Program Product

System/3 Bill of Material Processor Operations Manual

Program Number 5702-M41

The IBM System/3 Bill of Material Processor is a programming system designed to create, maintain, reorganize, and use a central data base in a manufacturing organization. It provides the framework for a computer-oriented information system.

This manual contains operating information for program product System/3 Bill of Material Processor. The primary audience includes operators, systems analysts, and programmers.

This manual contains (1) instructions for retrieving the programs and sample problem from the distribution disk, (2) instructions for the System/3 Disk System Management procedures required to use the program product, (3) instructions for the execution of the object programs and expanded explanations of error messages, and (4) instructions for operator action when required.

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CONTENTS

INTRODUCTION

The items covered in this manual are:

1. Instructions for retrieving the programs and the sample problem from the distribution disk

2. Instructions for the System/3 Disk System Management procedures required to use the program product

3. Instructions for the execution of the object programs

4. Expanded explanation of error messages and instructions for operator action when required

PREREQUISITES

System/3 Model 10 readers of this publication should be familiar with the IBM System/3 Disk System Operators Guide (GC21-7508), IBM System/3 Disk System Operation Control Language and Disk Utilities Reference Manual (GC21-7512), and IBM System/3 Disk System Halt Procedure Guide (GC21-7540).

System/3 Model 6 readers of this publication should be familiar with the IBM System/3 Model 6 Operator's Guide (GC21-7501), IBM System/3 Model 6 Operation Control Language Reference Manual (GC21-7516), and IBM System/3 Model 6 Disk Utility Programs Reference Manual (GC21-7524) and IBM System/3 Model 6 Halt Procedure Guide (GC21-7541).

SYSTEM CONFIGURATIONS

The minimum configuration for the Bill of Material Processor using the System/3 Model 10 is:

5410	A14	Processing Unit (16K)
4100		Multi-Function Card Unit attachment
3970		Printer attachment
5424	Model A1	Multi-Function Card Unit
5203	Model 1	Printer
5444	Model 1	Disk Storage Drive (see note)

The minimum configuration for the Bill of Material Processor using the System/3 Model 6 is:

5406	B4	Processing Unit (16K)
3901		Printer attachment
5213	Model 1	Printer
5444	Model 1	Disk Storage Drive (see note)

For card I/O on the System/3 Model 6, in addition to the minimum system, the 5496 Model 1 Data Recorder with attachments 3210 and 7501 is required.

Note: Sufficient disk capacity is required to contain the system program and user data files. The appropriate System/3 manuals should be consulted to determine total file requirements. For a single drive system, it should be noted that master file reorganization requires a new disk area plus an associated temporary disk output file.

For the Model 6, special consideration must be given to the user's input/output volume requirements, with respect to the equipment capabilities. The speed of the I/O devices (for example, the printer and data recorder) has a significant effect on the overall throughput, and must be thoroughly examined and evaluated relative to the user's overall system requirements.

In addition to the System Control Program a minimum of 13K bytes is required to compile and execute the programs. Some programs utilize the Overlay Editor of RPG II. Exact core requirements for program execution will vary with each user. See the section of the program description manual entitled "Core Storage Requirements in Preparatory Procedures" for additional information.

For the Model 10 user, improved performance will result with additional core storage capacity, as the overlay requirements will be reduced or eliminated.

Discussion in the text refers to the three configurations as the Model 10, Model 6, and the Model 6 (card). Occasional references are made to the Model 6 as the noncard system and to the Model 10 and Model 6 (card) as the card system.

PROGRAMMING SYSTEM

The programs required for the compilation and execution of the System/3 Bill of Material Processor are:

Program Name	Model 10 Program Number	Model 6 Program Number
System/3 Disk System Control Program	5702-SC1	5703-SC1
System/3 Disk RPG II Program	5702-RG1	5703-RG1
System/3 Model 6 Conversational Utility Programs		5703-UT1*

*The System/3 Model 6 Conversational Utility Programs are required for data file preparation for Model 6 systems that do not have the IBM 5496 Data Recorder, Model 1, with the System/3 Model 6 On-Line Feature.

The System/3 Disk System Card Utilities Programs (5702-UT1) for the Model 10 may be used for sorting card input files and reproducing card decks in the program modification process.

SUMMARY OF IBM SYSTEM/3 BILL OF MATERIAL PROCESSOR PROGRAMS

The System/3 Bill of Material Processor consists of the following programs in RPG II source statements:

- Item master file load
- Item master file maintenance
- Item master file reorganization
- Item master file reorganization - update product structure file
- Item master file reorganization - update standard routing file
- Product structure file format
- Product structure file load and maintenance
- Product structure file unload
- Product structure file retrieval
- Work center master file load
- Work center master file maintenance
- Work center master file reorganization

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- Work center master file reorganization - update standard routing file
- Standard routing file format
- Standard routing file load and maintenance
- Standard routing file unload
- Standard routing file retrieval

The functions of the individual programs, as well as the system operation for using these programs, are described in this publication.

RETRIEVING THE PROGRAM PRODUCT FROM THE DISTRIBUTION DISK

The IBM System/3 Bill of Material Processor is distributed on disk with a pack identification of S3BOMP.

Source identification is provided in positions 74-77 of the listing and cards produced from the distribution medium.

The 17 source programs and the sample problem material are contained in the source library under the following names:

Source Library	Names	Source Identification 74-77
Generalized Source Programs		
Item master file load	$*BA	IMLD
Item master file maintenance	$*BB	IMMT
Item master file reorganization	$*BC	IMRE
Item master file reorganization - update product structure file	$*BD	IMRP
Item master file reorganization - update standard routing file	$*BE	IMRR
Product structure file format	$*BF	PSFM
Product structure file load and maintenance	$*BG	PSLM
Product structure file unload	$*BH	PSUN
Product structure file retrieval	$*BI	PSRV
Work center master file load	$*BJ	WCLD
Work center master file maintenance	$*BK	WCMT
Work center master file reorganization	$*BL	WCRE
Work center master file reorganization - update standard routing file	$*BM	WCRR
Standard routing file format	$*BN	RTFM
Standard routing file load and maintenance	$*BO	RTLM
Standard routing file unload	$*BP	RTUN
Standard routing file retrieval	$*BQ	RTRV
Sample Problem Modification Cards for Model 10 and Model 6 (card)	$*BR	
Sample Problem Control and Data Cards for Model 10 and Model 6 (card)	$*BS	

The 17 demonstration object programs for the Model 6 are contained in the object library under the following names:

Object Library	Names
Item master file load	$*BA
Item master file maintenance	$*BB
Item master file reorganization	$*BC
Item master file reorganization - update product structure file	$*BD
Item master file reorganization - update standard routing file	$*BE
Product structure file format	$*BF
Product structure file load and maintenance	$*BG
Product structure file unload	$*BH
Product structure file retrieval	$*BI
Work center master file load	$*BJ
Work center master file maintenance	$*BK

<u>Object Library</u>   <u>Names</u>

   Work center master file reorganization $*BL
   Work center master file reorganization - $*BM
     update standard routing file
   Standard routing file format $*BN
   Standard routing file load and maintenance $*BO
   Standard routing file unload $*BP
   Standard routing file retrieval $*BQ

    The following are sample problem sequential data files for Model 6 noncard system:

<u>Files</u>   <u>Names</u>

   Item master load   BOMP$A
   Item master maintenance   BOMP$B
   Product structure load   BOMP$G1
   Product structure maintenance   BOMP$G2
   Product structure retrieval   BOMP$I
   Work center master load   BOMP$J
   Work center master maintenance   BOMP$K
   Standard routing load   BOMP$O1
   Standard routing maintenance   BOMP$O2
   Standard routing retrieval   BOMP$Q

