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System 80

Models 10/15/20 Migration Guide

UP-12649 Rev. 1

This Library Memo announces the release and availability of the *System 80 Models 10/15/20 Migration Guide*, 12649 Rev. 1.

This guide is a standard library item (SLI). It is part of the standard library provided automatically with the purchase of the product.

This guide describes the process of moving to System 80 Models 10 through 20 from a Series 90 or other model System 80. It provides an overview of the migration process and highlights the major steps involved.

This revision adds, revises, or expands the following information presented in the guide:

- System generation (SYSGEN) parameters supported for OS/3 Release 13.0 on the Models 10 through 20
- Compatibility of your current hardware and software to that supported by Release 13.0 and Models 10 through 20
- New peripheral support (8494 and M9720 disks, 9246-14B and 9246-25B printers, and DCPs)
- Considerations for moving your data files and program libraries to models 10 through 20
- Considerations for converting IMS single-thread to multithread and IMS action programs to CDM
- Information about converting your transaction programs for processing under TPS
- Changes you may want to make to your current language programs to run them on the Models 10 through 20 in a System 80 environment
- Conversion of your ANSI 1968 COBOL programs to ANSI 1985 COBOL
- Changes you should make to your ICAM networks and communications programs to run them on Models 10 through 20

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Migration Guide

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System 80 Models 10/15/20

Migration Guide

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About This Guide

Purpose

This guide is one of a series designed to instruct and guide you in the use of Operating System/3 (OS/3). This guide specifically describes how to make the transition from a Series 90 (90/25, 90/30, 90/30B, and 90/40) or System 80 (models 3 through 6) to the System 80 models 10 through 20. It is intended for Series 90 users and System 80 users who are making the transition to OS/3 Release 13.0 (and future releases) on the models 10 through 20.

Scope

The transition to models 10 through 20 is a straightforward process that can be accomplished with little difficulty. This guide provides all the procedures that are part of the transition process. Some of these procedures must be performed; others are optional, depending on your current system. This guide offers examples, procedures, items for consideration, and suggestions and recommendations. Where appropriate, it provides detailed information on the facilities, along with references to other OS/3 documentation.

Audience

This guide is for site administrators and system programmers of Series 90 and System 80 OS/3 systems who are involved in the planning or actual execution of transition to models 10 through 20.

Prerequisites

Anyone using this guide should be familiar with OS/3 software, OS/3 software installation, the concepts of communications networks, and system operations.

Organization

This guide is divided into two parts.

- **Part 1. Migration from Series 90 to Models 10 through 20**

  This part consists of Sections 1 through 6, which provide the information you need to make the transition from a Series 90 system to System 80 models 10 through 20.

  Section 1. Series 90 Migration Overview

  Presents an overall look at the migration process and provides guidelines to aid you in planning your transition to models 10 through 20.

  Section 2. System Generation

  Describes the changes that you may want to make to your current system generation parameter set to make it conform to your new system configuration.

  Section 3. Data Management

  Describes the process for moving the data files and program libraries from your current system to models 10 through 20. Also included are recommendations and considerations that relate to data management issues.

  Section 4. Language Products

  Describes the changes that you can make to your current language programs to run them on models 10 through 20. This section also provides information about the language conversion aids available from Unisys.

  Section 5. ICAM Migration

  Describes the changes you should make to your ICAM network generations and your communications user programs for them to run on models 10 through 20.

  Section 6. Data Base Products

  Presents the procedure to convert from single-thread to multithread IMS and to convert your action programs to consolidated data management. This section also lists the IMS configuration parameters supported for each release from 6.1.2 through 13.0. Considerations for moving a DMS data base to models 10 through 20 are also presented.

- **Part 2. Migration from System 80 to Models 10 through 20**

  This part consists of Sections 7 through 12, which provide the information you need to make the transition from Models 3 through 6 and 8 to models 10 through 20.

  Section 7. System 80 Migration Overview

  Presents an overall look at the migration process and provides guidelines to aid you in planning your transition to models 10 through 20.

  Section 8. System Generation

  Describes the changes that you may want to make to your current system generation parameter set to make it conform to your new system configuration.

  Section 9. Data Management

  Describes the process for moving the data files and program libraries from your current system to models 10 through 20. Also included are recommendations and considerations that relate to data management issues.

  Section 10. Language Products

  Describes the changes that you can make to your current language programs to run them on models 10 through 20. This section also provides information about the language conversion aids available from Unisys.

  Section 11. ICAM Migration

  Describes the changes you should make to your ICAM network generations and your communications user programs for them to run on models 10 through 20.

  Section 12. Data Base Products

  Presents the procedure to convert from single-thread to multithread IMS and to convert your action programs to consolidated data management. This section also lists the IMS configuration parameters supported for each release from 6.1.2 through 13.0. Considerations for moving a DMS data base to models 10 through 20 are also presented.

Results

After completing the procedures in this guide, you should have successfully migrated to your new system.

Notation Conventions

The following conventions are used in this guide:

- Macroinstructions and operands are shown in uppercase letters.
- User-supplied variables are shown in lowercase letters in format descriptions and in italics within the text.
- Default values are shaded.
- Optional operands are enclosed in brackets.
- Braces enclose groups of operands from which you must choose one.

Related Product Information

Note: *Throughout this guide, when we refer to another document, use the version that applies to the software level in use at your site.*

1985 American Standard COBOL Technical Overview, **7002 3932**

BASIC Programming Reference Manual, UP-9168

Consolidated Data Management Programming Guide, **UP-9978**

Data Utilities Operating Guide, **UP-8834**

File Placement Analyzer (FIPLAN) Programming Guide, **UP-9731**

General Editor (EDT) Operating Guide, **UP-9976**

Information Management System (IMS) System Support Functions Programming Guide, **UP-11907**

Installation Guide, **UP-8839**

Integrated Communications Access Method (ICAM) Communications Physical Interface (CPI) Programming Guide, **UP-9746**

Integrated Communications Access Method (ICAM) Utilities Programming Guide, **UP-9748**

System Activity Monitor Programming Guide, **UP-9983**

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Section 1
Series 90 Migration Overview

1.1. General Considerations

When you migrate from a Series 90 system to the models 10 through 20 you'll be surprised at how easy the transition is. This is because models 10 through 20 provide extensive software and hardware compatibility with your current Series 90 system (90/25, 90/30, 90/30B, or 90/40).

Models 10 through 20 operate under the control of an enhanced version (Release 13.0) of the OS/3 software, the same operating system you use with your Series 90 system. (OS/3 Release 8.1 was the last release that supported Series 90.) OS/3 supports common programming languages, program products, and data storage methods. This lets you quickly move your applications to models 10 through 20. You can also use the same communications facilities on models 10 through 20, so you don't have to redesign your online programs. And, many of your Series 90 peripheral devices, such as disk and tape units, are also compatible between systems. In many cases, you can simply move your programs and data files directly to models 10 through 20 and start production immediately!

1.2. Migration Flowchart

Figure 1-1 gives an overview of the migration process. We've made one assumption in this flowchart: that you'll carry your programs and data files to models 10 through 20 on your Series 90 disk devices. (All the devices supported on models 10 through 20 are listed in 3.4.) Since most of your Series 90 disks can be used on the models 10 through 20, this is the quickest and easiest way to migrate to your new system. Once Release 13.0 is installed, you can simply mount your Series 90 disks on models 10 through 20 and begin generating your supervisors, ICAM networks, and IMS configurations immediately. A complete list of devices supported on models 10 through 20 is listed in 3.4.

However, if you decide to transfer your programs and data files to one of the larger capacity disks supported by models 10 through 20 (8417, 8470, 8494, or M9720), you must copy your programs and data files to a temporary media, such as tape or diskette, on your Series 90 system. Then, you can load your programs and data files from the temporary media onto the new disk. Section 3 tells you how to move your data files to models 10 through 20; Section 4 discusses program migration.

The flow chart shown in Figure 1-1 is simply a suggested plan. It gives you a general idea of what you must consider and points you in the right direction. Your exact plan of migration should be determined by your operational needs.

1.3. Migration Aids

Unisys provides several software aids to further simplify your migration effort. A description of you how to use these aids is provided later; for now, here's a brief description of each:

- DTFCDI301

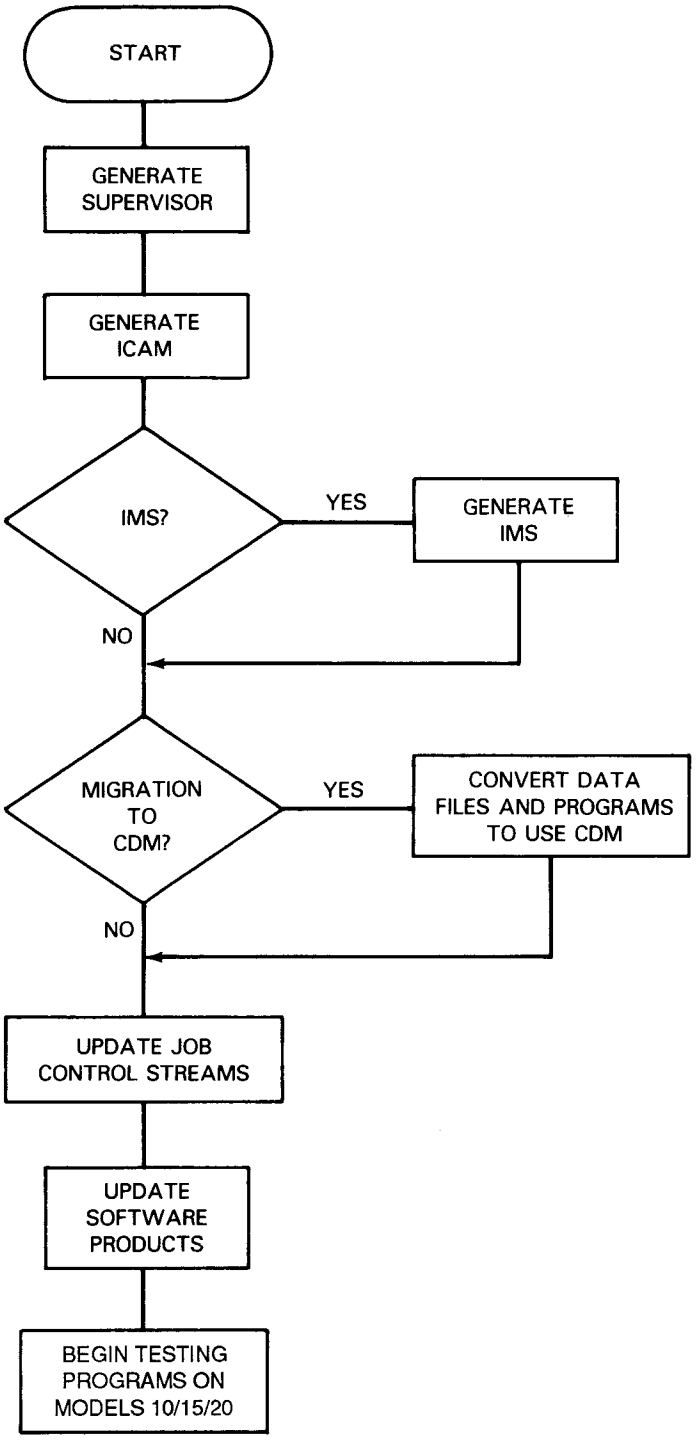
  The DTFCDI301 converter program converts OS/3 Assembler source code from define the file (DTF) macrocode to OS/3 common data interface (CDI) macrocode. DTFCDI301 converts file descriptions and I/O macros so they can run in a CDM environment (see 4.6).

