



KONICA MINOLTA

# VIVID 910

NON-CONTACT 3-D DIGITIZER

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

***KONICA MINOLTA, that's who***

ISO 9001  
CERTIFIED  
ISO 14001



The essentials of imaging

# VIVID 910 The new World leader in:

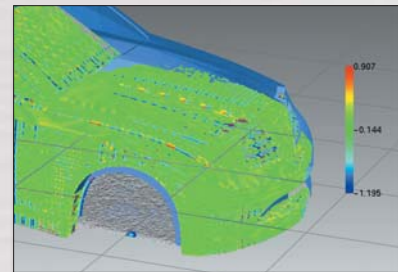
- Precision** -  $\pm 0.008\text{mm}$  (over 300,000 points) typical based on Konica Minolta standard test method
- Speed** - scans in less than one second
- Simplicity** - point and shoot simplicity for consistently excellent results
- Flexibility** - only Konica Minolta offers interchangeable lenses for big and small parts and "Dynamic Range Expansion technology" VIVID 910' break-through innovation for measuring from dark to shiny surfaces in a single pass
- Value** - Konica Minolta sets a new price / performance threshold

Who but Konica Minolta gives you the VIVID 910 3-D Scanner, offering high-speed and high-accuracy, at a high-value price? VIVID 910 is the newest of Konica Minolta's VIVID family of 3-D scanners. You've come to know Konica Minolta's VIVID digitizers, setting the pace in 3-D digitizing with performance, attractive price, simple camera-like operation, and rock-solid reliability.

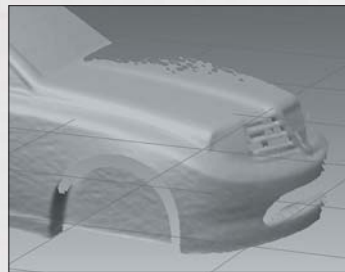
## Main Applications

The VIVID 910 is ideal for the following applications:

- On-Line Quality Control Inspection of production parts (i.e. CAI, 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 & Antiquities cataloging, Archeology, Anthropology research
- Computer graphics: Animation, Computer Simulations
- Web content creation/ on-line product catalog creation



Comparison with 3-D data



3-D data captured by scanning



## Certified Performance

Who but Konica Minolta backs up the volumetric accuracy of their digitizer products? Konica Minolta understands the importance of quantifiable performance to organizations with ISO 9000 certification and all who compete in today's quality-driven, manufacturing world. Konica Minolta stands behind the VIVID 910 by offering a "Certificate of Performance" traceable to national standards laboratories.

# Hardware

## Flexibility: Variable digitizing Volumes by interchangeable Lenses

Who but Konica Minolta gives you the flexibility to capture the hood ornament, the whole hood, or the whole car? The VIVID 910 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:  $f=25\text{mm}$ , MIDDLE  $f=14\text{mm}$ , WIDE  $f=8$ )



## Portable & Compact

Who but Konica Minolta understands portability? VIVID 910 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 Vivid. Multiple scans can be saved to the compact flash memory or viewed immediately on the rear-panel's color LCD viewfinder.



## Autofocus

Who but Konica 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 VIVID back and forth, or to manually adjust to guess at the optimal focus, its automatic.

## Rich 3-D Color

Who but Konica Minolta gives you color data is second to none? Vivid's color images are equivalent to a 3 CCD digital camera with full 24-bit color depth. 640 x 480 x 24 bits. Konica Minolta's expertise shows through with MeasureMax, the ability to capture a wider range of dark to shiny surface finishes that blind other digitizers.