    Figure 1 is a chart showing steps to be followed in creating the system.
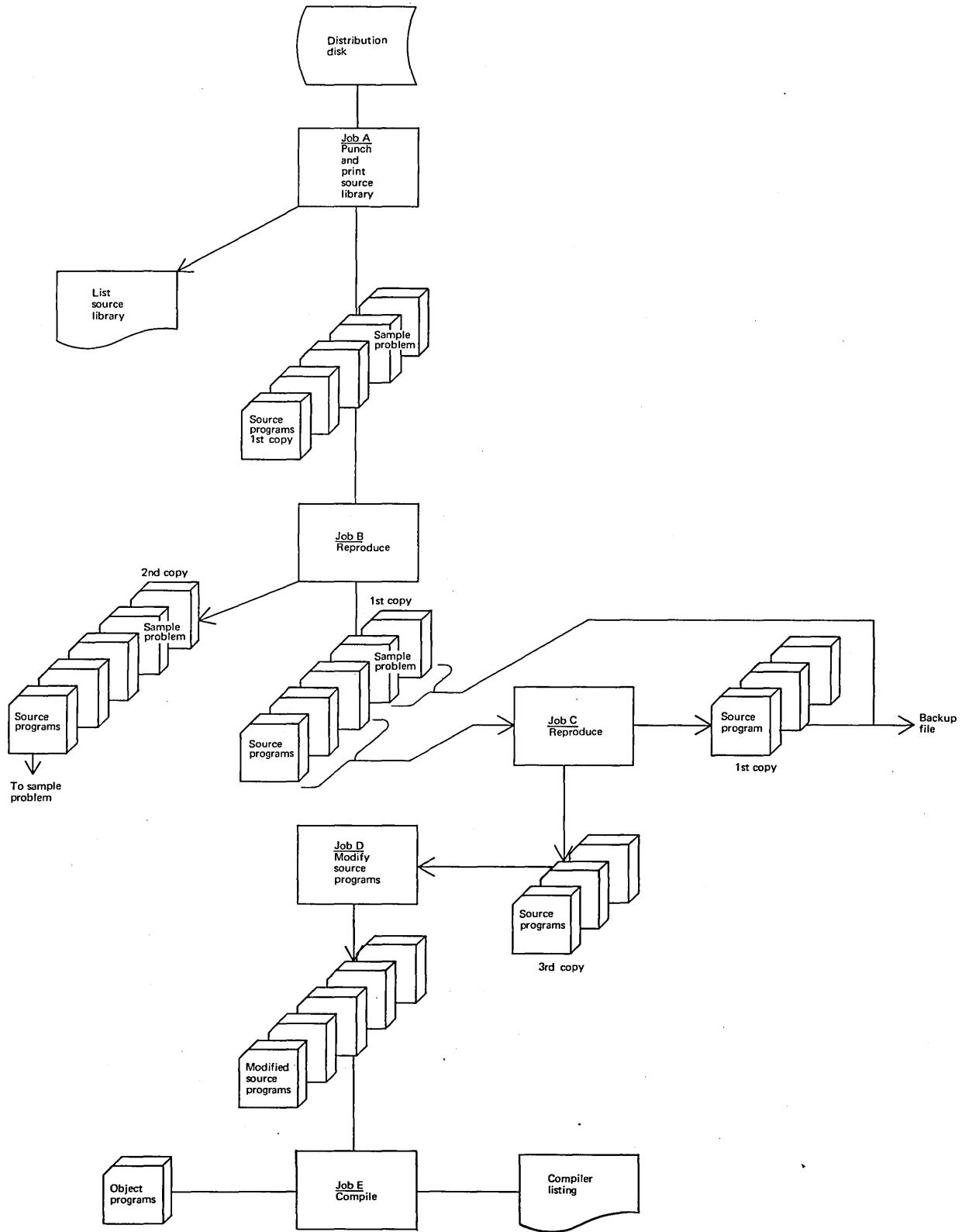
Figure 1. System creation (Part 1 of 3)
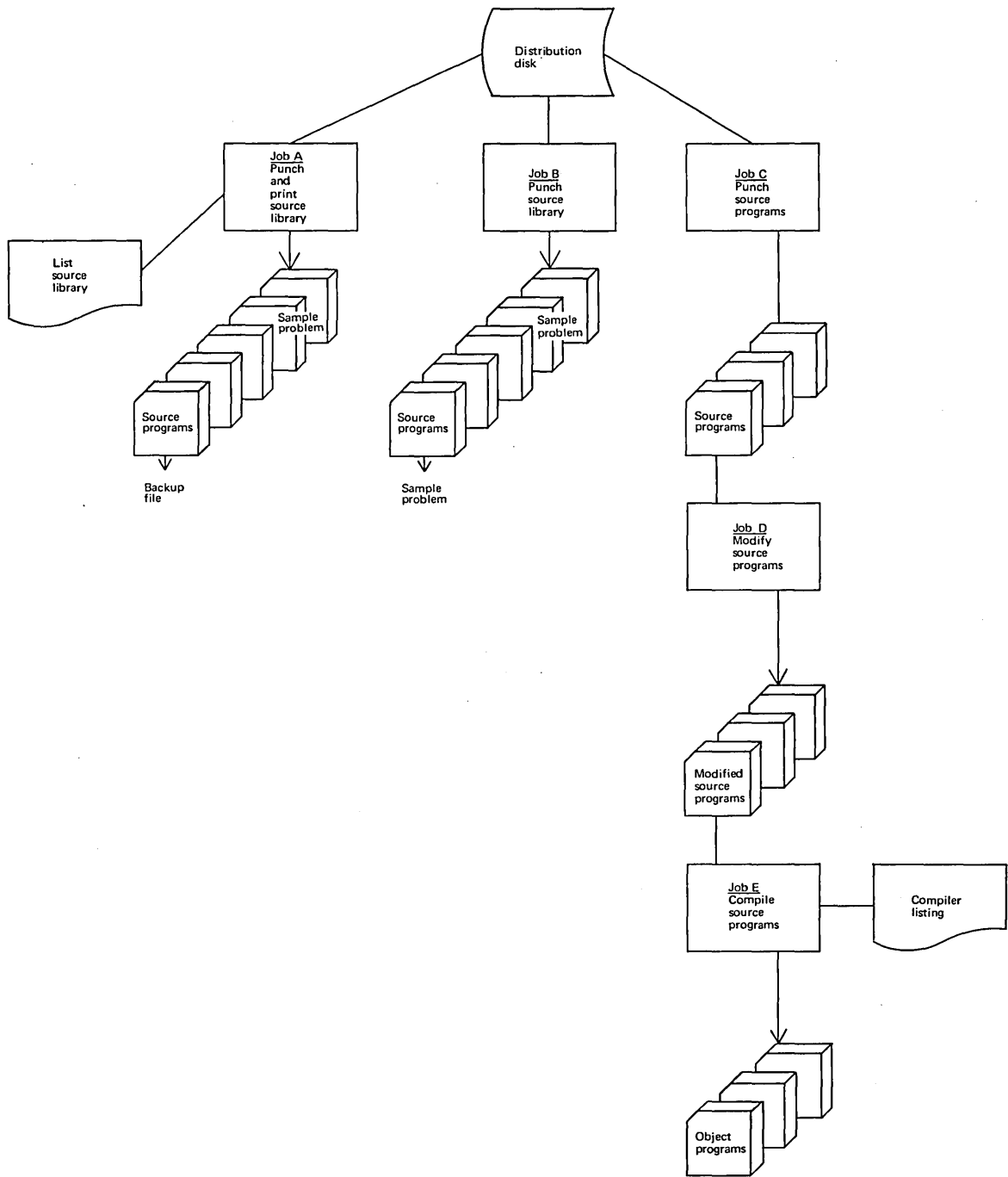
Figure 1. System creation (Part 2 of 3)
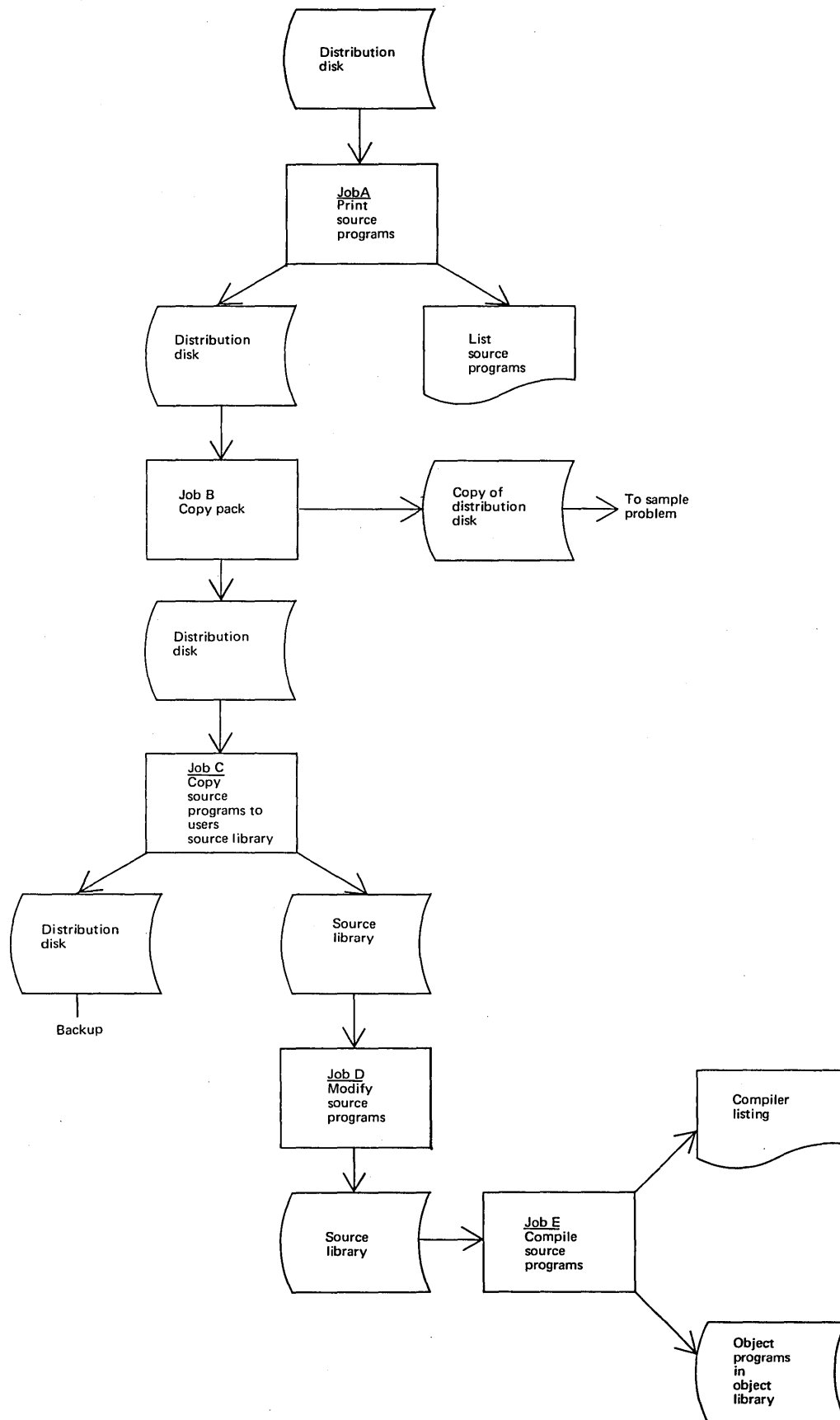
Figure 1. System creation (Part 3 of 3)

MODEL 10 AND MODEL 6 (CARD)

To display the VTOC and directories (optional) and punch and print the source programs and sample problem material from the source library for the Model 10, the following OCL statements should be placed in the reader hopper (job A of Figure 1, part 1). For planning purposes, the user should have a supply of approximately 11,000 cards available for the execution of this job.

```
/&      DISPLAY VTOC
// LOAD $LABEL,F1
// RUN
// DISPLAY UNIT-R1,LABEL-VTOC
// END

/&      DISPLAY DIRECTORIES
// LOAD $MAINT,F1
// RUN
// COPY FROM-R1,TO-PRINT,LIBRARY-ALL,NAME-DIR
// END

/&
// LOAD $MAINT,F1
// RUN
// COPY FROM-R1,LIBRARY-S,NAME-$*B.ALL,TO-PRTPCH,RETAIN-P (see note)
// END
```

To display the VTOC and directories (optional) and punch and print the source programs and sample problem modification material from the source library for the Model 6 (card), the following responses should be entered through the keyboard (job A of Figure 1, part 1). For planning purposes, the user should have a supply of approximately 11,000 cards for the execution of this job.

```
READY-                              LOAD
****************************************************************
010 LOAD            NAME-          $LABEL
011                 UNIT-          F1
020 DATE    (MM/DD/YY)   -
030 SWITCH (00000000)
040 FILE            NAME-
****************************************************************
MODIFY

RUN
    ENTER '//' CONTROL STATEMENT
// DISPLAY UNIT-R1,LABEL-VTOC
    ENTER '//' CONTROL STATEMENT
// END

READY-                              LOAD
****************************************************************
010 LOAD            NAME-          $MAINT
011                 UNIT-          F1
020 DATE    (MM/DD/YY)   -
030 SWITCH (00000000)
040 FILE            NAME-
****************************************************************
MODIFY

RUN
    ENTER '//' CONTROL STATEMENT
// COPY FROM-F1,TO-PRINT,LIBRARY-ALL,NAME-DIR

READY-                              LOAD
****************************************************************
010 LOAD            NAME-          $MAINT
011                 UNIT-          F1
020 DATE    (MM/DD/YY)   -
030 SWITCH (00000000)   -
040 FILE            NAME-
****************************************************************
MODIFY

RUN
    ENTER '//' CONTROL STATEMENT
// COPY FROM-R1,LIBRARY-S,NAME-$*B.ALL,TO-PRTPCH,RETAIN-P
```

To start system operation:

1. Place blank cards in the punch device, and load forms in the
    printer.

2. Mount the distribution pack on R1 and ready drive 1. (It is
    assumed that the systems pack is on F1).

3. Ready the input/output devices. Turn print switch ON on the 5496
    Data Recorder of Model 6 (card).

4. Press START on the console (HALT/RESET for a DPF system) on the
    Model 10, PROG START on the Model 6 Operator Keyboard Console.

