



 Data General



# Mentor

PROGRAM

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FIELD ENGINEERING DIVISION  
DATA GENERAL CORPORATION

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RECORD OF REVISIONS

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September 1985	0		RDOS COURSE A CAI STUDENT GUIDE, First Release	

## FOREWORD

This Student Guide provides the DGC field engineer with information to support the "Introduction to RDOS" software. It has been developed to accompany the Computer Aided Instruction (CAI) course. The guide will help you keep track of your progress as you work through the course.

If, in the process of using this CAI package, you encounter problems with the system or program, contact the CAI Administrator in your branch, or call the MENTOR HELPLINE. (For NAFE students, this number is located at the FE Training Center in Woodstock, Connecticut, (203) 928-0611 X2235. International students can call their respective FE Training Centers.

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## CAI USER'S GUIDELINES

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### INTRODUCTION

Review these User's Guidelines before beginning this CAI course. The information contained in this section will help you to better use the program. Once your course has been loaded on the system, automatic prompts, located at the bottom of each frame, will be presented to you. These prompts will guide you through the course modules.

Should you encounter problems with the system or with the CAI course, contact your CAI Administrator, or contact the MENTOR HELPLINE. NAFE students can dial (203) 928-0611 X2235. International students should call their respective FE Training Centers.

### BEGINNING THE CAI PROGRAM

Once the course has been loaded onto the system by your CAI Administrator, you will be ready to begin your CAI session.

When you are asked to enter the name of the package, type **RDOS**. This course filename gives you access to the courseware. Once this filename has been entered, the first frame of the CAI course appears.

### ENDING OR INTERRUPTING THE CAI PROGRAM

You may interrupt the program at any time from any frame by pressing the **BREAK/ESCAPE** Key. This will return you to the **MAIN MENU**. From the **MAIN MENU** you may then exit from the course or select another module.

### FINAL EXAMINATION

When you have completed the course, see your branch manager for a copy of the final exam. You may use all the materials provided with the course to complete the final exam.



## PROGRESS CHECKLISTS

This Student Guide contains progress checklists for each module. These are intended to assist you in keeping track of the topics covered, additionally they serve as a reminder of each module's objectives.

## COURSE STRUCTURE

1. The "Introduction to RDOS" course is divided into eight modules. Each module is then subdivided into Lessons. The MAIN MENU is presented first. From the MAIN MENU you may chose any of the eight MODULES; within a particular module, you may chose any lesson. You can move freely about the course from one module to another by making selections from the MAIN and MODULE MENUS. Proceed through the course at your own pace.

2. Take a break at the end of each module to rest your eyes and to absorb what you have just learned. Move through the course at a pace that you find comfortable with your learning style.

## REFERENCE MATERIALS

The documents listed below are necessary to successfully complete this course. The documents will be referenced directly as you progress through the course. They will also serve as reference documents for you to use upon completion of the course.

Document Title	DG Part Number
** Introduction to RDOS	069-400011-00
RDOS System Reference	093-400027
How to Load and Generate RDOS	069-400013-00
** RDOS/DOS Command Line Interpreter	093-000109-010194

\*\* Before starting the computer aided instruction, read the following background materials. Understanding this information will strongly enhance your ability to comprehend and enjoy this course.

"Introduction to RDOS", read the following sections:

OVERVIEW  
THE COMMAND LINE INTERPRETER  
FILES, DISKS, AND DIRECTORIES  
MEMORY MANAGEMENT

"How to Load and Generate RDOS", read the following section:

OVERVIEW

## COURSE OUTLINE

- I. MODULE 1 - INTRODUCTION TO RDOS
  - A. Definition and Features of RDOS
  - B. Filenames and Communicating with RDOS
  - C. Overview of Loading and Generating RDOS
  
- II. MODULE 2 - SYSTEM START UP AND SHUT DOWN
  - A. Starting up an RDOS system
  - B. Shutting down an RDOS system
  
- III. MODULE 3 - THE COMMAND LINE INTERPRETER
  - A. Writing Command Lines
  - B. Commands without Arguments
  - C. Commands with Arguments
  
