OLYMPUS®

Your Vision, Our Future

Innovation in NDT™

5800PR, 5900PR, 5910PR

Computer Controlled Pulser-Receivers

ULTRASONIC PULSER-RECEIVERS

The Panametrics-NDT™computer-controlled pulser-receiver family of ultrasonic testing instrumentation is designed to provide superior response for both conventional and high frequency applications. Each instrument is designed with a superior low noise receiver and high performance pulser control.

When used with an analog or digital oscilloscope, Panametrics-NDT Pulser-Receivers provide the perfect building blocks for ultrasonic flaw detection, thickness gaging, materials characterization, and transducer characterization. Local control and instrument memory is ideal for ensuring repeatable results in manual test set ups. With computer control of individual settings through GPIB or RS-232, test parameters may be derived and then programmed for production volume analysis.

THREE MODELS TO FIT YOUR TESTING NEEDS

Model 5800PR: 35 MHz (-3 dB) ultrasonic bandwidth is ideal for general purpose ultrasonic testing with a wide variety of metals, plastics, composites and biomedical specimens.

Model 5900PR: 200 MHz (-3 dB) ultrasonic bandwidth permits testing in applications where conventional instruments fail to provide adequate resolution This unit is typically used with broadband transducers in the frequency range of 10 to 125 MHz with thin or non-attenuating materials.

Model 5910PR: 400 MHz (-3 dB) ultrasonic bandwidth unit is typically used with broadband transducers from 50 to 250 MHz for applications that challenge limits in axial and near surface resolution.

FEATURES

- Three available models provide optimization for conventional, high and ultra high frequency applications.
- Broadband negative spike excitation is optimized for the frequency band of each instrument.
- Adjustable pulse energy and damping from a regulated voltage source for optimizing pulse shape
- Rise times < 1ns are available for ultra high frequency inspection.
- 100 µjoules of available energy for conventional frequency applications
- Internal pulse frequency source is crystal stabilized and uses a frequency divider to select PRF rate.
- External pulser mode allows use of an external pulse generator in conjunction with each instrument's receiver electronics.
- Superior isolation of receiver from pulser main bang when operating in through transmission mode
- Multi-position switchable high and low pass filters optimize main bang recovery and noise response.
- Computer-controllable through GPIB IEEE488 and RS-232 communication ports
- Local manual control via sealed keypad for independent operation with high visibility LCD display of parameters
- Packaged in a rack-adaptable 16.7″ x 3.5″ (419 x 88.9 mm) instrument cabinet

PANAMETRICS-NDT™

Nondestructive Testing Products

920-018

ULTRASONIC PULSER-RECEIVERS

Olympus NDT is a leading manufacturer of ultrasonic laboratory equipment, thickness gages, flaw detectors and a wide range of transducers. For more than 40 years, we have provided pulser-receivers for analytical and research applications. We have earned our reputation by delivering high performance, reliability and exceptional customer service.

The computer-controlled pulser-receiver family incorporates design features to ensure optimal signal response. The pulsers are designed to provide broadband excitation for maximum broadband transducer performance. Pulser architecture ensures fast rise times that when coupled with instrument selectable energy and damping options optimize the excitation pulse for the frequency of inspection. Pulse stability is achieved through the use of a fixed, regulated high voltage source. Each model's broadband receiver is designed with a combination of input attenuation, output attenuation and gain stages for a wide dynamic range, low noise response, and fine resolution sensitivity adjustments. All attenuators use relay switched resistors for accuracy and stability. In addition, high and low pass filters improve main bang recovery and noise response. When used with a digital or analog oscilloscope, these instruments will provide the research unmatched performance and flexibility.

STANDARD INCLUSIONS

Each pulser-receiver in this family is shipped with an instruction manual, power cord, RS-232 cable as well as two BCB-58-4 cables and 50 ohm terminators for connection to an oscilloscope. In addition, the 5900PR and 5910PR include a low impedance Microdot® transducer cable. The 5910PR also includes a cable set consisting of a 10-foot power/control cable, and two RF cables for Sync and RF connection of the 5910R host receiver and 5910RPP remote pulser preampifier.

