Program Product

VS APL
Installation Reference Material

IBM

ABOUT THIS PUBLICATION

VS APL is a program product that interprets and executes statements written in APL (A Programming Language). This publication describes how to install VS APL and how to perform various system management functions such as converting workspaces, defining VS APL users, and maintaining public and project libraries. It is intended for those who have responsibility for these functions. The reader is assumed to have knowledge of VS APL and Conversational Monitor System (CMS), which runs under VM/370, or VS Personal Computing (VSPC), which runs under OS/VS1 (Program Number 5740-XR5), OS/VS2 MVS (Program Number 5740-XR6), or DOS/VS (Program Number 5746-XR3). (For the remainder of the publication, the term OS/VS2 will be used to represent OS/VS2 MVS.)

Major Divisions of the Publication

"Introduction" describes the components of VS APL.

"VS APL Distribution Volume" describes the contents and format of the VS APL distribution volume.

"Installing VS APL under VM/370 (CMS)" explains how to install VS APL as a shared or non-shared system under VM/370 (CMS).

"Installing VS APL under OS/VS (VSPC)" explains how to install VS APL as a foreground processor under OS/VS (VSPC).

"Installing VS APL under DOS/VS (VSPC)" explains how to install VS APL as a foreground processor under DOS/VS (VSPC).

"Defining VS APL Users" explains how to define VS APL users to the host system.

"Defining Auxiliary Processors" explains how to define auxiliary processors to the host system.

"VS APL Public and Project Libraries" explains how to create and maintain VS APL public and project libraries.

"Workspace Conversion" explains how to convert APL\360, APLSV, and APL/CMS workspaces to VS APL workspaces for use under CMS or VSPC.

"Transporting Workspaces between CMS and VSPC" explains how to transport VS APL workspaces between CMS and VSPC.

"Using the VS APL Microcode Assist" discusses the use of the VS APL microcode assist feature.

"Storage Requirements" presents virtual storage and auxiliary storage requirements for VS APL.

"Messages" contains information about error and diagnostic messages.

"Appendix A. VS APL Components" lists the items contained in each component of VS APL.

"Appendix B. Sample Terminal Session for VS APL under CMS" contains a sample terminal session that can be used to test that VS APL is installed correctly under CMS.

"Appendix C. Sample Terminal Session for VS APL under VSPC" contains a sample terminal session that can be used to test that VS APL is installed correctly under OS/VS (VSPC) or DOS/VS (VSPC).

Conventions Used in the Publication

The conventions used in describing the syntax of commands and statements are:

- Expressions enclosed in brackets, [], are optional.

- Items separated by an OR sign, |, are alternatives, only one of which may be specified.

- Uppercase items must be entered as shown except that they may be truncated if so noted and, if entered at a terminal, they may be entered as either lowercase or uppercase.

- Lowercase items are variables for which a value is substituted.

- Parentheses, (), must be entered as shown.

Required Publications

All readers must be familiar with some of the information presented in this publication:

- *VS APL General Information*, GH20-9064, which provides a general description of VS APL.

Readers concerned with VS APL under CMS must be familiar with some of the information presented in these publications:

- *IBM Virtual Machine Facility/370: Introduction*, GC20-1800, which provides a general description of VM/370 and CMS.

- *IBM Virtual Machine Facility/370: Command Language Guide for General Users*, GC20-1804, which provides basic information about CMS and CP for VM/370 Release 2.

- *IBM Virtual Machine Facility/370: Operator's Guide*, GC20-1806, which describes how to define VM/370 users and CMS virtual disks.

- *IBM Virtual Machine Facility/370: EDIT Guide*, GC20-1805, which describes how to use the CMS editor for VM/370 Release 2.

- *VS APL for CMS: Terminal User's Guide*, SH20-9067, which describes how to use VS APL under CMS.

- *IBM Virtual Machine Facility/370: CMS User's Guide*, GC20-1819, which provides basic information about CMS and how to use the CMS editor to create and modify programs for VM/370 Release 3.

- *IBM Virtual Machine Facility/370: CP Command Reference for General Users*, GC20-1820, which provides basic information about CP for VM/370 Release 3.

- *IBM Virtual Machine Facility/370: Command and Macro Reference*, GC20-1818, which provides reference material on CMS commands, subcommands, and macros for VM/370 Release 3.

Readers concerned with VS APL under VSPC must be familiar with some of the information presented in these publications:

- *VS Personal Computing (VSPC) for OS/VS and DOS/VS: General Information,* GH20-9070, which provides a general description of VSPC.

- *VS Personal Computing (VSPC) Installation Reference Material,* SH20-9072, which describes the VSPC Service Program and VSPC commands. This publication also contains information on OS/VS and DOS/VS (VSPC) messages.

- *VS APL for VSPC: Terminal User's Guide,* SH20-9066, which describes how to use VS APL under VSPC.

Readers concerned with VS APL under OS/VS (VSPC) must be familiar with some of the information presented in this publication:

- *OS/VS JCL Reference,* GC28-0618, which describes the OS/VS JCL statements used in this publication.

Readers concerned with VS APL under DOS/VS (VSPC) must be familiar with some of the information presented in this publication:

- *DOS/VS System Control Statements,* GC33-5376, which describes the DOS/VS control statements used in this publication.

Related Publications

Readers may need to be familiar with some of the information presented in these publications:

- *Operator's Library: System/370 Model 135 Procedures,* GC38-0005, which explains how to load the VS APL microcode assist feature on a System/370, Model 135.

- *IBM System/370 Model 145 Operating Procedures,* GC38-0015, which explains how to load the VS APL microcode assist feature on a System/370, Model 145.

- *IBM Virtual Machine Facility/370: System Messages,* GC20-1808, which lists CP and CMS messages.

- *DOS/VS Messages,* GC33-5379, which lists DOS/VS (VSPC) messages.

- *IBM Virtual Machine Facility/370: System Programmer's Guide,* GC20-1807, which describes shared systems.

- *IBM Virtual Machine Facility/370: Planning and System Generation Guide,* GC20-1801, which describes how to implement a shared system.

CONTENTS

FIGURES

SUMMARY OF AMENDMENTS

Release 2, October, 1976

New Auxiliary Processors and Distributed Workspaces

New Programming Features

VS APL is distributed with the following additional items:

Item	Description
Full Screen Management auxiliary processor	An auxiliary processor (number 124) that can be used with VS APL under VSPC.
CMS VSAM auxiliary processor	An auxiliary processor (number 123) that can be used with VS APL under CMS.
MEDIT	A public library 1 workspace.
SEDIT	A public library 1 workspace.
HOWEDITS	A public library 1 workspace.
SBIC	A public library 1 workspace.
VSAPLFILE	A public library 2 workspace (VS APL under VSPC).
FULLSCREEN	A public library 2 workspace (VS APL under VSPC).
PRINT	A public library 2 workspace (VS APL under CMS).

Information pertinent to these new items has been added to the Introduction, to the sample terminal session for VS APL under CMS, and to the descriptions of the VS APL distribution volume, VS APL installation procedures for CMS and VSPC, and auxiliary processors.

DOS/VS Conversion Program

New Programming Feature

VS APL now includes a workspace conversion program (APLCVDOS) that executes under DOS/VS(VSPC). A description of the procedure for executing the DOS/VS conversion program is now provided in the chapter "Workspace Conversion."

DOS/VS Installation Information

Service Changes

A new chapter, describing how to install VS APL under DOS/VS (VSPC), has been added to the text. Virtual and auxiliary storage requirements for VS APL under DOS/VS (VSPC) have been added to the chapter "Storage Requirements."

Transporting Workspaces

Service Change

Various changes have been made to the procedures shown for VS APL workspace transport from CMS to VSPC and from VSPC to CMS.

INTRODUCTION

VS APL is a program product that interprets and executes statements written in APL (A Programming Language). It runs under:

- Conversational Monitor System (CMS), which runs under VM/370

- VS Personal Computing (VSPC), which runs under OS/VS1, OS/VS2, and DOS/VS

VS APL is divided into the six components described below.

Interpreter: Scans, analyzes, and executes VS APL statements. It is fully independent of the environment in which VS APL operates. It is free of all dependencies on terminal type, library organization, host system, and other characteristics of a particular installation.

Executor: Provides environment-dependent services for the interpreter, such as access to libraries and terminal input and output. There are two versions of the executor, one for use under CMS and one for use under VSPC.

Shared Storage Manager: Enables programs that are operating concurrently to communicate with each other via shared variables. The shared storage manager distributed with VS APL is used only under CMS. Under VSPC, the shared storage manager is a component of VSPC.

Auxiliary Processors: Provide services to VS APL users via shared variables. There are four internal auxiliary processors for use under VSPC; they are distributed as part of the executor. There are five auxiliary processors for use under CMS; they are distributed as a separate component. Also distributed with VS APL, for use under CMS only, is a set of macros that can be used to write auxiliary processors. Distributed with VSPC is a set of similar macros that comprise the VSPC background interface.

Conversion Program: Converts APL\360, APLSV, and APL/CMS workspaces to VS APL workspaces. There are four versions of the conversion program, two for use under CMS, one for use under OS/VS, and one for use under DOS/VS.

Distributed Workspaces: Provide useful functions for VS APL users. They are described in *VS APL for CMS: Terminal User's Guide* and *VS APL for VSPC: Terminal User's Guide.*

VS APL DISTRIBUTION VOLUME

The VS APL distribution volume contains all the components of VS APL and the sample job control statements and procedures used to install it. For installation under VM/370 (CMS) and OS/VS (VSPC), the distribution volume is an unlabeled tape. For installation under DOS/VS (VSPC), the distribution volume is either an unlabeled tape or a disk. The format of the distribution tape volume is shown in Figure 1. The format of the distribution disk volume is shown in Figure 2.

File Number	Contents	File Characteristics RECFM	LRECL	BLKSIZE
1	All object code for DOS/VS (VSPC); interpreter, executor (including internal auxiliary processors), and conversion program.	FB	80	3440
2	Sample job control statements to install under DOS/VS and to run the conversion program.	F	80	80
3	Sample job control statements to install under OS/VS and to run the conversion program.	F	80	80
4	EXEC procedure to install under CMS; in CMS TAPE DUMP format.	F	805	805
5	Object code for the interpreter for CMS and OS/VS (VSPC).	FB	80	3200
6	Object code and other data for CMS; executor, shared storage manager, auxiliary processors and auxiliary processor macros, conversion programs, and conversion procedures; in CMS TAPE DUMP format.	F	805	805
7	Object code for OS/VS (VSPC); executor (including internal auxiliary processors), and conversion program.	FB	80	3200
8	Workspace 1 NEWS	F	800	800
9	Workspace 1 WSFNS	F	800	800
10	Workspace 1 CONVERT	F	800	800
11	Workspace 1 TYPEDRILL	F	800	800
12	Workspace 1 APLCOURSE	F	800	800
13	Workspace 1 PLOT	F	800	800
14	Workspace 1 EXAMPLES	F	800	800
15	Workspace 1 FORMAT	F	800	800
16	Workspace 1 MEDIT	F	800	800
17	Workspace 1 SEDIT	F	800	800
18	Workspace 1 HOWEDITS	F	800	800
19	Workspace 1 SBIC	F	800	800
20	Workspace 2 VSFILES[1]	F	800	800
21	Workspace 2 VSAPLFILE[1]	F	800	800
22	Workspace 2 FULLSCREEN[1]	F	800	800
23	Workspace 2 APFNS[2]	F	800	800
24	Workspace 2 PRINT[2]	F	800	800

[1] Workspace is used only under VSPC.

[2] Workspace is used only under CMS.

Figure 1. Format of VS APL Distribution Tape Volume

Data Set Name	Contents	File Characteristics		
		RECFM	LRECL	BLKSIZE
A5748AP1.DOSVSOBJ.VSAPL	All object code for DOS/VS (VSPC); interpreter, executor (including internal auxiliary processors), and conversion program.	FB	80	3440
A5748AP1.DOSVSJCL.VSAPL	Sample job control statements to install under DOS/VS and to run the conversion program.	F	80	80
A5748AP1.NEWS.VSAPL	Workspace 1 NEWS	FB	80	800
A5748AP1.WSFNS.VSAPL	Workspace 1 WSFNS	FB	80	800
A5748AP1.CONVERT.VSAPL	Workspace 1 CONVERT	FB	80	800
A5748AP1.TYPEDRIL.VSAPL	Workspace 1 TYPEDRILL	FB	80	800
A5748AP1.APLCOURS.VSAPL	Workspace 1 APLCOURSE	FB	80	800
A5748AP1.PLOT.VSAPL	Workspace 1 PLOT	FB	80	800
A5748AP1.EXAMPLES.VSAPL	Workspace 1 EXAMPLES	FB	80	800
A5748AP1.FORMAT.VSAPL	Workspace 1 FORMAT	FB	80	800
A5748AP1.MEDIT.VSAPL	Workspace 1 MEDIT	FB	80	800
A5748AP1.SEDIT.VSAPL	Workspace 1 SEDIT	FB	80	800
A5748AP1.HOWEDITS.VSAPL	Workspace 1 HOWEDITS	FB	80	800
A5748AP1.SBIC.VSAPL	Workspace 1 SBIC	FB	80	800
A5748AP1.VSFILES.VSAPL	Workspace 2 VSFILES	FB	80	800
A5748AP1.VSAPLFIL.VSAPL	Workspace 2 VSAPLFILE	FB	80	800
A5748AP1.FULLSCRE.VSAPL	Workspace 2 FULLSCREEN	FB	80	800

Figure 2. Format of VS APL Distribution Disk Volume

INSTALLING VS APL UNDER VM/370 (CMS)

This section describes how to install VS APL as a shared or non-shared system under VM/370 (CMS). Installing VS APL as a shared system makes more efficient use of real storage and improves system performance. When VS APL is a shared system, all users share one copy of the VS APL executor, interpreter, and shared storage manager; an initialization routine and translate tables (executor modules APLSCINI and APLSCTBL) reside in each user's virtual machine. When VS APL is a non-shared system, the VS APL executor, interpreter, and shared storage manager reside in each user's virtual machine. Whether VS APL is shared or not, any auxiliary processors invoked by a user reside in his virtual machine.

Before installing VS APL as a shared system, you should be familiar with the information about saved systems and shared segments presented in *IBM Virtual Machine Facility/370: System Programmer's Guide* and *IBM Virtual Machine Facility/370: Planning and System Generation Guide.*

Requirements for Installation

The facilities required for installing VS APL under VM/370 (CMS) are:

- A System/370 machine configuration that can support VM/370 (CMS).

- An installed release of VM/370 (CMS) of the required level or later: Release 3 (Program Level Change 1) if installing VS APL as a shared system; Release 2 (Program Level Change 13) if installing VS APL as a non-shared system. PTF number V03314 must be applied to CMS if it is not included in the release.

- A virtual machine large enough to install VS APL (see "Virtual Storage Requirements").

- A magnetic tape device.

- The VS APL distribution tape.

- A CMS A-disk large enough to contain the VS APL distributed files (see "Auxiliary Storage Requirements").

- A CMS Y-disk large enough to contain the generated VS APL system (see "Auxiliary Storage Requirements").

- If installing VS APL as a shared system, space on a CP-owned DASD volume for the system (see "Auxiliary Storage Requirements").

- A terminal supported by CMS.

Overview of Installation Procedure

In brief, the procedure for installing VS APL under VM/370 (CMS) is as follows. The procedure is described in detail in the next section.

1. Plan and define the CMS disks required for VS APL.

2. If installing VS APL as a shared system, plan the system's load address and DASD space allocation.

3. Log on to VM/370 and IPL CMS.

4. Access and prepare the A-disk and the Y-disk.

5. Access the distribution tape.

6. Transfer file APLINSTL EXEC (the CMS procedure that builds VS APL) from the distribution tape to the A-disk.

7. Build VS APL by executing procedure APLINSTL.

8. If installing VS APL as a shared system, define, load, and save the system.

9. Test that VS APL is installed correctly by executing the sample terminal session (see Appendix B).

Installation Procedure

1. Plan the disk arrangement for the VS APL system, and define the disks as described in *IBM Virtual Machine Facility/370: Operator's Guide*. Two disks are required:

   - One which is accessed as the A-disk during execution of the installation procedure. It will contain all the files transferred from the distribution tape and the module files created in step 7. The minimum space required is shown in "Auxiliary Storage Requirements." Additional space should be allocated for future maintenance. At completion of the procedure, the A-disk should be kept as backup.

