



THE GLOBAL LEADER IN HIGH POWER ULTRASONICS



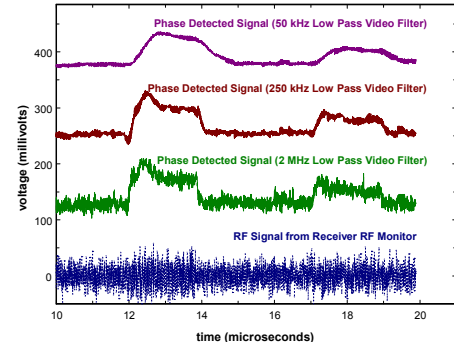
## RITEC SNAP System

First Ultrasonic System designed for Nonlinear Applications:

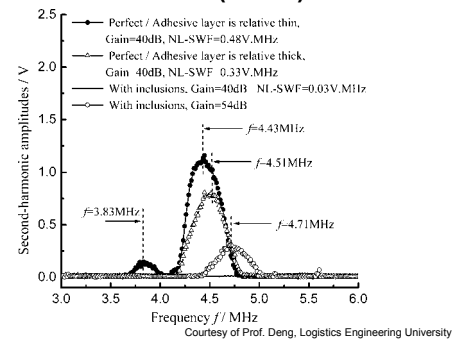
- A phase-sensitive superheterodyne receiver provides the ability to extract undetectable signals from the noise.
- Characterize materials by measuring nonlinear properties.
- Examine harmonic frequencies for increased sensitivity in material evaluation.
- High Power Gated Amplifiers deliver high power RF tone burst pulses up to **5 kilowatts RMS** up to 7 MHz,
- Two gated amplifiers provide a variety of nonlinear measurements such as beam mixing with the nonlinear generation of sum and difference frequencies.
- Easily customized to specific frequency and power requirements.

### Industrial Applications

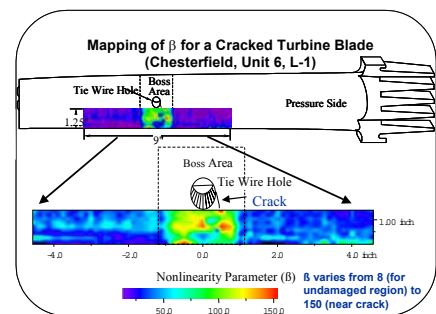
Improved signal detection



### Determine Adhesive Properties with Nonlinear Guided (Lamb) waves



### Early Detection of Damage and Remaining Lifetime



Courtesy of T. Yost NASA Langley Research Center  
Use of this data taken with the SNAP system does not constitute an endorsement of RITEC's products by NASA.

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## **MOST POWERFUL ULTRASONIC PULSER / RECEIVER**

The RITEC SNAP is a complete ultrasonic measurement system designed for ultrasonic research and applications of the nondestructive evaluation of materials properties. Some special capabilities not available in other commercial instruments include:

- The ability to make reproducible measurements using short (down to single cycle) RF burst excitations in composites and other difficult materials,
- High power RF tone burst excitations up to 5 kilowatts, providing ability to drive inefficient transducers,
- A modular approach, (This permits a system to be customized by the user for specific experimental requirements. Standard configurations include a high power tone burst pulser, a broadband pulser/receiver and the complete superheterodyne measurement system.) The power frame was designed to accept up to five gated amplifier modules; this allows a wider frequency range using two or more gated amplifiers.
- Superior signal processing for amplitude and phase measurements of pulsed RF signals. Measurements of the phase angle are reproducible to within 0.3 degrees and amplitudes are reproducible to within 0.01 dB. For example, in a test sample with a transit time of 5 microseconds with 10 MHz transducers, a resolution of 4 picoseconds is possible. Phase detection can improve the signal to noise by up to 50 times.

This ability to measure signals automatically and accurately coupled with software to process these readings into acoustic time of flight and attenuation information combine to make the SNAP System a very powerful ultrasonic research tool.

### **GENERAL SPECIFICATIONS**

1. The unit can be mounted in a standard 19-inch rack. The system is 17.5" (44.5 cm) wide, 10.5" (26.7 cm) high, 17.2" (43.7 cm) deep.
2. Total weight is approximately 50 pounds (23 kg). Universal line voltage requirements are from 85 to 240 Volts RMS at 50 to 60 Hertz. (300 Volt Amperes) at maximum duty cycle.

### **PULSERS**

1. Sinusoidal Radio Frequency (RF) Tone Burst. Select from a custom range or from two standard ranges: from 50 kHz to 5 MHz or 250 kHz to 7 MHz. Gated amplifiers operate up to 30 MHz at reduced output powers; receiver operates to 80 MHz.

For additional information on the capabilities of the SNAP along with applications and measurements, please see the expanded specifications at <http://www.ritecinc.com/snapspecs.pdf> and contact RITEC for further details.

2. Unique Triple synthesizer module allows independent control over frequencies and amplitude for two radio frequency tonebursts which can be delayed by up to 6 ms relative to the trigger. Modulation circuitry allows Square, Hanning and combination of two frequency tonebursts sent to gated amplifier number one.
3. Power Output: 5 kW at 7 MHz, The saturated power output in the primary frequency ranges is ~ 7 kW. Level Control: Greater than 30 dB
4. Pulse Width: controllable in increments of time or in cycles of RF. Maximum Pulse Width: limited to 200 microseconds.
5. Maximum Duty Cycle: limited by over current settings; 0.3% for the high power pulser.
6. Two different protection circuits are provided: over current and over voltage.
7. Accepts an external gating signal and external RF signal from an arbitrary waveform generator (factory configured).

### **RECEIVER**

1. Total Gain: 22 dB to 100 dB
2. Gain Control: 78 dB in 2 dB steps
3. Noise Figure: Approximately 6 dB at maximum gain.
4. Inputs: One of the two inputs can be active.
5. Three selectable high pass filters: 0.05, 1, or 4 MHz in the low frequency unit: 0.25, 1, or 4 MHz in the high frequency unit.
6. Three selectable low pass filters: 20, 40, and 80 MHz.
7. Maximum bandwidth: 50 kHz to 80 MHz
8. Input Impedance: 50 Ohms
9. Broadband receiver Output: 1 Volts peak-to-peak into 50 Ohms.
10. Intermediate frequency of 20 MHz with selectable band-pass filter of 0.4, 1 or 4 MHz.
11. Phase detector filters of 50 kHz, 100 kHz, 150 kHz, 250 kHz, 400 kHz, 800 kHz, 1.5 MHz, and 2 MHz. Maximum phase detector output of +/-200mV peak.
12. Integrator Rates of 454 Hz, 769 Hz, 1.4, 2.4, 4.1, 7.3, 12.2, 21.3, 37, 66.7, 110, 196, 348, 617, 1100 or 2000 kHz. Maximum Integrator output of +/- 5V.
13. External Pre-Amplifier: can be powered by a rear panel connector. (+8V, -8V, +18V, -18V, and ground)

### **TIMING**

1. Triggered Internally, Externally or Software.
2. Internal Range: 0.08 Hz to 10,000 Hz in 42 steps
3. Positive trigger output coherent with the RF burst. 80 MHz clock output coherent with the RF burst also available.

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