

N71-19793

RECONFIGURABLE G & C COMPUTER STUDY FOR SPACE STATION USE

FINAL REPORT

VOLUME VI

APPENDIX 4

31 January 1971

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Prepared Under Contract No. NAS9-10416

**Autonetics Division of North American Rockwell
for
Manned Spacecraft Center
National Aeronautics and Space Administration**

FOREWORD

This final report covers the work performed by Autonetics Division of North American Rockwell Corporation under a study contract entitled Reconfigurable G&C computer Study for Space Station Use. The report is submitted to the National Aeronautics and Space Administration Manned Spacecraft Center under the requirements of Contract NAS 9-10416. The study program covered the period from December 29, 1969 through January 31, 1971. The NASA Technical Monitor was Mr. E. S. Chevers.

The final report consists of seven (7) volumes:

Volume I	Technical Summary
Volume II	Final Technical Report
Volume III	Appendix 1. Model Specification
Volume IV	Appendix 2. IOP - VCS Detailed Design
Volume V	Appendix 3. System Analysis and Trade-Offs
Volume VI	Appendix 4. Software and Simulation Description and Results
Volume VII	Appendix 5. D-200 Computer Family
	Appendix 6. System Error Analysis
	Appendix 7. Reliability Derivation for Candidate Computers
	Appendix 8. Power Converter Design Data
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1.0 RGC ASSEMBLY PROGRAM

1.1 INTRODUCTION

This section describes the RGC assembly program from a user's standpoint. The program is available in card deck form compatible with the IBM S360 at Autonetics or the XDS Sigma 5 at NASA MSC.

1.2 SYMBOLIC NOTATION

1.2.1 Symbols

A symbol is a string of from one to six alphabetic or numeric characters the first of which is non-numeric. The legitimate characters are the letters A to Z and the digits 0 to 9. The value of a symbol is defined by its appearance in the location field of an input card. Every symbol appearing in a program must be defined once and only once.

There are ten special symbols, 9 are used to reference RGC computer registers; these are: R1 (Register 1), R2 (Register 2), ..., R9 (Register 9). The asterisk, *, is used to designate the current memory address being assembled; i.e., the address specified by the location field.

1.2.2 Symbolic Expressions

A symbolic expression is a decimal integer, a symbol (including the special symbols), or a symbol and an integer connected by the arithmetic operator + or -.

1.3 INPUT DESCRIPTION

Programs for the RGC computer system are written in a symbolic assembly language consisting of symbolic instructions, data items, storage assignments, and comments. A symbolic instruction is either a direct machine instruction or an assembler pseudo-operation. Data items can be either decimal integers, decimal numbers stored in floating point format, or BCD character strings. Storage assignment and allocation is accomplished through the use of assembler pseudo-operations. Comments may be included with an instruction or data item or may be inserted as desired in the program sequence.

Symbolic instructions and data items are punched one per card (EBCDIC) in the following general format:

1. Location Field	Card columns 1-6
2. Operation Field	Card columns 8-10
3. Variable field	Card columns 16-72
4. Comments Field	Card columns 17-72
5. Tag Field	Card column 72
6. Identification Field	Card columns 72-80

1.3 (Continued)

NOTES:

1. A blank column must separate the variable field from the comments field.
2. Card column 7 must be blank.
3. If the location field is not blank, it must have a character in card column 1.

1.3.1 Location Field

This field generally defines the memory location to be assigned to the corresponding instruction. For purposes of assembly, memory addresses can range from 0000 through 9999.

The location field may contain one of the following:

1. Blank - a blank location field will cause the assembler to assign the next sequential memory location.
2. Symbol - any legitimate symbol other than the 11 special symbols. The memory location will be assigned as described for a blank field.
3. Asterisk - this is a special case and designates a comments card. When an asterisk, *, is punched in column 1, the assembler does not process the card, but reproduces it on the output listing.

1.3.2 Operation Field

The operation field contains a 1- to 3-character mnemonic defining an RGC computer instruction or assembler pseudo-operation. The legitimate computer instructions are described in Section 8.2.2, Vol. 2. The assembler pseudo-operations are described in a later section.

1.3.3 Variable Field

This field is used to identify and define any variable data associated with the instruction or pseudo-operation specified in the operation field. The format of the variable field for pseudo-operations is described individually in a later section. The format of the variable field for machine instructions is given in Section 8.2.2, Vol. 2; however, generally, this field contains up to three subfields separated by commas. Each subfield contains a symbolic expression which specifies an RGC memory address, register, or machine flag.

1.3.3 (Continued)

In addition, address modification (indexing) can be designated by appending a dollar sign, \$, to the symbolic expression. The dollar sign is followed by a digit from 1 to 9 to specify the particular register to be used.

1.3.4 Comments Field

The comments field begins with the first blank column after column 16. It can contain any string of alphanumeric (EBCDIC) characters. This field is not interpreted by the assembler, but is reproduced on the output listing and is used to increase program readability.

1.3.5 Identification Field

The identification field is used to identify and serialize the program card deck. This field is not interpreted by the assembler, but is reproduced on the output listing.

1.3.6 Tag Field

This field is only meaningful for machine instructions. An asterisk in the field designates that a time synchronization is to be performed in the simulator prior to executing the machine instruction. This is accomplished in the simulator by insuring that all CPUs and IOPs have been simulated up to the time of this instruction prior to proceeding with the simulation. The main purpose of this feature is to insure realistic timing relationships between processors where instruction execution causes processor (CPU/IOP) interaction.

1.4 PROGRAM MODULARITY

It is often desirable to load/execute programs or subprograms in areas of memory other than those in which the programs were assembled. Additionally, in a redundant computer system it may be necessary to load a single program module (subprogram) into more than one memory module. This requires facilities to enable definition of program sub-units and to allow program relocation.

The assembler provides the "MOD" pseudo-operation to facilitate sub-unit definition. This feature allows a program module to be identified with a symbolic name by which it can be subsequently referenced during the simulator loading process.

In order to facilitate the relocation process, the assembler (and computer simulator) utilizes displacement addressing; i.e., addressing relative to the program counter, for all operands accessed from memory. For example, if the operands of an ADD instruction in loc. 1400 were located in 1300 and 1301, the operand addresses generated by the assembler in the punched output deck would be -100 and -99, respectively. Note that the printed output will reflect the actual memory addresses.

1.5 STORAGE PROTECTION

The RGC computer system provides a memory storage protection feature on an individual memory address basis. This feature is essentially a binary indicator associated with each memory or flag address which is used to determine whether modification of the contents of the address are permitted during program execution. The storage protection indicators are set during the simulator loading process and the setting for each address is specified in the assembly program output deck.

As part of the simulator initialization process, all memory locations are established as unprotected prior to the memory loading process. All machine instructions and data items are assembled into protected memory locations (no modification permitted) unless an RSP pseudo operation is encountered. This pseudo operation causes subsequent instructions and data to be assembled in unprotected locations. Note that the BSS, MB, and FB pseudo operations, while reserving memory addresses, do not actually load data. Therefore, these operations do not affect the storage protection indicators.

1.6 PSEUDO-OPERATIONS

This section describes the available assembler pseudo-operations which can be used for storage allocation, data generation, assembly mode control, etc.

1. TTL (Title)

Format: 1. Location Field - Blank
 2. Variable Field - Alphanumeric characters

Description: The current page on the output listing is ejected. All subsequent pages will be headed with the characters in the variable field until another TTL card is encountered.

2. SP (Space)

Format: 1. Location Field - Blank
 2. Variable Field - A positive decimal integer less than 10.

Description: The output listing is advanced the number of lines specified in the variable field.

3. EJ (Eject)

Format: 1. Location Field - Blank
 2. Variable Field - Blank

Description: The current page on the output listing is ejected.

4. END (End)

Format: 1. Location Field - Blank
 2. Variable Field - Blank

1.6 (Continued)

Description: This card signifies the end of the source program deck; it must be present as the last card of each program.

5. NDK (No Deck)

Format: 1. Location Field - Blank
2. Variable Field - Blank

Description: Punching of the output card deck is inhibited.

6. EQU (Equate)

Format: 1. Location Field - Symbol (except special symbols)
2. Variable Field - Symbolic expression

Description: The symbol in the location field is assigned the value of the expression in the variable field. Note that any symbol appearing in the variable field must have been previously defined.

7. ORG (Origin)

Format: 1. Location Field - Blank
2. Variable Field - Symbolic Expression

Description: The next location assigned by the assembler is determined by the variable field.

8. ADR (Address Constant)

Format: 1. Location Field - Symbol or Blank
2. Variable Field - Symbolic Expression

Description: The value of the expression in the variable field is assembled in the current location in the decimal integer format.

9. DEC (Decimal Constant)

Format: 1. Location Field - Symbol or Blank
2. Variable Field - A decimal number of the form
± 123.4567E12.

Description: The number in the variable field is assembled in the current location. If no decimal point appears in the number, it is assembled in the integer format, otherwise it is assembled in the floating-point format. The E-notation is used to designate decimal exponentiation.

1.6 (Continued)

10. BSS (Block Started by Symbol)

Format: 1. Location Field - Symbol or Blank
 2. Variable Field - Symbolic Expression

Description: A sequential block of memory locations is reserved. The length of the block is equal to the value of the expression in the variable field. Note that any symbol appearing in the variable field must have been previously defined.

11. MB (Memory Block) and FB (Flag Block)

Same as BSS. Supplied as a documentation aid in distinguishing data word blocks from flag word blocks.

13. RSP (Release Storage Protect)

Format: 1. Location Field - Blank
 2. Variable Field - Blank

Description: Subsequent machine instructions and data items will be assembled in "unprotected" memory locations.

14. FLG (Initialize Flags)

Format: 1. Location Field - Blank
 2. Variable Field - Symbolic Expression, Binary String

Description: A block of flags starting with the address determined by the value of the expression in the 1st subfield of the variable field is set to the state(s) specified by the digits in the 2nd subfield. (Where 1 = True, 0 = False). The length of the block is determined by the number of binary digits in the 2nd subfield.

12. MOD (Module Definition)

Format: 1. Location Field - Blank
 2. Variable Field - Symbol

Description: A program module is defined with the name specified in the variable field. All subsequent instructions and data will be associated with this module until another MOD pseudo-operation is encountered. A MOD card must appear in the program deck prior to the first machine instruction.

1.7 ERROR DETECTION

During the assembly process, certain types of source program errors may be discovered. These errors will be indicated by an alphabetic designator on the output listing. The following is a preliminary list of the error types along with the alphabetic designator:

U	Undefined symbol: a symbol appears in a variable field but never appears in a location field.
M	Multiply defined symbol: a symbol appears in more than one location field.
L	Location field error: something other than a legitimate symbol appears in the location field.
O	Operation code error: something other than a legitimate operation code mnemonic appears in the operation field.
F	Variable field format error: the format of the variable field is incorrect.
A	Variable field addressing error: an address in the variable field is illegitimate or a symbol in the variable field refers to a different memory module than the instruction location.
T	Variable field indexing error: one or more of the index register specifications is illegitimate.

1.8 OUTPUT DESCRIPTION

The Assembly Program generates output in both printed and punched card form. The printed output consists of the Program Listing, Symbol List, and Module List. The punched card output is referred to as the program Object Deck.

Examples of the printed output may be seen in Volume 6, Appendix 4 of this report.

1.8.1 Program Listing

The program listing will provide a hard-copy listing of the input source cards together with assembler-generated data. The information will be presented in a one source card per line format.

1.8.2 Symbol List

The symbol list will directly follow the program listing and contains an alphabetically ordered list of all symbols appearing in the program together with their value.

1.8.3 Module List

The module list will directly follow the symbol list and contains an alphabetically ordered list of all program modules defined in the program together with the starting and ending locations assembled in the module.

1.8.4 Object Deck

The object deck is punched in EBCDIC format and contains a numeric representation of the assembled program for input into the Simulator program.

2.0 RGC SYSTEM SIMULATION PROGRAM

2.1 INTRODUCTION

This section describes the RGC System Simulation program from a user's standpoint. The program is available in card deck form compatible with the IBM S360 at Autonetics or the XDS Sigma 5 at NASA MSC.

2.2 GENERAL

The RGC System Simulation program provides a functional, interpretive simulation of the RGC computer system described in Section 8.2.2, Volume 2. The simulator is executed in a non-interactive batch processing environment. Programs written for the RGC computer system are processed by the RGC Assembly Program which produces a punched card deck suitable for input to the simulator. These programs, together with appropriate simulation control cards, constitute the input for a simulation run. Execution of the simulation consists of reproducing instruction by instruction operation of the central processing and input/output processing units of the RGC computer system while maintaining a pseudo real time reference. This process continues until terminated by the time limit, specified on a control card, is exceeded or a non-recoverable condition is created in the simulated system.

2.3 INPUT DESCRIPTION

The input card deck is composed of three types of data: 1) simulation control, 2) fault events, and 3) object programs. The first two types may be placed in any order but they both must precede the third type. The general card format for all data except object programs is as follows:

- | | |
|-------------------------|--------------------|
| 1. Time Field | Card columns 1-8 |
| 2. Operation Field | Card columns 10-12 |
| 3. Variable Field | Card columns 16-71 |
| 4. Continuation Field | Card column 72 |
| 5. Identification Field | Card columns 73-80 |

Time Field - This field contains a decimal number of up to 8 digits or a decimal number of up to 6 digits followed by an "E" and another digit. The "E" designator denotes decimal exponentiation.

Operation Field - This field contains a 1 - to 3-character mnemonic designating one of a predetermined set of control or fault options.

Variable Field - This field can contain multiple subfields separated by commas. Each subfield contains a decimal integer or a 1 - to 6-character alphanumeric symbol.

Continuation Field - This field is applicable only to Fault Event data; the letter "T" in this field indicates that the value of the time field is to be continued for the next cards.

2.3 (Continued)

Identification Field - This field is not interpreted by the simulator. It can be used for identification and serialization of the input deck.

2.3.1 Simulation Control Cards

The following is a list of the simulation control options:

1. TTL (Title)

Format: The variable field contains a string of alpha-numeric characters.

Description: The character string in the variable field is reproduced at the top of each page of the output listing.
2. LIM (Execution Time Limit)

Format: The variable field contains a decimal integer $\leq 999,999,999$.

Description: The simulation execution will be terminated if the simulation clock exceeds the number in the variable field. The units of time are tenths of microseconds.
3. TIM (Simulation Time Resolution)

Format: The variable field contains a decimal integer.

Description: The number in the variable field specifies the width of the maximum time slot associated with CPU/IOP updating cycle; i.e., the maximum pseudo real-time difference between any two CPUs/IOPs during simulation. The time units tenths of microseconds.
4. MSZ D, F (Memory Size)

Format: a) The time field contains a decimal integer (1-8)
b) The variable field contains 2 subfields each containing a decimal integer.

Description: The memory module designated by the time field is assigned M data locations and F flag locations. If more than one MSZ card is included, D and F must be the same on all cards.

2.3.1 (Continued)

5. MIC 0, A, B (Memory Initial Conditions)
- Format: a) The time field contains a decimal integer (1-8)
- b) The variable field contains 3 subfields, each containing a decimal integer.
- Description: The memory module designated by the time field is initialized to the conditions specified in the variable field, where 0 is the access option (1-5) and A and B are the addresses (1-8) on Bus A and Bus B respectively. A MSZ card must appear in the deck prior to any MIC cards.
6. CPU N /I₁, D₁, /I₂, D₂, ... (CPU)
- Format: The variable field contains an optional number of subfields separated by commas and slashes (/).
- Description: The CPU designated by N, the first subfield, is initialized to the conditions specified by the remaining subfields. The number immediately following a slash must be an integer, 1-12, and selects the particular parameter to be initialized. The selected parameter is initialized to the value specified by the next subfield (D_i). The following is a list of the parameters that can be initialized.
1. Not currently used.
 2. Program Counter
 3. Compartment (0 = Comp. A, 1 = Comp. B)
 4. Memory Mode (0 = Main Memory, 1 = ROM)
 5. Memory Bus (0 = Bus A, 1 = Bus B)
 6. Execution Time Clock
 - 7-11 Not currently used.
 12. Trace Mode (0 = System Trace, 1 = Inst. Trace)
7. IOP N /I₁, D₁, /I₂, D₂, ... (IOP)
- Format: The variable field contains an optional number of subfields separated by commas and slashes (/).
- Description: The IOP designated by N is initialized to the conditions specified by the remaining subfields. The number immediately following a slash must be an integer, 1-21, and selects the particular parameter to be initialized. The selected parameter is initialized to the value specified by the next subfield (D_i). The following is a list of the parameters that can be initialized:

2.3.1 (Continued)

7. IOP (Continued)

1. Not currently used
2. Program Counter
3. Compartment (0 = Comp. A, 1 = Comp. B)
4. Not currently used
5. Memory Bus (0 = Bus A, 1 = Bus B)
6. Execution Time Clock
- 7-11. Not currently used
12. Trace Mode (0 = System Trace, 1 = Inst. Trace)
13. Real Time Clock Interval
- 14-19. Not currently used.
20. Watchdog Timer Initial Value
21. Real Time Clock Initial Value

8. MEM D, N, 0 (Memory Module)

Format: The variable field contains three subfields. The first subfield contains either M or R and the other two subfields contain decimal integers.

Description: Subsequent ~~MOD~~ cards will cause the specified object program module to be loaded into the memory module designated by D and N where D specifies either main memory (M) or read-only memory (R) and N is the module number. The program will be loaded starting at the location specified by 0.

9. MOD NAME, L, H (Program Module)

Format: The variable field contains three subfields. The first subfield contains an alphameric symbol of up to six characters and the other two subfields contain decimal integers.

Description: The object program module, NAME, is loaded into the memory module specified by the most recent MEM card. L and H are the low and high limits respectively of the program module.

10. SPM (Start Program Modules)

Format: The variable field is blank.

Description: This card must immediately precede the object program modules.

2.3.2 Fault Event Cards

Fault Event cards follow the general format previously described. The Time Field designates the simulation time at which the fault event is to be initiated. Multiple faults can be initiated simultaneously by coding a "T" in the Continuation Field of the first Fault Event card, and leaving the Time Field of subsequent cards blank.

The Operation Field must contain one of the following mnemonics:

1. SFL (Start Fault List)

This card designates the beginning of the Fault Event cards; it must be the first card in the Fault Event deck.

2. EFL (End Fault List)

This card designates the end of the Fault Event cards; it must be the last card in the Fault Event deck.

The general format for the variable field on the following cards contains three subfields: 1) fault type, 2) fault duration, and 3) fault data. The subfields are separated by commas and each contains a decimal integer. The first subfield selects one of a pre-determined set of fault types associated with the particular operation code. The second subfield specifies the time duration, if any, for the fault event. The third subfield is used to specify any variable data associated with a particular fault type.

3. CP1, CP2, CP3, CP4 (CPU Fault)

These cards designate a fault event for the specified CPU. The variable field follows the standard format. The fault types which are currently implemented are listed below:

- (8) Register read fault
- (9) Register write fault
- (10) Program control fault

4. IO1, IO2, IO3, IO4 (IOP Fault)

These cards designate a fault event for the specified IOP. The variable field follows the standard format. The fault types which are currently implemented are listed below:

- (10) Program control fault

2.3.2 (Continued)

5. MM1, MM2, ..., MM8 (Memory Module Fault)

These cards designate a fault event for the specified memory module. The variable field follows the standard format. The fault types which are currently implemented are listed below:

- (3) Operand Read Fault
- (4) Operand Write Fault
- (5) Flag Read Fault
- (6) Flag Write Fault
- (7) Instruction Read Fault

6. VC1, VC2, VC3, VC4 (VCS Fault)

These cards designate a fault event for the specified VCS. The variable field follows the standard format. The fault types which are currently implemented are listed below:

- (1) S-Matrix Fault - the data field for this fault type contains a four-digit number, each digit corresponding to one column of the S-Matrix. The digits must be 0, 1, or 2 and have the following significance:
 - 0 = permanent "0" in the column
 - 1 = permanent "1" in the column
 - 2 = normal operation of the column
- (2) P-Matrix Logic Fault

2.3.3 Object Programs

The object program modules can be included in the input deck in the same form as they were generated by the Assembly Program. The program modules may be included in any order, but all modules must be grouped together and preceded by SPM (Start Program Modules) card.

2.4 OUTPUT DESCRIPTION

There are two primary mode/formats of printed output available in the simulation program. The most detailed format is the instruction-by-instruction trace mode. In the mode, simulated execution of every CPU and IOP instruction causes a line of trace to be printed. The line contains the simulation time, instruction type, operand addresses, and operand values. A title line indicates each time the simulation is switched from one processor to another. In addition, significant VCS activity is traced as in the system trace mode.

2.4 (Continued)

The system trace mode provides a greatly improved output format from the standpoint of readability and visibility for overall simulated system operation. In the mode, only significant simulation activity causes printed output to be generated. Using the "Print" pseudo-operations, the programmer can control program execution tracing internal to his program such that significant events within the program execution path will cause text or data to be listed on the simulator output listing together with the simulation time. Section 4 of this appendix contains a sample of this output mode. The following is a list of the messages generated by the simulator in this mode. Underscores in the messages indicate places where variable data would be included:

1. "MEMORY ACCESS ERROR. CPU INTERRUPT NO. 2"

This message is generated if a storage protect violation or a bus access violation occurs in a CPU.

2. "MEMORY ACCESS ERROR. IOP INTERRUPT NO. 4"

This message is analogous to No. 1 for an IOP.

3. "LOAD VCS _____. P-MTRX () = _____"

This message is printed when an LP instruction is executed by an IOP.

4. "LOAD VCS _____. R-MTRX () = _____"

This message is analogous to No. 3 for an LR instruction.

5. "OUTPUT MSG TYPE _____ TO COMPUTER(S) _____"
"DATA = _____"

This message is printed when an OC instruction is executed by an IOP.

6. "EXCESSIVE ERRORS () ON BUS _____ SWITCH TO VCS _____"

This message is printed when an IOP transmission mode switch occurs.

7. "LOAD VCS _____ WORD = _____ LEVEL = _____"
R1 = _____ R2 = _____ R3 = _____"

This message is printed as a result of an OS, OSN, IS, or ISN instruction being executed by an IOP and indicates that a data word has been transmitted to a VCS.

2.4 (Continued)

8. "INPUT FROM LP _____ ON BUS(S) _____ DATA = _____"

This message is printed when an input transmission occurs due to execution of an IS or ISN instruction by an IOP.

9. "***** VCS _____ OUTPUT RESULT = _____ *****"

This message is printed when a word is transmitted on a bus through a VCS.

10. "VCS _____ P-MTRX = _____ R-MTRX = _____"

This message is printed when the state of the P or R matrix is changed.

11. "VCS _____ S-MTRX = _____"

This message is printed when a voting operation takes place in a VCS.

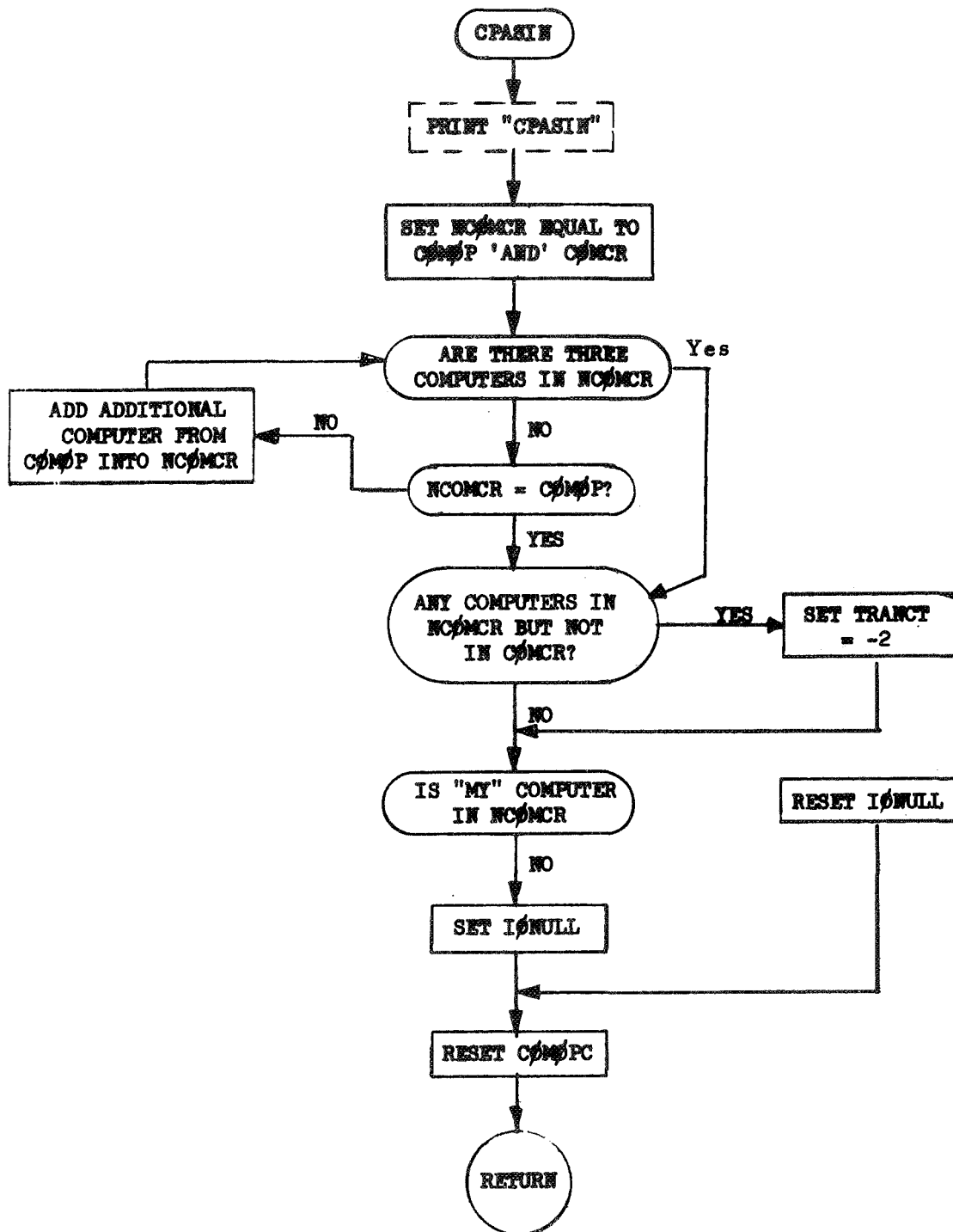
3.0 RGC SOFTWARE SYSTEM

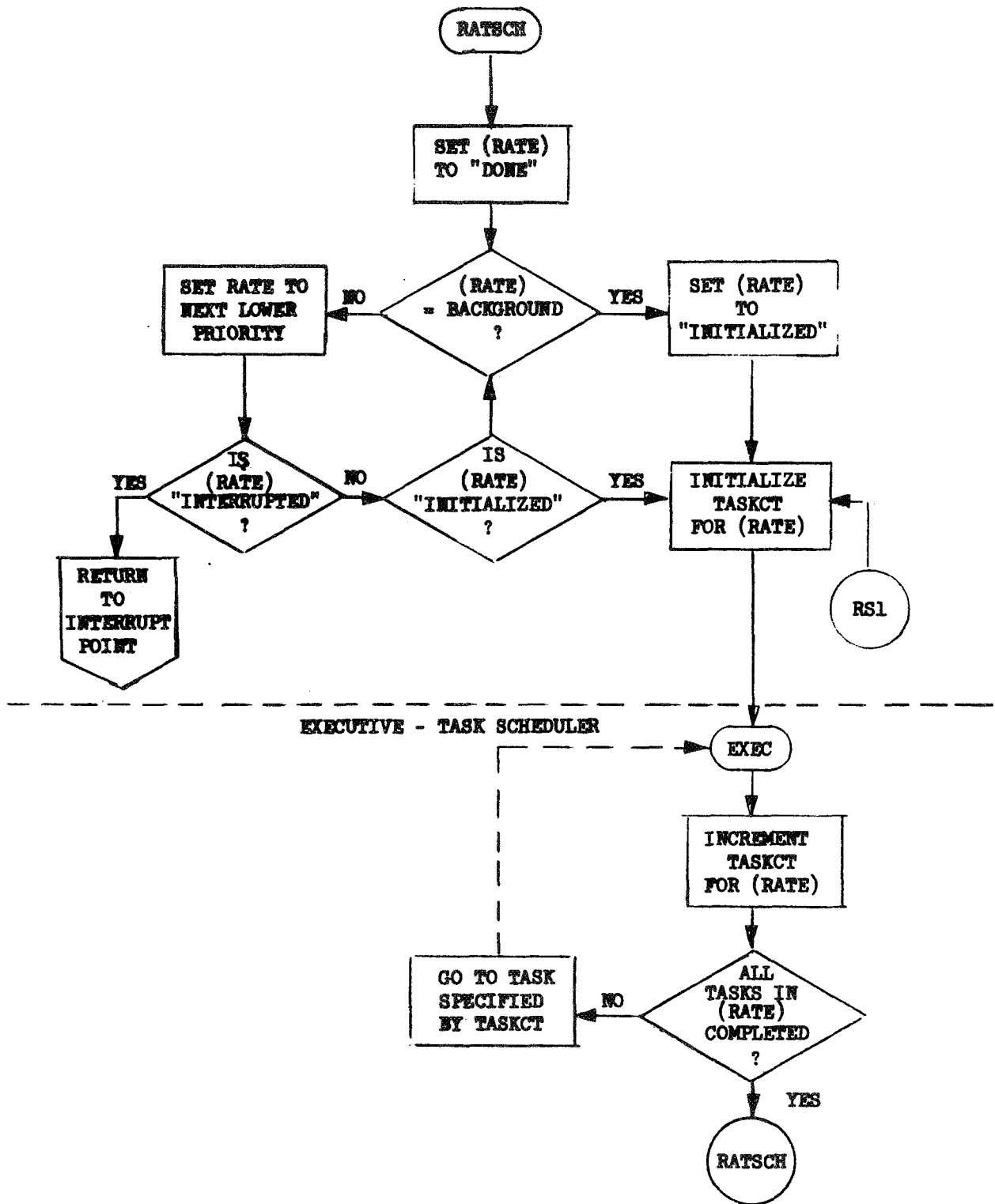
This section contains flow diagrams and listings of the Executive, Resource Controller, and Input/Output program modules which comprise the RGC Software System. In some cases, the flow diagrams make reference to program symbols. The following is a list of these symbols and their significance to the programs:

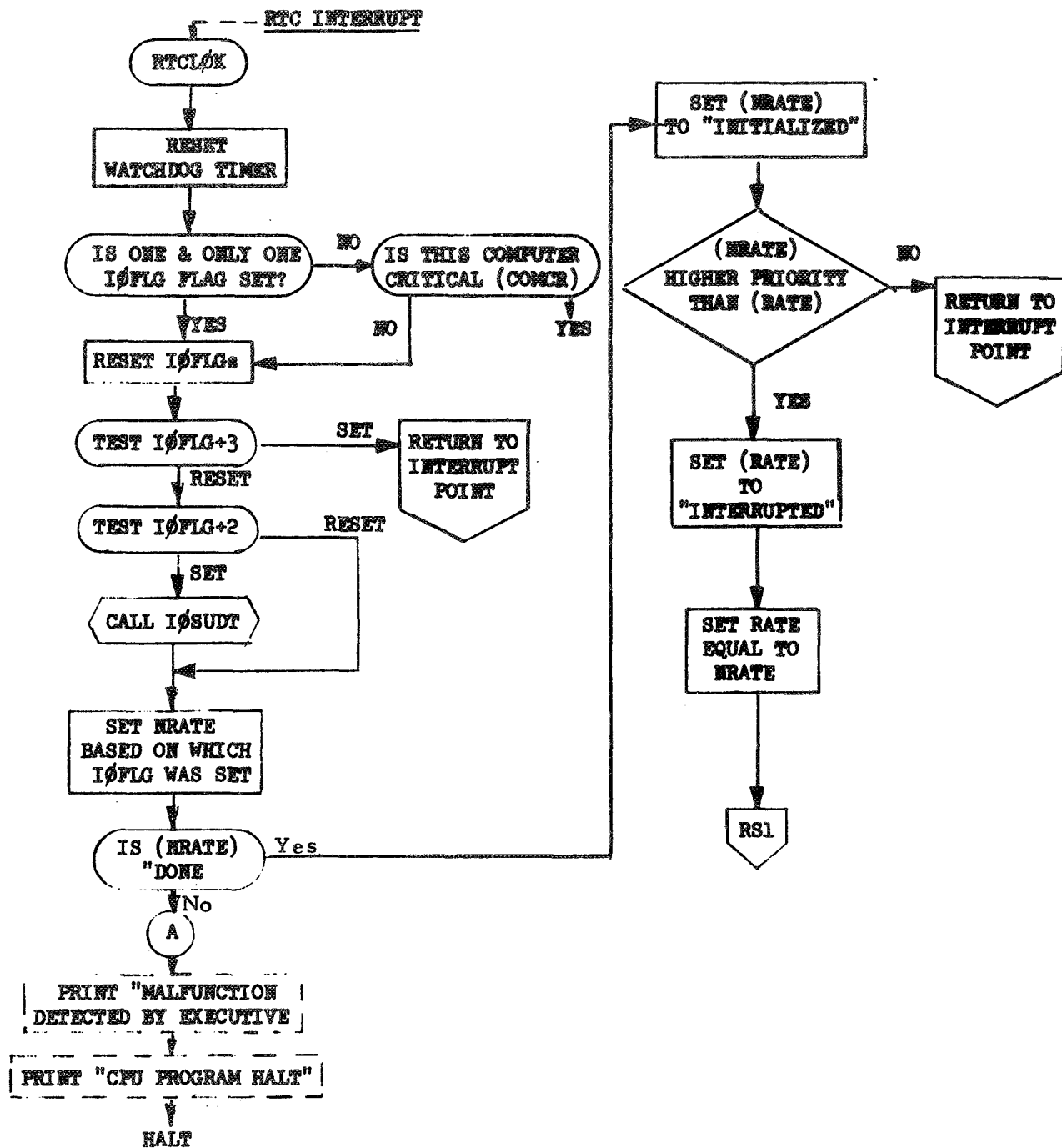
BK1FLG	A flag set by the CPU to cause a "background" message to be transmitted by the IOP.
CØMCR	Four flags that designate which of the four computers currently have critical status.
CØMØP	Four flags that designate which of the four computers currently have operational status.
ELVAS1, E2VAS1 ELVAS2, E2VAS2	Four of the Error Status flags used by the Resource Controller for error analysis.
INIFLG	A flag used to inhibit I/O transmission during system initialization. It is set by the Executive.
IØFLG, IØFLG+1 IØFLG+2, IØFLG+3	Four flags used to specify which of the four I/O cycles has most recently been completed.
IØNULL	A flag which causes the IOP to bypass the critical I/O when the computer is not in critical status.
NCØMCR	Four flags that designate the new or updated value of CØMCR during the transition period following a reconfiguration.
PVØTE	Four flags which represent a given computer's "vote" on the operational status of the other computers. This will be identical to CØMØP except when the Resource Controller detects a failure in another computer.
RATE	A word which specifies the computation frequency currently being scheduled by the Executive. The expression, (RATE), is used to designate "the contents of RATE".
SCUMP	Four flags which contain the most recent sample of the S-Matrix of the Primary VCS after the critical I/O cycle.

