German Ultrasound Museum

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Collection of Devices, last update June 2013

No. **001** description: **Echoencephalography**

type of device: A-Mode producer/distributor : Krautkrämer/Siemens

development: 1959-1960

frequency: 2 MHz time of production: since 1961

A-Mode-system with oscilloscope for determining time delay and amplitude of an echo. Modification of the ultrasonic testing device Krautkrämer USIP 10 by Siemens Co for brain scans. Oldest echoencephalography system in Germany (here with additional calibrator and camera). 36 x 23 x 56 cm
Origin: Mann, Mainz.

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No. 002 **description:** **Ophalmography**

type of device: A-Mode **producer/distributor:** Krautkrämer/Siemens

development: 1959-1961

frequency: 4-15 MHz **time of production:** since 1961

A-Mode-system with oscilloscope for determining time delay and amplitude of the echo.
Modification of the ultrasonic testing device USIP 10 from Krautkrämer by Siemens Co.
for use in Ophthalmology. 36 x 23 x 56 cm
Origin: Mann, Mainz.

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No. 003 **description:** **Echocardiography**

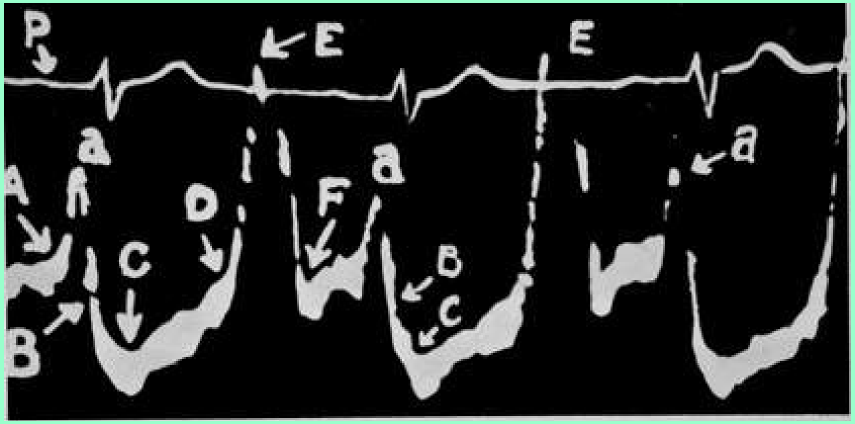
type of device: A-Mode **producer/distributor:** Krautkrämer/Siemens

development: 1959-1960

frequency: 2-5 MHz **time of production:** since 1961

A-Mode-system with oscilloscope for determining time delay and amplitude of the echo.
TM – display by auxiliary unit.
Modification of an ultrasonic testing device USIP 10 from Krautkrämer by Siemens Co.
For use in cardiology.
36 x 23 x 56 cm

Special version of oldest German echoencephalography-device converted for Cardiography. - The very first TM-system, however, was an echo material-machine from Siemens Co. modified by Hertz and Edler (Lund) for TM.



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No. 011 **description:** **Material testing**

type of device: A-Mode **producer/distributor:** Krautkrämer

development:

frequency: 0.5-10 MHz **time of production:** since 1960

Material-testing device type USIP 10 from Krautkrämer Co., Cologne.
This original device was later modified for medical diagnostics (Encephalography, Cardiography, Ophthalmography) in collaboration with Siemens Co.
(bound by contract).

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No. 012 **description:** **Material testing**

type of device: A-Mode **producer/distributor:** Krautkrämer

development:

frequency: 2 MHz **time of production:** since 1968

Portable battery-powered non-destructive testing device of Krautkrämer Co., Cologne.
Further modifications for medical applications were planned.
Only a small number of these devices were ever tested.

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No. 004 **description:** Echopan

type of device: A-Mode **producer/distributor:** Siemens AG, Erlangen

development: 1973-1974

frequency: 2-5 MHz **time of production:** since 1974

Echoencephalography system with 2 channels for simultaneous bilateral echography of the skull. Used in Neurology (for identifying tumors or atrophy) and in Traumatology (hemorrhages). Equipped for calibration and compensation of depth; filters, camera.

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No. 005 **description:** **Echopan KS**

type of device: A-Mode **producer/distributor:** Siemens AG, Erlangen

development: 1973-1974

frequency: 2-5 MHz **time of production:** since 1974

A-Mode with M-Mode display via storage oscillograph und UV-recorder with glass-fiber optics.
Developed for cardiological examinations.
Later supplemented with mechanical sector-scanner for B-Mode display.
30 x 50 x 60 cm

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No. 006 **description:** **Echogerät Serie 1000**

type of device: A-Mode **producer/distributor:** Kretztechnik AG, Zipf

development: 1955-1958

frequency: 1-14 MHz **time of production:** 1958-1965

This A-Mode device of the 1000 series, a tube model, was one of the first devices developed for non-destructive material testing. Starting in 1960 it was increasingly used for medical purposes; first in Ophthalmology und Neurology (Traumatology), and later in Obstetrics. Analysis of time delay and amplitude of the echo.

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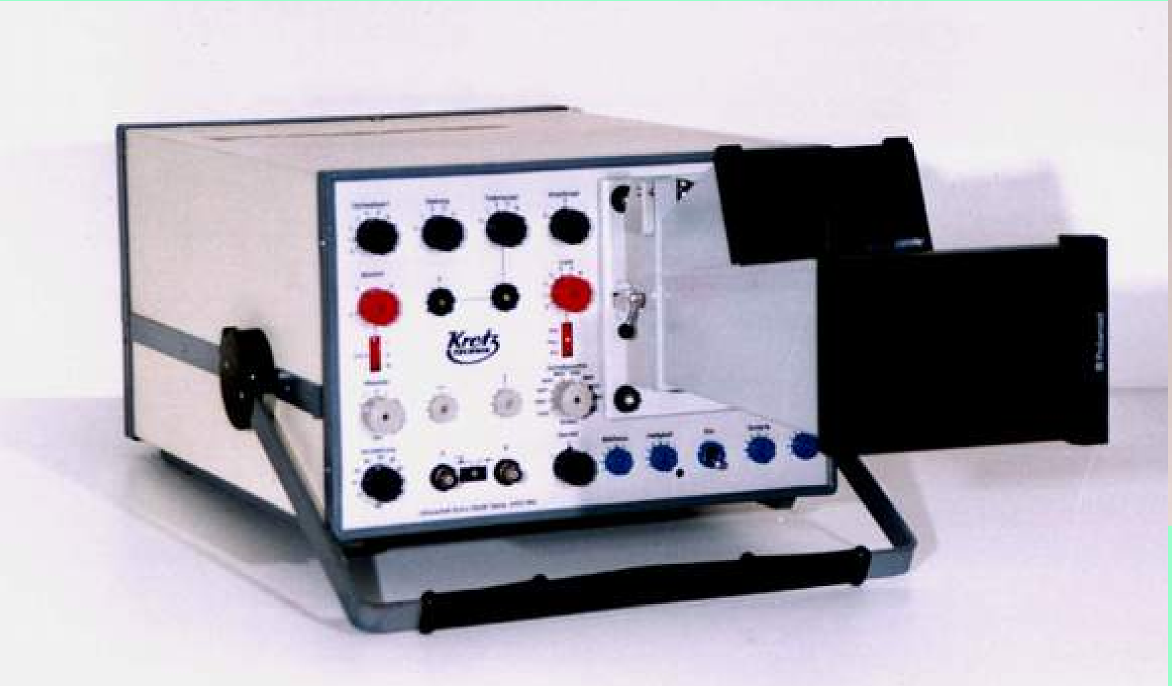
No. 007 **description:** 4100 MGB

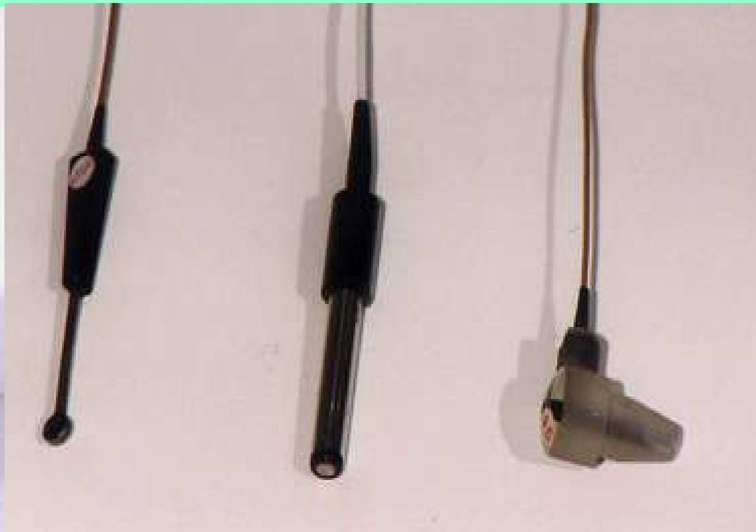
type of device: A-Mode **producer/distributor:** Kretztechnik AG, Zipf

development: 1966-1968

frequency: 0.5-15 MHz **time of production:** 1968-1978

Two-channel system, time-mark channel, compensation of depth, magnifier, quartz stabilized time scale. This modernized device was fully transistorized.
Used for abdominal and obstetrical diagnostics (including a vaginal probe!). This device was also part of Compound-scan systems. Similar devices were used for echoencephalography, ophthalmography – and also for material testing.





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No. 008 **description:** Echoencephalograph 4200 ME

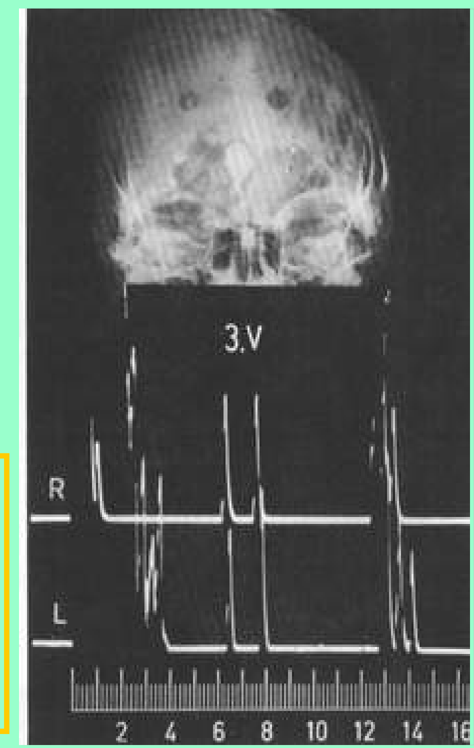
type of device: A-Mode **producer/distributor:** Kretztechnik AG, Zipf

development: 1972-1973

frequency: 0.5-4 MHz **time of production:** 1973-1985

A-Mode-Encephalograph with separate channels for simultaneous bilateral echo investigations. Visual documentation of the screen by retractable camera.
Fully transistorized system.

Echoencephalogram:
Diameter of the
3rd ventricle.
Figure: Schiefer,
Erlangen)



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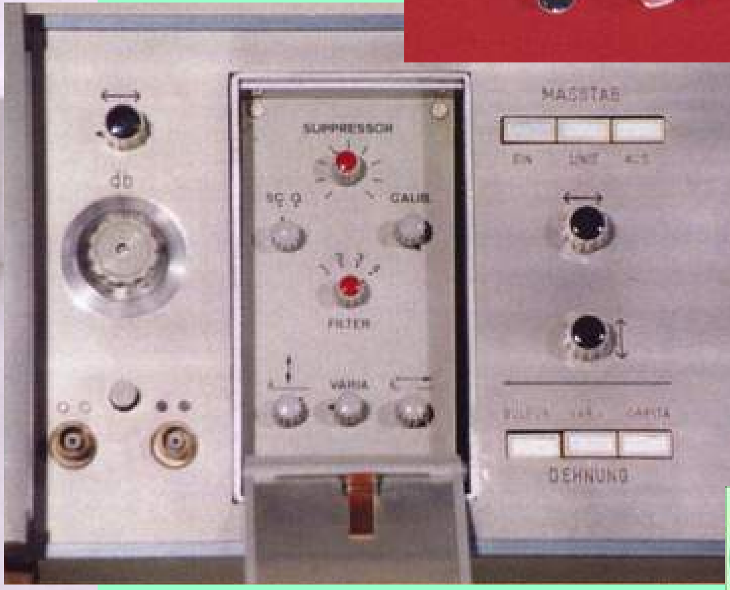
No. 009 **description:** **Echoophthalmograph 7200 MA**

type of device: A-Mode **producer/distributor:** Kretztechnik AG, Zipf

development: 1969-1971

frequency: 6-15 MHz **time of production:** 1971-1985

A-Mode-ophthalmograph, integrated quartz oscillator, calibration, frequency filter.
Horizontal resolution 0.3 µsec/mm.
Equipped for standardized examinations – according to Ossoinig.
Origin: Kretztechnik, Zipf.



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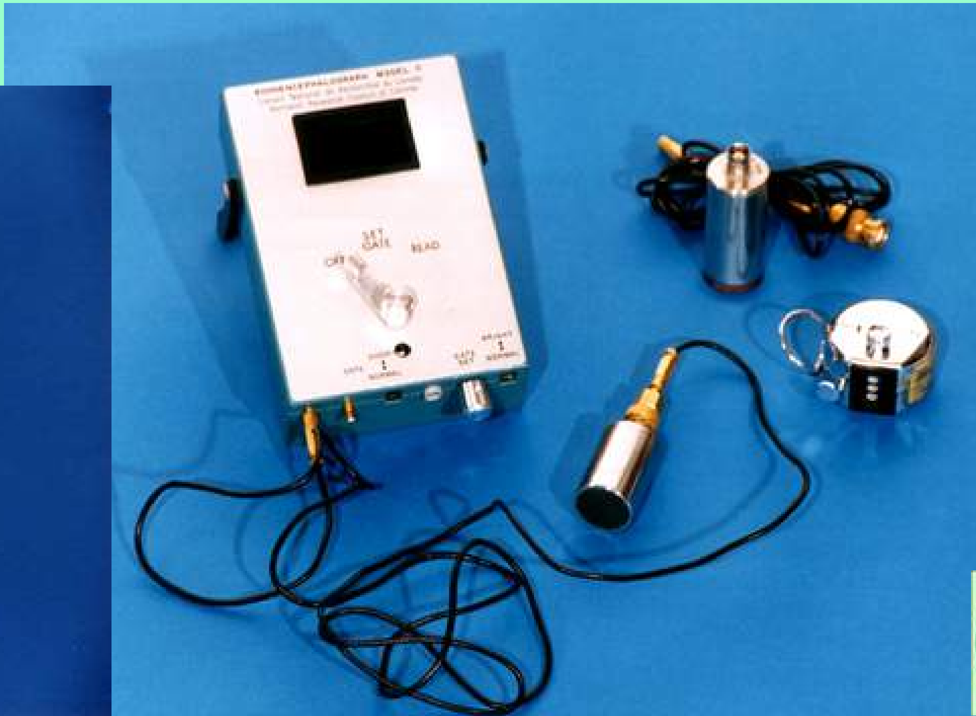
No. 010 **description:** Echoencephalograph Model C

type of device: A-Mode **producer:** Radio & Electrical Lab., Canada

development: 1965

frequency: 3 MHz **time of production:** 1965

A-Mode device, pocket sized, 14 x 10 x 4 cm.
Probably custom-made for H. R. Müller, Basel.
A numerical display (digits) can be switched to either echo amplitude or to time-delay of the echo.
Origin: H. R. Müller, Basel



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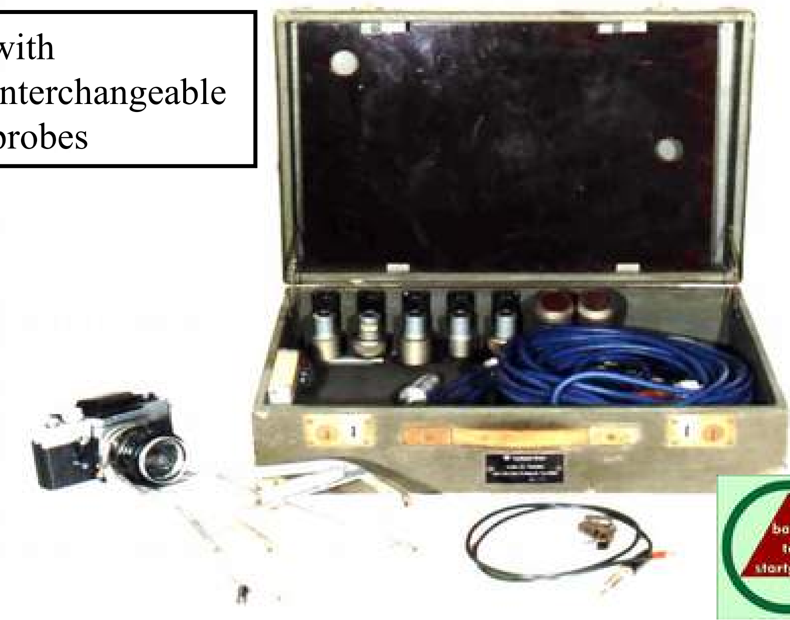
No. 050 **description:** Materialprüfgerät 9020

type of device: A-Mode **producer/distributor:** Funkwerk Erfurt

development: 1956-1957

frequency: 1-6 MHz **time of production:** since 1958

A-Mode device, one channel.
The GDR started development of material testing devices (type 608 was a precursor of this device) in 1951. This type 9020 was first used for medical diagnostics (Obstetrics and Traumatology).
Origin: Institute for Medical Physics und Biophysics, Halle University.



with interchangeable probes

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No. 051 **description:** Sonovisor 1

type of device: A-Mode **producer/distributor:** Carl Zeiss Jena

development: 1956

frequency: 2-5 MHz **time of production:** 1957-1958

A-Mode device, later converted to B-Mode, or Schwingschnittverfahren („swinging sections“). Originally developed for material testing. Later used for medical purposes with an add-on linear probe of about 5 MHz, sliding on circular rails. Mechanical vertical spacing. Control of synchronized image points

by magnetic encoder. Water-coupling for the transducer (B-Mode add-on not present here).

