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Suppliers' Information Note

For The BT Network

BT MetroNetWave Service Service Description

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1. Introduction

These notes describe the BT MetroNetWave product. It also provides information about the service for use by Customer Premises Equipment (CPE) manufacturers and developers.

This service is not available for new supply.

2. Service Outline

2.1. General

MetroNetWave is a point to point wavelength service delivered over a BT provided customer private network (three or more sites) utilising dense wave division multiplexing, - offering very high bandwidth connectivity, up to 2.5Gbit/s per wavelength. The service allows the transport of the following services: -

- FDDI
- ESCON
- Gigabit Ethernet,
- Fibre Channel,
- STM-1
- STM-4
- STM-16
- FICON
- ATM-155
- ATM-622
- Fast Ethernet

Video in the following format

- DVB ASI,

The MetroNetWave service will be offered in discrete wavelengths, equipped with multiple channel interfaces per wavelength up to a maximum bit rate of 2.5Gbit/s per wavelength.

MetroNetWave is delivered via the PMM Multiplexer, and the Flexible Multiplexer. The PMM will provide the 2.5Gbit/s DWDM ring, with the Flexible Multiplexer offering efficient wavelength use, by multiplexing up to 8 optical client channels into a single 2.5Gbit/s channel. The PMM can be configured for either standard (PMM-S), or extended (PMM-E) rings:

- PMM-S
 - 20 Protected 2.5Gbit/s wavelengths
 - Maximum circumference up to 25Km (depending on survey)
- PMM-E
 - 32 Protected 2.5Gbit/s wavelengths
 - Maximum circumference up to 125Km (depending on survey)

Wavelengths will be multiplexed together at a customer site such that multiple wavelengths can share a single pair of fibres into the customer's premises. Reach per wavelength will be distance-limited dependant on the ring type PMM-E, or PMM-S. Customers may, if and when they wish, upgrade their MetroNetWave service to a maximum of 32 protected wavelengths for PMM-E rings and 20 protected wavelengths for PMM-S, with up to 8 client channels per 2.5Gbit/s channel, by insertion of additional cards, and or filters. Wavelength upgrades may require a protection switch depending on configuration.

Two pairs of fibres from customer sites will provide the standard MetroNetWave service. These fibre pairs will be diversely routed where possible.

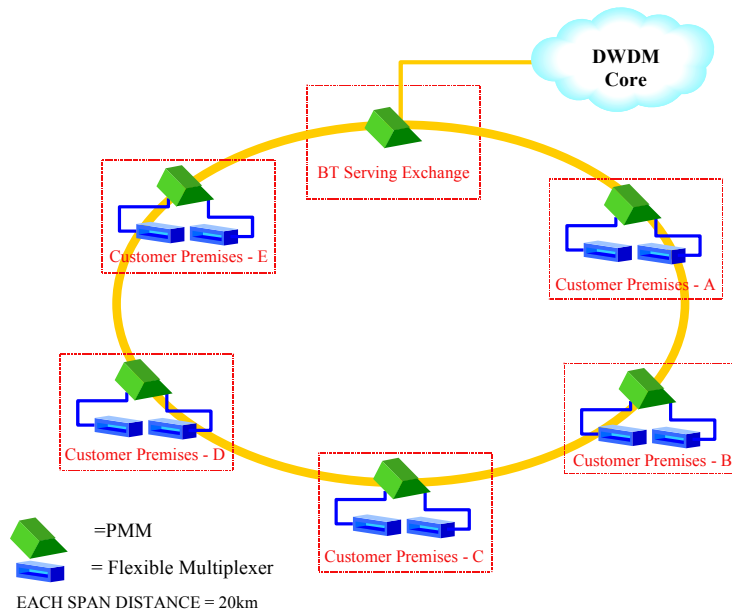


Figure 1 Typical MetroNetWave service configuration

For enquiries concerning connection availability between particular sites and for further information on the MetroNetWave service please contact the Advanced Data Services Helpdesk, details available at: <http://www.sinet.bt.com/usenum.htm>

2.2. Applications

It is intended that customers will use this service for the interconnection of:

- switched data services such as ATM 155, and 622 Mbps;
- data centre services such as ESCON, Fibre Channel and FICON;
- LAN services such as fast ethernet, and gigabit ethernet.

2.3. Geographical Availability

All major cities in the United Kingdom.

3. Customer Interface

Customer interfaces that will be offered are presented via either the PMM or Flexible Multiplexer. The PMM has a single transponder card type that supports the various client interfaces on single-mode fibre. The Flexible Multiplexer has three types of Optical interface card that can be utilised. Each card supports a single client interface.

Interface Card	Data Rate	Interface		
		Multimode, @1300nm	Multimode @850nm	Singlemode @1300nm
Multirate Low Speed	Up to 200Mbit/s	✓	✗	✓
Multirate High Speed	200M - 1.25Gbit/s	✓	✓	✓
Fixed Rate ESCON	200Mbit/s	✓	✗	✗

The optical interfaces on the Flexible multiplexer are MU type (mini SC), and on the PMM transponders FC/PC. Optical patch cords can provide the necessary interface conversion if required.

