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CORDS, DAMNED CORDS AND STATISTICS

by
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for Networking+ (August 2006)

The latest draft of EN 50173-1 defines a cord as a "cable unit or element with a minimum of one termination". Of course we have to look for the definition of a "*cable unit*" and a "*cable element*". Do not fear - a "cable element" is, for the purposes of this article, a twisted pair or an optical fibre: and a cable unit is a logical group of cable elements i.e. a four pair balanced cable or a cable containing one or more optical fibres. The definition of a cord therefore covers everything from a simple optical fibre pigtail, as used to terminate a cable, to the complete range of crossconnect, equipment and test cords.

So what is so important about "cords" that justifies 800 words in Networking+ in the middle of August? Quite simply, according to statistics, they are the primary cause of system failure. Yet they are purchased as the most basic of commodities with little regard paid to their quality and they are treated with great disdain during their lifetime - until things start to go wrong.

For copper cabling, we may be dimly aware that the main source of system failure is "noise". That noise may be seen as NEXT, ELFEXT, return loss or even alien crosstalk on a "receive signal" pair. To avoid such noise we buy cords of a certain Category to match our installations. However, few of us realise that a Category 6 cord is more than two plugs crimped on the end of a Category 6 cable - there are specifications for Category 6 cords that are difficult to meet without the use of sophisticated manufacturing controls. Not that it really matters for most of us - we tie any excess length in knots and push it into every available orifice in our cord management systems.

With regard to optical fibre, installers purchase a range of pigtails, crossconnect cords (a patch cord is the special case of a crossconnect cord which has the same connector at both ends), equipment cords and test cords. Users will purchase crossconnect and equipment cords as the need arises. Users generally treat optical fibre cords quite carefully: may be because they think that as "optical fibre is made of glass it is bound to more fragile". Also the number of optical fibre cords is comparatively low and their are better options for their accommodation. Either way, optical fibre cords are generally better treated than their copper counterparts.

In all cases the cords used will be of an optical fibre geometry (core/cladding diameter) and transmission performance to match the installation. However, there are changes on the horizon that significantly change they way we purchase and select optical fibre cords. Unfortunately, those changes are going to invisible to the naked eye and we will have to become much more rigorous in terms of administration if we are going to maintain the operation of future optical fibre communications systems.

In the last month, we have seen the publication of ISO/IEC 14763-3 which requires the termination of test cords to be of "reference" quality. This is the first "invisible" change, applicable to both multimode and singlemode cabling, which separates test cords from "installation" cords.

There are more significant changes that can, and do, affect system performance using multimode optical fibre. Usrs forced to use 1000BASE-LX equipment over low bandwidth multimode optical fibre have been advised to use "offset" equipment cords to obtain the maximum transmission distance. "Offset" cords ensure that light is launched off-centre into the installed cabling. They are uni-directional and must only be used at the transmitter. The use of "offset" cords is being extended with the imminent publication of the IEEE 802.3aq standard which allows 10 Gigabit Ethernet to operate over lengths in excess of 200 metres using low bandwidth multimode optical fibre.

No one has considered the need to maintain the “offset” condition through a crossconnect. This may be because both 1000BASE-LX and 10GBASE-F are primarily backbone networks based on a two-connection channel model. However, the FIA is aware of organisations building innovative new transmission systems that push the boundaries of multimode transmission to new heights using existing cabling. These systems not only demand the use of “offset” equipment cords - they also demand the use of high concentricity terminations at all equipment panels and on all crossconnect cords in order to maintain the off-centre launch condition throughout a multiple connection system.
Similar to the situation of a “reference” test cord, high concentricity terminations will be outwardly no different to a standard termination but the failure to use them would render the performance of such high demand transmission systems less than optimal.

In order to provide guidance to this complex situation the FIA are producing a Technical Support Document designated “TSD-2000-2-3: Optical Fibre Cabling: Components: Cords”, the document will be completed in October 2006. If any readers which to have advance information regarding this or any other issues raised by this article they should contact the FIA Secretariat (jane@fiasec.demon.co.uk) or the author.

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.