## Easy to Use

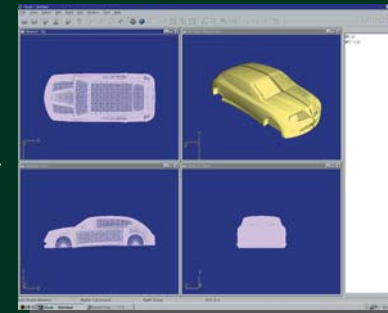
Who but Konica Minolta gives you camera-like simplicity? Unlike some digitizers, there is no lengthy set-up, warm-up and calibration process before your can measure. No moving the scanner back and forth until just the right distance is reached: its automatic. No need to manually adjust the scanner for different ambient light conditions. Konica 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. Konica 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 Konica Minolta gives you a whole solution, not just data? Each VIVID 910 includes Konica Minolta's powerful polygon-editing software. You can operate the VIVID 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, \*.vnd, \*.scn, \*.cdm (Konica Minolta proprietary)

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

### Software functions

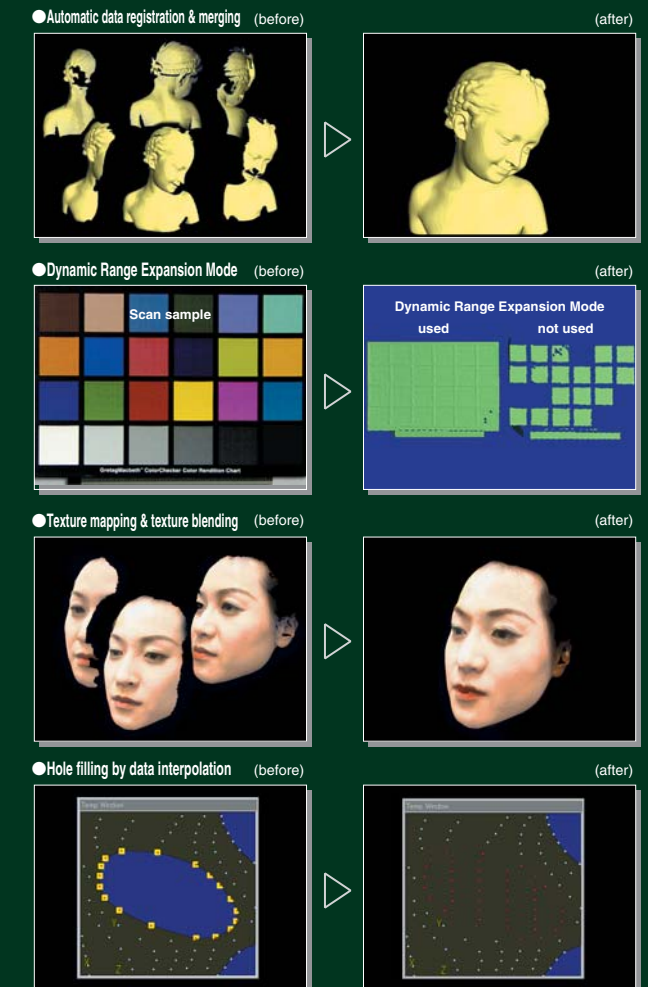
- Automatic and Manual data registration, data merging, smoothing, sub-sampling and curvature-based decimation, polygon checking (intersections, degeneration, etc), texture blending and merging, etc.
- Point Group Editing Selection via color, Bezier, rectangle tools, interactive and parametric rotation, 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 NT®4.0 (Service Pack 6 or higher) Windows® 2000 (Service Pack 2 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-Dlabs OXYGEN GVX1 (recommended\*)
- SCSI interface : SCSI card by Adaptec (ASPI library by Adaptec is also required. And compatible models recommended on Windows®2000\*)
- Media drive : CD-ROM drive

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

### Main display examples





# Theory of Operation

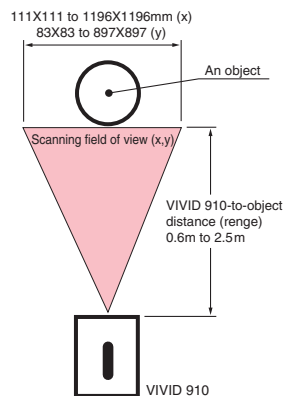
## Basic Principle

The VIVID 910 uses LASER triangulation. The object is scanned by a plane of laser light coming from the Vivid'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). VIVID 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 VIVID has no parallax error, its "spot - on"!

