

virtual | technologies, inc.

cyberglove

Virtual Technologies' flagship product, the CyberGlove®, is a fully instrumented glove providing up to 22 high-accuracy joint-angle measurements.

The CyberGlove uses Virtual Technologies' proprietary resistive bend-sensing technology to accurately transform hand and finger motions into real-time digital joint-angle data. Our VirtualHand® Suite 2000 software converts the data into a graphical hand which mirrors the subtle movements of the physical hand.

The 22-sensor CyberGlove has three flexion sensors per finger, four abduction sensors, a palm-arch sensor, and sensors to measure wrist flexion and abduction. Each sensor is extremely thin and flexible, being virtually undetectable in the light-weight elastic glove.

The CyberGlove has been used in a wide variety of real-world applications, including digital prototype evaluation, virtual reality, biomechanics and animation. The CyberGlove has become the de facto standard for high-performance hand measurement and real-time motion capture.



cybertouch



With its CyberTouch™ vibro-tactile feedback option for the CyberGlove, Virtual Technologies, Inc. has added touch feedback to its industry-leading hand-sensing product.

The CyberTouch feedback option enables CyberGlove users to manually experience virtual worlds, feeling physical vibro-tactile sensations from interaction with computer-generated 3D objects. CyberTouch can also be used for data visualization to "touch" non-objects, such as where vibrational intensity is proportional to ground-density data, water content, magnetic-field strength, hazard proximity or even light intensity.



The CyberTouch system consists of six small, lightweight vibro-tactile stimulators, one on each finger and one on the palm of the CyberGlove. Each stimulator can be individually programmed to provide the desired feedback level.

The stimulators can generate pulses, sustained vibration, or customized actuation functions. Software developers can program the CyberTouch stimulators in combination to produce spatiotemporal tactile feedback patterns simulating movement or fluid flow across the hand.

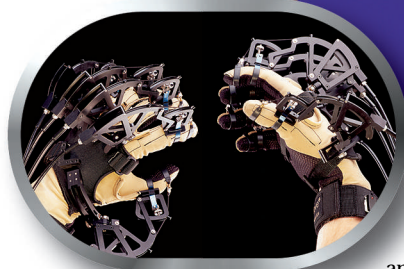
Virtual Technologies, Inc. is a hot Silicon Valley
technology company and the worldwide
leader in hand-sensing and force feedback.

cybergrasp

The CyberGrasp™ force-feedback option represents a revolution in human-computer-interface technology. CyberGrasp enables CyberGlove users to literally “reach in and grab” computer-generated or tele-manipulated objects via the most natural interface possible – the human hand.

CyberGrasp is a lightweight, force-reflecting exoskeleton that slips over a CyberGlove and provides resistive force feedback to each finger and the palm. With the CyberGrasp force-feedback system, users are able to explore the physical properties of the computer-generated 3D objects they manipulate in a simulated virtual world.

Grasp forces are produced by a network of tendons routed to the fingertips via the exoskeleton. There are six actuators, one for each finger and one for the palm, which can be individually programmed to prevent the user's fingers from penetrating or crushing a virtual solid object. The high-bandwidth actuators are located in a small Actuator Module which can be placed on the desktop, or worn in a VTi GraspPack™ backpack for portable operation, dramatically increasing the effective workspace.



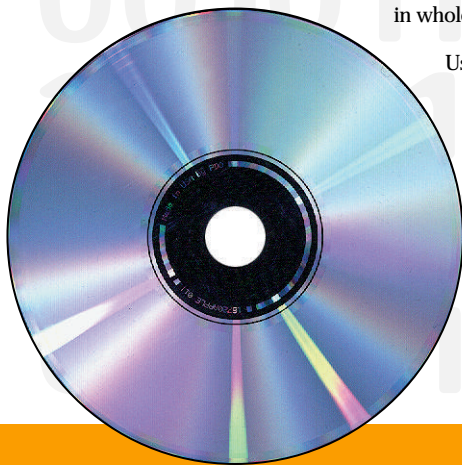
The CyberGrasp system exerts grasp forces perpendicular to each fingertip and the palm, allowing full range of hand motion without restriction. CyberGrasp is fully adjustable and designed to accommodate a wide variety of hand sizes.

virtualhand suite 2000

The VirtualHand® Suite 2000 is a complete development solution for “hand-enabling” 3D software applications. Users can now easily add graphical hand motion, hand-interaction and force feedback to their simulation applications.

The VirtualHand Suite 2000 integrates seamlessly with VTi's family of hardware products making it easy for simulation developers in mechanical CAD or R&D to take full advantage of VTi's revolutionary developments in whole-hand-interface technology.

Users of hand-enabled applications can wear VTi's CyberGlove, CyberTouch and CyberGrasp to handle, and even feel, three-dimensional digital objects and experience realistic force feedback through the most natural interface — the human hand.



