**OXFORD SEMICONDUCTOR**

*Application Note **OXAN 1***
*Customer perception of performance in IEEE 1394 Applications*

## Contents

## Introduction

This application note details the parameters important for customer perception of performance in IEEE 1394 applications. Much attention is given to the maximum performance of any given system. However, in the majority of applications small data block sizes are used and maximum performance will not be achieved.

## Description

In all data transfer operations, optimal performance is achieved when large data block sizes are transferred. Each transaction consists of a protocol stage, a drive spin stage and a fetch data stage. The larger the amount of data transferred in each transaction, the smaller percentage of time is spent on drive spin up and protocol.

In normal operation, the most frequently used applications do not transfer large amounts of data. An example of this is browsing a directory structure. This can be done frequently and transfers, at most, 4k of data per transaction.

Although all companies quote the highest data rate achievable, the customer will rarely see this performance. Their judgement of speed will be based on the speed during normal, small block size performance.

This area has become of concern within the IEEE 1394 community. Protocol changes are being considered to reduce the time spent on the protocol phase of the transaction and so greatly improve small block size performance.

## Optimisation of OXFW911

Oxford Semiconductor has designed the OXFW911 IEEE 1394 to IDE bridge with improved performance in mind.

They have integrated the 16-bit flash memory onto the device to minimise the wait states incurred in accessing the flash. They have also optimised the interaction of the ARM7-TDMI based hardware and the firmware to reduce the relative time spent on the SBP-2 protocol conversion.

## Graphs of OXFW911 Performance

Figure 1 details the performance of the OXFW911 with various block sizes versus the same drive placed on the internal IDE bus. So far these figures for the OXFW911 have been limited by the speed of the drive used for testing, and the bus. These figures will be updated once faster drives are available.

The tests were carried out on a NEC DTLA-307020 20.5GB hard disk using 15-11-2000 firmware. The tests were carried out on a Windows 2000 system using YAPT. The Host was a Dell PIII 800 with 128M RAM.

## Optimal Performance

While testing the OXFW911, it has been noted that several factors influence the maximum speed obtained. The main factors are the operating system used, the drive speed and the OHCI card.

## Conclusion

Customer perception of drive performance is determined during normal use. In most cases the data block sizes transferred are small. Therefore, increased performance at small block sizes will greatly increase the customers' perception of drive speed.

The OXFW911 has been optimised in both hardware and firmware to take full advantage of the ARM7TDMI processor. This optimisation has resulted in excellent performance at small block sizes, this can be better then when the drive is connected internally.
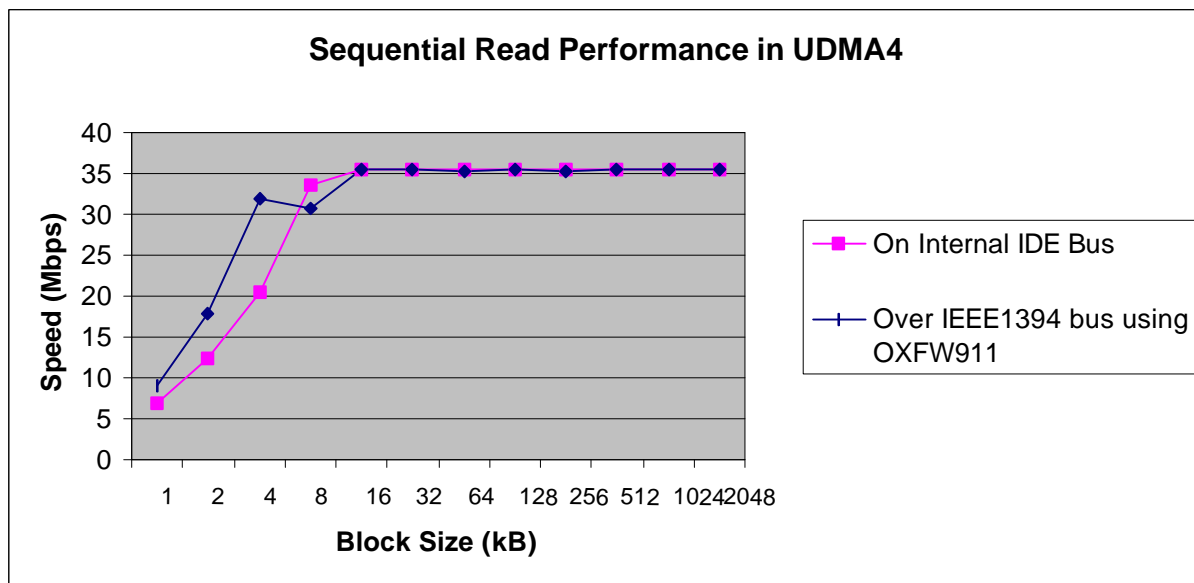.

## Sequential Read Performance in UDMA4

Figure 1 - IEEE 1394 Performance Vs Internal IDE Performance.

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