   - One which is accessed as the Y-disk during execution of the installation procedure. It will contain the generated VS APL system. The minimum space required is shown in "Auxiliary Storage Requirements." Additional space should be allocated for public workspaces other than those distributed. The Y-disk will be accessed by VS APL users. It should be defined with a write password known only to those who are responsible for installing and maintaining VS APL.

2. If installing VS APL as a shared system, decide what the load address of the shared system will be. The address must be larger than the largest virtual machine of any VS APL user; the shared system must not overlay any other saved segment that will be attached at the same time as VS APL. The load address should not be unnecessarily high; if it is, real storage is wasted for unreferenced CP segment table entries. During step 7 of the installation procedure, enter the load address when prompted to do so.

   Also allocate permanent space on a CP-owned DASD volume to contain the saved system. For the space required, see "Auxiliary Storage Requirements."

3. Log on to VM/370 and IPL CMS with a virtual machine large enough to install VS APL (see "Virtual Storage Requirements").

4. Access the A-disk and the Y-disk in read/write mode. If the disks are newly allocated, format them using the CMS FORMAT command.

If the disks are not newly allocated, issue the CMS LISTFILE command, and check that no files with the identifications listed below exist. If there are any such files, rename them; otherwise they will be replaced in steps 6 and 7. The files that are created on each disk are:

Filename	Filetype	Disk
APL	EXEC	A and Y
APL	MODULE	A and Y
APLCVCMS	EXEC	A and Y
APLCVCMS	MODULE	A and Y
APLCVRPQ	EXEC	A and Y
APLCVRPQ	MODULE	A and Y
APLIBTAB	APLIBTAB	A and Y
APLMAC	MACLIB	A and Y
APL100	TEXT	A and Y
APL101	TEXT	A and Y
APL110	TEXT	A and Y
APL111	TEXT	A and Y
APL123	TEXT	A
APLMAIN	MODULE	A[1]
APL	MAP	A
APLCVCMS	MAP	A
APLCVRPQ	MAP	A
macro-name[2]	MACRO	A
APLINSTL	EXEC	A
module-name[3]	TEXT	A
APFNS	W0000002	Y
APLCOURS	W0000001	Y
CONVERT	W0000001	Y
EXAMPLES	W0000001	Y
FORMAT	W0000001	Y
HOWEDITS	W0000001	Y
MEDIT	W0000001	Y
NEWS	W0000001	Y
PLOT	W0000001	Y
PRINT	W0000002	Y
SBIC	W0000001	Y
SEDIT	W0000001	Y
TYPEDRIL	W0000001	Y
WSFNS	W0000001	Y

[1] Created only when VS APL is installed as a shared system.

[2] There is a macro file for each macro listed in Appendix A under "Auxiliary Processor Macros."

[3] There is a text file for each module listed in Appendix A under "CMS Executor Modules," "Interpreter Modules," "Shared Storage Manager Modules," and "CMS Conversion Modules."

5. Ask the system operator to mount the distribution tape and to attach the tape drive as virtual device 181, 182, 183, or 184.

6. Transfer file APLINSTL EXEC (the CMS procedure that builds VS APL) from the distribution tape to the A-disk by issuing these CMS commands:

```
TAPE REW (address
TAPE FSF 3 (address
TAPE LOAD * * A (address
```

address
   is the symbolic tape identification or the address of the device on which the distribution tape is mounted.

7. Invoke the procedure that builds VS APL by issuing this CMS command:

```
APLINSTL
```

The procedure is conversational; enter information when prompted to do so. The procedure performs the following actions:

a. Transfers all required text, exec and macro files (distribution tape files 5 and 6) from the distribution tape to the A-disk.

b. Transfers the distributed workspace files from the distribution tape to the Y-disk (workspaces VSFILES, VSAPLFILE and FULLSCREEN which are used only under VSPC, are not transferred).

c. Generates file APLMAC MACLIB from the auxiliary processor macros.

d. Copies the following files from the A-disk to the Y-disk:

   • APL EXEC (VS APL startup procedure)

   • APLCVCMS EXEC (APL\360 and APLSV conversion program procedure)

   • APLCVRPQ EXEC (APL/CMS conversion program procedure)

   • APLIBTAB APLIBTAB (library table file)

   • APL100 TEXT, APL101 TEXT, APL110 TEXT, APL111 TEXT, and APL123 TEXT (auxiliary processors)

   • APLMAC MACLIB (auxiliary processor macro library)

e. Creates files APL MODULE (initialization routine and auxiliary processor translate tables for shared system; executor, interpreter, and shared storage manager for non-shared system), APLMAIN MODULE (executor, interpreter, and shared storage manager for shared system), APLCVCMS MODULE (APL\360 and APLSV conversion program), and APLCVRPQ MODULE (APL/CMS conversion program).

f. Copies files APL MODULE, APLCVCMS MODULE, and APLCVRPQ MODULE from the A-disk to the Y-disk.

A REGEN option, which is available in response to a prompt, causes the procedure the perform only actions e and f. The REGEN option can be used to recreate the module files after updated text files have been copied to the A-disk or to recreate a shared system at a different load address.

8. If installing VS APL as a shared system, define the system to CP and then load it and save it as follows:

   a. Define the system to be saved by adding a NAMESYS macro to your installation's DMKSNT ASSEMBLE module. Code the macro as follows:

```
APLMAIN NAMESYS   SYSNAME=APLMAIN,
                  SYSSIZE=172K,
                  VSYSADR=IGNORE,
                  VSYSRES=,
                  SYSCYL=,
                  SYSVOL=serial-number,¹
                  SYSSTRT=(cylinder,page),²
                  SYSPGCT=48,
                  SYSPGNM=(128-175),³
                  SYSHRSG=(8,9,10)³
```

   ¹ Provide the serial number of the volume on which space was allocated in step 2.

   ² Provide the starting cylinder and page address of the space allocated in step 2.

   ³ The page and segment numbers shown are based on a load address of 512K. Provide the numbers that correspond to the load address you selected in step 2.

   b. Assemble the new system name table (DMKSNT) by using the GENERATE EXEC procedure as described in *IBM Virtual Machine Facility/370: Planning and System Generation Guide.*

   c. Using a virtual machine large enough to contain the system to be saved (load address plus 400K), load the system and save it:

```
LOADMOD APLMAIN
SAVESYS APLMAIN
```

   d. Before continuing with step 9, log on to VM/370 with a smaller virtual machine (of a size no greater than the saved system's load address).

9. Test that VS APL is installed correctly by executing the sample terminal session (see Appendix B).

This completes the installation procedure. The A-disk should be kept for backup and maintenance of the system. The distributed workspaces must be kept on the Y-disk; that is, on the disk that is accessed as a Y-disk by VS APL users. The other files on the Y-disk (see list in step 4 above) can also be kept there or they can be transferred to the CMS system disk.

INSTALLING VS APL UNDER OS/VS (VSPC)

This section describes how to install VS APL as a foreground processor under either OS/VS1 (VSPC) or OS/VS2 (VSPC).

Requirements for Installation

The facilities required for installing VS APL under OS/VS are:

- A System/370 machine configuration that can support OS/VS1 (VSPC) or OS/VS2 (VSPC).

- An installed release of OS/VS1 (VSPC) or OS/VS2 (VSPC).

- OS/VS Linkage Editor; utility programs IEBPTPCH, IEHPROGM, and IEBUPDTE; and job control program IEFBR14.

- A region large enough to run the VSPC Service Program and the OS/VS Linkage Editor.

- A magnetic tape device.

- The VS APL distribution tape.

- Space in OS/VS1 SYS1.LINKLIB or OS/VS2 SYS1.LPALIB for the VS APL load module (see "Auxiliary Storage Requirements").

- Space in OS/VS private libraries for the VS APL object decks and the conversion program load module (see "Auxiliary Storage Requirements").

- Space in VSPC public libraries for the distributed workspaces (see "Auxiliary Storage Requirements").

- Authorization to update OS/VS1 SYS1.LINKLIB or OS/VS2 SYS1.LPALIB.

- Authorization as a VSPC chief administrator.

- A terminal supported by VSPC (required only to execute the sample terminal session).

Overview of Installation Procedure

In brief, the procedure for installing VS APL under OS/VS (VSPC) is as follows. The procedure is described in detail in the next section.

1. Punch the sample JCL from the distribution tape.

2. Allocate space for and catalog the data sets required for installing VS APL: VSAPL.OBJLIB and VSAPL.CNVTLIB.

3. Transfer object modules from the distribution tape to data set VSAPL.OBJLIB.

4. Link-edit the VS APL load module.

5. Link-edit the conversion program into data set VSAPL.CNVTLIB.

6. Run the VSPC Service Program to define VS APL, public libraries 1 and 2, and the internal auxiliary processors to VSPC and to transfer the distributed workspaces to the VSPC libraries.

7. Test that VS APL is installed correctly by executing the sample terminal session (see Appendix C).

Installation Procedure

1. Punch the OS/VS sample JCL procedures from the VS APL distribution tape by executing the following job:

```
//PUNCHJCL JOB   accounting-information,MSGLEVEL=1
//          EXEC PGM=IEBPTPCH
//SYSPRINT DD    SYSOUT=A
//SYSUT1   DD    DSN=JCL,VOL=SER=APLDTR,UNIT=2400,
//               DISP=OLD,LABEL=(3,NL),
//               DCB=(LRECL=80,BLKSIZE=80,RECFM=F)
//SYSUT2   DD    SYSOUT=B
//SYSIN    DD    *
   PUNCH
/*
```

There are six jobs in the sample JCL. The first five are used for each of the next five steps of the installation procedure. The last one is used to run the conversion program (see "OS/VS Workspace Conversion Program").

It may be necessary to alter the sample JCL to suit your requirements. In each step, the sample JCL is listed, and the modifications that may be required are noted. In this step and in steps 3 and 6, group name 2400 is used as the UNIT parameter to. mean any magnetic tape device. In steps 4 and 5, group name SYSDA is used as the UNIT parameter to mean any direct access device. If either of these names is not so defined for your installation, these parameters must be altered.

2. Allocate space for two partitioned data sets and catalog them:

- VSAPL.OBJLIB, object module library for the executor, interpreter, and conversion program.

- VSAPL.CNVTLIB, load module library for the conversion program.

Execution of job ALLOC from the sample JCL, altered to suit your requirements, accomplishes this step. Supply the information shown in lowercase below.

```
//ALLOC     JOB  accounting-information,MSGLEVEL=1
//          EXEC PGM=IEFBR14
//DD1       DD   DSN=VSAPL.OBJLIB,DISP=(NEW,KEEP),
//               VOL=SER=volser,UNIT=typeunit,
//               SPACE=(3200,(143,5,20)),
//               DCB=(LRECL=80,BLKSIZE=3200,RECFM=FB)
//DD2       DD   DSN=VSAPL.CNVTLIB,DISP=(NEW,KEEP),
//               VOL=SER=volser,UNIT=typeunit,
//               SPACE=(CYL,(1,1,1))
//          EXEC PGM=IEHPROGM
//SYSPRINT  DD   SYSOUT=A
//SYSIN     DD   *
  CATLG DSNAME=VSAPL.OBJLIB,VOL=typeunit=volser
  CATLG DSNAME=VSAPL.CNVTLIB,VOL=typeunit=volser
/*
```

3. Transfer files 5 and 7 from the VS APL distribution tape to data set VSAPL.OBJLIB. Execution of job BUILDOBJ from the sample JCL, altered to suit your requirements, accomplishes this step. Supply the information shown in lowercase below.

Each input file is a series of object modules, each preceded by a ./ ADD NAME= statement. The BUILDOBJ job reads the two files and writes each object module as a member of VSAPL.OBJLIB.

```
//BUILDOBJ JOB  accounting-information,MSGLEVEL=1
//          EXEC PGM=IEBUPDTE,PARM=NEW
//SYSPRINT  DD   SYSOUT=A
//SYSUT2    DD   DSN=VSAPL.OBJLIB,DISP=OLD
//SYSIN     DD   DSN=INTERP.OBJECT,VOL=SER=APLDTR,
//               UNIT=2400,DISP=(OLD,PASS),LABEL=(5,NL),
//               DCB=(LRECL=80,BLKSIZE=3200,RECFM=FB)
//          EXEC PGM=IEBUPDTE,PARM=NEW
//SYSPRINT  DD   SYSOUT=A
//SYSUT2    DD   DSN=VSAPL.OBJLIB,DISP=OLD
//SYSIN     DD   DSN=OSVS.DEPENDNT.OBJECT,VOL=SER=APLDTR,
//               UNIT=2400,DISP=OLD,LABEL=(7,NL),
//               DCB=(LRECL=80,BLKSIZE=3200,RECFM=FB)
/*
```

4. Link-edit the VS APL load module. Execution of job LINKAPL from the sample JCL, altered to suit your requirements, accomplishes this step. The job contains two SYSLMOD DD statements, one to link-edit VS APL into SYS1.LINKLIB for OS/VS1 and another to link-edit VS APL into SYS1.LPALIB for OS/VS2. Remove the statement that does not apply to your operating system, and supply the information shown in lowercase below.

The link-edit map output from this step should be saved.

```
//LINKAPL  JOB  accounting-information,MSGLEVEL=1
//         EXEC PGM=HEWL,
//              PARM='RENT,NCAL,LIST,MAP,XREF'
//SYSPRINT DD   SYSOUT=A
//OBJLIB   DD   DSN=VSAPL.OBJLIB,DISP=SHR
//SYSLMOD  DD   DSN=SYS1.LINKLIB,DISP=OLD (OS/VS1 ONLY)
//SYSLMOD  DD   DSN=SYS1.LPALIB,DISP=OLD (OS/VS2 ONLY)
//SYSUT1   DD   UNIT=SYSDA,SPACE=(TRK,(40,10))
//SYSLIN   DD   *
   INCLUDE OBJLIB(1)
                 .
                 .
                 .

   ENTRY APLPCOEX
   SETCODE AC(1)
   NAME APLPCOEX(R)
/*
```

[1] The sample JCL contains an INCLUDE statement for each module listed in Appendix A under "VSPC Executor Modules" and "Interpreter Modules."

5. Link-edit the conversion program into data set VSAPL.CNVTLIB. Execution of job LINKCNVT from the sample JCL, altered to suit your requirements, accomplishes this step. Supply the information shown in lowercase below.

The link-edit map output from this step should be saved.

```
//LINKCNVT JOB  accounting-information,MSGLEVEL=1
//         EXEC PGM=HEWL,PARM='NCAL,LIST,MAP,XREF,REUS'
//SYSPRINT DD   SYSOUT=A
//OBJLIB   DD   DSN=VSAPL.OBJLIB,DISP=SHR
//SYSLMOD  DD   DSN=VSAPL.CNVTLIB,DISP=OLD
//SYSUT1   DD   UNIT=SYSDA,SPACE=(TRK,(40,10))
//SYSLIN   DD   *
   INCLUDE OBJLIB(1)
                 .
                 .
                 .

   ENTRY COIBM
   NAME APLCVOS(R)
/*
```

[1] The sample JCL contains an INCLUDE statement for each module listed in Appendix A under "VSPC/OS Conversion Modules."

6. Run the VSPC Service Program to:

- Define VS APL as a foreground processor.

- Define public libraries 1 and 2.

- Define the distributed auxiliary processors.

- Transfer the distributed workspaces from the distribution tape to libraries 1 and 2 (workspaces APFNS and PRINT, which are used only under CMS, are not transferred).

