

MINOLTA

VI-900

NON-CONTACT 3D DIGITIZER

The essentials of imaging

www.minolta.com



*Who gives you a **World Class 3-D Scanner** with
LASER accuracy, **One-button camera**
simplicity and an **amazingly low price?***

MINOLTA, that's who



VI-900 The new World leader in:

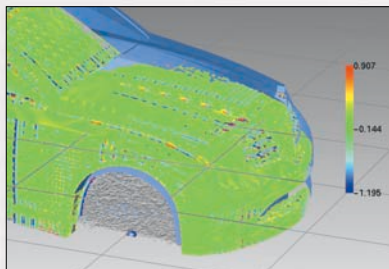
- Speed** - scans in less than one second
- Precision** - over 300,000 points with range precision to 0.020mm (0.0008") typical based on Minolta standard test method
- Simplicity** - point and shoot simplicity for consistently excellent results
- Flexibility** - only Minolta offers interchangeable lenses for variable scanning volumes
- Value** - Minolta sets a new price / performance threshold

Who but Minolta gives you the VI-900 3-D Scanner, offering high-speed and high-accuracy, at a high-value price? VI-900 is the newest of Minolta's VI family of 3-D scanners. You've come to know Minolta's VI-900, setting the pace in 3-D digitizing with performance, low price, simple camera-like operation, and rock-solid reliability.

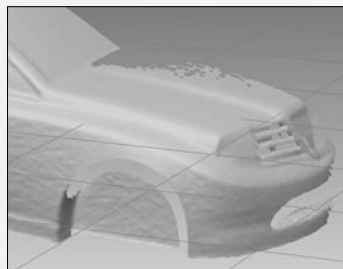
<Main Applications>

The VI-900 is ideal for the following applications:

- On-Line Quality Control Inspection of production parts (e.g. CAT)
- First Article Inspection; Tool and Die Verification
- Industrial Design: capture design studies into CAD database
- Rapid Prototyping Input
- Reverse Engineering: create CAD legacy data from master parts
- 3-D shape capture for Computer Aided Engineering Analysis (CAE and FEA)
- Machine Vision
- Medical Applications:
 - Surgical Planning (maxillofacial, dental and orthopedic), orthotics and prosthetics, plastic surgery, anthropometric measurements
- Archiving: Museums, Artifact cataloging, Archeology, Anthropology research
- Computer graphics: Animation, Computer Simulations
- Web content creation/ on-line product database creation



Comparison with 3-D data



3-D data captured by scanning

Certified Performance

Who but Minolta backs up the volumetric accuracy of their digitizer products. Minolta understands the importance of quantifiable performance to organizations with ISO 9000 certification and all who compete in today's quality-driven, manufacturing world. Minolta stands behind the VI-900 by offering a "Test Report" as measured against artifacts traceable to national standards organizations.

Hardware

Flexibility: Variable digitizing Volumes by interchangeable Lenses

Who but Minolta gives you the flexibility to capture the hood ornament, the whole hood, or the whole car? The VI-900 can digitize variable volumes (between 110 x 80 x 40 mm and 1200 x 900 x 750 mm) while still maintaining precise repeatability. Large part - small part, just pick the right lens for the size of your scan. The three lenses (telephoto, medium, wide angle) are standard equipment and are as easy to change as the lens on your SLR camera. (TELE: f=25mm, MIDDLE f=14mm, WIDE f=8)



Portable & Compact

Who but Minolta understands portability? VI-900 travels light -- it is compact (213mm (8-3/8 in.) x 413mm (16-1/4 in.) x 271mm (10-11/16 in.)) weighs only 11kg (24 lbs.) and is a stand-alone instrument. You don't even need a host computer to use VI-900. Multiple scans can be saved to the compact flash memory or viewed immediately on the rear-panel's color LCD viewfinder.



Autofocus

Who but Minolta, the leader in optical technology, brings autofocus from the world of photography to our precision measurement devices? There is no need to move the VI-900 back and forth, or to manually adjust to guess at the optimal focus, its automatic.

Rich 3-D Color

Who but Minolta gives you color data is second to none? VI-900's color images are equivalent to a 3 CCD digital camera with full 24-bit color depth. 640 x 480 x 24 bits

Easy to Use

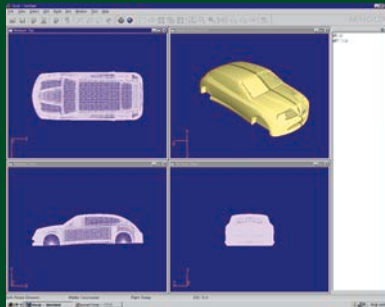
Who but Minolta gives you camera-like simplicity? Unlike some digitizers, there is no lengthy set-up, warm-up and calibration process before you can measure. No moving the scanner back and forth until just the right distance is reached: its automatic. No need to manually adjust the scanner for different ambient light conditions. Minolta has eliminated these quirks found in other scanners. Turn it on, aim and frame using the LCD viewfinder, and shoot.

