

HONEYWELL

DPS 6

IBM

DISTRIBUTED

DATA

PROCESSING

OVERVIEW

SOFTWARE

**DPS 6
IBM DISTRIBUTED DATA
PROCESSING OVERVIEW**

SUBJECT

DPS 6 Support of IBM Distributed Data Processing

SPECIAL INSTRUCTIONS

This manual supersedes *DPS 6 Level 6 IBM Distributed Data Processing Overview*, CR56-01, dated March 1983. Change bars in the margin indicate new or changed information; asterisks indicate deletions.

SOFTWARE SUPPORTED

This manual supports Release 1.2 of the Systems Network Architecture running under Release 3.1 of the MOD 400 Executive.

ORDER NUMBER

CR56-02

March 1985

PREFACE

This manual is written for those who wish to understand the capabilities supported by DPS 6 systems in IBM networks using either Systems Network Architecture (SNA) or Binary Synchronous Communications (BSC) products. This manual assumes the reader has general knowledge about IBM Distributed Data Processing (DDP) concepts and does not explain such concepts.

This manual describes those GCOS 6 capabilities that support IBM SNA or BSC products. It also includes an application scenario illustrating the use of GCOS 6 facilities in an IBM SNA network.

The major topics discussed in this manual are:

- An application scenario, illustrating the use of DPS 6 in an IBM SNA or BSC environment
- An overview of DPS 6 SNA capabilities
- An overview of DPS 6 BSC capabilities
- Overviews of GCOS 6 software and DPS 6 hardware
- An overview of DPS 6/IBM networks.

In this manual, the term "MOD 400" refers to the GCOS 6 MOD 400 Executive, which executes on DPS 6 hardware. "DPS 6" refers to DPS 6, disk-based microSystem 6/10, or microSystem 6/20 hardware, unless otherwise noted.

USER COMMENTS FORMS are included at the back of this manual. These forms are to be used to record any corrections, changes, or additions that will make this manual more useful.

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The following conventions are used to indicate the relative levels of topic headings used in this manual:

<u>Level</u>	<u>Format</u>
1 (highest)	<u>ALL CAPITALS, UNDERLINED</u>
2	<u>Initial Capitals, Underlined</u>
3	ALL CAPITALS, NOT UNDERLINED
4	Initial Capitals, Not Underlined

MANUAL DIRECTORY

Manuals are obtained by submitting a Honeywell Publications Order Form to the following address:

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SNA MANUALS

The following publications constitute the DPS 6/SNA manual set for Release 1.2 of SNA.

<u>Order Number</u>	<u>Manual Title</u>
CR56	IBM Distributed Data Processing Overview
CR57	DPS 6/SNA Administrator's Guide
CR58	SNA Interactive Terminal Facility User's Guide
CR59	SNA Remote Job Entry Facility User's Guide
CR60	SNA File Transfer Facility User's Guide
GR11	SNA Application Programmer's Guide
CZ74	GCOS 6 Data Base Augmented Real-Time Tracing System User's Guide
GB88	SNA Host System Programmer's Guide

SOFTWARE RELEASE BULLETIN

The SNA product is described in a Software Release Bulletin. Consult the Software Release Bulletin before using the software. The DPS 6/SNA Software Release Bulletin is:

<u>Order Number</u>	<u>SRB Title</u>
GR12	SNA Software Release Bulletin

Contact your Honeywell representative if a copy of the Software Release Bulletin is not available.

MOD 400 MANUALS

The MOD 400 manual set provides information prerequisite to using the SNA manual set. Honeywell software reference manuals are periodically updated to support enhancements and improvements to the software. Before ordering any manuals, refer to the Manual Directory of the MOD 400 Guide to Software Documentation to obtain information concerning the specific edition of the manual that supports the software currently in use at your installation. If you use the four-character base publication number to order a document, you will receive the latest edition of the manual. If you wish to order a specific edition of a document, you must use the seven- or eight-character publication number listed in the MOD 400 Guide to Software Documentation.

IBM MANUALS

Refer to these IBM documents for host programming, operating, application, and configuration information.

Order Number

Manual Title

SC27-0164	ACF/VTAM Messages and Codes
SC27-0449	ACF/VTAM Programming
SC27-0611	ACF/VTAM Planning and Installation Reference
SC30-3167	ACF/NCP Installation and Resource Definition
SC30-3168	ACF/NCP System Support Programs: Utilities
SC30-3169	ACF/NCP and Emulation Program: Messages and Codes
SC23-0046	JES2 Initialization and Tuning
SC33-0149	CICS Resource Definition Guide



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Section 1

INTRODUCTION

A DPS 6 computer executing under the control of GCOS 6 MOD 400 can communicate with IBM host networks that use Systems Network Architecture (SNA) and/or Binary Synchronous Communications (BSC) products. The GCOS 6 facilities require no additional host system programming, and minimal changes in standard operation, to engage in communication. DPS 6 hardware in conjunction with GCOS 6 software allows data entry, word processing, batch processing, transaction processing, and program development to occur concurrently with communications to an IBM host.

DPS 6 COMMUNICATIONS WITH IBM HOST PROCESSORS

GCOS 6 supports software facilities that execute on DPS 6 hardware and emulate the standard functions of some widely used IBM communications devices. These facilities allow dynamic connection to an IBM host. Terminals do not have to be dedicated; when they are not being used to communicate with an IBM host, they can be used for any other purpose.

Both SNA and BSC modes of operation use the same processors, operating systems, peripherals, and terminals. Indeed, SNA and BSC facilities can operate concurrently under GCOS 6.

DPS 6/IBM APPLICATION SCENARIO

The following paragraphs describe the possible use of DPS 6 in an SNA network. DPS 6 could be used in a similar way in a BSC network, with the exception of file transfer.

Suppose that a consumer goods distributor has 14 sales offices, four regional warehouses, and a data processing center located in the Midwest. The host of the network is located at the data processing center. Sales offices process orders, answer customer inquiries, and ensure that accounts receivable are collected from the customers in the sales offices' regions. The regional warehouses fill orders that originate from the sales offices. The various components of the company communicate with each other by means of the network that is illustrated in Figure 1-1. The applications used at the sales offices and the warehouse are summarized in Figure 1-2.

Order entry clerks at the sales offices enter orders using a GCOS 6 TPS 6 transaction processing program. The transaction processing program ensures that each order is valid; it checks that customer numbers, names, addresses, and credit terms are correct and that product numbers, descriptions, weights, and prices are valid. The entered orders are collected and transmitted to the host periodically, using the GCOS 6 SNA Remote Job Entry (RJE) Facility. When the day's orders have been collected from all the sales offices, applications at the host compare orders against inventory to determine whether the product is available and, if it is, to which warehouse to send the order. If the product is not available, it must be back ordered. The sales offices use the GCOS 6 SNA Interactive Terminal Facility (ITF) to communicate with CICS at the host to determine order status (back order, shipped, etc.). The sales offices use the Office Automation System Facility (OASF) for correspondence, both internal and external (sales drives, past-due notices, reports, memos, etc.).

The warehouses use the SNA RJE Facility to print orders and select lists that are routed to the warehouses by the host. The warehouses use the GCOS 6 SNA File Transfer Facility (SFT-6) to send information back to the host, including labor hours, payroll, and inventory counts. The information sent back to the host is transmitted as disk files, created using the GCOS 6 Data Entry Facility-II (DEF-II).

