

# TimeKeeper® GrandMaster

The TimeKeeper GrandMaster is a time serving appliance designed for high frequency trading and other financial applications that leverages the capabilities and cost-advantages of commodity hardware to combine exceptional performance with a significant price reduction.



**TimeKeeper Multi-Protocol GrandMaster Clock**

- Dual, redundant and hot-swappable AC power supplies
- PTP, NTP on all ports - low 100's of nanoseconds accuracy
- 1G/10G Ethernet fix network queueing problems that introduce silent time errors
- Standard cooling requirements for easy install
- Can act as Grandmaster and/or boundary clock for NTP and PTP
- Time Intelligence Platform gathers statistics from clients, detects problems
- Auto-discovers your time network topology and displays it for single-pane-of-glass enterprise management
- Remote monitoring/configuration
- Multiple time sources for redundancy/security
- Detect/self-heal from network failure and GPS spoof attack
- GPS jamming detection and recovery
- High quality GPS time source with an option to use multiple GPS time sources
- Scalable operation, including support for remote servers outside the local network and high performance implementation of both PTP and NTP
- Advanced time network administration via web interface.

## How to purchase

TimeKeeper GrandMaster Clocks (TK-GM), TimeKeeper Server Software, and TimeKeeper Client Software are all available from FSMLabs and FSMLabs resellers. For purchase information or for a live demonstration of TimeKeeper please contact FSMLabs at [sales@fsm labs.com](mailto:sales@fsm labs.com).

## Security from the ground up

Timekeeper Grandmasters are able to track multiple sources of time as cross checks and are able to detect GPS spoof attacks, jamming attacks and equipment failures.

## Flexible Server Configuration

The web interface simplifies configuration. For example: the clock can be easily setup to use a PTP source as a backup to the on-board GPS and a NTP source as a cross check.

## Transparent Failover

Grandmasters can be setup to back up each other so that if one has a failure time service continues.

## Enterprise Reliability

Includes redundant hot-swap power supplies, multiple network ports, client monitoring and multi-source redundancy.

## TimeKeeper GrandMaster Clocks

### Specification

Chassis	1U rack-mountable, dual (redundant) power supplies	Standard
Networking	5x 1G Ethernet RJ45	Standard
	2x 10G Ethernet SFP+	Standard
	Additional networking	Optional
	Infiniband	Optional
Time Source	GPS	Standard
	Additional or replacement GPS receivers from Symmetricom and/or Spectracom	Optional
Oscillator	< 25µs/24hr holdover	Standard
	< 10 µs/24hr holdover	Optional
Management	TimeKeeper Time Intelligence Platform for configuration of GrandMaster, monitoring, clients plus real-time performance data and network visualization	Standard
Fault Detection	TimeKeeper Multi-Source self-check, additional GPS sources and patent pending threat detection	Standard
Audit Trace	Full logging and alerting of sources and of any TimeKeeper Clients	Standard
Protocol Support	PTP, NTP, PTP telcom profile, PTP hybrid mode, TIME (RFC 868)	Standard

TimeKeeper and FSMLabs are registered trademarks of Finite State Machine Labs Inc.