

REFERENCE MANUAL

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DISC PACK CONDITIONING PROGRAM



**SYSTEM TEN** COMPUTER BY **SINGER**

**SINGER**  
BUSINESS MACHINES

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REFERENCE MANUAL

DISC PACK CONDITIONING PROGRAM



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**SINGER**  
**BUSINESS MACHINES**

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## PREFACE

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This document is a guide to the conditioning of new disc packs and unused portions of existing disc packs. The disc packs are conditioned in order to be usable with a modified disc controller.

The Disc Pack Conditioning Program is expected to be used by System Ten\* computer users for the purpose of writing on all sectors of new disc packs. For packs currently in use, the program will be used to write on all sectors which have not previously been written upon.

The program is released as a single object program. The System Ten computer user may load it from cards or a DMF linked disc file.

The following manuals are pertinent:

Disc Management Facility (DMF) Reference Manual (Pub. No. 40-225)

Models 40 and 42 Disc Drives Reference Manual (Pub. No. 40-298)

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Section 1  
**PROGRAM DESCRIPTION**

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THE DISC CONTROLLER  
CONTROLLER MODIFICATION  
PROGRAM FUNCTIONS  
OPERATING ENVIRONMENT  
DISC DRIVES

## PROGRAM DESCRIPTION

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The purpose of the Disc Pack Conditioning Program is to prepare new disc packs, and portions of existing packs, to be usable with a modified Disc Controller. The program ensures that each sector of a pack has been written upon and that each contains correct track identification.

### THE DISC CONTROLLER

The Disc Controller controls all disc units connected to the System Ten computer and handles all data transfer between the disc drives and the Central Processing Unit. The Controller also checks for errors and executes certain types of error recovery, such as automatic retries on parity errors.

Controller error checking includes track verification on Read instructions, to ensure that the disc arm is positioned correctly. Track verification is performed on every Read but is particularly important if the Read required a seek. The verification process consists of reading a track ID number which is recorded on the disc and comparing it to the track referenced by the Read instruction. If the two are unequal, the Controller causes the disc drive to restore and recalibrate the arm, and returns Error status to allow the program to retry the Read.

### CONTROLLER MODIFICATION

The Controller is being modified to cause a similar track verification on disc Writes. Prior to writing a sector, the new Controller reads the track ID from the first available sector (or from the sector addressed by the Write instruction) and ensures that it is on the correct track prior to writing. If the track ID is wrong, the Controller forces arm recalibration and returns Error status to the CPU. If the track ID of the sector addressed by the instruction is unreadable, the Controller returns Flag status.

## PROGRAM DESCRIPTION

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This means that the Write instruction is incapable of writing on a sector which has not previously been written upon. Because of this, the Write Control variant of the Write instruction will not be changed, i.e., it will not perform track verification prior to writing. The Write Control instruction is thus used by the Pack Conditioning Program to condition sectors to make them usable by System Ten computer software without any subsequent use of Write Control.

## PROGRAM FUNCTIONS

Two modes of conditioning are available:

### WRITE MODE:

In WRITE mode, an entire pack is conditioned using the Write Control instruction. This mode is not valid for the pack from which the program is loaded, and requires operator confirmation if the specified pack has a readable DMF Volume Label. This mode is intended for use on all new packs and scratch packs. It is also recommended for packs containing large uninitialized areas; in this case it may be faster to BACKUP the data, condition the pack in WRITE mode, then RESTORE the data.

### READ-BEFORE-WRITE MODE:

This mode is intended for packs which are already in use and have few uninitialized sectors. All sectors of the pack are read; only those which return Flag status (uninitialized or "bad" sectors) are conditioned using the Write Control instruction. The program reports all sectors conditioned, and all "bad" sectors, on a console log or on the DMF print logical unit, if available.

READ-CHECK: on completion of conditioning in either WRITE or READ-BEFORE-WRITE mode, the program executes an additional verification phase. This requires that the operator stop the drive and re-start it to force arm recalibration. The program then reads a sector from each track to check track ID.