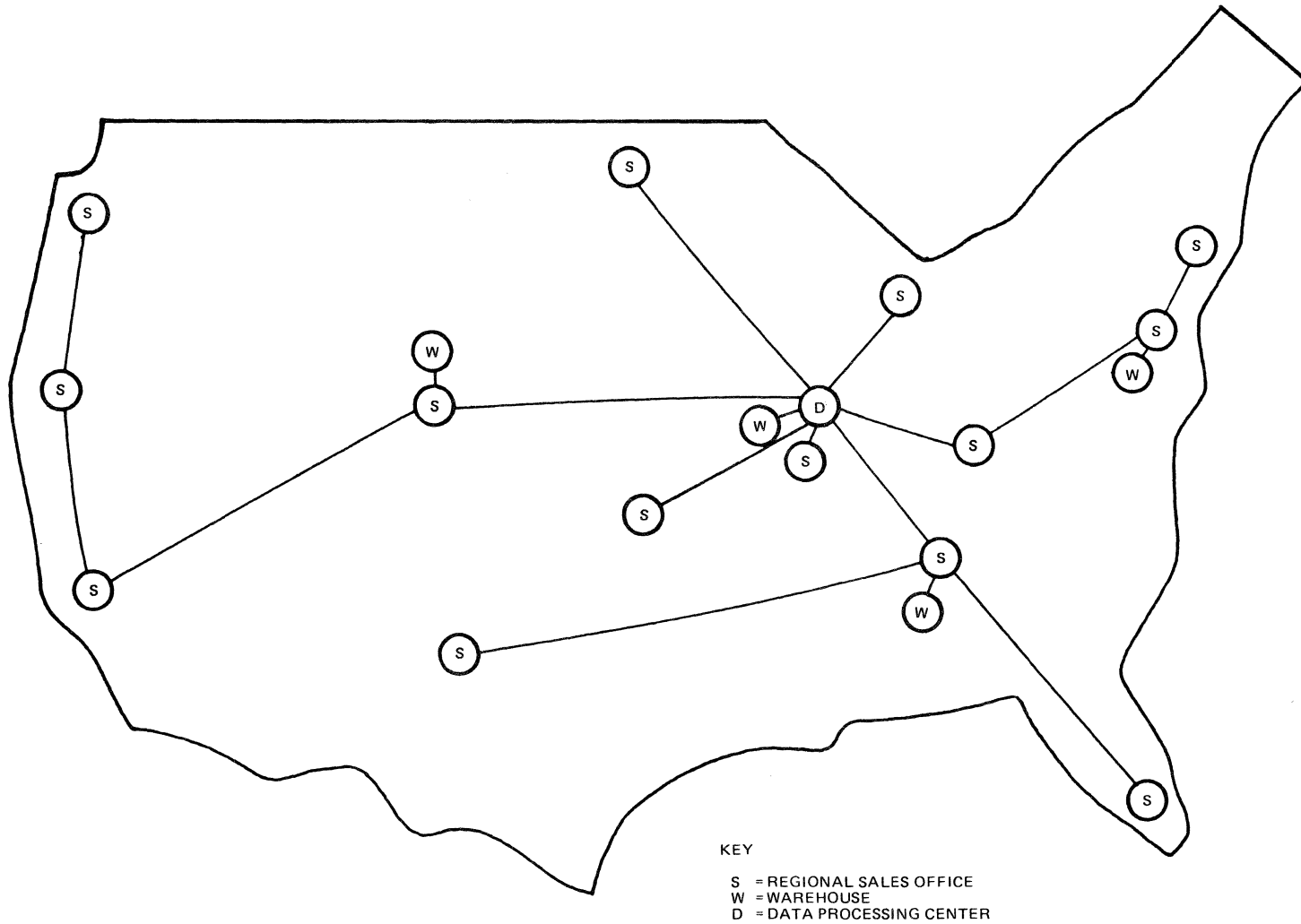
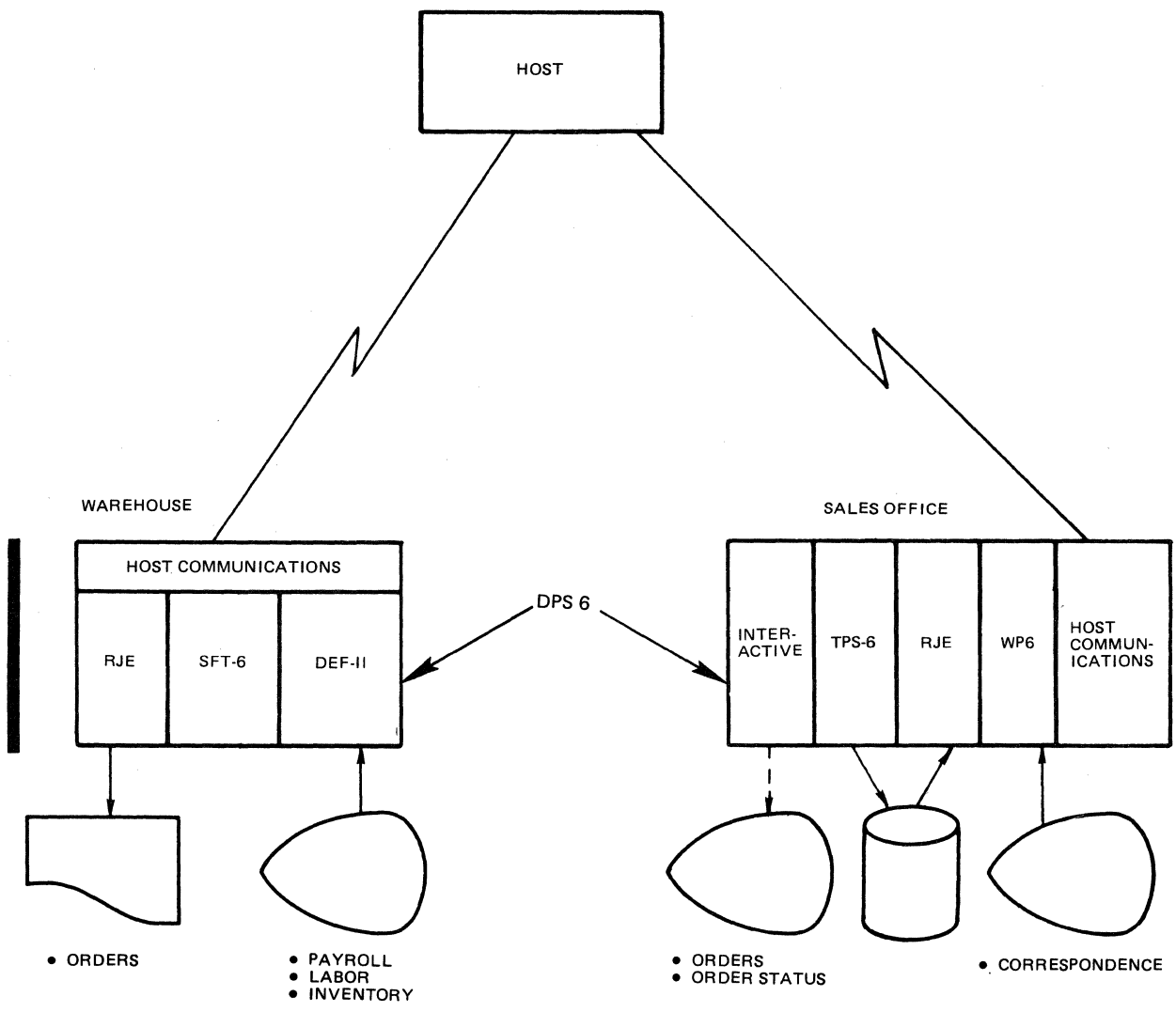


Figure 1-1. Communications Network for Consumer Goods Distributor



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Figure 1-2. Applications Used at Sales Offices and Warehouses

SNA DOCUMENT SET

A subset of the GCOS 6 MOD 400 manual set fully describes SNA. These manuals are described briefly below.

