

XR7 Software

Software extensions for Flexibilis switch products

- ✓ Provide standards-based functionalities required in many of the same applications as HSR or PRP, for example IEC 61850 compliant electrical substations
- ✓ Can be used together with Flexibilis Redundant Switch IP core or with XRS7000 SpeedChips from Arrow
- ✓ XR7 Redundancy Supervision provides HSR/PRP supervision functionality (IEC624-39-3)
- ✓ XR7 PTP provides clock synchronization (IEEE 1588-2008)

XR7 Software products provide standards-based functionality for use in redundant and critical Ethernet networks. The software is field-proven and has already been implemented in hundreds of thousands of devices.

XR7 Software is written in pure C language and is provided as source code. It is available for Linux and NIOS but is easily portable to other operating systems as well. Porting requires changes to be made only to the system-specific interfaces. This allows the common software module containing the core functionality, to remain unchanged.

XR7 Redundancy Supervision

XR7 Redundancy Supervision provides the HSR/PRP supervision feature described in IEC624-39-3 standard (HSR/PRP), which monitors HSR/PRP redundancy operation. If there is a single failure (e.g. link break) in the HSR/PRP network, it cannot be detected by any other protocol or application. That is why it is critical to have HSR/PRP supervision running in a redundant network. XR7 Redundancy Supervision provides this network monitoring information.

XR7 Redundancy Supervision does not include a network management system. The information it provides can be delivered to the network user via a 3rd party network management or monitoring system.

XR7 Precision Time Protocol (PTP)

Time synchronization is critical in networks e.g. for security, system control and problem solving. XR7 PTP is an IEEE 1588-2008 compliant implementation of the PTP for clock synchronization over IP and Ethernet. PTP enables precise synchronization of device clocks in packet-based networks. Devices are automatically synchronized to the most accurate clock in the network. The protocol supports system wide synchronization with minimal network and local clock computing resources.

With XR7 PTP, it is possible to achieve nanosecond class synchronization accuracy. Time synchronization is required e.g. in substations where the accuracy requirement for advanced applications is 1 μ s.

Standard compliance	IEC62439-3:2016 HSR/PRP Redundancy Supervision Protocol
Operating systems	Linux, NIOS
Programming language	C

XR7 Precision Time Protocol (PTP)

Standard compliance	IEEE 1588-2008
Supported profiles	IEC 61850-9-3 IEEE C37.238-2011 PTP default ITU-T G.8275.1 ITU-T G.8265.1
Operating systems	Linux, NIOS
Programming language	C
Clock types	Master, slave and boundary clocks End-to-end and peer-to-peer modes One-step and two-step operations
Other features	Best Master Clock (BMC) algorithm Configurable asymmetry and PHY corrections Adjustable message transmission intervals
When used with Flexibilis switch products	One-step clock support Transparent clock support
Synchronization accuracy	Synchronization accuracy is mostly dependent on the hardware, but nanosecond class accuracy can be achieved.