- COBTRN303

  ANSI 1968 COBOL programs will run without change on models 10 through 20. However, to make use of the new features offered by CDM, it is recommended that you convert your existing data files to MIRAM and your ANSI 1968 COBOL programs to ANSI 1974 or ANSI 1985 COBOL. Unisys makes available to you the COBTRN303 program that converts ANSI 1968 COBOL source statements into a format acceptable as input to the ANSI 1974 COBOL compiler (see 4.2). Generally, ANSI 1974 COBOL source is acceptable to the ANSI 1985 COBOL compiler.

- SFCVR

  The screen format conversion utility (SFCVR) converts Series 90 screen formats so they can be used on models 10 through 20. SFCVR lets you modify complete screen format libraries or individual screen formats either interactively or in batch mode (see 3.10).



Generation includes SUPGEN and I/OGEN phases of SYSGEN. Select data management mode

DMGTMODE={MIXED / CDI}

Update network definitions, recompile CUPs, and generate dedicated or global network.

Recompile action programs. If using new models 10/15/20 features, convert single-thread IMS systems to multithread and convert applications that use BDM to use CDM.

If not already using CDM, you may choose to convert data files to MIRAM and recompile sorce programs to use CDM. Conversion to CDM is not a requirement.

Modify job control streams to specify new models 10/15/20 devices.

Update screen formats (if created on release 8.1) and BEM EDT procedures.

Use sample data files; run side by side with present system.

Figure 1-1. Models 10 through 20 Migration Flowchart

1.4. An Approach to Migration

The best way to begin your migration is to plan it. We suggest you review Figure 1-1 and then develop an outline of the steps you'll follow during your own migration. Here are some other guidelines to help you carry out a successful migration:

1. Back up your system

   Be certain you have a current backup copy of your Series 90 SYSRES volume before you migrate to models 10 through 20. This is a standard precaution for moving to a new computer system.

2. Use sample data files

   Use sample data files for program testing before you migrate all your data files to models 10 through 20. This lets you identify any potential problems that could destroy complete data files.

3. Run applications side by side

   After you migrate to models 10 through 20, continue running jobs on your Series 90 system while you test applications to models 10 through 20. Parallel operation lets you thoroughly test your programs to models 10 through 20 while using your Series 90 system as a backup. This prevents testing procedures or problems from completely halting your DP operations. We can't overemphasize the importance of running parallel production jobs.

   Remember, forward migration is supported. Backward migration is not. You cannot take a program that is compiled and linked on Release 13.0 (or a later release) and execute it on a release prior to Release 13.0.

4. Don't make changes during migration

   If possible, don't make any changes or enhancements to your programs while migration is under way. If you must make changes, monitor them carefully.

5. Have everything ready

   Plan everything you need for the migration before you begin. This includes personnel, facilities, documentation, system time, migration aids, and recording medium.

6. Update your documentation

   Remember to update your in-house documentation (operator instructions, run books, standing orders, and so forth) to reflect your new data processing system.

Section 2
System Generation

2.1. General

There are physical differences between your Series 90 system and models 10 through 20. Therefore, you must adjust models 10 through 20 system generation parameters before you can use Series 90 software on your new system.

You can perform system generation (SYSGEN) on models 10 through 20 just as you do on Series 90. Models 10 through 20 support the SYSGEN dialog, which lets you generate supervisors interactively at a workstation. Or, if you prefer using cards, you can also generate your models 10 through 20 supervisors in batch mode. Regardless of the method you use, all SYSGEN procedures are fully compatible between systems.

We deliver a basic supervisor, SY$BAS, as part of the system control software. SY$BAS eliminates the need to perform a SYSGEN operation unless you have a specific reason to do so. If you require features not supplied by SY$BAS, you must generate a supervisor tailored to your own needs. The *Installation Guide,* UP-8839, describes the procedures for generating a supervisor either interactively or in batch mode.

2.2. Supervisor Configuration

Models 10 through 20 offer several new SUPGEN parameters that are not available with your Series 90 system. In addition, many parameters you've used on your Series 90 system have new default values on models 10 through 20.

Table 2-1 lists SUPGEN parameters that are either new or have been changed since Series 90 Release 8.1. We've also provided a brief description of each parameter in the table; for more detailed descriptions, see the *Installation Guide,* UP-8839.

Table 2-1. New or Changed SUPGEN Parameters

Parameter	Description	New or Changed in Release
CHAN	Specifies input/output microprocessor (IOMP) channel number.	8.2
CHAN1	Specifies second input/output microprocessor (IOMP) channel number.	8.2
COMM1	Specifies if ICAM network interfaces with communications terminals or only workstations when system supports two IOMP channels.	8.2
DMGTMODE	Specifies type of data management support.	8.2
FILELOCK	Specifies which files are lockable.	8.2
IGNORESFT	Specifies whether system ignores // SFT statements.	8.2
IORB	Specifies number of input/output resource blocks (IORBs) to be generated for the channel.	8.2
IORB1	Specifies number of input/output resource blocks (IORBs) to be generated for the second channel.	8.2
JCREADWKS	Specifies whether workstation-initiated commands (RU, FI, and SI) can read from the card reader.	8.2
TRNWKAREA	Specifies whether the system generates a 32K-to-125K transient work area to keep most recently used transient modules in main storage.	8.2
INTMEM	Specifies percentage of available main storage allocated for interactive services use.	9.0
ISWORKn	Allows interactive services work volume specification that controls where EDT, ESCORT, and BASIC work files are allocated.	9.0
JOBMEM	Specifies percentage of available main storage allocated for jobs use.	9.0
MAXJOBS	Specifies maximum number of job slots.	9.0

continued

Table 2-1. New or Changed SUPGEN Parameters (cont.)

Parameter	Description	New or Changed in Release
MAXRUNSYMBS	Specifies maximum number of run symbionts that can be executed concurrently in the system.	9.0
MAXSWSJOBS	Specifies maximum number of jobs initiated from a single workstation that can run concurrently in the system.	9.0
MAXWSJOBS	Specifies maximum number of job initiated from a single workstation that can run concurrently in the system.	9.0
RESMGT	Enables resource management capabilities.	9.0
SPOOLING	Specifies spooling.	9.0
SYSMBMEM	Specifies percentage of available main storage allocated for symbiont use.	9.0
CACHESEGSIZE	Specifies number of 1024-byte blocks in a CACHE segment.	10.0
CONALARM	Specifies whether to sound an audible alarm when an action or reply message is sent to the system console.	10.0
DDPSC	Specifies whether host ids are checked as part of a user's identity when the user enters a command into the system from a remote host.	10.0
DMRECV	Creates IRAM/MIRAM files with recover option.	10.0
EXECPRI	Allows user-specified job step processor execution priority.	10.0
PASSWORD	Specifies whether all users are required to enter a password to log on.	10.0
VVAVR	Indicates whether automatic volume table of contents (VTOC) verification is performed at automatic volume recognition (AVR) time.	10.0

Table 2-1. New or Changed SUPGEN Parameters (cont.)

Parameter	Description	New or Changed in Release
IMVJOB	Allows relocation (shuffle) of immovable jobs to utilize locations more efficiently.	11.0
MEMCON	Allows execution with or without job consolidation when free storage space is available.	11.0
MIRAMCHAR	Indicates that newly created MIRAM files are created as MIRAM characteristic files.	11.0
ALTJCS	Identifies the file that is to be the system default for the alternate YJCS library.	12.0
EXPBFCTSZ	Specifies the maximum number of dynamic buffer control blocks (DBCB) that can be dynamically allocated at any one time if the resident control block becomes full.	12.0
ISWKSBUL	Specifies the values that control display of the interactive services BULLETIN when a user logs on.	12.0
ISWKSLOG	Specifies the values that control the interactive services LOG file for each user that logs on.	12.0
RESBFCTSZ	Specifies the maximum number of dynamic buffer control blocks for which resident storage space is set aside.	12.0
SYMBIONT	Assigns a specific priority to a specific symbiont.	12.0
IGNJCERR	Suppresses job control error messages.	13.0
SCRATCHDVC	Specifies the default location of the WORK and TEMP files.	13.0
SPOOLTPBUFR	Specifies the size of the buffer to be used to generate the tape block in 256-byte increments.	13.0
TAPEAVR	Inhibits tape automatic volume recognition (AVR) during system initialization when NO is specified.	13.0

2.3. I/O Configuration

Models 10 through 20 support channel addresses that are different from those supported on your present system. The channels supported on models 10 through 20 are channels 1 through 6 and 12 through 15. Channels 1 through 6 are selector channels, and channel 1 has the highest priority. If you have job control streams that use explicit channel addresses on their DVC statement, you will have to change the channel address information on the DVC statements so that they conform to the channel address assignments for models 10 through 20.

2.4. 8418 Disk Support

The 8418 disk cannot be used as a SYSRES device on models 10 through 20. The relatively small capacity of the 8418 disk can cause sizing problems. The addition of new products to OS/3, as well as existing products increasing in size, makes it difficult to fit everything onto an 8418 disk. By not allowing the 8418 disk to be used as a SYSRES device, we've eliminated potential sizing problems.

2.5. Plateau Control

Models 10 through 20 use plateau control. It provides coordination between the different levels of the hardware, software, microcode, and microcode products. The Release 13.0 *System Release Description*, 7003 4392-000, provides additional information on plateau control and includes a table of supported plateaus with corresponding microcode levels.

Section 3
Data Management

3.1. General

As we explained in Section 1, models 10 through 20 are designed to operate primarily under CDM. CDM supports many new, interactive features such as screen format services, dialog processor, EDT, and enhanced workstation support. To use these features, you must convert the disk data files they use to MIRAM format.