PMM Transponders have 1310nm short haul interfaces, with FC/PC connectors. The transmitter operates at 1310nm but the receiver is sensitive from 1260nm to 1600nm.

3.1. Client Interfaces supported

Service	Bandwidth bit/s	Delivery Architecture & fibre presentation			
		PMM Direct Transponder Single-mode Fibre		Flexible Mux Multi/single node	
		Supported	Max Fill/lambda	Supported	Max Fill/lambda
STM-1	155M	√	1	√	8
STM-4	622M	√	1	√	3
STM-16	2.5G	√	1	×	×
ESCON	200M	√ 2R	1	√	8
FDDI	100M	√ 2R	1	√	8
Gigabit Ethernet	1.25G	√	1	√	2
Fibre Channel	1.06G	√ 2R	1	√	2
FICON	1.06G	√ 2R	1	√	2
Digital video DVB ASI	270M	√ 2R	1	√	8
ATM-155	155M	√	1	√	8
ATM-622	622M	√	1	√	3
Fast Ethernet	100M	√ 2R	1	√	8

NOTE:

- A single Transponder type supports all bit rates up to and including 2.5G, this Transponder is available in the first release.
- The Flexible Multiplexer can combine disparate clients. The maximum fill per lambda depends on the combination
- All client rates at 3R (re-shape, regenerate and retime) unless stated
- Fibre Channel at 3R will be available via the direct transponder in release 2.2 for the PMM

3.2. Client Protocol Restrictions

There are limitations due to protocol latency rather than optical performance for some of the protocols, which will restricts the circuit distance:

ESCON = approx. 40km

Fibre Channel =approx. 100km

ESCON channels can be used in two main configurations:

ESCON Channel Extension

This uses only ESCON channels. It is mainly for data backup and disaster recovery applications. Connects a mainframe to a remote storage location. This is supported on PMM/ Flexible Mux.

ESCON with Geoplex/GDPS

This is a specific application. It is designed to make several remotely located mainframes appear to be a single processor. GDPS requires additional ISC and ETR links between the mainframes. This is currently NOT supported on PMM/Flexible Mux.

3.3. Connector

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.

Local interfaces:

- Flexible Multiplexer interface cards use MU (mini SC) connectors.
- PMM transponders use FC/PC connectors.

Optical patch cords can provide the necessary interface conversion if required.

3.4. Transmission

The combination of NTE (PMM & Flex Mux) transport aggregate Client data on 2.5Gbit/s channels, multiplexed together with multiple 2.5Gbit/s channels around a DWDM ring. The Client data is transported on a point-to-point basis within a single MetroNetWave customer ring.

Sub 2.5Gbit/s client data is aggregate together on the Flex Mux into a single 2.5Gbit/s channel. The aggregated 2.5Gbit/s is then multiplexed with up to 32 other 2.5Gbit/s channels via transponders and filters (multipliable wavelengths are combined onto 2 fibre pairs, 1 pair east & 1 west for protection)

All fibre optic connectors to and from the PMM equipment utilise single mode fibre 9/125 micron according to ITU-T G.652.

Traffic protection around the MetroNetWave ring can be achieved is a number of ways by routing the worker and protection client signals in opposite ring directions via separate transponders.

4. Power supply

The NTE is powered from DC power supply (48V)

Duplicated DC power connections (PMM = 2*LTU, Flex Mux = 2*PSU)

Maximum power consumption:

- PMM = 461W (13 unprotected wavelengths)
- Flex Mux = 165W (8 * sub 2.5G channels)

The actual power consumption of the BT NTE will depend on the customer requirements.

5. Customer Apparatus Design/Installation Advice

The MetroNetWave service has been designed such that any vendors Fibre Channel, Gigabit Ethernet, ESCON, or ATM switch device that has standard interfaces of the 850nm MM or 1310nm SM variety will be able to connect to each NTE.

6. Technical Specification

6.1. Power

Input Voltage: 48V DC, or 230V AC mains when used with the cabinet

Power consumption:

- PMM = 461W (13 unprotected wavelengths)
- Flex Mux = 165W (8 * sub 2.5G channels)

The actual power consumption of the BT NTE will depend on the customer requirements.

6.2. Environmental

Temperature: +5°C to +45°C

Relative Humidity: 10% to 90% non-condensing

6.3. Physical

Weight (fully loaded):

- PMM = Approx. 35Kg
- Flex Mux = Approx. 15.5Kg

Dimensions (mm):

- PMM = 435 width x 235 depth x 148 height
- Flex Mux = 442 width x 280 depth x 400 height

Optical Ports:

- PMM = FC/PC
- Flex Mux = Mini SC (Type MU)

Rack mounting:

- Both unit can be either 19", or ETSI

6.4. Modules

6.4.1. Flexible Multiplexer

Three types of Optical card can be utilised in the Flex Mux NTE. Each card supports a single client interface. The three cards are:

- Multirate Low Speed Interface card - Up to 200Mbit/s
- Multirate High Speed Interface card - 200M - 1.25Gbit/s
- Fixed Rate ESCON Interface card - 200Mbps

6.4.2. PMM

The PMM Transponder card supports a single client interface.

