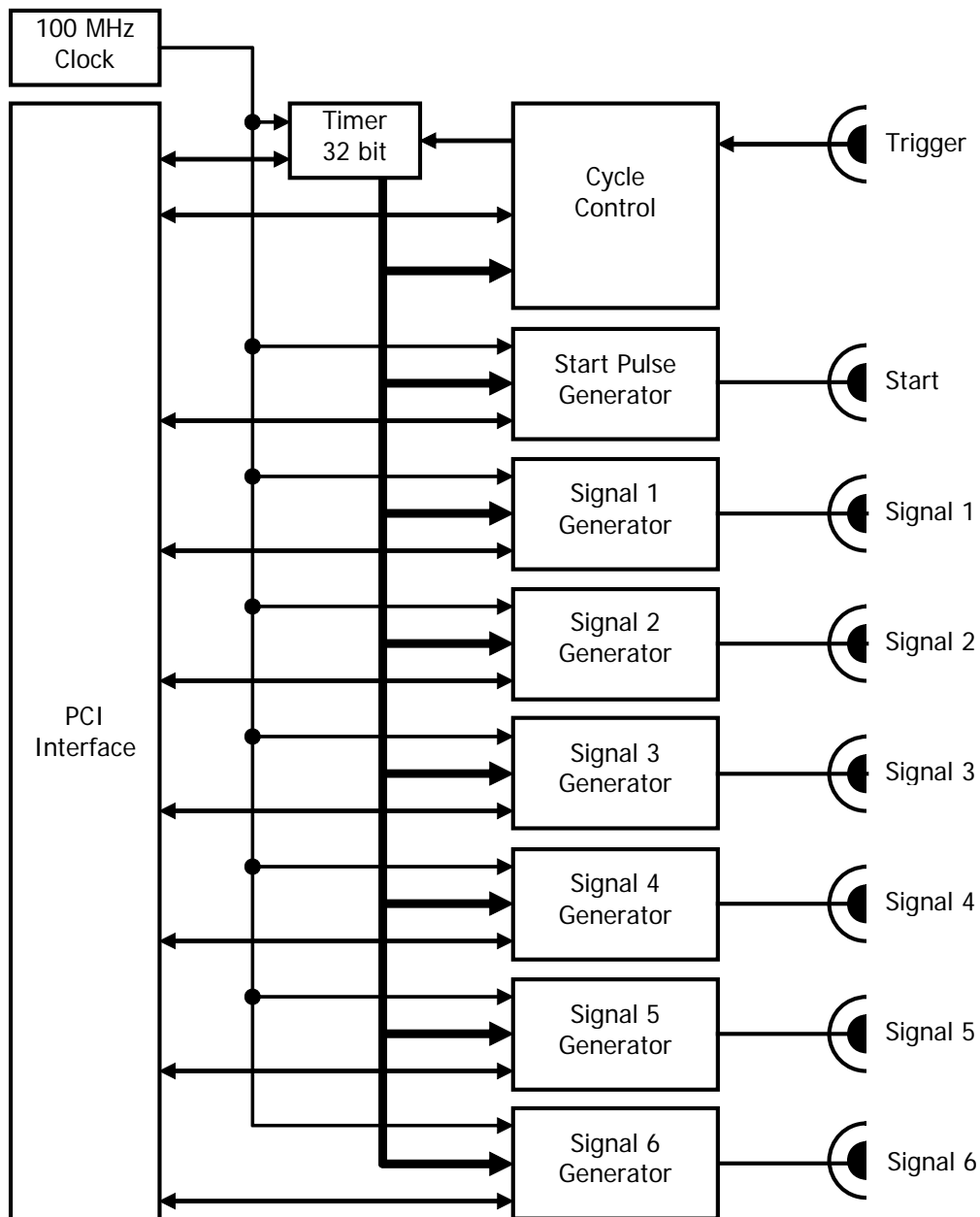


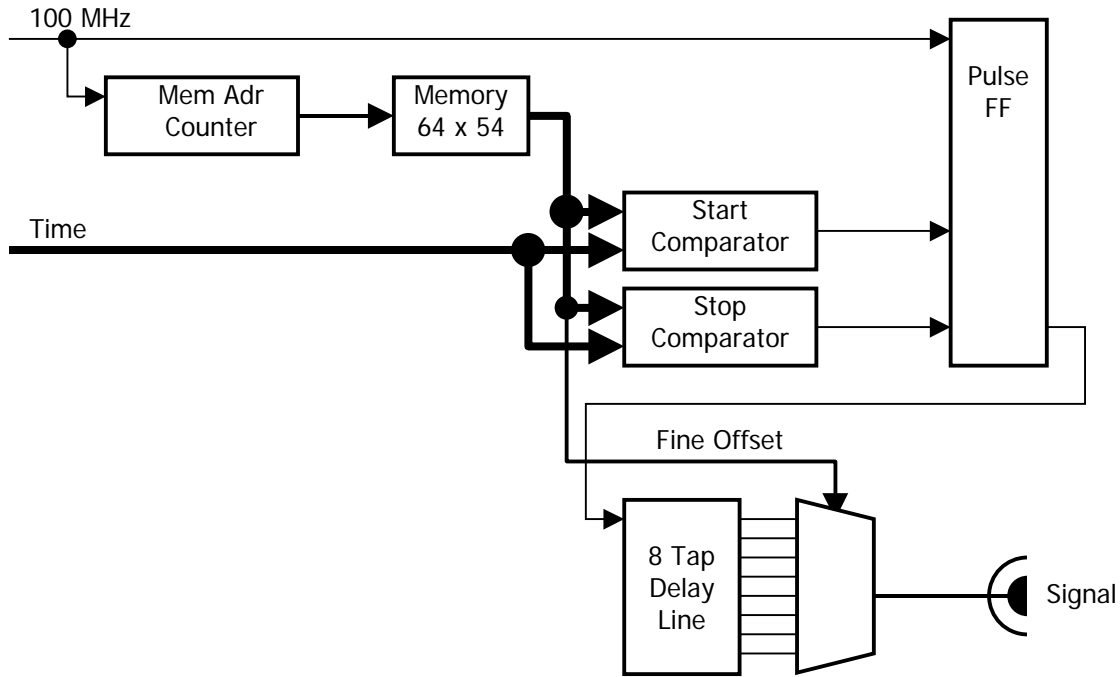
## General Information

DDG-210 is a Digital Delay Generator which can control experiments as a master device. Timing is referenced to the leading edge of the START pulse. There are 6 signal outputs available on which a sequence of up to 64 pulses can be defined. This sequence is called a cycle. The hardware allows to execute one to 65,535 cycles without interruption or indefinite repetition of the cycle. The polarity of the start and signal outputs is selectable.

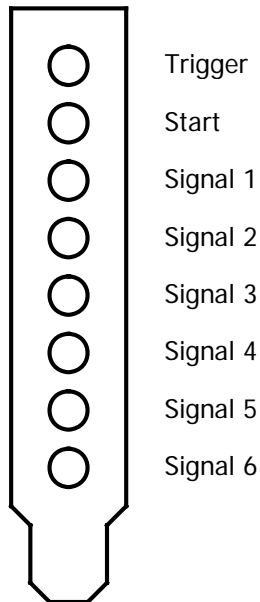
## Simplified Block Diagram of DDG-210



### Simplified Block Diagram of a Signal Generator



### Connector Layout



## Specification

Max. Cycle Time	40 s
Min. Pulse width (Start)	40 ns
Max. Pulse width (Start)	40 s
Min. Pulse width (delayed Outputs)	10 ns
Max. Pulse width (delayed Outputs)	5 ms
Minimum delay with respect to leading edge of Start	40 ns
Min. Pulse distance on the same output	30 ns
Max. no. of pulses per signal and cycle	64
Max. no. of cycles	65,536 or endless
Time resolution of nominal Pulse Position	10 ns
Time resolution of Pulse Fine Offset	1/8 of 10 ns
Trigger Modes:	none, each cycle, each sequence
Trigger Jitter	5 ns max
Delay Trigger input to Start Pulse Output	50 ns
Output high level	+5V (no load); +2,5 V (50 $\Omega$ load)
Output low level	0V
Output impedance	50 $\Omega$
Output connector type	MCX

## Hardware Installation

To install the device, switch off the computer and insert the DDG-210 module into a free slot. To avoid damage due to electrostatic discharge we recommend to touch the module at the metallic back shield. Then touch a metallic part of the computer with the other hand. Then insert the module into a free slot of the computer. Keep the DDG module as far as possible apart from loose cables or other computer modules to avoid noise pick-up.

Windows has a list of hardware components, and on the start of the operating system, it automatically assigns the required hardware resources to the components of this list. If you have several DDG-210 modules in the computer each module gets its own address range.

When the computer is started the first time with the DDG-210 Windows detects the DDG module and attempts to update the list of hardware components. Therefore it may ask for driver information from a disk. In case of Windows NT / 2000 / XP / VISTA the driver "bh.inf" from the root directory of the installation CD-ROM will be found automatically.