Execution of job VSPCSERV from the sample JCL, altered to suit your requirements, accomplishes this step. Supply the information shown in lowercase below. Although files 8 through 16 of the distribution tape contain 800-byte unblocked records, they must be described as 80-byte blocked records to the IMPORT function of the VSPC Service Program. See *VSPC Installation Reference Material* for a description of the VSPC Service Program and control statements.

```
//VSPCSERV JOB    accounting-information,MSGLEVEL=1
//         EXEC  PGM=ASUSPEXC,PARM=NOLIST
//SYSOLDIR DD    DSN=name,DISP=OLD
//SYSOLIB1 DD    DSN=name,DISP=OLD
//SYSOLIB2 DD    DSN=name,DISP=OLD
//NEWS     DD    DSN=NEWS,VOL=SER=APLDTR,
//               UNIT=2400,DISP=(OLD,PASS),LABEL=(8,NL),
//               DCB=(LRECL=80,BLKSIZE=800,RECFM=FBS)
//WSFNS    DD    DSN=WSFNS,VOL=SER=APLDTR,
//               UNIT=2400,DISP=(OLD,PASS),LABEL=(9,NL),
//               DCB=(LRECL=80,BLKSIZE=800,RECFM=FBS)
//CONVERT  DD    DSN=CONVERT,VOL=SER=APLDTR,
//               UNIT=2400,DISP=(OLD,PASS),LABEL=(10,NL),
//               DCB=(LRECL=80,BLKSIZE=800,RECFM=FBS)
//TYPEDRIL DD    DSN=TYPEDRIL,VOL=SER=APLDTR,
//               UNIT=2400,DISP=(OLD,PASS),LABEL=(11,NL),
//               DCB=(LRECL=80,BLKSIZE=800,RECFM=FBS)
//APLCOURS DD    DSN=APLCOURS,VOL=SER=APLDTR,
//               UNIT=2400,DISP=(OLD,PASS),LABEL=(12,NL),
//               DCB=(LRECL=80,BLKSIZE=800,RECFM=FBS)
//PLOT     DD    DSN=PLOT,VOL=SER=APLDTR,
//               UNIT=2400,DISP=(OLD,PASS),LABEL=(13,NL),
//               DCB=(LRECL=80,BLKSIZE=800,RECFM=FBS)
//EXAMPLES DD    DSN=EXAMPLES,VOL=SER=APLDTR,
//               UNIT=2400,DISP=(OLD,PASS),LABEL=(14,NL),
//               DCB=(LRECL=80,BLKSIZE=800,RECFM=FBS)
//FORMAT   DD    DSN=FORMAT,VOL=SER=APLDTR,
//               UNIT=2400,DISP=(OLD,PASS),LABEL=(15,NL),
//               DCB=(LRECL=80,BLKSIZE=800,RECFM=FBS)
//MEDIT    DD    DSN=MEDIT,VOL=SER=APLDTR,
//               UNIT=2400,DISP=(OLD,PASS),LABEL=(16,NL),
//               DCB=(LRECL=80,BLKSIZE=800,RECFM=FBS)
//SEDIT    DD    DSN=SEDIT,VOL=SER=APLDTR,
//               UNIT=2400,DISP=(OLD,PASS),LABEL=(17,NL),
//               DCB=(LRECL=80,BLKSIZE=800,RECFM=FBS)
```

```
//HOWEDITS DD     DSN=HOWEDITS,VOL=SER=APLDTR,
//                UNIT=2400,DISP=(OLD,PASS),LABEL=(18,NL),
//                DCB=(LRECL=80,BLKSIZE=800,RECFM=FBS)
//SBIC     DD     DSN=SBIC,VOL=SER=APLDTR,
//                UNIT=2400,DISP=(OLD,PASS),LABEL=(19,NL),
//                DCB=(LRECL=80,BLKSIZE=800,RECFM=FBS)
//VSFILES  DD     DSN=VSFILES,VOL=SER=APLDTR,
//                UNIT=2400,DISP=(OLD,PASS),LABEL=(20,NL),
//                DCB=(LRECL=80,BLKSIZE=800,RECFM=FBS)
//VSAPLFIL DD     DSN=VSAPLFIL,VOL=SER=APLDTR,
//                UNIT=2400,DISP=OLD,LABEL=(21,NL),
//                DCB=(LRECL=80,BLKSIZE=800,RECFM=FBS)
//FULLSCRE DD     DSN=FULLSCRE,VOL=SER=APLDTR,
//                UNIT=2400,DISP=OLD,LABEL=(22,NL),
//                DCB=(LRECL=80,BLKSIZE=800,RECFM=FBS)
//SYSPRINT DD     SYSOUT=A
//SYSIN    DD     *
AUTH chief-administrator-number/password
DEFINE FP NAME(APL) CODE(A0) ENTRY(APLPCOEX)
DEFINE USER(1) PASSWORD(password) LIBTYPE(PUBLIC C)-
   SPACE(1000) PROJLIB(NONE) CONTENT(APL) INTPRMAX(60 30)
DEFINE USER(2) PASSWORD(password) LIBTYPE(PUBLIC C)-
   SPACE(1000) PROJLIB(NONE) CONTENT(APL) INTPRMAX(60 30)
DEFINE AP(121) NOPASS SSMAX(4000000 30)
DEFINE AP(122) NOPASS SSMAX(4058 30)
DEFINE AP(123) NOPASS SSMAX(32767 30)
DEFINE AP(124) NOPASS SSMAX(4096 30)
AUTH 1/password
IMPORT 1 NEWS TYPE(OBJECT) CONTENT(APL)
IMPORT 1 WSFNS TYPE(OBJECT) CONTENT(APL)
IMPORT 1 CONVERT TYPE(OBJECT) CONTENT(APL)
IMPORT 1 TYPEDRILL TYPE(OBJECT) CONTENT(APL)
IMPORT 1 APLCOURSE TYPE(OBJECT) CONTENT(APL)
IMPORT 1 PLOT TYPE(OBJECT) CONTENT(APL)
IMPORT 1 EXAMPLES TYPE(OBJECT) CONTENT(APL)
IMPORT 1 FORMAT TYPE(OBJECT) CONTENT(APL)
IMPORT 1 MEDIT TYPE(OBJECT) CONTENT(APL)
IMPORT 1 SEDIT TYPE(OBJECT) CONTENT(APL)
IMPORT 1 HOWEDITS TYPE(OBJECT) CONTENT(APL)
IMPORT 1 SBIC TYPE(OBJECT) CONTENT(APL)
AUTH 2/password
IMPORT 2 VSFILES TYPE(OBJECT) CONTENT(APL)
IMPORT 2 VSAPLFILE TYPE(OBJECT) CONTENT(APL)
IMPORT 2 FULLSCREEN TYPE(OBJECT) CONTENT(APL)
/*
```

7. Test that VS APL is installed correctly by executing the sample terminal session (see Appendix C).

INSTALLING VS APL UNDER DOS/VS (VSPC)

This section describes how to install VS APL as a foreground processor under DOS/VS (VSPC).

Requirements for Installation

The facilities required for installing VS APL under DOS/VS are:

- A System/370 machine configuration that can support DOS/VS (VSPC).

- An installed release of DOS/VS (VSPC).

- The following DOS/VS system and utility programs:
  - CORGZ
  - DSTRB
  - LNKEDT
  - MAINT

- A partition large enough to run the VSPC Service Program and the above utility programs.

- Two magnetic tape devices or one direct access storage device.

- The VS APL distribution tape or distribution disk.

- Space available for private relocatable libraries, core image libraries, VS APL object decks, and VS APL link-edited modules (see "Auxiliary Storage Requirements").

- Space in VSPC public libraries for the distributed workspaces (see "Auxiliary Storage Requirements").

- Authorization as a VSPC chief administrator.

- A terminal supported by VSPC (required only to execute the sample terminal session).

Overview of Installation Procedure

In brief, the procedure for installing VS APL under DOS/VS (VSPC) is as follows. The procedure is described in detail in the next section.

1. Punch the sample JCL from the distribution tape or distribution disk.

2. If private libraries are desired, define a private relocatable library for the APL object decks and a private core image library for the APL foreground processor module and APL workspace conversion program.

3. Deblock the object decks from the distribution tape or distribution disk onto another tape or disk file, and catalog them into the relocatable library.

4. Link-edit the APL foreground processor and workspace conversion programs into the core image library.

5. Run the VSPC Service Program to define VS APL, public libraries 1 and 2, and the internal auxiliary processors to VSPC and to transfer the distributed workspaces to the VSPC libraries.

6. Test that VS APL is installed correctly by executing the sample terminal session (see Appendix C).

Installation Procedure

1. Punch the DOS/VS sample JCL from the VS APL distribution tape by executing the following job:

```
// JOB PNCHSAMP
// ASSGN SYS004,TAPE                    Distribution Tape
// ASSGN SYS005,X'00D'
// EXEC DSTRB
// UDS COP
// END
/&
```

Punch the DOS/VS sample JCL from the VS APL distribution disk by executing the following job:

```
// JOB PNCHSAMP
// ASSGN SYS004,unit,VOL=111111,SHR    Distribution Disk
// DLBL UIN,'A5748AP1.DOSVSJCL.VSAPL',99/365,SD
// EXTENT SYS004
// ASSGN SYS005,X'00D'
// EXEC DSTRB
// UDS COP
// END
/&
```

There are several DOS/VS jobs in the sample JCL. It may be necessary to alter the sample JCL to suit your requirements. In each step the sample JCL is listed, and the modifications that may be required are noted. In this step, the word *unit* is used to represent the unit type of the distribution disk. In other steps, the words *devicetype*, and *volserial* are used to represent the DOS/VS device type and volume serial number, respectively. For those steps, you should supply the DOS/VS device type and volume serial number that is appropriate to your installation. The volume serial number of the distribution disk is always 111111.

2. If private libraries are desired, define a private relocatable library for the APL object decks and a private core image library for the APL forground processor and APL workspace conversion program. If private libraries are not desired, skip to step 3.

Execution of job ALLOCRLB from the sample JCL, altered to suit your requirements, can be used to define a new private relocatable library. Supply the information in lowercase below.

```
// JOB ALLOCRLB
// ASSGN SYSRLB,devicetype,VOL=volserial,SHR
// DLBL IJSYSRL,'VS APL PRIV RLB',99/365,SD
// EXTENT SYSRLB,volserial,1,0,first-track,total-tracks
// EXEC CORGZ
 NEWVOL RL=cylinders(directory-tracks)
 /*
/&
```

Execution of job ALLOCCIL from the sample JCL, altered to suit your requirements, can be used to define a new private core image library. Supply the information in lowercase below.

```
// JOB ALLOCCIL
// ASSGN SYS003,devicetype,VOL=volserial,SHR
```

```
// DLBL IJSYSPC,'VS APL PRIV CIL',99/365,SD
// EXTENT SYS003,volserial,1,0,first-track,total-tracks
// EXEC CORGZ
  NEWVOL CL=cylinders(directory-tracks)
/*
/&
```

The space required in the relocatable and core image libraries is given in the section "Storage Requirements."

3. Deblock the object decks from the distribution tape or distribution disk onto another (possibly temporary) tape or disk file. Clear space in the system or private relocatable library by deleting all VS APL object decks and by condensing the library. Then, catalog the deblocked object decks into the relocatable library.

Execution of job TAPEDEBL from the sample JCL, altered to suit your requirements, accomplishes this step using a distribution tape. The deblocked output will be on tape. Supply the information in lowercase below.

```
// JOB TAPEDEBL
// ASSGN SYS004,TAPE            Input Distribution Tape
// ASSGN SYS005,TAPE            Output Tape
// UPSI 10100
// EXEC DSTRB                   Deblock object file
// UDS DBL
// END
// MTC WTM,SYS005
// MTC REW,SYS005
* REMOVE FOLLOWING THREE CARDS IF SYSTEM RLB IS USED
// ASSGN SYSRLB,devicetype,VOL=volserial,SHR
// DLBL IJSYSRL,'VS APL PRIV RLB',99/365,SD
// EXTENT SYSRLB
// EXEC MAINT                   Delete VS APL OBJ and condense
  DELETR1
    .
    .
    .
  CONDS RL
/*
// ASSGN SYSIPT,SYS005          SYSIPT is deblocked OBJ
// EXEC MAINT                   Catalog deblocked OBJ
/&
```

Execution of job DISKDEBL from the sample JCL, altered to suit your requirements, accomplishes this step using a distribution disk. The deblocked output will be on disk. Supply the information in lowercase below.

```
// JOB DISKDEBL
// ASSGN SYS004,devicetype,VOL=111111,SHR
// DLBL UIN,'A5748AP1.DOSVSOBJ.VSAPL','99/365,SD
// EXTENT SYS004
// ASSGN SYS005,devicetype,VOL=volserial,SHR
// DLBL UOUT,'VSAPL.DEBLK.OBJECT',,,SD
```

---

[1] The sample JCL contains a DELETR statement for each module listed in Appendix A under "VSPC Executor Modules," "Interpreter Modules," and "VSPC/DOS Conversion Modules."

```
// EXTENT SYS005,volserial,1,0,first-track,total-tracks
// EXEC DSTRB
// UDS DBL                          Deblock object file
// END
* REMOVE FOLLOWING THREE CARDS IF SYSTEM RLB IS USED
// ASSGN SYSRLB,devicetype,VOL=volserial,SHR
// DLBL IJSYSRL,'VS APL PRIV RLB',99/365,SD
// EXTENT SYSRLB
// EXEC MAINT                       Delete VS APL object and condense
  DELETR¹
           .

           .

           .

  CONDS RL
/*
// ASSGN SYS006,SYSIPT              Store SYSIPT for later restoration
// DLBL IJSYSIN,'VSAPL.DEBLK.OBJECT'
// EXTENT SYSIPT
  ASSGN SYSIPT,SYS005              SYSIPT is deblocked object
// EXEC MAINT                       Catalog deblocked object
  CLOSE SYSIPT,UA
  ASSGN SYSIPT,SYS006              Restore SYSIPT
/&
```

¹ The sample JCL contains a DELETR statement for each module listed in Appendix A under "VSPC Executor Modules," "Interpreter Modules," and "VSPC/DOS Conversion Modules."

4. Link-edit the VS APL foreground processor and workspace conversion modules into the core image library.

   Execution of job LINKAPL, altered to suit your requirements, accomplishes this step. This job will first delete the appropriate phases and then condense the core image library. You should remove the appropriate ASSGN, DLBL, and EXTENT statements from the sample JCL if the system core image library or the system relocatable library is to be used. Supply the information in lowercase below.

```
// JOB LINKAPL
* REMOVE FOLLOWING THREE STATEMENTS IF
* SYSTEM CORE IMAGE LIB IS USED
// DLBL IJSYSPC,'VS APL PRIV CIL',,SD
// EXTENT SYSCLB
  ASSGN SYSCLB,devicetype,VOL=volserial,SHR
// EXEC MAINT
 DELETC APLPCOEX,APLCVDOS
  CONDS CL
/*
* REMOVE FOLLOWING THREE STATEMENTS IF
* SYSTEM RLB IS USED
// ASSGN SYSRLB,devicetype,VOL=volserial,SHR
// DLBL IJSYSRL,'VS APL PRIV RLB',,SD
// EXTENT SYSRLB
// OPTION CATAL
ACTION REL,CLEAR,MAP,NOAUTO    VSPC/DOS workspace conversion
```

```
PHASE   APLCVDOS,S,NOAUTO         modules
 INCLUDE¹
        .
        .
        .
 ENTRY COIBM
 PHASE APLPCOEX,S,NOAUTO          VS APL foreground processor
 INCLUDE²
        .
        .
 ENTRY APLPCOEX
/*
// EXEC LNKEDT
/&
```

¹ The sample JCL contains an INCLUDE statement for each module listed in Appendix A under
  "VSPC/DOS Conversion Modules."

² The sample JCL contains an INCLUDE statement for each module listed in Appendix A under "VSPC
  Executor Modules" and "Interpreter Modules." The INCLUDE statements are ordered to minimize
  paging.

5. Run the VSPC Service Program to:

   • Define VS APL as a foreground processor.

   • Define public libraries 1 and 2.

   • Define the distributed auxiliary processors.

