



Nokia Optical PDH Access

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Nokia DF2-8 and DF34

Nokia's optical line equipment concept provides digital signal transmission on optical fibres at bit rates of 2, 8 and 34 Mbit/s.

Transmitter options take advantage of the low dispersion and attenuation in the 1300 nm wavelength region.

A specially designed receiver frontend facilitates a very high dynamic range. In all hierarchy levels, full laser output power is accepted by the receiver, so no optical attenuators are needed to build-out low loss sections.



Optical Line Equipment

Product codes			
21513	Term. Repeater 2-8 M, 1300 nm LED MM/SM		
21516	Term. Repeater 2-8 M, 1300 nm LASER SM		
21518	Term. Repeater 2-8 m, 1300 nm LASER LP		
21905	DF2-8 Program E		
21532	Term. Repeater 34M,1300 nm,SM laser LP,C1		
21533	Term. Repeater 34 M, 1300 nm LED MM/SM		
21536	Term. Repeater 34 M, 1300nm SM laser,C3A		
21912	DF34 Program E		
	DF 2-8 at 2Mbit/s	DF 2-8 at 8Mbit/s	DF34
Recommendations	G.703, G.821, G.955, G.651, G.652, G.653, G.654		
Bit rate (kbit/s)	2048	8448	34 368
Optical Line Code	5B6B		
Wavelength (nm) Note 1	1280-1330		
Min transmitter power			
LED 1300 nm (SM)			-21
Laser 1300nm (SM)			-4
Laser 1300nm (SM, low power)			-14
Receiver sensitivity BER E-10 (dBm), 1300nm			
	-52	-47	-42
Dynamic Range of receiver (dB), 1300 nm			
	>53	>48	>40
Digital Interface			
ITU-T recommendations /Code	G.703 / HDB3		
Optical Interface			
ITU-T recommendations	G.651, G.652, G.821, G.956		
Optical connector	FC, type PC		
Baud rate (baud)	3 277 k	11 827 k	42 960 k
Pulse shape	NRZ		
Other Interfaces			
Service Interface	V.11/ITU-T		
Data channel, V.11/async. (number and sampling rate)	2 x 34 kHz	2x 70 kHz	2x 70 kHz
Power supply			
Input voltage	-20 ... -72 V DC		
Power consumption			
Line terminal / LED	9W	9W	12W
Line terminal / Laser	10W	10W	14W
Environmental Specification			
Operation	ETS 300 019, Class 3.1 E		
EMC	ETS 300 386 (2000)		

Note 1: These limits are valid for units with uncooled lasers at 20±5°C and with cooled lasers at 20...50°C. If these units are used at other temperatures, it should be noted that the centre wavelength may exceed the limits. The temperature coefficient of the centre wavelength is max. 0.6 nm/°C for 1300 nm.

Nokia DM8 and DM34

Nokia's higher order digital multiplex equipment multiplexes four tributary signals into the main system, and vice versa.

The digital multiplex equipment is developed for ITU-T PDH hierarchy level multiplexing and demultiplexing in different kinds of networks, for example junction networks, dedicated networks for railways, gas, oil and power companies, corporate networks and networks for connecting mobile radio base stations.

Nokia's higher order multiplexing equipment can use any suitable transmission medium, such as radio links and optical fibre systems.

