MCCD

Eight output START trigger / master clock source

User Manual

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Copyright Information

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1 Introduction

The Model MCCD is a fast pulse distributor intended to be used with multiple MCS8A modules. It is also a very good general-purpose pulse generator when multiple synchronized jitter-free signals are required. It expands one common START signal to several synchronous starting MCS8A units. The introduced additional time jitter is typical less than 0.075 ps rms. Output rise / fall time is 60 ps. The minimum pulse width is 90 ps. It can operate up to 6 GHz periodic signal frequency.

In addition there is a synchronous clock source at the rear panel. It can supply up to 8 MCS8A units with a common clock for synchronous operation of multiple MCS8A, providing up to 64 synchronized channels. It has a clock input (TTL 3.3V, 10 to 120 MHz) to be distributed to the connected MCS8As. Termination can be 50 Ohm or 3 kOhm. AC or DC coupling is selectable.

If no input signal is connected, by setting the jumper JP1 the internal 10 MHz clock source is fed to the output connectors. The internal quartz oscillator can be replaced by an oven-stabilized oscillator (option MCCDOVX) or a highly stable Cs atomic clock (option MCCDATOM).

Also there is an optional binary divider (32 bit), which can reduce the external clock in binary steps. Divider factor is set by internal jumpers.

2 Hardware Description

2.1 Overview

The MCCD is a 8 output fast pulse driver with 60 ps rise time and a 8 output clock driver (TTL) with internal reference clock or ext input.

2.2 Front Panel, Trigger Fan-out

Fig. 2.1: The MCCD Front Panel

The connectors at the front panel are for distributing one trigger signal from the TRG IN input to eight output SMA connectors. Instead of an external trigger signal the internal (10 MHz) or external clock signal can be fed to the output connectors by setting the internal jumper JP1, “Internal Trigger”, see Fig. 2.2.