This manual, the DPS 6 IBM Distributed Data Processing Overview (Order Number CR56), discusses those GCOS 6 capabilities that support IBM SNA and BSC products, and includes scenarios illustrating GCOS 6 facilities in an SNA network. This manual is written for those who wish to understand GCOS 6 SNA or BSC capabilities.

The DPS 6 SNA Administrator's Guide (Order Number CR57) is written for two distinct audiences: those who operate DPS 6 nodes in an SNA network and those who configure such nodes. The manual describes both the menu-driven and command-line interfaces to SNA operation and configuration, the operation of DPS 6 nodes, and the configuration of each SNA service and facility. Configurator and Transport Facility error messages are included. Anyone who configures a DPS 6/SNA node is assumed to be familiar with MOD 400 system building.

The DPS 6 SNA Interactive Terminal Facility User's Guide (Order Number CR58) is written for those responsible either for the entry and manipulation of data through Honeywell WST/VIP terminals or for the processing of data through application programs executing on DPS 6 systems. The manual describes ITF in detail, both from a data-entry operator's viewpoint and an application programmer's viewpoint. ITF error messages are included.

The DPS 6 SNA Remote Job Entry Facility User's Guide (Order Number CR59) is written for RJE operators. The manual details the concepts of the RJE Facility, operating procedures, and operator commands, including an operations scenario. RJE error messages are included.

The DPS 6 SNA File Transfer Facility User's Guide (Order Number CR60) is written for SFT operators. The manual details operating procedures and operating commands for SFT-6. SFT-6 and SFT-HOST error messages are included.

The DARTS User's Guide (Order Number CZ74) is written for those who will use network maintenance and problem analysis tools. The manual describes the DARTS online tracing facility, including DARTS commands.

The SNA Host System Programmer's Guide (Order Number GB88) is written for those who configure an IBM host to support connection with the DPS 6 SNA program products (ITF, RJE, SFT, and AIF). The manual discusses network considerations, ACF/NCP generation, ACF/VTAM definition, defining ITF to interactive systems, defining RJE to interactive systems, and using SNA with NCCF/NPDA.

The SNA Application Programmer's Guide (Order Number GR11) is written for DPS 6 application programmers. This manual describes how to develop transaction programs, written in COBOL and Assembly language, that use the SNA Application Interface, in basic (LU-0) sessions, to communicate with the IBM CICS and IMS transaction programs.

Table 1-1 suggests documents of interest to individuals with various jobs who work in the network as a whole, at the host system, and at the DPS 6 system.

Table 1-1. SNA Documentation Audience

Manual Order No.	Network			Audience (Host)		DPS 6		
	MIS Director	Management	Operator	System Programmer	File Transfer User	System Programmer	Operator	End User
CR56	X	X	X					
CR57		X				X	X	
CR58		X				X	X	X
CR59		X				X	X	X
CR60		X		X	X	X	X	
CZ74		X				X	X	
GB88		X		X		X		
GR11	X	X				X		X

Refer to the paragraph "The SNA Document Set" for a full description of each manual.

MIS = Management Information Systems

Section 2

SYSTEM NETWORK ARCHITECTURE CAPABILITIES

The GCOS 6 SNA products are:

- SNA Transport Facility
- SNA Interactive Terminal Facility (ITF)
- SNA Remote Job Entry Facility (RJE)
- SNA File Transfer Facility (SFT)
- SNA Application Interface Facility (AIF).

The Transport Facility provides the basic Physical Unit (PU) functions of SNA to support the other SNA facilities and the SNA Administrator and SNA Configurator System Services.

The SNA products relate to the IBM SNA devices as follows:

- The ITF emulates the IBM 3278 terminals and IBM 3287 printers attached to an IBM 3274 terminal controller.
- The RJE emulates the IBM 3777 Model 3 controller and attached devices.
- The AIF provides the protocol handling (interface) between DPS 6 applications and IBM host applications.

The SFT does not emulate any IBM product; it provides the transport of files between the DPS 6 and IBM host.

The networking capabilities of SNA facilities are described in more detail in Section 6.

SNA TRANSPORT FACILITY

The SNA Transport Facility allows DPS 6 systems to connect to an IBM host as one or more Type 2 Physical Units (PU.T2). This facility provides common protocol services for the SNA Interactive Terminal, File Transfer, Program Interface, and RJE Facilities. The Transport Facility also provides SNA protocol support.

The SNA Transport Facility supports multiple Interactive Terminal, File Transfer, Application Interface, and RJE Facilities, multiple links to one or more hosts, multipoint links, and coexistence with other SNA devices (e.g., 3274 Controller).

The number of physical and logical units connected to an SNA host is limited only by the resources available on the DPS 6 system and by protocol limits.

The SNA Transport Facility is required by the SNA RJE, ITF, SFT, and AIF. It must be configured into the DPS 6 system when MOD 400 is configured. In operation, the SNA Transport Facility is invisible to the user. The Transport Facility is briefly described in this manual; its configuration is described in the DPS 6/SNA Administrator's Guide.

The SNA Transport Facility includes the SNA Operator Control (SOPR) and SNA Configurator. The SNA Configurator executes in either a batch mode (using input sequential files) or an interactive mode (using screen-oriented forms). The SNA Configurator permits the Operator Control to tailor all DPS 6 SNA products (RJE, ITF, SFT, AIF) to a specific user environment (logical node).

Any number of logical nodes (PU.T2) can be configured on a DPS 6 system. A single DPS 6 system can appear to the IBM Host as IBM 3274 clusters, IBM 3777 RJE workstations, SFT and AIF logical nodes.

The SNA Operator Control provides the operator functions that make available common monitoring and control of the logical nodes executing on the DPS 6.

For more information about operating and configuring DPS 6 SNA nodes, refer to the DPS 6/SNA Administrator's Guide.

SNA REMOTE JOB ENTRY FACILITY

The RJE Facility allows a DPS 6 system to emulate many of the functions of an IBM 3777 Model 3 controller and its attached devices in an SNA environment. The Transport Facility provides connection to the SNA. The facility can coexist with other invocations of the SNA RJE Facility, the ITF, the SFT, the AIF, and many GCOS 6 multifunction facilities. Each invocation of the SNA RJE Facility supports up to six logical devices. Data can

reside on any appropriate DPS 6 or Level 6 device; data can also be directed to any appropriate Level 6 or DPS 6 device.

For further information about the SNA RJE Facility, refer to the SNA Remote Job Entry Facility User's Guide.

SNA INTERACTIVE TERMINAL FACILITY

The GCOS 6 SNA ITF allows VIP72XX, asynchronous VIP78XX, VIP73XX, WST72XX, and asynchronous WST78XX terminals to appear to an IBM host as IBM 3278 terminals attached to an IBM 3274 terminal controller operating in an SNA environment. The ITF also allows DPS 6 matrix and line printers to appear as IBM 3287 printers. Using this facility, a DPS 6 system can easily communicate with existing applications through an SNA network with no additional programming required either on the host or the DPS 6 system. Users of DPS 6 terminals can interact with one or more IBM host application systems.

The SNA ITF also provides a User Exit Facility that permits user-written COBOL or Assembly language programs to be executed before and/or after keyboard activity for each terminal. User exits extend the data manipulating capabilities of a standard IBM 3274 cluster without changing the SNA ITF's appearance to either the IBM host or the SNA network. For example, a user exit program could be used to calculate a total price after an operator has entered the unit price and the quantity. The program can then place the total price in an appropriate field in the form to be transmitted to the host.

