

# MicroPulse 6PA



The MicroPulse 6PA is our next generation, mains-powered phased array instrument. The MicroPulse 6 is a 128/256 phased array system, that also provides 12 separate high-performance conventional channels, delivering an extremely capable and flexible instrument.

MicroPulse 6 is an enclosed unit with no external air intakes, and is capable of conventional, phased array and FMC acquisition processes. With Gigabit Ethernet the unit provides seriously fast data transfer to suit all your inspection requirements.

## Overview

The MicroPulse 6 is a mains powered Phased Array instrument. The system has 256 transmitters and 256 receivers. Up to 128 receive channels will be active during any firing (a maximum aperture of 128 channels). The 256 transmitters will allow the selected aperture of up to 128 channels to be used in either pulse echo or through transmission modes. The system supports phased array and FMC modes of operation. In phased array modes, parallel firing is possible with up to three phased array sweeps and one conventional firing or four phased array sweeps. In its standard configuration the system also has twelve high performance conventional ultrasonic channels. Like the MicroPulse 5 the system is controlled by a separate computer using a Gigabit Ethernet connection. This link is currently capable of up to 115Mbytes per second transfer rates. The system is compatible with existing MicroPulse command language and data reporting structures and thus compatible with existing software platforms, making it a seamless upgrade from the MicroPulse 5.

## Software Platforms

The open and transparent data format and long-established MicroPulse command language makes for a totally new experience, no longer is the user forced down the one software platform fits all, resulting in complex and cluttered applications. Supplied in the box, Peak NDT's ArrayGen software will get you started, then the choices are yours. Compatible with procedure based platforms like MIPS/GUIDE to user definable interfaces like InspectionWare, LabView or TWI's Crystal FMC platform. If a bespoke application is what's required, then using Peak NDT's Focal Law calculation dll with the transparent data formats and standard sockets make writing custom applications a breeze.

Full Information available at [www.peakndt.com](http://www.peakndt.com)

## Features

- Rugged / reduced weight
- No forced air intake
- Easily scalable – two units can be simply paired to provide a seamless 256/512 system, further units can be connected using Peak NDT's unique MPLink technology – providing further expansion of phased array channels
- All channels available for beam forming
- High power phased array channels – user definable pulser voltage available up to 200V
- Inputs for 4 axes of 32bit encoder inputs accepting 5V encoders at rates of up to 700kHz for true pulse on position
- Outputs digitised waveform and / or peak-detected data with up to 4 hardware gates
- High data output – up to 120 MegaBytes per second
- Existing MicroPulse command language and data reporting structures and thus compatible with existing software platforms.

## Applications

- Pipeline girth weld inspection
- Inline testing systems
- Research and development
- Immersion tanks
- Gantry systems
- In-situ monitoring

# Specification of Phased Array Channels

	Parameter	Range	Step Size
<b>Configurations</b>		32/64, 64/128, 128/256 and 256/512	
<b>Pulser</b>	Pulser Type	Negative square wave	-
	Pulser Voltage	50 to 200Volts	50Volt
	Pulser Rise Time	<5ns	-
	Pulser Width	20nsec to 500nsec	2nsec
	Pulser Output Impedance	<10Ω	-
	Pulser Damping	100Ω	-
	Pulse Repetition Frequency	1Hz to 55kHz**	1Hz
	Parallel Firing	Yes	-
	Phased Array Pulser Delay	0 to 25000nsec	1nsec
Number of Tx Focal Laws	Up to 2048	-	
<b>Receiver</b>	Gain	70dB	0.25dB
	Gain Linearity	Better than 0.25dB	-
	Input Impedance	100Ω	-
	Bandwidth	0.75MHz to 20MHz (-3dB)	-
	Analogue Filters	0.75MHz to 5MHz (-3dB) Bandpass 5MHz to 10MHz (-3dB) Bandpass 2MHz to 10MHz (-3dB) Bandpass	Discrete selection
	Digital Filters	Programmable high and low pass	User definable
	Phased Array Receiver Delay	0 to 25000nsec	1nsec
	Number of Rx Focal Laws	Up to 2048	-
	Dynamic Depth Focusing	At 100MHz realtime	-
Channel Crosstalk	>60dB between channels at 2MHz	-	
<b>Distance Amplitude Correction</b>	DAC Dynamic Range	0 to 60dB*	0.25dB
	DAC Trigger	Transmit pulse or material interface echo	Selectable
	No of DAC curves	2048 utilising up to 64kbytes	N/A
	DAC update	40dB/μsec	N/A
	DAC Clock	0.78125MHz, 1.5625MHz, 3.125MHz, 6.25MHz, 12.5MHz and 25MHz selectable	6 settings (selectable)
<b>Digitiser and Digital Processing</b>	ADC Resolution	12 bits	N/A
	Amplitude Resolution	16 bits	-
	Sample Rate	10, 25, 50 and 100MHz	Selectable
	Number of ADC's	One per 2 channels (128 in a 256 system)	-
	Element Summing	Up to 512 channels	N/A
	Acquisition Gate Delay	64k sample points from trigger or I/F echo	1 sample point
	Acquisition Gate	Up 32K sample points (Conventional PA) In FMC up to 8K samples points	1 sample point
	Rectification	No Rectification Fullwave +ve halfwave -ve halfwave	Selectable
	Smoothing	None and 10 selectable settings	N/A
	Hardware Gates	4 gates utilising up to 32K samples each (Conventional PA)	-
	Interface Echo	Hardware interface trigger for gate and DAC	-
	Hardware Peak Processing	For each gate up to 80 peaks (N + largest), first peak, largest peak, threshold crossing (N/A for FMC)	-
	Output Options	Peak processed data and/or full digitised waveform	-
Threshold	10 to 4095	1	
Averaging	2 to 256 realtime; 2 to 8 realtime for FMC	-	
Gain Reduced Firing	Selectable to be triggered on saturation with programmable adjustment level	-	