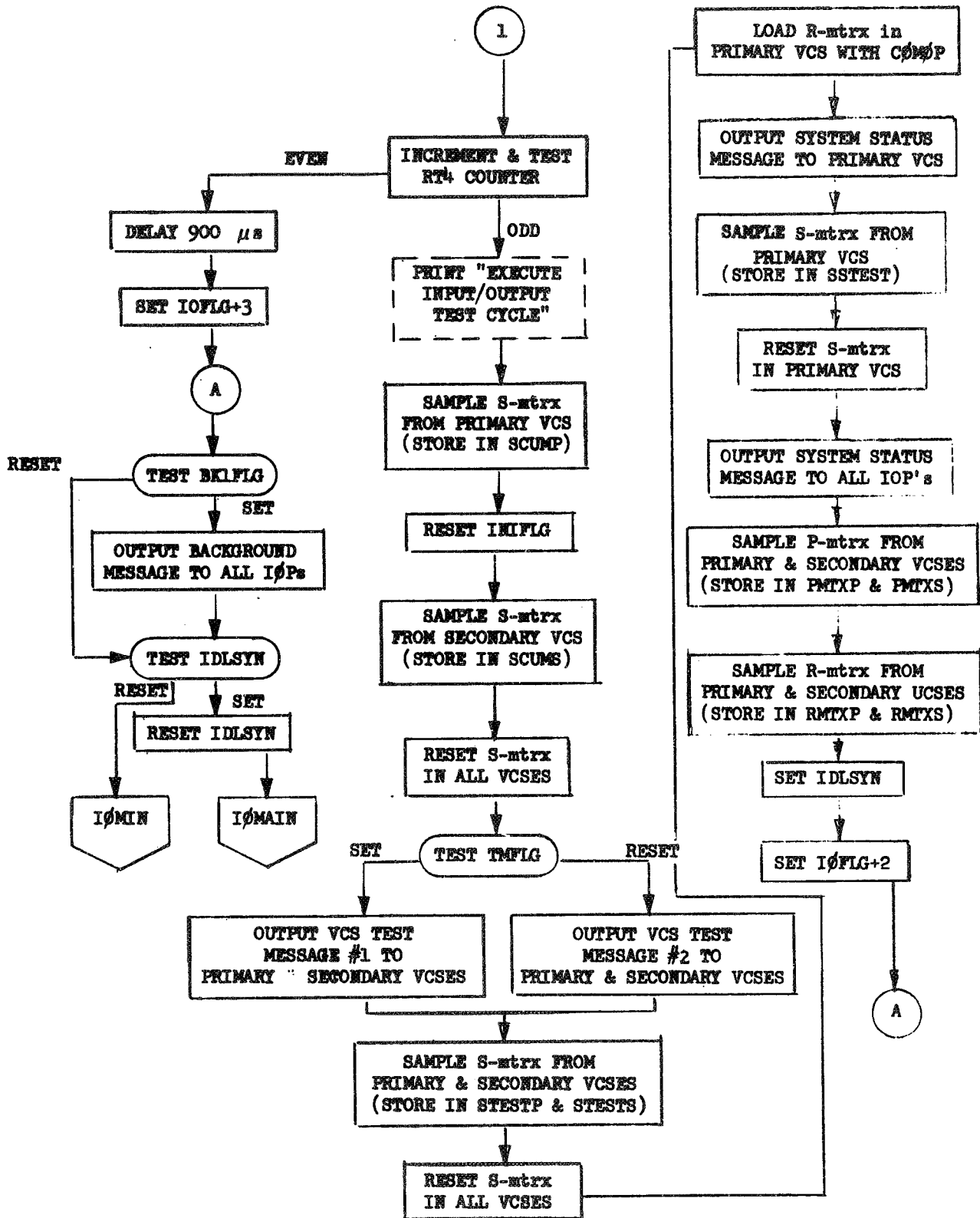
3.0 (Continued)

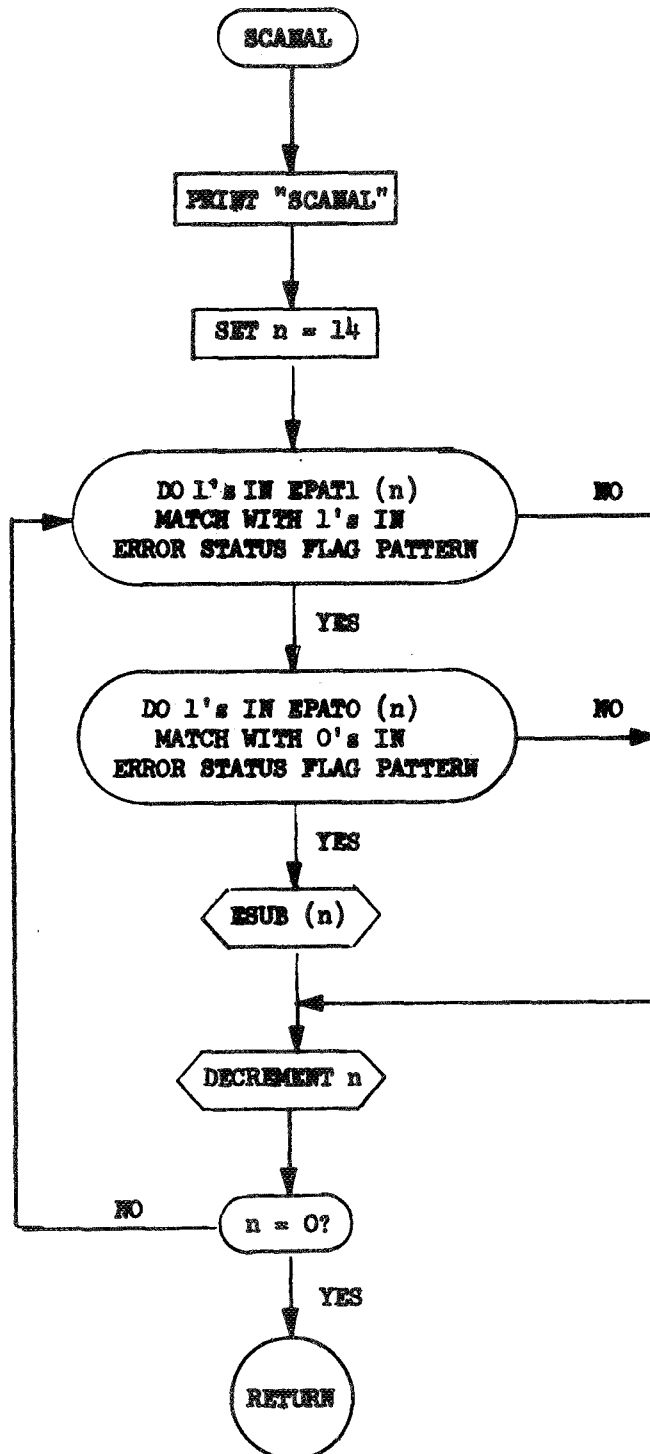
SSTEST	Four flags which contain the most recent sample of the S-Matrix after the System Status Test.
STESTP, STESTS	Eight flags which contain the most recent sample of the S-Matrix after the VCS test for the Primary (STESTP) and Secondary (STESTS) VCSs.
TMFLG	A flag which specifies which of the two test messages is to be transmitted during the VCS test.
TRANCT	A word used as a flag to indicate that a transition from non-critical to critical status is occurring in some computer.
VCSAS	A word that designates which VCS is currently assigned as Associate.
VCSOP	Four flags that designate which of the four VCSs currently have operational status.
VCSPR	A word that designates which VCS is currently assigned as Primary.
VCSSC	A word that designates which VCS is currently assigned as Secondary.
VCSSP	A word that designates which VCS is currently assigned as Spare.
VISTC	A word used as a module 4 counter to identify which of the VCS Test combinations is to be performed.

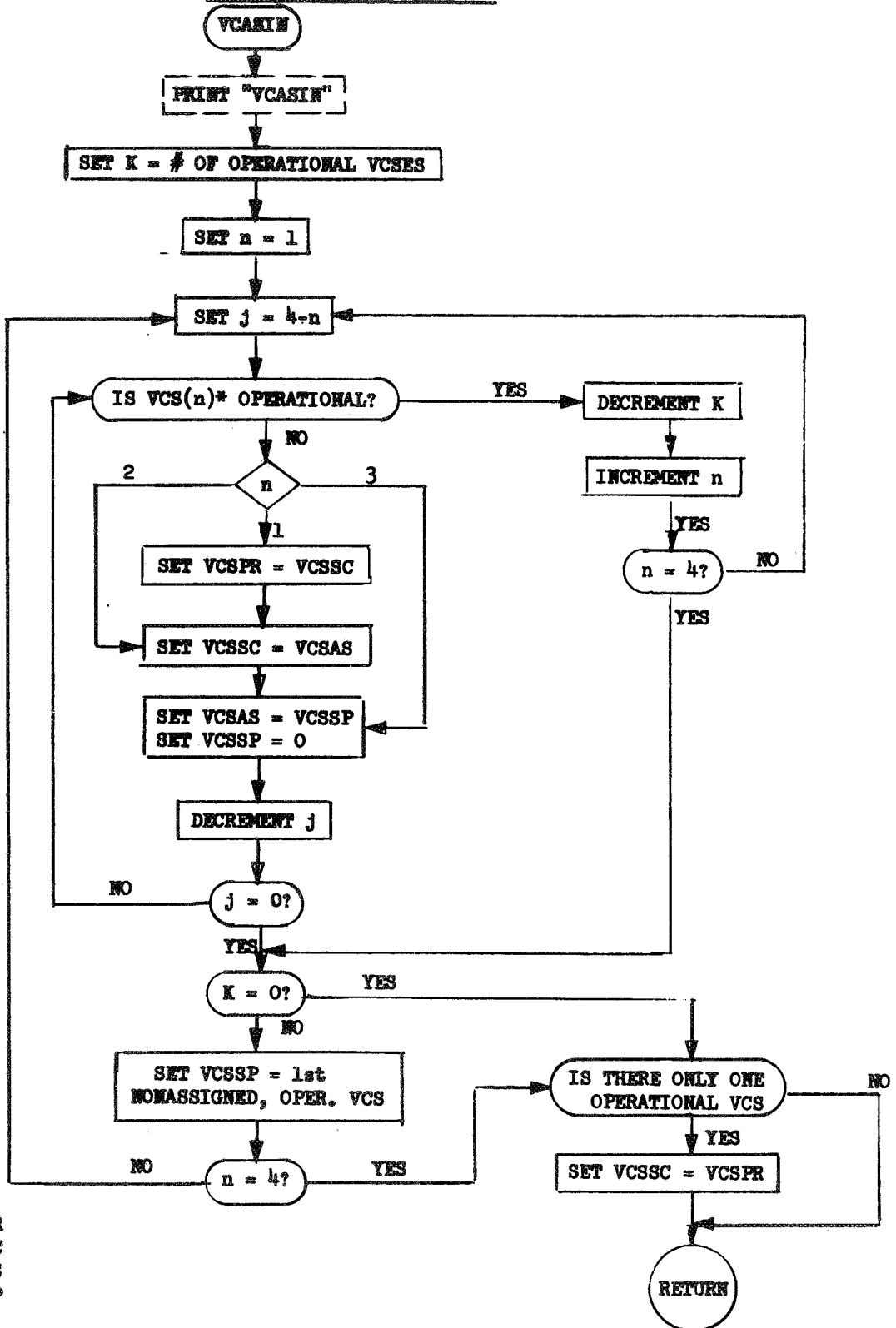
COMPUTER ASSIGNMENT SUBROUTINE

EXECUTIVE - RATE SCHEDULER

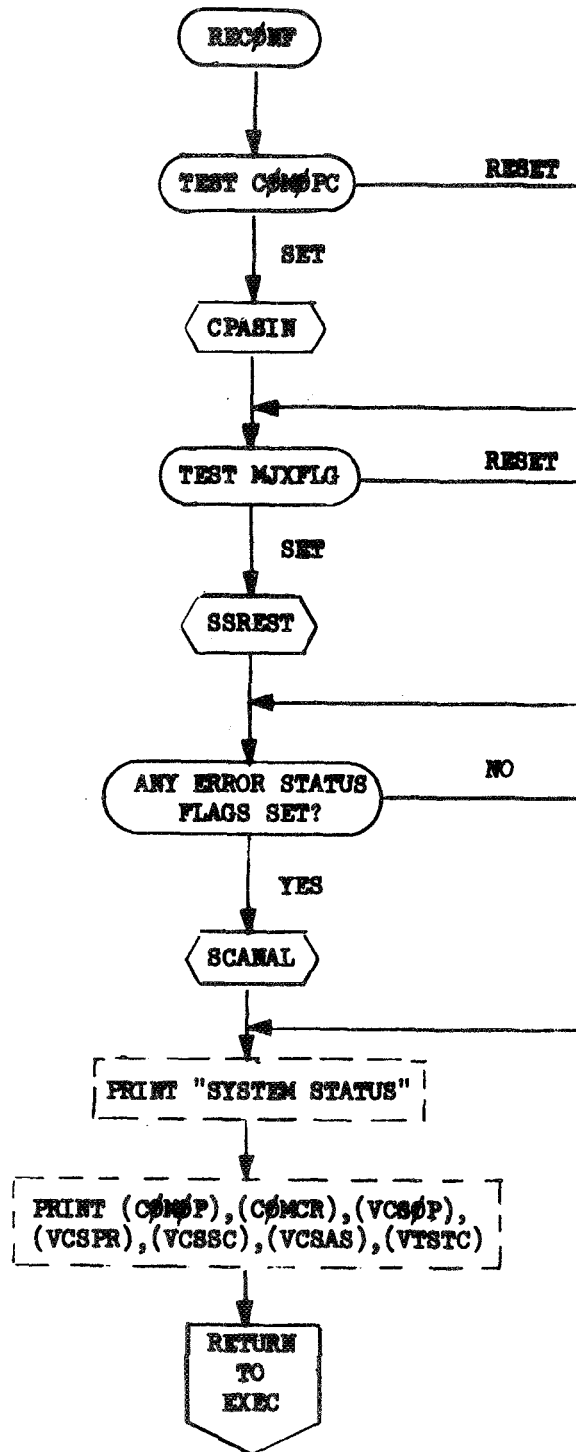


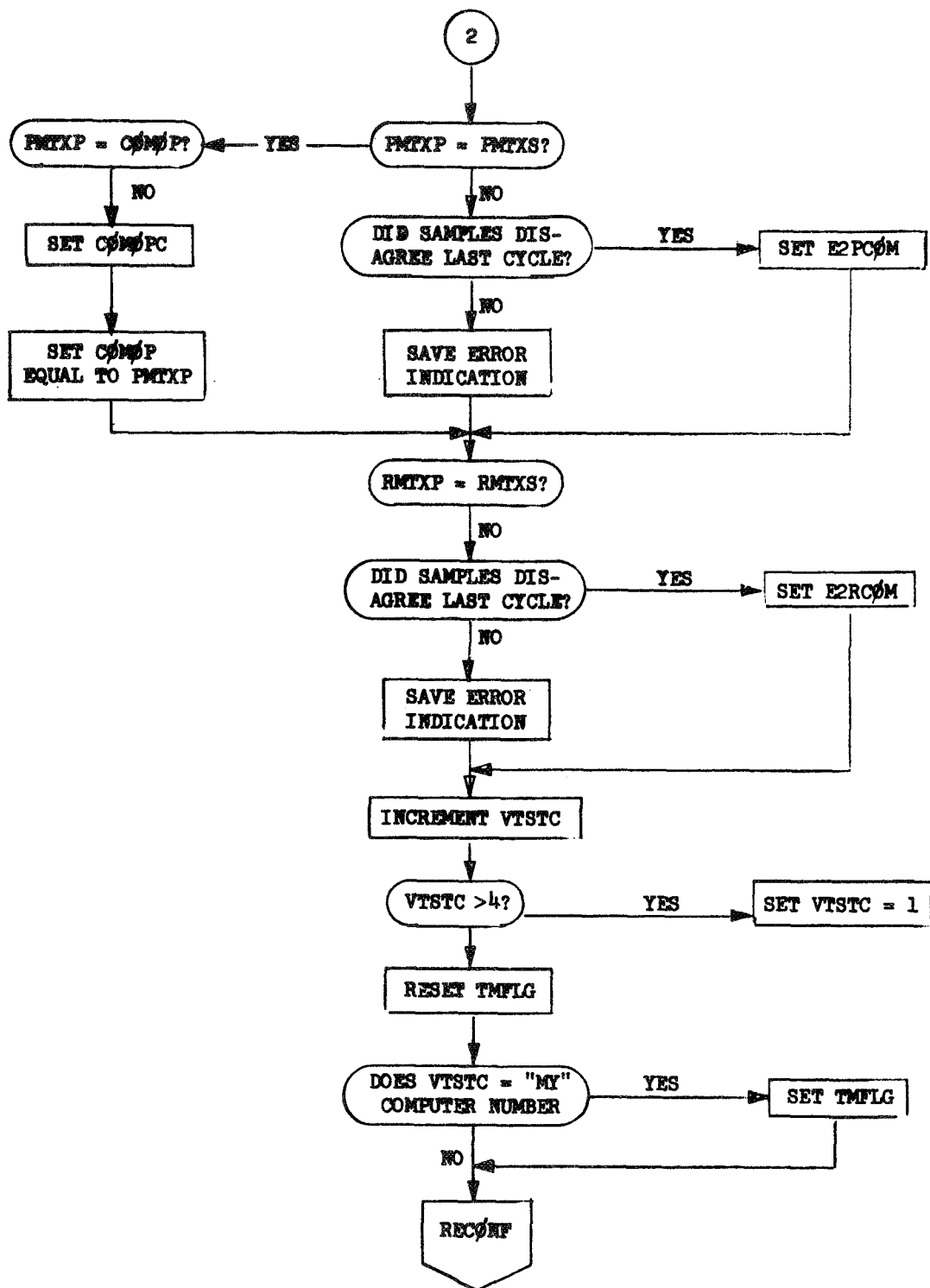


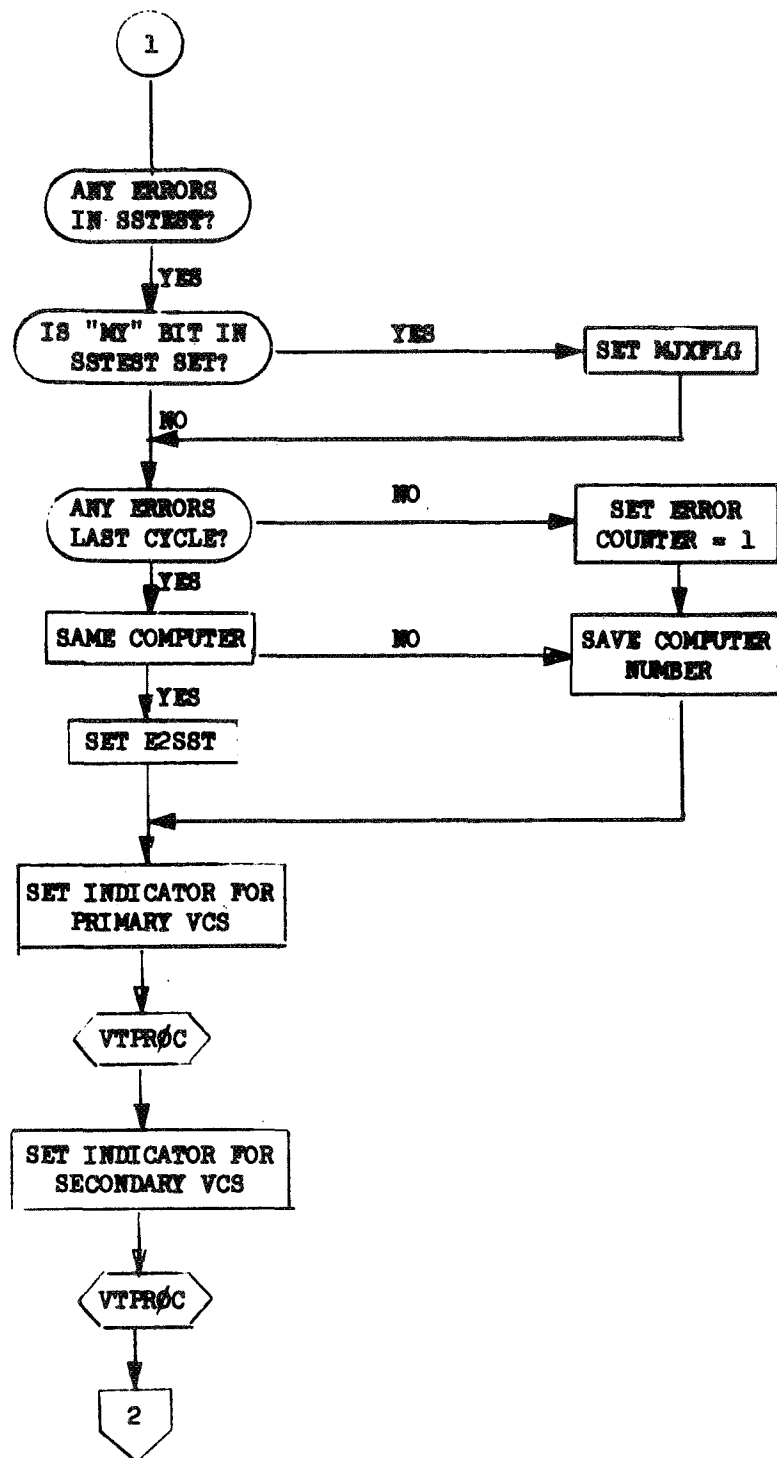
STATUS CHANGE ANALYSIS SUBROUTINE

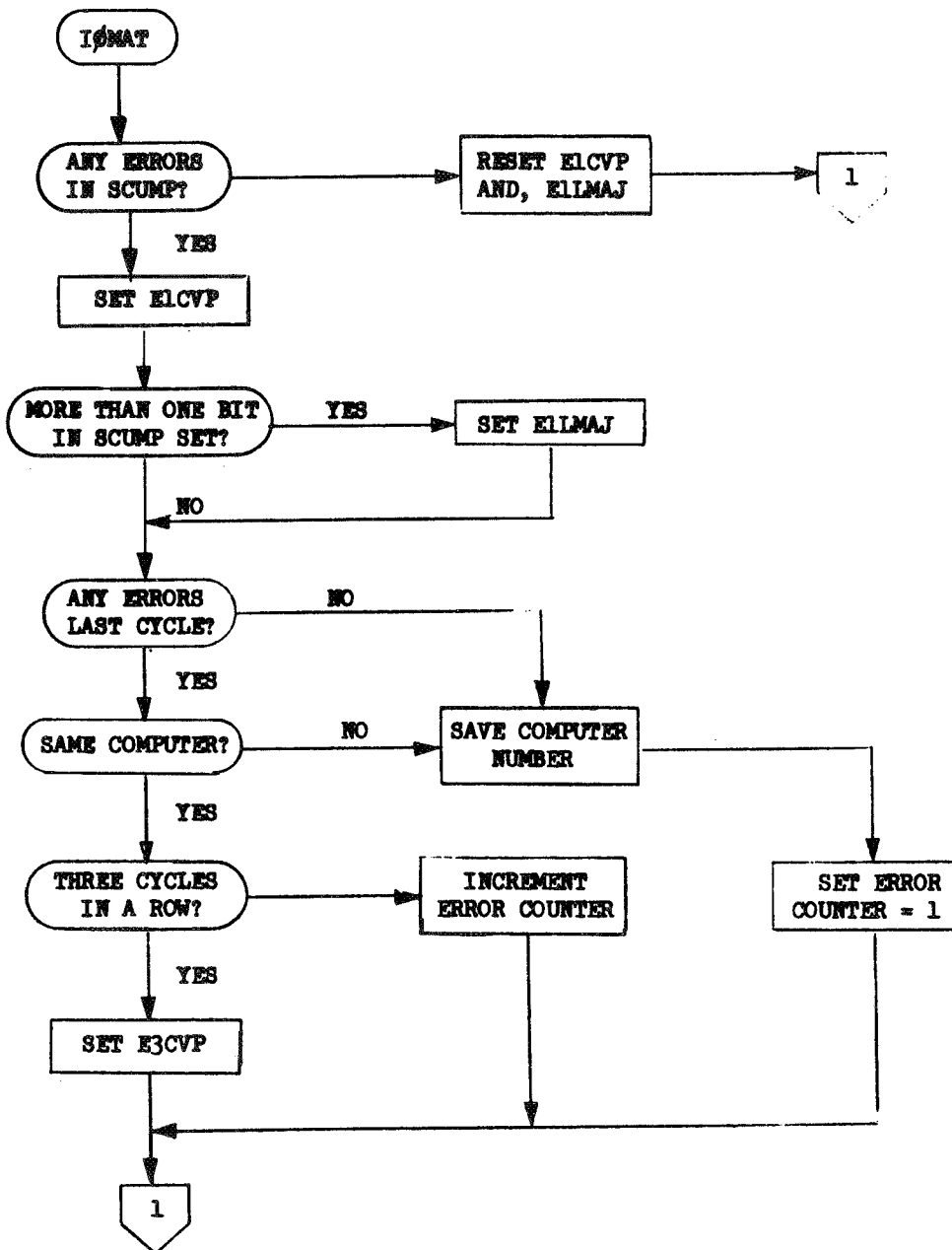
VCS ASSIGNMENT SUBROUTINE

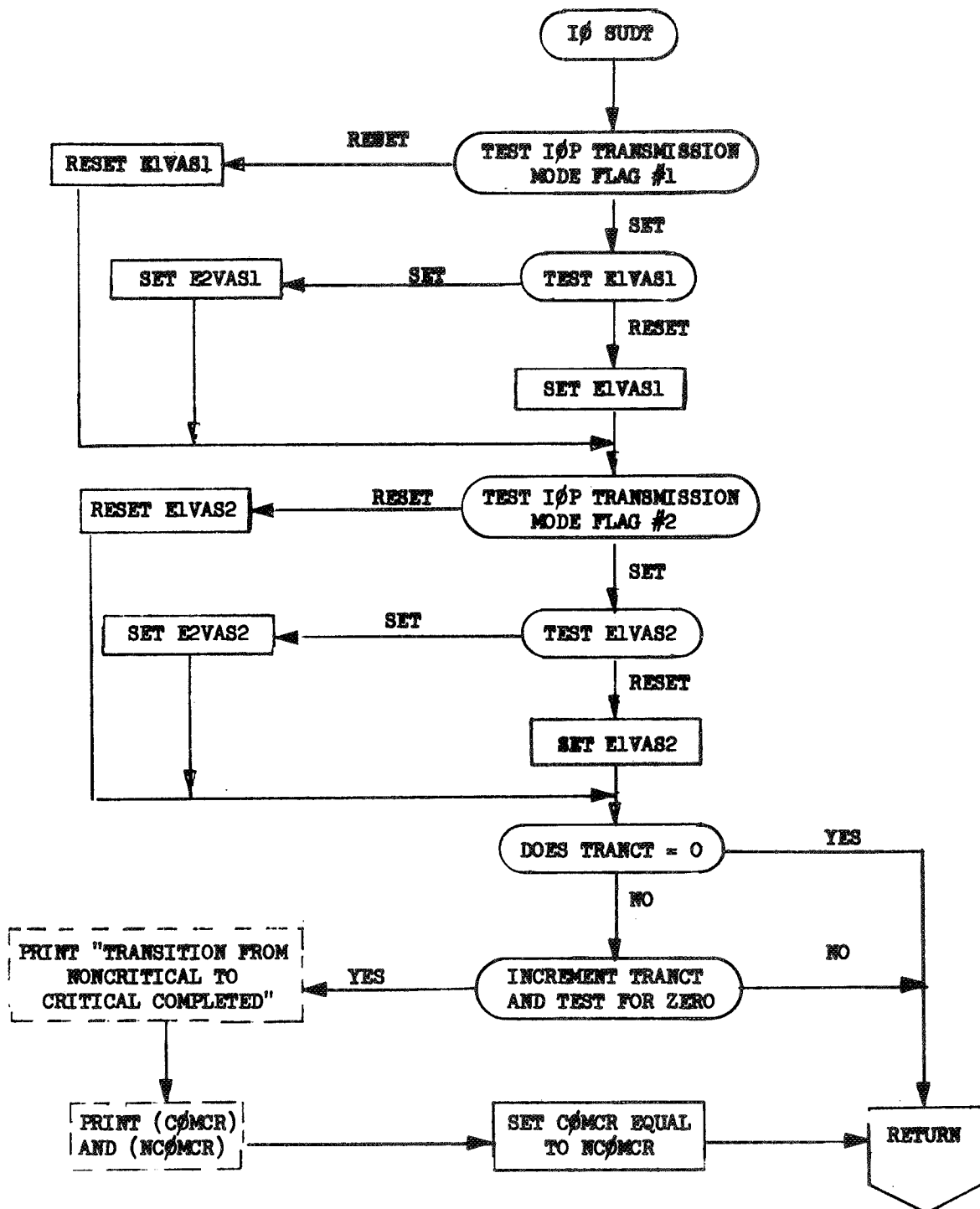
*VCS (1) = VCSPR
 VCS (2) = VCSSC
 VCS (3) = VCSAS
 VCS (4) = VCSSP

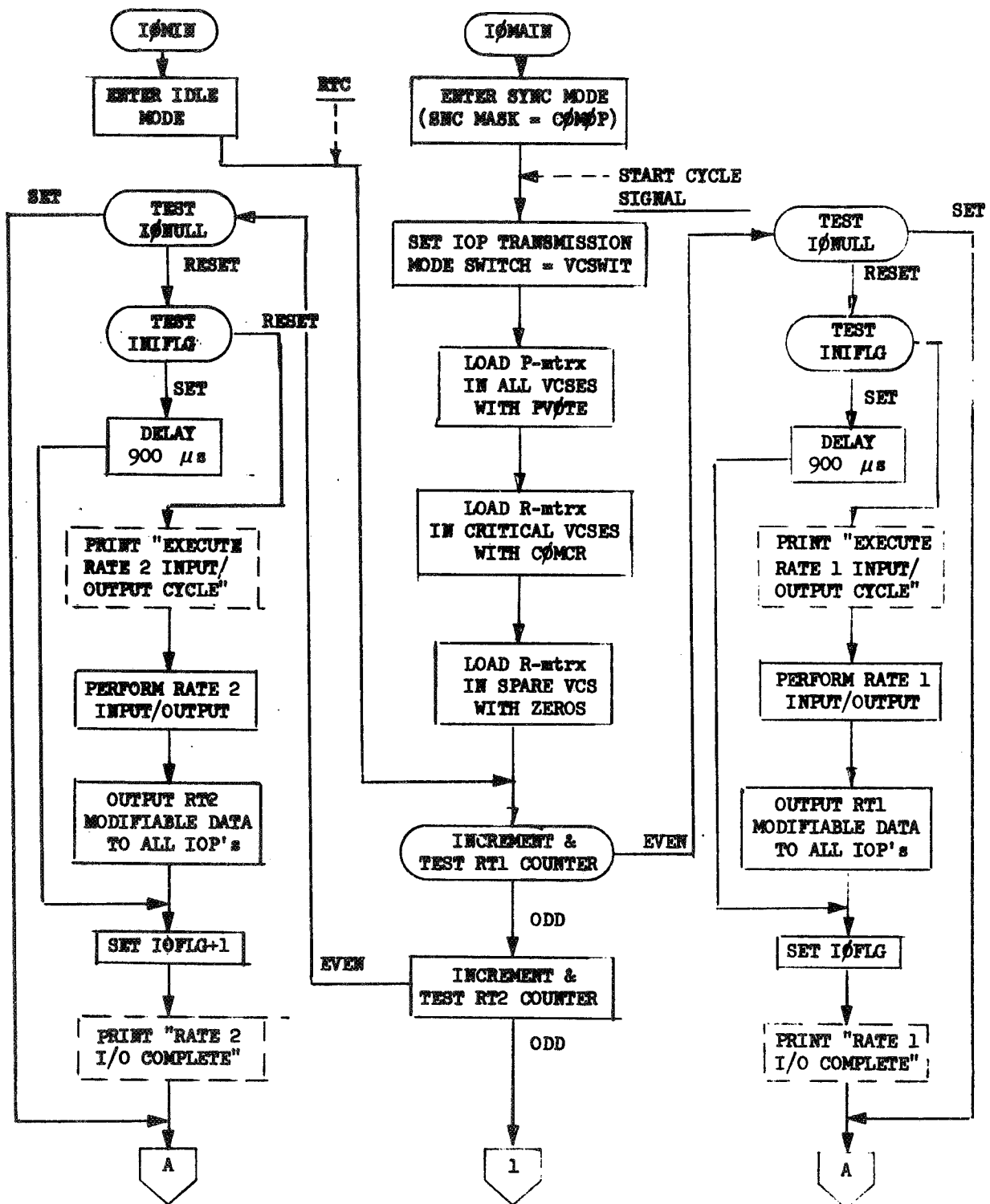
RESOURCE CONTROLLER - SYSTEM CONFIGURATOR





RESOURCE CONTROLLER - INPUT/OUTPUT MONITOR AND TEST

EXECUTIVE - I/O STATUS UPDATE SUBROUTINE



4.0 SIMULATION

4.1 IOP/VCS OPERATION

This section contains a listing of eight simulation cases run to verify proper operation of the voting function in the IOP/VCS. Three IOP were simulated and for each case, a different combination of data/timing was simulated. The conditions and results of the cases are summarized below:

	IOP 1			IOP 2			IOP 3			Results In S-Matrix
	Inst.	Data*	Timing	Inst.	Data*	Timing	Inst.	Data*	Timing	
Case 1	OS	1	To	OS	1	To+6	OS	1	To+26	0000
Case 2	OS	1	To	OS	1	To+14	OS	1	To+35	0010
Case 3	OS	2	To	OS	1	To+7	OS	2	To+14	0100
Case 4	OS	1	To	OS	1	To+40	OS	1	To+44	0000
Case 5	OS	3	To	OS	3	To+40	OS	3	To+44	1000
Case 6	IS	4	To	IS	4	To+6	IS	4'	To	0010
Case 7	IS	5	To	IS	5	To+26	IS	5	To+6	0000
Case 8	ISN	5'	To	ISN	5	To	ISN	5	To+14	1000
*Data Message #1 = Output to LP#1 - 111111, 212121 Data Message #2 = Output to LP#1 - 121212, 222222 Data Message #3 = Output to LP#1 - 131313, 232323, 323232 Data Message #4 = Input request - 1 word from LP#1 Data Message #4' = Input request - 1 word from LP#2 Data Message #5 = Input request - 3 words from LP#1 Data Message #5 = Input request - 3 words from LP#2										

4.2 SYSTEM OPERATION

This section contains a listing of a simulation run used to verify total system operation with three computers operating. Refer to the flow diagram in Section 3 and the Simulator description in Section 2 for description of the printed messages and the program sequence and flow.

