MCPC680 32 Channel Pulse Counting System

Description

The PhotoniQ model MCPC680 is a complete, off-the-shelf, high speed, 32 channel pulse counting system for PMTs, silicon photomultipliers (SiPM) and APDs. Implemented as a stand-alone laboratory instrument with a PC interface, the MCPC680 is used for discrimination, counting, and data acquisition (DAQ) of single pulse events across 32 independent counting channels. Its front end design permits direct connection to most PMTs and SiPMs without the need for a preamplifier. Flexible intelligent triggering allows the unit to reliably acquire count data using one of several sophisticated triggering techniques. The MCPC680 is fully configurable through the PC via its USB 2.0 port using an included graphical user interface. Continuous high speed data transfers to the PC are also handled through this port. Additionally, a LabView™ generated DLL is provided for users who wish to write their own applications that interface directly to the unit.

Applications

- Fluorescence Spectroscopy
- Fluorescence Lifetime Measurement
- Chemiluminescence Detection
- Bioluminescence Detection
- Photon Correlation Spectroscopy
- Bioaerosol Detection and Discrimination
- LIDAR
- Optical Tomography of Biological Tissue
- Low Light Level Detection
- Flow Cytometry
- Single Molecule Detection
- Neutrino Detection
- Spatial Radiation Detection
- Confocal Microscopy
- Particle Physics

Features

- Includes 32 independent counting channels with PMT / SiPM interface and discriminators
- Threshold control of internal leading / trailing edge discriminators
- Pulse width discrimination based on user-defined minimum / maximum conditions
- Pulse pair resolution of less than 4 nsec.
- Maximum count rate greater than 250 MHz per channel for a total of 8 billion counts per second
- Intelligent triggering supports external, internal, level, and continuous counting modes
- Flexible control of counting period parameters such as delay, width, or external
- Adjustable microGate provides additional level of count gating at sub-nanosecond time resolution
- Synchronization of microGate to external excitation source
- Trigger stamping and time stamping with 100 nsec resolution
- USB 2.0 interface supports high data transfer rates
- Graphical User Interface (GUI) for menu driven data acquisition and configuration
- LabVIEW™ generated DLL for interface to user custom applications
Included Accessories and Software
The MCPC680 is enclosed in a rugged, EMI-shielded, instrument case and is shipped with the following standard components and software:

- PhotoniQ Control and Acquisition Interface Software CD-ROM
- DC power supply (+5V, 3A) with power cord
- USB 2.0 cable

Recommended Sensor Interface Circuits

Software Features & Functions

- Graphical User Interface (GUI) for menu driven data acquisition, configuration, and status
- Real time display shows total count for count period across all channels for each trigger
- Integrated log file viewer permits on-screen viewing of logged count records
- Microgate width and delay controllable in GUI with 500 psec resolution
- Fully programmable count period minimizes dead time
- High speed trigger counter and record counter
- Acquisition can be programmed to acquire for a preset number of records
- Trigger stamping and record time stamping with 100 nsec resolution
- USB 2.0 interface supports high transfer rates
- Included Microsoft Windows DLL for interface to custom user applications

Specifications

<table>
<thead>
<tr>
<th>Description</th>
<th>Specification</th>
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<tbody>
<tr>
<td>Number of Channels</td>
<td>32</td>
</tr>
<tr>
<td>Input Impedance</td>
<td>50 ohm, AC coupled</td>
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<tr>
<td>Pulse Pair Resolution (PPR)</td>
<td>4 nsec max.</td>
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<tr>
<td>Minimum Detectable Pulse Amplitude</td>
<td>8 mV</td>
</tr>
<tr>
<td>Maximum Count Rate per Channel</td>
<td>250 MHz</td>
</tr>
<tr>
<td>Count Period Range</td>
<td>50 nsec to 1 sec</td>
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<tr>
<td>Maximum Count per Count Period</td>
<td>16,383</td>
</tr>
<tr>
<td>Maximum Trigger Rate</td>
<td>125 KHz</td>
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<tr>
<td>Sustained Trigger Rate (32 Channels Enabled)</td>
<td>64 KHz</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>5 Watts typ.</td>
</tr>
<tr>
<td>Width</td>
<td>9.843 in. (250 mm)</td>
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<tr>
<td>Height</td>
<td>3.346 in. (85 mm)</td>
</tr>
<tr>
<td>Length</td>
<td>10.236 in. (260 mm)</td>
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* See MCPC680 User Manual for details