

iC149

PROGRAMMABLE ns-PULSE GENERATOR

preliminary



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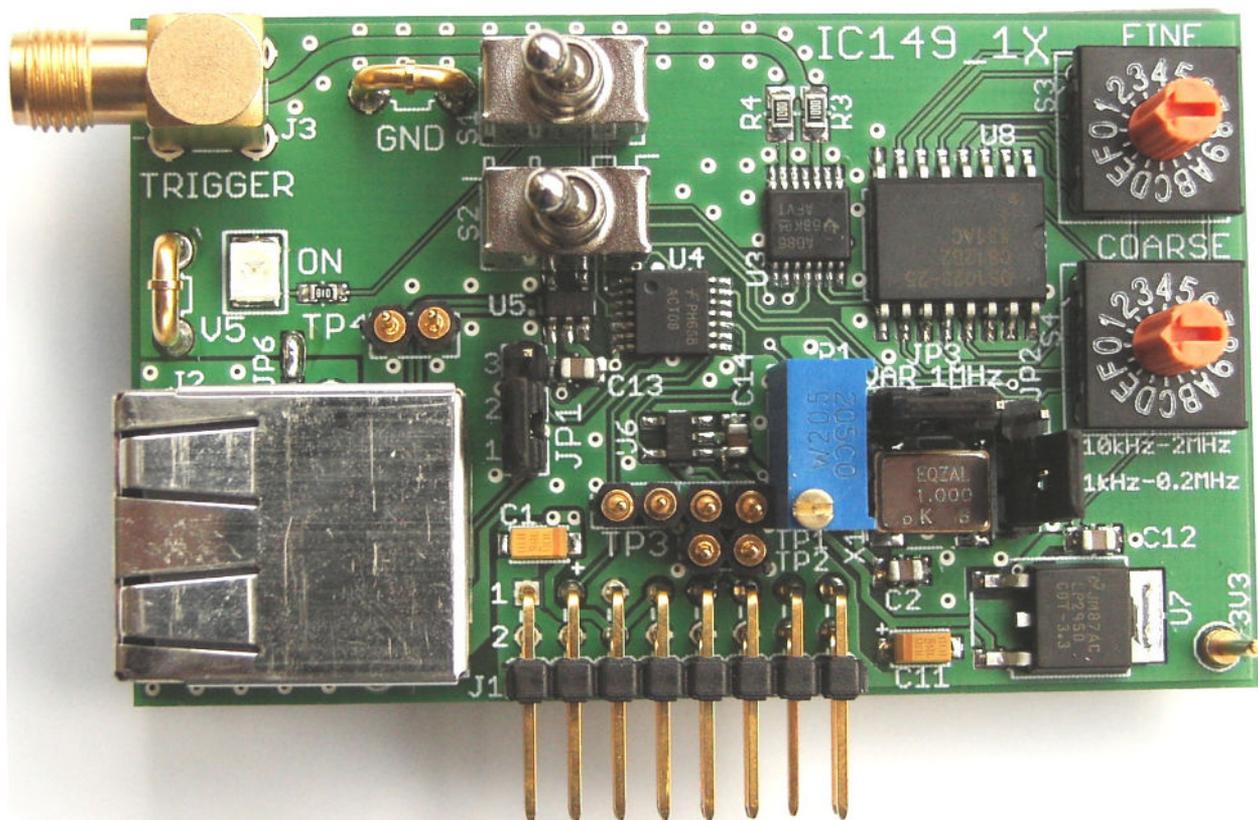
FEATURES

- ◆ Pulse width 1 to 64 ns in steps of 0.25 ns
- ◆ Fixed crystal stabilised frequency of 1 MHz
- ◆ Variable frequency of 1 kHz to 2 MHz
- ◆ LVDS und TTL outputs
- ◆ Compatible with HG1D, NZN1D, NZP1D

APPLICATIONS

- ◆ Pulse generator for fast laser diode drivers

BOARD



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DESCRIPTION

Pulse generator iC149 produces pulses with a small duty cycle in the range of ca. 1 ns up to 64 ns max. in steps of 0.25 ns at a pulse frequency of 1 MHz. The pulse width is set by means of two hexadecimal coding switches in coarse and fine steps.

