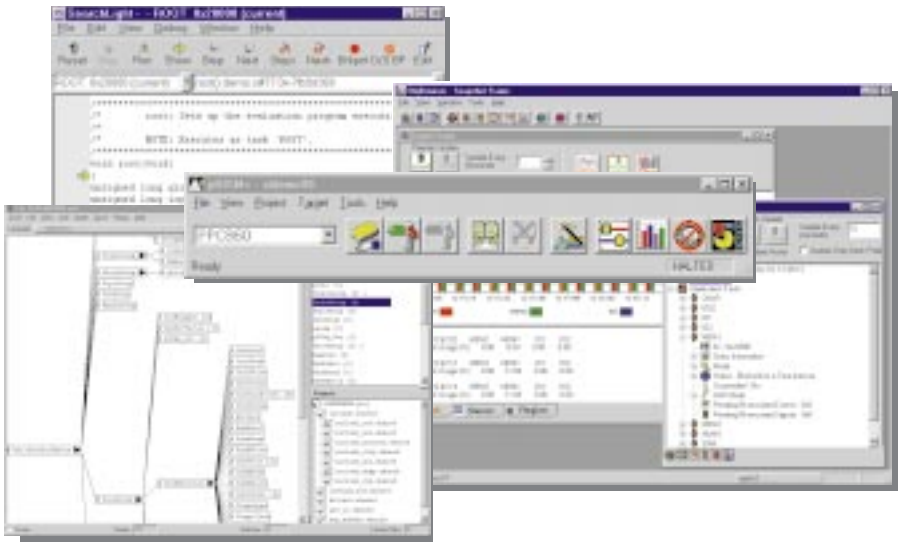
Integrated Systems, Inc.(ISI) the industry leader in embedded software development, redefines the industry with pRISM+. pRISM+ is a complete, integrated development environment for designing and delivering embedded software applications. pRISM+ combines the industry's optimal development tools with pSOSystem, the industry's most proven and reliable Real-Time Operating System (RTOS). pRISM+ is architected to give you the competitive edge by increasing your productivity and supplying you with the technology you need to get your job done. The pRISM+ environment combines the industry's "Best-of-Class" tools for developing, analyzing and testing your embedded application in one seamless environment that is built with an open, extensible architecture to accommodate your future needs.

The pRISM+ tools directly address the key issues facing embedded developers today: Time-to-market pressures, increasing application complexity, legacy code and re-use requirements, and the increasing size of embedded development teams. Meanwhile, today's world demands a higher level of quality and reliability from embedded systems than ever before. The pRISM+ development environment provides embedded developers with the right combination of power and flexibility to meet all of these exacting requirements.

ISI is dedicated to providing embedded developers with the best tools, software, and services for embedded development. pRISM+ integrates the industry's leading RTOS, pSOSystem, with the industry's premier tools.

pRISM+ Overview

The pRISM+ environment provides tools for application centered development and target analysis. The graphically oriented pRISM+ environment contains tools such as compilers and debuggers which are vital for every embedded developer. Examples of other productivity enhancing tools which are part of the pRISM+ product family are development tools such as SNiFF+, for code comprehension, the pRISM+ Wizard, which simplifies pSOSystem configuration and setup to jumpstart your embedded development project, and the pRISM+ Manager, which integrates all the tools and provides a common information repository for your embedded development project. In addition, pRISM+ offers a unique set of analysis tools specifically created for the embedded developer, such as ESp and the Object Browser. ESp provides event-based profiling information and the Object Browser gives a time-based view of your application's behavior.



The pRISM+ toolbar gives you easy access to all the different tools in the pRISM+ environment.

Increasing Developer Productivity—Starting Faster

The pRISM+ Manager, like all the other pRISM+ tools, uses the native host graphical environment for further ease of use and efficiency. Windows users access the pRISM+ environment with familiar menu bar layouts, shortcuts and help systems. Similarly, UNIX developers access pRISM+ with familiar Motif interfaces and facilities.

During and after setup, the pRISM+ environment is coordinated by the pRISM+ Manager. The pRISM+ Manager coordinates the interaction of the different pRISM+ tools, and maintains a central repository of information which all tools can use. Embedded developers interact with the pRISM+ Manager through the pRISM+ toolbar. The toolbar has icons to launch all of the pRISM+ tools, and can be reconfigured to launch your choice of tools.

