

# digital

# Software Product Description

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**PRODUCT NAME: DECnet-20, Version 1.0**

**SPD 23.2.0**

## **DESCRIPTION:**

DECnet-20 Version 1.0 allows a suitably configured DECSYSTEM-20 to participate as a Phase II DECnet system in point-to-point computer networks. DECnet-20 offers task-to-task communications using the DIGITAL Network Architecture (DNA) protocols. DECnet-20 communicates with adjacent systems over synchronous communications lines. Access to DECnet-20 is made via MACRO-20 system calls.

DECnet-20 is a Phase II network product and is for use only with Phase II DECnet products supplied by DIGITAL.

The functionality available to a TOPS-20 user depends, in part, on the configuration of the rest of the network. Each DECnet product offers its own level of functionality and its own set of features to the user. Networks consisting entirely of DECnet-20 systems have the full functionality described in this SPD. Networks that mix DECnet-20 systems with other DECnet products may limit the functions available to the DECnet user because some DECnet features are not supported by all DECnet products.

The Phase II products and functions available to users on mixed networks can be determined by comparison of the SPDs for the component products. An overview of DECnet and the common functionality available with mixed networks can be obtained from the General Phase II DECnet SPD (10.78).

### *Task-to-Task Communication*

Using DECnet-20, a TOPS-20 user program can exchange messages with other user programs using Phase II DECnet DNA protocols. The two user programs can be on the same or adjacent DECnet systems. (Adjacent systems control opposite ends of a point-to-point communication line. The DECSYSTEM-2040/2050/2060 with its required communications front-end processor, is defined as a DECnet system.) If adjacent systems, the second system can be any Phase II DECnet system that supports synchronous communication lines. However, DECnet networks that include systems other than DECSYSTEM-2040/2050/2060, can also include only one DECSYSTEM-2040/2050/2060; e.g., two DECSYSTEM-2050s may be connected via DECnet; but a DECnet network containing a DECSYSTEM-2020 or DECnet-11M, for example, can also include only one DECSYSTEM-2040/2050/2060.

The DECnet messages sent and received by the two user programs can be in any data format.

### *Network Control Program*

The network control program (NETCON) supports the logging and displaying of statistics, and loading and dumping the DN20 communications front-end (applicable on 2040/2050/2060 systems only).

Using the DECnet-20 NETCON utility, an operator can display DECnet activity at the local node. The user can display statistics related to communication lines, including data on traffic and errors. Output can be directed to the terminal or to a report file.

Other utilities provide controlled local loopback test arrangements. This enables the user to perform a logical series of tests that will aid in isolating communication problems.

### *Communications*

DECnet-20 Version 1.0 supports the DIGITAL Data Communications Message Protocol (DDCMP) for full-duplex transmission in point-to-point operation using serial synchronous facilities. DDCMP provides error detection/correction and physical link management facilities.

DECnet-20 Version 1.0 implemented on a DECSYSTEM-2040/2050/2060 supports one point-to-point synchronous link. On a DECSYSTEM-2020, two point-to-point synchronous links may be supported with the proper hardware configuration as noted below. Only one physical link may connect any pair of nodes.

The synchronous line units interface to Bell System 208A modems for operation at speeds up to 4.8KB, to ICC COMLINK II modems for speeds up to 19.2KB, and to Bell 303 modems (using a C.C.I.T.T V.35 converter), for speeds in excess of 19.2KB. Equivalent modems may also be used. Note that it is the customer's responsibility to demonstrate the equivalency.

### *DECnet-20 Operation*

DECnet-20 is implemented as an ancillary process under TOPS-20 with DIGITAL-supplied monitor-level components and user-level utilities. DECnet-20 is implemented in two forms: For the DECSYSTEM-2040/2050/2060, DECnet-20 resides in part in the central processor and in part in a dedicated communication front-end, the DN20; for the DECSYSTEM-2020, DECnet-20 resides entirely in the central processor.

**DECnet-20 Configuration**

The process of configuring a DECnet-20 system is based primarily on tradeoffs of cost, performance, and functionality, within the realm of satisfying the user's application requirements. It can be readily expected that network applications will run the full gamut from low-speed, low-cost situations to those of relatively high performance and functionality. The performance of a given DECnet system is a function not only of the expected network traffic and resultant processing ("global" conditions), but also of the amount of concurrent processing expected on that system ("local" conditions). Thus, system performance depends on many factors, including:

- CPU power or power of the communications front-end processor
- number of device interrupts per unit time
- communication line characteristics
- number and size of buffers
- message size and frequency
- "local" applications

It is important to note that the rate at which user data can be transmitted ("throughput") over a communications line may sometimes approach, but will never equal or exceed, the actual line speed; the same may be said for multiple lines as well. The reason, simply stated, is that the actual throughput is a function of many factors, including the user application(s), network topology, protocol overhead, and the factors cited at the beginning of this section.

