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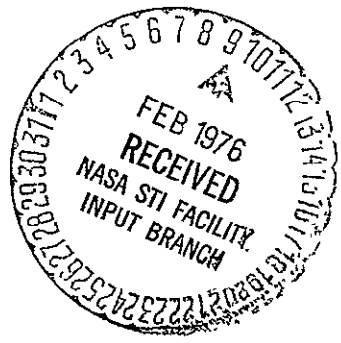
FINAL REPORT

GENERAL PURPOSE SIMULATION SYSTEM OF THE DATA MANAGEMENT SYSTEM FOR SPACE SHUTTLE MISSION 18

CONTRACT NAS8-31458

JANUARY 16, 1976



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FINAL REPORT OF THE SPACE SHUTTLE DATA MANAGEMENT SYSTEM GPSS PROGRAM

January 16, 1976

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FOREWORD

This document presents results of work performed by D P Associates, Inc., Huntsville, Alabama, under Contract No. NAS8-31458 (SB420-8(a)75C-122) for the George C. Marshall Space Flight Center, Data Systems Laboratory. Technical coordination was through Mr. Frank Crumbley, Mr. Douglas Thomas and Mr. James Mabry.

ABSTRACT

This report presents a simulation program for the flow of data through the Data Management System for Spacelab and Shuttle. Included are the science, engineering, command and guidance, navigation and control data. The programming language used was General Purpose Simulation System V (OS). The science and engineering data flow was modeled from its origin at the experiments and subsystems to transmission from Space Shuttle. Command data flow was modeled from the point of reception onboard and from the CDMS Control Panel to the experiments and subsystems. The GN&C data flow model handled data between the General Purpose Computer and the experiments and subsystems. Mission 18 was the particular flight chosen for simulation. First, the general structure of the program is presented, followed by a user's manual. Inputs required to make runs are discussed followed by identification of the output statistics. The appendices contain a detailed model configuration, program listing and results.

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SECTION I

INTRODUCTION

One of the many facets of the developmental phase of Space Shuttle involves design of the Shuttle/Spacelab Data Management System. This design effort must necessarily include two separate but interdependent foci. Of initial interest is the design of the total data management system and the capability of the specified system to service data management functions over a broad spectrum of mission profiles. As the system design emerges, the emphasis turns to the problem of individual component or hardware design. The Space Shuttle Data System Simulator (SSDSS) described in this report has been designed to provide analytical capability both from the system design and hardware design standpoint.

The task facing the data management system designer is a considerable one. There is, for example, the problem of the tremendous volume of data that must be managed during a typical mission. This problem of volume is complicated by the diverse types of data that must be managed -- scientific measurements and recordings, control, command and various other kinds of data. Furthermore there are complex interrelationships among the several types of data that must be considered. This complex volume of data must be input to an intricate system of data processing equipment and the whole affair linked to ground stations through available communication networks. Thus, the designer must be aided in the design effort by methodologies sufficiently suited to this difficult analytical task.

The SSDSS was developed to provide the data system designer with analytical capability for assessing the ability of a specified system configuration to efficiently manage the data generated by a given mission profile. Several simulator characteristics were considered essential in developing SSDSS. Since many shuttle missions are anticipated, it was determined that the simulator should not be mission specific, that is, that it be capable of handling a variety of mission profiles. It was also decided that the simulator should provide the system designer with a ready tool for conducting trade studies -- for analyzing the impact of altering selected design variables. Finally, it was felt that the simulator should be as user oriented as possible -- that individuals might use the program without having an intimate understanding of the programming language or the program itself.

SECTION II

SPACE SHUTTLE MISSION 18

The SSDSS was initially developed using the data profile of Shuttle Mission 18 [1] as input. Mission 18 is a multi-discipline, 168 hour Spacelab mission tentatively scheduled for November 1, 1980. The broad objective of this mission is to provide an environment for development and evaluation of instrumentation, equipment, and techniques which will subsequently be incorporated in operational systems of the Spacelab.

2.1 MISSION PAYLOAD

The operational phase of Mission 18 will include performance of one Earth observation experiment, nine Earth and Ocean Physics experiments, and deployment of two Mini-Laser Ranging Satellites (Mini-LAGEOS). These experiments together with Shuttle flight maneuvers create the bulk of data that must be accomodated by the Shuttle data management system.

2.2 DATA MANAGEMENT SYSTEM

Figure 1 is a schematic diagram of the data management system of the Spacelab and Shuttle. Experiments are depicted by Block 1. Block 2 represents experiment remote acquisition units (RAU's) which interface the experiments with the data system. There is a similar configuration between Spacelab subsystems, Block 13, and the data system with Block 14 depicting the subsystem RAU's. The system includes three computers and associated input/output devices: Blocks 3 and 4 represent the experiment computer system; Blocks 15 and 16 represent

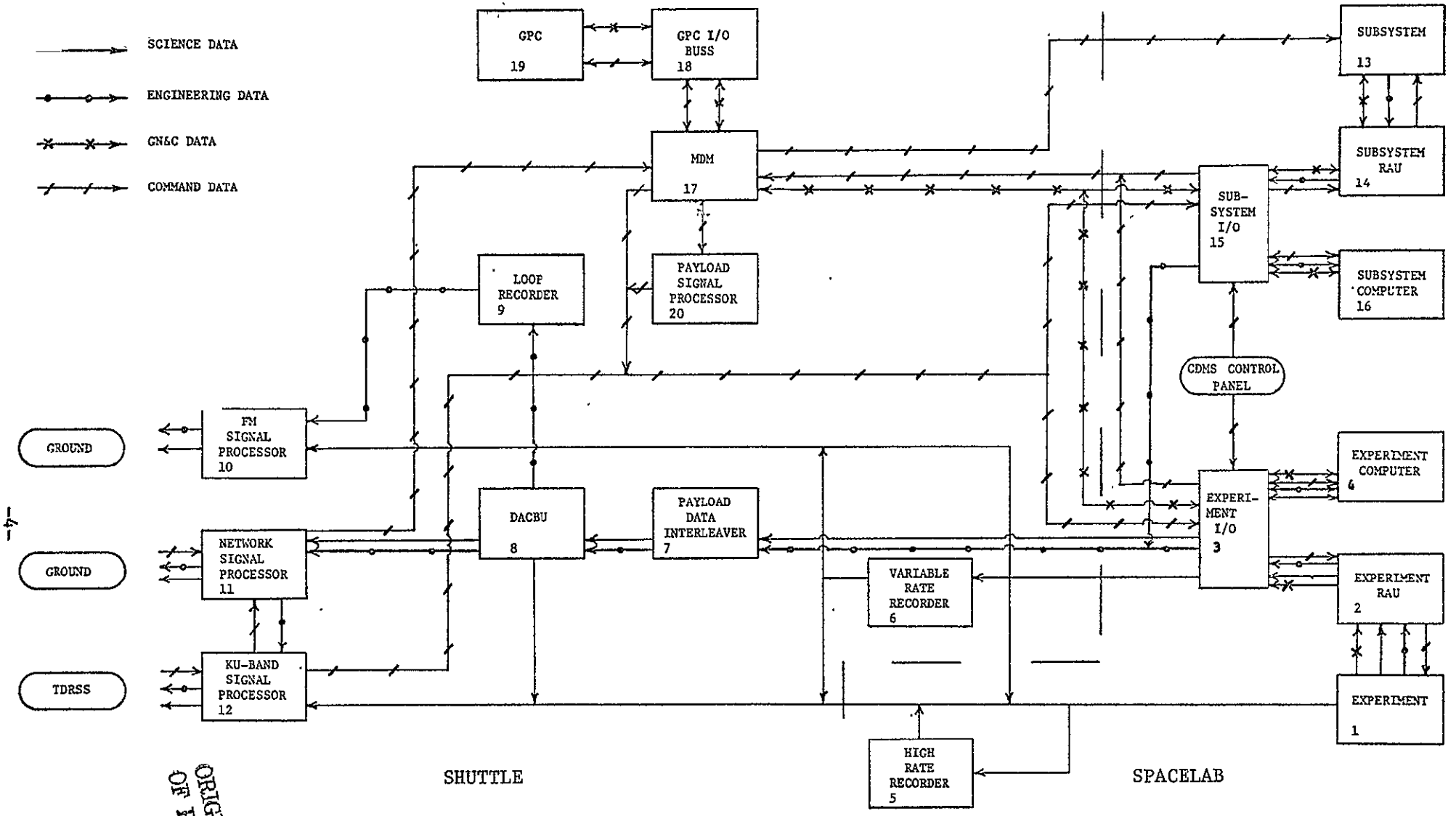

Figure 1. Schematic Diagram of Space Shuttle Data Management System

the subsystem computer system; and Blocks 18 and 19 depict the general purpose computer (GPC). The system includes three recording devices: high rate recorder, Block 5; variable rate recorder, Block 6; and a loop maintenance recorder, Block 9. Also included are three signal processors; the F.M. signal processor, Block 10; the network signal processor, Block 11; and the K.U. band signal processor, Block 12. As the diagram indicates, the F.M. and network signal processors are linked through ground tracking stations while the K.U. band signal processor is linked through the Tracking and Data Relay Satellite System (TDRSS). Finally, the system includes certain miscellaneous items of equipment: the payload data interleaver, Block 7; the data acquisition control and buffer unit (DACBU), Block 8; the multiplexer/demultiplexer (MDM), Block 17; and the payload signal processor, Block 20 [2,3].

Four different types of data are processed by the system: science, engineering, command and guidance, navigation and control. Science data generated by the experiments is input to the system at Block 1 and is processed thru some prescribed combination of equipment prior to transmission. Engineering data, from monitoring of experiments and subsystems, enters the system at either Block 1 or Block 12 and is processed through the appropriate computer system, Blocks 3 and 4 or Blocks 15 and 16; the payload data interleaver, Block 7; and the DACBU, Block 8, prior to transmission. Command data is transmitted to the Shuttle either through groundlinks or TDRSS and is received by the appropriate signal processor, Blocks 11 or 12. Command data originating onboard enters the system through the CDMS control panel. Guidance, Navigation and Control data (GN&C) enters the system either at the experiments or the GPC and generally procedes through one or more of the three computer systems.

SECTION III

THE DATA MANAGEMENT SYSTEM SIMULATOR

3.1 GENERAL INFORMATION

The SSDSS was developed in IBM's General Purpose Simulation System V (GPSS), a special purpose simulation language. The major advantage of using a special purpose language for a project of this nature rather than a general purpose language such as FORTRAN is programming efficiency. Also, GPSS is quite widely used, thus anyone who is at all familiar with simulation would probably have at least limited exposure to GPSS.

Some general characteristics about the program are reflected in Figure 2. The core requirement and CPU time required for simulating the entire 168 hour Mission 18 data profile was 228 K bytes and 41 minutes respectively on an IBM 360-65.

The SSDSS simulation uses a unit of time of one hundredth of an hour or 36 seconds. This time period was chosen to give the greatest possible resolution of data flow details, yet still be able to complete an entire mission simulation in a reasonable period of computer run time.

3.2 SIMULATOR DESIGN

Because of the complexity of the data management system, the GPSS software program has been structured into a modular format consisting of 9 divisions, called modules. Certain modules are logically subdivided into parts, i.e. Part 1, Part 2.... Figure 3 shows the nine programs modules presently included in the simulator. Figure 1 contains 20 blocks. Each

- PROGRAM DECK
  - INPUT TAPE FOR EXPERIMENT SCHEDULES
  - GPSS INSTRUCTIONS
    - DEFINITIONS, INITIALIZATION: 700
    - GPSS STATEMENTS: 1600
    - REPORT MODULE: 200
  - INPUT DECK: 2000 CARDS

- COMPUTATIONAL TIME
  - CORE REQUIREMENT: 228K
  - CPU TIME: 41 MINUTES
  - EXECUTION TIME: 45 MINUTES

- OUTPUT LISTING
  - PAGES: 150
    - PROGRAM LISTING: 110 PAGES
    - SIMULATION OUTPUT: 40 PAGES
  - LINES: 8300

Figure 2. Program Characteristics

MODULES	DESCRIPTION
1	EXPERIMENT DATA INPUT (EXPERIMENT SCIENCE DATA AND SUBSYSTEM ENGINEERING DATA).
2	EXPERIMENT SCIENCE DATA PART 1. EXPERIMENT TO I/O PART 2. I/O TO COMPUTER. COMPUTER TO I/O TO PAYLOAD DATA INTERLEAVER TO TRANSMIT. PART 3. I/O TO KU-BAND OR V. R. REC. PART 4. EXPERIMENT TO KU-BAND OR H. R. REC.
3	EXPERIMENT ENGINEERING DATA PART 1. EXPERIMENT TO I/O PART 2. I/O TO COMPUTER. COMPUTER TO I/O TO PAYLOAD DATA INTERLEAVER. PART 3. PAYLOAD DATA INTERLEAVER TO TRANSMIT.
4	SUBSYSTEM ENGINEERING DATA PART 1. SUBSYSTEM TO I/O PART 2. I/O TO COMPUTER. COMPUTER TO I/O TO PAYLOAD DATA INTERLEAVER. PART 3. PAYLOAD DATA INTERLEAVER TO TRANSMIT.
5	DOWNLINK SCHEDULE
6	GROUNDLINK SCHEDULE
7	COMMAND DATA PART 1. GROUND COMMAND THRU NETWORK SIGNAL PROCESSOR. PART 2. GROUND COMMAND THRU KU-BAND. PART 3. CDMS CONTROL PANEL.
8	GUIDANCE, NAVIGATION AND CONTROL DATA PART 1. GPC TO EXPERIMENT COMPUTER AND SUBSYSTEM. PART 2. EXPERIMENT/SUBSYSTEM TO GPC.
9	OUTPUT REPORT GENERATOR

Figure 3. Program Modules

block represents data management hardware modelled by this program. Each module simulates a specific type of data; science, engineering, etc., flowing between blocks. The relationships between modules, blocks and data flow are defined as follows:

- Module 1 utilizes the experiment schedule for the mission to input experiment science data at Block 1 and subsystem engineering data at Block 13.
- Module 2 includes processing of all science data; it is subdivided into four parts.
  - Part 1 treats data from experiments to I/O, Blocks 1-3.
  - Part 2 includes data flow from I/O to Computer, Block 4; back through I/O to payload data interleaver, Block 7; to transmission via network signal processor, Block 11.
  - Part 3 replicates data flow from the I/O to the K.U. band signal processor, Block 12, or the variable rate recorder, Block 6.
  - Part 4 handles data flow direct from experiments, Block 1, to the K.U. band processor, Block 12, or the high rate recorder, Block 6.
- Module 3 treats experiment engineering data; it is subdivided into 3 parts.
  - Part 1 includes data from experiments to I/O, Blocks 1-3.
  - Part 2 replicates data flow from the I/O thru the computer, Block 4, to the payload data interleaver, Block 7.
  - Part 3 handles data movement from the payload data interleaver thru the DACBU, Block 8, to transmission thru either the F.M. or network signal processor, Blocks 10 or 11.
- Module 4 replicates subsystem engineering data; it is subdivided into three parts which parallel those in Module 3.
  - Part 1 includes data from subsystems to I/O, Blocks 13-15.
  - Part 2 replicates data flow from the I/O thru the subsystem computer, Block 16, to the payload data interleaver, Block 7.
  - Part 3 handles data movement from the payload data interleaver thru the DACBU, Block 8, to transmission thru either the F.M. or network signal processor, Blocks 10 or 11.

- Module 5 reproduces the TDRSS schedule. It was found that this schedule was approximately cyclic over a twenty-four hour cycle, thus Module 5 simply replicates a one day cycle continuously over the duration of the mission.

- Module 6 simulates the ground tracking station signal schedule. Since the ground station network actually consists of several individual stations, the simulator must develop a composite schedule from individual station schedules input.

- Module 7 treats the different command data flows found in the system; it is subdivided into three parts.

  - Part 1 accommodates flows received thru the network signal processor, Block 11.

  - Part 2 includes flows received thru the K.U. band signal processor, Block 12.

  - Part 3 handles flows received thru the CDMS control panel on-board.

- Module 8 replicates GN&C data flows; it is divided into two parts.

  - Part 1 accommodates data flows from the GPC, Block 19, to the experiment computer, Block 4, or subsystem, Block 13.

  - Part 2 reproduces data flows from the experiment, Block 1, or subsystem, Block 13, to the GPC, Block 19.

- Module 9 is the output report generator which is used to create the equipment utilization profiles shown in Figures 7-20.

3.3 TRADE STUDY CAPABILITY

A summary of the kinds of changes that might be analyzed in trade studies is given in Figure 4. While the list is not intended to be exhaustive, it does illustrate the kinds of changes which could be assessed with a minimum of alteration to the SSDSS.

Under the category of mission configuration, would be changes in the experiment profile either in the actual experiment schedule or the number of

- MISSION CONFIGURATION
  - DURATION OF MISSION
  - EXPERIMENT CONFIGURATION
    - SCHEDULES
    - NUMBER OF EXPERIMENTS
  - GN&C ACTIVITY
  - COMMAND ACTIVITY

- EQUIPMENT CONFIGURATION
  - CAPACITIES
  - AVAILABILITY
  - RELIABILITY
  - CHARACTERISTICS
    - RECORDER PROCESSING MODES
      - FIXED RATE
      - VARIABLE RATE
    - TRANSMITTERS
      - ONE WAY
      - TWO WAY

- DATA FLOW
  - ROUTING
  - FLOW RATES
  - PRIORITIES

- COMMUNICATION LINKS
  - ALTERNATIVE SYSTEMS
  - AVAILABILITY
  - SCHEDULES
  - RELIABILITY
  - INTERFERENCE

Figure 4. Trade Study Capability

experiments. Also included in this category would be changes in the level of GN&C and/or command data flow rate.

