

3 SPACESM F A S T R A KSM

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Ideal for head
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POLHEMUS

First in the third dimensionSM

3SPACE™ FASTRAK™

Only FASTRAK provides real time, six-degree-of-freedom tracking with virtually no latency. The perfect solution for the position/orientation measuring requirements of 3D applications and environments. Ideal for head tracking, biomechanical analysis, graphic and cursor control, and stereotaxic localization.



COMPONENTS

The 3SPACE FASTRAK includes a System Electronics Unit (SEU), power supply, one receiver, and one transmitter. You can expand the system's capabilities simply by adding up to three additional receivers.

FASTRAK is also available as a board level product for OEM/VAR applications.

► **System Electronics Unit** Contains the hardware and software necessary to generate the magnetic fields, compute position and orientation, and interface with the host computer via an RS-232 or IEEE-488 connection. (RS-422 optional)

► **Transmitter** The transmitter is a triad of electromagnetic coils, enclosed in a plastic shell, that emits the magnetic fields. The transmitter is the system's reference frame for receiver measurements.

► **Receiver** The receiver is a small triad of electromagnetic coils, enclosed in a plastic shell, that detects the magnetic fields emitted by the transmitter. The receiver is a lightweight cube whose position and orientation is precisely measured as it is moved. For 3D mouse applications you can get 3BALL™, which contains the receiver mounted in a convenient ball along with a switch.

FEATURES

► **Real Time** Virtually no latency. Digital Signal Processing (DSP) technology provides 4ms latency, updated at 120 Hz. And data are transmitted to the host at up to 100K bytes/sec.

► **Improved Accuracy and Resolution** Accuracy of 0.03 in RMS with a resolution of 0.0002 in/in makes this the most precise device of its kind.



The 3SPACE⁺ FASTRAK⁺ accurately computes the position and orientation of a tiny receiver as it moves through space. This device virtually eliminates the problem of latency as it provides dynamic, real time six-degree-of-freedom measurement of position (X, Y, and Z Cartesian coordinates) and orientation (azimuth, elevation, and roll).

FASTRAK is the perfect solution for interfacing with Virtual Reality environments and controlling simulator projectors or other applications where real time response is critical. It is also ideal for measuring range of motion or limb rotation in biomedical research. It is a fast, accurate, easy to use, and effective method of capturing motion data on any non-metallic object.

The FASTRAK system utilizes a single transmitter and can accept data from up to four receivers. If

that still isn't enough, you can frequency-multiplex up to eight systems (that's 32 receivers) with no change in the update rate. The use of advanced digital signal processing (DSP) technology provides an update rate of 120 Hz (with a single receiver) and a remarkable 4ms latency. The data are then transmitted over a high speed RS-232 interface at up to 115.2K baud or over an even faster IEEE-488 at up to 100K bytes/sec. If your application requires using the system in close proximity to a CRT, FASTRAK has special circuitry to allow you to synchronize with it for improved performance.

And because FASTRAK uses patented low-frequency magnetic transducing technology, there's no need to worry about maintaining a clear line-of-sight between receiver and transmitter. Polhemus has eliminated the problem of signal blocking that limits sonic or laser devices.

► **Range** Operation over a range up to 10 feet is now possible.

► **Multiple Receiver Operation** Permits measurement of up to 4 receivers on a single system and up to 32 receivers at a time, utilizing eight (8) multiplexed systems.

► **Reliable** From the pioneer in 3D position/orientation measuring devices, in business since 1970. Factory calibrated, never needs adjustment.

► **Multiple Output Formats** Position in cartesian coordinates (in or cm); orientation in direction cosines, Euler angles, or quaternions.

APPLICATIONS

► **Virtual Reality** From the beginning, Polhemus 3SPACE systems have been the systems of choice for VR head and body tracking applications. Now FASTRAK takes you to the next generation with real time tracking.

► Head Mounted Displays

FASTRAK is the consummate solution for head-mounted displays utilized in military, VR, or simulator applications. FASTRAK virtually eliminates latency (lag).

► **Biomechanical Analysis** Mount up to 32 receivers on parts of the anatomy and collect real time relative movement data for gait and limb analysis. Perfect for leg, joint, spinal, or shoulder rotational measurement.

► **Graphics** The natural way to manipulate graphics for animation or simulation. The receiver, mounted in a mouse, stylus, or other hand held device, is the ideal way to gain real time control over the placement of cameras, light sources, projectors, or any movable image.

► Stereotaxic Localization

The receiver can be mounted on a non-metallic object (such as a robotic prosthesis) to determine its position and orientation.

FASTRAK SPECIFICATIONS

Position Coverage	The system will provide the specified performance when the receivers are within 30 in of the transmitter. Operation over a range up to 10 feet is possible with slightly reduced performance.
Latency	4 milliseconds.
Update Rate	120 updates/sec ÷ number of receivers.
Interfaces	RS-232 with selectable baud rates up to 115.2K baud (optional RS-422). IEEE-488 at up to 100K bytes/sec; ASCII or Binary format.
Static Accuracy	0.03 in RMS for the X, Y or Z position; 0.15° RMS for receiver orientation.
Resolution	0.0002 in/in of transmitter and receiver separation; 0.025° orientation.
Range	Up to 10 feet.
Multiple Systems	Up to 8 systems can be frequency multiplexed with no change in update rate.
CRT Interference Rejection	Provided by means of an external cable and sensor.
Angular Coverage	The receivers are all-attitude.
Operating Environment	Large metallic objects, such as desks or cabinets, located near the transmitter or receiver, may adversely affect the performance of the system.
Operating Temperature	10°C to 40°C at a relative humidity of 10% to 95%, noncondensing.
Physical Characteristics	SEU - 11.0 in L x 11.4 in W x 3.6 in H Power Supply - 7.0 in L x 3.7 in W x 2.2 in H Transmitter - 2.3 in L x 2.2 in W x 2.2 in H Receiver - 0.9 in L x 1.1 in W x 0.6 in H.
Power Requirements	25 W, 90-250 VAC, 38-65 Hz.

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