The pRISM+ Wizard gives users a single focal point for entering setup and configuration information. The pRISM+ Wizard helps jumpstart the setup of the pSOSystem scalable operating system and checks your desired configuration for any conflicts or inconsistencies. The pRISM+ Wizard provides a selection of easily modifiable default configurations, that can be customized to your liking.

The pRISM+ Wizard automates and validates your pSOSystem configuration.

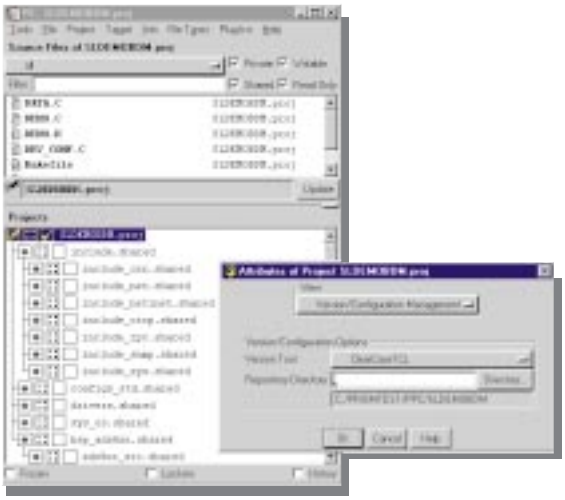
pRISM+ Tools at a Glance

pRISM+ Wizard	The pRISM+ Wizard automates the process of configuring the pSOSystem operating system for different needs, and provides error checking for configuration parameters.
pRISM+ Manager	The pRISM+ Manager coordinates the different pRISM+ tools and maintains a central repository of information for all the tools. The pRISM+ toolbar provides you with a central access point for every pRISM+ tool. Like the entire pRISM+ environment, it can be easily extended to additional tools; whether they're from ISI, from third parties or are in-house proprietary tools.
SNiFF+	The SNiFF+ module supplies configuration management and version control, parsing and browsing capabilities for code comprehension, and automatic documentation generation. SNiFF+ is optional for PC hosts, standard on UNIX hosts.
Compilers	Embedded compilers that work efficiently and generate compact, fast code are critical to every embedded systems project. pRISM+ compilers are specifically chosen for their performance in embedded systems applications, are integrated with pSOSystem, and are performance-tuned for specific target processors.
Debuggers	pRISM+ debuggers are pSOS-aware. pRISM+ debuggers specifically support your embedded development with their knowledge of pSOS and your embedded processor's specific architectural requirements.
ESp	The optional pRISM+ ESp tool profiles the execution of your program over a period of time, allowing you to monitor the ongoing behavior of your application. The ESp tool provides you with an event-based view of your application's dynamic behavior.
Object Browser	The pRISM+ Object Browser takes snapshots of your application's behavior at any instant, collecting and graphically displaying the status of any pSOSystem object, such as queues, tasks and semaphores. The Object Browser gives you a time-based view of your application's dynamic behavior.

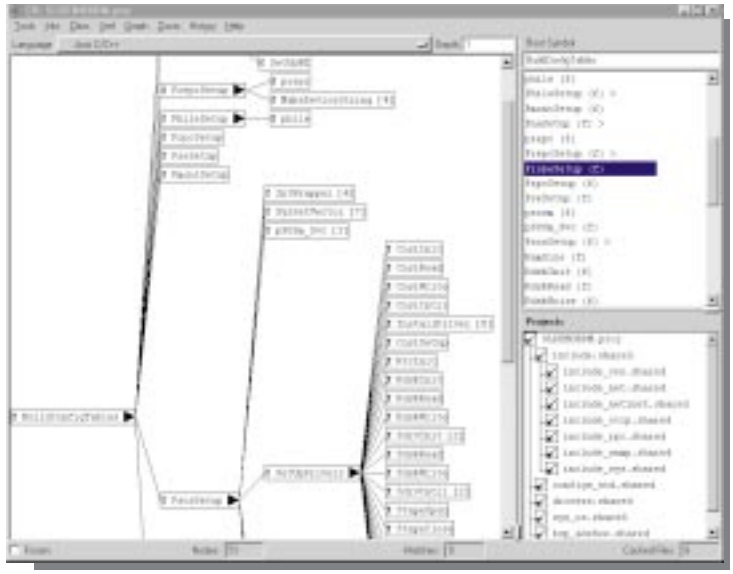
pRISM+ Featured Tools		
Target Family	**Compiler Choices**	**Debugger Choices**
PowerPC Family	Diab Data, D-CC & D-CC+	Software Development Systems, SingleStep
		Integrated Systems, Searchlight
	Microtec C & C++ Compiler	Microtec, XRAY Pro
68xxx Family	Diab Data, D-CC & D-CC+	Software Development Systems, SingleStep
		Integrated Systems, Searchlight
	Microtec C & C++ Compiler	Microtec, XRAY Pro
x86	CAD-UL, Organon C/C++	CAD-UL, Organon XDB
MIPS	Diab Data, D-CC & D-CC+	Integrated Systems, Searchlight
ARM	ARM Consortium C Compiler	ARM Consortium ARM Debugger