Note: Each entry in the source library can be punched separately by
       changing the keyword parameter NAME-$*B.ALL to a specific source
       library entry name ($*BA-$*BS).

    The OCL statements // COPY and // CEND, which are punched at the
beginning and end of each source entry, should be discarded.

The cards that have been punched from the source library should be filed as a backup copy of the distribution disk.

Implementing the sample problem in Appendix J of the IBM System/3 Bill of Material Processor Program Description Manual requires all entries in the source library ($*BA-$*BS). The cards that have been punched from the source library for the Model 10 are used to create this copy of these entries (job B of Figure 1, part 1). The same procedures that were used to punch the backup copy of the distribution disk are followed to prepare these entries for the Model 6 (card) (job B of Figure 1, part 2). This approach does not provide the same level of proof of the prior deck as does the procedure for the Model 10. It is a reasonable approach, however, considering the relative operating rates of the I/O devices. (Reproducing the deck, as done on the Model 10, for the Model 6 (card) would require that the original punched deck be copied to the user's source library and that subsequent decks be punched from that library.) To implement the program product (Model 10), each source program is reproduced from the backup copy (job C of Figure 1, part 1).

To implement the program product (Model 6 (card)), each source program is punched individually from the source library of the distribution disk (job C of Figure 1, part 2).

The OCL cards used in punching the backup copy of the distribution disk can be used in punching the source programs from the source library if the keyword parameter, NAME-$*B.ALL, is changed to the specific source library entry name ($*BA-$*BQ) for a source program.

The source programs require modification to user specifications before compilation (job D of Figure 1, parts 1 and 2). Program modification instructions are contained in the IBM System/3 Bill of Material Processor Program Description Manual.

MODEL 6 (NONCARD)

To display the VTOC and directories (optional) and print the source programs from the source library for the Model 6, the following response should be entered through the keyboard (job A of Figure 1, part 3):

```
READY-                                   LOAD
*********************************************************************
010 LOAD            NAME-        $LABEL
011                 UNIT-        F1
020 DATE    (MM/DD/YY)  -
030 SWITCH (00000000)  -
040 FILE            NAME-
*********************************************************************
MODIFY

RUN
    ENTER '//' CONTROL STATEMENT
// DISPLAY UNIT-F1,LABEL VTOC
    ENTER '//' CONTROL STATEMENT
// END

READY-                                   LOAD
*********************************************************************
010 LOAD            NAME-        &MAINT
011                 UNIT-        F1
020 DATE    (MM/DD/YY)  -
030 SWITCH (00000000)  -
040 FILE            NAME-
*********************************************************************
```

MODIFY

RUN
    ENTER '//' CONTROL STATEMENT
// COPY FROM F1,TO-PRINT,LIBRARY-ALL,NAME-DIR
    ENTER '//' CONTROL STATEMENT
// END

READY-   LOAD
****
010 LOAD   NAME- $MAINT
011   UNIT-   F1
020 DATE   (MM/DD/YY) -
030 SWITCH (00000000) -
040 FILE   NAME-
****
MODIFY

RUN
    ENTER '//' CONTROL STATEMENT
// COPY FROM-R1,LIBRARY-S,NAME-S*B,A,TO-PRINT,RETAIN-P
    ENTER '//' CONTROL STATEMENT
// END

    To start system operation:

    1. Load forms in the printer.

    2. Mount the distribution pack on R1 and ready drive 1. (It is
        assumed that the systems pack is on F1.)

    3. Ready the input/output devices.

    4. Place PROG START on the Model 6 Operator Keyboard Console.

Note: Each source program entry in the source library is printed
        separately by specifying the source library entry name
        ($*BA-$*BQ). The example on the copy statement shown is for the
        printing of source program $*BA.

    The distribution disk is copied to another disk which will be used
for implementing the sample problem (job B of Figure 1, part 3). The
distribution disk is retained as the backup copy. The following
responses should be entered through the keyboard for this copy function:

READY-   LOAD
****
010 LOAD   UNIT- $COPY
011   UNIT-   F1
020 DATE   (MM/DD/YY) -
030 SWITCH (00000000) -
040 FILE   NAME-
****
MODIFY

RUN
    ENTER '//' CONTROL STATEMENT
// COPYPACK FROM-R1,TO-Rn   (n is the number 1 or 2 indicating the
                               removable disk to be used for the copy of
                               the distribution disk)

    ENTER '//' CONTROL STATEMENT
//END

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Instructions for implementing the sample problem on the Model 6 are contained in Appendix J of the IBM System/3 Bill of Material Processor Program Description Manual.

To implement the program product for the Model 6, the source programs in the source library ($*BA-$*BQ) of the distribution disk should be copied to the user's source library (job C of Figure 1, part 3). The user should allow enough space in the library to insert his modification code. The following responses should be entered through the keyboard for this copy function:

```
READY-                              LOAD
*****************************************************************
010 LOAD            NAME-           $MAINT
011                 UNIT-           F1
020 DATE    (MM/DD/YY)  -
030 SWITCH (00000000)  -
040 FILE            NAME-
*****************************************************************
MODIFY

RUN
    ENTER '//' CONTROL STATEMENT
// COPY FROM-R1, LIBRARY-S,TO-F1,RETAIN-P,NAME-$*B.ALL
```

The source programs in the user's source library require modification to user specification before compilation (job D of Figure 1, part 3). Instructions for modifying the programs are contained in the IBM System/3 Bill of Material Processor Program Description Manual. Modification will be accomplished by using the IBM System/3 Model 6 Conversational Keyboard Source Entry (KSE) Utility Program.

DISK SYSTEM MANAGEMENT PROCEDURES

This section contains information the operator needs to compile the user-tailored source programs, to punch or catalog the resulting object programs in the object library, and to initialize packs in preparation for loading the files. It is assumed that the user's system pack is on F1. This section is also used for the sample problem.

COMPILING PROGRAMS

The program supplied on the distribution disk requires modification at source language level to suit the individual user's requirements. After these modifications have been completed, the programs must be compiled. Instructions for creating the copy of the source programs used in the modification process are contained in the preceding section, "Retrieving the Program Product from the Distribution Disk".

The following is an example of the OCL statements that may be used to compile a program and punch or catalog an object program for the Model 10 and Model 6 (card) (job E of Figure 1, parts 1 and 2):

```
/&
// LOAD $RPG,F1
// FILE NAME-$SOURCE,UNIT-F1,PACK-SYSTEM,RETAIN-S,TRACKS-30
// FILE NAME-$WORK,UNIT-F1,PACK-SYSTEM,RETAIN-S,TRACKS-30
// RUN
        (Insert source program)
/*
```

Note: The punch or catalog function is specified in the RPG II control record. On the Model 6 (card), the punching of the object deck requires an additional step to punch the program to complete job E of Figure 10, part 2.

The following is an example of the responses that may be used to punch a compiled object program for the Model 6 (card):

```
READY-                          LOAD
***************************************************************
010 LOAD            NAME-       $MAINT
011                 UNIT-       F1
020 DATE    (MM/DD/YY)  -
030 SWITCH (00000000)   -
040 FILE            NAME-
***************************************************************
MODIFY

RUN
    ENTER '//' CONTROL STATEMENT
// COPY FROM-R1,LIBRARY-O,NAME-$*BA,TO-PUNCH,RETAIN-P
```

(

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The following is an example of the responses that may be used to compile a program from the source library and catalog an object program for the Model 6 (job E of Figure 1, part 3).

Note: For the COMPILE statement keyword OBJECT, a response should be keyed when the user wishes to designate an object library other than that specified by the user's system. For example, in the sample problem programs the response should be R1 to designate the location of the copy of the distribution disk.

```
READY-                                       LOAD
****************************************************************
010 LOAD          NAME-        $RPG
011               UNIT-        F1
020 COMPILE       OBJECT-
021               SOURCE-      PROGRAM NAME
022               UNIT-        R1
030 DATE   (MM/DD/YY)  -
040 SWITCH (00000000)  -
050 FILE          NAME-        $WORK
051               UNIT-        F1
052               PACK-        SYSTEM
053               LABEL-
054               RECORDS-
055               TRACKS-      30
056               LOCATION-
057               RETAIN-      S
058               DATE-
060 FILE          NAME-        $SOURCE
061               UNIT-        F1
062               PACK-        SYSTEM
063               LABEL-
064               RECORDS-
065               TRACKS-      30
066               LOCATION-
067               RETAIN-      S
068               DATE-
070 FILE          NAME-
****************************************************************
MODIFY
RUN
```

COPYING OBJECT PROGRAMS INTO OBJECT LIBRARY

For the Model 10 and Model 6 (card) user who has punched his object program into cards and wants to copy them into the object library, the following OCL statements serve as an example:

```
/&
// LOAD $MAINT,F1
// RUN
// COPY FROM-READER,LIBRARY-O,NAME-name,RETAIN-P,TO-F1
       (Insert object program)
// END
```

INITIALIZING DISK PROCEDURES

IBM disk cartridges must be initialized before use. If a disk cartridge has not been initialized, the following set of OCL statements accomplish the initialization:

```
/&
// LOAD $INIT,F1
// RUN
// UIN UNIT-R1,TYPE-PRIMARY
// VOL PACK-pack identification
// END
```

    The following is an example of the responses that may be used to initialize a disk cartridge on the Model 6.

```
READY-                                   LOAD
****************************************************************
010 LOAD                NAME-        $INIT
011                     UNIT-        F1
020 DATE    (MM/DD/YY)  -
030 SWITCH (00000000)   -
040 FILE                NAME-
****************************************************************
MODIFY

RUN
   ENTER '//' CONTROL STATEMENT
// UIN UNIT-R1,TYPE-PRIMARY
   ENTER '//' CONTROL STATEMENT
// VOL PACK-pack identification
   ENTER '//' CONTROL STATEMENT
// END
```

EXECUTION OF OBJECT PROGRAMS

The System/3 Bill of Material Processor allows wide flexibility in operating procedures. These procedures must be firmly specified, both for those persons within the data processing operation and for those who prepare input for or receive output from the system.