In this section, we'll provide guidelines so you can decide which files you should convert and show you how to convert those files to MIRAM.

3.2. Media Considerations

Your data files can reside on a variety of media: disks, tapes, diskettes, and cards. However, only your disk data files must be converted to MIRAM. All tape, diskette, and card data files are compatible with both BDM and CDM, so you don't have to convert these files. Table 3-1 lists each type of media and shows which support BDM and which support CDM. We've broken down the disk media category into subcategories representing each type of disk file. As you can see, CDM supports MIRAM, IRAM, and SAT characteristic files only. All other disk data files must be converted to MIRAM to use CDM.

Table 3-1. Media Support for BDM and CDM

Media	BDM Support	CDM Support
Tape	Yes	Yes
Diskette	Yes	Yes
Card	Yes	Yes
Disk		
MIRAM	Yes	Yes
IRAM	Yes	Yes
SAT	Yes	Yes
SAM	Yes	No
DAM	Yes	No
ISAM	Yes	No
NI	Yes	No
ASAM	Yes	No
Workstation	No	Yes

Most Series 90 users operate under BDM. It uses the DTF interface and supports each of the following file access methods:

- MIRAM (multiple indexed random access method)
- IRAM (indexed random access method)
- SAT (system access technique)
- SAM (sequential access method)
- DAM (direct access method)
- ISAM (indexed sequential access method)
- ASAM (alternate sequential access method)

Models 10 through 20, however, are designed to operate primarily under CDM. It is an enhanced version of data management that uses CDI for all files. CDI supports just one file access method, MIRAM (and IRAM, a subset of MIRAM), which offers all the processing capabilities previously provided on Series 90 by sequential, relative, direct, and indexed file access methods.

3.3. Environments

To ease your migration, models 10 through 20 support applications that use BDM as well as those that use CDM. This lets you run your current Series 90 programs on models 10 through 20 without changing those programs or the data files they use. On models 10 through 20, you choose your data management environment during SYSGEN by specifying one of two values for the DMGTMODE parameter:

```
DMGTMODE=[MIXED]
         {CDI  }
```

If you specify DMGTMODE=CDI, models 10 through 20 support CDM only; if you accept the default DMGTMODE=MIXED, models 10 through 20 support BDM and CDM. When you operate in mixed mode, models 10 through 20 are fully compatible with your Series 90 system at the load code level. A program that runs on Series 90 using BDM can run on models 10 through 20 without change; a Series 90 program that uses CDM can also run on models 10 through 20 without change. You should select the environment that matches your current Series 90 environment. If you are using the BDM-only environment, you should run in the mixed environment on models 10 through 20.

Models 10 through 20 have many advanced interactive facilities that use CDM exclusively. These facilities include screen format services (SFS), ESCORT™ programming language, dialog processor, the OS/3 general editor (EDT), and workstation support. While your existing applications can run on models 10 through 20 without change, if you want to incorporate these new features into your applications, you must migrate from BDM to CDM. Basically, this involves converting your disk data files to MIRAM format and, in some cases, recompiling your programs. Here are some of the advantages MIRAM provides:

- A single access method for all file structures
- Improved file access time
- Multikey access
- Record deletion
- Higher degree of disk file sharing
- Distributed data processing (DDP) remote file sharing

Throughout this part we'll tell you how to convert various software features to CDM. Remember that we offer mixed mode support primarily so you can continue using BDM applications after you migrate to models 10 through 20. Whenever possible, you should convert your programs and data files to run in a CDM-only environment.

3.4. Hardware Compatibility

Many Series 90 peripheral devices are also supported on models 10 through 20. You can take many of your disks and tape devices as well as a variety of printers and card devices with you when you migrate. The following list shows the peripherals that are supported by models 10 through 20.

- Disks

  8416*, 8418*, 8417, 8419, 8430, 8433, 8470, 8480, 8494, and M9720

  * Data devices only not to be as SYSRES on models 10 through 20.

- Diskettes

  8420 and 8422

- Tapes

  UNISERVO® 10, 12, 14, 16, 20, 22, 24, 26, and 28

  Streaming tape and BT32xx tapes

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- Printers

  0770, 0770 II, 0776, 0789, 0798, 9246-14B, and 9246-25B

- Card readers

  0716 and 0719

- Card punches

  0608

- Workstations

  Model 1 and Model 2

  SVT 1122

- Communications subsystems

  UTS 20, 30, 40, 400, and 4000

  SVT 1120, 1123, and 1124

  DCPs

3.5. Support for 8470 Disk Units

The 8470 disk used on models 10 through 20 supports both BDM and CDM. Therefore, you don't have to bring your Series 90 disks forward to run applications under BDM on the models 10 through 20. You can simply copy your Series 90 software to tape or diskette, load it onto an 8470 unit, and continue normal processing operations.

3.5.1. Moving Files to the 8470 Disk

The 8470 disk has much greater capacity than any Series 90 disk. Therefore, you may decide to move the contents of several Series 90 disks onto one 8470 disk. To increase system throughput and decrease response time, you should place heavily accessed files next to one another on the 8470 disk. To do this, you must first know your application environment and be able to identify those files you use most frequently.

Series 90 users of Release 7.0.1 forward can use the system activity monitor (SAM) to provide detailed disk and file information. If you are migrating from Releases 7.0.1 or 7.1, you can use SAM to identify heavily accessed Series 90 disks and those that have large average arm movements. For Release 8.0 forward, use SAM trace mode and the volume table of contents (VTOC) of your Series 90 disks to identify heavily accessed files on those disks. This data should help you determine the file placement to optimize load balancing and minimize disk arm movement. For more information

about SAM, see the *System Activity Monitor Programming Guide,* UP-9983.

Once you've migrated to models 10 through 20, you can use the file placement analyzer (FIPLAN) to determine optimum file placement. FIPLAN is a general purpose performance tool that uses SAM trace data as input and projects an optimized disk file allocation. You can then allocate files to provide balanced loading across disks and ensure reduced seek time (time spent searching for files) within each disk. For more information about FIPLAN, see the *File Placement Analyzer (FIPLAN) Programming Guide,* UP-9731.

3.5.2. Effect of Sector Size on Performance

The physical sector size of the 8470 disk is 1024 bytes, but data may be accessed in either 1024- or 256-byte increments; each 1024-byte sector can be treated as four logical 256-byte sectors. When you access the 8470 disk in 256-byte logical sector increments, additional I/O requests are incurred when:

- The starting logical sector number does not fall on a 1024-byte physical sector boundary.
- The number of bytes accessed is not a multiple of 1024.

Because the 8470 disk provides access to files in 256-byte mode, you can create files and subsequently access them with your existing Series 90 application programs without modifying these applications. However, when you develop new applications or update existing ones, you may want to modify them to use the 1024-byte sector size by increasing the I/O buffer size specification to a multiple of 1024. The buffer size requirements differ for each file type (SAM, DAM, ISAM, or MIRAM) and record type (fixed or variable format) being used by an application program. You can calculate the minimum buffer size required for a given record size by substituting either 256 or 1024 for the sector size variable. Refer to the *Consolidated Data Management Programming Guide,* UP-9978, for details on buffer sizing calculations for SAM, DAM, ISAM, and MIRAM files.

When you define file characteristics with a higher level language, the buffer size can be defined as a multiple of 1024:

- In COBOL, use the BLOCK CONTAINS clause to specify either the number of records in a logical block or the number of bytes in a logical block.
- In RPG, use the BLOCKSIZE specification to define the number of bytes in a logical block.
- In FORTRAN, use the unit definition to define a block size.

By using a 1024-byte value for sector size in these calculations, you can specify an effective buffer size module of 1024.

In general, accessing files in 1024-byte sector increments provides for the most efficient I/O operation, but may result in unused disk space. For example, an ISAM file with a 1200-byte block size requires two 1024-byte sectors per block, or 2048 bytes. If you access files in 256-byte sector increments, you can often save space but you may incur additional I/O requests. The same 1200-byte block size ISAM file requires five 256-byte blocks, or 1280 bytes. Although you save 768 bytes (you use 1280 bytes instead of 2048) when you use 256-byte sector increments, you also require five I/O requests instead of two.

Here are the accessing modes for the various file structures supported by the 8470 disk:

- File formats

  You can maintain both system files and data files on the 8470 disk. System access technique (SAT), SAM, DAM, ISAM, and MIRAM files are all supported.

- System files

  System files are maintained as SAT files and are based on a 256-byte sector format. The system access technique, and products that use SAT for logical I/O, use the 256-byte sector mode when accessing the 8470 disk. However, when multiple 256-byte blocks are accessed in one I/O and the I/O begins on a 1024-byte sector boundary, no performance loss occurs.

- Data files

  SAM, DAM, and ISAM files use the 256-byte sector mode. These files define a block-size value that represents the physical size of a block containing one or more records. This block size cannot be modified once the file is created. However, when the specified block size is rounded up to the next 256-byte boundary and this figure is a 1024-byte multiple, I/O is performed in 1024-byte increments.

  MIRAM files are accessed in either 1024-byte or 256-byte sector mode, depending on the size of the I/O buffer available in the application. If the application provides a buffer that is a multiple of 1024 and the buffer size is adequate to process records in 1024-byte sector increments, MIRAM performs read/write operations in 1024-byte increments. Otherwise, MIRAM performs read/write operations in 256-byte sector increments. In either mode, MIRAM records span sectors as necessary; no space is left unused between logical record slots.

3.6. Support for 8494 and M9720 Disk Units

The 8494 and M9720 disks support BDM and CDM and all existing file structures (SAM, DAM, ISAM, IRAM, SAT, and MIRAM). The guidelines for moving your Series 90 software to the 8494 or M9720 disks is basically the same as that documented for the 8470 disk (3.5.1.).

The effect of sector size on performance is also the same as that documented for the 8470, taking into account that the sector size for the 8494 and M9720 is 512 bytes as versus 1024 bytes for the 8470 disk (3.5.2).

Also take note when calculating disk space requirements for MIRAM files on the 8494 and M9720 disks that the track capacity of 96 sectors per track applies to both data and index partitions.

3.7. Data Utilities

We provide a program, the OS/3 data utilities, that lets you move your disk data files to models 10 through 20 and convert them to MIRAM. All data utility job control streams are upward compatible from Series 90 to models 10 through 20 Release 13.0. Thus, you can use data utilities to transfer your data files between peripheral devices (disk, tape, and diskette) either on Series 90 or on models 10 through 20. You can also use data utilities to reformat your data files to your own specifications on either system.

