Model 6510

8-Chan. 4-Input Narrowband Digital Receiver VME Board

General Information

Model 6510 is a general purpose multichannel digital receiver VME board which accepts digitized data at sampling rates up to 50 MHz. It may be configured with up to eight channels of narrowband receivers to perform frequency down conversion, lowpass filtering, and decimation of the sampled output.

The receiver output signals are delivered through front panel C40 comm ports for implementing DSP functions on Pentek's C40 DSP processor boards.

Receiver tuning, filter and FIFO control is available from the VMEbus.

Operating Principle

This unit utilizes highly integrated digital receiver chips containing a tunable local oscillator, a mixer and a tunable low pass output filter. The local oscillator frequency and the output filter cutoff frequency in each section are independently programmable over the VMEbus interface providing extremely flexible and agile operation.

Model 6510 uses the Intersil HSP50016 receiver chip.

Applications

These VME boards provide an effective way to create multichannel digital signal processing and analysis systems for selected frequency bands. Since they down convert selected bands, they make it economically feasible to perform DSP functions such as FFT spectrum analysis on RF signals. Typical applications include frequency-division multiplexed communications systems, modem modulation schemes, and analysis of many forms of radar signals.

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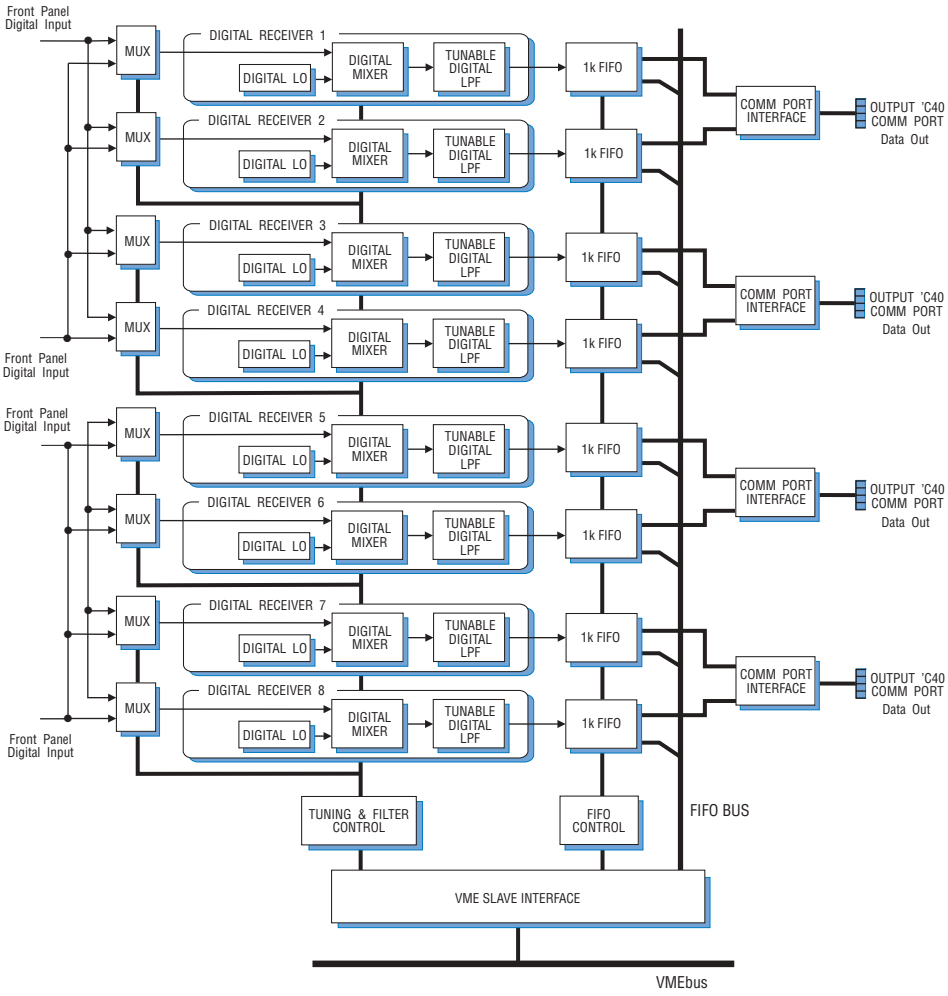
Features

- Sampling rates to 50 MHz
- Four TTL or FPDP inputs
- Four C40 comm port data outputs
- Tuning control via VME interface
- Dynamic range greater than 100 dB
- 0.006 Hz tuning resolution
- FIFO buffering
- Compatible with the Pentek Series 64xx A/D Converters

Block Diagram, Model 6510



PENTEK

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Flexible Input Connections

Parallel digital input data samples from four sources are accepted on two front panel multipin connectors with TTL or, optionally, FPDP level compliance. Each receiver channel employs a 2-input multiplexer which independently selects two of these four input data sources.

The VMEbus interface is used to program operating modes, tuning frequencies and decimation bandwidths.

Specifications

Narrowband Receivers (8)

Receiver type: Intersil HSP50016

Digital input format: four independent inputs; each input with 16-bit words, 2's complement; one sample clock line

Input level: TTL single-ended; optionally FPDP (option -008)

Sampling rate: DC to 50 MHz max.

Data input connector: 80-pin flat ribbon cable 0.025" pitch (3M)

Input multiplexers: two groups of four receiver channels each; each group can independently select one of two front panel inputs under program control

Local oscillator: direct digital synthesizer; single frequency CW and sweep (chirp) up/down modes; CW frequency is equal to $F*f_s/2^{33}$, where F is a 32-bit binary integer and f_s is the input sample rate

Tuning range: DC to $f_s/2$ (25 MHz for f_s = 50 MHz)

Tuning resolution: $f_s/2^{33}$ (~0.006 Hz for f_s = 50 MHz)

Low pass filter: decimating 121-tap FIR, programmed by 15-bit integer R, from 16 to 32,768; nominal output Nyquist bandwidth $f_N = f_s/4R$; output sampling rate is $f_s/4R$ for complex outputs and $f_s/2R$ for real outputs

Filter response: $\pm$0.04 dB passband ripple; –3 dB bandwidth = $0.56f_N$; –100 dB stop bandwidth = $0.8f_N$

Real mode: consecutive 16-bit real output samples at sampling rate $f_s/2R$

Complex mode: 16-bit complex (interleaved I and Q) output samples at sampling rate $f_s/4R$ per complex pair

Data FIFO: 1k x 16 expandable to 16k x 16 bits per channel, VME interrupts for full, half-full and empty.

Comm port outputs: Four, one for each receiver channel pair; byte-serial with 4 bytes per 32-bit longword; data packed (two 16-bit words per longword) or unpacked (one 16-bit word per longword)

VME interface: slave A32, D32, I(1-7)

Control registers: memory-mapped over the VMEbus; receiver chip control registers (includes local oscillator, filter decimation, real/complex mode, etc.), input multiplexer control, and channel synchronization control

Power: 5.1 A at +5 V

Size: standard 6U VMEbus board, single slot; board 160 mm (6.3 in.) x 233.5 mm (9.2 in.), panel 0.8 in. wide

Ordering Information

Model	Description
6510	8-Channel 4-Input Digital Receiver VME Board
Options:	
-008	FPDP inputs
-021	16 ksample FIFOs

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