

See Better Than Ever
HUMANSKAN *Has The Technology*



The Leader in Next Generation
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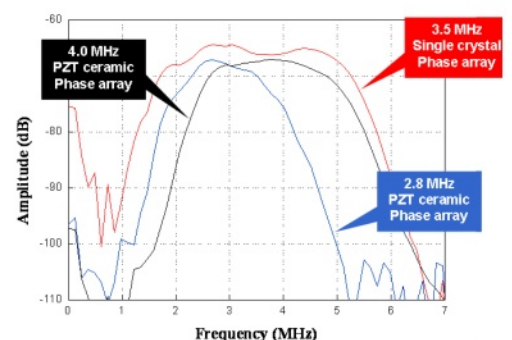
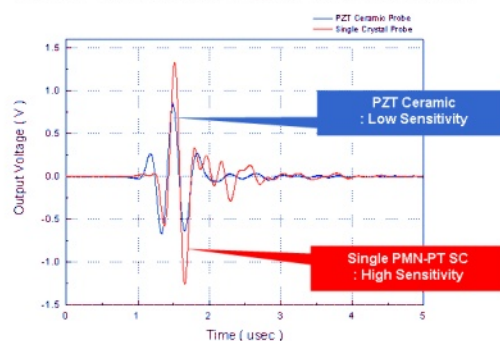
Single Crystal Transducer

Next Generation from PZT Ceramics

Since its inception in March of 2000, Humanscan's focus has been developing innovative products to provide best possible images to improve quality of life. Humanscan's strong commitment in research and development has resulted in introduction of the best quality resolution and sensitivity probes. Humanscan's established dynamic organizational structure allows Humanscan to respond efficiently to the customers' needs and expeditiously bring innovative forefront technology to the market.

Humanscan has been researching and developing the use of single crystal in ultrasound probes. Although, in the 1980s, a numerous academic papers stated that the usage of single crystal in medical ultrasound probe yielded superior results, difficulties in manufacturing hindered its commercialization. In November of 2001, Humanscan successfully demonstrated the world's first PMN-PT single crystal cardiac probe for mass production and commercialization at the medical equipment exhibition, MEDICA. Thereafter, Humanscan introduced single crystal probes ranging from 2MHz to 8MHz at the international conferences and exhibitions¹⁻³⁾. Since then, Humanscan has led the developmental history of single crystal probes. Through these outstanding achievements, Humanscan has differentiated its probes from that of pre-existing state-of-the-art ultrasound probes.

Humanscan has secured its unparalleled technological advancement through its ongoing research and development. Compare to probes made with PZT, Humanscan's single crystal technology has two times or higher sensitivity. High sensitivity is crucial in detecting abnormal blood flow in color Doppler imaging since the signal of abnormal blood flow is very low. Furthermore, while existing PZT probe's bandwidth is 50~80%, Humanscan's single crystal probe's bandwidth is over 100%. Single crystal probe's broad bandwidth greatly enhances harmonic imaging. The importance of harmonic imaging is ever more increasing due to necessity for higher resolution in critical diagnosis. It also supports multiple Tx/Rx frequencies with full sensitivity



1) "2.6 MHz Phased Array Ultrasonic Probe using PMN-TP Single Crystal Grown by the Bridgman Method," Proc, IEEE Ultrason. Symp., pp. 1114-1119, 2002.

2) "A 128ch 7.5 MHz Linear Array Ultrasonic Probe using PMN-PT Single Crystal," Proc, IEEE Ultrason. Symp., pp. 782-785, 2003.

3) "A 6.0 MHz 0.15 mm Pitch Phased Array Ultrasonic Probe using PMN-PT Single Crystal," Proc, IEEE Ultrason. Symp., pp. 219-222, 2005.

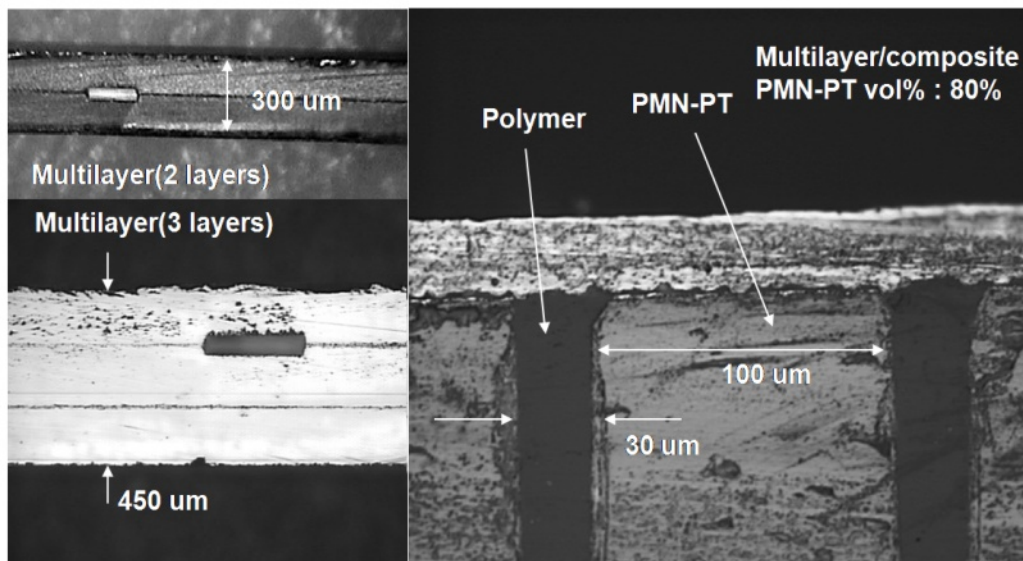
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Multilayer Single Crystal/Polymer Composite To Better and Beyond

The benefit of piezo-material/polymer composite is higher electro-mechanical coupling. However, electrical impedance of single crystal is somewhat lower than that of PZT ceramics. So, monolayer single crystal/polymer composite is not powerful for transducer application.