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No. 052 description: **Sonovisor 2**

type of device: A-Mode and mechanical B-Mode

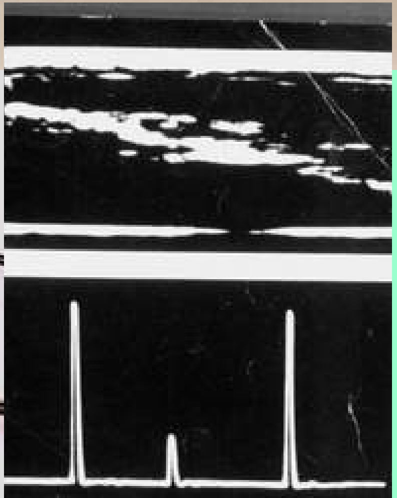
producer/distributor: Carl Zeiss Jena

development: 1957-1958

frequency: 2-5 MHz

time of production: 1958-1959

A- and B-Mode device, the so-called Schwingschnittverfahren („swinging sections“).
Further development of Sonovisor 1. Partly transistorized.
Scanner with no metal coupling disc. Still portable at 25 kg.



Material testing:

Fault in metal bar.

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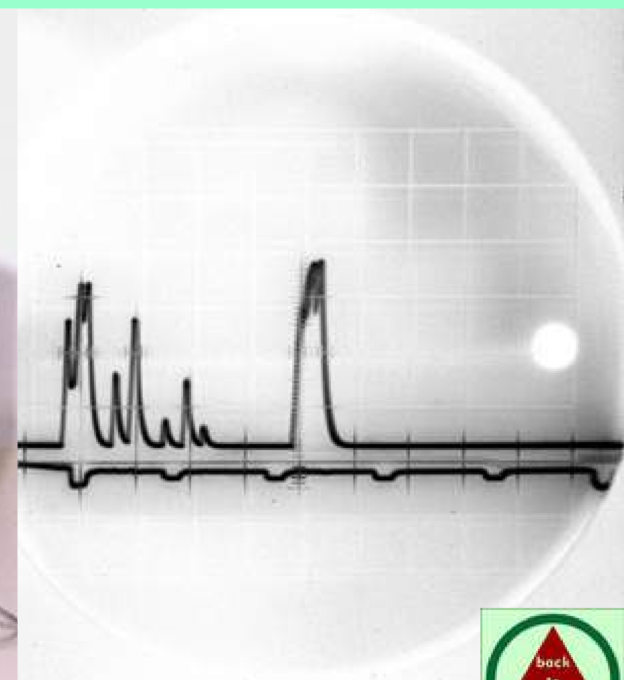
No. 054 **description:** Echogerät GA 10

type of device: A-Mode **producer/distributor:** VEB Ultraschalltechnik Halle

development: 1967-1968

frequency: 1-6 MHz **time of production:** 1968-1971

Belongs to series A 10. Modules slide in and can be interchanged, enabling multifunctional use.
Introduced as GA with 1-6 MHz probes for Obstetrics and Gynecology.
Also available: EA 10 for Traumatology, OA 10 for Ophthalmology and KA 10 for Cardiology.
2 channels; EA version 3 includes a calibrated scale and threshold regulation.
Origin: R. Millner, U. Cobet Halle



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No. 054 z **description:** Echogeraet GA 10

type of device: A-Mode TM-Mode **producer/distributor:** VEB Ultraschalltechnik Halle

development: 1967-1968

frequency: 10-12 MHz **time of production:** 1968-1971

Modules slide in and can easily be interchanged.
With an added module this device could be used for an echo-glottographia, for example.
Movements were recorded in M-Mode (TM-Mode) with a high sampling rate; transducer frequency 10-12 MHz.

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No. 055 **description: Echogerät GA 10, older version**

type of device: A-Mode **producer/distributor:** VEB Ultraschalltechnik Halle

development: 1966-1968

frequency: 1-6 MHz **time of production:** 1968-1971

Older version of the A 10 series. Developed at the Ultrasound Department, Institute of Medical Physics (later: Applied Biophysics), Halle University and at the Research Institute M. v. Ardenne, Dresden.

Production of the pilot series by Strobl company, Berlin, later by VEB Ultraschalltechnik Halle.

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No. 056 **description:** Echogerät EA 20

type of device: A-Mode **producer/distributor:** VEB Ultraschalltechnik Halle

development: 1970

frequency: 1-4 MHz **time of production:** 1970-1980

Improved version of the A 10 series with magnifier, compensation of depth and auto-determination of the midlinee echo.

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No. 057 **description:** Echoencephalograph T

type of device: A-Mode **producer/distributor:** Krautkrämer/Siemens

development: ??

frequency: ?? **time of production:** ??

Origin: R. Soldner, Erlangen

German Ultrasound Museum

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No. 113 **description:** Echoview 80 L

type of device: Compound **producer/distributor:** Picker Int. Inc., USA

development: approx. 1970

frequency: 1-7.5 MHz **time of production:** 1974-1979

Digital compound-scanner, built 1974. Real time (Linear Array 3.5 and 5 MHz) as an option.
Displaying A-Mode, B-Mode und TM-scan.
Origin: H.-J. Schultz, Picker International

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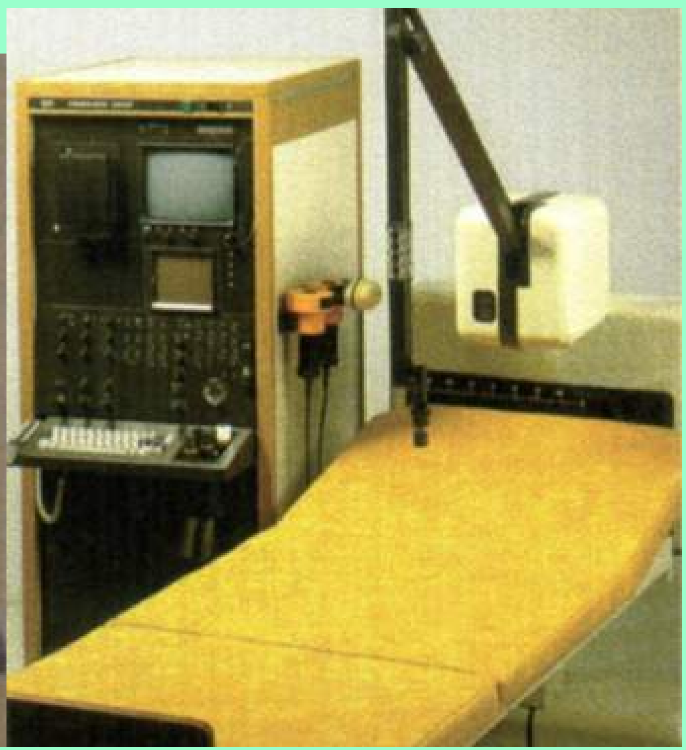
No. 114 **description:** Combison 202

type of device: Compound **producer/distributor:** Kretztrechnik AG, Zipf

development: 1978-1979

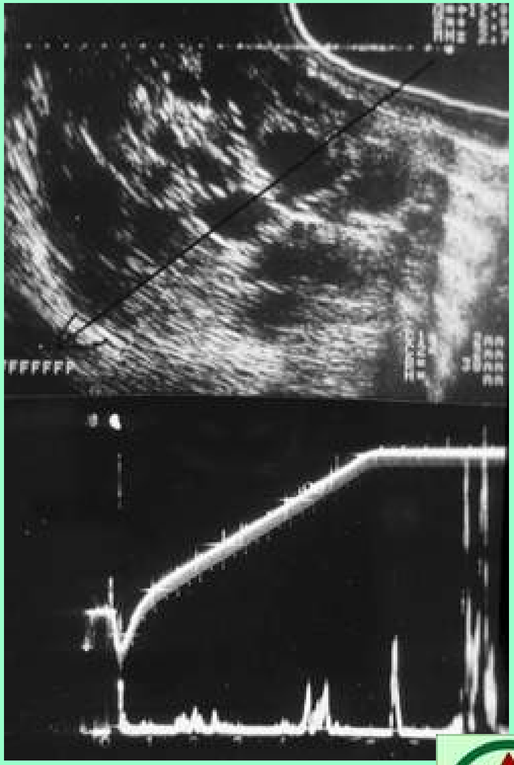
frequency: 2 and 5 MHz **time of production:** 1979-1983

Compound-Scanner, A- and B-Mode. Digital frame storage, grayscale-technique, automatic image evaluation (histogram).
The improved type 202 R offered additional real-time technique (mechanical sector) for transcutaneous, transrectal und intravesical applications.



cystic liver
B-Scan

A -Mode



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No. 114 SK description: Combison 202

type of device: Compound producer/distributor: Kretztrechnik AG, Zipf

development: 1978-1979

frequency: time of production: 1979-1983

Compound scanner

Scan-arm with localizer for a compound system (Combison 202 Kretz) necessary for manual B-Scans.

During the scan procedure information about the position and the direction of the transducer is gathered. These data are captured as analog electrical signals via mechanically-linked potentiometers and are simultaneously processed in the ultrasonic system.

The accuracy of the data collected in this way substantially determines the precision and the quality of the ultrasound images.

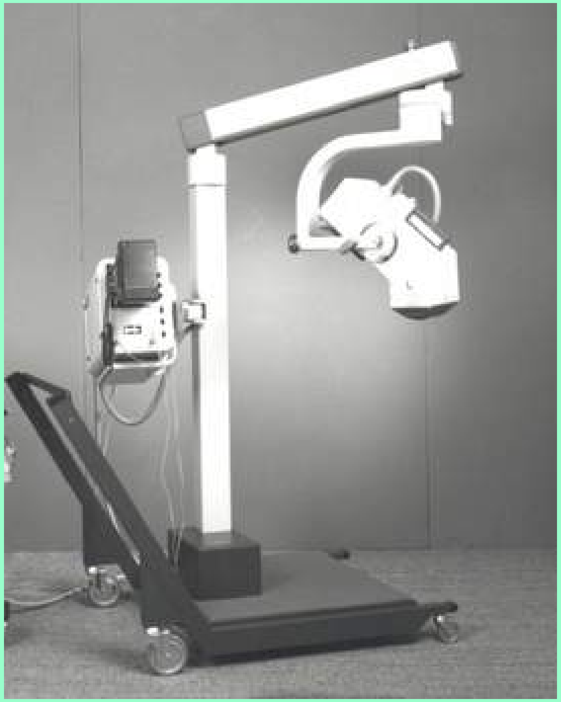
No. 115 **description:** Vidoson 635

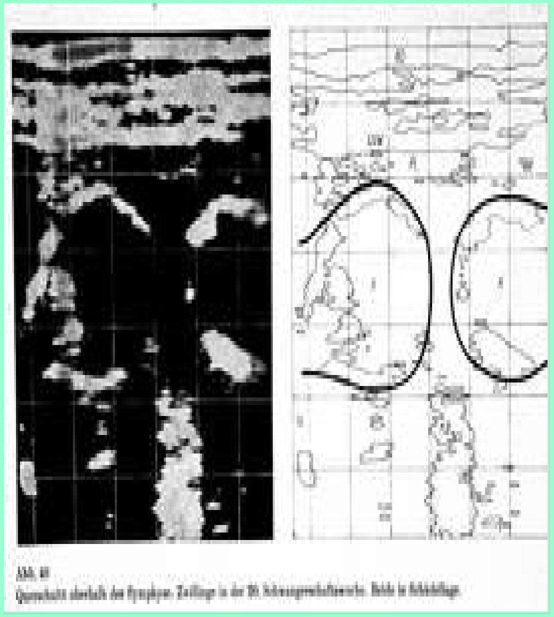
type of device: mechan. Sector B-Mode **producer/distributor:** Siemens AG, Erlangen

development: 1961-1965

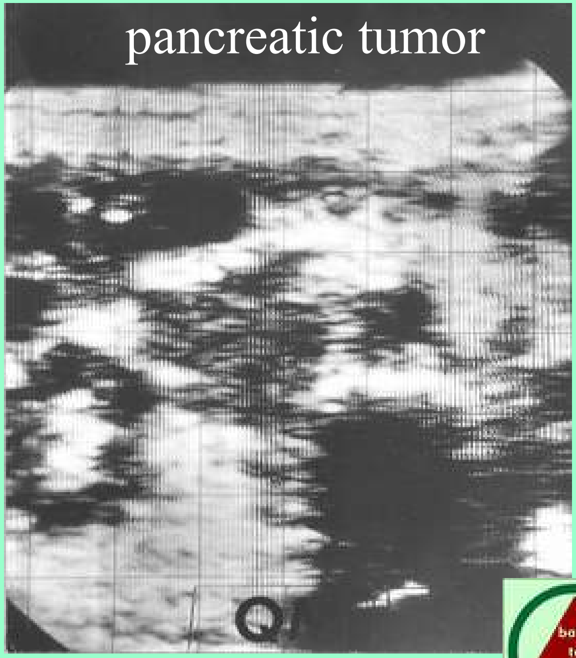
frequency: 2.5 MHz **time of production:** 1965-1975

Mechanical real-time B-Mode system (15 frames/sec) with water coupling.
Adjustable section plane, gray-scale display.
Originally developed for mamma-sonography, first used instead in Obstetrics by Holländer, later in abdominal diagnostics by Rettenmaier.
Origin: Rücker, Roderbirken





twins
fig. Holländer, 1968



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No. 115 z **description:** Vidoson 635

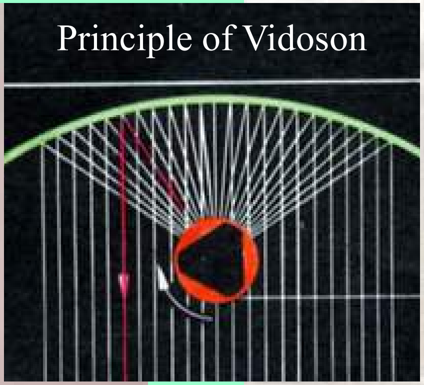
type of device: mechan. Sector B-Mode **producer/distributor:** Siemens AG, Erlangen

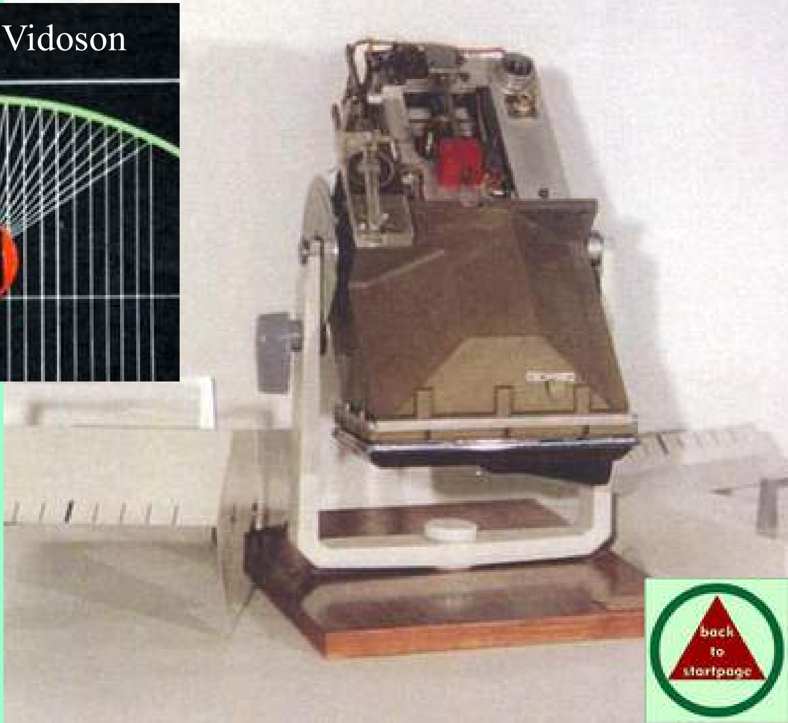
development: 1961-1965

frequency: 2.5 MHz **time of production:** 1965-1975

Mechanical real-time B-Mode system (15 frames/sec) with water coupling.
Adjustable section plane, gray-scale display.
(The ultrasonic impulses of a rotating transducer are first reflected by a parabolic mirror,

then beamed parallel towards the body.)
Origin: Lutz, Bayreuth





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No. 115 SK 1

description: **Vidoson 635**

type of device: mechan. Sector B-Mode

producer/distributor: Siemens AG, Erlangen

development: 1961-1965

frequency: 2.5 MHz

time of production: 1965-1975

Mechanical linear sector scanner

Scanner unit of the first real-time ultrasound system (Vidoson 635).

Three successively activated ultrasonic transmitters rotate in the focal plane of a parabolic reflector.

This reflector transforms the original sector scan to a (linear) parallel scan. The reason for this unorthodox solution: The constant rotation of the transducers is – contrary to repetitive longitudinal motions - not subject to inertial force. Therefore scanning time and frame rate are not limited, as they would be in case of longitudinal motions of the transducer.

The longitudinal axis of the rotating transducers can be shifted. In this way the section plane can be varied up to 3.5 cm without moving the complete scanning unit which is connected to the patient‘s skin. This method was intended to facilitate ultrasonic mamma inspections.

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No. 115 SK 2 **description:** Vidoson 735

type of device: mechan. Sector B-Mode **producer/distributor:** Siemens AG, Erlangen

frequency: 3.5 MHz **time of production:** 1978-1980

Transducer for mechanical linear scanner (Vidoson 735)

Rotating transducer mount with three identical periodically-activated transmitters for the Vidoson 735 series.
The elliptic shape of the transducer is a consequence of the opto-acoustical characteristics of the corresponding parabolic reflector.

No. 117 description: ATL Mark III

type of device: B-Mode (with optional Doppler mode) producer/distributor: Advanced Technology Labs.

development: before 1975

frequency: 3.5 and 5 MHz time of production: 1975

Mechanical B-scan with A- and M-Mode, sector-scanner. Pw-Doppler unit optional, 3.5 and 5 MHz. Programs for measuring; video documentation.
Used mainly for abdominal, cardiological, and vascular applications.