   • Transfer the distributed workspaces from the distribution tape or disk to
     libraries 1 and 2 (workspace APFNS and workspace PRINT, which are
     used only under CMS are not transferred).

   Execution of job VSPCSRVT from the sample JCL, altered to suit your
   requirements, accomplishes this step for the distribution tape. Execution of
   job VSPCSRVD, similarly altered, accomplishes this step for the
   distribution disk. Supply the information in lowercase below. (The term
   'file-id' represents the identification of the file, such as the VSAM master
   catalog or VSPC directory, that was assigned when VSPC was installed.)
   Both of these jobs assume that the VSAM master catalog was permanently
   assigned at IPL time and that you are using a VSAM user catalog. The user
   catalog, the VSPC directory, and VSPC library data sets are assumed to
   reside on the same volume (which is assigned arbitrarily to SYS001). See
   VSPC Installation Reference Material for a description of the VSPC
   Service Program and VSPC libraries.

```
// JOB VSPCSRVT
// OPTION LISTX
// ASSGN SYS004,TAPE                     Distribution tape
// MTC REW,SYS004
// MTS FSF,SYS004,7
// DLBL IJSYSCT,'file-id',,VSAM     VSPC master catalog
// EXTENT SYSCAT
// ASSGN SYS001,devicetype,VOL=volserial  VSPC library disk
// DLBL IJSYSUC,'file-id',,VSAM     VSAM user catalog
// EXTENT SYS001
// DLBL IJSYSOD,'file-id',,VSAM     VSPC directory
// EXTENT SYS001
// DLBL IJSYSO1,'file-id',,VSAM     VSPC library
// EXTENT SYS001
// DLBL IJSYSO2,'file-id',,VSAM     VSPC library
```

```
// EXTENT SYS001
// EXEC ASUSPEXC
AUTH chief-administrator-number/password
DEFINE FP name(APL) CODE(A0) ENTRY(APLPCOEX)
DEFINE USER(1) PASSWORD(password) LIBTYPE(PUBLIC C)-
   SPACE(1000) PROJLIB(NONE) CONTENT(APL) INTPRMAX(60 30)
DEFINE USER(2) PASSWORD(password) LIBTYPE(PUBLIC C)-
   SPACE(1000) PROJLIB(NONE) CONTENT(APL) INTPRMAX(60 30)
DEFINE AP(121) NOPASS SSMAX(4000000 30)
DEFINE AP(122) NOPASS SSMAX(4058 30)
DEFINE AP(123) NOPASS SSMAX(32767 30)
DEFINE AP(124) NOPASS SSMAX(4096 30)
ENVIRONMENT DEVICE(2400 004 NOREWIND) NOLABEL-
   FORMAT(F) BLOCKSIZE(800) RECORDSIZE(80)
AUTH 1/password
IMPORT 1 NEWS TYPE(OBJECT) CONTENT(APL)
IMPORT 1 WSFNS TYPE(OBJECT) CONTENT(APL)
IMPORT 1 CONVERT TYPE(OBJECT) CONTENT(APL)
IMPORT 1 TYPEDRILL TYPE(OBJECT) CONTENT(APL)
IMPORT 1 APLCOURSE TYPE(OBJECT) CONTENT(APL)
IMPORT 1 PLOT TYPE(OBJECT) CONTENT(APL)
IMPORT 1 EXAMPLES TYPE(OBJECT) CONTENT(APL)
IMPORT 1 FORMAT TYPE(OBJECT) CONTENT(APL)
IMPORT 1 MEDIT TYPE(OBJECT) CONTENT(APL)
IMPORT 1 SEDIT TYPE(OBJECT) CONTENT(APL)
IMPORT 1 HOWEDITS TYPE(OBJECT) CONTENT(APL)
IMPORT 1 SBIC TYPE(OBJECT) CONTENT(APL)
AUTH 2/password
IMPORT 2 VSFILES TYPE(OBJECT) CONTENT(APL)
IMPORT 2 VSAPLFILE TYPE(OBJECT) CONTENT(APL)
IMPORT 2 FULLSCREEN TYPE(OBJECT) CONTENT(APL)
/*
/&

// JOB VSPCSRVD
// OPTION LISTX
// ASSGN SYS004,devicetype,VOL=111111,SHR
// DLBL NEWS,'A5748AP1.NEWS.VSAPL',99/365,SD
// EXTENT SYS004
// DLBL WSFNS,'A5748AP1.WSFNS.VSAPL',99/365,SD
// EXTENT SYS004
// DLBL CONVERT,'A5748AP1.CONVERT.VSAPL',99/365,SD
// EXTENT SYS004
// DLBL TYPEDRI,'A5748AP1.TYPEDRIL.VSAPL',99/365,SD
// EXTENT SYS004
// DLBL APLCOUR,'A5748AP1.APLCOURS.VSAPL',99/365,SD
// EXTENT SYS004
// DLBL PLOT,'A5748AP1.PLOT.VSAPL',99/365,SD
// EXTENT SYS004
// DLBL EXAMPLE,'A5748AP1.EXAMPLES.VSAPL',99/365,SD
// EXTENT SYS004
// DLBL FORMAT,'A5748AP1.FORMAT.VSAPL',99/365,SD
// EXTENT SYS004
// DLBL MEDIT,'A5748AP1.MEDIT.VSAPL',99/365,SD
// EXTENT SYS004
```

```
// DLBL SEDIT,'A5748AP1.SEDIT.VSAPL',99/365,SD
// EXTENT SYS004
// DLBL HOWEDIT,'A5748AP1.HOWEDITS.VSAPL',99/365,SD
// EXTENT SYS004
// DLBL SBIC,'A5748AP1.SBIC.VSAPL',99/365,SD
// EXTENT SYS004
// DLBL VSFILES,'A5748AP1.VSFILES.VSAPL',99/365,SD
// EXTENT SYS004
// DLBL VSAPLFI,'A5748AP1.VSAPLFIL.VSAPL',99/365,SD
// EXTENT SYS004
// DLBL FULLSCR,'A5748AP1.FULLSCRE.VSAPL',99/365,SD
// EXTENT SYS004
// DLBL IJSYSCT,'file-id',,VSAM              VSAM master catalog
// EXTENT SYSCAT
// ASSGN SYS001,devicetype,VOL=volserial VSPC library disk
// DLBL IJSYSUC,'file-id',,VSAM              VSAM user catalog
// EXTENT SYS001
// DLBL IJSYSOD,'file-id',,VSAM              VSPC directory
// EXTENT SYS001,volserial
// DLBL IJSYSO1,'file-id',,VSAM              VSPC library
// EXTENT SYS001,volserial
// DLBL IJSYSO2,'file-id',,VSAM              VSPC library
// EXTENT SYS001,volserial
// EXEC ASUSPEXC
AUTH chief-administrator-number/password
DEFINE FP NAME(APL) CODE(A0) ENTRY(APLPCOEX)
ENVIRONMENT DEVICE(distribution-device) FORMAT(FB)-
   BLOCKSIZE(800) RECORDSIZE(80)
DEFINE USER(1) PASSWORD(password) LIBTYPE(PUBLIC C)-
   SPACE(1000) PROJLIB(NONE) CONTENT(APL) INTPRMAX(60 30)
DEFINE USER(2) PASSWORD(password) LIBTYPE(PUBLIC C)-
   SPACE(1000) PROJLIB(NONE) CONTENT(APL) INTPRMAX(60 30)
DEFINE AP(121) NOPASS SSMAX(4000000 30)
DEFINE AP(122) NOPASS SSMAX(4058 30)
DEFINE AP(123) NOPASS SSMAX(32767 30)
DEFINE AP(124) NOPASS SSMAX(4096 30)
AUTH 1/password
IMPORT 1 NEWS TYPE(OBJECT) CONTENT(APL)
IMPORT 1 WSFNS TYPE(OBJECT) CONTENT(APL)
IMPORT 1 CONVERT TYPE(OBJECT) CONTENT(APL)
IMPORT 1 TYPEDRILL TYPE(OBJECT) CONTENT(APL)
IMPORT 1 APLCOURSE TYPE (OBJECT) CONTENT(APL)
IMPORT 1 PLOT TYPE(OBJECT) CONTENT(APL)
IMPORT 1 EXAMPLES TYPE(OBJECT) CONTENT(APL)
IMPORT 1 FORMAT TYPE(OBJECT) CONTENT(APL)
IMPORT 1 MEDIT TYPE(OBJECT) CONTENT(APL)
IMPORT 1 SEDIT TYPE(OBJECT) CONTENT(APL)
IMPORT 1 HOWEDITS TYPE(OBJECT) CONTENT(APL)
IMPORT 1 SBIC TYPE(OBJECT) CONTENT(APL)
AUTH 2/password
IMPORT 2 VSFILES TYPE(OBJECT) CONTENT(APL)
IMPORT 2 VSAPLFILE TYPE(OBJECT) CONTENT(APL)
IMPORT 2 FULLSCREEN TYPE(OBJECT) CONTENT(APL)
/*
/&
```

6. Test that VS APL is installed correctly by executing the sample terminal session (see Appendix C).

DEFINING VS APL USERS

This section describes how to define VS APL users to VM/370 and VSPC.

VM/370 User Directory

Under CMS, a VS APL user is not defined as such. A VS APL user is a VM/370 user who has access to CMS and to VS APL and its libraries. The procedure for defining a VM/370 user directory entry is described in *IBM Virtual Machine Facility/370: Operator's Guide.* When defining a directory entry for a VS APL user, observe these guidelines:

- The virtual machine must be large enough to execute VS APL (see "Virtual Storage Requirements"). If VS APL is installed as a shared system, the virtual machine size must be no larger than the load address of the shared system.

- The user's CMS A-disk, in addition to whatever else he may use it for, is his VS APL private library. Define a disk at virtual device address 191 with sufficient space for anticipated workspace storage (see "Auxiliary Storage Requirements for Workspaces").

- The CMS Y-disk contains the VS APL public libraries; it can also contain other components of the VS APL system. Define a read-only link to this disk with virtual device address 19E.

- Do not define a link to a disk that contains VS APL project libraries. VS APL links to a project library disk dynamically as a G-disk with virtual device address 197. Defining a link to a project library disk could prevent other VS APL users from accessing project libraries. Also, do not define a disk with virtual device address 197 for any VS APL user.

- Define CMS as the system to be loaded when the user logs on.

VSPC User Profile

Under VSPC, a VS APL user is not necessarily defined as such. A VS APL user is a VSPC user whose profile includes the options required for using VS APL. Use the VSPC DEFINE command or the VSPC Service Program DEFINE control statement to define a new user's profile. Use the VSPC ALTER command or the VSPC Service Program ALTER control statement to modify an existing user's profile. They are described fully in *VSPC Installation Reference Material.* An example of DEFINE operands for a VS APL user is:

Operand	Description
USER(123456)	Defines user number and library number 123456.
PASSWORD(MYPASS)	Defines logon password.
LIBTYPE(PRIVATE)	User's library is private.
SPACE(500)	Maximum library space is 500 units (500,000 bytes).
PROJLIB(512)	User can access project library 512.
CONTENT(APL)	When user logs on, he is under control of VS APL. If a CONTENT attribute other than APL is defined, the user can access VS APL by issuing the ENTER command.
INTPRMAX(100 50)	Maximum workspace size is 100 units (100,000 bytes). Default workspace size is 50 units (50,000 bytes). VSPC permits a default workspace size that is smaller than that required by VS APL. To activate a VS APL workspace, a user should have a default workspace size of at least 20 units (20,000 bytes).
SSMAX(1000 5)	Maximum size of a single shared variable is 1000 bytes. Maximum number of shared variables is 5.

If the user intends to access VS APL workspaces in public or project libraries, the maximum workspace size must be at least as large as the maximum workspace size of those libraries.

See also "Transferring Conversion Program Output to VSPC" for a discussion of how user profiles can be defined as a result of workspace conversion.

DEFINING AUXILIARY PROCESSORS

This section describes how to define auxiliary processors to CMS and VSPC.

Defining Auxiliary Processors to CMS

Under CMS, auxiliary processors are not defined as such. An auxiliary processor exists as a CMS file whose filename is the name used to invoke it, whose filetype is TEXT, and whose filemode is any mode acceptable to CMS.

Defining Auxiliary Processors to VSPC

The internal auxiliary processors distributed with VS APL for use under VSPC are defined to VSPC during the installation procedure. They are identified as numbers 121 (APL VSPC file auxiliary processor), 122 (EBCDIC VSPC file auxiliary processor), 123 (VSAM file auxiliary processor) and 124 (full screen management auxiliary processor). If you have obtained the source code for VS APL, you can change the numbers by performing these actions:

1. Modify VS APL module APLPCOAP by specifying the new numbers as operands of the APAPL, APBCD, APVSAM and APFSM keywords of the APLPCOAP marco. Assemble the module.

2. Link-edit the VS APL load module as described in the installation procedure.

3. Execute the VSPC Service Program with DEFINE AP control statements to define the new numbers to VSPC (see *VSPC Installation Reference Material*).

4. Specify the new numbers for APAPL, APBCD, and APVSAM as the values of global variables APAP, APEP, and APVSAM in distributed workspace 2 VSFILES.

5. Specify the new number for APFSM as the value of global variable APFSM in workspace 2 FULLSCREEN.

To define a user-written auxiliary processor to VSPC, execute the VSPC Service Program with a DEFINE AP control statement as described in *VSPC Installation Reference Material*.

VS APL PUBLIC AND PROJECT LIBRARIES

In this section, the procedures for creating and maintaining VS APL public and project libraries are described.

VS APL Libraries under CMS

Under CMS, a VS APL public or project library is a collection of workspaces that has the properties described in the following sections. The libraries are defined in a CMS file called the library table file. When VS APL is installed, the library table file and public libraries 1 through 999 are created; no project libraries are created.

Library Table File

The library table file defines public and project libraries to VS APL under CMS. The filename and filetype of the library table file are both APLIBTAB. The library table file distributed with VS APL defines libraries 1 through 999 as public. When VS APL is installed, the file is placed on the Y-disk, but it can reside on any disk. It is located via the standard CMS search order.

When VS APL is invoked, the library table file is read into virtual storage. When a VS APL user requests access to a public or project library, the executor searches the file sequentially from the beginning for the specified library number. The information from the first matching entry is used to identify the library type and, if a project library, to link dynamically to the project library disk.

Records in the file are 80-byte card images of free format. Fields are delimited by one or more blanks. There are two types of records; each defines a single library or a range of libraries:

```
PUBLIC  libnum|(first-libnum last-libnum)
PROJECT libnum|(first-libnum last-libnum) owner device
```

PUBLIC or PROJECT
   is the library type; only the first two letters are required.

libnum
   is a library number; it can be any positive integer other than 1001
   (reserved for VS APL users' private libraries) and no greater than seven
   digits.

(first-libnum last-libnum)
   is a range of library numbers; the first number must be less than or equal to
   the second number.

owner
   is the VM/370 user identification of the owner of the disk on which the
   project library resides.

device
   is the virtual device address, as defined in the owner's directory entry, of
   the disk on which the project library resides.

Use the CMS editor to maintain the library table file (see *IBM Virtual Machine Facility/370: EDIT Guide*).

Public Libraries

For VS APL under CMS, a public library is a collection of workspaces that has these properties:

- It resides on a disk that is accessed as the Y-disk. The disk can contain more than one public library. It must not contain project libraries.

- It is defined as a public library in the library table file. For example, public libraries 1 through 999 are defined as:

      PUBLIC (1 999)

- Each workspace in the library is a CMS file whose filetype is W*nnnnnnn,* where *nnnnnnn* is the library number. For example, workspace 1 NEWS is a CMS file whose filename is NEWS and whose filetype is W0000001.

- Any VS APL user can list, load, or copy workspaces in the library.

- No VS APL user can save or drop workspaces in the library. The library is maintained with CMS commands.

How to Create a Public Library

Public libraries 1 through 999 are defined in the distributed VS APL system. The disk that contains public libraries is defined during the installation procedure.

To create a public library with a number greater than 999 or to change the distributed definition of public libraries, use the CMS editor to modify the library table file.