The system provides many checks against processing errors at execution time. Among the items detected are: invalid function requests, normal exceptions (such as requests for a record which does not exist), and erroneous linkages existent in the disk files. For the normal exception cases detected, the user is notified of the existing situation and processing continues. When it is determined that a serious error exists in the disk file, the job is terminated with a printout of information pertinent to the failure. The section entitled "Halts and Messages" contains a list of all halts and messages that are generated by the System/3 Bill of Material Processor.

Programming errors, operating errors, and power failure are a few possible causes in the range of potential conditions for system failure that make fully automatic detection and recovery not feasible. The user should provide the following:

- Housekeeping. Computer room housekeeping procedures must be established and enforced to prevent confusion in the physical handling and storage of the data processing media, cards, and disk packs.

- Audit lists. Audit lists designed and implemented by the user in the file organization and maintenance programs serve two functions. First, they provide a record of information originally or currently included in a file and therefore may be used in the reconstruction of certain records. Second, they serve as everyday working documents. The latter case is especially true of the user-defined listing available from the product structure file load and maintenance program. This listing should contain the entire bill of material for an assembly, with a notation of the maintenance performed. Therefore, it can be used as a master bill of material and also as a check to see that the information in the file has been updated correctly.

- Control. The user should devise external controls and reasonability checks for the validation of data. The bill of material processor applies no control over the user-specified content of disk records. Record counts are provided, as described in the program description manual, which may be posted to the user's control log.

- Reconstruction steps. At the time of system failure the user must determine the nature of the failure. Included in this responsibility is the determination of the extent of damage to the files. Where the error is limited and isolated, the user may apply limited disk patches against the file to restore it to the proper condition. Where error is extensive or widespread, the file backup must be used to restore the disk files, and all transactions since that backup copy was made must be reprocessed to make the file current. Also included in the recovery procedure must be isolation of the cause of failure. Where failure has resulted from a programming error, corrective action must be applied to prevent the same error from again causing system failure. Refer to the Appendix for reconstruction considerations.

• Backup. There must be a periodic backup of all disk storage files. Since relationships among files are represented by linkages, companion files must be backed up at the same time. Disk packs may be used as the backup medium. These backup copies of files must then be saved in the event that a later system problem results in erroneous disk files that cannot be easily reconstructed. From one backup point to another, all maintenance transactions which have been processed against the files must likewise be saved. A measure of the time between backups can be determined by a comparison of the time and effort required to back up the files versus the time and effort required to reprocess all transactions against the file since the last backup. A very likely point to provide backup follows lengthy batch runs, where a very limited amount of user input results in a high degree of change to the disk files. Backup prior to file reorganization is essential.

The transaction files for Model 10 or Model 6 (card) users must be in cards.

The transaction files for the Model 6 must be sequential files on disk. Although no early termination feasibility is provided during the execution of the programs on the Model 6, it is possible to provide termination through normal end-of-job procedure by reducing the volume of transaction to be processed in one execution of a program.

OPERATING INSTRUCTIONS

The following operating instructions for the Model 10 apply to the execution of each object program:

1. Place the OCL and data in the input device.

2. Prepare all I/O devices used by the program to be executed.

   a. Mount the disk cartridges which contain the files for program execution.

   b. Change forms on printer, if required.

3. Start all required I/O devices that are not ready.

4. When all required I/O devices are ready, press START on the console (HALT/RESET for Model 10 with DPF).

If a program is not allowed to complete the EOJ routine, disk file errors will occur. Refer to the Appendix of this manual for reconstruction considerations.

The management of OCL and data in the job stream depends on the user's choice of operating modes. Figures 2 and 3 illustrate the arrangements for running with the object program in cards or the object program copied on disk. Detailed information on the makeup of the OCL statements can be found in the IBM System/3 Disk System Operation Control Language and Disk Utilities Reference Manual (GC21-7512).

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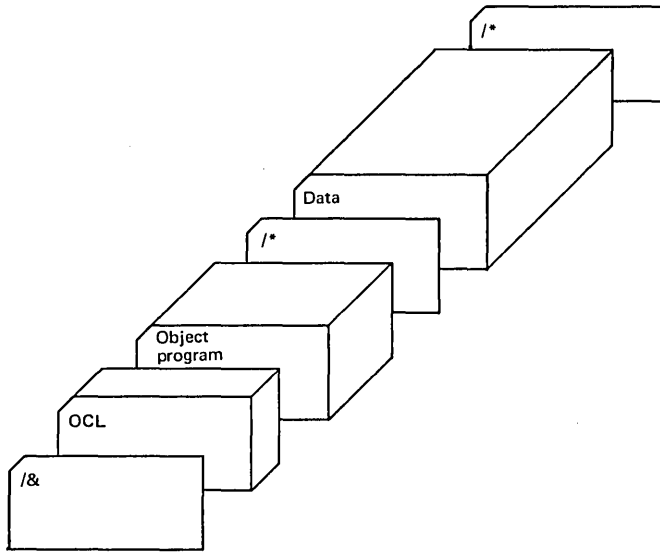
Figure 2. Program execution - object program in cards
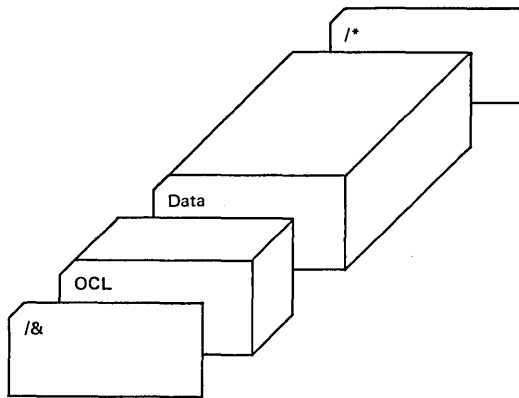
Figure 3. Program execution - object program on disk

The following is an example of the responses that may be used to execute an object program on disk for the Model 6.

```
READY                                  LOAD
****************************************************************
010 LOAD        NAME-           $*BJ
011             UNIT-           R1
020 DATE   (MM/DD/YY)  -
030 SWITCH (00000000)  -
040 FILE        NAME-           W$MSTRK
041             UNIT-           R1
042             PACK-           S3BOMP
043             LABEL-          BOMP$WCM
044             RECORDS-        48
045             LOCATION-       186
046             RETAIN-         T
047             DATE-
050 FILE        NAME-           TCARD
051             UNIT-           R1
052             PACK-           S3BOMP
053             LABEL-          BOMP$J
054             RECORDS-
055             TRACKS-         2
056             LOCATION-       150
057             RETAIN-         T
058             DATE-
060 FILE        NAME-
****************************************************************
```

The Model 6 card user also has the option of entering this OCL and data through the data recorder.

For further information see the IBM System/3 Model 6 Operation Control Language Reference Manual (GC21-7516).

ITEM MASTER FILE LOAD PROGRAM (IMLD)

This program loads the item master transaction file in item number sequence onto disk. The item master file is an indexed file.

INPUT

OCL: The OCL statements must include a FILE statement for the item master file. For Model 6 noncard, include a FILE statement for the item master transaction file.

Data: Item master transactions must be in item number sequence.

OUTPUT

Disk: Item master file

Printer: Audit list in user-specified format. Error messages are printed as error conditions are detected. A summary of records loaded and errors encountered is printed by the program.

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EARLY TERMINATION

No provision has been made for early termination of the run on the Model 6. To interrupt a run on the Model 10 and Model 6 (card) before all transactions have been processed, the following steps must be taken.

1. Press STOP on the console.

2. Press STOP on the card reader (Model 10 only).

3. Remove all the cards from the reader hopper except those required to complete a partially processed transaction.

4. Place an end-of-file card (/* in cc 1 and 2) behind the last card in the reader hopper.

5. Ready the card reader.

6. Press START on the console.

A normal last-card end of job occurs as a result of this procedure. The remaining cards in this file must be loaded by using the add function in the item master file maintenance program.

EXTERNAL CONTROLS

The program provides a summary of records loaded to the item master file and number of transaction inputs read on the last page of the audit list. User procedure may specify that these be posted to a control log.

ITEM MASTER FILE MAINTENANCE PROGRAM (IMMT)

This program adds, changes, and deletes item master records as described in the IBM System/3 Bill of Material Processor Program Description Manual.

INPUT

OCL: The OCL cards must include a FILE statement for the item master file. For Model 6 noncard, include a FILE statement for the item master transaction file.

Data: Addition, change, and delete item master transactions. (Faster throughput is obtained by having these transactions in item number sequence.)

Disk: The item master file must be online.

OUTPUT

Disk: The updated item master file

Printer: An audit list in user-defined format. Error messages will be printed as errors occur. At end of job, a summary of transactions and errors encountered is printed.

EARLY TERMINATION

No provision has been made for early termination of the run on the Model 6. To interrupt a run on the Model 10 and Model 6 (card) before all transactions have been processed, the following steps must be taken:

1. Press STOP on the console.

2. Press STOP on the card reader (Model 10 only).

3. Remove all cards from the reader hopper except those required to complete a partially processed transaction.

4. Place an end-of-file card (/* in cc 1 and 2) in the reader hopper.

5. Ready the card reader.

6. Press START on the console.

A normal last-card end of job occurs as a result of this procedure.

