DUB® SkinScanner in medicine and cosmetic
taberna pro medicum GmbH

- **High Frequency & High Resolution Ultrasound of the Skin**
  The DUB*SkinScanner systems are high frequency and high resolution diagnostic ultrasound systems for use in dermatology, cosmetics field and pharmaceutical and clinical research. Different models, versions, frequency ranges and options are available for all requirements. Today the 22 MHz diagnostic ultrasound is a wide spread method for non-invasive skin analysis.

- **History**
  After 10 years of broad experience in medical ultrasonography, including an intensive research and development program, tpm was proud to introduce the first commercially available A/B digital ultrasound system - our DUB°20 in 1986 designed specifically for dermatology and cosmetic use with 20 MHZ.

  The finest resolution and superior quality of signal processing and image analysis are pre-eminent for the DUB* systems. The DUB° provides continuous and rapid high resolution ultrasonography to exacting scientists. The already large range of functions has been stretched out in the Windows version since 2001. With the easy- to-handle window technology the DUB° for Windows is easy to operate.

- **Today**
  Our product portfolio offers frequencies from 18 MHz to 100 MHz mostly covered by portable DUB°USB devices. This broad range of devices provides an resolution (axial) from 88 μm to 16 μm.

  The easy-to-operate DUB° for Windows software works with all Microsoft operating systems from Windows XP to Windows 7 with 32 and 64 Bit.

  In **2004** the first DUB° as a USB version was introduced: the DUB°-USB. From now on it is possible to attach a high frequency high resolution ultrasound imaging system to an existing PC, controlled by the DUB°for Windows software.

  In **2007** the DUB°-USB75 has come into our product line, which extends the USB systems to frequency range from 18 MHz to 75 MHz. In the same year the very high frequency system with 100 MHz was introduced. One year later 2008 the optional Vacu Elasto Pump for USB systems was introduced.

  In **2012** the DUB°cutis was presented as cost-effective entry-level solution with 22 MHz.
Fields of application

- **Monitoring**
  - skin aging
  - Mohs surgery
  - skin elasticity
  - skin treatment

- **Diagnosis**
  - tissue beneath wounds and skin
  - skin damage caused by sun exposure
  - skin lesions caused by different clinical reasons

- **Efficacy**
  - laser treatment
  - wound treatment
  - cosmetic research
  - aesthetic skin treatment

- **Detection**
  - skin thickness
  - osteoporosis risk
  - tumor depth before and after surgery

Follow-up after skin treatment

Before treatment

After 3 months

After 12 months
**DUB cutis**

The new entry level in high frequency ultrasound imaging systems.

**with 22-28 MHz applicator**

A cost-effective device ideal for practicing doctors. The DUB cutis fulfils all requirements for German health insurance.

- **Key features**
  - Max. digitizing depth 8 mm
  - Max. axial resolution 57 µm at 28 MHz
  - Scan width 12.8 mm linear (appr. 33 µm step width)
  - Connect at USB 2.0 HighSpeed port with any computer
  - Easy-to-operate DUB SkinScanner software with all major functionalities:
    - Viewing: B-Scan, A-Scan, Sum-A, ScanLoop (20)
    - 2 color scales
    - Measurement: length, area, density, width, depth
    - Automatic skin thickness
    - Automatic skin density
    - Personalizable: e.g. clinic or doctor’s name

- **Option**
  - USB camera (e.g. Dino-lite)
DUB® SkinScanner

The standard system in high frequency ultrasound imaging systems.

for 22-28 or 33-38 MHz applicators

The standard device for more flexibility.

- **Key features**
  - Max. digitizing depth 8 mm
  - Max. axial resolution 42 µm at 38 MHz
  - Scan width 12.8 mm linear (appr. 33 µm step width)
  - Connect at USB 2.0 HighSpeed port with any computer
  - Easy-to-operate DUB SkinScanner software with all functionalities:
    - Viewing: B-Scan, RF-Mode, A-Scan, Sum-A, ScanLoop (2000)
    - Filter: Hilbert transformation
    - 7 color scales
    - Measurement: length, area, density, width, depth
    - Automatic skin thickness
    - Automatic skin density
    - Personalizable: e.g. clinic or doctor’s name

- **Options**
  - USB camera (e.g. Dino-lite)
  - Skin elasticity (Vacu Elasto Pump)
  - Osteoporosis risk detection
  - X-Scan (with volume measurement)
**DUB® SkinScanner+**

**More flexibility with high frequency ultrasound.**

**for 18-22, 22-28 or 33-38 MHz applicators**

The standard device for a better resolution and deeper penetration.