- IV. MODULE 4 - CLI FEATURES AND APPLICATIONS
  - A. CLI punctuation
  - B. Control sequences
  - C. Macros, Variables, and Error Messages

V. MODULE 5 - DISK ORGANIZATION

A. Physical and Logical Organization

B. Organization of individual files

C. Organization of groups of files

D. File Attributes, Templates, and  
Characteristics

VI. MODULE 6 - MEMORY MANAGEMENT

A. Chaining, Swapping, and Overlaying

B. Foreground and Background Processing

C. Virtual Overlaying and Window Mapping

VII. MODULE 7 - SYSTEM GENERATION AND MAINTENANCE

A. RDOS Installation and Generation

B. Backing up disks

VIII. MODULE 8 - RDOS ERRORS

A. RDOS Errors

## COURSE MAP

The following map is represents the RDOS course organization. It is recommended that the student complete the modules in this order, because much of the instruction is cumulative.

MODULE 1 INTRODUCTION
MODULE 2 START UP AND SHUT DOWN
MODULE 3 THE CLI
MODULE 4 CLI FEATURES
MODULE 5 DISK ORGANIZATION
MODULE 6 MEMORY MANAGEMENT
MODULE 7 SYSTEM MAINTENANCE
MODULE 8 RDOS ERRORS

MODULE 1

INTRODUCTION TO RDOS

## MODULE 1 OBJECTIVES

### INTRODUCTION TO RDOS

After completing this module, you should be able to:

- A. DESCRIBE the function of an operating system.
- B. LIST Data General equipment which uses RDOS.
- C. DEFINE the meaning of the RDOS acronym.
- D. IDENTIFY the features of RDOS.
- E. LIST the languages supported by RDOS.
- E. IDENTIFY the meaning of the following terms:
  - a. CLI
  - b. system generation
  - c. foreground/background program
  - d. software patch
  - e. RDOS flavors

MODULE 1 STUDENT CHECKLIST

LESSON MENU	IN PROGRESS	COMPLETED
1. Definition and Features of RDOS .....		
2. Filenames and Communicating with RDOS .....		
3. Overview of Loading and Generating RDOS .....		



MODULE 2

SYSTEM START UP AND SHUT DOWN

## MODULE 2 OBJECTIVES

### THE COMMAND LINE INTERPRETER

After completing this module, you should be able to:

1. LIST the three steps to bring up an RDOS operating system.
2. TYPE in the correct data to load a program.
3. IDENTIFY and USE the command to bring down RDOS properly.

SYSTEM START UP AND SHUT DOWN

MODULE 2 STUDENT CHECKLIST

LESSON MENU	IN PROGRESS	COMPLETED
1. Starting up an RDOS system		
2. Shutting down and RDOS system		

MODULE 3

THE COMMAND LINE INTERPRETER

## MODULE 3 OBJECTIVES

### THE COMMAND LINE INTERPRETER

After completing this module, you should be able to:

1. IDENTIFY the meaning of the following terms:

- a. command
- b. argument
- c. local switch
- d. global switch

2. USE the following CLI commands in the proper command line format.

- |          |           |
|----------|-----------|
| a. GTOD  | f. CREATE |
| b. GMEM  | g. DELETE |
| c. DISK  | h. XFER   |
| d. PRINT | i. TYPE   |
| e. LIST  | j. LOG    |

MODULE 3 STUDENT CHECKLIST

LESSON MENU

LESSON MENU	IN PROGRESS	COMPLETED
1. Writing command lines		
2. Commands without arguments		
3. Command with arguments		
4. Summary		

MODULE 4

CLI FEATURES AND APPLICATIONS

## MODULE 4 OBJECTIVES

### CLI FEATURES AND APPLICATIONS

After completing this module, you should be able to:

1. MATCH the following CLI punctuation with the function they serve:

- |                |                       |
|----------------|-----------------------|
| a. Semicolon   | e. Angle brackets     |
| b. Backslash   | f. Commercial at sign |
| c. Up arrow    | g. .MC extension      |
| d. Parentheses |                       |

2. MATCH the following control sequences with the function they serve:

- |              |              |
|--------------|--------------|
| a. Control-A | e. Control-Q |
| b. Control-C | f. Control-S |
| c. Control-F | g. Control-Z |
| d. Control-L |              |