There are basically three groups of communications interfaces presented in the tables below. They differ in many respects, particularly in their effect upon CPU utilization. The following tables show the various communications devices by category, and maximum line speed of each.

- With character interrupt devices such as the DUP11, CPU cycles are required not only for the DDCMP processing but also for each character sent and received.
- Devices such as the KMC11 (DUP11) are DMA devices. Since DDCMP is in the system software, CPU cycles are required for DDCMP line protocol processing. This feature is employed on the DECnet-20 implementation for the DECSYSTEM-2020.
- The DMC11 is a direct memory access (DMA) device. Also the DDCMP line protocol is executed in microcode by the DMC11 communication controller, off-loading the DN-20 front-end processor. Thus, the only DECnet load the processor sees is completed incoming and outgoing messages.

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DEVICE GROUPS

| Device Group Character Interrupt | Maximum Line Speed/Kilobits/Sec | DECSYSTEM 2040/2050/2060 (DN20) | DECSYSTEM 2020 |
|----------------------------------|---------------------------------|---------------------------------|----------------|
| DUP11                            | 9.6                             |                                 | N/A            |
| -----                            |                                 |                                 |                |
| DMA                              |                                 |                                 |                |
| KMC11 (DUP11)                    | N/A                             |                                 | 19.2           |
| -----                            |                                 |                                 |                |
| DMC11                            |                                 |                                 |                |
| DMC11-AL, -MD                    | 56.0                            |                                 | N/A            |
| -----                            |                                 |                                 |                |

The tables below describe the physical hardware configurations supported by DECnet-20 in terms of CPU class and communication interface device group.

**NOTE**

In the tables given below, the rated bandwidth is stated for a single device type. The maximum bandwidth for an intermix of device types cannot be calculated from these tables.

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MAXIMUM LINE CONFIGURATIONS ON DECSYSTEM 2040/2050/2060

| Device Group Character Interrupt | Comm. Option | Max. No. of Lines | Maximum Device Bandwidth (Kilobits/Sec) | Mode |
|----------------------------------|--------------|-------------------|---|------|
| DUP11                            | DN20-BA      | 1                 | 9.6                                     | FDX  |
| DMC11-AL, MD                     | DN21-BA      | 1                 | 56.0                                    | FDX  |

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MAXIMUM LINE CONFIGURATIONS ON DECSYSTEM 2020

| Device Group  | Comm. Option       | Max. No. of Lines | Maximum Device Bandwidth (Kilobits/Sec) | Mode |
|---------------|--------------------|-------------------|---|------|
| KMC11 (DUP11) | DN20-BA<br>DN20-BB | 2                 | 19.2                                    | FDX  |

In order to achieve a viable configuration, the user and/or a DIGITAL software specialist must perform a level of application analysis which addresses the factors above. In the preceding tables, the columns have the following meanings:

**Maximum Number Of Lines**

The largest number of physical lines which can be attached and driven by the DECnet-20 system.

**Maximum Device Bandwidth**

The maximum total number of bits per second which can be handled by a system when all communication devices of a single given type, such as character interrupt, are added together. For example, DECnet-20 on a DECSYSTEM-2020 can accommodate one full duplex KMC11 (DUP11) operating at 19.2KB or two lines similarly configured, operating at 9.6KB each. Maximum device bandwidth should be calculated for all lines known to operate concurrently.

**Maximum Line Speed**

The fastest clock rate at which the device can be driven under DECnet-20. This means that even if specific devices have the ability to operate at a maximum rate, they must be configured subject to the "maximum device bandwidth" restriction above.

**Mode**

This indicates whether the line is operating in either half-duplex (a single-bit stream) or full-duplex (two concurrent bit streams) mode.

**MINIMUM HARDWARE REQUIRED:**

Any valid DECSYSTEM-20 configuration with:

*DECSYSTEM-2040/2050/2060*

- One DN20-C communications front-end processor with one of the following:
  1. One DN20-BA low speed synchronous interface
  2. One DN21-BA high speed synchronous interface

*DECSYSTEM-2020*

- One DN20-BA low speed synchronous interface

**OPTIONAL HARDWARE:**

In order to support the optional second line capability on a DECSYSTEM-2020, one DN20-BB is required.

**PREREQUISITE SOFTWARE:**

TOPS-20 operating system, Release 3A.

**OPTIONAL SOFTWARE:**

None

**TRAINING CREDITS:**

None

**SUPPORT CATEGORY:**

A — Software Support will be provided as stated in the Software Support Categories Addendum to this SPD.

Installation under Category A support will convert the DECSYSTEM-20 system into a node with connection potential to a DECnet Phase II network. Network installation is available as Level I Consulting Services.

