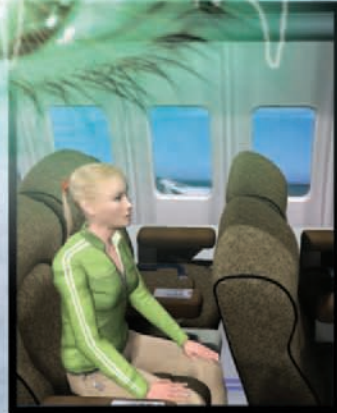


VR & STIMULUS PRESENTATION

CATALOG

For the Life Sciences



VR/Immersive Solutions with Physiology Data

- Create virtual worlds that are impossible or prohibitively expensive in the real world
- Synchronize VR events with physiological response data
- Multimodal stimulation: visual, auditory, olfactory, haptic, and electric
- Record and analyze physiological, behavioral, and subjective response data



Registered to ISO 9001:2008



BIOPAC VR & Stimulus Presentation

Virtual Reality (VR) allows you to tightly control the experimental conditions and design experiments that are otherwise impossible or prohibitively expensive in the real world. Immersive environments can take the subject anywhere and let you unlock the boundaries of your physical lab space and budget.

Immerse your subjects in a BIOPAC VR world and record physiological data as the virtual environment influences the subject.

Applications are varied and include

Psychology	Biomechanics & Kinesiology
Healthcare	Computer Modeling/Simulation
Education	Training: hazard, medical, etc.
Ergonomics	Marketing/Consumer Research

BIOPAC VR systems provide turnkey solutions that include all the interface options and VR worlds—*programming optional*.

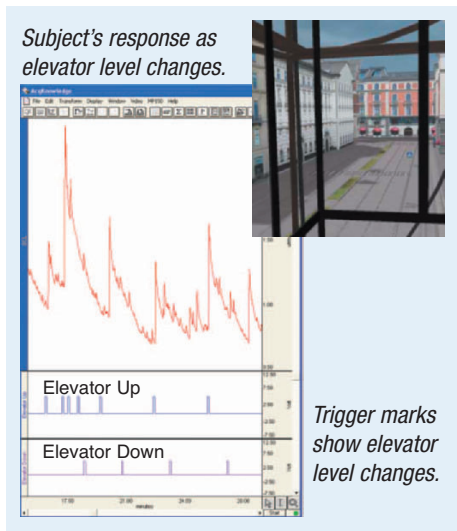
VR Systems include

- workstation computer
- pre-programmed worlds that allow you to start running subjects and recording data
- tutorial worlds with source code
- flexibility to create your own worlds
- remote monitoring system for the collection of physiological data
- head-mounted displays
- subject tracking options
- haptic feedback and scent delivery options

At the heart of the BIOPAC VR system is a VR Workstation computer: a high-end rendering machine optimized for VR applications.

Workstations are configured and tested before leaving BIOPAC to ensure streamlined customer setup. The VR Toolkit and worlds are installed and ready to go the moment you unpack the box.

The VR software communicates with the BIOPAC hardware to provide synchronization between VR events and the physiological data. Synchronization is a critical component of the VR system.



Use a feedback loop for greater control and automation of the VR world. This allows the world to change in real time, based on the subject's responses. Timing events are used for analysis of the physiological data.

VR systems include six working worlds that allow you to start running experiments immediately—two complete tutorial demo worlds with source code plus four additional executable worlds (*see page 7-8*).

A source code license pack is available for all worlds for further modification or easy creation of your own worlds. Existing worlds can also be customized to meet the requirements of your lab, or BIOPAC can provide custom worlds that are completely tailored to your protocol.

BIOPAC provides a selection of compatible 3D graphical models and sound files to support users who choose to create their own environments.

In addition to visual (3D) and audio stimulus, scent delivery and haptic feedback allow subjects to smell and feel the immersive world—add an incredible degree of realism to the immersive world!

**Some features are OS-specific.*

Watch demo videos at BIOPAC.COM

BIOPAC software is used in thousands of labs worldwide and cited in thousands of peer reviewed publications.

Interfacing a VR workstation with a BIOPAC data acquisition system adds a new dimension to your research by combining objective measures to a tightly controlled experimental protocol.