### Formats:

The user may select one of two formats for conditioned sectors. In LINKED format, all sectors are written with blanks in the first 94 positions and a DMF linkage in the last 6 positions of the sector. This will enhance the performance of the DMF CREATE function. The alternate sector format is a diagnostic pattern consisting of the actual sector address, the program name (PKCOND) and a string of characters constituting a "worst-case" bit pattern for the disc. This format helps to identify hardware difficulties.

### OPERATING ENVIRONMENT

The Pack Conditioning Program is capable of conditioning one or more packs in a single program run. Packs to be conditioned may be mounted on any drive; both the Model 40 drive and the Model 42 drive are supported. A console operator is required; all program options are selected by entering simple responses to program messages. An option is included to inhibit switching when the program is running in partition zero. Use of this option is recommended since it improves program performance and prevents interference from other partitions.

### DISC DRIVES

The Model 40 Disc Drive uses a removable disc pack consisting of ten magnetic recording surfaces, with a sector addressing range of 00000-99999.

The Model 42 Disc Drive uses a pair of disc packs, one of which is mounted on top of the other. Each pack has four recording surfaces. The resident (lower) pack has a sector addressing range of 00000-39999. The removable (upper) pack has a sector addressing range of 60000-99999.

When the Pack Conditioning Program is using the Model 42 drive, it offers the option to condition the 'UPPER' pack, 'LOWER' pack, or 'BOTH' packs. In any case, it does not reference the non-existent sectors in the range 40000-59999. It is possible to load the program from a resident pack on the Model 42 and use it to initialize one or more removable packs on the same drive. (See the Models 40 and 42 Disc Drives Reference Manual -- Publications Number 40-298 -- for additional details on the disc drives.)



Section 2  
**CONFIGURATION REQUIREMENTS**

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HARDWARE CONFIGURATION  
SOFTWARE CONFIGURATION  
ADDITIONAL INFORMATION

## CONFIGURATION REQUIREMENTS

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### HARDWARE CONFIGURATION

#### Required Hardware Components

- A System Ten Model 20 Processor Partition with at least 9K of core.
- A Model 40 or Model 42 Disc Drive.
- A Model 70 Workstation or Model 80 Video Display to be used as a console and optional display device.
- A Model 30 Card Reader (only required if the Disc Pack Conditioning Program is loaded from cards).

Refer to the individual hardware reference manuals for information and illustrations pertaining to these System Ten computer components.

#### Optional Hardware Components

- A Model 50 Line Printer to be used as a display device for certain program messages.
- Additional disc drives.

### SOFTWARE CONFIGURATION

#### Program Loader

- The Disc Pack Conditioning Program may be loaded by the standard four-card loader or by the DMF Conversational Loader. A Console attached as device 0 (zero) is required if the four-card loader is used. DMF logical unit assignments are required for console and display functions if the DMF Conversational Loader is used.

Refer to the individual software reference manuals for information and illustrations pertaining to the specific loaders.

ADDITIONAL INFORMATION

- Common core is not used by the Disc Pack Conditioning Program.
- The Disc Pack Conditioning Program's file name is PKCOND.
- The Disc Pack Conditioning Program's distribution ID is OB023Sr023, where r is the release level.

Section 3  
**OPERATING PROCEDURES**

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INSTALLING THE PROGRAM  
LOADING SEQUENCE  
OPERATOR COMMUNICATIONS  
PROGRAM MESSAGES  
RESTART OPTIONS  
PROGRAM TERMINATION

## OPERATING PROCEDURES

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### INSTALLING THE PROGRAM

The program is in the form of a single object deck and may be filed in the user's SYSPOL under the name PKCOND. Normally, users will maintain the program on drive zero and condition packs on other drives. Users having only one Model 40 drive will load the program through the card reader. Users of a single Model 42 drive need load the program from cards only when a resident pack is being conditioned; otherwise the program can be maintained on the resident pack and used to condition one or more removable packs.