Terminal devices are connected dynamically to the ITF. The Listener Facility of GCOS 6 permits users to log on and off the ITF. Thus, each terminal is a multiple-use terminal.

The SNA Transport Facility is required by the ITF. The ITF uses the multiple host, physical unit, and logical unit support provided by the Transport Facility.

For further information about the ITF, refer to the SNA Interactive Terminal Facility User's Guide.

SNA FILE TRANSFER FACILITY

The GCOS 6 SFT Facility allows host users to transfer files to and from a DPS 6. In addition to file transfer, SFT includes file management and control functions. The SFT Facility software consists of host-resident and DPS 6-resident components. In SNA sessions, the host-resident component acts as a primary logical unit, and the DPS 6-resident component acts as a secondary logical unit.

The SFT Facility allows:

- Transmission at line speeds up to 9600 bits per second

- Multiple file transmissions
- Transmission from a single host to a user-defined group of DPS 6 systems
- Unattended operation
- Data compression
- Recovery/restart of a file transfer operation.

The SNA Transport Facility is required by the SFT Facility.

For further information about the SFT Facility, refer to the SNA File Transfer Facility User's Guide.

SNA APPLICATION INTERFACE FACILITY

The SNA Application Interface allows DPS 6 applications to send transactions to and receive replies from an application running under CICS or IMS at an IBM host. The application program is shielded from many of the SNA communication details. An application-to-application or interprogram session is supported. The host transaction processing systems recognize that the applications supported by AIF are not devices and therefore simply pass data to the DPS application.

AIF provides the basic communications support needed for user COBOL application programs to communicate with CICS or IMS applications via Assembler subroutine calls from a COBOL program and user Assembly language programs to communicate with CICS or IMS applications via macrocalls.

AIF application macrocalls and called routines provide the interfaces to:

- Initiate a session
- Send a message
- Receive a message
- Terminate a session
- Test for session data
- Wait on event
- Send/receive data flow control signals and alerts
- Cancel an asynchronous request
- Send a response

AIF requires LU Type 0 (application to application) support provided by the SNA Transport facility.

For further information about AIF, refer to the SNA Application Programmer's Guide.

Section 3

***BINARY SYNCHRONOUS
COMMUNICATIONS
CAPABILITIES***

The GCOS 6 BSC products are:

- BSC Transport Facility
- 2780/3780 Workstation Facility
- HASP Workstation Facility
- Programmable Facility/3271.

The Transport Facility provides the basic BSC functions to support the other BSC facilities.

The BSC products provide emulation of these BSC devices:

- IBM 2780/3780 workstation
- IBM 3780 data communications terminal
- Multileaving HASP workstation with IBM 360-20 Submodel 5 identity
- IBM 3271 cluster controller.

The networking capabilities of BSC facilities are described in more detail in Section 6.

BSC TRANSPORT FACILITY

The BSC Transport Facility is required by all the BSC facilities. It provides communications and protocol support as well as File Transfer Facilities. The BSC Transport Facility allows BSC facilities to connect to one or more IBM hosts over one or more communications links.

The File Transfer function of the BSC Transport Facility uses either the IBM 2780 or 3780 protocol. A utility program, TRANB, performs the file transmission. TRANB converts ASCII data in DPS 6 files into EBCDIC 80-character records for transmission and also any received EBCDIC records into ASCII format.

Multiple file transmissions can occur concurrently. Each File Transfer takes place over a different communications line. The line can either remain connected after a file transfer or be disconnected.

For further information about the BSC Transport Facility, refer to the BSC Transport Facility User's Guide.

2780/3780 WORKSTATION FACILITY

The 2780/3780 Workstation Facility allows a DPS 6 system to communicate with an IBM host by means of the BSC2780/3780 protocol. Using this facility, DPS 6 systems provide operations compatible with an IBM 2780 or 3780 workstation. The facility provides RJE and batch data entry functionality.

For further information about this facility, refer to the 2780/3780 Workstation Facility User's Guide.

HASP WORKSTATION FACILITY

The HASP Multileaving Facility provides multileaving RJE workstation capabilities compatible with the IBM 360/20. The facility supports up to 15 separate data streams. As many as eight of the data streams can be assigned to card readers, and as many as seven to printers. Any of the 15 data streams can use magnetic tape or disk rather than actual unit record devices. The facility supports data compression or expansion.

For further information about this facility, refer to the HASP Workstation Facility User's Guide.

PROGRAMMABLE FACILITY/3271

The Programmable Facility/3271 (PF/3271) permits a DPS 6 system to perform the functions of an IBM 3271 terminal cluster. The facility provides operations compatible with the 3271 control unit, 3277 display station, and 3284 or 3286 printer. The facility can emulate any number of 3271 control units within the resource limits of the DPS 6 system. Each control unit supports any combination of up to 32 video terminals and printers.

PF/3271 permits user enhancements by program extensions that are user coded and maintained. Such programs can access normally invisible device buffers to add, change, and delete data. User programs have access to all files and peripherals attached to the MOD 400 system.

Any terminals or printers used by PF/3271 do not need to be dedicated to it; they can be connected or disconnected as required.

For further information about PF/3271, refer to the Programmable Facility/3271 User's Guide.



Section 4

GCOS 6 MOD 400 SOFTWARE OVERVIEW

Both the SNA and BSC facilities execute under the control of GCOS 6 MOD 400. This section contains a brief description of GCOS 6 MOD 400 and those facilities that can execute concurrently with the SNA facilities. All GCOS 6 MOD 400 facilities can execute concurrently with the BSC facilities.

GCOS 6 MOD 400 provides a DPS 6 system with a variety of processing capabilities. Processing capabilities supported include an executive, language processors, data entry, word processing, and communications. Multiple users can share the hardware resources.

The GCOS 6 MOD 400 Executive is partially memory-resident and partially disk-resident. The Executive includes program and task management facilities, multiprogram control, input/output (I/O) and communications device support, file and data management, utility programs, and support for a wide range of hardware configurations. The GCOS 6 command language provides an interface with the Executive for programmers, interactive users, and system operators. The GCOS 6 user productivity feature provides a menu-driven interface with the Executive that is easier to use than the command language interface. SNA facilities allow both a command-language and a menu-driven interface.

GCOS 6 MOD 400 offers two different communications I/O interfaces: logical and physical. Remote and local terminals can be accessed using either I/O interface.

GCOS 6 MOD 400 EXECUTIVE

MOD 400 permits concurrent execution of one batch stream (program development or other batch-oriented user applications) and one or more online streams. The batch application's memory can be rolled out to a mass storage device to free additional memory for online applications.

User-written online applications can be loaded and started automatically any time after system initialization. The number of applications operating concurrently is limited only by the amount of available memory. When one application is deleted or terminates, another application can automatically use the released memory.

MOD 400 allocates memory dynamically from pools and can relocate programs at load time. Once an application is loaded, it is dispatched according to its assigned priority level. Different tasks with the same priority level are serviced in round-robin fashion. If the Memory Management Unit (MMU) is present, user applications residing in different memory pools are prevented from interfering with each other or with the Executive.

MOD 400 PROGRAM DEVELOPMENT

MOD 400 contains a complete set of program development facilities including line and screen Editors, Linker, FORTRAN compilers, COBOL compilers, RPG compiler, BASIC interpreter, BASIC interpreter/compiler, C compiler, Pascal compiler, Ada compiler, macrocall assembler, VDAM and TCLF, and a number of utilities.