3. IDENTIFY the meaning of the following terms:

- a. CLI variables
- b. MACRO
- c. Indirect File

4. INTERPRET CLI error messages using the RDCS/DOS User's Handbook.



CLI FEATURES AND APPLICATIONS

MODULE 4 STUDENT CHECKLIST

LESSON MENU

LESSON MENU	IN PROGRESS	COMPLETED
1. CLI punctuation		
2. Control Sequences		
3. Macros, Variables, Error messages		
4. Summary		

MODULE 5  
DISK ORGANIZATION

## MODULE 5 OBJECTIVES

### DISK ORGANIZATION

After completing this module, you should be able to:

1. DIFFERENTIATE among contiguous, random, and sequential files.
2. DIFFERENTIATE among primary partitions, secondary partitions, and subdirectories.
3. IDENTIFY and USE the CLI commands that perform the following:
  - a. create a contiguous, random, and sequential file
  - b. create a secondary partition and a directory
  - c. initialize a directory or device
4. IDENTIFY the meaning of the following terms:

<ol style="list-style-type: none"><li>a. Disk block</li><li>b. Physical organization</li><li>c. Directory specifier</li><li>d. File characteristics</li><li>e. File attributes</li></ol>	<ol style="list-style-type: none"><li>j. Link</li><li>k. Logical organization</li><li>l. MAP.DR and SYS.DR</li><li>m. File templates</li></ol>
--	--

DISK ORGANIZATION  
MODULE 5 PROGRESS CHECKLIST

LESSON MENU	IN PROGRESS	COMPLETED
1. Physical and logical organization		
2. Organization of individual files		
3. Organization of groups of files		
4. File attributes, templates, characteristics		

MODULE 6  
MEMORY MANAGEMENT

## MODULE 6 OBJECTIVES

### MEMORY MANAGEMENT

After completing this module, you should be able to:

1. DIFFERENTIATE among the program segmentation techniques of:
  - a. Chaining
  - b. Swapping
  - c. Overlaying
  - d. Virtual Overlaying
  - e. Window Mapping
2. IDENTIFY the meaning of foreground and background processing.

MEMORY MANAGEMENT  
MODULE 6 PROGRESS CHECKLIST

LESSON MENU	IN PROGRESS	COMPLETED
1. Chaining, swapping, and overlaying .....		
2. Foreground and background processing .....		
3. Virtual overlaying and window mapping .....		

**MODULE 7**  
**SYSTEM GENERATION AND MAINTENANCE**

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**INTERNAL USE ONLY**

**7-1**

**052-000177**



## MODULE 7 OBJECTIVES

### SYSTEM GENERATION AND MAINTENANCE

After completing this module, you should be able to:

1. LIST the six major steps involved in installing a tailored RDOS system.
2. LIST the steps involved in installing the RDOS starter system from magnetic tape or diskette.
3. IDENTIFY the meaning of the following terms:
  - a. SYSGEN
  - b. Tuning
  - c. System stacks
  - d. System buffers
  - e. System cells
  - f. System task
  - g. System call
4. USE the utility programs BURST, DBURST, OWNER, and BACKUP and the DUMP command to make backup copies of disks.

SYSTEM GENERATION AND MAINTENANCE  
MODULE 7 PROGRESS CHECKLIST

LESSON MENU	IN PROGRESS	COMPLETED
1. RDOS installation and Generation		
2. Backing up disks		

MODULE 8  
RDOS ERRORS

## MODULE 8 OBJECTIVES

### RDOS ERRORS

After completing this module, you should be able to:

1. IDENTIFY the four main causes of RDOS system errors
2. INTERPRET the meaning of PANIC (exceptional status) codes, using the appropriate documentation.

