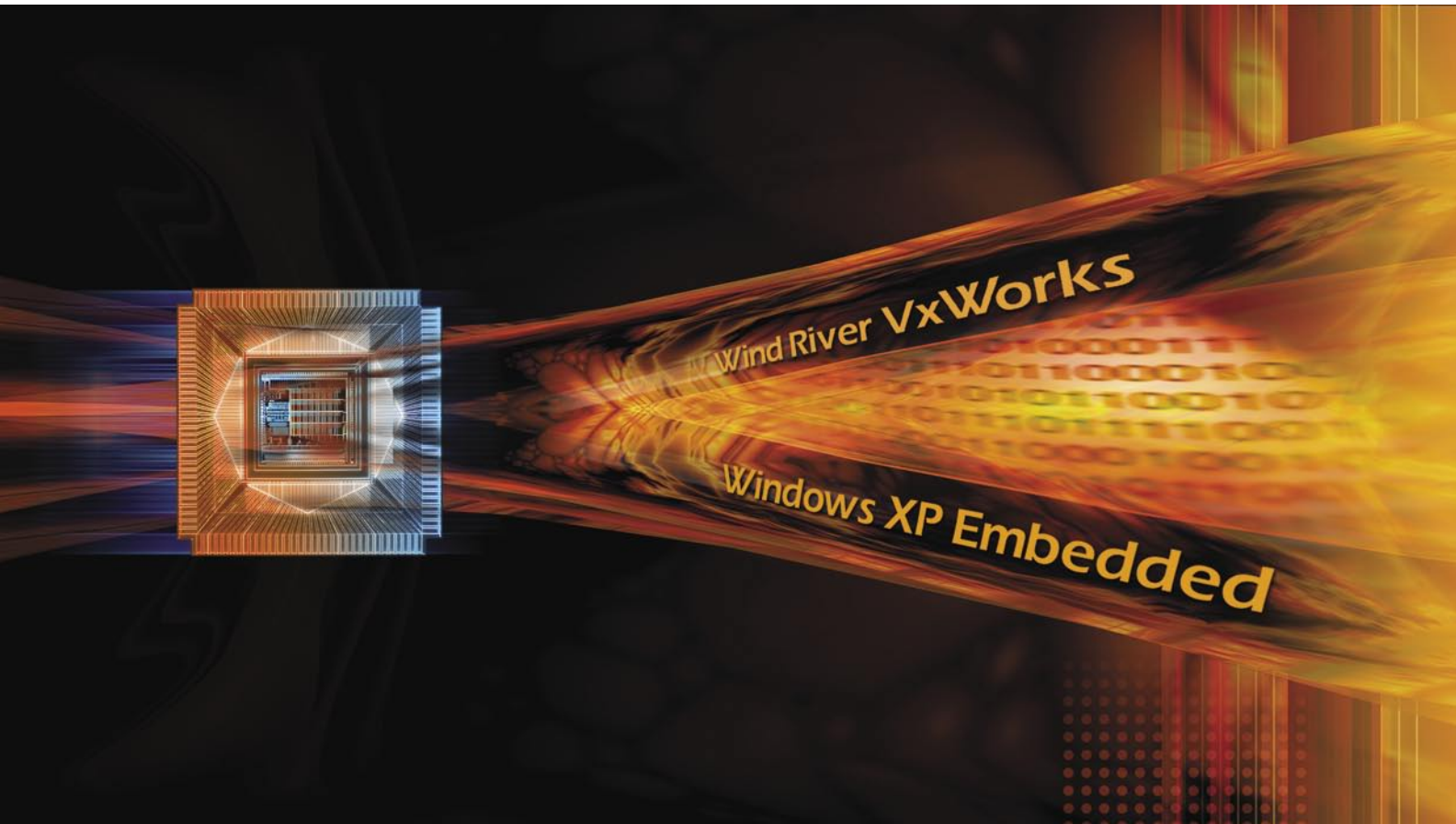




Wind River VxWorks® & Windows® XP Embedded on a single processor!

