



SIN 429

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Suppliers' Information Note

For The BT Network

BT LAN Extension Service 10000 Service Description

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1. Introduction

This Suppliers' Information Note (SIN) describes the BT Local Area Network (LAN) Extension Service 10000 (LES 10000). The SIN provides information about the service for use by Customer Premises Equipment (CPE) manufacturers and developers.

Note. Whilst still supported for existing customers, this product has been withdrawn for new sale. Contract resigns and external shifts are no longer allowed.

The BT Global service LES 10000 described in this SIN is now known as EES 10000 and is delivered using Openreach Wholesale End to End Extension Service 10000 (WEES 10000), which is described in SIN 460. However, this SIN 429 remains available for reference.

2. Service Outline

The LES 10000 service operates at a speed of 10.3125 Gbit/s for 10GBase-LR (10 Gigabit Ethernet LAN PHY) and 9.95328 Gbit/s for both STM-64 (10 Gigabit SDH) and 10GBase-LW (10 Gigabit Ethernet WAN PHY).

The LES 10000 service can be used as an STM-64 SDH transport service or used to interconnect Local Area Networks incorporating a 10 Gigabit Ethernet backbone.

The service is available as a protected LES 10000A service and an unprotected LES 10000B service:

- LES 10000A

The LES 10000A service is protected using dual fibre routes for additional route resilience. An optical line protection switch provides protection against loss of service due to network fibre breaks. The line protection is completely automatic.

- LES 10000B

The LES 10000B service is the unprotected version of the LES 10000 service. However if protection against both network fibre breaks and card failures is sought, 2 LES 10000B services may be used. The use of 2 LES 10000B circuits to provide additional resilience will result in 2 customer interfaces being presented at each site.

A typical LES 1000 service is shown in Figure 1.

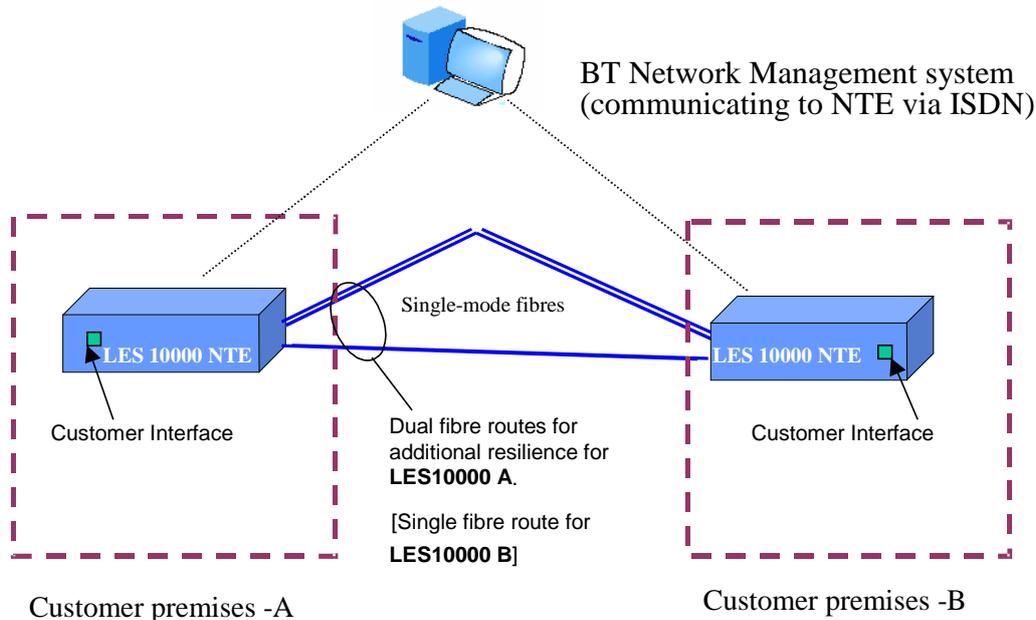


Figure 1. Typical LES 10000 configuration

3. Technical Specification

The LES 10000 NTE support the following types of customer interface:

1. 10.3125 Gbit/s 10 Gigabit Ethernet LAN PHY
10GBase-LR optical presentation with IEEE 802.3^[1] 10 Gigabit Ethernet framing.
2. 9.95328 Gbit/s 10 Gigabit Ethernet WAN PHY
10GBase-LW optical presentation with IEEE 802.3^[1] 10 Gigabit Ethernet framing.
3. 9.95328 Gbit/s STM-64 SDH
S64.1 optical presentation conforming to ITU-T Recommendation G.691^[5] and G.707^[6]

The LES 10000 NTE does not support conversion between the three interface types listed above. The same customer interface type must be presented at each end of a LES 10000 link.

