The Leader in 3D Ultrasound

VOLUSON 530D MT

MEDISON
Seize the moment with 3D

Remember the touching moment when the mother saw her baby moving actively in her womb? Capturing this special moment of maternal-fetal bonding is only possible with Medison’s VOLUSON 530D MT, the only genuine digital 3D ultrasound. Medison’s latest 4D technology not only allows you to watch a real-time moving fetus in the womb, but also automatically detect contours of various organs using VOCAL™.

Medison’s 3D Revolution has been the impetus for the monumental changes that have taken place in the 3D ultrasound market. The market is expected to increase as new clinical application features are added to VOLUSON 530D MT. Around the globe, researchers and physicians alike have recognized the importance of 3D ultrasound in clinical applications. It is not difficult to envision the need for powerful 3D imaging as a basic diagnostic tool in ultrasound for the next millennium. VOLUSON 530D MT will continuously lead the 3D ultrasound market with the latest image management & networking software: VOCAL™ and SHELL™ features. Providing valuable technology to capture more precious moments is Medison’s commitment to patient care for the next millennium.
Powerful, yet Versatile
VOLUSON 530D MT for all clinical areas

- Radiology
- Obstetrics & Gynecology
- Perinatology
- Breast Imaging
- Oncology
- Urology
- Small Parts Imaging
- Internal Medicine
Dedicated 3D Technology

Realization of Genuine 3D Ultrasound is only possible through dedicated 3D probes, digital scan converter, and software.

Clinical Utilities

VOLUSON 5300 MT™ provides various routine check procedures in Ob/Gyn Urology and Radiology. Furthermore, VOLUSON’S latest Millennium Technology offers doctors more powerful tools for surgery and cancer evaluation. VOLUSON 5300 MT is the most preferred system for 3D Ultrasound system by doctors and researchers.

Medison-Kretz 3D Research Foundation

The 3D Ultrasound Medical Foundation was formed by Medison Co., Ltd. to encourage the study of applications of 3D imaging in obstetrics and gynecology, as well as other regions of the body. Each year the medical foundation will award grants, each not to exceed $10,000, for such studies. It is anticipated that each award will obtain data that will lead to the submission of an article in a peer review journal.

Is the system used by distinguished doctors to research clinical papers?

Voluson® 5300 MT is used by some of the world’s most distinguished physicians and a large majority of professionals involved in diagnostic 3D ultrasound research. More than 500 papers have been researched with VOLUSON® 5300 MT since 1996.

* Diagram of annual clinical papers on 3D
Profitability
VOLUSON 530D MT will increase your profitability by increased productivity and reverse marketing (i.e. to increase customer awareness).

Increased Productivity
By hiring a trained sonographer to handle the scanning duties and using VOLUSON® 530D MT's networking capabilities, doctors can reach a faster, more accurate diagnosis while saving time and increasing profits. We call this ‘Virtual Sonography.’

Patient Marketing
To help our customers better sell their 3D ultrasound services, Medison is constantly promoting the benefits of 3D ultrasound through articles and ads in maternity magazines as well as waiting room posters/literature. This raises awareness and provides the opportunity for doctors to increase the profitability of their 3D services.

Expandability
The future of diagnostic imaging is in being able to share knowledge. VOLUSON 530D MT offers various networking solutions to meet your needs. VOLUSON 530D MT’S digital technology will allow you to incorporate future developments such as 3D Telemedicine, 3D Virtual Sonography, and ECG Trigger-gated 3D.
Medison has been an integral part in the history of diagnostic ultrasound. From the first 2D ultrasound to today's Live 3D™, Medison has revolutionized the way ultrasound is used for clinical diagnosis.

**First Generation**
Development of one-dimensional A-mode ultrasound for medical diagnosis.

**Second Generation**
Two-dimensional B-mode image commenced with Medison's Combison compound scanner. Ultrasound diagnosis started to spread to various clinical fields. The Combison 100, the world's first real-time sector scanner set a new standard in ultrasound diagnosis.

**Third Generation**
Marks the opening of color ultrasound and the introduction of digital technology by Dr. M. H. Lee.
in Ultrasound history

Fourth Generation
3D Revolution--development of the world's first 3D ultrasound system by Medison, featuring freely moveable scan planes and 3D image presentation.
Introduction of 4D Live 3D™ technology to view moving fetus.

Next Generation
Active development of 3D ultrasound market covering various clinical applications. 3D imaging as a basic tool in making medical diagnoses. Standard 3D Ultrasound technology will cover networking, multi-media functions, virtual sonography, and portability.