TRANSDUCERS

Olympus NDT manufactures a wide range of transducers for conventional and high frequency applications. Transducers with center frequencies between 50 kHz and 250 MHz are available in a variety of formats.

Pictured are high frequency permanent delay line transducers for immersion or contact applications ranging from 20 to 250 MHz, and a polymer immersion transducer.

PREAMPLIFIERS

The 5627RPP-1 Remote Pulser Preamp is available as an option for the 5900PR 200 MHz Bandwidth Pulser-Receiver. The 5627PP-1 permits use of an optimum short cable from pulser to the transducer to avoid degradation due to attenuation and cable reflections that can occur at long cable lengths. The small, lightweight package can be hand-held or mounted to a structure and drive up to 500 ft of cable back to the 5900PR host receiver for remote applications.

A line of low noise preamplifiers are available in a variety of bandwidths up to 40 MHz. These preamps can be used with our pulser-receivers for increased amplification in hard to penetrate materials or to drive long cable lengths from the transducer back for improved signal-to-noise ratio.

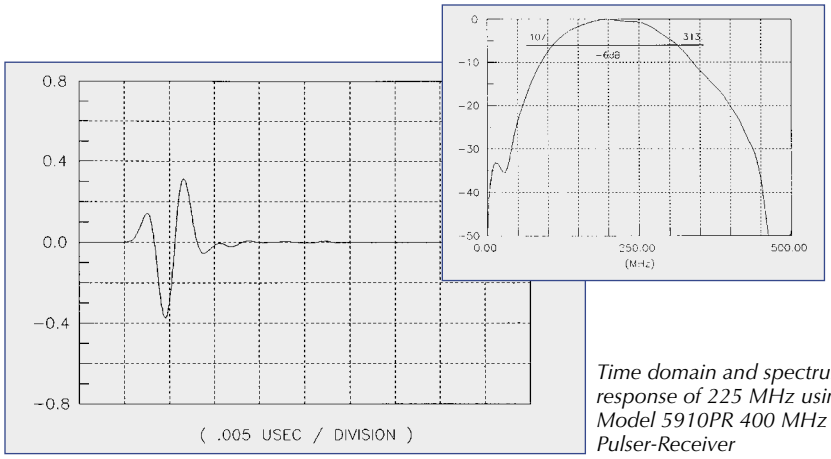
SOFTWARE

The Models 5800PR, 5900PR and 5910PR can be controlled serially via RS-232 or GPIB IEEE488 protocol. Direct parameter command control allows adaptation into test systems requiring automated setup. A LabView virtual instrument executable is available upon request for all models.

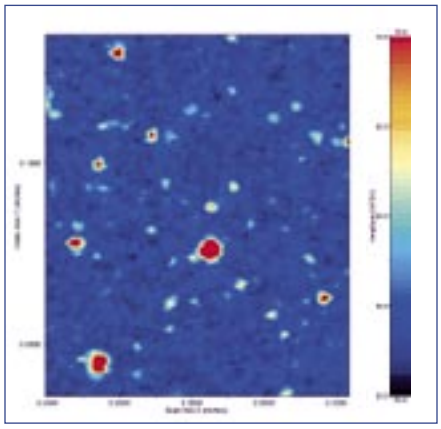
Panametrics-NDT pulser-receivers are also compatible with our ScanView Plus control and data acquisition package. This software provides instrument parameter control and waveform display while interfacing the pulser-receiver with either a 500 MHz or 2 GHz PC digitizer. This Windows®-based software program allows manual or timed collection of amplitude, depth, time of flight or waveform data. A variety of data and waveform processing tools are provided including annotation, clustering, FFT, convolution, etc. The Scanview Plus optional TGM (thickness gaging module) adds precision thickness measurement with real time measurements and statistic display. The TGM provides digital filtering, multipoint calibrations, special multilayer processing and user specified averaging to increase measurement accuracies.

