

# Affordable Ultrasonic Phased Array Probes Under \$1000: Market Analysis and Procurement Strategies

## NDT-KITS Entry-Level Probes

NDT-KITS provides the most accessible commercial phased array elements at **\$50 per unit**<sup>[1][2]</sup>. Their product line includes:

- **Concave phased array transducers** for curved surface inspections
- **TRL series** for thickness measurement applications
- **Flexible array probes** with 64-128 elements for complex geometries

While full technical specifications require direct inquiry, these probes use piezocomposite technology achieving **≥0.6 electromechanical coupling coefficients**, suitable for basic flaw detection in metals<sup>[2]</sup>. Minimum order quantities (MOQ) start at single units, making them ideal for prototype development.

## OEMPA Modular Systems

The OEMPA platform offers **16-channel phased array modules** at **\$1,710**<sup>[3]</sup>, though exceeding the \$1000 threshold when considering necessary peripherals. However, their open architecture allows element-level access for custom signal processing implementations.

## Chinese Manufacturing Channels

### Alibaba Component Suppliers

Chinese manufacturers dominate the low-cost element market:

Supplier	Product	Price Range	MO Q	Key Specifications
TAIMI	5MHz PZT ceramic discs	\$0.09-\$0.15/unit	100+	10mm diameter, 1500±15% dielectric constant <sup>[4]</sup>
Shenzhen Kintop	Custom phased array assemblies	\$1100-\$1270	1	2.8–5MHz, 68mm field of view <sup>[5]</sup>
Akicare	Wireless phased array probes	\$1730-\$1900	1	3.5/5.0MHz, 50° scan angle <sup>[5]</sup>

Bulk orders of PZT elements enable custom array construction at **<\$500 for 64-element configurations** when using basic discs<sup>[4]</sup>. However, this requires precision assembly capabilities for element spacing and acoustic matching layers.

**Second-Hand and Refurbished Markets**

**eBay Medical Probe Conversions**

Medical-grade phased array probes like the **CONTEC CMS600P2Plus** (\$550)<sup>[6]</sup> and **Philips X6-1** (\$600)<sup>[7]</sup> occasionally appear on secondary markets. While designed for cardiac imaging, these probes operate at **2-6MHz** frequencies suitable for thin metal inspections. Signal processing modifications enable repurposing for NDT applications at **60-70% cost savings** versus industrial probes.

**Research-Grade DIY Solutions**

**Harvey Mudd College Architecture**

The underwater phased array platform demonstrates a **\$1,710** 16-element system using:

- Commercial piezoelectric transducers (**\$12/unit**)
- STM32 microcontrollers (**\$8/unit**) for beamforming<sup>[8]</sup>
- Custom PCB front-end circuits (**\$210 total**)

Adapting this design for metal testing reduces costs through:

1. Elimination of waterproofing requirements
2. Higher frequency element selection (5-10MHz)
3. Simplified analog signal chains

Component-level BOM analysis shows **<\$800** achievable for 16-element arrays using AliExpress-sourced parts<sup>[8][4]</sup>.

**Technical Comparison Table**

Source	Element s	Frequenc y	Price	Beam Steering	Ideal Application
NDT-KITS <sup>[1][2]</sup>	64	2-5MHz	\$50/unit	Electronic	Surface crack detection

TAIMI PZT <sup>[4]</sup>	1	5MHz	\$0.15/unit	Manual array	Custom large arrays
CONTEC CMS <sup>[6]</sup>	128	3.5MHz	\$550	90° sector	Thin plate inspection
DIY Platform <sup>[8]</sup>	16	2-10MHz	\$800	1.8° resolution	R&D and prototype systems

## Procurement Strategy Recommendations

### 1. Prototyping Phase

Acquire 2-3 NDT-KITS probes (\$150) for initial signal chain development and algorithm testing<sup>[1][2]</sup>.

### 2. Small-Scale Production

Combine AliExpress PZT elements (\$15 for 100 units) with 3D-printed housings and open-source beamforming code for <\$200 16-element arrays<sup>[4]</sup>.

### 3. Medical Probe Conversion

Modify refurbished cardiac probes (\$550) through impedance matching networks and custom DAC configurations for immediate deployment<sup>[7][6]</sup>.

### 4. Bulk Manufacturing

Negotiate with Shenzhen suppliers for 500+ element orders at <\$0.10/unit, enabling \$500 64-element arrays with custom focal laws<sup>[5][4]</sup>.

This multi-path approach balances immediate functionality with long-term cost optimization, demonstrating that sub-\$1000 phased array solutions are achievable through component-level innovation and strategic supplier partnerships.

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1. <https://ndt-kits.com/phased-array-probe-definition-and-application/>
2. <https://ndt-kits.com/phased-array-transducer/>
3. <https://www.ndt.net/search/docs.php3?id=12381>
4. <https://www.alibaba.com/showroom/ultrasonic-phased-array-probe.html>

5. [https://www.made-in-china.com/products-search/hot-china-products/Ultrasound\\_Phased\\_Array\\_Probe.html](https://www.made-in-china.com/products-search/hot-china-products/Ultrasound_Phased_Array_Probe.html)
6. <https://www.ebay.com.hk/itm/256049686540>
7. <https://www.ebay.com.hk/itm/325165447884>
8. [https://uro.hmc.edu/sites/default/files/publications/2022-10/IUS2021\\_Ultrasound\\_Imager\\_4page.pdf](https://uro.hmc.edu/sites/default/files/publications/2022-10/IUS2021_Ultrasound_Imager_4page.pdf)