EtherNet/IP Conformance Testing: On-Ramp to the Development Fast Lane

Conformance testing may seem like a speed bump at the end of your product development cycle, but using ODVA's Protocol Conformance Test Software Tool *during development* can help you instead deliver a robust and conformant EtherNet/IP implementation. This article will show you tips on how to do that.

The first step in Conformance Testing is to define the "Statement of Conformance." This is the STC file, and it contains details about all the CIP objects implemented by your device. The Conformance Test Software uses this information to measure and document:

- Declared CIP functionality that is found to be missing
- Non-declared CIP functionality that is discovered

During development, the STC file can function as a list of requirements to drive automated testing of the device's implementation of EtherNet/IP encapsulation protocol as well as Common Industrial Protocol. As engineering work proceeds, additional device functionality can be added to the STC file so that, when product development is complete, an accurate and complete STC file is ready to deliver with the device to the ODVA Test Service Provider for conformance testing.

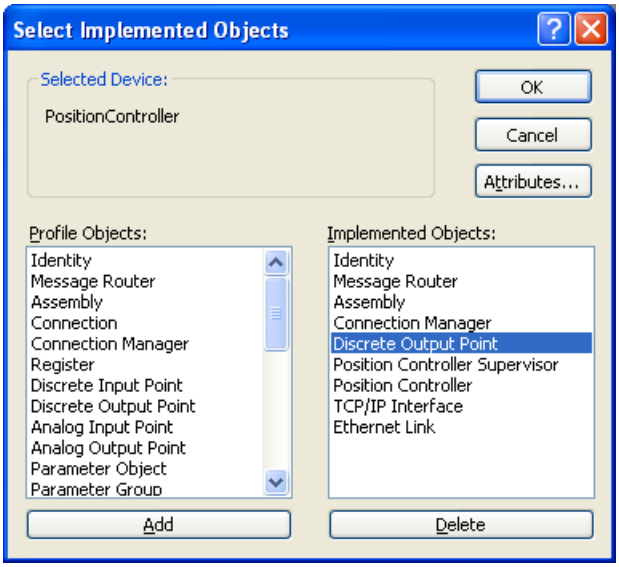

Figure 1 – Statement of Conformance Declares CIP Functionality

The Conformance Test Software provides *Conformance* and *Development* modes. In Development mode, you can select any individual test or series of tests. This allows you to concentrate on aspects of the specific CIP Network specification relevant to the current stage of your device development.

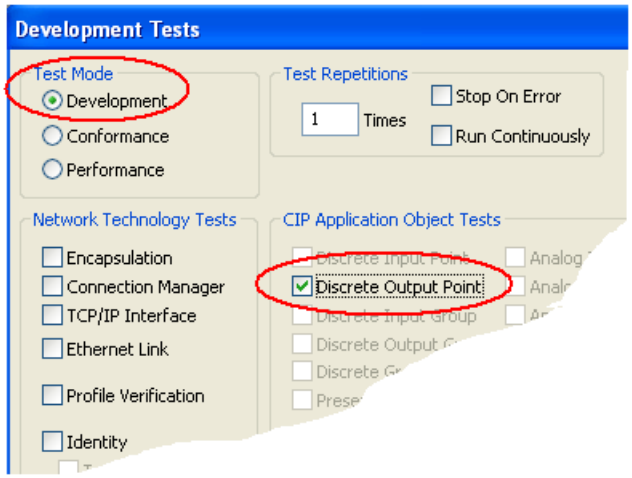

Figure 2 – Use Development Mode for Flexible, Focused Testing of CIP Functionality

Included with the Conformance Test Software is a detailed description of all tests that are performed – this is the Protocol Conformance Test Specification, or PCTS for short. There is a separate PCTS for CIP and for each network-specific adaptation. When conformance testing detects problems during development, the PCTS can provide insight into the actual test expectations and guide defect resolution.

Many EtherNet/IP developers use Wireshark (www.wireshark.org) to capture and analyze device messages. Wireshark combined with ODVA software is a powerful EtherNet/IP development tool. In order to take advantage of this combination, you must align the Wireshark capture with the Conformance Test log using the EtherNet/IP *Sender Context* field.

To do this, first be sure that Encapsulation logging is enabled in the Conformance Test Software (in the Setup dialog). In Wireshark, select Sender Context as a column.

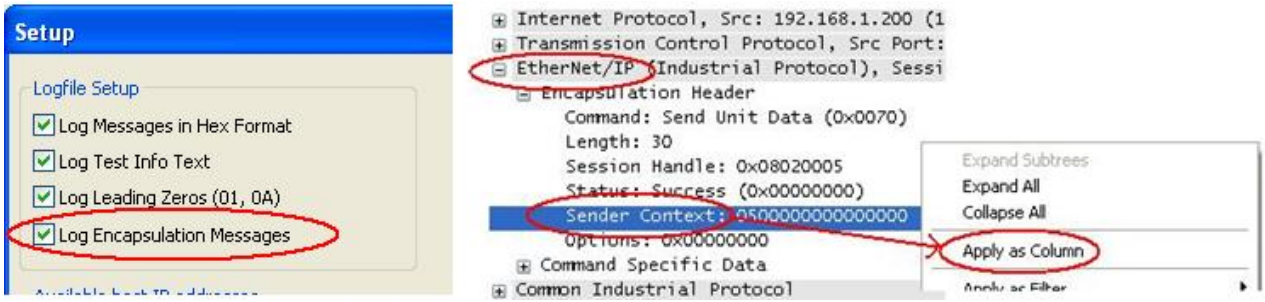

Figure 3 – Configure Wireshark for use during EtherNet/IP Conformance Testing

To correlate a Conformance Test log entry with the Wireshark capture, match the displayed Sender Context:

