

30 YEARS OF LEADERSHIP IN MASER CLOCK TECHNOLOGY

iMaser™ 3000

SMART ACTIVE HYDROGEN MASER CLOCK

State-Of-The-Art Performance & Features



Swiss Quality & Technology

- iDurable™ Teflon& Bulb Coating technology for over 20-year lifetime
- iCeramic™ Cavity technology for superior stability & lower thermal sensitivity
- LoSensitivity™ in temperature change technology for higher stability performance
- Remote IP control & monitoring for higher reliability & maintenance-free operation

Ultra High Frequency Stability

- Allan deviation (1Hz bandwidth):

1 s	$8 \cdot 10^{-14}$
10 s	$1.9 \cdot 10^{-14}$
100 s	$4 \cdot 10^{-15}$
1'000 s	$2 \cdot 10^{-15}$
10'000 s	$1.2 \cdot 10^{-15}$
Long term	$2 \cdot 10^{-16}$

Low Phase Noise (5MHz)

- -130 dBc/Hz @ 1Hz

High Electromagnetic Compliance

-  compliance per ISO 17025, including EN 55022 Class B, EN 55024 & EN 61326-1

Advanced Features

- Auto cavity SmarTuning™ capability
- Remote IP control, monitoring& self-diagnostics

Warranty

- 2 years, extendable to 5 or 7 years

Lifetime

- >20 years

Key Applications

- Frequency reference source
- VLBI / SLR
- Deep space tracking & navigation
- Time keeping & precision time scales
- GNSS satellite monitoring & geodesy



iMaser™ 3000 Specifications



FREQUENCY STABILITY

Allan Deviation

(1Hz bandwidth)	Standard*	Option LN*	Option ULN*	Option ST*
1 s	$1.5 \cdot 10^{-13}$	$1.2 \cdot 10^{-13}$	$9 \cdot 10^{-14}$	$8 \cdot 10^{-14}$
10 s	$2 \cdot 10^{-14}$	$2 \cdot 10^{-14}$	$2 \cdot 10^{-14}$	$1.9 \cdot 10^{-14}$
100 s	$5 \cdot 10^{-15}$	$5 \cdot 10^{-15}$	$5 \cdot 10^{-15}$	$4 \cdot 10^{-15}$
1'000 s	$2 \cdot 10^{-15}$	$2 \cdot 10^{-15}$	$2 \cdot 10^{-15}$	$2 \cdot 10^{-15}$
10'000 s	$2 \cdot 10^{-15}$	$1.5 \cdot 10^{-15}$	$1.2 \cdot 10^{-15}$	$1.2 \cdot 10^{-15}$

Long term drift

$2 \cdot 10^{-16}$ /day**

* Achieved with the advanced LoSensitivity™ in temperature change technology, providing an ultra-low temperature sensitivity of up to $<8 \cdot 10^{-16}$ /°C

** Typically achieved within +0.25 °C from ambient temperature with the HCB ultra-low temperature sensitivity and CT SmarTuning options after a long period of continuous, undisturbed operation

ENVIRONMENTAL

- Temperature sensitivity $<5 \cdot 10^{-15}$ /°C
With Active Heater-Cooler-Box $<8 \cdot 10^{-16}$ /°C (Option: HCB)
- Phase sensitivity to temperature 10 ps/°C
- Magnetic sensitivity $<5 \cdot 10^{-14}$ /G
 $<1 \cdot 10^{-14}$ /G (Option: MS)
- Frequency sensitivity to vibration $<1 \cdot 10^{-9}$ /g
- Power source sensitivity: $<1 \cdot 10^{-15}$ /V

CONTROL

- Synthesized frequency resolution $6.4 \cdot 10^{-15}$ ($3 \cdot 10^{-16}$ Option: CT)
- Frequency tuning range $\pm 3 \cdot 10^{-8}$

OUTPUTS

- 5 MHz 2
- 10 MHz 0
- 100 MHz 2 or 4 (Option: O2 or O4)
- 1 PPS TIMING 2
- 1 PPS TIMING 1
- 1 PPS TIMING 2 (Option: PPS2)

SINE OUTPUT SIGNALS

- Level (50 Ω) +12 dBm (± 1 dBm)
- Isolation >80 dB
- Spectral purity (2nd harmonic) <-40 dBc
- Spectral purity (spurious) <-70 dBc

1 PPS TIMING

- | | Output | Sync Input |
|------------------------------|----------------------|----------------------|
| • Format (I/O) | 1 PPS (Out) | 1 PPS (IN) |
| • Amplitude (TTL compatible) | 2.5 V (50 Ω) | 2.5 V (50 Ω) |
| • Pulsewidth | 100 μ s | >100 ns |
| • Rise time | <4 ns | <1 μ s |
| • Jitter | <100 ps | <1 μ s |
| • Auto sync Input | | 1 PPS |
| • User settable | | 50 ns/step |
| • Sync Input to Output | | < 25 ns |

POWER

- DC 22-30 V (3 A typical)
- AC (50-60Hz) 110- 220 V (85-135 or 176-264 V)
- Power normal operation /(Peak) 100 W / (220 VA max)
- Power (standby: ion pumps & heater) <30 W Standby battery operation
- Battery pack (UPS) 24V (Approved for air transport IATA)
18 hours max (Option: BAT1)
36 hours max (Option: BAT2)

PHASE NOISE

Output	5 MHz (dBc/Hz)	
	Standard	Option LN/ULN/ST
1 Hz	-118	-130
10 Hz	-135	-142
100 Hz	-145	-152
1 kHz	-152	-156
10 kHz	-155	-156
100 kHz	-155	-156

Output	10 MHz (dBc/Hz)	
	Standard	Option LN/ULN/ST
1 Hz	-112	-121
10 Hz	-129	-135
100 Hz	-139	-145
1 kHz	-146	-150
10 kHz	-149	-150
100 kHz	-149	-150

Output	100 MHz (dBc/Hz)	
	Standard	Option LN/ULN/ST
1 Hz	-92	-100
10 Hz	-105	-113
100 Hz	-115	-122
1 kHz	-125	-148
10 kHz	-145	-151
100 kHz	-145	-151

ADVANCED FEATURES

- Auto cavity SmarTuning™ (Option: CT)
- Remote Ethernet control & monitoring: LAN HTTP, FTP, open source thru Windows, Linux or Mac (Option: RE)

ELECTROMAGNETIC COMPLIANCE

-  compliance per ISO 17025, including EN 55022 Class B, EN 55024 & EN 61326-1

MECHANICAL

- Size (WxDxH) 60x80x95 cm
23.7 x31.5 x37.5"
- Weight 100kg/220lb (without battery packs)
Add 40 kg / 88 lb per battery pack

WARRANTY

- 2 years
- Extendable to 5 or 7 years (Option: W5 or W7)

LIFETIME

- >20 years

ORDERING

- Instructions Maser / xx / xx / xx (xx – option codes)
Example: Maser/BAT2/O4/ULN/RE/W5)