Available pRISM+ Host Systems and Target Processors	
Hosts	PC Windows NT Windows 95 Sun Solaris HP-UX
Targets	PowerPC Family 68xxx Family x86 architecture (386 and above) MIPS ARM

Please contact ISI for latest host/target availability



The pRISM+ project editor gives you a hierarchical view of your project files.



The SNiFF+ source browser is a powerful tool for code comprehension, project development and maintenance, and for aiding code re-use.

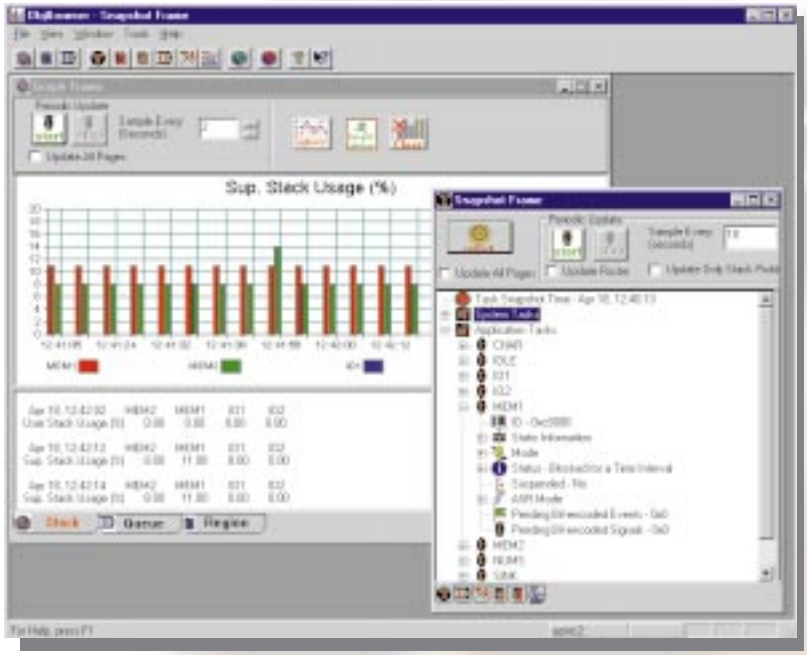
Developing Your Application

During application development you can view and access your project from the pRISM+ graphical project editor, accessed from the pRISM+ toolbar. The project editor gives you easy access to your project files, with a hierarchical view of all the files in your project. While in the project editor, simply click on the file of your choice and the source editor will pop up to enable viewing and editing. Several capabilities, from source browsing to documentation building are also available to help you create your product.

The standard pRISM+ environment gives you the right tools to help you through each phase in your application development. pRISM+ can be extended, specifically in the areas of source code comprehension and development. SNiFF+ is one of your options for extending your pRISM+ environment. SNiFF+ is a comprehensive programming environment, offering tools to facilitate source browsing, re-use and reverse engineering, documentation generation, and configuration management and version control.