- 3rd '80s
  - CFM (2D)
- 4th mid '90s
  - Static 3D
- 5th Now
  - Live 3D™
- fetal profile, late pregnancy
- VOLUSON 530DMT
  The World's Only Real-time 3D Digital Ultrasound
- 24 weeks of fetal face and hands
- Opening the age of 4D Sonography, Live 3D™
Realizing Genuine 3D Ultrasound with Digital Technology

Today, an indispensable feature of ultrasound systems is digital technology. But true digital ultrasound, from digital beamforming to digital image management and communication, is difficult to find. Producing clinical reports or transferring the images to fellow colleagues, VOLUSON 5300 DMT manages and transfers image data without any loss of image quality or artifacts. Gone are the days when you hand-cut your images to produce reports. Digital technology allows easier management of patient's images and powerful networking capabilities (built-in DICOM) lets you access these images from anywhere and anytime.

VOLUSON 5300 DMT is changing how medicine is practiced today by incorporating new ideas such as Virtual Sonography, 3D Telemedicine, and LIVE 3D”. Now doctors can decrease patient scanning time, yet provide even more detailed analyses away from the clinic. Patients can receive second opinions from specialists in distant locations and doctors can perform biopsies without unnecessary needle insertion. Without a doubt, digital technology is the backbone to VOLUSON 5300 DMT’s revolutionary 3D technology.

Genuine Digital 3D Ultrasound
**Digital Beamforming**

Fully digital ultrasound systems are realized by implementing digital beamforming process from the beginning. Each fully digitized channel produces data without any loss, reduced distortion, and noise. Previously, analog processing introduced image-degrading side effects like multiple signal reflection, non-linear attenuation, and time delay variations. Digital beamforming produces significant improvements in imaging resolution and contrast in VOLUSON 530D MT images.

**Digital Image Management**

Genuine digital processing extends all the way to image storage and management, eliminating image quality losses due to multiple analog-digital conversions. VOLUSON 530D MT’s image management software SonoView™ allows physicians to store patient’s records, preview, enhance, search, and archive images without loss in image quality, preserving the moment of real-time scanning.

**Direct Digital Communication**

VOLUSON 530D MT supports DICOM 3.0, allowing physicians to directly exchange images and patient information via the Internet, PACS, or even LAN. In addition to image management capabilities, SonoView™ provides powerful networking capabilities. Furthermore, VOLUSON 530D MT offers a mini PACS solution with SonoView™. VOLUSON 530D MT’s SonoView™ allows you to connect other VOLUSON 530D MT systems or personal computers with SonoView™ or SonoView™ to form a cluster network (Cluster 3D).
Advanced Features of VOLUSON 530D MT

**Optimal Harmonic Imaging (OHI™)**

OHI™ combines the advantages of both Optimized Tissue Imaging (OTI™) and Tissue Harmonic Imaging (THI™) techniques. Useful especially for difficult examinations, OHI™ enables improved recognition of organ structures and enhances tissue differentiation.

**High Resolution Zoom**

High Resolution Zoom function preserves the quality before and after zoom.

**New Abdominal Transducer (S-AB 2-5MHZ)**

New abdominal transducer with 192 acoustic elements allows enhanced accurate focusing and improves lateral and contrast resolution.

**Enhanced Pulse Correlation (EPC)**

High Resolution with low or high frame-rate

The lateral resolution can be optimized with this innovative correlation algorithm. With the new process, the signals of the neighbouring pulses are dynamically weighted for display of the actual pulse, considerably improving detail resolution and signal to noise ratio.
Voluson 3D Imaging

Learn and experience 3D imaging on your own personal computer

- Cyber 3D sonography courses for physicians in Obstetrics, Gynecology, Radiology, and Urology.
- 3D ultrasound image atlas includes various normal and abnormal clinical images by specialty.
- Learn about the latest features VOLUSON S300 MT in the product showcase.
- Virtual sonography - A new concept of 3D imaging. The doctor can provide a more extensive analysis of the patient even after the patient has left the clinic. For example, fetal echo scanning is difficult to perform due to the actively moving fetus. But virtual sonography overcomes the limitations of live scanning and provides a simple solution for both doctor and patient.
Add a New Dimension to Clinical Diagnosis

VOLUSON 530D MT's 3D imaging does not merely provide visualization of structures in three dimensions. VOLUSON 530D MT provides a new level of precision and thoroughness, adding an additional dimension to your clinical diagnosis.

