

RAM-5000-0.25-7-5kW-Mark-VI-PLUSInstrument Serial No. XXXX

Summary

The RAM-5000 system is a sophisticated computer controlled instrument designed for a variety of pulsed ultrasonic measurements. This system is an outstanding tool for conventional measurements of attenuation, velocity, and time of arrival, and it can also be used for resonance measurements as well.

The system includes 1 high power amplifier optimized for operation from 250 kHz to 7 MHz; the amplifier is capable of driving over 1400 V peak to peak into a 50 Ohm load over this frequency range. The amplifier can also be used outside of their nominal frequency range at reduced power, and typically generate at least 1250 V peak to peak at 10 MHz and 500 V peak to peak at 20 MHz. The amplifier has been designed to be quite rugged, and can drive a severely mismatched load without incident.

This system has the -PLUS upgrade, which includes an integrated oscilloscope and multiplexer for selecting and digitizing waveforms. Combined with the stand alone control software, this is a very capable instrument for ultrasonic measurements. With the use of the included API (application programming interface), custom control and acquisition programs can be written, allowing the RAM-5000 to be used for sophisticated scanning and inspection systems.

The RAM-5000 is a highly versatile and configurable system. Other frequency ranges and custom configurations are available upon request.

Gated Amplifiers

Frequency Range Synthesizer.....	200 kHz to 20 MHz in 1-Hz steps
Pulse Width.....	0.1125 to 200 μ s in 12.5-ns steps
Pulse Delay	1.6125 to 6,550 μ s in 12.5-ns steps
Phase Control	0 to 360 degrees in 0.022-degree steps
Amplitude Control	0 to 100% (relative to GA Output Level) in 0.024-% steps
Nominal Frequency Range Gated Amplifier	250 kHz to 7 MHz
RMS Output Power (into 50 Ohms) over Nom. Freq. Range.....	5 kW
Nominal Output Impedance of Gated Amplifier	50 Ohms
On/Off Ratio of Gated Amplifier	> 140 dB
Output Level Control	> 20 dB
Gated Amplifier Output Level Monitor	60 dB below High Power Output into 50 Ohms
RF Level Control	0 to 5 V in 0.001-V steps
Bias Control	0 to 5 V in 0.001-V steps
Maximum Duty Cycle	0.3%
Overload Provisions.....	Output shuts down if excessive current from the high voltage supply.



RF Receiver

Receiver Inputs (multiplexed)	2
Impedance of Receiver Inputs	50 Ohms
RF High-Pass Filters	0.25, 1, and 4 MHz
RF Low-Pass Filters.....	5, 10, and 20 MHz
Gain to Receiver RF Output	10 dB to 88 dB in 2-dB steps
Maximum RF Output Level	1 V peak-to-peak into 50 Ohms
Receiver RF Output Impedance.....	50 Ohms
Receiver RF Monitor (Front Panel)	20 dB below Receiver RF Output
Maximum RF Monitor Output Level.....	100 mV peak-to-peak
RF Monitor Output Impedance.....	50 Ohms

Quadrature Phase Sensitive Detector Superheterodyne Receiver

Nominal Frequency Range of Receiver.....	20 kHz to 20 MHz
Phase of Local Oscillator	0 to 360 degrees in 0.022-degree steps
Intermediate Frequency (IF) of Superheterodyne Receiver.....	20 MHz
IF Bandwidth Filters	0.4, 1, and 4 MHz
Receiver Gain to output of Phase Detectors	22 dB to 100 dB in 2-dB steps
Number of Phase Detectors	2
Reference Phase.....	0 degrees or 180 degrees
Phase Detector Outputs.....	(0 and 90 degrees) or (180 and 270 degrees)
Phase Detector Resolution	< 0.05 degrees
Phase Detector Maximum Output Level (internal to RAM-5000)	±2 V
Phase Detector Monitors Maximum Output Level.....	±200 mV
Phase Detector Video Low-Pass Filters	50 kHz, 100 kHz, 150 kHz, 250 kHz, 400 kHz, 700 kHz, 1 MHz, 2 MHz

Integrators

Integrator Gate Delay	1.1125 to 6,550 μ s in 12.5-ns steps
Integrator Gate Width	0.1125 to 6,550 μ s in 12.5-ns steps
Integrator Gate Monitor Output Signal	Positive TTL
Integration Rate Constants	0.454, 0.769, 1.36, 2.37, 4.12, 7.3, 12.2, 21.3, 37.0, 66.7, 110, 196, 348, 617, 1100, 2000 V/(V ms)
Maximum Integrator Output Level (internal to RAM-5000)	±5 V
Number of Integrators	2
Maximum Integrator Monitors Output Level	±500 mV



Timing

Master Clock Frequency	80 MHz
Trigger Sources	Computer (software), Internal, or External
Computer Trigger Rates (subject to Duty Cycle limitation).....	0.01 Hz to 1 kHz
Internal Trigger Rates (subject to Duty Cycle limitation).	0.1 Hz to 10 kHz
External Trigger Input Signal	Positive TTL
Trigger Output Signal	Positive TTL

Measurement Circuits

Integrator Analog-to-Digital Converters.....	2
Integrator A/D Resolution (self-calibrating)	16 bits
Auxiliary Analog-to-Digital Converters	1
Auxiliary A/D Resolution	12 bits
Internal Analog Signal Diagnostic Channels (multiplexed into Aux. A/D)	6
External Analog Signal Sensor Inputs (multiplexed into Aux. A/D)	2
External Sensor Maximum Input Levels	± 5 V

Waveform Digitizer and signal selector (-PLUS option)

Model	PicoScope 5244D (200 MHz bandwidth, 2 channel, 8-16 bit vertical resolution)
Signal selector type	Software controlled multiplexer
Rear panel outputs.....	4
Internal Output channels	2
Signals available	Trigger, Synthesizers, RF Burst, RF Receiver Output, Phase detector monitors, Integrator monitors, Integrator Gate, Auxiliary Input

Computer and Control Interface

Digital Interface	32-bit TTL (16 bit Input, 16 bit Output)
Data Acquisition Card.....	Sealevel 8010 PCI board
Connector to Digital Interface	50 Pos. Connector
Operating system	Windows 7 SP2/8/10/11, 32 or 64 bit
Digitizer interface	USB 3.0

Cabinet and Power Supply

Cabinet Style	19-inch rack mount; side panels provided
Dimensions	17.5" (44.5 cm) wide, 10.5" (26.7 cm) high, 17.2" (43.7 cm) deep
Shipping Weight	Approximately 50 pounds (23kg)
AC Power Requirements.....	85 to 240 Volts RMS, 50-60 Hz, ~300 W
AC Power Factor.....	>99%
Auxiliary Power Outputs (-18V,-8V,+8V,+18V,+48V).....	2