



# Phar Lap ETS®

## Real-time Operating System

Ardence's Phar Lap ETS is the optimal real-time solution for devices based on the Intel x86 architecture. ETS delivers ease of use and predictable performance, combined with unmatched dependability. ETS is proven in thousands of demanding environments, such as: multi-media streaming solutions, sub-micron scanning systems, ocean vessel location systems and RFID products.



### CAPABILITIES AND FEATURES

- Robust, High Performance x86 RTOS: Sustained interrupt rates of > 30KHz
- Smallest Operational Footprint: <500KB with I/O, graphics, and TCP/IP
- Support for all Standard PC Hardware platforms
- Design Flexibility: Deployable in either monolithic or split kernel/application models
- Fully Win32 API Compliant: No need to use code wrappers for API mapping
- Real-time File System: High speed media access with FAT16 and FAT32 support
- Complete IA32 X86 CPU Support: 386, 486, Pentium, Pentium II, Pentium III, Pentium 4, Pentium M, Xeon, as well as AMD CPUs
- Microsoft's Developer Studio VS 6.0, .NET 2002: Develop, compile and debug in the standard Windows development environment
- Round-robin and Preemptive Scheduling Algorithm: Includes Priority Inversion Avoidance - ensures that lower priority threads do not impact the performance of higher priority threads
- Integrated Winsock Compliant Real-time TCP/IP Stack
- Real-time USB: USB 1.1 and 2.0 compliant with support for EHCI, UHCI and OHCI controller and devices
- Memory Protection: Leverages the x86 architecture to ensure robust applications

### OVERVIEW

ETS is a high-performance micro-kernel real-time operating system with an optimal operational footprint of 88K. Developers can install, configure and start developing on ETS within 2 – 4 hours. The ETS software development kit (SDK) provides a suite of tools that integrate seamlessly into the standard Microsoft Visual Studio IDE. The ETS Visual System Builder enables system developers to selectively choose the kernel components, effectively building the system from the bottom up.

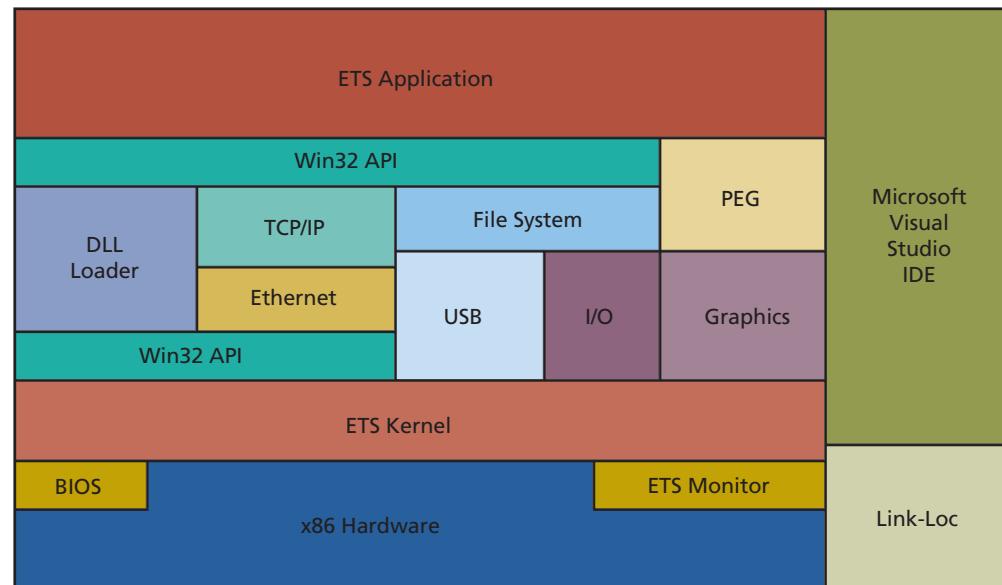
Because ETS was designed as a Win32 API compliant operating system, all the standard Windows conventions are maintained. This includes APIs, memory management, mutexes and semaphores that Windows developers are accustomed to using.

