Author

Mike Gilmore

Senior Partner of The Cabling Partnership (www.it-cabling.com)
Managing Director of e-Ready Building Limited
P.O.Box MT65, Leeds, United Kingdom. LS17 8YD.
e-mail: mike.gilmore@btinternet.com
Telephone: +44 (0) 113 232 3721, Fax: +44 (0) 113 293 2632

See last page for biographical details

The Cabling Partnership

The IT cabling infrastructure division of e-Ready Building Limited

The IT cabling consultants

e-Ready Building Limited
Next generation IT infrastructures

Dark Fibres have Dark Secrets

NETWORKING+ Copy date: October 2005

In the last issue of Networking+ we took the opportunity to introduce the work of the Fibreoptic Industry Association (FIA) and to highlight some of the key changes in our industry over the past few years. In comparison, this article focuses on a very specific issue which may become a contentious issue over the next few years. As there are already early indications of problems for some users this can be taken as “heads-up” warning.

The topic is one that is much misunderstood – both in it’s definition and it’s implementation – “dark fibre”.
What is dark fibre? Arguably it is any optical fibre that is not attached to transmission equipment. Others use the term to describe an optical fibre that is not terminated upon initial installation – awaiting further work before it can be used. However, for the purposes of this article dark fibre is optical fibre that is provided by a third party to enable future telecommunications connections between two premises. In this sense dark fibre ceases to be dark once the connections are made by the attachment of the relevant transmission equipment at each end.

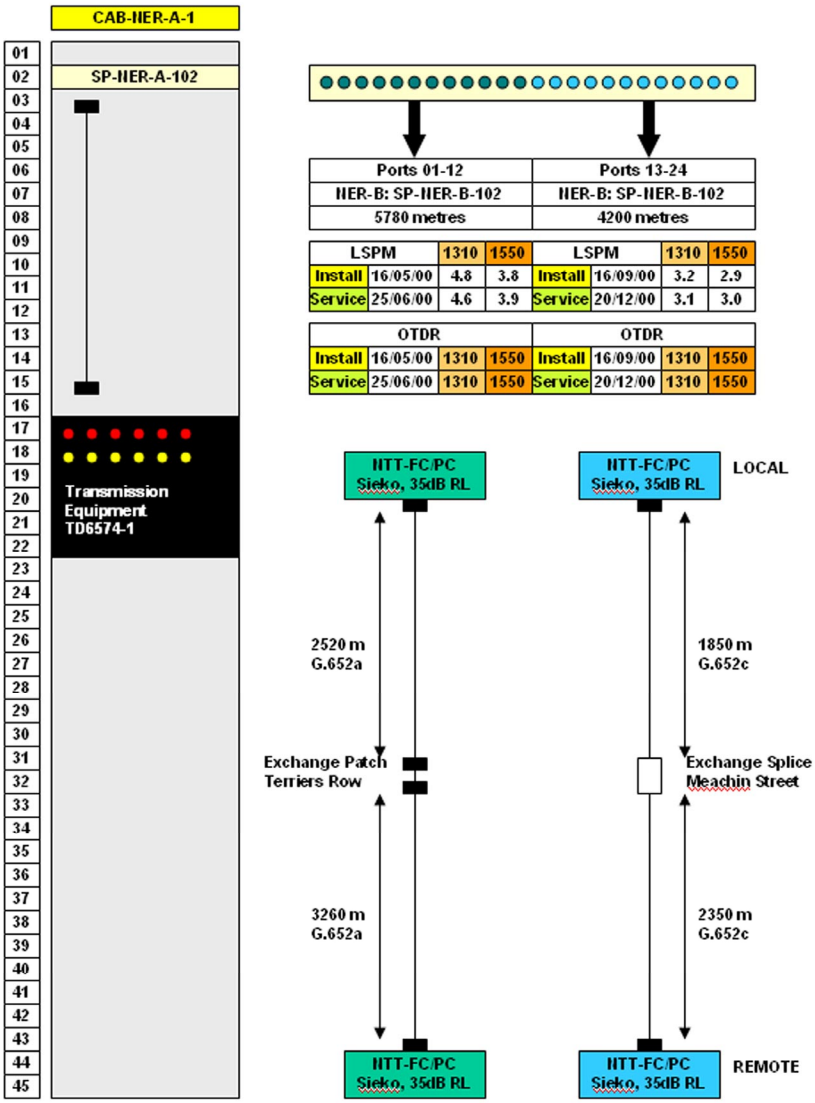
Many organisations throughout Europe’s major cities have leased, rented and even purchased dark fibre solutions to meet their corporate needs. The worrying aspect is how few of them actually know what that dark fibre comprises. You may be wondering why this is important – the main reason is that dark fibre lies in a difficult contractual area. It is not wholly controlled by the user (as an internal cabling infrastructure and attached equipment would be) but neither is it the regulated responsibility of a service provider (as a domestic telephone connection might be). The end-equipment attached to dark fibre is the users responsibility but the connection is someone else’s. The resulting and all-important quality of service is therefore a complex mix of responsibilities.