SNiFF+ builds upon the open and extensible technology of pRISM+. This means you can choose to use the tools which are offered with SNiFF+, or replace them with other subsystems. For example, SNiFF+'s interface to Configuration Management and Version Control (CMVC) systems can easily handle standard CMVC packages such as ClearCase, PVCS, RCS or even your own proprietary CMVC system. SNiFF+'s interfaces are clearly documented to extend to third party or in-house tools for CMVC, editors or other tools.

SNiFF+'s capabilities can help you in your analysis, development and maintenance of your software. SNiFF+'s symbol, hierarchy and class browsers, component analyzers and cross referencing tools assist you in quickly developing a complete understanding of existing software applications, enabling you to comprehend and extend existing embedded systems.



The pRISM+ Object Browser tool shows your embedded application's object state in detail.

Compiling Smarter

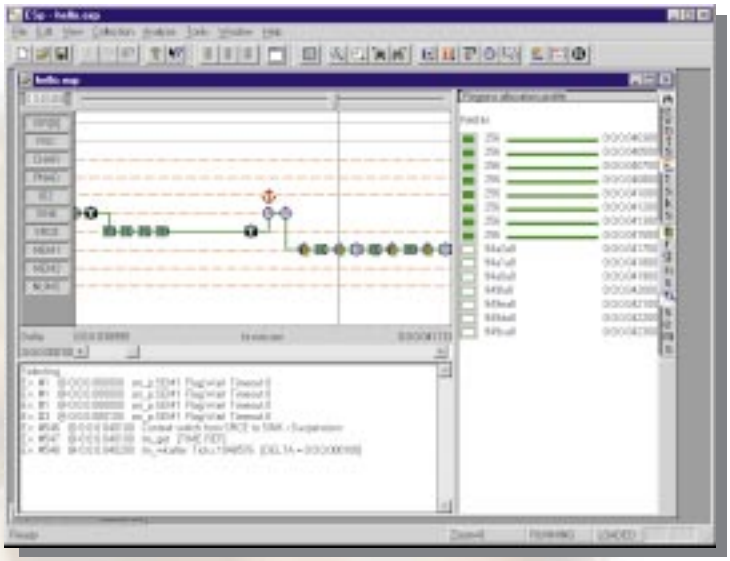
An embedded developer's needs differ dramatically from typical desktop application software developers. Nowhere is this more important than in the compiler, where efficient, compact and highly optimized code can make the difference between a product's success or failure. pRISM+ compilers are specifically chosen for their performance in embedded systems applications, are integrated with pSOSystem, and are performance-tuned for specific target processors. pRISM+ features Diab C and C++ Compilers for the Motorola 68K and CPU32 chip families, the Motorola/IBM PowerPC, and MIPS processors. The x86 family is supported by the Organon C/C++ compiler from CADUL, and the ARM family of chips are supported by the ARM consortium tools.

Each compiler and compiler company was specifically chosen for pRISM+ because they support the special needs of the embedded developer. All of the pRISM+ compilers are technological leaders for the processor families they support, producing code optimized for the embedded environment. Both Diab Data and CAD-UL offer both common and specific support for the embedded developer's requirements on each chip family, and for individual CPUs. For example, both compiler manufacturers support the common needs of embedded developers with complete control of code and data memory allocation. Each compiler also optimizes the code to take complete advantage of each processor's architecture, using processor specific optimizations whenever possible.

Optimizing Your Application's Performance

Target performance is a key issue in embedded software development. pRISM+ offers you two dynamic analysis tools to better understand and optimize your system's behavior. The Object Browser and ESp tools will enable you to ensure your application's performance, by capturing and analyzing information about your system's run- time behavior.

The Object Browser takes either manual or automatic snapshots of any pSOSystem object, including queues, memory regions, or tasks, enabling you to monitor your application's behavior at specific times. For example, you can set a periodic rate for the Object Browser to take snapshots of your target system. You can then display detailed pSOSystem object data for any of the times which have been captured. In addition, the Object Browser can graph object usage and behavior over time. For example, once you have chosen a snapshot frequency, you can dynamically watch stack usage over time. The Object Browser will update your object usage graph at your chosen frequency.



ESp (shown above) and the Object Browser combine to give you a powerful dynamic analysis of the running target system.