Alternatively a tunable (P1) oscillator can be used.

The pulses are output both as LVDS and TTL signals.

This module can easily be used with the evaluation boards HG1D, NZN1D and NZP1D.

ELECTRICAL CHARACTERISTICS

Operating Conditions: $T_a = 25\text{ }^\circ\text{C}$

Item No.	Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Power Supply							
101	V5	Power Supply		4.5	5	5.5	V
102	I(V5)	Supply Current	V5 = 5 V, S1 = ON/OFF, TRIGGER open V5 = 5 V, S1 = ON, TRIGGER 50 Ω vs. Ground		50 75		mA mA
Pulse Width							
201	T _{pmax}	Maximum Pulsweite	V5 = 5 V, $T_a = 27\text{ }^\circ\text{C}$, <i>coarse</i> = "F", <i>fine</i> = "F"		63.75		ns
202	T _{pmin}	Minimum Pulsweite	V5 = 5 V, $T_a = 27\text{ }^\circ\text{C}$, <i>coarse</i> = "0", <i>fine</i> \leq "F" cf. Figure 6		1		ns

PIN CONFIGURATION

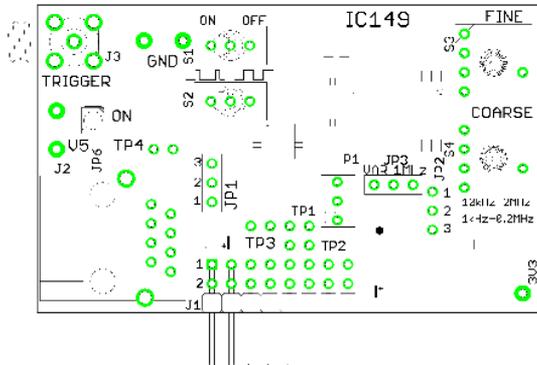


Figure 1: The populated PCB

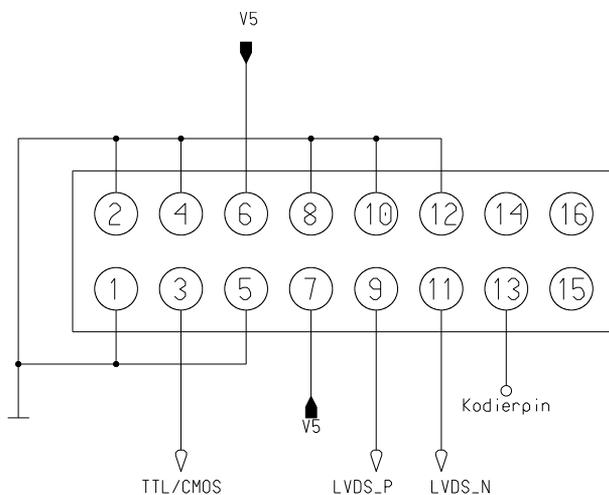


Figure 2: Pin configuration J1 (PCB bottom view)

- J1 16 pole pin header for power supply and signal outputs
- J2 RJ45 connector for output signals with LVDS or TTL/CMOS levels
- J3 TRIGGER: SMA connector for trigger output, $R_{out} = 50 \Omega$
- JP1 Jumper at position 1-2 selects TTL/CMOS signals for J2
- JP2 Jumper at position 1-2: variable frequency from 10 kHz to 2 MHz
Jumper at position 2-3: variable frequency from 1 to 100 kHz
- JP3 Jumper at position 1-2: crystal stabilised fixed frequency of 1 MHz
Jumper at position 2-3: variable frequency from 1 kHz to 2 MHz (see JP2)
- S1 Oscillator ON/OFF
- S2 Selector switch: programmable pulse or symmetrical 1 MHz signal
- S3 Coding switch *fine*
- S4 Coding switch *coarse*
- TP1 LVDS signal at J1 (must be terminated with 100Ω for measurement purpose)
- TP2 LVDS signal at J1
- TP3 TTL/CMOS signal at J1
- TP4 LVDS signal at J2
- P1 Trimmer for setting the variable frequency
- GND GND
- V5 5 V Power supply
- 3V3 3.3 V

