PIK TIME SYSTEMS®

Coming soon: new release of
the ELSTAB-based T&F transfer systems:
OSTT-5

Fiber-optic time and frequency distribution system OSTT-4 (L, DI option)

Introduction and key features

OSTT-4 may be used for clock comparisons as well as for delivering the ultimate quality time and frequency signals to the users not maintaining their own clocks and/or timescales. The **local module** of the system accepts the frequency and time signals (10 MHz and 1 PPS) and transmits them via an optical fiber to the **remote module.**
Our solution (in contrary to standard two-way systems) delivers stabilized and calibrated replica of source signals, thus may be described as a **virtual atomic clock** at the end of the fiber.

Specifications

- OSTT-4 consists of a local and remote module for time and frequency transfer,
- Transfers 10 MHz signals (100 MHz as an option), ADEV below $3x10^{-13}$ for 1 s averaging, below $3x10^{-17}$ for 10^5 s averaging,
- Transfers 1 PPS signal (also 100 PPS), phase synchronous with frequency signal, TDEV below 3 ps for 10 s averaging, below 1 ps for 10^5 s averaging,
- Time transfer absolute uncertainty below 50 ps,
- OSTT-4 is actively stabilized against fiber induced phase fluctuations; the phase correction range is 2000 ns,
- Output 1 PPS position may be adjusted with 1 ps resolution, negative delay also possible,
- OSTT-4 operates bi-directionally on a single optical fiber in C band, maximum optical loss 25 dB,
- As an option the system can be enriched with optical amplifiers.

Active delay stabilization

The unique features of the system are based on the concept of **active compensation of variations of the fiber delay.** The signal reaching the remote module is redirected backward to the local module and used for compensation of path delay fluctuations.

Autocalibration

Calibration of the time transfer is based on round-trip delay measurement, which is performed locally at the transmitting side of the system. **After installation and initial calibration, the input to output delay is constant and there is no need for any further measurements or data exchange.**

PPS alignment

1 PPS output signal may be advanced with 1 ps resolution to compensate for the delay introduced by the fiber link. Therefore remote 1 PPS may be aligned exactly with UTC(k), or even with some advance, if needed.

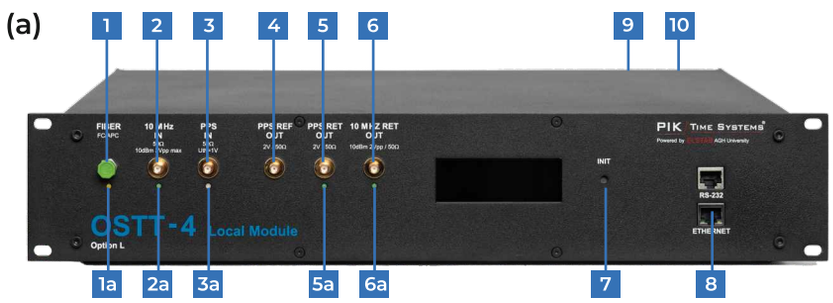
Dispersion Insensitive (DI) option

The Dispersion Insensitive option was introduced to simplify the calibration of time transfer. In the standard version of the OSTT-4 system the chromatic dispersion of the actual fiber link has a significant impact on the link calibration, and therefore must be accurately estimated. In the DI option, thanks to introducing an additional optical signal, the calibration is insensitive to the chromatic dispersion.

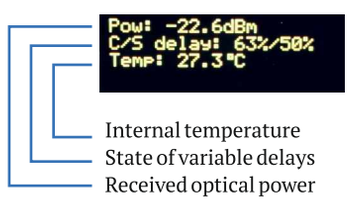
Interfaces description

Connectors location in local module (a) and remote module (b).

(a)



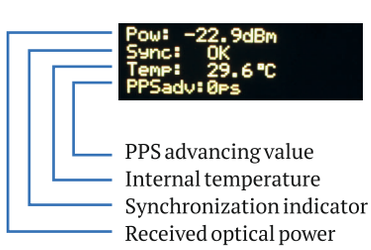
Display



1. Optical input/output connector; FC-APC type.
1a. LED indicating laser transmitter status.
2. 10 MHz input; SMA connector, 50 Ω DC termination, 0 dBm to 10 dBm input signal level, sinus or square wave.
2a. LED indicating synchronization of inner oscillators to the input frequency signal.
3. PPS input; SMA connector, 50 Ω DC termination, 1 PPS or 100 PPS.
3a. LED indicating PPS signal detection.
4. PPS REF(erence) output; SMA connector, 2 V at 50 Ω termination, used for calibration.
5. PPS RET(turned) output; SMA connector, 2 V at 50 Ω termination, used for calibration.
5a. LED indicating returned PPS signal detection.
6. 10 MHZ RET(turned) auxiliary output; SMA connector, 10 dBm at 50 Ω termination.
6a. LED indicating detection of the returned frequency signal.
7. INIT button.
8. Remote control and monitoring ports.
9. Fuse socket (at the rear panel).
10. DC power supply (at the rear panel); 48 V nominal, 40 V to 68 V acceptable, maximum supply current: 0.5 A.

(b)

Display



11. Optical input/output connector; FC-APC type.
11a. LED indicating laser transmitter status.
12. PPS outputs; SMA connectors, 2 V at 50 Ω termination.
12a. LED indicating PPS signal detection.
13. 10 MHz outputs; SMA connectors, AC-coupled, 2 Vpp at 50 Ω termination.
13a. LED indicating detection of the frequency signal.
14. Remote control and monitoring.
15. Fuse socket (at the rear panel).
16. DC power supply (at the rear panel); 48 V nominal, 40 V to 68 V acceptable, maximum supply current: 0.5 A.

PIK TIME SYSTEMS®

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