EXTERNAL CONTROLS

The program provides at beginning and end of job the record count for the item master file; at end of job a count is also printed for the different types of invalid transactions, input change transactions, records added, and records deleted on the item master file. User procedure may specify that these be posted to a control log. These totals, if posted in a control log, could be used to assist in determining when the item master file organization program should be executed.

ITEM MASTER FILE REORGANIZATION PROGRAM (IMRE)

This program reads the old item master file and builds the new item master file. It deletes records with the user-defined delete code in the activity code field. A second file, the item master relative record number file, is created to be used in the updating of the master record relative record number in the chain file.

INPUT

OCL: The OCL statements must include a DATE statement for the new item master file (must not be the same creation date as the old file) and a FILE statement for the old and new item master files and the item master relative record number file.

Disk: The old item master file must be online.

OUTPUT

Disk: New item master file and item master relative record number file

Printer: An audit list in user-defined format is printed. Error messages are printed as errors are encountered. Record counts are printed at end of job.

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EARLY TERMINATION

No provision for early termination has been incorporated into this program because of its relatively short run time.

EXTERNAL CONTROLS

The program provides a summary of active records on the new item master file as well as the records deleted and the reactivated deleted records from the old item master file on the last page of the audit list. User procedure may specify that these be posted to a control log.

ITEM MASTER FILE REORGANIZATION - UPDATE PRODUCT STRUCTURE FILE PROGRAM (IMRP)

This program updates the product structure file with the new parent and component item master relative record numbers.

INPUT

OCL: The OCL statements must include a FILE statement for the item master relative record number file and the product structure file.

Disk: Item master relative record number file and product structure file must be online.

OUTPUT

Disk: Product structure file updated with new parent and component item master relative record numbers

Printer: Error messages are printed as they occur. The user may print an audit list if he chooses.

EARLY TERMINATION

No provision for early termination has been incorporated into this program because of its relatively short run time.

EXTERNAL CONTROLS

At beginning and end of job, the record count, file capacity, and run activity control number are printed for the product structure file. In addition, at end of job a total of the updated product structure records is printed.

ITEM MASTER FILE REORGANIZATION - UPDATE STANDARD ROUTING FILE PROGRAM (IMRP)

This program updates the standard routing file with the new item master relative record number.

INPUT

OCL: The OCL statements must include a FILE statement for the item master relative record number file and the standard routing file.

| Disk: | Item master relative record number file and standard routing file must be online. |

OUTPUT

| Disk: | Standard routing file updated with new item master relative record numbers |
| Printer | Error messages are printed as they occur. The user may print an audit list if he chooses. |

EARLY TERMINATION

No provision for early termination has been incorporated into this program because of its relatively short run time.

EXTERNAL CONTROLS

At the beginning and end of job, record count and file capacity for the standard routing file are printed. In addition, at end of job a total of standard routing records updated during the run is printed.

PRODUCT STRUCTURE FILE FORMAT PROGRAM (PSFM)

This program builds the product structure file control record and an availability record for each cylinder of the file.

INPUT

| OCL: | The OCL statements must include a FILE statement for the product structure file. |
| Data: | Parameter input entry. This entry must not be followed by a /* statement. |

OUTPUT

| Disk: | Product structure file |
| Printer: | Error messages are printed as they occur. |

EARLY TERMINATION

No provision for early termination has been incorporated into this program because of its relatively short run time.

EXTERNAL CONTROLS

At the beginning of job, the parameter input information is printed. At end of job, the record count of zero, file capacity, and run activity control number of zero is printed. The record count is a count of user records and does not include control and availability records. User procedures may specify that these be posted to a control log.

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PRODUCT STRUCTURE FILE LOAD AND MAINTENANCE PROGRAM (PSLM)

This program performs the initial loading of the product structure file and subsequently handles the maintenance functions of adding, changing, and deleting records.

INPUT

OCL: The OCL statements must include a FILE statement for the
            product structure file and two FILE statements for the item
            master file. For Model 6 noncard, include a FILE statement
            for the product structure transaction file.

Data: Product structure transactions. For loading and adding, all
            input entries for a parent item number must be grouped
            together. The input entries in the group must be in
            component sequence. (Multiple consecutive transaction input
            entries for the same product structure are not permitted.)
            The groups themselves do not have to be in sequence.

Disk: The product structure file and the item master file must be
            online for all product structure file load and maintenance
            program runs.

OUTPUT

Disk: The product structure file and the item master file are
            updated by this run.

Printer: An audit list in user-defined format is printed during each
            run. Error messages are printed as error conditions occur.

EARLY TERMINATION

No provision has been made for early termination of the run on the
Model 6. To interrupt a run on the Model 10 and Model 6 (card) before
all transactions have been processed, the following steps must be taken:

1. Press STOP on the console.

2. Press STOP on the card reader (Model 10 only).

3. Remove all the cards from the card reader hopper.

4. Place an end-of-file card (/* in cc 1 and 2) in the reader
    hopper.

5. Ready the card reader.

6. Press START on the console.

A normal end of job occurs, closing the files. Another run must be
made if the remaining cards are to be subsequently entered into the
file.

Should the program be terminated without reaching end of job on the
load, the file will have to be reloaded. Prior to reloading the file it
will be necessary to reload the item master file.

When performing maintenance, if the program is terminated without
reaching end of job it may be necessary to reconstruct the file (refer
to the Appendix).

EXTERNAL CONTROLS

At beginning and end of job, the record count for the item master file and the record count, file capacity, and run activity control number are printed for the product structure file. User procedures may specify that these be posted to a control log.

PRODUCT STRUCTURE FILE UNLOAD PROGRAM (PSUN)

This program unloads the product structure file in the form of single-level bills of material in low-level code sequence.

INPUT

OCL: The OCL statements must include a FILE statement for the
            product structure file and two FILE statements for the item
            master file.

Data: Parameter input entries

Disk: The item master file and the product structure file must be
            online.

OUTPUT

Card or   Product structure transactions are unloaded in user
Printer: specified format to be used as input information to a
            subsequent load run using the product structure file load and
            maintenance program.

Disk: After unloading the last level of product structure file
            records, the chain anchors in the item master file are
            reinitialized to END... Information is temporarily stored in
            the file control record of the item master file in the event
            of an early termination.

Printer: Error messages are printed as they occur. At end of job,
            file statistics are printed. The Model 10 or Model 6 (card)
            user may print an audit list if he chooses.

EARLY TERMINATION

If it becomes necessary to terminate a product structure file unload run before the entire file is unloaded on the Model 10 or Model 6 with a card reader, the following procedure must be followed:

1. Press STOP on the console.

2. Press STOP on the card reader (Model 10 only).

3. Remove all the cards from the reader hopper.

4. Place an end-of-file card (/* in cc 1 and 2) in the reader
   hopper.

5. Ready the card reader.

6. Press START on the console.

If it becomes necessary to terminate a product structure file unload run before the entire file is unloaded on the Model 6 reader, the following procedure must be followed:

1. Key a /* record.

2. Press program start.

As a result of these actions, the program continues processing until it has unloaded the number of assemblies specified in the last parameter input entry read. It then prints the file statistics it has collected, and all the information needed for restart is stored in the item master file control record.

Note: The chain anchor fields in the item master file are reinitialized to the end-of-chain constant END.. after all the records have been unloaded. Because of this, the program should not be stopped during reinitialization. The product structure file retrievals cannot be run if reinitialization has occurred.

RESTART AFTER EARLY TERMINATION

To restart unloading the product structure file at the point where it was stopped by the early termination procedure, parameter input entries are resubmitted. Upon restarting, the program reads the restart information from the item master control record and continues at the point where it was stopped. Maintenance cannot be performed on the product structure file between early termination and restart. However, product structure retrievals can be performed between early termination and restart.

EXTERNAL CONTROLS

At beginning and end of job, the item master record count is printed, as well as record count, file capacity, and run activity control number for the product structure file. In addition, file statistics for the run are printed at end of job. User procedure may specify that these be posted to a control log. The total number of product structure records unloaded should be equal to the record count printed at end of job by the most recent run of the product structure file load and maintenance program.

PRODUCT STRUCTURE FILE RETRIEVAL PROGRAM (PSRV)

This program performs the six retrievals discussed in the IBM System/3 Bill of Material Processor Program Description Manual. The retrievals may be executed in any sequence the user desires.

INPUT

OCL: The OCL cards must include two FILE statements for the item master file and a FILE statement for the product structure file. For Model 6 noncard, include a FILE statement for the product structure inquiry file.

Data: Inquiry input entries for the retrievals to be run.

Disk: The item master file and the product structure file must be online.

OUTPUT

Printer: The product structure file retrieval program reports appear
            in user-specified format. Error messages are printed as
            error conditions are detected. At beginning and end of job,
            the record count for the item master file is printed and the
            record count, file capacity, and run activity control number
            for this run are printed for the product structure file.

EARLY TERMINATION

    No provision has been made for early termination of the run on the
Model 6. To interrupt a run on the Model 10 and Model 6 (card) before
all transactions have been processed, the following steps must be taken:

    1. Press STOP on the console.

    2. Press STOP on the card reader (Model 10 only).

    3. Remove all the cards from the reader hopper.

    4. Place an end-of-file card (/* in cc 1 and 2) in the reader
        hopper.

    5. Ready the card reader.

    6. Press START on the console.

    A normal last-card end of job occurs. It is mandatory that the above
procedure be followed to ensure that all activity chains built by
summarized routines are cleared.

WORK CENTER MASTER FILE LOAD PROGRAM (WCLD)

    This program loads the work center master transaction file from card
input in work center number sequence on to disk. The work center master
file is an indexed file.

INPUT

OCL: The OCL statements must include a FILE statement for the work
            center master file. For Model 6 noncard, include a FILE
            statement for the work center master transaction file.

Data: Work center master transactions, which must be in work center
            number sequence

OUTPUT

Disk: Work center master file

Printer: Audit list in user-specified format. Error messages are
            printed as error conditions are detected. A summary of
            records loaded is printed by the program.

EARLY TERMINATION

    No provision has been made for early termination of the run on the
Model 6. To interrupt a run on the Model 10 and Model 6 (card) before
all transactions have been processed, the following steps must be taken:

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1. Press STOP on the console.

