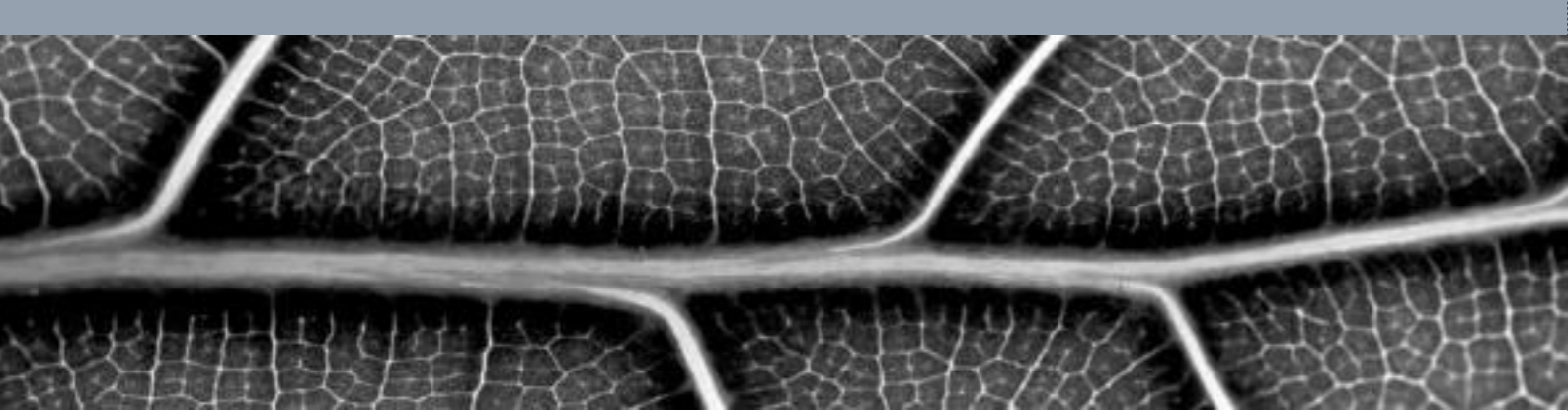


Low-Jitter Clock Distribution System for 3rd Generation Light Sources





Many instruments. Many people. Working together.

Stability means knowing your machine has innovative solutions. For users, stability means a machine achieving its full potential, enabling them to do more science. For us, stability means synchronized, connected, dynamic state-of-the-art instrumentation, working together as one system.

Because we know that the machine is more than just the sum of its parts.

Benefits

Femtosecond precision

- excellent synchronization of geographically distributed systems

Simple commissioning and use

- quick set-up and minimal start-up tuning
- remote monitoring of Libera Sync operation
- easily integrated into the Control System
- minimal requirements for environmental stability and conditions

Compensation of fiber drifts

- enables long-term link stability
- point-to-point distance (optical fiber pair length): up to ~1km (depending on the optical fiber used)

Compact, robust and high-performance device

- small dimension: standard form factor 1U 19"
- low power consumption - with each device consuming less than 30 W
- number of reference outputs on Receiver side: 2

Remote diagnostics

- operation of Transmitter and Receiver unit can be remotely monitored
- Receiver status monitored on the Transmitter and vice versa

Range of clock frequencies supported by Libera Sync:

- 350 MHz - 520 MHz

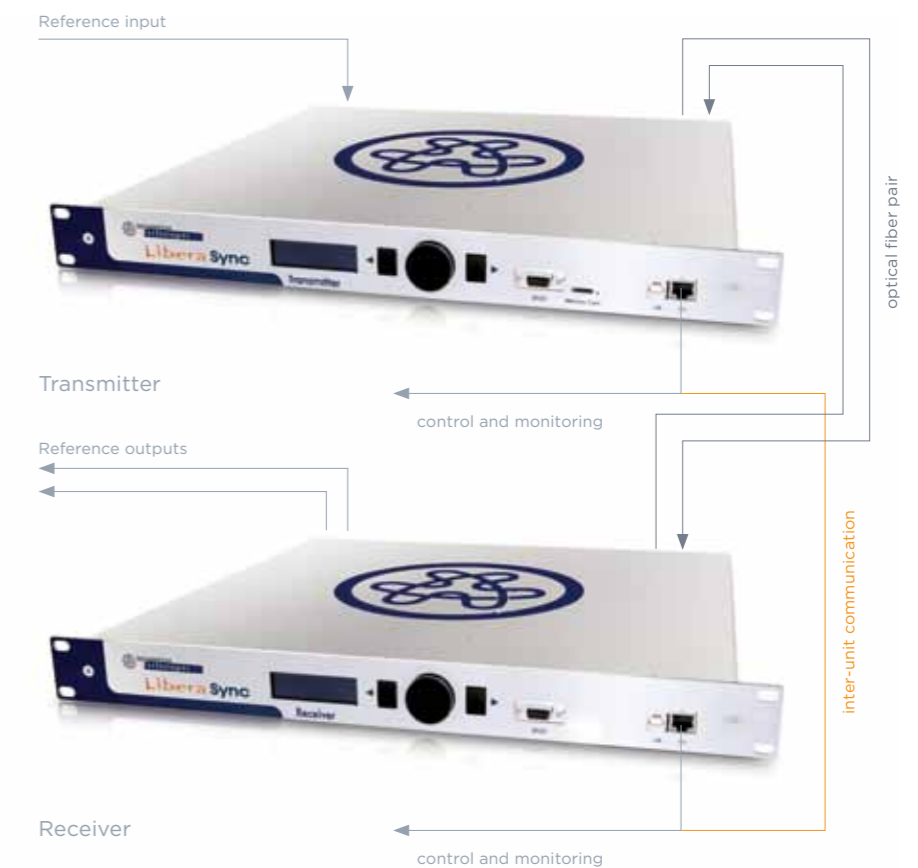
Added jitter performance

- Added jitter: typically 30 fs RMS, guaranteed 50 fs RMS (100 Hz - 10 MHz) @ 500 MHz

