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## 50 MHz Pulse Generator MA-Module Model MA204

The MA204 is a fully programmable pulse generator that allows the generation of precisely timed pulses of programmable frequency, pulse-width, delay, and amplitude. Operational modes include single, burst and continuous pulse outputs, together with double pulse capability. Extensive trigger and gating logic provides comprehensive control of pulse timing. The internal base clock can be disciplined to an external reference clock.



### SPECIFICATIONS

#### Number of Channels

1

#### Frequency

0.2 Hz – 50 MHz

#### Pulse Output

-2 V to +7 V

#### Operational Modes

Single, burst or continuous pulsing  
Single pulse or pulse pair  
Programmable rise/fall time  
External triggering  
Async. or sync. gating  
Burst from 2 to  $>4 \times 10^9$  pulses

#### Clock Disciplining

Internal Clock can be disciplined to a 10 MHz external reference for increased accuracy and stability.

#### Calibration

Calibration is normally not required. However, registers are provided that allow fine adjustment of the delay times.

#### Inputs/Outputs

Front panel pulse output  
Front panel sync output  
Front panel input A  
Front panel input B  
M-Module Trig A  
M-Module Trig B

#### Gate, Trigger, Ref. Clock inputs

Source can be the front panel A or B connectors or the MA-Module Trig A or Trig B signals.

#### Pulse and Sync Outputs

Can be directed to the front panel connectors and to the MA-Module backplane Trig A or B signals.

#### Front Panel Connectors

SMA

#### Ordering Information

##### Part Number

100 ps timing: 11028450-0001

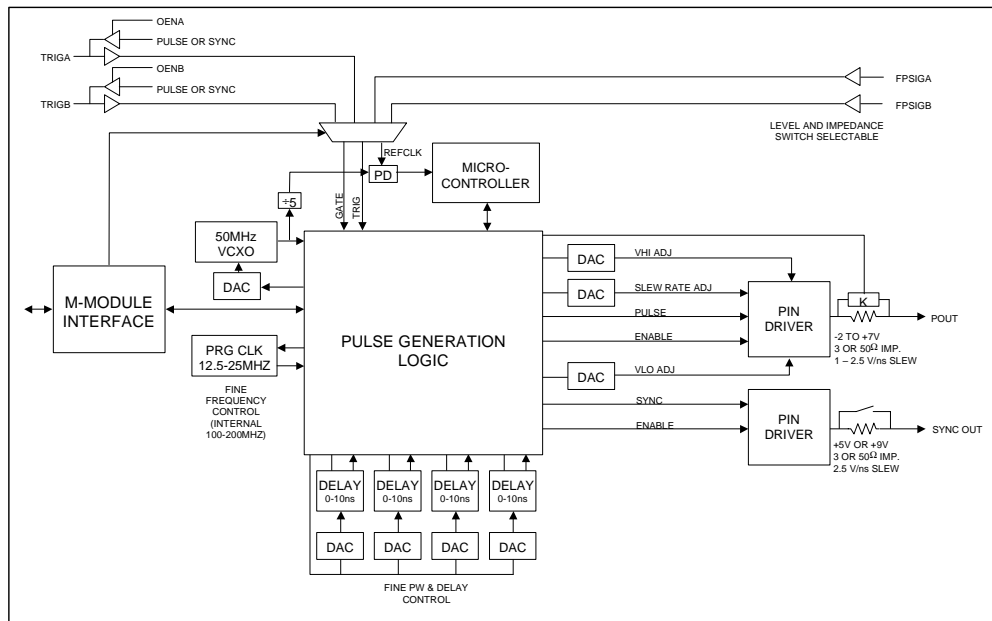
5 ns timing: 11028450-0002

#### M-Module Compliance

Complies with ANSI/VITA Std. 12-1996 for single-wide MA-Modules  
Data transfers: 16 bit  
Interrupts: INTA & INTC  
Triggers: TRIGA & TRIGB  
Compatible with VXI, VME, PCI, cPCI and other M-Module carriers

#### Applications

Functional testing  
Design verification  
Signal simulation  
Timing control



### Pulse Period

Range (internal triggering): 20 ns to 5.2 s

Programming Step Size: 100 ps  
Resolution<sup>1</sup>:

20 to 79.9 ns: 100 ps  
80 to 159.9 ns: 160 ps  
160 to 319.9 ns: 320 ps  
320 to 639.9 ns: 640 ps  
640 to 1279.9 ns: 1.28 ns  
1280 to 4999.9 ns: 2.56 ns  
≥ 5 μs period: 5 ns

Accuracy (internal clock): ±(0.01 % + 100 ps)<sup>2</sup>

### Pulse Width

Range: 0 ns<sup>3</sup> to 5.2 s

Prog. Resolution

-0001 version: 100 ps  
-0002 version: 5 ns

Accuracy (internal clock): ±(0.01 % + 2 ns)<sup>2,4</sup>

### Pulse Delay (from Sync Out)

Range: 20 ns to 5.2 s

Prog. Resolution

-0001 version: 100 ps  
-0002 version: 5 ns

Accuracy (internal clock): ±(0.01 % + 2 ns)<sup>2,4</sup>

### Pulse Out Characteristics

Range: -2.0 V to +7.0 V

Impedance (programmable): 3 Ω or 50 Ω

Prog. Resolution: 25 mV

Accuracy: ±(2.0 % + 100 mV)

Output Current (source or sink): 50 mA

Short Circuit Current (static): ±35 mA max

Short Circuit Current (dynamic): ±100 mA max

Rise/Fall Time (prog,  $R_L = \infty$ ): 1.0 to 2.5 V/ns

### Input Characteristics (FPSIGA & FPSIGB)

Impedance (selectable): 56, 82, 180, or >100 KΩ

Threshold (selectable): -2.0, 0, +1.2, or +1.8 V

Frequency: 50 MHz max

Pulse Width: 10 ns min

### Sync Out Characteristics

Time to un-delayed output pulse

-0001 version: 14 ns typ

-0002 version: 4 ns typ

Time from external trigger: 80 ns max

Output Impedance (selectable): 3 Ω or 50 Ω

Amplitude (selectable,  $R_L = \infty$ ): 5.0 V or 9.0 V

Output Current (source or sink): 50 mA

Rise/Fall Time ( $R_L = \infty$ ): 2.5 V/ns typ

Pulse Width

period < 80 ns: 10-20 ns

period ≥ 80 ns: 40-80 ns

### Power (-0001/-0002)

+5 V: 1.3 A / 200 mA

+12 V: 200 ma / 170 mA

-12 V: 200 ma / 180 mA

### Temperature

Operating: 0°C to 50°C

Storage: -40°C to 70°C

### Notes:

1. In general, the resolution is 100 ps when programming a period less than 5 μs. However, there are some areas that have less resolution as specified for the various ranges.
2. The percent accuracy can be improved by disciplining the internal clock to an external precision 10 MHz reference clock. The internal clock accuracy will discipline in about 10 minutes to within one decade of the external reference, up to 10<sup>-8</sup> accuracy.
3. For pulse periods < 40 ns, pulse width = ½ period. For periods ≥ 40 ns the minimum pulse width = 15-30 ns. See User Manual for further details.
4. Use of the calibration register can improve this accuracy.



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