Ground Penetrating Radar for Road Maintenance Using the DT9832

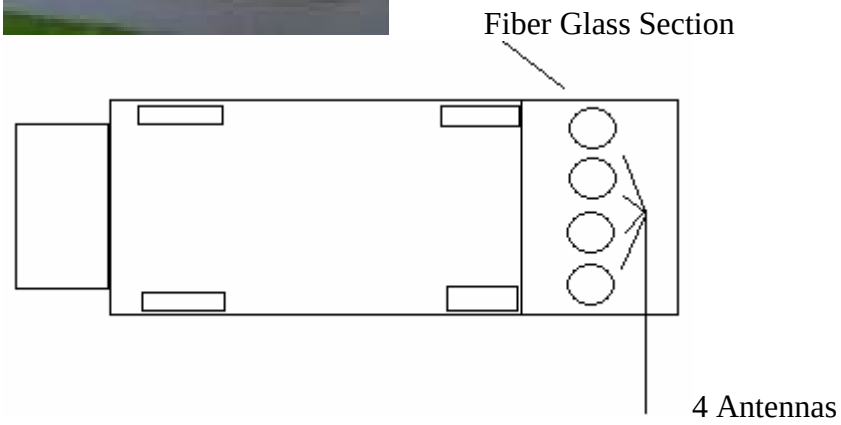
Application Summary

A road maintenance/ground penetration analysis company provides analysis and data recording of newly laid asphalt roads. The company presently does this with the use of about a half a dozen specially equipped RV's.

The company was looking to upgrade their systems inside these RV's and looking to use a lower cost solution than the present device which tends to be expensive and slow. The company was looking for a high speed, portable data acquisition device which had the ability to keep up with the vehicle when driving at speeds up to 60mph while performing the radar pass over the newly laid asphalt.

Specialized RV

The RV's used in this application have a rear end that is equipped with up to 4 radar antennas and are made completely of fiber glass. The fiber glass is necessary so that there are no metallic components which could interfere with the incoming radar signals. Along with the four radar antennas, the customized vehicles have a Distance Measuring Instrument (DMI) that is used to scan the roads.



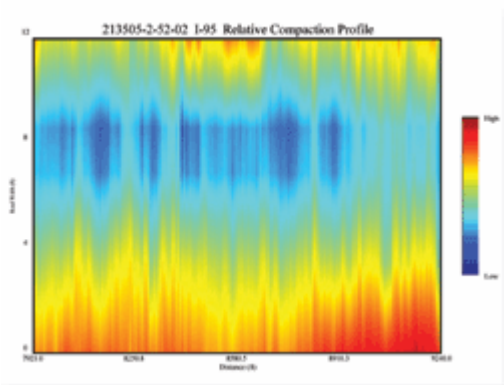
To get accurate and reliable data, the company needs to scan all 4 antenna readings simultaneously so that there is no time delay between the measurements. A counter/timer is necessary to use along with the DMI to obtain the accurate distance being logged with the radar data.

Solution

They have decided to use Data Translation's high-speed, DT9832 USB data acquisition module to record each of the four simultaneous radar signals and the DMI readings. The DT9832 module has four simultaneous, high-speed channels with throughput rates of 1.25MHz per channel, 16 Digital I/O lines, 2 Counter Timers and 3 Quad Decoders.

The company intends to get a notification pulse every 20ms. When they get this pulse, for the next 18ms they will collect radar signals from each of the four analog inputs. They have to record (and display) each of these 18ms long analog signals at 1024 samples. Along with this they get rectangular pulses from the DMI system. This needs to be recorded using one of the counters.

The new system will be able monitor compactness of the new asphalt layering. The information provided from the DT9832 module is given in a color spectrum (see below). The bluer the spectrum the less compact the layer of asphalt. The redder the spectrum lines the more compact and less likely the road is to erode or need maintenance.



Spectrum

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