Editors and Linker

MOD 400 includes both line and screen editors for program preparation, updating, and correction. Both editors are reentrant; a single memory-resident copy of either editor can be used by many users. The line editor is available for those users who are more comfortable with traditional editors. The screen editor provides full screen-editing functions for efficient editing. MOD 400 also includes a linker to process object text produced by the language processors.

FORTRAN Compiler

MOD 400 supports the Advanced FORTRAN Compiler. The Advanced FORTRAN Compiler is a complete implementation of the ANSI-77 standard with the following extensions: fixed- and double-precision fixed, fractional and double-precision fractional, and double-precision integer (32-bit integer) data types. The

FORTTRAN compiler supports a complete set of the ANSI-77 standard library subroutines. The FORTRAN compiler also supports a bit manipulation function, DATE and TIME subroutines, WAIT, START, and TRON tasking subroutines, and an INCLUDE statement. The INCLUDE statement allows FORTRAN source text from a separate file to be included in a FORTRAN program.

COBOL Compiler

MOD 400 supports the Advanced COBOL Compiler. The Advanced COBOL Compiler complies with or exceeds most of the ANSI-74 standard and represents FIPS Level 4 (High). The Advanced COBOL Compiler generates reentrant programs and permits the separation of data and procedures. The data types supported by the Advanced COBOL Compiler include 16- and 32-bit binary (COMP-1 and COMP-2) and signed and unsigned packed decimal (COMP-5). The Advanced COBOL Compiler embeds English language diagnostics in the source text; the diagnostics can be displayed on a terminal.

RPG Compiler

The MOD 400 RPG compiler is a compatible language subset of Honeywell Level 62 and Level 64 compilers, as well as the IBM System/3 and System/32 compilers.

BASIC Interpreter and Interpreter/Compiler

MOD 400 supports a BASIC interpreter and a BASIC interpreter/compiler. BASIC is one of the simplest computer languages to learn and use; yet it contains powerful language features that permit the implementation of complex scientific and business applications. The BASIC interpreter/compiler was designed specifically for multiuser program development. The BASIC interpreter and interpreter/compiler support command mode, execution mode, and immediate mode. The BASIC interpreter/compiler also supports compile mode.

C Compiler

MOD 400 supports C, a general-purpose, low-level programming language. The MOD 400 C compiler provides a C program with an emulation of a single-user UNIX* environment. Run-time routines, signals, messages, and traps all appear to a C program as they do under UNIX.

*UNIX is a trademark of AT&T Bell Laboratories.

Pascal Compiler

Pascal is a general-purpose, high-level programming language. The language accepted by the GCOS DPS 6 Pascal compiler is intended to conform to the International Standards Organization (ISO) DP 7185 at the time that DP7185 is accepted by the American National Standards Institute. GCOS 6 Pascal currently conforms most closely to the language defined by ISO/TC97/SC5/N596.

Macrocall Assembler

MOD 400 supports a macrocall Assembly language for program development. Some of the features supported are nested macrocalls, local and global macrocall variables, evaluation of functions during assembly, complex symbolic expressions, and user-defined operation codes. The assembler supports a wide range of scientific instructions and data types. Macrocalls exist for all Executive, File System, and Communications System services.

VDAM and TCLF

VDAM is a programmatic interface for displaying processing software. In the DPS 6, transaction processing involves the use of forms processed by programs using the Transactive Control Language Facility (TCLF).

Utilities

MOD 400 includes utilities that support mass storage, magnetic tape, card, and print devices. These utilities include debugging aids, program patchers, and copy/compare, print, dump/edit, file dump, data transcription, and file formatting features.

FILE SYSTEM

The GCOS 6 file system supports the following file organizations:

- UFAS sequential files
- UFAS relative files
- UFAS indexed files
- UFAS random files
- UFAS alternate index
- UFAS dynamic
- BES-compatible fixed-relative files

A sequential file can reside on any device (mass storage, magnetic tape, card reader, card punch, or terminal). The pipe attribute allows a sequential file to pass information in the form of logical records between cooperating processes. All file organizations support fixed- or variable-length records.

Users specify concurrency control. Users can also specify the level of access to a file as read only, read/write, exclusive write, exclusive read/write, or read/write no write.

MOD 400 provides concurrency control for shared files by control interval locking. A control interval is a physical block of data read or written by the file system. The first access by the user to a control interval may cause it to be locked until the user releases the control interval.

SYSTEM CONTROL

The GCOS 6 command language processor helps users to define and control applications tasks. The command language processor reads commands from a sequential input device (either a terminal or a file) and executes each request in order. The batch application stream is always controlled by the command language processor; concurrent online applications can also use the command language processor, if appropriate. GCOS 6 commands support file maintenance and other utility functions, interjob control, intrajob control, file assignment, asynchronous task operation, and communication with the system operator.

GCOS 6 operator commands allow the system operator to configure, load, and monitor application processes.

COMMUNICATIONS SUPPORT

GCOS 6 MOD 400 provides a variety of communications capabilities. These communications capabilities are accessible to user applications either through the file system or directly through the physical I/O interface. At the file system level, communications endpoints (terminals) appear to user applications as sequential files.

MOD 400 supports the concurrent execution of multiple applications programs (both system and user developed), any number of which may coexist on a single DPS 6 system. This multifunction capability is designed to interface with the GCOS 6 communications and networking products to support distributed data processing. All the BSC facilities can execute in conjunction with the SNA facilities. Both the Data Entry Facility-II (DEF-II) and the Office Automation System Facility (OASF) can also execute in conjunction with SNA facilities.

Data Entry Facility-II

DEF-II executes under the control of MOD 400 to provide source data entry with validation and editing functions. DEF-II data entry is forms mode data entry and includes extensive attribute support. DEF-II supports up to 32 workstations and various terminal types and keyboards.

Office Automation System Facility

The OASF is a menu-driven system that supports document entry, formatting, and editing. OASF editing is performed with a powerful screen editor. OASF aids form letter writing, proposal writing, preparation of recurring reports, and other repetitive tasks that occur in the office environment. OASF requires a WST7803 or VIP7803 or VIP7813 or VIP7303 or VIP7305 terminal.

Transaction Processing System 6

The Transaction Processing System 6 (TPS 6) provides an online, interactive, and protected environment for high-volume, fast-response, concurrent transaction processing. TPS 6 allows efficient data entry to, and retrieval from, a central data base, using a variety of terminals. TPS 6 includes a data base management system; restart and recovery features; two languages for creating, debugging, and running interactive and batch application programs; and screen management facilities.

Section 5

DPS 6 HARDWARE OVERVIEW

The SNA Transport, Interactive Terminal, File Transfer, and RJE Facilities all execute on the DPS 6 systems and the microSystems 6/10 and microSystems 6/20. Depending on the central processor, memory is available up to 16 million bytes.

MEGABUS ARCHITECTURE

All Level 6 computers of Model 37 or higher (indeed of Model 33 or higher), as well as all DPS 6 computers, support the same Megabus architecture.

The Megabus architecture accommodates all the system elements: central processor, memories, and communications and peripheral controllers. The central processor provides such standard features as:

- Seven registers for byte, word, or double-word processing
- Seven additional registers for memory addressing
- Sixty-four priority levels
- Real-time clock and bootload Read-Only Memory (ROM) (with an optional watchdog timer)
- A power failure interrupt (with an optional memory save and auto-restart unit)

- A console bootstrap procedure indicating logic malfunctions on both the control panel and the faulty board.

DPS 6 MEMORY

DPS 6 systems (and Level 6 Models 43 and higher) support an optional Memory Management Unit (MMU) that provides memory segmentation and ring-structured storage protection. With the MMU, read, write, and execute access can be assigned as appropriate. The Level 6 Model 43 has an optional double-fetch memory capability that can increase performance by 30 percent. Level 6 Models 53 and higher have cache memory that permits the central processor to execute program code even faster than the Model 43.