- Remote Monitoring option provides subjects with a greater degree of freedom and allows them to move around within the virtual world
- The VR interface maintains subject isolation from all electrical sources

Physiological data is captured from subjects as they are immersed in the world. The Remote Monitoring system provides four channels of physiological monitoring and is configurable to record any combination of signals: ECG, EEG, EOG, EMG, EGG, EDA, temperature, respiration, and pulse. The AcqKnowledge® software will display the data in real time and provides detailed signal analysis for post acquisition scoring of the data.

Eye tracking can be added to the head-mounted display to track the subjects' eyes

as they view the immersive environment during the experiment.

For static presentations that do not require VR, BIOPAC also offers an interface solution for the leading visual presentation packages. BIOPAC systems interface with SuperLab®, E-Prime®, Presentation™, Direct RT™, MediaLab™, plus any other system that outputs marker information via the parallel port. The packages provide a powerful way to deliver sounds, images and movies to the subject. Close synchronization between the stimuli and the physiological signals is achieved through digital markers.

Whether you need a fully immersive environment or a static visual presentation system, BIOPAC can provide a solution that fits your protocol and your budget. BIOPAC systems are completely modular and easy to build upon. It's easy to start with an introductory system and then, as your requirements and budget change, add more functionality.

System Features

BIOPAC VR systems combine complex stimulus delivery, behavioral monitoring and physiological signal acquisition and analysis.

The VR software is easy to use and adaptable. Easily make subtle changes to an experiment without having to redesign the entire protocol.

AcqKnowledge® has a wide range of automated analysis routines that streamline the analysis process, eliminate subjectivity and save time.

The VR software provides you with an unlimited degree of flexibility.

Each VR system comes with example programs showing you how to create a specific world and control items within the world.

There are also character sets that include hundreds of ready made civilian, military, or animal characters.

Create rich 3D environments that are 100% personalized to match your protocol.

Send the physiological data stream back to the VR world to make decisions based on the subject's physiological responses.





Complete Solutions for Your VR Lab

Combine the sophistication and performance of BIOPAC research systems with the power and flexibility of our new VR platform. Use MP150 hardware, AcqKnowledge® software, and a VR Workstation—which includes executable VR worlds and the Vizard™ VR Toolkit—to run or create immersive environments with physiological data for life science research.



MP150 data acquisition provides:

- High resolution—16 bit
- High speed—up to 400 kHz aggregate
- Variable sample rates (analog & calculation channels)—record signals at unique sample rates
- 16 analog inputs and 2 independent analog outputs
- 16 Digital I/O lines (TTL triggers)
- 16 online calculation channels
- Ultra-fast Ethernet ready connectivity
- Optically-isolated systems maintain subject safety
- Compatibility for 20+ BIOPAC amplifiers

Remote Monitoring

Use the TEL100C system to record data while subjects are mobile within a VR world. The system includes a portable amplifier/transmitter that transmits up to four channels of data over a single lightweight coaxial cable. Gain and bandwidth for each channel can be adjusted independently.

Two-way Communications Interface

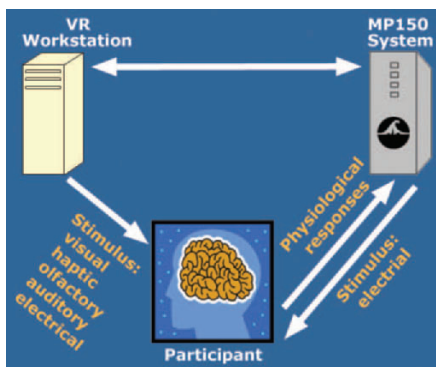
The interface sends marker information from the virtual world to the MP150 and includes the biofeedback data transfer protocol for real-time digital communication, which allows the participant's physiological feedback to control the VR world.

ACQKNOWLEDGE® SOFTWARE

The AcqKnowledge® software included with each MP System is a highly interactive straight-forward application. Intuitive controls let you instantly view, measure, analyze, and transform data. Perform complex data acquisition, triggering and analysis using simple pull-down menus and dialogs—no need to learn a programming language or new protocol.

