digital

Software Product Description

DESCRIPTION:

TRAX is designed to provide a transaction processing environment for the PDP-11/34, 11/60, and 11/70. The system supports both an *application environment* and a *support environment*. The application environment is used exclusively for execution of user-written transaction processing applications. It includes screen formatting for the VT62, transaction routing, transaction logging, file update journaling, and automatic recovery/restart.

The TRAX support environment can be used for:

- application batch processing and line printer spooling
- program development, including the macro assembler, text editing, compiling, linking, debugging, and documentation preparation
- constructing a transaction processor
- managing a TRAX system
- backing up and restoring system data files

The support environment can operate concurrently with the application environment (on a PDP-11/70) if there is sufficient memory. Programs run under the TRAX support environment are written as stand-alone units. These programs can be initiated from a support terminal or as part of a batch stream under the control of a batch processor.

The RMS record management services included with TRAX support sequential, relative, and multi-key indexed file organizations. The SORT program provides the ability to reorder data files into a new file based upon key fields of input-data records.

The Application Terminal Language (ATL) is used to define screen forms. ATL allows an application program to define individual fields and to enable terminal function keys. ATL formats messages to be processed by application programs and replies sent from application programs to terminals.

The two basic software configurations are:

- TRAX with COBOL
- TRAX with BASIC-PLUS-2

In the support environment, users write applications as *transaction processors* that execute in the application environment. A transaction processor is a collection of data tables and software. Transaction processors and their accompanying TRAX services are the system elements that make TRAX transaction processing possible. Each transaction processor includes:

- a definition for each transaction in the application
- definitions of forms to be used at application terminals
- application programs for each application-specific processing step
- specifications for each file accessed, including journaling requirements
- transaction processor support services provided by TRAX

TRAX provides extensive support services to a transaction processor. The only application routines that must be programmed are the routines to handle application-specific processing steps; all that remains to construct a transaction processor is the generation of several data tables and definitions. These tables drive the TRAX transaction processor support services and give the transaction processor the desired characteristics.

A transaction processor is constructed by a programmer or designer interacting with the system via the transaction processor generation utilities from a support environment terminal.

Program Development

The support environment provides facilities for program development.

Text Preparation

Source programs and documentation are prepared on-line in the support environment with the DIGITAL standard editor, EDT. Screen mode display, cursor control are used to enter, display, and edit text. A text formatting program is available for documentation files.

Compilation and Linking

The DCL command language provides commands to translate a source program into a runnable program or task.

Debug

Individual application programs are debugged in the support environment using the DEBUG utility. DEBUG emulates the transaction environment yet gives the programmer access to interactive debugging facilities such as the BASIC-PLUS-2 debugger. In addition, it

allows the programmer, either interactively or via a file, to provide the input messages for the application program to process. All external calls made by the application program are logged in a file or on the support terminal.

When all application programs are individually tested, a debug transaction processor can be constructed to run in the application environment. This incorporates a full trace facility as well as software error logging for the operator's use.

System and Data Integrity

Data integrity, availability, and reliability are provided by backup, restore, automatic restart, and security facilities.

Record locking ensures that simultaneous updates to a record do not destroy the integrity of the user's file set. The system staging facilities protect file sets from transaction aborts. Journaling can provide parallel recording of changes to staged data files as transaction execution tasks are completed. Facilities are provided for off-line application of recorded changes to a backup copy of an application's file set to fully restore the file set in the event of a system failure. Off-line facilities can back up user data file sets or restore them from previous backup copies. The system recovers from system or user transaction aborts and resource interlocks between transactions.

TRAX recovers from most system crashes, including power failure. Transactions in progress will be aborted, with the system performing all required cleanup operations. If a transaction instance has been completed, but the system is in the process of applying staged file updates when the crash occurred, then upon restart the system will perform all necessary operations to assure that the updates are correctly applied.

Application Terminal Security

Application terminal security is provided by utilities that establish sign-on/sign-off definitions, work classes, and user authorizations.

A work class is a list of transactions stored as part of the transaction processor. When associated with a terminal station or a user identifier, a work class determines the transactions permitted a station or user. A given transaction can be included in any number of work classes.

Batch and Spooling

A centralized QUEUE facility within the support environment allows the generation of multiply-named work queues and the subsequent submission of batch or line printer spooling jobs to named queues. The submission can occur from a support terminal, from a program running in the support environment, or from a transaction application program running in a transaction processor. Multiple batch processors and line printer spoolers can operate concurrently.

Software Performance Monitoring

A set of utilities can be used to produce extensive transaction processor statistics. These utilities keep track of various system parameters and provide a picture of the transaction processor operation over chosen periods of time. The statistics collected include station, cache, transaction, and data file statistics as well as general system statistics.

The reports provided by these utilities contain user-selected data. The report generation utility can run independently of the sample gathering so that reports can be generated during off hours or as a low priority background job.

Software Error Logging

Software error logging provides the ability to log all transaction processor-detected errors to a disk file and optionally to a support terminal. A utility can be used to select and format the software error entries into an error log report.

Software error logging detects malfunctioning applications software and provides a tool to debug an on-line transaction system. The software error log also reports terminal status errors and hardware errors that were detectable only by software.

Hardware Error Logging

Hardware error logging monitors the hardware reliability of the system.

It detects and records information about hardware errors as they occur whether or not the errors are recoverable.

The analysis and report utilities can be used to detect increased error frequency and can thus aid the scheduling of maintenance.

System Generation

System generation includes interactive dialogue and hardware auto-sizing. Everything the system can do by itself is done without involving the operator. All TRAX options are fully installed by answering "yes" to a question and mounting the option tape; no special installation instructions are required. When the generation is complete, a copy of the system is stored on magnetic tape so system generation need not be repeated.