COMMUN DATA BLOCK

PAGE 1

ERRS	LUC	BA1	BA2	BA3	STMTNO	SOURCE	STATEMENT
					3	* THIS BLOCK DEFINES ALL PARAMETERS REFERENCED BY MULTIPLE PR	
					5	ARG	50
	50				6	* SYSTEM STATUS OUTPUT DATA	
	50	7			7	LSYSTA	ADR SYSTA2-SYSTAI
	51				8	SYSTA	MB 1
	52				9	VCSPR	BSS 1
	53				10	VCSSC	BSS 1
	54				11	VCSAS	BSS 1
	55				12	VCSCR	BSS 1
	56				13	VTSTC	BSS 1
	57				14	DEC	1
						PACKED VALUE OF COMOP, COMCR, VC	
						PRIMARY VCS	
						SECONDARY VCS	
						ASSOCIATE VCS	
						CRITICAL VCSES	
						VCS TEST COUNTER	
						PRESENCE FLAG (1-PRESENT)	

1	16	*** STATUS FROM COMPUTER 1, IF NOT ME ***
58	17	SYSTA1 MR 1 PACKED VALUE OF COMB, CONC, VC
59	18	VCSPR1 BSS 1 PRIMARY VCS
60	19	VCSSC1 BSS 1 SECONDARY VCS
61	20	VCSAS1 BSS 1 ASSOCIATE VCS
62	21	VCSCR1 BSS 1 CRITICAL VCSES
63	22	VTSTC1 BSS 1 COUNTER FOR VCS TEST SEQUENCE
64	23	MR 1 PRESENCE FLAG (1=PRESENT)
1	24	*** STATUS FROM COMPUTER 2, IF NOT ME ***
65	25	SYSTA2 MR 1 PACKED VALUE OF COMB, CONC, VC
66	26	VCSPR2 BSS 1 PRIMARY VCS
67	27	VCSSC2 BSS 1 SECONDARY VCS
68	28	VCSAS2 BSS 1 ASSOCIATE VCS
69	29	VCSCR2 BSS 1 CRITICAL VCSES
70	30	VTSTC2 BSS 1 COUNTER FOR VCS TEST SEQUENCE
71	31	MR 1 PRESENCE FLAG (1=PRESENT)
1	32	*** STATUS FROM COMPUTER 3, IF NOT ME ***

1	58
1	59
1	60
1	61
1	62
1	63
1	64
	65
1	66
1	67
1	68
1	69
1	70
1	71

COMMON DATA BLOCK

PAGE 2

ERRS	L6C	0A1	0A2	0A3	STMTNO	S O U R C E	S T A T E M E N T
1	72				33	SYSTA3 MB	1 PACKED VALUE OF COMOP, COMCR, VC
1	73				34	VCSPR3 BSS	1 PRIMARY VCS
1	74				35	VCSSC3 BSS	1 SECONDARY VCS
1	75				36	VCSAS3 BSS	1 ASSOCIATE VCS
1	76				37	VCSCR3 BSS	1 CRITICAL VCSES
1	77				38	VTSTC3 BSS	1 COUNTER FOR VCS TEST SEQUENCE
1	78				39	MB	1 PRESENCE FLAG (1=PRESENT)
1	79				40	*** STATUS FROM COMPUTER 4, IF NOT ME ***	
1	80				41	SYSTA4 MB	1 PACKED VALUE OF COMOP, COMCR, VC
1	81				42	VCSPR4 BSS	1 PRIMARY VCS
1	82				43	VCSSC4 BSS	1 SECONDARY VCS
1	83				44	VCSAS4 BSS	1 ASSOCIATE VCS
1	84				45	VCSCR4 BSS	1 CRITICAL VCSES
1	85				46	VTSTC4 BSS	1 COUNTER FOR VCS TEST SEQUENCE
1	86				47	MB	1 PRESENCE FLAG (1=PRESENT)
1	87				48	* SUBSYSTEM INPUT/OUTPUT DATA	
1	88				49	LLP1IN DEC	3 DATA BLOCK SIZE
1	89				50	LP1IND MB	2 MAJORITY CONSENSUS AFTER VOTING
1	90				51	LP1IN DEC	2 MESSAGE LENGTH
1	91				52	MB	2 MESSAGE STATUS WORD
1	92				53	MB	1 MESSAGE STATUS WORD
1	93				54	MB	2 MESSAGE STATUS WORD
1	94				55	MB	1 MESSAGE STATUS WORD
1	95				56	MB	2 MESSAGE STATUS WORD
1	96				57	MB	1 MESSAGE STATUS WORD
1	97				58	LP1OUT DEC	2 MESSAGE LENGTH
1	98				59	MB	2 DATA BLOCK SIZE
1	99				60	LLP2IN DEC	4 MAJORITY CONSENSUS AFTER VOTING
1	100				61	LP2IND MB	3 MESSAGE LENGTH
1	101				62	LP2IN DEC	3 MESSAGE STATUS WORD
1	102				63	MB	1 MESSAGE STATUS WORD
1	103				64	MB	1 MESSAGE STATUS WORD
1	104				65	MB	1 MESSAGE STATUS WORD

PAGE 44

ERRS	L5C	0A1	9A2	0A3	STMTN0	SOURCE	STATEMENT
1	172				96	BKDAT4 MB	BACKGROUND DATA
					98		* FUNCTIONAL IDENTIFICATION PARAMETERS
1	174				99	IDCUR BSS	CURRENT IDENTIFICATION
1	175				100	IDPRI BSS	PRIMARY IDENTIFICATION
1	176				101	IDSEC BSS	SECONDARY IDENTIFICATION
					103		** I/O PROGRAM RATE COUNTERS, INITIALIZED BY EXEC
1	177				104	CNT1 BSS	RT1 COUNTER
1	178				105	CNT2 BSS	RT2 COUNTER
1	179				106	CNT4 BSS	RT4 COUNTER
					107		* MISCELLANEOUS
					108	TRANCT BSS	TRANSITION FLAG AND TIMER
1	180				109	VCSSP BSS	SPARE VCS
1	181				110	VCSCR0 BSS	VCS ADDRESS WORDS, OUTPUT
1	182				111	VCSCRI BSS	VCS ADDRESS WORDS, INPUT
1	184				112	CRITN0 MB	NUMBER OF CRITICAL COMPUTERS
1	186				113	NCRTN MB	TRANSITION VALUE FOR CRITN0
1	187				114	KACNT MB	10P KEEP ALIVE TIMER
1	188						

COMMON FLAG BLOCK

PAGE 6

ERRS	L0C	0A1	0A2	0A3	STMTN0	SOURCE	STATEMENT
1	68				148	* SAMPLES OF R-MATRIX	
1	72				149	RMTXP FB 4	R-MATRIX SAMPLE, PRIMARY VCS
					150	RMTXS FB 4	R-MATRIX SAMPLE, SECONDARY VCS
					151	* MISCELLANEOUS	
1	76				152	INIFLG FB 1	TASK INITIALIZATION FLAG
1	77				153	COMCD FB 4	CONDITIONAL COMPUTERS
1	81				154	COMOPC FB 1	FLAG FOR CHANGE IN COMOP
1	82				155	NCOMCR FB 4	TRANSITION VALUE FOR COMCR
1	86				156	SINFLG FB 1	SYSTEM INITIALIZATION FLAG
1	87				157	IOPUFL FB 1	IOP POWER-UP INITIALIZATION FLAG
1	88				158	STRFLG FB 1	I/O PROGRAM START-UP FLAG
1	89				159	I0STOP FB 1	SAVE/RESTART FLAG
1	90				160		

COMMON FLAG BLOCK

PAGE 7

ERRS	L9C	BA1	BA2	BA3	STMTN6	S O U R C E	S T A T E M E N T
					162	* STATUS FLAG BLOCK FOR RECONFIGURATOR	
					163	SETABS EQU *	
1	92				164	E1CVP FB	(1) CRITICAL VOTING, PRIMARY VCS
1	93				165	E1CVS FB	(1) CRITICAL VOTING, SECONDARY VCS
1	94				166	E1LMAJ FB	(1) LOSS OF MAJORITY IN CRITICAL
1	95				167	E1VT1P FB	(1) VCS TEST (1-SET), PRIMARY VC
1	96				168	E1VT1S FB	(1) VCS TEST (1-SET), SECONDARY VC
1	97				169	E1VTOP FB	(1) VCS TEST (0-SET), PRIMARY VC
1	98				170	E1VTOS FB	(1) VCS TEST (0-SET), SECONDARY VC
1	99				171	E1VAS1 FB	(1) VCS ADDRESS SWITCH (NO-00)
1	100				172	E1VAS2 FB	(1) VCS ADDRESS SWITCH (LOSS OF
					173	FLGMST EQU *	START OF MULTIPLE TIME FLAGS
					174	E3CVP FB	(3) CRITICAL VOTING, PRIMARY VCS
1	101				175	E2SST FB	(2) SYSTEM STATUS TEST
1	102				176	E2VT1P FB	(2) VCS TEST (1-SET), PRIMARY VC
1	103				177	E2VT1S FB	(2) VCS TEST (1-SET), SECONDARY VC
1	104				178	E2VTP FB	(2) VCS TEST (EITHER), PRIMARY V
1	105				179	E2VTS FB	(2) VCS TEST (EITHER), SECONDARY
1	106				180	E2PC8M FB	(2) P-MATRIX COMPARISON
1	107				181	E2RC8M FB	(2) R-MATRIX COMPARISON
1	108				182	E2VAS1 FB	(2) VCS ADDRESS SWITCH (NO-00)
1	109				183	E2VAS2 FB	(2) VCS ADDRESS SWITCH (LOSS OF
1	110				184	FLGMN0 EQU	*-FLGMST NUMBER OF MULTIPLE TIME FLAGS
					185	SETABL EQU	*-1
					186	FLGCNT EQU	SETABL-SETARS+1

ABSOLUTE DATA/LINKAGE LOCATIONS

PAGE 8

ERRS	LOC	0A1	0A2	0A3	STMTNO	SOURCE	STATEMENT
					189	* THIS MODULE LOADS ALL DEDICATED LOCATIONS, I.E., LOCATIONS	
					190	* WHICH HAVE SPECIAL HARDWARE SIGNIFICANCE	
					192	* SPECIAL PURPOSE IOP LOCATIONS	
1	1				193	ORG 1	
1	1	203			194	J IOPWR	POWER-UP INTERRUPT
1	2	201			195	J RSTART	ERROR INTERRUPT - RESTART
1	3	201			196	J RSTART	ERROR INTERRUPT - RESTART
1	4	201			197	J RSTART	ERROR INTERRUPT - RESTART
1	5				198	48 1	WATCHDOG TIMER
1	6	200			199	J WDT	WATCHDOG TIMER INTERRUPT
1	7	201			200	J RSTART	ERROR INTERRUPT - RESTART
1	8				201	DEC 33333	'GO' TRANSMISSION CODE
1	9				202	DEC 55555	'NO-GO' TRANSMISSION CODE
					204	* PRINTERS FOR INPUT DATA FROM OTHER COMPUTERS	
					206	*** INPUTS FROM IOP 1 ***	
1	10				207	ORG 10	
1	11	0			208	ADR	MSG TYPE 0
1	12	58			209	ADR SYSTA1	MSG TYPE 1 - SYSTEM STATUS DATA
1	13	166			210	ADR PKDAT1	MSG TYPE 2 - BACKGROUND DATA
1	14	127			211	ADR R1M0D1	MSG TYPE 3 - RATE 1 MODIFIABLE D
1	15	148			212	ADR R2M0D1	MSG TYPE 4 - RATE 2 MODIFIABLE D
1	16	0			213	ADR R4M0D1	MSG TYPE 5 - RATE 4 MODIFIABLE D
					215	*** INPUTS FROM IOP 2 ***	
1	20				216	ORG 20	
1	20	0			217	ADR	MSG TYPE 0

PAGE

ERRS	L9C	BA1	BA2	BA3	STMT6	SOURCE	STATEMENT
	1	65			218	ADK	SYSTA2
	1	168			219	ADR	MSG TYPE 1 - SYSTEM STATUS DATA
	1	131			220	ADR	MSG TYPE 2 - BACKGROUND DATA
	1	152			221	ADR	MSG TYPE 3 - RATE 1 MODIFIABLE D
U	1	0			222	ADR	MSG TYPE 4 - RATE 2 MODIFIABLE D
							MSG TYPE 5 - RATE 4 MODIFIABLE D
						*** INPUTS FROM IOP 3 ***	
	1	30			224	SRG	30
F	1	0			225	ADR	MSG TYPE 0
	1	72			226	ADR	MSG TYPE 1 - SYSTEM STATUS DATA
	1	170			227	ADR	MSG TYPE 2 - BACKGROUND DATA
	1	135			228	ADR	MSG TYPE 3 - RATE 1 MODIFIABLE D
	1	156			229	ADR	MSG TYPE 4 - RATE 2 MODIFIABLE D
U	1	0			230	ADR	MSG TYPE 5 - RATE 4 MODIFIABLE D
					231	ADR	
						*** INPUTS FROM IOP 4 ***	
	1	40			233	SRG	40
F	1	0			234	ADR	MSG TYPE 0
	1	79			235	ADR	MSG TYPE 1 - SYSTEM STATUS DATA
	1	172			236	ADR	MSG TYPE 2 - BACKGROUND DATA
	1	139			237	ADR	MSG TYPE 3 - RATE 1 MODIFIABLE D
	1	160			238	ADR	MSG TYPE 4 - RATE 2 MODIFIABLE D
U	1	0			239	ADR	MSG TYPE 5 - RATE 4 MODIFIABLE D
					240	ADR	

INPUT/OUTPUT ROUTINE

PAGE 10

ERRS	LBC	BA1	BA2	BA3	STMTNO	SOURCE	STATEMENT
1	200				242	ORG 200	
					243	* IOP POWER-UP INITIALIZATION	
1	200				245	* WATCHDOG TIMER RUN-OUT	
1	201				246	WDT P WATCHDOG TIMER RUN-OUT ...RESTART PROGRAM	
1	202	208	88		247	RSTART TF IOP1,STRFLG	
1	203	87			248	IOP ERROR INTERRUPT ... RESTART PROGRAM	
1	204	88			249	IOPSWK SF IOPUFL SET IOP POWER-UP FLAG	
					250	RF STRFLG	
1	205	208			252	* WAIT FOR START INDICATION FROM CPU	
1	206	311	88		253	TF **3,STRFLG IS START FLAG SET	
1	207	205	25	50	254	DLY D2,25,50 NO, WAIT	
1	208				255	J **2	
1	209	87			256	IOP1 START INPUT/OUTPUT PROGRAM EXECUTION	
1	210	88			257	P IOPUFL YES, START I/O PROGRAM	
1	211	12			258	RF STRFLG	
1	212	213			259	SF IOPFLG+2	
					260	J IOPMAIN	

[illegible]

INPUT/OUTPUT ROUTINE

PAGE 12

ERRS	LBC	BA1	BA2	BA3	STMTN6	SOURCE	STATEMENT
1	243	301			294	RS	ISCALL
					295	* OUTPUTS FOR SYSTEM STATUS TEST	RESET STATUS
1	244	44	52		296	LR	CBMRP,VCSRP
1	245	50	52	0540	297	0SN	LSYSTA,VCSRP,36540
1	246	31	52		298	SAS	SSTEST,VCSRP
1	247	52			299	RS	VCSRP
1	245	50	301	296	300	* 0C	LSYSTA,ISCALL,MSGTY1
					301	* SAMPLE P-MATRICES FOR COMPARISON	TRANSMIT SYSTEM STATUS
1	249	60	52		302	SAP	PMTXP,VCSRP
1	250	64	53		303	SAP	PMTXS,VCSRP
					304	* SAMPLE R-MATRICES FOR COMPARISON	PRIMARY VCS
1	251	68	52		305	SAR	RMTXP,VCSRP
1	252	72	53		306	SAR	RMTXS,VCSRP
1	253	120			307	SF	IDLSYN
1	254	12			308	SF	ISFLG+2
1	255	282			309	J	BKEND
							GO TO COMMON BACKGROUND
1	256	282	19		311	** RATE 1 I/O CYCLE	
1	257	253	76		312	RT1	BKEND,ISNULL
1	258	261			313	TF	*+2,INIFLG
1	259	312			314	J	*+3
1	260	265	900	900	315	DLY	D3,900,900
1	261				316	J	BYRT1
1	262	99	182		317	P	EXECUTE RATE 1 INPUT/OUTPUT CYCLE
1	263	89	184	0521	318	0S	LP1OUT,VCSRP,36521
1	264	122	301	1631	319	IS	LP1IN,VCSRP,41631
1	265	10		298	320	9C	LP1MD,ISCALL,MSGTY3
1	266	262			321	SF	ISFLG
1	267				322	P	RATE 1 I/O COMPLETE
1					323	J	BKEND
							GO TO COMMON BACKGROUND

BYPASS I/O IF IOT CRITICAL

OUTPUT TO LP1
INPUT FROM LP1
RATE 1 MODIFIABLE DATA

GO TO COMMON BACKGROUND

INPUT/OUTPUT ROUTINE

PAGE 13

ERRS	LSC	0A1	0A2	0A3	STMTNO	SOURCE	STATEMENT
1	266	232	19		325	*** RATE 2 I/O CYCLE	
1	267	271	76		326	RT2	BK GND, IONULL
1	270	273			327	TF	**+2, INIFLG
1	271	312	900	900	328	J	**+3
1	272	277			329	DLY	D3, 900, 900
1	273				330	J	BYRT2
1	274	113	182	0522	331	P	EXECUTE RATE 2 INPUT/OUTPUT CYCLE
1	275	106	184	1632	332	0S	LP2OUT, VCSCRO, 36522 OUTPUT TO LP2
1	276	143	301	299	333	IS	LP2IN, VCSCRI, 41632 INPUT FROM LP2
1	277	11			334	0C	LR2MD, IOPALL, MSGTY4 RATE 2 MODIFIABLE DATA
1	278				335	BYRT2 SF	I0FLG+1
1	279	282			336	P	RATE 2 I/O COMPLETE
1					337	J	BK GND GO TO COMMON BACKGROUND
F	1	280	312	900	339	*** RATE 4 I/O CYCLE--CURRENTLY NOT BEING USED	
	1	281	13	900	340	RT4 DLY	D3, 900, 900
					341	SF	I0FLG+3
	1	282	293	18	342	*** COMMON BACKGROUND, ALL I/O CYCLES	
	1	283	69	0	343	BK GND TF	BK GND1, BK1FLG
	1	284	258		344	J	IOEXIT
	1	285			345		
	1	286	312	900	346	P	SAVE/RESTART POINT - IOP STOP
	1	287	286		347	DLY	D3, 900, 900
	1	288	291	120	348	J	**+1
	1	289	20		349	TF	**+3, IDLSYN
	1	290	225		350	RF	SYNFLG
	1	291	120		351	J	I0MIN
	1	292	213		352	RF	IDLSYN
					353	J	I0MAIN

1 293 164 301 297 355 BK GND1 0C BK DAT, IOPALL, MSGTY2 BACKGROUND DATA TO ALL

INPUT/OUTPUT ROUTINE

PAGE 14

ERRS	L0C	0A1	9A2	0A3	STMTN0	S0JRC E	S T A T E M E N T
1	294	18			356	RF	BK1FLG
1	295	288			357	J	IOEXIT
** INPUT MESSAGE TYPE C0DES **							
1	296				359	MSGTY1 DEC	1
1	297				360	MSGTY2 DEC	2
1	298				361	MSGTY3 DEC	3
1	299				362	MSGTY4 DEC	4
1	300				363	MSGTY5 DEC	5
* THE FOLLOWING IOP PARAMETERS ARE INTERNAL TO I/O ROUTINE							
1	301				364	IOPALL DEC	1234
1	302				365	GDMMSG DEC	3
1	303				366	DEC	12345
1	304				367	DEC	54321
1	305				368	DEC	31942
1	306				369	BDMSG DEC	3
1	307				370	DEC	12345
1	308				371	DEC	54221
1	309				372	DEC	31942
1	310				373	RSP	
1	311				374	D1 DEC	350
1	312				375	D2 DEC	50
					376	D3 DEC	900
BAD VERSION OF VCS TEST MESSAGE							

* THE FOLLOWING MACHINE ARE LOCAL TO THE I/O PROGRAM

380	ORG	120
381	IDLSYN FB	1
382	END	
383		

FLAG TO IDENTIFY SYNC CYCLE

*** LIST OF DEFINED SYMBOLS ***

IDL SYN	120	LSYSTA	50	SYSTA	51	VCSPR	52
VCSSC	53	VCSAS	54	VCSCR	55	VTSYC	56
SYSTA1	58	VCSPR1	59	VCSSC1	60	VCSAS1	61
VCSCR1	62	VTSYC1	63	SYSTA2	65	VCSPR2	66
VCSSC2	67	VCSAS2	68	VCSCR2	69	VTSYC2	70
SYSTA3	72	VCSPR3	73	VCSSC3	74	VCSAS3	75
VCSCR3	76	VTSYC3	77	SYSTA4	79	VCSPR4	80
VCSSC4	81	VCSAS4	82	VCSCR4	83	VTSYC4	84
LLP1IN	86	LP1IN	87	LP1IN	89	LP1OUT	99
LLP2IN	102	LP2IN	103	LP2IN	106	LP2OUT	119
LR1M0D	122	R1M0D	123	R1M0D1	127	R1M0D2	131
R1M0D3	135	R1M0D4	139	LR2M0D	143	R2M0D	144
R2M0D1	148	R2M0D2	152	R2M0D3	156	R2M0D4	160
BKDAT	164	BKDAT1	166	BKDAT2	168	BKDAT3	170
BKDAT4	172	IDCUR	174	IDPRI	175	IDSEC	176
CNT1	177	CNT2	178	CNT4	179	TRANCT	180
VCSSP	181	VCSCR5	182	VCSCR1	184	CRITN0	186
NCRITN	187	KACNT	188	VCSWIT	1	VCSWT1	2
VCSWT2	3	IRFLG	10	RMTXSP	14	BK1FLG	18
IRNULL	19	SYNFLG	20	VCADS	21	TMFLG	22
SCUMP	23	SCUMS	27	SSTEST	31	STESTP	35
STEST5	39	MJXFLG	43	COMBP	44	COMCR	48
VCSSP	52	PV8TE	56	PMTXP	60	PMTXS	64
RMTXP	68	RMTXS	72	INIFLG	76	COMCD	77
COMAPC	81	NCOMCR	82	SINFLG	86	IPUFL	87
STRFLG	88	IPSTBP	89	SETABS	92	E1CVP	92
E1CVS	93	E1LMAJ	94	E1VTIP	95	E1VT1S	96
E1VTOP	97	E1VTOS	98	E1VAS1	99	E1VAS2	100
FLGMST	101	E3CVP	101	E2SST	102	E2VT1P	103
E2VT1S	104	E2VTP	105	E2VTS	106	E2PC0M	107
E2RC0M	106	E2VAS1	109	E2VAS2	110	FLGMN0	110
SETABL	110	FLGCNT	19	WDT	200	RSTART	201
IRP3MR	203	IRP1	208	IRMAIN	213	IR0	221
IRMIN	225	IRTEST	230	IR1	239	IR2	241
RT1	256	BYRT1	265	RT2	268	BYRT2	277

RT4
MSGTY1
MSGTY3
D1

280
296
300
310

BACKND
MSGTY2
IAPALL
D2

282
297
301
311

16

IOEXIT
MSGTY3
GDMSG
D3

288
298
302
312

BACKND1
MSGTY4
BDMSG

293
299
306

LIST OF MODULES	NAME	START LOC	END LOC	STMTNO
	INPUT	1 1	312	1

ERR	LOC	OFF	QAS	STATNO	SOURCE	STATEMENT
				3	* INTERRUPT LINKAGE IN ROM	
1	1			5	ARG	1 EXINIT
1	1	3+1		6	3MM	POWER-UP
1	2	7		7	3MM	RAM1
1	3			8	ARG	3
1	4	7		9	3	ROM2
1	5	0		10	IRI	0
1	6			11	ARG	5
1	7			12	3MM	RTCLAK
1	8	300		13	3MM	RTCLAK
1	9	300		14	P	CPU PROGRAM HALT IN ROM
1	10			15	HLT	
1	11			16	P	WATCHDOG TIMER INTERRUPT
1	12			17	P	CPU PROGRAM HALT IN ROM
1	13			18	HLT	
1	14			19	EXINIT EQU	341
1	15			20	RTCLAK EQU	380
1	16			21	END	

RGC EXECUTIVE

PAGE 19

ERRS	LBC	BA1	BA2	BA3	STMTNO	SOURCE	STATEMENT
1	340				195	GRG	340
1	340	421			196	EXEC B	TSKSCH
					198	*	INITIALIZATION FOR EXECUTIVE
1	341	343			200	EXINIT DI	DISABLE INTERRUPTS
1	342	76			201	B	DUMMY
1	343		86		202	SET	INIFLG,SINFLG
					203	*	INITIALIZE TASK SCHEDULE
1	344	8	136	130	204	CPY	8,TASKST,TASKST
					205	*	SET ALL RATES TO DONE
1	345	8	146		206	RSB	8,RTSTA1
					207	*	RESET I/O FLAGS
1	346	4	10		208	RSB	4,I0FLG
					209	*	RESET I/O PROGRAM RATE COUNTERS
1	347	483	177		210	YV	K31,CNT1
1	348	483	178		211	YV	K31,CNT2
1	349	483	179		212	YV	K31,CNT4
					213	*	RESET ERROR FLAGS
1	350	19	92		214	RSB	FLGCNT,SETABS
					215	*	INITIALIZE SYSTEM STATUS FROM COMOP,VCSOP
1	351	4	48		216	RSB	4,COMCR
1	352	4	44	56	217	CPY	4,COMOP,PV0TE
1	353	189	0		218	BSR	LCPASI,0
1	354	1			219	RST	VCSWIT
1	355	190	0		220	BSR	LVCASI,0
					221	*	ARM SWN REAL TIME CLOCK INTERRUPT
1	356	360	174	476	222	BE	EXI1,IDCUR,K1
1	357	360	174	478	223	BE	EXI1,IDCUR,K3
1	358	5			224	AI	5

RGC EXECUTIVE

PAGE 20

ERRS	LBC	BA1	BA2	BA3	STMTN0	SOURCE	STATEMENT
1	359	361			225	B	**2
1	360	5			226	EXI1 AI	6
1	361	473	5		228	MV	IWDTIM,5 RESET WATCHDOG TIMER
1	362	365	1	87	229	BBS	**3,1,10PUFL IS IOP READY
1	363	484	50	50	230	DLY	D1,50,50
1	364	362			231	B	**2
1	365	88			232	SET	STRFLG YES, SET START FLAG
					233	* START TASK	EXECUTION IN BACKGROUND RATE
1	366				234	P	START EXECUTIVE PROGRAM EXECUTION
1	367	418			235	B	RS2

RGC EXECUTIVE

PAGE 21

ERRS	LOC	0A1	0A2	0A3	STMTN8	SOURCE	STATEMENT
					237	* RTC INTERRUPT PROCESSING	
1	380				239	ORG 380	
1	380	475	8008		240	RTCLK MV KO,R8	
					241	* SIMULATOR TRACE CONTROL	
1	381	476	486	486	242	ADD K1,TRCNT,TRCNT	
1	382	384	486	487	243	BLT *+2,TRCNT,TRTIME	
1	383	1			244	TMD 1	TURN ON TRACE
1	384	472	5		245	MV WDTIME,508	RESET WATCHDOG TIMER
1	385	474	188		246	MV KATIME,KACNT88	RESET IOP KEEP ALIVE COUNT
					248	* TEST I/O FLAGS	
1	386	481	8002		249	MV KM3,R2	
1	387	475	8003		250	MV KO,R3	
1	388	392	1	13	251	RTC1,1,18FLG+302	IS FLAG SET
1	389	8002	8001		252	R2,R1	YES TALLY IT
1	390	13			253	18FLG+302	RESET I8FLAG
1	391	476	8003	8003	254	ADD K1,R3,R3	
1	392	476	8002	8002	255	K1,R2,R2	
1	393	388	8002	476	256	BNE RTC0,R2,K1	
					257	* ALL FLAGS TESTED, IS ONE AND ONLY ONE SET	
1	394	397	8003	476	258	RTC2 BE *+3,R3,K1	
1	395	174	8004		259	IDCUR,R4	RETURN IF NOT CRITICAL
1	396	452	1	48	260	ERR1,1,CAMCR84	OTHERWISE, ERROR
1	397	399	8001	475	261	BNE *+2,R1,KO	IS IT THE UNUSED CYCLE
1	398	0			262	IRT 0	YES, RETURN
1	399	401	8001	476	263	RTC21,R1,K1	IS IT A TEST CYCLE
1	400	426	0		264	I8SUDT,0	YES, GO TO STATUS UPDATE ROUTINE
1	401	452	1	146	265	ERR3,1,RTSTA101	NO, IS RATE DONE
1	402	146	150		266	RTSTA101,RTSTA201	YES, CHANGE TO INITIALIZED
					267	* IS NEW RATE HIGHER THAN CURRENT RATE	
1	403	405	8001	471	268	SGT RTC3,R1,RATE	CURRENT RATE HIGHER, RETURN TO I
1	404	0			269	IRT 0	

RGC EXECUTIVE

PAGE 22

ERRS

L6C 8A1 9A2 8A3 STMTN8 S O U R C E S T A T E M E N T

1	405	471	8003	270	* RTC3	NEW RATE HIGHER, START IT
1	406	150		271	RV	RATE,R3
1	407	411		272	RST	RTSTA283
				273	BRI	RS1

SET CURRENT RATE TO INTERRUPTED

ERRS	LBC	0A1	0A2	0A3	STMTN0	S O U R C E	S T A T E M E N T
					300	* I/O STATUS UPDATE SUBROUTINE	
						* UPDATE STATUS FLAGS FOR VCS ADDRESS SWITCH	
1	426	428	2	99	302	ISUDT 3S	**2,VCSWT1,E1VAS1 TWO SWITCHES IN A ROW ON NI
1	427	429			303	B	NO
1	428	109			304	**2	YES, SET FLAG
1	429	1	2	99	305	E2VAS1	UPDATE CURRENT STATUS
					306	1,VCSWT1,E1VAS1	
1	430	432	3	100	308	3S	TWO SWITCHES IN A ROW ON PI
1	431	433			309	B	NO
1	432	110			310	E2VAS2	YES, SET FLAG
1	433	1	2	100	311	1,VCSWT1,E1VAS2	UPDATE CURRENT STATUS
1	434	2	3		312	VCSWT1,VCSWT2	RESET IOP STATUS
						* TEST FOR TRANSITION MODE	
1	435	443	180	475	314	BE	IS TRANSITION OCCURRING
1	436	443	180	1	315	10S1,TRANCT08,KO	YES, TEST FOR COMPLETION
1	437	438			316	10S1,TRANCT08,1	DUMMY
1	438				317	**1	TRANSITION FROM NON-CRITICAL TO CRITICAL COMPLI
1	439	4	48		318	P	TRANSITION FROM NON-CRITICAL TO CRITICAL COMPLI
1	440	4	82		319	4,COMCR	UPDATE MODE
1	441	4	82	48	320	4,NCOMCR,COMCR	
1	442	187	186		321	4,NCOMCR,COMCR	
1	443	0			322	NCRITN08,CRITN08	RETURN
1	443				323	0	

RGC EXECUTIVE

PAGE 25

ERRS	LBC	BA1	BA2	BA3	STMTN8	SOURCE	STATEMENT
					325	* TEST CASE FOR EXECUTIVE	
1	444				327	BTST	P
1	445	450	486	488	328		BNE
1	446				329		P
1	447				330		HLT
1	448	89			331		RF
1	449	340			332		B
1	450	485	100	700	333	EXEE	CLY
1	451	340			334		B

BACKGROUND TASKS SCHEDULED
 EXEE,TRCNT,TSTOP
 SAVE-RESTART POINT = CPU STOP

I0STOP
 EXEC
 D2,100,700
 EXEC

RGC EXECUTIVE

PAGE 26

ERRS	L0C	0A1	0A2	0A3	STMTN0	S O U R C E	S T A T E M E N T
1	452				336	* ERROR EXITS	
1	453				337	ERR1 P	HALFJUNCTION DETECTED BY EXECUTIVE
1	454				338	P	CPU PROGRAM HALT
					339	HLT	
					340	ERR3 EQU	ERR1

RGK EXECUTIVE

PAGE 28

ERRS	L9C	BA1	BA2	BA3	STMTN8	S O U R C E	S T A T E M E N T
1	479				374	K4 DEC	4
1	480				375	KM2 DEC	-2
1	481				376	KM3 DEC	-3
1	482				377	KM4 DEC	-4
1	483				378	K31 DEC	31
					379	RSP	
1	484				380	D1 DEC	50
1	485				381	D2 DEC	700
1	486				382	TRCNT DEC	0
1	487				383	TRTIME DEC	0
1	488				384	TSTOP DEC	24
					385	* A SOLUTE LINKAGE	
					386	IGMAT EQU	500