How to Maintain a Public Library

Public library workspaces can be added, replaced, or deleted only by someone who is allowed write access to the public library disk. The maintenance functions are performed with CMS commands. The functions should be performed when no one is using VS APL. If this is not possible, notify VS APL users that they are not to access the Y-disk until the maintenance functions are completed.

To add or replace a public library workspace:

1. Have the VS APL user who created the workspace issue these CP and CMS commands to spool it to you:

       SPOOL PUNCH userid
       DISK DUMP filename filetype

   userid
       is your VM/370 user identification.

   filename filetype
       is the workspace identification.

2. Access the public library disk in read/write mode and any filemode (B is used in the following examples).

3. Transfer the workspace from the virtual reader to the A-disk:

       DISK LOAD

4. Copy the workspace from the A-disk to the public library disk and rename it. Note that the filetype of private workspaces is VSAPLWS. For example:

```
COPYFILE NEWPUB VSAPLWS A = W0000003 B (REPLACE
```

Specify the REPLACE option only if the workspace is intended to replace one with the same identification.

To delete a public library workspace:

1. Access the public library disk in read/write mode and any filemode.

2. Erase the workspace. For example:

```
ERASE NEWPUB W0000003 B
```

Project Libraries

For VS APL under CMS, a project library is a collection of workspaces that has these properties:

- It resides on a disk that can be linked to dynamically as a G-disk with virtual device address 197. The disk can contain more than one project library. It must not contain public libraries.

- It is defined as a project library in the library table file. For example, project library 2000 which is owned by CMS user ABC1234 and resides on his disk at virtual device address 196 is defined as:

```
PROJECT 2000 ABC1234 196
```

- Each workspace in the library is a CMS file whose filetype is W*nnnnnnn*, where *nnnnnnn* is the library number. For example, workspace 2000 PROJWORK is a CMS file whose filename is PROJWORK and whose filetype is W0002000.

- Any VS APL user who knows the read password defined for the disk can list, load, or copy workspaces in the library.

- Any VS APL user who knows the write password defined for the disk can save or drop workspaces in the library.

How to Create a Project Library

To create a project library, first decide whether it is to reside on an existing disk or on a new disk. It must reside on a new disk if maximum access control is wanted. VS APL users' access to project libraries is controlled by passwords associated with a disk, not with a library.

To define the project library, use the CMS editor to add a record to the library table file. If the library is to reside on a new disk, define the disk as described in the following paragraphs; otherwise, creation of the library is completed.

The procedure for defining a disk (that is, for defining or modifying a VM/370 user directory entry) is described in *IBM Virtual Machine Facility/370: Operator's Guide.* When defining a project library disk, observe these guidelines: ˙

• Define the disk in a VM/370 user directory entry that is used for no purpose other than to contain the definition of the project library disk(s). This is recommended because VS APL links to project disks dynamically and cannot do so if a permanent link exists. If the disk is defined in an active VM/370 user directory entry, that user must detach the disk each time he logs on.

• Define passwords as required to impose the desired level of control. A VS APL user must specify the read password for LIB, LOAD, and COPY commands; the write password for SAVE and DROP commands. To allow uncontrolled access, define a password as ALL.

• Define sufficient space for anticipated workspace storage (see "Auxiliary Storage Requirements for Workspaces").

After the project library disk has been defined, format it using the CMS command FORMAT.

How to Maintain a Project Library

Project library workspaces can be added, replaced, or deleted by any user who knows the write password defined for the disk on which the project library resides. Maintenance is normally performed with VS APL commands SAVE and DROP; it can also be performed with CMS commands as described in "How to Maintain a Public Library."

VS APL Libraries under VSPC

Under VSPC, a VS APL public or project library is a VSPC public or project library that contains workspaces with a content attribute of APL.

Use either the VSPC DEFINE command or the VSPC Service Program DEFINE control statement to create a public or project library (see *VSPC Installation Reference Material*). An example of DEFINE operands for a public library is:

Operand	Description
USER(3)	Defines user number and library number 3.
PASSWORD(XYZ)	Defines password which must be specified to logon as user 3 or to gain access to the library; if access is not to be controlled, specify NOPASS.
LIBTYPE(PUBLIC C)	Library is public; see discussion below of library maintenance for meaning of C.
SPACE(1000)	Maximum library space is 1000 units (1,000,000 bytes).
CONTENT(APL)	Defines the content attribute of the workspace attached when a user logs on as user number 3.
INTPRMAX(100 50)	Maximum workspace size is 100 units (100,000 bytes); default workspace size is 50 units (50,000 bytes).

The maximum workspace size must be no greater than that of VS APL users who access workspaces in the library.

To define a project library, specify operands as above except for the library type, which is PROJECT rather than PUBLIC.

Public and project libraries are maintained by users who have the requisite access to the libraries. In terms of library access, there are three types of users:

- The library manager is the user who has logged on to VSPC by supplying the library number.

- The workspace owner is the user who stored the workspace in the library.

- Other users are those other than the library manager or workspace owner who are allowed to access the library. All users are allowed to access public libraries. Only those users whose profile definition includes the PROJLIB operand are allowed to access the specified project library.

For both public and project libraries, if C is specified in the LIBTYPE operand when the library is defined, only the library manager can store, replace, or delete a workspace. If C is not specified, only the workspace owner can replace a workspace; either the workspace owner or the library manager can delete a workspace; other users can store new workspaces and thus become workspace owners.

To store a new workspace or replace an existing one, use the VS APL command SAVE. To delete a workspace, use the VS APL command DROP or the VSPC command PURGE.

WORKSPACE CONVERSION

This section describes how to convert APL\360, APLSV, and APL/CMS workspaces to VS APL workspaces. Throughout this section, the term *source APL* is used to mean APL\360, APLSV, or APL/CMS.

General Information

This section contains information that is applicable to workspace conversion under both CMS and VSPC unless noted otherwise.

Pre-Conversion Considerations

There are three items—library numbers, workspace names, and passwords—that may be unacceptable to CMS or VSPC. These items can be modified during the conversion procedure, as described later. However, they should be modified by the owners of the source APL workspaces before the workspaces are dumped. Modifying these items before rather than during the conversion procedure ensures that they are modified as the workspace owners wish them to be and simplifies the conversion procedure.

The unacceptable items are:

- A library number greater than seven digits.

- A workspace name that contains deltas, underscored letters, lowercase letters, or national characters.

- For CMS only, a workspace name longer than eight characters.

- For VSPC only, a password that contains deltas or underscored characters. An invalid logon password can be altered by a VSPC administrator following conversion. An invalid workspace password must be modified by the workspace owner prior to conversion; a workspace with an invalid password cannot be accessed, and there is no way to alter the password.

Conversion Input

Input to the conversion procedure is a workspace dump tape from the source APL system. The tape can be multi-volume. For APL\360 and APLSV, the tape is produced by the source APL utility program; it can be a full dump, an incremental dump, or a selective dump. For APL/CMS, the tape is produced by the CMS TAPE DUMP command; it must contain only workspaces that were created on Version 2 of APL/CMS.

Conversion Options

There are three options that define which of the input workspaces are to be processed:

Option	Description
Full	All workspaces on the input tape are processed.
Resume	All workspaces on the input tape, beginning with a specified workspace, are processed.
Select	Only the specified workspaces are processed.

There are two options that define the type of conversion for the selected workspaces:

Option	Description
Format	Workspace is converted to the format defined for VS APL.
Content	Includes format conversion. In addition, all function statements are examined for items that will not execute correctly under VS APL. Such items are converted to their VS APL equivalent, if there is one. The incompatible items, whether converted or not, are reported.

These types of conversion are described in greater detail in *VS APL for CMS: Terminal User's Guide* and *VS APL for VSPC: Terminal User's Guide.*

Conversion Output

Output of the conversion procedure is workspaces that can be executed by VS APL and a conversion report. The converted workspaces may or may not execute properly, depending on their content. The conversion report is intended for distribution to the owners of the workspaces. It gives information about the converted workspaces and, if content conversion was done, information about items that must be evaluated or modified by the workspace owner to ensure proper execution.

Conversion program error messages are listed in the "Messages" section.

Workspace Conversion under CMS

There are two workspace conversion programs that execute under CMS: APLCVCMS converts APL\360 and APLSV workspaces for use under CMS; APLCVRPQ converts APL/CMS workspaces for use under either CMS or VSPC. The procedures for using the two programs are described in this section and are the same unless noted otherwise.

Auxiliary Storage Required by Conversion Programs

When converting APL/CMS workspaces for use under VSPC, a scratch tape and A-disk space are required. The APLCVRPQ conversion program transfers each converted workspace to the tape and creates two files of job control statements on the converter's A-disk. The tape and the punched JCL files are subsequently used with the VSPC Service Program as described in step 6 of the conversion procedure, below. The amount of A-disk space required is n 800-byte blocks, where n is the number of converted workspaces multiplied by 0.3.

When converting APL/CMS workspaces for use under CMS, APL\360 workspaces, or APLSV workspaces, only A-disk space is required. The APLCVRPQ and APLCVCMS conversion programs transform each input workspace to a CMS file on the converter's A-disk. Estimate the amount of disk space required according to the number of workspaces to be converted, their size, and the amount of data they contain (see "Auxiliary Storage Requirements for Workspaces"). If possible, use an A-disk with sufficient space for all the workspaces to be converted. This should be possible if the input tape is a single volume.

The simplest way to convert a multi-volume input tape is to segment the job by volume. Allocate the maximum disk space allowed by CMS (246 cylinders) and do a separate full conversion of each volume as if it were a complete dump tape. Directory information, which may be present on the first volume of the input tape, is not needed for VS APL under CMS and is ignored by the conversion program.

See the last item in step 5 of the conversion procedure for a discussion of how to resume conversion if it terminates abnormally because of insufficient disk space.

Identification of Converted Workspaces

When an APL\360 or APLSV workspace is converted, its identification is transformed to a CMS file identification. The workspace name, truncated from the right to eight characters, becomes the CMS filename. The library number, truncated from the left to seven digits or extended to the left with zeros to seven digits, and prefixed with a W, becomes the CMS filetype. The CMS filemode is always A1. For example:

Workspace Identification	CMS File Identification
25 GENWORK	GENWORK W0000025 A1
1234567 COMPUTATION	COMPUTAT W1234567 A1
12345678 XREF	XREF W2345678 A1

When an APL/CMS workspace is converted, its identification (which is a CMS file identification) is retained with no change. The filetype of a private APL/CMS workspace is VMAPLWS. The filetype of a public APL/CMS workspace is P*nnnnnn,* where *nnnnnn* is the library number.

After workspaces have been converted, it may be necessary to change their identification. This can be done as part of the conversion procedure (as described in step 6) or by the recipients of the converted workspaces. The required changes are:

- The filetype of private workspaces must be changed to VSAPLWS.

- For APL/CMS workspaces only, the filetype of public libraries must be changed to W*nnnnnnn,* where *nnnnnnn* is the library number.

- For APL/CMS workspaces only, lowercase letters or national characters that occur in a filename must be changed to uppercase letters or numbers.

Workspace Conversion Procedure

1. Log on to VM/370 and IPL CMS with a virtual machine large enough to execute the conversion program (see "Virtual Storage Requirements").

2. Access an A-disk in read/write mode with the required amount of disk space (see "Auxiliary Storage Required by Conversion Programs"). If the disk is newly allocated, format it using the CMS FORMAT command.

3. Ask the system operator to mount the workspace dump tape and to attach the tape drive as virtual device 181. If converting APL/CMS workspaces for use under VSPC, also ask the system operator to mount a scratch tape and to attach the tape drive as virtual device 182.

4. Invoke the conversion program and specify the desired options by issuing one of the following CMS commands:

- To invoke the APL\360 and APLSV conversion program:

  ```
  APLCVCMS [FULL|RESUME|SELECT] [CONTENT|NOCONTENT]
  ```

  The meaning of the operands is described in "Conversion Options"; NOCONTENT selects the format option. The operands can be truncated down to their initial character. The sequence in which the two operands are entered is immaterial. The default operands are FULL and CONTENT.

- To invoke the APL/CMS conversion program:

  ```
  APLCVRPQ [FULL|RESUME] [CONTENT|NOCONTENT]
  ```

  The operands are as described above. Note that the SELECT option is not supported.

5. The conversion procedure is conversational. Enter information as explained below when prompted to do so. If the information is an APL workspace identification, represent APL characters with EBCDIC characters as follows:

APL	EBCDIC
0 - 9	0-9
$\underline{A}$ - $\underline{Z}$	a-z (lowercase)
A - Z	A-Z (uppercase)
Δ	*
$\underline{Δ}$	$

Note that when the conversion program prints a workspace identification as part of a prompt, it uses A-Z to represent A - Z and a-z to represent $\underline{A}$ - $\underline{Z}$.

- If the input option is RESUME, enter the identification of the workspace at which conversion is to begin as:

  ```
  library-number workspace-name
  ```

- If the input option is SELECT, enter a list of the workspaces to be converted. The list can have up to 100 entries. Each entry can be one of the following:

  ```
  library-number workspace-name
  ```
  to select a specific workspace.

  ```
  library-number
  ```
  to select all workspaces in a specific library.

  Press the RETURN key after each entry. Press the RETURN key alone to terminate the list. Entries in the list that are not found on the input tape are ignored.

- If converting APL/CMS workspaces, enter YES or NO (depending on the destination of the converted workspaces) in response to this prompt:

  ```
  IS OUTPUT FOR VSPC (YES|NO)
  ```

- If a CMS file identification duplicates that of a file already on the A-disk, enter one of the following options:

Option	Description
RENAME	Give the workspace a new name. In response to the next two prompts for filename and filetype, enter the desired CMS filename and filetype or press the RETURN key alone to leave either one unchanged. Filetype, if entered, must be as described earlier (W followed by seven digits).
IGNORE	Reject the workspace; do not convert it.
REPLACE	Replace the existing CMS file with this one.
CANCEL	Terminate execution of the conversion program.

- If a workspace name is invalid (contains deltas or underscored letters), enter the RENAME, IGNORE, or CANCEL option as described in the preceding step.

- When end of volume is reached, either enter CANCEL to terminate execution of the conversion program, or do the following to continue with the next volume:

  - Enter CP mode by pressing the ATTN key twice, (or press the PA1 key if an IBM 3270 terminal is being used).

  - Use the CP command MSG to ask the system operator to mount the next volume on the tape drive attached as virtual device 181.

  - Type the CP command BEGIN.

  - Type RESTART.

- If the conversion program terminates abnormally because the A-disk is full or because of an unrecoverable error, the last partially converted workspace is erased from the A-disk and its identification is printed at the terminal. Process the workspaces that have been converted by doing step 6 of the conversion procedure. Then rewind the input tape by issuing this CMS command:

  ```
  TAPE REW
  ```

  and resume the conversion procedure at step 4. Specify the RESUME option and the identification of the workspace that was printed when the conversion program terminated.

6. When the conversion program has completed execution, process the converted workspaces according to their destination:

- If the converted workspaces are to be used with VS APL under CMS and are not owned by the converter, separate the conversion report into sections by library number and distribute the sections to their owners. Disperse the converted workspaces to their owners and erase them from the A-disk by doing one of the following:

  - To change the filetype of APL\360 or APLSV private workspaces to VSAPLWS before dispersing them, use the CMS editor to create a file named NEWTYPE EXEC containing these statements:

    ```
    &CONTROL ERROR
    RENAME &1 &2 &3 = VSAPLWS =
    ```

Then issue these CP and CMS commands for each owner:

```
SPOOL PUNCH userid
LISTFILE * filetype A (EXEC
CMS NEWTYPE
LISTFILE * VSAPLWS A (EXEC
CMS DISK DUMP
CMS ERASE
```

userid
: is the owner's VM/370 user identification.

filetype
: is that of the owner's workspaces in the form Wnnnnnnn; it can be obtained from the conversion report.

- To disperse APL\360 or APLSV workspaces without changing their filetype, issue these CP and CMS commands for each owner:

```
SPOOL PUNCH userid
LISTFILE * filetype A (EXEC
CMS DISK DUMP
CMS ERASE
```

The operands are as described above.

