

Nokia DF2-8, DF34 and DF140

- optical line equipment

Optical Line Equipment Concept

Nokia's optical line equipment concept provides digital signal transmission on optical fibres at bit rates of 2, 8, 34 and 140 Mbit/s. Several transmitter options for different fiber types and lengths are available. They take advantage of the low dispersion and attenuation in the 1310 nm and 1550 nm wavelength regions; at low bit rates the economical 850 nm version is also available. LED and laser transmitters are available for both multi-mode and single-mode fibers. All the line equipment uses two-level 5B6B line code with a frame structure having additional bits for Service Telephone and auxiliary data channels.

The equipment comprises PCB hybrids in the transmitter and receiver sections, thus allowing easy configuration depending on the fiber type and route length.

A specially designed receiver front-end 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.

Line Repeaters

Intermediate repeaters are not needed in most cases. Greater distances can be spanned by installing two line terminals back-to-back at the G.703 interface. The power feeding is from a local source.

Integrated Supervision with Versatile Programming

All management operations are performed through the microprocessor built into each item of equipment. The microprocessor is commanded through an ITU-T V.11 service interface.

The service interface is normally accessed by means of a hand-held Service Terminal which provides an advanced way of communicating with the optical line equipment. It provides facilities, such as:

- Accurate alarm indications from both line terminals and repeaters
- Programming of internal variables
- Setting of local and remote test loops for easy fault detection
- Signal quality measurements
- Reviewing and resetting of internal counters.

Technical Highlights

- Performs all relevant ITU-T specified optical line equipment functions
- Extremely high dynamic range
- Advanced and compact design
- Built in DC/DC converter and supervisory microprocessor
- Orderwire and auxiliary data channels in optical line equipment
- 1+1 and N+1 protections as options
- Flexible installation into various mechanical constructions
- Can be managed with a common network management tool, the Nokia NMS
- Fast and easy commissioning

For remote operations the local V.11 service interface can be extended to remote stations through one of the optical line equipment. Using the remote operation capability, the user can access all stations along the route to get detailed information from the network; for example, signal quality statistics from repeaters.

If centralised Network Management is needed, the Nokia NMS family can be used. The Nokia NMS family centralises access to all equipment alarm and measurement informations, and controls all equipment parameters.

Flexible Installation

Nokia's mechanical construction concept offers several flexible installation options: wall-mounted cases, Nokia Office Boxes, equipment cabinets, slim racks and 19" sub racks. This arrangement allows

the free placement of units, and of other Nokia transmission equipment units such as higher order multiplexers or Service Telephone equipment in vacant unit spaces, giving excellent configuration flexibility.

Technical Data

Optical Line Equipment

	<div>DF 2-8</div> <div>DF 34</div> <div>DF 140</div>			
Recommendations	-----G. 703, G. 821, G. 955, G. 651, G. 652, G. 653, G. 654-----			
Bit rate (kbit/s)	2048	8448	34368	139264
Optical line code	5B6B	5B6B	5B6B	5B6B
Wavelength	850/1310	850/1310	1310/1550	1310/1550
Min. transmitted power				
LED 850 nm	-17	-17	—	—
LED 1310 nm (multimode)	-21	-21	-21	—
LED 1310 nm (single mode)	-30	-30	-30	—
Laser 1310 nm (single mode)	-4	-4	-4	-4
Laser 1310 nm (SM, low power)	-14	-14	-14	-14
Laser 1550 nm DFB	-4	-4	-4	-4
Laser 1550 nm DBF (high power)	—	—	+3	—
Receiver sensitivity				
BER 10 ⁻¹⁰ (dBm)				
-850nm	-49	-43	—	—
-1310 nm	-52	-47	-42	-35
-1310 and 1550 nm high perf.	-52	-47	-42	-38
Dynamic range of receiver (dB)				
-850 nm	>40	>34	—	—
-1310 and 1550 nm	>53	>48	>40	>35
-1550 nm (high power)	—	—	>47	--
Digital interface				
ITU-T recommendations	G. 703	G. 703	G. 703	G. 703
Code	HDB3	HDB3	HDB3	CMI
Optical interface				
ITU-T recommendations	-----G. 651, G.652-----			
Optical connector	FC (PC), SC	FC (PC), SC	FC (PC), SC	FC (PC), SC
Baud rate (baud)	3277 k	11827 k	42960 k	181 M
Pulse shape	NRZ	NRZ	NRZ	NRZ
Other interfaces				
Service telephone	----- analog, 0.3 ... 3.4 kHz -----			
Service interface	-----V.11/ ITU-T-----			
Data channel, V11/async. (number and sampling rate)	2 x 34 kHz	2 x 70 kHz	2 x 70 kHz	3 x 64 kHz, 193 kHz
Optional auxiliary channel	—	—	—	2048 or 8448 kbit/s (G.703)
Power supply				
Input voltage range	----- -20 ... -72 VDC -----			
Power consumption (typical)				
Line terminal/LED	9W	9W	12W	—
Line terminal/Laser	10W	10W	14W	16W
Environment	Operation		Transport and Storage	
Temperature	-10 °C to +50 °C		-40 °C to +70 °C	
Humidity	<95% at 30 °C		up to 98%	

Nokia code: 0501_EN_0899_1.0.Libris: All Nokia products are subject to continuous research and development; we therefore reserve the right to alter technical specifications without prior notice. NOKIA is a registered trademark of Nokia Corporation. Any other trademarks mentioned in the document are property of their respective owners. Nokia Networks 1999