

System 3112

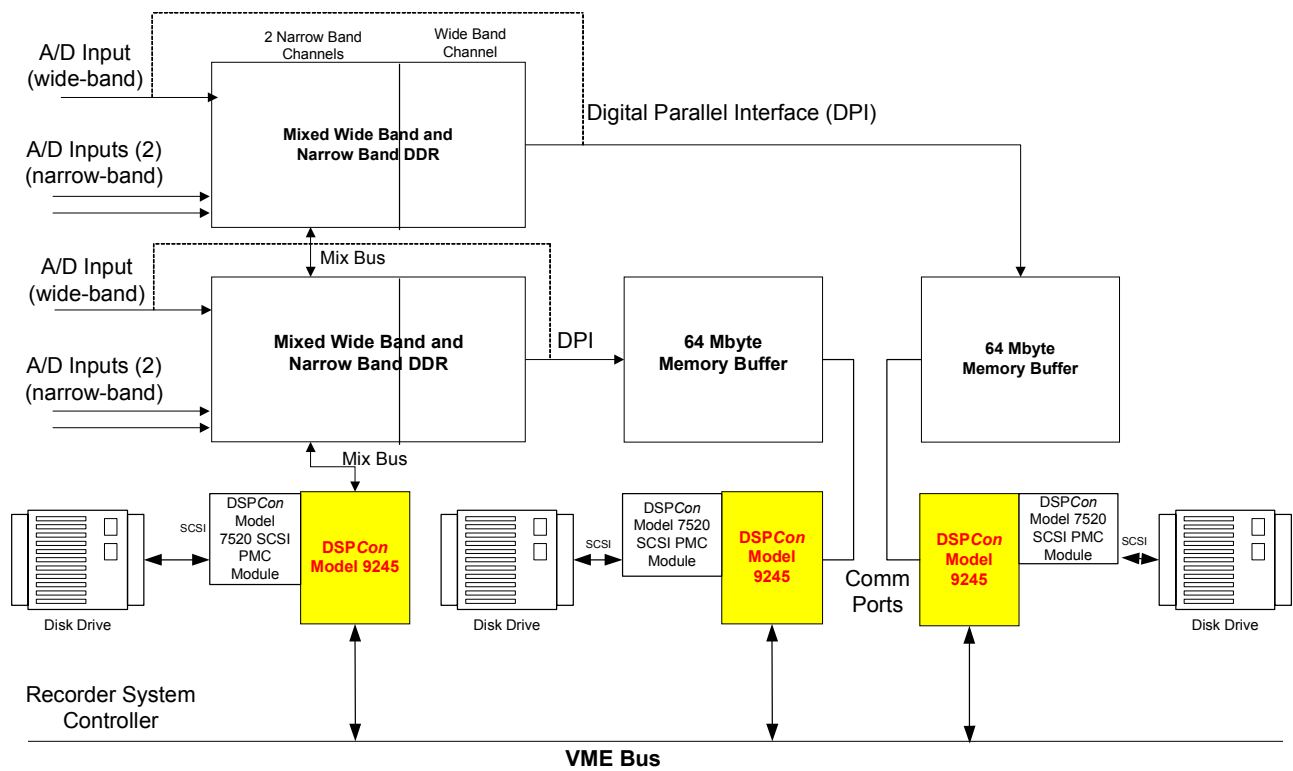
Wideband and Narrowband High-Speed Data Acquisition and Record System

DSPCon's System 3112 is designed to capture two wideband transient data channels, plus up to four narrowband continuous channels. This system also includes an embedded Pentium PC and a display keyboard. In addition, the system is delivered with three high-speed disk drives with two for data collection and one as a spare and for data backup.

Data from the two wideband channels is recorded on two separate disks, while data from the four narrowband channels is recorded to a single disk. As an option, DSPCon can provide tape drives, rather than disk drives.

There are three DSPCon Model 9245 Single TMS320C40 DSP processors that perform a task of data movement from the two Digital Drop Receivers (DDRs) to DSPCon Model 7520 SCSI Interface. Prior to being recorded on the disk, the data from the two wideband channels is first moved to a Memory Buffer. The DSPCon Model 9245 DSP Processor, which connects the two DDRs through the MIX bus, is the system controller.

System Block Diagram



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Wideband Recording

Two identical channels of analog data are digitized by the undersampling A/Ds. The signals of interest are band-limited in a 5 MHz IF band centered at 30 MHz. They are digitized with a 40 MHz sampling frequency which translates the IF band down to 10 MHz. The digital outputs are then applied to two Pentek 4272 Multiband Digital Receivers.

The input digital data channels consist of 12-bit samples and the digital receivers are tuned to down convert the 5 MHz IF down to DC, while rejecting the higher frequency components created by the sampling process. After this second down conversion in the digital receivers, the original IF signal that was centered at 30 MHz is now a complex signal translated to a center frequency of 0 Hz. Complex I and Q samples at 5 Msamples/sec are sent to two 64 MB High-Speed Buffer Memory boards. Their function is to capture and output the high-speed data to the Single 'C40 DSP Processor boards. In turn, the processor boards move the data to the SCSI Controllers. Under a custom software package developed by DSPCon, the SCSI controllers stream the data to the high-speed, high-capacity disk drives for storage and subsequent off-line analysis. When full, the disk drives are physically moved to a workstation, connected to the system, for data analysis.

The Digital Drop Receivers (DDRs) can handle input signals at sampling rates up to 70 Msamples/sec, well within the 40 Msample/sec data rate coming from the A/D. The 20 MB/sec complex output data streams from the DDRs can be easily accommodated by the memory buffers, since they can handle rates to 140 MB/sec.

Software

DSPCon's System 3112 is provided with a simple Application Programming Interface C-level command interface, which communicates from a PC to the DSP processors. It also allows the system to be connected via many different ways, embedded PC's, VxWorks system controllers and even PC to VME Bus adapters without changing any code. A simple API was developed in order to configure decimation factors, tune frequencies, filenames, and transfer lengths for the system. There is also an abort command, erase, reset, and a way to wait or query if the current capture of the data is complete. In addition, there is a function for transferring files from the host machine to the software drives. The system is capable of storing over 500 sets of information on one set of disk drives depending on the disk capacity.

