60802 Sync Applications

Mark Hantel • 07•2021
60802 Addressable Market

• The 60802 industrial profile is currently being targeted to be scalable to accommodate equipment that goes between ambient air temperature and controlled spaces in a Siberian winter, to very controlled clean room conditions in a microchip fabrication facility.

• The initial stated goals of 60802 are to address 80%+ of the industrial market, the “majority use cases”

• It is not always reasonable to expect one specification to meet all market conditions and requirements
History

- Rockwell Automation has been shipping products based on IEEE1588 time synchronization for 12+ years.
- 1 sec sync interval, end-to-end path delay model
- Simple digital frequency compensated clock and software filters
- Low cost crystal oscillators (XO, not TCXO or OCXO)
- Sync accuracy better than +/-1 usec over at least 64 hops
Meeting Time Sync Goals in 60802

• Axiom: Time should be interoperable among all devices grouped together in 60802 networks
• This does not mean one specification for time across all 60802 devices
• There are multiple ways to hit this goal
  • Accommodate 80%+ of use cases and leave others unaddressed for release 1
  • Define separate but interoperable specifications for ccA and ccB
  • Define a solution that will hit the majority of the market and also an “Extended Operating Range” solution
Proposal

• To be inclusive of use cases presented to 60802, develop multiple time profiles for 60802
• Based on end application, not based on conformance class as defined today
• Proposal:

  Base Profile
  - 1us time error over 64 hops
  - 1s sync interval (125ms may be acceptable)
  - 1s pdelay interval (125ms may be acceptable)
  - XO Oscillator
  - Accelerated intervals at startup

  Extended Temperature Profile
  - 1us time error over 64 hops
  - 125ms sync interval
  - 31.25ms pdelay interval
  - <3ppm TCXO/OCXO Oscillator
Thank you!