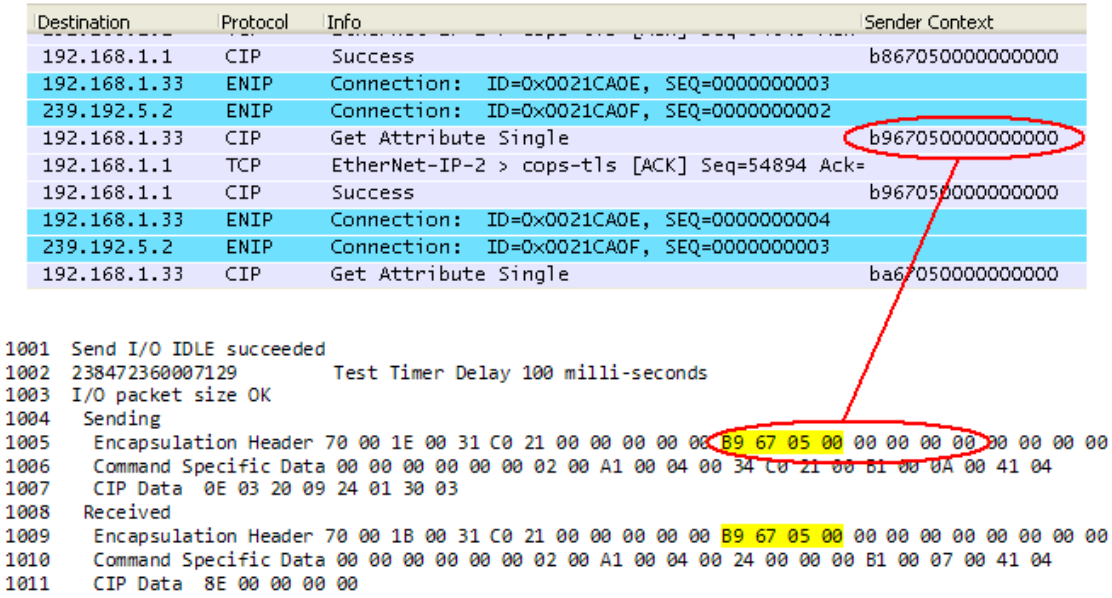

Figure 4 – Use Sender Context to Correlate Conformance Test Log with Wireshark Capture

Sender Context starts at byte offset 12 of the Encapsulation Header. This value can be used directly to search within either the capture (using Wireshark's Find Packet) or in the log file (using the Find command).

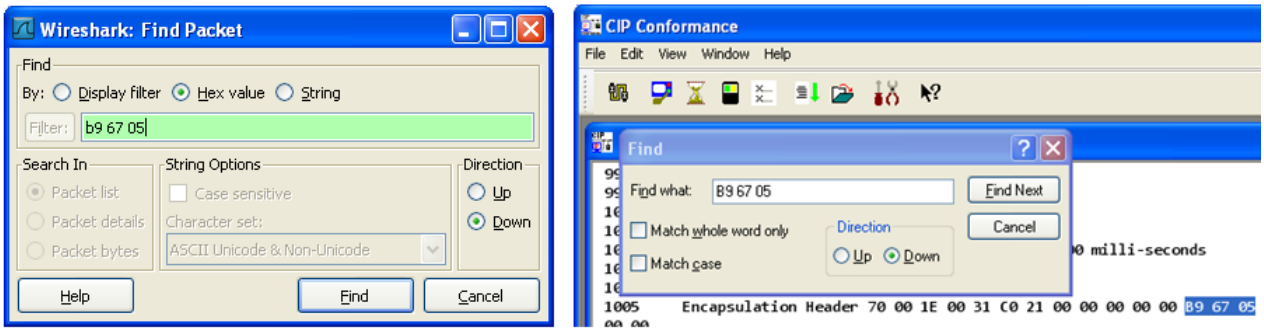

Figure 5 – Quickly Search Log Files and Captures with Sender Context

As you can see, ODVA's Conformance Test Software can be an additional tool to assist your development of conformant CIP devices. K**eep in mind, however, that it is necessary to implement your device to the current CIP Networks Library Specifications**. If you encounter a discrepancy between your internal test results and the specification, please contact ODVA for assistance.

For more information about Conformance Testing or to schedule conformance testing for your device, please see ***CIP Product Compliance*** subtopic ***Conformance Testing Process*** on the ODVA website at www.odva.org.