- **Key features**
  - Max. digitizing depth 16 mm
  - Max. axial resolution 42 µm at 38 MHz
  - Scan width 12.8 mm linear (appr. 33 µm step width)
  - Connect at USB 2.0 HighSpeed port with any computer
  
  Easy-to-operate DUB SkinScanner software with all functionalities:
  - Viewing: B-Scan, RF-Mode, A-Scan, Sum-A, ScanLoop (2000)
  - Filter: Hilbert transformation
  - 7 color scales
  - Measurement: length, area, density, width, depth
  - Automatic skin thickness
  - Automatic skin density
  - Personalizable: e.g. clinic or doctor’s name

- **Options**
  - USB camera (e.g. Dino-lite)
  - Skin elasticity (Vacu Elasto Pump)
  - Osteoporosis risk detection
  - X-Scan (with volume measurement)
DUB® SkinScanner 75

High frequencies with one ultrasound imaging system.

**for all available B-Scan applicators up to 75 MHz**

The premium device for a higher resolution.

- **Key features**
  - Max. digitizing depth 16 mm
  - Max. axial resolution 21 µm at 75 MHz
  - Scan width 12.8 mm linear (appr. 33 µm step width)
  - Connect at USB 2.0 HighSpeed port with any computer

Easy-to-operate DUB SkinScanner software with all functionalities:
- Viewing: B-Scan, RF-Mode, A-Scan, Sum-A, ScanLoop (2000)
- Filter: Hilbert transformation
- 7 color scales
- Measurement: length, area, density, width, depth
- Automatic skin thickness
- Automatic skin density
- Automatic epidermis thickness
- Personalizable: e.g. clinic or doctor’s name

- **Options**
  - USB camera (e.g. Dino-lite)
  - Skin elasticity (Vacu Elasto Pump)
  - Osteoporosis risk detection
  - X-Scan (with volume measurement)
Why we use different frequencies:

- **7.5 MHz**: Resolution 210 µm, penetration 50-70 mm
- **10 MHz**: Resolution 158 µm, penetration 35 mm
- **18 MHz**: Resolution 72 µm, penetration 8-10 mm
- **22 MHz**: Resolution 88 µm, penetration 12-15 mm
- **33 MHz**: Resolution 31 µm, penetration 2-3 mm

The shown frequencies are the center frequencies - the upper border frequencies are up to 40% higher.
Different frequencies

50 MHz
resolution 31 μm
penetration 3-4 mm

75 MHz
resolution 21 μm
penetration 2-3 mm

100 MHz
resolution 16 μm
penetration 0.8-1.5 mm

The shown frequencies are the center frequencies - the upper border frequencies are up to 40 % higher.

www.skinscanner.de

World-wide commercialized A/B ultrasound skin diagnostic system for Dermatology since 1986
DUB® profi D4W-3D

The solution for real 3D ultrasound skin diagnostics.

for 22, 33, 50 or 75 MHz 3D-applicators

The best choice for 3D ultrasound skin scanners.

Key features

Max. digitizing depth 16 mm

Stand-alone computer system

Max. axial resolution 21 µm at 75 MHz

2D scan width 12.8 mm linear (appr. 33 µm step width)
3D scan volume 12.8 mm x 13 mm x penetration depth mm

Easy-to-operate DUB SkinScanner software with all functionalities (excerpts):
- Viewing: 3D-B-Scan, B-Scan, RF-Mode, A-Scan, Sum-A, ScanLoop (2000)
- Filter: Hilbert transformation
- 7 color scales
- Measurement: length, area, density, width, depth
- Automatic skin thickness
- Automatic skin density
- Automatic epidermis thickness
- Personalizable: e.g. clinic or doctor’s name

Options

Skin elasticity (Vacu Elasto Pump)

Osteoporosis risk detection
DUB® 100 - 12 Bit

The exceptional solution for very high frequency ultrasound.

for 75 or 100 MHz applicators

The world-wide one-and-only 100 MHz system!

