

Model SNAP-0.25-7

Instrument Serial No. XXXX

Summary

The SNAP system is a sophisticated computer controlled instrument designed specifically to make possible the study of nonlinear ultrasonic phenomena. Wave mixing measurements can be investigated using the two independently controlled gated amplifiers, with independent frequency and timing controls. Harmonic generation measurements can be made using the frequency selection and rejection properties of a super-heterodyne receiver. This system is also an outstanding tool for conventional measurements of attenuation, velocity, and time of arrival.

This system includes 2 high power amplifiers optimized for operation from 250 kHz to 7 MHz. Each amplifier is capable of driving over 1400 V peak to peak into a 50 Ohm load. The amplifiers can also be used outside of their nominal frequency range at reduced power. The amplifiers have been designed to be quite rugged, and can drive severely mismatched loads without incident.

The SNAP is a highly versatile and configurable system. Other frequency ranges and configurations are available upon request.

Gated Amplifiers

Frequency Range Synthesizer No. 1	200 kHz to 30 MHz in 1-Hz steps
Frequency Range Synthesizer No. 2.....	200 kHz to 30 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 No. 1	250 kHz to 7 MHz
Nominal Frequency Range Gated Amplifier No. 2	250 kHz to 7 MHz
RMS Output Power (into 50 Ohms) over Nom. Freq. Range GA No. 1	5 kW
RMS Output Power (into 50 Ohms) over Nom. Freq. Range GA No. 2	5 kW
Nominal Output Impedance of Gated Amplifiers	50 Ohms
On/Off Ratio of Gated Amplifiers	> 140 dB
Output Level Control	> 20 dB
Gated Amplifier Output Level Monitors	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.
Overvoltage Protection	Output automatically shuts down if an over voltage event occurs.
Active Gated Amplifiers	GA No. 1, GA No. 2 or Both

RF Receiver

Receiver Inputs (multiplexed)	2
Impedance of Receiver Inputs	50 Ohms
Maximum input level.....	100 mV peak to peak
RF High-Pass Filters	0.1, 1, and 4 MHz
RF Low-Pass Filters.....	20, 40, and 80 MHz
Gain to Receiver RF Output (Rear Panel)	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.....	200 kHz to 80 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 (Rear Panel).....	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

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, 32 or 64 bit

Cabinet and Power Supply

Cabinet Style	19-inch rack mount; side panels provided
Cabinet Dimensions	17.5" (44.5 cm) wide, 10.5" (26.7 cm) high, 17.2" (43.7 cm) deep
Shipping Weight (Cabinet only)	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