RGC EXECUTIVE

PAGE 29

ERRS

L0C

0A1

0A2

0A3

STMTN0

S 0 U R C E

S T A T E M E N T

388 *** FLAGS FOR EXECUTIVE

390 * TASK STATUS INDICATORS, 1 = ACTIVE

1 130

391 0RG 130

1 130

392 TASKST FB 8

1 138

393 TASKSI FB 8 INITIALIZATION

394 * RATE STATUS INDICATORS

1 146

395 RTSTA1 FB 4 1=ACTIVE, 0=DONE

1 150

396 RTSTA2 FB 4 1=INIT., 0=INTERRUPTED

397 RSP *** TEMPORARY ***

398 FLG TASKSI,11111111

399 END

RESOURCE CONTROLLER

PAGE 30

ERRS LBC BA1 BA2 BA3 STMTN8 SOURCE STATEMENT

```

1 500          194          9RG          500
* INPUT/OUTPUT MONITOR AND TEST

1 500          197          * BYPASS TESTS IF IN INITIALIZATION
1 501          198          I0MAT BBR I0M0,1,SINFLG RESET INITIALIZATION FLAG
1 502          199          RST SINFLG KM3,ERCNT1 RESET INITIALIZE INDICATORS
1 503          200          YV KM3,ERCNT3
1 504          201          YV KM4,CPNUM1
1 505          202          YV KM4,CPNUM3
1 506          203          YV KO,VTSTC
1 507          204          YV RECONF
1 507          205          B

208          * EXAMINE RESULTS OF CRITICAL VOTING
209          I0M0 RST E1CVP,E1CVS RESET ONE-TIME ERROR FLAGS
210          BBR I0M01,4,SCUMP ANY ERRORS IN CRITICAL VOT
211          * ERROR, FIND WHICH COMPUTER DISAGREED
212          YV KO,R2
213          SET E1CVP,E1LMAJ
214          BMS I0M002,C0MCR#2,SCUMP#2 1,0 * MAJORITY REACHED
215          I0M001 BBR *+2,1,SCUMP#2
216          YV R2,R3
217          ADD K1,R2,R2
218          SNE I0M001-1,R2,K4
219          B *+3
220          I0M002 RST E1LMAJ MAJORITY REACHED, RESET FLAG
221          B I0M001

223          BNE I0M02,R3,CPNUM1 DID SAME ONE DISAGREE LAST
224          B I0M021,ERCNT1,1 YES, THREE TIMES IN A ROW
225          SET E3CVP YES, SET STATUS FLAG
226          B I0M01+1

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RESOURCE CONTROLLER

PAGE 31

ERRS	LAC	BA1	BA2	BA3	STMTN0	SOURCE	STATEMENT
					228	* N9 ERRORS IN CRITICAL VOTING	
1	524	992	999		229	I0M01 MV KM4,CPNUM1	CLEAR FAILED COMPUTER NUMB
1	525	991	1003		230	MV KM3,ERCNT1	RESET ERROR COUNTER
1	526	529			231	3 I0M021	
					233	* FIRST DISAGREEMENT	
1	527	8003	999		234	I0M02 MV R3,CPNUM1	SAVE COMPUTER NUMBER
1	528	990	1003		235	MV KM2,ERCNT1	SET ERROR COUNTER TO ONE
					236	* GET RESULTS FROM SECONDARY VCS	
1	529	531	4	27	237	I0M021 BBR I0M03,4,SCUMS	
1	530	93			238	SET E1CVS	ERROR, SET STATUS FLAG
					240	* EXAMINE RESULTS OF SYSTEM STATUS TEST	
1	531	542	4	31	241	I0M03 BBR I0M11,4,SSTEST	IS THERE ANY DISAGREEMENT
					242	* DID I DISAGREE IN SYSTEM STATUS TEST	
1	532	174	K002		243	MV I0CUR08,R2	GET MY IDENTIFICATION
1	533	535	1	31	244	BBR I0M1,1,SSTEST02	
1	534	43			245	SET MJXFLG	SET DISAGREEMENT FLAG
					247	I0M1 K0,R2	TEST FOR TWO SUCCESSIVE FAILURES
1	535	979	K002	31	248	MV ++2,1,SSTEST02	FIND DISAGREEING COMPUTER
1	536	534	1	1	249	BI ++1,R2,1	
1	537	536	K002	1002	250	I0M12,R2,CPNUM3	DID SAME ONE DISAGREE LAST
1	538	545	K002	1	251	I0M2,ERCNT3,1	YES, TWO TIMES IN A ROW
1	539	547	1005		252	E2SSST	YES, SET STATUS FLAG
1	540	102			253	SET B	
1	541	543				I0M11+1	
					255	I0M11 MV KM4,CPNUM3	RESET FAILED COMPUTER NUMB
1	542	992	1002		256	MV KM2,ERCNT3	RESET ERROR COUNTER
1	543	990	1005		257	3 I0M2	GO TO VCS TEST
1	544	547					
					259	* ONE DISAGREEMENT IN SYSTEM STATUS TEST	

ERRS	LSC	BA1	PA2	AA3	STMTN0	SOURCE	STATEMENT
1	545	6002	1002		260	10M12 4V	R2,CPNUM3 SAVE COMPUTER NUMBER
1	546	959	1005		261	4V	KM1,ERCNT3 SET ERROR COUNTER TO ONE
					263		* PROCESS RESULTS OF VCS TEST, PRIMARY
1	547	979	8002		264	10M2 4V	SET INDICATOR FOR PRIMARY
1	548	812			265	BSR	K0,R2
					266		VTPRC0,0
					267		* PROCESS RESULTS OF VCS TEST, SECONDARY
1	549	930	8002		268	4V	K1,R2 SET INDICATOR FOR SECONDARY
1	550	812	0			BSR	VTPRC0,0

RESOURCE CONTROLLER

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ERRS	LBC	BA1	BA2	BA3	STMTNO	SOURCE	STATEMENT
							* COMPARE P-MATRICES FROM PRIMARY AND SECONDARY VCSES
1	551	557	60	64	270	I0M21 BBE	I0M23,PMTXP,PMTXS
					271		
					272		* DISAGREEMENT IN P-MATRIX SAMPLES
1	552	555	1	175	273	BBR	I0M22,1,E3FLGF TWO SUCCESSIVE DISCREPANCIES
1	553	107			274	SFT	E2PC9M YES, SET STATUS FLAG
1	554	561			275	B	I0M231
1	555	175			276	SET	E3FLGF NO, SET FIRST TIME FLAG
1	556	562			277	B	I0M24
					278		* P-MATRIX SAMPLES AGREE, SAVE IN SYSTEM STATUS
1	557	175			279	RST	E3FLGF RESET FIRST TIME FLAG
					280		* HAS MAJORITY OPINION OF COMOP CHANGED
1	558	561	44	60	281	BBE	I0M231,COMOP,PMTXP
1	559	81			283	SET	COMOPC YES, SET FLAG
1	560	4	60	44	284	CPY	4,PMTXP,COMOP UPDATE SYSTEM STATUS
1	561	175			285	RST	E3FLGF RESET STATUS FLAG
1	562	568	68	72	287		* COMPARE R-MATRICES FROM PRIMARY AND SECONDARY VCSES
					288	BBE	I0M26,RMTXP,RMTXS
1	563	566	4	176	289		* DISAGREEMENT IN R-MATRIX SAMPLES
1	564	108			290	BBR	I0M25,4,E4FLGF TWO SUCCESSIVE DISCREPANCIES
1	565	568			291	SET	E2RC9M YES, SET ERROR FLAG
1	566	176			292	B	I0M26
1	567	569			293	SET	E4FLGF NO, SET FIRST TIME FLAG
					294	B	I0M3
					295		* SAMPLES AGREE
1	568	176			296	RST	E4FLGF RESET FIRST TIME FLAG
					297		* UPDATE VCS TEST SEQUENCE COUNTER
1	569	22			298	RST	TMFLG RESET TEST MESSAGE FLAG
1	570	980	8003	56	299	ADD	K1,R3,V1STC\$8 ROOST TEST COUNTER
1	571	573	56	983	300	BNE	I0M4,V1STC\$8,K4 HAS TEST CYCLE BEEN COMPLE
1	572	979	56		301	4V	K0,V1STC\$8 YES, RESET COUNTER
1	573	575	56	8002	302	BNE	I0M5,V1STC\$8,IOCUR

RESOURCE CONTROLLER

PAGE 34

ERRS	LGC	0A1	0A2	0A3	STMTN8	SOURCE	STATEMENT	SET TEST MESSAGE FLAG
1	574	22			303	SFT	TMFLG	
1	575	580			304	B	RECONF	
1	576	979	56		306	4V	KO,VTSTC	
1	577				308	P	* RECONFIGURATOR STATUS FLAGS *	
1	578	19	92		309	PF	FLG CNT, SETABS	
1	579	580			310	B	RECONF	

RESOURCE CONTROLLER

PAGE 35

ERRS	LBC	BA1	BA2	BA3	STMTNO	SOURCE	STATEMENT
1	580	979	ROO8		313	RECONF YV	KO,RR
1	581	533	1	81	314	BSR	**2,1,CAM8PC
1	582	729	0		315	BSR	CPASIN,0
1	583	585	1	43	316	BSR	**2,1,MJXFLG
1	584	593	0		317	BSR	SSREST,0
1	585	587	19	110	318	BSR	**2,FLGCNT,SETABL
1	586	646	0		319	BSR	SCANAL,0
							TEST COM8P CHANGE FLAG
							UPDATE COMPUTER ASSIGNMENT
							TEST STATUS UPDATE FLAG
							SET, RESET SYSTEM STATUS
							**2,FLGCNT,SETABL
							TEST STATUS ERROR FLAGS
							SCANAL,0
							SET, ANALYZE ERROR
1	587	12	44	51	321	* PACK SYSTEM STATUS FLAGS INTO OUTPUT MESSAGE	
					322	PCK	12,CAM8P,SYSTA
1	588				324	P	* SYSTEM STATUS *
1	589	12	44		325	PF	12,CAM8P
1	590	52	53	54	326	PD	VCSPR,VCS8C,VCSAS
1	591	56			327	PD	VTSTC
1	592	340			328	B	EXEC

RESOURCE CONTROLLER

PAGE 37

ERRS	LBC	BA1	BA2	BA3	STMTNO	SOURCE	STATEMENT
1	615	8003	50	8005	363	* NO CONSENSUS - IF WORD IS VTSTC, RESET IT. OTHERWISE, SKIP	
1	616	0	5	0	364	SSR5 SUB R3,LSYSTA,R5	GET ADDRESS OF WORD
1	617	604	8005	994	365	MVA 085,5,0	
1	618	979	56		366	BNE SSR2,R5,AVTSTC	IS IT VTSTC
1	619	613			367	MV K0,VTSTC#8	YES, RESET VTSTC
1	620	613			368	B SSR3	
					369	B SSR3	

ERRS	LUC	0A1	0A2	0A3	STMT00	SOURCE	STATEMENT
					371	SUBROUTINE	*** MAJOR ***

```

373 * THIS SUBROUTINE DETERMINES THE MAJORITY OPINION ON A DATA 0
375 * R5 = ADDRESS OF STATUS FLAGS(4)
376 * R6 = DISPLACEMENT BETWEEN DATA OR FLAG BLOCKS
377 * R3 = ADDRESS OF DATA WORD OR FLAG WORD
378 * R4 = 1 IF DATA WORD, 4 IF FLAG WORD
380 * IF MAJORITY CONSENSUS IS FOUND RETURN IS TO CALL + 2
381 * IF NO CONSENSUS WAS FOUND RETURN IS TO CALL + 1
383 * ADDRESS OF MAJORITY CONSENSUS IS RETURNED IN REGISTER 7

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1	621	8008	0	MAJOR	MTS	R8,0	SAVE REG. 8 IN STACK
1	622	979	R001	MV	KO,R1		LOOP INDICES, R1 = I, R2 = J
1	623	8001	980	MJ1	ADD	R1,K1,R2	J = I+1
1	624	8001	R005	ADD	R1,R5,R7		GET ADDRESS OF I-TH STATUS FLAG GI
1	625	638	1	BBR	MJ6,1,087		IS STATUS OF I-TH SAMPLE GI
1	626	8002	R005	ADD	R2,R5,R7		GET ADDRESS OF J-TH STATUS FLAG
1	627	636	1	BBR	MJ5,1,087		IS STATUS OF J-TH SAMPLE GI
				*	STATUS OF BOTH SAMPLES OK, MAKE COMPARISON		
1	628	8001	R006	MUL	R1,R6,R7		GET ADDRESS OF WORD I
1	629	8007	R003	ADD	R7,R3,R7		
1	630	8002	R006	MUL	R2,R6,R8		GET ADDRESS OF WORD J
1	631	8008	R003	ADD	R8,R3,R8		
				*	FLAG WORD OR DATA WORD		
1	632	635	R004	BNE	MJ4,R4,K1		
1	633	641	0	BE	MJ7,087,088		COMPARE TWO DATA WORDS

ERRS	LBC	BA1	BA2	BA3	STMTNO	SOURCE	STATEMENT
1	634	636			402	B	MJ5 NOT EQUAL, TRY ANOTHER PAIR
1	635	641	0	0	404	MJ4 BBE	MJ7,0\$7,0\$8 COMPARE TWO FLAG WORDS
1	636	930	8002	8002	405	MJ5 ADD	K1,R2,R2 J = J + 1
1	637	626	8002	983	407	BNE	MJ2,R2,K4 ANY MORE J'S
1	638	940	8001	8001	408	MJ6 ADD	K1,R1,R1 NO, I = I + 1
1	639	623	8001	982	409	BNE	MJ1,R1,K3 ANY MORE I'S
1	640	644			411 412	* RETURN FOR NO CONSENSUS S	MJ8
1	641	8001	-1		414	* RETURN IF CONSENSUS IS FOUND	RETURN = RETURN + 1
1	642	930	8001	8001	415	MJ7 YES	R1,-1
1	643	8001	-1		416	ADD	K1,R1,R1
1	644	8008	0		417	YTS	R1,-1
1	645				418	YES	R8,0
1	646				419	RTT	1 RESTORE REGISTER 8 RETURN TO CALL + 1

RESOURCE CONTROLLER

PAGE 40

ERRS	LUC	BA1	BA2	BA3	STMTN8	SOURCE	STATEMENT
					421	*	SUBROUTINE *** SCANAL ***
					423	*	* THIS SUBROUTINE COMPARES THE STATES OF THE STATUS ERROR FLA
					424	*	* WITH THE ERROR PATTERNS STORED IN THE TABLES, EPAT1 AND EPA
					425	*	* IF A MATCH IS FOUND, THE SUBROUTINE CORRESPONDING TO TH
					426	*	* IS CALLED VIA THE ENTRY TABLE, ERTENT
A	1 646	-13	8001	0	428	SCANAL P	*** SCANAL ***
	1 647				429	EPATN8,R1,0	
					431	*	* COMPARE STATUS FLAGS WITH ONE ERROR PATTERN
	1 648	19	170	673	432	SCA1	UPK FLGcnt,TEMPF,EPAT1\$1 UNPACK THE 1-SET PATTE
	1 649	19	110	170	433	SRB	FLGcnt,SETABL,TEMPF
	1 650	652	19	170	434	BRB	SCA2,FLGcnt,TEMPF
	1 651	655			435	B	SCA3
	1 652	19	170	687	436	SCA2	UPK FLGcnt,TEMPF,EPAT0\$1 NO, TRY NEXT PATTERN
	1 653	19	110	170	437	ANB	FLGcnt,SETABL,TEMPF UNPACK THE 0-SET PATTE
	1 654	656	19	170	438	BBR	SCA4,FLGcnt,TEMPF DO 0-SET'S MATCH
					439	*	* PATTERN DOES NOT MATCH, TRY NEXT ONE
	1 655	648	8001	1	440	SCA3	BI SCA1,R1,1
					441	*	* PATTERN MATCHES, CALL CORRESPONDING SUBROUTINE
	1 656	701	0		442	SCA4	BSR ERTENT\$1,0
	1 657	655			443	B	SCA3 TRY NEXT PATTERN
					444	*	* ALL PATTERNS TESTED, RETURN
	1 658	10	101		445	RSB	FLGMN8,FLGMST RESET MULTIPLE TIME FLAGS
	1 659	0			446	RRT	0

ERRS L9C 8A1 8A2 8A3 STMTN8 SOURCE STATEMENT

* PATTERNS USED TO ANALYZE ERRORS DETECTED BY STATUS FLAGS

449
 451 *** EACH PATTERN IS STORED AS TWO NUMBERS, EPAT1 AND EPAT2.
 452 *** EPAT1 = A CODE DESIGNATING THE 'TRUE' FLAGS IN THE
 453 *** EPAT2 = A CODE DESIGNATING THE 'FALSE' FLAGS IN THE
 454 *** THESE TWO WORDS ARE IN A 'PACKED' FORM AND EPAT1 IS
 456 *** THE PATTERNS ARE COMPARED WITH THE STATUS FLAG BLOCK
 457 *** ERTENT IS A TABLE OF ENTRY POINTS TO SUBROUTINES
 458 *** ARE CALLED WHEN A PATTERN MATCH IS FOUND

*** EPAT1 -- TABLE OF TRUE (1-SET) FLAGS ***

1	660	EPAT1S EQU	*	524285	1
1	661	DEC		524286	2
1	662	DEC		523775	3
1	663	DEC		524031	4
1	664	DEC		524159	5
1	665	DEC		524223	6
1	666	DEC		490559	7
1	667	DEC		490751	8
1	668	DEC		491327	9
1	669	DEC		491519	10
1	670	DEC		524279	11
1	671	DEC		507135	12
1	672	DEC		507903	13
1	673	DEC		524283	14
		EPAT1 EQU	**1		LAST ENTRY IN TABLE
		EPATN8 EQU	EPAT1S-EPAT1		NEGATIVE OF THE NUMBER OF

RESOURCE CONTROLLER

PAGE 42

ERRS	LOC	BA1	BA2	BA3	STMTNO	SOURCE	STATEMENT
					480	*** EPATO -- TABLE OF FALSE (0-SET) FLAGS ***	
1	674				482	DEC	0
1	675				483	DEC	0
1	676				484	DEC	49408
1	677				485	DEC	49664
1	678				486	DEC	16448
1	679				487	DEC	16512
1	680				488	DEC	65536
1	681				489	DEC	65728
1	682				490	DEC	66304
1	683				491	DEC	66496
1	684				492	DEC	65536
1	685				493	DEC	0
1	686				494	DEC	768
1	687				495	DEC	65536
					496	EPATO EQU	**1
							LAST ENTRY IN TABLE

*** ERTENT -- TABLE OF SUBROUTINE ENTRIES ***

498							
500	688	710				B	ESUB1
501	689	715				B	ESUB2
502	690	702				B	ESUB3
503	691	706				B	ESUB4
504	692	702				B	ESUB5
505	693	706				B	ESUB6
506	694	720				B	ESUB7
507	695	720				B	ESUB8
508	696	720				B	ESUB9
509	697	720				B	ESUB10
510	698	702				B	ESUB11

RESOURCE CONTROLLER

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ERRS	LBC	BA1	BA2	BA3	STMTNO	SOURCE	STATEMENT
1	699	722			511	B	ESUB12
1	700	722			512	B	ESUB13
1	701	702			513	B	ESUB14
					514	ERTENT EQU	*-1

LAST ENTRY IN TABLE

RESOURCE CONTROLLER

PAGE 44

EKRS	LBC	BA1	BA2	BA3	STMTN	SOURCE	STATEMENT
1	702	52	K001		516	* FAIL PRIMARY VCS	
1	703	51			517	FAILPR 4V	VCSPR,R1
1	704	763			518	FAILVC RST	VCSBP-191
1	705	0			519	BSR	VCASIN,0
					520	RRT	0
1	706	53	K001		522	* FAIL SECONDARY VCS	
1	707	703			523	FAILSC 4V	VCSSC,R1
					524	B	FAILVC
1	708	55			526	* FAIL A COMPUTER ** COMPUTER NUMBER IN R1 **	
1	709	0			527	FAILCP RST	PVOTE-191
					528	RRT	0

RESOURCE CONTROLLER

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ERRS	L0C	0A1	0A2	0A3	STMTN0	S O U R C E	S T A T E M E N T
					531	* FAIL EITHER	PRIMARY OR SECONDARY VCS
					532	ESUB1	BRE
					533	B	BRE
					534	BRE	BRE
					535	B	BRE
					536	RRT	RRT
					538	ESUB2	BRE
					539	B	BRE
					540	BRE	BRE
					541	B	BRE
					542	RRT	RRT
					544	ESUB3	BRE
					545	ESUB4	BRE
					546	ESUB5	BRE
					547	ESUB6	BRE
					548	ESUB7	BRE
					549	ESUB8	BRE
					550	ESUB9	BRE
					551	ESUB10	BRE
					552	ESUB11	BRE
					553	ESUB12	BRE
					554	ESUB13	BRE
					555	ESUB14	BRE
					556	ESUB15	BRE
					557	ESUB16	BRE
					558	ESUB17	BRE
					559	ESUB18	BRE
					560	ESUB19	BRE
					561	ESUB20	BRE
					562	ESUB21	BRE
					563	ESUB22	BRE
					564	ESUB23	BRE
					565	ESUB24	BRE
					566	ESUB25	BRE
					567	ESUB26	BRE
					568	ESUB27	BRE
					569	ESUB28	BRE
					570	ESUB29	BRE
					571	ESUB30	BRE
					572	ESUB31	BRE
					573	ESUB32	BRE
					574	ESUB33	BRE
					575	ESUB34	BRE
					576	ESUB35	BRE
					577	ESUB36	BRE
					578	ESUB37	BRE
					579	ESUB38	BRE
					580	ESUB39	BRE
					581	ESUB40	BRE
					582	ESUB41	BRE
					583	ESUB42	BRE
					584	ESUB43	BRE
					585	ESUB44	BRE
					586	ESUB45	BRE
					587	ESUB46	BRE
					588	ESUB47	BRE
					589	ESUB48	BRE
					590	ESUB49	BRE
					591	ESUB50	BRE
					592	ESUB51	BRE
					593	ESUB52	BRE
					594	ESUB53	BRE
					595	ESUB54	BRE
					596	ESUB55	BRE
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					598	ESUB57	BRE
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					605	ESUB64	BRE
					606	ESUB65	BRE
					607	ESUB66	BRE
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					613	ESUB72	BRE
					614	ESUB73	BRE
					615	ESUB74	BRE
					616	ESUB75	BRE
					617	ESUB76	BRE
					618	ESUB77	BRE
					619	ESUB78	BRE
					620	ESUB79	BRE
					621	ESUB80	BRE
					622	ESUB81	BRE
					623	ESUB82	BRE
					624	ESUB83	BRE
					625	ESUB84	BRE
					626	ESUB85	BRE
					627	ESUB86	BRE
					628	ESUB87	BRE
					629	ESUB88	BRE
					630	ESUB89	BRE
					631	ESUB90	BRE
					632	ESUB91	BRE
					633	ESUB92	BRE
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					674	ESUB133	BRE
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					703	ESUB162	BRE
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					711	ESUB170	BRE
					712	ESUB171	BRE
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					714	ESUB173	BRE
					715	ESUB174	BRE
					716	ESUB175	BRE
					717	ESUB176	BRE
					718	ESUB177	BRE
					719	ESUB178	BRE
					720	ESUB179	BRE
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					722	ESUB181	BRE
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					724	ESUB183	BRE
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					730	ESUB189	BRE
					731	ESUB190	BRE
					732	ESUB191	BRE
					733	ESUB192	BRE
					734	ESUB193	BRE
					735	ESUB194	BRE
					736	ESUB195	BRE
					737	ESUB196	BRE
					738	ESUB197	BRE
					739	ESUB198	BRE
					740	ESUB199	BRE
					741	ESUB200	BRE
					742	ESUB201	BRE
					743	ESUB202	BRE
					744	ESUB203	BRE
					745	ESUB204	BRE
					746	ESUB205	BRE
					747	ESUB206	BRE
					748	ESUB207	BRE
					749	ESUB208	BRE
					750	ESUB209	BRE
					751	ESUB210	BRE
					752	ESUB211	BRE
					753	ESUB212	BRE
					754	ESUB213	BRE
					755	ESUB214	BRE
					756	ESUB215	BRE
					757	ESUB216	BRE
					758	ESUB217	BRE
					759	ESUB218	BRE
					760	ESUB219	BRE
					761	ESUB220	BRE
					762	ESUB221	BRE
					763	ESUB222	BRE
					764	ESUB223	BRE
					765	ESUB224	BRE
					766	ESUB225	BRE
					767	ESUB226	BRE
					768	ESUB227	BRE
					769	ESUB228	BRE
					770	ESUB229	BRE
					771	ESUB230	BRE
					772	ESUB231	BRE
					773	ESUB232	BRE
					774	ESUB233	BRE
					775	ESUB234	BRE
					776	ESUB235	BRE
					777	ESUB236	BRE
					778	ESUB237	BRE
					779		

RESOURCE CONTROLLER

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ERRS	LGC	BA1	BA2	BA3	STMTN0	SOURCE	STATEMENT
1	727	949	1005		559	ES1 MV	KM1,ERCNT3
1	728				560	RR7	O
					561	ESUB13 EQU	FSUB12
					562	ESUB14 EQU	FAILPR

RESOURCE CONTROLLER

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ERRS	L9C	8A1	8A2	8A3	STMTN9	S O U R C E	S T A T E M E N T
					564	*	SUBROUTINE *** CPASIN ***
					566	*	THIS SUBROUTINE DETERMINES THE NEW SYSTEM LEVEL COMPUTER AS
					567	*	AFTER A CHANGE IN COMPUTER STATUS, I.E. 2COM0P8
					569	*	COM0P REFLECTS THE NEW OPERATIONAL STATUS ON ENTRY
					570	*	ON EXIT, COMCR IS UPDATED TO NEW TEMPORARY STATUS AND NC
					571	*	CONTAINS THE DESIRED NEW STATUS
					573	*	THE TRANSITION FLAG, TRANCY, IS SET FOR NON-CRITICAL TO
1	729				575	CPASIN P	*** CPASIN ***
1	730		44	48	576	AN8	4,COM0P,COMCR REMOVE NON-OPER. COMPS. FR
1	731	4	45	82	577	CPY	4,COMCR,NCMCR REMAINING COMPUTERS
1	732	979	8001		578	4V	K0,R1 R1 = 0
1	733	992	8002		579	4V	KM4,R2 R2 = 04
1	734	736	1	36	581	CPA1	**2,1,NCMCR+482 COUNT CRITICAL COMPUTERS I
1	735	980	8001	8001	582	ADD	K1,R1,R1 THAT8 ONE
1	736	734	8002	1	583	BT	CPA1,R2,1 HAVE ALL BEEN CHECKED
1	737	8001	186		584	4V	R1,CRITN9 UPDATE CRITICAL COMPUTER COUNT
1	738	77	170		586	*	ASSIGN NEW COMPUTER IF LESS THAN THREE CRITICAL
1	739	992	8002		587	4V	COMCD,TEMPF1 INITIALIZE FOR LOOP
1	740	750	8001	982	588	4V	KM4,R2
1	741	743	1	48	589	SE	CPA7,R1,K3 ARE THERE THREE
1	742	747	86	174	590	88R	CPA5,1,COM9P+482 NO, TEST FOR REPLACEMENTS
1	743	741	8002	1	591	88	CPA6,NCMCR+482,TEMPF1+482
1	744	750	4	170	592	BT	CPA4,R2,1 ALL COMPUTERS TESTED
1					593	88R	CPA7,4,TEMPF1 HAVE CONDITIONAL COMPUTERS

RESOURCE CONTROLLER

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ERRS	LBC	BA1	BA2	BA3	STMTN	SOURCE	STATEMENT
1	745	4	170		594	RSE	4,TEMPF1
1	746	739			595	B	CPA2
							NO, TRY THEM
							GO THRU LOOP AGAIN
1	747	56			597	* SPAKE FOUND, ASSIGN IT	
1	748	950	8001		598	SET	NCOMCR+482
1	749	743		8001	599	ADD	K1,R1,R1
					600	B	CPA3
							R1 = R1 + 1
1	750	8001	187		602	* ALL SPARES ASSIGNED, SET TRANSITION FLAGS, IF ANY NON-CRIT.	
1	751	992	8002		603	4V	R1,NCRITN88
1	752	761	86	52	604	4V	KM4,R2
1	753	752	8002	1	605	8MS	CPA8,NCOMCR+482,COMCR+482
					606	BI	*-1,R2,1
					607	* UPDATE CRITICAL BYPASS FLAG	
1	754	174	8001		608	4V	IDCUR,R1
1	755	758	1	82	609	BBS	*+3,1,NCOMCR#1
1	756	19			610	SET	IONULL
1	757	759			611	B	*+2
1	758	19			612	RST	IONULL
1	759	81			614	RST	COM8PC
1	760	0			615	RRT	RESET CHANGE FLAG
					616		RETURN
1	761	990	180		617	* TRANSITION FOUND, SET FLAG	
1	762	753			618	CPA8	KM2,TRANCT
						B	CPA71

RESOURCE CONTROLLER

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ERRS	L8C	8A1	8A2	8A3	STMTN8	S O U R C E	S T A T E M E N T
					620	*	SUBROUTINE *** VCASIN ***
					622	*	* THIS SUBROUTINE DETERMINES THE NEW VCS STATUS UPON ENTRY
					623	*	* AFTER A CHANGE IN VCS STATUS
					625	*	* VCS8P CONTAINS THE NEW VCS STATUS UPON ENTRY
					626	*	* VCS8P, VCSSC, VCSAS, VCSSP, VCSCR, VCSCRO, VCSCRI ARE U
					628	VCASIN P	*** VCASIN ***
1	763				629	RST	TEMPF1
1	764	170			630	CPY	4,VC88P,TEMPF1+1
1	765	4	52	171	631	WV	K1,R1
1	766	980	8001		632	WV	K4,R1,R3
1	767	983	8001	8003	633	SUB	NO, ADVANCE ASSIGNMENT
					634	* ADVANCE VCS ASSIGNMENTS IF CURRENT VCS IS NOT OPERATIONAL	
1	768	51	8002		635	WV	VC88P-181,R2
1	769	778	1	170	636	885	GET ADDRESS OF VCS TO BE U
1	770	781	8003	979	637	BE	IS VCS OPERATIONAL
1	771	771				B	VCA7,R3,K0 ANY MORE ALTERNATES
							**1
1	772	53	52		639	WV	VCSSC,VC88P
1	773	54	53		640	WV	VC88S,VCSSC
1	774	141	54		641	WV	VCSSP,VC88S
1	775	979	181		642	WV	K0,VCSSP
					644	SUB	R3,K1,R3
1	776	8003	980	8003	645	3	VCAS
1	777	768			646		
					647	* RNE VCS ASSIGNED, GO TO NEXT	
1	778	170			648	VCAS	TEMPF182
1	779	980	8001	8001	649	RST	K1,R1,R1
1	780	767	8001	983		ADD	VCAS2,R1,K4
						SLT	ANY MORE TO BE ASSIGNED

HERE IF PRIMARY REASSIGNME
HERE IF SECONDARY REASSIGN
HERE IF ASSOCIATE REASSIGN

REMOVE IT FROM AVAILABLE LIST
ANY MORE TO BE ASSIGNED

RESOURCE CONTROLLER

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ERRS	L9C	B41	MA2	MA3	STMTN8	SOURCE	STATEMENT
1	781	783	4	171	651	VCA7	* HAVE ALL AVAILABLE VCSES BEEN USED
1	782	980	R003		652	BRP	VCA8,4,TEMPF1+1
1	783	786	1	170	653	WV	K1,R3 NO, MOVE UNUSED ONE INTO VCSSP
1	784	980	R003	8003	654	BRS	**3,1,TEMPF1+3 IS THIS THE UNUSED ONE
1	785	783			655	ADD	NO, TRY NEXT
1	786	8003	181		656	B	**2
1	787	767	8001	983	657	WV	R3,VCSSP YES, ASSIGN IT TO SPARE
1					658	BNE	VCA2,R1,K4
1	788	797	4	52	660	VCA8	* IF ONLY ONE VCS, ASSIGN IT TO BOTH PRIMARY AND SECONDARY
1	789	979	R002		661	BRP	VCA82,4,VCSP YES, COUNT THEM
1	790	979	R001		662	WV	K0,R2
1	791	794	1	52	663	WV	K0,R1
1	792	797	R002	979	664	BRR	VCA81,1,VCSP+1 IS VCS OPERATIONAL
1	793	980	R002		665	BNE	VCA82,R2,K0 YES, HAVE THERE BEEN OTHER
1	794	980	R001	8001	666	WV	K1,R2 NO, SAVE INDICATOR
1	795	791	R001	983	667	VCA81	ADD K1,R1,R1
1					668	BNE	VCA8+3,R1,K4
1	796	52	53		669	WV	* PRIMARY VCS IS ONLY ONE OPERATIONAL, ASSIGN IT TO SECONDARY
1					670		VCSPR,VCSSC
1	797	52	985	995	672	VCA82	* ALL VCSES ASSIGNED, UPDATE CODES FOR CRITICAL VCSES
1	798	53	995		673	MUL	VCSPR,K10,VCSCRS
1	799	995	985	995	674	ADD	VCSSC,VCSCRS,VCSCRS SECONDARY AND ASSOCIATI
1	800	54	55	55	675	MUL	VCSCRS,K10,VCSCR
1					676	ADD	VCSSC,VCSCR,VCSCR CRITICAL * PRI SEC ASSOC
1	801	807	1	1	677	WV	* UPDATE VCS ADDRESS CODES FOR I/O PROGRAM
1	802	52	182		678	BBS	VCA9,1,VCSPWIT
1	803	53	183		679	WV	VCSPR,VCSCRB
1	804	55	184		680	WV	VCSSC,VCSCRB+1
1	805	995	185		681	WV	VCSCR,VCSCRI
1					682	WV	VCSCRS,VCSCRI+1
1	806	0			683	RRT	0 RETURN

RESOURCE CONTROLLER

EPRS		LOC	BA1	BA2	BA3	STMTN0	SOURC E	PAGE	51	STATEMENT
1	807	53	182			684	VCA9			VCSSC,VCSCR0
1	808	52	183			685				VCSPR,VCSCR0+1
1	809	995	184			686				VCSCR5,VCSCRI
1	810	55	185			687				VCSCR,VCSCRI+1
1	811	0				688	QRT	0		RETURN

RESOURCE CONTROLLER

PAGE 52

ERRS	LBC	BA1	BA2	BA3	STMTNO	SOURCE	STATEMENT
					690	*	SUBROUTINE *** VTPROC ***
					692	*	* THIS SUBROUTINE IS USED TO PROCESS THE RESULTS OF THE VCS
					694	*	* ENTRY / R2 = 0 IF PRIMARY VCS, = 1 IF SECONDARY
					695	*	* FLAGS E1VT1P,E1VT1S,E2VT1P,E2VT1S,E1VTOP,E1VTOS,E2VTPE
					696	*	* MAY BE SET BY THIS ROUTINE
1	812	983	8002	8004	698	VTPROC MUL	K4,R2,R4 R4 = 0 OR 4
1	813	56	8003		699	WV	VTSTC08,R3 TEST COUNTER INTO R3
1	814	8004	8003	8005	700	ADD	R4,R3,R5
1	815	95	97		701	RST	E1VT1P02,E1VTOP02 RESET ONE-TIME FLAGS
					702	*	* TEST FOR EXPECTED DISCREPANCY
					703	BMS	VTPO,COMCR03,STESTP05
1	816	820	48	35	704	RST	STESTP05
1	817	35			705	WV	TEST OK
1	818	992	1000		706	KM4,CPNUM202	RESET COMPUTER NUMBER
1	819	828				VTP2	
					708	*	* TEST FAILURE UNLESS THERE ARE LESS THAN TWO CRITICAL COMPU
1	820	842	186	981	709	VTP0 BLT	VTP6+1,CRITN008,K2
					710	*	* ERROR IN 1-SET TEST
1	821	181	95		711	SET	ERBUF05,E1VT1P02
1	822	824	1	177	712	88S	SET ERROR INDICATIONS
1	823	827	1000	8003	713	BE	*+2,1,E5FLGF02 TWO SUCCESSIVE ERRORS
1	824	177			714	SET	VTPI,CPNUM202,R3 YES, SAME COMPUTER
1	825	8003	1000		715	WV	E5FLGF02 NO, SET FIRST TIME FLAG
1	826	829			716	B	R3,CPNUM202 SAVE COMPUTER NUMBER
					717	* TWO SUCCESSIVE ERRORS IN 1-SET WITH SAME COMPUTER	
1	827	103			718	VTPI SET	E2VT1P02
					720	VTP2 RST	E5FLGF02 RESET FIRST TIME FLAG