# Specification of Conventional Channels

	Parameter	Range	Step Size	
<b>Configurations</b>		12 conventional channels		
<b>Pulser</b>	Pulser Type	Negative square wave	-	
	Pulser Voltage	50 to 300Volts	50Volt	
	Pulser Rise Time	<5ns	-	
	Pulser Width	16nsec to 1010nsec	2nsec	
	Pulser Output Impedance	<10Ω	-	
	Pulser Damping	50Ω too 660Ω in 8 steps	-	
	Pulse Repetition Frequency	1Hz to 55kHz*	1Hz	
	Parallel Firing	Yes		
<b>Receiver</b>	Gain	70dB*	0.25dB	
	Input Noise	2nV typical	N/A	
	Gain Linearity	Better than 0.25dB	N/A	
	Input Impedance	660Ω	N/A	
	Bandwidth	0.75MHz to 25MHz (-3dB)	N/A	
	Analogue Filters	0.75MHz to 12MHz (-3dB) Bandpass	Discrete selection	
		2.5MHz to 18MHz (-3dB) Bandpass		
		3MHz to 22MHz (-3dB) Bandpass		
		3MHz to 25MHz (-3dB) Bandpass		
		0.5MHz Bandpass Filter		
1MHz Bandpass Filter				
2MHz Bandpass Filter				
4MHz Bandpass Filter				
5MHz Bandpass Filter				
10MHz Bandpass Filter				
5MHz 2nd order TOFD Bandpass Filter				
10MHz 2nd order TOFD Bandpass Filter				
Digital Filters	Programmable high and low pass	User definable		
Channel Crosstalk	Better than 60dB between channels at 2MHz			
<b>Distance Amplitude Correction</b>	DAC Dynamic Range	0 to 60dB*	0.25dB	
	DAC Trigger	Transmit pulse or material interface echo	User selectable	
	No of DAC curves	256 utilising up to 64kbytes	N/A	
	DAC update	40dB/μsec	N/A	
	DAC Clock rate	0.78125MHz, 1.5625MHz, 3.125MHz, 6.25MHz, 12.5MHz and 25MHz selectable		
<b>Digitiser and Digital Processing</b>	ADC Resolution	12 bits	N/A	
	Amplitude Resolution	Up to 12 bits		
	ADC Rate	10, 25, 50 and 100MHz	N/A	
	Number of ADC's	One per 6 channels		
	Acquisition Gate Delay	64k sample points from trigger or interface echo	1 sample point	
	Acquisition Gate	Up 32K sample points	1 sample point	
	Rectification	No Rectification		Discrete selection
		Fullwave		
		+ve halfwave		
	-ve halfwave			
Post Rectification Filter (Ascan smoothing)	None and 10 selectable settings	User selectable		
Hardware Gates	4 gates utilising up to 32K samples each			
Interface Echo	Hardware interface trigger for gate and DAC	Selectable		
Hardware Peak Processing	For each gate up to 80 peaks (N + largest), first peak, largest peak, threshold crossing			

Parameter	Range	Step Size
Peak Threshold	10 to 4095	1
Averaging	2 to 256 realtime	
Gain Reduced Firing	Selectable to be triggered on saturation with programmable adjustment level	

## General Specifications

<b>Interfaces</b>	Communication Interface	Gigabit Ethernet capable of up to 120MB/s
	Digital Encoders	4 axes of differential 32-bit encoder inputs accepting 5Volt encoders at rate of up to 700kHz
	Digital I/O	16 TTL inputs and 16 TTL outputs
	Analogue Outputs	Trigger, Gate, A-scan
<b>Connectors</b>	Phased Array Connectors	Two 160-pin female connectors. Hypertronics™ HLMYJPAPF1600
	Conventional UT Connector	12 Coaxial Lemo 00
	Ethernet Connector	Industrial RJ45 / 9-pin D-type
	LVDS Master/Slave	1 x high speed EQDP connector
	Encoder Connector	Lemo Lemo 4B.330
	I/O Connector	2 x Lemo 4B.324
	Power Connector	Switched IEC Inlet
	Analogue O/P Connectors	3 x 50Ω BNC
	Trigger I/P Connectors	1 x 50Ω BNC
<b>Physical</b>	Case Size (D x W X H)	380x450x180mm
	Power Supply	100-240V, 50-60Hz
	Power Consumption	300W Max
	Weight	14kg
<b>Environmental</b>	Operating / Storage Conditions	Operating Temperature: 0 to 45°C Storage Temperature: -10 to 55°C Relative Humidity: less than 85% non-condensing
	EMC	EN61326
	Safety	EN61010

\* Total Gain + DAC cannot exceed 120dB

\*\* Dependent on Gate length and Pulse Parameters