Two-dimensional imaging provided only limited scope in viewing structures of interest in the human body. However, 3D ultrasound allows you to visualize structures from any angle and direction in an incredibly quick and precise manner. Three-dimensional Multi-planar Imaging capability of VOLUSON 530D MT allows physicians to detect fetal face in frontal, sagittal, and coronal view. Physicians can utilize data acquired from the coronal plane, which was previously not available in standard two-dimensional scanning procedures.

VOLUSON 530D MT is expanding the realm of 3D ultrasound with increased clinical utilities. For example, detection of the nature and scope of problems with prostate or cystic tumors can be done by utilizing the SHELL™ imaging function of Virtual Organ Computer Aided analysis (VOCAL™) feature, the new 3D rendering mode. Furthermore, 3D Ultrasound is changing ways of how medicine is practiced. First, doctors benefit from the added clinical dimension and detailed analysis provided by 3D imaging. And patients benefit from the decreased scanning time and precise diagnosis with powerful visual aides to help them understand their disease. Only VOLUSON 530D MT, powered by the new Millennium Technology, offers genuine 3D imaging solutions.

VOCAL™

VOLUSON 530D MT's new advanced 3D feature, VOCAL™ provides automatic volume calculation and powerful evaluation of tumors with three-dimensional angio histogram.
**VOCAL™ (Virtual Organ Computer Aided analysis)**
- Automatic volume calculation of prostate
- Surface rendering made from wire mesh to surface

**VOCAL™ 3D Angio Histogram with 3D-Shell™ Imaging**
VOLUSON 5300 MT offers a 3D color angio histogram. 3D-Shell™ Imaging offers improved reproducibility of color histogram parameters because it covers the entire tumor contour, rather than a rectangular part of the tumor. The 3D images on the right show the blood vessel tissues newly produced by a malignant mass.

**VOCAL™ 3D Angio Histogram with 3D-Shell™ Imaging**
Analysis of the extent of vascularization and blood flow from the environment to the tumor is important in clinical evaluation of tumor. This image shows high-vascularization from the environment within the rendered 3D-Shell™.

**Multi-Planar Image Display**
VOLUSON 5300 MT displays volume data in 3 orthogonal planes: frontal view, sagittal view, and coronal view.
Various Transparent Modes

VOLUSON 5300 MT provides three different transparent modes as shown below.

- Max mode for bony structures
- Min mode for vessels and cystic structures
- X-ray mode displays both the soft tissue as well as bony structures.

Volume measurement by Planimetric Trace Method

Comparison of the accuracy of the different volume calculation methods shows VOLUSON 5300 MT's ability to perform accurate volume measurement.

Electronic editing (MagiCut™)

New 3D Smooth-Surface mode

New 3D surface rendering algorithm. For rendering volume data sets with noise caused by echogenic contents in the amniotic fluid, this special algorithm delivers considerably improved results. Additionally, the smooth surface can be mixed with an artificial gradient light source. The smoothing and light effects are adjustable.

By reducing Rendering time from 30.0 seconds per frame to 0.3 seconds per frame, full reconstruction time of entire tissue volumes can be reduced dramatically.

VOLUSON 5300 MT offers MagiCut™, a program which allows the user to cut away unwanted portions of either the slice images or 3D rendered image by using the trackball.
Opening the age of 4D sonography with Live 3D™

Clinical Application of 4D

The clinical applications of 4D are myriad and run the gamut from obstetrics and gynecology to interventional applications. This includes enhanced maternal fetal bonding and improved assessment for fetus at risk for specific anomalies especially in confining normalcy of the fetus. 4D also offers accurate 3D biopsy, especially in breast scanning, minimized motion artifacts of moving fetus and other organs, and improved spatial resolution (better gray scale with better resolution). Further 4D offers continuous development of Live 3D making possible intraoperative applications such as tumor visualization and provides a means of transferring volume data across networks for consultation and interpretation at a remote site.

Innovative Live 3D™ visualization

- Capture 3D motion of the moving fetus and organs by dramatically improved 3D volume data acquisition and rendering speed

Self-optimization of 3D images

- Auto 3D View Cleaner: Automatic threshold
- Auto 3D View Finder: Automatic surface detection
- MagiCut: Editing rendered 3D image

Minimized artifacts

- Reduce motion artifacts
- Improved spatial resolution

3D processing up to 100% faster

In case of rendering noisy volume data sets this new algorithm delivers considerably improved results. Additionally the Smooth Surface mode can be mixed with an artificial gradient light source.

