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DM4E1S

DM4E1S is an optical modem that provides solutions for point-to-point communications, being able to connect simultaneously up to 4 independent aggregates. It can connect up to 6 tributaries of up to 2,048Mbit/s each, directing them to any position in the available aggregates. It is compatible with the sub-rack frame standard Telebrás *Slim*, being able to be managed by management card DMG20, VT100 terminal or remote equipment.

Main features

- **Point-to-point operation** with up to 4 independent aggregate channels, reducing costs in the implementation of centralized and distributed systems.
- **Flexible Mapping of tributaries** allowing the configuration of the tributaries in any position within the aggregates.
- **Aggregates with bidirectional fibers** optimizing the use of installed fibers.
- **Backup of aggregate link** being able to function with 1+1 redundancy or with independent aggregates, according with the application (in the options with 2 or 4 optical interfaces).
- **Aggregate Single E1**, enabling the transmission of an electric tributary link in de optical interfaces at 2,048Mbit/s (compatible with DM705). Works for tributary E1 as well as V.11/V.35.
- **Configurable operation topology** enabling the use of independent aggregates, channel redundancy (1+1), and Single E1 simultaneously.
- **Automatic Laser Shutdown** when aggregate in LOS, increasing security in the installation and maintenance of the optical link.
- **Alarm generation** selectable by interface. Has two inputs for external alarms and one output in relay with NO/NC option.
- **Telebrás Slim standard for sub-rack** or compatible table cabinet. Supports hot swap.
- **Management via VT100 terminal or via SNMP** by DMG20 management card, allowing configuration, verification of states and tests activation.
- **Manages remote equipments** through the aggregate link (In-Band management), without interfering in data transmission.
- **Up to four optical interfaces** with multimode or single mode fibers option, with one or two fibers. Available with 1,2 or 4 optical interfaces. Should be solicited on purchase.
- **4 E1 tributaries** G.703 at 2,048Mbit/s, with configurable impedance 75Ω or 120Ω.
- **2 V.11 interfaces (V.35 compatible)**, being able to operate in rates of Nx64kbit/s.
- **1 V.28 interface** for asynchronous operation, up to 115200bit/s.
- **Loopbacks for test** activated local or remotely.
- **Monitors errors** in the aggregates, with error rates, control of synchronism loss and loss in the optical channel (LOS).
- **LEDs to indicate** alarm, test and state of the power supplied.
- **Software download via terminal**, allowing software updates in the local equipment as well as in the remote equipment.
- **THIS PRODUCT IS NOT COMPATIBLE WITH DATACOM'S DM16E1/DM4E1.**

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Physical Characteristics

Dimensions


- Board dimensions, frontal panel and Edge connector according to practiced by Telebrás 225-540-780 (1995).

Panel

- 1, 2 or 4 optical interfaces;
- 3 LED indicators (PWR, TEST and ALARM);
- RJ45 connector for RS232 terminal.

Power supply

- Works with power supplied from the sub-rack frame or table cabinet.
- Allows Hot Swap.

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Aggregates

Interfaces availability


- The equipment can be purchased with 1,2 or 4 available optical interfaces.
- Types of optical interfaces offered in DM4E1S:
 - Single Fiber
 - Dual Fiber
 - Multimode

Tests

- Loop back tests in every aggregate tributary interface. Test activation indicated in LED in the panel.
- Detection of error rate in the channel, loss of synchronism and loss of optical sign (LOS). Indication in LED in the panel.

Operational mode

- Aggregate frame with up to 6 multiplexed tributary channels. Allows the use of remote management and error control.
- Tributary channel E1 or V.11/V.35 directly connected to the aggregate interface. This option allows the conversion of an electrical interface into optical, for communication with a remote DM705 using optical E1. Operation with redundant 1+1 protection. An interface for the main channel and another for the backup channel is used. Possess the options of automatic, semi-automatic or manual switching for the backup link when there is any flaw in the main link. This option is only available when equipped with 2 or 4 optical interfaces.