When the program is loaded from disc, DMF logical unit assignments are used for CONO (console output), CONI (console input), and PRINT (line printer output). Since a console operator is required, both CONO and CONI must be assigned; if either is not assigned, the program will temporarily assign it to device zero. The PRINT unit is used only for a message which may appear several times when READ-BEFORE-WRITE mode is in use. Users who do not have a line printer may choose to assign the PRINT unit to the console or to IGNORE.

### LOADING SEQUENCE

The Disc Pack Conditioning Program may be loaded by a standard four-card loader or by the DMF Conversational Loader. A console attached as device 0 (zero) is required if the four-card loader is used, and DMF logical unit assignments are required for console and display functions if the DMF Conversational Loader is used. The program will determine by which one of the above methods it was loaded and process accordingly.

OPERATOR COMMUNICATIONS

A console operator is required for the operation of the Disc Pack Conditioning Program. All user options are entered on the console in response to specific questions from the program, so no command syntax is required. All responses by the console operator are validated.

An erroneous response causes the message to be re-issued. A few messages accept the Enter key as a response; in these cases the default response is first in the response list. Every response is terminated by the Enter key; if the operator mis-types a response, pressing the Error key cancels the entry. The program returns the carriage, lights the 'Repeat Entry' light, and reads the response again. Use of the New Line key serves the same purpose on the Model 80 Display.

PROGRAM MESSAGES

Refer to Section 4 for an illustrated flow chart showing the following messages and responses in relationship to the functional logic of the program.

I)PKCOND: PACK CONDITIONING PROGRAM, RELEASE r

r is the current release level.

A)PKCOND: SET MODE ? (YES/NO).

This message is issued only if the program is running in partition zero. If the answer is 'YES', partition switching will be inhibited for the duration of the run. The response to this message defaults to 'YES' if the Enter key is pressed.

A)PKCOND: WRITE LINKED SECTORS OR DIAGNOSTIC PATTERN?  
(LINKED/DIAG).

If the response is 'LINKED', sectors will be written blank but with a DMF linkage to the next sequential sector. If the response is 'DIAG', sectors will be written using a diagnostic character pattern, with an indication that the sector has been initialized by PKCOND.

A)PKCOND: ENTER DRIVE NUMBER.

The response to this message is a single digit specifying the drive on which a pack is to be conditioned. This message is repeated each time a pack is conditioned or when the operator causes the program to restart. Responding with a control key causes normal program termination.

A)PKCOND: ENTER DRIVE MODEL NUMBER (40/42).

A)PKCOND: ENTER SPLIT DISC OPTION (UPPER/LOWER/BOTH).

This message is issued only if the drive model number was specified as '42'. It permits the operator to select either the resident or removable portion of the split disc, or both.

A)PKCOND: ENTER MODE: READ-BEFORE-WRITE OR WRITE (READ/WRITE).

This is the selection which sets the basic operating mode for the program. The response 'READ' causes the program to identify each uninitialized sector by attempting to read it; 'WRITE' causes a sweep of the entire pack using the Write Control instruction. See description of Program Functions in Section 1 for more details.

I)PKCOND: PACK ON DRIVE d CONTAINS A VOLUME LABEL:  
DMF volume label display.

This message can appear only if WRITE mode has been specified and the pack on the designated drive (d) contains a DMF volume label in sector 00001. The DMF volume label is displayed on the console and the following message is issued:

A)PKCOND: DO YOU WISH TO OVER-WRITE IT? (YES/NO).

If the operator does not answer 'YES', the program returns to request a new drive number.

S)PKCOND: 'WRITE' MODE NOT VALID FOR DRIVE d.

This diagnostic is issued if the user specifies WRITE mode for the pack from which the Pack Conditioning Program was loaded. The program requests a new drive number.

A)PKCOND: SVC-REQ AT SECTOR ddddd; CONTINUE? (YES/NO).

dddddd is the sector address of the sector last accessed by the program before detecting a Service Request. The program awaits an operator response before continuing. If the response is 'YES', or if the operator presses the Enter key, execution resumes. If 'NO', a new drive number is requested.

E)PKCOND: ERROR READING SECTOR ddddd.

This diagnostic may be issued during either the Read-Before-Write phase or the Read-Check phase (which follows both READ and WRITE modes). The indicated sector has returned Error Status. The read instruction is retried once; if the Error repeats, the message is re-issued, and the program goes on to the next sector.