- **Acquisition Features**—variable sample rates, pause mode, and stimulation design and control. Online analysis settings, filters and transformations provide real-time recording feedback.
- **Display Features**—multiple display modes, advanced grid system, journal facility for notes, textual event markers, and measurement tools. Mouse-over tool tips (for sample rate, channel rate, measurement results, etc.) help guide application use.
- **Analysis Features**—signal averaging, sophisticated pulmonary integration routines, filtering, FFT, histogram, automatic data reduction, template analysis, peak detection features, find rate settings, and equation generator.
- **Automated Routines***—available for ECG, HRV, EDA, EMG, EEG, BP, ERP, Pulmonary, and more!
- **Support Features**—real-time, searchable user guides (PDF) as well as extensive online support and training options. Plus, you can download *Quick Start* template files to make it even easier to start your experiment.
- **Translations***—Chinese, French, Italian, Japanese, and Spanish available now.

*Some features are OS-specific.



BIOPAC software also supports video synchronization so it is possible to video the entire experiment and correlate the subject's movements and reactions to the physiological data*. AcqKnowledge® allows you to advance the video to a certain point and locate the corresponding time point in the physiological data file, or locate a point in the physiological recording and jump to the corresponding point in the video.



Vizard™ VR Toolkit is everything you need to build complete, interactive 3D content. Designed for rapid prototyping, Vizard™ gets you creating fast and provides the resources to deploy even the most challenging applications. With Vizard™, even someone with no programming experience can leap into the world of interactive 3D content and soon discover what it's like to have an untethered imagination.

Vizard™ supports stereoscopic head-mounted displays, 3D sound and many peripheral input devices, including head trackers and game pads. Distributed, networked environments are also supported.

The open-source language Python is free and has an active user community providing a wealth of resources for applications. VRML and other 3D formats provide immediate access to large 3D databases.

Vizard™ is a high-level graphics toolkit for the development of high-performance graphics applications, including virtual reality, scientific visualization, games, and flight simulation. By providing you an object-oriented framework encompassing OpenGL, DirectX multimedia, human bipeds, display and peripheral hardware interfaces, and efficient networking, Vizard™ frees you from low-level programming and instead allows you to concentrate on creating your interaction and content. In addition, by building upon the Vizard™ abstraction layer, your project is instantly upward compatible with future advances in all the underlying components.

New! Vizard now supports CAVEs—contact BIOPAC for more info.

VR Toolkit is installed on all BIOPAC VR Workstations. VR environment resources provided with the VR Starter Suite include executable worlds (with optional source code license), tutorial demonstrations with source code, and objects and sounds to accelerate development. See page 9.

VR Character Sets

Character sets available with civilian, military, or animal avatars. Sets feature fully animatable 3D characters for Vizard™. See page 12.

	poly level	low	medium	high
number of triangle polys	550	2500	5000	
max. bones per vertex	2	2	3	
number of bones	25	33	42	



BIOPAC VR Workstations will enhance any application that demands complex stimulus delivery and an evolving environment.

PSYCHOLOGY

Social Psychology. Test a hypothesis with full control of a range of factors including the physical appearance of the virtual world and the behavior and appearance of others without sacrificing realism. Implement impossible manipulations like changing the race and gender of participants.

Spatial Cognition. Create complex environments for studying spatial behavior, navigation and memory.

Vision. Investigate the perception of distance, size and motion beyond the limitations of conventional 2D displays.

Education. Model scientific systems, recreate historical events and sites, create virtual classrooms that can be attended by multiple users at separate locations.

Virtual sound. Accurately recreate the 3D character of real-world sound and explore the perception and cognitive mapping of sound.

Phobias and Therapy. Recreate environments associated with a phobia and expose participants while monitoring their physiological responses to changes in the environment.

POST TRAUMATIC STRESS DISORDER

VR is presently being applied for research of treatment of PTSD. Combine rich 3D graphics with high fidelity sound and scents to maximize the immersive experience. This approach allows researchers to fully control the environment and ensure the subject receives the appropriate stimuli.

ERGONOMICS

Build a virtual assembly line to investigate human performance of the required tasks, the physical constraints and mechanical stress on the body as well as psychological stress as a function of equipment design. Identify each potentially stressful task before completing the real assembly line design. Test designs of operator interfaces (i.e., in aircraft, vehicles, industrial applications) before ever building a more costly functional physical model.

