



HIFUPlex™ LT -04, -05, -06 3D Focusing

All HIFUPlex LT models are sold through Sonic Concepts, Inc.

The HIFUPlex LT 3D Focusing is a turnkey investigational and upgradable system for high intensity focused ultrasound (HIFU) research. Powered using Sonic Concepts' TPO™ drive electronics and HIFU phased array transducer technology.

The HIFUPlex LT 3D Focusing system uses the TPO drive electronics system comprised of up to 128 discrete RF signals with independent transmit agility. Each channel supports transmit modes ranging from a single cycle pulse to large bursts.

The HIFUPlex LT 3D Focusing transducers are comprised of up to 128 elements built within the monolithic transducer and includes low-loss cabling and matching circuitry.

The integrated system uses time delay to electronically steer the acoustic focal depth along the axis with micrometer resolution. Acoustic intensity and focal steering calibration are performed within a free field environment using National Physical Laboratory (NPL) traceable hydrophones.

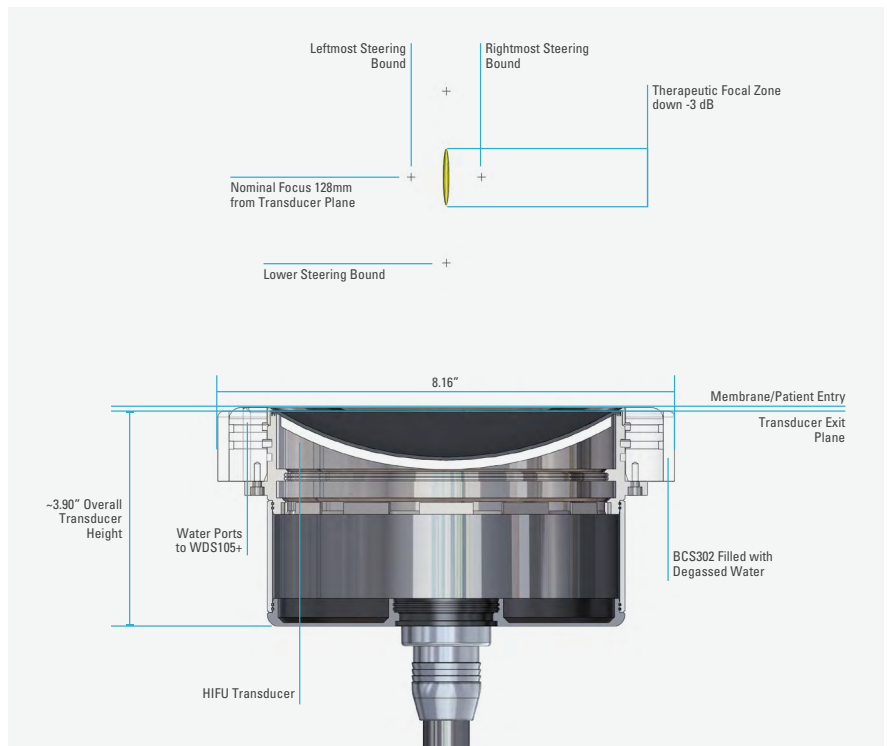
System Features

- HIFU with 500 Average Watts and 2000 Peak Watts of Total Acoustic Power (TAP)
- MATLAB Parser Commander Suite
- User friendly with complex transmit agility
- Dynamic 3D focal steering with treatment precision
- Full-system calibration and verification

HIFUPlex LT offers 3 transducer configurations

-04 (500 kHz), -05 (1.1 MHz) and -06 (2.0 MHz).

All three configurations use the same Ø150 mm f/1.0 multi-element focused transducer and produce the same amount of total acoustic power with transmit efficiencies up to 90% over a 40% bandwidth.



Transducer Acoustic Performance Specifications

The table to the right features HIFUPlex LT -04, -05 and -06 acoustic performance specifications.