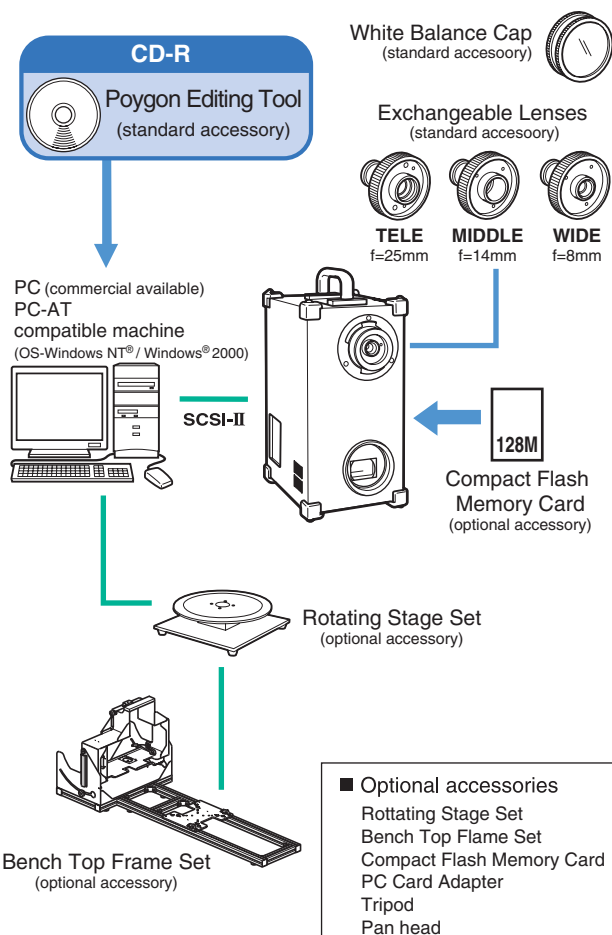
## High Accuracy Measurement

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 VIVID 910.

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



## Specifications

Type	Non-contact 3D digitizer VIVID 910
Measuring method	Triangulation light block method
Auto Focus method	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
Scan Range (Depth of field)	0.6 to 2.5m (2m for WIDE)
Optimal 3D measurement Range	0.6 to 1.2m
Laser class	Class 2 (IEC 60825-1), "Eye safe", Class 1 (FDA)
Laser Scan Method	Galvanometer-driven rotating mirror
X Direction Input Range (Varies with the distance)	111 to 463mm (TELE), 198 to 823mm (MIDDLE), 359 to 1196mm (WIDE)
Y Direction Input Range (Varies with the distance)	83 to 347mm (TELE), 148 to 618mm (MIDDLE), 269 to 897mm (WIDE)
Z Direction Input Range (Varies with the distance)	40 to 500mm (TELE), 70 to 800mm (MIDDLE), 110 to 750mm (WIDE/FINE mode)
Precision (Z, Typ.)	± 0.008mm (Condition: FINE mode, Minolta's standard)
Accuracy	TELE X: ± 0.22mm, Y: ± 0.16mm, Z: ± 0.10mm to the Z reference plane (Conditions: TELE/FINE mode, Minolta's standard)
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 : 307,000 (for FINE mode), 76,800 (for FAST mode) Color data : 640 x 480 x 24 bits color depth
Output Format	3-D data : Konica 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. 1.1kg (25 lbs)
Operating temperature/ humidity range	10 to 40°C, relative humidity 65% or less with no condensation
Storage temperature/ humidity range	-10 to 50°C, relative humidity 85% or less (at 35°C) 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 VIVID-910.



- 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 30mW 690nm  
クラス2 レーザ商品 CLASS 2 LASER PRODUCT  
Complied with IEC Publication 825, Amendment 1, 1990-08

CLASS LASER PRODUCT



The manufacturing center of Konica Minolta Sensing Inc. (Location: Aichi Pref., Japan) was approved by the British certification organization Lloyd's Register Quality Assurance for certification under the ISO 9001: 1994 international quality management system standards on March 3, 1995. Since its establishment in 1990, the center has carried out the development and production of precision instruments and associated application software for the measurement of color, light, and shape. Certification was awarded to the center's quality management system, including design, manufacturer, management of manufacture, calibration and servicing. Certification was carried over to the ISO 9001: 2000 standards in February, 2003.

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