- To disperse APL/CMS workspaces, issue these CP and CMS commands for each workspace:

```
SPOOL PUNCH userid
DISK DUMP filename filetype
ERASE filename filetype
```

userid
: is the owner's VM/370 user identification.

filename filetype
: is the identification of the APL/CMS workspace.

• If the converted workspaces are to be used with VS APL under CMS and are owned by the converter, the conversion procedure is completed except for changing the filetype.

To change the filetype of all private workspaces, issue this CMS command:

```
RENAME * filetype A = VSAPLWS =
```

filetype
: is either that generated for APL\360 and APLSV workspaces in the form Wnnnnnnn, where nnnnnnn is the source APL library number; or VMAPLWS for APL/CMS workspaces.

To change the filetype of APL/CMS public workspaces, issue this CMS command:

```
RENAME * Pnnnnnn A = Wnnnnnnn =
```

nnnnnn
: is the APL/CMS library number; note that the new filetype has an additional zero to the left.

- If the converted workspaces are APL/CMS workspaces to be used under VSPC, use the output of the conversion program as input to the IMPORT function of the VSPC Service Program.

There are two JCL files on the A-disk. The file named IMPORT DDCARDS contains the DD statement shown below for each converted workspace. The file named IMPORT COMMANDS contains the IMPORT statement shown below for each converted workspace.

```
//ddname DD    DSN=wsname,UNIT=2400,LABEL=(n,NL),
//              VOL=SER=XXXX,DISP=(OLD,PASS),
//              DCB=(LRECL=80,BLKSIZE=800,RECFM=FBS)
```

```
IMPORT wsname FROM(ddname) TYPE(OBJECT) CONTENT(APL)
```

ddname
  is M1 through Mn, where n is the number of converted workspaces.

wsname
  is the workspace name (the CMS filename).

n
  is the position of the workspace on the output tape.

The JCL files must be modified before they are used to run the VSPC Service Program. Use the CMS editor to modify them before printing and punching them, or modify them manually afterward. The required modifications are:

- Add the JCL statements required by the service program.

- Add an AUTH control statement.

- In each DD statement, change XXXX to the serial number of the output tape.

- If the output tape has standard labels, change the LABEL subparameter NL in each DD statement to SL.

- If lowercase letters or national characters occur in a workspace name, change them to uppercase letters or numbers in the DD and IMPORT statements.

- If the workspaces are to be transferred to VSPC libraries other than that specified in the AUTH control statement, insert the library number in each IMPORT statement preceding wsname.

- If the VSPC host system is DOS/VS, use the information in file IMPORT DDCARDS to prepare the required TLBL statements.

Print and punch the files by issuing these CMS commands:

```
PRINT IMPORT DDCARDS
PRINT IMPORT COMMANDS
PUNCH IMPORT DDCARDS
PUNCH IMPORT COMMANDS
```

Send the output tape, the conversion report, and the printed and punched JCL files to the VSPC installation.

At the VSPC installation, execute the VSPC Service Program to transfer the converted workspaces to VSPC libraries. IMPORT, AUTH, and the VSPC Service Program are described in *VSPC Installation Reference Material*.

Workspace Conversion under VSPC

There is one workspace conversion program that executes under OS/VS (APLCVOS) and another that executes under DOS/VS (APLCVDOS). Both programs convert APL\360 and APLSV workspaces. The procedures for using the two programs are described in this section and are the same unless noted otherwise. The procedure for converting APL/CMS workspaces for use under VSPC is described in "Workspace Conversion under CMS."

Converting workspaces to be used under VSPC is basically a three-step procedure:

1. Execute the conversion program. The output is a conversion report and a data set which contains the converted workspaces and user profiles.

2. Separate the conversion report into sections by library number and distribute the sections to their owners.

3. Execute the VSPC Service Program with COPY control statements to transfer the converted workspaces to VSPC libraries and (optionally) to define their owners to VSPC. Input to the VSPC Service Program is the data set output by the conversion program.

If the source APL dump tape contains library numbers or workspace names that are unacceptable to VSPC, the procedure must be executed twice. First do a full conversion. The unacceptable workspaces are rejected by the conversion program but identified on the conversion report. Then do a selective conversion of the rejected workspaces using information provided by the workspace owners to rename them.

Conversion Control Statements

Input to the conversion program is an APL\360 or APLSV workspace dump tape and a set of control statements as described below. All control statements are optional. A statement can appear anywhere within columns 1 to 71 of a card; columns 72 to 80 are ignored; continuation is not allowed. The operands shown in uppercase can be truncated down to their initial character. Operands can be separated by blanks or parentheses. If an operand is an APL workspace identification, represent APL characters with EBCDIC characters as follows:

APL	EBCDIC
0 - 9	0-9
A - Z	A-Z (uppercase)
$\underline{A}$ - $\underline{Z}$	a-z (lowercase)
Δ	*
$\underline{\Delta}$	$

FORMAT Statement

Use the FORMAT statement to select format conversion. Omit the statement to select content conversion. The syntax of the statement, which has no operands, is:

```
FORMAT
```

SELECT Statement

Use the SELECT statement to identify the libraries and/or workspaces to be converted during a selective conversion, and (optionally) to provide new identifications for workspaces with invalid library numbers or names. The maximum number of SELECT statements allowed is 100. If SELECT statements are included, RESUME is not allowed. For full conversion, omit both SELECT and RESUME statements.

The syntax of the statement is:

```
SELECT libnum [newlibnum] [wsname [newwsname]]
```

libnum
    is the library number of the source APL workspace.

newlibnum
    is the VSPC library number; if omitted, the library number is libnum. The number cannot exceed seven digits.

wsname
    is the name of the source APL workspace; if omitted, all workspaces in the specified library are selected.

newwsname
    is the name of the workspace in VSPC; if omitted, the name is wsname. The name cannot exceed 11 characters and cannot contain deltas or underscored letters.

RESUME Statement

Use the RESUME statement to identify the workspace at which conversion is to resume. If RESUME is used, SELECT statements are not allowed. For full conversion, omit both RESUME and SELECT statements.

The syntax of the statement is:

```
RESUME libnum wsname
```

libnum
    is the library number of the source APL workspace.

wsname
    is the name of the source APL workspace.

DESCRIBE Statement

Use the DESCRIBE statement to supply library space and shared variable space values. Only one DESCRIBE statement is allowed. The values apply to all libraries processed by the conversion program.

The syntax of the statement is:

```
DESCRIBE [LSPACE n] [SHARE m]
```

LSPACE n
    is the maximum size of a library; n is units of 1000 bytes.

SHARE m
    is the maximum size of a shared variable; m is units of 1000 bytes.

The conversion program determines library space for each user as follows:

- If the input tape contains directories, the LSPACE operand of the DESCRIBE statement is ignored. The conversion program computes LSPACE according to the user's source APL workspace size (WSSIZE) and quota (WSQUOTA) as follows:

$X \leftarrow 20480 \lceil 6144 + 1.1 \times WSSIZE$
  Greater of 20K and source WS size plus 10% plus 6144 for internal buffers

$X \leftarrow 2048 \times 1 \rho 0 \quad 2048 \top 2047 + X$
  Rounded to nearest 2K

$VSPCSIZE \leftarrow 1 \rho 0 \quad 1000 \top 999 + X$
  Rounded to nearest 1000 and converted to units of 1000

$LSPACE \leftarrow VSPCSIZE \times WSQUOTA$
  Multiplied by workspace quota

- If the input tape has no directories, LSPACE is as specified in the DESCRIBE statement. There are no directories if the input tape is a selective dump, or if it is multi-volume and the first volume is not input to the conversion program.

- If there is no DESCRIBE statement, or if LSPACE is not specified, LSPACE is 500 units.

The conversion program specifies each user's maximum shared variable size to be either that specified in the DESCRIBE statement or 0. It is the specified SHARE value if the input tape contains directories, the user's directory indicates a shared variable quota other than 0, and a SHARE value is specified in the DESCRIBE statement. In all other cases, SHARE is 0. For APL\360, which does not support shared variables, the SHARE value resulting from conversion is always 0.

Note that APLSV defines the number of shared variables that a user can have, but does not restrict the size of a shared variable. Therefore, if a SHARE value is not defined to the conversion program and not otherwise defined to VSPC, or if the SHARE value is inadequate, a user who migrates to VS APL from APLSV will not be able to execute functions that use shared variables.

OS/VS Workspace Conversion Program

Execution of job CONVERT from the sample OS/VS JCL distributed with VS APL can be used to run the OS/VS conversion program. Alter the job to suit your requirements as noted below.

```
//CONVERT    JOB    REGION=value[1]
//           EXEC   PGM=APLCVOS
//STEPLIB    DD     DSN=VSAPL.CNVTLIB,DISP=SHR
//APLTLBL    DD     DSN=dsname,VOL=( PRIVATE,,SER=volser ),
//                  UNIT=2400,DISP=OLD,LABEL=( 1,BLP )[2]
//APLTDTA    DD     DSN=dsname,VOL=( PRIVATE,,SER=volser ),
//                  UNIT=2400,DISP=OLD,LABEL=( 2,BLP )[2]
//APLTEOV    DD     DSN=dsname,VOL=( PRIVATE,,SER=volser ),
//                  UNIT=2400,DISP=OLD,LABEL=( 3,BLP )[2]
//APLDIRE    DD     UNIT=SYSDA,SPACE=( 8004,( 5,5 ),RLSE )[3]
//APLOUT     DD     DSN=APLOUT,VOL=SER=volser,UNIT=2400,
//                  DISP=( NEW,KEEP,KEEP ),LABEL=( ,SL )[4]
//APLRPRT    DD     SYSOUT=A,DCB=BLKSIZE=121
//SYSUDUMP   DD     SYSOUT=A
//SYSIN      DD     *
Insert conversion control statements[5].
/*
```

[1] For region size, see "Virtual Storage Requirements." Supply other JOB parameters according to your requirements.

[2] The APLTLBL, APLTDTA, and APLTEOV DD statements describe the source APL dump tape. The conversion program bypasses label processing. Supply the information shown in lowercase.

[3] The APLDIRE DD statement describes a temporary data set used by the conversion program for directory entries (information about each input account number). Each 8004-byte block has space for 400 entries. The space allocation in the sample JCL allows for conversion of 32,000 account numbers. Modify the space allocation, if necessary.

[4] The APLOUT DD statement describes the sequential data set created by the conversion program. It can be tape, as described in the sample JCL, or disk. Supply the information shown in lowercase. If output to disk is wanted, supply the appropriate information.

[5] Insert conversion control statements after the SYSIN DD statement.

DOS/VS Workspace Conversion Program

Execution of job CONVERT from the sample DOS/VS JCL distributed with VS APL can be used to run the DOS/VS conversion program. Alter the job to suit your requirements as noted below.

```
// JOB CONVERT
// ASSGN SYS004,TAPE¹
// ASSGN SY005,TAPE,VOL=CNVRT²
// ASSGN SYS006,3330,VOL=volserial,SHR³
// DLBL APLDIRE,'file-id',,SD
// EXTENT SYS006,volserial,1,sequence,rel-track,...
...number-of-tracks
// EXEC APLCVDOS,SIZE=size⁴
Insert conversion control statement⁵.
/*
/&
```

[1] The SYS004 assignment describes the source APL dump tape. The conversion program does not perform DOS label processing, but reads the label as the first file.

[2] The SYS005 assignment describes the output tape created by the conversion. No label or leading tape mark is written.

[3] The SYS006 assignment describes a temporary data set used by the conversion program for directory entires. This data set must reside on a 3330 DASD device.

[4] For partition size, see "Virtual Storage Requirements."

[5] Insert conversion control statements after the EXEC statement.

User Profiles Created by Conversion Program

The data set created by the conversion program contains a user profile for each converted library as well as the converted workspaces. The contents of each user profile created by the conversion program are:

Item	Value
USER	Source APL library number or new library number specified in SELECT statement.
PASSWORD	Source APL logon password if directories were processed by conversion program; otherwise NOPASS.
LIBTYPE	Public library if USER is less than 1000; users other than the library manager can store files in the library (C is not specified). Private library if USER is greater than or equal to 1000.
SPACE	Library space quota as determined by conversion program. See discussion of LSPACE in "DESCRIBE Statement."
CONTENT	APL
SIZE	*edit-size* (maximum size for editable data) is 0.
	obj-size (maximum size for object programs) is 0.

Item	Value
INTPRMAX	*maximum* (maximum interpreter workspace size) is:

$X \leftarrow 20480 \lceil 6144 + 1.1 \times WSSIZE$

    Greater of 20K and source WS size plus 10% plus 6144 for internal buffers

$X \leftarrow X + 8192$

    Plus 8K

$X \leftarrow 2048 \times 1 \rho 0 \quad 2048 \top 2047 + X$

    Rounded to nearest 2K

$MAXIMUM \leftarrow 1 \rho 0 \quad 1000 \top 999 + X$

    Rounded to nearest 1000 and converted to units of 1000

default (default interpreter workspace size) is VSPCSIZE (see "DESCRIBE Statement").

Item	Value
SSMAX	*size* (maximum size of a shared variable) is as determined by conversion program. See discussion of SHARE in "DESCRIBE Statement."
	number (maximum number of shared variables) is source APL shared variable quota if directories were processed by conversion program; otherwise 0. Always 0 for converted APL\360 workspaces.
PROJLIB	None
JECODE	None
NOADM	User not authorized to use VSPC administrator commands.

Transferring Conversion Program Output to VSPC

When a converted workspace is transferred to VSPC, it becomes a file in the VSPC library. Its library number is the source APL library number or the new library number specified in a SELECT statement. Its name is the source APL workspace name or the new workspace name specified in a SELECT statement. Its password is the source APL workspace password.

Use the COPY control statement of the VSPC Service Program to transfer the conversion program output (converted workspaces and user profiles) to the VSPC library. Each user profile that does not exist in the VSPC library is inserted. If a user profile does exist in the library, the profile created by the conversion program is ignored. The converted workspaces are added to the newly defined or existing user libraries.

If the owner of converted workspaces is a new VSPC user and if the profile created by the conversion program is not satisfactory, either (1) use DEFINE to create a user profile before transferring the conversion program output; or (2) use ALTER to modify the user profile after transferring the conversion program output.

COPY, DEFINE, ALTER, and the VSPC Service Program are described in *VSPC Installation Reference Material.*

TRANSPORTING WORKSPACES BETWEEN CMS AND VSPC

When transporting VS APL workspaces between CMS and VSPC, no conversion is required. VS APL workspaces have the same format under all host systems.

Transporting Workspaces from CMS to VSPC

1. At the CMS installation:

   a. Ask the system operator to mount a scratch tape and to attach the tape drive as virtual device 181, 182, 183, or 184.

   b. Access the disk(s) from which the workspaces are to be transferred in read/only mode.

   c. Define the output device by issuing the CMS command:

   ```
   FILEDEF OUTMOVE TAPn ( RECFM F LRECL 800 BLOCK 800
   ```

   TAPn
   is the magnetic tape device where n can be 1, 2, 3, or 4 to represent device 181, 182, 183, or 184 respectively.

   d. Transfer the workspaces to tape by issuing these CMS commands for each workspace:

   ```
   FILEDEF INMOVE DISK filename filetype filemode
   MOVEFILE
   ```

   filename filetype filemode
   is the CMS identification of the workspace.

   e. When all workspaces have been transferred to tape, rewind and unload the tape:

   ```
   TAPE RUN TAPn
   ```

2. At the VSPC installation, execute the VSPC Service Program with IMPORT control statements, using the tape as input, to transfer the workspaces to VSPC libraries. Each workspace on the tape is a separate data set. For OS/VS (VSPC), use one DD statement and one IMPORT control statement for each workspace. For DOS/VS (VSPC), use one IMPORT control statement for each workspace and one ENVIRONMENT control statement for the entire job. Although the input data sets contain 800-byte unblocked records, they must be described as 80-byte blocked records to the service program. For example, to transfer the first two workspaces on the tape into OS/VS (VSPC) library 1002 and give them the names MYWS and TESTWS, use these statements:

   ```
   //MYWS      DD    DSN=MYWS,VOL=SER=volser,UNIT=2400,
   //                DISP=( OLD,PASS ),LABEL=( 1,NL ),
   //                DCB=( LRECL=80,BLKSIZE=800,RECFM=FBS )
   //TESTWS    DD    DSN=TESTWS,VOL=SER=volser,UNIT=2400,
   //                DISP=( OLD,PASS ),LABEL=( 2,NL ),
   //                DCB=( LRECL=80,BLKSIZE=800,RECFM=FBS )

   IMPORT 1002 MYWS TYPE( OBJECT ) CONTENT( APL )
   IMPORT 1002 TESTWS TYPE( OBJECT ) CONTENT( APL )
   ```

To Perform the same operation for DOS/VS (VSPC), use these statements:

```
//ASSGN     SYS004,TAPE

ENVIRONMENT DEVICE( 2400  004  NOREWIND ) NOLABEL -
   FORMAT( F ) BLOCKSIZE( 800 ) RECORDSIZE( 80 )

IMPORT 1002 MYWS TYPE( OBJECT ) CONTENT( APL )
IMPORT 1002 TESTWS TYPE( OBJECT ) CONTENT( APL )
```

See *VSPC Installation Reference Material* for a description of the VSPC Service Program and the ENVIRONMENT and IMPORT control statements.