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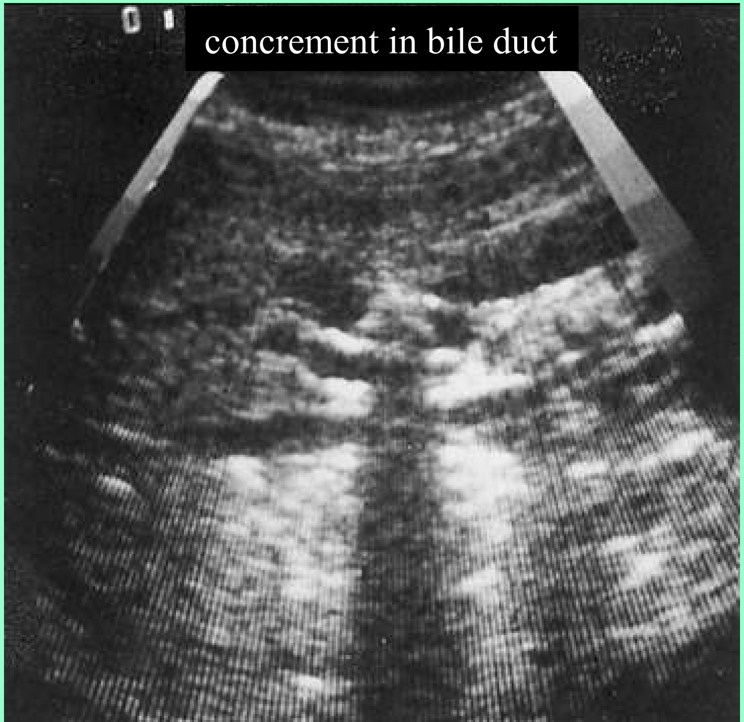
No. **118** description: **Combison 100**

type of device: B-Mode producer/distributor: Kretztechnik AG, Zipf

development: 1976 – 1978

frequency: 2.5 – 4 MHz time of production: 1978 – 1983

Real-time sector scanner. 5, later 3 rotating elements. Omnidirectional measuring possible. Additional monitor.
Transrectal and intravesical transducers. Used in Obstetrics/Gynecology, Internal Medicine and Urology. Origin: Frentzel-Beyme, Berlin


concrement in bile duct

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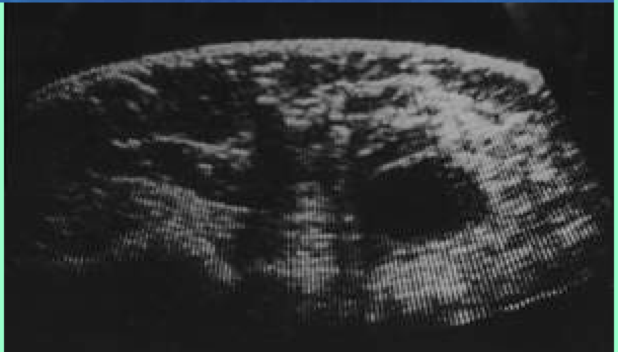
No. 118 z **description: Combison 100**

type of device: B – Mode **producer/distributor:** Kretztechnik AG, Zipf

development: 1976 - 1978

frequency: 2.5 - 4 MHz **time of production:** 1978 - 1983

Real-time sector scanner. Automated mamma scanner:
For imaging the scanner circled the mamma within a water bath – driven by an additional engine. These images were then assembled with the help of a computer, similar to computerized tomography in radiology.



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No. **118 SK** description: **Combison 100**

type of device: B-Mode producer/distributor: Kretztechnik AG, Zipf

frequency: 3.5 MHz time of production: 1976 – 1979

Mechanical Sector Scanner

Mechanical sector scanner for Combison 100 with 5 identical rotating transducers (fix-focus).
The transducer pointing to the connecting window was activated by a magnetic strip fixed at the cover.
The accompanying switches, which were also activated by magnets, can be seen between the transducers.

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No. 120 **description:** Combison 1320-5

type of device: B-Mode **producer/distributor:** Kretztechnik AG, Zipf

development: 1983/1984

frequency: 3.5 and 7 MHz **time of production:** 1984-1993

Mechanical sector scanner and electronic multi-array scanner. Intracavitary probes. Digital scan-converter for gray-scale storage. Software: coordinated operation, picture processing, gauging. Integrated instant-camera documentation. Spectral-Doppler as an option. Used for abdomen, obstetrics, transrectal, vaginal and intravesical.

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No. 121 **description:** Sonoline 3000

type of device: B-Mode **producer/distributor:** Siemens AG, Erlangen

development:

frequency: 3 and 5 MHz **time of production:** 1985

Real-time sector-scanner with switch from 3 to 5 MHz. Storage function.

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No. 121 SK **description: Sonoline 3000**

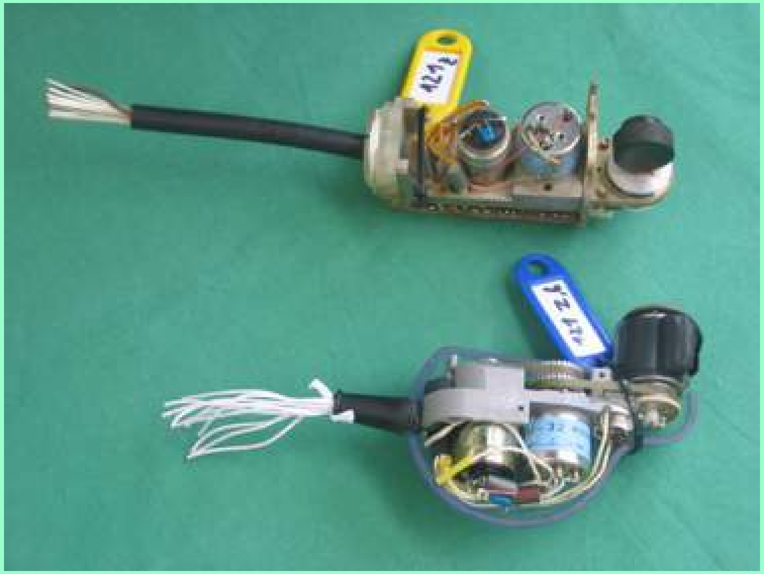
type of device: B-Mode **producer/distributor:** Siemens AG Erlangen

development:

frequency: 5 MHz **time of production:** 1978-1980

Sector Scanner

Prototype of a mechanical sector scanner with two identical transducers mounted on a rotating support.



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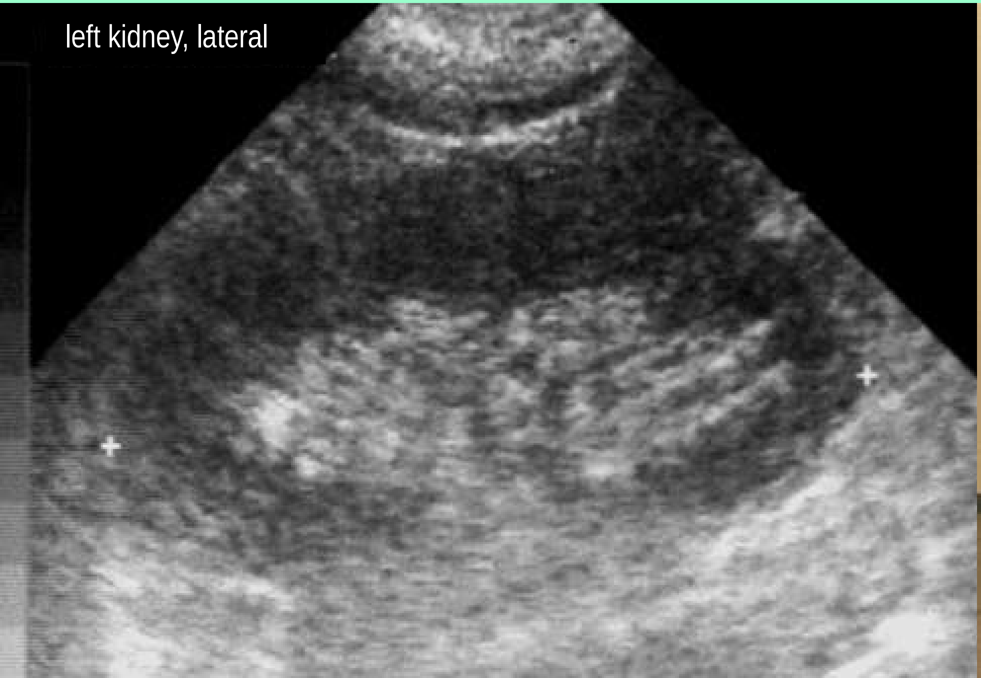
No. 122 **description:** B-Mode System SB 30

type of device: B-Mode **producer/distributor:** VEB Ultraschalltechnik Halle

development: ?

frequency: 2 and 5 MHz **time of production:** 1979

Ultrasound system with 2 rotating scanners, 2 und 5 MHz. 16 levels gray scale, variable TGC, gauging marks. This system was meant to cover the demands for B-mode devices in the German Democratic Republic (GDR), as devices from Western manufacturers could not be imported. However, because of inadequate technology (lack of electronic components), this system was not able to meet international quality standards.
Origin: Institute for Biophysics, Halle



No. 123 **description:** Mechanical Sector Scanner

type of device: B-Mode **producer/distributor:** Halle???

development: ?

frequency: ? **time of production:**

Mechanical Sector Scanner

Mechanical sector scanner with 4 identical transducer elements on a rotating disc to be placed directly on the skin. This may have been the transducer for the concept of a compound system with semi-automatic scanning – similar to the system of Jan Donald, Glasgow.

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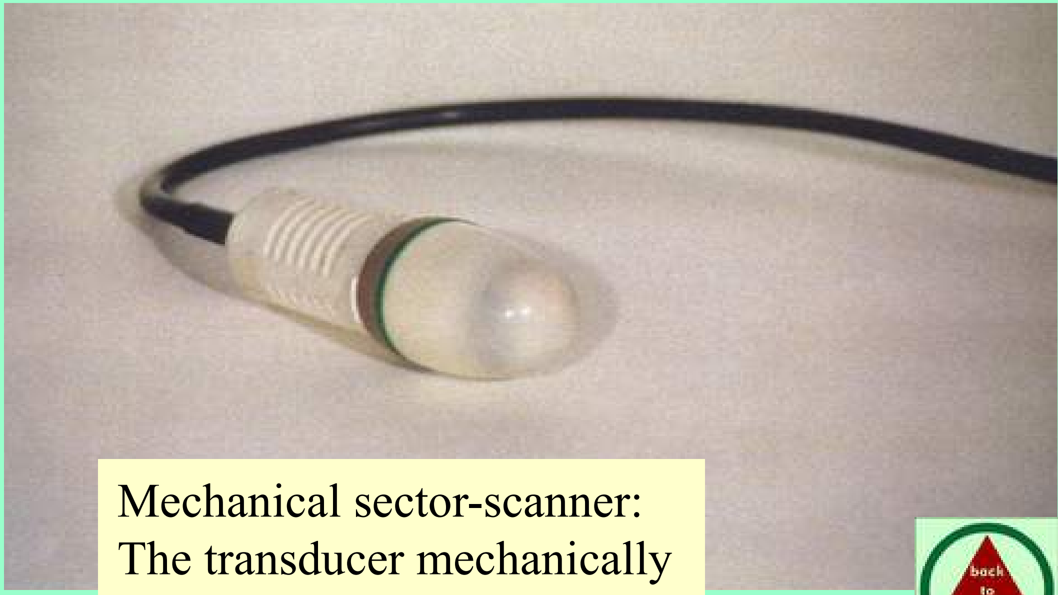
No. 119 | description: **Sonoline SX**

type of device: B-, M-Mode Doppler | producer/distributor: Siemens AG, Erlangen

development: 1982/1983

frequency: 3.5 and 5 MHz | time of production: beginning 1983

B-Mode device, mechanical sector-scanner with 3.5 and 5 MHz. Also M-Mode and Doppler-Mode. Zoom. Measurements of distance and volume, calculation of delivery date.
This scanner was developed parallel to the linear-scanner Sonoline LX with identical components as part of the „Sonoline“ series.
With a size of only 30 x 24 x 40 cm it was a small, portable scanner-unit for universal use.



Mechanical sector-scanner: The transducer mechanically "wobbeles" to and fro.

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No. 119 SK **description:** Sonoline SX

type of device: B-Mode **producer/distributor:** Siemens AG, Erlangen

development:

frequency: 3.5; 5 MHz **time of production:** 1982-1984

Sector Scanner

Sample mechanical sector scanner probes with varying ultrasound frequencies, each with three identical transducers on a rotating support.
(With guidance for puncture tubes.)

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No. 124 description: ADR 2130

type of device: B-Mode producer/distributor: ADR/Kranzbühler & Sohn

development: 1969-1971

frequency: 1-7.5 MHz time of production: beginning 1971

Real-time B-Mode device, linear multi-element array probe with 64 single elements.
10 gray scales, 20-40 frames/sec. , 50-120 lines. Freeze frame. Electronic caliper.
This scanner was developed by ADR in Phoenix, Arizona, and very successfully distributed by Kretz, later by Kranzbühler. Used mainly in Obstetrics and Internal Medicine.


14th week/gestation


Non-Hodgkin Lymphoma

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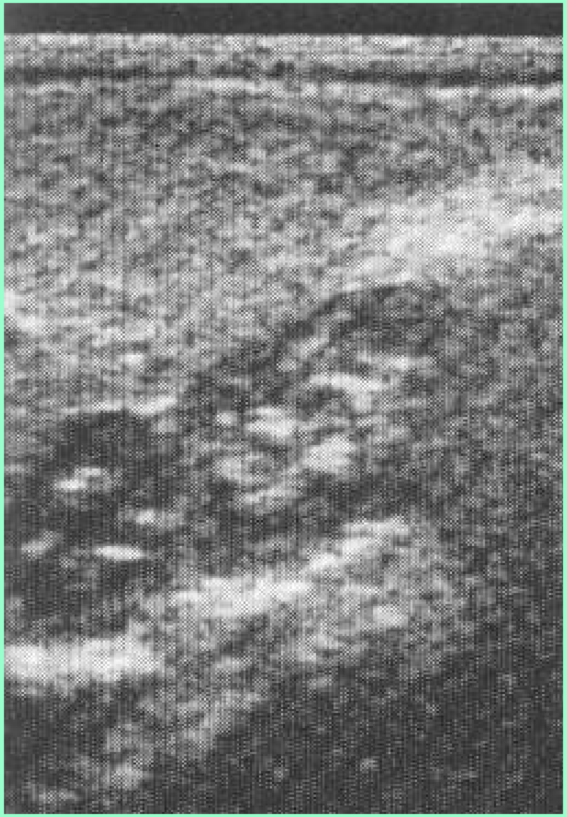
No. 125 **description:** Sonolayer SAL – 20 A

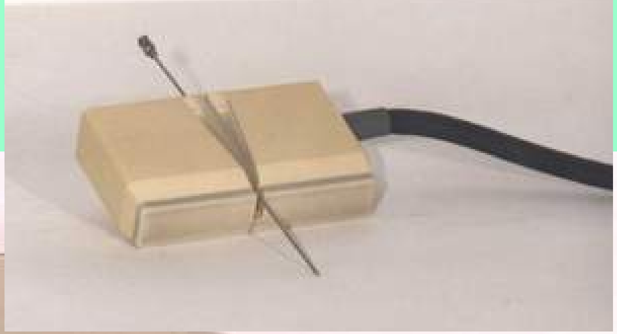
type of device: B-Mode **producer/distributor:** Toshiba, Tokyo

development: 1977-1979

frequency: 2.4 and 3.5 MHz **time of production:** beginning 1979

B – mode, real time. Linear-scanner with electronic focusing. 8 gray scales.
No storage of the screen images possible. Alphanumerical keys for patient's data. Biopsy probe.





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No. 127 **description:** Multison 400

type of device: B-Mode **producer/distributor:** Siemens AG, Erlangen

development: c. 1975

frequency: 2.5 and 3.5 MHz **time of production:** beginning 1977

B-mode, real time, linear array technique.
30 frames/s with 2.5 MHz,
40 frames/s with 3.5 MHz.
Electronic caliper.
Origin: Dr. F. Lorenz, Berlin

Array not yet with dynamic focusing, only one transformation layer. Already with micro divisions, however. The assembly was essentially aligned for separate modules. Image quality not satisfactory with 2.5 MHz

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No. **127 SK** description: **Multison 400**

type of device: B-Mode producer/distributor: Siemens AG, Erlangen

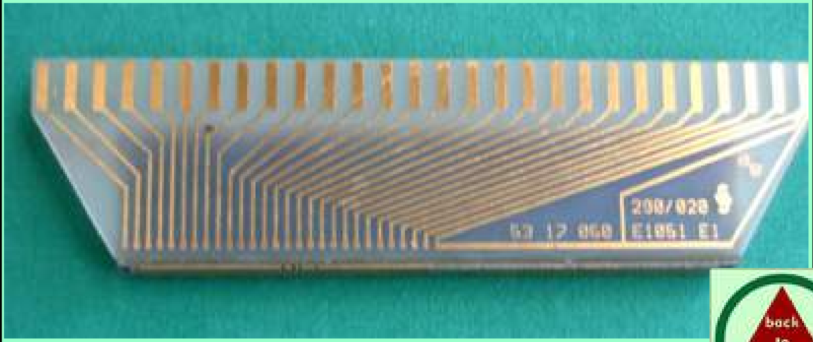
development:

frequency: 2.5 MHz time of production: beginning 1975

Linear Array

First generation linear array, not yet with dynamic focusing, with only one transformation layer, however already with micro divisions.
The assembly was essentially aligned for separate modules.

Image quality not satisfactory.



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No. **128** description: **Imager 1000**

type of device: B-Mode producer/distributor: Siemens AG, Erlangen
development:

frequency: 2.5 and 3.5 MHz time of production: beginning 1977

Early linear array system, fix focus in transmitting and receiving.
No dynamic focusing yet.
Only two frequencies: 2.5 and 3.5 MHz.

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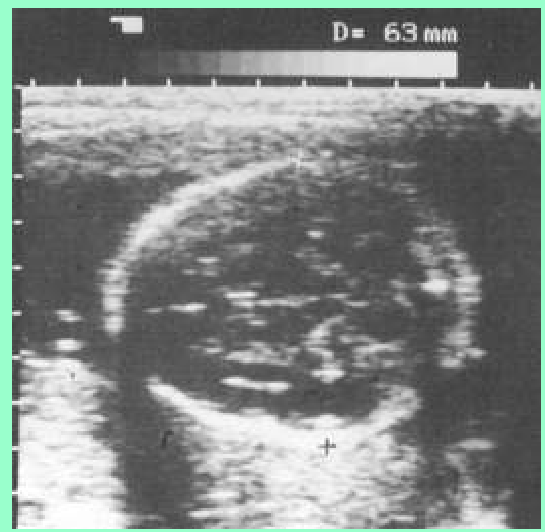
No. 129 **description:** Imager Serie 2000

type of device: B-Mode **producer/distributor:** Siemens AG, Erlangen

development: 1979/1980

frequency: 3.5 and 7 MHz **time of production:** 1980-1985

Real-time B-mode, 3.5 and 7 MHz.
Electronic focusing, microprocessor controlled. Alphanumerical input of patient’s data.
Electronic measuring auf distances.
Mainly used for Obstetrics and Gynecology, also for abdominal diagnostics.



