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Software Product Description

DESCRIPTION:

The TOPS-10 LIR for DECsystem-1091S Operating System services a range of simultaneous job types and response requirements, including timesharing, batch, remote batch, and real-time. TOPS-10 allocates memory, storage, peripherals, and processing time among system users, and has a scheduler that is adjustable at installation. To service multiple users concurrently, the DECsystem-10 uses multiprogramming, virtual memory and swapping. The TOPS-10 monitor supports reentrant software; that is, one copy of a reentrant language processor or program in memory can serve multiple users simultaneously. The monitor performs all input/output, user communication, resource arbitration, and other necessary services.

TOPS-10 Timesharing

Depending on configuration and total computing load, up to 512 terminals can be attached to up to 120 active jobs. See the terminal capacity section of this SPD. CRTs or hardcopy terminals operating at 110 to 9600 baud may be used. TOPS-10 supports automatic answering modems and baud rate detection at speeds of 110, 150, 300 and 1200 baud as described in the configuration section of this SPD.

The TOPS-10 command language, file structure, I/O processing, and job scheduling are independent of the application language used. In addition, standard software interfaces make it easy for users to develop their own languages or systems. Editors, compilers, and interactive high-level debuggers shorten development time and increase programmer productivity.

TOPS-10 Batch Processing with GALAXY

GALAXY Batch on the DECsystem-10 is designed for ease of use and flexible control over job processing. The command language for batch is an extension of the timesharing language which allows easy movement between batch and interactive processing, and reduces the amount of training necessary to use the system effectively. An interactive user can prepare jobs and enter them into the batch input queue for processing. The user is allowed to specify the characteristics and limits associated with his batch job, and can modify them as necessary. The system operator controls the batch system and specifies all operating parameters. The operator has the power to select or reject jobs, to suspend them, or to remove them from the batch system. GALAXY software is included with TOPS-10, Version 7.01 and is further described in the GALAXY-10, Version 2 (7.32) SPD.

Network Communications

TOPS-10 synchronous communication provides error-correcting high speed paths among TOPS-10 systems and remote stations. The high-speed synchronous transmission is on a message basis, in contrast with the character-by-character basis of lower-speed asynchronous transmission.

When combined with the appropriate hardware, the software supplied with TOPS-10 provides efficient use of the high-speed transmission in both directions simultaneously on a full-duplex line. The software handles device control-message formatting and message acknowledgements. The data transmission is "pipelined", a technique that increases line efficiency by overlapping messages and acknowledgements. Transmission errors are detected using cyclic redundancy checks (CRC-16). Data errors are corrected by retransmission.

The TOPS-10 synchronous communications can be used to extend the capabilities of the DECsystem-10 through the use of remote stations. Each remote station can include a line printer, a card reader, a console terminal, and, depending on the type of remote station, up to 32 asynchronous command terminals. The user interface and facilities available on the remote station are identical with those seen by a local user. The TOPS-10 monitor allows for simultaneous operation of multiple remote stations and in so doing has provisions to differentiate one remote station from another. By using peripheral devices at various stations, the user is provided with increased capabilities. For example, data can be collected from various remote stations, compiled and processed at the central station, and the results of the processing can be sent to all contributors of the data.

More than one DECsystem-10 can be in a single network. DECsystem-10 systems can be connected directly or through a remote station. A user at a terminal anywhere in the network can select which DECsystem-10 to use. TOPS-10 supports up to 63 nodes.

TOPS-10 provides communications with IBM systems and remote stations using 2780 and 3780 protocols. 2780/3780 is a separate software product, which requires a license and is described in a separate SPD.

User Command Language

Through an easy-to-use command language, the user controls the running of a job. Specifically, the user can:

- Compile, execute, and debug programs
- Create, edit, list, append, and delete files
- Use available resources such as magnetic tapes, private disk packs, or other peripherals
- Communicate with the system operator and request such services as the mounting and dismounting of disk packs and magnetic tapes
- Start, suspend, or terminate a job
- Spool output to line printer, card punch, paper tape punch, and plotter
- Determine status of the system and the resources available
- Request time and resource utilization data
- Send messages to other terminals in the system

Real-Time Processing

TOPS-10 real-time software features fast response, high throughput, system security, high-priority queues, the ability to lock jobs in memory, and disk transfer priorities. Direct access to real-time devices is available. The system administrator controls access to real-time features. Real-time programs can be written in FORTRAN or assembly language.