RESOURCE CONTROLLER

PAGE 53

ERRS	LBC	6A1	6A2	6A3	STMTN0	SOURCE	STATEMENT
1	829	831	186	981	721	* BYPASS 0=SET TEST IF TWO CRITICAL COMPUTERS	
1	830	839	1	48	722	VTP11 BNE *+2,CRITN0\$8,K2	JUST TWO
1	831	839	4	35	723	VTP5,1,C9MCR\$3	YES, BYPASS IF 1=SET TEST
1	832	97	35	181	724	* TEST FOR EXPECTED AGREEMENTS, 0=SET	
1	833	837	1	179	725	VTP5,4,STESTP\$4	
1	834	179	35	181	726	E1VTOP\$2	SET STATUS FLAG
1	835	837	1	179	727	4,STESTP\$4,ERBUF\$4	SAVE TEST RESULTS
1	836	179	0	0	728	* HAVE THERE BEEN TWO SUCCESSIVE FAILURES	
1	837	105	1	95	729	VTP3 BBS VTP4,1,E6FLGF\$2	TEST FIRST TIME FLAG
1	838	841	181	0	730	SET E6FLGF\$2	NO, SET FLAG
1	839	834	4	0	731	RET 0	RETURN
1	840	179	0	0	732	* TWO SUCCESSIVE ERRORS	
1	841	179	0	0	733	VTP4 SET E2VTP\$2	
1	842	179	0	0	734	VTP6	
1	843	179	0	0	735	VTP5 BBS VTP3,1,F1VTP\$2	WAS THERE AN ERROR IN 1=SE
1	844	179	0	0	736	RSE 4,ERBUF\$4	NO, CLEAR RESULT BUFFER
1	845	179	0	0	737	RST E6FLGF\$2	RESET FIRST TIME FLAG
1	846	179	0	0	738	RET 0	RETURN

RESOURCE CONTROLLEK

PAGE 54

ERRS	L6C	8A1	8A2	8A3	ST4TN8	SOURCE	STATEMENT
					740	*	SUBROUTINE *** INVATE ***
					742	*	* THIS SUBROUTINE DRES MAJORITY VATING ON REDUNDANT COPIES OF
					743	*	* DATA MESSAGE FROM EITHER LP'S OR OTHER COMPUTERS
					745	*	* THE DATA IS STORED IN CONSECUTIVE BLOCKS IN THE FORMAT CR
					746	*	* BY THE IS AND ISN INSTRUCTIONS.
					748	*	* R3 = ADDRESS OF FIRST DATA WORD
					749	*	* R6 = DATA BLOCK SIZE (INCLUDING STATUS WORD)
					750	*	* R4 = 3 FOR LP INPUT DATA... = 4 FOR COMPUTER INPUT DATA
					752	*	* RETURN IS TO CALL+2 IF A GOOD DATA SET IS FOUND
					753	*	* RETURN IS TO CALL+1 IF NO GOOD DATA IS AVAILABLE
1	843	979	8001		755	INVATE MV	K0,R1 R1 = 0
1	844	979	8005		756	MV	K0,R5 R5 = 0
1	845	4	170		757	RSB	4,TFLAG RESET STATUS FLAGS
					758	* TEST STATUS	WORDS AND SET STATUS FLAGS
1	846	8006	980	8007	759	SUB	R6,K1,R7 GET ADDRESS OF STATUS WORD
1	847	8007	8003	8007	760	ADD	R7,R3,R7
1	848	8007	997		761	MV	R7,TEMP+1 SAVE ADDRESS
1	849	855	0	980	762	INV1	INV2,007,K1 TEST STATUS WORD, 100K
1	850	852	8004	983	763	BNE	*+2,R4,K4 STATUS OK, TEST COMCR IF R4=4
1	851	855	1	48	764	BBR	INV2,1,CAMCR\$5 IS DATA FROM A CRITICAL CR
					765	* STATUS 8K,	SET FLAG AND COUNT
1	852	8007	996		766	4V	R7,TEMP
1	853	170			767	SET	TFLAG\$5 SET STATUS FLAG
1	854	980	8001	8001	768	ADD	K1,R1,R1 R1 = NO. OF GOOD DATA SETS
1	855	979	0		769	MV	K0,007 RESET STATUS WORD
1	856	8006	8007	8007	770	ADD	R6,R7,R7 GET ADDRESS OF NEXT STATUS WORD

RESOURCE CONTROLLER

PAGE 55

ERRS	L9C	9A1	9A2	9A3	STMTN9	S 9 J R C F	S T A T E M E N T
1	857	930	R005	R005	771	ADD	K1,R5,R5
1	858	849	R005	R004	772	BNE	INV1,R5,R4
1	859	861	R001	979	773	* HOW MANY GOOD DATA SETS	
1	860	0			774	BNE	*+2,R1,K0
1	861	871	R001	980	775	RRT	0
1	862	170	R005	0	776	IF	INV4,R1,K1
1	863	980	R004		777	* MORE THAN ONE GOOD COPY, GET MAJORITY	
1	864	621	1		778	YVA	TFLAG,R5,0
1	865	0			779	YV	K1,R4
1	866	R003	R006	R004	780	BSR	MAJOR,1
1	867	0	0		781	RRT	0
1	868	980	R003	R003	782	SUB	R3,R6,R4
1	869	879	R003	R003	783	YV	087,084
1	870	863		997	784	ADD	K1,R3,R3
					785	SE	INV6,R3,TEMP+1
					786	B	INV3
							RETURN HERE IF NO CONSENSUS
							UPDATE WORD TO MAJORITY
							GET NEXT WORD
							ANY MORE WORDS
1	871	873	R004	982	788	* ONLY ONE GOOD DATA SET, IF LP DATA-USE IT	
1	872	0			789	INV4	BE
1	873	R003	R002	R006	790	RRT	*+2,R4,K3
1	874	996	R002	R007	791	SUB	0
1	875	980	R007	R007	792	SUB	R3,R2,R6
1	876	0	0		793	SUB	TEMP,R2,R7
1	877	980	R006	R006	794	YV	K1,R7,R7
1	878	875	R006	R003	795	ADD	087,086
1	879	R001	0		796	SNE	K1,R6,R6
1	880	980	R001	R001	797	* DATA UPDATED, RETURN TO CALL+2	INV5,R6,R3
1	881	R001	0		798	YFS	R1,0
1	882	0			799	ADD	K1,R1,R1
					800	MTS	R1,0
					801	RRT	0
							END OF BLOCK

NO GOOD DATA, RETURN TO CALL+1

RETURN HERE IF NO CONSENSUS

UPDATE WORD TO MAJORITY

GET NEXT WORD

* ONLY ONE GOOD DATA SET, IF LP DATA-USE IT

BE

GET ADDRESS FOR STORING

GET ADDRESS OF GOOD DATA

MOVE A WORD

* DATA UPDATED, RETURN TO CALL+2

YFS

MTS

RESOURCE CONTROLLER

PAGE 56

ERRS LOC 8A1 8A2 8A3 STMTN8 SOURCE STATEMENT

803 * SUBROUTINE *** MOVEFV ***

805 * THIS SUBROUTINE MOVES A DATA SET FROM THE 'OUTPUT' POSITION
806 * DATA BLOCK TO THE INPUT POSITION CORRESPONDING TO 'THIS' CO

808 * DATA IS ASSUMED STORES IN CONSECUTIVE BLOCKS WITH 'OUTPUT

810 * R3 = ADDRESS OF FIRST WORD OF BLOCK

811 * R6 = DATA SET SIZE (INCLUDING STATUS WORD)

1	883	979	8004	813	MOVEFV	MV	K0,R4	INITIALIZE LOOP
1	884	980	174	814		ADD	K1,INDCUR,R5	
1	885	8004	8003	815	MOV1	ADD	R4,R3,R1	GET ADDRESS OF WORD TO BE MOVED
1	886	8005	8006	816		MUL	R5,R6,R2	DISPLACEMENT TO 'MY' INPUT SET
1	887	8002	8001	817		ADD	R2,R1,R2	ADDRESS IN INPUT BLOCK
1	888	0	0	818		MV	0\$1,0\$2	MOVE ONE WORD
1	889	980	8004	819		ADD	K1,R4,R4	
1	890	885	8004	820		BNE	MOV1,R4,R6	ANY MORE
1	891	0		821		RTT	0	RETURN

RESOURCE CONTROLLED

PAGE 57

ERRS	LNC	BA1	BA2	BA3	STMTNO	SOURCE	STATEMENT
					823	** RATE 1 SAMPLE TASK **	
					825	RITASK EQU *	
					827	* GET MAJORITY CONSENSUS ON MODIFIABLE DATA	
1	892	123	R003	0	828	MVA R1M0D,R3,0	
1	893	122	R006		829	MV LR1M0D,R6	
1	894	883	0		830	BSR M0VEFV,0	UPDATE OWN VERSION IN INPUT AREA
1	895	127	R003	0	832	MVA R1M0D1,R3,0	
1	896	983	R004		833	MV K4,R4	
1	897	843	0		834	BSR INV0TE,0	GET MAJORITY VOTE
1	898	899			835	R **1	RETURN HERE IF NO CONSENSUS
					837	* GET MAJORITY CONSENSUS ON LP INPUT DATA	
1	899	90	R003	0	838	MVA LP1IN+1,R3,0	
1	900	86	R006		839	MV LLP1IN,R4	
1	901	982	R004		840	MV K3,R4	
1	902	843	0		841	BSR INV0TE,0	
1	903	189			842	SET XTRAP1	SET EXTRAPOLATION FLAG IF NO CON
					844	* COMPUTE SAMPLE FUNCTION	
					846	* LP201 = I1/R1M1 + I2/R1M2	
					847	* WHERE, R1M1(N) = R1M1(N-1) + 1 IF R1M1(N-1) .LT. 20	
					848	* R1M1(N) = 1 IF R1M1(N-1) = 20	
					849	* R1M2(N) = R1M2(N-1) = 1 IF R1M2(N-1) .GT. 1	
					850	* R1M2(N) = 10 IF R1M2(N-1) = 1	
					851	*	

RESOURCE CONTROLLER

PAGE 58

ERRS	LBC	BA1	BA2	BA3	STMTNO	S O U R C E	S T A T E M E N T
1	904	123	980	123	853	COMP1 ADD	R1M8D,K1,R1M8D
1	905	907	123	987	854	BNE	**2,R1M8D,K20
1	906	980	123		855	MV	K1,R1M8D
1	907	124	980	124	856	SUB	R1M8D+1,K1,R1M8D+1
1	908	910	124	979	857	BGT	**2,R1M8D+1,K0
1	909	985	124		858	MV	K10,R1M8D+1
1	910	123	87	8002	860	DIV	R1M8D,LP1IND,R2
1	911	124	88	8003	861	DIV	R1M8D+1,LP1IND+1,R3
1	912	8002	8003	100	862	ADD	R2,R3,LP18UT+1
* LP282 = XYXY WHERE X = L.S. DIGIT OF I2 * R1M3(N+1) = ZZZ Y = L.S. DIGIT OF R1M3 * WHERE Z = X + Y							
1	913	88	8001		864	MV	LP1IND+1,R1
1	914	973	0		865	BSR	XTRACT,0
1	915	8005	8004		866	MV	R5,R4 R4 = X
1	916	8004	985	8002	869	MUL	R4,K10,R2
1	917	8002	988	8003	870	MUL	R2,K100,R3
1	918	8002	8003	8003	871	ADD	R2,R3,R3 R3 = X0X0
1	919	125	8001		872	MV	R1M8D+2,R1
1	920	973	0		874	BSR	XTRACT,0
1	921	8004	8005	125	875	ADD	R4,R5,R1M8D+2 R5 = Y
1	922	8003	8005	8003	876	ADD	R3,R5,R3
1	923	8005	988	8005	877	MUL	R5,K100,R5
1	924	8003	8005	101	878	ADD	R3,R5,LP18UT+2
1	925				879		
1	926	87	88			P	** RATE 1 SAMPLE TASK **
1	927	123	124	125	881	PD	LP1IND,LP1IND+1
1	928	100	101		882	PD	R1M8D,R1M8D+1,R1M8D+2
					883	PD	LP18UT+1,LP18UT+2
					884		

RESOURCE CONTROLLER

PAGE 59

ERRS	LAC	BA1	BA2	BA3	STMTNB	SOURCE	STATEMENT
1	929	340			385	B	FXEC

RESOURCE CONTROLLER

PAGE 60

ERRS	LBC	BA1	BA2	BA3	SYMTN	SOURCE	STATEMENT
					887	** RATE 2 SAMPLE TASK **	
					889	* GET MAJORITY ON MODIFIABLE DATA	
					890	R2TASK EQU *	
1	930	144	R003	0	891	MVA R2MOD,R3,0	
1	931	143	R006		892	MV LR2MOD,R6	
1	932	883	0		893	BSR MOVEFV,0	
1	933	148	R003	0	895	MVA R2MOD1,R3,0	
1	934	983	R004		896	MV K4,R4	
1	935	843	0		897	BSR INV8TE,0	
1	936	937			898	B **1	RETURN HERE IF NO CONSENSUS
					900	* GET MAJORITY ON LP DATA	
1	937	107	R003	0	901	MVA LP2IN+1,R3,0	
1	938	102	R006		902	MV LLP2IN,R6	
1	939	982	R004		903	MV K3,R4	
1	940	843	0		904	BSR INV8TE,0	
1	941	190			905	SET XTRAP2	NO MAJORITY, SET EXTRAPOLATION F
					907	* COMPUTE SAMPLE FUNCTION	
					909	* LP281 = XXXX WHERE X = 10 * (L.S. DIGIT OF IN1)	
					910	* LP281 = XXXX WHERE X = 0 IF L.S.D. = 0	
					911	* LP282 = (R2M1)(Y)(Y+1)(Y+2) WHERE Y = SECOND DI	
1	942	103	R001		913	MV LP2IND,R1	
1	943	973	0		914	BSR XTRACT,0	
1	944	947	R005	979	915	SNE **3,R5,K0	R5 = L.S.D. OF IN1
1	945	979	120		916	MV KO,LP2OUT+1	
1	946	953			917	B R2T1	

RESOURCE CONTROL

PAGE 61

EFBS	LBC	BA1	BA2	BA3	STMTN	SOURCE	STATEMENT
1	947	945	8005	8002	919	SUB	K10,R5,R2 R2 = X
1	948	991	8001		920	MOV	KM3,R1
1	949	8002	985	8002	921	MUL	R2,K10,R2
1	950	8002	8003	8003	922	ADD	R2,R3,R3
1	951	949	8001	1	923	BT	*-2,R1,1
1	952	8003	120		924	MOV	R3,LP28UT+1
1	953	945	104	8001	926	DIV	K10,LP2IND+1,R1
1	954	973	0		927	BSR	XTRACT,0
1	955	8005	8004		928	MOV	R5,R4 R5 = Y
1	956	145	985	8002	929	MUL	R2M8D+1,K10,R2
1	957	144	8002	8002	930	ADD	R2M8D,R2,R2
1	958	991	8001		931	MOV	KM3,R1
1	959	8002	985	8002	932	MUL	R2,K10,R2
1	960	8002	8005	8002	933	ADD	R2,R5,R2
1	961	963	8005	984	934	BNE	*+2,R5,K9
1	962	989	8005		935	MOV	KM1,R5
1	963	980	8005	8005	936	ADD	K1,R5,R5
1	964	959	8001	1	937	BT	R2T2,R1,1
1	965	8002	121		938	MOV	R2,LP28UT+2
1	966				940	P	** RATE 2 SAMPLE TASK **
1	967	103	104		941	PD	LP2IND,LP2IND+1
1	968	144	145		942	PD	R2M8D,R2M8D+1
1	969	120	121		943	PD	LP28UT+1,LP28UT+2
1	970	144	145		945	MV	R2M8D,R2M8D+1
1	971	8004	144		946	MOV	R4,R2M8D
1	972	340			947	B	EXEC

RESOURCE CONTROLLER

PAGE 62

ERRS L8C 0A1 0A2 0A3 STMTN6 S O U R C E S T A T E M E N T

```

949 * SUBROUTINE *** XTRACT ***
951 * THIS SUBROUTINE EXTRACTS THE LEAST SIGNIFICANT DIGIT IN R1
952 * THE RESULT IS RETURNED IN R5

1 973 8001 8005 954 XTRACT FLT R1,R5
1 974 986 8005 955 FLD KF10,R5,R5
1 975 8005 956 FIX R5,R5
1 976 985 8005 957 MUL K10,R5,R5
1 977 8001 8005 958 SUB R1,R5,R5
1 978 0 959 RRT 0

```

PAGE 63

SYSTEM 2

* TEMPORARY STORAGE AND CONSTANTS		NO. OF	
K0	DEC	0	FAIL
K1	DEC	1	FAIL
K2	DEC	2	COUNT
K3	DEC	3	ERROR
K4	DEC	4	ERROR
K9	DEC	9	
K10	DEC	10	
KF10	DEC	10.0	
K20	DEC	20	
K100	DEC	100	
KM1	DEC	-1	
KM2	DEC	-2	
KM3	DEC	-3	
KM4	DEC	-4	
KM7	DEC	-7	
AVTSTC	ADR	VTSTC	
VCSCRS	MR	1	
TEMP	MB	3	
CPNUM1	BSS	1	
CPNUM2	MB	2	
CPNUM3	MB	1	
ERCNT1	BSS	1	
ERCNT2	BSS	1	
ERCNT3	MR	1	
EXEC	EQU	340	

ORG 170
* TEMPORARY FLAG STORAGE

RESOURCE CONTROLLER

PAGE 64

ERRS	L0C	0A1	0A2	0A3	STMTN0	S O U R C E	S T A T E M E N T
1	170				992	TEMP1 FB	5
					993	TFLAG EQU	TEMP1
					994	TEMPF1 EQU	TEMP1
					995	TEMPF EQU	TEMP1
1	175				996	E3FLGF FB	1
1	176				997	E4FLGF FB	1
1	177				998	E5FLGF FB	2
1	179				999	E6FLGF FB	2
1	181				1000	ERBUF FB	8
1	189				1001	XTRAP1 FB	1
1	190				1002	XTRAP2 FB	1
					1003	END	

FIRST TIME FLAG FOR P-MATRIX COM
 FIRST TIME FLAG FOR R-MATRIX COM
 FIRST TIME FLAG FOR VCS TEST
 FIRST TIME FLAG FOR VCS TEST
 INTERMEDIATE ERROR INDICATOR FOR

RGC COMPUTER IOP/VCS SIMULATION

```

**** IOP 1
      40
210 ** TEST CASE 1 **
**** IOP 2
      40
**** IOP 3
      40
**** IOP 1
      40
380
**** IOP 2
      40
**** IOP 3
      40
640
**** IOP 1
      40
580
**** IOP 2
      40
**** IOP 3
      40
640
750
750
**** IOP 1
      40
750
**** IOP 2
      40
**** IOP 3
      40
840
920
920
1010

      LOAD VCS 1 R-MTRX(1)=1110
      LOAD VCS 1 R-MTRX(2)=1110
      LOAD VCS 1 R-MTRX(3)=1110
      LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 0 R3=
      LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 0 R3=
      VCS 1 P-MTRX=1110 R-MTRX=1110
      LOAD VCS 1 WORD= 111111 LEVEL=2 R1= 111111 R2= 136521 R3=
      LOAD VCS 1 WORD= 111111 LEVEL=2 R1= 111111 R2= 136521 R3=
      LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 0 R3=
      * * * * * VCS 1 OUTPUT RESULT= 136521 * * * * *
      VCS 1 S-MTRX=0000
      LOAD VCS 1 WORD= 212121 LEVEL=2 R1= 212121 R2= 111111 R3=
      LOAD VCS 1 WORD= 212121 LEVEL=2 R1= 212121 R2= 111111 R3=
      LOAD VCS 1 WORD= 111111 LEVEL=1 R1= 111111 R2= 0 R3=
      * * * * * VCS 1 OUTPUT RESULT= 111111 * * * * *
      VCS 1 S-MTRX=0000
      LOAD VCS 1 WORD= 212121 LEVEL=1 R1= 212121 R2= 0 R3=

```

RGC COMPUTER IOP/VCS SIMULATION

PAGE 66

```

**** IOP 3
1090
1090
**** IOP 1
1090
**** IOP 2
1150
**** IOP 3
1180
1260
1260
**** IOP 1
7000
7370
**** IOP 2
7510
**** IOP 1
7570
**** IOP 2
7710
**** IOP 3
7720
7740
7740
**** IOP 1
7740

* * * * * VCS 1 OUTPUT RESULT= 212121 * * * * *
VCS 1 S-MTRX=0000

LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 111111 R3= 0
LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 111111 R3= 0
LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 0 R3= 0
* * * * * VCS 1 OUTPUT RESULT= 33333 * * * * *
VCS 1 S-MTRX=0000

LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 111111 R3= 0
LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 111111 R3= 0
LOAD VCS 1 WORD= 111111 LEVEL=2 R1= 111111 R2= 136521 R3= 0
LOAD VCS 1 WORD= 111111 LEVEL=2 R1= 111111 R2= 136521 R3= 0
LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 0 R3= 0
* * * * * VCS 1 OUTPUT RESULT= 136521 * * * * *
VCS 1 S-MTRX=0000

LOAD VCS 1 WORD= 212121 LEVEL=2 R1= 212121 R2= 111111 R3= 0

```

```

**** IOP 2
7980      LOAD VCS 1 WORD= 212121 LEVEL=2 R1= 212121 R2= 111111 R3= 0
7910      * * * * * VCS 1 OUTPUT RESULT= 111111 * * * * *
7910      VCS 1 S-MTRX=0010

**** IOP 3
7920      LOAD VCS 1 WORD= 111111 LEVEL=1 R1= 111111 R2= 0 R3= 0

**** IOP 2
8080      * * * * * VCS 1 OUTPUT RESULT= 212121 * * * * *
8080      VCS 1 S-MTRX=0010

**** IOP 1
8080      LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 111111 R3= 0

**** IOP 3
8090      LOAD VCS 1 WORD= 212121 LEVEL=1 R1= 212121 R2= 0 R3= 0

**** IOP 2
8220      LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 111111 R3= 0
8250      * * * * * VCS 1 OUTPUT RESULT= 33333 * * * * *
8250      VCS 1 S-MTRX=0010

**** IOP 3
8430      LOAD VCS 1 WORD= 134521 LEVEL=1 R1= 134521 R2= 0 R3= 0
8430      LOAD VCS 1 WORD= 111111 LEVEL=2 R1= 111111 R2= 134521 R3= 0
8800      LOAD VCS 1 WORD= 212121 LEVEL=3 R1= 212121 R2= 111111 R3= 134521
9140      LOAD VCS 1 WORD= 134521 LEVEL=1 R1= 134521 R2= 111111 R3= 134521
9340      LOAD VCS 1 WORD= 111111 LEVEL=2 R1= 111111 R2= 134521 R3= 134521
9510      LOAD VCS 1 WORD= 212121 LEVEL=3 R1= 212121 R2= 111111 R3= 134521
9850

```

EXCESSIVE ERRORS(B) ON BUS 1 SWITCH TO VCS 2

*** IOP 3

9850	LOAD VCS 2 WORD= 236521	LEVEL=1	R1= 236521	R2=	0	R3=	0
10050	VCS 2	P-MTRX=1110	R-MTRX=0000				
10050	VCS 2	S-MTRX=0000					
10050	LOAD VCS 2 WORD= 111111	LEVEL=2	R1= 111111	R2= 236521	R3=		0
10220	VCS 2	S-MTRX=0000					
10220	LOAD VCS 2 WORD= 212121	LEVEL=3	R1= 212121	R2= 111111	R3= 236521		
10390	VCS 2	S-MTRX=0000					
10560	LOAD VCS 2 WORD= 236521	LEVEL=1	R1= 236521	R2= 111111	R3= 236521		
10760	VCS 2	S-MTRX=0000					
10760	LOAD VCS 2 WORD= 111111	LEVEL=2	R1= 111111	R2= 236521	R3= 236521		
10930	VCS 2	S-MTRX=0000					
10930	LOAD VCS 2 WORD= 212121	LEVEL=3	R1= 212121	R2= 111111	R3= 236521		
11100	VCS 2	S-MTRX=0000					
11270	LOAD VCS 2 WORD= 236521	LEVEL=1	R1= 236521	R2= 111111	R3= 236521		
11470	VCS 2	S-MTRX=0000					
11470	LOAD VCS 2 WORD= 111111	LEVEL=2	R1= 111111	R2= 236521	R3= 236521		
11640	VCS 2	S-MTRX=0000					
11640	LOAD VCS 2 WORD= 212121	LEVEL=3	R1= 212121	R2= 111111	R3= 236521		

RGC COMPUTER IOP/VCS SIMULATION

```

**** IOP 3
11810
11980
**** IOP 1
14000
14370
**** IOP 2
14440
**** IOP 3
14510
**** IOP 1
14570
**** IOP 2
14640
14710
14710
**** IOP 3
14710
**** IOP 1
14740
**** IOP 2
14810
14880
14880
**** IOP 3
14880

```

VCS 2 S-MTRX=0000
EXCESSIVE ERRORS(B) ON BUS 2 SWITCH TO VCS 1

```

LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 111111 R3= 0
LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 111111 R3= 0
LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 111111 R3= 136521
LOAD VCS 1 WORD= 121212 LEVEL=2 R1= 121212 R2= 136521 R3= 0
LOAD VCS 1 WORD= 111111 LEVEL=2 R1= 111111 R2= 136521 R3= 0
* * * * * VCS 1 OUTPUT RESULT= 136521 * * * * *
VCS 1 S-MTRX=0000
LOAD VCS 1 WORD= 121212 LEVEL=1 R1= 121212 R2= 111111 R3= 136521
LOAD VCS 1 WORD= 222222 LEVEL=2 R1= 222222 R2= 121212 R3= 0
LOAD VCS 1 WORD= 212121 LEVEL=2 R1= 212121 R2= 111111 R3= 0
* * * * * VCS 1 OUTPUT RESULT= 121212 * * * * *
VCS 1 S-MTRX=0100
LOAD VCS 1 WORD= 222222 LEVEL=1 R1= 222222 R2= 111111 R3= 136521

```

RGC COMPUTER IOP/VCS SIMULATION

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```

*** IOP 2
15050
15050
*** IOP 3
15050
*** IOP 1
15080
*** IOP 2
15150
15220
15220
*** IOP 1
21000
21370
21570
21740
*** IOP 2
21770
*** IOP 3
21810
*** IOP 2
21970
22010
22010

** TEST CASE 4 **

*** * * * * VCS 1 OUTPUT RESULT* 222222 * * * * *
VCS 1 S=MTRX=0100

LOAD VCS 1 WORD* 33333 LEVEL=1 R1* 33333 R2* 11111 R3* 136521
LOAD VCS 1 WORD* 33333 LEVEL=1 R1* 33333 R2* 121212 R3* 0
LOAD VCS 1 WORD* 55555 LEVEL=1 R1* 55555 R2* 11111 R3* 0
* * * * * VCS 1 OUTPUT RESULT* 33333 * * * * *
VCS 1 S=MTRX=0100

LOAD VCS 1 WORD* 136521 LEVEL=1 R1* 136521 R2* 121212 R3* 0
LOAD VCS 1 WORD* 11111 LEVEL=2 R1* 11111 R2* 136521 R3* 0
LOAD VCS 1 WORD* 212121 LEVEL=3 R1* 212121 R2* 11111 R3* 136521
LOAD VCS 1 WORD* 136521 LEVEL=1 R1* 136521 R2* 11111 R3* 0
LOAD VCS 1 WORD* 136521 LEVEL=1 R1* 136521 R2* 11111 R3* 136521
LOAD VCS 1 WORD* 11111 LEVEL=2 R1* 11111 R2* 136521 R3* 0
* * * * * VCS 1 OUTPUT RESULT* 136521 * * * * *
VCS 1 S=MTRX=0000

```

RGC COMPUTER IOP/VCS SIMULATION

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```

**** IOP 3
22010
**** IOP 2
22140
22180
22180
22180
**** IOP 3
22180
22180
**** IOP 2
22350
22350
**** IOP 3
22350
22350
**** IOP 1
22420
**** IOP 2
22480
22520
22520
**** IOP 1
28000
28370
28570
28740

** TEST CASE 5 **

LOAD VCS 1 WORD= 111111 LEVEL=1 R1= 111111 R2= 111111 R3= 136521
LOAD VCS 1 WORD= 212121 LEVEL=2 R1= 212121 R2= 111111 R3= 0
* * * * * VCS 1 OUTPUT RESULT= 111111 * * * * *
VCS 1 S-MTRX=0000

LOAD VCS 1 WORD= 212121 LEVEL=1 R1= 212121 R2= 111111 R3= 136521
* * * * * VCS 1 OUTPUT RESULT= 212121 * * * * *
VCS 1 S-MTRX=0000

LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 111111 R3= 136521
LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 111111 R3= 136521
LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 111111 R3= 0
* * * * * VCS 1 OUTPUT RESULT= 33333 * * * * *
VCS 1 S-MTRX=0000

LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 111111 R3= 136521
LOAD VCS 1 WORD= 131313 LEVEL=2 R1= 131313 R2= 136521 R3= 136521
LOAD VCS 1 WORD= 232323 LEVEL=3 R1= 232323 R2= 131313 R3= 136521

```

RGC COMPUTER IOP/VCS SIMULATION

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```

**** IOP 2
28770 LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 111111 R3= 0
**** IOP 3
28810 LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 111111 R3= 136521
**** IOP 1
28910 LOAD VCS 1 WORD= 323232 LEVEL=3 R1= 323232 R2= 232323 R3= 131313
**** IOP 2
28970 LOAD VCS 1 WORD= 131313 LEVEL=2 R1= 131313 R2= 136521 R3= 0
29010 * * * * * VCS 1 OUTPUT RESULT= 136521 * * * * *
29010 VCS 1 S=MTRX=1000
**** IOP 3
29010 LOAD VCS 1 WORD= 131313 LEVEL=1 R1= 131313 R2= 111111 R3= 136521
**** IOP 2
29140 LOAD VCS 1 WORD= 232323 LEVEL=2 R1= 232323 R2= 131313 R3= 0
29180 * * * * * VCS 1 OUTPUT RESULT= 131313 * * * * *
29180 VCS 1 S=MTRX=1000
**** IOP 3
29180 LOAD VCS 1 WORD= 232323 LEVEL=1 R1= 232323 R2= 111111 R3= 136521
**** IOP 2
29310 LOAD VCS 1 WORD= 323232 LEVEL=2 R1= 323232 R2= 232323 R3= 0
29350 * * * * * VCS 1 OUTPUT RESULT= 232323 * * * * *
29350 VCS 1 S=MTRX=1000
**** IOP 3
29350 LOAD VCS 1 WORD= 323232 LEVEL=1 R1= 323232 R2= 111111 R3= 136521
**** IOP 2
29520 * * * * * VCS 1 OUTPUT RESULT= 323232 * * * * *
29520 VCS 1 S=MTRX=1000

```

```

*** IOP 3
29520
*** IOP 1
29590
*** IOP 2
29650
29690
29690
*** IOP 1
35000
*** IOP 3
35030
*** IOP 1
35030
*** IOP 2
35030
*** IOP 3
35400
*** IOP 1
35400
*** IOP 2
35460
*** IOP 3
35600
*** IOP 1
35600
35660
35660

LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 11111 R3= 136521
LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 232323 R3= 131313
LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 232323 R3= 0
* * * * * VCS 1 OUTPUT RESULT= 33333 * * * * *
VCS 1 S-MTRX=1000

LOAD VCS 1 R-MTRX(3)=1110
LOAD VCS 1 R-MTRX(1)=1110
LOAD VCS 1 R-MTRX(2)=1110
LOAD VCS 1 WORD=2341632 LEVEL=1 R1=2341632 R2= 11111 R3= 136521
LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2= 232323 R3= 131313
LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2= 232323 R3= 0
LOAD VCS 1 WORD= 1 LEVEL=2 R1= 1 R2=2341632 R3= 136521
LOAD VCS 1 WORD= 1 LEVEL=2 R1= 1 R2=2341631 R3= 131313
* * * * * VCS 1 OUTPUT RESULT= 12341631 * * * * *
VCS 1 S-MTRX=0010

```

TEST CASE 6 **

RGC COMPUTER IOP/VCS SIMULATION

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```

*** IOP 2
35660
*** IOP 1
35830
35830
*** IOP 3
36110
36170
36310
36820
37020
37530
37730
38240
38440
38950
39150
*** IOP 1
42000
42200

LOAD VCS 1 WORD= 1 LEVEL=1 R1= 1 R2= 232323 R3= 0
* * * * * VCS 1 OUTPUT RESULT= 1 * * * * *
VCS 1 S=MTX=0010

LOAD VCS 1 WORD=2341632 LEVEL=1 R1=2341632 R2=2341632 R3= 136521
INPUT FROM LP 1 ON BUS(S) 123 DATA= 3617
LOAD VCS 1 WORD= 1 LEVEL=2 R1= 1 R2=2341632 R3= 136521
LOAD VCS 1 WORD=2341632 LEVEL=1 R1=2341632 R2=2341632 R3= 136521
LOAD VCS 1 WORD= 1 LEVEL=2 R1= 1 R2=2341632 R3= 136521
LOAD VCS 1 WORD= 141632 LEVEL=1 R1= 141632 R2=2341632 R3= 136521
LOAD VCS 1 WORD= 1 LEVEL=2 R1= 1 R2= 141632 R3= 136521
LOAD VCS 1 WORD= 141632 LEVEL=1 R1= 141632 R2= 141632 R3= 136521
LOAD VCS 1 WORD= 1 LEVEL=2 R1= 1 R2= 141632 R3= 136521
LOAD VCS 1 WORD= 141632 LEVEL=1 R1= 141632 R2= 141632 R3= 136521
LOAD VCS 1 WORD= 1 LEVEL=2 R1= 1 R2= 141632 R3= 136521
LOAD VCS 1 WORD= 1 LEVEL=2 R1= 1 R2= 141632 R3= 136521

LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2=2341631 R3= 131313
** TEST CASE 7 **

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**** IOP 3
42260 LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2= 141632 R3= 136521
**** IOP 1
42400 LOAD VCS 1 WORD= 3 LEVEL=2 R1= 3 R2=2341631 R3= 131313
**** IOP 3
42460 LOAD VCS 1 WORD= 3 LEVEL=2 R1= 3 R2=2341631 R3= 136521
**** IOP 2
42460 LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2= 232323 R3= 0
42570 * * * * * VCS 1 OUTPUT RESULT= 12341631 * * * * *
42570 VCS 1 S-MTRX=0000
42660 LOAD VCS 1 WORD= 3 LEVEL=1 R1= 3 R2= 232323 R3= 0
42740 * * * * * VCS 1 OUTPUT RESULT= 3 * * * * *
42740 VCS 1 S-MTRX=0000
43080 INPUT FROM LP 1 ON BUS(S) 123 DATA= 4308
43250 INPUT FROM LP 1 ON BUS(S) 123 DATA= 4325
43420 INPUT FROM LP 1 ON BUS(S) 123 DATA= 4342

**** IOP 1 ** TEST CASE 8 **
49000
**** IOP 2
49200 LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2= 232323 R3= 0
**** IOP 3
49340 LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2=2341631 R3= 136521
**** IOP 2
49400 LOAD VCS 1 WORD= 3 LEVEL=2 R1= 3 R2=2341631 R3= 0