Table 2: Connectors on the PCB

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BLOCK DIAGRAM

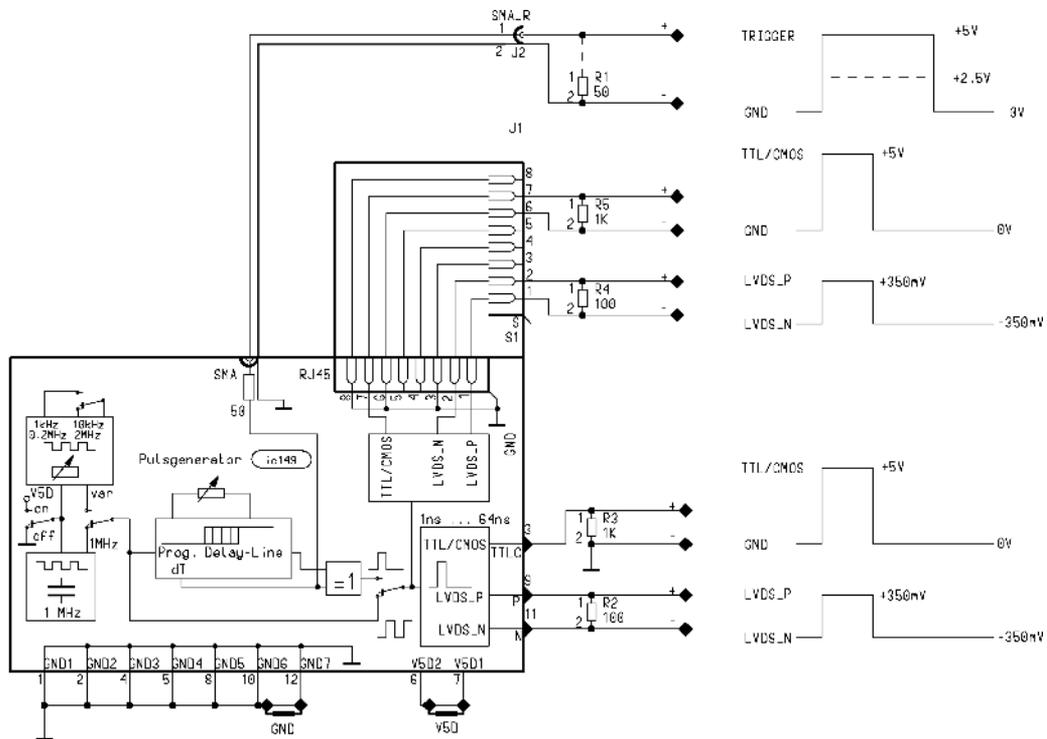


Figure 3: Block diagram of the iC149

VARIABLE OSCILLATOR

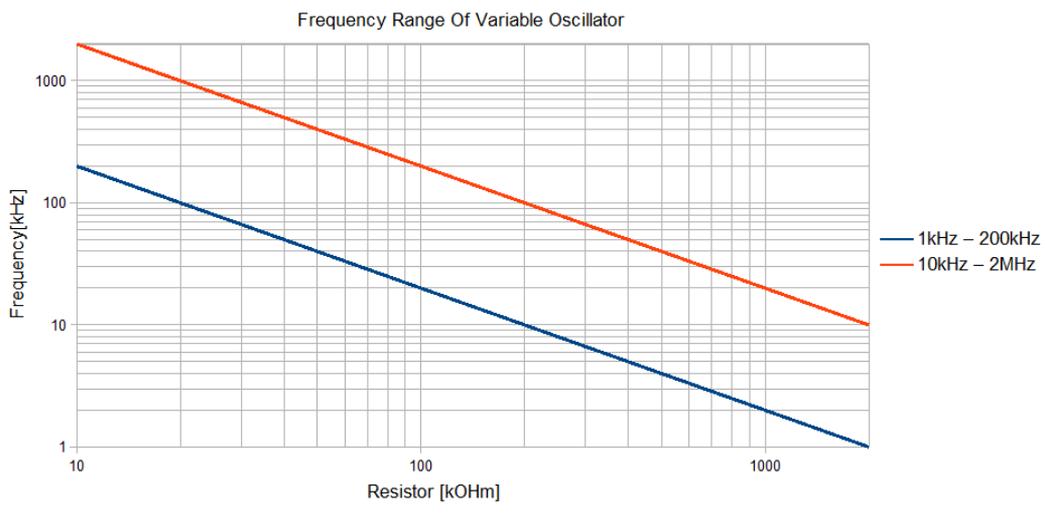


Figure 4: Variable frequency vs. potentiometer setting

SETTING THE PULSE WIDTH

$$\Delta T = (m * 4 \text{ ns} + n * 0.25 \text{ ns}) \pm 2 \text{ ns}$$

