

Low Power Gigabit Ethernet Transceiver

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Background:

The US Navy utilizes a variety of Unmanned Undersea Vehicles (UUVs) as operation platforms for collection of many different types of underwater data. A major concern with these vehicles is operational endurance: how long it can perform its mission without recharging batteries. Therefore it is important to minimize power consumption in the data collection payload. Efforts are ongoing at the Naval Undersea Warfare Center (NUWC) Newport to develop such systems. The interface between the UUV and payload is often Gigabit Ethernet, which consumes a significant amount of power. In some cases the Ethernet interface consumes more power than the remainder of the sensor system. This must be minimized.

Project Details:

This Capstone project attempts to create a low power Gigabit Ethernet interface in two main phases: Market survey and prototype development/testing. The students will research several different methods to convert a serial data string into GigE messages. This may include GigE specific interface chips, GigE equipped ARM processors, and/or GigE equipped FPGAs. Second, one or more of these methods will be selected to build, code, and test. NUWC will build the prototype board(s) based on circuit diagrams created by Capstone team members. The team will write software/firmware for the prototypes to send simulated data to a PC while measuring power consumption

Development Phases:

- Market Survey
- Method Selection
- Hardware Diagram Development
- Hardware Procurement and Assembly (NUWC)*
- Firmware/Software Design
- Firmware/Software Implementation
- Firmware/Software Verification

-Power Consumption Measurement