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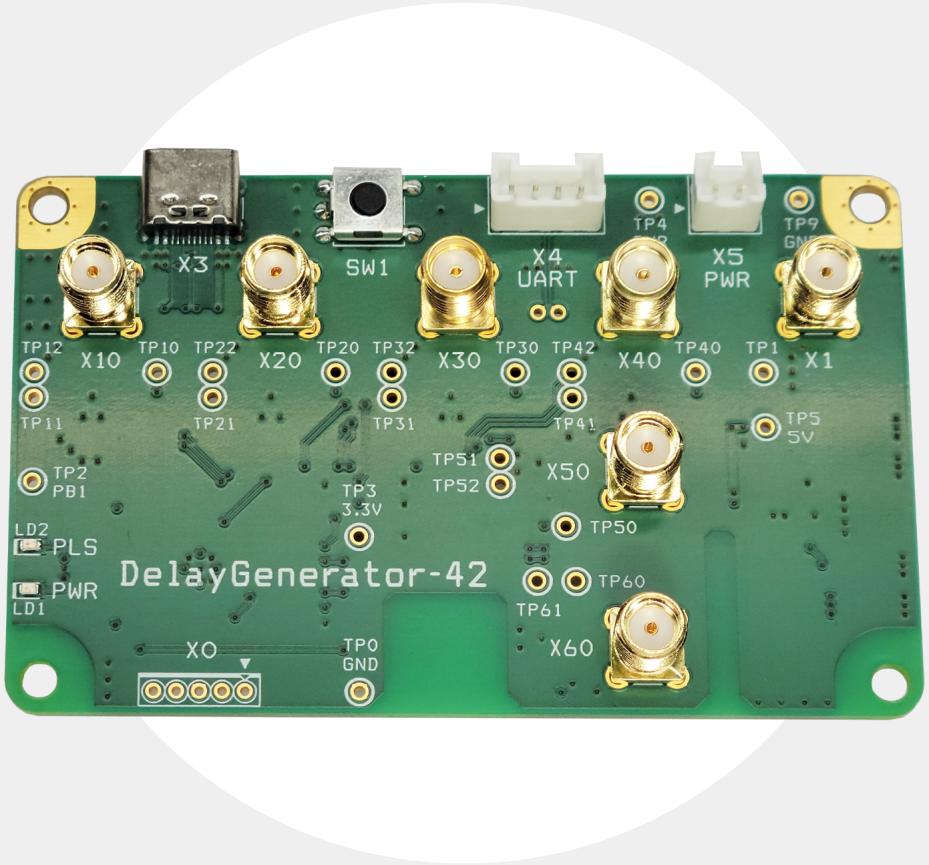


Delay Generator - 42

Digital Low Voltage 6-channels Pulse & Delay Generator

6 Independent Channels low-voltage pulse generator **DG-42** is designed for control of external devices by means of trigger pulses with adjustable durations and delays with 200 ps time resolution.

Features

- 6 output channels;
- Independently adjustable pulses with resolution of 200 ps;
- Pulse duration starting from 1 ns with rising/falling edges of 0.8 ns;
- Powerful output pulses (5 V at 50 Ω impedance);
- External or internal triggering;
- Software control with saving parameters;
- UART or USB interfaces.

The parameters of output pulses "CH 1" - "CH 6" are regulated independently. Pulse durations are adjustable in the range of 1 ns ÷ 1 s and delay durations are independently adjustable in the range of 0 ns ÷ 1 s with a discrete of 200 ps. Time jitter does not exceed 0.5 ns in the entire range of pulse durations and delays. All channels generate powerful output pulses with an amplitude of 5 V at 50 Ω.