Trade studies in the area of equipment configuration might include changing the capacity of different equipment items or changing the availability of a particular item, where availability is defined as percent of the total mission duration that the equipment is available. Further, reliability studies might be incorporated by specifying a failure probability for a particular item. The SSDSS also has the capability of treating any one of the three recorders as fixed or variable rate recorders and any of the three transmitters as one or two-way processors.

Under the category of data flow alterations, trade studies might be conducted to assess the impact of different routing sequences, different flow rates for the different types of data, or different priorities for the data types.

The priorities used in the basic study are shown in Figure 5. The assignment of these priorities to various types of data at various stages in the model insures that if there is a conflict for a particular piece of hardware the proper type of data i.e., that with the highest priority, will have preference.

Finally, changes in the communication links might be assessed. For example, the impact of incorporating alternate systems might be of importance. Changes in the availability or reliability of communication links can be analyzed as well as alterations in the schedules of available links. It is also possible to assess the impact of competition for the links from, say, another mission.

Type of Data	GPSS Priorities
• Science	0-20
• Engineering	10-20
• Command	25
• GN&C	
Input to GPC	20
Output from GPC	30

Figure 5. Priority Classification of Data Types

SECTION IV

USER'S MANUAL

4.1 INPUT

In order for a user to implement the SSDSS various mission characteristics should be specified. These characteristics include the experiment schedule and the acquisition and loss of signal schedules to both the TDRSS and the ground tracking network. Also defined should be the data flow rates generated at different points as well as routing information. Figure 6a summarizes the necessary user inputs.

4.1.1 Experiment Schedules

The schedules of experiments for a mission are created on an input tape using the GPSS SAVEVALUE MATRIX 1 (MX1). The program to accomplish this is listed in appendix E. Each initial card represents one experiment and is specified by the column number of the matrix. The rows are: 1, the start time in hundredths of hours; 2, the experiment identification and; 3, the length of time, in hundredths of hours, the experiment remains active.

The rate of flow of science data generated by each experiment is defined in the FUNCTION statement FLOW (statement numbers 502 and 503 in the program listing, appendix C). The first number in each pair is the experiment ID and the second number is the corresponding data flow rate generated by that experiment. This flow rate is in thousands of bits per time unit. Since the time unit is one hundredth of an hour, or 36 seconds, 8640 would correspond to 8640/36 or 240 K bits per second.

- EXPERIMENT SCHEDULES
  - EXPERIMENT NUMBER
  - START TIME
  - DURATION OF EXPERIMENT
  - FLOW RATE

- DOWNLINK SCHEDULE (TDRSS)
  - ACQUISITION TIMES
  - LOSS TIMES

- GROUNDLINK SCHEDULE
  - ACQUISITION TIME
  - GROUND STATION ID
  - DURATION OF ACQUISITION

- FLOW MODIFICATION AND ROUTING DATA
  - PERCENTAGE OF DATA FLOW ASSIGNED TO ALTERNATE ROUTES
  - FLOW RATES FOR COMMAND, GN&C, AND ENGINEERING DATA
  - FLOW RATE FOR SUBSYSTEM DATA

Figure 6a. User Supplied Inputs

This method of assigning data flow rates assumes a constant rate coming from each experiment throughout the mission. If the rate is not constant a fourth row should be added to the input tape matrix to correspond to the rate of data flow for a particular use of the experiment. For example, the first experiment might have a flow rate assigned in MX1 as MX1 (4,1), 8640 on the input tape. If this method for assigning flow rates is used than statement number 523 of the program should be changed from

```
BLITZ ASSIGN 3,FN$FLOW,PF
```

to

```
BLITZ ASSIGN 3,MX1(4,1),PF.
```

4.1.2 Data Link Schedules

The SSDSS uses GPSS facilities to check the availability of a link between the orbiter and the TDRSS or the ground. If facility 50 is "seized" there is a down link through the TDRSS and data may be sent. For the data sent directly to the ground facility 49 is used. SAVEVALUE MATRIX 2 (MX2) is used to specify the TDRSS schedule and SAVEVALUE MATRIX 3 (MX3) is used to specify the ground tracking station schedule.

4.1.2.1 Downlink Schedule

The schedule of acquisition and loss of signal between the Shuttle Orbiter and the TDRSS was checked and found to be nearly cyclic every 24 hours. Therefore, only one day's schedule is explicitly defined in the program. The remaining days of the mission follow the same schedule by just repeating the sequence of seizing and releasing facility 50.

The entries in MX2 are simply a sequence of the alternating acquisition and loss of signal times. The time of the first acquisition is assigned to MX2 (1,1). The amount by which this value exceeds the activation of this module, 400 (4th hour of the mission), is placed in variable 18. The first loss of signal is assigned to MX2(1,2), the second acquisition to MX2(1,3) and the second loss to MX2(1,4). After the last loss of signal of the cycle an increment should be used to bring the time to 2800. This increment is 3 in the present program (statement number 955 in appendix C). The signal schedule started at 4 hours and ended at 28 hour. Therefore, the 24 hour cycles has a 4 hour offset from the beginning of the mission.

If the schedule is not cyclic the user may continue to define acquisition and loss times for the rest of the mission by expanding the matrix. However many columns the matrix expands to, that number should replace the number 60 in the MATRIX definition card at the beginning of the INITIAL cards and in the TEST card, statement number 950.

4.1.2.2 Groundlink Schedule

The data link schedule to the ground tracking stations is not cyclic, therefore, it was necessary to include the entire schedule in the program. The actual groundlink schedule is a composite of each acquisition of each tracking station. Because there are many tracking stations around the world and because more than one station often has acquisition it was necessary to use a different form for the groundlink SAVEVALUE matrix than for the downlink matrix.

The format of the initial cards is similar to that of the input tape. The column numbers represent each acquisition. The row numbers are defined as follows: 1, is the start of acquisition; 2, is the ground station identification and; 3, is the duration of acquisition. Should this schedule be changed the new number of acquisitions must be specified in the MATRIX definition card located before the initial cards.

4.1.3 Data Rates and Routing

At the beginning of the program deck the user specifies the flow rates for data which originate at various places in the model. Also specified are various percentages which are used to control data routing. If data comes to a decision point a certain percentage, say 95 percent, might take one branch while the remaining part, 5 percent, would go to another branch.

As with previous user inputs, values are put in MATRIX (MX4) by way of initial cards. The meaning of each matrix value is given in the program listing under "User Set Variables" and in appendix B.

Examples

MX4(1,1),95. This value, 95%, is the percentage of data generated by the experiments which is routed to the KU-Band Signal Processor or the High Rate Recorder.

MX4(1,16),72. This is the data flow rate of command data coming from the onboard CDMS Control Panel. It is 72 K bits/time period = 2KBPS.

4.1.4 Block Capacities

The STORAGE DEFINITIONS (statement numbers 416 thru 431) define the maximum capacity of a block to process data in one time unit. For

example, the Experiment RAU's, STORAGE 2, have a capacity defined as 36000. This means that 36000 K bits may enter the experiment RAU's in one time period i.e., 1 million bits per second. The storage numbers are the same as the block numbers in Figure 1. In order to change these capacities the user would multiply the block's new maximum allowable rate (in K bits/sec) by the number of seconds per time period, in this case 36, and enter this number on the storage definition card.

4.2 OUTPUT

There are two types of output from a GPSS program. One type is the standard GPSS output statistics. The other output is programmer defined, in this case graphs. Figure 6b summarizes the output statistics.

4.2.1 Route Flow Statistics

The first section of output is the "block counts." For each block number there is a corresponding program statement. The "total" column gives the number of times data has entered a particular block. This section of output is useful in programming and debugging because it indicates which statements were used and which were not, as well as showing any unusually large or small quantities. The block counts, however, do not explicitly tell how much data went into a block; therefore their use for analysis is rather limited.

4.2.2 Equipment Utilization Statistics

Information on usage for the items of equipment is given on the page marked "storages." In the "storage" column are the acronyms for the items used in the simulation of mission 18. The hardware item number, block

- ROUTE FLOW STATISTICS

- EQUIPMENT UTILIZATION STATISTICS
  - UTILIZATION
  - MAXIMUM DATA FLOW PROCESSED IN A TIME UNIT
  - AVERAGE DELAY IN RECORDERS, COMPUTERS
  - TOTAL DATA PROCESSED, K BITS

- GROUNDLINK AVAILABILITY

- DOWNLINK AVAILABILITY

- DATA LOST STATISTICS
  - LOSS LOCATIONS
  - LOSS QUANTITIES

- EQUIPMENT UTILIZATION PROFILES
  - FLOW RATES
    vs
  - TIME

Figure 6b. · Program Output

numbers, to which they refer are indicated in the equate statement (statements 395 thru 412). Items of equipment which were not used are left off the storage statistics page.

The actual utilization of an item of hardware is not given, but may be computed as follows:

$$U = \frac{\text{Entries X Avg Time/Unit}}{\text{Capacity X Length of Simulation}}$$

for example, the utilization for the experiment computer, block 4, is:

$$U_{CPUEX} = \frac{9648 \text{ X } 495.159}{288 \text{ X } 16{,}800}$$

$$= 99\%$$

The maximum amount of data an item ever had to handle is given in the "maximum contents" column. Again, these quantities are in thousands of bits. The total amount of data which passed through a block is shown under "entries." The experiment RAU's processed a total of 9,381,450 K bits.

The GPSS definitions of all column headings may be found in appendix F and in the GPSS-V User's Manual beginning on page 290.

4.2.3 Signal Availability

As described in paragraph 4.1.2 facilities 49 and 50 indicate the availability of signal links between the orbiter and the ground and TDRSS respectively. The "Facilities" page shows what portion of the total time of the mission each data link was available. Under "Average Utilization During Total Time" downlink (facility 49) was available 17.8% of the time and ground-link (facility 50) was available 84.2% of the time.

4.2.4 Data Loss Statistics

Some of the "Fullword Savevalues" show how much data was terminated or lost at each block in the model. SAVEVALUE numbers 1 thru 20 correspond to the model item numbers. At block 4, the experiment computer, 861,945 K bits were lost. This lost was because although data was going into the computer no data is called to leave the computer, therefore after the computer is filled any additional data added causes a like amount of data to be lost. SAVEVALUE's between 20 and 100 are used for programming purposes only and can usually be ignored. SAVEVALUE numbers from 100 up are used for saving graphical values and can be disregarded.

4.2.5 Equipment Utilization Profiles

The non-standard portion of the output is a series of graphs, one for each item of hardware used. These graphs show contents of the item versus time. Because of the limits of the GPSS report generator only a limited number of time periods can be represented on a page of output. These graphs give a "snapshot" value at each time period, that is, the contents of the block is the instantaneous value at the time given below the line. For example, it may be seen from Figure 7 that the contents of the experiment RAU's is about 900 K at the end of the 12th hour.

SECTION V

CONCLUSIONS AND RECOMMENDATIONS

The SSDSS has been thoroughly tested using Shuttle Mission 18 data profile as input. The model appears to replicate quite accurately the interactions which will occur in the data management system of the actual mission. From limited trade study analysis it is apparent that this model can provide valuable information for Space Shuttle Data Management System designers.

It is recommended that developmental work on the SSDSS be continued on three major fronts. First, that the program be examined thoroughly for user oriented improvements which could be incorporated without changing the basic program. Second, that efforts be made to achieve additional program efficiency resulting in either improved core or run time requirements. Third, that further effort be expended in developing improved output with the ultimate objective of obtaining an instantaneous utilization profile of each item of equipment for the duration of the mission.

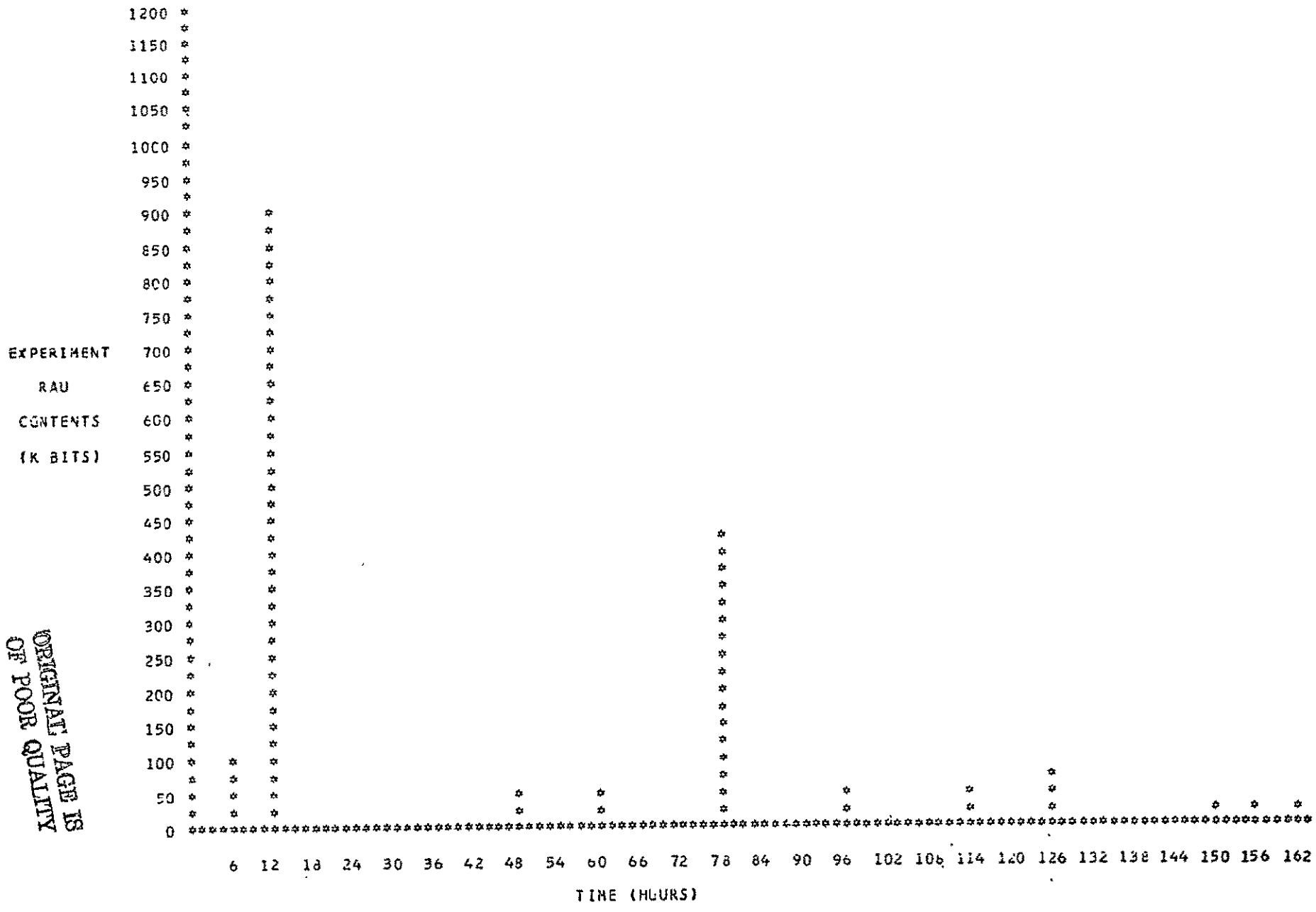

FIGURE 7: CONTENTS OF EXPERIMENT RAU AS A FUNCTION OF TIME.

