Application Report

BRANCH : Universities, Laboratories, Research based organizations

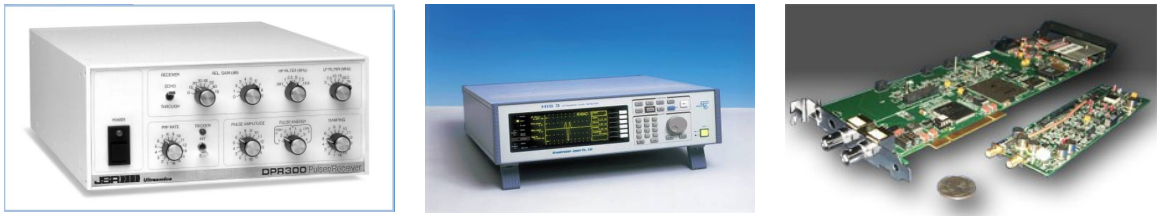
TEST TASK : High resolution imaging, thickness gauging, material analysis

SOLUTION : High frequency ultrasonic testing

We have delivered many high frequency Pulser Receiver systems for use in stand alone as well in conjunction with automated scanning systems. In many cases, our ultrasonic units have also become a part of customer built or their existing scanning systems.

The practical uses of higher frequency ultrasonic testing are many. As the use of higher frequencies involves parallely increase in attenuation and scattering effects of the ultrasound energy, generally such tests are limited to applications for use on thinner sections of test materials. Some common applications include the following: (a) High resolution ultrasonic imaging of ceramic parts, biological tissues, microelectronics components (b) Thickness gauging of very non-metallic coatings on non-metallic substrates and on small tubings etc (c) very high frequency material property analysis etc.

In many materials like fine grained metals, ceramics and thin polymers, these higher test frequencies permit measurement of significantly smaller flaws and measurement of considerably lower thickness limits as compared to with use of conventional test frequency instrumentation. Selection of proper Pulser / Receiver design and setup has a major effect on the final performance. A user also has to consider several other important parameters for an optimum test like use of proper cable lengths, selection of appropriate transducers considering their aspects such as echo recovery time based on center frequency and bandwidth, sensitivity, beam diameter, focal zone, attenuation effects in water path and test material.



Stand-alone Pulser Receivers and Plug-in P/R cards

The performance of any ultrasonic transducer is significantly affected by the type of excitation pulse that is used to drive. This is specifically true, when we work at higher frequencies as compared to the normal range. Use of highly damped broadband transducers that will be driven by spike excitation is common. For an optimum frequency response, the rise time of the excitation pulse must be much shorter than the period of the transducer. Pulsers that are selected for high frequency applications must therefore be capable of generating an excitation pulse with a minimum rise time as possible.

On the receiver side, the RF bandwidth must be sufficient to process the received echoes without causing frequency downshift and associated phase distortion. An RF bandwidth of atleast twice the center frequency

of the received signal is generally recommended. Use of appropriate cable length though it does not sound such an important criteria, is still an important aspect to be thought of and considered. The electrical transit time in the cable always has to be shorter than the period of the transducer. Elsewise, cable reflections can occur which will re-excite the transducer causing ringing and signal distortion thereby affecting near surface resolving capabilities.

For ensuring optimum results in testing, an optimum selection of instrumentation and its accessories is therefore, a big pre-requisite.

Suitable Equipment :

- Our entire range of Pulser Receiver systems and testing accessories

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