$$1 \leq m \text{ (coarse)} \leq 15,$$

$$0 \leq n \text{ (fine)} \leq 15$$

$$\Delta T = (m * 4 \text{ ns} + 3.75 \text{ ns}) \pm 2 \text{ ns}$$

$$1 \leq m \text{ (coarse)} \leq 15,$$

$$n \text{ (fine)} = 15$$

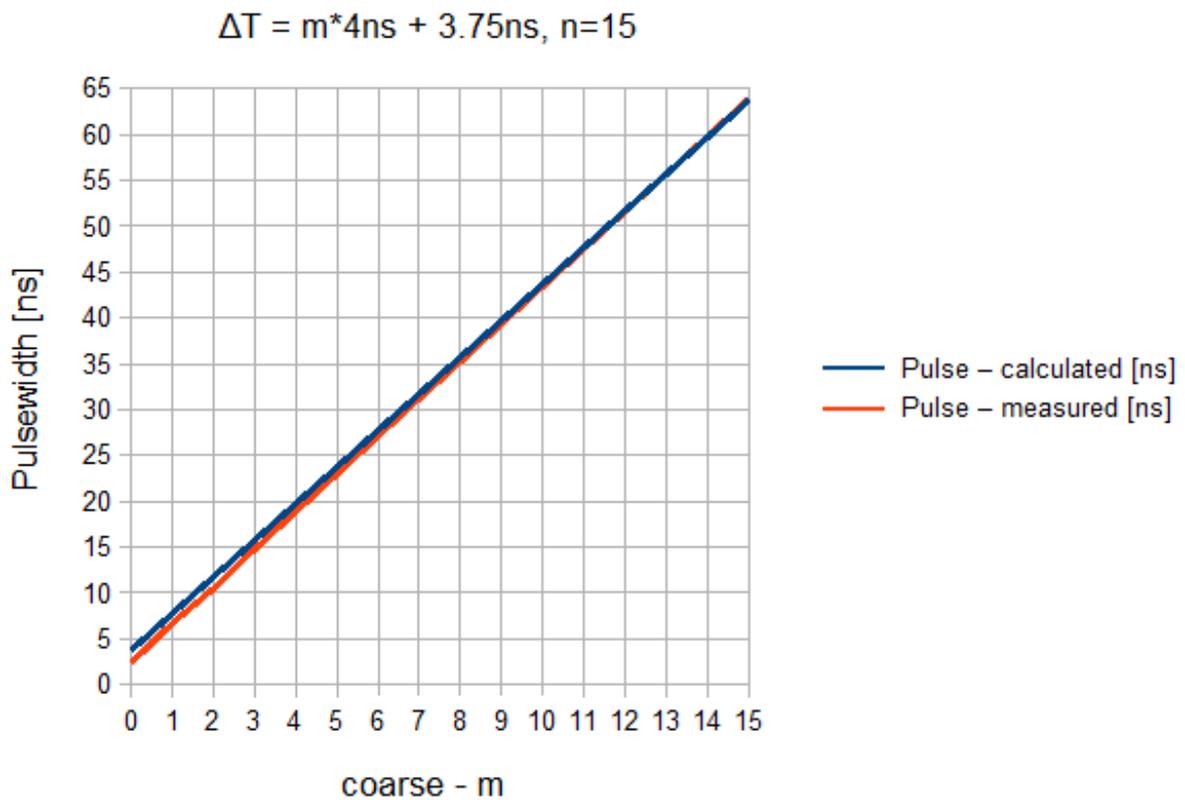


Figure 5: Setting the pulse width "coarse"

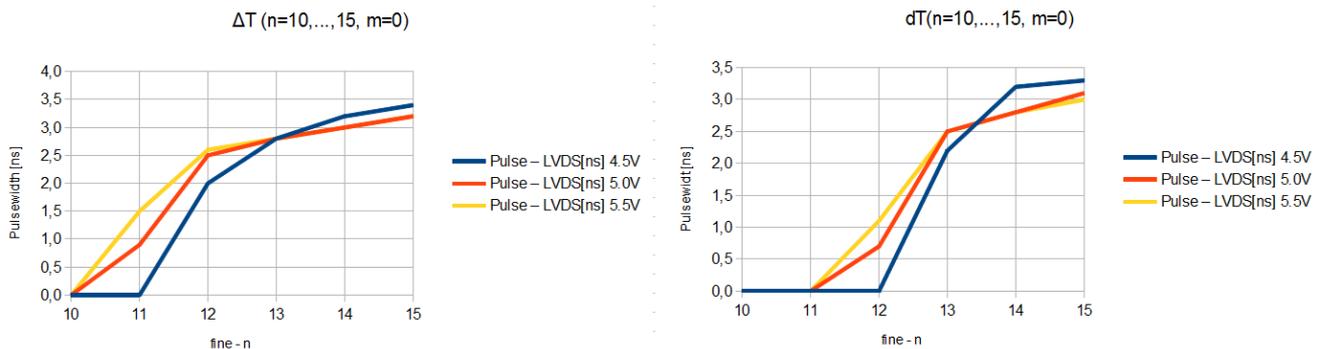


Figure 6: Setting the pulse width "fine", with respect to the supply voltage and device parameter variation

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SAMPLE PULSES

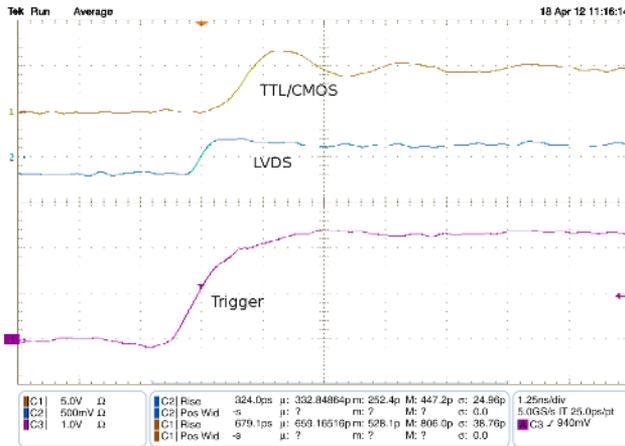


Figure 7: In pulse mode (S2 left hand position) the rising edge of the trigger signal and the LVDS appear simultaneously. The TTL/CMOS has an approx. 1 ns delay.