The data utility program can be run in either batch or interactive mode. Interactive data utilities defaults to MIRAM for all output disk files; also, you don't need to include job control statements when you run interactive data utilities since all devices are assigned in the dialog. You may not be familiar with interactive data utilities (which is supported only for Release levels 7.1 forward), so we'll describe it briefly.

To use interactive data utilities, you key in RV I@DATA at your workstation. A series of questions in dialog format is then displayed on your workstation screen. Your answers to these questions specify which files you want to copy or reformat. If you don't understand a question, you can display a help screen that further defines the question. After you have answered all the questions, the DATA routine begins processing.

Regardless of whether you use data utilities in interactive or batch mode, this routine lets you copy your disk data files to tape or diskette on your Series 90 system. Then, you can load your data files to an 8470, 8494, or M9720 disk and reformat the data files, again using data utilities. Figure 3-1 illustrates this process.

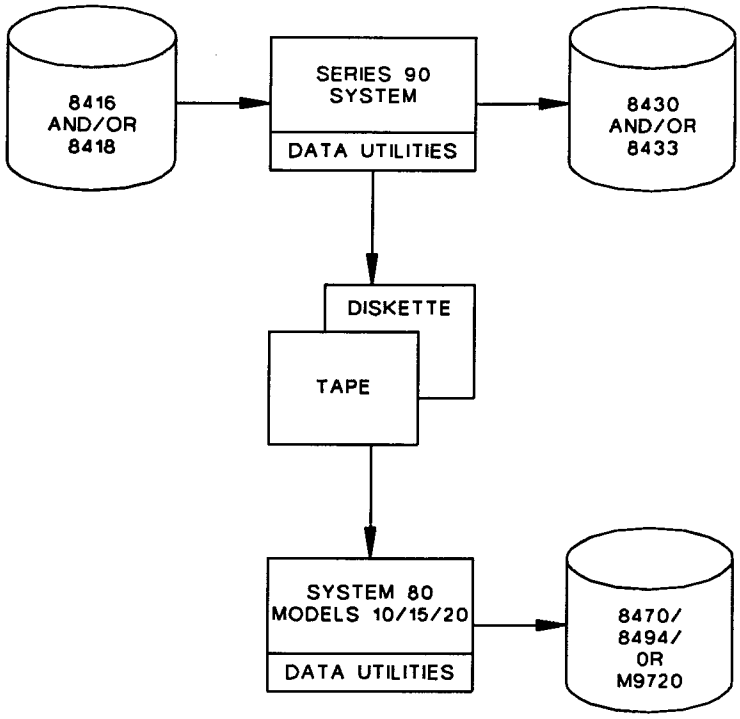

Figure 3-1. Copying Data Files Using Data Utilities

3.8. MILOAD Utility

You may want to use the utility program MILOAD when transferring your data files to models 10 through 20. MILOAD can significantly increase performance when you reformat large, multikeyed MIRAM files. MILOAD supports input files on tape (created by OS/3 in EBCDIC mode) or on disk (MIRAM format). The output file created by MILOAD is always a MIRAM characteristic file. See the *Data Utilities Operating Guide,* UP-8834, for more information on how to use MILOAD.

3.9. Disk File Sharing

CDM file sharing is different from BDM file sharing. To understand this, the term *lockable file* must be defined. A lockable file is protected by data management. It is protected in the sense that data management guarantees that the manner in which a program intends to access a file is consistent with any other programs that are already accessing the file. For example, if a program has exclusive use of a file, no other programs can access that file. If a file is not lockable, data management does not provide this protection. To summarize:

- Under CDM, all files are lockable. Data management protection is always provided when accessing a file under CDM.

- Under BDM, you have some control over file locking via the FILELOCK SYSGEN parameter. The default, SHARE, specifies that all files are lockable. However, you can specify YES, which indicates that only files whose physical file name (LBL) starts with Y or $LOK are considered lockable. On Series 90, the NO specification was supported. It is not supported on models 10 through 20.

Under CDM there is support for facilities that was not available under BDM:

- When a file is being shared between a writer and a reader, the reader has access to all the records that are added by the writer. Under BDM, the added records are not accessible.

- The problems that you encountered (using BDM MIRAM) when a writer and reader were accessing an indexed file have been resolved under CDM. Under BDM, the reader could encounter DM24 errors or premature end of file conditions when reading through a file.

- CDM supports multiple writers sharing a file. There are some limitations to this support in an interactive (IMS or TIP/30) environment. However, in a batch environment, there are facilities that were previously not available to the BDM user.

The FILELOCK SYSGEN parameter that was mentioned earlier is used as follows on the models 10 through 20:

- If you are using FILELOCK=YES or NO on your current system, specify FILELOCK=YES on the models 10 through 20.

- If you are using FILELOCK=SHARE on your current system, specify FILELOCK=SHARE on the models 10 through 20.

3.10. Screen Formats

You can move your existing Series 90 screen format libraries intact to models 10 through 20. Series 90 screen formats created on release 8.0 are fully compatible between systems and can be run on models 10 through 20 without change. If you are migrating from Series 90 Release 7.01 or 7.1, you can also use your screens on your new system. But when you use Release 7.0.1 or 7.1 screens, models 10 through 20 screen format coordinator must convert each screen each time the screen is read into main storage. We recommend that, whenever possible, convert your 7.0.1 or 7.1 screens to meet models 10 through 20 requirements. (Use the screen format converter utility to assist you with the conversion.)

We provide a utility program, the screen format conversion utility (SFCVR), that converts Release 7.0.1 or 7.1 screens so they are compatible with models 10 through 20. SFCVR takes these screens and reworks them into a format acceptable to the models 10 through 20 screen format coordinator. You can run SFCVR either in batch mode or interactively, simply by entering the following command.

```
RV SFCVR[,,I=Y]
```

where:

I=Y
: Specifies that you are running SFCVR interactively.

Additional keyword parameters let you specify which files or libraries you want to convert. Of course, you can also specify where the converted output is to be stored. In most cases, you'll probably accept the following defaults when you run SFCVR:

- Old screen formats are stored in YFMT on your Release 7.0.1 or 7.1 SYSRES volume.
- New (converted) screen formats are stored in YFMT on your models 10 through 20 SYSRES volume.

Just as a precaution, we recommend that you back up and save your original screen formats before you use SFCVR. Store these formats in a library until your migration is complete. You'll find that SFCVR lets you modify a complete format library or individual format files quickly and simply.

Section 4
Language Products

4.1. General

Your Series 90 programs are fully compatible with the models 10 through 20 at the load code level when equivalent functionality is available. Therefore, you can run most of your current programs on models 10 through 20 without making any changes to them. We recommend, however, that when you migrate to models 10 through 20, you convert any programs that use BDM to use CDM instead. As we explained in 1.3, you can't incorporate any new models 10 through 20 features into your existing programs until you convert those programs to CDM.

In this section, we'll tell you how to convert your Series 90 programs that use BDM so they can run on models 10 through 20 using CDM. We provide guidelines for converting programs written in each of the following languages:

- COBOL
- FORTRAN IV™
- Report Program Generator II (RPG II)
- BASIC
- Basic Assembly Language (BAL)
- ESCORT Programming Language

In most cases, you can obtain CDM support simply by recompiling your programs. All procedures for compiling programs are fully compatible between systems. That is, you can recompile (or convert and reassemble for BAL programs) your programs on models 10 through 20 just as you do on Series 90. And, since you can already run all your current programs on models 10 through 20 using mixed mode support, you don't have to recompile all your programs at once; instead, you can convert them at your convenience, according to your priorities and workload.

FORTRAN IV is a trademark of SuperSoft Associations.

4.2. COBOL (ANSI 1968 to ANSI 1974 or ANSI 1985)

Your ANSI 1968 COBOL programs can run in mixed mode on models 10 through 20 without change. However, CDM doesn't support ANSI 1968 COBOL. Therefore, you may want to convert your ANSI 1968 COBOL programs to ANSI 1974 or ANSI 1985 COBOL and then recompile those programs to run on models 10 through 20 under CDM.

Unisys makes available a language converter, the COBOL converter (COBTRN303), that converts ANSI 1968 COBOL source code to ANSI 1974 COBOL source code. COBTRN303 also flags (issues a diagnostic message) any source statements that it cannot convert; you must convert these statements manually. COBTRN303 produces converted output that is acceptable to the ANSI 1974 COBOL compiler, except for those items that have been flagged. Except for SAM and ISAM ORGANIZATION clauses, the converted output of COBTRN303 is generally acceptable to the ANSI 1985 COBOL compiler.

For more details on using COBTRN303, see the *COBTRN303 User Reference,* UA-0314. For more details on the differences between ANSI 1974 COBOL and ANSI 1985 COBOL, see the *1985 American Standard COBOL Technical Overview,* 7002 3932.

Here are some additional guidelines for converting ANSI 1968 COBOL to ANSI 1974 or ANSI 1985 COBOL:

1. Data file support

   - Converting to ANSI 1974 COBOL

     You must convert all direct access method (DAM) data files to MIRAM format, using OS/3 data utilities. We also recommend that you convert all SAM and ISAM data files to MIRAM, but this is necessary only if you specify DMGTMODE=CDI in your supervisor. The ORGANIZATION clause in your COBOL program is automatically changed if you use COBTRN303. If you convert your COBOL source code manually, you must make the changes shown in Table 4-1.

   - Converting to ANSI 1985 COBOL

     You must convert all SAM, DAM, and ISAM files to MIRAM format, using OS/3 data utilities. You must also manually change the COBOL ORGANIZATION clause as shown in Table 4-1.

Table 4-1. Changes to ORGANIZATION Clause

File Type	ANSI COBOL ORGANIZATION Clause			DMGTMODE= MIXED	DMGTMODE= CDI
	1968 COBOL	1974 COBOL	1985 COBOL		
SAM	Sequential	SAM	N/A	Supported	Not supported
DAM	Relative	N/A	N/A	Supported	Not supported
ISAM	Indexed	ISAM	N/A	Supported	Not supported
MIRAM	N/A	Sequential, relative, or indexed	Sequential relative, or indexed	Supported	Supported

2. Features supported only by ANSI 1974 and ANSI 1985 COBOL

   - CDM
   - MIRAM data files
   - Workstations
   - Reentrant IMS or TIP action programs

3. Main storage requirements

   ANSI 1968 COBOL is statically linked; ANSI 1974 and ANSI 1985 COBOL can be statically or dynamically linked and may require increased main storage allocation on the // JOB statement.

4. Printer requirements

   ANSI 1968 COBOL directs SYSLST to the printer. ANSI 1974 and ANSI 1985 COBOL direct SYSLST to the system log file.

