APPLICATION OF THE SPACEWIRE PLUG-AND-PLAY PROTOCOL

Session: SpaceWire Networks

Long Paper

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ABSTRACT

The proposed SpaceWire Plug-and-Play (SpaceWire PnP) protocol provides an infrastructure for network management. The protocol defines a set of common features (i.e. parameters and behaviors) to facilitate recognition of and interaction with SpaceWire PnP devices. Network management involves the automatic discovery of arbitrary network topologies, the configuration of device parameters to establish communication, and the timely detection of changes to the network. Network discovery entails the recognition of the type of each device (i.e. router or node) encountered, the identification of key device characteristics, and the mapping of the connections between devices. The facilities provided by the SpaceWire PnP protocol can be used for network discovery and configuration in several different ways depending upon the specific network management approach. The SpaceWire PnP protocol provides mechanisms for arbitration between multiple network managers to prevent collisions and minimize network traffic in dynamic ad-hoc networks. It also provides support for both polled and asynchronous notifications of changes to the network. In addition, it offers standard support for accessing device configuration parameters including those required for Plug-and-Play and those defined by the

ECSS-E50-12A SpaceWire standard (e.g. routing table, logical address, etc.). We describe each SpaceWire PnP feature and give an example of its use in network management.