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Examples of possible configurations

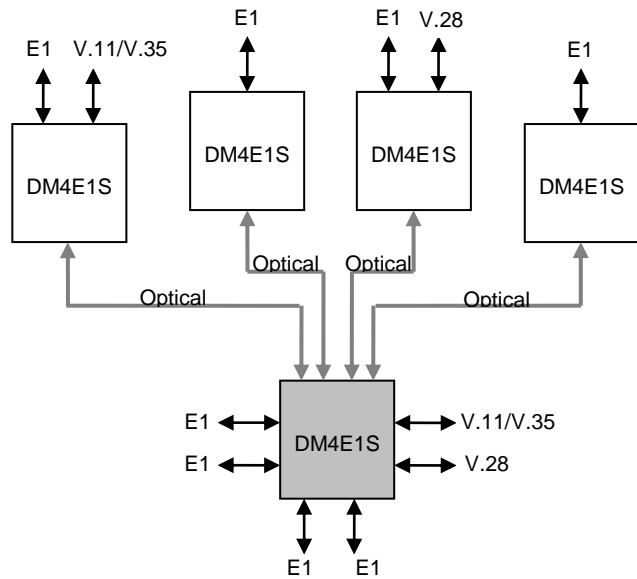


Figure 1 – Configuration with 4 independent aggregates.

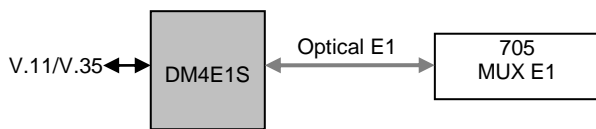


Figure 2 – Optical modem configured for 2,048Mbit/s.

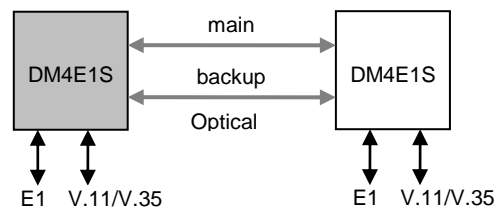


Figure 3 – Aggregates configuration with 1+1 redundancy.

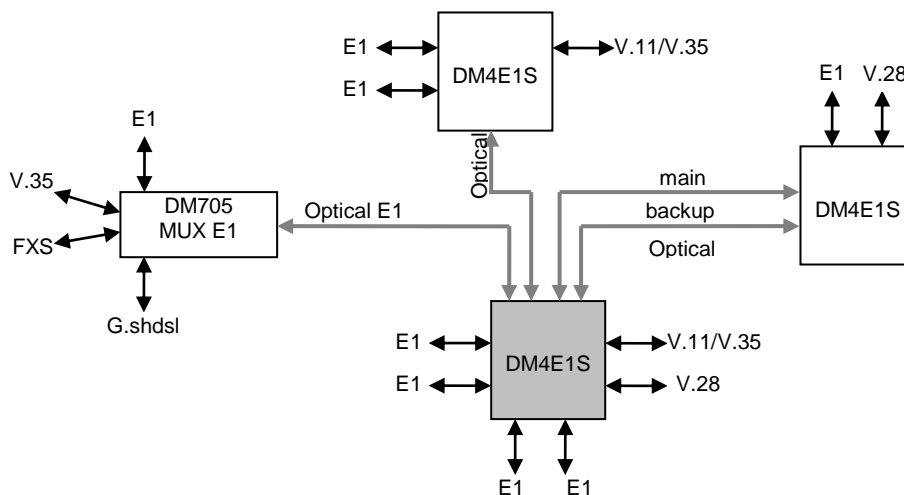



Figure 4 – Mixed Configuration: aggregate with 1+1 configuration, independent aggregate without protection and optical modem at 2,048Mbit/s.

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Optical interfaces

- **SC/PC connectors**, in two fibers (multimode or singlemode) or in monofiber (singlemode). The providing standard is singlemode monofiber.
- **Transmitter:** Laser diode of 1310nm or 1550nm, with options for short or long range.
- **Singlemode receptor:** Uses PIN photodiode. Minimum level of -34dBm for BER of 10^{-12} , accepts signal with maximum intensity of -8dBm.
- **Multimode receptor:** Uses PIN photodiode. Minimum level of -30dBm for BER of 10^{-12} , accepts signal with maximum intensity of -14dBm.
- The DM4E1S monofiber interface operates with different wave lengths for transmission and reception. One side transmits in 1310nm and the other in 1550nm, in a fashion that the transmitter signal reflections do not affect the receptor, allowing the use of PC polish connectors – more economical – throughout all the fiber extension.
- Since the majority of the two fiber equipments use PC polish connectors, the direct substitution of a link installed with two fibers modules by two independent links using monofiber modules becomes easy.