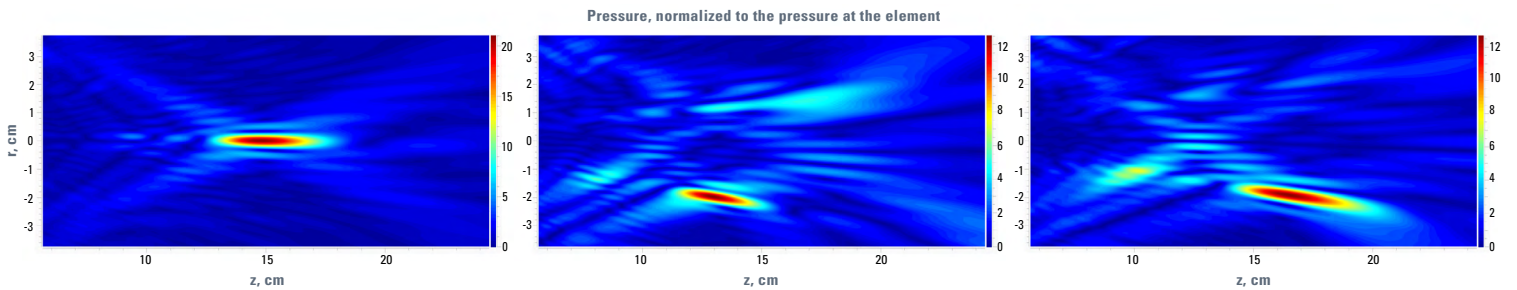
	Fc (MHz)	No. of Elements	Radius (mm)	I.D. (mm)	O.D. (mm)	Geometric Focal Distance* (mm)	Lateral Width+ (mm)	Axial Length+ (mm)	Pressure Focal Gain+	TAP (watts)	Focal Pressure+ Mpa_pk	Focal Pressure (w/ 0.7 dB/cm) Mpa_pk
HIFUPlex LT-04	0.5	64	150	44	150	128	3.0	30.0	21.0	500	67	40.0
HIFUPlex LT-05	1.1	128	150	44	150	128	1.4	10.7	50.2	500	217	69.8
HIFUPlex LT-06	2.0	128	150	44	150	128	0.8	7.3	92	500	396	50.3

*From the exit plane of the transducer using the BSC-300 coupling system

+Assuming a linear field

Dynamic 3D Focal Steering

The acoustic pressure field maps below illustrate software-controlled spatial modulation of the HIFUplex LT-04 along the XZ transverse plane. The HIFUplex coherent focus is shown at 150 mm, or 128 mm from the exit plane of the transducer (left), $X = 20$ mm $Z = 130$ mm (mid), and $X = 20$ mm $Z = 170$ mm (right).



	Axial Focal Steering down -3 dB		Lateral Focal Steering down -3 dB
	Near Field Distance* (mm)	Far Field Distance* (mm)	Diameter (mm)
HIFUplex LT-04	104	182	32
HIFUplex LT-05	118	176	21
HIFUplex LT-06	134	166	12

The table to the left presents the steering range down -3 dB for each transducer configuration.

*From the exit plane of the transducer using the BSC-300 coupling system

Standard Configuration & Upgrades

The standard HIFUplex LT 3D Focusing system includes one of the three configurations and is calibrated with the representative TPO-500 Series (64- or 128-channel drive system) with 500 Average Watts and 2,000 Peak Watts. TAP. Peripherals include a MATLAB based Commander Suite, BCS-300 water coupling system, visual thermochromatic target and acoustic calibration along the steering axis.

If multiple transducer configurations are ordered they can all be calibrated to the same TPO.

The following upgrades are available and can be added to the standard configuration:

- Central opening for PCD and potential USgFUS integration
 - A replaceable passive cavitation detector (PCD) is built integral to the transducers central opening for real-time cavitation monitoring (Y-107 illustrated in Figure 1 below)
 - Potential USgFUS central opening for eventual integration with an imaging probe and Vantage system through Verasonics Inc. and conversion to the Verasonics HIFUplex -04, -05 and -06 (illustrated in Figure 2 below). *HIFUplex Solutions at verasonics.com/hifuplex*
- MRI compatible (not upgradable to Verasonics HIFUplex -04, -05 and -06)
- 3rd harmonic operation with acoustic focus and focal steering calibration (not upgradable to Verasonics HIFUplex -04, -05 and -06)
- Water conditioning unit, including a closed-loop degassing circuit with temperature controlled heating and chilling capability
- Large animal treatment armature and apparatus

Figure 1
PCD Integration

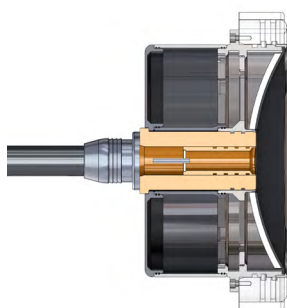


Figure 2
USgFUS Integration