Fetal skull, 24th week of pregnancy
(Holländer)

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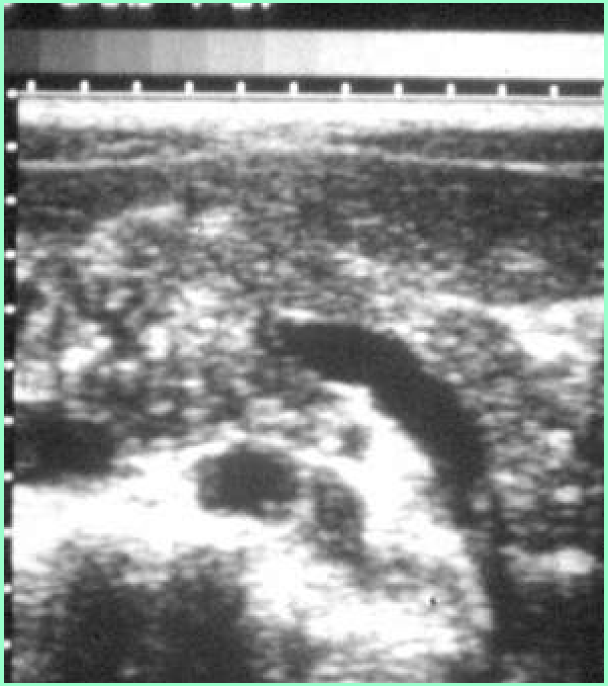
No. 130 **description:** Imager 2380

type of device: B-Mode **producer/distributor:** Siemens AG, Erlangen

development: 1978/80

frequency: 2.5 and 3.5 MHz **time of production:** since 1980

Real Time B-Mode, 2.5 and 3.5 MHz.
Dynamic focusing (receiver). Electronic multi-caliper for measuring distance, circumference, area and volume. Storage of measurements.



chronic calcified pancreatitis

No. 131 **description:** Sonoline 1000

type of device: B-Mode **producer/distributor:** Siemens AG, Erlangen

development:

frequency: 3 and 4 MHz **time of production:** 1983

Portable real-time system, linear array, 3 and 4 MHz. Dynamic focusing, zooming, caliper for measuring distance, circumference, area, volume, time and biometrical data. Mainly in use for Obstetrics.

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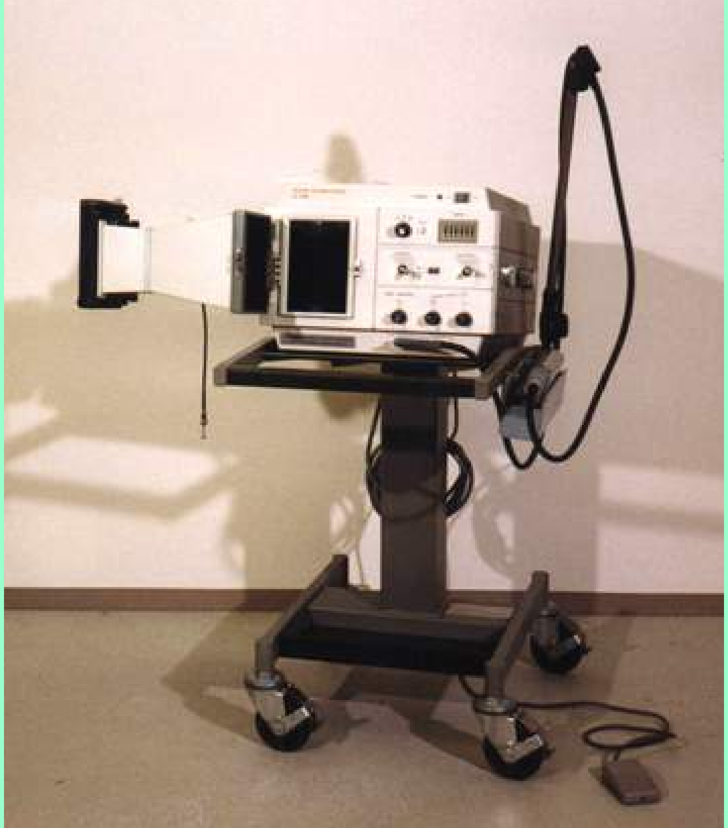
No. 133 description: **Linear Scanner LS 1500**

type of device: B-Mode producer/distributor: Picker Int., USA

development: 1979

frequency: 3 and 5 MHz time of production: since 1979

Real Time B – Mode, linear array, 3 and 5 MHz
Display on X – Y monitor. Storage.



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No. 134 description: Axiscan 5 A

type of device: B-Mode producer/distributor: Roche / Kontron

development:

frequency: 2 MHz time of production: 1976 - 1981

Real-time B – Mode, linear array, 2 MHz. Portable. 64 elements, 8 of them active for one line of the image. Mainly in use for Obstetrics.

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No. 135 description: Kontron Sigma 20

type of device: B-Mode producer/distributor: Kontron Instruments

development:

frequency: 3.5 and 5 MHz time of production:

Real-time B-Mode, linear phased array. Also TM-Mode.

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No. 141 **description:** CS 9200

type of device: B-Mode **producer/distributor:** Hitachi/Picker

development:

frequency: 3.5 - 7.5 MHz **time of production:** 1990-1995

B-mode system with curved and linear array probes; here with 3.5 MHz curved array for appications in Internal Medicine.
Origin: Klinikum Ibbenbueren

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Milestones of development 136 - 142

- Special developments
- Doppler-systems
- Other objects
- Cut transducers without apparatuses

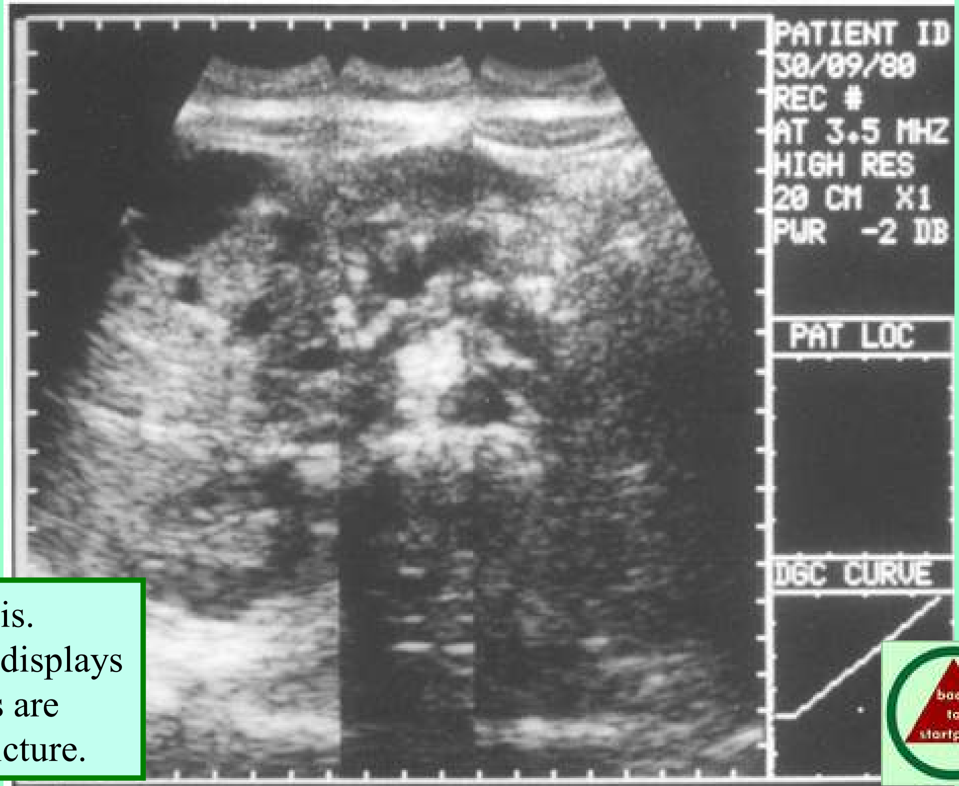
No. 136 description: **Diasonics RA1**

type of device: B-Mode / Doppler **producer/distributor:** Diasonics/Siemens AG

development: 1978 -1980

frequency: 2 - 7.5 MHz **time of production:** since 1980

Real-time B-Mode. Mechanical sector scanner. The probe for „small parts“ is coupled with a pw-Doppler-probe (see No.136 SK1). Documentation by instant camera.
In the 3.5 MHz probe three sector scanners are synchronized for a wide field of view (136 SK2).
A special scanner arm enables automatic positioning. The RA1 was the first „high end“ system.



Chronic pancreatitis.
This cross section displays how 3 sector scans are joined to form 1 picture.

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No. **136 SK1** description: **RA1 Small –Parts Probe**

type of device: B-Mode Doppler

producer/distributor: Diasonics/Siemens AG

development:

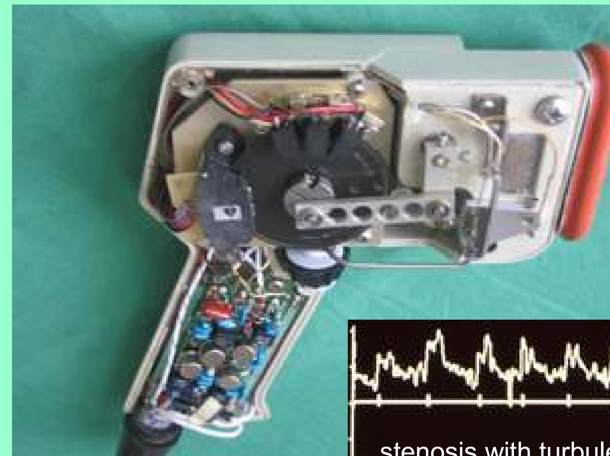
frequency: 7.5 / 2 MHz

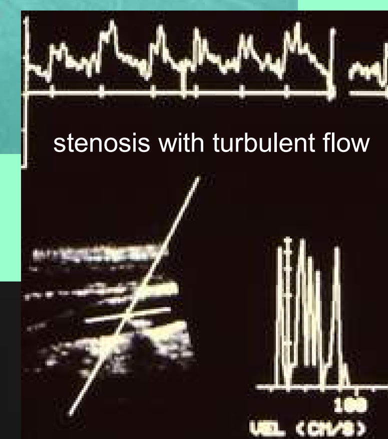
time of production: 1978-1980

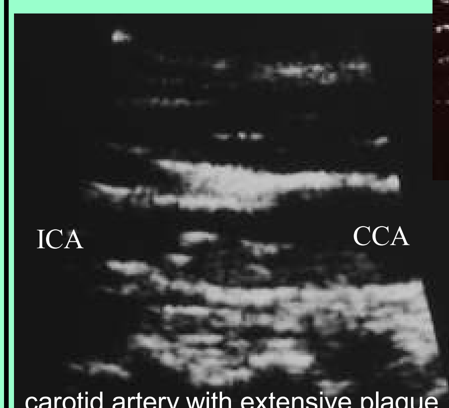
"Small-Parts" Duplex Probe

Mechanical sector scanner (wobbler) with high resolution; separate pw-Doppler.
Both probes are joined in one oil-filled case.
Position, size and angle of the Doppler sample volume can be adjusted within the field of view of the B-Mode probe.
Crude spectral display.

Frequencies: 7.5 MHz B-Mode
2.0 MHz Doppler Mode







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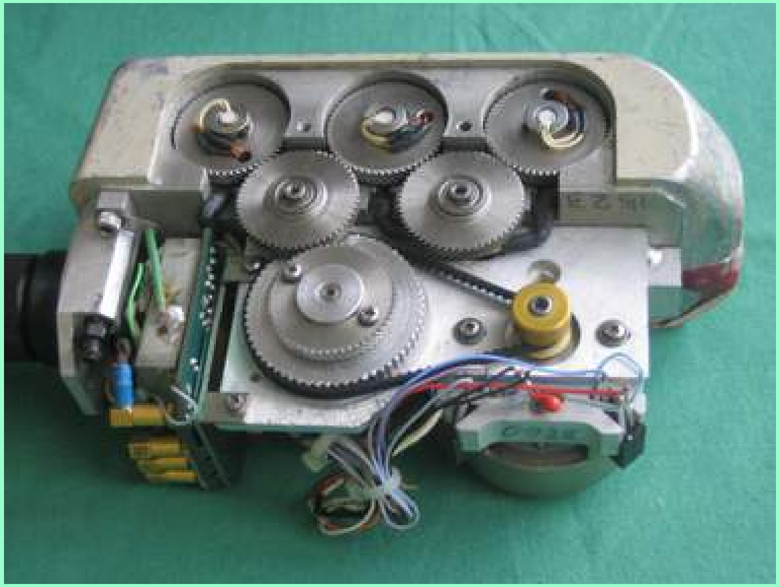
No. **136 SK 2** description: **RA1 Mehrfachsonde**

type of device: B-Mode producer/distributor: Diasonics/Siemens AG

development:

frequency: 3.5 MHz time of production: 1978-1980

Mechanical multi transducer system
Three synchronously rotating transducers for displaying larger body surfaces.
Each transducer displays a pre-defined part of the sectional plane. The transducers are alternately activated.
The whole picture is displayed by combining the three separate scans (see No. 136).
Relatively low frame rate.



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No. 137 description: Color Doppler SSD 880

type of device: B-Mode, Color-Doppler

producer/distributor: Aloka Co, Tokyo

development: 1980-1985

frequency:

time of production: 1985-1992

Real-time B-Mode, phased array technique with integrated color-Doppler (Color Coded Duplex). First system with integrated combination of A-Mode, TM-Mode, B-Mode, Doppler-Mode (cw- pw- and directional color Doppler).

No. 138 **description:** Sonoline 8000

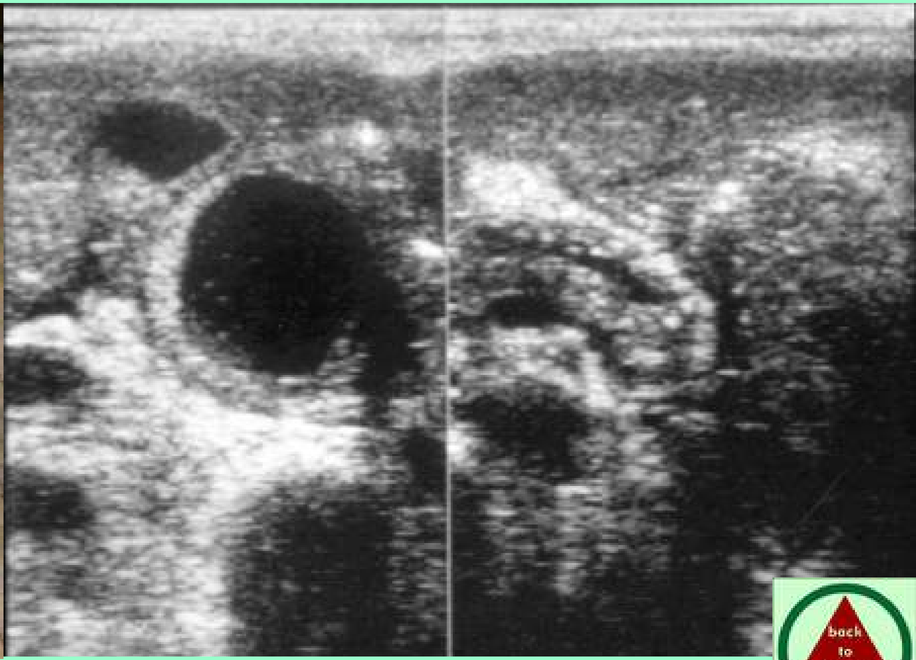
type of device: B-Mode **producer/distributor:** Siemens AG, Erlangen

development: 1979-1982

frequency: 2.5-7.5 MHz **time of production:** 1982-1985

Real-time B-Mode, linear array technique. Dynamic focusing (transmitter and receiver). First fully digitalized ultrasound device.

pancreas pseudo-cyst / chronic pancreatitis



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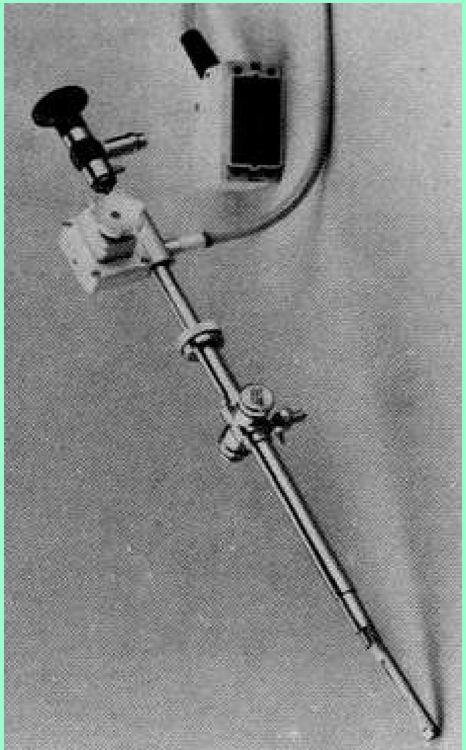
No. 138 Z 1 description: Ultrasound Laparascope UM 2 for Sonoline 8000

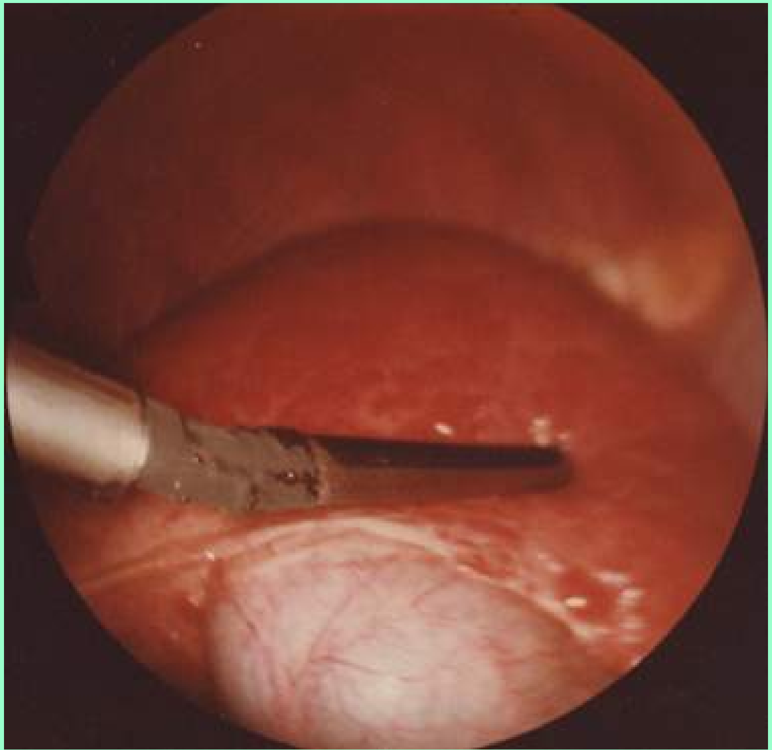
type of device: B-Mode, producer/distributor: Siemens AG, Erlangen

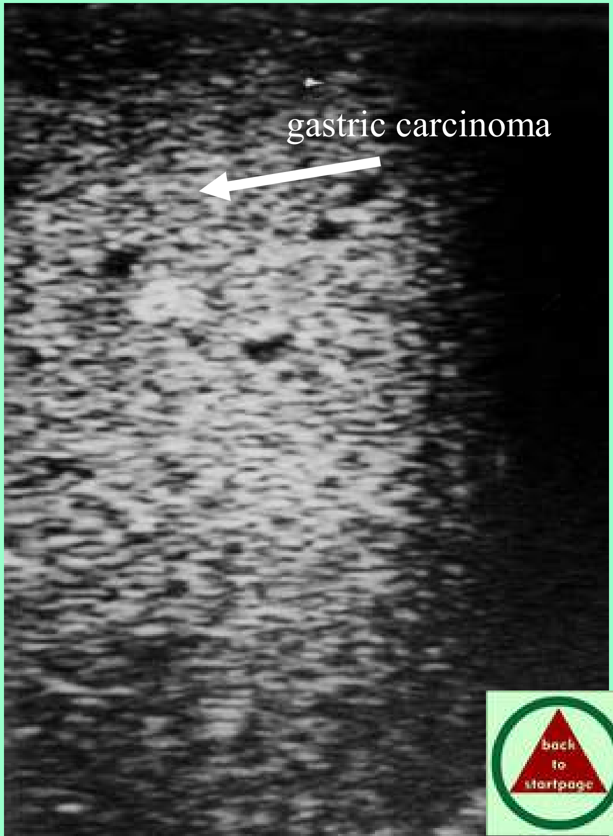
development: since 1982

frequency: 7.5 MHz time of production: prototype 1983

Linear array for laparoscopy with 96 single elements. Sterilization possible with cold gas. Dynamic focusing by digital signal processing in 16 channels. Each element is connected to the Sonoline 8000 by a separate coaxial cable. This intricate requirement was not easy to fulfill, especially the connection between the flexible array and the fixed laparoscopic tube.