```

*** IOP 3

```

49540 LOAD VCS 1 WORD= 3 LEVEL=2 R1= 3 R2=2341631 R3= 136521
49570 * * * * * VCS 1 OUTPUT RESULT= 12341631 * * * * *
49570 VCS 1 S-MTRX=1000
49740 * * * * * VCS 1 OUTPUT RESULT= 3 * * * * *
49740 VCS 1 S-MTRX=1000
50080 INPUT FROM LP 1 0N BUS(S) 123 DATA= 5008
50250 INPUT FROM LP 1 0N BUS(S) 123 DATA= 5025
50420 INPUT FROM LP 1 0N BUS(S) 123 DATA= 5042

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**** CPU 1 *** CPASIN ***
**** CPU 2 *** CPASIN ***
**** CPU 3 *** CPASIN ***
**** CPU 1 *** VCASIN ***
**** CPU 2 *** VCASIN ***
**** CPU 3 *** VCASIN ***
**** CPU 1 ***
6295 START EXECUTIVE PROGRAM EXECUTION
6535 BACKGROUND TASKS SCHEDULED
**** CPU 2 ***
6260 START EXECUTIVE PROGRAM EXECUTION
6500 BACKGROUND TASKS SCHEDULED
**** CPU 3 ***
6295 START EXECUTIVE PROGRAM EXECUTION
6535 BACKGROUND TASKS SCHEDULED
**** IOP 1 *** START INPUT/OUTPUT PROGRAM EXECUTION
6961 IOP 2 *** START INPUT/OUTPUT PROGRAM EXECUTION
6962 IOP 3 *** START INPUT/OUTPUT PROGRAM EXECUTION
6963 CPU 2 ***
11075 * SYSTEM STATUS *
11075 LBC 44=111000001110
11075 LBC 52= 1 LBC 53= 2 LBC 54= 3
11075 LBC 56= 0
**** CPU 1 ***
11110 * SYSTEM STATUS *
11110 LBC 44=111000001110

```

```

**** CPU 1
11110 L8C 52* 1 L8C 53* 2 L8C 54* 3
11110 L8C 56* 0
**** CPU 3
11110 * SYSTEM STATUS *
11110 L8C 44*111000001110
11110 L8C 52* 1 L8C 53* 2 L8C 54* 3
11110 L8C 56* 0
**** IOP 1
12581 L8AD VCS 1234 P-MTRX(1)=1110
**** IOP 2
12582 L8AD VCS 1234 P-MTRX(2)=1110
**** IOP 3
12583 L8AD VCS 1234 P-MTRX(3)=1110
**** IOP 1
12781 L8AD VCS 123 R-MTRX(1)=0000
**** IOP 2
12782 L8AD VCS 123 R-MTRX(2)=0000
**** IOP 3
12783 L8AD VCS 123 R-MTRX(3)=0000
**** CPU 2
15320 BACKGROUND TASKS SCHEDULED
**** CPU 1
15455 BACKGROUND TASKS SCHEDULED
**** CPU 3
15855 BACKGROUND TASKS SCHEDULED
**** IOP 1
22261 RATE 1 1/8 COMPLETE
**** IOP 2
22262 RATE 1 1/8 COMPLETE
**** IOP 3
22263 RATE 1 1/8 COMPLETE
**** CPU 2
23265 BACKGROUND TASKS SCHEDULED

```

```

**** CPU 1
23300 BACKGROUND TASKS SCHEDULED
**** CPU 3
23300 BACKGROUND TASKS SCHEDULED
**** CPU 2
29425 ** RATE 1 SAMPLE TASK **
29425 L8C 87# 0 L9C 88#
29425 L8C 123# 1 L8C 124#
29425 L9C 100# 0 L9C 101#
**** CPU 1
29460 ** RATE 1 SAMPLE TASK **
29460 L8C 87# 0 L9C 88#
29460 L8C 123# 1 L9C 124#
29460 L8C 100# 0 L9C 101#
**** CPU 3
29460 ** RATE 1 SAMPLE TASK **
29460 L8C 87# 0 L8C 88#
29460 L8C 123# 1 L8C 124#
29460 L8C 100# 0 L8C 101#
**** I8P 1
33131 RATE 2 I/O COMPLETE
**** I8P 2
33132 RATE 2 I/O COMPLETE
**** I8P 3
33133 RATE 2 I/O COMPLETE
**** CPU 2
36300 BACKGROUND TASKS SCHEDULED
**** CPU 1
36335 BACKGROUND TASKS SCHEDULED
**** CPU 3
36335 BACKGROUND TASKS SCHEDULED
**** CPU 2
44560 ** RATE 2 SAMPLE TASK **
44560 L8C 103# 0 L9C 104#
44560 L8C 144# 0 L9C 145#

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```

**** CPU 2
44560 L6C 120# 0 L6C 121# 12
**** CPU 1
44595 ** RATE 2 SAMPLE TASK **
44595 L6C 103# 0 L6C 104# 0
44595 L6C 144# 0 L6C 145# 0
44595 L6C 120# 0 L6C 121# 12
**** CPU 3
44595 ** RATE 2 SAMPLE TASK **
44595 L6C 103# 0 L6C 104# 0
44595 L6C 144# 0 L6C 145# 0
44595 L6C 120# 0 L6C 121# 12
**** IOP 1
48101 RATE 1 I/O COMPLETE
**** IOP 2
48102 RATE 1 I/O COMPLETE
**** IOP 3
48103 RATE 1 I/O COMPLETE
**** CPU 2
49420 BACKGROUND TASKS SCHEDULED
**** CPU 1
49455 BACKGROUND TASKS SCHEDULED
**** CPU 3
49455 BACKGROUND TASKS SCHEDULED
**** CPU 2
59555 ** RATE 1 SAMPLE TASK **
59555 L6C 87# 0 L6C 88# 0
59555 L6C 123# 2 L6C 124# 9
59555 L6C 100# 0 L6C 101# 0
**** CPU 1
59590 ** RATE 1 SAMPLE TASK **
59590 L6C 87# 0 L6C 88# 0
59590 L6C 123# 2 L6C 124# 9
59590 L6C 100# 0 L6C 101# 0

```

```

**** CPU 3
59590 ** RATE 1 SAMPLE TASK **
59590 L9C 87* 0 L9C 88* 0
59590 L9C 123* 2 L9C 124* 9
59590 L9C 100* 0 L9C 101* 0
**** CPU 2
62430 BACKGROUND TASKS SCHEDULED
**** CPU 1
62465 BACKGROUND TASKS SCHEDULED
**** CPU 3
62465 BACKGROUND TASKS SCHEDULED
**** CPU 2
70560 BACKGROUND TASKS SCHEDULED
**** CPU 1
70595 BACKGROUND TASKS SCHEDULED
**** CPU 3
70595 BACKGROUND TASKS SCHEDULED
**** CPU 2
78005 BACKGROUND TASKS SCHEDULED
**** CPU 1
78040 BACKGROUND TASKS SCHEDULED
**** CPU 3
78040 BACKGROUND TASKS SCHEDULED
**** IOP 1
78101 RATE 1 I/O COMPLETE
**** IOP 2
78102 RATE 1 I/O COMPLETE
**** IOP 3
78103 RATE 1 I/O COMPLETE
**** CPU 2
89140 ** RATE 1 SAMPLE TASK **
89140 L9C 87* 0 L9C 88* 0
89140 L9C 123* 3 L9C 124* 8
89140 L9C 100* 0 L9C 101* 0
91015 BACKGROUND TASKS SCHEDULED

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```

**** CPU 1
89175 ** RATE 1 SAMPLE TASK **
89175 L8C 87# 0 L8C 88# 0
89175 L8C 123# 3 L8C 124# 8
89175 L8C 100# 0 L8C 101# 0
91050 BACKGROUND TASKS SCHEDULED
**** CPU 3
89175 ** RATE 1 SAMPLE TASK **
89175 L8C 87# 0 L8C 88# 0
89175 L8C 123# 3 L8C 124# 8
89175 L8C 100# 0 L8C 101# 0
91050 BACKGROUND TASKS SCHEDULED
**** IOP 1
93131 RATE 2 I/O COMPLETE
**** IOP 2
93132 RATE 2 I/O COMPLETE
**** IOP 3
93133 RATE 2 I/O COMPLETE
**** CPU 2
98460 BACKGROUND TASKS SCHEDULED
**** CPU 1
98495 BACKGROUND TASKS SCHEDULED
**** CPU 3
98495 BACKGROUND TASKS SCHEDULED
**** CPU 2
104720 ** RATE 2 SAMPLE TASK **
104720 L8C 103# 0 L8C 104# 0
104720 L8C 144# 0 L8C 145# 0
104720 L8C 120# 0 L8C 121# 12
**** CPU 1
104755 ** RATE 2 SAMPLE TASK **
104755 L8C 103# 0 L8C 104# 0
104755 L8C 144# 0 L8C 145# 0
104755 L8C 120# 0 L8C 121# 12

```

```

*** CPU 3
104755 ** RATE 2 SAMPLE TASK **
104755 L0C 103* C L0C 104* C
104755 L0C 144* C L0C 145* C
104755 L0C 120* C L0C 121* 12
**** IOP 1
108101 RATE 1 I/9 COMPLETE
**** IOP 2
108102 RATE 1 I/9 COMPLETE
**** IOP 3
108103 RATE 1 I/9 COMPLETE
**** CPU 2
111580 BACKGROUND TASKS SCHEDULED
*** CPU 1
111515 BACKGROUND TASKS SCHEDULED
**** CPU 3
111615 BACKGROUND TASKS SCHEDULED
*** IOP 1
114561 EXECUTE INPUT/OUTPUT TEST CYCLE
**** IOP 2
114562 EXECUTE INPUT/OUTPUT TEST CYCLE
*** IOP 3
114563 EXECUTE INPUT/OUTPUT TEST CYCLE
**** IOP 1
115441 L0AD VCS 1 W0RD= 136540 LEVEL=1 R1= 136540 R2= 0 R3= 0
**** IOP 2
115442 L0AD VCS 1 W0RD= 136540 LEVEL=1 R1= 136540 R2= 0 R3= 0
**** IOP 3
115443 L0AD VCS 1 W0RD= 136540 LEVEL=1 R1= 136540 R2= 0 R3= 0
**** CPU 3
115880 VCS 1 P-MTRX=1110 R-MTRX=0000
115641 VCS 1 S-MTRX=0000
**** IOP 1
115641 L0AD VCS 1 W0RD= 12345 LEVEL=2 R1= 12345 R2= 136540 R3= 0
115642 VCS 1 S-MTRX=0000

```

```

**** IOP 2
115642 LOAD VCS 1 WORD= 12345 LEVEL=2 R1= 12345 R2= 136540 R3= 0
115643 VCS 1 S=MTRX=0000
**** IOP 3
115643 LOAD VCS 1 WORD= 12345 LEVEL=2 R1= 12345 R2= 136540 R3= 0
115811 VCS 1 S=MTRX=0000
**** IOP 1
115811 LOAD VCS 1 WORD= 54321 LEVEL=3 R1= 54321 R2= 12345 R3= 136540
115812 VCS 1 S=MTRX=0000
**** IOP 2
115812 LOAD VCS 1 WORD= 54321 LEVEL=3 R1= 54321 R2= 12345 R3= 136540
115813 VCS 1 S=MTRX=0000
**** IOP 3
115813 LOAD VCS 1 WORD= 54321 LEVEL=3 R1= 54321 R2= 12345 R3= 136540
**** CPU
115981 VCS 1 S=MTRX=0000
**** IOP 1
115981 LOAD VCS 1 WORD= 31942 LEVEL=3 R1= 31942 R2= 54321 R3= 12345
115982 VCS 1 S=MTRX=0000
**** IOP 2
115982 LOAD VCS 1 WORD= 31942 LEVEL=3 R1= 31942 R2= 54321 R3= 12345
115983 VCS 1 S=MTRX=0000
**** IOP 3
115983 LOAD VCS 1 WORD= 31942 LEVEL=3 R1= 31942 R2= 54321 R3= 12345
116151 VCS 1 S=MTRX=0000
**** IOP 1
116152 VCS 1 S=MTRX=0000
**** IOP 2
116153 VCS 1 S=MTRX=0000
**** IOP 1
116321 LOAD VCS 2 WORD= 236540 LEVEL=1 R1= 236540 R2= 0 R3= 0
**** IOP 2
116322 LOAD VCS 2 WORD= 236540 LEVEL=1 R1= 236540 R2= 0 R3= 0

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```
*** IOP 3
116323 LEAD VCS 2 WORD= 236540 LEVEL=1 R1= 236540 R2= 0 R3= 0
116523 VCS 2 P-MTRX=1110 R-MTRX=0000
116521 VCS 2 S-MTRX=0000
*** IOP 1
116521 LEAD VCS 2 WORD= 12345 LFVEL=2 R1= 12345 R2= 236540 R3= 0
116522 VCS 2 S-MTRX=0000
*** IOP 2
116522 LEAD VCS 2 WORD= 12345 LEVEL=2 R1= 12345 R2= 236540 R3= 0
116523 VCS 2 S-MTRX=0000
*** IOP 3
116523 LEAD VCS 2 WORD= 12345 LEVEL=2 R1= 12345 R2= 236540 R3= 0
116523 VCS 2 S-MTRX=0000
*** CPU 2
116691 VCS 2 S-MTRX=0000
*** IOP 1
116691 LEAD VCS 2 WORD= 54321 LFVEL=3 R1= 54321 R2= 12345 R3= 236540
116692 VCS 2 S-MTRX=0000
*** IOP 2
116692 LEAD VCS 2 WORD= 54321 LEVEL=3 R1= 54321 R2= 12345 R3= 236540
116693 VCS 2 S-MTRX=0000
*** IOP 3
116693 LEAD VCS 2 WORD= 54321 LEVEL=3 R1= 54321 R2= 12345 R3= 236540
116693 VCS 2 S-MTRX=0000
*** CPU 3
116861 VCS 2 S-MTRX=0000
*** IOP 1
116861 LEAD VCS 2 WORD= 31942 LEVEL=3 R1= 31942 R2= 54321 R3= 12345
116862 VCS 2 S-MTRX=0000
*** IOP 2
116862 LEAD VCS 2 WORD= 31942 LEVEL=3 R1= 31942 R2= 54321 R3= 12345
116863 VCS 2 S-MTRX=0000
*** IOP 3
116863 LEAD VCS 2 WORD= 31942 LEVEL=3 R1= 31942 R2= 54321 R3= 12345
117031 VCS 2 S-MTRX=0000
```

```

**** IOP 1
117032 VCS 2 S-MTRX=0000
**** IOP 2
117033 VCS 2 S-MTRX=0000
**** IOP 1
118211 LOAD VCS 1 R-MTRX(1)=1110
**** IOP 2
118212 LOAD VCS 1 R-MTRX(2)=1110
**** IOP 3
118213 LOAD VCS 1 R-MTRX(3)=1110
**** IOP 1
118551 LOAD VCS 1 WORD= 136540 LEVEL=1 R1= 136540 R2= 54321 R3= 12345
**** IOP 2
118552 LOAD VCS 1 WORD= 136540 LEVEL=1 R1= 136540 R2= 54321 R3= 12345
**** IOP 3
118553 LOAD VCS 1 WORD= 136540 LEVEL=1 R1= 136540 R2= 54321 R3= 12345
118753 VCS 1 P-MTRX=1110 R-MTRX=1110
**** IOP 1
118751 LOAD VCS 1 WORD= 3598 LEVEL=2 R1= 3598 R2= 136540 R3= 12345
**** IOP 2
118752 LOAD VCS 1 WORD= 3598 LEVEL=2 R1= 3598 R2= 136540 R3= 12345
118753 * * * * * VCS 1 OUTPUT RESULT= 136540 * * * * *
118753 VCS 1 S-MTRX=0000
**** IOP 3
118753 LOAD VCS 1 WORD= 3598 LEVEL=1 R1= 3598 R2= 54321 R3= 12345
**** IOP 1
118921 LOAD VCS 1 WORD= 1 LEVEL=2 R1= 1 R2= 3598 R3= 12345
**** IOP 2
118922 LOAD VCS 1 WORD= 1 LEVEL=2 R1= 1 R2= 3598 R3= 12345
118923 * * * * * VCS 1 OUTPUT RESULT= 3598 * * * * *
118923 VCS 1 S-MTRX=0000
**** IOP 3
118923 LOAD VCS 1 WORD= 1 LEVEL=1 R1= 1 R2= 54321 R3= 12345

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*** IOP 1
119091      LOAD VCS 1 WORD=      2 LEVEL=2 R1=      2 R2=      1 R3=      12345
*** IOP 2
119092      LOAD VCS 1 WORD=      2 LEVEL=2 R1=      2 R2=      1 R3=      12345
119093      * * * * * VCS 1 OUTPUT RESULT=      1 * * * * *
119093      VCS 1 S-MTRX=0000
*** IOP 3
119093      LOAD VCS 1 WORD=      2 LEVEL=1 R1=      2 R2=      54321 R3=      12345
*** IOP 1
119261      LOAD VCS 1 WORD=      3 LEVEL=2 R1=      3 R2=      2 R3=      12345
*** IOP 2
119262      LOAD VCS 1 WORD=      3 LEVEL=2 R1=      3 R2=      2 R3=      12345
119263      * * * * * VCS 1 OUTPUT RESULT=      2 * * * * *
119263      VCS 1 S-MTRX=0000
*** IOP 3
119263      LOAD VCS 1 WORD=      3 LEVEL=1 R1=      3 R2=      54321 R3=      12345
*** IOP 1
119431      LOAD VCS 1 WORD=      123 LEVEL=2 R1=      123 R2=      3 R3=      12345
*** IOP 2
119432      LOAD VCS 1 WORD=      123 LEVEL=2 R1=      123 R2=      3 R3=      12345
119433      * * * * * VCS 1 OUTPUT RESULT=      3 * * * * *
119433      VCS 1 S-MTRX=0000
*** IOP 3
119433      LOAD VCS 1 WORD=      123 LEVEL=1 R1=      123 R2=      54321 R3=      12345
*** CPU 2
119715      ** RATE 1 SAMPLE TASK **
119715      L9C 87=      0 L9C 88=      0
119715      L9C 123=      4 L9C 124=      7 L9C 125=      0
119715      L9C 100=      0 L9C 101=      0
*** IOP 1
119601      LOAD VCS 1 WORD=      0 LEVEL=2 R1=      0 R2=      123 R3=      12345
*** IOP 2
119602      LOAD VCS 1 WORD=      0 LEVEL=2 R1=      0 R2=      123 R3=      12345
119603      * * * * * VCS 1 OUTPUT RESULT=      123 * * * * *
119603      VCS 1 S-MTRX=0000

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```

**** IOP 3
119603          LOAD VCS 1 WORD=      0 LEVEL=1 R1=      0 R2= 54321 R3= 12345
**** CPU 1
119750 ** RATE 1 SAMPLE TASK **
119750 L8C 87= 0 L8C 88= 0
119750 L8C 123= 4 L8C 124= 7 L8C 125= 0
119750 L8C 100= 0 L8C 101= 0
**** CPU 3
119750 ** RATE 1 SAMPLE TASK **
119750 L8C 87= 0 L8C 88= 0
119750 L8C 123= 4 L8C 124= 7 L8C 125= 0
119750 L8C 100= 0 L8C 101= 0
**** IOP 1
119771          LOAD VCS 1 WORD=      1 LFVEL=2 R1=      1 R2=      0 R3= 12345
**** IOP 2
119772          LOAD VCS 1 WORD=      1 LEVEL=2 R1=      1 R2=      0 R3= 12345
119773          * * * * * VCS 1 OUTPUT RESULT=
119773          VCS 1 S-MTRX=0000
**** IOP 3
119773          LOAD VCS 1 WORD=      1 LEVEL=1 R1=      1 R2= 54321 R3= 12345
**** IOP 2
119943          * * * * * VCS 1 OUTPUT RESULT=
119943          VCS 1 S-MTRX=0000
**** IOP 3
119943          LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 54321 R3= 12345
**** IOP 1
120111          LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2=      0 R3= 12345
**** IOP 2
120112          LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2=      0 R3= 12345
120113          * * * * * VCS 1 OUTPUT RESULT=
120113          VCS 1 S-MTRX=0000
**** IOP 1
120981          OUTPUT MSG TYPE 1 TO COMPUTER(S) 1234
DATA= 3598          1 2 3          0 1

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*** IOP 2
120982          OUTPUT MSG TYPE 1 TO COMPUTER(S) 1234 3
                DATA= 359# 1 2 0 123 0 1

*** IOP 3
120983          OUTPUT MSG TYPE 1 TO COMPUTER(S) 1234 3
                DATA= 359# 1 2 0 123 0 1

*** CPU 2
124590          BACKGROUND TASKS SCHEDULED
*** CPU 1
124625          BACKGROUND TASKS SCHEDULED
*** CPU 3
124625          BACKGROUND TASKS SCHEDULED
*** CPU 2
130520          TRANSITION FROM NON-CRITICAL TO CRITICAL COMPLETED
130520          L8C 48#C000
130520          L8C 82#1110
*** CPU 1
130555          TRANSITION FROM NON-CRITICAL TO CRITICAL COMPLETED
130555          L8C 48#C000
130555          L8C 82#1110
*** CPU 3
130555          TRANSITION FROM NON-CRITICAL TO CRITICAL COMPLETED
130555          L8C 48#C000
130555          L8C 82#1110
*** CPU 2
132555          * SYSTEM STATUS *
132555          L8C 44#110110110
132555          L8C 52# 1 L8C 53# 2 L8C 54# 3
132555          L9C 56# 1
*** CPU 1
132570          * SYSTEM STATUS *
132570          L8C 44#110110110
132570          L8C 52# 1 L8C 53# 2 L8C 54# 3
132570          L9C 56# 1

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**** CPU 3
132570 * SYSTEM STATUS *
132570 L0C 44=110110110
132570 L0C 52= 1 L0C 53= 2 L0C 54= 3
132570 L0C 56= 1
**** IOP 1
132581 LOAD VCS 1234 P-MTRX(1)=1110
**** IOP 2
132582 LOAD VCS 1234 P-MTRX(2)=1110
**** IOP 3
132583 LOAD VCS 1234 P-MTRX(3)=1110
**** IOP 1
132781 LOAD VCS 123 R-MTRX(1)=1110
**** IOP 2
132782 LOAD VCS 123 R-MTRX(2)=1110
**** IOP 3
132783 LOAD VCS 123 R-MTRX(3)=1110
**** IOP 1
133241 EXECUTE RATE 1 INPUT/OUTPUT CYCLE
**** IOP 2
133242 EXECUTE RATE 1 INPUT/OUTPUT CYCLE
**** IOP 3
133243 EXECUTE RATE 1 INPUT/OUTPUT CYCLE
**** IOP 1
133411 LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 0 R3= 12345
**** IOP 2
133412 LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 0 R3= 12345
**** IOP 3
133413 LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 54321 R3= 12345
133613 VCS 1 P-MTRX=1110 R-MTRX=1110
**** IOP 1
133611 LOAD VCS 1 WORD= 0 LEVEL=2 R1= 0 R2= 136521 R3= 12345
**** IOP 2
133612 LOAD VCS 1 WORD= 0 LEVEL=2 R1= 0 R2= 136521 R3= 12345
133613 * * * * * VCS 1 OUTPUT RESULT= 136521 * * * * *

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*** IOP 2
133613 VCS 1 S-MTRX=0000
*** IOP 3
133613 LOAD VCS 1 WORD= 0 LEVEL=1 R1= 0 R2= 54321 R3= 12345
*** IOP 1
133741 LOAD VCS 1 WORD= 0 LEVEL=2 R1= 0 R2= 0 R3= 12345
*** IOP 2
133782 LOAD VCS 1 WORD= 0 LEVEL=2 R1= 0 R2= 0 R3= 12345
133783 * * * * * VCS 1 OUTPUT RESULT= 0 * * * * *
133783 VCS 1 S-MTRX=0000
*** IOP 3
133783 LOAD VCS 1 WORD= 0 LEVEL=1 R1= 0 R2= 54321 R3= 12345
*** IOP 2
133953 * * * * * VCS 1 OUTPUT RESULT= 0 * * * * *
133953 VCS 1 S-MTRX=0000
*** IOP 3
133953 LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 54321 R3= 12345
134121 LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 0 R3= 12345
*** IOP 2
134122 LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 0 R3= 12345
134123 * * * * * VCS 1 OUTPUT RESULT= 33333 * * * * *
134123 VCS 1 S-MTRX=0000
*** IOP 3
134123 LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2= 54321 R3= 12345
*** IOP 1
134121 LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2= 0 R3= 12345
*** IOP 2
134122 LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2= 0 R3= 12345
134293 * * * * * VCS 1 OUTPUT RESULT= 12341631 * * * * *
134293 VCS 1 S-MTRX=0000
*** IOP 1
134321 LOAD VCS 1 WORD= 2 LEVEL=1 R1= 2 R2= 0 R3= 12345

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**** IOP 2
134322          LOAD VCS 1 WORD=      2 LEVEL=1 R1=      2 R2=      0 R3= 12345
**** IOP 3
134323          LOAD VCS 1 WORD=      2 LEVEL=1 R1=      2 R2= 54321 F3= 12345
134463          * * * * * VCS 1 OUTPUT RESULT=      2 * * * * *
134463          VCS 1 S-MTRX=0000
**** CPU 3
134971          INPUT FROM LP 1 ON BUS(S) 123 DATA= 13497
**** IOP 3
135141          INPUT FROM LP 1 ON BUS(S) 123 DATA= 13514
**** CPU 2
135300          BACKGROUND TASKS SCHEDULED
**** CPU 1
135315          BACKGROUND TASKS SCHEDULED
**** CPU 3
135315          BACKGROUND TASKS SCHEDULED
**** IOP 1
135341          OUTPUT MSG TYPE 3 TO COMPUTER(S) 1234
                      DATA=      4      7      0      1
**** IOP 2
135342          OUTPUT MSG TYPE 3 TO COMPUTER(S) 1234
                      DATA=      4      7      0      1
**** IOP 3
135343          OUTPUT MSG TYPE 3 TO COMPUTER(S) 1234
                      DATA=      4      7      0      1
**** IOP 1
136041          RATE 1 I/O COMPLETE
**** IOP 2
136042          RATE 1 I/O COMPLETE
**** IOP 3
136043          RATE 1 I/O COMPLETE
**** CPU 2
142745          BACKGROUND TASKS SCHEDULED

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*** CPU 1
142760 1 BACKGROUND TASKS SCHEDULED
*** CPU 3
142760 3 BACKGROUND TASKS SCHEDULED
*** IOP 1
144111 1 EXECUTE RATE 2 INPUT/OUTPUT CYCLE
*** IOP 2
144112 2 EXECUTE RATE 2 INPUT/OUTPUT CYCLE
*** IOP 3
144113 3 EXECUTE RATE 2 INPUT/OUTPUT CYCLE
*** IOP 1
144281 1 LOAD VCS 1 WORD= 136522 LEVEL=1 R1= 136522 R2= 0 R3= 12345
*** IOP 2
144282 2 LOAD VCS 1 WORD= 136522 LEVEL=1 R1= 136522 R2= 0 R3= 12345
*** IOP 3
144283 3 LOAD VCS 1 WORD= 136522 LEVEL=1 R1= 136522 R2= 54321 R3= 12345
*** IOP 1
144481 1 LOAD VCS 1 WORD= 0 LEVEL=2 R1= 0 R2= 136522 R3= 12345
*** IOP 2
144482 2 LOAD VCS 1 WORD= 0 LEVEL=2 R1= 0 R2= 136522 R3= 12345
144483 * * * * * VCS 1 OUTPUT RESULT= 136522 * * * * *
144483 VCS 1 S-MTRX=0000
*** IOP 3
144483 3 LOAD VCS 1 WORD= 0 LEVEL=1 R1= 0 R2= 54321 R3= 12345
*** IOP 1
144651 1 LOAD VCS 1 WORD= 12 LEVEL=2 R1= 12 R2= 0 R3= 12345
*** IOP 2
144652 2 LOAD VCS 1 WORD= 12 LEVEL=2 R1= 12 R2= 0 R3= 12345
144653 * * * * * VCS 1 OUTPUT RESULT= 0 * * * * *
144653 VCS 1 S-MTRX=0000
*** IOP 3
144653 3 LOAD VCS 1 WORD= 12 LEVEL=1 R1= 12 R2= 54321 R3= 12345
*** IOP 2
144823 2 * * * * * VCS 1 OUTPUT RESULT= 12 * * * * *
144823 VCS 1 S-MTRX=0000

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*** IOP 3
144823 LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 54321 R3= 12345
*** IOP 1
144991 LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 0 R3= 12345
*** IOP 2
144992 LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 0 R3= 12345
144993 * * * * * VCS 1 OUTPUT RESULT= 33333 * * * * *
144993 VCS 1 S=MTRX=0000

*** IOP 3
144993 LOAD VCS 1 WORD=2341632 LEVEL=1 R1=2341632 R2= 54321 R3= 12345
*** IOP 1
144991 LOAD VCS 1 WORD=2341632 LEVEL=1 R1=2341632 R2= 0 R3= 12345
*** IOP 2
144992 LOAD VCS 1 WORD=2341632 LEVEL=1 R1=2341632 R2= 0 R3= 12345
145163 * * * * * VCS 1 OUTPUT RESULT= 12341632 * * * * *
145163 VCS 1 S=MTRX=0000

*** IOP 1
145191 LOAD VCS 1 WORD= 3 LEVEL=1 R1= 3 R2= 0 R3= 12345
*** IOP 2
145192 LOAD VCS 1 WORD= 3 LEVEL=1 R1= 3 R2= 0 R3= 12345
*** IOP 3
145193 LOAD VCS 1 WORD= 3 LEVEL=1 R1= 3 R2= 54321 R3= 12345
145333 * * * * * VCS 1 OUTPUT RESULT= 3 * * * * *
145333 VCS 1 S=MTRX=0000
        INPUT FROM LP 2 ON BUS(S) 123 DATA= 3333
        INPUT FROM LP 2 ON BUS(S) 123 DATA= 3333
        INPUT FROM LP 2 ON BUS(S) 123 DATA= 3333

OUTPUT MSG TYPE 4 TO COMPUTER(S) 1234
DATA= 0 0 1

OUTPUT MSG TYPE 4 TO COMPUTER(S) 1234
DATA= 0 0 1

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RGC COMPUTER SYSTEM SIMULATION *** RUN 3-A

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*** IOP 3
146383      OUTPUT MSG TYPE 4 TO COMPUTER(S) 1234
          DATA= 0 0 0 1

*** IOP 1
147081      RATE 2 I/O COMPLETE
*** IOP 2
147082      RATE 2 I/O COMPLETE
*** IOP 3
147083      RATE 2 I/O COMPLETE
*** CPU 2
154455      ** RATE 1 SAMPLE TASK **
154455      L8C 87= 13497 L8C 88= 13514
154455      L8C 123= 5 L8C 124= 6
154455      L8C 100= 4951 L8C 101= 4040
*** CPU 1
154470      ** RATE 1 SAMPLE TASK **
154470      L8C 87= 13497 L8C 88= 13514
154470      L8C 123= 5 L8C 124= 6
154470      L8C 100= 4951 L8C 101= 4040
*** CPU 3
154470      ** RATE 1 SAMPLE TASK **
154470      L8C 87= 13497 L8C 88= 13514
154470      L8C 123= 5 L8C 124= 6
154470      L8C 100= 4951 L8C 101= 4040
*** IOP 1
159081      EXECUTE RATE 1 INPUT/OUTPUT CYCLE
*** IOP 2
159082      EXECUTE RATE 1 INPUT/OUTPUT CYCLE
*** IOP 3
159083      EXECUTE RATE 1 INPUT/OUTPUT CYCLE
*** IOP 1
159251      L6AD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 0 R3= 12345
*** IOP 2
159252      L6AD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 0 R3= 12345

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**** IOP 3
159253      LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 54321 R3= 12345
159453      VCS 1  P-MTRX=1110 R-MTRX=1110
**** IOP 1
159451      LOAD VCS 1 WORD= 4951 LEVEL=2 R1= 4951 R2= 136521 R3= 12345
**** IOP 2
159452      LOAD VCS 1 WORD= 4951 LEVEL=2 R1= 4951 R2= 136521 R3= 12345
159453      * * * * * VCS 1 OUTPUT RESULT= 136521 * * * * *
159453      VCS 1  S-MTRX=0000
**** IOP 3
159453      LOAD VCS 1 WORD= 4951 LEVEL=1 R1= 4951 R2= 54321 R3= 12345
**** IOP 1
159621      LOAD VCS 1 WORD= 4040 LEVEL=2 R1= 4040 R2= 4951 R3= 12345
**** IOP 2
159622      LOAD VCS 1 WORD= 4040 LEVEL=2 R1= 4040 R2= 4951 R3= 12345
159623      * * * * * VCS 1 OUTPUT RESULT= 4951 * * * * *
159623      VCS 1  S-MTRX=0000
**** IOP 3
159623      LOAD VCS 1 WORD= 4040 LEVEL=1 R1= 4040 R2= 54321 R3= 12345
**** IOP 2
159793      * * * * * VCS 1 OUTPUT RESULT= 4040 * * * * *
159793      VCS 1  S-MTRX=0000
**** IOP 3
159793      LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 54321 R3= 12345
**** IOP 1
159961      LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 4951 R3= 12345
**** IOP 2
159962      LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 4951 R3= 12345
159963      * * * * * VCS 1 OUTPUT RESULT= 33333 * * * * *
159963      VCS 1  S-MTRX=0000
**** IOP 3
159963      LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2= 54321 R3= 12345
**** IOP 1
159961      LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2= 4951 R3= 12345

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**** IOP 2
159962 LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2= 4951 R3= 12345
160133 * * * * * VCS 1 OUTPUT RESULT= 12341631 * * * * *
160133 VCS 1 S-MTRX=0000
**** IOP 1
160161 LOAD VCS 1 WORD= 2 LEVEL=1 R1= 2 R2= 4951 R3= 12345
**** IOP 2
160162 LOAD VCS 1 WORD= 2 LEVEL=1 R1= 2 R2= 4951 R3= 12345
**** IOP 3
160163 LOAD VCS 1 WORD= 2 LEVEL=1 R1= 2 R2= 54321 R3= 12345
160303 * * * * * VCS 1 OUTPUT RESULT= 2 * * * * *
160303 VCS 1 S-MTRX=0000
**** CPU 3
160811 INPUT FROM LP 1 ON BUS(S) 123 DATA= 16081
**** IOP 3
160981 INPUT FROM LP 1 ON BUS(S) 123 DATA= 16098
**** IOP 1
161181 OUTPUT MSG TYPE 3 TO COMPUTER(S) 1234
DATA= 5 6 4 1
**** IOP 2
161182 OUTPUT MSG TYPE 3 TO COMPUTER(S) 1234
DATA= 5 6 4 1
**** IOP 3
161183 OUTPUT MSG TYPE 3 TO COMPUTER(S) 1234
DATA= 5 6 4 1
**** IOP 1
161881 RATE 1 I/O COMPLETE
161881
**** IOP 2
161882 RATE 1 I/O COMPLETE
161882
**** IOP 3
161883 RATE 1 I/O COMPLETE
161883
**** CPU 1
170845 ** RATE 2 SAMPLE TASK **
170845 LBC 103= 3333 LBC 104= 3333
170845 LBC 144= 0 LBC 145= 0