TRAINING

Use virtual reality to accelerate training by constructing realistic scenarios for trainee nurses and physicians, hazard workers, military, police, firefighters, etc. Immerse the trainee in an emergency situation at a hospital, a fire, a military confrontation, a terrorist attack, a school hostage crisis, a natural disaster, etc.

Have prospective employees perform key aspects of the job in order to assist with the screening process or setting up individualized training routines. Evaluate physiological responses of trainees during the simulation (i.e., indices of arousal, threat, challenge, etc.).

BIOMETRICS AND KINESIOLOGY

Study the postural responses to the perceived motion of a virtual scene while obtaining physiological measures like EEG, EMG, goniometry and acceleration. For example, evaluate brain or stroke damage. Manipulate the available sensory information concerning task-relevant objects in the world.

HEALTH CARE

Use virtual reality to train medical staff and assist with surgery, pre-operative planning, assisted surgery and remote surgery. Employ virtual reality to research the treatment of PTSD, phobias, drug dependencies, etc. Immerse participants in virtual reality to study pain distraction. Design and test virtual prosthetic devices (e.g., myoelectric interfaces using real-time EMG feedback) that can help subjects during difficult learning stages without the need to wear the prosthetic.

COMPUTER INTERFACES: BCI AND HCI

Create brain-computer interfaces (BCI) utilizing real-time EEG data to enhance motor function. Expand human computer interaction (HCI) by providing the computer access to physiological states via real-time monitoring. Augment computer control by adding a neuro-electric HCI employing such physiological signals as EEG, EMG, EOG to aid in intuitive robotic control and virtual-reality based navigation of data sets.

AUGMENTED REALITY

See the virtual world and the real world simultaneously. Receive information about the participant's physiological state (i.e., heart rate, blood pressure, real-time indicators of stress and arousal) as well as task-relevant information such as descriptions of components during a mechanical repair, medical data during surgery, or 3D layout of hidden structures (pipes, electrical lines) during construction or maintenance work.

MARKETING AND BRAND MANAGEMENT

Product development, packaging & presentation, store design & layout, communications

Simulate complex and rich environments, manipulate market conditions, and control decisions and answers without leaving the lab. Rapidly prototype and subtly adjust the advertising or marketing message to refine it for the target audience. For example, use eye tracking and a head-mounted display to find the areas of maximum interest (as established by gaze tracking) on a web page, a 3D scene of a store, package design, etc.

Contact a BIOPAC Applications Specialist to discuss your specific protocol.



BIOPAC virtual worlds are ready to run without programming. The source code is also available for user customization and further development of the world (see page 12). Two tutorial demonstration worlds— Iowa Gambling Task and Pit—are detailed and fully documented, including source code, to greatly assist users who wish to create or modify the existing environments and start creating their own.

BIOPAC has a selection of compatible 3D graphical models and sound files to further expedite the development process. The VR software uses a simple scripting language to create rich 3D environments and rapid results. BIOPAC will also undertake the creation of custom worlds, ensuring that you get the precise functionality your protocol demands.

BIOPAC VR Systems provide users with a variety of environment options and time horizons.

- Use the BIOPAC worlds and start working immediately
- Customize the BIOPAC worlds to personalize the environment
- Follow the detailed tutorials with source code to create your own worlds
- Employ BIOPAC to develop a custom ready environment

Movement can be controlled by the experimenter and/or participant's physiological reactions.

Data analysis is simplified with automatic scoring of the data. The current state of the environment, participant, and/or audience is marked in the physiological data record.



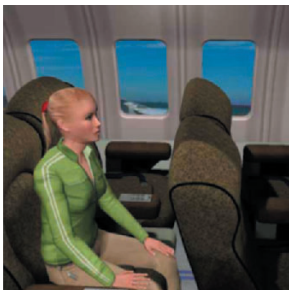
ACROPHOBIA

Participants ride a construction elevator in an environment designed to emphasize the perception of height. There are seven floors (different heights) for the elevator and two modes of the experiment:

Subject feedback—Physiological responses are fed back to the VR world and progress to the next level is allowed/prohibited based on SCR and SCL response levels.