Memory is available in either standard or high-density MOS versions. The maximum capacity for a Level 6 Model 43 is 1024K bytes. Memory is divided up into 64K-byte modules with a maximum of 256K bytes per controller and a maximum of eight controller boards per system. Level 6 Models 53 and higher support the same maximum amount of memory.

SPECIAL COBOL AND FORTRAN SUPPORT

The DPS 6 (and Level 6 Model 43) has an optional scientific instruction processor that permits it to support an extremely efficient FORTRAN compiler. Level 6 Models 47 and 57 contain special hardware to support the execution of COBOL instructions.

DPS 6 PERIPHERAL DEVICES

All DPS 6 systems (and Level 6 Models 33 and higher) support a variety of peripheral devices, including single- and double-side diskettes, Phase-Encoded (PE) and Non-Return-to-Zero-Inverted (NRZI) magnetic tape units, cartridge disk drives, full-size disk drives, hard copy and CRT terminals, and card devices (readers, mark sense readers, punches, and reader/punches). Serial, line, dot matrix, and band printers are supported by DPS 6, as well as the VIP and WST series of CRT/keyboard terminals, and a variety of other asynchronous terminals, including special purpose terminals for data entry or word processing. DPS 6 also supports keyboard/printers and receive-only printer terminals. The modems supported are the type 103, 113, and 212A modems for asynchronous communications terminals, and also a modem bypass.

The SNA Interactive Terminal Facility supports WST/VIP72XX, asynchronous WST/VIP78XX, and VIP73XX CRT terminals. SNA Remote Job Entry Facility can be invoked from any terminal that is supported by DPS 6.

The Interactive Terminal and Remote Job Entry Facilities support other peripherals that are supported by Release 3.0 of GCOS 6 MOD 400.

CONTROL PANELS AND CABINETS

DPS 6 systems are packaged in a variety of cabinets, including office packaging. They provide a choice of a basic or a full control panel; both control panels contain keylocks and checklights for basic logic test displays.

The DPS 6 System Control Facility allows dial-up control of the system control panel.



Section 6

DPS 6/IBM NETWORKS

This section contains a detailed description of the capabilities supported by the SNA and BSC facilities.

SNA NETWORKS

The following products support the connection of DPS 6 systems to a host mainframe in an SNA network:

- SNA Transport Facility
- SNA Remote Job Entry (RJE) Facility
- SNA File Transfer (SFT) Facility
- SNA Interactive Terminal Facility (ITF)
- SNA Application Interface Facility (AIF).

The following paragraphs contain a detailed description of these facilities.

SNA Transport Facility

The SNA Transport Facility is required by the ITF, the RJE, the AIF, and the SFT Facilities. The Transport Facility provides common SNA protocol services for these facilities.

SNA SUPPORT

The SNA Transport Facility supports up to four physical data links. Single (point to point) or multiple (multipoint) physical units are supported on the physical data links.

The SNA Transport Facility supports as many physical units and logical units in session with the host as the resources of the DPS 6 system allow. The number of logical units per physical unit is limited only by the product-specific limitations of the facilities using the SNA Transport Facility. The SNA Transport Facility permits different session types to use the facility at the same time. For example, interactive sessions and batch sessions can execute simultaneously.

The SNA Transport Facility supports the following data link configurations:

- Half-duplex, point-to-point, nonswitched
- Full-duplex, point-to-point, nonswitched
- Half-duplex, multipoint, nonswitched
- Full-duplex, multipoint, nonswitched
- Half-duplex, point-to-point, switched
- Full-duplex, point-to-point, switched.

Two-Way Alternate (TWA) operation is supported for the Interactive Terminal, File Transfer, Application Interface, and RJE Facilities (TWA is the mode of operation of the corresponding IBM devices). The Transport Facility supports transmission speeds of up to 56,000 bits per second. The SNA facilities can coexist with other DPS 6 or IBM devices on a multipoint link (e.g., 3274 and 3777).

SDLC SUPPORT

The SNA Transport Facility supports SDLC secondary station communications. The facility does not support SDLC loop exchanges.

For point-to-point switched lines, Exchange Identification (XID) information is specified by the user when the logical node is configured.

OPERATOR FUNCTIONS

The SNA Transport Facility permits the operator to:

- Shut down a link, a logical unit, or a physical unit
- Display link status information
- Display physical and logical unit status information
- Start, stop, display, or reset event logs
- Display or reset link, physical unit, and logical unit statistics

- Trace node traffic on a physical unit or logical unit basis
- Shut down the SNA Transport Facility.

IBM SOFTWARE SUPPORT

The SNA Transport Facility supports the following IBM software:

- ACF/VTAM
- ACF/NCP
- MVS
- DOS/VSE
- JES2
- VSE/POWER
- CICS/VS
- IMS/VS Data Communications
- TSO
- ICCF
- NCCF/NPDA.

MULTIFUNCTION FACILITY SUPPORT

The following multifunction facilities can be executed at the same time that the SNA Transport Facility is executing:

- All BSC facilities
- All SNA facilities
- Data Entry Facility-II
- Office Automation System 6
- Program development (compilers, editors, utilities)
- Transaction Processing System 6
- Batch programs written in COBOL, RPG II, FORTRAN, or BASIC.

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SNA Interactive Terminal Facility

The SNA Interactive Terminal Facility (ITF) permits DPS 6 computers with WST72XX, asynchronous WST78XX, VIP72XX, asynchronous VIP78XX, VIP73XX, or VIP78XX terminals attached to them to appear to an IBM mainframe as IBM 3274 terminal controllers with IBM 3278 display units attached. The ITF allows DPS 6 terminal users to interact with host applications. "Help" screens for each type of terminal keyboard map the native keys to an IBM 3274 keyboard. ITF also supports user-written User Exit programs to further manipulate data before and after keyboard activity. The facility supports any combination of up to 32 terminals and printers per invocation of ITF.

SNA SUPPORT

The SNA ITF appears to the host as an IBM 3274-1C controller, a PU.T2. Each invocation of the SNA ITF appears as only one controller (one physical unit). Multiple invocations (with only one copy in memory) of the ITF allow multiple physical unit support.

One invocation of the ITF supports logical connections to only one host (System Services Control Point); the SNA Transport Facility, however, can be connected to multiple hosts. Therefore, a multiple-host connection requires multiple invocations of the ITF.

The ITF supports 32 logical units, the limit imposed by the implementation of the 3274 SNA controller. More than 32 logical units can be supported by using multiple invocations of the SNA ITF, using different physical unit addresses in a multipoint environment. The total number of terminals actively connected to the SNA Transport Facility is limited only by the resources available to the DPS 6 system, or by SNA logical unit limits. The logical units supported by the ITF are Type 1 (SCS printer), 2, or 3 (3270 printer).

The ITF has the same line configurations and SDLC support as the SNA Transport Facility (refer to "SNA Transport Facility" earlier in this section).

The SNA Interactive Facility supports EBCDIC code. All data is translated to and from ASCII code as necessary. Embedded protocol control characters are translated to their ASCII equivalent.

3270 FEATURE SUPPORT

The SNA ITF has the same display size (1920 bytes) as the IBM 3270 Model 2.

The ITF supports uppercase and lowercase, blink, reverse video, and underscoring, but does not support these 3270 terminal attributes: Report Power On/Off, Foreign Character Sets, Color, Multiple Character Sets, Portions of Extended Highlighting, or Programmable Symbols.