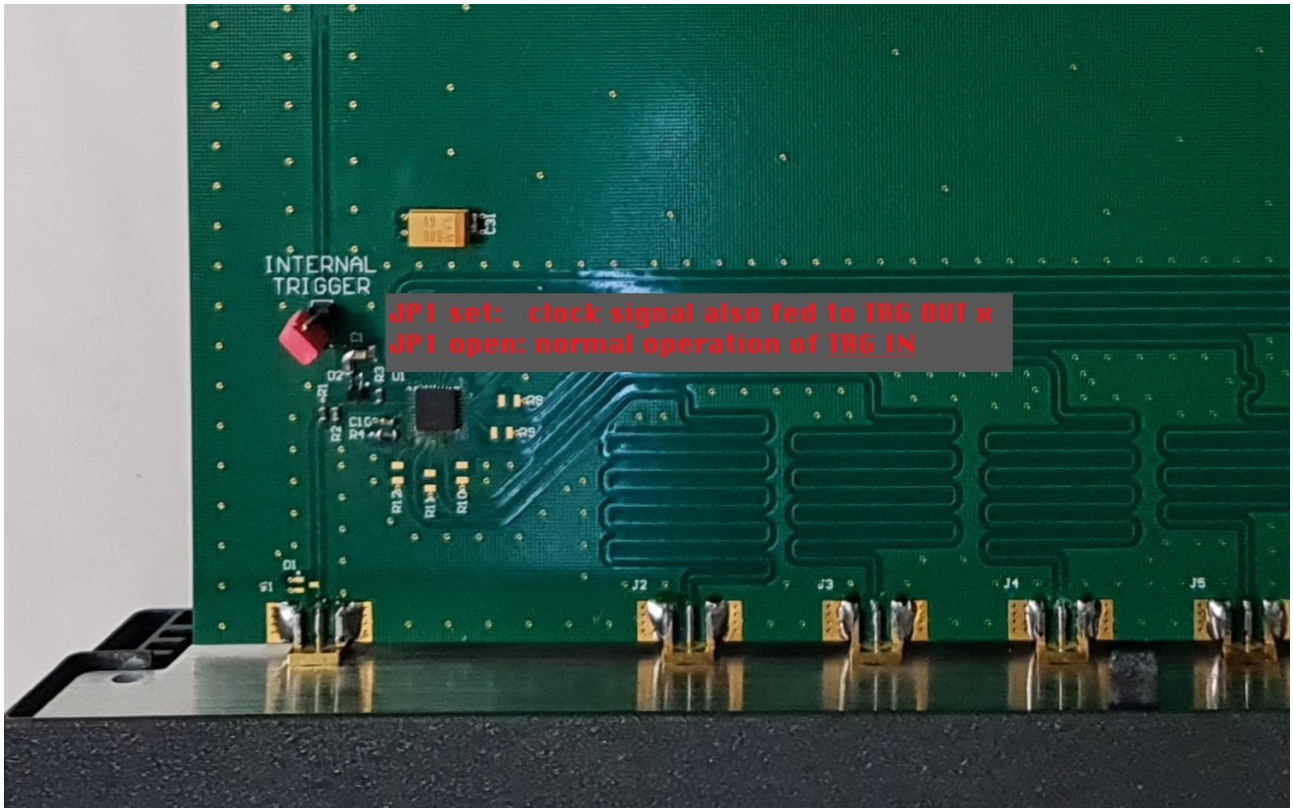

Fig. 2.2: Trigger input setting with JP1

2.3 Rear Panel, Clock Fan-out

Fig. 2.3: The MCCD Rear Panel

At the rear panel a clock source (TTL 3.3V, 10 to 120 MHz) can be distributed from a BNC connector labeled CLOCK IN to eight synchronous output signals at BNC connectors CLK1 - CLK8. Termination of the clock input can be set to 50 Ohm or 3 kOhm with JP2. AC or DC coupling is selectable with jumper JP3, see Fig. 2.4

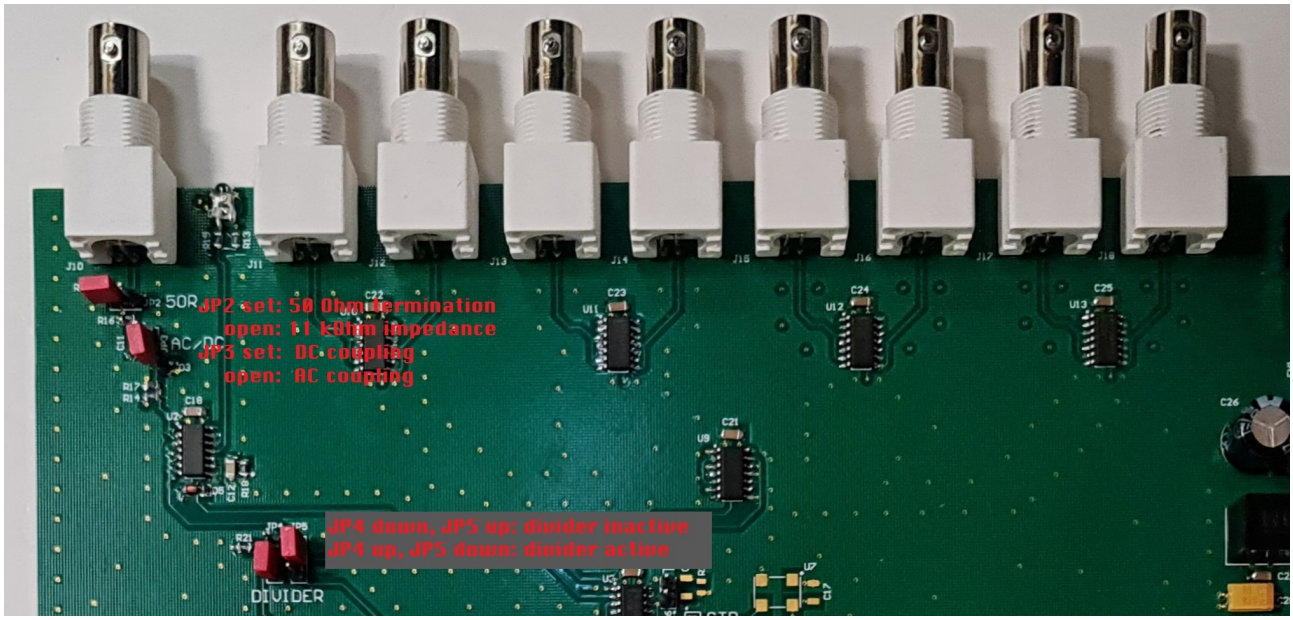

Fig. 2.4 Jumpers JP2 for 50 Ohm Termination and JP3 for DC/AC coupling

A clock signal from an external source is automatically recognized. By two LEDs it is indicated if the external or the internal clock is used.

The internal quartz oscillator can be replaced by an oven-stabilized oscillator (option MCCDOVX) or a highly stable Cs atomic clock (option MCCDATOM).

Also there is an optional binary divider (32 bit), which can reduce the external clock in binary steps. Divider factor is set by internal jumpers see Fig. 2.5.