But what about scanning an object from all sides? We've made that easy too. Minolta provides an optional rotating table to index the scanned part and capture all sides in one automated process. Each scan is automatically aligned. Who else makes it this easy?

Software

Advanced Polygon Editing Software (Standard Accessory)

Who but Minolta gives you a whole solution, not just data? Each VI-900 includes Minolta's powerful polygon-editing software. You can operate the VI-900 from your host computer, perform automatic data registration, edit captured scan data (fill holes, decimate, smooth, etc), merge scans into a single "watertight" mesh, and export into a variety of data formats.



Import Formats: *.stl and *.cam, *.vvd, *.scn, *.odm (Minolta proprietary)

Export Formats: *.dxf, *.obj Wavefront, SOFTIMAGE, VRML and STL (polygonal data)
ASCII (point cloud data)
TIFF *.tif, *.PDM (texture map color data)

<Main functions>

Automatic and Manual data registration, data merging, smoothing, sub-sampling and curvature-based decimation, polygon checking (intersections, degeneration, etc), texture blending and merging, etc.

- Point Group Editing
Selection via color, Bezier, rectangle tools, interactive and parametric rotation, translation of point groups, hole filling, smoothing, cloning and deletion of point groups. Color editing: color blending and merging of multiple color scans

- Camera Remote Operation
Image capture, auto/manual-ranging, (i.e., depth of field setting), auto/manual laser power setting, camera data acquisition control, turn-table control

- Scan Data Display Modes
Wireframe, smooth shaded, flat shaded, color image, texture mapping

Required Host Computer

- Windows® Workstation
- OS : Windows®NT4.0 (Service Pack 6 or higher)
 - CPU : Pentium III or higher
 - Main memory : 512MB or more (1024MB or more recommended)
 - Display : 800 x 600 or higher
 - Graphic board : 3-Disks OXYGEN GVX1 (recommended*)
 - SCSI interface : SCSI card by Adaptec (ASPI library by Adaptec is also required)
 - Media drive : CD-ROM drive

* A graphic board supported by OpenGL must be used. (For details, contact Minolta.)

<Main display examples>

● Automatic data registration & merging (before) (after)



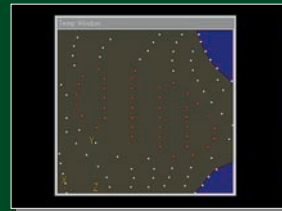
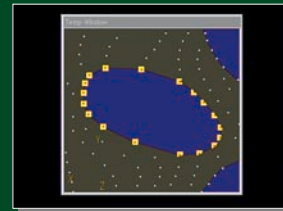
● Subsampling (before) (after)



● Texture mapping & texture blending (before) (after)



● Hole filling by data interpolation (before) (after)



Theory of Operation

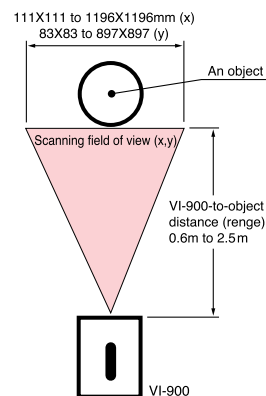
<Basic Principle>

The VI-900 uses LASER triangulation. The object is scanned by a plane of laser light coming from the VI-900's source aperture. The plane of light is swept across the field of view by a mirror, rotated by a precise galvanometer. This LASER light is reflected from the surface of the scanned object. Each scan line is observed by a single frame, captured by the CCD camera. The contour of the surface is derived from the shape of the image of each reflected scan line. The entire area is captured in 2.5 seconds (0.3 seconds in FAST mode), and the surface shape is converted to a lattice of over 300,000 vertices (connected points). VI-900 gives you more than a point cloud; a polygonal-mesh is created with all connectivity information retained, thereby eliminating geometric ambiguities and improving detail capture. A brilliant (24-bit) color image is captured at the same time by the same CCD. Unlike other scanners, the VI-900 has no parallax error, its "spot-on"!