## Software Installation

The DDG-210 modules come with the 'DDG Standard Software' which controls all hardware and software parameters of the module. Up to 4 DDG-210 modules in one computer can be operated by one DDG application.

The DDG-210 Standard Software runs under Windows NT, 2000, XP and VISTA. To facilitate the development of user-specific software a DLL library is available.

The installation of the DDG-210 Standard Software is simple. Start "setup.exe" from the directory \DDG\_1.0 of the installation CD-ROM and follow the instructions of the installation software.

The DDG-210 software is based on 'LabWindows/CVI' of National Instruments. Therefore the so-called 'CVI Run-Time Engine' is required to run the DDG software. The 'Run-Time Engine' contains the library functions of LabWindows CVI and is loaded together with the DDG software. The installation routine suggests a special directory to install the Run-Time Engine. If the required version of the Run-Time Engine is already installed for another application, it is detected by the installation software and shared with the existing LabWindows CVI applications.

## Description of Setup File

This description is included in the file "ddg200.set" which is located in the installation directory of DDG.

## Manual Update

The complete manual will be published on our website <http://www.becker-hickl.de> as soon as it is available. Please check our website from time to time.

## Technical Support

We are pleased to assist you in case of any problems you may have with your DDG-200 module. To fix the problem we ask you to send us a setup file (.set) with your system settings.

Furthermore, please add as much as possible of following information:

Description of the Problem

DDG-210 Serial Number

Software Version

Trigger signal source

Trigger signal shape, amplitude and repetition rate

System Connections: Cable Lengths, Ground Connections. Add a drawing if necessary.

Environment: Possible Noise Sources

Your personal data: E-mail, Telephone Number, Postal Address

The fastest way is to send us an email with the setup file(s) attached. We will check your system settings and – if necessary – reproduce the problem in our lab. Usually we will be able to send you an answer within one or two days.



Becker & Hickl GmbH  
Nahmitzer Damm 30  
12277 Berlin, Germany

Tel. +49 / 30 787 56 32  
FAX +49 / 30 787 57 34

email: [info@becker-hickl.com](mailto:info@becker-hickl.com)  
[www.becker-hickl.com](http://www.becker-hickl.com)