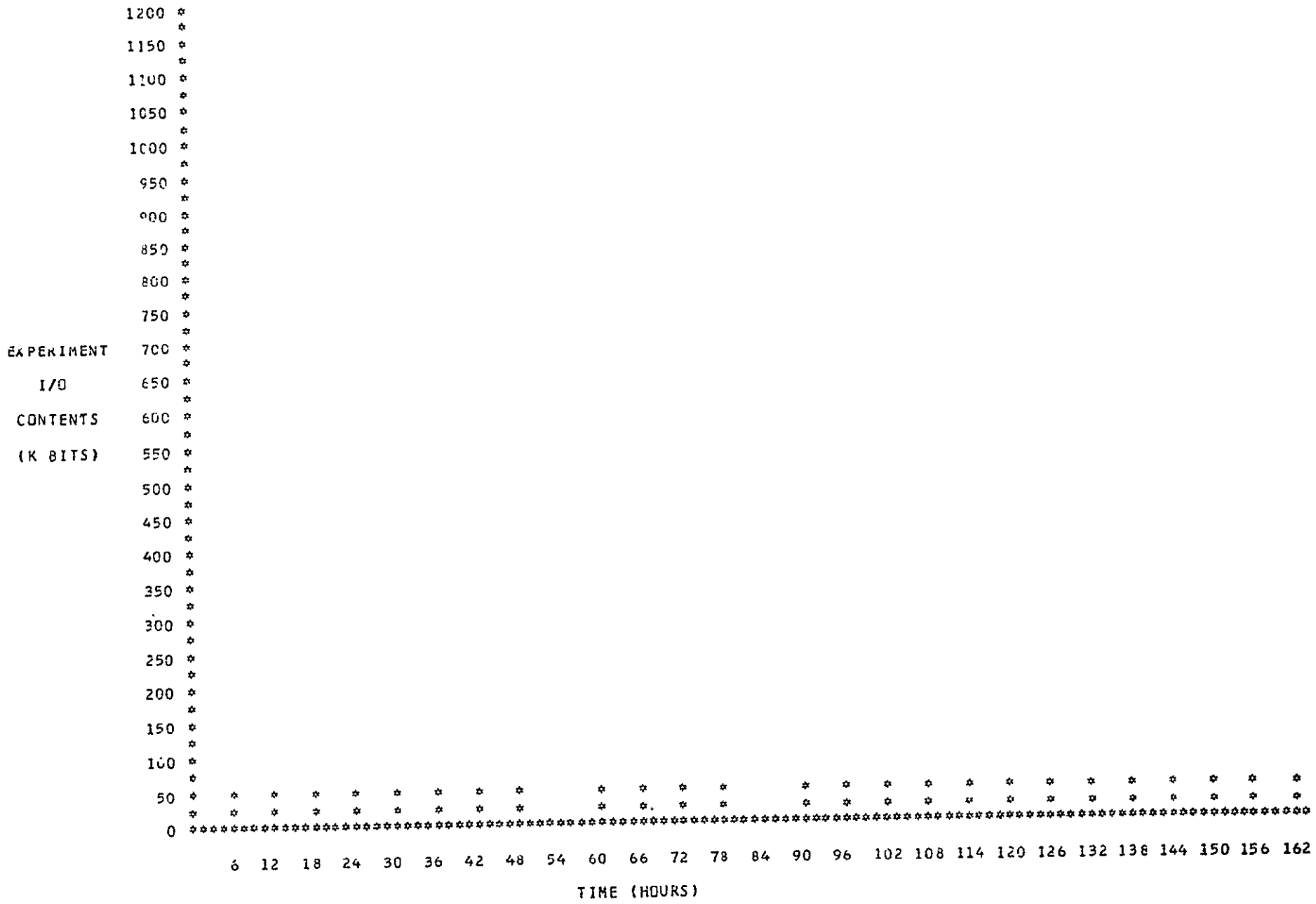

FIGURE 8: CONTENTS OF EXPERIMENT I/O AS A FUNCTION OF TIME.

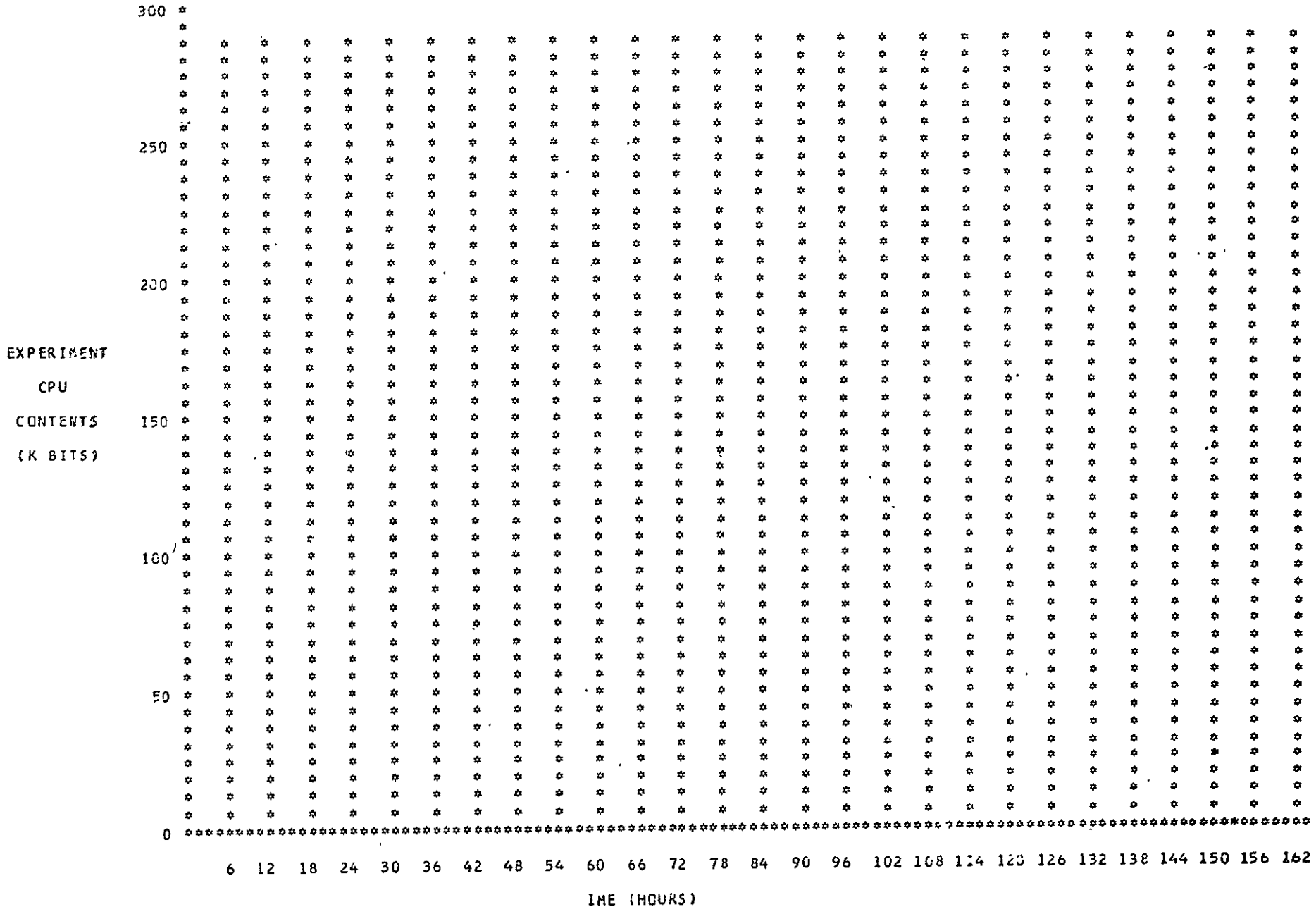

FIGURE 9: CONTENTS OF EXPERIMENT CPU AS A FUNCTION OF TIME.

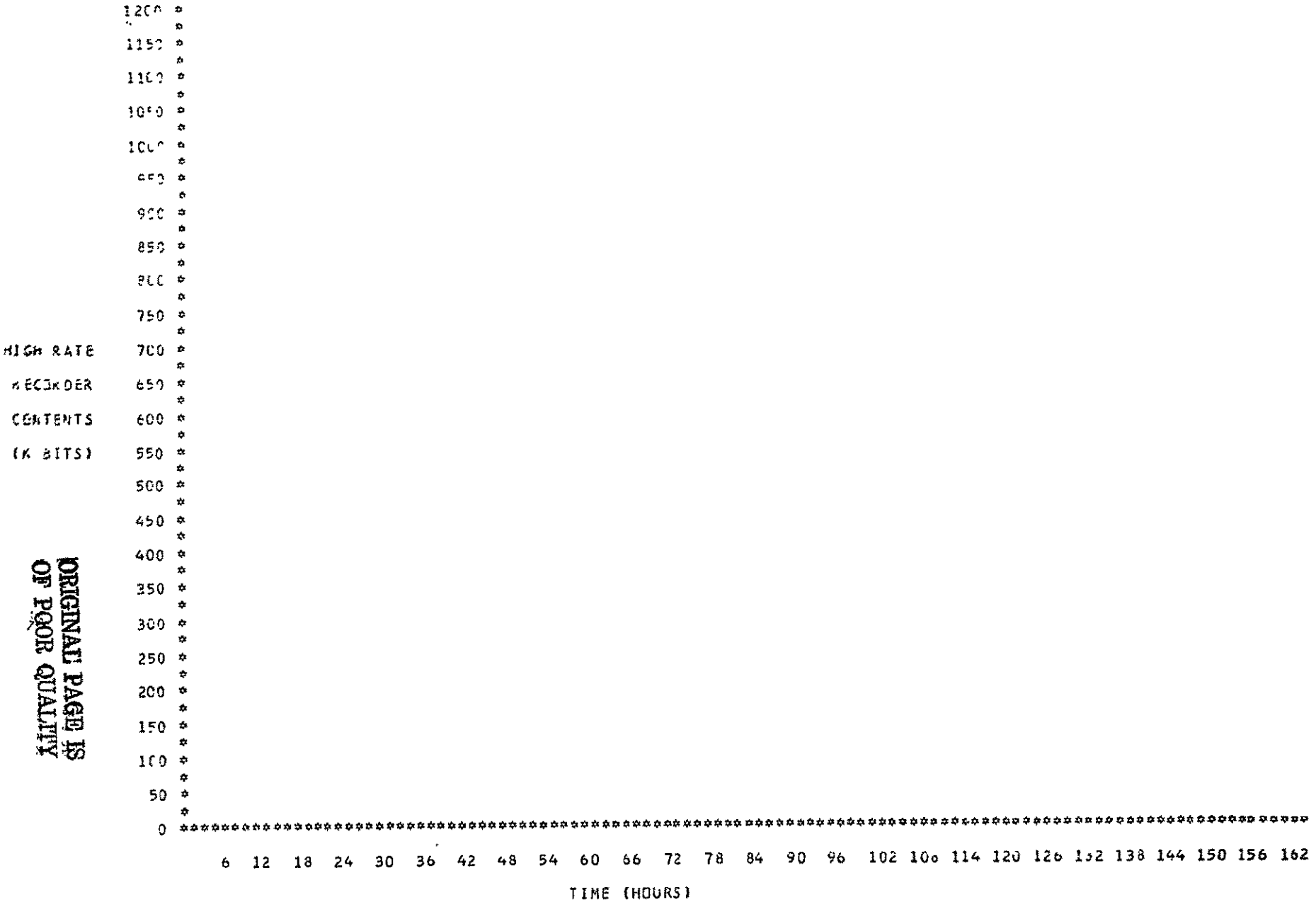

FIGURE 10: CONTENTS OF HIGH RATE RECORDER AS A FUNCTION OF TIME.

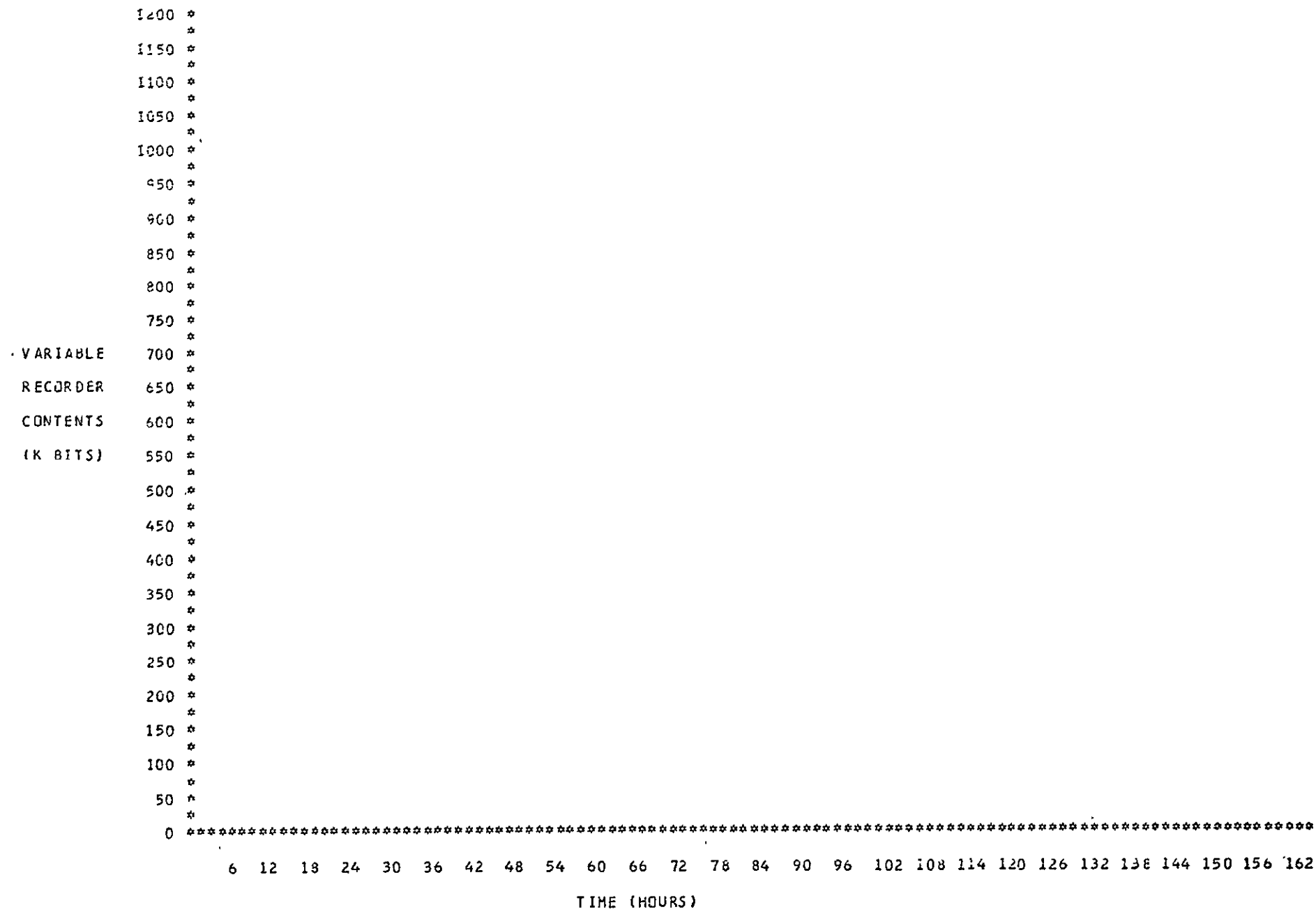

FIGURE 11: CONTENTS OF VARIABLE RATE RECORDER AS A FUNCTION OF TIME.

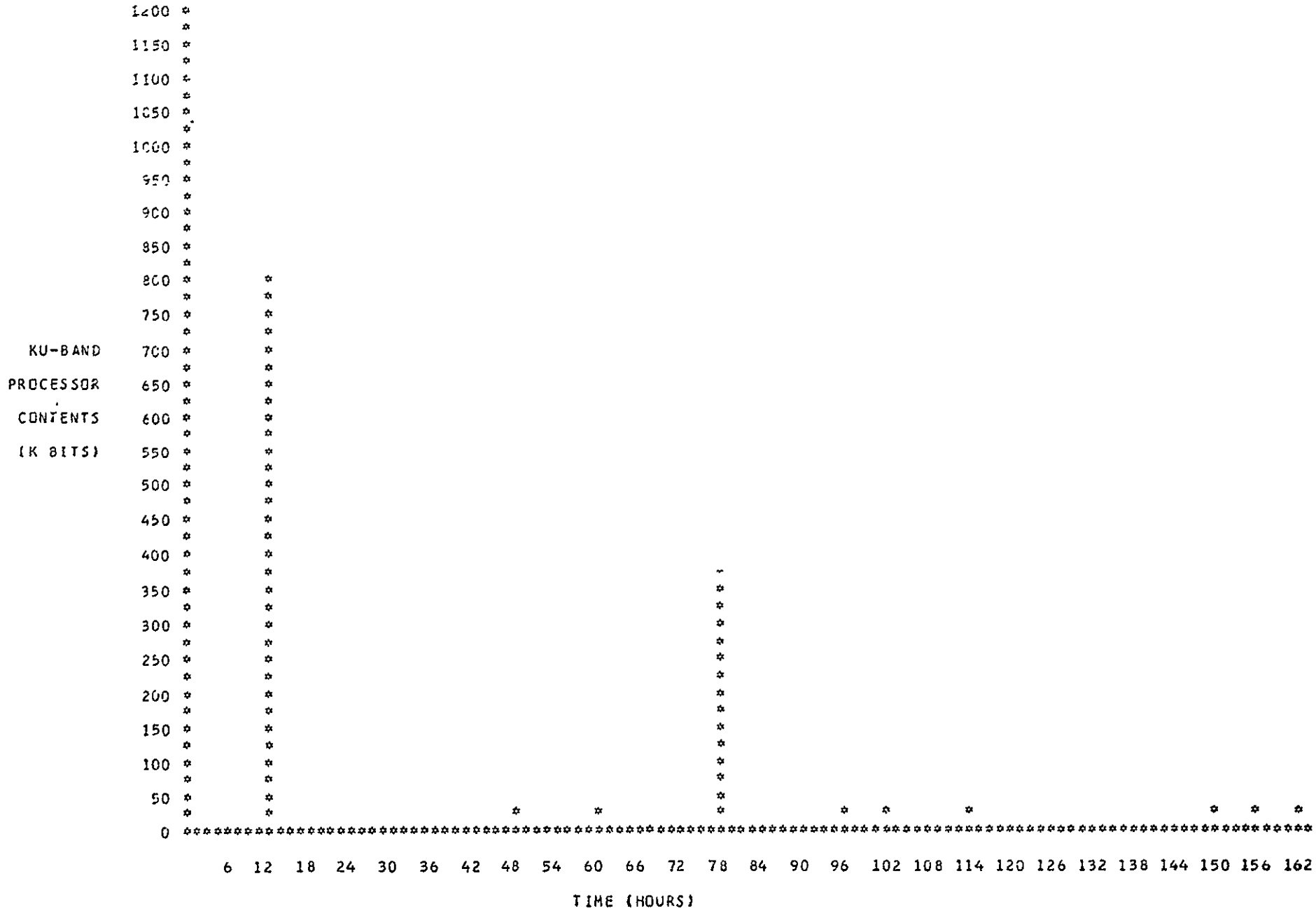

FIGURE 12: CONTENTS OF KU-BAND PROCESSOR AS A FUNCTION OF TIME.

