Software Product Description

PRODUCT NAME: BASEstar Classic for OpenVMS VAX, Version 3.4A **SPD 33.17.06**

DESCRIPTION

BASEstar Classic software facilitates the integration of manufacturing applications with plant equipment, accelerates development of integrated manufacturing systems, and provides an architecture for consistent development of manufacturing applications. BASEstar software has features for manufacturing application integration, device connection and control of plant equipment, and storage and management of device and operator files through its library system.

BASEstar Classic's software operates in a distributed OpenVMS VAX and/or Alpha processing environment. Its application integration features include the ability to collect, manage, and distribute plant data, automatically notify applications of critical changes in plant information, and synchronize execution of manufacturing applications. BASEstar's distributed capabilities allow globally defined objects, residing on any node in the network, to be used by applications residing on different nodes in a BASEstar network.

BASEstar device integration software gives generic device access and control for plant equipment through an interface that is independent of device-specific operations and protocols. BASEstar device connection management software is dependent on equipment level communications achieved through BASEstar Device Access Software (DAS), allowing data to be obtained through standard mechanisms and made available throughout the BASEstar network. BASEstar device connection management capabilities can also be used to start and stop device operations, upload from and download to the memory of programmable devices, and perform other standard functions offered by industrial control devices.

BASEstar CIMfast software is included in BASEstar Classic to provide a 4GL programming environment for BASEstar application developers. CIMfast is an application enabler that allows even inexperienced BASEstar application developers to create BASEstar applications quickly.

BASEstar offers two distinct interfaces. The BASEstar command line interface (CLI) is used by system managers and manufacturing engineers in configuring the BASEstar environment (such as defining users, devices, and data points, setting up system security, and recording system events in a central log file). BASEstar software also offers an application programming interface for software developers, providing callable services for application and device integration.

BASEstar is licensed as two packages:

- BASEstar Classic Development is a development license enabling software developers to integrate manufacturing applications and devices. It also provides the option to create applications using the CIMfast application enabler.
- BASEstar Classic Runtime is a runtime license allowing applications and devices integrated with BASEstar software to run in a BASEstar environment. It provides the capability to execute previously developed callable or standalone CIMfast applications, create standalone CIMfast applications, but not to create callable CIMfast applications.

Features

Application Integration

- Data Management

  BASEstar software's data management capabilities provide a common mechanism for defining, organizing, and accessing data in an integrated manufacturing environment. This data comes from a variety of sources including plant devices, area, plant or work cell applications, and user input.

  BASEstar software defines discrete data elements, called "logical points," to manage manufacturing data. These logical point definitions reference both single data elements and data structures, allowing users maximum flexibility in data definition and acquisition. When BASEstar software starts, each point value is set to an initial value or to its last known value. Because BASEstar data is referenced by name, applications are independent of data sources and do not require alteration when sources of data change.

BASEstar data management includes the ability to access and change point values and definitions, receive notification of point value changes, and obtain point values by performing arithmetic or logical operations through BASEstar expression processing. BASEstar notification of point value changes also includes fields within structured points, providing notification when a field value changes. Through these capabilities, BASEstar software acts as the hub for collecting and distributing current-value manufacturing data to integrated manufacturing applications.

Manufacturing data collected by BASEstar software can be formatted to database specifications and exported to an Rdb/VMS database for use in data analysis applications such as historical trend analysis and statistical quality control. In addition, BASEstar data can be exported to other external destinations including a database of choice, an application, or another computer system. BASEstar technical documentation describes how to write a database server to export BASEstar data to an external destination.

- Distributed Messaging

  BASEstar event-driven messaging is a controlled and efficient means of message communication between manufacturing applications. BASEstar messaging isolates applications from networking protocols and communications paths and provides a means by which applications can communicate whether they reside on a single system or are distributed throughout a network.

  BASEstar messaging offers users the ability to create, receive, and send messages between applications synchronously or asynchronously.

  It supports three types of messaging: point-to-point messaging, messaging over a circuit between two ports, or messaging to a circuit cluster port that forwards the message to multiple destinations.