The VirtualHand Suite 2000 consists of a Device Manager, a Device Configuration Utility and the VirtualHand Toolkit. Its features include:

- A general framework for constructing hand-enabled simulations from scratch, or for integrating hand-interaction into existing applications.
- Full network support, so a user can run an application on a host computer while receiving device data from another machine on the network, thus permitting interaction between geographically distributed teams.
- A user-friendly Java™-based Device Configuration Utility that lets users calibrate and configure VTi CyberGlove products, along with 3rd-party spatial trackers, in an intuitive and graphical manner.
- An efficient Device Manager that communicates in real time with peripheral devices, and runs as a standalone background process.
- Real-time collision-detection capabilities between 3D digital objects, as well as between digital objects and the graphical hand.
- A high-level force-feedback API, including effects such as jolts, pulses and vibrations for CyberGrasp users.
- An object-oriented architecture with an accompanying C++ library.

Virtual Technologies, Inc. is a hot Silicon Valley technology company and is the worldwide leader in hand sensing and force feedback for the manufacturing enterprise, R&D and multimedia.

Our flagship product, the CyberGlove®, is a fully instrumented glove that accurately transforms physical hand and finger movements into computer-generated data and imagery. The CyberGlove is used in a wide variety of applications, including mechanical CAD, training and simulation, telerobotic control, and performance motion capture.

From corporate, industrial, government, medical and university research labs around the world, to

Hollywood studios and special-effects companies, the CyberGlove has become the de facto standard for high-performance hand measurement and real-time motion capture.

With the introduction of products such as our award-winning CyberTouch™ vibro-tactile feedback option for the CyberGlove users are able to literally “feel” computer-generated objects or regions.

The CyberGrasp™ force-feedback option is a revolution in human-computer-interface technology. It enables CyberGlove users to “reach in and grab” computer generated objects and experience realistic force feedback via the most natural interface possible — the human hand.

VTi products are distributed, sold and supported directly through a growing worldwide network of resellers as well as through partnerships with major OEMs and system integrators. Please contact us directly or visit our website at www.virtex.com to locate a reseller near you.



applications

Mechanical CAD	Training & Simulation	Entertainment	Medical Simulation	Biomechanics
Force/Haptic Feedback	Virtual Reality	Digital Prototype Evaluation	Gesture Recognition	
Manufacturing	Assembly/Maintenance Verification	Ergonomics	Telerobotics	Hand Sensing
Performance Animation	Motion Capture	Music Generation	Automotive and Aerospace Design	

technical

cyberglove® specifications

Sensor Resolution: 0.5 degrees (typ.)

Sensor Repeatability: 1 degree (typical standard deviation between glove wearings).

Sensor Linearity: 0.6% maximum nonlinearity over full joint range.

Sensor Data Rate: 150 records/sec (unfiltered); 112 records/sec (filtered). Programmable sample period or polled I/O. (Rates listed are for 18-sensor records at 115.2 kbaud. Higher rates possible with fewer sensors enabled.)

CyberGlove: One size fits most; 3 oz; 10 ft glove cable standard (25 ft cable optional).

Instrumentation Unit: 10.00" x 6.25" x 2.75"; 27 oz.

Interface: RS-232 (115.2 kbaud max). Analog sensor outputs also provided.

cybertouch™ specifications

Vibro-tactile Stimulators: Six: one on each finger, one on the palm.

Vibrational Frequency: 0 – 125 Hz.

Vibrational Amplitude: 1.2 N peak-to-peak @ 125 Hz (max).

CyberGlove: One size fits most; 5 oz; 10 ft glove cable standard. (Sensor Technical Specifications same as the standard CyberGlove.)

Instrumentation Unit: 10.00" x 6.25" x 2.75"; 30 oz.

Interface: RS-232 (115.2 kbaud max).

cybergrasp™ specifications

Force: 12 N per finger (max, continuous).

Weight: 16 oz (exoskeleton without CyberGlove).

Workspace: 1-meter spherical radius from the Actuator Module.

CyberGlove: A CyberGlove is required for CyberGrasp. (22-sensor CyberGlove recommended.)

Instrumentation Unit: A Force Control Unit and Actuator Module are included.

Interface: Ethernet.

virtualhand® suite 2000 system requirements

Operating System: Windows® NT 4.0 or SGI IRIX® (versions 6.4 or 6.5).

Host Computer: Pentium® 400MHz or SGI Octane® R10000 recommended.

Memory: 128MB RAM.

Graphics: High-end OpenGL graphics.

Other: Java™ Run-time Environment (version 1.1.6 or higher).

Interface: Ethernet.

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The CyberGlove is the de facto standard for

whole-hand interaction with 3D graphical

environments and real-time motion capture.

3D motion