RDOS ERRORS  
MODULE 8 PROGRESS CHECKLIST

LESSON MENU	IN PROGRESS	COMPLETED
1. RDOS Errors		

RDOS PANICS  
(SYSTEM EXCEPTIONAL STATUS)

RDOS PANICS

(SYSTEM EXCEPTIONAL STATUS)

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All RDOS systems will PANIC when certain potentially serious error conditions are encountered. This PANIC is a memory-resident routine with a starting address at location 11. Its purpose is to terminate the system operation, prevent possible degradation of the database and to print an error message at the master console, indicating the nature of the suspected problem. RDOS routines perform a JSR @11 to use PANIC when an error condition occurs; PANIC will then print the contents of the accumulators and an additional identifying code to indicate the specific nature of the problem. User programs may also generate a PANIC by the above method (this occurrence is rare). Generally if this does happen, the panic code will be user defined and will not resemble an RDOS panic code.

The format for an RDOS panic code is as follows:

PANIC MESSAGE FORMAT

-----

15352	04472	17207	31551	110021
AC0	AC1	AC2	AC3	PANIC CODE

RDOS/INFOS PANIC SUBCODES  
-----

The following RDOS/INFOS PANIC SUBCODES have been added to the operating system as an aid in problem determination occurring due to system failures. These new PANIC SUBCODES became affective in RDOS/INFOS 6.60/2.60, respectively. The following table lists SUBCODE definitions and respective accumulator.

**Table 9-1 Panic Subcodes**

PANIC SUB CODE -----	DESCRIPTION -----
PANIC 2 .....	SYSTEM DIRECTORY ERROR
110002	CALLED BY SYSTEM OVERLAY "WDBL"
PANIC 3 .....	INTERRUPT STACK FAULT
110003	CALLED BY "GSUB" AC2 <= CURRENT STACK POINTER
120003	CALLED BY "INTD" AC1 <= INTERRUPTING DEVICE CODE AC2 <= INTERRUPT STACK ADDRESS
130003	CALLED BY "GSUB" AC2 <= CURRENT STACK POINTER
140003	CALLED BY "GSUB" AC2 <= CURRENT STACK POINTER
150003	CALLED BY "GSUB" AC2 <= CURRENT STACK POINTER
PANIC 4 .....	INCONSISTENT SYSTEM DATA.
110004	CALLED BY "FIL I"
120004	CALLED BY "BLK I"
130004	CALLED BY "IOBU"
140004	CALLED BY "OPPRO"



**Table 9-1 Panic Subcodes (continued)**

PANIC SUBCODE	DESCRIPTION
PANIC 5 .....	MASTER DEVICE FILE DATA ERROR.
110005	CALLED BY "OVLA"
120005	CALLED BY "INI3"
130005	CALLED BY "SOV3"
140005	CALLED BY "SOV6"
150005	CALLED BY "SOV7"
160005	CALLED BY "SOV3"
PANIC 6 .....	MASTER DEVICE TIMEOUT.
110006	CALLED BY "INI3"
120006	CALLED BY "OVLA"
130006	CALLED BY "SOV3"
140006	CALLED BY "SOV6"
150006	CALLED BY "SOV7"
160006	CALLED BY "SOV3"
PANIC 7 .....	6060/6061/6067 DISK ERROR.
110007	CALLED BY "DZPD" AC0 <= DIA STATUS WORD AC1 <= DIB STATUS WORD AC2 <= BUFFER ADDRESS
PANIC 10 .....	UNCLEARABLE UNDEFINED INTERRUPT.
110010	CALLED BY "INTD" AC2 <= UNKNOWN DEVICE CODE IUDDC: DEVICE CODE IUDCT: # OF UNDEFINED INTERRUPTS

**Table 9-1 Panic Subcodes (continued)**

PANIC SUBCODE	DESCRIPTION
PANIC 11 .....	UNDEFINED EXTENDED INSTRUCTION UNMAPPED ECLIPSE SYSTEMS
110011	CALLED BY "GSUB"
PANIC 12 .....	SYSTEM DISK ERROR
110012	CALLED BY "FINIT2"
120012	CALLED BY "INI2"
PANIC 13 .....	ATTEMPT TO RETURN FROM BACKGROUND LEVEL 0.
110013	CALLED BY OVERLAY "SOV12" AC1 <= PARTITION BASE ADDRESS AC2 <= PROGRAM TABLE ADDRESS
120013	CALLED BY OVERLAY "SV27" AC2 <= CURRENT CELL (CC)
PANIC 14 .....	IPB PANIC
110014	CALLED BY "DPMO". AC2 <= DCB ADDRESS
120014	CALLED BY "DPMO"
130014	CALLED BY "DPMO"
140014	CALLED BY "DPMO"