The ESp tool profiles your application's behavior over a period of time. In contrast to the Object Browser tool, which captures object states at periodic intervals, ESp presents an event-based sequence of action for analysis. As part of the ESp setup, you can define events which trigger a data collection point. With ESp, you can run a defined "experiment" on the target, and gather system data at these predetermined events. ESp will clearly show the tasks in the system, and the stream of execution as it passes from one task to another. ESp will also show if undesirable states have occurred, such as when a task is starved for resources.

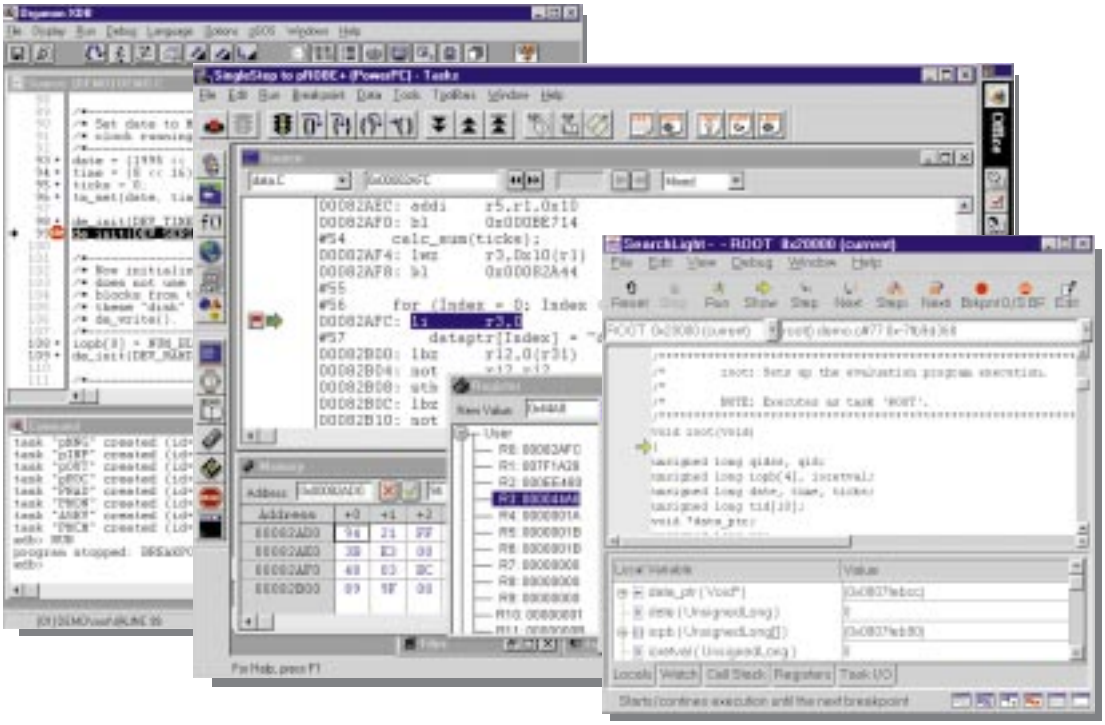
Both ESp and the Object Browser combine to give you a broad, system level view of your running target system. All of the collected data from these tools can be easily imported into standard PC tools such as Microsoft Excel, Microsoft Word and Microsoft PowerPoint®. Using the ESp and the Object Browser tools, you'll be able to analyze the dynamic behavior of your system, enabling you to quickly and efficiently complete your final application.

For debugging and analysis, pRISM+ supplies a source level debugger in conjunction with ESp and the Object Browser. Depending upon your target processor choice, pRISM+ will supply SDS Singlestep, CAD-UL XDB, or ISI's Searchlight debugger. Each of these debuggers supply embedded developers with basic debugger operations, plus a different set of advanced options depending on the exact debugger chosen. Of course, each one of these pRISM+ debuggers is pSOS-aware.

All of the pRISM+ debuggers let you control the execution of pSOSystem-based programs, allowing you to easily locate and analyze run-time errors. All of the debuggers give detailed displays of all pSOS objects, as well as the ability to set breakpoints. After a breakpoint has been hit, CPU registers, and local and global memory can be examined. In addition to breakpoint control, each debugger allows you to single-step through your application, either at the assembly or the source code level. All of the debugger's facilities for examining tasks, registers and memory are available for examining the state of the embedded target system during single-step operation.

