

HIFUPlex™

Introducing the HIFUPlex Portfolio

An Ultrasound-Guided
Platform to Advance your
Biomedical Research
in Focused Ultrasound



SONIC
CONCEPTS

Verasonics®
The leader in Research Ultrasound™

HIFUPlex™

Sonic Concepts, an innovator of high performance transducers, and Verasonics, a leader in research ultrasound systems, introduce the HIFUPlex Portfolio. By bringing together the best of Sonic Concepts' transducers, and the high quality and versatility of Verasonics' Vantage ultrasound systems, the HIFUPlex Portfolio delivers premium quality, innovation and versatility to ultrasound-guided focused ultrasound (USgFUS). HIFUPlex addresses many applications in focused ultrasound (FUS), and meets a wide range of budgets.

Sonic Concepts designs and manufactures cutting-edge, top-of-the-line therapeutic transducers in many different configurations. These transducers offer high efficiency over a broad bandwidth and highly uniform acoustic output at the radiating surface ideal for FUS applications. Verasonics' Vantage ultrasound systems are used today at numerous institutions and companies worldwide for FUS research and product development. The Vantage 64 LE, Vantage 128 and 256 systems are available in high intensity focused ultrasound (HIFU) configurations, which enable both energy delivery and imaging using the same transmitters, for flexible and comprehensive exploration with focused ultrasound.

FUS demonstrates important and growing utility in a variety of application areas, including tissue destruction, drug delivery, neuro-stimulation and modulation, immunomodulation, stem cell honing, in addition to many others. Ultrasound is becoming increasingly preferred as a valuable technique not only for energy delivery, but also to identify, guide and target tissue in real time, as well as to monitor the treatment. HIFUPlex can be used in the vast majority of indication areas to advance biomedical research.

HIFUPlex Offers:

- Five standard ultrasound system and transducer configurations to meet a range of customer requirements, including variable depths and frequencies, for research and development
- An easy upgrade pathway from any Vantage configuration and from non-USgFUS solutions using Sonics Concepts' Transducer Power Output™ (TPO™) system
- A graphical user interface (GUI), with interleaving scripts that control the major parameters of FUS and imaging

Vantage USgFUS GUI

The Vantage software combined with HIFUPlex now includes a GUI, with interleaving scripts that control the major parameters of FUS and imaging. *The Vantage USgFUS GUI is included in the 3D USgFUS and 1D USgFUS HIFUPlex Portfolio configurations.*

Software: Full-screen graphical user interface for visualization and control

- Provides high level selection of modular operating modes
- Includes operating modes for typical USgFUS experimental workflow
- Extensible Modes Include:
 - Imaging only (B-mode, color flow Doppler)
 - FUS only (adjust pulse frequency, duration, voltage, focal position)
 - GUI-based treatment protocol design and preview
 - Test utilities



HIFUPlex Portfolio Configurations:

3D USgFUS

Solutions for large animal and deep target applications, featuring 3D FUS focal positioning and 2D imaging

HIFUPlex-04 & -05 (0.5 & 2.0 MHz, respectively) provide 3D therapeutic focusing where both lateral and axial steering is required. These solutions provide interleaving capability between the FUS therapy and imaging using the Vantage platform.

FUS key features include:

- Ø150 mm f/1.0 FUS transducer
- Center frequencies available at 0.5 and 2.0 MHz
- Transmit efficiencies up to 80% over a 40% bandwidth
- Axial steering between 110 and 140 mm (from the exit plane)
- Lateral steering Ø12 mm (from the axis)

Imaging features include:

- 3.5 MHz 128-element phased array
- Watertight housing with rotational and vertical adjustability

1D USgFUS

Solutions for small animal and intermediate depth applications, featuring adjustable FUS focal depth and 2D imaging

HIFUPlex-01, -02 & -03 (0.5, 1.1 & 2.0 MHz, respectively) provide 1D therapeutic focusing on small and large animals under ultrasound guidance. These solutions provide interleaving capability between the FUS therapy and imaging using the Vantage platform.