Hard Real-Time • Cost-Effective • High Reliability



KUKA Controls Worldwide

KUKA Controls GmbH is a leading developer of hardware and software for real-time critical applications and has delivered over 70,000 systems worldwide. Founded in 1986, KUKA Controls is a wholly owned subsidiary of KUKA Roboter GmbH, one of the world's leading robotics manufacturers. KUKA Robot Group is a part of IWKA, a holding company with sales over \$2 billion dollars annually. Our products are developed and marketed from locations in Weingarten, Augsburg and Günzburg, Germany and Detroit, Michigan. Technical support is available throughout the world.



Automation Data Integrity

VxWin technology runs Occubot, a leading automobile seat wear testing application. Tests consist of thousands of continuous cycles run over hundreds of hours. The integrity of continually-recorded test data is maintained regardless of events occurring on Windows. VxWin enables robot control, force monitoring and dynamic path adjustments to run alongside the graphical operator interface and data display on a single processor.



Critical Medical Reliability

VxWin technology provides the reliability and stability necessary to precisely and safely position the Accuray X-Ray delivery system during full-body radio surgery treatment. VxWin software enables the motion control application, VxWorks, and the operator Interface running on Windows OS, to coexist on a single system. This eliminates the need for a separate dedicated user interface.



Precision Machine Control

Schleicher Electronic's CNC, ProNumeric, delivers industry-leading performance using VxWin to combine state-of-the-art CNC coupled with an advanced graphical user interface. The PC-based system interpolates up to 64 axes simultaneously coupling external sensors input to NC operations.

Strategic Advantage – Single Processor Operation

KUKA Controls' technology extends Wind River VxWorks with Windows XP Embedded and allows both to reside concurrently on a single processor. KUKA Controls' VxWin adds Microsoft® Windows XP capabilities to Wind River's VxWorks real-time operating system, eliminating the need for a second system running an HMI. VxWin lowers hardware and development costs and delivers superior reliability in an industry-standard solution.



Give Your Next System New Flexibility and Capabilities with KUKA Controls' Cost-effective Technology

- Hyperthreading, multiprocessor, and APIC support
- Matlab® / Simulink® / Real-Time Workshop® support
- Full .NET support
- Java virtual machine
- High-end graphical Windows interfaces
- Access to powerful Windows XP API
- Outstanding connectivity
- Hard real-time performance
- High-resolution real-time timer, granularity 0.8 microseconds
- Lowers hardware costs, drastically increasing reliability (MTBF)
- Nonproprietary ~ built on COTS operating systems
- Availability of numerous hardware drivers
- Full support from a worldwide company

VxWin Extension Technology

Real-time control must be accurate, reliable and cost-effective. Extending the proven real-time performance of Wind River VxWorks with the flexible attributes of Windows XP Embedded on the same machine, results in a powerful real-time system with access to all Windows XP features.

Think of the many possibilities for new products or significant product enhancements that KUKA Controls' technology offers: increased GUI capabilities, standards-compliant connectivity, lower hardware costs, lower development costs, and greater reliability. A new, yet

proven, way to increase your competitive edge.