E)PKCOND: ERROR WRITING SECTOR ddddd.

This diagnostic should not appear, since Error status is not anticipated on the Write Control instruction. If issued, it indicates hardware malfunction.

E)PKCOND: FLAG READING SECTOR ddddd.

This diagnostic can appear only when performing a read-check. It indicates that Flag status has been returned while checking to see that one sector on each track is readable. One software retry is performed on this error.

E)PKCOND: FLAG WRITING SECTOR ddddd.

This diagnostic applies to both modes; the sector being written (using Write Control) returns Flag status. One software retry is performed.

A)PKCOND: READY DEVICE Dn.

Disc drive n has returned Fault status. Pressing the Enter key will retry the disc I/O; a control key will cancel the current pack conditioning and cause the program to request a new drive number.



I)PKCOND: BEGINNING OF READ-CHECK PHASE.

The conditioning process is completed; the program will now check to ensure that it can read from each track (i.e., each cylinder/surface combination). The following message is issued to force head recalibration:

A)PKCOND: STOP DRIVE d, THEN START AGAIN.

I)PKCOND: SECTORS ddddd-ddddd INITIALIZED.

This message is issued in READ-BEFORE-WRITE mode when a range of contiguous sectors have been conditioned using Write Control. This message appears on the Print logical unit if available. If the program is loaded from cards, the message appears on the console.

I)PKCOND: PACK ON DRIVE d INITIALIZED.

This message appears at the end of the Read-Check phase.

I)PKCOND: END OF JOB.

This message appears at end of job (when a control key response is returned from a drive number request) if the program was loaded by DMF and is returning to the Conversational Loader.

L)PKCOND: END OF JOB

This message is displayed at program termination if the program was loaded from cards. In this case, the program terminates by entering a Load condition.

T)PKCOND: DISC ACCESS MASK INVALID.

The disc access mask for this partition does not allow disc reads and/or writes. The program is also unable to modify the mask.

RESTART OPTIONS

- Depressing any control key in response to any console message except,  
A)PKCOND: ENTER DRIVE NUMBER,  
will cause the Disc Pack Conditioning Program to restart by requesting a new drive number.
- Depressing a service request key during the operation of the Disc Pack Conditioning Program will interrupt the program and give the console operator the option to either CONTINUE or RESTART the program.

PROGRAM TERMINATION

The operator terminates the Disc Pack Conditioning Program by pressing a control key response to the message:

A)PKCOND: ENTER DRIVE NUMBER.

The program then issues the console message:

I)PKCOND: END OF JOB.