TOPS-10 File Handling

File service for disk storage is designed for convenience and efficiency. RP04/RP06 disk drives can be dual ported for high availability and increased performance. Each user can have as many files as desired on any of the available file storage devices. The system administrator establishes limits on the total amount of space each user's files can occupy. Each file is referred to by name, so that the user is not required to know where a file is physically located on the disk.

File storage is dynamically allocated during program operation, so there is no need to preallocate space before a file is established; however, preallocation can be done to guarantee the availability of space at some later time.

Updating files is performed by either of two methods —superseding or updating-in-place. Files can be shared concurrently (even with different access methods) among specified users. Access is controlled through the use of protection codes. Additionally, TOPS-10 provides features that allow installation of more extensive file security and access-logging software.

Virtual Memory

The user can run programs with address space greater than the physical memory actually utilized and can take advantage of typical program characteristics to reduce memory demands. A unique feature of TOPS-10 virtual memory is that its use is optional. The system administrator decides which users may access the facility. Controls are provided to both the user and the administrator to allow them to tune the system to their needs.

Error Handling

TOPS-10 has extensive error detection, logging, and recovery procedures for virtually all types of peripheral and memory failure. Error recovery provides system continuation and availability. Error logging provides Field Service and the system administrator with valuable information regarding hardware failures, and aids in their diagnosis and correction.

Utilities

The following is a list of the TOPS-10 System Software components:

BACKUP	Saves/restores disk files to/from magnetic tape
BOOTM	Bootstrap load memory from magnetic tape storage
BOOTS	Bootstrap load/dump memory from/to disk storage
COMPIL	Interprets commands including: COMPILE, LOAD, EXECUTE
CREF	Produces cross-reference listings from MACRO and FORTRAN output
CRSCPY	Automatically copies system dump to permanent storage
DAEMON	Provides services including error logging, utilization logging and dumping job images
DDT	Provides on-line interactive debugging for MACRO assembly programs
DIRECT	Produces file directory listings
DTELDR	Loads/dumps PDP-11 memory across DTE interface
FILCOM	Compares source or binary files to highlight differences
FILDDT	Examines/patches disk files
HELP	Types HELP files on user terminal
INITIA	Initializes terminal line characteristics
LINK-10	Merges relocatable modules into object modules
LOGIN	Validates system access
LOGOUT	Terminates system access
MACRO-10	MACRO assembler for TOPS-10
MONGEN	System generator program for configuration dependent software
MAKLIB	Manipulates relocatable library files
NETLDR	Loads/dumps remote nodes across synchronous interface
OMOUNT	Provides operator interface to mount/dismount removable media

OPSER	Controls multiple operator subjobs
PFH	Manages programs working set
PIP	Copies, deletes, and renames files
QUOLST	Lists disk quotas
REACT	Maintains system access files
SCDSET	Maintains scheduler class files
SETSRC	Manipulates job/system search lists
SYSINF	Provides interprocess communications control
SYSTAT	Displays system parameters
TECO	Text editor
TGHA	Detects and records MOS memory errors
UMOUNT	User interface to mount/dismount removable media
WTBOOT	Writes bootstrap to disk

The following utility programs are DIGITAL Supported for the stated conditions only; and are Customer Supported for any other kind of use.

AVAIL
Availability report program
Condition: Reports from AVAIL file

CREDIR
Create user file directories and subfile directories
Condition: Used by operator to create UFDs

DELFIL
Delete files without deallocating space
Condition: Used by operator on files with RIB errors

DSKLST
List contents of disk structure and compute statistics
Condition: Stand-alone system (not timesharing)

DSKRAT
Report on integrity of file structure
Condition: Stand-alone system (not timesharing)

FE
Front-end device interface (RSX-20F to TOPS-10)
Condition: Installation or update of DIGITAL Supported software

FEFILE
Allocate front-end file system (FE.SYS)
Condition: Installation or update of DIGITAL Supported software

FILDAE
Mediate file access based on complex user specification
Condition: For examples in DIGITAL manuals

GLOB
Create global cross-reference file
Condition: For DIGITAL Supported software

HELPER
Module to type HELP files
Condition: For DIGITAL Supported software

MACDLX
Cross-assembler for PDP-11 code
Condition: Installation or update of DIGITAL Supported software