5627RPP-1 remote pulser preamp for use with Model 5900PR

General purpose low noise preamplifier



Time domain and spectrum response of 225 MHz using the Model 5910PR 400 MHz bandwidth Pulser-Receiver



Naturally occurring sub 15 micron defects in aluminum oxide imaged using a Model 5910PR and 170 MHz immersion transducer

APPLICATIONS

TRANSDUCER CHARACTERIZATION

Panametrics-NDT Pulser-Receivers have been used as the basis for both industrial and medical transducer characterization systems. The combination of these products provides superior performance reliability and flexibility for conventional, high frequency, and phased array transducer characterization in both industrial and medical sectors. All of our computer controlled pulser-receivers have an external pulser mode that allows end-users to substitute their own excitation method while still taking advantage of the instrument's low noise receiver characteristics.

BIOMEDICAL APPLICATIONS

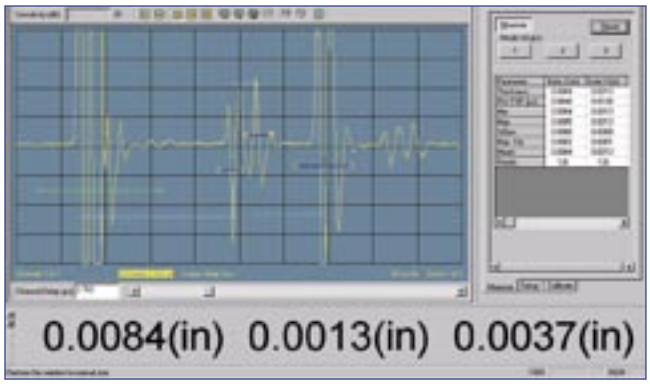
Panametrics-NDT instrumentation has been a standard in R&D for a variety of biomedical applications. These include: ocular imaging, vascular imaging, tissue characterization, blood flow analysis, and bone structure characterization.

HIGH FREQUENCY ULTRASOUND

Higher frequency ultrasound improves axial and transverse resolution for both thickness gaging and flaw detection applications. While attenuation is much greater with frequencies above 20 MHz, high frequency inspection often allows sub 25 micron defect detection and thickness gaging as well as microstructure analysis. For example, a 100 MHz focused F2 immersion transducer has a beam diameter of only 50 microns at its focus.

MATERIAL CHARACTERIZATION

Measurement of Young's Modulus and Shear Modulus of Elasticity and Poisson's ratio in non-dispersive isotropic engineering materials can be determined quickly and easily through computations based on sound velocities. Correlation of velocity time of flight, attenuation, and spectral content can often times be correlated to other material properties. Grain structure, particle distribution, degree of nodularity in cast iron, polymerization in plastics, and mix ratios of liquids can all be inferred ultrasonically.



Thickness of a multilayer plastic bottle measure with a 5900PR using a V2064, 125 MHz delay line contact transducer and ScanView Plus TG software

Model 5910PR shown with its 5910RPP remote pulser preamp mounted on an immersion staging area in a laboratory setup using Scanview Plus and a 2 GHz PC digitizer