Clinical Application

- The most recognizable display of fetal features
- Detailed evaluation of fetal biophysical profile
- Accurate 3D biopsy
- Especially in breast scanning, brachytherapy of the prostate or other cancer diagnosis & treatment
- More accurate biopsy operation and less pain for the patient
Diverse scanheads to meet all your scanning needs

State of the art transducers provide more accurate focusing and improved lateral and contrast resolution.

<table>
<thead>
<tr>
<th>Abdominal</th>
<th>Abdominal-Volume</th>
<th>Small Parts / Vascular</th>
<th>Small Parts / Vascular-Volume</th>
<th>Cardiac</th>
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<td>AB2-5</td>
<td>VAW3-5</td>
<td>NLP5-10</td>
<td>VNW 5-10</td>
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<td>VAW 4-7</td>
<td>NLV4-8</td>
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Millennium Technology - Probes
Endocavity
ICA 5-8

Endocavity Volume
VDW 5-8

VRW 7-10

Paediatrics
VNA 5-8

ACM 5-8

Intraoperative
IOC 4-8

IOL 5-9

LAP 5-8

Powerful and Versatile

Internal Medicine
- Abdominal
- Cardiac package
- Intercavity

Small parts
- PV (Peripheral Vascular)
- Thyroid
- 3D Multi-planar
- Live 3D

Voluson 530D MT

Ob/Gyn
- Transvaginal sonography
- 3D Multi-planar
- Live 3D

Radiology
- Cardiac package
- SonoView™
- 3D Multi-planar
- Optimal Harmonic Imaging™

Millennium Technology
Probes
Extended 3D Routine Check

Clinical procedure to assess development of the fetus more accurately and comprehensively

Obstetrics

Fetal Bone Assessment
- Maximum mode: the maximum gray values of the ROI
- Successful visualization of fetal bone

Fetal Brain Assessment
- Schematic representation of the axial examination of the fetal head
  - Sagittal anatomy (A) Sagittal (B) Axial (C) Coronal

Fetal Heart Assessment
- Identification & Assessment of the standard cardiac plane
- Echographic examination of the fetal heart

Nuchal Translucency measurement
- Earlier detection of genetic anomaly
- Nuchal Translucency thickness > 3mm: High possibility of genetic anomaly

Check the Cervix
- Check the morphology of the cervix
- Cervical length < 2.5cm: Increase possibility of miscarriage

Exact Volume Measurement
- Automatic Volume calculation

Gestational Sac

Fetus in early pregnancy

Nuchal Translucency thickness = 2.1mm (Normal)

True mid sagittal view of septated cervix

<table>
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<tr>
<th>Detection Rate (%)</th>
<th>4CH</th>
<th>LVOT</th>
<th>RVOT</th>
<th>AA</th>
<th>DA</th>
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<tr>
<td>2D (n=10)</td>
<td>93</td>
<td>63</td>
<td>63</td>
<td>12</td>
<td>18</td>
<td>12</td>
<td>25</td>
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<td>3D (n=10)</td>
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<td>87</td>
<td>100</td>
<td>67</td>
<td>100</td>
<td>52</td>
<td>67</td>
</tr>
</tbody>
</table>

Kathleen A. 3-D of the Fetal Heart JIREL 1E-4420

Gestational Age

0  9  13  20  24
Extended 3D Routine Check

**Gynecology**

- **Evaluation of Fetal Morphologic Anomalies**
- **Recognition of Trisomies**
  - Angle measurement of forehead and nose
  - Measurement of relation between upper and lower jaw in Coronal plane
- **Exact Volume Measurement II**
  - Automatic Volume calculation
- **Maternal Fetal Bonding**
  - Enhance the relationship between mother and fetus

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- **Intrauterine scanning**
  - Sono-hysteroscopy (3D SHG)
    - Earlier grouping patients of miscarriage & infertility
    - Uterine malformation
- **Recognition of Endometrium Cancer**
  - Mean volume of endometrium >13 mL, all cancers were diagnosed
- **3D Power Doppler of Ovarian Malignancy**
- **3D application of Breast malignancy**
  - Morphologic & Multisectonal Information
  - 3D Angio-histogram can provide information about Breast malignancy

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- **Images**
  - Multi-planar view of cleft lip
  - Uterine polyp
  - Multi-planar view of septated uterus
  - VICAL™ of endometrium
  - Fetal kidney
  - Fetal stomach
  - Sleeping baby
  - Thumb in the mouth
  - Ovarian Carcinoma
  - 3D angio-histogram of Breast cancer
  - 3D biopsy of Breast cyst