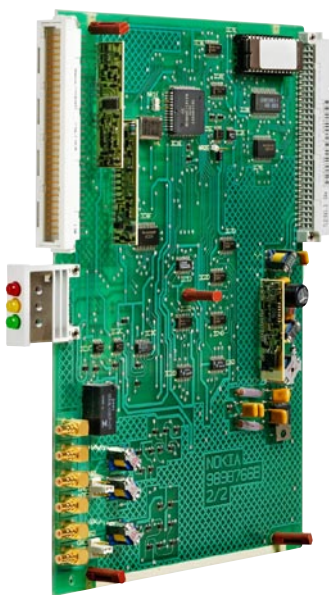


Higher order digital multiplex equipment

Product codes		
21300	DM8 Multiplex Equipment 75/120 ohm	
21301	DM8 Multiplex Equipment 75 ohm	
21320	DM34 Multiplex Equipment	
21305	DM8 Program E	
21325	DM34 Program	
DM8		
DM34		
ITU-T recommendations	G.742, G.703, G.821	G.751, G.703, G.821
Multiplex Bit Rate	8448 kbit/s	34 368 kbit/s
Tributary Bit Rate	2048 kbit/s	8 448 kbit/s
Multiplexing Method	Bit by bit interleaving. Positive justification	
Power Consumption	3.5W	5W
Digital Interface		
ITU-T recommendations G.703 and G.823		
Other Interfaces		
Service Interface	V.11 / ITU-T	
Data Channel Interface	V.11 / ITU-T	
(number and sampling rate)	1x10kHz	1x22kHz
Signal test points	G.703 ITU-T	
Two Programmable Alarm Outputs		
Active State	I < 5mA, Udc <- 2V	
Passive State	I < 50µA, -75V < Udc <- 12V	
Power Supply		
Input voltage	-20...-72 V DC	
Mechanical Dimensions (mm)		
Height	233	
Width	25	
Depth	160	
Environmental Specification		
Operation	ETS 300 019, Class 3.1 E	
EMC	ETS 300 386 (2000)	

Nokia C02 and C08-34

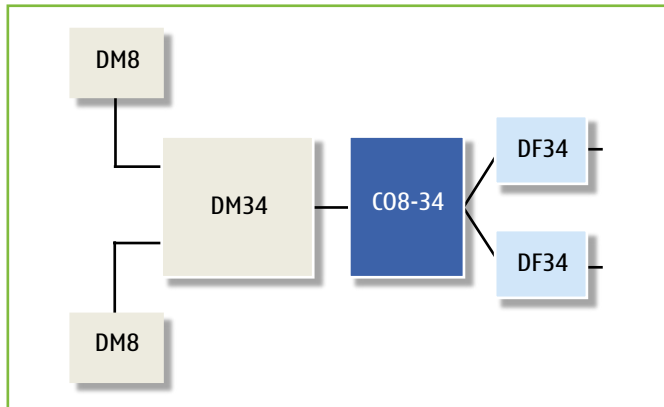
The change-over equipment is to provide an alternative transmission path in case of a line failure. The protection is 1+1 all bit rates 2...34 Mbit/s and it is organized in such a way that in the transmit direction the change-over equipment sends the signal to two redundant transmission lines. In the receive direction it selects one of the two incoming signals. The selection is based on the external control data received from the protected systems. The change-over function can be controlled either automatically or manually.



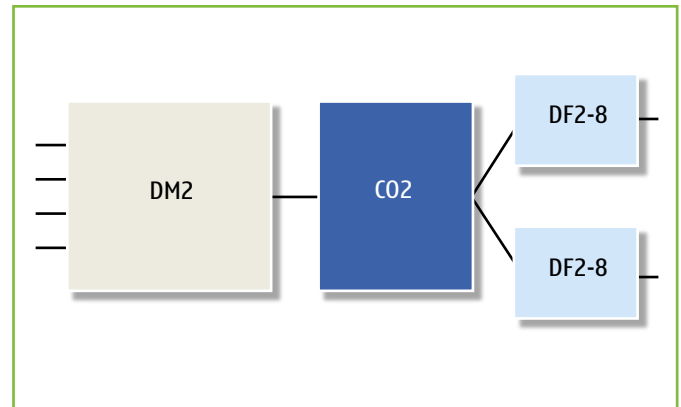
Change-Over Equipment

Product codes			
21561.1	Change-over Unit, 2Mbit/s, 75/120ohm		
21561.2	Change-over Unit, 2Mbit/s, 75ohm		
21561.3	Change-over Unit, 8 and 34 Mbit/s		
		C0 2	C0 8-34
ITU-T recommendations	G.703, G.821, G.955, G.651, G.652, G.653, G.654		
Bit rate (kbit/s)	2048	8448-34 368	
Power consumption	3 W		
Digital Interface			
ITU-T recommendations	G.703 and G.823		
Other Interfaces			
Service Interface	V.11/ITU-T (max bit rate 9600 bit/s)		
Two Programmable Alarm Outputs			
Active State	I<5mA, Udc<-2V		
Passive State	I<50µA, -75V< Udc<-12V		
Change-over time			
Time since control data reception (when no persistency check is done)	< 1ms	< 10 ms	
Power supply			
Input voltage	-20 ... -72 V DC		
Environmental Specification			
Operation	ETS 300 019, Class 3.1 E		
EMC	ETS 300 386 (2000)		