**Table 9-1 Panic Subcodes (continued)**

PANIC	DESCRIPTION
PANIC 15 .....	MAP FAULT FROM INTERRUPT WORLD.
110015	CALLED BY "MAPZ" ACO <= PC OF TRAP
120015	CALLED BY "MAPZ"
PANIC 16 .....	MULTI-BIT ERCC ERROR.
110016	CALLED BY "INTD" ACO <= DIB 0,ERCC AC1 <= DIA 1,ERCC
PANIC 17 .....	MEMORY PARITY ERROR.
110017	CALLED BY "INTD". ACO <= DIA 0,PAR AC1 <= DIB 1,PAR
PANIC 20 .....	INSUFFICIENT MEM TO EXECUTE INFOS
110020	CALLED BY "INI1"
PANIC 21 .....	SPOOLER PANIC
110021	CALLED BY OVERLAY "SPLR"
PANIC 23 .....	UNIVERSAL POWER SUPPLY CONTROLER FAULT
110023	CALLED BY INTD
PANIC 77 .....	JUMP 0 PANIC, RDOS/INFOS TRIED TO EXECUTE LOCATION ZERO.
110077	CALLED BY LOCATION "INTD"
PANIC 100 .....	INFOS ATTEMPTED TO MAP MORE THAN TWO USER WINDOWS.
110100	CALLED BY "IRP2"

**Table 9-2 Core Resident Module Term Definitions**

Core Resident Module	Definition
"GSUB"	GENERAL SUBROUTINE
"INTD"	INTERUPT SERVICE ROUTINE
"FIL1"	FILE I/O ROUTINE
"BLK1"	BLOCK I/O ROUTINE
"OVLA"	OVERLAY LOADER
"IOBU"	I/O ROUTINE FOR A DEVICE BUFFER
"OPPRO"	OPERATOR MESSAGE HANDLER
"DPM0"	IPB HANDLER
"MAPZ"	MAP PROTECTION HANDLER
"DZPD"	ZEBRA DRIVER
"INI2"	INITIALIZATION CODE
"INI3"	INITIALIZATION CODE
"IRP2"	INFOS - MAP A BUFF WINDOW ROUTINE

**Table 9-3 System Overlay Term Definitions**

System Overlay	Definition
"SOV3"	SYSTEM OVERLAY #10
"SOV6"	SYSTEM OVERLAY #27
"SOV7"	SYSTEM OVERLAY #30
"SV27"	SYSTEM OVERLAY #62
"WDBL"	SYSTEM OVERLAY #24
"SPLR"	SYSTEM OVERLAY #25
"SOV12"	SYSTEM OVERLAY #36

**Table 9-4 RDOS/INFOS Panic Codes**

**Panic Code # 2 - System directoy Error ( SYS.DR )**  
-----

**Description:**

This panic is caused by an error in the operating system file SYS.DR. When RDOS/INFOS is trying to create a file, it must insert the name of the new file into the SYS.DR file. The system was trying to do that, when it found a block with room in it for the new name, but could not find the indicated free space in the block.

**Troubleshooting:**

This panic is usually caused by having either a bad link within the SYS.DR file, or having a block with bad information in it written into SYS.DR. Both of these would indicate some failure within the disk or within memory prior to the actual write to the disk.

**Panic Code # 3 - Interrupt Stack Fault**  
-----

This panic is caused by a stack overflow inside the RDOS/INFOS addressing space. The operating system uses stacks for temporary storage of its accumulators; Panic Code # 3 indicates that this current stack has just overflowed.

**Troubleshooting:**

This panic could be caused by a CPU/memory related problem. If the current stack pointer were to become corrupted then the execution of either a push or pop instruction could cause a stack fault to occur. This panic would also occur if a device were to continually interrupt. Because RDOS/INFOS uses the VCT instruction, a continuously interrupting device could cause enough return blocks to be pushed onto the interrupt stack causing it to overflow.