SPECIFICATIONS*

PULSER	5800PR	5900PR	5910PR
Pulser Location	Host Instrument	Host Instrument	Remote: Connected to Host
Pulse Type (main bang)	Negative Impulse		
Rise Time: 10% to 90%	Typically 7 nS, 10 nS max	Typically < 1 nS, 2 nS max	Typically < 1 nS, 2 nS max
Available Pulse Voltage (no load)	300 V	220 V	220 V
Available Pulse Energy (typical)	12.5, 25, 50, 100 µjoules	1, 2, 4, 8, 16, 32 µjoules	0.65 or 2.6 µjoules
Damping	Two damping menus, selectable: Standard: 25, 50, 100, 50 ohms Extended: 15, 17, 21, 25 36, 50, 100 or 500 ohms	7, 10,16, 20, 26, 30, 40, 50 ohms	TT Mode: 50 or 25 ohms P-E Mode: 25 or 16.7 ohms
Mode	Pulse-Echo, Through Transmission, or External Pulser		
Isolation (74 dB min)	Typically 78 dB at 10 MHz (74 dB min)	Typically 80 dB at 10 MHz (46 dB min)	Typically 50 dB at 400 MHz
Remote Pulser Preamp	None available	Compatible with 5627RPP-1	Standard configuration
Pulse Repetition Rate Internal	Two frequency menus selectable: **Standard:** 100, 200, 500, 1 k, 2 k, 5 k, 10 kHz **Extended:** 80, 100, 125, 160, 200, 250, 400, 500, 625, 800, 1 k, 1.25 k, 2 k, 2.5 k, 4 k, 5 k, 10 kHz	200, 500, 1 k, 2 k, 5 k, 10 k, 20 kHz	200, 500, 1 k, 2 k, 5 k, 10 k, 20 kHz
Pulse Repetition Rate External	0-10 kHz	0-20 kHz	0-20 kHz
Synch Output Pulse	Pos. TTL compatible, precedes Main Bang by approx. 50 nS	Pos. TTL compatible, precedes Main Bang by approx. 230 nS	Pos. TTL compatible precedes Main Bang by approx. 230 nS
External Trigger Input	TTL and HCMOS compatible, capacitor coupled, optoisolated. Dual isolators accept either polarity. Pulse height: 2.4 V - 12 V. Max. input DC level: ±100		

RECEIVER			
Maximum Bandwidth	1 kHz – 35 MHz (-3 dB)	1 kHz – 200 MHz (-3 dB)	5.0 MHz – 400 MHz (-3 dB)
Voltage Gain (RL=50 ohms)	20, 40, 60 dB	26, 40, 54 dB	66 dB +/- 4 dB, includes remote preamp and receiver gain
Phase	180° inverting	Select 0 or 180°	Non-Inverting
Attenuation Coarse	10, 20, 30 , 40, 50 dB	0, 10, 20, 30, 40, 50 dB	0, 10, 20, 30, 40, 50 dB (precedes Preamp)
Attenuation Fine	0-15.9 dB, 0.1 dB increments	0-15.5 dB, 0.5 dB increments	0-31.5 dB, 0.5 dB increments (post Preamp)
High Pass Filter	1k, 100 k, 300 kHz or 1 MHz	1kHz, 1, 3, or 10 MHz	5, 10 or 50 MHz
Low Pass Filter	35, 20, 10, 5 MHz	200, 100, 50, 20 MHz	400, 200, 100, 50 MHz
Noise (referred to input)	80 µV peak-peak typical, BW=35 MHz	MHz120 µV peak-peak typical, BW=200 MHz	60 µVRMS typical, BW=400 MHz
Max Signal Output	+/- 1V pk., terminated in 50 ohms	+/- 1V pk., terminated in 50 ohms	+/- 1.5v pk., terminated in 50 ohms, 1 dB compression
Input Impedance	500 ohms for signals < 0.5 V pk 100 ohms for signals > 0.5 V pk with coarse attenuation set < 10 dB	50 ohms for signals < 0.5 V pk; .20 ohms at levels > 0.5 V pk with coarse attenuator set < 10 dB	50 ohms for signals < 0.5 V pk; .20 ohms at levels > 0.5 V pk with coarse attenuator set < 10 dB
Output Impedance	50 ohms		
Maximum Input Power	0.25 w		
Power Main Requirements	100/120/220/240 VAC, +/-12.5%: Uses power entry module with detachable power cord 50/60 HZ		
Operating Temperature	32° to 122° F (0 to 50° C)		
Size	16.7″ x 3.5″ x 12.7″(419 mm x 88.9 mm x 315 mm)		
Weight	13.3 lbs (6.0 kg)	16 lbs (7.27 kg)	16 lbs (7.27 kg)

OLYMPUS

CE

Printed 10/2005

Olympus NDT
48 Woerd Ave, Waltham, MA U.S.A.
TEL 781-419-3900 • 800 225-8330 in North America
e-mail: pana@olympusNDT.com

WWW.PANAMETRICS-NDT.COM