FUS key features include:

- Ø64 mm f/1.0 FUS transducer
- Center frequencies available at 0.5, 1.1 and 2.0 MHz
- Transmit efficiencies up to 90% over a 40% bandwidth
- Axial steering (25 to 75 mm from the transducer exit plane)

Imaging features include:

- 5.0 MHz 64-element phased array
- Watertight housing with rotational and vertical adjustability



1D FUS

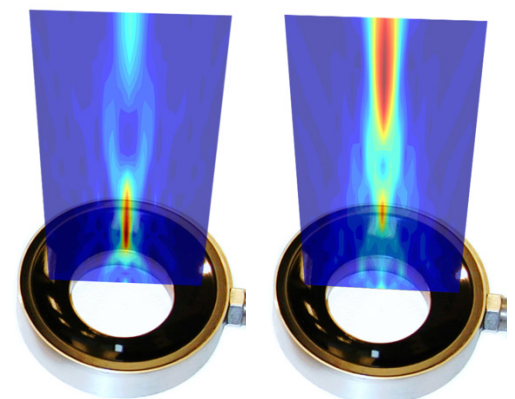
Solutions *without imaging* (adjustable FUS focal depth) to initiate research efforts within a conservative budget

HIFUPlex-00 is designed to accommodate superficial to moderate depth investigations with electronic axial steering (from 25 to 75 mm from the transducer exit plane). An example of 500 kHz focal steering is presented below.

FUS key features include:

- Ø64 mm f/1.0 FUS transducer
- Center frequencies available at 0.5, 1.1 and 2.0 MHz
- Transmit efficiencies up to 90% over a 40% bandwidth
- Axial steering from 25 to 75 mm from the transducer plane
- Transmit drive electronics provide an easy-to-use GUI touch screen offering adjustable calibrated power output, frequency, pulse repetition rate, burst duration, axial steering position and more

HIFUPlex-00 is upgradable to HIFUPlex-01, -02 or -03 to add ultrasound imaging for ultrasound-guided FUS (USgFUS).



30 mm focus

70 mm focus

HIFUPlex Design Specifications

HIFUPlex Solutions	-00	-01	-02	-03	-04	-05
Includes	FUS Array	FUS Array Imaging Array Cone & Target	FUS Array Imaging Array Cone & Target	FUS Array Imaging Array Cone & Target	FUS Array Imaging Array Cone & Target	FUS Array Imaging Array Cone & Target
FUS Array						
Frequency (MHz)	0.5, 1.1 & 2.0	0.5	1.1	2.0	0.5	2.0
# of Elements*	AA	AA	AA	AA	64	128
Avg. Total Acoustic Power (W)**	500	500	500	500	500	1200
Peak Total Acoustic Power (W)**	3000	2000	3000	3000	3200	6400
Axial Steering	✓	✓	✓	✓	✓	✓
Lateral Steering					✓	✓
Imaging Array						
Frequency (MHz)		5.0	5.0	5.0	3.5	3.5
Elements		64	64	64	64	128
Target Depth						
Shallow	✓	✓	✓	✓		
Moderate	✓	✓	✓	✓	✓	✓
Deep					✓	✓
USgFUS		✓	✓	✓	✓	✓
Compatibility	TPO	Vantage HIFU Vantage + TPO	Vantage HIFU Vantage + TPO	Vantage HIFU Vantage + TPO	Vantage HIFU Vantage + TPO	Vantage HIFU Vantage + TPO

*Annular Array

** Total Acoustic Power specifications are subject to verification; Peak Total Acoustic Power figures assume max 10 ms burst duration

✓ Indicates supported capabilities



Verasonics, Inc. is a privately held company founded in 2001, with headquarters in Kirkland, Washington, USA. As the leader in research ultrasound, Verasonics is focused on providing researchers and developers with the most advanced and flexible tools enabling them to develop new algorithms and products used in biomedical ultrasound, materials science, earth sciences, and the physics of acoustics and ultrasonics. Verasonics also licenses its technology to companies for use in their commercial products. Verasonics has customers located in 28 countries across North and South America, Europe, Asia and Australia.



Sonic Concepts, Inc. Founded in 1986, Sonic Concepts, Bothell, WA, delivers premium ultrasonic systems to the biomedical, industrial, marine and research markets. The Company specializes in designing and manufacturing High Intensity Focused Ultrasound (HIFU) transducers, electronics and software. Systems are installed in leading corporate and academic research labs around the world.

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