  DECmessageQ is Digital's NAS implementation of a message queuing system that supports interprocess communication in a heterogeneous environment between independent tasks for receiving and sending messages. The integration of DECmessageQ with BASEstar software allows BASEstar applications to receive BASEstar data change notification through DECmessageQ queues.

- Application Control and Synchronization

  BASEstar application control coordinates the start up and shut down of applications within a distributed manufacturing system. After BASEstar start up is complete, a site-specific startup command file executes to start BASEstar applications. BASEstar applications can also be started by sending a message to a server port which is associated with the executable image of the application to be started. Applications can also be started remotely on any BASEstar system using a BASEstar callable service.

  When BASEstar shuts down, it sends a shutdown message to all application message ports. Any BASEstar application can create a message port to receive this shutdown request and proceed with an orderly shut down.

  BASEstar synchronization services give software developers a sophisticated mechanism for synchronizing application processing in a distributed environment. These services also provide a means to synchronize access to user-specified resources.

- Application Development

  BASEstar Classic software includes two tools to facilitate the development of BASEstar applications. The Value Notification Utility is a testing tool to notify an application developer when a logical point value has changed. The BASEstar LSE Environment extends the VAX Language-Sensitive Editor (LSE) to provide expandable tokens for BASEstar callable services, DAS support routines, and BASEstar application programming interface (API) constants.

- CIMfast application enabler

  CIMfast provides the following benefits to BASEstar application developers:

  — Fully portable applications

  — Reduced development time

  — Reduced application complexity

  — Enhanced software maintainability

  — Rapid prototyping capability

  CIMfast provides a very high level event-driven language especially suited for describing highly asynchronous BASEstar interaction. This language, called the CIMfast Event Language (CEL), allows the user to describe in very simple terms what BASEstar Events will be reacted to. For each Event, the user can specify a sequence of Actions to be taken when this Event occurs. The CIMfast Event Language provides a wide range of Events and Actions that support the typical interaction of an application with BASEstar.

Device Integration

- Device Access and Control

  BASEstar Classic software enables applications to interact with plant devices without knowing any of their physical characteristics such as location, protocol, or device-specific data formats. BASEstar uses device access software modules to provide device access and control capabilities including:

  — Allocating devices for exclusive use

— Reading data from and writing data to devices by address

— Reading data from and writing data to devices by name

— Starting/stopping devices and device programs

— Selecting device programs for execution

— Reading status and diagnostic information from devices

— Uploading files or device programs from devices

— Downloading files or device programs to devices

— Deleting files from devices

— Displaying file directories from devices

— Deallocating devices

The implementation of the specific DAS determines which operations are available.

- Data Collection

  BASEstar software collects data from plant devices upon request, at regular predefined intervals, or when generated by the device. Polling is a means of collecting data by reading specified address registers in the memory of a programmable device at predefined intervals. Pollsets define the set of points from which data is collected.

  Triggered polling is new functionality which allows a pollset read to be initiated by an event. Triggered polling causes a pollset read to be executed when the value of a BASEstar logical point changes.

  In addition to polling, BASEstar software can also receive unsolicited data from plant equipment. The ability to collect unsolicited data directly from a device eliminates the processing overhead involved in continuously polling devices to receive data.

- Device Access Software (DAS)

  Manufacturing devices from various vendors use different data protocols and command structures when connecting to a computer system. BASEstar uses special modules called device access software (DAS) to communicate between BASEstar and the device controllers of a particular manufacturer. BASEstar software includes example DAS modules for RS-232 devices and for DECnet and TCP/IP networks.

  BASEstar software includes three DAS modules. The RS-232 DAS enables communication with devices having an RS-232 serial port. The DECnet and TCP/IP DAS enables communication with applications through DECnet and TCP/IP networking software to integrate applications running on an MS–DOS® personal computer or on a UNIX® system with BASEstar device connection management software. The DECdevice DAS emulates the memory of a simple manufacturing device for testing applications using BASEstar device connection management functionality.