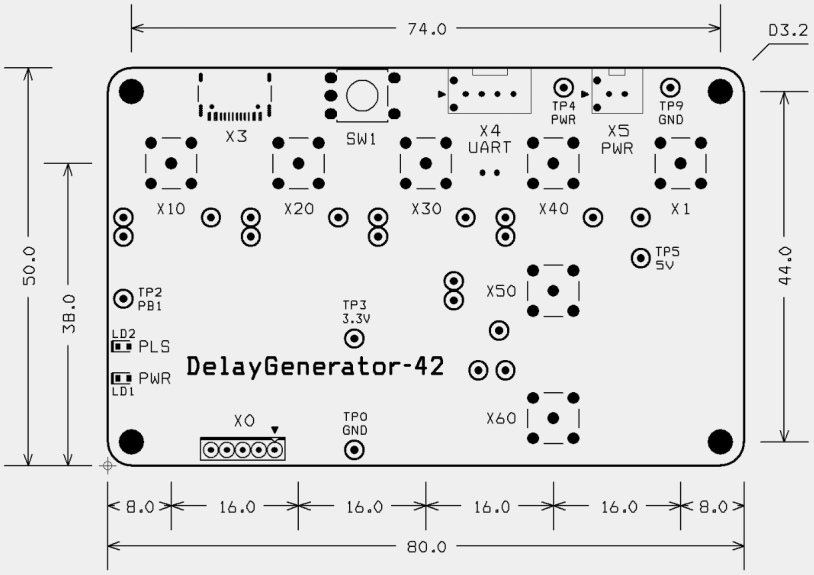
The **DG-42** is started either by an external trigger pulse (rising or falling edge selectable), or from the internal generator with an adjustable frequency. External trigger pulse must be with amplitude of 3 ÷ 5 V at 50 Ω.

The generator supply voltage must be between 4 V and 16 V (5 V recommended). Power consumption depends on the connected load and pulse parameters and usually does not exceed 1 W.

The parameters of output pulses are regulated via supplied *"DelayGenerator"* for PC software (Windows) and Android. The set values may be stored in the generator's non-volatile memory.

The power supply can be connected to a separate connector on the board, or power can be supplied through the USB type C connector or UART connector.

The DG-42 may communicate with a computer via standard USB cable with a USB type C or USB-UART bridge. It is also possible to control DG-42 by means of the command set via the supported UART protocol (SDK supplied).

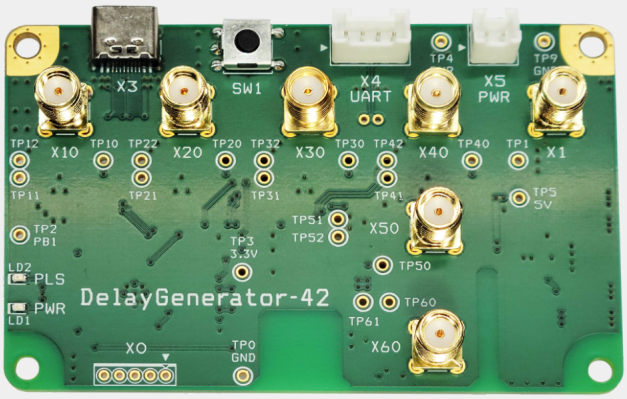


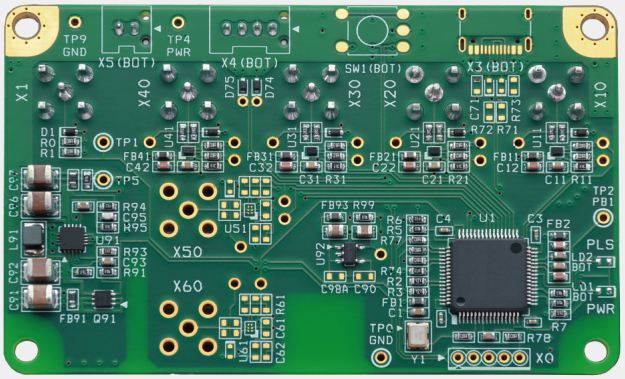
Specifications

Number of output channels	6
Output pulse voltage (at 50 Ohm load)	5 ÷ 5.5 V
Output impedance	2.5 Ω
Duration of rise and fall	0.8 ns
Adjustable pulse duration Pulse1 ÷ Pulse5	1 ns ÷ 1 s
Adjustable pulse duration Pulse6	20 ns ÷ 1 s
Adjustable delay Delay1 ÷ Delay6	0 ns ÷ 1 s
Time resolution	200 ps
Channel to channel jitter	0.5 ns
Pulse duration jitter	0.5 ns
Pulse repetition rate	to 100 kHz [1]
Triggering mode	external / internal
Internal triggering mode	on / off / gate
External triggering mode	on rise / on fall
External trigger input voltage (impedance of 50 Ohm)	3 ÷ 5 V
External trigger input duration	≥ 6 ns
Minimal delay relative to external trigger input (insertion delay)	67 ÷ 73 ns
Delay jitter relative to external trigger	6 ns
Supply voltage & current	4 ÷ 16 V & 200 mA
Dimensions W×L×H	50×80×16 mm

1 Optional (maximum possible frequency 10 MHz)

Connectors and switches





X1 (input) – input trigger (SMA through hole, straight).
On board 0732513140 (Molex). Mating connector for cable 73251-0450 (Molex).