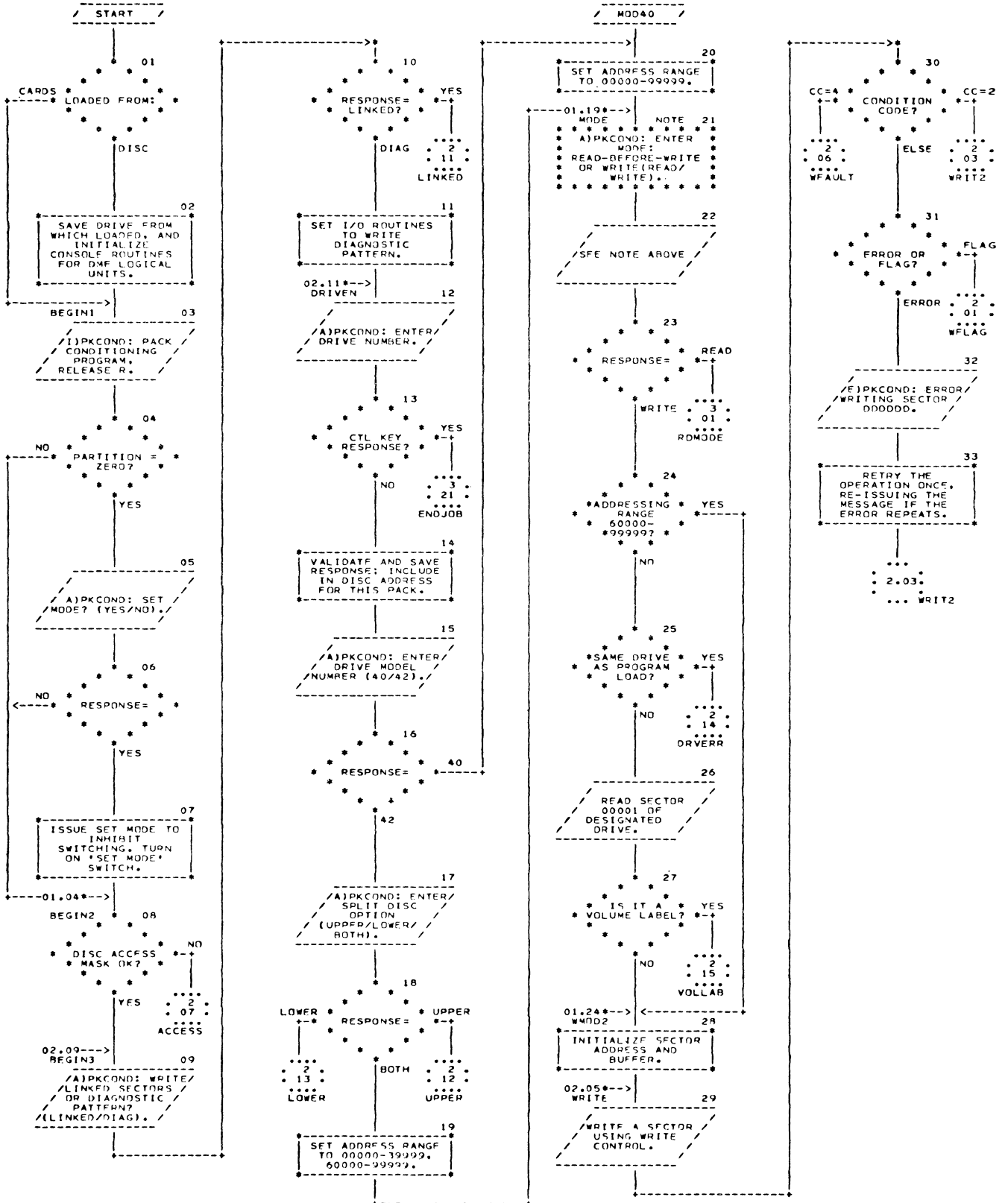
The job is completed and the program returns to C\_LOAD if the program was loaded from the disc. If the program was loaded from cards, the above message is issued with a severity code of 'L', and the program enters a Load Condition.

NOTE: If the program has inhibited partition switching, it will return the system to normal mode prior to issuing the above end-of-job message.

