

TO: ATA-3 Working Group
SUBJECT: Error Detection Using Parity
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The enhanced transfer modes in ATA-2 and those proposed for ATA-3 need a reliable method to detect errors in the data transferred across the cable to verify that it was received correctly and was not corrupted.

This proposal is to add a one-bit parity to the 16-bit ATA word for detecting data errors during reads and writes. This proposal is based on Mode 4 timing multi-word DMA timing. The method of enabling parity is needs to be determined.

The Parity- signal uses the existing IOCS16- signal. Data parity is odd. A low active state indicates a parity bit of 1.

The Error- signal use the PDIAG- signal. If a parity error is detected the receiving device would indicate this by asserting this signal (low active).

If a Error- signal is asserted the transmitting device shall resend the same word of data on the next cycle. The disk drive is expected to retry parity errors indefinitely. The host may terminate the retry of parity errors by reset.

On a read operation the disk drive may negate IORDY to extend the cycle time allowing it to setup for retransmitting the data word. The host may also extend the cycle time by delaying DIOR-.

On a write operation the host may extend the cycle time by by delaying DIOW- allowing it to setup for retransmitting the data word. The disk drive may also negate IOCHRDY if additional time is needed to setup to receive the retransmission.

The basic timing considerations for generating and detecting an error are given in figures 1 and 2. Note that all times are measured at the receiver.

If the time allowed for parity generation is not satisfactory parity could be generated in the data buffer and not when data is gated to the bus. This would require 17-bit wide buffers.

tGr	20 ns	data setup time read
tGw	20 ns	data setup time write
tX1	10 ns max	parity setup time
tX2	30 ns max	parity error detected to Error- signal asserted
tA	25 ns max	maximum time to assert IORDY following IOR-

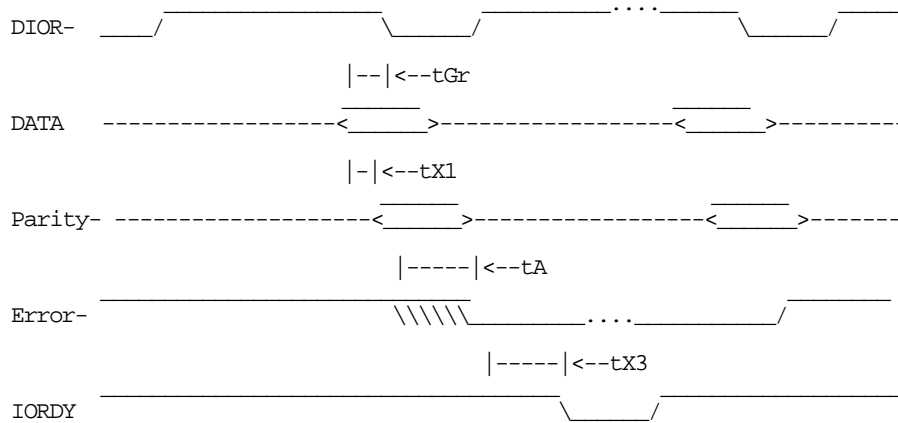


Figure 1 - Read with Parity Error

If a parity error is detected on a read the drive asserts IORDY to allow time to setup for retransmitting the last data word.

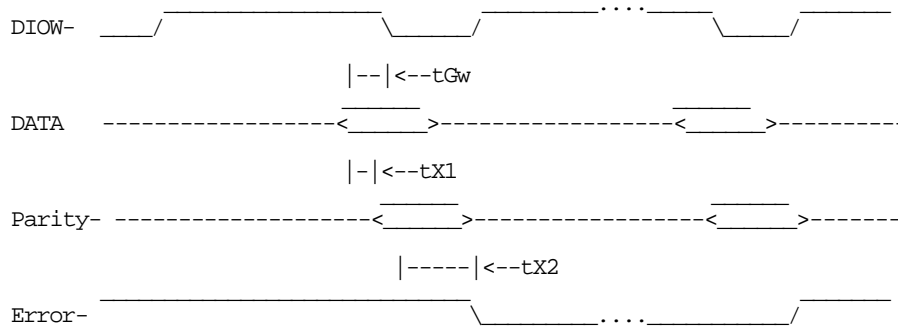


Figure 2 - Write with Parity Error

If a parity error is detected on a write the host extends the cycle time as needed to setup for retransmitting the last word of data.