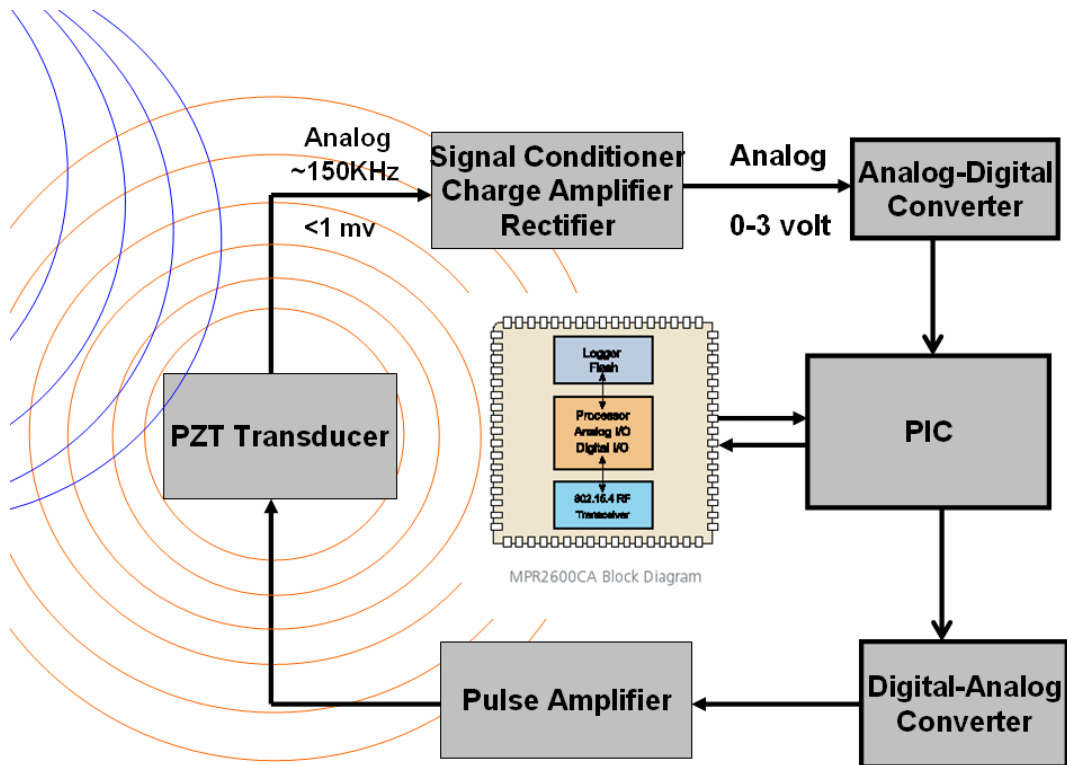


ECE 191 Project Spring 2009

Wireless Sensor Module for Structural Health Monitoring of Composite Structures in Aircraft: Active Acoustic Electronics

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The long term goal of this project is to configure a wireless sensor network using IEEE 802.15.4 Zigbee protocol compliant RF transceiver motes to collect real time data from acoustic transducers. In this active system, the piezoelectric transducers with integral motes are attached to a composite aircraft component and acoustic pulses are sent from individual wireless motes/transducers to nearby transducer/motes. The output of the transducers are processed and wirelessly transmitted to a host computer which then analyzes this data to detect the existence and location of possible damage. This project is a continuation from the last two quarters when teams used Crossbow Technologies MicaZ Zigbee compliant motes and successfully demonstrated that simple acoustic information could be acquired and transmitted over the Network.



Acoustic In-Situ NDT Testing Module

Spring 2009 Project: Last quarters group primarily addressed developing the hardware necessary to generate an acoustic pulse, receive and condition the pulse from the transducer as well as develop a PIC based interface.

The goal of the Spring quarter group is to further develop, modify as well as refine this circuitry into a functioning unit. The deliverables would consist of the pulse generator, controllable by the Mote and capable of producing a pulse of sufficient amplitude to travel 10 inches in the composite panel to surrounding transducers, the signal conditioning and interface capable of inputting the signal to the mote.