Each of the debuggers can run target applications in either Task Debug Mode (TDM), or System Debug Mode (SDM). SDM is generally used to debug Interrupt Service Routines (ISR) or Device Drivers. SDM allows the target system to run all pSOS tasks simultaneously, as it would run in the real world. When the system stops, every task is stopped for an overall view of the system. TDM gives the developer control of individual tasks within a user-defined "debug set" of tasks. Under TDM, the user defined list of tasks is stopped, leaving the rest of the system running. This simplifies the analysis of different real-time pSOS tasks, allowing the developer additional flexibility in verifying and analyzing the embedded system.

The different pRISM+ debuggers, ESp and the Object Browser offer powerful tools to analyze and debug the embedded application. Each tool facilitates an intimate understanding of your embedded application's dynamic behavior.



pRISM+ debuggers support the specific architectural features of your target CPU, and are a powerful aid to examine your run-time system.

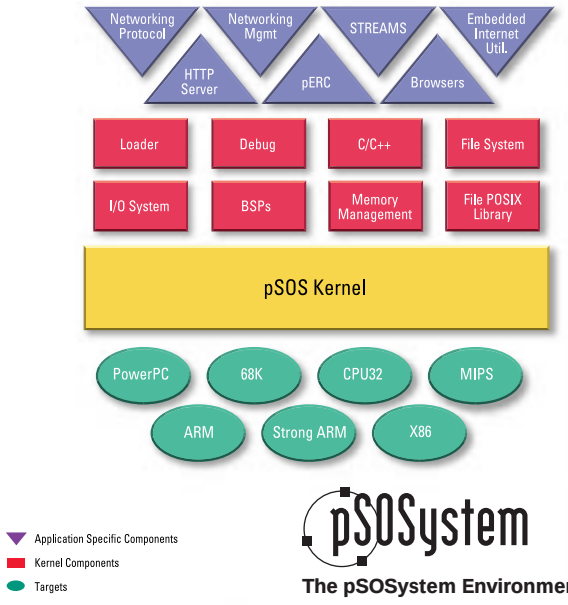
Simplifying Team Development

pRISM+ is designed to simplify team development, with the capability to support multiple developers per project, all working in a heterogeneous pRISM+ environment. pRISM+ is built in a pure client-server architecture which will support the distribution of tools across a heterogenous network. For example, developers can be connected across a LAN, or WAN, to each other, and to the actual target hardware, allowing a broadly distributed team to collaborate or share resources.

Seamlessly Integrated with pSOSystem, a proven RTOS

pRISM+ is seamlessly integrated with pSOSystem, the industry's proven real-time operating system for embedded applications. pRISM+ simplifies the configuration and setup of your pSOS project and helps you create your applications faster. The pRISM+ compilers and debuggers are fully integrated with pSOSystem, allowing you to compile and debug easily. The Object Browser and ESp are fully pSOS-aware, giving you detailed information of your application's performance.

pSOSystem is fully field proven in thousands of mission-critical applications, with over 5000+ pSOS design wins and over 20 million production copies worldwide. As an accepted industry standard, pSOSystem enjoys a wealth of support from ISI, as well as many third party solution providers.



