

Soft dB

## SIGNAL RANGER MK2

### Overview

*Signal Ranger MK2 is a fixed point DSP board featuring a 300MHz TMS320C5502 DSP, a 400 kgates SPARTAN 3 FPGA and a high-speed USB 2 interface, providing fast communications to the board. The Windows driver allows the connection of any number of boards to a PC. The DSP board may be used while connected to a PC, providing a means of exchanging data and commands between the PC and DSP in real-time (ideal for advanced dedicated instrumentation). It may also be used in stand-alone mode, executing embedded DSP code. Given its very flexible resources (DSP+FPGA) and the fact that it can work as a stand-alone board, the Signal Ranger MK2 board may be used in many applications. The Signal Ranger MK2 DSP board can be used with the expansion board SR2 Analog 16 which adds 16 ADCs and DACS (16-bits). Along with this expansion board, our Signal Ranger MK2 DSP board is a cost-effective solution for multi-channel DSP applications.*

### Software Development Tools

- **Driver For Win2k And Winxp:** This driver allows the connection of any number of boards to the PC.
- **Full-Featured Symbolic Debugger:** The debugger includes features such as real-time graphical data plotting, symbolic read/write access to variables, dynamic execution, Flash programming... etc. At its core, the minidebugger uses the same interface libraries that a developer uses to design a stand-alone DSP application. This insures a seamless transition from the development/debugging environment to the deployed application.
- **Labview Interface:** This library of LabVIEW VIs allows the development of LabVIEW code to interface with the DSP board. It includes VIs to download DSP code (COFF loader), launch DSP functions, and read/write DSP memory while the DSP code is executing.
- **C/C++ Interface:** This DLL allows the development of PC code written in C/C++ to interface with the DSP board. They include functions to download DSP code (COFF loader), launch DSP functions, and read/write DSP memory while the DSP code is executing.

- **Selftest Application:** This application tests all the hardware on the DSP board.
- **Code Examples:** Two demo LabVIEW applications exemplify the development of DSP code in C and in assembly. It also shows how to interface this code to a PC application written in LabVIEW. One demo Visual Studio application exemplifies the development of a PC application written in C/C++.
- **Flash Driver And Example Code:** This driver includes all the code to configure and use the on-board 2 Mbytes Flash ROM from within user DSP code.
- **Factory-Default FPGA Configuration:** The board is provided with a factory default FPGA configuration, which provides 63 configurable digital I/Os.

### Exclusive Labview Interface Suitable For The Development Of Advanced Instruments Based On Our Signal Ranger MK2 DSP Board

LabVIEW is a powerful programming environment for the development of instrumentation and analysis applications. It allows a fast and easy way to build a dedicated PC interface with our DSP board. The LabVIEW interface provided with the DSP board includes many VI libraries for downloading DSP code or FPGA logic, launch DSP functions, and read/write DSP memory in real time while the DSP code is executing.

Example of diagram and front panels in LabVIEW

### Key Features & Benefits

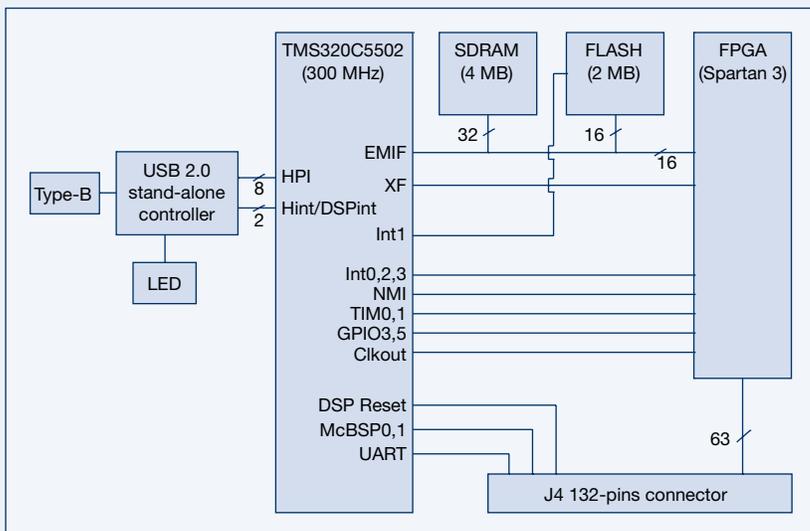
- Cost-effective solution for multi-channel audio applications (with the optional SR2 Analog 16 expansion board).
- Includes a powerful 400 kgates Spartan 3 FPGA from Xilinx providing 63 digital I/Os for general purposes and hardware interface.
- USB 2.0 port allows the transfer of real-time data to/from the PC.
- Two boot modes (Stand-Alone and PC) are accessible without using any jumpers. Even when the DSP board has booted in stand-alone mode, the PC may be connected at any time to read/write DSP memory without interrupting the already executing DSP code.