There are three critical aspects to the specification of a dark fibre link: the type of optical fibre, its length and the performance of the resulting connections.

Most third party optical fibre between buildings is singlemode. However, there is no such thing as “plain vanilla” singlemode – there are thirteen different ITU specifications and these differences are mirrored in European product specifications. All the variants have different properties and have been designed to do different jobs ranging from sub-sea long-haul connections and core networks to smaller scale metropolitan area networks.

Although most equipment connected to dark fibre would not really care whether it was ITU G652.a or ITU G655c optical fibre, the losses created at joints and connections between these optical fibres can be dramatically affected. Furthermore, the type of equipment being used is becoming increasingly complex with wavelength division multiplexing being offered by many equipment vendors. The capacity of an optical fibre to accept WDM technology depends upon its type and the associated transmission properties.

I hear you cry “what’s the problem - we just need to ask the dark fibre provider for details of their link and the equipment guys for their demands” – at which point I respond – “good luck”. In many cases the dark fibre provider will not know the detailed contents of the cabling and the equipment vendor’s salesperson (sorry - Account Manager) will tell you with great authority that “good old singlemode“ is all you need. He or she may be right for that particular type of equipment – but they may not be right in perpetuity as equipment demands change.



Moving on to the length of the installed links – links plural because most connections have built-in resilience. I have known back-up routes to be twice the length of the primary link resulting in back-up service failure at the most critical time possible. 1Gb/s and 10Gb/s Ethernet have well defined maximum ranges, even on singlemode optical fibre, and although going beyond the standards is possible it can come at a heavy price.

The longer the link, the greater the probability of joints (splices) and even exchange connections which increase the loss experienced by the signals and in some cases the back-up routes fail due to a combination of loss and length. It is very important to obtain from the dark fibre provider a full and detailed performance characterisation of the links being offered. As links can be re-configured by the provider as part of regular maintenance, the initial functional performance has to be monitored to ensure that degradation has not occurred.

The final issue of importance is the specification of the connections presented at either end of the installed dark fibre. Singlemode transmission equipment cares deeply about unwanted reflections from these connections and it is vital to ensure a “conformant” connection set at each end.

So if you have dark fibre as part of your network, how much do you really know about it? Equally importantly, how much does your provider know about it? Don’t delay – check it out. It costs nothing but your time but can save a fortune later.

The FIA has a wide range of Technical Support Documents aimed to assist users in all areas of specification and operation of optical fibre cabling. If you wish to access the resources provided by the FIA go to www.fia-online.co.uk. Enquiries can be e-mailed to jane@fiasec.demon.co.uk.or, alternatively, you can contact the FIA Secretariat in 01763 273039.

The Cabling Partnership
P. O. Box MT 65, LEEDS, West Yorkshire, LS17 8YD, England
Telephone: +44 (0) 113 232 3721 Fax: +44 (0) 113 293 2632

Biography

As the Technical and Standards Director of the UK Fibreoptic Industry Association, Mike is heavily involved in the development of training and competence standards for the fibre installation industry and sets down policy in this area. In addition he chairs the audit and arbitration committees for the FIA. His book "Fibre optic cabling; theory design and installation practice" published in 1991 remains a reference for both experts and entrants into this field.

In the UK, Mike is Chairman of TCT/7, the BSI technical committee responsible for the three panels on telecommunication cabling. He also chairs two of these panels (TCT7/-/1 and TCT7/-/3). TCT7/-/1 acts to assist development of European and international standards for telecommunications cabling. TCT7/-/3 manages the implementation of European standards and others in the UK.

At the European level Mike is Convenor of CENELEC TC215 Working Group 1, the group that controls the development of European standards for the design and installation of telecommunications cabling. In the international arena Mike is Convenor of ISO/IEC JTC1 SC25 WG3 IPTG, a standards committee working on generic cabling for industrial premises (ISO/IEC 24702).

Mike is a regular speaker at seminars and conferences in all five continents. He has provided the keynote address and opening presentation in many conferences in the UK, Germany and the Netherlands. His seminars, providing regular updates on the progression of cabling standards are particularly well attended and are operating in the UK and continental Europe.