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First the basics based on standard IEEE 802.3:

Fast Ethernet uses 1300 nm wavelength for transmission.
Fast Ethernet transmits the $100 \mathrm{Mbit} / \mathrm{s}$ data stream using a 4B/5B code with $125 \mathrm{Mbit} / \mathrm{s}$ effectively.

To calculate the maximum supported distance you have to consider two parameters: attenuation and dispersion (expressed by bandwidth or bandwidth length product).

Now have a look at the switches. Hirschmann Fast Ethernet transmitters for multimode fibers usually offer 8 dB attenuation budget with $50 \mu$ fiber.

For typical fibers you can assume an attenuation of $<1.5 \mathrm{~dB} / \mathrm{km}$ at 1300 nm . Per connection (connector attenuation) you calculate additonal .5 dB .

Let's have a look at the attenuation:

8 dB budget offered by switch is reduced by .5 dB per connection. $7.5 \mathrm{~dB} / 1.5 \mathrm{~dB} / \mathrm{km}$ makes 5.0 km . That's maximum distance supported for a direct link between two devices due to the attenuation. Additional patch panels between two devices reduce the distance.

Now we have to consider the bandwidth, or correct: the Bandwidth Length Product BLP.
The BLP is used to easily calculate the supported distance limited by the dispersion. The BLP unit either is Mbit/s*km or MHz*km.

You divide the BLP by the bandwidth (speed) used and get the distance.
For example: $500 \mathrm{MHz}^{*} \mathrm{~km} / 125 \mathrm{MHz}=4 \mathrm{~km}$ (use 125 MHz or Mbit/s, both fits for our purposes; the theory behind this is a lot more complex).

Hirschmann switches claim to support a distance of up to 5 km with $50 \mu$ fiber. This is based on the above mentioned attenuation budget and an assumed fiber BLP of more than 750 $\mathrm{MHz} * \mathrm{~km}$, a value exceeded by most of todays fibers.

The minimum of both calculations determines the maximum supported distance.

Now a last remark regarding the standard IEEE 802.3:
This standard demands support of at least 2 km by ports.

This means that a distance of 4 km is according to standard.
It does not mean that the 4 km are beyond the standard.