**28 32 38 40 (weeks)**
Abdominal 3D Sonography in Radiology

Standardized Ultrasound-Volume Documentation of the Upper Abdomen

- Median - sagittal
- Liver - subcostal
- Right kidney - longitudinal
- Gallbladder - bile duct
- Pancreas - transverse
- Spleen - longitudinal
- Left kidney - longitudinal

- More information due to inclusion of multiplanar scan plane analysis and different reconstruction modes
- Availability and comparability of 3D Ultrasound Volume data for future follow-up
- Quick and simple procedure
- Suitable for our daily diagnostic practice
- More comfort for the patient during scanning
Comparison of breast imaging in 2D and 3D

3D-Breast Sonography is a New Quality Approach to Breast Imaging

- Multi-planar display of an invasive ductal carcinoma: sagittal, transversal and coronal plane (not possible with 2D-US).
- Volume scan of a normal breast including color Doppler information and the transparent rendered image (bottom right) presenting tissue and color information.
- Multi-planar display and transparent rendering of dilated ducts due to retracted nipple.

- 3D surface rendering of a block of breast tissue representing with multiple cysts.
- 3D-color histogram: a block of tissue including angio information provides statistical data of the perfusion in the carcinoma.
- Volume calculation using VOCAL™ of a fibrocystoma. The program automatically detects the boundary of the mass and calculates the volume.

- Puncture of the cyst with a 22 gauge needle. The additional planes delivered by 3D-US clearly demonstrate the correct needle position.
Finding the perfect 3D system that will meet all your clinical needs is not easy to find. Here is the first step to help you select the right 3D system. You will find the only system to possess the latest 3D technology, proven clinical value, profitability and expandability is the VOLUSON S30D MT.

**Point 1.**
Does the system have 3D/4D dedicated probes, a 3D/4D digital scan converter, and 3D/4D software?

VOLUSON S30D MT has all three for genuine 3D imaging.

**Point 2.**
Does the system have a 3D transvaginal probe?

Only VOLUSON S30D MT provides 3D transvaginal imaging for more accurate and precise ultrasound diagnoses.

**Point 3.**
Does the system have automatic volume calculation?

VOLUSON S30D MT offers YOCAL™ automatic volume calculation as part of the PG 3D View™ rendering program. YOCAL™ utilizes a newly developed algorithm to automatically detect the contour of structures such as the prostate, cysts, and lesions and calculate the volume.

**Point 4.**
Does the system have multi-planar image display?

VOLUSON S30D MT displays volume data in 3 orthogonal planes: frontal view, sagittal view, and coronal view.

**Point 5.**
Does the system have a transparent mode?

VOLUSON S30D MT offers the following transparent modes: Max mode for bony structures, Min mode for vessels and hollow structures, X-ray mode for tissue blocked by tumors or similar structures.
**Point 6.**
Does the system have **image management and networking software**?

Voluson® 5300 MT offers Sonoweb™, a comprehensive digital image management software package. The optional PC-3D View™ software offers the same functionality as Sonoweb™ on standard PCs.

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**Point 8.**
Does the system have an **electronic editing (MagiCut™)**?

Voluson® 5300 MT offers MagiCut™, a program which allows the user to cut away unwanted portions of either the slice images or 3D rendered image by using the trackball.

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**Point 7.**
Does the system have a **3D angio-histogram**?

Voluson® 5300 MT offers a 3D color angio with histogram. A breast volume probe supports color and B/W tissue and 3D modes.

The 3D images on the right show the blood vessel tissues newly produced by a malignant mass.

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**Point 9.**
Is the system used by **distinguished doctors to research clinical papers**?

Voluson® 5300 MT is used by many of the world’s most distinguished physicians and a large majority of professionals involved in diagnostic 3D ultrasound research. More than 500 papers have been researched with the Voluson® 5300 since 1996.

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**Point 10.**
Is the system **expandable and upgradeable**?

Voluson® 5300 MT currently supports or will support the following advanced capabilities:

- Live 3D™ imaging (4D)
- Virtual 3D sonography
- 3D harmonic imaging

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VOLUSON® 530D MT

What is Millennium Technology?
Simply stated, the Voluson 530D MT is the pride of Medison's own millennium technology and the embodiment of our technological strengths. Medison's millennium technology will continue to develop as doctors themselves continue to push the envelope in visual diagnostic technology.

Visit the following Internet Web sites to learn more about 3D & 4D ultrasound.
- www.obgyn.net
- www.sonosite.com
- 3dcongress.org

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