

Libera
Sync

Low-Jitter Clock Distribution System





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.

Libera Sync assures clock signal distribution with femtosecond jitter and fiber drift compensation. It is suitable for FEL and synchrotron light source machines.

Benefits

Femtosecond precision

- excellent synchronization of geographically distributed systems

Simple commissioning and use

- quick set-up and minimal start-up tuning
- reduced cost for the clock distribution system
- reduced operating cost
- remote monitoring of Libera Sync operation
- due to low complexity from the users point of view, easily integrated into the control system
- minimal requirements for environmental stability and conditions

Compensation of fiber drifts

- enables long-term stability

Compact, robust and high-performance device

- small dimension: standard form factor 2U 19"
- low power consumption - with each device consuming less than 50 W

Remote diagnostics

- operation of 2 units spaced at max of 300m apart can be remotely monitored

Range of clock frequencies supported by Libera Sync:

- 1-5 GHz



Transmitter



Receiver

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.

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.

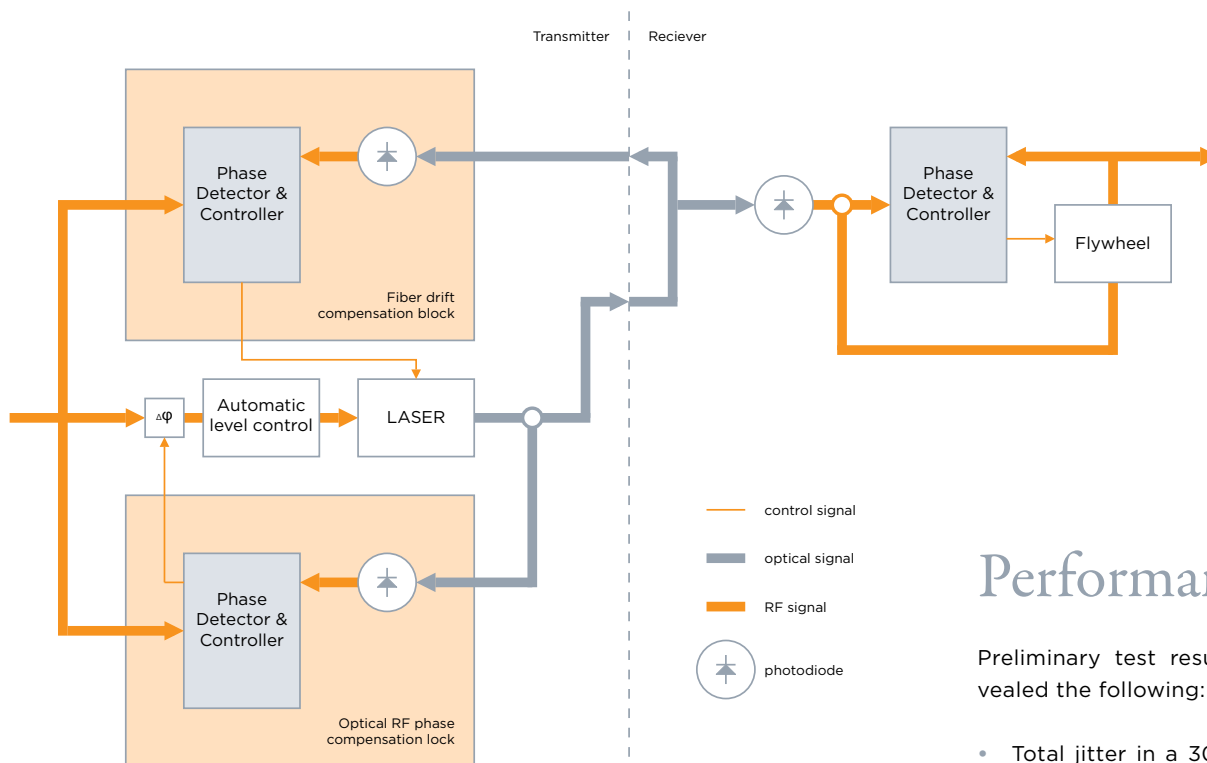
How Does It Work?

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.

Patent pending solution

Libera Sync transfers the clock signal from the master oscillator unit to a remote point with ultra low added jitter. Technical solution that provides low-jitter and fiber drift compensation is patent pending.



Performance

Preliminary test results at Elettra revealed the following:

- Total jitter in a 300 m optical fiber was about 20 fs (femtoseconds) in the range of 100Hz up to 10MHz with high quality oscillator used as a signal source. Libera Sync added jitter was below 10 fs.
- In the range 10 Hz up to 10 MHz, added jitter by Libera Sync is approximately 40 fs

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When your users demand stability.