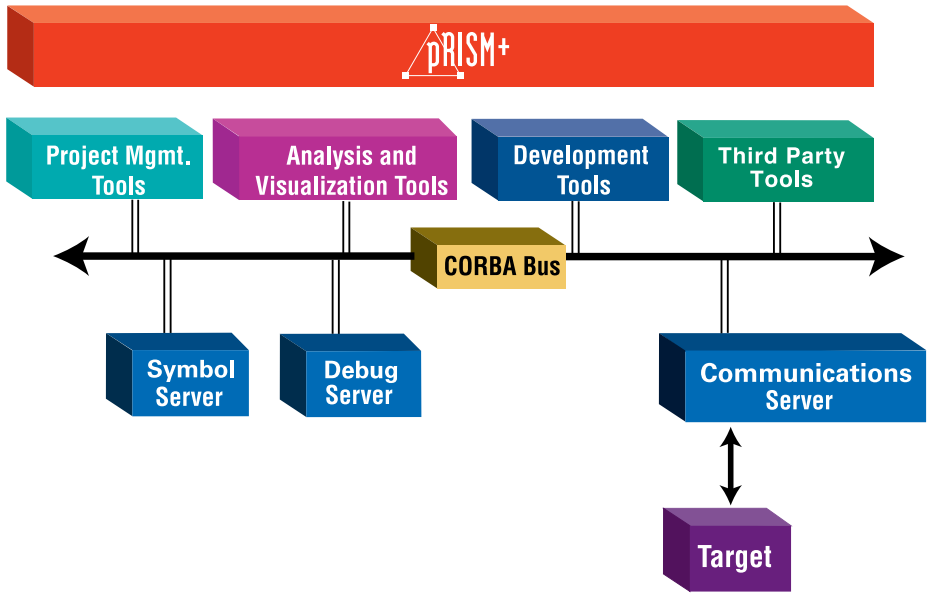
The pSOSystem Environment

pARTNERS Program

ISI is fully dedicated to supporting your embedded development needs. We realize that in today's world, with increasing rates of change and competition in the market, no single company can successfully meet all of your development needs. To supplement our embedded products, we consider it a high priority to establish strong Third Party partnerships. Because pSOSystem is a widely accepted industry standard, it enjoys a wealth of support from third party solution providers. Our pSOSystem pRODUCTIVITY pARTNERS program, and our pRISM+ pARTNERS program provides you with an easy way to access the collective expertise of our over 150 pARTNERs.

Ranging from off the shelf software and hardware solutions, to complete consulting projects, you will find your answer through the collective power of our pARTNERS programs.

pRODUCTIVITY pARTNERS



pRISM+ is a complete, graphical environment for embedded development. It includes a complete tool suite specifically created for your target microprocessor, and is built around the industry standard CORBA bus to accommodate expansion to third party tools.

Support for Third Party Tools and Custom Tools

While pRISM+ is delivered with a complete tool suite for embedded developement, pRISM+ is built on the industry standard Common Object Request Broker Architecture (CORBA) object bus framework to accommodate future requirements. CORBA support enables pRISM+ users to work in a distributed computing environment, and enables other tool companies which support CORBA to easily integrate their tools into the pRISM+ environment through open pRISM+ APIs. Custom tools can be linked in through pRISM+'s open standards. The pRISM+ framework can also communicate with popular desktop tools via its bridge to Microsoft OLE and OCX components.

The pRISM+ architecture is built to support additional tools at various levels of integration, from detailed integration with the pRISM+ servers to simply launching a tool from an icon on the pRISM+ toolbar.

Technical Support and Professional Services for your Developement Needs

The pRISM+ development environment is fully supported through ISI, allowing you to turn to one provider for all your software development requirements. ISI provides both full technical support, and short and long term engineering consulting services. ISI and our partners are fully devoted to providing software solutions for your embedded systems development. Each of the tools within pRISM+ is specifically focused for an embedded developer's needs, as are the companies which supply them. Meeting your needs with the right combination of products and services is our highest priority.

Fast, Reliable Embedded Systems Development

pRISM+ supports the industry's leading tools. Each tool chain is optimized for the specific target CPU that your development team has chosen, resulting in the best development tools, and the fastest, most compact application code. As a developer, you'll increase your productivity by working with the best tools possible, and decrease your overall product cost by delivering on-time and meeting your application's performance requirements.

ISI provides Embedded Solutions - giving you the technology, products and services to get your job done. ISI's embedded products can solve your time-to-market challenges and help you deliver a superior product - first.

pRISM+ Highlights

- Increases developer productivity
- Simplifies team development
- Seamlessly integrated with pSOSystem RTOS
- Extensible to third party tools through industry standard CORBA architecture
- A greater choice of tools to speed embedded development

Corporate Headquarters

Integrated Systems, Inc.
201 Moffett Park Drive
Sunnyvale, CA 94089
Phone: 408.542.1500
Fax: 408.542.1950
http://www.isi.com
E-mail: info@isi.com
1.800.543.7767
(U.S. and Canada only)

Regional Headquarters

Europe, UK
Phone: +44.1.438.751.651
Fax: +44.1.438.312.311

Regional Headquarters

Asia Pacific
Phone: +1.408.542.1700
Fax: +1.408.542.1952

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