2. Press STOP on the card reader (Model 10 only).

3. Remove all the cards from the reader hopper except those required to complete a partially processed transaction.

4. Place an end-of-file card (/* in cc 1 and 2) behind the last card in the reader hopper.

5. Ready the card reader.

6. Press START ON THE console.

A normal last-card end of job occurs as a result of this procedure. The remaining cards in the file can be loaded by using the add function in the work center master file maintenance program.

EXTERNAL CONTROLS

At end of job, the program provides a summary of records loaded and work center master transaction input entries read on the last page of the audit list. User procedure may specify that these be posted to a control log.

WORK CENTER MASTER FILE MAINTENANCE PROGRAM (WCMT)

This program adds, changes, and deletes work center master records as described in the IBM System/3 Bill of Material Processor Program Description Manual.

INPUT

OCL: The OCL statements must include a FILE statement for the work center master file. For Model 6 noncard, include a FILE statement for the work center master transaction file.

Data: Addition, change, and delete transactions. (Faster throughput is obtained by having these transactions in work center number sequence.)

Disk: The work center master file must be online.

OUTPUT

Disk: The updated work center master file

Printer: An audit list in user-defined format. Error messages are printed as errors occur. At end of job, a summary of transactions and errors encountered is printed.

EARLY TERMINATION

No provision has been made for early termination of the run on the Model 6. To interrupt a run on the Model 10 and Model 6 (card) before all transactions have been processed, the following steps must be taken:

1. Press STOP on the console.

2. Press STOP on the card reader (Model 10 only).

3. Remove all cards from the reader hopper except those required to complete a partially processed transaction.

4. Place an end-of-file card (/* in cc 1 and 2) in the reader hopper.

5. Ready the card reader.

6. Press START on the console.

A normal last-card end of job will occur as a result of this procedure.

EXTERNAL CONTROLS

At beginning and end of job, the record count for the work center master file is printed. At end of job, a count is also printed for the different types of invalid transactions, input change transaction, records added and records deleted, and total records in the work center master file. User procedure may specify that these be posted to a control log. The cumulative totals in the log could be used to assist in determining when the work center reorganization program should be executed.

WORK CENTER MASTER FILE REORGANIZATION PROGRAM (WCRE)

This program reads the old work center master file and builds a new file. It deletes records with the user-defined delete code in the activity code field. A second file, the work center master relative record number file, is created to be used in the updating of the work center master relative record number field in the chain file.

INPUT

OCL: The OCL statements must include a DATE statement for the new work center master file (must not be the same creation date as the old file), two FILE statements for the work center master file, and a FILE statement for the work center master relative record number file.

Disk: The old work center master file must be online.

OUTPUT

Disk: New work center master file and work center master relative record number file

Printer: An audit list in user-defined format is printed. Error messages are printed as errors are encountered.

EARLY TERMINATION

No provision for early termination has been incorporated into this program because of its relatively short run time.

EXTERNAL CONTROLS

The program provides a count of active records on the new work center master file and deleted and reactivated deleted records from the old work center master file on the last page of the audit list.

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WORK CENTER MASTER FILE REORGANIZATION - UPDATE STANDARD ROUTING FILE PROGRAM (WCRR)

This program updates the standard routing file with the new work center master relative record number.

INPUT

OCL: The OCL statements must include a FILE statement for the work center master relative record number file and the standard routing file.

Disk: Work center master relative record number file and standard routing file must be online.

OUTPUT

Disk: Standard routing file updated with new work center master relative record numbers

Printer: Error messages are printed as they occur. The user may print an audit list if he chooses.

EARLY TERMINATION

No provision for early termination has been incorporated into this program because of its relatively short run time.

EXTERNAL CONTROLS

At beginning and end of job, the record count and file capacity are printed for the standard routing file. In addition, a total of standard routing records updated during the run is printed.

STANDARD ROUTING FILE FORMAT PROGRAM (RTFM)

This program builds the standard routing file control record and an availability record for each cylinder of the file.

INPUT

OCL: The OCL statements must include a FILE statement for the standard routing file.

Data: Parameter input entry. This entry must not be followed by a /* statement.

OUTPUT

Disk: Standard routing file

Printer: Error messages are printed as they occur.

EARLY TERMINATION

No provision for early termination has been incorporated into this program because of its relatively short run time.

EXTERNAL CONTROLS

At beginning of job, the parameter input information is printed. At end of job, the record count of zero and the file capacity are printed. The user may specify that these be posted to a control log. The record count is a count of user records and does not include control and availability records.

STANDARD ROUTING FILE LOAD AND MAINTENANCE PROGRAM (RTLM)

This program performs the initial loading of the standard routing file and subsequently handles the maintenance function of adding, changing, and deleting records.

INPUT

OCL: The OCL statements must include a FILE statement for the standard routing file and two FILE statements each for the item master and work center master files. For Model 6 noncard, include a FILE statement for the standard routing transaction file.

Data: Standard routing transactions. For loading and adding, all input entries for a routing must be grouped together in operation number sequence. The groups do not have to be in sequence.

Disk: The standard routing, item master, and work center master files must be online for all standard routing load and maintenance program runs.

OUTPUT

Disk: The standard routing, work center master, and item master files are updated by this run.

Printer: An audit list in user-defined format is printed during each run. Error messages are printed as error conditions occur.

EARLY TERMINATION

No provision has been made for early termination of the run on the Model 6. To interrupt a run on the Model 10 and Model 6 (card) before all transactions have been processed, the following steps must be taken:

1. Press STOP on the console.

2. Press STOP on the card reader (Model 10 only).

3. Remove all the cards from the card reader hopper.

4. Place an end-of-file card (/* in cc 1 and 2) in the reader hopper.

5. Ready the card reader.

6. Press START on the console.

A normal end of job occurs, closing the files. A maintenance run must be used if the remaining cards are subsequently to be entered into the file.

Should the program be terminated without reaching end of job on the load, the file will have to be reloaded. Prior to reloading the file it will be necessary to reconstruct the chain fields in the item master and the work center master file.

Should the program be terminated without reaching end of job when performing maintenance, it may be necessary to reconstruct the file (refer to the Appendix).

EXTERNAL CONTROLS

At beginning and end of job, the record count for the item master and work center files are printed. In addition, the record count and file capacity for the standard routing file are printed.

STANDARD ROUTING FILE UNLOAD PROGRAM (RTUN)

This program unloads the standard routing file in the form of routings in operation number sequence.

INPUT

OCL: The OCL statements must include a FILE statement for the
            standard routing file and two FILE statements each for the
            item master and work center master files.

Data: Parameter input entries

Disk: The standard routing, item master, and work center master
            files must be online.

OUTPUT

Card or   Standard routing transactions are unloaded in user
Printer: specified format to be used as input information to a
            subsequent load run, using the standard routing file load and
            maintenance program.

Disk: After unloading the last routing, the chain anchors in the
            item master and work center master files are reinitialized to
            END... Information is temporarily stored in the item master
            file control record in the event of an early termination.

Printer: Error messages are printed as they occur. At end of job,
            file statistics are printed. The Model 10 or Model 6 card
            user may print an audit list if he chooses.

EARLY TERMINATION

If it becomes necessary to terminate a standard routing file unload run before the entire file is unloaded on the Model 10 or Model 6 with a card reader, the following procedure must be followed:

1. Press STOP on the console.

2. Press STOP on the card reader (Model 10 only).

3. Remove all the cards from the reader hopper.

4. Place an end-of-file card (/* in cc 1 and 2) in the reader hopper.

5. Ready the card reader.

6. Press START on the console.

If it becomes necessary to terminate a standard routing file unload run before the entire file is unloaded on the Model 6 without a card reader, the following procedure must be followed.

1. Key a /* record.

2. Press program start.

As a result of these actions, the program continues processing until it has unloaded the number of routings specified in the last parameter input entry read. It then prints the file statistics it has collected, and all the information needed to restart is stored in the item master file control record.

Note: The chain anchor fields in the item master and work center master files are reinitialized to the end-of-chain constant END.. after all the records have been unloaded. Because of this, the program should not be stopped during reinitialization. The standard routing file retrievals cannot be run if reinitialization has occurred.

RESTART AFTER EARLY TERMINATION

To restart unloading the standard routing file at the point where it was stopped by the early termination procedure, parameter input entries are resubmitted. Upon restarting, the program reads the restart information from the item master control record and continues at the point where it was stopped. Maintenance cannot be performed on the standard routing file between early termination and restart. However, standard routing file retrievals can be performed between early termination and restart.

EXTERNAL CONTROLS

At beginning and end of job, the item master and work center master count are printed, as well as the standard routing record count and file capacity. User procedure may specify that these be posted to a control log. In addition, file statistics for the run are printed at end of job. The total number of standard routing records unloaded should be equal to the record count printed at end of job by the most recent run of the standard routing file load and maintenance program.

STANDARD ROUTING FILE RETRIEVAL PROGRAM (RTRV)

This program performs the two retrievals discussed in the IBM System/3 Bill of Material Processor Program Description Manual. The retrievals may be executed in any sequence the user desires.

INPUT

OCL: The OCL statements must include a FILE statement for the
            standard routing file and two FILE statements each for the
            item master and work center master files. For the Model 6
            noncard, include a FILE statement for the standard routing
            inquiry file.

Data: Inquiry input entries for the retrievals to be run

Disk: The item master file, work center master file, and the
            standard routing file must be online.

OUTPUT

Printer: The standard routing file retrieval program reports will
            appear in user-specified format. Error messages will be
            printed as error conditions are detected. At beginning and
            end of job, the record counts for the item master and work
            center master files are printed. In addition, the record
            count and file capacity for the standard routing files are
            printed.

EARLY TERMINATION

    No provision has been made for early termination of the run on the
Model 6. To interrupt a run on the Model 10 and Model 6 (card) before
all transactions have been processed, the following steps must be taken:

    1. Press STOP on the console.

    2. Press STOP on the card reader (Model 10 only).

    3. Remove all the cards from the reader hopper.

    4. Place an end-of-file card (/* in cc 1 and 2) in the reader
        hopper.

    5. Ready the card reader.

    6. Press START on the console.

    A normal last-card end of job occurs.

HALTS AND MESSAGES

This section contains a list of all halts and messages that are generated by the System/3 Bill of Material Processor. The programs operate under the IBM System/3 Disk System Management. Halts occurring under Disk System Management are described in the IBM System/3 Disk System Halt Procedure Guide (GC21-7540) for the Model 10, or IBM System/3 Disk System Halt Procedure Guide (GC21-7541) for the Model 6.