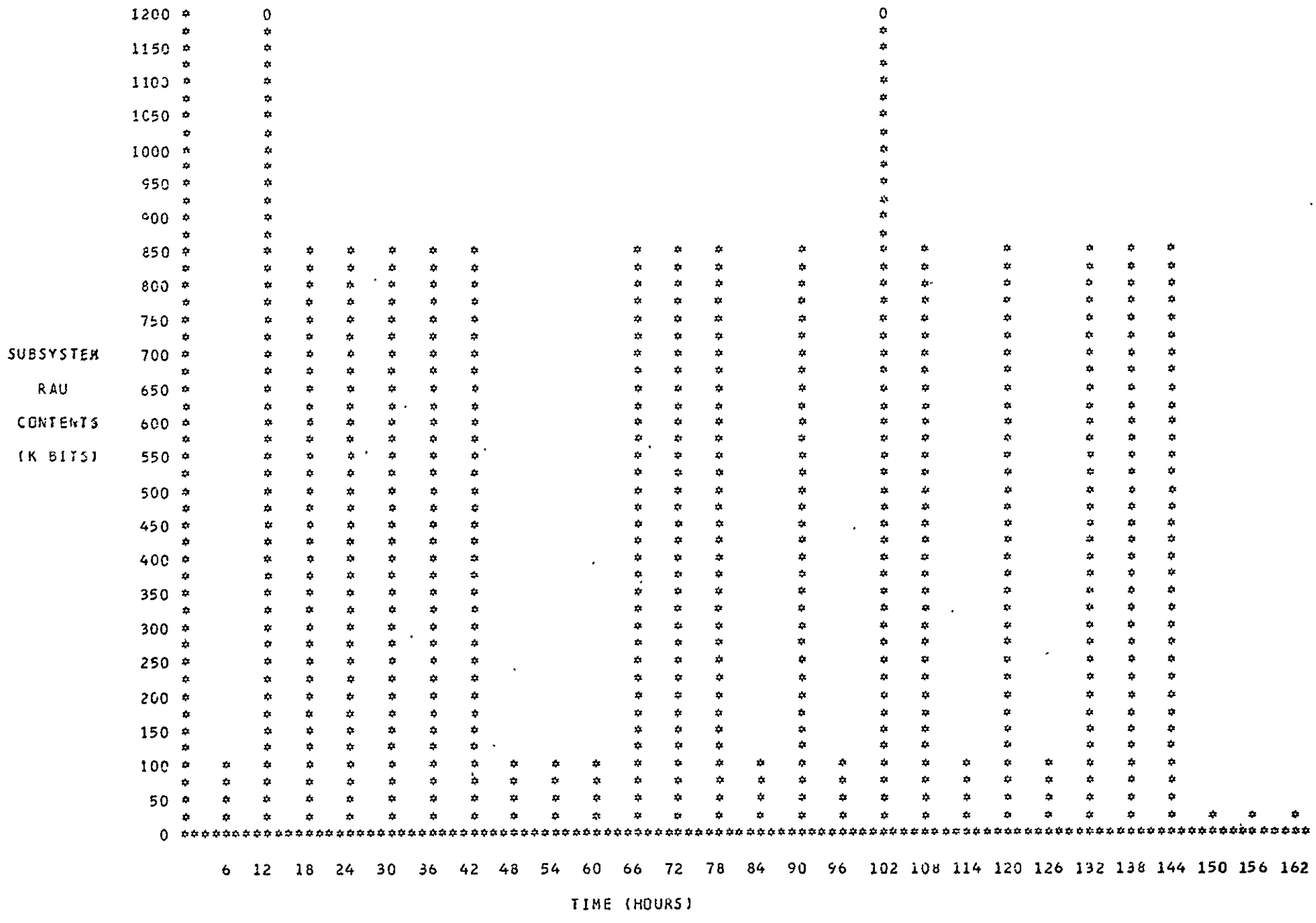

FIGURE 13:CONTENTS OF SUBSYSTEM RAU AS A FUNCTION OF TIME.

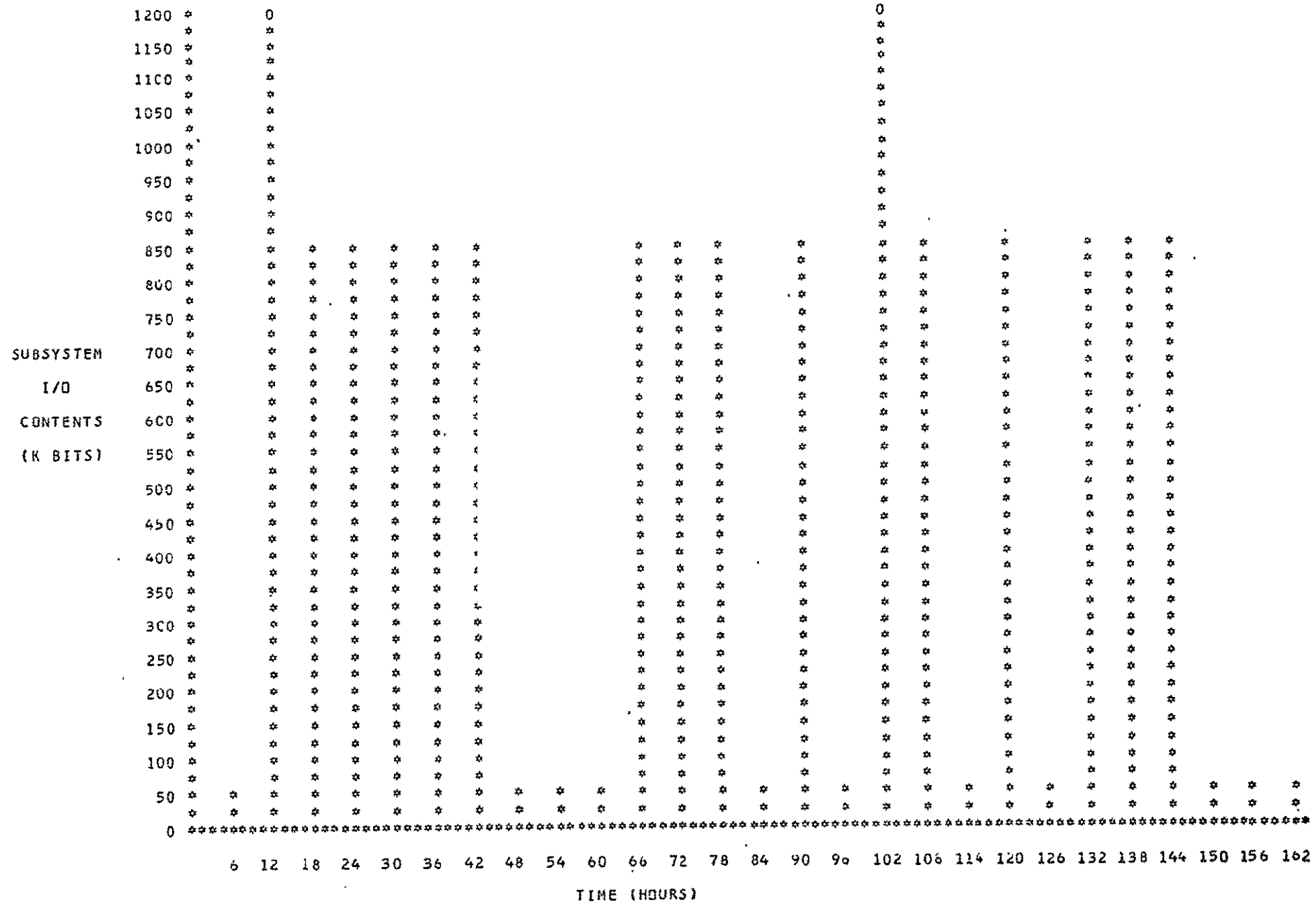

FIGURE 14:CONTENTS OF SUBSYSTEM I/O AS A FUNCTION OF TIME.

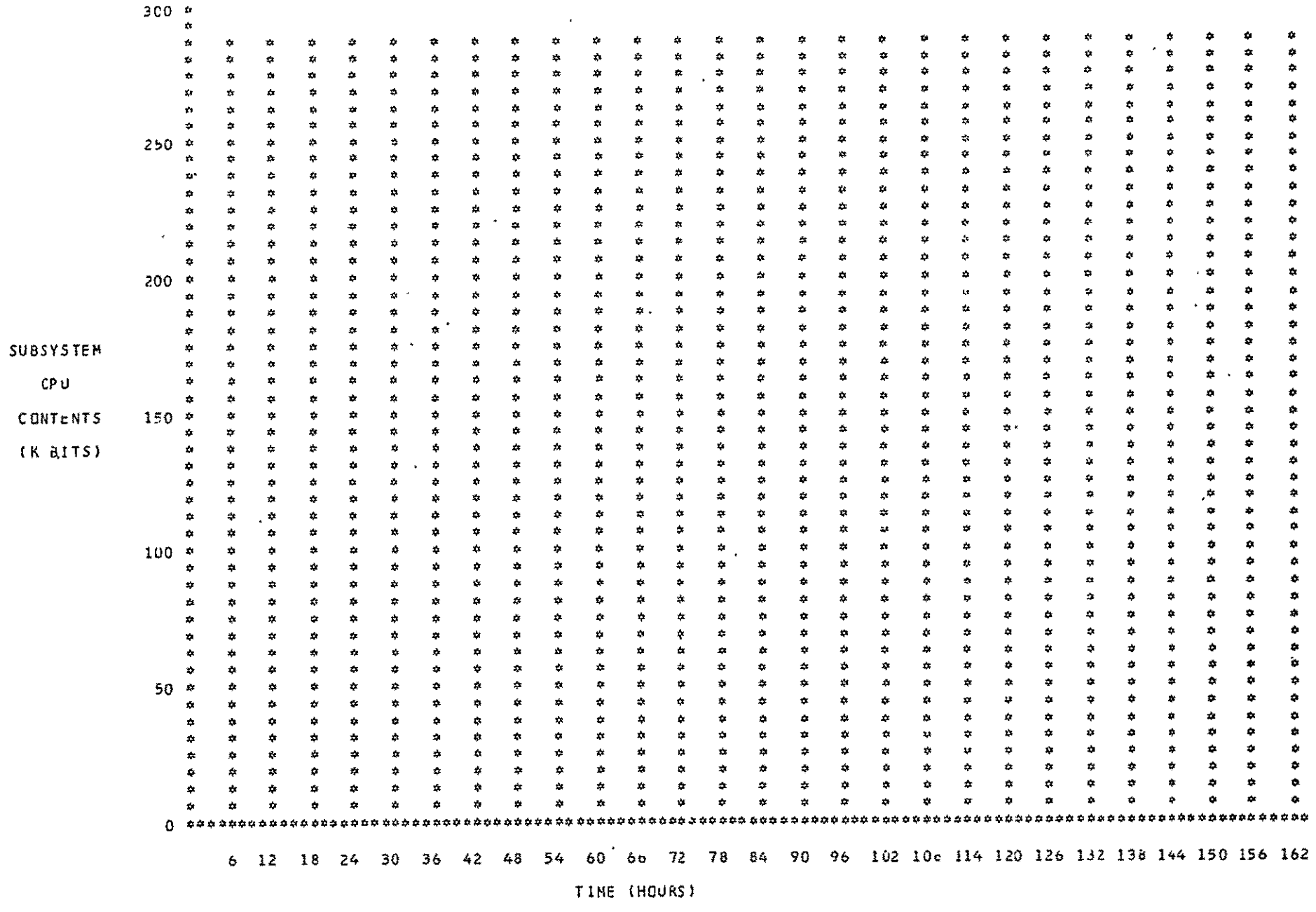

FIGURE 15:CONTENTS OF SUBSYSTEM CPU AS A FUNCTION OF TIME.

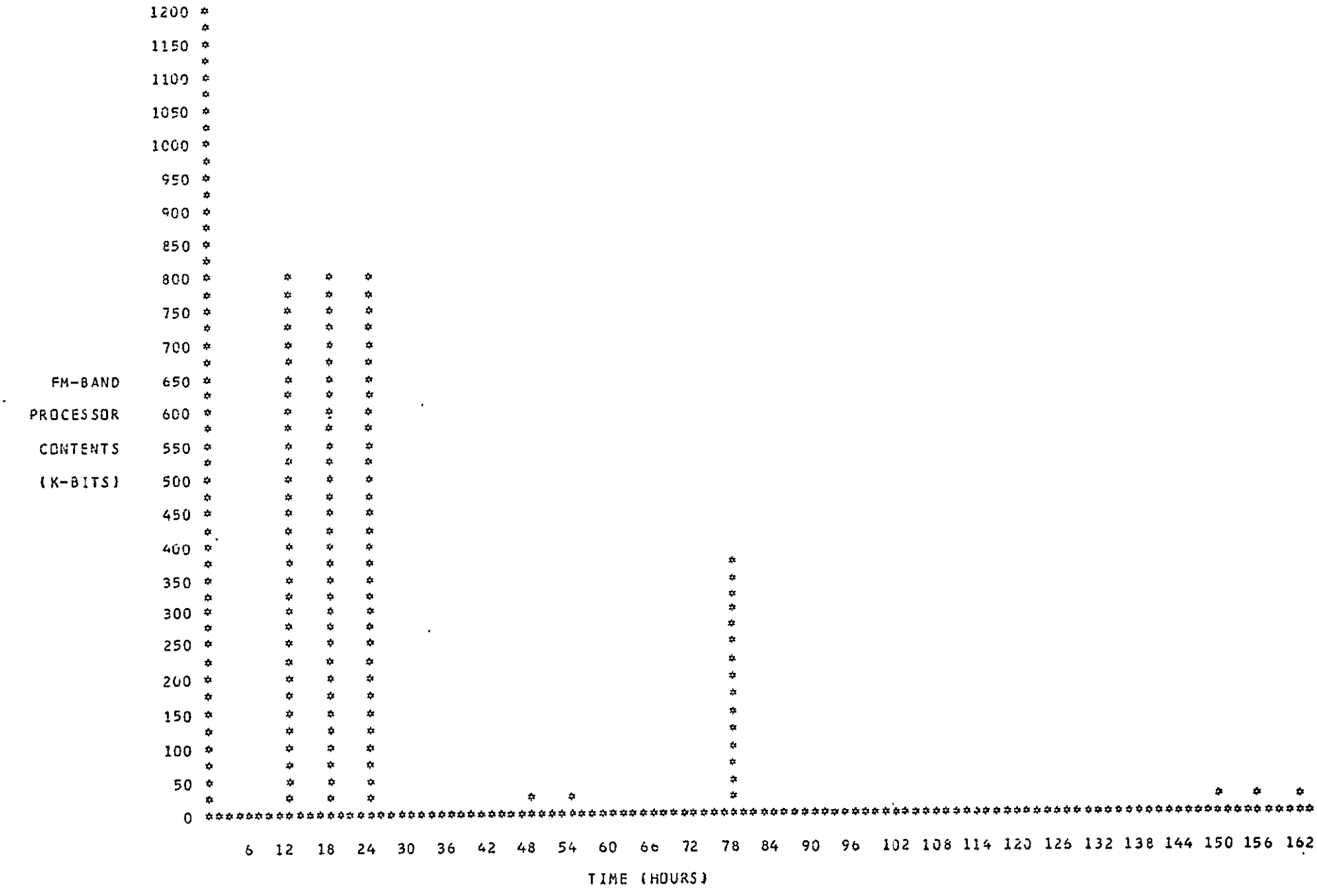

FIGURE 16: CONTENTS OF FM PROESSOR AS A FUNCTION OF TIME.