Experimenter-controlled—Progress to the next level is initiated by a keystroke from the experimenter.

Physiological responses are analyzed in real-time to determine when the participant should move to the next height level.



FEAR OF FLYING

Participants are immersed in a virtual airplane and experience take-off, normal flight, and turbulence. Tactile feedback is employed (via the HDS100 haptic delivery system) to enhance the physical experience. The experimenter can trigger events, such as take-off sequence, turbulence, cabin announcements, etc.



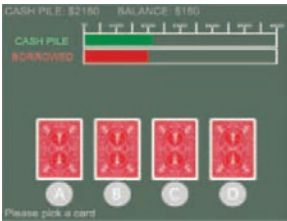
PUBLIC SPEAKING

In this social anxiety environment, participants deliver a speech from behind a podium. The speech text is presented on a display on the podium and can be scrolled via a joystick. Audience size can be controlled. The audience state or attitude—e.g., bored, interested, rude, or indifferent—is set by the researcher during the experiment. Audience behavior is defined using avatar animations and is not limited to the animations included with the environment.



CUE REACTIVITY

Participants are exposed to a sequence of rooms along a corridor that contain different stimulation environments. Neutral environments and stimulus environments are included, and the environments can be expanded. The number of rooms as well as the objects in the rooms can be modified. This paradigm can be used to investigate the relationship between addictions/craving, physiological response, and the way the stimulus is presented in the environment. For instance, observe how participants react to cigarettes on a table.



IOWA GAMBLING TASK

Participants follow the classic Iowa Gambling Task experiment, in which they choose between decks of cards with unpredictable payoffs—reward or penalty, net gain or loss. Card appearance and win/lose probabilities can be modified. Provided in English and French. Skin conductance response before and after participants make a choice can easily be analyzed.

- *Tutorial demonstration world—includes source code.*



PIT

The Pit is a great demonstration of the power of virtual reality. The world displays a pit in the ground with a plank of wood placed across it. Participants must walk across the plank to safely reach the other side of the pit. As they walk across the virtual plank, the world tracks their movement and updates the display. A Precision Position Tracker system is required to monitor subjects as they walk across the plank.

- *Tutorial demonstration world—includes source code.*



Optimized Systems

- Powerful VR Workstation Computer
- Sophisticated real-time communication between the VR world (to control environment) & MP150 (to record participant data)
- Fully functioning Tutorial Demonstration VR Worlds
- Easily expandable for multiple subjects



A :: PREFERRED WORKSTATION

VRWORKSTATION

For existing users who already have a BIOPAC MP150 Data Acquisition System, the Preferred Workstation includes everything you need to start your VR lab—except for a head-mounted display. The Preferred Workstation is the foundation of all VR Workstations; it includes a high-end rendering computer optimized for VR applications, 20" flat panel monitor, and the VR Starter Suite with all the essentials for your VR lab.

VR Starter Suite

The VR Starter Suite is a series of essential tools for interfacing a BIOPAC data acquisition system with the Vizard™ VR Toolkit. The suite includes:

Tutorial Demonstration VR worlds—Start running experiments the moment you receive your system. The graphics-rich executable programs cover a range of immersive worlds for a variety of applications and can be used to accelerate development effort. All systems include source code for two demos (Pit and Iowa Gaming Task), with source code available for additional worlds.

Vizard™ Virtual Reality Toolkit—The Toolkit developer edition allows you to run the Tutorial Demonstration VR Worlds and includes everything you need to build complete, interactive 3D content. Designed for rapid prototyping, Vizard™ gets you creating fast and provides the resources to deploy even the most challenging applications. With Vizard™, even someone with no programming experience can leap into the world of interactive 3D content and soon discover what it's like to have an untethered imagination.

Communications Interface—The optically isolated interface (STP100C) connects to the parallel port and provides two-way communication between the virtual world and the BIOPAC MP150 data acquisition system by sending specific marker information to the MP150. The communication interface also includes the biofeedback data transfer protocol that allows real-time digital communication between the MP150 and the VR Workstation, allowing physiological feedback to control the world.