In addition to performance, ETS simplifies development through extensive use of tools designed and optimized to present comprehensive and detailed information to the software engineer to quickly and accurately resolve issues as they arise during the development process.

### ARCHITECTURE

The ETS kernel architecture provides complete flexibility in implementation as it allows system architects to utilize either a monolithic or split kernel/application implementation. The ability to split the ETS application allows for in-field updating of either the kernel or the application.

### ETS Hierarchical Component Diagram



The ETS Kernel is designed around a high-speed scheduler that utilizes both preemptive and round-robin algorithms. ETS supports unlimited threads and assures fine-grained control over applications with 256 levels of assignable thread priority. The scheduler guarantees that critical thread context switches and yields to threads of higher priority occur in the 500 nanosecond to less than 2 microsecond range.

ETS is the only real-time operating system that supports a robust subset of the Win32 API and a standard DLL model. Together, these capabilities simplify application migration path from Windows-based code and allow ETS applications to be developed in a componentized fashion with a minimized memory footprint.

Precise execution of events is critical in a real-time system. ETS provides complete flexibility to the developer to determine the appropriate timer resolution for their system. Timer interval values can be set between 1 microsecond and 18.2 milliseconds.

## FLEXIBLE IMPLEMENTATION

ETS provides the system designer with a highly functional foundation on which to build a system, including integrated real-time TCP/IP and USB 1.1 and 2.0.

Complex user interfaces and Web-based services are fully supported with an included graphics package and an integrated Web server.

## DEVELOPMENT ENVIRONMENT

Development with ETS is designed with the software engineer in mind. By providing a comprehensive suite of tools that integrate-smoothly into the well-known Microsoft IDE - Visual Studio, development and debugging time is minimized. These tools provide the software engineer with the ability to interactively view the application in real-time to understand the interactions between hardware, the ETS kernel and the ETS application for debugging and behavior analysis.

## ETS DEVELOPMENT ENVIRONMENT PLUG-INS

**Visual System Builder** provides software engineers with the ability to define a "bottom up" configuration of the ETS kernel and components to determine the optimal fit for the end system.

**Embedded Studio Express** is a powerful tool that plugs into the Visual Studio IDE and provides a simple and consistent framework for rapid development of ETS-based applications.

**TCP/IP** provides complete access to ETS TCP/IP APIs to develop network drivers and for support of higher layer protocols.

**LinkLoc** is an ETS-focused linker that integrates with the Microsoft Visual Studio IDE to provide optimized linker functionality for ETS.

**Real-time USB** support for 1.1 and 2.0 devices



## ABOUT ARDENCE, INC.

Ardence, Inc. is a global leader in designing and developing software solutions that enhance the control, security, dependability and management of Windows operating systems.

The company's Embedded Solutions include RTX®, Phar Lap ETS® and ReadyOn.® Ardence has a worldwide base of nearly 3,000 customers in 45 countries, including more than two dozen in the Fortune 100.

Leading customers include: Eaton Corporation, Siemens, Stanley Works, Muhlbauer, Honeywell, National Instruments and Kongsberg.

Partners include:  
Dell, HP, IBM and Microsoft

## NORTH AMERICA

ARDENCE, INC.  
266 2ND AVENUE  
WALTHAM, MA 02451-1102  
TOLL-FREE: 1-800-334-8649  
MAIN NUMBER: 781-647-3000  
WEB: [WWW.ARDENCE.COM](http://WWW.ARDENCE.COM)  
E-MAIL: [INFO@ARDENCE.COM](mailto:INFO@ARDENCE.COM)

## EUROPE

ARDENCE, INC.  
ABS - PORTE DE L'ARÉNAS, HALL C  
455 PROMENADE DES ANGLAIS  
06299 NICE CEDEX 3 - FRANCE  
TEL: +33 (0)4 89 06 60 10  
FAX: +33 (0)4 89 06 60 20  
E-MAIL: [FBOISSET@ARDENCE.COM](mailto:FBOISSET@ARDENCE.COM)