Final Year Project 2001-2002

Virtual Scope Using Personal Computer

(KW4-01)

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In this project, a selective two-channel 10 MHz sampling frequency oscilloscope was designed. Different from the conventional stand-alone oscilloscope, this oscilloscope acts as a computer peripheral that interfaces with Personal Computer through 8255 I/O interface. Thus it is also called Virtual Scope.

**Specification of Virtual Scope**

- Two input channels A and B
- Peak sampling rate: 10MHz
- Voltage Base: ±0.45, ±0.9, ±4.5 and ±9.0 V
- Time Base: 250ms/div – 2.5μs/div
- Single/ Dual Channel Display
- DC meter with ±9.0 V measuring range
- User-friendly system software includes Fast Mode Display, Data Storage capability.

**System Block Diagram**

**Fig. 1 -- System block diagram of Virtual Scope**

**Fig.2 -- Block diagram of Data Acquisition System**
• **Time Base:** Selected by changing the **sampling frequency** from Programmable Clock

• **Voltage Base:** Selected by changing the **linear transformation ratio** of Signal Conditioning Circuit

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**Deliverables**

![Fig. 3---Overall System](image1)

![Fig. 4----PCB of Data Acquisition System](image2)

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**Results**

<table>
<thead>
<tr>
<th>Figure</th>
<th>Measured value from Lab. CRO</th>
<th>Measured value from Virtual Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fig.5</td>
<td>8Vp-p, 100Hz</td>
<td>7.875V p-p, 100Hz</td>
</tr>
<tr>
<td>Fig.6</td>
<td>8Vp-p, 100kHz</td>
<td>7.875V p-p, 100kHz</td>
</tr>
<tr>
<td>Fig.7</td>
<td>Dual signal, both are 8Vp-p, 100Hz and out of phase</td>
<td>7.875Vp-p, 100Hz, out of phase</td>
</tr>
</tbody>
</table>

Tab 1 – The comparison of signal measured by Lab CRO and the signal measured by the Virtual Scope
Fig. 5 – Captured Waveform from Virtual Scope with measured signal = 8Vp-p Sin wave at 100Hz

Fig. 6 – Captured Waveform from Virtual Scope with measured signal = 8Vp-p Sin wave at 100kHz

Fig. 7 – Captured Waveform from Virtual Scope using Dual Channel mode with 2 measured signals. Each signal is 8Vp-p Sin wave at 100Hz and they are out of phase.