B :: PREFERRED PHYSIOLOGY WORKSTATION

VR100PHYS-W

The Preferred Physiology Workstation adds objective physiological response data. Includes everything in the Preferred Workstation, plus the MP150 data acquisition system and the TEL100C Remote Monitoring System. The MP150 system uses the marker information for automated analysis of the subject response data and can also send digital data back to the VR world for biofeedback.

MP150 System with AcqKnowledge® software—The modular, powerful interface system can be used with BIOPAC’s amplifiers and accessories and with equipment you already have. Ethernet-ready data acquisition and analysis. Record multiple channels with differing sample rates, up to 400 kHz aggregate. *See page 3-4 for MP System details.*

TEL100C Remote Monitoring System—Records data with minimal cabling while participants are immersed in the virtual world. Monitor a wide range of physiological signals, including cardiac output, ECG, EDA (GSR), EEG, EMG, EOG, PPG, RSP, and SKT. Specialized signal processing of physiologic variables (like RMS filtered EMG, or QRS detection) can be performed on the computer via calculation channels. Add Precision Tracking to allow subjects 10 x 10 meters of movement.

Electrodes and transducers purchased separately—visit www.biopac.com.

C :: PREFERRED PHYSIOLOGY INTRO WORKSTATION

VR100INTRO-W

The Preferred Physiology Intro Workstation provides everything you need to start your VR lab—everything in the Preferred Physiology Workstation plus the HMD1 head-mounted display, the VR Worlds Pack with source code, and an InertiaCube head orientation tracker (*pages 11-14*).

D :: PREFERRED PHYSIOLOGY ADVANCED WORKSTATION

VR100ADV-W

The Preferred Physiology Advanced Workstation includes everything in the Preferred Physiology Intro Workstation, with an upgrade to HMD2 head-mounted display (*page 12*) instead of HMD1.

E :: PREFERRED PHYSIOLOGY ULTIMATE WORKSTATION

VR100ULT-W

The Preferred Physiology Ultimate Workstation is a great solution for labs that want to expand their stimulus delivery capabilities or modify and create high quality worlds. Includes everything in the Preferred Physiology Advanced Workstation, plus precision position tracking with support and the Characters Set of Human Avatars. Precision Tracking provides high-quality optical tracking for expanded subject mobility, up to 10 x 10 meters (*page 12*).

VR Workstation	A-Preferred	B-Physiology	C-Intro	D-Advanced	E-Ultimate
High-end rendering PC (Windows OS) with 20" flat panel monitor					
VR Starter Suite: 6 executable worlds, 2 incl. source code; Vizard™ VR Toolkit; Interface					
MP150 Data Acquisition* & AcqKnowledge® software					
TEL100C Remote Monitoring: 4 channel system with minimal cabling					
VR Worlds Pack with Source Code License: Acrophobia, Flying, Speaking, Cue Reactivity					
Head-Mounted Display HMD1 or HMD2			HMD1	HMD2	HMD2
InertiaCube Orientation (head position) Tracking					
Precision Position Tracking & Support (4 camera)					
Human Characters Set					



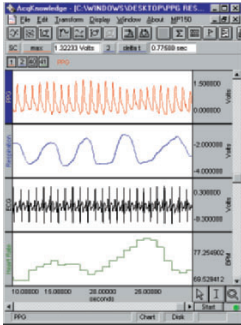
Hardware for VR & Physiology Data

Data Acquisition Hardware

See pages 3-4 and 9-10 for details.

VR Workstations: Turnkey solutions that allow you to use VR in your lab immediately. Complete Workstations available for starter to ultimate labs.

Data Acquisition System: MP150 with AcqKnowledge® software—supplies real-time display and analysis of physiological and behavioral data, plus real-time biofeedback for VR worlds. See BIOPAC's range of 20+ biopotential and transducer amplifiers online.



Remote Monitoring System TEL100C—4 channel universal amplifier system allows participants to move freely in the VR environment with minimal wiring.

Stimulation: Use electrical stimulation while the subject is immersed in a virtual world to study pain, stress, etc.

STM100C—Provides 0-200 V output or .01-50 ma constant current. Controlled via MP150 system and AcqKnowledge® software.

STM200—Provides 0-100 V output. This stand-alone stimulator is controlled by the Vizard™ software or AcqKnowledge® software.

