Red River

Pocket Watch
Model 350

Programmable CardBus Digital Receiver

Pocket Watch transforms any laptop or notebook computer into a high performance software defined radio receiver. The unique polychannel architecture combines the flexibility, performance, and precision of advanced digital downconverter chips with two high speed A/D converters to address both narrowband and wideband applications. A single module offers up to eight independent output channels derived from two analog inputs.

The *Pocket Watch* digitizer consists of a dual channel, 10-bit A/D converter operating at clock rates up to 95 MSPS. The sample clock source is software selectable from either the on-board crystal oscillator or an external source connected through the front of the card.

Samples out of the A/D converters can be routed directly to the host computer or distributed to a pool of up to eight digital downconverter channels. Each channel tunes to a signal of interest and performs amplitude adjustment based on gain control settings. The maximum signal bandwidth available in each channel increases as the number of channels is reduced. The downconverter can ouptut a 4 MHz signal bandwidth when the part is configured as a single channel.

The complex data samples produced by the downconverter are stored in a multi-queue FIFO. The FIFO organization can be configured to match the number of active output channels. The depth of each FIFO is also variable, allowing higher sample rate channels to obtain more memory.

The *Pocket Watch* can operate as either a PCI bus master or target, allowing DMA transfers to be initiated either autonomously by the receiver or under direct control of the host. Each FIFO is assigned a programmable threshold that signals either the local controller or the host for service. Alternatively, output data can be routed directly to a dedicated port on the front of the card.

▲ *Industry Standard CardBus Form Factor*

▲ *Laptop or Notebook Host Computer*

▲ *Dual 10-bit (95 MSPS) A/D Converter*

▲ *Internal / External Sample Clock Select*

▲ *Up to 8 Independent Signal Channels*

▲ *4 MHz Max Digital Filter Bandwidth*

▲ *32-bit / 33 MHz CardBus PCI*

▲ *PCI Bus Master With Auto DMA Feature*

▲ *DMA Burst or Scatter Gather Operation*

▲ *Discrete Trigger Input and Data Port*

▲ *Includes Waveformer Configuration Tool*

▲ *Windows and Linux Drivers Available*
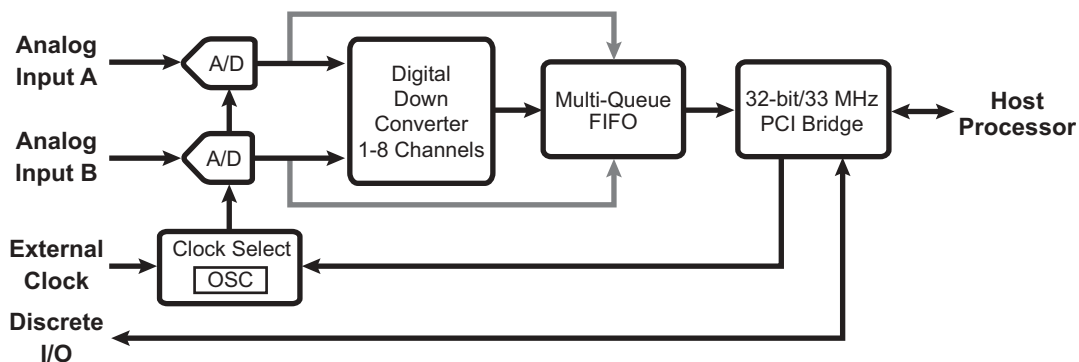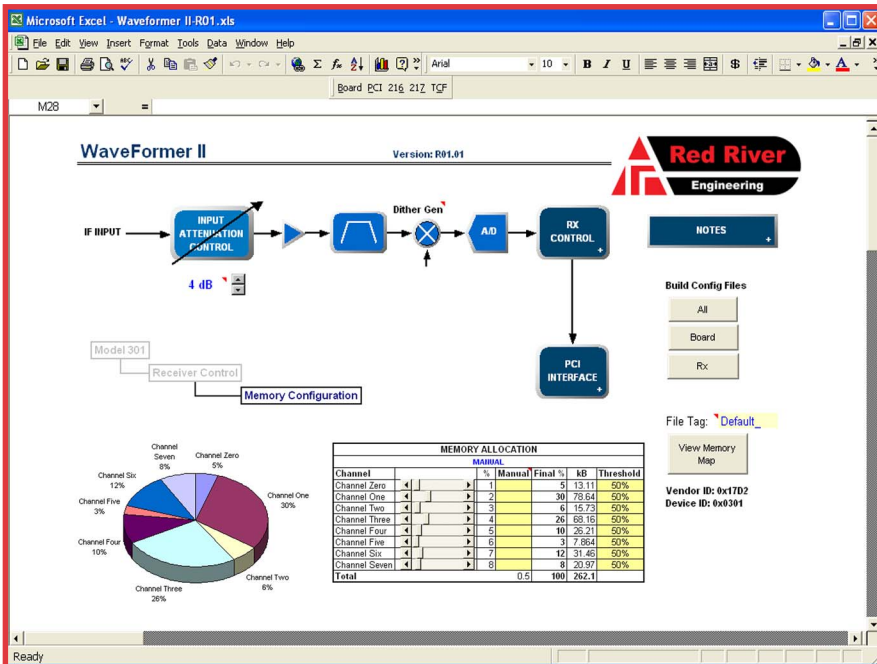
The Waveformer configuration tool simplifies receiver programming.

Pocket Watch offers a simple memory-mapped host interface referenced to a single base address. The host processor has direct access to all control registers, including the sample clock selector, multi-queue FIFO organization, downconverter (ISL5216) configuration space, local command/status, and receiver data flow control. The interface includes an interrupt to alert the host of an error condition or data service request.

Pocket Watch programming is simplified by the *Waveformer* configuration tool that automates the process of computing register values based on the desired performance characteristics of the receiver. The user enters configuration information through a series of menu-driven spreadsheets that accept input based on available register options. The spreadsheets also perform error checking to eliminate configuration conflicts and graphically display key performance parameters in simple block diagrams and frequency response plots. The configuration tool generates a file containing the complete memory map that can be easily uploaded from the host.

Typical Applications

▲ *Signal Intelligence (SIGINT) Collection*

▲ *Multi-Mode Software Defined Radio Receiver*

▲ *Multi-Channel Narrowband Digital Receiver*

▲ *Single Channel Wideband Digital Receiver*

▲ *Portable Spectrum Analyzer*

▲ *Signal Recorder*

Specification Summary

▲ Receiver

Dual 10-bit A/D Converter
20 MSPS to 95 MSPS Encode Rate
100 kHz to 100 MHz (3 dB) Input
-2 dBm Input Power (Full Scale)
0 dBm 3rd Order Intercept Point
Intersil ISL5216 Downconverter
1-8 Independent Output Channels
256 kbyte Multi-Queue Data FIFO
4 MHz Maximum Signal Bandwidth
   (Single Channel Operation)
2 MHz Maximum Signal Bandwidth
   (Multi-Channel Operation)
96 dB Digital Automatic Gain Control
65 dB Spur Free Dynamic Range
55 dB SINAD

▲ Board

32-bit/33 MHz PCI Bus
Multi-Channel Auto DMA Engine
DMA Burst or Scatter-Gather

▲ Options

Four or Eight Channel Downconverter
Selectable Oscillator Frequency
Customization Available by Request

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