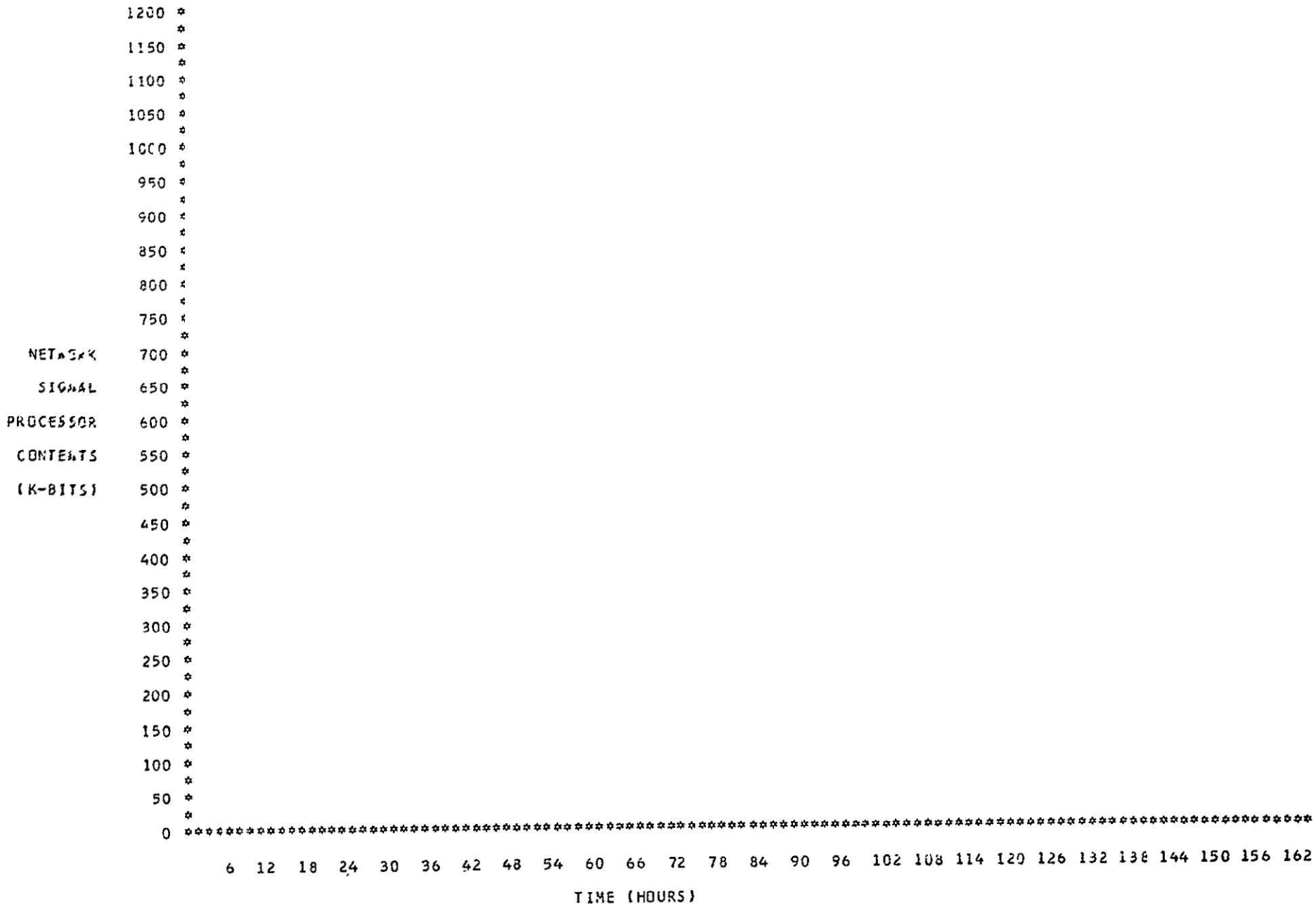

FIGURE 17: CONTENTS OF NETWORK SIGNAL PROCESSOR AS A FUNCTION OF TIME.

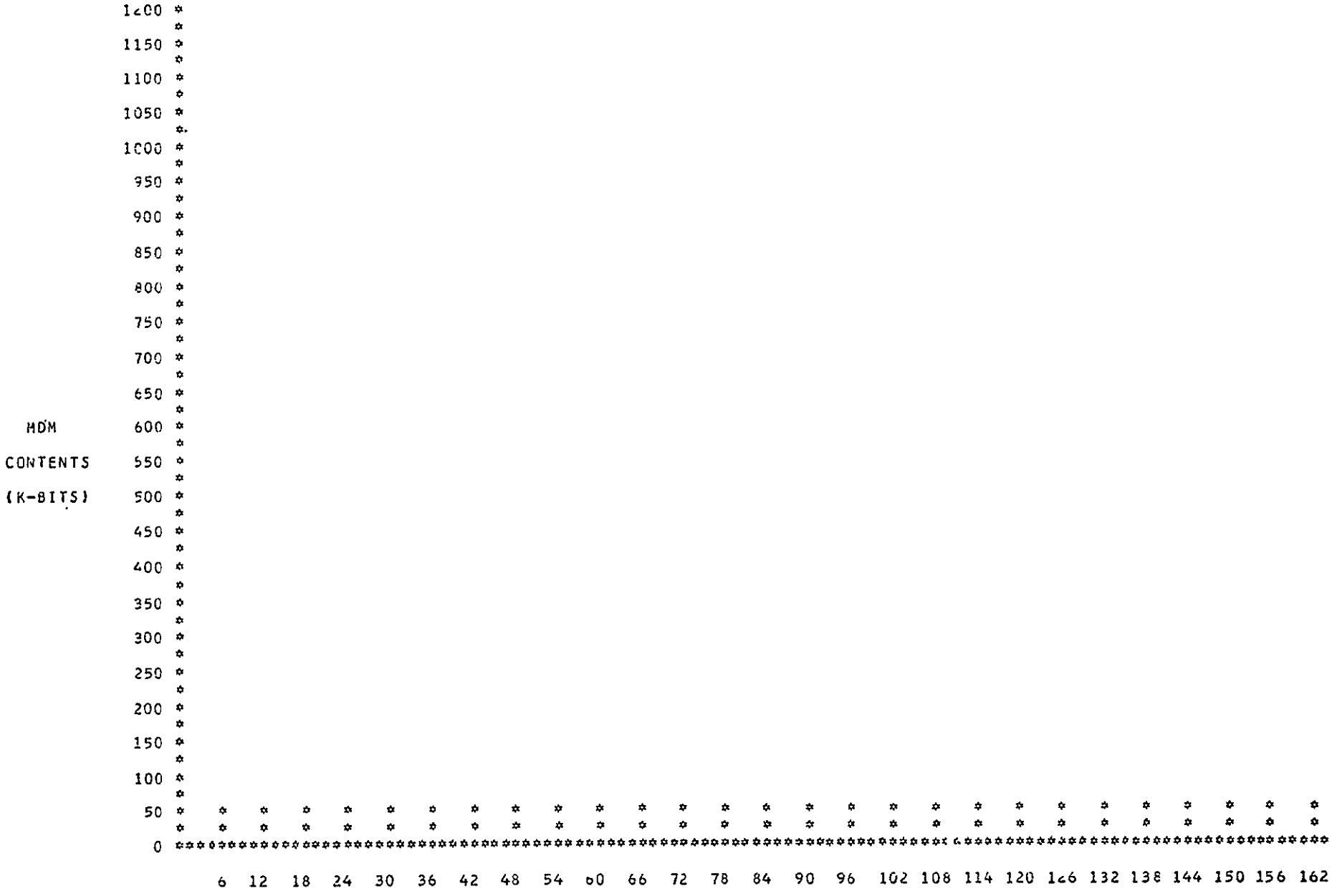

FIGURE 18: CONTENTS OF MDM AS A FUNCTION OF TIM E.

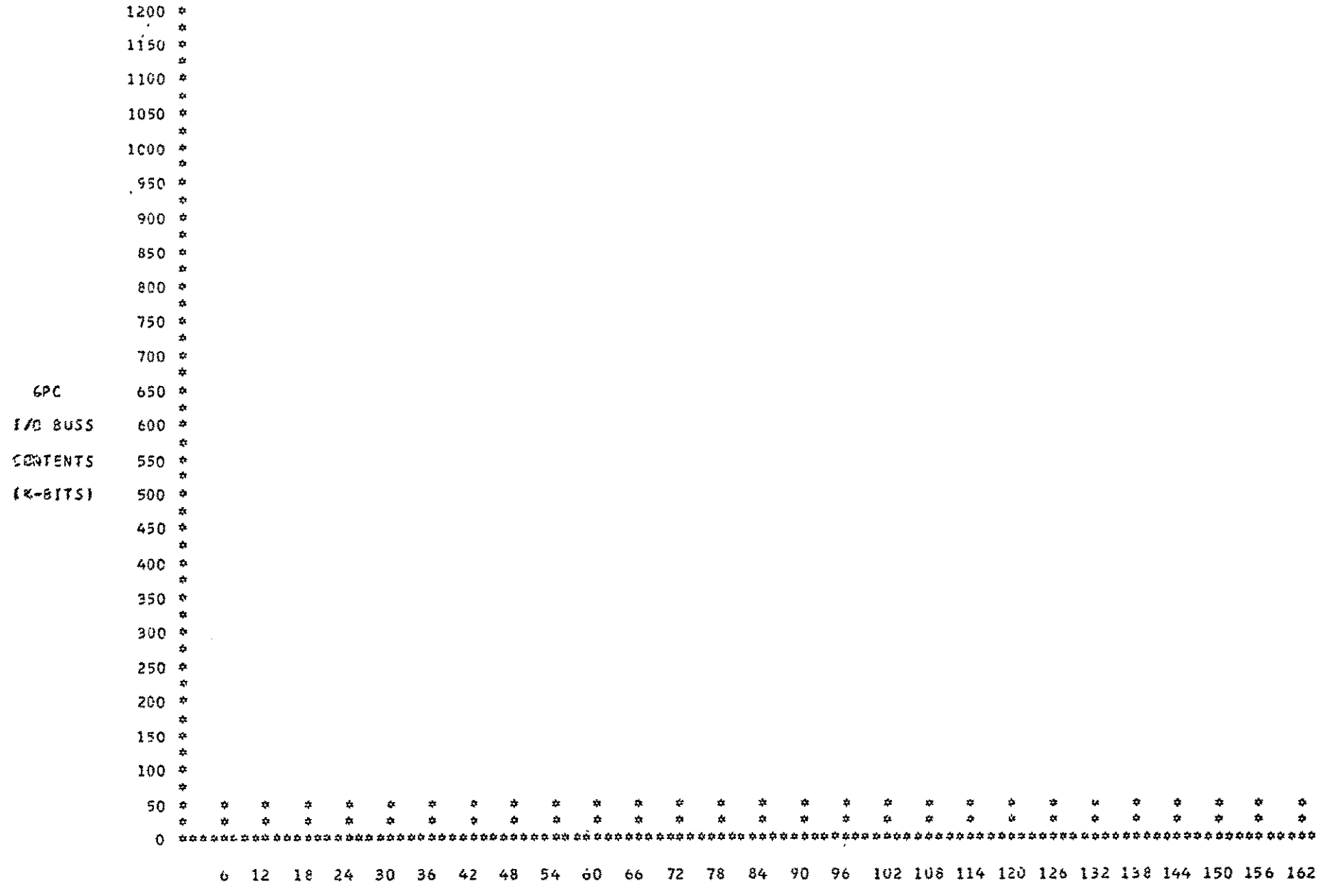

FIGURE 19: CONTENTS OF GENERAL PURPOSE COMPUTER I/O BUSS AS A FUNCTION OF TIME.

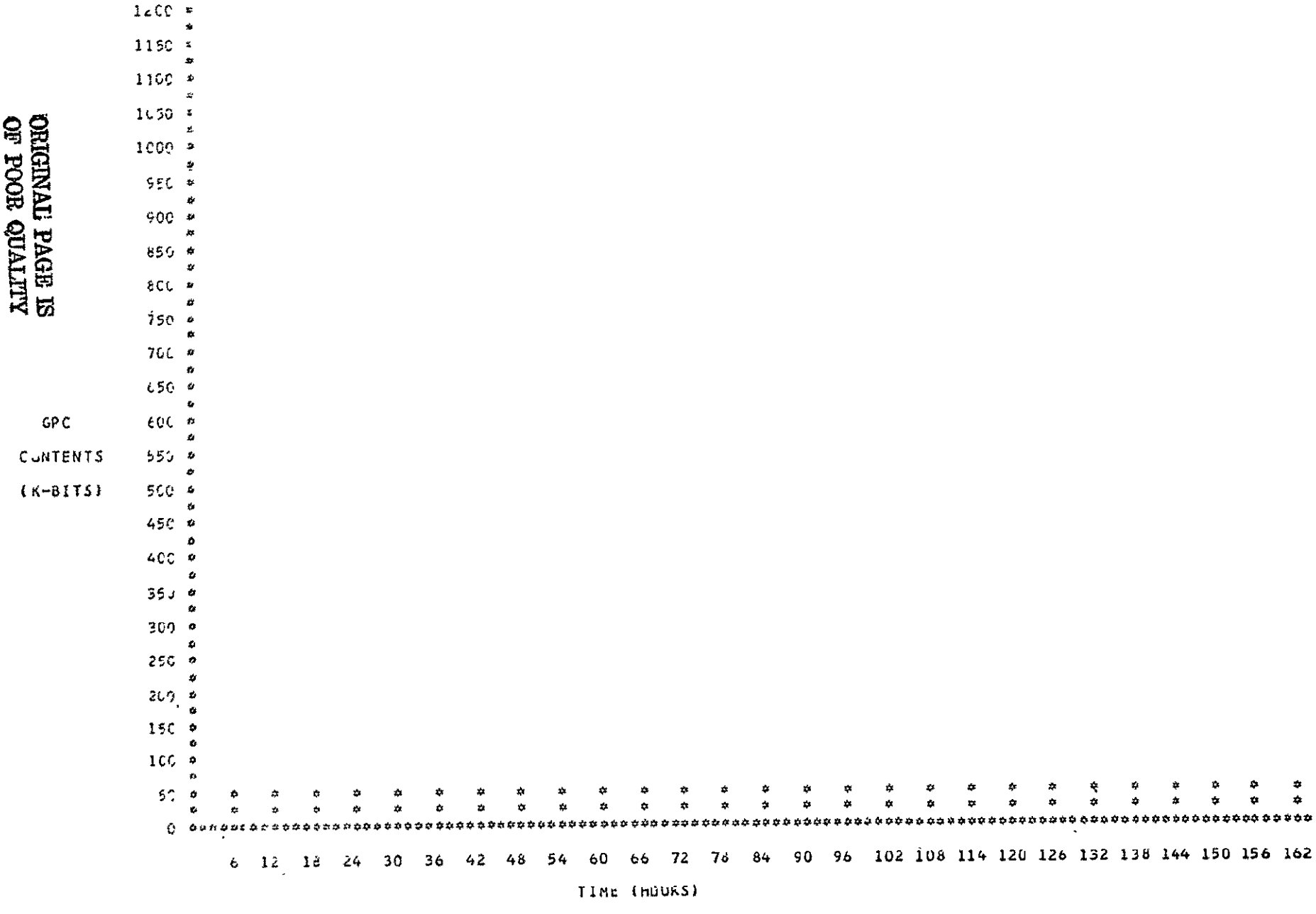

FIGURE 20: CONTENTS OF GENERAL PURPOSE COMPUTER AS A FUNCTION OF TIME.

SECTION VI

REFERENCES

1. Book 18 - Mission 18, Volume III, "Integrated Mission Planning, First Two Years of Shuttle Missions," George C. Marshall Space Flight Center, NASA, August 15, 1974.

2. "CAMS Subsystem Specifications," Document No. SS-ER-0004, ERNO, May 1975.

3. "Space Shuttle System Payload Accommodations," Document No. JSC-07700, Volume XIV, Revision C, with change 10, Johnson Space Center, July 1974.

4. "General Purpose Simulation System-V User's Manual," Document No. SH20-0851-1, IBM, August 1971.

APPENDIX A

SYSTEM MODULE I/O CONFIGURATIONS

APPENDIX A

SYSTEM MODULE I/O CONFIGURATIONS

Module	Configuration

	Experiments
	• Science Data
	  • Inputs: None
	  • Outputs: Compiled from mission schedule
	  • 95 percent direct to transmission.
	  • 5 percent transmitted to RAU.
	
	• Engineering Data
	  • Inputs: N/A
	  • Outputs: Transmitted to RAU's. Rate of 3 KBPS.
	
	• Command Data
	  • Inputs: Experiment RAU's at 2 KBPS.
	  • Outputs: N/A
	
	• GN&C Data
	  • Inputs: N/A
	  • Outputs: Transmission to experiment RAU's. Rate of 1 KBPS.

2	Experiment RAU's
	• Science Data
	  • Inputs: From experiments at rate compiled from mission schedule.
	  • Outputs: Transmitted to experiment I/O at 1 MBPS.
	
	• Engineering Data
	  • Inputs: From experiments at 3 KBPS.
	  • Outputs: Transmitted to experiment I/O at 1 MBPS.
	
	• Command Data
	  • Inputs: From experiment I/O at 2 KBPS.
	  • Outputs: To experiments at 2 KBPS.
	
	• GN&C Data
	  • Inputs: From experiments at 1 KBPS.
	  • Outputs: Experiment I/O at 1 KBPS.

Module	Configuration

3	Experiment I/O
	• Science Data
	  • Inputs:
	  • Experiment RAU at 1 MBPS.
	  • Experiment Computer at 8 KBPS.
	  • Outputs:
	  • Experiment Computer at 8 KBPS; thru Experiment I/O to Payload Data Interleaver at 8 KBPS.
	  • To Variable Rate Recorders (Downlink not available) or to FM Signal Processor (Downlink available, KU Band Signal Processor not available) or KU Band Signal Processor (Downlink available) at 1 MBPS.
	
	• Engineering Data
	  • Inputs:
	  • Experiment RAU at 1 MBPS.
	  • Experiment Computer at 1 MBPS.
	  • Outputs:
	  • Payload Data Interleaver or Experiment Computer at 1 MBPS.
	
	• Command Data
	  • Inputs:
	  • Experiment Computer at 2 KBPS.
	  • Payload Signal Processor at 2 KBPS (Without both Detached Payload and Subsystem Commands).
	  • MDM-(When there is no Safety and Arming Command and 90% of data has by-passed the PSP and there is no Subsystem Command.); at 2 KBPS.
	  • CDMS Control Panel at 2 KBPS. (When there is no Subsystem Command).
	  • KU-Band Signal Processor at 2 KBPS. (When there is a Direct Payload Command and no Subsystem Command).
	  • Outputs:
	  • Experiment Computer at 2 KBPS.
	  • Addressed Experiment RAU at 2 KBPS.
	  • MDM-at 2 KBPS; (When GPC interaction is required).
	
	GN&C Data
	• Inputs:
	  • MDM-at 2 KBPS. (When there is no Subsystem Data).
	  • Experiment RAU at 1 KBPS.
	  • Experiment Computer at 1 KBPS.
	• Outputs:

Module	Configuration
	• Experiment Computer at 2 KBPS. • Experiment Computer at 1 KBPS. • MDM-at 1 KBPS.