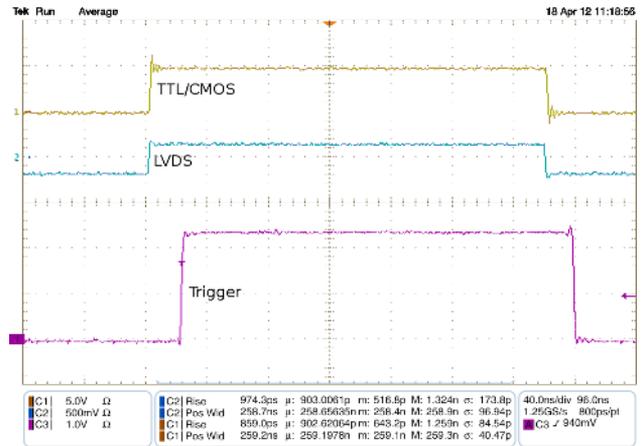


Figure 8: In the symmetrical mode (S2 right hand position) the rising edge of the trigger signal has an approx. 20 ns delay with reference to the output signals.

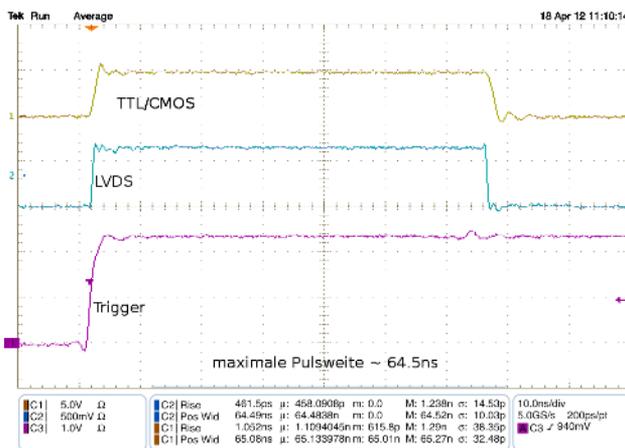


Figure 9: Maximum pulse width at switch setting "FF"

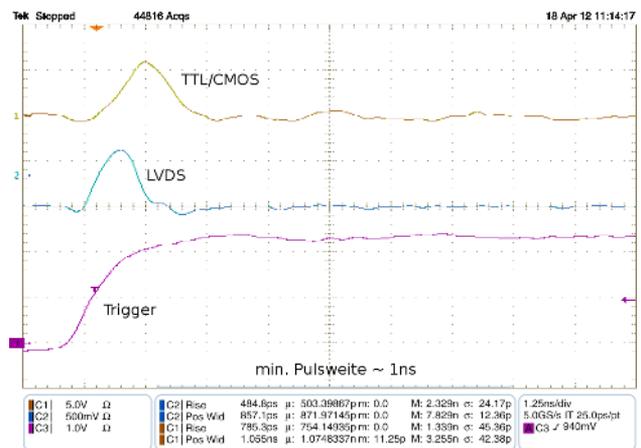


Figure 10: Minimum pulse width at switch setting "0B"

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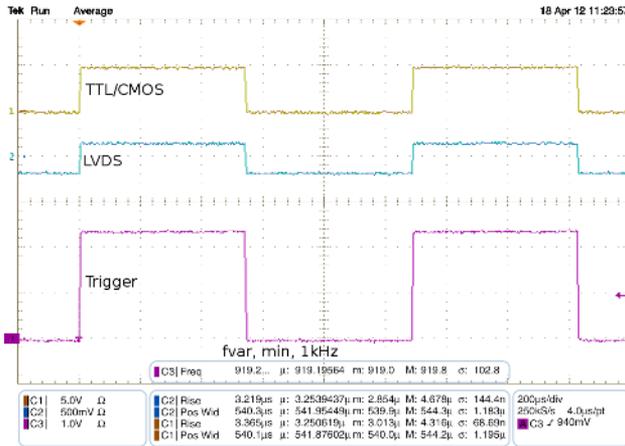