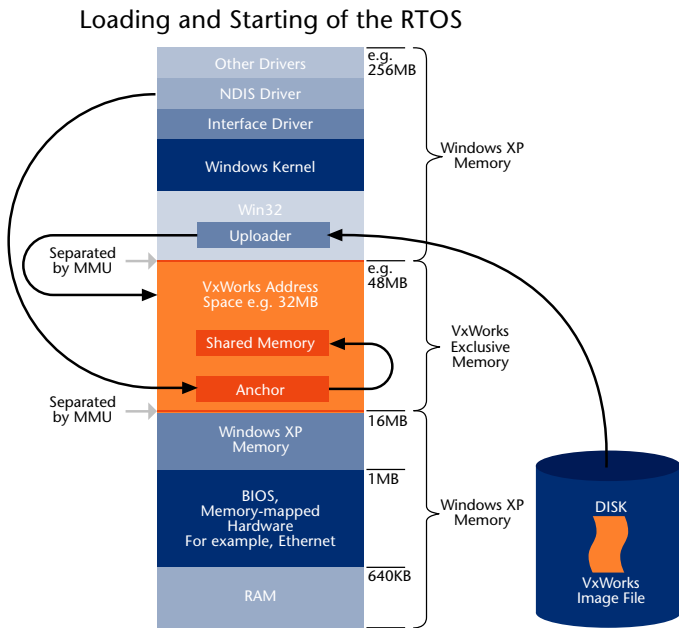
Products using VxWin technology have years of operational

experience in critical applications. Tens of thousands of industrial robots, industrial automation, process automation, medical equipment and other applications are in operation throughout the world. We have established a long-term relationship with Wind River and Microsoft assuring seamless interoperability of our products. Users also have the support of our applications engineers worldwide and our ongoing commitment to continuous product improvement.

Applications

- PC-based industrial automation; including PLC, motion control, robotics, CNC
- Real-time test and measurement/data recording
- Medical devices and equipment
- Military and Aerospace
- VxWorks target simulation with real-time behavior and hardware access

Memory Allocation



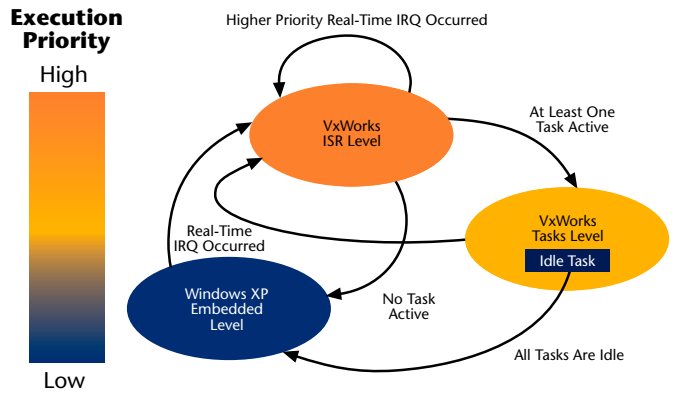
KUKA Controls' VxWin utilizes the x86 MMU to protect VxWorks memory from Windows XP.

A User-Friendly Environment

The Windows environment assures ease of programming, debugging and implementation. VxWin technology adds to the hard real-time performance of VxWorks with the extensive high-end graphical features and applications available through Windows XP Embedded. Programmers realize all the hardware and real-time features of VxWorks plus access to a wide range of third party drivers and analysis tools available on the market. VxWin supports all applicable Wind River VxWorks features.



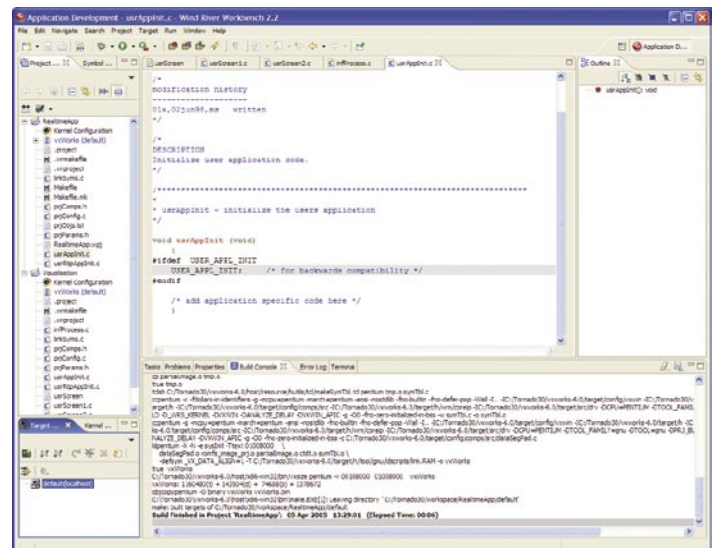
State Machine



KUKA Controls' VxWin assures complete execution of all real-time tasks before switching back to Windows XP.