HALTS

The message display unit on the console or keyboard is used to display programmed halts. These halts indicate incorrect program operation, machine errors, or in some cases information or instructions. All halts require operator action. The programmer should be notified if halts occur during the running of his job.

The operator options for the halts are as follows:

    0 - Continue the job.
    2 - Controlled cancel. Control is given to the job in
          storage and it initiates the job cancellation.
    3 - Immediate cancel. Control is given to the system, and it
          initiates job cancellation.

For the Model 10, dial one of the above numbers on the rightmost address/data switch, perform any action indicated in the halt message, and press console START (HALT/RESET for a DPF system).

For the Model 6, key one of the above numbers through the keyboard, perform the action indicated in the halt message, and key PROG START.

Halt Code	Source and Explanation
H1 or AB245	Parameter input entry contains invalid data. The halt occurs to allow the operator to submit a correct parameter input entry. To continue processing, the operator should resubmit a correct parameter and respond with option 0. To end the job, the operator should respond with option 3. This halt may occur in the standard routing file and product structure file format programs only.
H2 or ACD124	Parameter input entry contains invalid data. The halt occurs to allow the operator to submit a correct parameter input entry. To continue processing, the operator should remove the parameter input entry, examine and resubmit a correct parameter input entry, and respond with option 0. To go to end of job, the operator should submit a /* and respond with option 0. This halt may occur in the product structure file and standard routing file unload programs only.
H8 or ACD1345	A file error has occurred. To continue processing, the operator should remove the last input entry read, resubmit it, and respond with option 0. To go to end of job, respond with option 2. This halt may occur in the product structure file and the standard routing file load and maintenance program only.

```
H9          A file error has occurred.  To continue processing,
or          respond with option 0.  To go to end of job, respond
AB          with option 2.
```

MESSAGES

Messages are printed on the printer as error conditions are detected. Messages are also printed to give other informative data to the user as well as to identify the normal and abnormal end-of-job conditions.

When a file error message specifies a file name, it signifies the error was discovered during an attempt to read from the specified file. The error may be in the file specified or in the file containing the pointer to the specified file. The user should determine which file is in error by dumping the files and checking the contents.

The following error and information messages are arranged in numeric sequence. These message numbers are combined with the four-character program codes, shown in Figure 4, to form the message. An explanation of the cause of the error and the key or relative record number of the questionable transaction is also included. In some instances a number indexed to an expanded explanation appears in the reference column. These expanded explanations immediately follow the message listing.

Program	Code
Item master file load	IMLD
Item master file maintenance	IMMT
Item master file reorganization	IMRE
Item master file reorganization - update product structure file	IMRP
Item master file reorganization - update standard routing file	IMRR
Product structure file format	PSFM
Product structure file load and maintenance	PSLM
Product structure file unload	PSUN
Product structure file retrieval	PSRV
Work center master file load	WCLD
Work center master file maintenance	WCMT
Work center master file reorganization	WCRE
Work center master file reorganization - update standard routing file	WCRR
Standard routing file format	RTFM
Standard routing file load and maintenance	RTLM
Standard routing file unload	RTUN
Standard routing file retrieval	RTRV

MESSAGES Prog. ID	ACTION*	IMLD	IMMT	IMRE	IMRP	IMRR	PSFM	PSLM	PSUN	PSRV	WCLD	WCMT	WCRE	WCRR	RTFM	RTLM	RTUN	RTRV
XXXXφ1-INVALID INPUT	HCP						X	X							X	X		
φ2-INVALID INPUT	CP	X	X					X		X	X	X				X		X
φ3-INVALID INPUT	CP	X	X					X		X	X	X				X		X
φ4-GROUP ERROR	CP	X						X			X					X		
φ5-VALID PARAM	CP						X								X			
φ6-CNTRL REC ERR	EJ		X					X	X	X						X	X	X
φ7-CNTRL REC ERR	EJ			X				X	X	X						X	X	X
φ8-CNTRL REC ERR	EJ											X				X	X	X
φ9-CNTRL REC ERR	EJ				X									X		X	X	X
1φ-NO RECD FOUND	CP		X					X		X						X		X
11-FILE ERROR-IM	HCP		X					X		X						X		X
12-RECD DELETED	CP		X	X				X		X						X		X
13-NO RECD FOUND	CP							X		X						X		X
14-FILE ERROR-IM	HCP							X		X						X		X
15-RECD DELETED	CP							X		X						X		X
16-NO RECD FOUND	CP							X		X						X		X
17-FILE ERROR-PS	HCP							X		X								
18-NO RECD FOUND	CP															X		X
19-FILE ERROR-RT	HCP															X		X
2φ-NO RECD FOUND	CP											X				X		X
21-FILE ERROR-WC	HCP											X				X		X
22-RECD DELETED	CP											X	X			X		X
23-NO RECD FOUND	CP															X		X
24-FILE ERROR-WC	HCP															X		X
25-RECD DELETED	CP															X		X
26-FILE ERROR-RR	EJ			X														
27-FILE ERROR-RR	EJ												X					
28-REC FOUND ACT	CP		X	X								X	X					
29-FILE ERROR-IM	EJ							X	X	X								
3φ-NO COMPONENTS	CP							X		X								
31-CHGE CODE ERR	CP		X					X				X				X		
32-DUPLICATE ADD	CP		X					X				X				X		
33-FORMAT ERROR	EJ						X								X			
34-NO USAGES	CP									X								X
35-FILE IS FULL	CP							X								X		
36-NO MAINTNANCE	EJ							X								X		
37-INVALID RUN	EJ								X								X	
38-USED ON ITSLF	CP							X										
39-W/U CHAIN ERR	CP							X										
4φ-NO ROUTING	CP															X		X
41-PARENT ERROR	CP							X								X		
42-FILE ERROR	HCP			X														
43-FILE ERROR	HCP				X													
44-FILE ERROR	HCP													X				
45-LLC TOO LARGE	CP									X								
46-SEQUENCE ERR	CP							X								X		
47-IM PARENT ERR	CP								X								X	
48-CHAIN FLE ERR	CP								X								X	
49-MSTR FILE ERR	CP								X								X	
5φ-CHAIN FLE ERR	CP								X								X	
51-RESTART ERROR	EJ								X								X	
52-BREAKN CHAINS	CP								X								X	
53-FILE ERROR-IM	EJ								X								X	
54-FILE ERROR-WC	EJ																X	
98-ABNORMAL EOJ	EJ		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
99-END OF JOB	EJ	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

```
* HCP — HALT-CONTINUE PROCESSING
  CP   — CONTINUE PROCESSING
  EJ   — GO TO END OF JOB
```

Figure 4.   Message summary

Message Number	Message and Explanation	Reference
XXXX01-INVALID INPUT	One or more of the fields in the parameter input entry are invalid. The program halts to allow the operator to submit a correct parameter input entry.	
XXXX02-INVALID INPUT	The transaction code of the transaction just read is in error. The program continues processing with the next transaction.	
XXXX03-INVALID INPUT	A required field in the transaction just read is blank. This transaction is not processed. Processing continues with the next transaction.	
XXXX04-GROUP ERROR	For the item master and work center master load programs, the message indicates that the level break for the last transaction group processed did not occur on the correct input entry. The record output may not contain correct values for all fields. Check the transactions submitted to determine which fields in the disk record must be updated. Processing continues with the next transaction.

For the product structure and standard routing file load and maintenance programs, the message indicates multiple consecutive transactions for the same product structure and standard routing record. This transaction is not processed; processing continues with the next transaction.

For the product structure, standard routing file load, and maintenance programs, the message indicates multiple consecutive transactions for the same product structure and standard routing record. This transaction is not processed; processing continues with the next transaction. | |
XXXX05-VALID PARAM	The parameter input entry submitted to this program is correct. The values accepted are printed.	
XXXX06-CNTRL REC ERR	An error has occurred during the retrieval of the item master file control record. The program goes to abnormal end of job.	1
XXXX07-CNTRL REC ERR	An error has occurred during the retrieval of the product structure file control record. The program goes to abnormal end of job.	1

Message Number	Message and Explanation	Reference
XXXX08-CNTRL REC ERR	An error has occurred during the retrieval of the work center master file control record. The program goes to abnormal end of job.	1
XXXX09-CNTRL REC ERR	An error has occurred during the retrieval of the standard routing file control record. The program goes to abnormal end of job.	1
XXXX10-NO RECD FOUND	In reading the item master file by key, a no record found condition has been encountered. Processing continues with the next transaction.	
XXXX11-FILE ERROR-IM	In reading the item master file by key, a file error has occurred. The item sought is not equal to the item number in the record retrieved. The program halts. See appropriate halt explanation for information on recovery procedures.	
XXXX12-RECD DELETED	In reading the item master file by key, a record deleted condition has been encountered. The item master record has the delete code in the activity code field (I$ACD). Deleted records are not processed. Processing continues with the next transaction.	
XXXX13-NO RECD FOUND	In reading the item master file by relative record number, a no record found condition has been encountered. Processing continues with the next transaction.	4,5
XXXX14-FILE ERROR-IM	In reading the item master file by relative record number, a file error has occurred. Either the compare portions do not match or the relative record number sought is not equal to the relative record number in the item master record retrieved. The program halts. See appropriate halt explanation for information on recovery procedures.	3,5
XXXX15-RECD DELETED	In reading the item master file by relative record number, a record deleted condition has been encountered. The item master record has the delete code in the activity code field (I$ACD). Processing continues with the next transaction.	4,5
XXXX16-NO RECD FOUND	In reading the product structure file, a no record found condition has occurred. The relative record number sought is outside the extents of the file. Processing continues with the next transaction.	4,5