Multilayer single crystal/polymer composite is a very useful material. First time in the world, Humanscan introduced not only single crystal/polymer composite but also multilayer single crystal/polymer composite transducers⁴⁻⁶).

Humanscan's new design technologies in materials, processes and architecture have brought clear resolution and higher sensitivity to ultrasound equipment. As a leading-edge medical ultrasound probe manufacturer, Humanscan offers the best value. Guided by the brand promise of "See Better than Ever", Humanscan is dedicated to researching and developing products to better quality of life. Every step in innovation and advancement made in probe technology has Humanscan's embedded commitment to improving wellness of people.



4) "Multilayer PMN-PT Single Crystal Transducer for Medical Application," Proc. IEEE Ultrason. Symp., pp. 1021-1024, 2004.

5) "Multi-Layered PMN-PT Single Crystal/Polymer Composite 96ch Phased Array for Medical Ultrasound Imaging," Proc. IEEE Ultrason. Symp., pp. 172-175, 2006.

6) "Piezoelectric Single Crystal for Medical Ultrasound Transducer," Proc. IEEE Ultrason. Symp., pp. 300-304, 2007.





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Humanscan's Commitment Present and Future Applications

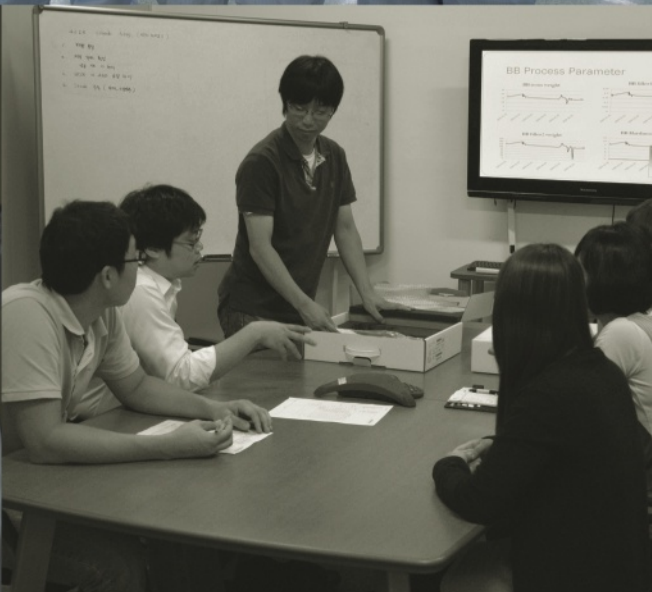
Humanscan's commitment to health industry continues on through its dedicated research and development program. The allocated resources are dedicated to (1) improving existing product quality and ergonomics and (2) developing products to maximize synergy effects of Humanscan's superior technology.

Humanscan's technology has been covering and can be applied to broad range of areas:

- Medical: Obstetrics and Gynecology, Surgery, Radiology, Veterinary
- Aesthetic: Body Shaping, Contouring, Skin Rejuvenation

Enormous applicability of Humanscan's technology has allowed engineers and designers to explore new areas. "Healthier Life" for the end users as its ultimate objective, Humanscan is constantly developing and testing products to find ways to reach the objective.

Humanscan has been a leader in introducing products with state-of-the-art technologies since 2001. While providing best working environment to promote creativity and innovation, Humanscan is determined to demonstrate its leadership in the industry. Humanscan will stay focused on its pursuit for the "Healthier Life".



HUMANSO

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PRODUCT LISTS

	Fc	# elem	Pitch	Elev.	Azimuth	Focus	ROC	BW
	MHz		mm	mm	mm	mm	mm	%
Phased Array								
3PC	3.5	64	0.300	14.0	19.2	80	64	>95
3PX	3.5	64	0.240	14.0	15.4	80	64	>95
3PR	3.5	80	0.250	14.0	20.0	80	80	>95
3PT	3.3	98	0.200	14.0	19.2	80	98	>95
3PD	3.5	112	0.170	14.0	19.0	80	112	>95
3PL	3.2	128	0.220	13.5	28.2	75	128	>95
5PG	5.5	64	0.150	10.0	9.6	65	64	>95
7PG	7.5	96	0.100	6.5	9.6	28.5	96	>80
7PX	7.0	128	0.100	6.0	12.8	35	128	>80
Linear Array								
5LG	5.5	128	0.300	5.0	38.4	22	128	>95
5LX	5.5	192	0.210	5.0	40.3	22	192	>95
5LR	5.5	192	0.300	5.0	57.6	22	192	>95
8LG	7.5	128	0.300	5.0	38.4	18	128	>80
Convex Array								
3CX	3.2	128	0.415	13.0	53.0	80	128	>95
4CG	3.5	128	0.475	13.0	60.8	60	128	>95
4CR	4.4	192	0.270	11.0	51.8	63	192	>95