4	Experiment Computer
	• Science Data
	  • Inputs:
	  • Experiment I/O at 8 KBPS.
	  • Outputs:
	  • Experiment I/O at KBPS.
	• Engineering Data
	  • Inputs: Experiment I/O at 8 KBPS.
	  • Outputs: Experiment I/O at 8 KBPS.
	• Command Data
	  • Inputs:
	  • Experiment I/O at 2 KBPS.
	  • Outputs:
	  • Experiment I/O at 2 KBPS.
	• GN&C Data
	  • Inputs:
	  • Experiment I/O at 2 KBPS.
	  • Experiment I/O at 1 KBPS.
	  • Outputs:
	  • Experiment I/O at 1 KBPS.

5	High Rate Recorders
	• Science Data
	  • Inputs: Experiment at rate compiled from mission schedule. Capacity: 30 MBPS input; 36,000 M bits total.
	  • Outputs: KU-Band Signal Processor at 30 MBPS.
	• Engineering Data
	  • N/A
	• Command Data
	  • N/A

Module	Configuration
	• GN&C Data • N/A

6	Variable Rate Recorders
	• Science Data
	  • Inputs: Experiment I/O.
	  • Capacity: 30 MBPS input; 36,000 M bits total.
	  • Outputs: KU-Band Signal Processor at 30 MBPS or FM Signal Processor at 1 MBPS.

	• Engineering Data • N/A
	• Command Data • N/A
	• GN&C Data • N/A

7	Payload Data Interleaver
	• Science Data
	  • Inputs: Experiment I/O at 8 KBPS.
	Payload Signal Processor (omit).
	  • Outputs: DACBU at 16 KBPS.

	• Engineering Data
	  • Inputs:
	  • Experiment I/O, Subsystem I/O at 64 KBPS.
	  • Payload Signal Processor (Omit).
	  • Outputs: DACBU at 64 KBPS.

	• Command Data • N/A
	• GN&C Data • N/A

8	DACBU
	• Science Data
	  • Inputs: Payload Data Interleaver at 16 KBPS.
	  • Outputs: Network Signal Processor at 64 KBPS.

Module	Configuration

	• Engineering Data
	  • Inputs: Payload Data Interleaver at 64 KBPS.
	  • Outputs: Loop Recorder at 128 KBPS. Network Signal Processor at 128 KBPS.
	• Command Data
	  • N/A
	• GN&C Data
	  • N/A

9	Loop Recorder
	• Science Data
	  • N/A
	• Engineering Data
	  • Inputs: DACBU at 128 KBPS.
	  • Outputs: FM Signal Processor at 128 KBPS.
	• Command Data
	  • N/A
	• GN&C Data
	  • N/A

10	FM Signal Processor
	• Science Data
	  • Inputs: Variable Rate Recorder at 1 MBPS.
	  • Outputs: Ground at 1 MBPS.
	• Engineering Data
	  • Inputs: Loop Recorder at 128 KBPS.
	  • Outputs: Ground at 1 MBPS.
	• Command Data
	  • N/A
	• GN&C Data
	  • N/A

Module	Configuration

11	Netowrk Signal Processor
	• Science Data
	  ◦ Inputs: DACBU at 64 KBPS.
	  ◦ Outputs: Ground at 96 or 192 KBPS or KU-Band Signal Processor at 192 KBPS.
	• Engineering Data
	  ◦ Inputs: DACBU at 128 KBPS.
	  ◦ Outputs: Ground at 192 KBPS or KU-Band Signal Processor at 192 KBPS.
	• Command Data
	  ◦ Inputs: Ground command at 2 KBPS or KU-Band Signal Processor at 2 KBPS (When there is no Direct Payload command).
	  ◦ Outputs: MDM at 2 KBI
	• GN&C Data
	  ◦ N/A

12	KU-Band Signal Processor
	• Science Data
	  ◦ Inputs:
	  ◦ Experiment at rate determined by mission schedule and signal acquisition schedule.
	  ◦ High Rate Recorders at 30 MBPS.
	  ◦ Variable Rate Recorders at 30 MBPS.
	  • Netowrk Signal Processor at 192 KBPS.
	  • Outputs: Ground at 30 MBPS.
	• Engineering Data
	  ◦ Inputs: Netowrk Signal Processor at 192 KBPS.
	  ◦ Outputs: Ground at 30 MBPS.
	• Command Data
	  ◦ Inputs: Ground command at 2 KBPS.
	  ◦ Outputs: All three at 2 KBPS---
	  • Netowrk Signal Processor (with no Direct Payload Command); or Experiment I/O (With a Direct Payload Command and no Subsystem Command); or Subsystem I/O (with both Direct Payload and Subsystem Commands).
	• GN&C Data
	  ◦ N/A

Module	Configuration

13	Subsystem
	• Science Data
	  ◦ N/A
	
	• Engineering Data
	  ◦ Inputs: None
	  ◦ Outputs: RAU at 3 KBPS plus 10% of experiment data rate compiled from mission schedule.
	
	• Command Data
	  ◦ Inputs: MDM - at 2 KBPS; (When there is a Payload, Safety and Arming Command).
	  Subsystem RAU at 2 KBPS.
	  ◦ Outputs: None
	
	• GN&C Data
	  ◦ Inputs: Subsystem RAU at 2 KBPS.
	  ◦ Outputs: Subsystem RAU at 1 KBPS.

14	Subsystem RAU
	• Science Data
	  ◦ N/A
	
	• Engineering Data
	  ◦ Inputs: Subsystem at 3 KBPS plus 10% of experiment data rate compiled from mission schedule.
	  ◦ Outputs: Subsystem I/O at 1 MBPS.
	
	• Command Data
	  ◦ Inputs:
	  ◦ Subsystem I/O at 2 KBPS, (with no GPC Interaction required)
	  ◦ Subsystem I/O at 2 KBPS.
	  ◦ Subsystem I/O at 2 KBPS (with no Process Monitor required)
	  ◦ Outputs: Subsystem at 2 KBPS.
	
	• GN&C Data
	  ◦ Inputs:
	  ◦ Subsystem I/O at 2 KBPS.
	  ◦ Subsystem at 1 KBPS.
	  ◦ Outputs:
	  ◦ Subsystem at 1 KBPS.
	  ◦ Subsystem I/O at 1 KBPS.

Module	Configuration

15	Subsystem I/O
	• Science Data
	  • N/A
	
	• Engineering Data
	  • Inputs:
	  • Subsystem RAU at 1 MBPS.
	  • Subsystem Computer at 8 KBPS.
	  • Outputs:
	  • Subsystem Computer at 8 KBPS.
	  • Payload Data Interleaver at 1 MBPS.
	
	• Command Data
	  • Inputs:
	  • CDMS Control Panel at 2 KBPS (with a Subsystem Command).
	  • Subsystem Computer at 2 KBPS.
	  • Payload Signal Processor at 2 KBPS (with no Detached Payload Command, but with a Subsystem Command)
	  • MDM--(When there is no Safety and Arming Command and 90% of data has by-passed the PSP and there is a Subsystem Command); at 2 KBPS.
	  • KU-Band Signal Processor at 2 KBPS; (When there is both a Direct Payload Command and a Subsystem Command)
	
	  • Outputs:
	  • Subsystem Computer at 2 KBPS.
	  • Subsystem RAU at 2 KBPS.
	  • MDM at 2 KBPS; (When GPC interaction is required).
	
	• GN&C Data
	  • Inputs:
	  • Subsystem Computer at 2 KBPS and 1 KBPS.
	  • MDM at 2 KBPS. (When there is Subsystem data)
	  • Subsystem RAU at 1 KBPS.
	  • Outputs:
	  • Subsystem Computer at 2 KBPS and 1 KBPS.
	  • Subsystem RAU at 2 KBPS.
	  • MDM at 1 KBPS.

16	Subsystem Computer • Science Data • N/A

Module	Configuration

	• Engineering Data
	  • Inputs: Subsystem I/O at 8 KBPS.
	  • Outputs: Subsystem I/O at 8 KBPS.
	• Command Data
	  • Inputs: Subsystem I/O at 2 KBPS.
	  • Outputs: Subsystem I/O at 2 KBPS.
	• GN&C Data
	  • Inputs: Subsystem I/O at both 2 KBPS and 1 KBPS.
	  • Outputs: Subsystem I/O at both 2 KBPS and 1 KBPS.

17	MDM
	• Science Data
	  • N/A
	• Engineering Data
	  • N/A
	• Command Data
	  • Inputs:
	  • Network Signal Processor at 2 KBPS.
	  • Subsystem I/O at 2 KBPS; (When GPC interaction is required).
	  • Experiment I/O at 2 KBPS; (When GPC interaction is required).
	  • GPC I/O Buss at 2 KBPS.
	  • Outputs:
	  • GPC I/O Buss at 2 KBPS.
	  • Subsystem at 2 KBPS; (When there is Payload, Safety and Arming Command).
	  • Payload Signal Processor at 2 KBPS. (When there is Payload, Safety and Arming Command and 10% of the data is routed to the PSP).
	  • Subsystem I/O at 2 KBPS. (When there is no Att. Payload, Safety and Arming Command and 90% of the data has by-passed the PSP and there is a Subsystem command).
	  • Experiment I/O at 2 KBPS. (When there is no Payload, Safety and ARming Command and 90% of the data has by-passed the PSP and there is no Subsystem Command).
	• GN&C Data
	  • Inputs:

Module	Configuration
	• GPC I/O Buss at 2 KBPS. • Subsystem I/O at 1 KBPS • Experiment I/O at 1 KBPS. • Outputs: • Experiment I/O at 2 KBPS; (When there is no Subsystem data). • Subsystem I/O at 2 KBPS; (When there is Subsystem data). • GPC I/O Buss at 1 KBPS.
18	GPC Input/Output Buss. • Science Data • N/A • Engineering Data • N/A • Command Data • Inputs: • MDM at 2 KBPS. • GPC at 2 KBPS. • Outputs: • GPC at 2 KBPS • MDM at 2 KBPS. • GN&C Data • Inputs: • GPC at 2 KBPS. • MDM at 1 KBPS. • Outputs: • MDM at 2 KBPS. • GPC at 1 KBPS.
19	GP Computer • Science Data • N/A • Engineering Data • N/A

Module	Configuration

	• Command Data
	  • Inputs:
	  • GPC I/O Buss at 2 KBPS.
	  • Outputs:
	  • GPC I/O Buss at 2 KBPS.

	• GN&C Data
	  • Inputs:
	  • GPC I/O Buss at 1 KBPS.
	  • Outputs:
	  • GPC I/O Buss at 2 KBPS.

20	Payload Signal Processor • Science Data • N/A
	• Engineering Data • N/A

	• Command Data
	  • Inputs:
	  • MDM at 2 KBPS. (With no Payload, Safety and Arming Command and 10% data enters the PSP).
	  • Outputs:
	  • Subsystem I/O at 2 KBPS. (When there is no Detached Payload Command and a Subsystem Command).
	  • Experiment I/O at 2 KBPS. (When there is no Detached Payload Command and no Subsystem Command).

	• GN&C Data • N/A

APPENDIX B

USER SET VARIABLES

DEFINITIONS OF MATRIX 4

APPENDIX B
USER SET VARIABLES
DEFINITIONS OF MATRIX 4

I. Data flow rate assignments as a percentage of the incoming data rate.

Science and Engineering data:

MX4(1,1) = Percent of data from experiments to KU Band Signal Processor or High Rate Recorder.

MX4(1,2) = Percent of data from experiments to experiment RAU's.
= 100 percent - MX4(1,1).

MX4(1,3) = Percent of data lost by compression from I/O to computer.

MX4(1,4) = Percent of data from I/O to computer.
= 100 percent - MX4(1,3).

Command data:

MX4(1,5) = Percent of data from MDM to I/O or Payload Signal Processor, remainder is safety and arming signal to subsystems.

MX4(1,6) = Percent of data from I/O or PSP branch of MX4(1,5) to PSP, remainder to I/O.

MX4(1,7) = Percent of data from KU Band Signal Processor to Network Signal Processor, remainder to I/O's.

MX4(1,8) = Percent of data from I/O branch of MX4(1,7) to subsystem I/O, remainder to experiment I/O.

MX4(1,9) = Percent of data from subsystem I/O to subsystem RAU's, remainder to subsystem computer.

MX4(1,10) = Percent of data from experiment I/O to experiment RAU's, remainder to experiment computer.

MX4(1,11) = Percent of data from CDMS Control Panel to the experiment I/O, remainder to subsystem I/O.

MX4(1,12) = Percent of control panel data from subsystem I/O to MDM for GPC interaction, remainder to experiment RAU's.

MX4(1,13) = Percent of control panel data from experiment I/O to MDM for GPC interaction, remainder to experiment RAU's.

II. Data flow rate assignments at origination points.

Command data:

MX4(1,14) = Data rate from command input to Network Signal Processor.

MX4(1,15) = Data rate from command input to KU Band Signal Processor.

MX4(1,16) = Data rate from the CDMS Control Panel.

GN&C data:

MX4(1,17) = Data rate generated by the GPC to the GPC I/O Buss.

MX4(1,18) = Data rate from subsystems to subsystem RAU's.

MX4(1,19) = Data rate from experiments to experiment RAU's.

Engineering data:

MX4(1,20) = Data rate from experiments to experiment RAU's.

MX4(1,21) = Data rate from subsystems to subsystem RAU's.