5. SEARCH ALL statement

   In ANSI 1968 COBOL, the indexed table item in the SEARCH ALL statement can be on either side of the equal sign (=) in the WHEN clause. In ANSI 1974 COBOL, the indexed table item must be on the left side of the equal sign (=).

6. Job control

   The // LFD filename,,EXTEND statement is not supported for MIRAM files. Instead, specify OPEN EXTEND when you open a MIRAM file in your program.

4.3. FORTRAN IV

To convert FORTRAN IV to CDM mode, you must recompile the FORTRAN IV programs (specify DMGTMODE=CDI during supervisor generation) and make the following changes:

1. All disk data files must be converted to MIRAM format.

2. Unit definitions must be reassembled and relinked with updated definitions.

3. FORTRAN IV compiler and object modules must be placed in the proper order for CDM (module first in the library).

We deliver two sets of FORTRAN IV compiler macros in the system macro library (YMAC), and two sets of FORTRAN IV compiler object modules in the system object library (YOBJ). One set of each, called MIX, supports both BDM and CDM. The other set, called DTF, supports only BDM. The DTF modules are placed first in their respective libraries so that the normal FORTRAN IV default is to BDM.

To support CDM, you must reverse the order of FORTRAN IV modules in YMAC and YOBJ before assembling a unit definition or linking a FORTRAN IV object program. To do so, enter the following command to run the prefiled job stream MIXFOR4:

```
RV MIXFOR4
```

If you don't place these modules in the proper order when using the FORTRAN IV compiler run-time modules, errors will result.

Note: *In CDM mode, specify the FDIAGNOSE=YES parameter only for a printer, not for a workstation.*

4.4. RPG II

Your BDM RPG II programs can run on models 10 through 20 in mixed mode without modification or recompilation. To convert your RPG II programs to CDM mode, you must recompile your programs (specify DMGTMODE=CDI during supervisor generation), and change the disk data files your programs use to MIRAM format.

In a mixed mode environment, all disk file interfaces default to BDM. To generate CDM MIRAM interfaces, you must supply one of the following statements in the job control stream that executes the program:

```
// PARAM MIRAM=file1,file2,...,filen
```

or

```
// PARAM MIRAM=ALL
```

where:

`file1,file2,...,filen`
Specifies which files are MIRAM; files not specified are accessed through BDM mode (specify DMGTMODE=MIXED during supervisor generation).

`ALL`
Specifies that all disk data files are MIRAM and are accessed in CDM mode (specify DMGTMODE=MIXED or DMGTMODE=CDI during supervisor generation).

Note: *These parameters are used only with disk data files. Other devices use CDM in both CDM and MIXED modes.*

The // PARAM MOD=IRAM statement used in Release 6.1.2 specifies that all IRAM files are accessed through BDM when you compile your programs in mixed mode. If you want your IRAM files accessed in CDM mode, replace the // PARAM MOD=IRAM statement with the // PARAM MIRAM=ALL statement.

You compile your RPG II programs on models 10 through 20 just as you do on your Series 90 system. However, the RPG II compiler may require more main storage on models 10 through 20. If necessary, increase the main storage allocation on the // JOB statement of the job that compiles the program. For more details on using RPG II on models 10 through 20, see the *Report Program Generator II (RPG II) Programming Guide,* UP-8067.

4.5. Basic Editor Monitor (BEM)

BEM is not supported on models 10 through 20. BEM BASIC and BEM EDT functionality is provided by the interactive BASIC and EDITOR products.

4.5.1. Editor (EDT)

The editor (EDT) runs in either CDM or mixed mode and operates in essentially the same way as BEM EDT. However, there are some differences between the two editors. The following guidelines should help you convert your BEM EDT procedures to EDT with a minimum of difficulty:

- File and record differences

  1. EDT can access SAT and MIRAM library files, MIRAM data files, spool files, sequential device files, tape, card, and diskette files. BEM EDT accesses only SAT library files.

  2. EDT supports variable-length and fixed-length records. BEM EDT supports only fixed-length records.

- Syntax conventions

  1. EDT uses a colon (:) as a column and line range separator, while BEM EDT uses a hyphen (-).

     Note: *EDT lets you change the column and line range separator from the preset colon to another symbol via the @SET COLON=range-separator command.*

  2. EDT indicates the start column of a found search string by an open bracket ([). BEM EDT uses a percent sign (%). EDT uses a closed bracket (]) to indicate the end of column of a found search string. BEM EDT has no special symbol for the end column.

  3. EDT uses #Gn(x:y) where x:y denotes the column range to define a variable substring. BEM EDT uses #Gn(s,L) where s denotes the starting column and L denotes the length of the substring.

  4. EDT uses n(x:y) as the syntax for a line substring; BEM EDT uses n:x-y.

  5. The current line number and increment are not local for BEM EDT.

  6. EDT (using a free-form scan) recognizes as command lines only those lines whose first nonblank character is a command trigger (@). BEM EDT recognizes the command trigger only in column 1.

  7. EDT defaults to the PRINT option of the procedure file that called it, or to NOPRINT if it is called from the main work file. BEM EDT defaults to NOPRINT. EDT allows greater control and flexibility with the PRINT and NOPRINT options on the DO command.

- Function key support

  EDT supports the following function keys:

  F1
  F2
  F15 (EOF)
  F18
  F19

- BEM EDT commands not supported by EDT

  1. These commands have no equivalent function in EDT:

     ```
     @RSP
     @SET PAGE
     ```

     Note: *Although EDT does not support RSP scanning of the spool file, you can use the interactive services DI SPL instead. You can also read spool files using EDT; however, you must know which spool file is to be retrieved before you can use this command.*

  2. Models 10 through 20 have equivalent system commands that replace these BEM EDT commands:

     ```
     @UPPER
     @LOWER
     @HELP
     @TYPE
     ```

  3. The EDT keyword KKEY has the same function as the BEM EDT DESEQ command, but is more thorough in syntax checking.

- BEM features not provided by interactive services

  1. Idle terminal timeout and logoff

  2. Ability to limit command access based on user-id

  3. TTY support

For further information on EDT, see the *General Editor (EDT) Operating Guide*, UP-9976.

4.5.2. Interactive BASIC

Interactive BASIC is functionally equivalent to BEM BASIC and can be run in either CDM or mixed mode. You may already be familiar with interactive BASIC, since it is supported on Series 90 for Releases 7.0.1 forward. To use interactive BASIC, log on to one of your models 10 through 20 workstations and enter the following command:

```
BASIC
```

When the message BASIC READY appears on your workstation screen, you can begin entering the BASIC statements for your program. Each line is checked for correct syntax as it is entered.

BEM BASIC and interactive BASIC are compatible with one exception: The workstation access method (WSAM), which is used by interactive BASIC, adds its own control character to a record for proper positioning. Therefore, when you create screens, you should output your screen with one PRINT command. If you build your screen with more than one PRINT command, WSAM will position the cursor in between the PRINT commands, which may affect your output.

Here's a summary of interactive BASIC features:

- Workstation support
- CDM
- MIRAM data file support
- Extended HELP message processing

For more information on interactive BASIC, see the *BASIC Programming Reference Manual,* UP-9168.

4.6. Basic Assembly Language (BAL)

You can run your BAL programs in mixed mode on models 10 through 20 without making any changes. However, to convert to CDM mode, you must modify your source code and reassemble and relink your programs. You must also change any data files these programs use to MIRAM format. If your programs process SAM or DAM user disk labels, you must update them because MIRAM doesn't support user disk labels.

We provide a BAL macro converter, the DTF macro to CDI macro converter (DTFCDI301), that converts file definition and I/O macros from DTF macro code to CDI macro code. DTFCDI301 flags statements that can't be converted or that require special attention. It converts the following DTF macros:

DTFCD	DTFIS	DTFNI
DTFDA	DTFMI	DTFPR
DTFIR	DTFMT	DTFSD

In addition, the following imperative and other macros associated with these DTF macros are also converted:

CDIO	FEOV	POINTS	SETF
CLOSE	GET	PRIO	SETFL
CNTRL	LBRET	PRTOV	SETL
DPCA	MTIO	PUT	SETP
DTFDM	NOTE	READ	SETS
ENDFL	OPEN	RELSE	TRUNC
ESETL	POINT	SAMIO	WRITE

There are sufficient differences between DTF and CDI assembler specifications to preclude a one-for-one conversion approach. Therefore, we've provided the following guidelines in 4.6.1 through 4.6.3 to help your conversion effort.

4.6.1. BAL Migration Guidelines

1. User physical I/O programs that execute with the system access bit in the CCB turned off aren't supported. This bit is reset by the CCB macro when the fourth positional parameter (error option) excludes an X'08' setting. If you want to continue to use these programs, you must modify them to turn on the system access bit. However, you should consider converting these programs to a higher level language.

2. Programs that operate at the physical I/O level must not be dependent on the particular sequence of operations used by a particular channel.

3. Programs should not use negative relocation for addressing unauthorized storage areas.

4. Programs must be independent of the relations between instruction execution times, I/O data rates, access times, I/O command execution times, and timing facilities (including elapsed time values).

5. Programs must not use Series 90 low order storage locations assigned specifically for system use.

6. Programs must not depend on Series 90 machine dependent functions.

7. The following Series 90 privileged instructions don't exist on models 10 through 20:

   a. SOFTSCOPE forward scan (SSFS)

   b. SOFTSCOPE reverse scan (SSRS)

   c. Load control storage (LCS)

8. Change any specific references to fields contained in DTF structures in the user region of your programs.

9. Contingency routine addresses for EOFADDR and ERROR aren't supported by CDM; access these addresses with inline code following imperative commands.

4.6.2. DTF ISAM to CDI MIRAM Keyword Conversion

Table 4-2 compares DTF keyword parameters and CDI keyword parameters. Look at this table first, and then at the conversion that follows it. In the conversion, a DTF ISAM file is converted to a CDI MIRAM file with a single key. Note that line sequence numbers are used for comparison between the DTF and CDI parameters.

