

# DN2

## Dynamic Node Equipment

### Efficient three-in-one node for network flexibility and reliability

The Dynamic Node (DN2) is a member of Nokia's flexible DYNANET family of equipment. The DN2 is cross-connect equipment with drop/insert and multiplexing capabilities, supporting up to 40 x 2 Mbit/s interfaces. It is designed to provide reliability, efficiency and ease of use, as well as access to a large variety of services.

### Reliability

The excellent reliability of the DN2 node is due to its modular and decentralised design. The cross-connection functions are distributed, not left in a single centralised control which could suffer a complete node breakdown. Furthermore, most of the DN2 units can be duplicated, meaning that the node can be configured flexibly to give you the level of redundancy and reliability you require.

Route protection is possible. Nokia has extensive experience with loop networks and their synchronisation. Thus DN2 fully supports the implementation of loop and mesh networks.

### Compactness

The DYNANET installation concept offers several flexible installation

options: choose from among wall-mounted cases, Nokia Office Boxes, equipment cabinets, slimracks and 19" subracks. Units can be placed freely in any vacant unit space (including other Nokia transmission equipment units), so flexibility of the configuration can be increased.

Expanding the capacity of the DN2 node is easy. For example, only one more interface card is needed to have two extra 2 Mbit/s ports. The maximum size of one DN2 node is 40 x 2 Mbit/s ports in an unprotected configuration. The number of ports in a protected application will depend on the level of redundancy required.

### Bandwidth used effectively

The DN2 can handle nx64 kbit/s signals, and signals down to the nx8 kbit/s level. This allows for efficient use of slow-rate data channels and digital cellular network traffic channels.

If network faults occur, the DN2 makes it possible to activate alternate connections even at the channel level. This provides additional network reliability and flexibility.

In the design of DN2, supervision and maintenance have been top priorities. Parameters can be changed remotely, and monitoring can be done remotely.

### Technical Highlights

- Modular design:
  - capacity can be increased to up to 40 ports, by 2 port increments
  - direct data or speech interfaces upon request
- Several different cross-connection alternatives available
- Efficient capacity grooming and re-routing
- Reliable operation
- Versatile equipment and route protection alternatives
- Decentralised cross-connection
- Local and remote management

Faulty units can be replaced quickly and easily thanks to the cloning and self-programming features that are built into the units.

To drop or insert voice and data channels, you need only the relevant VF or data interface unit.

### Various services

The connection capabilities of the DN2 satisfy various user needs. In addition to an extensive array of interfaces, the DN2 offers the following types of connections:

1. Through-connections: for example, cross-connection of 64 kbit/s channels between 2 Mbit/s ports.
2. Digital common channel connections for multipoint-to-multipoint and point-to-multipoint links.
3. Conditional connections for redundant network connections (e.g. loop).

When the drop/insert and multiplexing features of the DN2 are considered, the superior qualities of the DYNANET product family become clear in the wide selection of user channel

interface cards. DYNANET interface units offer a wide range of subscriber and junction line signalling interfaces. Data interface channels range from X.58 and V.110 multiplexed slow data rate channels up to nx64 kbit/s channels with a variety of V and X series interfaces. ISDN Basic Access U- and S-interfaces are also included in the selection. The channel units are the same as those used in other DYNANET equipment: the DM2 multiplexing equipment and the DB2 branching equipment.

## Operation and management

Management software can be used for advanced local, remote, or centralised management and supervision.

Nokia offers three different management alternatives: Service Terminal, the DN2 Manager and the Nokia Network Management System (Nokia NMS).

The handheld Service Terminal consists of a keyboard and an alphanumeric display for on-site (or remote) equipment settings and adjustments.

Service Terminal functions are also available through an emulator program that runs on a PC.

The DN2 Manager is a Nokia software package that is used to configure and set up the DN2. The Manager requires a Windows NT 3.51 (or later) compatible PC. It allows the user to design the DN2 connections in an MS-Windows environment.

The Nokia NMS is used for centralised monitoring and control of the telecommunications network and for managing the individual network elements.

## Technical Data

### Main characteristics

ITU-T Recommendations	G.703, G.704, G.706, G.823, G.821, (Blue Book)	
Connections	Non-blocking	
Capacity	Up to 40 x 2 Mbit/s signals; free cross-connection down to 1 bit level in every 2 Mbit/s signal	
Connection types and capacities	Through connection & broadcast	8...2048 kbit/s
	Digital common channel for digital data connections	32...2048 kbit/s
	Bit pattern	8...2048 kbit/s
	Change-over connection	8...2048 kbit/s

### Electrical interfaces

#### 2 Mbit/s

Number of 2 Mbit/s interfaces	1...40
ITU-T Recommendations (Transparent 2 Mbit/s)	G.703, G.704 G.706 or G.703
Bit rate	2048 kbit/s +/-50 ppm
Interface impedance	75 ohm or 120 ohm
Input signal attenuation	0 to 6 dB/1 MHz

### VF and data

Interface units of the DYNANET family are detailed in separate brochures	
Capacity of direct VF and data channels	30/31 x 64 kbit/s timeslots (or comparable)

### Other interfaces

Service interface	75-9600 bit/s, V.11 ITU-T
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### Synchronisation

Clock source	Internal clock, external clock or any incoming signal	
	Network synchronisation methods	
	Master-slave synchronisation	
	Network Master Slave Synchronisation takes advantage of inter-node data transmission	

### Power feeding

Central battery voltage	20...72 VDC
Power consumption excluding 4 x 2 Mbit/s:	15 W typical
VF/data interface units	12 x 2 Mbit/s: 35 W typical
	28 x 2 Mbit/s: 75 W typical
	40 x 2 Mbit/s: 120 W typical

### Mechanical dimensions

	Height	Width	Depth
20T cartridge (4 plug-in units) (EMC mechanics)	306 mm	112 mm	219 mm
40T cartridge (8 plug-in units) (EMC mechanics)	306 mm	232 mm	219 mm
19" subrack (16 plug-in-units) (EMC mechanics)	378 mm	480 mm	219 mm

### Environmental specifications

	Operation	Transport and storage
Temperature	-10° to +50°C	-40° to +70°C
Humidity	95% at 30°C	up to 98%

### Electromagnetic requirements

Complies with the following requirement: prETS 300386-1 table 5