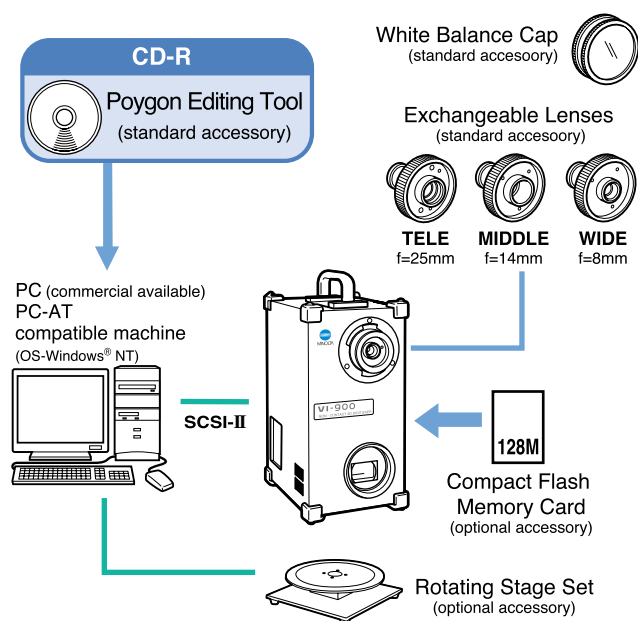
<High Accuracy Measurement>

A high-accuracy scanner and a high-accuracy Calibration facility unit to be used for calculation of 3-D data have been developed for the VI-900.

The 3-D reference chart traceable to the national standards has also been established to utilize the technology and algorithm that enable higher accuracy measurement.



System Block Diagram



■ Optional accessories

- Rotating Stage Set
- Compact Flash Memory Card
- PC Card Adapter
- Tripod
- Pan head

Specifications

Type	Non-contact 3D digitizer VI-900
Measuring method	Triangulation light block method
AF	Image surface AF (contrast method), active AF
Light-Receiving Lens (Exchangeable)	TELE: Focal distance f=25mm MIDDLE: Focal distance f=14mm WIDE: Focal distance f=8mm
Image Input Range	0.6 to 2.5m (2m for WIDE)
Measurement Input Range	0.6 to 1.2m
Laser Output	"Eye safe", Class 1 (FDA), Class 2 (IEC), Maximum 30mW 690nm
Laser Scan Method	Galvano mirror
Input Time	0.3 sec (FAST mode), 2.5 sec (FINE mode), 0.5 sec (COLOR)
Transfer Time to Host Computer	Approx. 1 sec (FAST mode), 1.5 sec (FINE mode)
Ambient Lighting Condition	Office Environment, 500 lx or less
Imaging Element	3-D data: 1/3-inch frame transfer CCD (340,000 pixels) Color data: 3-D data is shared (color separation by rotary filter).
Number of Output Pixels	3-D data : 640 x 480 (for FINE mode), 320 x 240 (for FAST mode) Color data : 640 x 480
Output Format	3-D data : Minolta format, & (STL, DXF, OBJ, ASCII points, VRML) (Converted to 3-D data by the Polygon Editing Software/ standard accessory) Color data: RGB 24-bit raster scan data
Recording Medium	Compact Flash memory card (128MB)
Data File Size	Total 3-D and color data capacity: 1.6MB per data (for FAST mode), 3.6MB per data (for FINE mode)
Viewfinder	5.7-inch LCD (320 x 240 pixels)
Output Interface	SCSI II (DMA synchronous transfer)
Power	Commercial AC power 100 to 240V (50 to 60Hz), rated current 0.6A (when 100Vac is input)
Dimensions (WxHxD)	213 x 413 x 271 mm (8-3/8 x 16-1/4 x 10-11/16 in.)
Weight	Approx. 11kg
Operating environment	temperature: 10 to 40°C (50 to 104°F) ; relative humidity 65% or less with no condensation, Pollution degree: 2, Installation category: II
Storage temperature range	-10 to 50°C (14 to 122°F) ; relative humidity 85% or less (at 35°C/95°F) with no condensation

- Specifications are subject to change without notice.
- Product names in this brochure are trademarks of their respective companies.

SAFETY PRECAUTIONS

Read all safety and operating instructions

- before operating the VI-900.
Use only a power source of the specified rating.
Improper connection may cause a fire or electric shock..
- Do not stare into the laser beam.
(MAX. 30mW 690nm / CLASS 1 (FDA),
CLASS 2 (IEC) LASER PRODUCT)



CAUTION

レーザー光
ビームをのぞきこまないこと
LASER RADIATION
DO NOT STARE INTO BEAM
LASER STRAHLUNG
NICHT IN DEN STRAHL SEHEN
MAX 25mW 695nm
クラス2 レーザ商品 CLASS 2 LASER PRODUCT
Complied with IEC Publication 825, Amendment 1, 1990-08

CLASS 1 LASER PRODUCT

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