3.1. 10Gig Ethernet LAN PHY and WAN PHY

10 Gigabit Ethernet conforms to the IEEE 802.3ae^[4] standard.

The interface is the Network Termination Point (NTP), i.e. the point of connection between the BT Network Terminating Equipment (NTE) and the CPE interface. The Customer Interface consists of a pair of SC/PC type fibre interface ports (transmit and receive). The customer provides the fibre patch connectors between the NTE and CPE; the maximum fibre length is shown in Table 1.

The 10GBase-LR and 10GBase-LW type interface is as specified in the 10 Gigabit Ethernet IEEE 802.3ae^[4] specifications. Attention is drawn to the Intellectual Property Rights (IPRs) set out in the preface of this agreed International standard. It is the responsibility of the CPE supplier to ensure that they have the necessary rights from the owner of the IPR. The IPR owner has stated that they are

willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world.

Protocol	10 Gigabit Ethernet IEEE 802.3ae ^[4]
Line Rate	10.3125 Gbit/s for 10GBase-LR (LAN PHY) and 9.95328 Gbit/s for 10GBase-LW (WAN PHY)
Maximum Bit Error Rate	10 ⁻¹²
Power Requirement	See Section 4.2
Customer Fibre Connector	SC/PC type
Customer interface Fibre (<i>Customer provided</i>)	Single-mode 1310nm, 9/125 micron
Customer interface Fibre Maximum Delivery Distance	10km from NTE's 10GBase-LW or 10GBase-LR port
Operating Temperature	5° to 40° C
Laser Safety	Class 1 under all conditions as per IEC 825-1 ^[2]

Table 1. 10 Gigabit Ethernet LAN and WAN PHY NTE technical specification

3.1.1. Network Fibre Break

In the event that there is a network fibre break, the customer interface will shut down if it is operating with customer equipment using a 10GBase-LR interface. This will be seen on customer equipment as a LOS (Loss of Signal) condition.

Customer equipment using a 10GBase-LW interface will see MS-AIS generated at each end of a LES10000 link in the event of a network fibre break, in accordance with IEEE 802.3ae^[4]. The fault propagation behaviour of the NTE customer port operating in 10GBase-LW mode may be changed from generation of MS-AIS to generation of LOS (Loss of Signal) by special request.

3.1.2. Frame Size

The minimum and maximum Ethernet frame size supported by the LES 10000 service is determined by the customer's equipment not the LES 10000 NTEs. The LES 10000 service can support any frame size supported by the customer's equipment.

3.2. STM-64 10 Gigabit SDH

The STM-64 interface conforms to ITU-T Recommendation G.707^[6] and G.691^[5].

The interface is the Network Termination Point (NTP), i.e. the point of connection between the BT Network Terminating Equipment (NTE) and the CPE interface. The Customer Interface consists of a pair of SC/PC type fibre interface ports (transmit and receive). The customer provides the fibre patch connectors between the NTE and CPE; the maximum fibre length is shown in Table 2.

The STM-64 S64.1 interface is as specified in ITU-T G.691^[5] recommendations. Attention is drawn to the Intellectual Property Rights (IPRs) set out in the preface of this agreed International standard. It is the responsibility of the CPE supplier to ensure that they have the necessary rights from the owner of the IPR. The IPR owner has stated that they are willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world.

Protocol	G.707 STM-64 according to ITU-T G.707
Line Rate	9.95328 Gbit/s
Maximum Bit Error Rate	10 ⁻¹²
Power Requirement	See Section 4.2
Customer Fibre Connector	SC/PC type
Customer interface Fibre (<i>Customer provided</i>)	Single-mode 1310nm, 9/125 micron
Customer interface Fibre Maximum Delivery Distance	10km from NTE's customer port.
Operating Temperature	5° to 40° C
Laser Safety	Class 1 under all conditions as per IEC 825-1 ^[2]

Table 2. STM-64 customer interface NTE technical specification

3.2.1. Network Fibre Break

Customer equipment using an STM-64 interface will see MS-AIS generated at each end of a LES10000 link in the event of a network fibre break, in accordance with ITU-T G.707 ^[6].