The ITF supports all of the keyboard characteristics of the IBM 3270 terminal except Security Lock, Data Entry, Keypunch, International Caps, Keyclick, Badge Reader, Selector Pen, and Test Erase. The facility supports Cursor Select as an alternative to Selector Pen.

The ITF supports the following printer features:

- 3270 data stream (logical unit Type 3)
- SCS data stream (logical unit Type 1)

- Host-initiated printer matrix
- Default matrix
- Between bracket share.

Note that only existing printer matrix entries can be redefined.

IBM PRODUCT SUPPORT

The SNA ITF supports interaction with IBM TSO, ICCF, CICS/VS, and IMS/VS.

USER EXITS

The SNA ITF supports User Exits. User Exits allow user-written COBOL or Assembly language programs to be executed either before data is displayed or after data has been entered on the keyboard. The User Exit feature supports standard GCOS 6 files and devices.

TERMINAL SUPPORT

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The SNA ITF supports WST72XX, VIP72XX, VIP73XX, asynchronous WST78XX and VIP78XX terminals. The facility also supports remotely connected terminals. VIP72XX and WST72XX support does not include the status line (the 25th line of the Screen). WST78XX, VIP78XX, and VIP73XX support does include support of the status line. The ITF supports standard, data entry, and word processing keyboards for all terminals.

*

SNA Remote Job Entry Facility

The SNA RJE Facility is compatible with an IBM 3777 Model 3 RJE Workstation (PU.T2). The SNA RJE Facility uses the physical unit services of the SNA Transport Facility. The SNA RJE Facility only supports one controller (physical unit).

The SNA RJE Facility supports logical connection to one host (System Service Control Point). The facility supports multidomain operations with IBM access methods and program products supporting Advanced Function for Communications (ACF). Multiple-host connection is achieved by multiple logical RJE connections. At no time can a logical RJE station connect to more than one host.

The facility supports up to six logical units. (This limit is imposed by the architecture of the 3777 Model 3 controller.) To support more than six logical units, configure multiple RJE controllers. The total number of RJE stations actively connected to the SNA Transport Facility is limited only by the resources available in the DPS 6 system or by logical unit limits. The RJE station appears to the host as a Type 1 logical unit.

The SNA RJE Facility supports the same line facilities as the SNA Transport Facility. It also supports EBCDIC code. All data is translated to and from ASCII code as necessary.

DATA MANIPULATION

The SNA RJE Facility permits concatenation of input data from more than one device or data set (file) into one job. It is usual to use separate files for Job Control Language (JCL) and batch data.

The SNA RJE Facility supports data and space compression and expansion so that throughput can be increased. The facility can also decompact data received from a host.

KEYBOARD SUPPORT

Although the SNA RJE Facility is compatible with the characteristics of the 3777 from the host's viewpoint, the facility does not provide strict compatibility with either the physical attributes or the operational characteristics of IBM RJE. The functional characteristics are, however, simulated by a set of operator commands.

DEVICE SUPPORT

The IBM 3770 family supports only diskette storage devices. DPS 6 systems support disk operations using any of the standard GCOS 6 MOD 400 supported devices. The SNA RJE Facility can receive and/or transmit directly to or from disk devices.

The SNA RJE Facility supports the BASIC Exchange Format, as do the IBM 3770 devices.

The SNA RJE Facility also supports the following:

- EBCDIC transmission
- Keyboard switches and indicators (by software emulation)
- International printing (as permitted by current products)
- Card punches (transparent receive to disk)
- Transparent transmission
- Exchange Identification Information (XID).

The SNA RJE Facility does not support the following special features: Operator ID Reader, 3770 Door Keylock, Cryptographic Feature, Multiple Print Trains, Special Card Reader Formats (51 or 66 columns), Optical Mark Read (OMR) Card Reader, Remote Power Off, and ASCII Transmission.

Since GCOS 6 MOD 400 is a complete operating system rather than a limited special purpose RJE terminal, GCOS 6 has features that can be used to enhance RJE. For example, printing of files can be deferred, or corrections can be made in RJE input using the GCOS Text Editor.

IBM HOST PRODUCT SUPPORT

The SNA RJE Facility supports connections with IBM hosts executing JES2 under OS/VS2-MVS and POWER under DOS-VSE. Access is possible through ACF/VTAM and ACF/NCP.

SNA File Transfer Facility

The SNA File Transfer (SFT) Facility allows host users, in an SNA network, to transfer files to and from a DPS 6. In addition to File Transfer, the SFT Facility includes the file management and control functions Delete, Rename, and Execute Command List, as well as recovery/restart capabilities.

SFT consists of an IBM-resident component, GCOS 6 SNA File Transfer-HOST (SFT-HOST), and a DPS 6-resident component, GCOS 6 SNA File Transfer-6 (SFT-6). In SNA sessions, SFT-HOST acts as the primary logical unit and SFT-6 acts as a secondary logical unit. Multiple transmissions between SFT-6 and IBM hosts are possible. Also, from a single host, file transmissions to a user-defined group of DPS 6 systems is possible. Unattended operation of SFT-6 is allowed. The standard DPS 6 SNA operator interface allows starting, stopping, or viewing the status of SFT-6. Line speeds of up to 56,000 bits per second and switched and leased line support are provided.

SNA Application Interface Facility

The SNA Application Interface Facility (AIF) allows DPS 6 applications to communicate in an SNA network using SNA program-to-program communication. The DPS 6 programs communicate with CICS or IMS transaction programs in logical unit type 0 sessions. A type 0 session is data communication between two logical units using SNA protocols. AIF allows application programs to interface to an SNA network at a higher level than the SNA baseline. AIF creates and manages data structures on behalf of the application program. However, some knowledge of CICS and/or IMS protocols is necessary.

COMPONENTS OF THE SNA APPLICATION INTERFACE

The AIF consists of three logical subcomponents: the PU subcomponent, the LU subcomponent for each LU configured, and the monitor call handler subcomponent. The PU task is created at start up. It, in turn, creates the LU tasks as required. The PU also creates an LU status table that it will maintain during subsequent processing. The LU subcomponent is made up of three modules, the control module, the protocol handler module, and the session control module. The control module handles all the LU interfaces: to the PU, to the application program through the monitor control handler, and to the transmission services. It also provides mainloop processing for the LU; i.e., controls execution of session control subroutines that provide basic SNA services and the protocol handlers. The protocol handler module

executes the proper session call subroutine on behalf of the session call executor. The session control module provides the subroutines that interface to the baseline. These subroutines are executed by the protocol handlers. Subroutines are provided to receive, send, initiate a session, terminate a session, send interrupt (control) information, and various other subroutines to support these functions. The monitor call handler subcomponent manages the intertask group communication from the user task group, and, in general, acts as the interface to the AIF services.

ACCESS TO INTERFACE

The DPS 6 application program gains access to the services provided by the AIF by executing macrocalls called session calls. These session calls are a set of formatted requests. They interface to the SNA network via the SNA baseline running on the DPS 6. Session call users must provide a Session Call Control Block (SCCB) with all calls. An initiate call by an application program causes an available LU to be assigned to this application.

SNA SUPPORT

The SNA application interface uses the PU.T2 services of the SNA Transport Facility. The AIF appears to the host as one or more type 0 logical units. It supports a maximum of 251 LUs. The AIF is not sensitive to the data format of transaction program data. If requested, it converts all transaction program data between EBCDIC and ASCII. Otherwise, the transaction program performs all data translation between CICS or IMS formats and its own formats, including EBCDIC/ASCII conversion.

SNA Network Management Utilities

Information available for network problem analysis and management is described briefly in the following paragraphs.