**Table 9-4 RDOS/INFOS Panic Codes (continued)**

**Panic Code # 4 - Inconsistent System Data**  
-----

**Description:**

This panic can be caused by any one of the following:

- A. RDOS/INFOS has encountered a logical block address which is outside the bounds of the disk.
- B. A device code was encountered in a table for which there is no corresponding device driver.
- C. A table address was found to point to the wrong place in memory.

**Troubleshooting:**

Item A in the description list above occurs most frequently. The location of a logical block outside the disks boundaries can be caused by several different failures. If a disk block is written incorrectly on the disk, it could contain a bad pointer in it. A bad block address can also be created by a memory going bad, e.g., picking or dropping bits within a block address. For this panic, check both the disk and memory for an intermittent failure.

The occurrence of items B and C above are extremely rare. Either a bad memory or a bad map cause them to occur. In either case, it would be a failure in the CPU, memory or MAP rather than a peripheral that causes the system to go down.

**Panic Code # 5 - Master Device File Data Error**  
-----

**Description:**

A Panic Code 5 is caused by a fatal status error on the disk from which RDOS was booted. RDOS/INFOS has tried to recover from the error ten (decimal) times and was unsuccessful.

**Troubleshooting:**

This panic indicates a disk failure. Test the last disk unit used to boot the system for reliability.

**Table 9-4 RDOS/INFOS Panic Codes**

**Panic Code # 6 - Master Device Timeout**  
-----

**Description:**

This panic is caused by the lack of an interrupt from the disk that was booted. RDOS/INFOS began an operation on that disk and the operation did not complete within ten seconds.

**Troubleshooting:**

This panic indicates a failure in the disk system, used to boot the system. Again, as was the case with a panic 5, check the disk unit's reliability.

**Panic Code # 7 - 6060/6061/6067 Disk Error**  
-----

**Description:**

This particular panic can only occur on a system that has a 6060, 6061, or a 6067 disk on it. It indicates is that a disk has returned an illogical status to the operating system.

**Troubleshooting:**

At the time of this panic, accumulator # 0 will contain the DIA status word for the controller. Accumulator # 1 contains the DIB status word for the drive in question. For a detailed description of how to determine which drive and/or controller, refer to Software FAB # S1023 dated 30 November 1978.

Table 9-4 RDOS/INFOS Panic Codes (continued)

Panic Code # 10 - Unclearable Undefined Interrupt  
-----

Description:

This panic will occur whenever the operating system receives an interrupt from a device which has not been SYSGEN'd and whose interrupt could not be cleared. RDOS/INFOS will try to clear the interrupt 2000 (decimal) times. If it cannot be cleared, the system will go down with a panic 10.

Troubleshooting:

At the time of this panic, accumulator # 2 will contain the device code of the device whose interrupt could not be cleared. If the device is a real one, try to find out why this interrupt logic failed. If, however, the device code is one for a device which does not exist, you should try to find out where the spurious interrupt is coming from and why.

Panic Code # 13 - Attempt To Return From Background Level 0  
-----

Description:

Theoretically this panic should never occur. However, if it does, it is an attempt to restore a program from a push file that was never written (the execution of the system call .RTN at level # 0 in the background).

Troubleshooting:

The first program that RDOS/INFOS runs in the background is CLI. CLI is run at what is referred to as level # 0, signifying that it is the first program in the system. If this program were to ever 'return' to the operating system then there would logically be nothing left in the system to run, which is contrary to the philosophy of using an operating system. It is possible to encounter this situation, however, if a user were to chain to one of his programs from level # 0 in the background and then do a .RTN in his program. CLI, itself, is protected from doing a .RTN call at level # 0. Therefore, it would have to be done in a user program.



**Table 9-4 RDOS/INFOS Panic Codes (continued)**

**Panic Code # 14 - IPB Panic**  
-----

**Description:**

This panic can only occur on those systems which have an IPB in them. It can be caused by either of two things. The first is an interrupt from the interval timer in the IPB, device code 37. The second is the receipt of an illegal message from the other CPU in the dual configuration.

