

Answer on Question#39194 - Math - Other

a 20 kbps device is connected to a processor. the interrupt overhead is 10 microseconds. what is the minimum performance achieved when interrupt initiated data transfer is used instead of programmed i/o?

Solution

Denote by x bytes the length of the data packet, then time in which a packet can be handled is $\frac{8 \cdot x}{20,000} = \frac{x}{2,500}$ s. Therefore, we can calculate the time for an interrupt servicing $\frac{x}{2,500} + 0.01$ s.

$$\frac{\frac{x}{2,500}}{\frac{x}{2,500} + 0.01} = \frac{x}{x+25} = 1 - \frac{25}{x+25}$$

Achieved performance $\frac{x}{2,500} + 0.01$. Supposing $x = 1$, we obtain minimum performance $1 - \frac{25}{1+25} \approx 0.0385$.

Answer

0.0385 or 3.85%