APPENDIX C

PROGRAM LISTING

```
                      * * *  GPSS  V  -  OS  VERSION  * * *
                     *** IBM PROGRAM PRODUCT 5734-XS2 (V1M3) ***
                                                                    STATEMENT
                                                                     NUMBER
REALLOCATE COM,67000                                                    1
REALLOCATE BLO,1700,VAR,65,FUN,5,HSV,1                                  2
REALLOCATE BSV,1,LSV,1,GRP,1,HMS,1,BMS,1,LMS,1                          3
REALLOCATE FAC,50,STO,25,LOG,1,FSV,700,BVR,1,CHA,20,TAB,1               4
```

```
BLOCK
NUMBER  *LOC   OPERATION  A,B,C,D,E,F,G,H,I          COMMENTS                                                    STATEMENT
                SIMULATE   55                                                                                      NUMBER
                                                                                                                       5
*****************************************************************************************************************      6
*****************************************************************************************************************      7
**                                                                                                             **      8
**                                                                                                             **      9
**      D. P. ASSOCIATES, INC.                                                                                 **     10
**                                                                                                             **     11
**          SPACE SHUTTLE DATA SYSTEM SIMULATION                                                               **     12
**                                                                                                             **     13
**                                                                                                             **     14
*****************************************************************************************************************     15
*****************************************************************************************************************     16
*****************************************************************************************************************     17
*****************************************************************************************************************     18
**                                                                                                                     19
**    USER SET VARIABLES                                                                                               20
**                                                                                                                     21
 4      MATRIX      X,1,23                                                                                           22
*                                                                                                                    23
*     MX4(1,1) =PERCENT OF DATA FROM EXPERIMENTS TO KU BAND OR RECORDER                                              24
*     MX4(1,2) =100-MX4(1,1).                                                                                        25
*     MX4(1,3) =PERCENT OF DATA LOST BY COMPRESSION FROM I/O TO COMPUTER                                             26
*     MX4(1,4) =100-MX4(1,3), DATA FROM I/O TO COMPUTER.                                                             27
*                                                                                                                    28
*    COMMAND DATA MODULE                                                                                             29
*                                                                                                                    30
*     MX4(1,5) =PERCENT OF DATA FROM MDM TO I/O OR PAYLOAD SIGNAL PROCESSOR.                                         31
*     MX4(1,6) =PERCENT OF DATA FROM MDM TO PALOAD SIGNAL PROCESSOR.                                                 32
*     MX4(1,7) =PERCENT OF DATA FROM KU-BAND TO NETWORK SIGNAL PROCESSOR.                                            33
*     MX4(1,8) =PERCENT OF DATA FROM KU-BAND TO SUBSYSTEM I/O.                                                       34
*     MX4(1,9) =PERCENT OF DATA FROM SUBSYSTEM I/O TO SUBSYSTEM RAU.                                                 35
*     MX4(1,10)=PERCENT OF DATA FROM EXPERIMENT I/O TO EXPERIMENT RAU.                                               36
*     MX4(1,11)=PERCENT OF DATA FROM CONTROL PANEL TO EXPERIMENT I/O.                                                37
*     MX4(1,12)=PERCENT OF DATA FROM SUBSYSTEM I/O TO MDM.                                                           38
*     MX4(1,13)=PERCENT OF DATA FROM EXPERIMENT I/O TO MDM.                                                          39
*                                                                                                                    40
*    DATA FLOW RATES                                                                                                 41
*                                                                                                                    42
*     MX4(1,14)=COMMAND RATE FROM COMMAND INPUT TO NETWORK SIGNAL PROCESSOR                                          43
*     MX4(1,15)=COMMAND RATE FROM COMMAND INPUT TO KU BAND SIGNAL PROCESSOR                                          44
*     MX4(1,16)=COMMAND RATE FROM CONTROL PANEL.                                                                     45
*     MX4(1,17)=GN+C RATE FROM GPC TO GPC I/O BUSS.                                                                  46
*     MX4(1,18)=GN+C RATE FROM SUBSYSTEM TO SUBSYSTEM RAU.                                                           47
*     MX4(1,19)=GN+C RATE FROM EXPERIMENT TO EXPERIMENT RAU.                                                         48
*     MX4(1,20)=ENGINEERING DATA RATE FROM EXPERIMENT TO EXPERIMENT RAU.                                             49
*     MX4(1,21)=ENGINEERING DATA RATE FROM SUBSYSTEM TO SUBSYSTEM RAU.                                               50
*                                                                                                                    51
        INITIAL     MX4(1,1),95/MX4(1,2),5/,MX4(1,3),90/MX4(1,4),10                                                52
        INITIAL     MX4(1,5),98/MX4(1,6),10/MX4(1,7),95/,MX4(1,8),50                                               53
        INITIAL     MX4(1,9),90/MX4(1,10),90/MX4(1,11),50/MX4(1,12),75                                             54
        INITIAL     MX4(1,13),50                                                                                   55
        INITIAL     MX4(1,14),72/MX4(1,15),72/MX4(1,16),72                                                         56
        INITIAL     MX4(1,17),72/MX4(1,18),36/MX4(1,19),36                                                         57
        INITIAL     MX4(1,20),108/MX4(1,21),108                                                                    58
        INITIAL     MX4(1,22),10/MX4(1,23),50                                                                      59
```

```
**                                                                              60
*******************************************************************************61
*******************************************************************************62
                                                                                63
*                                                                               64
*  MACRO DEFINITION FOR TRANSMISSION OF ALL DATA TO NEXT UNIT                   65
*                                                                               66
 TRNSA STARTMACRO                                                               67
 #A    GATE SNF    #B,#C                                                       68
       TEST GE     #C,PF3,#E                                                   69
 #F    ENTER       #B,PF3                                                      70
 BUFER MACRO                                                                    71
       ASSIGN      8,#B,PF                                                     72
       ASSIGN      9,#B,PF                                                     73
       SAVEVALUE   V53,PF9                                                     74
       LEAVE       #E,PF3                                                      75
       TRANSFER    ,#B                                                         76
       ENDMACRO                                                                77
*                                                                              78
*  MACRO DEFINITION FOR TRANSMISSION OF PART DATA TO NEXT UNIT                 79
*  #A (TRNSP MACRO) = #E (TRNSA MACRO)                                         80
*  #F (TRNSP MACRO) = #A (TRNSA MACRO)                                         81
*  #H (TRNSP MACRO) = #F (TRNSA MACRO)                                         82
 TRNSP STARTMACRO                                                               83
 #A    ASSIGN      #B,#C,PF                                                    84
       SPLIT       1,#D                                                        85
       PRIORITY    #E                                                          86
       ASSIGN      3,#I,PF                                                     87
       ADVANCE     1                                                           88
       TRANSFER    ,#F                                                         89
 #D    ASSIGN      3,#B,PF                                                     90
       TRANSFER    ,#H                                                         91
       ENDMACRO                                                                92
*                                                                              93
*                                                                              94
*  MACRO DEFINITION FOR DELAY TRANSMISSION TO NEXT UNIT                        95
*  #A (WAITA MACRO) = #C (TRNSA MACRO)                                         96
*  #D (WAITA MACRO) = #A (TRNSA MACRO)                                         97
*                                                                              98
 WAITA STARTMACRO                                                               99
 #A    PRIORITY    #B                                                         100
       QUEUE       #C,PF3                                                     101
       ADVANCE     1                                                          102
       DEPART      #C,PF3                                                     103
       TRANSFER    ,#D                                                        104
       ENDMACRO                                                               105
*                                                                             106
*  MACRO DEFINITION FOR TRANSMISSION OF ALL DATA TO SIGNAL PROCESSOR          107
*                                                                             108
 TMITA STARTMACRO                                                              109
 #A    GATE SNF    #B,#C                                                      110
       TEST GE     #C,PF3,#E                                                  111
       ENTER       #B,PF3                                                     112
 BUFER MACRO                                                                   113
       ASSIGN      8,#B,PF                                                    114
       ASSIGN      9,#B,PF                                                    115
       SAVEVALUE   V53,PF9                                                    116
       LEAVE       #B,PF3
```

```
        TERMINATE
        ENDMACRO
*
*  MACRO DEFINITION FOR TRANSMISSION OF PART DATA TO STORAGE PROCESSOR
*  #A (TMITP MACRO) = #E (TMITA MACRO).
*
 TMITP  STARTMACRO
 #A     ASSIGN      10,#C,PF
        SPLIT       1,#B
        ASSIGN      3,#F,PF
        TRANSFER    ,#D
 #G     ASSIGN      3,PF10,PF
        TRANSFER    ,#E
        ENDMACRO
*
*  CONSTANT RATE RECORDER
*
*  COLLECT ENTRY CANDIDATES
 COU    STARTMACRO
 #A     QUEUE       #B
        TEST L      #C,1080000,#D
        SAVEVALUE   #E,PF3
        SAVEVALUE   #F,1
 #G     ADVANCE     0
 BUFER  MACRO
        ENDMACRO
*  CHECK REMAINING SPACE
 CHE    STARTMACRO
        TEST L      #A,#B,#C
        TEST GE     PF3,#D,#E
        SPLIT       1,#F
        ASSIGN      3,#D,PF
        ENDMACRO
*  LOSE SOME DATA
 LOS    STARTMACRO
 #A     SAVEVALUE   #A,PF3
        TEST GE     #B,#C,#D
        SAVEVALUE   #E,0
        SAVEVALUE   #F,1
 #G     DEPART      #E
        SAVEVALUE   #H,PF3
        TERMINATE
 #D     SAVEVALUE   #F,1
        TRANSFER    ,#B
        ENDMACRO
*  SAVE PART DATA
 SAV    STARTMACRO
 #A     ASSIGN      3,#B,PF
        PRIORITY    #C
        QUEUE       #D
        TRANSFER    ,#E
        ENDMACRO
*  LOAD MAX RATE AND DUMP
 LOA    STARTMACRO
 #A     SAVEVALUE   #D,1
 BUFER  MACRO
        TEST E      #C,#D,#E
```

```
        ASSIGN      5,108C000,PF
 #F     ENTER       #J,PF5
        SAVEVALUE   #G,0
        SAVEVALUE   #H,0
 #E     DEPART      #G
        TRANSFER    ,#I
        ENDMACRO
*  LOAD REMAINING TAPE SPACE
 REM    STARTMACRO
 #A     TEST E      #B,#C,#D
        ASSIGN      5,#E,PF
        TRANSFER    ,#F
        ENDMACRO
*
*  MACRO DEFINITION FOR TRANSMISSION OF ALL DATA TO V. R. RECORDER
*
 RECDA STARTMACRO
 #A     PRIORITY    #H
        GATE SNF    #B,#C
        TEST GE     #D,#E,#F
        ENTER       #B,#E
        TRANSFER    ,#G
        ENDMACRO
*
*  MACRO DEFINITION FOR TRANSMISSION OF PART DATA TO RECORDER
*
 RECDP STARTMACRO
 #A     ASSIGN      #B,#C,PF
        ENTER       #D,#C
        ASSIGN      #E,#J,PF
        SAVEVALUE   #I,#G
        ASSIGN      3,#F,PF
        TRANSFER    ,#H
        ENDMACRO
*
*  MACRO DEFINITION OF RECORDER DUMP, ALL DATA
*
 DUMPA STARTMACRO
 #A     GATE U      #I,#B
        GATE SNF    #C,#D
        TEST GE     #E,PF3,#F
        LEAVE       #G,PF3
        TRANSFER    ,#H
        ENDMACRO
*
*  MACRO DEFINITION OF RECORDER DUMP, PART DAT
*
 DUMPP STARTMACRO
 #A     ASSIGN      #B,#C,PF
        SPLIT       1,#I
        PRIORITY    #D
        ADVANCE     #E
        ASSIGN      3,#H,PF
        TRANSFER    ,#F
 #I     ADVANCE     0
        ASSIGN      3,4G,PF
        LEAVE       #J,PF3
```

```
       ENDMACRO                                                          231
 JUMP1 STARTMACRO                                                        232
       TRANSFER    ,#A                                                   233
       ENDMACRO                                                          234
*                                                                        235
*  MACRO DEFINITION FOR DELAY TO NEXT TDRSS LINK                         236
*                                                                        237
 DLAY1 STARTMACRO                                                        238
 #A    PRIORITY    #B                                                    239
       ADVANCE     V5                                                    240
       TRANSFER    ,#C                                                   241
       ENDMACRO                                                          242
*                                                                        243
*  MACRO DEFINITION FOR DELAY ONE TIME UNIT IN RECORDER DUMP             244
*                                                                        245
 DLAY2 STARTMACRO                                                        246
 #A    PRIORITY    #B                                                    247
       ADVANCE     1                                                     248
       TRANSFER    ,#C                                                   249
       ENDMACRO                                                          250
*                                                                        251
*  MACRO DEFINITION FOR DELAY TO NEXT DOWNLINK                           252
*                                                                        253
 DLAY3 STARTMACRO                                                        254
 #A    PRIORITY    #B                                                    255
       TEST GE     #C,#D,#E-                                             256
       ADVANCE     #D                                                    257
       TRANSFER    ,#F                                                   258
 #E    ADVANCE     #C                                                    259
       TRANSFER    ,#F                                                   260
       ENDMACRO                                                          261
*                                                                        262
*  MACRO DEFINITION FOR RECORDING DATA LOST AT RECORDERS                 263
*                                                                        264
 LOSED STARTMACRO                                                        265
 #A    SAVEVALUE   #B+,PF3                                               266
       TERMINATE                                                         267
       ENDMACRO                                                          268
*                                                                        269
*  MACRO DEFINITION FOR COMPUTER LOAD ROUTINE, PART 1                    270
*                                                                        271
 COMPA STARTMACRO                                                        272
 #A    TEST GE     #B,PF3,#C                                             273
       ENTER       #D,PF3                                                274
 #E    LINK        #D,FIFO                                               275
       ENDMACRO                                                          276
*                                                                        277
*  MACRO DEFINITION FOR COMPUTER LOAD ROUTINE, PART 2                    278
*                                                                        279
 COMPB STARTMACRO                                                        280
 #A    TEST G      #B,0,#C                                               281
       ASSIGN      4,#B,PF                                               282
       SPLIT       1,#D                                                  283
       ENTER       #E,#3                                                 284
       TRANSFER    ,#F                                                   285
 #D    ASSIGN      3,#G,PF                                               286
       ENDMACRO                                                          287
```

```
*
*  MACRO DEFINITION FOR COMPUTER LOAD ROUTINE, PART 3
*
 COMPC STARTMACRO
 #A    SPLIT     1,#B
       QUEUE     #C
       SEIZE     #C
       DEPART    #C
 #D    UNLINK    #C,#E,1
       SPLIT     1,#F
       RELEASE   #C
       TERMINATE
       ENDMACRO
*
*  MACRO DEFINITION FOR COMPUTER LOAD ROUTINE, PART 4
*
 COMPD STARTMACRO
 #A    SEIZE     #B
       TEST E    PF3,#C,#D
       RELEASE   #B
       TERMINATE
 #D    TEST L    #C,PF3,#E
       ASSIGN    3,#F,PF
       TRANSFER  ,#G
 #E    ASSIGN    3,#H,PF
       ASSIGN    2,#I,PF
       RELEASE   #B
       SAVEVALUE #J,PF3
       LINK      #B,LIFO
       ENDMACRO
*
*  MACRO DEFINITION FOR COMPUTER LOAD ROUTINE, PART 5
*
 COMPE STARTMACRO
 #A    SAVEVALUE #B,PF3
       SAVEVALUE #C,PF2
       SAVEVALUE #D,PF3
       TERMINATE
       ENDMACRO
*
*  MACRO DEFINITION FOR COMPUTER, COMMAND DATA, PART 2
*
 COMPY STARTMACRO
 #A    TEST G    #B,0,#C
       ASSIGN    4,#B,PF
       SPLIT     1,#D
       ENTER     #E,#B
       LEAVE     #E,#B
       TRANSFER  ,#F
 #D    ASSIGN    3,#B,PF
       ENDMACRO
*
*  MACRO DEFINITION FOR RECEIVING DATA
*
 RECEV STARTMACRO
 #A    GATE SNF  #B,#C
       ENTER     #E,PF3
```

```
        BUFFER                                                          345
        LEAVE       #B,PF3                                              346
        ENDMACRO                                                        347
                                                                        348
   MACRO DEFINITION FOR TRANSMISSION OF DATA                            349
                                                                        350
 TMIT   STARTMACRO                                                      351
 #A     GATE SNF     #E,#C                                             352
        TEST GE      #C,PF3,#E                                         353
        ENTER        #B,PF3                                            354
        BUFFER                                                          355
        ASSIGN       8,#B,PF                                           356
        ASSIGN       9,#F,PF                                           357
        SAVEVALUE    V58,PF9                                           358
        LEAVE        #B,PF3                                            359
        ENDMACRO                                                        360
*                                                                       361
*  MACRO DEFINITION FOR COMPUTER, COMMAND DATA, PART 1                  362
*                                                                       363
 COMP1 STARTMACRO                                                       364
 #A     TEST GE      #B,PF3,#C                                         365
 #E     ENTER        #D,PF3                                            366
        LEAVE        #D,PF3                                            367
        TRANSFER     ,#F                                               368
        ENDMACRO                                                        369
*                                                                       370
*  MACRO DEFINITION FOR COMPUTER, COMMAND DATA, PART 3                  371
*                                                                       372
 COMPX STARTMACRO                                                       373
 #A     QUEUE        #C                                                374
        SEIZE        #C                                                375
        DEPART       #C                                                376
 #D     TEST NE      #G,0,#B                                           377
        UNLINK       #C,#E,1                                           378
        SPLIT        1,#F                                              379
 #B     RELEASE      #C                                                380
        TERMINATE                                                       381
        ENDMACRO                                                        382
*                                                                       383
*  MACRO DEFINITION FOR BUFFER                                          384
*                                                                       385
 BUFER STARTMACRO                                                       386
        ASSIGN       6,PR,PF                                           387
        PRIORITY     0,BUFFER                                          388
        PRIORITY     PF8                                               389
        ENDMACRO                                                        390
*                                                                       391
*                                                                       392
*  EQUATE STATEMENTS                                                    393
*                                                                       394
 RAUEX EQU          2,S                                                395
 IOEXP EQU          3,S                                                396
 CPUEX EQU          4,S                                                397
 HRREC EQU          5,S                                                398
 VARREC EQU         6,S                                                399
 POINT EQU          7,S                                                400
 DACBU EQU          8,S                                                401
```

```
LMREC EQU         9,S                                                  402
FMSIG EQU         10,S                                                 403
NMSIG EQU         11,S                                                 404
KUSIG EQU         12,S                                                 405
RAUSU EQU.        14,S                                                 406
IDSUB EQU         15,S                                                 407
CPUSU EQU         16,S                                                 408
MDMUL EQU         17,S                                                 409
GPCID EQU         18,S                                                 410
GPCOM EQU         19,S                                                 411
PSPRG EQU         20,S                                                 412
*                                                                      413
*  STORAGE DEFINITIONS                                                 414
*                                                                      415
2       STORAGE   36000                                                416
3       STORAGE   36000                                                417
4       STORAGE   288                                                  418
5       STORAGE   36000000                                             419
6       STORAGE   36000000                                             420
7       STORAGE   2304                                                 421
8       STORAGE   4608                                                 422