VR & Life Science Software

See pages 3-4 and 9-10 for details.

AcqKnowledge® Software—included in all Workstations.

VR Starter Suite—included in all Workstations; not sold separately.

The VR Starter Suite is a series of essential tools for interfacing a BIOPAC data acquisition system with the Vizard™ VR Toolkit. The suite includes: STP100C interface, linking protocol, tutorials, example code, and detailed documentation. It provides setups for creating digital event markers that synchronize VR world events with the physiological data and for creating biofeedback loops that use the physiological data to control the VR world.

Vizard™ VR Toolkit—Allows you to modify the world source code and includes everything you need to build complete, interactive 3D content. Designed for rapid prototyping, it gets you creating fast and provides the resources to deploy even the most challenging applications. Developer edition. See page 8 for details.

Plus, free to BIOPAC customers, for use within the VR platform only:

3D Objects—Building blocks for creating new virtual worlds. Load objects in the VR Toolkit and then position, rescale, rotate, etc. to create your virtual environment.

Sounds—Import ambient or spatialized sounds to the VR Toolkit and apply or activate in a variety of ways. Ambient sounds create background noise (such as sounds from a busy street) and spatialized sounds relate to specific objects in the VR world (such as engine revving coming from a car).

VR Worlds Source Code License Pack VRWORLDS-PACK

Executable worlds are included in the VR Starter Suite as a locked environment to be used as provided. Add a Source Code License to modify an environment and accelerate development of customized worlds (source code for Pit and Iowa Gambling Task tutorial worlds is included in the VR Starter Suite). Code is written in Python programming language with extensive comments. Models from the environment to be used within the VR platform only.

Individual licenses also available:

Acrophobia	VRWORLD-ACROPHO	Public Speaking	VRWORLD-SPEAK
Fear of Flying	VRWORLD-FLYING	Cue Reactivity	VRWORLD-CUE

Character Sets

Fully animatable 3D characters for Vizard™ VR Toolkit (or 3DS Max). Each character in 3 different polycounts with 100 typical animations. High-res textures with layers in Photoshop® psd files provide many possibilities to change the models and textures. Includes various interchangeable equipment items and normal bump maps and specular map.

Humans (100 civilian characters)	VRCHARACTERS-H
Soldiers (50 military characters)	VRCHARACTERS-S
Animals (30 fully rigged models)	contact BIOPAC for details

Head-Mounted Displays

Orientation tracker highly recommended—see TRACK1, page 14
Eye tracking system integration available—see EYE series, page 14



Head-Mounted Display HMD1

Two high-contrast microdisplays (SVGA 800 x600 3D OLED) deliver fluid, full-motion video in more than 16.7 million colors. Specially developed optics deliver a bright, crisp image. Nearly 40° field of view.



Head-Mounted Display—High Resolution HMD2

This state-of-the-art head-mounted display delivers unsurpassed visual acuity and dual input SXGA (1280 x 1024) image quality for an amazing immersive experience. It incorporates custom engineered optics and high-resolution color microdisplays. LCOS reflective display technology provides a high-contrast virtual image. 60° field of view.



Hardware for VR & Physiology Data

Haptic Delivery

Haptic Delivery System HDS100

The Haptic Delivery System provides tactile feedback reality experiments. Includes an audio amplifier that connects and actuators & isolators that vibrate based on the sound from the sound card. Actuators are placed under chair legs or on a platform and to increase the realism of the VR environment (e.g., movement while in a car or elevator).

Actuators—The electromagnetic motor delivers low-frequency motion to four actuators with two channels 150 W each RMS (6 ohm).

Motion isolators—Isolate the tactile sensation to the couch or chair.

Interface cable (amp to existing sound card)—Stereo phone plug to dual RCA Y cable.

The system is compatible with the Vizard™ VR Toolkit included in all Workstations, SuperLab®, E-Prime®, and other presentation systems that interface your computer's sound card. Replacement actuators/isolators **RXHDS**.