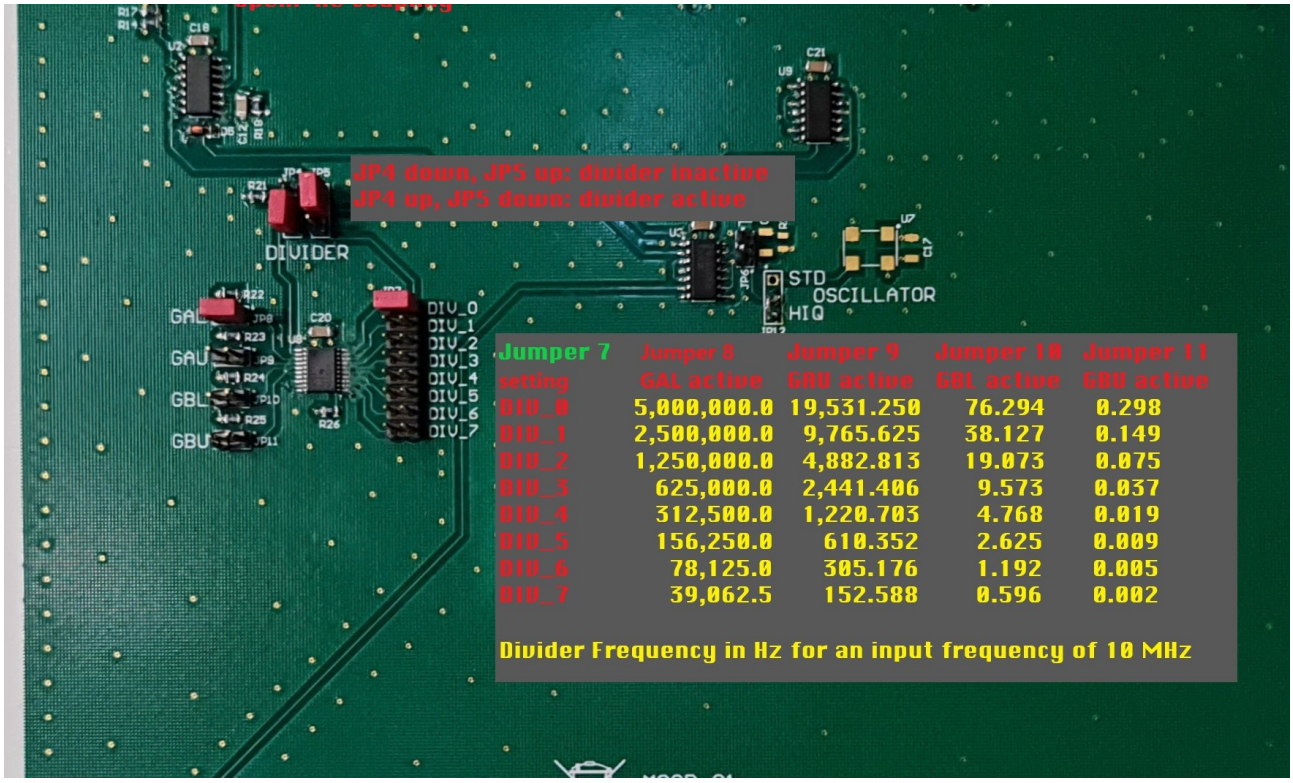

Fig. 2.5: Divider setting

3 Application: synchronized use of up to eight MCS8A multiscalers

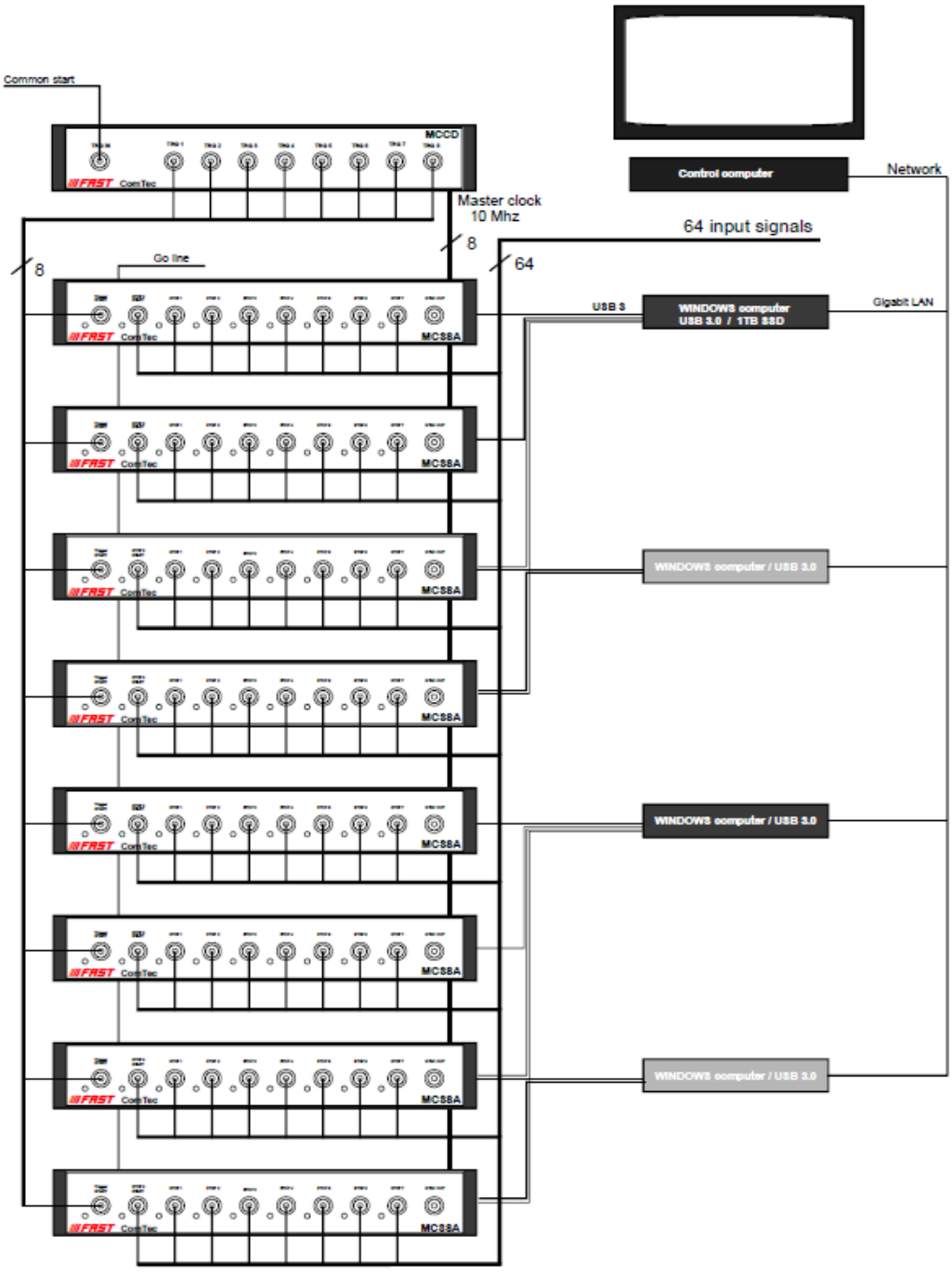

Fig. 3.1: Synchronized use of 8 MCS8A multiscalers

4 Specifications

FRONT PANEL
TRG Input: 1x SMA connector, Zin = 50 Ohm, 0->0.25V nom.
0V…-1.5V maximum input voltage range, Threshold: -0.125V fixed
Don't apply pos. voltage!
TRG outputs: 8 x SMA connector, outputs
FAST NIM (CML) pulses (neg.: 0V -> -0.4V) into 50 Ohm,
Zout = 50 Ohm, back terminated.

REAR PANEL
Reference clock in: BNC connector, TTL compatible,
input frequency: 10 MHz - 120 MHz,
optional 50 Ohm terminated (int. Jumper)
optional AC- coupled (int. Jumper)
Master clock out: (8x)
BNC connector, TTL compatible, 0...3.3V, rise time: 1ns
Power connector: 5.5 x 2.1 mm DC connector (center positive)

REFERENCE CLOCK:
10 MHz crystal oscillator (10ppm)
MCCDOVX option
10 MHz ovenized crystal oscillator, frequency stability: 0.03 ppm @ 0°C to +50°C
MCCDATOM option 10 MHz Cs atomic clock