Transporting Workspaces from VSPC to CMS

1. At the VSPC installation, execute the VSPC Service Program with EXPORT control statements to transfer the workspaces to tape. Transfer each workspace as an unlabeled data set containing 800-byte unblocked records. For OS/VS (VSPC), use one DD statement and one EXPORT control statement for each workspace. For DOS/VS (VSPC), use one EXPORT control statement for each workspace and one ENVIRONMENT control statement for the job. For example, to transfer two workspaces named MYWS and TESTWS from OS/VS (VSPC) library 1002 as the first two data sets on the tape, use these statements:

```
//MYWS      DD    DSN=MYWS,VOL=SER=volser,UNIT=2400
//                DISP=( OLD,PASS ),LABEL=( 1,NL ),
//                DCB=( LRECL=80,BLKSIZE=800,RECFM=FBS )
//TESTWS    DD    DSN=TESTWS,VOL=SER=volser,UNIT=2400,
//                DISP=( OLD,PASS ),LABEL=( 2,NL ),
//                DCB=( LRECL=80,BLKSIZE=800,RECFM=FBS )

EXPORT 1002 MYWS TYPE( OBJECT ) CONTENT( APL )
EXPORT 1002 TESTWS TYPE( OBJECT ) CONTENT( APL )
```

To perform the same operation for DOS/VS (VSPC), use these statements:

```
//ASSGN     SYS004,TAPE

ENVIRONMENT DEVICE( 2400  004  NOREWIND ) NOLABEL -
   FORMAT( F ) BLOCKSIZE( 800 ) RECORDSIZE( 80 )

EXPORT 1002 MYWS
EXPORT 1002 TESTWS
```

See *VSPC Installation Reference Material* for a description of the VSPC Service Program and the ENVIRONMENT and EXPORT control statements.

2. At the CMS installation:

   a. Ask the system operator to mount the tape and to attach the tape drive as virtual device 181, 182, 183, or 184.

   b. Access the disk(s) to which the workspaces are to be transferred in read/write mode.

c. Define the input device by issuing this CMS command:

```
FILEDEF INMOVE TAPn (RECFM F LRECL 800 BLOCK 800
```

TAPn
   is the magnetic tape device where n can be 1, 2, 3, or 4 to represent device 181, 182, 183, or 184 respectively.

d. Transfer the workspaces from tape to disk by issuing these CMS commands for each workspace:

```
FILEDEF OUTMOVE DISK filename filetype filemode
MOVEFILE
```

filename
   is the name of the workspace.

filetype
   is VSAPLWS if the workspace is transferred to a private library; it is Wnnnnnnn if the workspace is transferred to a public or project library, where nnnnnnn is the library number.

filemode
   is that of the disk to which the workspace is transferred.

USING THE VS APL MICROCODE ASSIST

The VS APL microcode assist, which is available for System/370 Models 135 and 145, performs some of the functions of the VS APL interpreter. The procedure for loading the microcode assist is described in *Operator's Library: System/370 Model 135 Procedures* and *IBM System/370 Model 145 Operator Procedures*. If the microcode assist is there when VS APL is invoked, it is detected and used.

STORAGE REQUIREMENTS

Virtual Storage Requirements

Figure 3 shows the minimum virtual machine size (VM/370), region size (OS/VS), and partition size (DOS/VS) required to install and execute VS APL and to execute the workspace conversion programs.

Host System	To Install VS APL	To Execute VS APL	To Execute Conversion Program
VM/370 (CMS) (APL non-shared)	400K	400K[1]	200K + 3.1 × WS[5] for APLCVCMS
			200K + 2.1 × WS[6] for APLCVRPQ
VM/370 (CMS) (APL shared)	SSA[2] + 400K	320K[3]	as above
OS/VS (VSPC)	256K	185K[4]	124K + 3.1 × WS[5]
DOS/VS (VSPC)	256K	185K[4]	124K + 3.1× WS[5]

[1] Assumes a minimum-size workspace (20K) and no auxiliary processors. To execute with all distributed auxiliary processors and 4K of shared memory, add 20K. For additional shared memory or larger workspace, increase virtual machine size correspondingly. Users who access a large number of disks and files may require additional storage for CMS control blocks.

[2] Where SSA is the shared system's load address.

[3] This is the minimum-size CMS virtual machine. It allows a 100K workspace. You can increase the size of the virtual machine as noted in 1 above, but must not exceed the load address of the shared system. In addition, 192K (3 segments) of shared main storage is required.

[4] This is the virtual storage required for the VS APL interpreter and executor (including the internal auxiliary processors), rather than the region or partition size. It does not include virtual storage required for VSPC, access methods, and workspaces.

[5] Where WS is the size of each source APL workspace.

[6] Where WS is the size of the largest source APL workspace; virtual machine size must be at least 264K.

Figure 3.   Virtual Storage Requirements for VS APL

Auxiliary Storage Requirements

In this section, direct access storage devices are identified as follows:

2314: IBM 2314 Direct Access Storage Facility and IBM 2319 Disk Storage.

3330: IBM 3330 Disk Storage and IBM 3333 Disk Storage and Control.

3340: IBM 3340 Direct Access Storage Facility.

Auxiliary Storage Requirements for VS APL

Figure 4 shows the minimum auxiliary storage required to install VS APL as a non-shared system under CMS. Note the columns that indicate whether the storage requirement applies to the A-disk, the Y-disk, or both. The total cylinder requirements for each disk are computed using the total block requirements; they are not the sum of the cylinders required for each component.

Figure 5 shows a summary of the minimum auxiliary storage required to install VS APL as a shared system under CMS. The detail is as shown in Figure 4, except that component APL MODULE requires 8 blocks and there is an additional component, APLMAIN MODULE, that requires 232 blocks on the A-disk.

Component	Disk A	Y	800-byte Blocks	Cylinders 2314	3330	3340
TEXT files for executor, interpreter, shared storage manager	x		814	6	4	9
TEXT files for conversion programs	x		256	2	1	3
Link-edit maps	x		136	1	1	2
Macros	x		125	1	1	2
APLINSTL EXEC	x		45	1	1	1
APL MODULE	x	x	285	2	2	3
APLCVCMS MODULE	x	x	86	1	1	1
APLCVRPQ MODULE	x	x	81	1	1	1
APL EXEC	x	x	2	1	1	1
APLCVCMS EXEC	x	x	2	1	1	1
APLCVRPQ EXEC	x	x	1	1	1	1
Auxiliary processors	x	x	60	1	1	1
APLMAC MACLIB	x	x	119	1	1	2
Library table file	x	x	1	1	1	1
Distributed workspaces		x	396	3	2	5
Total for A-disk	x		2013	14	8	21
Total for Y-disk		x	1033	7	4	11

Figure 4. Auxiliary Storage Requirements for Non-Shared VS APL under CMS

Storage Device	Unit of Storage	Units Required	2314	Cylinders 3330	3340
A-disk	800-byte block	2013	14	8	21
Y-disk	800-byte block	801	8	4	9
CP volume	4K page	49	2	1	3

Figure 5. Auxiliary Storage Requirements for Shared VS APL under CMS

Figure 6 shows the minimum auxiliary storage required to install VS APL under OS/VS (VSPC). The VSPC library storage requirement is for the distributed workspaces.

Figure 7 shows the minimum auxiliary storage required to install VS APL under DOS/VS(VSPC). The VSPC library storage requirement is for the distributed workspaces.

Auxiliary Storage Requirements for Workspaces

The amount of auxiliary storage required for a workspace depends on the amount of data it contains, not on the size of the workspace. To compute the number of bytes required to store a workspace, subtract the space available, $\Box WA$, from the workspace size, $)WSSIZE$.

Under VSPC, a VS APL workspace is a VSPC file. VSPC files are stored in units of 1000 bytes.

Data Set	Data Set Type	Number of Directory Blocks	Unit of Storage	Units Required
SYS1.LINKLIB (OS/VS1 only)	partitioned	1	cylinder[1]	1
SYS1.LPALIB (OS/VS2 only)	partitioned	1	cylinder[1]	1
VSAPL.OBJLIB	partitioned	20	3200-byte block	143
VSAPL.CNVTLIB	partitioned	1	cylinder[1]	1
VSPC library	VSAM	—	1000-byte unit	500

[1] Storage requirements for load module data sets are for a 3330.

Figure 6. Auxiliary Storage Requirements for VS APL under OS/VS (VSPC)

Library or Disk File	Directory Tracks	Unit of Storage	Units Required 2314/2319	3340	3330
Relocatable library	1	cylinder	8	12	6
Core-Image library	2	cylinder	3	4	2
Deblocked object deck file	-	tracks	100	80	57
VSPC library (VSAM)	-	1000-bytes	500	500	500

Figure 7. Auxiliary Storage Requirements for VS APL under DOS/VS (VSPC)

Under CMS, a VS APL workspace is a CMS file with a block size of 800 bytes. Figure 8 shows the capacity per cylinder of the direct access storage devices supported by CMS in terms of 800-byte blocks and several data sizes.

Device	Blocks	Clear WS	15K Data	25K Data	50K Data
2314	150	25	7.5	4.5	2.3
3330	266	44.3	13.3	8.1	4.1
3340	96	16	4.8	2.9	1.5

Figure 8. Auxiliary Storage Capacity per Cylinder

MESSAGES

Messages under CMS

Error and diagnostic messages that are issued by the CMS executor of VS APL are printed at the user's terminal. They are identified by a message number prefix of APL. They are documented in *VS APL for CMS: Terminal User's Guide.*

A VS APL user can also receive messages issued by CP or CMS. CP and CMS messages are identified by message number prefixes of DMK and DMS, respectively. They are documented in *IBM Virtual Machine Facility/370: System Messages.*

Messages under VSPC

The following error and diagnostic messages are issued by the VSPC executor of VS APL and are printed on the VSPC online log. The VS APL user receives the message **SYSTEM ERROR** *nnn,* where *nnn* is the online log message number.

APLP001I   PGM CHECK LOOP IN APL PROCESSOR.

Explanation: During processing of a program check, a second program check occurred.

System Action: Message APLP011I, which shows the PSW and general registers at the time of the second program check, is issued. A dump is taken, and execution is terminated.

User Action: Report the problem to the system programmer.

APLP002I   PGM CHECK IN EXECUTOR.

Explanation: A program check occurred in the VS APL executor.

System Action: Message APLP011I, which shows the PSW and general registers at the time of the program check, is issued. A dump is taken, and execution is terminated.

User Action: Report the problem to the system programmer.

APLP003I   EXECUTOR SAVE AREA BLOCK FULL.

Explanation: The executor is designed so that routine calls are nested to a maximum depth of five. An attempt to call a sixth-level routine was made, and there is no sixth save area.

System Action: A dump is taken, and execution is terminated.

User Action: Report the problem to the system programmer.

APLP004I   INVALID ASSIST CHECK CONDITION CODE.

Explanation: During initialization, when a test was made for the presence of the VS APL microcode assist, an unexpected condition code was returned.

System Action: Execution continues without use of the VS APL microcode assist.

User Action: Report the problem to the system programmer.

APLP005I UNEXPECTED SYSTEM ERROR CODE RECEIVED.
RET: *xxx,* **REAS:** *yyy,* **SYS:** *www,* **APL:** *zzzzz.*

Explanation: An unexpected error code was received from VSPC following a service request. *xxx* is the return code, *yyy* is the reason code, *www* is the VSPC request code, *zzzzz* is the VS APL service request code.

System Action: A dump is taken. A clear workspace is loaded. Execution continues.

User Action: Report the problem to the system programmer.

APLP006I NO SYSTEM INDICATOR ON ASYNCH ENTRY.

Explanation: VSPC invoked the VS APL processor for an asynchronous occurrence. No indicator was set to distinguish the cause.

System Action: A dump is taken. Execution continues.

User Action: Report the problem to the system programmer.

APLP007I MULTIPLE UNEXPECTED ERROR CODES FROM SYSTEM.

Explanation: Multiple unexpected error codes were received from VSPC following similar service requests.

System Action: A dump is taken, and execution is terminated.

User Action: Report the problem to the system programmer.

APLP008I APL ASSIST INCOMPATIBLE WITH APL PROCESSOR.

Explanation: During initialization, when a test was made for the presence of the VS APL microcode assist, it was discovered that the microcode assist is not at the same level as the VS APL processor.

System Action: Execution continues without use of the VS APL microcode assist.

User Action: Report the problem to the system programmer.

APLP009I INSUFFICIENT STORAGE FOR MINIMUM WS.

Explanation: The default workspace size defined in the user's profile is too small for VS APL operation.

System Action: A dump is taken, and execution is terminated.

User Action: Report the problem to the account administrator.

APLP011I PSW: *xxxxxxxx xxxxxxxx,* **REGS:**

Explanation: VS APL has been terminated because of a program check. This message shows the contents of the program check old PSW and the general registers. It is issued following messages APLP001I or APLP002I.

System Action: Abend processing continues.

User Action: Include this information when reporting the problem to the system programmer.

APLP014I UNEXPECTED ERROR IN APL INTERNAL AP.

Explanation: An unexpected error code was received from VSPC following a service request in an internal auxiliary processor. The prior message, APLP005I, gives additional information about the error.

System Action: A dump is taken, and execution is terminated.

User Action: Report the problem to the system programmer.

Conversion Program Messages

The following error messages are issued by workspace conversion programs and appear on the conversion report. With the conversion programs that run under CMS, the messages are also printed at the terminal. When a workspace or library is in error, its identification either appears in the message or preceding the message in the conversion report.

There are messages in addition to those listed below that appear on the conversion report. They are directed to the workspace owner and are documented in *VS APL for CMS: Terminal User's Guide* and *VS APL for VSPC: Terminal User's Guide*.

HDR LABEL I/O ERROR. CONVERSION CANCELLED

Explanation: An unrecoverable error occurred while an input header label was being read.

System Action: Execution of the conversion program is terminated.

User Action: Obtain another copy of the input tape from the source APL system.

Issued by: APLCVCMS, APLCVOS, APLCVDOS.

TRLR LABEL I/O ERROR. CONVERSION CANCELLED

Explanation: An unrecoverable error occurred while an input trailer label was being read.

System Action: Execution of the conversion program is terminated.

User Action: If the error occurred on the last or only volume, none. Otherwise, run the conversion program again using the remaining volumes.

Issued by: APLCVCMS, APLCVOS, APLCVDOS.

SYSTEM ERROR WHILE CONVERTING WORKSPACE/DIRECTORY *libnum name.* WORKSPACE/DIRECTORY UNCONVERTED AND PRESUMED DAMAGED

Explanation: A program check occurred, probably because of invalid information in a workspace or directory.

System Action: The contents of the program check old PSW and general registers are printed. Execution of the conversion program continues with the next workspace.