Patching is fully automated; all control and patch data reside on a single magnetic tape.

On-line Diagnostics

A set of diagnostics can be run from the support environment while normal system operation continues. Possible hardware problems can be investigated without terminating normal system operation.

MINIMUM HARDWARE REQUIRED:

The minimum hardware configurations described below will support four VT62 terminals with a transaction processor cache (user area) of 32K bytes.

- PDP-11/34, or PDP-11/60 (no WCS support), with at least 192K bytes of memory
- PDP-11/70 with at least 256K bytes of memory (at least 384K bytes of memory are required to operate the application and support environments concurrently)

with

- KT11 Memory Management Unit

- LA36 Console terminal
- KW11-L or KW11-P clock, or DL11-WA/WB console interface and line frequency clock
- One of the following disk systems
  1. RK711 (11/34, 11/60 only) disk cartridge controller, and drive, and an additional RK07 disk drive.
  2. RJM02 (11/34, 11/60 only) disk pack controller and drive.
  3. RWM03 (11/70 only) disk pack controller and drive.
  4. RJP04 (RWP04 for 11/70) disk pack controller and drive.
  5. RJP05 (RWP05 for 11/70) disk pack controller and drive.
  6. RJP06 (RWP06 for 11/70) disk pack controller and drive.
- One of the following magnetic tape systems:
  1. TJE16 (TWE16 for 11/70) magnetic tape controller (includes one TE16 transport).
  2. TJU45 (TWU45 for 11/70) magnetic tape controller (includes one TU45 transport).
  3. TJU16 (TWU16 for 11/70) magnetic tape controller (includes one TU16 transport).

OPTIONAL HARDWARE:
- Additional memory to a system total of 248K bytes for 11/34 and 11/60, or additional memory to a system total of 3840K bytes for 11/70.
- FP11 Floating Point Processor
- KE11-F Floating Instruction Set
- KW11-C Calendar Clock
- 96-character, 132-column LP11 line printer
- LA180P

MASS STORAGE:
- RK07, RP04, RP05, or RP06 disk pack drives (with appropriate controller)
- RM02 disk pack drives (with appropriate controller)
- RM03 disk pack drives (with appropriate controller)
- TU16, TE16, or TU45 tape transports (with appropriate controller)

One of the following (for 11/70 systems only)
- An additional RWM03 disk pack controller
- An additional RWP04 disk pack controller
- An additional RWP05 disk pack controller
- An additional RWP06 disk pack controller

TERMINALS:
- Up to 16 LA36 or VT52 support environment terminals connected by DZ-11A, -B, or -E interfaces or DL-11D interfaces. Up to 8 LA36 or VT52 support environment terminals when operating the support environment and the application environment concurrently.

Up to a total of 64 application environment terminals (VT62, LA180P (attached to VT62) or LA180S) using:
  1. At most 48 asynchronous terminal lines provided by a dedicated KMC11-A and DZ11-A, -B, or -E interfaces.
  2. At most 16 synchronous terminal lines provided by a dedicated KMC11-A and DUP11 interface(s). Each DUP11 can support up to a maximum of 8 VT62 terminals.

NOTE:
An asynchronous or synchronous terminal line can support a maximum of 8 multidropped terminals.

PREREQUISITE SOFTWARE:
None

OPTIONAL SOFTWARE:
TRAX/COBOL (available only for TRAX with TRAX/BASIC-PLUS-2)
TRAX/BASIC-PLUS-2 (available only for TRAX with TRAX/COBOL)
TRAX/TL (Transaction Link)
TRAX/3271-TL

TRAINING CREDITS:
FOUR (4) — Applies only to options that include support services. Consult the latest Educational Services Catalog at your local office for the available courses, course requirements, and guidelines.

SUPPORT CATEGORY:
A — 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.

Standard options with no support services are only available after the purchase of one supported license. When a software license is ordered without support services, the category of support applicable to such software is Category C.

A single-use license only option is a license to copy the software previously obtained under license, and use such software in accordance with DIGITAL's Standard Terms and Conditions of Sale. The category of support applicable to such copied software is Category C.

The following key (M, Z) represents the distribution media for the product and must be specified at the end of the order number, e.g., QP408-AM = binaries on 9-track magnetic tape.

M = 1600 bpi 9-track Magnetic Tape
Z = No hardware dependency

Standard Options

This software is not available as a separate product (except as specified under upgrade options). Package systems are available that include TRAX software.

Upgrade Options

The following option is available to licensed users of RSTS/E and COBOL-11, IAS and COBOL-11, or RSX-11M and COBOL-11. This option is only available to users who purchased a license for RSTS/E, IAS, or RSX-11M before April 27, 1978. Use is limited to the single CPU on which such license presently exists, and is governed by the provisions of such license.

QP407 -AM—

Single-use license for TRAX with TRAX/COBOL, binaries, documentation, support services

The following option is available to licensed users of RSTS/E and BASIC-PLUS-2, IAS and BASIC-PLUS-2, or RSX-11M and BASIC-PLUS-2. This option is only available to users who purchased a license for RSTS/E, IAS, or RSX-11M before April 27, 1978. Use is limited to the single CPU on which such license presently exists, and is governed by the provisions of such license.

QP408 -AM—

Single-use license for TRAX with TRAX/BASIC-PLUS-2, binaries, documentation, support services

NOTE:

User should be aware that TRAX may not support all of the hardware supported by the RSTS/E, IAS, or RSX-11M operating systems.

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.