More thoughts on Open Fiber Control....

Jonathan Thatcher

jonathan@worldwidepackets.com

History

Originally used by IBM in AS/400 system running SW link at 220 Mb/s

Brought into Fibre Channel with rest of link technology for 266 Mb/s and 1062.5 Mb/s

Fell out of favor in FC because:

- Companies didn't meet timing specs (digital did, but not analog control loops).

- Impossible to build FC-Loops with more than two nodes (degenerate, no?)

- Waiting for the 10 second timer was a pain

NOFC (non-OFC) implemented first at 1062.5

Why OFC In The First Place?

With OFC, the link could run at a power level higher than eye safety limits

- **There is no practical eye safety limit while the fibers are plugged into the transceiver! No radiation, no limit.**

- **Excess laser power was easy to come by**

- **Using the extra power budget allowed for less expensive optics (looser Tx tolerances; lower Rx sensitivity)**

How would it be done for "AE"

Firstly, we would not have to use timing. We could use optical power instead.

In multilaser systems use this simple algorithm:

- **If there is no Rx input light, only turn on one laser (assumes that the one laser inherently meets safety specifications)**

- **If there is Rx input light (any channel or color), turn on all lasers**

What about PAM?

Change algorithm to:

- **If there is no Rx input light, only turn on the lowest power code (assumes that this level inherently meets safety specifications)**

- **If there is Rx input light, enable all code levels**

What about Serial?

Serial is only slightly harder.

Use a method similar to PAM: Power up into a lower level bias and then follow the same rules.

What is the drawback?

It's not the logic. That would be less than 50 gates, even for serial.

Depending on how the additional optical budget would be utilized, the receiver MIGHT have to tolerate a larger dynamic range. But the receiver will probably have gain control anyway.

Who wouldn't like it?

Companies that are already running the laser at the max (heat, reliability, roll-over on the power curve).

But, implementation could be optional.

As long as the Rx is specified to tolerate the extra power, the use of this kind of OFC could be purely optional!!!

Each company could optimize according to their needs and still interoperate

Are there any issues?

Just one:

An optical transceiver could be faked into powering into a high power state.

This was true for the timing based OFC also, but it was more difficult in that case.

If this is a problem to the laser safety people, the work around is to include a simple handshake. This would not be a big deal. But, it would be a complication.