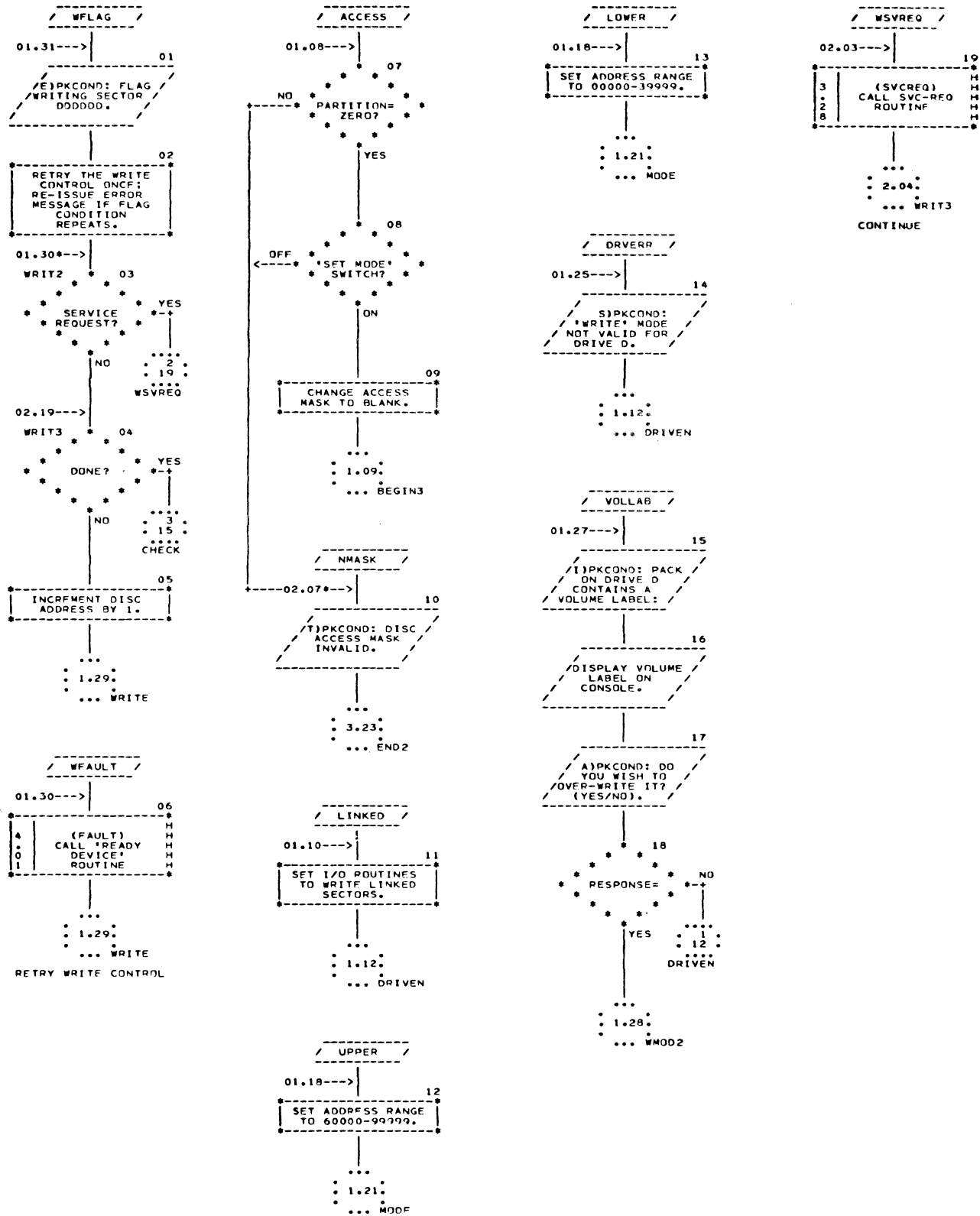
Section 4  
FUNCTIONAL PROGRAM FLOW CHARTS