The SNA Transport Facility collects types 1, 2, 3, 4, and 5 statistics that can be accessed using NCCF/NPDA operator commands. These statistics consist of the number of messages sent, the number of messages received, the amount of traffic on the SDLC link, the number of link errors, the number of protocol errors, physical unit and logical unit statistics, and engineering change levels. Statistical information is fully compatible with NCCF conventions.

DARTS (Database-Augmented Real-Time Tracing System) is an online software trace utility operating under MOD 400. DARTS can operate with networking or other software, under the control of any user. DARTS monitors the flow of execution of a set of software programs. DARTS is described in the DPS 6 DARTS User's Guide.

The SNAMAP utility formats and displays selected SNA tables and data structures. SNAMAP is described in the DPS 6/SNA Administrator's Guide.

These DPS 6 utility programs, together with the NCCF/NPDA statistics support, permit rapid problem diagnosis. The problem isolation process using NCCF/NPDA is essentially the same as with comparable IBM controllers and devices. The user is responsible for isolating the problem and notifying the appropriate vendor as necessary.

BSC NETWORKS

These facilities support the connection of DPS 6 systems to an IBM mainframe under the BSC protocol:

- BSC Transport Facility
- 2780/3780 Workstation Facility
- HASP Workstation Facility
- Programmable Facility/3271 (PF/3271).

The following paragraphs contain a detailed description of these facilities.

BSC Transport Facility

The BSC Transport Facility is required by all the other BSC facilities. This facility provides protocol support for the other BSC facilities, and also permits file transfer between DPS 6 systems and an IBM mainframe.

LINE PROTOCOL SUPPORT

The BSC Transport Facility supports four different protocols. It supports the BSC2780 and 3780 line protocols. It also supports the HASP protocol; the facility makes the DPS 6 system appear to the host as a System 360 Model 20 multileaving workstation. The BSC Transport Facility also supports a 3271 protocol; it makes the DPS 6 system appear to the host as a 3271 control unit. When the BSC Transport Facility is transferring files, it uses the 2780 or 3780 protocol.

The BSC Transport Facility supports lines with the following characteristics:

- Synchronous
- Half- or full-duplex
- Dedicated or switched
- 2000 to 56,000 bits per second transmission speed.

The transmission mode supported by the BSC Transport Facility is synchronous Two-Way Alternate (TWA).

The BSC Transport Facility automatically converts data from ASCII to EBCDIC for transmission to host mainframes. Received files are automatically converted to ASCII.

FILE TRANSMISSION

The BSC Transport Facility supports a file transfer facility called TRANB. TRANB is a file transmission utility program that transmits files from a DPS 6 system to an IBM host using either the BSC2780 or 3780 line protocol. TRANB supports multiple concurrent file transmissions over separate communications lines. Only one copy of TRANB is required for multiple concurrent transfers; of course, additional memory buffers are required to support multiple transfers. TRANB performs extensive preanalysis, postanalysis, and processing on the files it transfers. For example, TRANB validates command statements and arguments, validates the DPS 6-to-host connection, allocates memory, interrogates files and allocates buffers, and monitors buffer size and record size for oversize transmission. TRANB carries on the host dialog required for file verification or file creation.

DPS 6 HARDWARE REQUIREMENTS

The BSC Transport Facility requires a DPS 6 central processor with a Multiline Communications Processor (MLCP) or MLC-16 communications controller, and one or more synchronous line adapters.

GCOS 6 REQUIREMENTS

The BSC Transport Facility requires GCOS 6 MOD 400. MOD 400 must be configured with the appropriate line protocol; for example, MOD 400 must be configured with either the BSC2780 or 3780 line protocol for file transfer.

2780/3780 Workstation Facility

The 2780/3780 Workstation Facility permits a DPS 6 system to perform the functions of an IBM 2780 or 3780 workstation. Batch jobs can be entered from the 2780/3780 Workstation Facility using a card reader, magnetic tape, or a disk file. Output from the host can be directed to a printer, a card reader/punch, magnetic tape, or a disk file.

The 2780/3780 Workstation Facility supports the following features:

- Line printer horizontal format control
- Transparent transmission
- Send/receive of two or seven records per data block
- Dynamic card reader
- Interruptable printer

- Automatic disconnect
- Space compression/expansion.

LINE PROTOCOL SUPPORT

The 2780/3780 Workstation Facility supports either the BSC2780 or 3780 line protocol. The desired line protocol must be specified when MOD 400 is configured.

DPS 6 REQUIREMENTS

The 2780/3780 Workstation Facility has the same hardware requirements as the BSC Transport Facility.

The 2780/3780 Workstation Facility requires the GCOS 6 MOD 400 with the appropriate line protocol configured. The facility also requires the BSC Transport Facility.

HASP Workstation Facility

The HASP Workstation Facility permits a DPS 6 system to perform many of the functions of a HASP multileaving workstation when communicating with an IBM host. The HASP Workstation Facility performs input and output operations concurrently, using the interleaved data stream supported by the BSC Transport Facility. The HASP Workstation Facility supports multiple card readers, multiple printers, magnetic tape files, and disk files for both input and output. The facility also supports data compression and expansion, dynamic file creation, spooling, and a dynamic card reader.

LINE PROTOCOL SUPPORT

The line protocol support for the HASP Workstation Facility is provided by the BSC Transport Facility. The multileaving protocol permits card images and HASP workstation terminal-operator messages to be combined into the same transmission message. Similarly, host responses can contain display messages intermixed with print records. New jobs can be submitted while another is being printed. Data is sent in both directions simultaneously. EBCDIC-to-ASCII conversions are done automatically. (Data is transmitted in EBCDIC.)

DPS 6 REQUIREMENTS

The HASP Workstation Facility has the same hardware requirements as the BSC Transport Facility.

The HASP Workstation Facility requires GCOS 6 MOD 400 configured with the HASP line protocol. HASP also requires the BSC Transport Facility.

Programmable Facility/3271

The Programmable Facility/3271 (PF/3271) permits a DPS 6 to emulate an IBM 3271 Model 2 terminal cluster. PF/3271 permits VIP72XX, WST72XX, asynchronous VIP78XX, or asynchronous WST78XX terminals; matrix printers; or line printers to interact with an IBM host. Up to 32 devices can interact with the host.

LINE PROTOCOL SUPPORT

PF/3271 communicates with an IBM host system, using a multipoint, polled BSC3270 line protocol. The 3270 protocol support is provided by the BSC Transport Facility.

KEYBOARD SUPPORT

PF/3271 supports the following keyboard functions: cursor control, program functions, program attentions, insert, delete, field mark, and erase EOF.

USER EXITS

PF/3271 supports user-written application programs that can be executed either before data is displayed or after data is entered. Thus, user-written programs can manipulate data transmitted from the host before it is displayed on a data entry operator's terminal, or programs can manipulate entered data before it is transmitted.

DPS 6 REQUIREMENTS

PF/3271 has the same hardware requirements as the BSC Transport Facility.

MOD 400 must be configured with the appropriate line protocol for PF/3271. Protocol support for PF/3271 is contained within the BSC Transport Facility.

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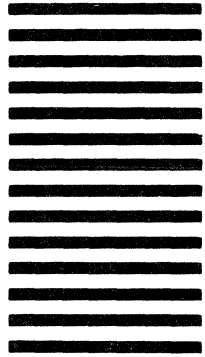


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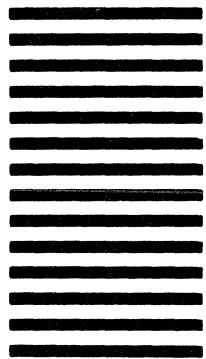


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