PC Based Logic Analyzer

Functional Description

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Introduction:
A logic analyzer is an instrument that displays digital signals. It functions much like an analog oscilloscope except it only displays four levels: low, high, tri-state and indeterminate; it also samples more lines. This project will create a PC based logic analyzer for use in Junior laboratory. It will have external conditioning hardware (known as a POD) connected to the PC. The PC will provide a Graphical User Interface (GUI), triggering, and signal display. This data flow is seen in Figure 1.
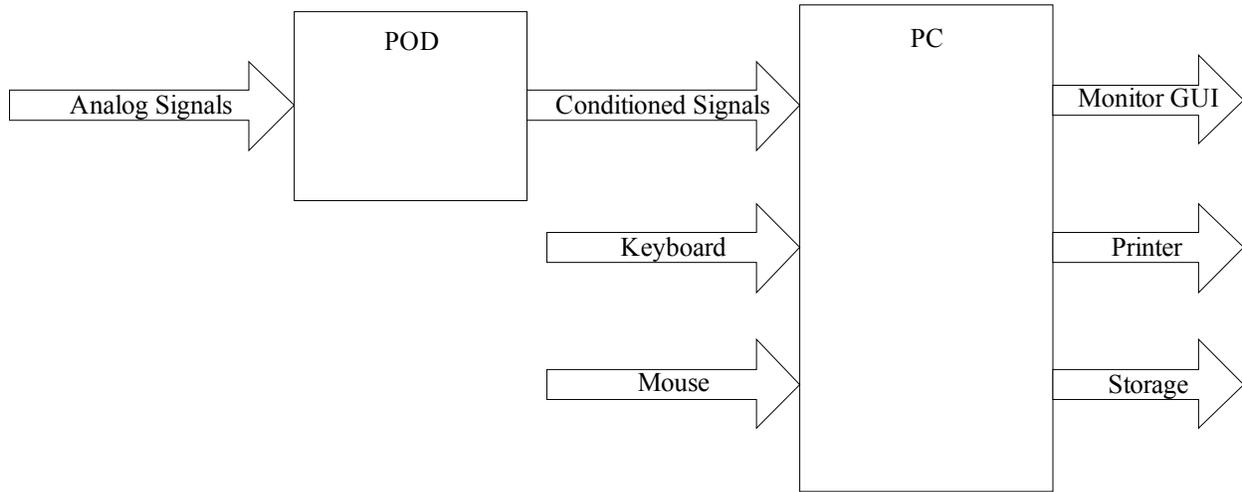

Figure 1: System Block Diagram

Inputs:

Analog Signals	Signals on the POD's probes. These can be TTL or CMOS based.
PC Commands	Commands entered using keyboard and mouse.

Outputs:

Monitor Display	Displays captured data, trigger signal, cursors and basic Windows functions (print, save etc.)
Printer	Prints the displayed waveform.
Storage	Saves waveform as an image

System Description

POD: This will accept analog signals on 8-16 data lines. The signals originate from TTL or CMOS based circuits. The POD will condition the signal to be transmitted to the PC via USB.

PC: The software will receive conditioned signals and display them in a user-friendly manner. It will provide several forms of triggering, cursors, zooming, etc. and standard window features.

Modes of Operation

Setup Mode: In this mode, the user selects the desired threshold levels for the analog signal type (TTL or CMOS), the number of lines to be sampled, and the triggering method.

Run Mode: In this mode, the analyzer displays the conditioned signals based on the selected triggering method.

Stop Mode: This mode allows the user to stop collecting data and freeze the display. The display can still be zoomed and the cursors moved.