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Message Number	Message and Explanation	Reference
XXXX17-FILE ERROR-PS	In reading the product structure file, a file error has occurred. Either the compare portions do not match or the parent or component relative record numbers do not match. The program halts. See appropriate halt explanation for information on recovery procedures.	5
XXXX18-NO RECD FOUND	In reading the standard routing file, a no record found condition has occurred. The relative record number sought is outside the extents of the file. The program continues processing with the next transaction.	4
XXXX19-FILE ERROR-RT	In reading the standard routing file, a file error has occurred. Either the compare portions do not match, or the item or work center relative record numbers do not match. The program halts. See appropriate halt explanation for information on recovery procedures.	
XXXX20-NO RECD FOUND	In reading the work center master file by key, a no record found condition has been encountered. Processing continues with the next transaction.	
XXXX21-FILE ERROR-WC	In reading the work center master file by key, a file error has occurred. The work center sought is not equal to the work center number in the record retrieved. The program halts. See appropriate halt explanation for information on recovery procedures.	3
XXXX22-RECD DELETED	In reading the work center master file by key, a record deleted condition has been encountered. The work center master record has the delete code in the activity code field (W$ACD). Processing continues with the next transaction.	
XXXX23-NO RECD FOUND	In reading the work center master file by relative record number, a no record found condition has been encountered. Processing continues with the next transaction.	4

Message Number	Message and Explanation	Reference
XXXX24-FILE ERROR-WC	In reading the work center master file by relative record number, a file error has occurred. Either the compare portions do not match or the relative record number sought is not equal to the relative record in the work center master record retrieved. The program halts. See appropriate halt explanation for information on recovery procedures.	
XXXX25-RECD DELETED	In reading the work center master file by relative record number, a record deleted condition has been encountered. The work center master record has the delete code in the activity code field (W$ACD). Processing continues with the next transaction.	4
XXXX26-FILE ERROR-RR	A file error has occurred in reading the item master reorganization relative record number file (I$RRNO). Either the item master file or the relative record number file is in error. The user should check the FILES statement for the relative record number file to determine if the file is large enough to contain an entry for every record on the item master file. The backup of the old item master file will have to be copied and the reorganization program rerun.	
XXXX27-FILE ERROR-RR	A file error has occurred in reading the work center master reorganization relative record number file (W$RRNO). Either the work center master file or the relative record number file is in error. The user should check the FILES statement for the relative record number file to determine if the file is large enough to contain an entry for every record on the work center master file. The backup of the old work center master file will have to be copied and the reorganization program rerun.	

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Message Number	Message and Explanation	Reference
XXXX28-REC FOUND ACT	An attempt has been made to delete a master record with active chains. The record cannot be deleted until all chains are inactive; the record remains active. The program continues processing with the next transaction. One or more of the following chains may have to be deleted to allow the master record to be deleted: the assembly component chain, the standard routing chain, or the usage of this master on a higher level assembly (to delete the where-used chain).	
XXXX29-FILE ERROR-IM	A file error has occurred in reading the item master file by relative record number. The item master file must be rebuilt.	
XXXX30-NO COMPONENTS	The item master record referenced has no component chain. The transaction requested cannot be performed. The program continues with the next transaction.	
XXXX31-CHGE CODE ERR	The transaction card being processed has an invalid user change code. Processing continues with the next transaction.	
XXXX32-DUPLICATE ADD	This record is already on the file and is not added. Processing continues with the next transaction.	
XXXX33-FORMAT ERROR	A chain error has occurred during the formatting of a direct file. The user should compare the parameter input entry submitted and the FILE statement to determine if the values given for number of records agree. The program goes to abnormal end of job.	
XXXX34-NO USAGES	The record just referenced has no where-used chain. The transaction requested cannot be performed. The program continues processing with the next transaction.	
XXXX35-FILE IS FULL	The file being maintained is full. Processing continues with the next transaction.	
XXXX36-NO MAINTNANCE	The no-maintenance switch for this file has been turned on by the unload program. No maintenance can be performed during an unload. The program goes to abnormal end of job.	

Message Number	Message and Explanation	Reference
XXXX37-INVALID RUN	The unload program being run cannot be executed due to a previous unload in process.	
XXXX38-USED ON ITSLF	A used on itself condition has been detected during an addition to the product structure file. The program enters the routine to correct low-level code; the record added in error will be deleted. The program must not be interrupted until the low-level codes have been corrected.	
XXXX39-W/U CHAIN ERR	An error has been detected in the where-used chain of an item referenced during low-level code correction. The program cannot halt until the low-level codes have been corrected. Processing continues with the next where-used chain that must be followed to correct low-level code.	
XXXX40-NO ROUTING	The item master record referenced has no routing chain. The transaction requested cannot be performed. Processing continues with the next transaction.	
XXXX41-PARENT ERROR	The parent master record for this transaction has been found to be in error in a previous transaction. Processing continues with the next transaction.	
XXXX42-FILE ERROR	The compare portions in the product structure and relative record number files do not agree. Either the item master file or the product structure file is in error. The program halts. See appropriate halt explanation for information on recovery procedures.	
XXXX43-FILE ERROR	The compare portions in the standard routing and the relative record number files do not agree. Either the item master or the standard routing file is in error. The program halts. See appropriate halt explanation for information on recovery procedures.	
XXXX44-FILE ERROR	The compare portions in the standard routing and the relative record number files do not agree. Either the work center master or the standard routing file is in error. The program halts. See appropriate halt explanation for information on recovery procedures.	

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Message Number	Message and Explanation	Reference
XXXX45-LLC TOO LARGE	The low-level code of this item is too large to be entered in the level table. Processing continues with the next item in the retrieval.	
XXXX46-SEQUENCE ERR	The component or routing operation transaction just read is out of sequence. The entire assembly or routing is printed before the transaction just read is processed. Printing of the assembly or routing starts over with the processing of the transaction just read.	
XXXX47-IM PARENT ERR	An error has occurred during an attempt to read an item master record. None of the standard routing or product structure records for this item number have been unloaded. The program continues processing with the next item master record.	
XXXX48-CHAIN FLE ERR	An error has occurred during an attempt to read the first chain record in a standard routing or product structure chain. None of the routing or product structure records for this item number have been unloaded. The program continues processing with the next item master record.	
XXXX49-MSTR FILE ERR	An error has occurred during an attempt to read a work center master or component item master record. A portion of a routing or assembly may already have been unloaded. Check the output and eliminate any output for this item number. The program continues processing with the next item master record.	
XXXX50-CHAIN FLE ERR	An error has occurred during an attempt to read a chain record in a standard routing or product structure record. A portion of a routing or assembly may already have been unloaded. Check the output and eliminate any output for this item number. The program continues processing with the next item master record.	
XXXX51-RESTART ERROR	An error has occurred during an attempt to read the last item master record processed in a previous unload run. This restart attempt has failed, and an abnormal end of job results. The unload must be started from the beginning.	

Message Number	Message and Explanation	Reference
XXXX52-BREAKN CHAINS	The unload has been completed. The chains between the master and chain records are being broken. This run must not be interrupted.	
XXXX53-FILE ERROR-IM	An error has occurred during an attempt to read an item master record to break the standard routing or product structure chains. The program goes to abnormal end of job, and the item master file must be rebuilt. If this is a standard routing unload, the work center master file must be rebuilt also.	
XXXX54-FILE ERROR-WC	An error has occurred during an attempt to read a work center master record to break the work center where-used chain. The program goes to abnormal end of job, and the work center master file must be rebuilt.	
XXXX98-ABNORMAL EOJ	This message indicates a program abnormal end of job. The reason for the abnormal end of job is indicated in a previous message.	2
XXXX99-END OF JOB	This message indicates normal end of job.	

ERROR MESSAGE REFERENCES

1. This error forces an abnormal end of job and is followed by the message XXXX98-ABNORMAL EOJ.

2. The disk file (or files) has been closed, but the disk file (or files) and/or the program are in error. These conditions must be thoroughly investigated and corrected before the files are used.

    The program may not have processed all of the transactions. The unprocessed transactions have to be reentered after the file (or files) and/or program have been corrected.

3. A printout of the disk area containing the records in question should be made. This, along with all maintenance audit lists, should be forwarded to the responsible programmer. Some file reconstruction will very likely be necessary. The user may be aware of certain file errors and may tolerate a given number of such errors in retrievals, but these error conditions should be corrected as soon as possible.

4. If this error occurs while following a product structure, a standard routing, or a where-used chain, it constitutes a file error, since a chain file should not point to a deleted record or a relative record number outside the extents of the file. A printout of the disk area containing the records in question should be made. This, along with all maintenance audit lists, should be forwarded to the responsible programmer. Some file reconstruction will very likely be necessary.

5. If this error occurs during a summarized retrieval, it forces an abnormal end of job to prevent activity chains that have not been

cleared from interfering with a retrieval. When the retrieval program is restarted after the abnormal end of job, RACN will be incremented and will inactivate the old activity chains which had not been cleared.

APPENDIX: RECONSTRUCTION CONSIDERATIONS

The file maintenance programs cannot be run unless the file indexes and the record chains are intact. To reconstruct the chain files, the master files must be considered. The following information pertains only to the Bill of Material Processor fields; however, reconstruction of user data should also be considered in the overall reconstruction.

File reconstruction can be divided into two categories:

1. Reconstruction of a small number of selective records in the files under consideration

2. Reconstruction of one or more files

It may not always be immediately obvious which reconstruction approach should be taken. For example, a failure to obtain a correct comparison on control fields in a record or the detection of an invalid relative record number may be interpreted five ways: (1) one selected record is in error, (2) an entire file is in error, (3) the program was compiled incorrectly, (4) an incorrect physical file was mounted, (5) a machine malfunction occurred. The first possibility probably can be corrected by reconstructing the single record. The second requires complete reconstruction of the entire file. The last three may or may not require any reconstruction. Complete documentation of the machine and program status at the time of error detection and a dump of the questionable file areas will aid the user in evaluating the error condition.

Selected record reconstruction may be possible if all file interrelationships for the record can be corrected. Each item master record contains the relative record number of the first link in the primary chains (assembly - component and routing operation) and the first link in a subordinate chain (assembly where-used). The work center master records contain the first link in a subordinate chain (work center where-used). Each chain record carries the relative record number of subsequent links for the primary and subordinate chains in addition to the relative record numbers for the reverse subordinate chain. The chain records also carry the compare portion for the corresponding master records.

Where error is extensive or widespread, the file backup must be used to restore the disk files. All transactions made since the backup copy was made must be reprocessed to make the file current. The recovery procedure must also isolate the cause of failure. Where failure has resulted from a programming error, corrective action must be applied to prevent the same error from recurring. Because of the interrelationship of the files, if reconstruction of one file becomes necessary it is usually necessary to reconstruct other files.

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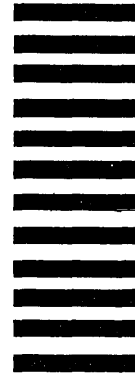
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