MAKVFU
Create VFU files for line printers
Condition: For DIGITAL Supported software

PAL-10
Cross-assembler for PDP-8/PAL programs
Condition: Installation or update of DIGITAL Supported software

RUNOFF
Text formatting program
Condition: For DIGITAL supplied documentation files

SCAN
Commands parsing subroutine
Condition: For DIGITAL Supported software

SOUP
Source update package
Condition: With DIGITAL supplied correction files

SYSDPY
Repetitive on-line statistics display program
Condition: With VT50 or VT52 terminals

SYSERR
System-error report program
Condition: Reports of DIGITAL supplied hardware

WILD
Subroutine to scan file directories
Condition: For DIGITAL Supported software

MINIMUM HARDWARE REQUIRED:

KL10-E central processing unit, 256K words of memory, console terminal, RP04 or RP06 disk drive with controller, and at least one 1600 BPI magnetic tape transport with controller

OPTIONAL HARDWARE:

Memories

A total of up to 3 million words of memory as follows:

MEM. TYPE	MAX. SIZE
MA20 CORE	256 KW
MB20 CORE	512 KW
MF20 MOS	3072 KW

Disk Systems

RH20 Massbus controller with RP04 or RP06 disk drives

Magnetic Tape Systems

TD10C DECtape controller with TU55 or TU56 tape transports
RH20:DX20:TX02 controller with TU70/71/72 tape transports
RH20:TM02/3 controller with TU45/77 tape transports

Punched Card Equipment

BA10 with CR10E or CR10F card reader
CD20 with CR10E or CR10F card reader
CP10D card punch

Line Printers

LP100 controller with LP05, LP07, LP14 line printer
BA10 controller with LP10F, LP10H line printer
LP20 controller with LP05, LP14 line printer
LP200 controller with LP07 line printer

Plotters

BA10 controller with XY10 plotter control
XY10A Calcomp plotter model 565
XY10B Calcomp plotter model 563

Communications

DTE:DN20 synchronous/asynchronous front-end
DTE:DN87S synchronous/asynchronous front-end
DC20 asynchronous console front-end
DN80, 81, 82 remote job entry/terminal concentrator station
DN200 remote job entry/terminal concentrator station

Terminals

VT100, VT52, VT50, VT05, LA120, LA38, LA37, LA36, LA30, VT37, LT35, and LT33

In addition, 2741 terminals are supported on DN87S front-ends.

Miscellaneous

DK10 programmable real-time clock
DIB20 I/O Bus Interface (1091 only)

The optional hardware described above is supported on configurations as noted in the following table.

Autobaud Detect and Modem Control Support

	DN200	DC20	DN87S	DN82	DN20	DN92
Autobaud Detect	X	X	X	X	X	
Modem Control	X	X	X	X	X	X

PREREQUISITE SOFTWARE:

None

OPTIONAL SOFTWARE:

ALGOL-10
APL-BASIC
APL-SF
BASIC-10
COBOL-74 with SORT/MERGE
CPL-10
DBMS-10
FORTRAN-10
IQL-10 Extended
SORT/MERGE
DECsystem-10 2780/3780 ET

TRAINING CREDITS:

TEN (10) — Applies only to options that include support services. Consult the latest Educational Services Catalog at your local DIGITAL office for the available courses, course requirements, and guidelines.

SUPPORT CATEGORY:

DIGITAL SUPPORTED

TOPS-10 LIR for DECsystem-1091S is a DIGITAL Supported Software Product.

SOFTWARE INSTALLATION:

DIGITAL INSTALLED

DIGITAL installation is required for Software Product Support. There is no charge for installation if performed at the time of system installation. DIGITAL installed software products, except for operating systems, are subject to an add-on installation fee when purchased subsequent to system installation.

SOFTWARE PRODUCT SUPPORT:

TOPS-10 LIR for DECsystem-1091S includes standard warranty services as defined in the Software Support Categories Addendum of this SPD.

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 License Agreement between Purchaser and DIGITAL.

This software is available only on 9-track 1600 BPI Magtape (PE).

TOPS-10 LIR for DECsystem-1091S is available with the following system as indicated.

1091S   Single-use license, sources and binaries, documentation, support services for KL10E systems

ADDITIONAL SERVICES:

Post-warranty Software Product Services are available for licensed customers. Customers should contact their local DIGITAL office for additional information.