Figure 11: Minimum variable frequency, JP3 = 2-3, JP2 = 2-3, P1 = CCW

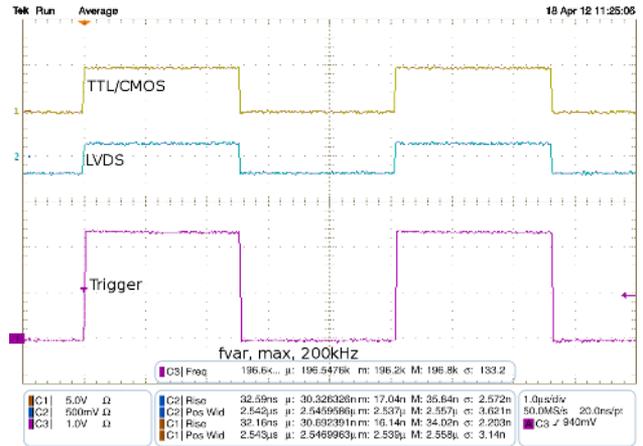


Figure 12: Maximum variable frequency, JP3 = 2-3, JP2 = 2-3, P1 = CW

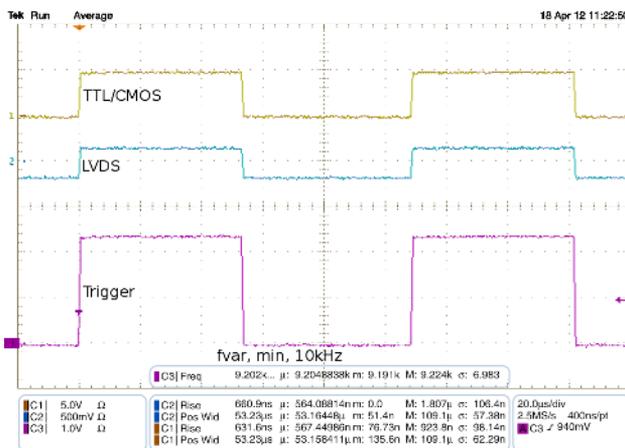


Figure 13: Minimum variable frequency, JP3 = 2-3, JP2 = 1-2, P1 = CCW

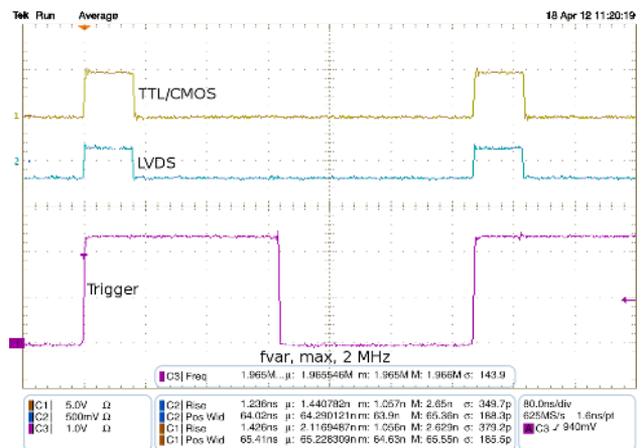


Figure 14: Maximum variable frequency, JP3 = 2-3, JP2 = 1-2, P1 = CW

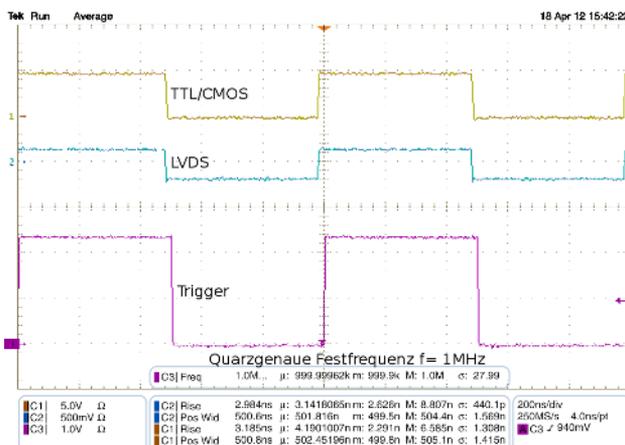


Figure 15: Fixed frequency 1 MHz, JP3 = 1-2

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