- **Key features**
  - Max. digitizing depth 3.2 mm
  - Max. axial resolution 16 µm at 100 MHz
  - 12 Bit digitizing with 400 MHz
  - Scan width 12.8 mm linear (appr. 16 µm step width)
  - Stand-alone computer system

  Easy-to-operate DUB SkinScanner software with all functionalities (excerpts):
  - Viewing: B-Scan, RF-Mode, A-Scan, Sum-A, ScanLoop (2000)
  - Filter: Hilbert transformation
  - 7 color scales (12 Bit)
  - Measurement: length, area, density, width, depth
  - Automatic skin thickness
  - Automatic skin density
  - Automatic epidermis thickness
  - Personalizable: e.g. clinic or doctor’s name

- **Option**
  - USB camera (e.g. Dino-lite)
Skin elasticity measurement with the Vacu Elasto Pump system offers more detailed information about all skin layers and below. With adjustable pressure, timings.

Epiluminescence microscopy
USB-camera Dino-Lite for reproducibility of ultrasound scans e.g. before/during/after treatment.

Early osteoporosis risk detection
Software evaluation with skin thickness measurement of high frequency ultrasound images.

Volume measurement X-Scan
Easy-to-handle with two cross-sectional B-Scans with special applicator tip and software module.
Different frequencies - different resolutions
The digitizing depth for all ultrasound images is 4 mm.

1. Naevus
2. Epidermis
3. Dermis
4. Subcutaneous Fat
5. Subcutaneous Tissue
6. Sun Damage
7. Stratum Corneum
8. Hair Follicles

- **22 MHz**

- **50 MHz**

- **75 MHz**
Dermatopathology and Sonography

Poorly circumscribed, reddish-brownish tumor on the left leg

Diameter: 10 mm

Tentative diagnosis: Malignant melanoma

Epiluminescence picture of a tumor

Echolucent area with small echogenic band in the upper part and hypoechoic sharp edged area

Dermis and subcutis: Normal echogenicity

22 MHz-Sonogram with DUB SkinScanner

Tumor depth: 0.90 mm

Final diagnosis: Malignant melanoma

Tumor depth: 0.86 mm

Poorly circumscribed, asymmetrical, pigmented tumor on the upper back

Diameter: 10 mm

Tentative diagnosis: Malignant melanoma

Echolucent area with several tissue echos within the whole structure of the poorly differentiated tumor

Dermis and subcutis: Normal echogenicity

Tumor depth: 1.0 mm

Histology of surgically removed tumor

Final diagnosis: Hidracanthoma simplex

Tumor depth: 0.95 mm

Pictures by courtesy of the Department of Dermatology, Dermatopathology and Sonography of the Skin, Medical Center Charité, Humboldt-University of Berlin, Germany
Scan viewing modes

- **A-Scan**
  A complete ultrasound picture is assembled together out of many single A-Scan lines. With the DUB®SkinScanner software it is possible to view all single A-lines. Together with the Sum-A functionality the skin thickness can easily be measured.

- **RF-Scan**
  The RF-Scan shows the original raw data of the recorded ultrasound image. All calculations and different viewings will always be calculated by the DUB®SkinScanner software with these data format to ensure highest picture quality.

- **B-Scan**
  A complete B-Scan is built up from 384/768 A-Scan lines. Converted into one of 7 available color scales and 2 different transformations (Hilbert and Full-Wave) a typical high frequency ultrasound image for clinical evaluation is created.

- **M-Scan**
  The M-Scan shows a single A-Scan line against the time. These pictures are mainly used for skin elasticity measurement in combination with the Vacu Elasto Pump. Pressure and timings are adjustable as well as the possibility to switch between spontaneous- and rising-mode.
Outlook: New fields of applications

High frequency ultrasound in veterinary medicine

■ **Current research projects**

  Development of a cutting-edge method of skin monitoring for the early detection of general health disorders in dairy cows.

  Non invasive early diagnosis of mammary tumors, skin disorders, skin tumors and parasitic diseases of dogs and cats.

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**taberna pro medicum is partner of the ampel network.**

The **ampel** network promotes interdisciplinary thinking and operations of all partners, to identify synergies between human and veterinary medicine with the aim to create novel commercial applications and products.

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Distribution

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