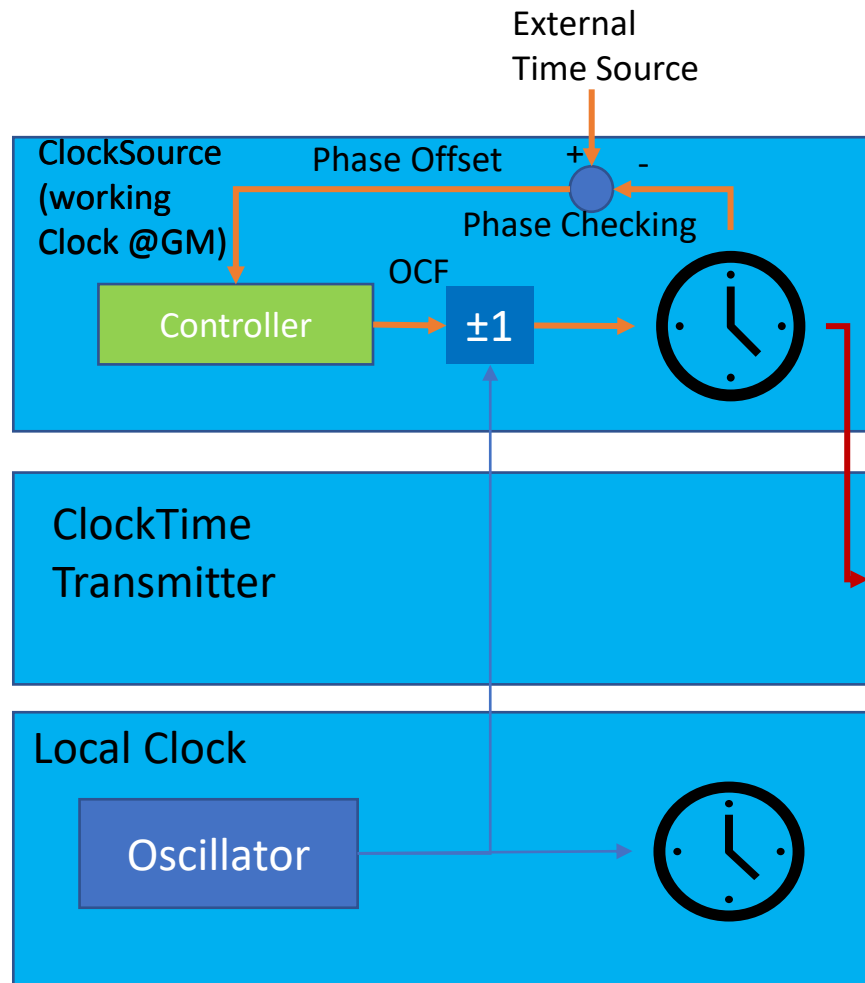


Grand Master Element: Standard Industrial Automation Case with a common Oscillator

Günter Steindl and Dragan Obradovic

Grand Master Element: Standard Industrial Automation Case



The ClockTime-Transmitter (ClockMaster) just forwards the ClockSource Time. The ClockSource has a control loop whose goal is to bring the phase offset to zero.

The drift rate seen by the adjacent Slave element looking at the GM-Time information in the Sync messages is the superposition of the control limit of $\pm 3\text{ppm/s}$ (at the control signal OCF) and the drift of the LocalClock Oscillator of $[-1.35 : 2.12]\text{ppm/s}$. Hence the overall drift can be greater than 5ppm/s !

GM Time in Sync Message

Sync Messages transmit:

- 1) Controlled time as the Master Time
- 2) LocalClock Time for the NRR calculation
- 3) $\text{gmRR}=\text{OCF}$ (the control signal in ppm/s), whose drift-rate is bounded as described above