Table 4-2. Comparison of DTF and CDI Keyword Parameters

Sequence Number	DTF Parameter	DTF Description	CDI Parameter	CDI Description
1	ACCESS	Specifies how the file is to be shared	ACCESS	Specifies how the file is to be shared
2	BLKSIZE	Block size calculated by (RECORD LENGTH + 5) x (NUMBER OF RECORDS PER BLOCK)	BFSZ	Buffer size calculated on record and sector sizes as defined for MIRAM files
3	ERROR	ERROR contingency routine address	-	No corresponding CDI parameter
4	INDAREA	Main storage location for index blocks during load operations, or for top index table during random retrieval or record insertion	INDA	Same function as in DTF mode
5	INDSIZE	Length of index area	INDS	Length of index area
6	IOAREA1	Location of I/O area	IOA1	Location of I/O area
7	IOROUT	Type of file processing	-	No corresponding CDI parameter
8	KEYARG	Program location for address/keys to effect record retrieval	KARG	Program location for address/keys to effect record retrieval

continued

Table 4-2. Description of DTF and CDI Keyword Parameters (cont)

Sequence Number	DTF Parameter	DTF Description	CDI Parameter	CDI Description
9-10	KEYLEN KEYLOC	Length and offset of record key	KEYn (LEN,LOC)	Length and offset of record key
11	PCYLOFL	Percentage of cylinder overflow	-	No corresponding CDI parameter
12	RECFORM	Record format	RCFM	Record format
13	RECSIZE	Maximum record length	RCSZ	Maximum record length
14	TYPEFLE	Sequential/random access	MODE	Sequential/random access
15	VERIFY	Specifies if output record parity is to be checked	VRFY	Specifies if output record parity is to be checked
16	WORK1	Location of the record work area	WORK	Specifies that records will be processed in a work area instead of in a buffer
17	-	No corresponding DTF parameter	PROC	Keyed/unkeyed processing

Here are the characteristics of the DTF ISAM file before conversion to MIRAM:

	Parameter	Value	Sequence Number
DTFIS	ACCESS	EXC	1
	BLKSIZE	427	2
	ERROR	errtn	3
	INDAREA	indx	4
	INDSIZE	256	5
	IOAREA1	newrec	6
	IOROUT	LOAD	7
	KEYARG	ssnno	8
	KEYLEN	9	9
	KEYLOC	39	10
	PCYLOFL	20	11
	RECFORM	FIXBLK	12
	RECSIZE	80	13

TYPEFLE	RANSEQ	14
VERIFY	YES	15
WORK1	worka	16

To convert the DTF ISAM file to a CDI MIRAM file with a single key, make the following changes:

	Parameter	Value	Sequence Number
RIB	ACCESS	EXC	1
	BFSZ	512	2
	INDA	indx	4
	INDS	256	5
	IOA1	newrec	6
	KARG	ssnno	8
	KEY1	(9,39,NDUP,NCHG)	9-10
	RCFM	FIX	12
	RCSZ	80	13
	MODE	RAN	14
	VRFY	YES	15
	WORK	YES	16
	PROC	KEY	17

4.6.3. DTF to CDI Processing Considerations

Here are some considerations when converting from DTF to CDI:

1. Opening files

   To open a file in DTF, use:

   ```
   OPEN INP
   ```

   To open a file in CDI, use:

   ```
   OPEN INP,(INPRIB)
   ```

   You must supply the resource information block (RIB) name when you open a file using CDI. This sets up the file structure; otherwise, all defaults for the file structure are applied.

2. Closing files

   To close a file in either DTF or CDI, use:

   ```
   CLOSE INP
   ```

3. Sequential processing

   To sequentially process an ISAM file in DTF, use:

```
SETL INP,BOF          (This sets file at beginning.)
```

   To continue processing, use:

```
GET INP,WORKA         (This reads a record sequentially.)
PUT INP,WORKA         (This updates the record.)
```

   To terminate sequential processing, use:

```
ESETL INP
```

   To sequentially process a MIRAM file, you must first be sure you are starting at the beginning of the file. If you have just issued the OPEN macro for that file, the current location is automatically set to the beginning of the file. If the file is already opened, use the following macro to set the current position to the beginning of the file:

```
DMSEL INP,RECORD,BOF          (The BOF option places you at the
                               beginning of the file.)
```

   To continue processing, use:

```
DMINP INP,WORKA,,,SEQ         (This reads a record sequentially.)
DMUPD INP,WORKA               (This updates the record.)
```

   Note: *We supply the SEQ parameter in the DMINP macro to override the MODE=RAN parameter in line 14 of the RIB. (See Table 4-2.)*

4. Random processing

   To randomly process the file in DTF, specify the keyword parameter IOROUT=ADD or IOROUT=ADDRTR; then, use the following:

```
WRITE INP,NEWKEY

or                    (Use either macro to write a new record.)

ADD INP
```

```
WAITF
```
(This delays processing until prior action terminates.)

```
READ INP,KEY
```
and (This retrieves record by location.)

```
WAITF
```

```
WRITE INP,KEY
```
or (This rewrites the last record retrieved.)

```
UPDT INP
```

followed by:

```
WAITF
```

To randomly process a file in CDI, use:

```
DMOUT INP,WORKA
```
(This writes a new record.)

```
DMINP INP,WORKA
```
(This retrieves a record by key.)

```
DMUPD INP,WORKA
```
(This updates a record.)

```
DMDEL INP
```
(This deletes a record.)

4.7. ESCORT Programming Language

The ESCORT programming language uses CDM interfaces and is completely compatible between Series 90 and the models 10 through 20. You don't have to make any changes to your ESCORT programs or data files to use them on models 10 through 20.

4.8. Sorting

Models 10 through 20 support the sort/merge and SORT3 programs as follows:

- Sort/Merge

  All Series 90 sort/merge job control streams are fully compatible with models 10 through 20. In addition, models 10 through 20 sort/merge programs support MIRAM files in both BDM and CDM mode. In a mixed mode environment, when there is tape input, disk output, and no SORT FILTYPE parameter (to explicitly declare the disk output file type), the output file is a MIRAM file. (In a BDM only environment, the output file is a SAM file.)

- SORT3

  All Series 90 SORT3 job control streams are fully compatible with models 10 through 20. SORT3 supports MIRAM files in both BDM and CDM mode. In a mixed mode environment, SORT3 produces MIRAM files as output regardless of input file type.

Section 5
ICAM Migration

5.1. General

Most Series 90 integrated communications access method (ICAM) programs are source code compatible with models 10 through 20. Therefore, you can run most of your communications user programs (CUPs) on models 10 through 20 without change. But ICAM has been enhanced to include many new features since OS/3 Release 8.1. These features include global network support, interactive services interface (DMI), and new workstation support. To use these new ICAM features in CUPs that currently run under BDM, you must convert those CUPs to use CDM and regenerate your ICAM network to define the communications (channel and line) network configuration for the models 10 through 20.

In this section, we'll tell you how to upgrade your existing CUPs to models 10 through 20. It's really a very simple process. In most cases, all you have to do is recompile your CUPs on models 10 through 20, just as you previously did on your Series 90 system. The only exceptions to this are communications physical interface (CPI) user programs, which require some additional changes.

5.2. Communications User Programs (CUPs)

5.2.1. COBOL CUPs

Series 90 COBOL CUPs are source compatible with models 10 through 20 and can run in a mixed mode data management environment without change. To use CDM interfaces for data files, however, you must recompile your COBOL CUPs on models 10 through 20.

5.2.2. RPG II CUPs

Series 90 RPG II CUPs are source compatible with models 10 through 20 and can run in a mixed mode environment without change. To use CDM interfaces for data files, however, you must recompile your RPG II CUPs on models 10 through 20.

5.2.3. Assembler CUPs

Most Series 90 Assembler CUPs are source compatible with models 10 through 20 and can run in a mixed mode environment without change. To use CDM interfaces for data files, however, you must convert and reassemble your Assembler programs on models 10 through 20. See 4.6 for details on converting Assembler programs to CDM mode.

5.3. Network Definition

ICAM lets you:

- Input data from a network of remote terminals into a program for processing
- Distribute messages to the terminals within the network
- Transfer messages from terminal to terminal

Generally, you have only one network defined and operating on your system. However, ICAM permits you to define several distinct networks and to have these networks operating simultaneously. You define each network during SYSGEN by submitting a set of macros that defines the terminals, lines, buffers, and queues for that network. In addition, you must specify which of the four available communications interfaces each network is to use. A terminal can be included in more than one network definition; however, only one network can use the terminal at a time.

The models 10 through 20 communications hardware configuration supports up to 2 channels with 14 lines (ports) on each channel. Your ICAM network generation must include the physical channel and line specification in the LINE and CACH macros.

5.4. Communications Physical Interface (CPI) Guidelines

If you are a communications physical interface (CPI) user, you are totally responsible for all single line communications adapter (SLCA) initialization and control procedures. Therefore, you must make some changes to your CPI user programs when you migrate to models 10 through 20. The most significant changes are summarized here:

- The communications physical input/output control program (CPIOCP) packet size has been increased to 14 full words (including sense bytes for the SLCA).
- The port control word must specify the character detect and character interpretation tables as table 1 (bytes 2 and 3, bit 1=0).

- The SLCA buffer size must be specified in the TN#PBLTH field of the CPIOCP at line request time. The valid range is 32-256 in decimal. If buffer toggling is required, the line buffer size must be an even multiple of the SLCA buffer size.

- To set asynchronous line speeds for models 10 through 20 single line communications adapter port control word, see Table 5-1.

Table 5-1. Port Control Word Settings for Models 10 through 20 Asynchronous Line Speeds

Bits				Asynchronous Speed (Bits per Second)
4	5	6	7	
0	0	0	0	Not used (invalid*)
0	0	0	1	50
0	0	1	0	75
0	0	1	1	110
0	1	0	0	134
0	1	0	1	150
0	1	1	0	300
0	1	1	1	600
1	0	0	0	900
1	0	0	1	1200
1	0	1	0	1800
1	0	1	1	2400
1	1	0	0	3600
1	1	0	1	4800
1	1	1	0	7200
1	1	1	1	9600

*Results in program alert sense and unit check status

- The channel number and SLCA number must be set in the CPIOCP for every request, including a network request. The channel number must be $0D_{16}$ or $0F_{16}$; the SLCA number must be in the range 01_{16} to $0F_{16}$.

- To retrieve the data in the SLCA buffer when a CPIOCP input timeout error occurs, specify the line procedure timer value in the port control word. See the *Integrated Communications Access Method (ICAM) Communications Physical Interface (CPI) Programming Guide,* UP-9746.

- The turn-off command does not provide an immediate status. The I/O completion interrupt must be awaited.

- Data chain users must set up the first two CPIOCP packets (including the first data chain address) prior to the first CCR call. Failure to comply with this requirement causes a system error.
- Invalid packet chaining links cause system errors.
- If buffer toggling is required, TN#PESO (error schedule only) must not be specified in the TN#PFLGS field of the CPIOCP. If specified, return of the CPIOCP buffer completion interrupt is prevented.
- If buffer toggling is required, all CPIOCPs must specify continuation (TN#PFS and TN#PFL=0) after the first CPIOCP.