Reduce Hardware Increase Reliability

With VxWin, high-end GUI features can be added to VxWorks without adding a second processor. Because hardware component count is significantly reduced, MTBF is drastically increased. Costs are further reduced because system size and weight can be cut. System resources are allocated individually for either VxWorks or Windows XP Embedded, guaranteeing that hardware-based interrupts allocated for VxWorks are handled in real-time. In addition, the design of VxWin guarantees VxWorks real-time application performance regardless of Windows XP occurrences.



Familiar Development Tools Speed Development

Faster Development Cycles

VxWin developers enjoy a faster development cycle working in the well-known and thoroughly proven Wind River and Microsoft environments. VxWin allows users to leverage familiar development tools and APIs in the development of their real-time applications. Using familiar development suites such as Visual Studio®/Workbench/Tornado for the development of visualization and real-time applications, programmers can reuse existing Windows or VxWorks code and knowledge instead of having to port to another proprietary API.

Wind River VxWorks Advantages

Wind River VxWorks is used worldwide in embedded control systems, medical applications, test and measurement systems and industrial automation applications. It offers a number of distinct advantages: a small footprint, very fast response and hardware control interrupts can be accessed easily.

- Real-time deterministic response measured in microseconds
- Hardware access to ISA and PCI plug-in boards, no kernel driver to develop
- Communication between Windows XP and VxWorks via TCP/IP (virtual network) or shared memory
- Optional products available, e.g., VxDCOM, OPC server
- Availability of many existing VxWorks drivers, e.g., fieldbus, measurement hardware and more
- Familiar Tornado and Workbench development tools
- Powerful, graphical real-time analysis tools, e.g. Scopetools™
- Comprehensive documentation (HTML, newsgroups)



Scalability

VxWorks applications can be quickly integrated into a VxWin system without any added hardware costs. Because standard TCP/IP communications for connecting to the Windows operating system are used, porting to existing VxWorks application is easily accomplished. Users also have the option to use the same VxWorks application in an embedded system, for example, Xscale architecture.

Windows XP Advantages

Application development with Windows XP provides:

- Multitasking, intertask communication
- Components for Windows XP Embedded included
- Connectivity: TCP/IP .NET, Java, Winsock, COM/DCOM, and file sharing
- HTTP server, ISAPI, ASP, SOAP server, SOAP Client
- Programming languages: C, C++, C#, Visual Basic®
- Known development tools ~ Microsoft Visual Studio

Evaluate VxWin

KUKA Controls' VxWin technology is used in applications worldwide. KUKA Controls invites you to contact your local KUKA Controls representative for a copy of VxWin extension software for a time-limited evaluation. To download the evaluation software immediately, visit us on the Web at: <http://www.kuka-controls.com>

**Visit us on the Web at
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KUKA Controls GmbH

Worldwide Headquarters
Ettishofer Strasse 8
88250 Weingarten
Germany

sales@kuka-controls.com

Tel: +49 751 56122-0

Fax: +49 751 56122-22

KUKA Controls

United States – Sales
17821 E. 17th Street
Tustin, California 92780

sales@kuka-controls.com

Tel: +1 714 505-1485

Fax: +1 714 505-1149

United States – Support
22500 Key Drive
Clinton Township
Michigan 48036

sales@kuka-controls.com

Tel: +1 248 844-0569

Fax: +1 248 844-0505

KUKA Controls, Germany, is the headquarters for KUKA Control's worldwide operation. Located in three German cities, the KUKA staff of professionals provides the products and the service support for KUKA customers.



Staff in the United States includes engineering and applications support teams for consulting, development, and integration of software & embedded systems.



The Americas • Asia Pacific • Europe

