digital

Software Product Description

PRODUCT NAME: OS/78, Version 2, DECstation 78 Operating System SPD 4.3.3

DESCRIPTION:

OS/78 is a comprehensive executive designed to support the DECstation 78 computer system. OS/78 provides an extensive collection of application software development tools and an efficient run-time environment for the production use of these application programs. OS/78 is controlled through a Concise Command Language (CCL) that simplifies program development and execution.

Programs stored on diskettes can be accessed for loading, modification or execution by simple keyboard commands. OS/78 also allows program chaining, so that a complex program can be divided into a series of smaller modules.

The CCL (Concise Command Language) allows the user to operate the system through terminal commands. Three classes of functions are available through CCL: system functions, language functions, and utility functions.

System Functions:

Batch Processing

The SUBMIT instruction calls in a batch processor to execute a sequence of commands which have been stored in a file. This feature permits the user to execute a series of pre-determined operations using a single command. SUBMIT also provides an optional method for redirecting line printer output to diskette files when there is no line printer in the system.

I/O Handlers

In addition to I/O support for the VT78 processor and the RX78 diskette drives, OS/78 supports an LQP printer, the LA78 printer and two asynchronous serial line units.

System Configuration

The SET command enables the user to set I/O handler options. (Examples: print-line length, read-only device, etc.)

Concurrent Processing (Symbiont)

A symbiont is a user-written interrupt-driven assembly language program that uses the upper 4K words of memory. The OS/78 symbiont facility allows such a symbiont task to run in parallel with OS/78 while OS/78 operates normally in 12K words of memory. The symbiont task may run communications, print, monitor real-time jobs, etc.

Simple keyboard commands can be used to start the symbiont or to return OS/78 to single-task operation with 16K words of memory.

OS/78 includes an LA78 printer-spooler symbiont.

File Management

The system provides standard routines for the creation, modification, renaming, and deletion of files. CCL commands invoke these routines.

Language Functions:

BASIC

OS/78 BASIC is implemented as a compiler language. It consists of an editor, compiler, and a run-time system, all three supporting BASIC's dual functions as an interactive program development tool and a system for both interactive and batch-mode program execution.

OS/78 BASIC includes features oriented to the commercial user:

- Multiple Data Formats — the system supports three types of data format: floating point numeric, alphanumeric string, and commercial decimal (numeric string) data.
- Commercial Decimal Arithmetic to 15-digit precision, including data format conversion.
- PRINT USING statement for formatted printing of numeric strings; especially useful for columns and tables.
- Full upper/lower case capability.
- Cursor control function to facilitate data entry.
- Random-access record oriented I/O for rapid storing and retrieval of individual records.

Assembler

The PAL command calls a three-pass assembler. The optional third pass creates a side-by-side octal and symbolic listing and symbol table. This assembler accepts input generated by the EDIT function and generates output acceptable to the LOAD (absolute loader) and CREF (Cross Reference Utility) functions.

FORTRAN

OS/78 FORTRAN IV permits generalized array subscripting and 1- to 7-dimension arrays. Large amounts of data can be easily stored and accessed. FORTRAN IV also offers direct access I/O. With this feature, the user can directly reference any record in a data file.

OS/78 FORTRAN IV supports mixed-mode arithmetic, octal constants, logical IF statements, and general integer expressions in IF statements. In addition, OS/78 FORTRAN IV allows initial values in operators, including EQU and XOR.

Text manipulation is aided by Hollerith field specifications for text as well as literals and constants. DATA statements, BLOCK statements and BLOCK DATA statements are supported.

OS/78 FORTRAN IV has a library of mathematical functions for calculating logarithms, absolute values, and trigonometric functions. Other functions manipulate character strings.

Utility Functions:

The HELP utility can display on the screen instructions for use of OS/78 utilities and languages.

EDIT calls a symbolic editor which is used to create and modify ASCII source files so that these files can be used as input to BASIC, the PAL 8 assembler, or the FORTRAN IV compiler.

LOAD calls an absolute loader which reads a binary program into memory and creates a resident memory image suitable for addition to the system library or for immediate execution.

ODT (Octal Debugging Technique) allows the user to run programs under carefully controlled conditions, modify programs during execution, or monitor the state of main memory and processor registers.

CREF (Cross Reference Utility Program) aids the development programmer in writing, debugging, and maintaining assembly language programs by providing the ability to locate all references to a particular symbol. Input is supplied to CREF in the form of an ASCII listing file produced by the PAL assembler.

The MAP command runs a utility program that constructs a table showing the memory locations used by a particular binary file. This feature assists the programmer in allocating memory.

DIRECT produces a listing of the file directory for any OS/78 diskette. Selective listings can be obtained through the use of command options.

DUPLICATE allows the copying of an entire diskette with a single command.

The COPY command transfers one or more selected files from diskette to any I/O device. The method of specifying files is flexible and allows users to copy selected groups of files with simple commands.

MINIMUM HARDWARE REQUIRED:

DECstation 78/40

OPTIONAL HARDWARE:

LQP 78 Letter Quality Printer
LA78-P Line Printer
Additional RX78 Dual Floppy Disk Drive

PREREQUISITE SOFTWARE:

None

OPTIONAL SOFTWARE:

MACREL/LINKER

TRAINING CREDITS:

None

SUPPORT CATEGORY:

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

UPDATE POLICY:

Software Updates, if any, released by DIGITAL during the one (1) year period following installation, will be provided to the customer for a media 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.

Source and/or listing options are only available after the purchase of at least one supported license and after a source license agreement is in effect.

The following key (Y) represents the distribution media for the product and must be specified at the end of the order number, e.g., QF022-AY = binaries on floppy disk.

Y = RX01 Floppy Diskette

Standard Options

For DECstation 78-A Systems

78/40   -B— DECstation 78 (tabletop), single-use license, binaries, documentation, support services (media: Y)

78/40   -D— DECstation 78 with cabinet, single-use license, binaries, documentation, support services (media: Y)

78/60   -D— DECstation 78, single-use license, binaries, documentation, support services (media: Y)

QF022   -A— Single-use license, binaries, documentation, support services (media: Y)

Upgrade Options

The following option is available as an upgrade kit from OS/8, Version 3D, for use on the same single CPU on which OS/8, Version 3D, is licensed. The license previously granted for OS/8, Version 3D, shall be extended to cover this upgrade.

QF023 -C— OS/78 Version 2 Single-use license, bi-
           naries, documentation, no support ser-
           vices (media: Y)

Update Options

Users of OS/78, Version 1, whose specified Support
Category warranty has expired may order under li-
cense the following software update at the then
current charge for such update. The update is distrib-
uted in binary form on the appropriate medium and
includes no installation or other services unless spec-
ifically stated otherwise.

QF022 -W— Binaries, documentation (media: Y)

Source/Listing Options
QF022 -E— All sources (media: Y)

ADDITIONAL SERVICES:

None

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.