X3 (bidirectional) – power and control of DG-42 via USB type C (5 V & 200 mA).

X4 (UART) – power and control of DG-42 via UART standard interface.
On board B04B-PASK-1 (JST). Mating connector for cable is PAP-04V-S (JST) with a crimp contacts SPHD-002T-P0.5.

1. **Pin 1** POWER 5 V & 200 mA;
2. **Pin 2** GND;
3. **Pin 3** RXD (input);
4. **Pin 4** TXD (output).

X5 (input) – power supply for DG-42.
On board B02B-PASK-1 (JST). Mating connector for cable is PAP-02V-S (JST) with a crimp contacts SPHD-002T-P0.5.

1. **Pin 1** POWER 5 V & 200 mA;
2. **Pin 2** GND;

X10 (output) – output pulse with adjustable duration **Pulse 1.**

X20 (output) – output pulse of adjustable duration **Pulse 2.**

X30 (output) – output pulse of adjustable duration **Pulse 3.**

X40 (output) – output pulse of adjustable duration **Pulse 4.**

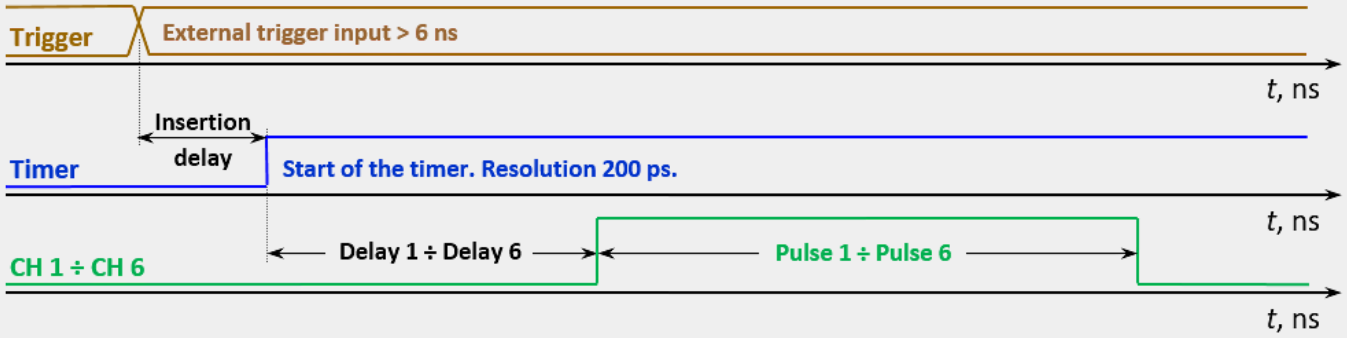
X50 (output) – output pulse of adjustable duration **Pulse 5.**

X60 (output) – output pulse of adjustable duration **Pulse 6.**

X10 – X60 – (SMA through hole, straight). On board 0732513140 (Molex). Mating connector for cable 73251-0450 (Molex).

SW1 – button to start / stop the DG-42 work.

Delay Generator - 42 pulse diagram



Detailed features

The **DG-42** generator is based on a microcontroller with a clock frequency of 170 MHz, therefore the appearance of an External input trigger pulse is determined within a 6 ns jitter accuracy. For Internal triggering, output pulses jitters do not exceed 0.5 ns.

After detecting the input trigger pulse microcontroller activates high-resolution (200 ps) timer with the insertion delay of approximately 70 ns. Inside a high-resolution timer, the jitter between output channels usually does not exceed 0.4 ns, but for low repetition rate pulses it can be as high as 0.5 ns. Jitter practically does not depend on pulse durations and delays.

The delay is counted relative to the start of the timer and can be varied from 0 ns to 1 s independently for each channel. Actual pulse duration is limited by driver integrated circuit capabilities only and it is adjustable from the minimal value 1 ns for all channels (except the special Channel 6 where the minimal pulse duration is 20 ns).

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