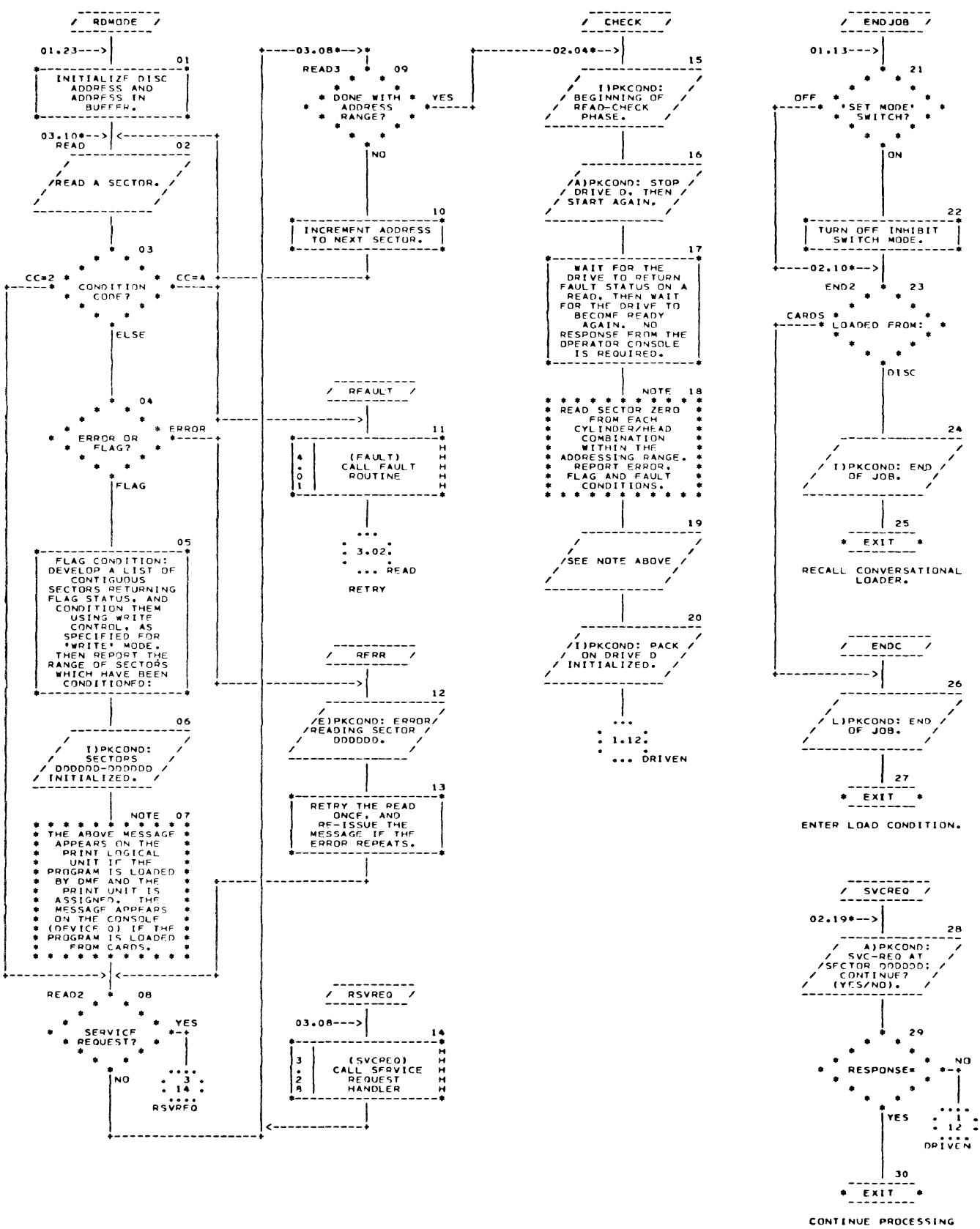


# FUNCTIONAL PROGRAM FLOW CHART



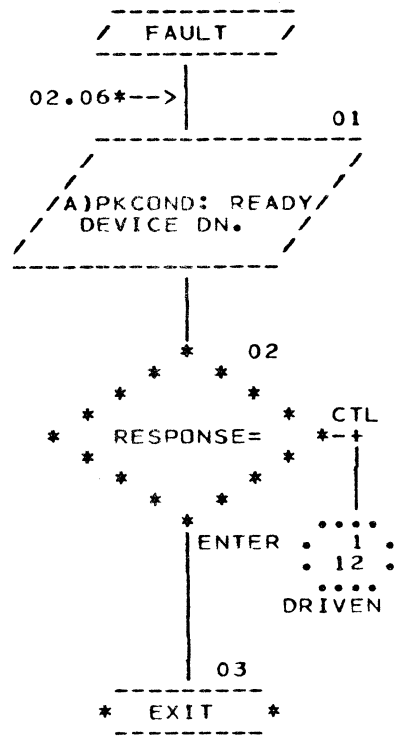
FUNCTIONAL PROGRAM FLOW CHART





FUNCTIONAL PROGRAM FLOW CHART

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DISC PACK CONDITIONING PROGRAM  
Reference Manual  
Publication No. 40-355

We produce manuals for you, and we want you to find them useful and informative. That's our job.

So we're asking you to help us furnish you with the best possible publications. Please take a few minutes to answer the following questions. Add any comments you wish. If you desire a reply to any question, be sure to include your name and address.

Thank you.

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If not, what additional information would be of help to you?

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