Radar data acquisition system pdf

Go to main content The most advanced radar systems operate in a wide range of bands and provide high resolution images. Continued advances in RADAR technology often translate into wider bandwidth, leading to an ever-increasing amount of data for processing. Therefore, high-performance data processing is essential for 21st century radar systems. In addition, with many different types of radar systems, each with its own specialisation in detection and/ or surveillance, additional technologies are needed to combine multiple radar system results into a higher order and a more trustworthy integrated image. Solution Signatec high-speed signalling systems. Signatec PCI products provide leading performance and market affordability. As standalone products, wave signal capturer board data, with deep buffered onboard memory, are able to retrieve or run on signals continuously without a break in analog recording and without data loss. Easily add more DAQ boards and create a simultaneous multichannel acquisition system. Signatec's real-time FPGA digital signal processing digitizers allow customers to implement their own in-line signal processing with optional onboard FPGA. Standard interfaces and examples are provided to simplify this task in available Signatec firmware development kits for custom user programming. Or customers can easily choose to take advantage of Signatec's built-in real-time DSP features for FFT, FIR filtering and DDC logic package processing provided with our FPGA digitizers at no additional cost. Our new generation of any waveform signal generator and DAC playback board provides four 14-bit/8-bit digital to analog conversion (DAC) channels to accurately produce output signal frequencies up to 1.2 GHz. Combined as a fully integrated system, Signatec's real-time wave signal recording products provide the ability to continuously stream real-time data at rates of up to 2.8GB/s at any location within your PC system. The advanced radar systems you provide will provide your customers with an unbeatable value offer. Use our powerful system software to manipulate Signatec products on the board or at the system level. System software can be used to set all hardware settings, record data from any data acquisition boards, re-create analog signals, display large amounts of signal data, run DSP applications and much more. In addition, each Signatec product comes with the following software free of charge: ● Software to install the product ● Complete library of features for user-specific application development ● Examples of source code that illustrate how to use the Application Building Feature Library ● Diagnostic executable programs to verify product functionality ● Integrator Signatec for application development and debugging (DSP products only) When you incorporate Signatec Signatec into all functions and note the comparable low cost of our boards in relation to other products with less capabilities, Signatec provides exceptional value for a wide range of radar applications. We encourage you to contact us and discuss your application with our engineering team in more detail. Signatec can provide customized custom hardware and software solutions to meet your specific application needs. We welcome your feedback on our existing products or possible future products. Thank you for your interest in Signatec. We look forward to hearing from you in the near future. Posted on Dec. 05, 2020 Introduction In radar data collection system, data from COTAL RADAR is processed by 8085 microprocessor and the processed data is

first sent to the RADAR control room, from there it is also transmitted to the main control room using a MODEM at a transfer rate of 9600bps, coded data are decoded by the INTEL 8051 microcontroler. The microprocessor set is equipped with a serial data transmission/receiver system. The RS 232 format is converted to TTL format by the RS232 IC converter. The data collection programme can be found on the EPROM Training Kit. Data related to RANGE, AZIMUTH, ELEVATION & QUALITY information are separated and fed into the display system via peripheral I\O interface IC 8255 . The quality information is taken from port 0 of 8051 directly and the interface circuit displays the operation mode (auto/manual) and the quality of the received data. Radar is an electromagnetic system for detecting and locating objects. It works by transmitting a certain type of waveform, such as pulse-modulated sinus wave, and detecting the nature of the echo signal. Radar is used to expand the ability of those senses to observe the environment, especially the sense of vision. In addition, the radar has the advantage of being able to measure the distance or range of an object. Radar is a contraction of the words Radio Detection and Range. The basic form of radar consists of a transmitted antenna emitted by electromagnetic radiation generated by an oscillator, a receiving antenna and an energy detection device or receiver. Part of the transmitted signal is captured by the reflective object (target) and irradiated in all directions. The receiving antenna collects the returned energy and delivers it to the receiver, where it is processed to detect the presence of the target and extract its location and relative speed. The distance to the target is determined by measuring the time it takes for the radar signal to travel to and from the target. The direction or angular position of the target may be determined from the direction of arrival of the reflected wave anchorage. The usual way to measure the direction of arrival is with a narrow antenna beam. If there is relative movement between the target and the radar, the displacement of the carrier frequency of the reflected wave (Doppler is a measure of the relative speed of targets and can be used to distinguish moving targets from stationary targets. A continuous indication of the speed of the change of target position is also available in radars that continuously monitor the movement of the target position. The most common radar waveform is a train of narrow pulses of rectangular shape modulating the sinusoidal wave carrier. The distance or range to the target shall be determined by measuring the TR time taken by the impulse to travel to the target and return. As electromagnetic energy is circulating at the speed of light C=3 x 10 8 m/s, the range R=CTR/2 . Factor 2 appears in the denominator due to the 2-way spread of radar with range in kilometres and TR nanoseconds R (km) = 0,15TR (microseconds). When the radar discharges the transmitted pulse, it shall elap long enough for any echo signal to return and be detected before the next pulse is transmitted. Therefore, the rate of impulse transmission is determined by the longest range at which targets are expected. If the frequency of pulse repetition is high, echo signals from some targets may come after the transmission of the next pulse and may result in ambiguity in the measuring range. Use of radar 1) Air traffic control 2) Aircraft navigation 3) Ship safety 4) Space 5) Remote sensing 6) Law enforcement 1) Military Serial data received from radar will be converted to parallel format by microprocessor 8051. This parallel data is then provided to the display device to display AZIMUTH, ELEVATION, RANGE, and AGC. Also from port zero, the control signals are decoded and the radar status is displayed. Hardware solutions for radar applications are more complex than ever before. The increasing complexity of modulation and transmission systems, new frequency bands and various solution objectives creates a challenge in finding the right balance of compromises. ISI LLC radar hardware solutions use modular access to radar applications. We start with the host computer or inserted SoC card, which contains building blocks of XMC or FMC slots. The computers contain the latest FPGA chip processing on the market, going all the way up to the Xilinx Ultrascale chip. These host operators can pair with our signal acquisition line and signal generation cards. Cards range from one channel to 16 channels, sampling rate up to 3.6 GSPS and bandwidth up to 6 GHz. This gives the user a digital signal processing horsepower need to process multiple channels simultaneously, along with the corresponding acquisition cards. In addition to carrier cards and acquisition hardware, we also offer multiple firmware and software solutions to meet your needs. Our firmware library includes a variety of signal processing solutions, from Digital Down Convert or Up Convert code to demodulation schemes. On the software side, we offer our framework platform for logic development that allows users to educate and develop Quickly. Contact us now to discuss your design requirements. Requirements.