

MTGEN

Master Time Generator

Ultra-low noise reference time generator



DESCRIPTION

MTGEN is a reference time generator providing 1PPS, IRIG, and NTP outputs. It derives a local time base from an atomic frequency standard (10 MHz or 100 MHz) and includes a multi-constellation GNSS receiver for UTC tracking and referencing.

The IRIG signal is phase-aligned with the generated 1PPS, ensuring consistent time correlation across outputs. Each 1PPS output can be individually delay-adjusted to meet specific synchronization needs.

MTGEN includes high-resolution time interval counter enabling real-time 1PPS measurements. Additionally, it supports optical time code and 1PPS transmission, allowing the local time to be distributed to remote users via fiber optic links.

BENEFITS

- < 5 ps RMS added timing jitter to the clock input
- ≤ 1 ns 1PPS rise and fall times
- Adjustable 1PPS duration and delay
- Synchronous IRIG signals

APPLICATIONS

Reference time generation and distribution for applications such as:

- Space telescope arrays and networks
- UTC time realization and distribution
- Atomic time scale generation
- Positioning, navigation and timing

SPECIFICATIONS

Parameter	Specification	Comment
Clock inputs	4 x SMA type	5/10/100 MHz at [7 – 10 dBm] input power, switchable
Control system interface	TCP/IP	e.g., EPICS or Telnet
Dimensions	3U	19" rack module
7x 1PPS outputs		
Signal level	2.5 V TTL	50 Ω impedance
Pulse rise and fall times	≤ 1 ns	from 10% to 90% level
Pulse duration	20 μ s – 500 ms	adjustable
Return loss	30 dB	at signal outputs
Delay adjustment	10-ns step size	at 100-MHz input
Timing jitter	< 5 ps RMS	added noise to the clock input
2x IRIG outputs		
Timecode	IRIG-B	contact Cycle for more details
NTP output		
NTP	chrony	compatible with NTPv4 (RFC 5905)
GNSS tracking & referencing		
GNSS receiver	Furuno GT-100	1x SMA-type, multi-GNSS RX, optional with a GNSS antenna
Outputs	1PPS & 10 MHz	1x SMA-type each, synchronized UTC time and freq. output
Time interval counter		
Input signal	1 PPS	2.5 V TTL at 50 Ω impedance
Input channels	4 x SMA type	real-time, 1-s rate, all input combinations reported.
Resolution	20 ps RMS	


Option A: Distribution amplifier

1PPS or IRIG distribution	2 x 10	2 switchable inputs, 10 additional outputs per module
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Option B: Phase/frequency meter

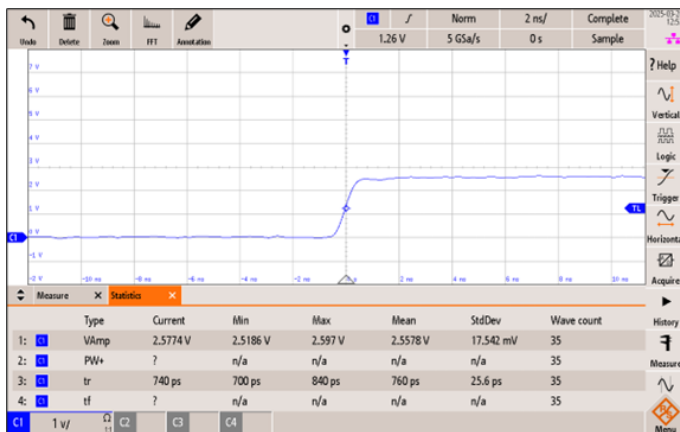
Input signal	Sine wave	[5 MHz – 100 MHz] frequency and [7 – 10 dBm] power
Input channels	4 x SMA type	real-time, 1-s rate, all input combinations reported, ch1=REF.
ADEV measurement floor ¹	<4E-14 at 1 s, <1E-14 at 10 s, <2E-15 at 100 s, <1E-15 at 1 000 s, <1E-15 at 10 000 s	

¹ Unit temperature from +15 to +30°C, with slope < 0.4°C/h and variation < 1°C pk-pk; humidity < 60 %RH with variation < 10 %RH pk-pk.

MEASUREMENT DATA

MTGEN performance with 100 MHz clock input:

Rise and fall time of the generated 1PPS signal:

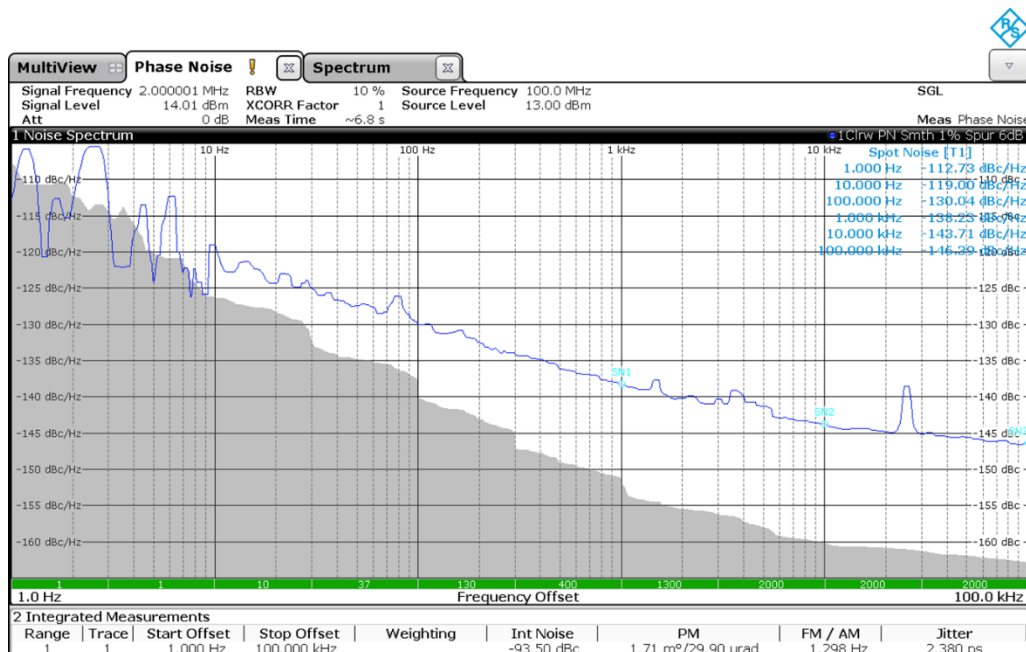


Mean rise time: 0.76 ns



Mean fall time: 0.82 ns

Additive timing jitter of the generated 1PPS:



Jitter: 2.38 ps RMS