For network generation:

- If your line handler uses half-duplex protocols, you must specify half-duplex in the LINE macro and CACH statement. All ICAM line handlers use half-duplex except NTR, UDLC-ABM, and PDN level 2X.25.
- If your line handler uses full-duplex protocols, you must specify full-duplex in the LINE macro and CACH statement.
- If necessary, you can use full-duplex modems and lines with half-duplex line handler protocols.

5.5. Remote Workstation Guidelines

If you currently are running on Release 8.2 or earlier, you must now specify the LINKPAK and UDUCT parameters on the BUFFERS network definition statement. Also, you must specify REMWORKSTATION in the I/OGEN phase of system generation.

5.6. Terminals Emulating Workstations

You must specify REMWORKSTATION in the I/OGEN phase of system generation if terminals are to be in session with interactive services. (See the *Installation Guide*, UP-8839.)

5.7. ICAM Trace

Starting with Release 8.2, ICAM trace is performed by the ITF symbiont. The TRACEMAX network definition parameter is no longer used. See the *Integrated Communications Access Method (ICAM) Utilities Programming Guide,* UP-9748, for a description of the ITF symbiont.

5.8. ICAM DT Trace

Starting with Release 12.0, ICAM provides a device trace that is capable of tracing the entire input and output as well as the physical I/O data structures for a given physical device. See the *Integrated Communications Access Method (ICAM) Utilities Programming Guide,* UP-9748, for a description of the DT symbiont.

5.9. ICAM Operator Communications

Starting with Release 8.2, the network name is referenced in ICAM messages and responses instead of the user's job slot number.

Section 6
Data Base Products

6.1. Information Management System (IMS)

There are two considerations:

1. Single-thread IMS is not supported on the models 10 through 20 and must be converted to multithread IMS.

2. Action programs should be converted from BDM to CDM to take advantage of CDM facilities.

6.1.1. Conversion to Multithread IMS

On your Series 90 system, you could generate two types of information management systems:

1. Single-thread IMS

   Only one action is processed at a time, but actions from different transactions may be interspersed.

2. Multithread IMS

   Actions are processed concurrently for different transactions.

If you are currently using multithread IMS, your existing Series 90 IMS systems can run on models 10 through 20. If you are currently using single-thread IMS, you must convert to multithread because single-thread IMS is not supported on models 10 through 20.

To convert from single-thread to multithread IMS, you must:

- Change IMS configuration parameters not supported by models 10 through 20
- Change the associated job control streams

In the following subsections, we show you which IMS configuration parameters you must change when moving to a multithread environment. We also provide a sample job control stream so you can see how to execute online IMS on models 10 through 20. However, remember that when you upgrade to multithread IMS, you should review the overall logic and design of your action programs. You can then take advantage of multithread to improve the efficiency of your IMS system.

Table 6-1 shows which IMS configuration parameters are supported on models 10 through 20 for OS/3 Releases 6.1.2 forward. To determine if a parameter is supported for a given release look for an X in the appropiate release column. (An X indicates that the parameter is supported, and if it is supported for IMS single-thread or multithread.) If a parameter from your current release is not supported on the release to which you are migrating, you must remove that parameter from your current configuration before you migrate to the new release. For a complete listing of parameter definitions and values, refer to the *Information Management System (IMS) System Support Functions Programming Guide,* UP-11907.

Table 6-1. IMS Configuration Parameters

Section	Parameter	Release 6.1.2		Release 7.0/7.1		Release 8.0/8.2/ 9.0/10.0		Release 10.0/ 11.0/12.0/13.0
		Single-Thread	Multi-Thread	Single-Thread	Multi-Thread	Single-Thread	Multi-Thread	Multi-Thread only
NETWORK	CUP			X	X	X	X	X
	KATAKANA					X	X	X
	PRCSNUM							X
	UNSOL							X
	STATUMSG							X
GENERAL	INBUFSIZ	X	X	X	X	X	X	X
	DDPBUF						X	X
	DDPSESS						X	X
	TRANLEN						X	X
OPTIONS	BASIC	X	X					
	DMS	X		X	X	X	X	X
	FASTLOAD			X	X	X	X	X
	INTLIST	X		X		X	X	X
	MSGCLR					X	X	X
	MSGPOS					X	X	X
	OPCOM		X		X	X	X	X
	RECLOCK	X		X		X		
	RESFMT					X	X	X
	RESMEM							X
	SFS			X		X	X	X
	STATS					X	X	X
TERMINAL	STATUSMSG							X
	UNATTEND							X
FILE	FILETYPE	X	X	X	X	X	X	X
	CAFILE	X	X	X	X	X	X	X
	CUPDATE	X	X	X	X	X	X	X
	DELETP					X	X	X
	PKEY					X	X	X
	DTF	X	X	X	X	X	X	X
	RIB			X		X	X	X
TRANSACT	LOCAP						X	X
	UNDEF					X	X	X

continued

Table 6-1. IMS Configuration Parameters (cont.)

Section	Parameter	Release 6.1.2		Release 7.0/7.1		Release 8.0/8.2/ 9.0/10.0		Release 10.0/ 11.0/12.0/13.0
		Single-Thread	Multi-Thread	Single-Thread	Multi-Thread	Single-Thread	Multi-Thread	Multi-Thread only
ACTION	EXPIRTME							X
	FCCEDIT			X	X	X	X	X
LANGUAGE	lex-name							X
	lang-name					X	X	X
LOCAP	locap						X	X
	RCHAR						X	X
DRCRDMGT	RESIDE	X		X		X		
TIMEOUTS	INTRFQCY							X
	ACTION	X	X	X	X	X	X	X
	STATUS		X		X		X	X

6.1.2. Conversion of IMS Programs to CDM

We recommend that you convert your IMS action programs to CDM so you can take advantage of the facilities, such as enhanced disk file sharing, that are provided by CDM. Note that IMS does not support mixed mode. Consequently, if you decide to use CDM, you must convert all your programs.

To convert your IMS systems from BDM to CDM, you must:

1. Accept the default CDM=YES in IMSCONF.
2. Change data management parameters in the FILE section of the IMS configurator to support CDM (described in 6.1.1.).
3. Convert your data files to MIRAM format (described in Section 3).
4. Recompile your action programs.

The following subsections describe the changes you must make to IMSCONF and to your IMS action programs.

IMSCONF

The IMSCONF job control procedure (jproc) generates and executes control streams to perform system generation for single-thread and multithread IMS systems. Use the following IMSCONF parameter to select the data management mode your IMS system uses:

```
CDM=[YES]
    [NO ]
```

To generate an IMS system using CDM, accept the default CDM=YES. This parameter replaces the CDI parameter used on Series 90 Release 7.1. Note that you must specify CDM=NO to run IMS in BDM mode; if you specify this parameter, you must also specify DMGTMODE=MIXED when you generate your supervisor during SYSGEN.

An IMSCONF feature, the internal statistical file (STATFIL), records data during online processing. STATFIL is a sequential unkeyed MIRAM file with variable-length records. There are two ways you can allocate STATFIL:

- Specify the STATFIL parameter in IMSCONF.
- Specify a user file label in the IMSFIL parameter in IMSCONF.

If you don't want to allocate STATFIL, specify NO in the IMSCONF INIT subparameter.

Table 6-2 lists new IMSCONF parameters for Releases 6.1.2 forward. An X indicates that the parameter is supported for the specified release; N/A means not applicable.

Table 6-2. New IMSCONF Parameters

IMSCONF Parameter	Release			
	6.1.2	7.0.1/7.1	8.0/8.2/ 9.0/10.0	11.0/12.0 /13.0
CDI	N/A	X	N/A	N/A
CDM	N/A	N/A	X	X
STATFIL	N/A	N/A	X	X
INIT=cyl-statfil	N/A	N/A	X	X
ZCNF=ST	X	X	X	
ZCNF=MT	X	X	X	X

Action Programs

To migrate your COBOL, RPG II, or BAL action programs, you need not recompile those programs on models 10 through 20. If you are converting an ANSI 1968 COBOL action program to ANSI 1974 COBOL, you may want to compile the program as reentrant code and configure the program as TYPE=REN (reentrant)instead of TYPE=SHR. If you are converting to ANSI 1985 COBOL, you cannot configure the program as TYPE=SHR; you must configure the program as TYPE=SER (serial reusable) or TYPE=REN (reentrant).

6.2. Data Base Management System (DMS)

You must recompile the device media control language (DMCL) for the data dictionary data base and the user production data base. You need not recompile the DMS application programs or regenerate the data dictionary.

Section 7
System 80 Migration Overview

7.1. General Considerations

Making the transition to the models 10 through 20 should be relatively easy and trouble free. Models 10 through 20 provide both software and hardware compatibility with your present system. The models 10 through 20 also offer greater processing power and more main storage than your present system. You can move all your programs and data files to the models 10 through 20 unchanged. You can also take most of your peripherals with you when you migrate to the models 10 through 20.

The following lists some of the areas that may be of concern to you when migrating to the models 10 through 20:

- Disk support for SYSRES and data files must be considered. Not all disks supported on the models 10 through 20 can be used as SYSRES. Capacity and sizing must be taken into consideration. Subsection 3.4 lists the hardware devices supported on the models 10 through 20 and identifies which disk units cannot be used as SYSRES devices. Additional information is presented in Section 8.

- Differences in channel addresses between your present system and the models 10 through 20 may require you to make changes to your job control streams. Subsection 8.3 provides information concerning the differences in channel addresses for the various System 80 models.

- The need to generate a supervisor or to define a different I/O configuration depends on the differences between your current system configuration and the configuration of the system to which you are migrating. Information concerning system generation is described in Section 8.

- Your program files (source, object, and load) and data files (including IMS and DMS) can be ported without change. You won't have to pass your program or files through transcription or conversion utilities. Information about language product migration is presented in Section 10. Migration information concerning data base products is presented in Section 12.

7.2. Migration Planning and Execution

Planning and executing your migration to the models 10 through 20 is essentially the same as that described in Section 1. Refer to the information in Section 1 to help you put together a migration plan.

7.2.1. Software Compatibility

You can move all your program (source, object, and load) and data files, without change, to the models 10 through 20.

7.2.2. Hardware Compatibility

You can take most of your present system peripherals with you when you migrate to the models 10 through 20. See 3.4 for a list of the peripherals that are supported by the models 10 through 20.