6.5. Fibre

Local Single Mode Fibre acc. G.652

Multi-Mode Fibre 50µm and 62.5 µm @ 1310

Remote Single Mode Fibre acc. G.652

6.6. Wavelength

6.6.1. Flexible Multiplexer

- 2.5Gbit/s aggregate Interface =1300nm
- Client interface cards =850nm or 1300nm see section 3.1

6.6.2. PMM

PMM Transponders have 1310nm short haul interfaces, with FC/PC connectors. The transmitter operates at 1310nm but the receiver is sensitive from 1260nm to 1600nm

6.7. Link Distance

The point-to-point links are within the MetroNetWave ring.

- PMM-S
 - Maximum circumference up to 25Km (depending on survey)
- PMM-E
 - Maximum circumference up to 125Km (depending on survey)

6.8. Configuration

6.8.1. PMM-S

Consists of the following: -

- Core Sub-rack including core items – (fits up to 15 transponders)
- Controller/Comms
- 200GHz Transponders
- Filters Shelf – (Fits up to 8 filters)
- Filters – (200Ghz 2 channel filters, OSC Filter)

- Optional Functionality – (Transponder Protection Unit, Sub-rack Power Interface Unit)

6.8.2. PMM-E

Consists of the following: -

- Core Sub-rack including core items – (fits up to 15 transponders)
- Controller/Comms
- 100GHz Transponders
- Amplifiers – (Booster 24dB and Booster 16dB)
- Filters Shelf – (Fits up to 8 filters)
- Filters – (100Ghz single channel filters, OSC Filter, Headend Filters)

- Optional Functionality – (Transponder Protection Unit, Sub-rack Power Interface Unit, Optical Levelling unit)

6.8.3. Flexible Multiplexer

- FlexMux Sub-rack
- Fits up to 8 client interface cards, see section [Flexible Multiplexer Modules](#)
- 2 * Power Supply & Fan units
- 2 * trunk System Interface cards (2.5Gbit/s link to PMM)
- Network/Element Management card slot

7. Further Information

For enquiries concerning connection availability between particular sites and for further information on the METRONETWAVE service please contact the Advanced Data Services Helpdesk <http://www.sinet.bt.com/usenum.htm> If you have enquiries relating to this document then please contact: help@sinet.bt.com

8. References

G.652	Recommendation G.652 (04/97) - Characteristics of a single-mode optical fibre cable; an ITU publication
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Please see <http://www.sinet.bt.com/usenum.htm> regarding availability of ITU standards.

ATM-155	SIN 373 BT High Bandwidth Service (DWDM) 1-Service Description
ATM-622	SIN 373 BT High Bandwidth Service (DWDM) 1-Service Description
DVB ASI,	DVB-PI, ETSI ref TR 101 891, DVB Blue book ref A055
ESCON	SIN 373 BT High Bandwidth Service (DWDM) 1-Service Description
Fast Ethernet	SIN 118 LAN Extension Service Nos.1&2 - Service Description
FDDI	SIN 233 BT Fibre Distributed Data Interconnection Services 1 & 2 (FIS 1 & 2) SIN 234 BT Fibre Distributed Data Interconnection Services 3 & 4 (FIS 3 & 4)

Fibre Channel,	SIN 373 BT High Bandwidth Service (DWDM) 1-Service Description
FICON	FICON, the IBM zSeries zOS channel protocol succeeding ESCON
Gigabit Ethernet,	SIN 360 Gigabit Ethernet for the BT Network - Interface Characteristics
STM-1	SIN 333 SDH Customer Interfaces at the STM-N Level (where N=1,4,16) Interface Characteristics
STM-4	SIN 333 SDH Customer Interfaces at the STM-N Level (where N=1,4,16) Interface Characteristics
STM-16	SIN 333 SDH Customer Interfaces at the STM-N Level (where N=1,4,16) Interface Characteristics

9. Abbreviations

ATM	Asynchronous Transfer Mode
CPE	Customer Premises Equipment
DWDM	Dense Wavelength Division Multiplexing
IBM	International Business Machines
ITU-T	International Telecommunication Union - Telecommunications Standardization Sector
LAN	Local Area Network
Mbit/s	Megabits per second
MBps	Megabytes per second
MHz	Megahertz- 1,000,000 Hz
MUX	Multiplexer
NTE	Network Terminating Equipment
NTP	Network Terminating Point
SIN	Supplier Information Note [BT]
SM	Single Mode
WDM	Wavelength Division Multiplexing

10. History:

Issue	Date	Revision changes
Issue 1.0	16 August 2001	First Issue
Issue 1.1	February 2003	“No new supply” added to Introduction. Editorial update.

< END >

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