EKSMA OPTICS

POCKELS CELLS | POCKELS CELLS DRIVERS | HV POWER SUPPLIES | Q-SWITCHING KITS | ULTRAFAST PULSE PICKING SYSTEMS | TIMING GENERATOS | CRYSTAL OVENS
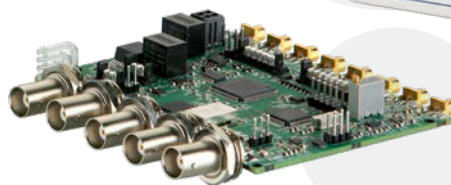
TOPAG Lasertechnik

Timing Generators

Laboratory type timing generator TG10

OEM version of TG10 timing generator SY4000-OEM

TIMING GENERATOR FOR APPLICATIONS WITH LASERS AND LASER COMPONENTS – TG10

Features

- Ultra-stable internal clock 0.2 ppm
- Precise delay control in range 2 ns to 150 ms
- 25 ps timing resolution
- Hi-accuracy synchronization to the external pulse train
- DAC output
- Frequency divider for photodetectors
- Measurement of:
    – Optical clock frequency
    – Triggering frequency
    – Delay

Applications

- Passive or active mode locked, Q-switched lasers, pulsed or QCW
- Data acquisition system triggering
- General purpose pulse generator
- Precise system clock source
- Laser pulse train converting to the clean clock source
- All functions listed above simultaneously at once!

The TG10 is a timing generator dedicated to the synchronization of laser systems and laser components: Pockels cell drivers, acousto-optical modulator drivers, laser diode and flash lamp drivers, detectors, data acquisition systems, laser pulse pickers, etc. The TG10 is designed to create up to 8 delayed output sequences precisely synchronized to the internal or external clock. A photodetector or electrical signal can be used as the input source to be synchronized with.

The timing generator can be used as a standalone unit with a touch screen interface (TG10) or installed as an optional add-on PCB board (SY4000-OEM). The TG10 device has an LCD touch screen for the manual control and a tunable knob for the adjustment of selected values set on the touch screen. Instructions of required actions are always displayed at the bottom of the screen. Besides, the timing generator has a digital control interface via CAN bus. Communication protocol with description for CAN is provided on request. CAN to USB converter is also available from EKSMA Optics.

Key features of the TG10

The key features of the TG10 module in addition to standard pulse generator features:

- Ability to lock to an external clock source, usually photo-diode pulse train. The triggering system is locked to the laser oscillator then, and trigger time is always in phase with the optical pulse.
- Instant switch between two configurations in delay blocks. Burst counter, gate input, frequency divider, or software commands may serve as the configuration switching signal sources. Configuration switch is used to control optical pulse pickers (EOM or AOM) in a highly flexible manner.

- Low jitter sync pulse output is used for high-speed acquisition systems like streak camera triggering. The typical jitter is 3...5 ps to the optical pulse.
- Control connector. The software-controllable multiplexer may divert any of the output signals to this connector to sniff what is on other connectors without disturbing them.
- Clock output: 1:1, 1:2 frequency.
- Up to 4 pulse outputs can be combined to single signals by OR, AND, NOT logical operations.
- DAC output, controlling, e.g. AOM pass though.

Input and output channels

CHANNEL	DESCRIPTION
OUTx	five digital general-purpose output channels (4.5 V @ 50 Ω)
AN OUT	analog output with 12-bit resolution (1 V @ 50 Ω)
COM TRIG	common trigger output. Configurable source (2.5 V @ 50 Ω)
PRE TRIG	precise trigger output channel. Configurable source (>1.5 V @ 50 Ω)
GATE IN	configuration switch and burst control input. (LVTTL, tolerates 5 V. 0.2 mA pull-down)
SYNC IN	trigger input for DC to 20 MHz frequencies. (LVTTL, tolerates 5 V. 0.2 mA pull-down)
CLK IN	clock input for 10 MHz to 100 MHz frequencies. (0.5 V to 3.3 V @ 50 Ω pk-pk, sine or pulses)

General specifications

PARAMETER	SPECIFICATION
TIME BASE	
Internal source	100 MHz 0.2 ppm TCXO
External source, Optical clock	20…100 MHz
INTERNAL RATE GENERATOR	
Sources	100 MHz clock, Optical clock, SYNC IN, Software command
Rate (T0 period)	50 ns…100 s (0.01 Hz to 20 MHz)
Resolution	10 ns or 1 Optical period or 1 SYNC IN period
RMS jitter	< 350 ps
EXTERNAL TRIGGER, SYNC IN INPUT	
System modes	Direct SYNC IN, SYNC IN re-clocked to Optical clock
Rate	DC to 20 MHz
Threshold	1.3 V
Input range	0…5 V
Trigger slope	rising edge
RMS jitter, Direct SYNC IN	< 120 ps
RMS jitter, SYNC IN re-clocked	< 5 ns
Insertion delay	< 80 ns
DELAY GENERATORS	
Channels, total	8
High res channels	5
High res channels, resolution	25 ps
Low res channels	3
Low res channels, resolution	< 10 ns
Delay	0 … 150 ms
Pulse width	2 ns … 150 ms
Accuracy, High res channel	2.5 ns + 0.000001 setpoint
Accuracy, Low res channel	≤ 10 ns + 0.000001 setpoint
Time base, Internal clock	100 MHz, 0.2 PPM TCXO
RMS jitter, channel to channel	< 30 ps TTL output, < 4 ps PRET output
CONFIGURATION SWITCH	
System modes	Single shot, burst, continuous, frequency divider, GATE IN, inverted GATE IN
Burst counter	1 … 65535
Frequency divider	1 … 32767
OUTPUTS, TTL/COMS	
Voltage @50 Ω load	2.5 V or 4.5 V
Voltage @1 MΩ load	5 V or 9 V
Voltage selection 5V/9V	internal jumper
Impedance	50 Ω
Rise time	1.5 ns typ
OUTPUT, PRET	
Pulse amplitude @50 Ω load	> 1 V
Impedance	50 Ω
Rise time	200 ps typ
OUTPUT, DIFFERENTIAL	
Type	LVPECL
OUTPUT, ANALOG	
DAC resolution	12 bit
Max amplitude @50 Ω	1 V
POWER	
Voltage	12 V ± 10%
Power	15 W max