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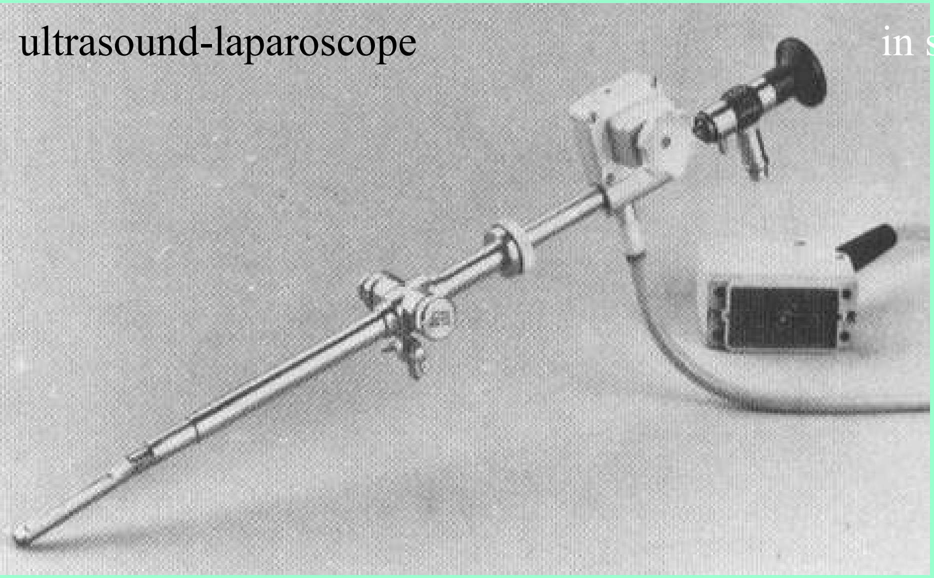
No. 138 Z 2 **description:** Laparascope for Sonoline 80

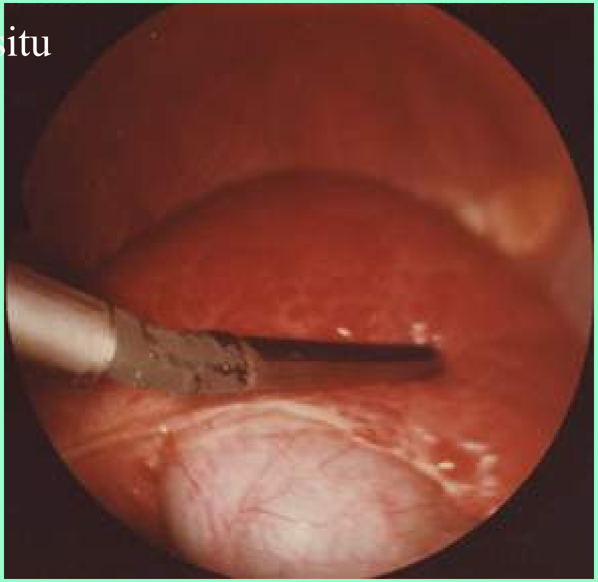
type of device: Linear Array **producer/distributor:** Siemens AG, Erlangen

development: 1982

frequency: 7.5 MHz **time of production:** prototype

Ultrasound transducer at the end of a 30 cm long probe, which can be inserted through the 10 mm wide tube of a customary optical laparoscope. The linear transducer has an active length of 35 mm. It is maneuverable in the ultrasound plane from -10° to +45°. Dynamic focusing by digital signal processing in 16 channels. Sterilization possible with cold gas.
Each of the 96 single elements is connected to the Sonoline 8000 by a separate coaxial cable. This intricate requirement was not easy to fulfill, especially the connection between the flexible array and the fixed laparoscopic tube.


ultrasound-laparoscope


in situ

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No. 138 SK 1 **description:** Sonoline 8000

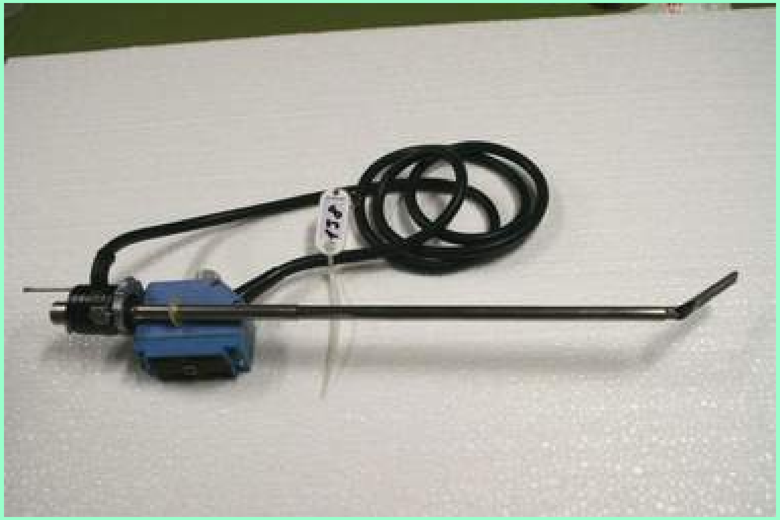
type of device: B-Mode, **producer/distributor:** Siemens AG, Erlangen

development: 1982-1983

frequency: 7.5 MHz **time of production:** 1983-1985

Linear Array

Linear array for laparoscopy with 96 single elements. Sterilization possible with cold gas. Dynamic focusing by digital signal processing in 16 channels. Each element is connected to the Sonoline 8000 by a separate coaxial cable. This intricate requirement was not easy to fulfill, especially the connection between the flexible array and the fixed laparoscopic tube.



No. 138 SK 1 description: Sonoline 8000

type of device: B-Mode, producer/distributor: Siemens AG, Erlangen

development:

frequency: 5 MHz time of production: 1979 - 1982

Linear Array

Linear array, 5 MHz, with 128 single elements. First system with completely digitalized signal processing including beam forming.

No. 139 description: Combison 330 Voluson

type of device: B-Mode, 3D-Imaging, Colorflow Doppler

producer/distributor: Kretztechnik, Zipf

development: 1986

frequency: 3.5-7.5 MHz

time of production: since 1989

B-Mode with mechanical sector, linear und curved array technique. Volume calculation with color-coded images. **First 3-dimensional ultrasound system** with surface view, translucent display and volume calculation. Various special probes, e.g. for intracavitary applications, spectral- and color Doppler.

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No. 140 description: **ATL Ultramark 9 HDI**

type of device: B-Mode, M-, TM-Mode, Colorflow Doppler

producer/distributor: Advanced Technology Labs.

development:

frequency: 2 - 10 MHz

time of production: 1988-1992

At that time ATL's top ultrasonic device, and with 565 lbs (256,3 kg) very impressive. For use in Obstetrics, Gynecology, Urology, Cardiology, small parts, vascular lab, Neurology.
Probes with phased, annular, linear and curved arrays; also mechanical sector, TEE, vaginal endo-probes, intraoperative probes. B-mode triggering by ECG optional.
Our system is equipped with a linear probe of 5-7 MHz and a sector probe of 2-3 MHz including software for intracranial investigations. M-mode also works in color.
Separate monitors for black-and-white and for colored displays.
Software-controlled multi-function switches at a touch-sensitive gas-discharge plasma display.
Independent steering of B-Mode display, colorflow-Doppler and cw-Doppler.
Frame rate up to 156/s, depending on depth and angle.

Origin: Klinikum Ibbenbueren

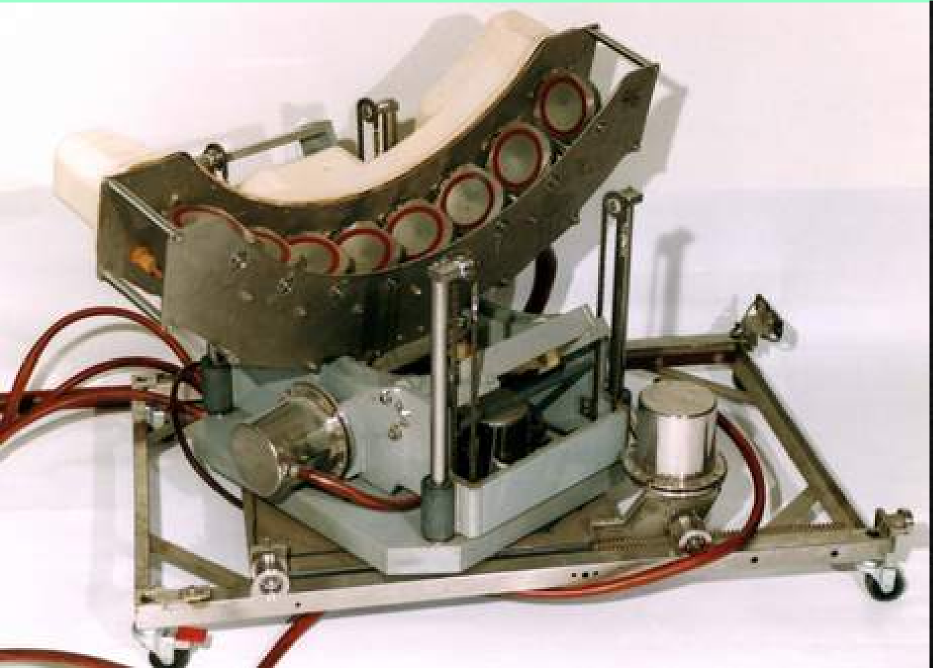
No. 142 **description:** Octoson

type of device: B-Mode **producer/distributor:** Ausonics, Sydney

development: 1978

frequency: 3 MHz **time of production:** since 1978

Very complex Compound system, simultaneous mechanical scanning by 8 large statically focused transducers within a water tank. Connection to patient by means of a large plastic examining surface upon which the patient lies. Originally designed for gynecological use, the Octoson was later modified for mamma inspections.



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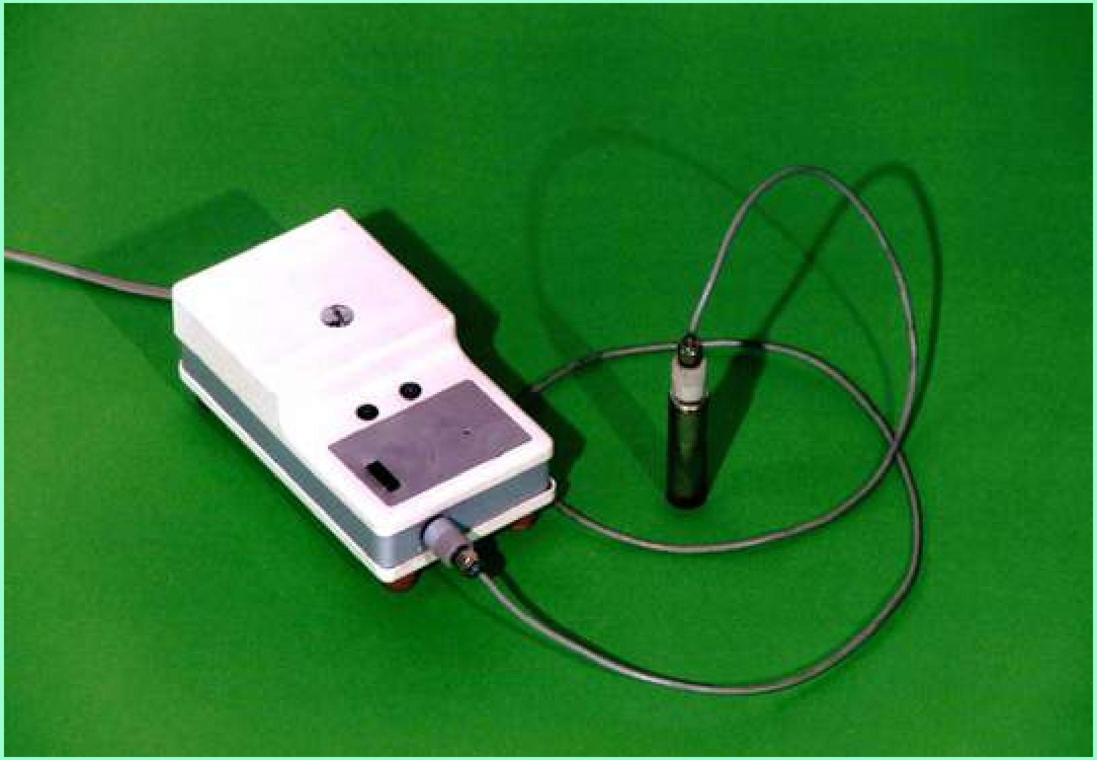
No. **140** description: **ENT - Detector**

type of device: Echo Detector producer/distributor: VEB Ultraschalltechnik, Halle

development: 1978

frequency: 4 MHz time of production: since 1979

Echo-Detector, pocket-size.
This device showed the existence (pathological finding) or none-existence of the echo of the back wall of the maxillary sinus via either a red or a green LED.



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No. **141** description: **MiniVisor**

type of device: Echo Detector producer/distributor: Organon Teknika Corp.

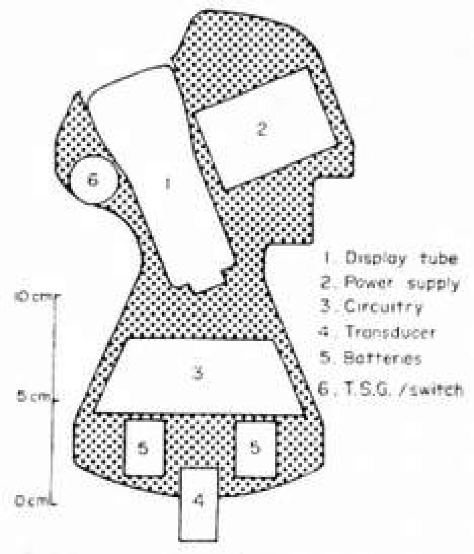
development:

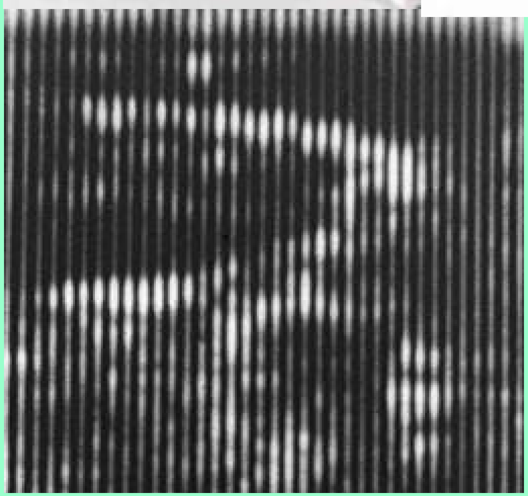
frequency: 3.12 MHz time of production: 1979

Portable Ultrasound Scanner

Battery-powered scanner with integrated linear-array. Contrary to customary array systems with many elements, of which several were activated simultaneously during one sounding period, this array had only 20 elements of which just 1 at a time was activated – similar to the Eye-Scanner (system Buschmann / Kretz) with 12 single elements.

At that time smallest scanner, 1,5 kg,
c. 26 x 16 x 16 cm. Display only 33 x 43 mm.
Just 1 switch for modulating amplification.





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No. 054 z **description:** **Device for Bone Scanning**

type of device: A-Mode **producer/distributor:** Institute for Biophysics, Halle

development: 1968

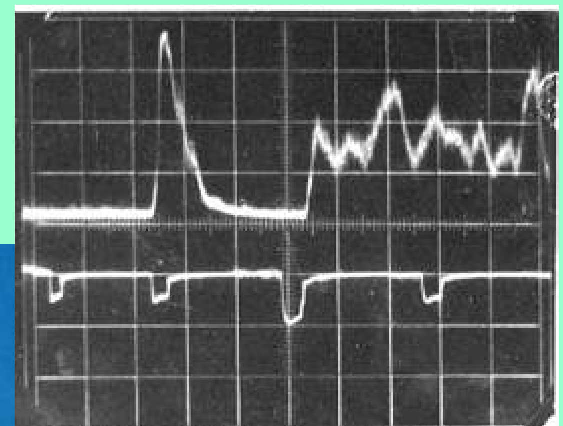
frequency: 2.5 to 7.5 MHz **time of production:** 1968

Scanner to be connected to the A-Mode device series GA 10 for measuring the speed and the attenuation of sound at the tibia in vertical and in oblique direction.