Short-term stability (Allan Deviation) of 3.0×10^{-10} at $\tau = 1$ sec, typical long term aging of $<9 \times 10^{-10}$/month, and maximum frequency change of $\pm 5 \times 10^{-10}$ over an operating temperature range of –10 °C to 70 °C.

Power requirements: 12V DC / 0.5A

Operating Temperature Range: 0°C to +50°C

Physical: aluminum case, 275 mm x 260 mm x 48 mm, 1.8 kg

Shipping case: 500mm x 400mm x 200mm, 7 kg

Accessories:
- **External power supply:** IN: 90 - 264 V AC, Out: 12 V DC (enclosed)
- **Handbook**

HARDWARE OPTIONS and Order Information:

Order Information

Model	Description	Order
MCCD	8-fold pulse driver + master clock source with 8 synchronous outputs	MCCD
MCCDOVX	Option: oven controlled ref.oscillator (higher stability)	MCCDOVX
MCCDATOM	Option: Cs atomic clock (highest stability)	MCCDATOM
MCCDDIV	Option: internal divider	MCCDDIV
MSET1	Set of cables: 8xRG316 SMA-SMA, 30 cm	MSET1
MSET2	Set of cables: 8xRG316 BNC-BNC, 50 cm	MSET2
MSET3	Set of cables: 8xRG316 BNC-BNC,100 cm	MSET3
MSET4	Set of cables: 1xSMA 1 m, 8xSMA 20 cm, 8xBNC 50 cm, BNC-SMA adapter	MSET4