  BASEstar device access software is available for leading industrial control devices from many vendors. In addition, BASEstar technical documentation explains how to develop DAS modules for any plant device.

Configuration Management

- Named Objects

  The BASEstar environment is a collection of named objects such as plant devices, users, and data point values (i.e., alarm and status data, production counts, etc.). Manufacturing applications need access to these resources by functional use rather than in a manner that is system-dependent and organized by the physical locations of objects. BASEstar named objects including logical points, devices, and groups can be organized as collections and referenced by application programs using BASEstar group services. In addition, objects can be defined with local or global scope. Local objects are known only on the local system. Global objects can be referenced by name by any application in a BASEstar domain.

- Distributed Capabilities

  BASEstar system objects are defined with a characteristic known as "scope" indicating how they can be accessed within a BASEstar network. BASEstar objects with a local scope are known by name only on systems where they were defined. BASEstar objects with a global scope can be accessed by any application within a BASEstar domain by referencing the object name only. Local objects can also be referenced by any application within a BASEstar domain, but can only be referenced remotely by specifying the node name along with the object name.

- Security

  BASEstar software offers security through access control lists (ACLs) which can be assigned to BASEstar objects such as systems, users, devices, and points. OpenVMS rights identifiers in conjunction with ACLs provide a means to grant or deny access to an object for a specific user or group of users. BASEstar security allows a system manager to provide security only where it is needed. Access between BASEstar systems can also be restricted where isolation of BASEstar systems is required.

- Event Logging

  BASEstar event logging provides the ability to centrally record BASEstar application, system, and network events such as object definitions, point value

changes, downloads to device memory, as well as errors and other diagnostic information. Events can be logged from an application program, as well as the menu interface, CLI, and CIMfast. In addition, software developers can retrieve the text of an event message and use it for system integration and debugging purposes.

- System Configuration and Tuning

  BASEstar software uses a system parameter database to size memory resident database sections, select performance trade-offs, and alter the customizable characteristics of a BASEstar system. These parameters can be changed using the BASEstar CLI.

  For system analysis purposes, BASEstar software has two monitor utilities supplying configurable, continuously updated displays on video terminals. Monitor BASEstar provides data to facilitate the tuning and optimization of processes running in the BASEstar environment. Monitor Port displays usage data for all message ports defined on the BASEstar system.

Interfaces

- Command Line Interface (CLI)

  The BASEstar CLI is a DCL-like interface for use by system managers, process engineers, and application programmers. Commands are provided for performing general operations such as BASEstar object configuration and management, and for system operations such as defining security, displaying BASEstar memory, and replicating a BASEstar system.

- Application Programming Interface (API)

  BASEstar software's application programming interface allows software programmers to create and integrate manufacturing applications using BASEstar functions. Through the use of the API, BASEstar software can be completely embedded within an integrated manufacturing system.

INSTALLATION

Digital recommends that a customer's first purchase of this software product include Digital Installation Services. These services provide for installation of the software product by an experienced Digital Software Specialist.

For subsequent purchases of this product, only experienced customers should attempt installation. Digital recommends that all other customers purchase Digital's Installation Services.

Customer Responsibilities

Before installation of the software, the customer must:

- Previously have installed all requisite software and hardware including terminals.
- Make available for a reasonable period of time, as mutually agreed by Digital and the customer, all hardware, communication facilities, and terminals that are to be used during installation.

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

HARDWARE REQUIREMENTS

Processors Supported

Any VAX-compliant processor that is capable of running the supported versions of the OpenVMS operating system.

Processor Restrictions

A TK50 Tape Drive is required for standalone MicroVAX 2000 and VAXstation 2000 systems.

A minimum of 16 MB of memory is required for an installation with all options installed.