```

RGC COMPUTER SYSTEM SIMULATION *** RUN 3-A

```

**** CPU 1
170845 L0C 120* 7877 L0C 121* 345
171705 BACKGROUND TASKS SCHEDULED
**** CPU 3
170845 ** RATE 2 SAMPLE TASK **
170845 L0C 103* 3333 L0C 104* 3333
170845 L0C 144* 0 L0C 145* 0
170845 L0C 120* 7877 L0C 121* 345
171705 BACKGROUND TASKS SCHEDULED
**** CPU 2
170830 ** RATE 2 SAMPLE TASK **
170830 L0C 103* 3333 L0C 104* 3333
170830 L0C 144* 0 L0C 145* 0
170830 L0C 120* 7877 L0C 121* 345
171690 BACKGROUND TASKS SCHEDULED
184400 ** RATE 1 SAMPLE TASK **
184400 L0C 87* 16081 L0C 88* 16098
184400 L0C 123* 6 L0C 124* 5
184400 L0C 100* 5899 L0C 101* 8484
**** CPU 1
184415 ** RATE 1 SAMPLE TASK **
184415 L0C 87* 16081 L0C 88* 16098
184415 L0C 123* 6 L0C 124* 5
184415 L0C 100* 5899 L0C 101* 8484
**** CPU 3
184415 ** RATE 1 SAMPLE TASK **
184415 L0C 87* 16081 L0C 88* 16098
184415 L0C 123* 6 L0C 124* 5
184415 L0C 100* 5899 L0C 101* 8484
**** IOP 1
189081 EXECUTE RATE 1 INPUT/OUTPUT CYCLE
**** IOP 2
189082 EXECUTE RATE 1 INPUT/OUTPUT CYCLE

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L0C 125* 12

L0C 125* 12

L0C 125* 12

```

*** IOP 3
189083 EXECUTE RATE 1 INPUT/OUTPUT CYCLE
*** IOP 1
189251 LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 4951 R3= 12345
*** IOP 2
189252 LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 4951 R3= 12345
*** IOP 3
189253 LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 54321 R3= 12345
*** CPU 3
189375 VCS 1 P-MTRX=1110 R-MTRX=1110
*** IOP 1
189451 LOAD VCS 1 WORD= 5899 LEVEL=2 R1= 5899 R2= 136521 R3= 12345
*** IOP 2
189452 LOAD VCS 1 WORD= 5899 LEVEL=2 R1= 5899 R2= 136521 R3= 12345
189453 * * * * * VCS 1 OUTPUT RESULT= 136521 * * * * *
189453 VCS 1 S-MTRX=0000
*** IOP 3
189453 LOAD VCS 1 WORD= 5899 LEVEL=1 R1= 5899 R2= 54321 R3= 12345
*** IOP 1
189621 LOAD VCS 1 WORD= 8484 LEVEL=2 R1= 8484 R2= 5899 R3= 12345
*** IOP 2
189622 LOAD VCS 1 WORD= 8484 LEVEL=2 R1= 8484 R2= 5899 R3= 12345
189623 * * * * * VCS 1 OUTPUT RESULT= 5899 * * * * *
189623 VCS 1 S-MTRX=0000
*** IOP 3
189623 LOAD VCS 1 WORD= 8484 LEVEL=1 R1= 8484 R2= 54321 R3= 12345
*** IOP 2
189793 * * * * * VCS 1 OUTPUT RESULT= 8484 * * * * *
189793 VCS 1 S-MTRX=0000
*** IOP 3
189793 LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 54321 R3= 12345
*** CPU 2
189960 BACKGROUND TASKS SCHEDULED

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*** CPU 1
189975 BACKGROUND TASKS SCHEDULED
*** CPU 3
189975 BACKGROUND TASKS SCHEDULED
*** IOP 1
189961 LHAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 5899 R3= 12345
*** IOP 2
189962 LHAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 5899 R3= 12345
189963 * * * * * VCS 1 OUTPUT RESULT= 33333 * * * * *
189963 VCS 1 S-MTRX=0000
*** IOP 3
189963 LHAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2= 54321 R3= 12345
*** IOP 1
189961 LHAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2= 5899 R3= 12345
*** IOP 2
189962 LHAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2= 5899 R3= 12345
190133 * * * * * VCS 1 OUTPUT RESULT= 12341631 * * * * *
190133 VCS 1 S-MTRX=0000
*** IOP 1
190161 LHAD VCS 1 WORD= 2 LEVEL=1 R1= 2 R2= 5899 R3= 12345
*** IOP 2
190162 LHAD VCS 1 WORD= 2 LEVEL=1 R1= 2 R2= 5899 R3= 12345
*** IOP 3
190163 LHAD VCS 1 WORD= 2 LEVEL=1 R1= 2 R2= 54321 R3= 12345
190303 * * * * * VCS 1 OUTPUT RESULT= 2 * * * * *
190303 VCS 1 S-MTRX=0000
190811 INPUT FROM LP 1 ON BUS(S) 123 DATA= 19081
190981 INPUT FROM LP 1 ON BUS(S) 123 DATA= 19098
*** IOP 1
191181 .OUTPUT MSG TYPE 3 TO COMPUTER(S) 1234
DATA= 0 5 12 1
*** IOP 2
191182 .OUTPUT MSG TYPE 3 TO COMPUTER(S) 1234
DATA= 0 5 12 1

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```

*** IOP 3
191183      OUTPUT MSG TYPE 3 TO COMPUTER(S) 1234 1
          DATA 0 5 12
*** IOP 1
191881      RATE 1 I/O COMPLETE
*** IOP 2
191882      RATE 1 I/O COMPLETE
*** IOP 3
191883      RATE 1 I/O COMPLETE
*** CPU 2
197405      BACKGROUND TASKS SCHEDULED
*** CPU 1
197420      BACKGROUND TASKS SCHEDULED
*** CPU 3
197420      BACKGROUND TASKS SCHEDULED
*** IOP 1
204111      EXECUTE RATE 2 INPUT/OUTPUT CYCLE
*** IOP 2
204112      EXECUTE RATE 2 INPUT/OUTPUT CYCLE
*** IOP 3
204113      EXECUTE RATE 2 INPUT/OUTPUT CYCLE
*** IOP 1
204281      LOAD VCS 1 WORD= 134522 LEVEL=1 R1= 134522 R2= 5899 R3= 12345
*** IOP 2
204282      LOAD VCS 1 WORD= 134522 LEVEL=1 R1= 134522 R2= 5899 R3= 12345
*** IOP 3
204283      LOAD VCS 1 WORD= 134522 LEVEL=1 R1= 134522 R2= 54321 R3= 12345
*** CPU 3
204345      VCS 1 P-MTRX=1110 R-MTRX=1110
*** IOP 1
204481      LOAD VCS 1 WORD= 7877 LEVEL=2 R1= 7877 R2= 134522 R3= 12345
*** IOP 2
204482      LOAD VCS 1 WORD= 7877 LEVEL=2 R1= 7877 R2= 134522 R3= 12345
204483      * * * * * VCS 1 OUTPUT RESULT= 134522 * * * * *
204483      VCS 1 S-MTRX=C000

```

```
**** IOP 3
20483 LOAD VCS 1 WORD= 7877 LEVEL=1 R1= 7877 R2= 54321 R3= 12345
**** IOP 1
20451 LOAD VCS 1 WORD= 345 LEVEL=2 R1= 345 R2= 7877 R3= 12345
**** IOP 2
20452 LOAD VCS 1 WORD= 345 LEVEL=2 R1= 345 R2= 7877 R3= 12345
20453 ***** VCS 1 OUTPUT RESULT= 7877 *****
20453 VCS 1 S=MTRX=0000
**** IOP 3
20453 LOAD VCS 1 WORD= 345 LEVEL=1 R1= 345 R2= 54321 R3= 12345
**** IOP 2
20483 ***** VCS 1 OUTPUT RESULT= 345 *****
20483 VCS 1 S=MTRX=0000
**** IOP 3
20483 LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 54321 R3= 12345
**** IOP 1
20491 LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 7877 R3= 12345
**** IOP 2
20492 LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 7877 R3= 12345
20493 ***** VCS 1 OUTPUT RESULT= 33333 *****
20493 VCS 1 S=MTRX=0000
**** IOP 3
20493 LOAD VCS 1 WORD=2341632 LEVEL=1 R1=2341632 R2= 54321 R3= 12345
**** IOP 1
20491 LOAD VCS 1 WORD=2341632 LEVEL=1 R1=2341632 R2= 7877 R3= 12345
**** IOP 2
20492 LOAD VCS 1 WORD=2341632 LEVEL=1 R1=2341632 R2= 7877 R3= 12345
20513 ***** VCS 1 OUTPUT RESULT= 12341632 *****
20513 VCS 1 S=MTRX=0000
**** IOP 1
20511 LOAD VCS 1 WORD= 3 LEVEL=1 R1= 3 R2= 7877 R3= 12345
**** IOP 2
20512 LOAD VCS 1 WORD= 3 LEVEL=1 R1= 3 R2= 7877 R3= 12345
```

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**** IOP 3
205193
**** CPU 3
205333
205333
**** IOP 3
205841
206011
**** CPU 3
206181
**** IOP 1
206381

**** IOP 2
206382

**** IOP 3
206383

**** IOP 1
207081
207081
**** IOP 2
207082
207082
**** IOP 3
207083
207083
**** CPU 2
214115
214115
214115
214115
214115
214990
**** CPU 1
214130
214130
214130

LOAD VCS 1 WORD= 3 LEVEL=1 R1= 3 R2= 54321 R3= 12345
* * * * * VCS 1 OUTPUT RESULT= 3 * * * * *
VCS 1 S-MTRX=0000

INPUT FROM LP 2 ON BUS(S) 123 DATA= 6666
INPUT FROM LP 2 ON BUS(S) 123 DATA= 6666
INPUT FROM LP 2 ON BUS(S) 123 DATA= 6666

OUTPUT MSG TYPE 4 TO COMPUTER(S) 1234
DATA= 3 0 0 1

OUTPUT MSG TYPE 4 TO COMPUTER(S) 1234
DATA= 3 0 0 1

OUTPUT MSG TYPE 4 TO COMPUTER(S) 1234
DATA= 3 0 0 1

** RATE 1 SAMPLE TASK **
LAC 87= 19081 LAC 88= 19098
LAC 123= 7 LAC 124= 4
LAC 100= 7499 LAC 101= 8282
BACKGROUND TASKS SCHEDULED

** RATE 1 SAMPLE TASK **
LAC 87= 19081 LAC 88= 19098
LAC 123= 7 LAC 124= 4

```

```

*** CPU 1
214130 LBC 100= 7499 LBC 101= 8282
215005 BACKGROUND TASKS SCHEDULED
*** CPU 3
214130 ** RATE 1 SAMPLE TASK **
214130 LBC 87= 19081 LBC 88= 19098
214130 LBC 123= 7 LBC 124= 4
214130 LBC 100= 7499 LBC 101= 8282
215005 BACKGROUND TASKS SCHEDULED
*** IOP 1
219081 EXECUTE RATE 1 INPUT/OUTPUT CYCLE
*** IOP 2
219082 EXECUTE RATE 1 INPUT/OUTPUT CYCLE
*** IOP 3
219083 EXECUTE RATE 1 INPUT/OUTPUT CYCLE
*** IOP 1
219251 LBCAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 7877 R3= 12345
*** IOP 2
219252 LBCAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 7877 R3= 12345
*** IOP 3
219253 LBCAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 54321 R3= 12345
*** CPU 3
219835 VCS 1 P-MTRX=1110 R-MTRX=1110
*** IOP 1
219451 LBCAD VCS 1 WORD= 7499 LEVEL=2 R1= 7499 R2= 136521 R3= 12345
*** IOP 2
219452 LBCAD VCS 1 WORD= 7499 LEVEL=2 R1= 7499 R2= 136521 R3= 12345
219453 * * * * * VCS 1 OUTPUT RESULT= 136521 * * * * *
219453 VCS 1 S-MTRX=0000
*** IOP 3
219453 LBCAD VCS 1 WORD= 7499 LEVEL=1 R1= 7499 R2= 54321 R3= 12345
*** IOP 1
219621 LBCAD VCS 1 WORD= 8282 LEVEL=2 R1= 8282 R2= 7499 R3= 12345

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```
*** IOP 2
219622      LOAD VCS 1 WORD=      8282 LEVEL=2 R1=      8282 R2=      7499 R3=      12345
219623      * * * * * VCS 1 OUTPUT RESULT=
219623      VCS 1      S-MTRX=0000

*** IOP 3
219623      LOAD VCS 1 WORD=      8282 LEVEL=1 R1=      8282 R2=      54321 R3=      12345
*** IOP 2
219793      * * * * * VCS 1 OUTPUT RESULT=
219793      VCS 1      S-MTRX=0000

*** IOP 3
219793      LOAD VCS 1 WORD=      33333 LEVEL=1 R1=      33333 R2=      54321 R3=      12345
*** IOP 1
219961      LOAD VCS 1 WORD=      33333 LEVEL=1 R1=      33333 R2=      7499 R3=      12345
*** IOP 2
219962      LOAD VCS 1 WORD=      33333 LEVEL=1 R1=      33333 R2=      7499 R3=      12345
219963      * * * * * VCS 1 OUTPUT RESULT=
219963      VCS 1      S-MTRX=0000

*** IOP 3
219963      LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2=      54321 R3=      12345
*** IOP 1
219961      LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2=      7499 R3=      12345
*** IOP 2
219962      LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2=      7499 R3=      12345
220133      * * * * * VCS 1 OUTPUT RESULT= 12341631 * * * * *
220133      VCS 1      S-MTRX=0000

*** IOP 1
220161      LOAD VCS 1 WORD=      2 LEVEL=1 R1=      2 R2=      7499 R3=      12345
*** IOP 2
220162      LOAD VCS 1 WORD=      2 LEVEL=1 R1=      2 R2=      7499 R3=      12345
*** IOP 3
220163      LOAD VCS 1 WORD=      2 LEVEL=1 R1=      2 R2=      54321 R3=      12345
*** CPU 3
220303      * * * * * VCS 1 OUTPUT RESULT=
220303      VCS 1      S-MTRX=0000
                INPUT FROM LP 1 0N BUS(S) 123 DATA= 22081
220811
```

RUC COMPUTER SYSTEM SIMULATION *** RUN 1-A

```

*** IOP 3
220981
*** IOP 1
221151
    INPUT FROM LP 1 ON BUS(S) 123 DATA= 22098
    OUTPUT MSG TYPE 3 TO COMPUTER(S) 1234
    DATA= 7 4 10 1

*** IOP 2
221182
    OUTPUT MSG TYPE 3 TO COMPUTER(S) 1234
    DATA= 7 4 10 1

*** IOP 3
221183
    OUTPUT MSG TYPE 3 TO COMPUTER(S) 1234
    DATA= 7 4 10 1

*** IOP 1
221881
    RATE 1 I/O COMPLETE
*** IOP 2
221882
    RATE 1 I/O COMPLETE
*** IOP 3
221883
    RATE 1 I/O COMPLETE
*** CPU 2
229935
    ** RATE 2 SAMPLE TASK **
    L0C 103= 6666 L0C 104= 6666
    L0C 144= 3 L0C 145= 0
    L0C 120= 4547 L0C 121= 3678
*** CPU 1
229950
    ** RATE 2 SAMPLE TASK **
    L0C 103= 6666 L0C 104= 6666
    L0C 144= 3 L0C 145= 0
    L0C 120= 4547 L0C 121= 3678
*** CPU 3
229950
    ** RATE 2 SAMPLE TASK **
    L0C 103= 6666 L0C 104= 6666
    L0C 144= 3 L0C 145= 0
    L0C 120= 4547 L0C 121= 3678
*** CPU 2
233795
    BACKGROUND TASKS SCHEDULED

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**** CPU 1
233810 BACKGROUND TASKS SCHEDULED
**** CPU 3
233810 BACKGROUND TASKS SCHEDULED
**** IOP 1
234561 EXECUTE INPUT/OUTPUT TEST CYCLE
**** IOP 2
234562 EXECUTE INPUT/OUTPUT TEST CYCLE
**** IOP 3
234563 EXECUTE INPUT/OUTPUT TEST CYCLE
**** IOP 1
235441 LOAD VCS 1 WORD= 136540 LEVEL=1 R1= 136540 R2= 7499 R3= 12345
**** IOP 2
235442 LOAD VCS 1 WORD= 136540 LEVEL=1 R1= 136540 R2= 7499 R3= 12345
**** IOP 3
235443 LOAD VCS 1 WORD= 136540 LEVEL=1 R1= 136540 R2= 54321 R3= 12345
**** IOP 1
235641 LOAD VCS 1 WORD= 12345 LEVEL=2 R1= 12345 R2= 136540 R3= 12345
**** IOP 2
235642 LOAD VCS 1 WORD= 12345 LEVEL=2 R1= 12345 R2= 136540 R3= 12345
235643 * * * * * VCS 1 OUTPUT RESULT= 136540 * * * * *
235643 VCS 1 S-MTRX=C000
**** IOP 3
235643 LOAD VCS 1 WORD= 12345 LEVEL=1 R1= 12345 R2= 54321 R3= 12345
**** IOP 1
235811 LOAD VCS 1 WORD= 54321 LEVEL=2 R1= 54321 R2= 12345 R3= 12345
**** IOP 2
235812 LOAD VCS 1 WORD= 54221 LEVEL=2 R1= 54221 R2= 12345 R3= 12345
235813 * * * * * VCS 1 OUTPUT RESULT= 12345 * * * * *
235813 VCS 1 S-MTRX=C000
**** IOP 3
235813 LOAD VCS 1 WORD= 54321 LEVEL=1 R1= 54321 R2= 54321 R3= 12345
**** IOP 1
235981 LOAD VCS 1 WORD= 31942 LEVEL=2 R1= 31942 R2= 54321 R3= 12345

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```
*** IOP 2
235982      LOAD VCS 1 WORD= 31942 LEVEL=2 R1= 31942 R2= 54221 R3= 12345
235983      * * * * * VCS 1 OUTPUT RESULT= 54321 * * * * *
235984      VCS 1 S-MTRX=0100
*** IOP 3
235985      LOAD VCS 1 WORD= 31942 LEVEL=1 R1= 31942 R2= 54321 R3= 12345
*** IOP 2
236322      VCS 1 P-MTRX=1110 R-MTRX=1110
236153      * * * * * VCS 1 OUTPUT RESULT= 31942 * * * * *
236153      VCS 1 S-MTRX=0100
*** IOP 3
236153      LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 54321 R3= 12345
*** IOP 1
236321      LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 54321 R3= 12345
*** IOP 2
236322      LOAD VCS 1 WORD= 55555 LEVEL=1 R1= 55555 R2= 54221 R3= 12345
236492      VCS 1 P-MTRX=1110 R-MTRX=1110
236323      * * * * * VCS 1 OUTPUT RESULT= 33333 * * * * *
236323      VCS 1 S-MTRX=0100
*** IOP 1
236491      LOAD VCS 2 WORD= 236540 LEVEL=1 R1= 236540 R2= 54321 R3= 12345
*** IOP 2
236492      LOAD VCS 2 WORD= 236540 LEVEL=1 R1= 236540 R2= 54321 R3= 12345
*** IOP 3
236493      LOAD VCS 2 WORD= 236540 LEVEL=1 R1= 236540 R2= 54321 R3= 12345
236693      VCS 2 P-MTRX=1110 R-MTRX=1110
*** IOP 1
236691      LOAD VCS 2 WORD= 12345 LEVEL=2 R1= 12345 R2= 236540 R3= 12345
*** IOP 2
236692      LOAD VCS 2 WORD= 12345 LEVEL=2 R1= 12345 R2= 236540 R3= 12345
236693      * * * * * VCS 2 OUTPUT RESULT= 236540 * * * * *
236693      VCS 2 S-MTRX=0000
*** IOP 3
236693      LOAD VCS 2 WORD= 12345 LEVEL=1 R1= 12345 R2= 54321 R3= 12345
```

```

*** IOP 1
236861      LOAD VCS 2 WORD= 54321 LEVEL=2 R1= 54321 R2= 12345 R3= 12345
*** IOP 2
236862      LOAD VCS 2 WORD= 54221 LEVEL=2 R1= 54221 R2= 12345 R3= 12345
236863      * * * * * VCS 2 OUTPUT RESULT= 12345 * * * * *
VCS 2      S-MTRX=0000

*** IOP 3
236863      LOAD VCS 2 WORD= 54321 LEVEL=1 R1= 54321 R2= 54321 R3= 12345
*** IOP 1
237031      LOAD VCS 2 WORD= 31942 LEVEL=2 R1= 31942 R2= 54321 R3= 12345
*** IOP 2
237032      LOAD VCS 2 WORD= 31942 LEVEL=2 R1= 31942 R2= 54221 R3= 12345
237033      * * * * * VCS 2 OUTPUT RESULT= 54321 * * * * *
VCS 2      S-MTRX=0100

*** IOP 3
237033      LOAD VCS 2 WORD= 31942 LEVEL=1 R1= 31942 R2= 54321 R3= 12345
*** IOP 2
237203      * * * * * VCS 2 OUTPUT RESULT= 31942 * * * * *
VCS 2      S-MTRX=0100

*** IOP 3
237203      LOAD VCS 2 WORD= 33333 LEVEL=1 R1= 33333 R2= 54321 R3= 12345
*** IOP 1
237371      LOAD VCS 2 WORD= 33333 LEVEL=1 R1= 33333 R2= 54321 R3= 12345
*** IOP 2
237372      LOAD VCS 2 WORD= 55555 LEVEL=1 R1= 55555 R2= 54221 R3= 12345
237373      * * * * * VCS 2 OUTPUT RESULT= 33333 * * * * *
VCS 2      S-MTRX=0100

*** IOP 3
238523      LOAD VCS 1 R-MTRX(3)=1110
*** IOP 1
238531      LOAD VCS 1 R-MTRX(1)=1110
*** IOP 2
238532      LOAD VCS 1 R-MTRX(2)=1110

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```
*** IOP 3
238863 LOAD VCS 1 WORD= 136540 LEVEL=1 R1= 136540 R2= 54321 R3= 12345
*** IOP 1
238871 LOAD VCS 1 WORD= 136540 LEVEL=1 R1= 136540 R2= 54321 R3= 12345
*** IOP 2
238872 LOAD VCS 1 WORD= 136540 LEVEL=1 R1= 136540 R2= 54221 R3= 12345
*** IOP 3
239063 LOAD VCS 1 WORD= 3822 LEVEL=2 R1= 3822 R2= 136540 R3= 12345
*** IOP 1
239071 LOAD VCS 1 WORD= 3822 LEVEL=2 R1= 3822 R2= 136540 R3= 12345
239072 * * * * * VCS 1 OUTPUT RESULT= 136540 * * * * *
239072 VCS 1 S-MTRX=0000
*** IOP 2
239072 LOAD VCS 1 WORD= 3822 LEVEL=1 R1= 3822 R2= 54221 R3= 12345
*** IOP 3
239233 LOAD VCS 1 WORD= 1 LEVEL=2 R1= 1 R2= 3822 R3= 12345
*** IOP 1
239241 LOAD VCS 1 WORD= 1 LEVEL=2 R1= 1 R2= 3822 R3= 12345
239242 * * * * * VCS 1 OUTPUT RESULT= 3822 * * * * *
239242 VCS 1 S-MTRX=0000
*** IOP 2
239242 LOAD VCS 1 WORD= 1 LEVEL=1 R1= 1 R2= 54221 R3= 12345
*** IOP 3
239403 LOAD VCS 1 WORD= 2 LEVEL=2 R1= 2 R2= 1 R3= 12345
*** IOP 1
239411 LOAD VCS 1 WORD= 2 LEVEL=2 R1= 2 R2= 1 R3= 12345
239412 * * * * * VCS 1 OUTPUT RESULT= 1 * * * * *
239412 VCS 1 S-MTRX=0000
*** IOP 2
239412 LOAD VCS 1 WORD= 2 LEVEL=1 R1= 2 R2= 54221 R3= 12345
*** IOP 3
239573 LOAD VCS 1 WORD= 3 LEVEL=2 R1= 3 R2= 2 R3= 12345
*** IOP 1
239581 LOAD VCS 1 WORD= 3 LEVEL=2 R1= 3 R2= 2 R3= 12345
239582 * * * * * VCS 1 OUTPUT RESULT= 2 * * * * *
```

```

*** 1P 1
239582 VCS 1 S-MTRX=0000
*** 1P 2
239582 LOAD VCS 1 WORD= 3 LEVEL=1 R1= 3 R2= 54221 R3= 12345
*** 1P 3
239743 LOAD VCS 1 WORD= 123 LEVEL=2 R1= 123 R2= 3 R3= 12345
*** 1P 1
239751 LOAD VCS 1 WORD= 123 LEVEL=2 R1= 123 R2= 3 R3= 12345
239752 * * * * * VCS 1 OUTPUT RESULT= 3 * * * * *
239752 VCS 1 S-MTRX=0000
*** 1P 2
239752 LOAD VCS 1 WORD= 123 LEVEL=1 R1= 123 R2= 54221 R3= 12345
*** 1P 3
239913 LOAD VCS 1 WORD= 1 LEVEL=2 R1= 1 R2= 123 R3= 12345
*** 1P 1
239921 LOAD VCS 1 WORD= 1 LEVEL=2 R1= 1 R2= 123 R3= 12345
239922 * * * * * VCS 1 OUTPUT RESULT= 123 * * * * *
239922 VCS 1 S-MTRX=0000
*** 1P 2
239922 LOAD VCS 1 WORD= 1 LEVEL=1 R1= 1 R2= 54221 R3= 12345
*** 1P 3
240083 LOAD VCS 1 WORD= 1 LEVEL=2 R1= 1 R2= 1 R3= 12345
*** 1P 1
240091 LOAD VCS 1 WORD= 1 LEVEL=2 R1= 1 R2= 1 R3= 12345
240092 * * * * * VCS 1 OUTPUT RESULT= 1 * * * * *
240092 VCS 1 S-MTRX=0000
*** 1P 2
240092 LOAD VCS 1 WORD= 1 LEVEL=1 R1= 1 R2= 54221 R3= 12345
*** 1P 1
240262 * * * * * VCS 1 OUTPUT RESULT= 1 * * * * *
240262 VCS 1 S-MTRX=0000
*** 1P 2
240262 LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 54221 R3= 12345

```

```

**** IOP 3
240423          LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 1 R3= 12345
**** IOP 1
240431          LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 1 R3= 12345
240432          * * * * * VCS 1 OUTPUT RESULT= 33333 * * * * *
240432          VCS 1 S-MTRX=0000
241301          OUTPUT MSG TYPE 1 TO COMPUTER(S) 1234 3
DATA= 3822 1 2 123 1 1

**** IOP 2
241302          OUTPUT MSG TYPE 1 TO COMPUTER(S) 1234 3
DATA= 3822 1 2 123 1 1

**** IOP 3
241303          OUTPUT MSG TYPE 1 TO COMPUTER(S) 1234 3
DATA= 3822 1 2 123 1 1

**** CPU 2
244505          ** RATE 1 SAMPLE TASK **
244505          L9C 87= 22081 L9C 88= 22098
244505          L9C 123= 8 L9C 124= 3 L9C 125= 8
244505          L9C 100= 10126 L9C 101= 8080

**** CPU 1
244520          ** RATE 1 SAMPLE TASK **
244520          L9C 87= 22081 L9C 88= 22098
244520          L9C 123= 8 L9C 124= 3 L9C 125= 8
244520          L9C 100= 10126 L9C 101= 8080

**** CPU 3
244520          ** RATE 1 SAMPLE TASK **
244520          L9C 87= 22081 L9C 88= 22098
244520          L9C 123= 8 L9C 124= 3 L9C 125= 8
244520          L9C 100= 10126 L9C 101= 8080

**** CPU 2
252835          * SYSTEM STATUS *
252835          L9C 44=1101110110
252835          L9C 52= 1 L9C 53= 2 L9C 54= 3
252835          L9C 56= 2