Long-term drift performance

- Long-term drift (24h, T = T₀ 32.5C) typically 150 fs RMS, 500 fs RMS guaranteed @ 300 m optical fiber length

Libera Sync assures clock signal distribution with femtosecond (fs) added jitter and fiber drift compensation. It is suitable for 3rd generation light source machines.



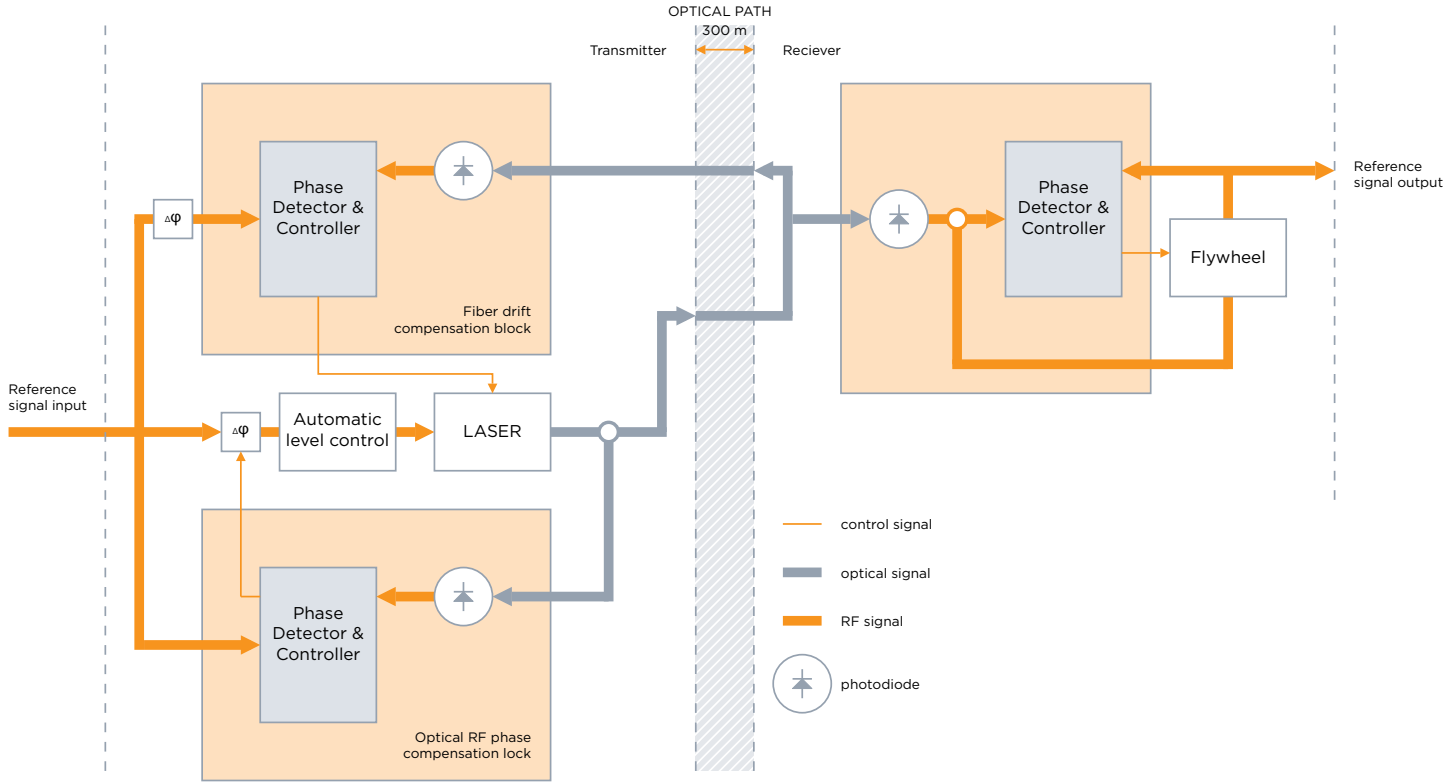
Role In the Accelerator

The system is used for transmitting clock signals from the source, usually a high-performance oscillator, to numerous sites inside the machine. Connection is point to point and requires one pair of Libera Sync devices for each connection.

How Does It Work?

Libera Sync consists of two units - Transmitter and Receiver, which are connected via a pair of commercial telecom optical single-mode fibers. Output from the clock source (usually a high-performance oscillator) is connected to the RF input of the Transmitter. The optical output from one unit is connected to the optical input of the second unit, and this applies to both the Transmitter and the Receiver. The RF signal is converted in the Transmitter unit to an optical signal and transmitted to the Receiver, which then converts the signal back to a standard (single, SMA connector) RF signal.

Exploiting Libera Sync for clock distribution, enables number of instruments in the machine to be driven with a clock signal that has significantly decreased jitter compared to other solutions. Instruments are significantly better synchronized with each other, and this has a strong impact on machine performance.



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