The fault propagation behaviour of the NTE customer port operating in STM-64 mode may be changed from generation of MS-AIS to generation of LOS (Loss of Signal) by special request. The generation of the LOS condition is achieved by shutting down the customer port on the LES 10000 NTE.

3.2.2. Transparency

The LES 10000 service is a physical layer transport with a high level of transparency. Where compatibility issues are encountered that result in the B1 byte being incorrectly reported, a completely transparent option can be enabled on the interface. The only requirement of the interface operating in transparent mode is that the customer signal operates at 9.95328 Gbit/s.

This mode of operation will not generate MS-AIS in the event of a network fibre break (but instead shutdown the customer port). In either transparent or standard mode, the customer signal is transported transparently by the LES 10000 NTE.

4. Physical Arrangements

4.1. Physical Location of Connectors

The User–Network Interface (UNI) is located at the connector on the BT Network Terminating Equipment (NTE) with a connector on the Customer side as described in the relevant part of Section 3 of this document.

4.2. NTE Power Supply Requirements

The NTE is locally powered and will require a local mains 50 Hz AC supply. It will be mounted in accordance with standard BT practices in agreement with the customer.

Where the NTE is powered by a customer provided –50 Volts, the NTE will be supplied with a connection lead that will be presented as wires only. As power supplies can vary slightly in output voltage and characteristics, the NTE will function with customer provided power supplies which are in accordance with the British Telecom Network Requirement, (BTNR) 2511 ^[3].

5. Service Availability and Tariffs

For further information on service availability and tariffs please contact:

David Midson

BT Global Services

Telephone:- 01205 356390

Alternatively please contact either

- Your companies BT Account Manager.
- For Personal customers, BT Sales 0800 800150 for product and service information, sales and rental enquiries.
- For Business customers, BT Sales 0800 800152 for product and service information, sales and rental enquiries.

Information may also be obtained from the Data Connect Helpdesk, for which contact details are given at <http://www.btplc.com/sinet/>

6. References

[1]	IEEE 802.3, Standards for Local Area Networks: CSMA/CD Access Method
[2]	IEC 825-1, International Electrotechnical Commission (IEC) Standard – Safety of Laser products Part 1
[3]	BTNR 2511 - Interface of telecomms equipment with a nominal 48v negative dc power supply
[4]	IEEE 802.3ae, IEEE standards for 10 Gigabit Ethernet in the LAN/WAN, 2002
[5]	ITU-T Recommendation G.691 Optical interfaces for single channel STM-64, STM-256 and other SDH systems with optical interfaces
[6]	ITU-T Recommendation G.707 Network node interface for the synchronous digital hierarchy (SDH)

For further information or copies of referenced sources, please see document sources at <http://www.btplc.com/sinet/>

7. Abbreviations

BT	British Telecommunications plc
CPE	Customers' Premises Equipment
CSMA	Carrier Sense Multiple Access
IEC	International Electrotechnical Commission
IEEE	Institute of Electronic and Electrical Engineers [USA]
IPR	Intellectual Property Right
LAN	Local Area Network
LOS	Loss of Signal
MS-AIS	Multiplex Section – Alarm Indication Signal
NTE	Network Termination Equipment
NTP	Network Terminating Point
SC/PC	Subscription Channel / Physical Contact
PHY	Physical Layer Device
SDH	Synchronous Digital Hierarchy
STM	Synchronous Transport /Transfer Mode
SIN	Suppliers' Information Note [BT]
UNI	User-to-Network Interface
WAN	Wide Area Network

8. History

Issue	Date	Revision changes
1.0	23 June 2004	
1.1	28 October 2005	Data rates in clause 3 corrected to align with Tables 1 & 2. Editorial changes.
1.2	30 October 2007	Withdrawal of product.
1.3	20 May 2009	Noted that the service is now delivered using Openreach Wholesale End to End Extension Service 10000 (WEES 10000), as described in SIN 460.
¼	August 2014	Change SINet site references from http://www.sinet.bt.com to http://www.btplc.com/sinet/

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