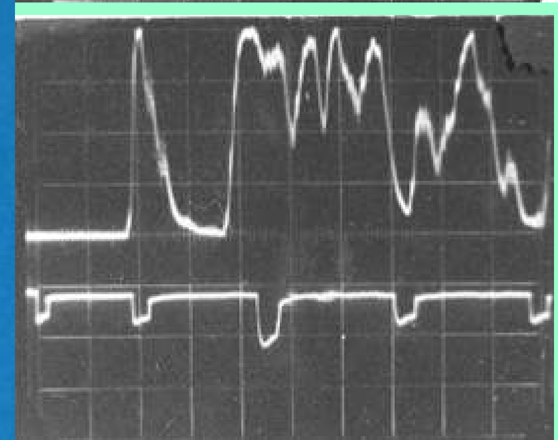
Model II

See device No 54 GA 10

Origin: R. Millner, Halle



normal



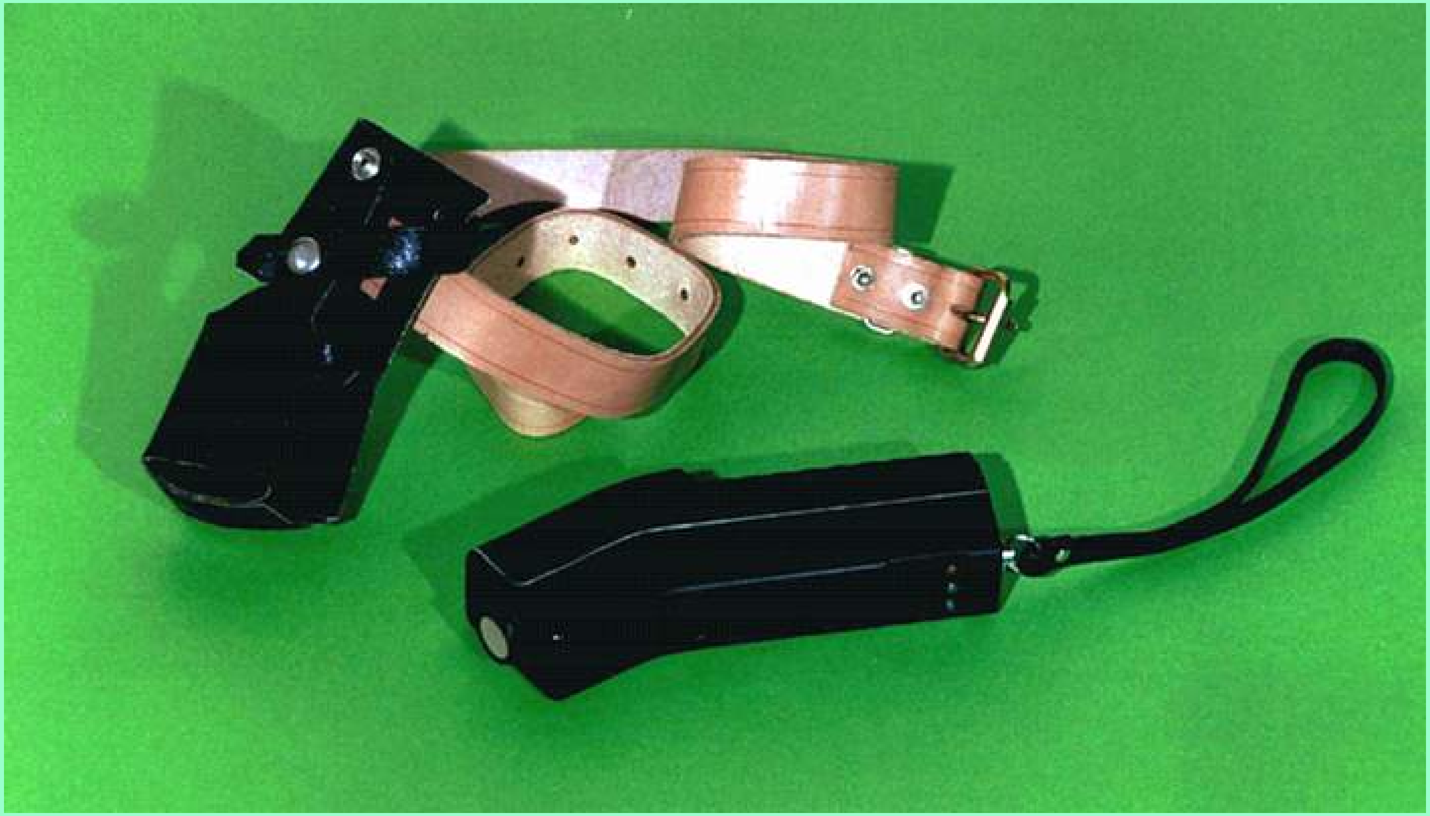
osteoporosis

No. 144 description: **Gestation detector TuR-TD 20S**

type of device: Doppler producer/distributor: VEB Transformatoren und Röhrenwerk Dresden

frequency: 2 MHz time of production: 1979

Portable Doppler system for the detection of gestation.
Also used in human medicine on an experimental basis.



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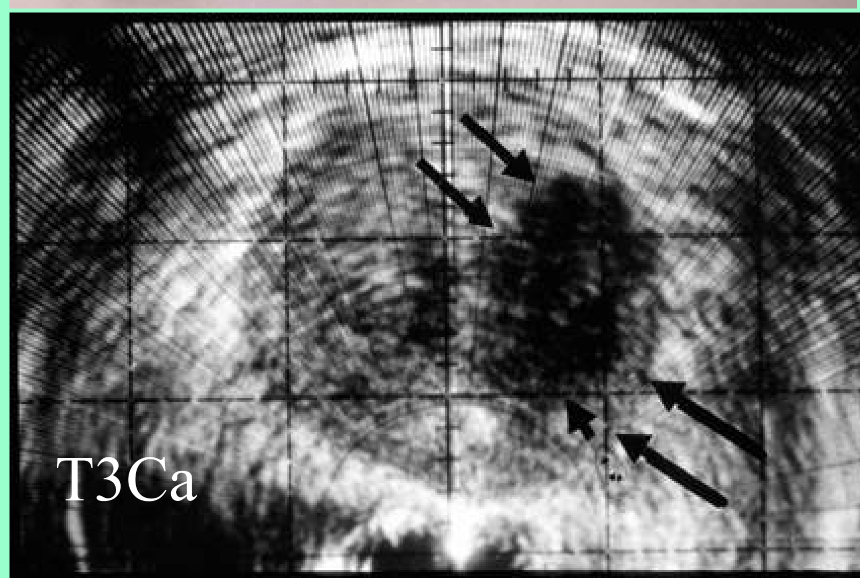
No. 145 **description:** **Trans Rectal Scanner 9526**

type of device: B-Mode **producer/distributor:** Brüel & Kjaer, DK

development: 1978 -1979

frequency: 3.5 MHz **time of production:** 1979

B-Mode, mechanically rotating scanner, exclusively for transrectal use.
Coupling by a water-filled standoff.
Origin: B. Frentzel-Beyme, Berlin



No. 146 **description:** Ultrasonic Endoscopic Probe UM 2

type of device: 360° Sector Scanner **producer/distributor:** Aloka/Olympus

development: since 1981

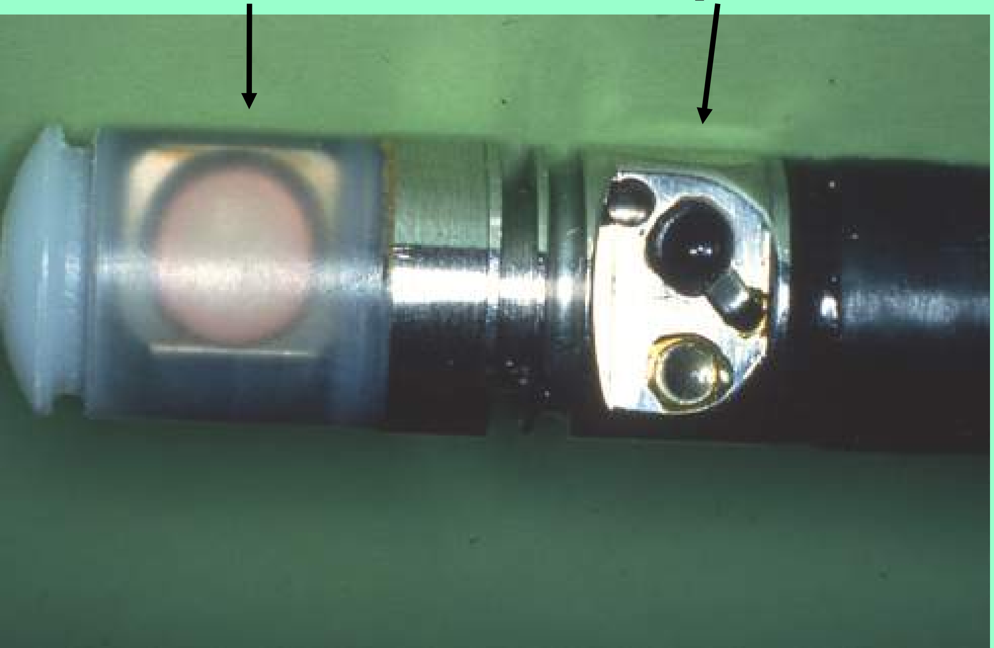
frequency: 7.5 MHz **time of production:**

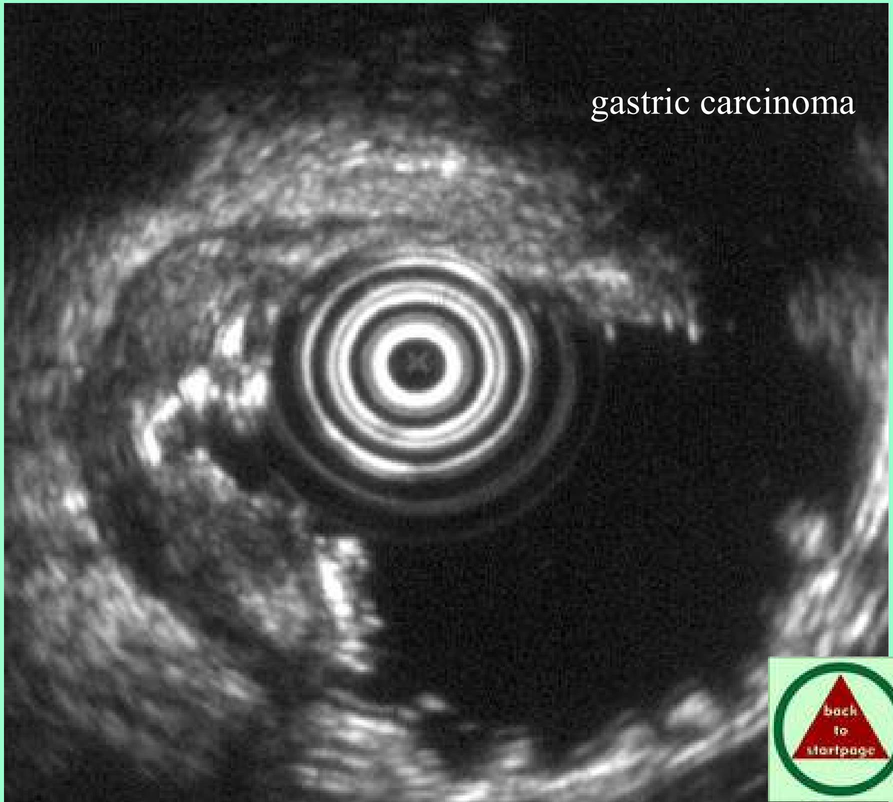
Mechanical 360° sector-scanner at the tip of a gastroscope with oblique optics for viewing. Originally developed for the inspection of organs next to the stomach, such as the pancreas; mostly used for the evaluation of the walls of the esophagus and the stomach - complementary to optical endoscopy.

See also No. 138, Sonoline 8000.

ultrasound transducer

optics





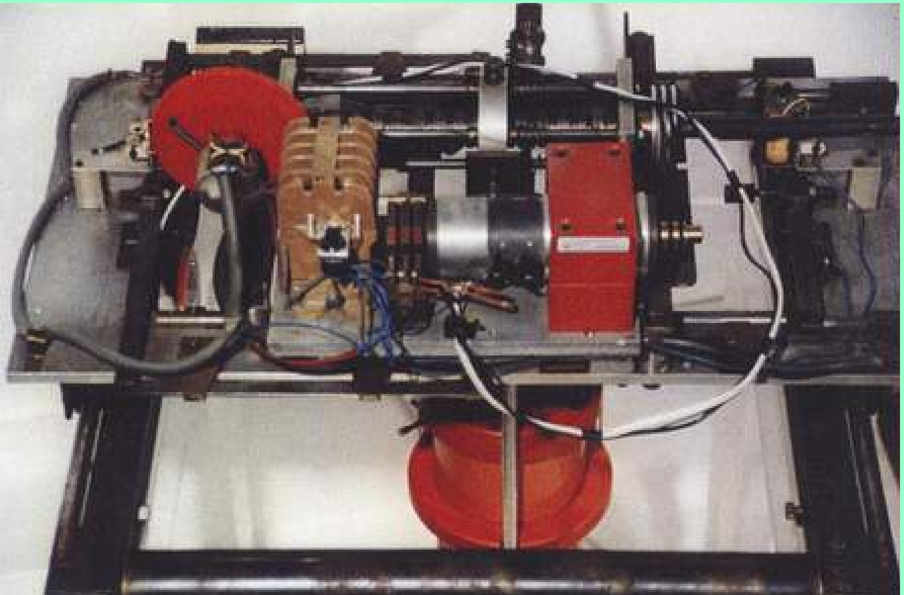
No. 157 **description:** **Focoscanner**

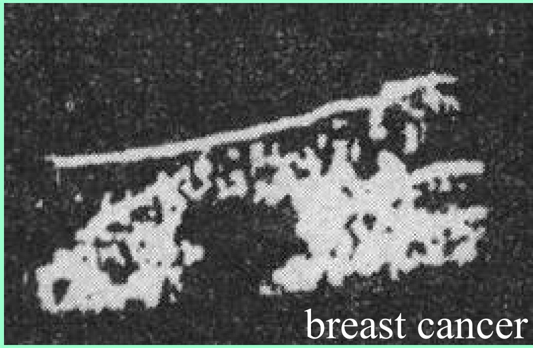
type of device: A-, B-, and C-Mode **producer/distributor:** Instit. M. von Ardenne, Dresden

development: 1959/60

frequency: 3 MHz **time of production:** 1960

A-, B- and C-system. The plane scanned is at right angle to sound propagation (C-plane). The transducer is moved in one line by a spindle. Line break by cograils.
For sound generation a virtual punctiform sonic source is generated in the level of the object by a lens and this performs the scanning procedure.
All echoes are depicted in the same focal intensity. Scanning time about 30 sec.
If a stone was localized, a fragmentation could be tried, as the maximum power output was 400 Watts. - Experimental device without clinical application.





breast cancer

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No. 160 description: **Sonoline SI 1200**

type of device: B-Mode, producer/distributor: Siemens AG, Erlangen

development:

frequency: 2.5-3 MHz time of production:

Phased array device specially constructed for cardiological diagnostics.
To minimize electronic layout, the focusing is done by 2 x 48 channels with alternating transmission cycles.
Color-coding of blood-flow (duplex mode).

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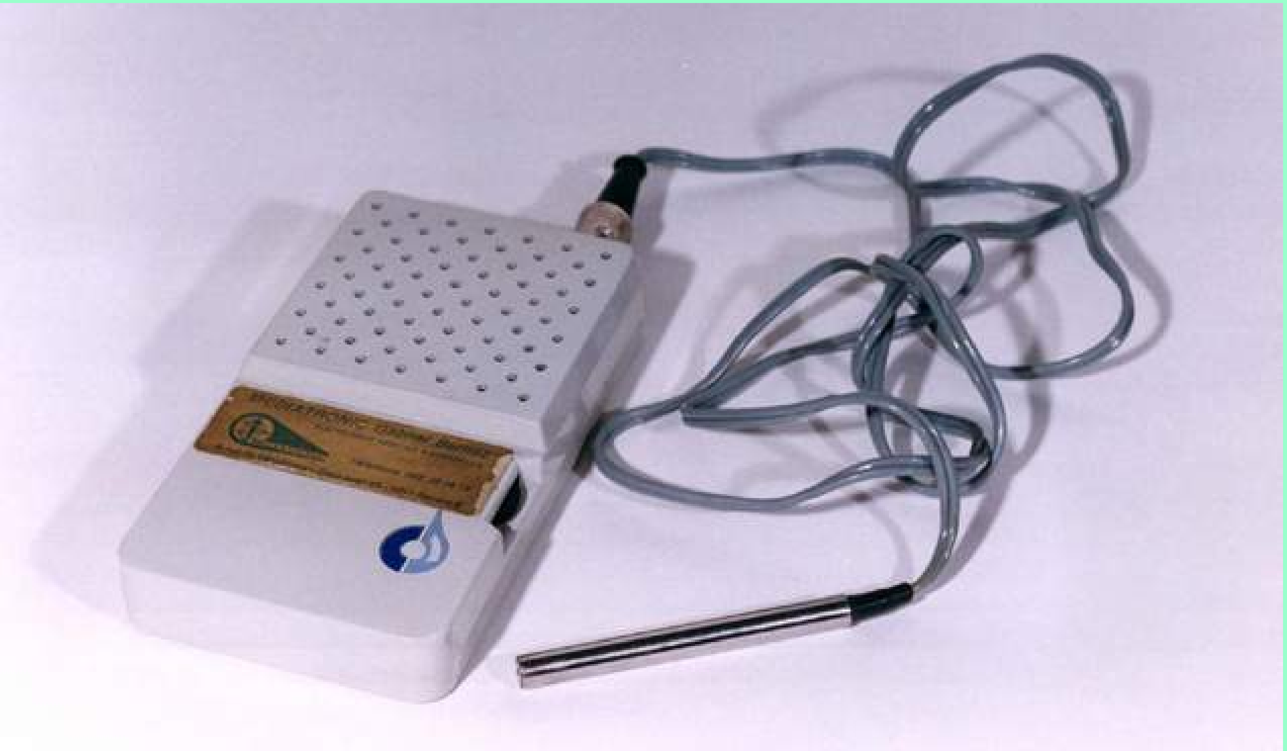
No. 260 description: **Pocket Doppler**

type of device: cw-Doppler producer/distributor: Mediatronics, Geneva

development: 1967

frequency: 8 MHz time of production: since 1968

Cw-pocket Doppler, 8 MHz
Simple yet highly-sensitive non-directional device.
First investigations of the fronto-orbital arteries, so called indirect Doppler sonography.
Origin: R. Müller, Basel



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No. 261 **description:** Fetal Puls Monitor FM 2

type of device: cw-Doppler **producer/distributor:** Sonicaid/Kranzbühler

development: 1968

frequency: 1.5 MHz **time of production:** 1968-1971

Cw–Doppler system with multiple elements transducer 1.5 MHz.
Integrated thermal recorder.
First device for continuous monitoring of fetal heartbeats.
Origin: Kranzbühler, Solingen.