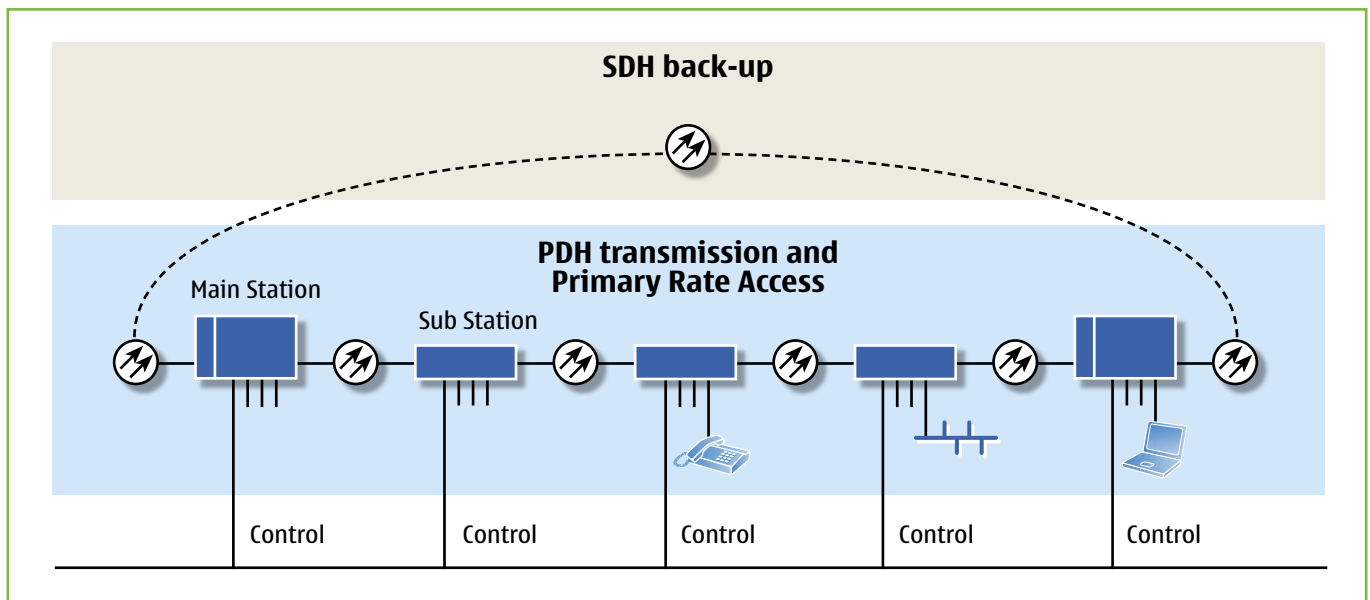
Application examples



34Mbit/s 1+1 protection



2Mbit/s 1+1 protection



Nokia NBA PDH products may be used as an access layer into core (SDH) networks. Often this access layer is required to support low rate services and branching or cross connect capability, Nokia Dynanet products are ideal in these situations. Resilience requirements encountered in many critical applications may be achieved through the use of Nokia DB2, DN2 and CO products in conjunction with DM and DF products for multiplex and transport as required. Additionally the wide ranging access interface requirements can be achieved using DM2, ACM and Dynanet interface products.

Flexible Installation

Nokia's Dynanet product range offers extremely flexible installation possibilities. The key Dynanet strength of freely installable units means that equipment units, such as higher order multiplexers, may be installed in any vacant slots, providing excellent configuration flexibility.

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