Scent Delivery

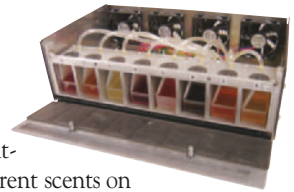
Scent Delivery System SDS100

The Scent Delivery System is a computer-controlled (USB), eight-cartridge scent machine that uses compressed air* to project different scents on cue for a predetermined time followed by a burst of unscented air to clear for the next scent. Scents are triggered from the virtual reality environment and disperse 3 m to 6 m depending on the number of fans activated.

* Requires companion SCENT cartridges and air compressor.

SCENT—Select from 120+ scents to enhance your protocol. Specialty scents (e.g., gun powder, cigarettes, whiskey) and environment scents (e.g., coffee, pepperoni, rain)—complete listing online.

SDSAIR—Companion 1/8 HP mini air compressor for use with SDS100.



Visual Presentation

E-Prime Systems

Programmable Stimulation System - **STMEPM**

Stimulus Presentation Sys. (STP100C) with E-Prime - **EPM100W** or E-Prime Professional - **EPM100WP**

E-Prime Experiment Generator - **EPM100** or Professional Experiment Generator - **EPM100P**

SuperLab Systems

StimTracker Stimulus Presentation Marker Interface - USB - **STK100**

StimTracker with SuperLab - **STK100W** (Win) or **STK100M** (Mac)

SuperLab Stimulus Presentation System - **STP100W**

Presentation System Interface - STP100C—included with Workstations.

Already have SuperLab® or another presentation system? Order the STP100C isolated digital interface to use it with a BIOPAC system. Includes a 3-meter ribbon cable, to be specified for SuperLab® (DB37 F/F) or for systems such as DirectRT™, E-Prime®, Inquisit™, MediaLab™, Presentation™, and Vizard™ that use the printer port (DB25 M/F).

Tracking Systems

Orientation Tracking TRACK1—included in Intro, Adv., and Ult. Workstations.

Precision 3-DOF orientation tracking for head tracking. Full integration of nine sensing elements ensures maximum accuracy, sensitivity and stability. Fine tune your setup with controllable filters, adjustable rotational sensitivity, and settable motion prediction. Sourceless tracking provides full 360° range and eliminates line-of-sight restrictions. Connects directly to the VR Toolkit included in all Workstations. Use additional sensors to track limb movement.



Eye Tracking Systems EYE Series

These turnkey eye tracking systems include cables required to interface to a BIOPAC MP System and AcqKnowledge® software. Eye tracking systems can interface with VR environments, stimulus presentation programs, and other media.

	Monocular	Binocular
Mounted with HMD1	EYETRAKHMD1MONO	EYETRAKHMD1BINO
Mounted with HMD2	EYETRAKHMD2MONO	EYETRAKHMD2BINO
Unmounted, for 3rd-party HMD	EYETRAKHMD3rdMONO	EYETRAKHMD3rdBINO
Mounted, eye frame	EYEFAMESCENEMO	EYEFAMESCENEBI

Precision Position Tracking Systems VRPPT Series—included in Ult. Workstations.

Precision Position Tracking (PPT) motion capture systems provide high-quality optical tracking over a wide area (scaleable up to 10 x 10 meters or more). This allows participants to navigate the virtual world by moving in physical space. It connects directly to the VR Toolkit included in Workstations and delivers flexible and accurate tracking. Real-time technology allows users to see tracking results the instant a subject performs a motion.

Ease of use—The intuitive graphical user interface includes a wizard for instant calibration using a digital calibration board for all three axes. Simple streaming or polling via RS-232 serial port 115.2 kbs interface.

Cameras track an infrared LED target that can be located on anything that requires tracking. Track the subject and/or objects, such as boxing gloves in a virtual fight.

2 cameras: VRPPT2

4 cameras: VRPPT4

8 cameras: VRPPT8

Support packages available.



Cost-Effective VR Solutions



- **Virtual Reality Workstations**
- **VR Worlds**—Immersive Environments, Tutorial Demonstrations, Source Code
- **Stimulus Presentation**
- **MP150 Data Acquisition**
- **Remote Monitoring System**
- **AcqKnowledge**®—automate data analysis & scoring
- **Vizard**™ VR Toolkit
- **Objects & Sounds**
- **Head-Mounted Displays**
- **Haptic Delivery**
- **Scent Delivery**
- **Eye Tracking**
- **Subject Tracking**



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