```

```

**** CPU 1
252850 * SYSTEM STATUS *
252850 L0C 44=111011101110
252850 L0C 52= 1 L0C 53= 2 L0C 54= 3
252850 L0C 56= 2
**** CPU 3
252870 * SYSTEM STATUS *
252870 L0C 44=111011101110
252870 L0C 52= 1 L0C 53= 2 L0C 54= 3
252870 L0C 56= 2
**** IOP 1
252581 LOAD VCS 1234 P-MTRX(1)=1110
**** IOP 2
252582 LOAD VCS 1234 P-MTRX(2)=1110
**** IOP 3
252583 LOAD VCS 1234 P-MTRX(3)=1110
**** IOP 1
252781 LOAD VCS 123 R-MTRX(1)=1110
**** IOP 2
252782 LOAD VCS 123 R-MTRX(2)=1110
**** IOP 3
252783 LOAD VCS 123 R-MTRX(3)=1110
**** IOP 1
253241 EXECUTE RATE 1 INPUT/OUTPUT CYCLE
**** IOP 2
253242 EXECUTE RATE 1 INPUT/OUTPUT CYCLE
**** IOP 3
253243 EXECUTE RATE 1 INPUT/OUTPUT CYCLE
**** IOP 1
253411 LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 1 R3= 12345
**** IOP 2
253412 LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 54221 R3= 12345
**** IOP 3
253413 LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 1 R3= 12345

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*** IOP 1
253611      LOAD VCS 1 WORD= 10126 LEVEL=2 R1= 10126 R2= 134521 R3= 12345
*** IOP 2
253612      LOAD VCS 1 WORD= 10126 LEVEL=2 R1= 10126 R2= 134521 R3= 12345
253613      * * * * * VCS 1 OUTPUT RESULT= 134521 * * * * *
253613      VCS 1 S-MTRX=0000

*** IOP 3
253613      LOAD VCS 1 WORD= 10126 LEVEL=1 R1= 10126 R2= 1 R3= 12345
*** IOP 1
253781      LOAD VCS 1 WORD= 3080 LEVEL=2 R1= 3080 R2= 10126 R3= 12345
*** IOP 2
253782      LOAD VCS 1 WORD= 3080 LEVEL=2 R1= 3080 R2= 10126 R3= 12345
253783      * * * * * VCS 1 OUTPUT RESULT= 10126 * * * * *
253783      VCS 1 S-MTRX=0000

*** IOP 3
253783      LOAD VCS 1 WORD= 3080 LEVEL=1 R1= 3080 R2= 1 R3= 12345
*** IOP 2
253953      * * * * * VCS 1 OUTPUT RESULT= 3080 * * * * *
253953      VCS 1 S-MTRX=0000

*** IOP 3
253953      LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 1 R3= 12345
*** IOP 1
254121      LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 10126 R3= 12345
*** IOP 2
254122      LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 10126 R3= 12345
254292      VCS 1 P-MTRX=1110 R-MTRX=1110
254123      * * * * * VCS 1 OUTPUT RESULT= 33333 * * * * *
254123      VCS 1 S-MTRX=0000

*** IOP 3
254123      LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2= 1 R3= 12345
*** IOP 1
254121      LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2= 10126 R3= 12345
*** IOP 2
254122      LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2= 10126 R3= 12345
254322      VCS 1 P-MTRX=1110 R-MTRX=1110

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**** IOP 2
254293      * * * * * VCS 1 OUTPUT RESULT= 12341631 * * * * *
254293      VCS 1  S-MTRX=0000

**** IOP 1
254321      LOAD VCS 1 WORD= 2 LEVEL=1 R1= 2 R2= 10126 R3= 12345
**** IOP 2
254322      LOAD VCS 1 WORD= 2 LEVEL=1 R1= 2 R2= 10126 R3= 12345
**** IOP 3
254323      LOAD VCS 1 WORD= 2 LEVEL=1 R1= 2 R2= 1 R3= 12345
254463      * * * * * VCS 1 OUTPUT RESULT= 2 * * * * *
254463      VCS 1  S-MTRX=0000

**** CPU 2 BACKGROUND TASKS SCHEDULED
254580
**** CPU 1 BACKGROUND TASKS SCHEDULED
254595
**** CPU 3 BACKGROUND TASKS SCHEDULED
254615
**** IOP 3
254971      INPUT FROM LP 1 ON BUS(S) 123 DATA= 25497
255141      INPUT FROM LP 1 ON BUS(S) 123 DATA= 25514

**** IOP 1
255341      OUTPUT MSG TYPE 3 TO COMPUTER(S) 1234
                DATA= 3 8 1

**** IOP 2
255342      OUTPUT MSG TYPE 3 TO COMPUTER(S) 1234
                DATA= 3 8 1

**** IOP 3
255343      OUTPUT MSG TYPE 3 TO COMPUTER(S) 1234
                DATA= 3 8 1

**** IOP 1
256041      RATE 1 I/O COMPLETE
**** IOP 2
256042      RATE 1 I/O COMPLETE

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*** IOP 3
256043 RATE 1 I/O COMPLETE
*** CPU 2
262025 BACKGROUND TASKS SCHEDULED
*** CPU 1
262040 BACKGROUND TASKS SCHEDULED
*** CPU 3
262060 BACKGROUND TASKS SCHEDULED
*** IOP 1
264111 EXECUTE RATE 2 INPUT/OUTPUT CYCLE
*** IOP 2
264112 EXECUTE RATE 2 INPUT/OUTPUT CYCLE
*** IOP 3
264113 EXECUTE RATE 2 INPUT/OUTPUT CYCLE
*** IOP 1
264281 LOAD VCS 1 WORD= 136522 LEVEL=1 R1= 136522 R2= 10126 R3= 12345
*** IOP 2
264282 LOAD VCS 1 WORD= 136522 LEVEL=1 R1= 136522 R2= 10126 R3= 12345
*** IOP 3
264283 LOAD VCS 1 WORD= 136522 LEVEL=1 R1= 136522 R2= 1 R3= 12345
*** IOP 1
264481 LOAD VCS 1 WORD= 4547 LEVEL=2 R1= 4547 R2= 134522 R3= 12345
*** IOP 2
264482 LOAD VCS 1 WORD= 4547 LEVEL=2 R1= 4547 R2= 136522 R3= 12345
264483 * * * * * VCS 1 OUTPUT RESULT= 136522 * * * * *
264483 VCS 1 S-MTRX=0000
*** IOP 3
264483 LOAD VCS 1 WORD= 4547 LEVEL=1 R1= 4547 R2= 1 R3= 12345
*** IOP 1
264651 LOAD VCS 1 WORD= 3678 LEVEL=2 R1= 3678 R2= 4547 R3= 12345
*** IOP 2
264652 LOAD VCS 1 WORD= 3678 LEVEL=2 R1= 3678 R2= 4547 R3= 12345
264653 * * * * * VCS 1 OUTPUT RESULT= 4547 * * * * *
264653 VCS 1 S-MTRX=0000

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```
*** IOP 3
264653
*** IOP 2
264823
264823
*** IOP 3
264823
*** IOP 1
264991
*** IOP 2
264992
264993
264993
*** IOP 3
264993
*** IOP 1
264991
*** IOP 2
264992
265163
265163
*** IOP 1
265191
*** IOP 2
265192
*** IOP 3
265193
*** CPU 3
265333
265333
265841
*** IOP 3
266011

LOAD VCS 1 WORD= 3678 LEVEL=1 R1= 3678 R2= 1 R3= 12345
* * * * * VCS 1 OUTPUT RESULT= 3678 * * * * *
VCS 1 S-MTRX=0000

LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 1 R3= 12345
LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 4547 R3= 12345
LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 4547 R3= 12345
* * * * * VCS 1 OUTPUT RESULT= 33333 * * * * *
VCS 1 S-MTRX=0000

LOAD VCS 1 WORD=2341632 LEVEL=1 R1=2341632 R2= 1 R3= 12345
LOAD VCS 1 WORD=2341632 LEVEL=1 R1=2341632 R2= 4547 R3= 12345
LOAD VCS 1 WORD=2341632 LEVEL=1 R1=2341632 R2= 4547 R3= 12345
* * * * * VCS 1 OUTPUT RESULT= 12341632 * * * * *
VCS 1 S-MTRX=0000

LOAD VCS 1 WORD= 3 LEVEL=1 R1= 3 R2= 4547 R3= 12345
LOAD VCS 1 WORD= 3 LEVEL=1 R1= 3 R2= 4547 R3= 12345
LOAD VCS 1 WORD= 3 LEVEL=1 R1= 3 R2= 1 R3= 12345
* * * * * VCS 1 OUTPUT RESULT= 3 * * * * *
VCS 1 S-MTRX=0000
INPUT FROM LP 2 ON BUS(S) 123 DATA= 9999
INPUT FROM LP 2 ON BUS(S) 123 DATA= 9999
```

```

**** CPU 3
266181
**** IOP 1
266361
      INPUT FROM LP 2 ON BUS(S) 123 DATA= 9999
      OUTPUT MSG TYPE 4 TO COMPUTER(S) 1234
      DATA= 0 3 0 1
**** IOP 2
266382
      OUTPUT MSG TYPE 4 TO COMPUTER(S) 1234
      DATA= 0 3 0 1
**** IOP 3
266383
      OUTPUT MSG TYPE 4 TO COMPUTER(S) 1234
      DATA= 0 3 0 1
**** IOP 1
267081
      RATE 2 I/O COMPLETE
**** IOP 2
267082
      RATE 2 I/O COMPLETE
**** IOP 3
267083
      RATE 2 I/O COMPLETE
**** CPU 2
273735 ** RATE 1 SAMPLE TASK **
273735 L9C 87# 25497 L9C 88# 25514
273735 L9C 123# 9 L9C 124# 2
273735 L9C 100# 15590 L9C 101# 4848
**** CPU 1
273750 ** RATE 1 SAMPLE TASK **
273750 L9C 87# 25497 L9C 88# 25514
273750 L9C 123# 9 L9C 124# 2
273750 L9C 100# 15590 L9C 101# 4848
**** CPU 3
273770 ** RATE 1 SAMPLE TASK **
273770 L9C 87# 25497 L9C 88# 25514
273770 L9C 123# 9 L9C 124# 2
273770 L9C 100# 15590 L9C 101# 4848
**** IOP 1
279081 EXECUTE RATE 1 INPUT/OUTPUT CYCLE

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```

*** IOP 2
279082 EXECUTE RATE 1 INPUT/OUTPUT CYCLE
*** IOP 3
279083 EXECUTE RATE 1 INPUT/OUTPUT CYCLE
*** IOP 1
279251 LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 4547 R3= 12345
*** IOP 2
279252 LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 4547 R3= 12345
*** IOP 3
279253 LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 1 R3= 12345
279453 VCS 1 P-MTRX=1110 R-MTRX=1110
*** IOP 1
279451 LOAD VCS 1 WORD= 15590 LEVEL=2 R1= 15590 R2= 136521 R3= 12345
*** IOP 2
279452 LOAD VCS 1 WORD= 15590 LEVEL=2 R1= 15590 R2= 136521 R3= 12345
279453 *** * * * VCS 1 OUTPUT RESULT= 136521 * * * *
279453 VCS 1 S-MTRX=0000
*** IOP 3
279453 LOAD VCS 1 WORD= 15590 LEVEL=1 R1= 15590 R2= 1 R3= 12345
*** IOP 1
279621 LOAD VCS 1 WORD= 4848 LEVEL=2 R1= 4848 R2= 15590 R3= 12345
*** IOP 2
279622 LOAD VCS 1 WORD= 4848 LEVEL=2 R1= 4848 R2= 15590 R3= 12345
279623 *** * * * VCS 1 OUTPUT RESULT= 15590 * * * *
279623 VCS 1 S-MTRX=0000
*** IOP 3
279623 LOAD VCS 1 WORD= 4848 LEVEL=1 R1= 4848 R2= 1 R3= 12345
*** IOP 2
279793 *** * * * VCS 1 OUTPUT RESULT= 4848 * * * *
279793 VCS 1 S-MTRX=0000
*** IOP 3
279793 LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 1 R3= 12345
*** IOP 1
279961 LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 15590 R3= 12345

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```
**** IOP 2
279962 LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 15590 R3= 12345
279963 * * * * * VCS 1 OUTPUT RESULT= 33333 * * * * *
279963 VCS 1 S-MTRX=0000

**** IOP 3
279963 LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2= 1 R3= 12345
**** IOP 1
279961 LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2= 15590 R3= 12345
**** IOP 2
279962 LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2= 15590 R3= 12345
280133 * * * * * VCS 1 OUTPUT RESULT= 12341631 * * * * *
280133 VCS 1 S-MTRX=0000

**** IOP 1
280161 LOAD VCS 1 WORD= 2 LEVEL=1 R1= 2 R2= 15590 R3= 12345
**** IOP 2
280162 LOAD VCS 1 WORD= 2 LEVEL=1 R1= 2 R2= 15590 R3= 12345
**** IOP 3
280163 LOAD VCS 1 WORD= 2 LEVEL=1 R1= 2 R2= 1 R3= 12345
280303 * * * * * VCS 1 OUTPUT RESULT= 2 * * * * *
280303 VCS 1 S-MTRX=0000
INPUT FROM LP 1 ON BUS(S) 123 DATA= 28081
INPUT FROM LP 1 ON BUS(S) 123 DATA= 28098

**** CPU 3
280981 INPUT MSG TYPE 3 TO COMPUTER(S) 1234
281181 DATA= 9 2 12 1

**** IOP 2
281182 OUTPUT MSG TYPE 3 TO COMPUTER(S) 1234
DATA= 9 2 12 1

**** IOP 3
281183 OUTPUT MSG TYPE 3 TO COMPUTER(S) 1234
DATA= 9 2 12 1

**** IOP 1
281881 RATE 1 1/8 COMPLETE
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```

**** IOP 2
281882 RATE 1 I/O COMPLETE
**** IOP 3
281883 RATE 1 I/O COMPLETE
**** CPU 2
290135 ** RATE 2 SAMPLE TASK **
290135 L8C 103* 9999 L8C 104* 9999
290135 L8C 144* 6 L8C 145* 3
290135 L8C 120* 1217 L8C 121* 36901
290995 BACKGROUND TASKS SCHEDULED
**** CPU 1
290150 ** RATE 2 SAMPLE TASK **
290150 L8C 103* 9999 L8C 104* 9999
290150 L8C 144* 6 L8C 145* 3
290150 L8C 120* 1217 L8C 121* 36901
291010 BACKGROUND TASKS SCHEDULED
**** CPU 3
290170 ** RATE 2 SAMPLE TASK **
290170 L8C 103* 9999 L8C 104* 9999
290170 L8C 144* 6 L8C 145* 3
290170 L8C 120* 1217 L8C 121* 36901
291030 BACKGROUND TASKS SCHEDULED
**** CPU 2
303705 ** RATE 1 SAMPLE TASK **
303705 L8C 87* 280A1 L8C 88* 28C98
303705 L8C 123* 10 L8C 124* 1
303705 L8C 100* 30906 L8C 101* 8282
**** CPU 1
303720 ** RATE 1 SAMPLE TASK **
303720 L8C 67* 280A1 L8C 88* 28C98
303720 L8C 123* 10 L8C 124* 1
303720 L8C 100* 30906 L8C 101* 8282
**** CPU 3
303740 ** RATE 1 SAMPLE TASK **
303740 L8C 87* 280A1 L8C 88* 28C98

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**** CPU 3
303740 LBC 123= 10 LBC 124= 1 LBC 125= 10
303740 LBC 100= 30906 LBC 101= 8282
**** CPU 2
308580 BACKGROUND TASKS SCHEDULED
**** CPU 1
308595 BACKGROUND TASKS SCHEDULED
**** CPU 3
308615 BACKGROUND TASKS SCHEDULED
**** IOP 1
309081 EXECUTE RATE 1 INPUT/OUTPUT CYCLE
**** IOP 2
309082 EXECUTE RATE 1 INPUT/OUTPUT CYCLE
**** IOP 3
309083 EXECUTE RATE 1 INPUT/OUTPUT CYCLE
**** IOP 1
309251 LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 15590 R3= 12345
**** IOP 2
309252 LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 15590 R3= 12345
**** IOP 3
309253 LOAD VCS 1 WORD= 136521 LEVEL=1 R1= 136521 R2= 1 R3= 12345
309453 VCS 1 P-MTRX=1110 R-MTRX=1110
**** IOP 1
309451 LOAD VCS 1 WORD= 30906 LEVEL=2 R1= 30906 R2= 136521 R3= 12345
**** IOP 2
309452 LOAD VCS 1 WORD= 30906 LEVEL=2 R1= 30906 R2= 136521 R3= 12345
309453 * * * * * VCS 1 OUTPUT RESULT= 136521 * * * * *
309453 VCS 1 S-MTRX=0000
**** IOP 3
309453 LOAD VCS 1 WORD= 30906 LEVEL=1 R1= 30906 R2= 1 R3= 12345
**** IOP 1
309621 LOAD VCS 1 WORD= 8282 LEVEL=2 R1= 8282 R2= 30906 R3= 12345
**** IOP 2
309622 LOAD VCS 1 WORD= 8282 LEVEL=2 R1= 8282 R2= 30906 R3= 12345
309623 * * * * * VCS 1 OUTPUT RESULT= 30906 * * * * *

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```

*** IOP 2
309623
*** IOP 3
309623
*** IOP 2
309793
309793
*** IOP 3
309793
*** IOP 1
309961
*** IOP 2
309962
309963
309963
*** IOP 3
309963
*** IOP 1
309961
*** IOP 2
309962
310133
310133
*** IOP 1
310161
*** IOP 2
310162
*** IOP 3
310163
310303
310303
310811
310981

VCS 1 S-MTRX=0000
LOAD VCS 1 WORD= 8282 LEVEL=1 R1= 8282 R2= 1 R3= 12345
* * * * * VCS 1 OUTPUT RESULT= 8282 * * * * *
VCS 1 S-MTRX=0000
LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 1 R3= 12345
LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 30906 R3= 12345
LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 30906 R3= 12345
* * * * * VCS 1 OUTPUT RESULT= 33333 * * * * *
VCS 1 S-MTRX=0000
LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2= 1 R3= 12345
LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2= 30906 R3= 12345
LOAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2= 30906 R3= 12345
* * * * * VCS 1 OUTPUT RESULT= 12341631 * * * * *
VCS 1 S-MTRX=0000
LOAD VCS 1 WORD= 2 LEVEL=1 R1= 2 R2= 30906 R3= 12345
LOAD VCS 1 WORD= 2 LEVEL=1 R1= 2 R2= 30906 R3= 12345
LOAD VCS 1 WORD= 2 LEVEL=1 R1= 2 R2= 1 R3= 12345
* * * * * VCS 1 OUTPUT RESULT= 2 * * * * *
VCS 1 S-MTRX=0000
INPUT FROM LP 1 ON BUS(S) 123 DATA= 31081
INPUT FROM LP 1 ON BUS(S) 123 DATA= 31098

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```

*** IOP 1
311181          OUTPUT MSG TYPE 3 TO COMPUTER(S) 1234
              DATA= 10 1 10 1
*** IOP 2
311182          OUTPUT MSG TYPE 3 TO COMPUTER(S) 1234
              DATA= 10 1 10 1
*** IOP 3
311183          OUTPUT MSG TYPE 3 TO COMPUTER(S) 1234
              DATA= 10 1 10 1
*** IOP 1
311881          RATE 1 I/O COMPLETE
*** IOP 2
311882          RATE 1 I/O COMPLETE
*** IOP 3
311883          RATE 1 I/O COMPLETE
*** CPU 2
316710          BACKGROUND TASKS SCHEDULED
*** CPU 1
316725          BACKGROUND TASKS SCHEDULED
*** CPU 3
316745          BACKGROUND TASKS SCHEDULED
*** IOP 1
324111          EXECUTE RATE 2 INPUT/OUTPUT CYCLE
*** IOP 2
324112          EXECUTE RATE 2 INPUT/OUTPUT CYCLE
*** IOP 3
324113          EXECUTE RATE 2 INPUT/OUTPUT CYCLE
*** IOP 1
324281          LOAD VCS 1 WORD= 136522 LEVEL=1 R1= 136522 R2= 30906 R3= 12345
*** IOP 2
324282          LOAD VCS 1 WORD= 136522 LEVEL=1 R1= 136522 R2= 30906 R3= 12345
*** IOP 3
324283          LOAD VCS 1 WORD= 136522 LEVEL=1 R1= 136522 R2= 1 R3= 12345

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```
*** IOP 1
32481 LOAD VCS 1 WORD= 1217 LEVEL=2 R1= 1217 R2= 136522 R3= 12345
*** IOP 2
32482 LOAD VCS 1 WORD= 1217 LEVEL=2 R1= 1217 R2= 136522 R3= 12345
32483 * * * * * VCS 1 OUTPUT RESULT= 136522 * * * * *
32483 VCS 1 S-MTRX=0000

*** IOP 3
32483 LOAD VCS 1 WORD= 1217 LEVEL=1 R1= 1217 R2= 1 R3= 12345
*** IOP 1
32485 LOAD VCS 1 WORD= 36901 LEVEL=2 R1= 36901 R2= 1217 R3= 12345
*** IOP 2
32485 LOAD VCS 1 WORD= 36901 LEVEL=2 R1= 36901 R2= 1217 R3= 12345
32485 * * * * * VCS 1 OUTPUT RESULT= 1217 * * * * *
32485 VCS 1 S-MTRX=0000

*** IOP 3
32485 LOAD VCS 1 WORD= 36901 LEVEL=1 R1= 36901 R2= 1 R3= 12345
*** IOP 2
* * * * * VCS 1 OUTPUT RESULT= 36901 * * * * *
32483 VCS 1 S-MTRX=0000

*** IOP 3
32483 LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 1 R3= 12345
*** IOP 1
32491 LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 1217 R3= 12345
*** IOP 2
32492 LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 1217 R3= 12345
32493 * * * * * VCS 1 OUTPUT RESULT= 33333 * * * * *
32493 VCS 1 S-MTRX=0000

*** IOP 3
32493 LOAD VCS 1 WORD=2341632 LEVEL=1 R1=2341632 R2= 1 R3= 12345
*** IOP 1
32491 LOAD VCS 1 WORD=2341632 LEVEL=1 R1=2341632 R2= 1217 R3= 12345
*** IOP 2
32492 LOAD VCS 1 WORD=2341632 LEVEL=1 R1=2341632 R2= 1217 R3= 12345
325163 * * * * * VCS 1 OUTPUT RESULT= 12341632 * * * * *
325163 VCS 1 S-MTRX=0000
```

RGC COMPUTER SYSTEM SIMULATION *** RUN 3-A

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**** IOP 1
325191 LOAD VCS 1 WORD= 3 LEVEL=1 R1= 3 R2= 1217 R3= 12345
**** IOP 2
325192 LOAD VCS 1 WORD= 3 LEVEL=1 R1= 3 R2= 1217 R3= 12345
**** IOP 3
325193 LOAD VCS 1 WORD= 3 LEVEL=1 R1= 3 R2= 1 R3= 12345
**** CPU 3
325333 * * * * * VCS 1 OUTPUT RESULT= 3 * * * * *
325333 VCS 1 S-MTRX=0000
325841 INPUT FROM LP 2 ON BUS(S) 123 DATA= 13332
**** IOP 3
326011 INPUT FROM LP 2 ON BUS(S) 123 DATA= 13332
**** CPU 3
326181 INPUT FROM LP 2 ON BUS(S) 123 DATA= 13332
**** IOP 1
326381 OUTPUT MSG TYPE 4 TO COMPUTER(S) 1234
DATA= 9 6 0 1
**** IOP 2
326382 OUTPUT MSG TYPE 4 TO COMPUTER(S) 1234
DATA= 9 6 0 1
**** IOP 3
326383 OUTPUT MSG TYPE 4 TO COMPUTER(S) 1234
DATA= 9 6 0 1
**** IOP 1
327081 RATE 2 I/O COMPLETE
**** IOP 2
327082 RATE 2 I/O COMPLETE
**** IOP 3
327083 RATE 2 I/O COMPLETE
**** CPU 2
333765 ** RATE 1 SAMPLE TASK **
333765 L8C 87= 31081 L8C 88= 31098
333765 L8C 123= 11 L8C 124= 10
333765 L8C 100= 5934 L8C 101= 8080
334320 BACKGROUND TASKS SCHEDULED

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*** CPU 1
333780 ** RATE 1 SAMPLE TASK **
333780 L8C 87 31081 L8C 88 31098
333780 L9C 123 11 L9C 124 10
333780 L8C 100 5934 L8C 101 8080
334335 BACKGROUND TASKS SCHEDULED
*** CPU 3
333800 ** RATE 1 SAMPLE TASK **
333800 L8C 87 31081 L8C 88 31098
333800 L8C 123 11 L8C 124 10
333800 L8C 100 5934 L8C 101 8080
334355 BACKGROUND TASKS SCHEDULED
*** CPU 1
339081 EXECUTE RATE 1 INPUT/OUTPUT CYCLE
*** CPU 2
339082 EXECUTE RATE 1 INPUT/OUTPUT CYCLE
*** CPU 3
339083 EXECUTE RATE 1 INPUT/OUTPUT CYCLE
*** CPU 1
339251 L8AD VCS 1 WORD 136521 LEVEL=1 R1= 136521 R2= 1217 R3= 12345
*** CPU 2
339252 L8AD VCS 1 WORD 136521 LEVEL=1 R1= 136521 R2= 1217 R3= 12345
*** CPU 3
339253 L8AD VCS 1 WORD 136521 LEVEL=1 R1= 136521 R2= 1 R3= 12345
*** CPU 3
339780 VCS 1 P-MTRX=1110 R-MTRX=1110
*** CPU 1
339451 L8AD VCS 1 WORD 5934 LEVEL=2 R1= 5934 R2= 136521 R3= 12345
*** CPU 2
339452 L8AD VCS 1 WORD 5934 LEVEL=2 R1= 5934 R2= 136521 R3= 12345
339453 ** * * * VCS 1 OUTPUT RESULT= 136521 * * * *
339453 VCS 1 S-MTRX=CJ000
*** CPU 3
339453 L8AD VCS 1 WORD 5934 LEVEL=1 R1= 5934 R2= 1 R3= 12345

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**** IOP 1
339621      LHAD VCS 1 WORD=      8060 LEVEL=2 R1=      8080 R2=      5934 R3=      12345
**** IOP 2
339622      LHAD VCS 1 WORD=      8080 LEVEL=2 R1=      8080 R2=      5934 R3=      12345
339623      * * * * * VCS 1 OUTPUT RESULT=      5934 * * * * *
339623      VCS 1 S-MTRX=0000

**** IOP 3
339623      LHAD VCS 1 WORD=      8080 LEVEL=1 R1=      8080 R2=      1 R3=      12345
**** IOP 2
339793      * * * * * VCS 1 OUTPUT RESULT=      8080 * * * * *
339793      VCS 1 S-MTRX=0000

**** IOP 3
339793      LHAD VCS 1 WORD=      33333 LEVEL=1 R1=      33333 R2=      1 R3=      12345
**** IOP 1
339961      LHAD VCS 1 WORD=      33333 LEVEL=1 R1=      33333 R2=      5934 R3=      12345
**** IOP 2
339962      LHAD VCS 1 WORD=      33333 LEVEL=1 R1=      33333 R2=      5934 R3=      12345
339963      * * * * * VCS 1 OUTPUT RESULT=      33333 * * * * *
339963      VCS 1 S-MTRX=0000

**** IOP 3
339963      LHAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2=      1 R3=      12345
**** IOP 1
339961      LHAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2=      5934 R3=      12345
**** IOP 2
339962      LHAD VCS 1 WORD=2341631 LEVEL=1 R1=2341631 R2=      5934 R3=      12345
340133      * * * * * VCS 1 OUTPUT RESULT= 12341631 * * * * *
340133      VCS 1 S-MTRX=0000

**** IOP 1
340161      LHAD VCS 1 WORD=      2 LEVEL=1 R1=      2 R2=      5934 R3=      12345
**** IOP 2
340162      LHAD VCS 1 WORD=      2 LEVEL=1 R1=      2 R2=      5934 R3=      12345
**** IOP 3
340163      LHAD VCS 1 WORD=      2 LEVEL=1 R1=      2 R2=      1 R3=      12345

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```

**** CPU 3
340303
340303
**** IOP 3
340811
**** CPU 2
340981
**** IOP 1
341181
**** IOP 2
341182
**** IOP 3
341183
**** IOP 1
341881
341882
341883
341883
**** CPU 2
350265
350265
350265
350265
**** CPU 1
350280
350280
350280
350280
**** CPU 3
350300
350300

```

*** ** * VCS 1 OUTPUT RESULT= 2 * * * * *
 VCS 1 S-MTRX=0000
 INPUT FROM LP 1 0N BUS(S) 123 DATA= 34081
 INPUT FROM LP 1 0N BUS(S) 123 DATA= 34098
 OUTPUT MSG TYPE 3 TO COMPUTER(S) 1234 1
 DATA= 11 10 8
 OUTPUT MSG TYPE 3 TO COMPUTER(S) 1234 1
 DATA= 11 10 8
 OUTPUT MSG TYPE 3 TO COMPUTER(S) 1234 1
 DATA= 11 10 8
 RATE 1 I/O COMPLETE
 RATE 1 I/O COMPLETE
 RATE 1 I/O COMPLETE
 RATE 1 I/O COMPLETE
 ** RATE 2 SAMPLE TASK **
 L8C 103= 13332 L8C 104= 13332
 L8C 144= 9 L8C 145= 6
 L8C 120= 8987 L8C 121= 69345
 ** RATE 2 SAMPLE TASK **
 L8C 103= 13332 L8C 104= 13332
 L8C 144= 9 L8C 145= 6
 L8C 120= 8987 L8C 121= 69345
 ** RATE 2 SAMPLE TASK **
 L8C 103= 13332 L8C 104= 13332

```

**** CPU 3
350300 L0C 144= 9 L0C 145= 6
350300 L0C 120= 8967 L0C 121= 69345
**** CPU 2
353125 BACKGROUND TASKS SCHEDULED
**** CPU 1
353140 BACKGROUND TASKS SCHEDULED
**** CPU 3
353160 BACKGROUND TASKS SCHEDULED
**** IOP 1
354561 EXECUTE INPUT/OUTPUT TEST CYCLE
**** IOP 2
354562 EXECUTE INPUT/OUTPUT TEST CYCLE
**** IOP 3
354563 EXECUTE INPUT/OUTPUT TEST CYCLE
**** IOP 1
355441 LOAD VCS 1 WORD= 136540 LEVEL=1 R1= 136540 R2= 5934 R3= 12345
**** IOP 2
355442 LHAD VCS 1 WORD= 136540 LEVEL=1 R1= 136540 R2= 5934 R3= 12345
**** IOP 3
355443 LOAD VCS 1 WORD= 136540 LEVEL=1 R1= 136540 R2= 1 R3= 12345
355643 VCS 1 P-MTRX=1110 R-MTRX=1110
**** IOP 1
355641 LOAD VCS 1 WORD= 12345 LEVEL=2 R1= 12345 R2= 136540 R3= 12345
**** IOP 2
355642 LOAD VCS 1 WORD= 12345 LEVEL=2 R1= 12345 R2= 136540 R3= 12345
355643 * * * * * VCS 1 OUTPUT RESULT= 136540 * * * * *
355643 VCS 1 S-MTRX=0000
**** IOP 3
355643 LOAD VCS 1 WORD= 12345 LEVEL=1 R1= 12345 R2= 1 R3= 12345
**** IOP 1
355811 LOAD VCS 1 WORD= 54321 LEVEL=2 R1= 54321 R2= 12345 R3= 12345
**** IOP 2
355812 LOAD VCS 1 WORD= 54321 LEVEL=2 R1= 54321 R2= 12345 R3= 12345
355813 * * * * * VCS 1 OUTPUT RESULT= 12345 * * * * *

```

```

*** IOP 2
355813
*** IOP 3
355813
*** IOP 1
355981
*** IOP 2
355982
355983
355983
*** IOP 3
355983
*** IOP 2
356153
356153
*** IOP 3
356153
*** IOP 1
356321
*** IOP 2
356322
356323
356323
*** IOP 1
356491
*** IOP 2
356492
*** IOP 3
356493
*** CPU 3
357065
*** IOP 1
356691

```

VCS 1 S-MTRX=0000

LOAD VCS 1 WORD= 54221 LEVEL=1 R1= 54221 R2= 1 R3= 12345

LOAD VCS 1 WORD= 31942 LEVEL=2 R1= 31942 R2= 54321 R3= 12345

LOAD VCS 1 WORD= 31942 LEVEL=2 R1= 31942 R2= 54321 R3= 12345

*** * * * VCS 1 OUTPUT RESULT=

VCS 1 S-MTRX=0010

LOAD VCS 1 WORD= 31942 LEVEL=1 R1= 31942 R2= 1 R3= 12345

*** * * * VCS 1 OUTPUT RESULT=

VCS 1 S-MTRX=0010

LOAD VCS 1 WORD= 55555 LEVEL=1 R1= 55555 R2= 1 R3= 12345

LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 54321 R3= 12345

LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 54321 R3= 12345

*** * * * VCS 1 OUTPUT RESULT=

VCS 1 S-MTRX=0010

LOAD VCS 2 WORD= 236540 LEVEL=1 R1= 236540 R2= 54321 R3= 12345

LOAD VCS 2 WORD= 236540 LEVEL=1 R1= 236540 R2= 54221 R3= 12345

LOAD VCS 2 WORD= 236540 LEVEL=1 R1= 236540 R2= 54321 R3= 12345

VCS 2 P-MTRX=1110 R-MTRX=1110

LOAD VCS 2 WORD= 12345 LEVEL=2 R1= 12345 R2= 236540 R3= 12345

```

*** IOP 2
356692 LOAD VCS 2 WORD= 12345 LEVEL=2 R1= 12345 R2= 236540 R3= 12345
356693 * * * * * VCS 2 OUTPUT RESULT= 236540 * * * * *
356693 VCS 2 S-MTRX=0000

*** IOP 3
356693 LOAD VCS 2 WORD= 12345 LEVEL=1 R1= 12345 R2= 54321 R3= 12345
*** IOP 1
356861 LOAD VCS 2 WORD= 54321 LEVEL=2 R1= 54321 R2= 12345 R3= 12345
*** IOP 2
356862 LOAD VCS 2 WORD= 54321 LEVEL=2 R1= 54321 R2= 12345 R3= 12345
356863 * * * * * VCS 2 OUTPUT RESULT= 12345 * * * * *
356863 VCS 2 S-MTRX=0000

*** IOP 3
356863 LOAD VCS 2 WORD= 54221 LEVEL=1 R1= 54221 R2= 54321 R3= 12345
*** IOP 1
357031 LOAD VCS 2 WORD= 31942 LEVEL=2 R1= 31942 R2= 54321 R3= 12345
*** IOP 2
357032 LOAD VCS 2 WORD= 31942 LEVEL=2 R1= 31942 R2= 54321 R3= 12345
357033 * * * * * VCS 2 OUTPUT RESULT= 54321 * * * * *
357033 VCS 2 S-MTRX=0010

*** IOP 3
357033 LOAD VCS 2 WORD= 31942 LEVEL=1 R1= 31942 R2= 54321 R3= 12345
*** IOP 2
357203 * * * * * VCS 2 OUTPUT RESULT= 31942 * * * * *
357203 VCS 2 S-MTRX=0010

*** IOP 3
357203 LOAD VCS 2 WORD= 55555 LEVEL=1 R1= 55555 R2= 54321 R3= 12345
*** IOP 1
357371 LOAD VCS 2 WORD= 33333 LEVEL=1 R1= 33333 R2= 54321 R3= 12345
*** IOP 2
357372 LOAD VCS 2 WORD= 33333 LEVEL=1 R1= 33333 R2= 54321 R3= 12345
357373 * * * * * VCS 2 OUTPUT RESULT= 33333 * * * * *
357373 VCS 2 S-MTRX=0010

```

```

*** IOP 1
358521      LOAD VCS 1 R-MTRX(1)=1110
*** IOP 2
358522      LOAD VCS 1 R-MTRX(2)=1110
*** IOP 3
358523      LOAD VCS 1 R-MTRX(3)=1110
*** IOP 1
358861      LOAD VCS 1 WORD= 136540 LEVEL=1 R1= 136540 R2= 54321 R3= 12345
*** IOP 2
358862      LOAD VCS 1 WORD= 136540 LEVEL=1 R1= 136540 R2= 54321 R3= 12345
*** IOP 3
358863      LOAD VCS 1 WORD= 136540 LEVEL=1 R1= 136540 R2= 1 R3= 12345
*** IOP 1
359061      LOAD VCS 1 WORD= 3822 LEVEL=2 R1= 3822 R2= 136540 R3= 12345
*** IOP 2
359062      LOAD VCS 1 WORD= 3822 LEVEL=2 R1= 3822 R2= 136540 R3= 12345
359063      * * * * * VCS 1 OUTPUT RESULT= 136540 * * * * *
VCS 1 S-MTRX=0000
*** IOP 3
359063      LOAD VCS 1 WORD= 3822 LEVEL=1 R1= 3822 R2= 1 R3= 12345
*** IOP 1
359231      LOAD VCS 1 WORD= 1 LFVEL=2 R1= 1 R2= 3822 R3= 12345
*** IOP 2
359232      LOAD VCS 1 WORD= 1 LFVEL=2 R1= 1 R2= 3822 R3= 12345
359233      * * * * * VCS 1 OUTPUT RESULT= 3822 * * * * *
VCS 1 S-MTRX=0000
*** IOP 3
359233      LOAD VCS 1 WORD= 1 LEVEL=1 R1= 1 R2= 1 R3= 12345
*** IOP 1
359401      LOAD VCS 1 WORD= 2 LEVEL=2 R1= 2 R2= 1 R3= 12345
*** IOP 2
359402      LOAD VCS 1 WORD= 2 LEVEL=2 R1= 2 R2= 1 R3= 12345
359403      * * * * * VCS 1 OUTPUT RESULT= 1 * * * * *
VCS 1 S-MTRX=0000

```

```

*** IOP 3
359403      LOAD VCS 1 WORD=      2 LEVEL=1 R1=      2 R2=      1 R3=      12345
*** IOP 1
359571      LOAD VCS 1 WORD=      3 LEVEL=2 R1=      3 R2=      2 R3=      12345
*** IOP 2
359572      LOAD VCS 1 WORD=      3 LEVEL=2 R1=      3 R2=      2 R3=      12345
359573      * * * * * VCS 1 OUTPUT RESULT=      2 * * * * *
VCS 1 S-MTRX=0000
*** IOP 3
359573      LOAD VCS 1 WORD=      3 LEVEL=1 R1=      3 R2=      1 R3=      12345
*** IOP 1
359741      LOAD VCS 1 WORD=      123 LEVEL=2 R1=      123 R2=      3 R3=      12345
*** IOP 2
359742      LOAD VCS 1 WORD=      123 LEVEL=2 R1=      123 R2=      3 R3=      12345
359743      * * * * * VCS 1 OUTPUT RESULT=      3 * * * * *
VCS 1 S-MTRX=0000
*** IOP 3
359743      LOAD VCS 1 WORD=      123 LEVEL=1 R1=      123 R2=      1 R3=      12345
*** IOP 1
359911      LOAD VCS 1 WORD=      2 LEVEL=2 R1=      2 R2=      123 R3=      12345
*** IOP 2
359912      LOAD VCS 1 WORD=      2 LEVEL=2 R1=      2 R2=      123 R3=      12345
359913      * * * * * VCS 1 OUTPUT RESULT=      123 * * * * *
VCS 1 S-MTRX=0000
*** IOP 3
359913      LOAD VCS 1 WORD=      2 LEVEL=1 R1=      2 R2=      1 R3=      12345
*** IOP 1
360081      LOAD VCS 1 WORD=      1 LEVEL=2 R1=      1 R2=      2 R3=      12345
*** IOP 2
360082      LOAD VCS 1 WORD=      1 LEVEL=2 R1=      1 R2=      2 R3=      12345
360083      * * * * * VCS 1 OUTPUT RESULT=      2 * * * * *
VCS 1 S-MTRX=0000
*** IOP 3
360083      LOAD VCS 1 WORD=      1 LEVEL=1 R1=      1 R2=      1 R3=      12345
360083      * * * * *

```

RGC COMPUTER SYSTEM SIMULATION --- RUN 3-A

```

**** IOP 2
360253
360253
**** IOP 3
360253
**** IOP 1
360421
**** IOP 2
360422
360423
360423
**** IOP 1
361291
**** IOP 2
361292
**** IOP 3
361293
**** CPU 3
363010
363455
363870
363870
363870
363870
**** CPU 2
363835
363835
363835
363835
**** CPU 1
363850
363850

```

* * * * * VCS 1 OUTPUT RESULT= 1 * * * * *
 VCS 1 S-MTRX=0000
 LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 1 R3= 12345
 LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 2 R3= 12345
 LOAD VCS 1 WORD= 33333 LEVEL=1 R1= 33333 R2= 2 R3= 12345
 * * * * * VCS 1 OUTPUT RESULT= 33333 * * * * *
 VCS 1 S-MTRX=0000

OUTPUT MSG TYPE 1 TO COMPUTER(S) 1234 3 123 2 1
 DATA= 3822 1 2

OUTPUT MSG TYPE 1 TO COMPUTER(S) 1234 3 123 2 1
 DATA= 3822 1 2

OUTPUT MSG TYPE 1 TO COMPUTER(S) 1234 3 123 2 1
 DATA= 3822 1 2

VCS 1 P-MTRX=1110 R-MTRX=1110
 VCS 2 P-MTRX=1110 R-MTRX=1110

** RATE 1 SAMPLE TASK **
 L8C 87= 34081 L8C 88= 34098 L8C 125= 16
 L8C 123= 12 L8C 124= 9
 L8C 100= 6628 L8C 101= 8888

** RATE 1 SAMPLE TASK **
 L8C 87= 34081 L8C 88= 34098 L8C 125= 16
 L8C 123= 12 L8C 124= 9
 L8C 100= 6628 L8C 101= 8888

** RATE 1 SAMPLE TASK **
 L8C 87= 34081 L8C 88= 34098
 L8C 123= 12 L8C 124= 9