**Troubleshooting:**

For the first condition listed above, the interval timer interrupt, if accumulator # 2 contains the octal number 064400, then this was what brought the system down. The operating system times all of the transmissions across the IPB's half-duplex line. If one of these transmissions has not completed within one second then the system will panic with code 14. The IPB handler program has a defined set of messages that it is capable of dealing with, if it should receive one of them from the other processor. If the IPB program were to receive something from the other processor that is not in that predefined list of proper messages then it panics with code 14. For either of these situations, it would be a fair assumption that the IPB itself was bad and should be replaced. One thing that you should be aware of when working on a dual-processor system is that if you depress 'STOP' on a CPU which is running RDOS/INFOS and communicating with another RDOS/INFOS CPU; that CPU will go down with a panic 14 because its interval timer will interrupt.

**Table 9-4 RDOS/INFOS Panic Codes (continued)**

**Panic Code # 15 - Map Fault From Interrupt World**  
-----

**Description:**

This panic is caused by a map violation in a user interrupt routine.

**Troubleshooting:**

If a user is servicing his own device, or any device which is not supported by RDOS/INFOS, the user must write his own device handler and interrupt service routine for that device. Within the interrupt service routine, the operating system not tolerate any traps (map violations). In order for RDOS/INFOS to guarantee real-time response a mistake in interrupt servicing is fatal. What this panic represents is either a 'bug', or mistake, or a corruption of the users memory. Accumulator # 0 will contain the logical address at which the trap occurred.

**Panic Code # 16 - Multi-bit ERCC Error**  
-----

**Description:**

Panic Code # 16 can only occur on Eclipse systems which have ERCC. This panic signifies the occurrence of a multi-bit error.

**Troubleshooting:**

At the time of this panic, accumulator # 0 will contain, in bits 0 through 4, the memory fault code. Accumulator # 0 will also contain, in bits 14 and 15, the high order two bits of the 18-bit failing physical address. Accumulator # 1 will contain the low order 16 bits of the 18-bit failing physical address. Using this 18-bit address and the interleaving factor the failing memory board can be determined.

AC0 <= DIB 0,ERCC  
AC1 <= DIA 1,ERCC

If a panic 16 occurs on an S/280 system only, the following is also true:

AC2 = Total count of ERCC errors since boot.

**Table 9-4 RDOS/INFOS Panic Codes (continued)**

**Panic Code # 17 - Memory Parity Error; NOVA 3 or S/20**  
-----

**Description:**

This panic can only occur on a NOVA 3 or S/20 system. It is a memory parity error.

**Troubleshooting:**

For a NOVA 3 at the time of the panic accumulator # 0, will contain, in bits 1 through 15, the low order 15 bits of the 17-bit failing physical address. Accumulator # 1, in bits 1 and 2, will contain the high order two bits of the 17-bit failing physical address. Using this 17-bit address and the interleaving factor the failing memory board can be determined.

For an S/20 at the time of the panic accumulators 0 and 1 will contain the address that caused the error.

**Panic Code # 20 - INFOS - Insufficient Memory to Execute INFOS**  
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**Description:**

This panic will only occur on an INFOS system. What it means is that INFOS has been SYSGEN'd such that it is too large to fit into memory. This will only show up when INFOS is booted from disk.

**Troubleshooting:**

The only troubleshooting that is necessary is to go back and redo the SYSGEN and try to decrease the size of the operating system.

**Table 9-4 RDOS/INFOS Panic Codes (continued)**

**Panic Code # 21 - Spooler Panic**  
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**Description:**

Panic # 21 is generated by the spooling program that is in RDOS/INFOS. Whenever this program gets an error on its own I/O it will bring the system down with a panic code 21.

**Troubleshooting:**

The occurrence of this panic indicates the fact that an unrecoverable I/O error has just occurred on the master disk. This is where all spooling operations take place. In order to find the error code number and the last disk status in error you should refer to FAB S1025 Software, dated 1/4/79, and TIB S1046 Software, dated 4/17/78, respectively.

Panic Code # 23 - Universal Power Supply Controller Fault

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Description:

The occurrence of a panic 23 indicates that the UPSC as determined the a fault exists in the power supply and interrupted RDOS prior to shutting down.

Troubleshooting:

At the time of the panic ACO will contain the fault code from the UPSC. To translate the fault code consult the hardware reference manual.