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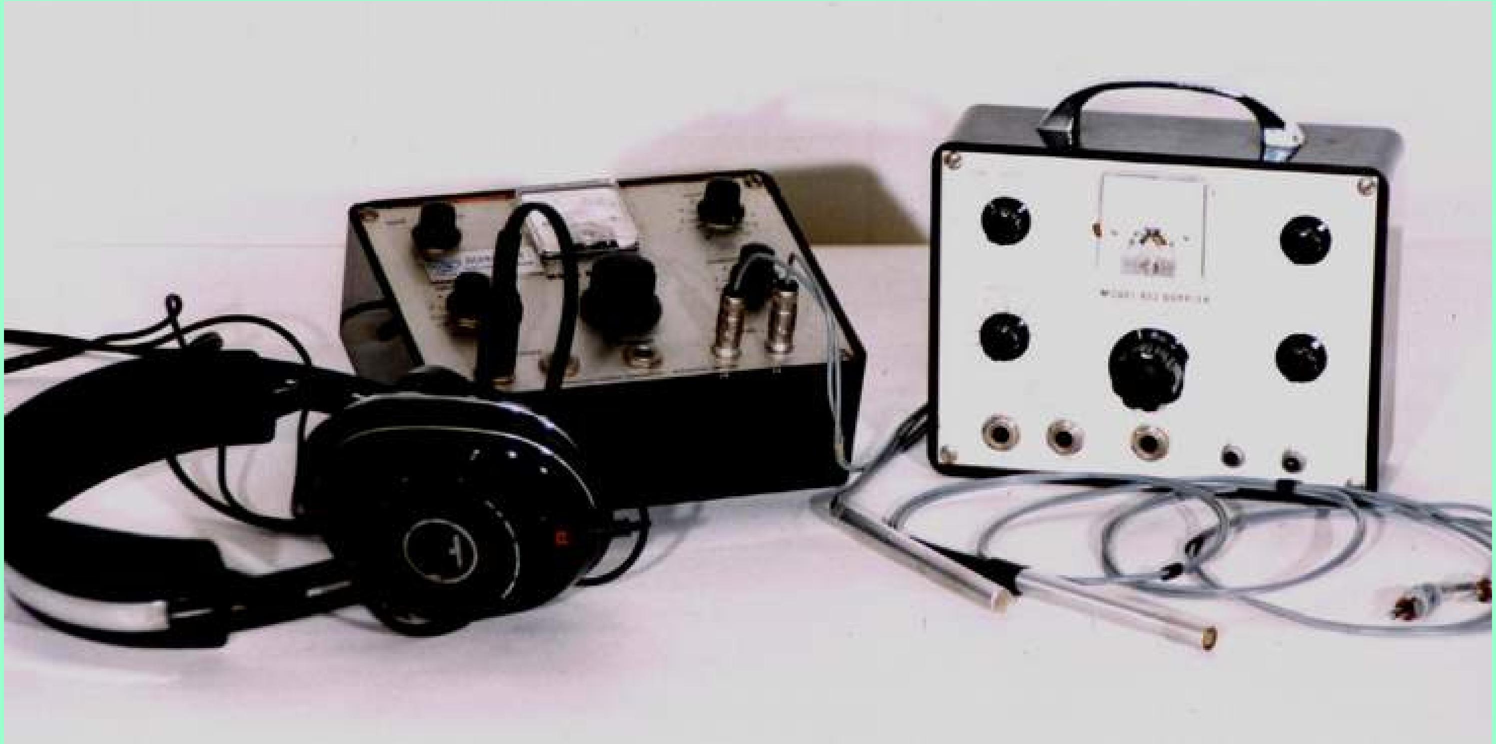
No. 262 **description:** Parks Model 802

type of device: cw-Doppler **producer/distributor:** Parks Electronics, USA

development: 1966-1968

frequency: 5 MHz **time of production:** since 1968

Cw-pocket Doppler system, non-directional, 5 MHz.
Used for first recordings of intracardial flow (Seipel)
Origin: L. Seipel, Tübingen.



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No. 263 **description:** Parks Model 806

type of device: cw-Doppler **producer/distributor:** Parks Electronics, USA

development: 1969

frequency: 5 MHz **time of production:** 1969 - 1970

Bidirectional Doppler system, 5 MHz. Direction of blood flow is indicated by 2 separate gauges and by 2-chanel acoustics. Outlet for printer.
Model 806 was the first bidirectional model by Parks, soon to be replaced by Model 906.
Origin: R. M. Schütz, Lübeck.

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No. 264 description: **Parks Model 906**

type of device: cw-Doppler producer/distributor: Parks Electronics, USA

development: 1970

frequency: 5, 10 MHz time of production: 1970

Two frequency bidirectional cw-Doppler system, 5 and 10 MHz.
Flow direction is indicated by two gauges as well as acoustically.
Outlet for printer. Replacement of Model 806.
Origin: R. M. Schütz, Lübeck.

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No. 265 **description:** DUD 02

type of device: cw-Doppler **producer/distributor:** Delalande Electronique, F

development: 1969

frequency: 4 MHz **time of production:** since 1970

Cw-Doppler with directional information, 4 MHz.
Zero-crossing-technique displays sum of frequency shift. External recorder.
With a pivot arm and an EDM, this system was deployed for „Doppler-angiography“.
Origin: B. Widder, Ulm

No. **266** description: **DUD 400**

type of device: cw-Doppler producer/distributor: Delalande Electronique, F

development: 1970-1972

frequency: 4 MHz time of production: since 1972

Cw-Doppler, 4 MHz.
Bidirectional system with integrated thermal printer; connections to external printer, EKG. Wall filter 10, 30 and 100 Hz. Display of averaged Vi and Vm.
Origin: I. Neuerburg-Heusler, Engelskirchen.

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No. 267 **description:** UDOP 1

type of device: cw-Doppler **producer/distributor:** Popp Elektronik, Halle

development: 1960-1970

frequency: 2 MHz **time of production:** 1970-1980

Cw-Doppler for fetal monitoring, 2 MHz.
Acoustic information of fetal cardiac actions. First Doppler system in the GDR.
The picture [left] displays a picoskope or oscilloscope used for optical visualization of the signal.
Origin: A. Millner, Halle

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No. 268 description: **UDOP 2**

type of device: cw-Doppler producer/distributor: VEB US-Technik, Halle

development: 1968-1969

frequency: 2 MHz time of production: 1969-1975

Cw-Doppler system with acoustical information for monitoring of fetal heart actions, 2 MHz. Similar to UDOP 1, but further improved by addition of signal filters and outputs for tape recorder and printer for continuous monitoring.

Origin: R. Millner, Halle

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No. **269** **description:** **UBD 2**

type of device: cw-Doppler **producer/distributor:** Instit. for Biophysics, Halle

development: 1974-1976

frequency: 2-10 MHz **time of production:** 1976-1980

Cw-Doppler system, bidirectional, 2-10 MHz.
Acoustical output, sockets for printer and PC.
System for the center of a vascular Doppler lab, intended for registering flow and volumes, and for determining flow indices, spectral distribution and power.
Origin: U. Cobet, Halle.

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No. **270** description: **FD 410**

type of device: cw-Doppler producer/distributor: VEB US-Technik, Halle

development: 1975

frequency: 4 MHz time of production: since 1977

Cw-Doppler system for fetal monitoring, 4 MHz. Sockets for printer and tape recorder.
Used for continuous monitoring with special probes.
Also deployed for blood flow monitoring (unidirectional).
Origin: R. Millner, Halle

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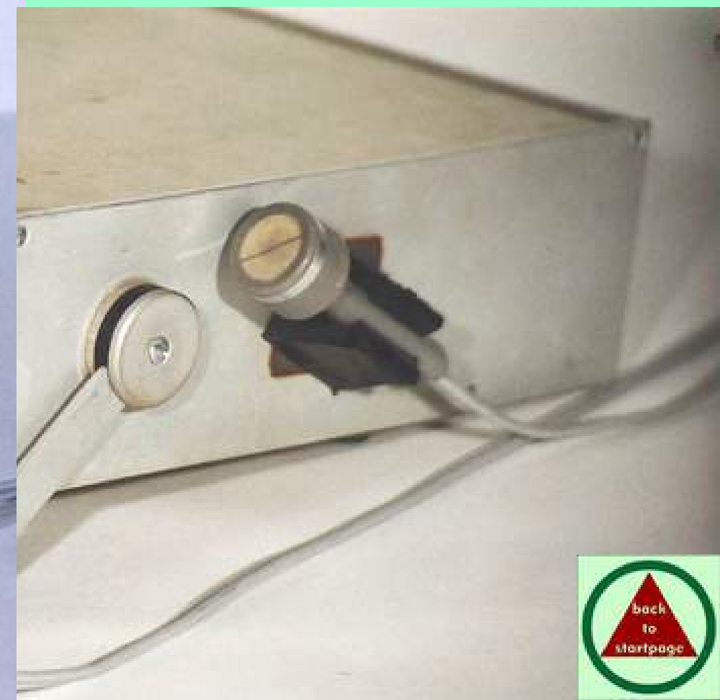
No. 271 **description:** FD 410 revised version

type of device: cw-Doppler **producer/distributor:** VEB US-Technik, Halle

development: 1977

frequency: 4 MHz **time of production:** 1978-1985

Fetal pulse detector, revised version, 4 MHz
Also deployed for blood flow monitoring (unidirectional).
Origin: R. Millner, Halle.



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No. **272** description: **Eucoton S**

type of device: cw-Doppler producer/distributor: Siemens AG, Erlangen

development:

frequency: 3-4 MHz time of production: 1970

Simple cw-Doppler system for monitoring of fetal cardiac actions, 3-4 MHz.

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No. 273 **description:** MDG 2

type of device: cw-Doppler **producer/distributor:** Kretztechnik, Zipf

development: 1969

frequency: 2 MHz **time of production:** since 1970

Cw-Doppler system for monitoring of fetal heart actions, 2 MHz.
Interchangeable probes; sockets for headsets and tape recorder.

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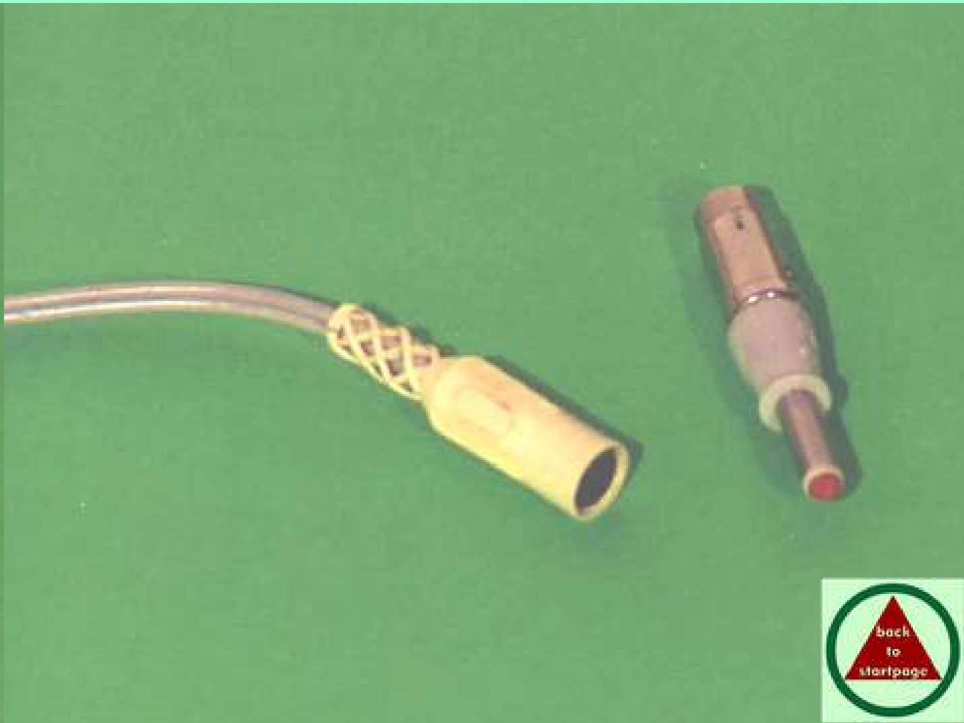
No. 274 **description:** Minivason 9

type of device: cw-Doppler **producer/distributor:** Kretztechnik, Zipf

development: 1972-1973

frequency: 6-8 MHz **time of production:** 1973-1979

Cw-Doppler system, pocket size, battery-powered.
Small loudspeaker, socket for headset, replaceable probe.
This sturdy device – an enhanced version of the „Minifeton“ (No. 278) - was mainly used in out-patient care, also in accidents.



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No. 276 **description:** TC 2-64

type of device: pw-Doppler **producer/distributor:** EME, Überlingen

development: 1982

frequency: 2 MHz **time of production:** since 1983

Pw-Doppler system, 2 MHz, developed by Eden Medizinische Elektronik Überlingen in cooperation with Neurosurgeon Rune Aaslid. First commercially available Doppler system for recording of transcranial (intracranial) blood flow by pulsed Doppler (TCD). Also first to include a 64-point spectral display of the Doppler-signal after fast Fourier transformation (FFT) in the same device. TCD monitoring with the probe fitted to the skull by an elastic strap.– Type TC2-64B was also equipped with 4 and 8 MHz probes for peripheral vascular examinations.
Origin: R. M. Schütz, Lübeck.

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No. 278 **description:** Minifeton

type of device: cw-Doppler **producer/distributor:** Kretztechnik, Zipf

development: 1969

frequency: 2 MHz **time of production:** 1970-1979

Cw-Doppler system for detection and monitoring of fetal heart beats, 2 MHz.
2 models: a) simple pocked Doppler device with acoustical output. b) later sized as an ordinary probe but equipped with remarkable functions: Automatic battery charging in a mount, acoustical output either by stethoscope or via a FM-transmitter by a standard radio.

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No. **279** description: **Doppler 762**

type of device: cw-Doppler producer/distributor: Kranzbühler

development:

frequency: 4 and 8 MHz time of production: since 1977

Cw-Doppler system with frequency filter, calibration and integrated printer.
Connects to "frequency analyzer 8106" for spectral analysis (FFT).

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No. 280

description: Microview

type of device: Doppler-, B-Mode

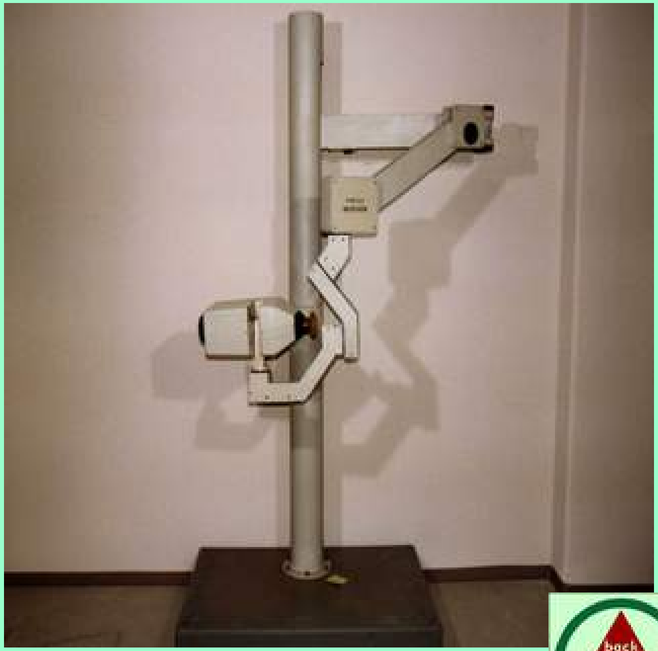
producer/distributor: Picker

development:

frequency: 10 MHz

time of production: since 1978

Microview Duplex. Mechanical linear scanner with high resolution for small parts-scanning, including Doppler sonography for superficial blood vessels.
The constructional design of the scanner allowed coupling without pressure.
Origin: H. J. Schulz, Hamburg



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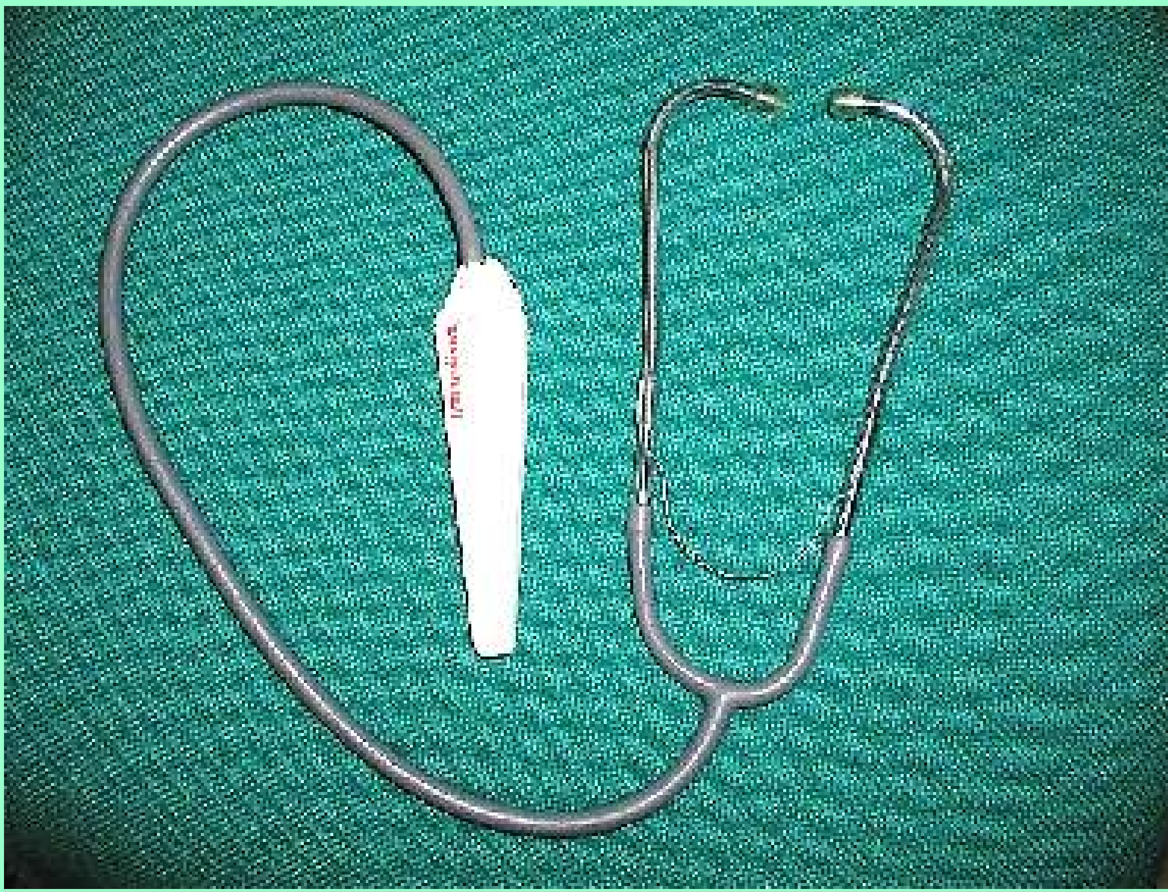
No. 281 **description:** Doppler-Stethoscope

type of device: cw-Doppler **producer/distributor:** Kranzbühler

development:

frequency: ?? **time of production:** ???