Section 8
System Generation

8.1. Basic Supervisor

A basic supervisor, SY$BAS, is delivered to you as part of the system control software for models 10 through 20. SY$BAS eliminates the need to perform a SYSGEN operation unless you have a specific reason to do so. If you require features not supplied by SY$BAS, you must generate a supervisor tailored to your needs. For a complete list of SY$BAS, you must refer to the *Installation Guide*, UP-8839.

8.2. Supervisor Configuration

You perform system generation (SYSGEN) on models 10 through 20 just as you do on your present system. Models 10 through 20 support the SYSGEN dialog, which lets you generate supervisors interactively at a workstation. Or, if you prefer using cards, you can also generate your models 10 through 20 supervisors in a batch mode. Regardless of the method you use, all SYSGEN procedures are fully compatible between systems. The *Installation Guide,* UP-8839, describes the procedures for generating a supervisor either interactively or in a batch mode.

See Table 2-1 for a list of the SUPGEN parameters that are new or whose default values have been changed.

8.3. I/O Configuration

Models 10 through 20 support channel addresses that are different from those supported on your present system. Table 8-1 shows the channel addresses that are supported for System 80 models 3 through 6, 8, and 10 through 20. If you have job control streams that use explicit channel addresses on the DVC statement, you may need to change the DVC statements. Use the channel address information in Table 8-1 to make the necessary changes.

Table 8-1. Supported Channel Addresses

System 80 Model	Supported Channel Address
3 through 6	1 through 4
8	0 through 3, 6, 7, and 12 through 15 Channels 1 through 3, 6, and 7 are selector channels, Channel 3 has the highest priority.
10 through 20	1 through 6, and 12 through 15 Channels 1 through 6 are selector channels. Channel 1 has the highest priority.

8.4. 8418 Disk Support

The 8418 disk cannot be used as a SYSRES device on models 10 through 20; the disk's relatively small capacity can cause sizing problems. The addition of new products to OS/3, as well as existing products increasing in size, makes it difficult to fit everything onto an 8418 disk. By not allowing the 8418 disk to be used as a SYSRES device, we've eliminated potential sizing problems.

8.5. Plateau Control

Models 10 through 20 use plateau control. It provides coordination between the different levels of the hardware, software, microcode, and microcode products. The Release 13.0 *System Release Description*, 7003 4392-000, provides additional information on plateau control and includes a table of supported plateaus with corresponding microcode levels.

Section 9
Data Management

9.1. Environments

Models 10 through 20 are designed to operate primarily under consolidated data management (CDM). It also supports basic data management (BDM).

On models 10 through 20, you chose your data management environment during SYSGEN by specifying one of two values for the DMGTMODE parameter:

If you specify DMGTMODE=CDI, models 10 through 20 support CDM only. If you accept the default DMGTMODE=MIXED, models 10 through 20 support BDM and CDM.

The data management environment that you select on models 10 through 20 is determined by the environment on your present system. If you are currently running in a mixed environment, specify DMGTMODE=MIXED.

If you are currently running in a CDM environment, specify DMGTMODE=CDI. Note that if you are moving from a model 3 through 6, you specify CDI because that is the environment you are currently using.

9.2. Disk File Sharing

The FILELOCK SYSGEN parameter specification on models 10 through 20 is determined by the specification on your present system.

If you are currently using FILELOCK=YES, use this specification on models 10 through 20.

If you are currently using FILELOCK=SHARE, use this specification on models 10 through 20. Note that if you are moving from models 3 through 6, you should specify SHARE because this is the only option available on models 3 through 6.

9.3. Disk Cache Facility

The disk cache facility used on models 10 through 20 is the same as that used on the model 8. If you are moving from models 3 through 6, you should be aware of the following additional facilities that are supported on models 10 through 20:

- Dynamic resegmenting of the cache buffer

  Disk cache employs the concept of a segment size where the cache buffer is divided into equal sized segments. You can dynamically resegment your cache buffer on models 10 through 20 via a console command. On models 4 through 6, you can generate your system with a segment size you specify, but you cannot dynamically resegment.

- Dynamic removal and activation of devices

  On models 10 through 20 you can dynamically remove and activate devices from cache via console commands (Release 11.0 forward). On models 4 through 6, you must do this statically at system generation time.

- Statistics by device address

  Models 10 through 20 support statistics by device address (for Release 11.0 forward).

- Larger maximum buffer size

  The maximum cache buffer size has been increased from 1 MB to 2 MB (for Release 11.0 forward).

- Selective caching of files

  You can designate on models 10 and 20 (Release 11.0 forward) and on the model 15 (Release 12.0 forward) that specific files be cached or not cached. This is an extremely useful tool for tuning your system because it lets you control which files use the cache.

If during the migration period you share a device between two processors, you should be aware of the following considerations:

- Only one system should be writing to a disk device. If both are writing, you run the risk of overwriting a format label or data.

- Do not cache the reader if one system is writing and the other is reading. If you do, the reader could get old information that happens to be in its cache but has since been updated by the writer. Use the CACHE IOGEN parameter or the cache console command to remove a device from cache.

9.4. Screen Formats

Starting with Release 8.0, a new internal format was used for screens. A conversion utility, SFCVR, was provided to convert screens from the old format to the new format. If you have screens that were created in Release 7.0 or 7.1, we recommend that you use SFCVR to convert them. If you do not, performance will suffer because they will be dynamically converted each time they are used. Refer to 3.10 for additional information on SFCVR.

Section 10
Language Products

When you migrate to models 10 through 20, you can move your COBOL, RPG II, BAL, FORTRAN IV, and Sort/SORT3 programs to the new system without making any changes to them. Any migration considerations are related to the conversion from BDM to CDM, which, as previously mentioned, is not required. This is something you have already done.

Section 11
ICAM Migration

11.1. General

The key factor for ICAM migration is your current software release level. This determines what changes you must make when you move to models 10 through 20. The following subsections identify at what release level you must make these changes.

11.2. Communications User Programs (CUPs)

Your COBOL, RPG II, and BAL CUPs will run unchanged on models 10 through 20 (Release 13.0). If you are currently running on Release 8.1 or earlier and want to convert to CDM, you must recompile your COBOL and RPG II CUPs. If you have BAL CUPs, you must make the necessary source changes and then reassemble the CUPs. Refer to 5.2 for detailed information.

11.3. Network Definition

The models 10 through 20 communications hardware configuration supports up to 2 channels with 14 lines (ports) on each channel. Your ICAM network generation must include the physical channel and line specification in the LINE and CACH macros.

11.4. Communications Physical Interface (CPI) Guidelines

If you are running on Release 8.1 or earlier, you must modify your CPI programs. See 5.4 for detailed information.

11.5. Remote Workstation Guidelines

If you are running on Release 8.2 or earlier, you must now specify the LINKPAK and UDUCT parameters on the BUFFERS network definition statement. Also, you must specify REMWORKSTATION in the I/OGEN phase of system generation.

11.6. Terminals Emulating Workstations

You must specify REMWORKSTATION in the I/OGEN phase of system generation if terminals are to be in session with interactive services.

11.7. ICAM Trace

Starting with Release 8.2, ICAM trace is performed by the ITF symbiont. The TRACEMAX network definition parameter is no longer used. See the *Integrated Communications Access Method (ICAM) Utilities Programming Guide,* UP-9748, for a description of the ITF symbiont.

11.8. ICAM DT Trace

Starting with Release 12.0, ICAM provides a device trace that is capable of tracing the entire input and output as the physical I/O data structures for a given physical device. See the *Integrated Communications Access Method (ICAM) Utilities Programming Guide,* UP-9748, for a description of the DT symbiont.

11.9. ICAM Operator Communications

Starting with Release 8.2, the network name is referenced in ICAM messages and responses instead of the user's job slot number.

Section 12
Data Base Products

12.1. Information Management System (IMS)

If you have configured your present system to operate in a mixed data management (CDM) environment, you must configure IMS to use the environment that applies to it. You specify this with the IMS CDM configuration parameter. CDM=YES (default) specifies CDM; CDM=NO specifies BDM.

The models 10 through 20 do not support single-thread IMS. You must convert any single-thread IMS systems to multithread. See 6.1.1 for IMS conversion details.

You should also consider that, starting with Release 10.0, COBOL action programs can be configured as reentrant (shareable).

12.2. Data Base Management System (DMS)

All device media control language (DMCL) modules must be recompiled unless you are moving to Release 13.0 from Release 11.0 or 12.0. Although not required, it is advisable to recompile your subschemas under the same situation because of an internal performance improvement that was introduced with Release 11.0.

There have been many DMS enhancements introduced since Release 8.1:

- Record indexing
  - Indexed location mode (8.1 SE)
  - Indexes available with any location mode (10.0)
  - Number of index keys increased to 32 per record type (10.0)
  - Manual insertion (optional) indexes (12.0)
- DBMON run-time monitor and performance tuning aid
  - Online mode (10.0 SE)
  - Study mode and print utility (12.0)

- DBMS run-time
  - Unsolicited commands (10.0 SE and 12.0)
  - Log departs (10.0 SE and 12.0)
  - Log conflicts (10.0 SE and 12.0)
  - Suppress subschema date/time check at DMCL level (12.0)
  - Multiple DBMSs (13.0)
- DML verb
  - Long (30-character) data names (10.0)
  - Range option for format 6 find/fetch (10.0)
  - DMLP copy facility (10.0 and 13.0)
  - Find/fetch/keep exclusive and conditional forms (10.0)
  - Find/fetch format 1 optional record name (11.0)
  - Move access to owner, next, and prior pointers (12.0)
- Journal files
  - Flexible assignment of journal files to DMCLs (9.0)
  - Disk journals extended over session (9.0)
- Data dictionary
  - Multiple schemas per data dictionary (9.0)
  - Resizing (unload/reload) utilities (10.0)
  - DDL delete utilities (10.0 and 12.0)
  - List utility (13.0)
- Other utilities
  - DBDUM tape block numbers (10.0 SE)
  - DBINT logical QBL scratching (11.0)

12.3. Conversion to TPS

You may wish to move to the Transaction Platform System (TPS). TPS provides a consistent platform for all transaction processing. If you are currently using IMS for your transaction processing and you wish to move to TPS, you can find valuable information in the *IMS to TPS Transition Guide*, 7002 4005.

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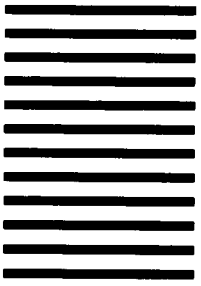

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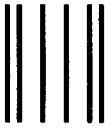

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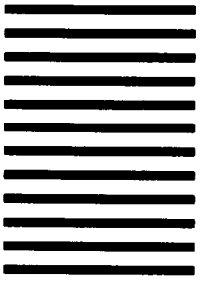

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