

Budget Network Attached Storage Unit

ABSTRACT

This project uses the iMCU W7100 capabilities to connect an IDE Hard Drive to a 100MB/s LAN. The project is intended to be a low-cost solution, only using the core W7100 circuitry and two level-shifting TTL latches to implement the design. The lightweight ATA-Over-Ethernet (ATAOE) protocol is used to move the data over the LAN at high speed with the minimum of software overheads.

PROJECT DESCRIPTION

The ATAOE adaptor operates by connecting a legacy parallel IDE hard drive to the spare I/O of the W7100. The bare minimum I/O for PIO mode is the three address lines, the sixteen data lines, as well as the read strobe, write strobe and chip select lines. The IDE specification supports TTL levels so the 3.3V logic outputs of the W7100 is suitable for directly connecting to the hard drive. However the data lines can be driven at 5V from the hard drive, so a pair of level translating latches were needed to convert between 3.3V and 5V to avoid possible damage to the IC. These latches as well as the connector adaptors form the majority of the additional hardware required.

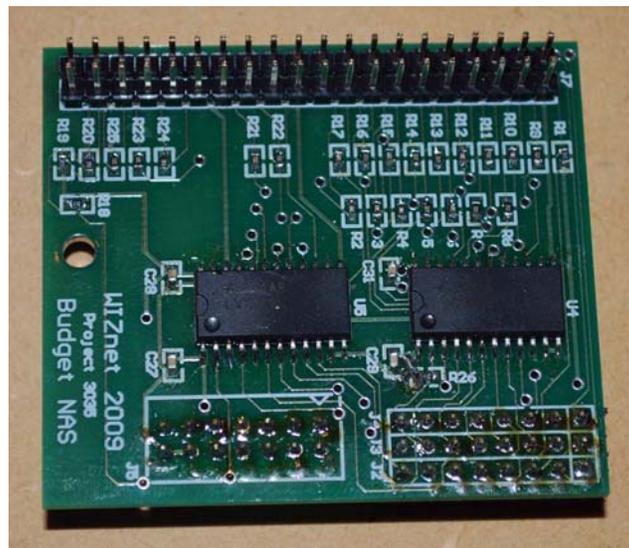


Figure 1. Level Translating Latch PCB with IDE 40-way connector

The software for the ATAOE driver running on the W7100 makes use of the MACRAW mode of socket operation. This mode sees the onboard Ethernet hardware pass unprocessed incoming Ethernet frames to the ATAOE driver.

The ATAOE driver decodes the Ethernet frames and if required, converts them into ATA commands and sends them down to the Hard Drive. Data transfers using ATAOE usually sends two 512-byte sectors at a time, so as to keep the Ethernet packet length below 1500 bytes [2]. Any data coming back from the Hard Drive is packaged into an Ethernet response and sent to the remote end.

PROJECT PHOTOS

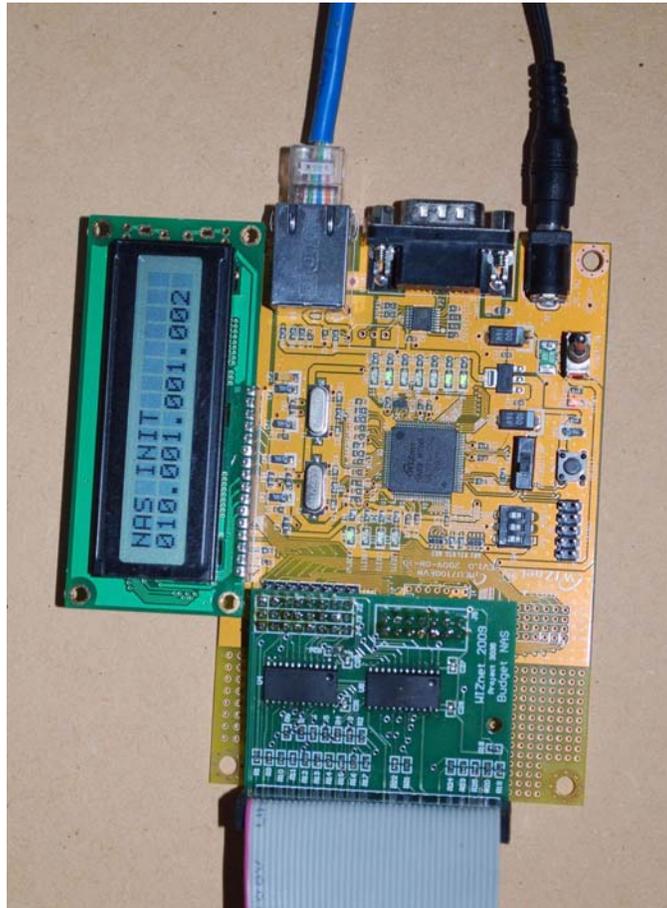


Figure 2. Unit Operating

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Figure 3. Unit Operating with IDE HDD

ADAPTOR SCHEMATIC