User Action: Obtain another copy of the rejected workspace or library from the source APL system.

Issued by: APLCVCMS, APLCVRPQ, APLCVOS, APLCVDOS.

ERROR UNRECOVERABLE. CONVERSION ABORTED

Explanation: Repeated system errors have occurred.

System Action: A storage dump is printed. Execution of the conversion program is terminated.

User Action: Obtain another copy of the input tape from the source APL system.

Issued by: APLCVCMS, APLCVRPQ, APLCVOS, APLCVDOS.

WORKSPACE REJECTED, NOT CONVERTED, DUE TO I/O ERROR

Explanation: An unrecoverable error occurred while the workspace was being read.

System Action: Execution of the conversion program continues with the next workspace.

User Action: Obtain another copy of the rejected workspace from the source APL system.

Issued by: APLCVCMS, APLCVRPQ, APLCVOS, APLCVDOS.

WORKSPACE FULL

Explanation: The workspace is too large to be converted.

System Action: Execution of the conversion program continues with the next object in the workspace.

User Action: Have the owner of the source workspace compress it or split it into two workspaces and obtain a dump of the modified workspace.

Issued by: APLCVCMS, APLCVOS, APLCVDOS.

WRITE ERROR *nn* WHILE SAVING *libnum name*. CONVERSION CANCELLED

Explanation: An error return from the FSWRITE macro occurred. *nn* is the return code (see *IBM Virtual Machine Facility/370: Command Language Guide for General Users.*) The probable cause of the error is a full A-disk (return code 13).

System Action: Execution of the conversion program is terminated.

User Action: Determine the reason for the error and correct it. Then run the conversion program again, specifying the RESUME option and the identification of the rejected workspace.

Issued by: APLCVCMS.

filename filetype IMPORT FILE SEQUENCE NUMBER *nnnn*

Explanation: Display of the file sequence number *nnnn* of the converted workspace *filename filetype* on the output tape.

System Action: None.

User Action: Use the information when preparing VSPC Service Program control statements.

Issued by: APLCVRPQ.

NOT A CMS DUMP TAPE. CONVERSION CANCELLED

Explanation: The input tape is not a CMS dump tape.

System Action: Execution of the conversion program is terminated.

User Action: Mount the correct tape.

Issued by: APLCVRPQ.

filename filetype filemode **NOT AN APL/CMS (PRPQ) WORKSPACE.**

Explanation: The file is not an APL/CMS workspace.

System Action: Execution of the conversion program continues with the next file.

User Action: None, unless all files on the tape are so rejected. In this case, mount the correct tape.

Issued by: APLCVRPQ.

INADEQUATE SPACE TO RUN CONVERSION. CONVERSION CANCELLED

Explanation: There is less than 64K of free virtual storage space available.

System Action: Execution of the conversion program is terminated.

User Action: Define a larger virtual machine.

Issued by: APLCVRPQ.

filename filetype **WORKSPACE TOO LARGE FOR VIRTUAL MACHINE SIZE. RERUN WITH LARGER MACHINE. WSSIZE IS *xxxx* NEED ABOUT *yyyy* BYTES TO CONVERT.**

Explanation: The workspace is too large to be converted.

System Action: Execution of the conversion program continues with the next workspace.

User Action: Define a larger virtual machine and run the conversion program again.

Issued by: APLCVRPQ.

filename filetype **WORKSPACE DAMAGED OR INVALID. NOT CONVERTED.**

Explanation: Either internal pointers in the workspace are invalid, or the workspace is not Version 2.

System Action: Execution of the conversion program continues with the next workspace.

User Action: Obtain a valid copy of the rejected workspace from the source APL system.

Issued by: APLCVRPQ.

WSID INVALID FOR VSPC. WORKSPACE (OR LIBRARY) REJECTED

Explanation: The workspace name contains deltas or underscored characters or the library number exceeds seven digits.

System Action: Execution of the conversion program continues with the next workspace.

User Action: Run the conversion program again, using a SELECT statement to provide a valid identification for the rejected workspace or library.

Issued by: APLCVOS, APLCVDOS.

* THIS LIBRARY DEFINED WITH DEFAULTS DUE TO SYSTEM ERROR

Explanation: An error occurred while the directory for the library was being read.

System Action: A user profile record containing default values for SPACE and SSMAX is written (see "User Profiles Created by Conversion Program"). Execution of the conversion program continues.

User Action: If defaults are acceptable, none. Otherwise, use the VSPC command ALTER to modify the user's profile.

Issued by: APLCVOS, APLCVDOS.

SELECTION LIST FULL. COMMAND IGNORED

Explanation: More than 100 SELECT statements were input to the conversion program.

System Action: The SELECT statements in excess of 100 are ignored.

User Action: Run the conversion program with the rejected SELECT statements.

Issued by: APLCVOS, APLCVDOS.

INVALID SELECT PARAMETER. COMMAND IGNORED

Explanation: The SELECT statement contains an invalid parameter.

System Action: The invalid statement is ignored.

User Action: Correct the SELECT statement and run the conversion program again.

Issued by: APLCVOS, APLCVDOS.

INVALID DESCRIBE COMMAND. CONVERSION CANCELLED

Explanation: The DESCRIBE statement contains an invalid parameter.

System Action: Execution of the conversion program is terminated.

User Action: Correct the DESCRIBE statement and run the conversion program again.

Issued by: APLCVOS, APLCVDOS.

INVALID CONVERSION OPTIONS. CONVERSION CANCELLED

Explanation: Either the RESUME statement contains an invalid parameter or a conversion control statement is unrecognizable.

System Action: Execution of the conversion program is terminated.

User Action: Correct the invalid statement and run the conversion program again.

Issued by: APLCVOS, APLCVDOS.

APPENDIX A. VS APL COMPONENTS

Listed below are the items that are contained in each component of VS APL. When you install VS APL, check the printed output of the installation procedure against these lists to verify that each component is complete.

Interpreter Modules

APLCOIBM
APLIACHK
APLIACIR
APLIADEC
APLIADOM
APLIAENC
APLIAFOR
APLIAGFM
APLIAGOU
APLIAGRD
APLIANAM
APLIAPRD
APLIAQFN
APLIARED
APLIAROT
APLIASCN
APLIASHF
APLIASHV
APLIASYV
APLIATAK
APLIATBC
APLIATRN
APLIATRS
APLIATSP
APLIECMX
APLIEFCH
APLIEFNM
APLIEIDX
APLIEMND
APLIEPSI
APLIEREV
APLIERHO
APLIESCA
APLIESPA
APLIETAK
APLIEXAR
APLIEXFR
APLITCMC
APLITCMD
APLITCME
APLITCMF
APLITCMG
APLITCMI

APLITCML
APLITCMS
APLITCMT
APLITCPI
APLITCPO
APLITERR
APLITEX
APLITFCH
APLITFDC
APLITFDE
APLITFDN
APLITFDO
APLITFUN
APLITHDR
APLITIDS
APLITIHI
APLITINI
APLITINP
APLITLXS
APLITMSG
APLITNCV
APLITPRL
APLITSUB
APLITUSG

CMS Executor Modules

APLSCDPY
APLSCERR
APLSCFXI
APLSCINI
APLSCLIB
APLSCMSC
APLSCMSG
APLSCOPY
APLSCSHV
APLSCSVI
APLSCTBL
APLSCTYP

VSPC Executor Modules

APLPAPAB
APLPAPCD
APLPCOAP
APLPCOEX
APLPCTBL
APLPFXIM
APLPLIBS
APLPMISC
APLPSERR
APLPSHVR
APLPTYIO

Shared Storage Manager Modules (CMS only)

ASUSHACC
ASUSHBPB
ASUSHBVB
ASUSHCPY
ASUSHGET
ASUSHOFR
ASUSHPUT
ASUSHQUE
ASUSHREF
ASUSHRET
ASUSHSOF
ASUSHSON
ASUSHSPC
ASUSHSRD
ASUSHSUB

Auxiliary Processors (CMS only)

APL100
APL101
APL110
APL111
APL123

Auxiliary Processor Macros (CMS only)

APLZCODE
ASUPCV
ASUSCV
ASUSHSVP
ASVPACC
ASVPCPY
ASVPOFR
ASVPQRY
ASVPREF
ASVPRET
ASVPSOF
ASVPSON
ASVPSPC
ASVPWAIT

CMS Conversion Modules (for APLCVCMS)

APLCCULL
APLCDISP
APLCFUNC
APLCGRUP
APLCIBNM
APLCINIT

APLCLEAR
APLCMISC
APLCOIBM
APLCPARM
APLCRPRT
APLCSAVE
APLCSHIP
APLCSPIE
APLCTBCD
APLCVARB
APLCWKSP
APLCWSFN
APLIESPA
APLIEREV
APLITFDC
APLITHDR
APLITIDS
APLITLXS
APLITNCV

APLODIRE
APLODISP
APLOFUNC
APLOGRUP
APLOIBNM
APLOINIT
APLOLEAR
APLOMISC
APLOPARM
APLORPRT
APLOSAVE
APLOSHIP
APLOSLST
APLOSPIE
APLOTBCD
APLOTIDY
APLOVARB
APLOWKSP
APLOWSFN

CMS Conversion Modules (for APLCVRPQ)

APLCOIBM
APLCSHIP
APLCTBCD
APLIESPA
APLITFDC
APLITHDR
APLITIDS
APLITLXS
APLITNCV
APLQDISP
APLQFUNC
APLQGRUP
APLQIBNM
APLQINIT
APLQLEAR
APLQMISC
APLQPARM
APLQRPRT
APLQSAVE
APLQSPIE
APLQVARB
APLQWKSP

VSPC/OS Conversion Modules

APLCOIBM
APLIEREV
APLIESPA
APLITFDC
APLITHDR
APLITIDS
APLITLXS
APLITNCV
APLOCULL

VSPC/DOS Conversion Modules

APLCOIBM
APLDCULL
APLDDIRE
APLDDISP
APLDFUNC
APLDGRUP
APLDIBNM
APLDINIT
APLDLEAR
APLDMISC
APLDPARM
APLDRPRT
APLDSAVE
APLDSHIP
APLDSLST
APLDSPIE
APLDTBCD
APLDTIDY
APLDVARB
APLDWKSP
APLDWSFN
APLIEREV
APLIESPA
APLITFDC
APLITHDR
APLITIDS
APLITLXS
APLITNCV

APPENDIX B. SAMPLE TERMINAL SESSION FOR VS APL UNDER CMS

Log on to VM/370, IPL CMS, and execute the VS APL session shown below. You must have access to the disk on which the VS APL system resides and to the Y-disk on which the distributed workspaces reside.

```
APL APL100                              Invoke VS APL and the
                                        auxiliary processor that
                                        issues CP and CMS commands

          V  S   A  P  L

CLEAR WS
      100 ⎕SVO 'X'                      Establish connection with
2                                       auxiliary processor
      X←'L * W0000001 Y'                Issue CMS command to list
NEWS       W0000001   Y1                workspaces in public library 1
TYPEDRIL   W0000001   Y1
APLCOURS   W0000001   Y1
CONVERT    W0000001   Y1
EXAMPLES   W0000001   Y1
PLOT       W0000001   Y1
FORMAT     W0000001   Y1
WSFNS      W0000001   Y1
SEDIT      W0000001   Y1
MEDIT      W0000001   Y1
HOWEDITS   W0000001   Y1
SBIC       W0000001   Y1
      )LOAD 1 EXAMPLES                  Load workspace
SAVED 08:50:42 06/12/75
      FINDTYPE '7'                      Data type of argument is ...
1                                       character
      FINDTYPE 7                        Data type of argument is ...
0                                       numeric
      )OFF HOLD                         Log off VS APL and return
ρ[                                      to CMS
```

APPENDIX C. SAMPLE TERMINAL SESSION FOR VS APL UNDER VSPC

Log on to VSPC and execute the VS APL session shown below. If the user number that you log on with has a content attribute of APL, omit the first statement.

```
ENTER APL                          Invoke VS APL

      V S   A P L

CLEAR WS
      )LOAD 2 VSFILES              Load workspace
SAVED 11:05:17 07/29/75
      'S' ACREATE 'SAMPLE'         Create VSPC APL file to
                                   be accessed sequentially
      AWRITE 3 4ρι12               Open file and write record 1
      AWRITE 4 3ρι12               Write record 2
      AREAD                        Read record 1
 1  2  3  4
 5  6  7  8
 9 10 11 12
      AREAD                        Read record 2
 1  2  3
 4  5  6
 7  8  9
10 11 12
      AREAD                        There is no record 3;
                                   file is closed
      DROP 'SAMPLE'                Purge the file
      )OFF HOLD                    Log off VS APL and return
ρ ε α L ↑                          to VSPC
```

GLOSSARY

The following terms are defined as they are used in this publication. If you do not find the term you are looking for, refer to the index or to the *IBM Data Processing Glossary*, GC20-1699.

A-disk: In CMS, a user's primary disk; accessed in read/write mode when a CMS terminal session is begun.

account administrator: A VSPC user who has limited authority to use the VSPC Service Program and to define and alter user profiles.

auxiliary processor: A program that communicates with other programs via shared variables.

chief administrator: A VSPC user who has full authority to use the VSPC Service Program and to define and alter user, foreground processor, and auxiliary processor profiles.

content attribute: In VSPC, information associated with a workspace that identifies its foreground processor or indicates its contents.

content conversion: A form of workspace conversion in which the contents of a workspace are analyzed and modified; includes format conversion.

conversion program: The component of VS APL that converts APL\360, APLSV, and APL/CMS workspaces to VS APL workspaces.

core image library: A DOS/VS library used to store link-edited programs. For DOS/VS(VSPC), the core image library is used to contain the APL foreground processor and the APL workspace conversion program.

executor: The component of VS APL that provides environment-dependent services for the interpreter.

filemode: In CMS, the third field of a file identifier; identifies the virtual disk on which the file resides and the mode in which the disk can be accessed.

filename: In CMS, the first field of a file identifier.

filetype: In CMS, the second field of a file identifier; may implicitly define certain file characteristics.

foreground processor: A processor, such as VS APL, that operates under the control of VSPC.

format conversion: A form of workspace conversion in which only the format of a workspace is modified.

full conversion: A form of workspace conversion in which all input workspaces are converted.

internal auxiliary processor: An auxiliary processor that is part of the VS APL (VSPC) executor, rather than a separate program.

interpreter: The component of VS APL that scans, analyzes, and executes VS APL statements.

library manager: A VSPC user whose user number is that of a public or project library.

library table file: A file that defines public and project libraries to VS APL under CMS.

private library: A library that is normally available only to a single user.

profile: A collection of information about a user, a foreground processor, or an auxiliary processor.

project library: A library that is normally available to a set of users.

public library: A library that is normally available to all users.

relocatable library: A DOS/VS library containing relocatable object modules. For DOS/VS(VSPC), the relocatable library is used to contain object decks from the VS APL distribution volume.

selective conversion: A form of workspace conversion in which only specified input workspaces are converted.

service program: In VSPC, a program that is used to manage the VSPC library and to define and alter profiles.

shared storage manager: The component of VSPC or of VS APL under CMS that manages the communication between auxiliary processors.

system disk: In CMS, the disk that contains the CMS nucleus and disk-resident command modules; accessed in read/only mode when a CMS terminal session is begun.

workspace: An area of virtual storage assigned to a user for his exclusive use. Also, the contents of that area when stored as a file.

Y-disk: In CMS, a disk that is an extension of the system disk. It contains VS APL modules, procedures, and public libraries.

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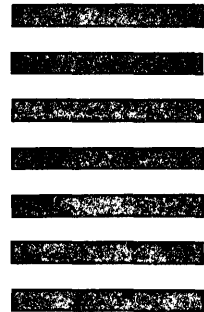any IBM representative will be happy to forward your comments.) Thank you for your
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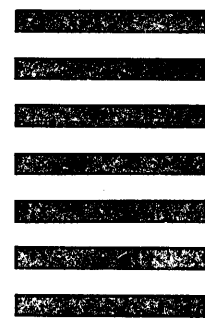cooperation.

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