- Unique software tools that allow a seamless transition from the development/debugging phase to the deployed application phase without any performance compromise.
- DSP JTAG connector. With the addition of a JTAG emulator (not included), it allows complete emulation from the Code-Composer-Studio environment.
- The board features a dedicated USB 2.0 controller. The DSP is free from all USB protocol management tasks. Furthermore, in this architecture, the USB controller is master, allowing the PC to positively take control of the board in any circumstance, even after the DSP code has crashed.

## Applications

- Multi-Channel Speech And Audio Acquisition And Processing.
- Multi-Channel Control.
- Instrumentation And Measurement.
- Vibro-Acoustic Analysis.
- Acoustic Array Processing/Beamforming
- DSP Software Development.

## Block diagram



## Technical Specifications

### Texas Instruments' DSP

- TMS320C5502 16-bits fixed point DSP @ 300 MHz
- 32Kwords of on-chip DARAM.

### Xilinx's Spartan-3 FPGA

- XS3S400 FPGA @ 150 MHz
- 400 000 gates.
- 56 kbits distributed RAM, 288 kbits block RAM,
- 16 dedicated 18x18 multipliers,
- 4 DCMs.
- Provides 63 user-configurable I/Os

### Memory

- 64 Kbytes on-chip (DSP) double-access RAM, mapped in data and program spaces.
- 4 Mbytes external 75MHz Synchronous Dynamic RAM, mapped in data and program space.
- 2 Mbytes external Flash Rom, mapped in data and program space.

### I/O Interfaces

- 63 digital I/Os through the FPGA
- Universal Asynchronous Receiver/Transmitter (UART)
- USB 2.0 PC connection. Average data throughput: 20Mb/s. Stand-alone USB controller requires no management from the DSP software

- JTAG connector
- 2 McBSPs (multi-channel buffered serial ports) for interfacing Analog Interface ICs

### Power Supply

- **Signal Ranger MK2** is self-Powered using an external 5V (+-5%) power pack

### Development Tools

- Driver for Win2k and WinXP
- Full-featured symbolic debugger
- Access library and LabVIEW interface
- SelfTest application
- Flash driver and example codes
- Initial FPGA Configuration

### Dimensions

- 17.5 cm x 7.3 cm

## Powerful Processing

The **Signal Ranger MK2** DSP board features a TMS320C5502 running at 300 MHz. The DSP provides high-performances and low-power consumption. It includes two multipliers, which allows up to 600 million multiply-accumulates per second. The 5502 has two ALUs: a central 40-bits arithmetic/logic unit (ALU) and an additional 16-bits ALU. These features allow an efficient implementation of advanced signal processing such as FIR filters, IIR filters, FFTs, LMS algorithm and various math functions. The 400 kgates Spartan 3 FPGA includes 16 dedicated 18x18 multipliers, which may be used for co-processing.

## About Soft dB

Soft dB provides innovative, state-of-the-art DSP boards, the Signal Ranger series. Combining performance, reliability and low cost, the Signal Ranger DSP board series is recognized throughout the world as an outstanding product on the DSP market in the fields of acoustics, vibrations, high speed control and related areas. Sold in more than 15 countries, our boards have proven to be extremely reliable and rugged and have established Soft dB's reputation as a high-quality DSP supplier.

**Soft dB**

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