Table 1 – Optical modules available options

Model	Description	Tx [nm]	TX Min. Power	Sensibility	Estimated Range*	Obs.
MS13	Multimode	1310	-20 dBm	-31 dBm	~ 2 Km	1
SS13	Singlemode 2 fibers short range	1310	-15 dBm	-34 dBm	~ 15 Km	2
SS15	Singlemode 2 fibers short range	1550	-15 dBm	-34 dBm	~ 15 Km	3
SL13	Singlemode 2 fibers long range	1310	-5 dBm	-34 dBm	~ 40 Km	2
SL15	Singlemode 2 fibers long range	1550	-5 dBm	-35 dBm	~ 100 Km	3
SLx15	Singlemode 2 fibers long range	1550	0 dBm	-35 dBm	~ 120 Km	3
SSB13 SSB15	Singlemode Monofiber short range	1310 ou 1550†	-14 dBm	-31 dBm	~ 15 Km	2
SLB13 SLB15	Singlemode Monofiber short range	1310 ou 1550†	-5 dBm	-34 dBm	~ 60 Km	2


(*)The estimated range includes a 3dB margin for losses in the link.

† Transmission of 1310nm and reception in 1550nm or vice versa. The attenuation in 1310nm is preponderant.

1) Considering a Multimode Fiber with 2 dB/km (1310nm) loss.

2) Considering a Singlemode Fiber with 0,36 dB/km (1310nm) loss.

3) Considering a Singlemode Fiber with 0,25 dB/km loss (1550nm).

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Tributaries

Interfaces availability

- 4 E1 interfaces – G.703 at 2,048Mbit/s and HDB3 codification. Selectable impedance between 75Ω or 120Ω. The data passes in a completely transparent manner, thus frame structure is not necessary.
- 2 V.11 interfaces (V.35 compatible) with configurable speed of N x 64kbit/s, N being an entire value from 1 to 32. The data is disposed internally in E1 (G.704) frame structure at 2,048Mbit/s, allowing remote recovery of the channel in E1 interface (splitter).
- 1 V.28 interface asynchronous, up to 115200bit/s.
- Interfaces selection done by straps, according with the available connectors in the sub-rack or table cabinet. Flexibility for multiple interface combination options.
- Configuration of up to 6 interfaces simultaneously (4 x E1, V.11/V.35 e V.28 disposed in DB25 connector and screw ruler).

Tests


- Loop back tests in every tributary interface. Test activation indicated in LED in the panel.
- AIS Detection. Available indication in the terminal and through the management system.

Configurations

- **Standard configuration:** Configuration with outputs from the four E1s in the DB25 from a Telebrás standard sub-rack, being possible to utilize cables and cabinets already available in the market to access the E1s. Internal and external alarms available in the screw ruler.
- **1V configuration:** Configuration in which the DB25 provides a V.11/V.35 with its main signals. The ruler of the sub-rack provides E1 for the screws usually used in the Telebrás standard as well as for the backup screws. Two more E1 interfaces in the DB25 connector can be made available. Option for internal and external alarm in the screw ruler.
- **2V configuration:** Configuration in which the DB25 provides two V.11/V.35 with 10 communication cables and 3 shared for control of the two V.11/V.35. Only two E1s can be used in this configuration, both in the screw ruler of the sub-rack. Option for internal and external alarm in the screw ruler.
- When using the V.28 interface, the pins CT105 and CT109 of the V.11/V.35 interfaces are used, and the interface is left without this control pins available. Only for 1V and 2V configurations.
- Possibility of using external clock CT128 for data reception. Only for 1V configuration.
- Great variety of options for clock configuration in the V.11/V.35 interfaces, such as invert TX clock, CT113 unlooped CT114, CT104 controlled, CT113 and regenerated.

Tributaries mapping

- In DM4E1S it is possible to freely position every tributary channel inside the aggregate frames, allowing great flexibility of configurations and connections with remote equipments.
- It is possible to map an E1 or V.11/V.35 tributary directly to an aggregate for communication with a remote MUX E1 DM705.

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Management

Selectable management sources

- **VT100 terminal:** The terminal management is done via a RS232 interface available in RJ45 connector, utilizing a VT100 terminal or emulator. Through the terminal it is possible to configure, check the status and start tests in the local and remote equipments.
- **SNMP**, through a DMG20 management card in the sub-rack. Possibility of DMView management software use. Having one management card connected to the SNMP manager in the sub-rack, all remote equipments can be managed using the In-Band frequency, making the necessary remote management structure extremely compact.
- **In-Band**, by remote equipment, through an aggregate link. Through a central equipment, all DM4E1S equipments remotely connected can be managed without interfering in data transmission.

Supplied optional accessories under order

Interface adaptors

- Screw ruler– BNC for E1 interfaces.
- DB25 – 1xE1
- DB25 – 4xE1
- DB25 – V.11/V.35 + 2xE1
- DB25 – V.11/V.35 + V.28 + 2xE1
- DB25 – 2xV.11/V.35
- DB25 – 2xV.11/V.35 + V.28

For more information on this product, contact DATACOM or visit our Website:
www.datacom-telematica.com.br