Disk Space Requirements (Block Cluster Size = 1)

Disk space required for installation:

BCC	31,500 blocks
BCCUTL	3,300 blocks
DCM	18,000 blocks
BRI	1,150 blocks
BCF	5,000 blocks

Disk space required for use (permanent):

BCC	24,600 blocks
BCCUTL	400 blocks
DCM	16,000 blocks
BRI	800 blocks
BCF	4,500 blocks

These counts refer to the disk space required on the system disk. The sizes are approximate; actual sizes may vary depending on the user's system environment, configuration, and software options. This does NOT account for the local database files needed for each specific node in the cluster. These files depend on the number of objects the user tells the installation they will be creating. For BASEstar, the minimum size of the local BASEstar database files would be 12,000 blocks, and for DCM it would be 4000 additional blocks.

CLUSTER ENVIRONMENT

This layered product is fully supported when installed on any valid and licensed VAXcluster configuration. However, to enable this product, installation of the software is required per VAXcluster node. The HARDWARE REQUIREMENTS section of this product's Software Product Description details any special hardware required by this product. (Note: VAXcluster configurations are fully described in the VAXcluster Software Product Description (SPD 29.78.xx) and include CI, Ethernet, and Mixed Interconnect configurations).

SOFTWARE REQUIREMENTS

For Systems Using Terminals (No DECwindows Interface):

- OpenVMS VAX Operating System V5.5-2, V6.0, V6.1, V6.2, V7.0, V7.1.
- A minimum of OpenVMS V6.1 is required when using the CIMfast option.
- DEC C Runtime Library Components for OpenVMS is needed for CIMfast option

Note: This product does not support DESKtop-VMS Software.

OpenVMS Tailoring

For OpenVMS VAX V5.x, the following OpenVMS classes are required for full functionality of this layered product:

- OpenVMS Required Saveset
- Network Support
- Programming Support
- System Programming Support
- Secure User's Environment
- Utilities
- Miscellaneous Files

For more information on OpenVMS classes and tailoring, refer to the OpenVMS VAX Operating System Software Product Description (SPD 25.01.xx).

OPTIONAL SOFTWARE

- Digital RDB V6.0, or Oracle V7.1 is required for CIMfast SQL option.
- DECmessageQ for OpenVMS VAX V2.0 or V2.1 for interprocess messaging and/or CIMfast option
- VAX Language-Sensitive Editor V3.1 - V4.0
- VAX FMS V2.3 or V2.4 (run-time system) is required only if the Menu System will be used. It is not required for basic BASEstar operation.

GROWTH CONSIDERATIONS

The minimum hardware/software requirements for any future version of this product may be different from the minimum requirements for the current version.

DISTRIBUTION MEDIA

9-track 1600 BPI Magtape, TK50 Streaming Tape

This product is also available as part of the OpenVMS Consolidated Software distribution on CDROM.

The software documentation for this product is also available as part of the OpenVMS VAX Online Documentation Library on CDROM.

ORDERING INFORMATION

Note: License units for BASEstar Classic allow for development and runtime kits, with Unlimited System Use.

BASEstar Classic Development

Software Licenses: QL-YU9A9-AA
Software Media: QA-YU9AA-**
Software Documentation: QA-YU9AA-GZ
Software Product Services: QT-YU9A*-**

BASEstar Classic Runtime

Software Licenses: QL-YUAA9-AA
Software Media: QA-YUAAA-**
Software Documentation: QA-YUAAA-GZ
Software Product Services: QT-YUAA*-**

* Denotes variant fields. For additional information on available licenses, services and media, refer to the appropriate price book.

SOFTWARE LICENSING

This software is furnished only under a license. For more information about Digital's licensing terms and policies, contact your local Digital office.

License Management Facility Support

This layered product supports the OpenVMS License Management Facility.

License units for this product are allocated on an Unlimited System Use.

For more information on the License Management Facility, refer to the OpenVMS VAX Operating System Software Product Description (SPD 25.01.xx) or the License Management Facility manual of the OpenVMS VAX Operating System documentation set.

SOFTWARE PRODUCT SERVICES

A variety of service options are available from Digital. For more information, contact your local Digital office.

SOFTWARE WARRANTY

Warranty for this software product is provided by Digital with the purchase of a license for the product as defined in the Software Warranty Addendum of this SPD.

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