Doppler – System



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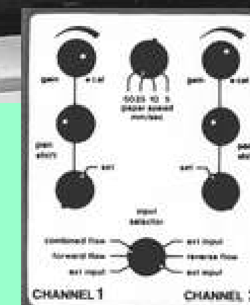
No. 282 **description:** Vasoflo 2

type of device: cw-Doppler **producer/distributor:** Sonicaid Ltd.

development:

frequency: 2, 4 and 8 MHz **time of production:** 1983-1988

Bidirectional cw-Doppler System with three frequencies for vascular and for cardiological examinations. Battery/mains operation.
Outphaser separation of forward and reverse flow. This separate flow can be displayed by printer on thermo-sensitive paper, by LEDs and on a none-fade digital memory scope. Acoustical output via integrated loudspeaker or headset (two channel).
Calibration pulses and zero run at the end of every recording.
Origin: Klinikum Ibbenbueren



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German Ultrasound Museum

Collection (Last Updated June 2013)

- From matter-testing to A-Scan
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  - Electronic real-time devices
  - Milestones of development
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  - Doppler-systems
  - **Other objects 346 - 391**
  - Cut transducers without apparatuses

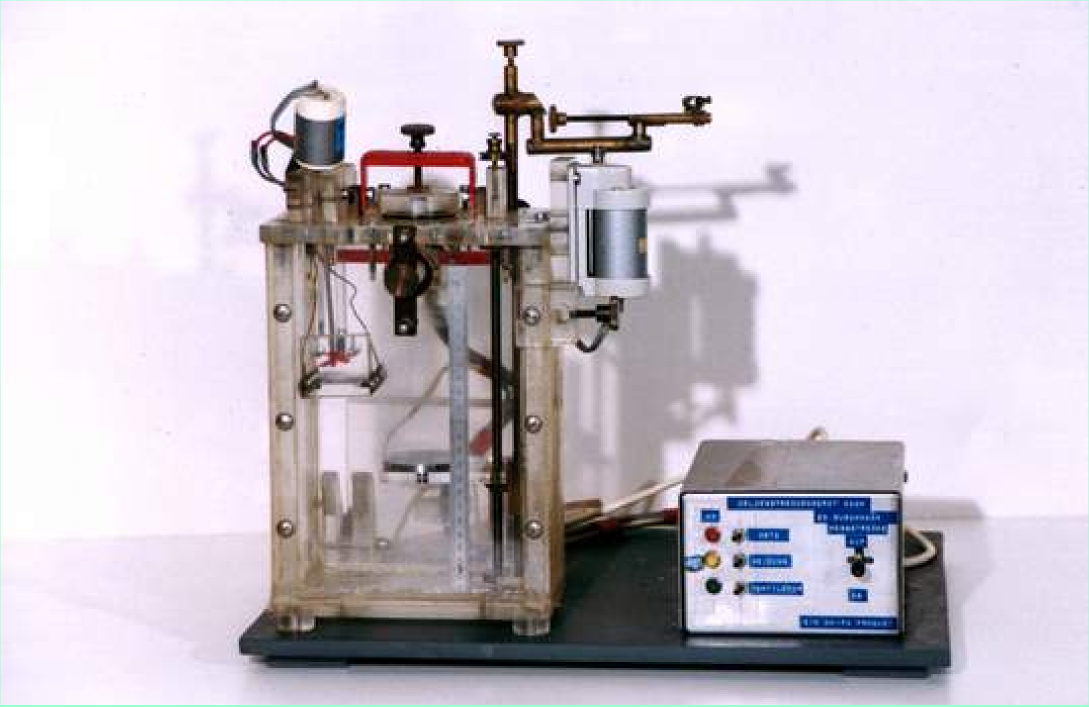
No. **346** **description:** **Measuring track in oil bath (new)**

type of device: Accessory **producer/distributor:** Dept. of Ophthalmology, Würzburg University

development:

frequency: **time of production:** 1985

This measuring system was developed by Buschmann in the Ophthalmology department of the Charité Berlin, 1966. Our device was built 1985 in Würzburg for determining the sensitivity of the transducer.
Origin: W. Buschmann, Würzburg.



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No. 346 description: **Measuring track in oil bath (old)**

type of device: Accessory **producer/distributor:** ??

development: ??

frequency: **time of production:** ??

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No. **365** description: **Uni Quatro**

type of device: Multiformat camera for documentation

producer/distributor:

development:

frequency:

time of production: since c. 1981

Early in the 1980s the Uni Quatro was introduced in (West) Germany. Before that, for documentation only Polaroid pictures could be shot (1 shot ≙1 € or 1.4 $) - or negatives on 35 mm films (later correlation used to be somewhat difficult).
The Uni Quatro documented on radiographic film - 4 frames, initially. Therefore it was first deployed in Radiology and later in other medical disciplines.
As the camera improved, one could choose between 8, 4, 2 or just 1 frame per sheet.

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No. 380 **description:** **Acoustic pressure scale**

type of device: **producer/distributor:** VEB Transformatoren- und Röhrenwerk, Dresden

development:

frequency: **time of production:** 1960

Acoustic pressure scale for determining the acoustic power for therapy (> 9.1 Watts).
The power or intensity is specified in Watts per square centimeter.
Origin: R. Millner, Halle

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No. 390 SK

description: Sonocur plus

type of device: B-Mode

producer/distributor: Siemens AG, Erlangen

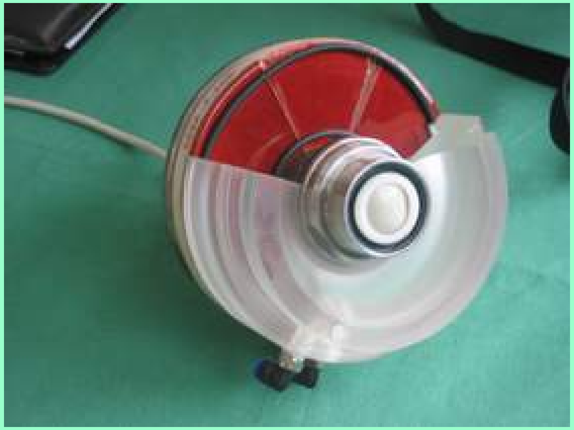
development:

frequency: ??

time of production: 1984

Shock wave generator + Sector scanner

US-therapy + B-scan. Combination of a shock wave generator for therapeutic use (here for pain treatment) with a mechanical sector scanner displaying the body surface being treated.
The initially plane shock wave is focused on the zone to be treated by a polystyrene lens - patient coupling by a water-filled standoff.



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No. 391 description: Sterling

type of device: B-Mode producer/distributor: Philips

development:

frequency: ?? time of production: 1990 - 1993

B-Mode-Device

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  - **Cut transducers without apparatuses 483 - 493**

No. 481 SK

type of device: B-Mode

description:

producer/distributor:

development:

frequency:

time of production:

Array transducer

Example of adaptation layers

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No. 482 SK

description:

type of device: B-Mode

producer/distributor:

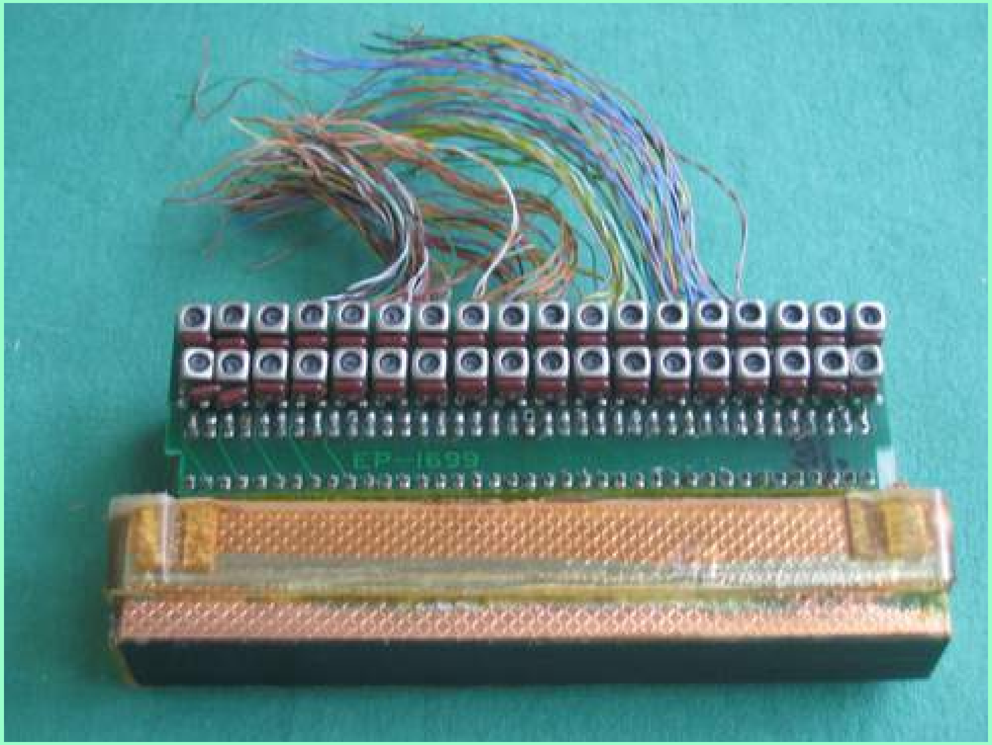
development:

frequency:

time of production:

Array transducer

Example of wiring



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No. 483 SK

description: Accuson transducer

type of device: B-Mode

producer/distributor: Accuson/Siemens AG

development:

frequency: 4 MHz

time of production: 1995

Phased Array Transducer

Transducer of an electronic sector scanner (phased array) with 128 single elements. Each element is connected to the ultrasonic device by an individual coaxial cable with a diameter of about 0.6 mm, and each element is triggered by a separate cable.

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No. 484 SK

description: Phased array

type of device: B-Mode

producer/distributor: Siemens AG

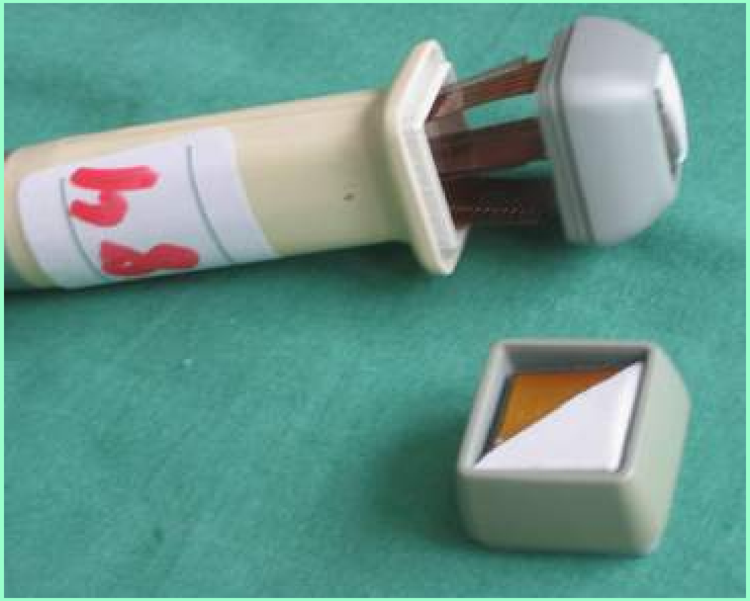
development:

frequency: 3.5 + 5 MHz

time of production: 1984

Phased array scanner

Acoustical parts for transducers of an electronic sector scanner (phased array) with 64 single elements.
Each element is connected to the ultrasonic device by an individual coaxial cable and is triggered by a separate cable.



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No. 485 SK

description: Curved Array

type of device: B-Mode

producer/distributor: Accuson/Siemens AG

development:

frequency: 7.5 MHz

time of production: 1998

Curved Array (vaginal probe)

Endoprobe for vaginal diagnostics.
Curved array with 128 single elements
and a 90° angle of view.
Fixed image plane.
Guide slot for visually controlled punctures.

No. **486 SK**

type of device: B-Mode

frequency: ??

description:

producer/distributor:

development:

time of production:

Mechanical sector scanner for teeth

No. 487 SK

description: Endoprobe

type of device: B-Mode

producer/distributor: Siemens AG, Erlangen

development:

frequency: 5-7.5 MHz

time of production: 1989-1990

Endoprobe (rectal probe)

Mechanical sector transducer
for endosonography. Designated
especially for transrectal scanning.
The mechanical drive makes it possible
to choose the location of the sectional
plane.

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No. 488 SK

description: Sector Scanner

type of device: B-Mode

producer/distributor: IVUS/Siemens AG

frequency: 20 MHz

time of production: 1984-1986

Sector scanner

Mechanical sector scanner for intravasal sonography. The ultrasound transducer (20 MHz) is fixed to the tip of the catheter. A rotating tilted mirror provides a 360° scan. This mirror is driven by a guide wire at the entrance of the catheter. Catheter is built for single use only.

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No. **490 SK**

type of device: B-Mode

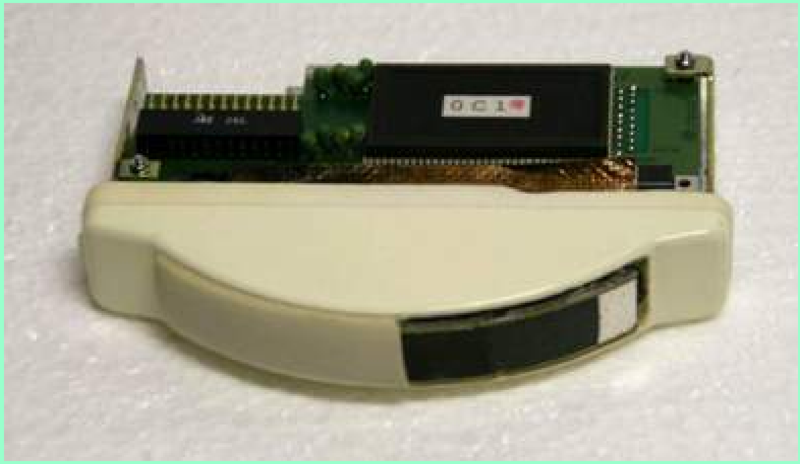
frequency: 5 MHz

description: **Curved Array**

producer/distributor: Picker

time of production: 1983-1985

Curved Array
Curved arrays are a variety of linear arrays. They only differ in the way the transducer elements are aligned. The same technology is applied in both cases.
In linear arrays – as the name implies – the elements are arranged in a straight line, while in curved arrays this line is curved along a more or less rounded arc. The image format of the curved array thus resembles a ring segment.
Curved arrays have the advantage – depending on the field of application – of combining the characteristics of both a sector scanner (small connecting area) and a linear array (large field of view).



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No. 491 SK

description: Endoprobe

type of device: B-Mode

producer/distributor: Matsushita/Siemens

frequency: 5-7.5 MHz

time of production: 1985-1988

Endoprobe (vaginal probe)

Mechanical sector scanner for endosonography, especially designed for vaginal examinations.

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No. **492 SK** description: **Multiline Array**

type of device: B-Mode producer/distributor: Siemens AG, Erlangen

frequency: 3.5 MHz time of production: 1981

Prototype of a the very first multiline array. By subdividing an array system into several parallel and separately-activated array lines, a dynamic focusing perpendicular to the direction of the scanning is possible (annular array) – unlike the array transducers with just one line of arrays which are still common today. In theory this method should have great diagnostic advantages. The high technological and electronic complexity of the method hasn't found wide-spread use in ultrasound equipment.

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No. **493 SK** description: **Linear Array**

type of device: B-Mode producer/distributor: Matsushita/Siemens

frequency: 5 MHz time of production: 1985

Linear Array

Example of the delicate architecture of a linear array structure. Here each single circuit-relevant element is again mechanically subdivided, in order to suppress unwanted oscillations. For attenuation the ceramic elements are embedded at the back in a supporting cushion to prevent resonances.

Furthermore, two transformational layers with different wave impedance are visible. They are necessary to adapt the acoustical impedance of the ceramic elements to biological tissues. This adaptation leads not only to better sound transmission; it also leads to an enlargement of the usable ultrasound frequencies and thus to better image quality. The top layer is formed by a so-called silicon lens, which not only protects the arrays but also helps focus the ultrasound beam at a right angle to the scan direction, contributing to better image quality.

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