**CUSTOMER RESPONSIBILITIES:**

Before installation of the software, the customer must:

1. Install or have installed all hardware, including terminals, to be used on the system.
2. Make available to DIGITAL personnel all hardware, including terminals, to be used during installation for a reasonable period of time each day, as mutually agreed upon by DIGITAL and the Customer, until installation is complete.

Delays caused by any failure to meet these responsibilities will be charged at the then prevailing rate for time and materials.

**PREREQUISITE SUPPORT:**

A Network Profile and DECnet Customer Support Plan covering all intended network nodes and their support must be prepared jointly by DIGITAL and the customer.

**UPDATE POLICY:**

Software Updates, if any, released by DIGITAL during the one (1) year period following installation, will be provided to the customer without additional charge (includes no installation). After the first year, updates, if any, will be made available according to then prevailing DIGITAL policies.

**ORDERING INFORMATION:**

All binary licensed software, including any subsequent updates, is furnished under the licensing provisions of DIGITAL's Standard Terms and Conditions of Sale, which provide in part that the software and any part thereof may be used on only the single CPU on which the software is first installed, and may be copied, in whole or in part (with the proper inclusion of the DIGITAL copyright notice and any DIGITAL proprietary notices on the software) only for use on such CPU. All source licensed software is furnished only under the terms and conditions of a separate Software Program Sources Agreement between Purchaser and DIGITAL.

DECnet-20 is available on 1600 bpi 9-track magnetic tape only.

*Standard Options**For DECSYSTEM 2040/2050/2060*

QTD01 AM Single-use license, binaries, documentation, support services

*For DECSYSTEM 2020*

QTD20 AM Single-use license, binaries, documentation, support services

**ADDITIONAL SERVICES:**

QJ680 SZ DECnet Level I Services. Level II services are also available. Consult the DECnet Phase II Products SPD (10.78) for a description of Level I and Level II services.

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ADDENDUM  
SOFTWARE SUPPORT CATEGORIES

Each software product (hereinafter 'SOFTWARE') with a designated Support Category A or B in the applicable Software Product Description (SPD) existing at the time of order will be the current release at the time of delivery and will conform to the SPD. DIGITAL's sole obligation shall be to correct defects (nonconformance of the SOFTWARE to the SPD) as described below. Any SOFTWARE with a designated Support Category C will be furnished on an 'as is' basis.

For SOFTWARE with a designated Support Category A or B, DIGITAL will provide the services set forth below without additional charge.

**CATEGORY A**

1. Upon notification by customer to the nearest DIGITAL office that the computer system, including all required prerequisite hardware and software, is ready for the installation of the SOFTWARE, DIGITAL will install such SOFTWARE in any location within the contiguous forty-eight (48) United States, the District of Columbia, or a country in which DIGITAL or a subsidiary of DIGITAL has a software service facility. The notification must be received by DIGITAL and the system must be ready for installation within thirty (30) days after the delivery of the SOFTWARE to customer or DIGITAL will have no obligation to install. Installation will consist of: (1) verification that all components of the SOFTWARE have been received by customer, (2) loading the SOFTWARE, and (3) executing a DIGITAL sample procedure.
2. During the ninety (90) day period after installation, if the customer encounters a problem with the current unaltered release of the SOFTWARE which DIGITAL determines to be a defect in the SOFTWARE, DIGITAL will provide the following remedial service (on site where necessary): (1) if the SOFTWARE is inoperable, apply a temporary correction (TC) or make a reasonable attempt to develop an emergency by-pass, and (2) assist the customer to prepare a Software Performance Report (SPR) and submit it to DIGITAL.
3. During the one (1) year period following installation, if the customer encounters a problem with the SOFTWARE which his diagnosis indicates is caused by a SOFTWARE defect, the customer may submit an SPR to DIGITAL. DIGITAL will respond to problems reported in SPRs which are caused by defects in the current unaltered release of the SOFTWARE via the Maintenance Periodical for the SOFTWARE, which reports SPRs received, code corrections, temporary corrections, generally useful emergency by-passes and/or notice of the availability of corrected code. Software Updates, if any, released by DIGITAL during the one (1) year period, will be provided to the customer on DIGITAL's standard distribution media as specified in the applicable SPD. The customer will be charged only for the media on which such updates are provided, unless otherwise stated in the applicable SPD, at DIGITAL's then current media prices.

**CATEGORY B**

During the one (1) year period following delivery, the services provided to the customer will be the same as set forth in 3 above.

**CATEGORY C**

SOFTWARE is provided on an 'as is' basis. Any software services, if available, will be provided at the then current charges.

DIGITAL shall have the right to make additional charges for any additional effort required to provide services resulting from customer use of other than current unaltered release of the SOFTWARE operated in accordance with the SPD.