9       STORAGE   4608                                                 423
10      STORAGE   36000                                                424
11      STORAGE   6912                                                 425
12      STORAGE   10800000                                             426
14      STORAGE   36000                                                427
15      STORAGE   36000                                                428
16      STORAGE   288                                                  429
17      STORAGE   36000                                                430
18      STORAGE   36000                                                431
19      STORAGE   1152                                                 432
20      STORAGE   1440                                                 433
*                                                                      434
*  VARIABLE STATEMENTS                                                 435
*                                                                      436
1       VARIABLE  PF4-1                                                437
2       FVARIABLE PF3*(MX4(1,1)/100.)+.5                               438
3       VARIABLE  X23-PF3                                              439
4       VARIABLE  PF3-X23                                              440
5       VARIABLE  X50-C1                                               441
6       VARIABLE  (2400*PF3)+MX2(1,PF4)                                442
7       VARIABLE  X21-PF3                                              443
8       VARIABLE  PF3-X21                                              444
9       VARIABLE  PF3-PF4                                              445
10      VARIABLE  MX3(1,PF1)+MX3(3,PF1)                                446
11      VARIABLE  X25-PF3                                              447
12      VARIABLE  PF3-X25                                              448
13      FVARIABLE PF3*(MX4(1,2)/100.)+.5                               449
14      FVARIABLE PF3*(MX4(1,3)/100.)+.5                               450
15      FVARIABLE PF3*(MX4(1,4)/100.)+.5                               451
16      VARIABLE  PF1-1                                                452
17      VARIABLE  PF1+1                                                453
18      VARIABLE  C1+17                                                454
19      VARIABLE  MX2(1,1)-400                                         455
20      VARIABLE  MX2(1,PF1)-MX2(1,V16)                                456
21      VARIABLE  X45-R5                                               457
22      VARIABLE  PF3-R2                                               458
```

```
23      VARIABLE    PF3-R3
24      VARIABLE    PF3-R4
25      VARIABLE    PF3-R5
26      VARIABLE    PF3-R6
27      VARIABLE    PF3-R7
28      VARIABLE    PF3-R8
29      VARIABLE    PF3-R9
30      VARIABLE    PF3-R10
31      VARIABLE    PF3-R11
32      VARIABLE    PF3-R12
33      VARIABLE    PR+1
34      VARIABLE    PF3-R14
35      VARIABLE    PF3-R15
38      VARIABLE    MX3(1,PF1)-C1
39      VARIABLE    MX3(1,PF1)+MX3(3,PF1)-C1
40      VARIABLE    MX3(1,PF2)+MX3(3,PF2)
41      VARIABLE    PF3-PF10
42      VARIABLE    100+N$PLOTA
43      VARIABLE    130+N$PLOTA
44      VARIABLE    160+N$PLOTA
45      VARIABLE    190+N$PLOTA
46      VARIABLE    220+N$PLOTA
47      VARIABLE    250+N$PLOTA
48      VARIABLE    280+N$PLOTA
49      VARIABLE    310+N$PLOTA
50      VARIABLE    340+N$PLOTA
51      VARIABLE    PF3-PF5
52      VARIABLE    PF3-R17
53      VARIABLE    PF3-R18
54      VARIABLE    PF3-V21
55      VARIABLE    PF3-R19
56      VARIABLE    MX3(1,PF1)-C1
57      VARIABLE    X49-C1
58      VARIABLE    400+PF6
59      VARIABLE    370+N$PLOTA
60      VARIABLE    430+N$PLOTA
61      VARIABLE    460+N$PLOTA
62      VARIABLE    490+N$PLOTA
63      VARIABLE    520+N$PLOTA
*
*  FUNCTION DEFINITIONS
*
*     DATA FLOW RATES FOR EXPERIMENTS
 FLOW  FUNCTION    PF2,D9
1,8640/4,1080/5,1080/6,8640/7,8640/8,360/12,309/44,36000/107,18000
*     DATA FLOW RATES FOR SUBSYSTEMS
 FLOW1 FUNCTION    PF2,D9
1,0/4,1080/5,C/6,C/7,8640/8,0/12,0/44,36000/107,18000
*
*****************************************************************************
**                                                                         **
**  MODULE 2.  EXPERIMENT SCIENCE DATA                                     **
**                                                                         **
**                                                                         **
*****************************************************************************
*
* PART 1. EXPERIMENT TO I/O
```

```
                *                                                                  516
                *     INPUT EXPERIMENT DATA FROM JOBTAPE                           517
                *                                                                  518
                      JOBTAPE   JOBTA1,SEQ1,730                                    519
1              SEQ1   ASSIGN    4,PF3,PF                                           520
2                     TEST LE   PF4,0,BLITZ                                        521
3                     TERMINATE                                                    522
4              BLITZ  ASSIGN    3,FNSFLOW,PF                                       523
5                     TRANSFER  ,LOOP1                                             524
6              UNITS  ADVANCE   1                                                  525
7              LOOP1  SPLIT     1,BLK1                                             526
8                     LOOP      4PF,UNITS                                        527
9                     TERMINATE                                                    528
                *     INPUT FOR EXPERIMENT SCIENCE DATA, PART 4                    529
10             BLK1   SPLIT     1,SECT4                                            530
                *     INPUT FOR SUBSYSTEM ENGINEERING DATA                         531
11                    SPLIT     1,MODL4                                            532
                *                                                                  533
                *    EXPERIMENT RAU                                                534
                *                                                                  535
12             RAU    ASSIGN    3,V13,PF                                           536
                *      TRANSMIT ALL DATA TO EXPERIMENT RAU                         537
                TRNSA  MACRO     RAUSG,2,WAIT2,R2,PART2,RAUEN,IOSEG,__            538
13             RAUSG  GATE SNF   2,WAIT2                                          538
14                    TEST GE   R2,PF3,PART2                                       538
15             RAUEN  ENTER     2,PF3                                              538
               BUFER  MACRO                                                       538
16                    ASSIGN    8,PR,PF                                            538
17                    PRIORITY  0,BUFFER                                           538
18                    PRIORITY  PF8                                                538
19                    ASSIGN    8,2,PF                                             538
20                    ASSIGN    9,S2,PF                                            538
21                    SAVEVALUE V58,PF9                                            538
22                    LEAVE     2,PF3                                              538
23                    TRANSFER  ,IOSEG                                             538
                *     TRANSMIT PART DATA TO EXPERIMENT RAU                         539
                TRNSP  MACRO     PART2,10,R2,MOVP2,12,RAUSG,PF10,RAUEN,V22        540
24             PART2  ASSIGN    10,R2,PF                                           540
25                    SPLIT     1,MOVP2                                            540
26                    PRIORITY  12                                                 540
27                    ASSIGN    3,V22,PF                                           540
28                    ADVANCE   1                                                  540
29                    TRANSFER  ,RAUSG                                             540
30             MOVP2  ASSIGN    3,PF10,PF                                          540
31                    TRANSFER  ,RAUEN                                             540
                *     DELAY TRANSMISSION ONE TIME UNIT                             541
                WAITA  MACRO     WAIT2,11,2,RAUSG                                 542
32             WAIT2  PRIORITY  11                                                 542
33                    QUEUE     2,PF3                                              542
34                    ADVANCE   1                                                  542
35                    DEPART    2,PF3                                              542
36                    TRANSFER  ,RAUSG                                             542
                *                                                                  543
                *    EXPERIMENT I/O                                                544
                *                                                                  545
                *     TRANSMIT ALL DATA TO EXPERIMENT I/O                          546
                TRNSA  MACRO     IOSEG,3,WAIT3,R3,PART3,IDENT,SPLT3,S3            547
```

```
37        IOSEG GATE SNF    3,WAIT3                                          547
38              TEST GE     X3,PF3,PART3                                     547
39        IDENT ENTER       3,PF3                                            547
          BUFFER MACRO                                                       547
40              ASSIGN      8,PR,PF                                          547
41              PRIORITY    0,BUFFER                                         547
42              PRIORITY    PF3                                              547
43              ASSIGN      8,3,PF                                           547
44              ASSIGN      9,S3,PF                                          547
45              SAVEVALUE   V50,PF9                                          547
46              LEAVE       3,PF3                                            547
47              TRANSFER    ,SPLT3                                           547
                *     TRANSMIT PART DATA TO EXPERIMENT I/O                   548
          TRNSP MACRO       PART3,10,R3,MOVP3,16,IOSEG,PF10,IDENT,V23        549
48        PART3 ASSIGN      10,R3,PF                                         549
49              SPLIT       1,MOVP3                                          549
50              PRIORITY    16                                               549
51              ASSIGN      3,V23,PF                                         549
52              ADVANCE     1                                                549
53              TRANSFER    ,IOSEG                                           549
54        MOVP3 ASSIGN      3,PF10,PF                                        549
55              TRANSFER    ,IDENT                                           549
                *     DELAY TRANSMISSION ONE TIME UNIT                       550
          WAITA MACRO       WAIT3,15,3,IOSEG                                 551
56        WAIT3 PRIORITY    15                                               551
57              QUEUE       3,PF3                                            551
58              ADVANCE     1                                                551
59              DEPART      3,PF3                                            551
60              TRANSFER    ,IOSEG                                           551
61        SPLT3 SPLIT       1,EXCPU                                          552
                *   PERCENT OF DATA TRANSMITTED VIA KU OR FM PROCESSOR       553
62              ASSIGN      3,V14,PF                                         554
63              TRANSFER    ,DOWN4                                           555
                *                                                            556
                * PART 2. I/O TO COMPUTER. COMPUTER TO PAYLOAD DATA INTERLEAVER TO 557
                *   TRANSMIT                                                 558
                *                                                            559
                *   EXPERIMENT COMPUTER                                      560
                *                                                            561
                *   PERCENT OF DATA TRANSMITTED THRU COMPUTER                562
64        EXCPU ASSIGN      3,V15,PF                                         563
65              TEST L      PF3,1,SCCPU                                      564
66              ASSIGN      3,1,PF                                           565
                *                                                            566
                *     TRANSMIT DATA TO EXPERIMENT COMPUTER                   567
          COMPA MACRO       SCCPU,R4,FOURB,4,FOURA                           568
67        SCCPU TEST GE     R4,PF3,FOURB                                     568
68              ENTER       4,PF3                                            568
69        FOURA LINK        4,FIFO                                           568
          COMPB MACRO       FOURB,R4,FOURC,FOURD,4,FOURA,V9                  569
70        FOURB TEST G      R4,0,FOURC                                       569
71              ASSIGN      4,R4,PF                                          569
72              SPLIT       1,FOURD                                          569
73              ENTER       4,R4                                             569
74              TRANSFER    ,FOURA                                           569
75        FOURD ASSIGN      3,V9,PF                                          569
          COMPC MACRO       FOURC,FOURA,4,FOURE,FOURF,BUFF4                  570
```

```
FOURC  SPLIT       1,FOURA
       QUEUE       4
       SEIZE       4
       DEPART      4
FOURE  UNLINK      4,FOURF,1
       SPLIT       1,BUFF4
       RELEASE     4
       TERMINATE
COMPD  MACRO       BUFF4,4,X21,FOURG,FOURH,V8,FOURE,V7,X20,4-
BUFF4  SEIZE       4
       TEST E      PF3,X21,FOURG
       RELEASE     4
       TERMINATE
FOURG  TEST L      X21,PF3,FOURH
       ASSIGN      3,V8,PF
       TRANSFER    ,FOURE
FOURH  ASSIGN      3,V7,PF
       ASSIGN      2,X20,PF
       RELEASE     4
       SAVEVALUE   4-,PF3
       LINK        4,LIFO
COMPE  MACRO       FOURF,21,20,4+
FOURF  SAVEVALUE   21,PF3
       SAVEVALUE   20,PF2
       SAVEVALUE   4+,PF3
       TERMINATE
*
*    PAYLOAD DATA INTERLEAVER
*
*       TRANSMIT ALL DATA TO PAYLOAD DATA INTERLEAVER
 TRNSA MACRO       PDPRT,7,GATE7,K7,PIEC7,PAYEN,DACSG,S7
 PDPRT GATE SNF    7,GATE7
       TEST GE     K7,PF3,PIEC7
 PAYEN ENTER       7,PF3
 BUFER MACRO
       ASSIGN      8,PK,PF
       PRIORITY    0,BUFFER
       PRIORITY    PF8
       ASSIGN      8,7,PF
       ASSIGN      9,S7,PF
       SAVEVALUE   V58,PF9
       LEAVE       7,PF3
       TRANSFER    ,DACSG
*       TRANSMIT PART DATA TO PAYLOAD DATA INTERLEAVER
 TRNSP MACRO       PIEC7,10,K7,TRVL7,16,PDPRT,PF10,PAYEN,V27
 PIEC7 ASSIGN      10,K7,PF
       SPLIT       1,TRVL7
       PRIORITY    16
       ASSIGN      3,V27,PF
       ADVANCE     1
       TRANSFER    ,PDPRT
 TRVL7 ASSIGN      3,PF10,PF
       TRANSFER    ,PAYEN
*       DELAY TRANSMISSION ONE TIME UNIT
 WAITA MACRO       GATE7,15,7,PDPRT
 GATE7 PRIORITY    15
       QUEUE       7,PF3
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                ADVANCE     1                                                   501
                ADVANCE     1                                                   501
122             DEPART      7,PF3                                               501
123             TRANSFER    ,PUPR               .                               502
*                                                                               503
*    DATA ACQUISITION CONTROL AND BUFFER UNIT                                   504
*                                                                               505
*       TRANSMIT ALL DATA TO DACBU                                              506
 TRNSA MACRO       DACSG,8,WATE8,R8,PIEC8,DACEN,KUSND,S8                        506
 DACSG GATE SNF    8,WATE8                                                      506
124             TEST GE     R8,PF3,PIEC8                                        506
125      DACEN  ENTER       8,PF3                                               506
 BUFER MACRO                                                                    506
127             ASSIGN      8,PR,PF                                             506
128             PRIORITY    0,BUFFER                                            506
129             PRIORITY    PF8                                                 506
130             ASSIGN      8,3,PF                                              506
131             ASSIGN      9,S8,PF                                             506
132             SAVEVALUE   V58,PF9                                             506
133             LEAVE       8,PF3                                               506
134             TRANSFER    ,KUSND                                              507
*       TRANSMIT PART DATA TO DACBU                                             508
 TRNSP MACRO       PIEC9,10,R6,TRVL8,16,DACSG,PF10,DACEN,V28                    508
 PIEC8 ASSIGN      10,R8,PF                                                     508
135.            SPLIT       1,TRVL8                                             508
136             PRIORITY    16                                                  508
137             ASSIGN      3,V28,PF                                            508
138             ADVANCE     1                                                   508
139             TRANSFER    ,DACSG                                              508
140      TRVL8  ASSIGN      3,PF10,PF                                           508
141             TRANSFER    ,DACEN                                              509
142     *     DELAY TRANSMISSION ONE TIME UNIT                                  510
 WAITA MACRO       WATE8,15,8,DACSG                                             510
 WATE8 PRIORITY    15                                                           510
143             QUEUE       8,PF3                                               510
144             ADVANCE     1                                                   510
145             DEPART      8,PF3                                               510
146             TRANSFER    ,DACSG                                              511
147     *                                                                       512
*       DOWNLINK AVAILABLE?                                                     513
*                                                                               514
 KUSND  GATE U      50,NETWK                                                     515
148     *                                                                       516
*    KU-BAND                                                                    517
*                                                                               518
*       TRANSMIT ALL DATA TO KU-BAND                                            519
 TMITA MACRO       KUSID,12,NETWK,R12,SUM12,S12                                 519
 KUSID GATE SNF    12,NETWK                                                     519
149             TEST GE     R12,PF3,SUM12                                       519
150             ENTER       12,PF3                                              519
151      BUFER  MACRO                                                           519
 BUFER MACRO                                                                    519
152             ASSIGN      8,PR,PF                                             519
153             PRIORITY    0,BUFFER                                            519
154             PRIORITY    PF8                                                 519
155             ASSIGN      8,12,PF                                             519
156             ASSIGN      9,S12,PF                                            519
157             SAVEVALUE   V58,PF9                                             519
158             LEAVE       12,PF3                                              519
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159                 TERMINATE                                                   599
                  TRANSMIT PART DATA TO KU-BAND                               600
                TMITP MACRO       SUM12,10,R12,NETWK,KUSID,V32,DOTA           601
160             SUM12 ASSIGN      10,R12,PF                                   601
161                   SPLIT       1,DOTA                                      601
162                   ASSIGN      3,V32,PF                                    601
163                   TRANSFER    ,NETWK                                      601
164             DOTA  ASSIGN      3,PF10,PF                                   601
165                   TRANSFER    ,KUSID                                      601
166             NETWK GATE U      49,SPIL8                                    602
                *                                                             603
                *   NETWORK SIGNAL PROCESSOR                                  604
                *                                                             605
                *     TRANSMIT ALL DATA TO NETWORK SIGNAL PROCESSOR           606
                TMITA MACRO       NSSND,11,SPIL8,R11,SUM11,S11                607
167             NSSND GATE SNF    11,SPIL8                                    607
168                   TEST GE     R11,PF3,SUM11                               607
169                   ENTER       11,PF3                                      607
                BUFER MACRO                                                   607
170                   ASSIGN      8,PR,PF                                     607
171                   PRIORITY    0,BUFFER                                    607
172                   PRIORITY    PF6                                         607
173                   ASSIGN      8,S11,PF                                    607
174                   ASSIGN      9,S11,PF                                    607
175                   SAVEVALUE   V58,PF9                                     607
176                   LEAVE       11,PF3                                      607
177                   TERMINATE                                               607
                  TRANSMIT PART DATA TO NETWORK SIGNAL PROCESSOR              608
                TMITP MACRO       SUM11,10,R11,SPIL8,NSSND,V31,DOTB           609
178             SUM11 ASSIGN      10,R11,PF                                   609
179                   SPLIT       1,DOTB                                      609
180                   ASSIGN      3,V31,PF                                    609
181                   TRANSFER    ,SPIL8                                      609
182             DOTB  ASSIGN      3,PF10,PF                                   609
183                   TRANSFER    ,NSSND                                      609
184             SPIL8 SAVEVALUE   8+,PF3                                      610
185                   TERMINATE                                               611
                *                                                             612
                * PART 3. I/O TO KU-BAND OR V.R. RECORDER                     613
                *                                                             614
                *     DOWNLINK AVAILABLE?                                     615
                *                                                             616
186             DOWN4 GATE U      50,GLAVL                                    617
                *                                                             618
                *   KU-BAND                                                   619
                *                                                             620
                *     TRANSMIT ALL DATA TO KU-BAND                            621
                TMITA MACRO       KUSEG,12,GLAVL,R12,PRT12,S12                622
187             KUSEG GATE SNF    12,GLAVL                                    622
188                   TEST GE     R12,PF3,PRT12                               622
189                   ENTER       12,PF3                                      622
                BUFER MACRO                                                   622
190                   ASSIGN      8,PR,PF                                     622
191                   PRIORITY    0,BUFFER                                    622
192                   PRIORITY    PF6                                         622
193                   ASSIGN      8,12,PF                                     622
194                   ASSIGN      9,S12,PF                                    622
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195             SAVEVALUE  V58,PF9                                    622
196             LEAVE      12,PF3                                     622
197             TERMINATE                                             622
                *      TRANSMIT PART DATA TO KU-BAND                  623
                TMITP  MACRO      PRT12,10,R12,GLAVL,KUSE6,V32,DUTC   624
198             PRT12  ASSIGN     10,R12,PF                           624
199                    SPLIT      1,DUTC                              624
200                    ASSIGN     3,V32,PF                            624
201                    TRANSFER   ,GLAVL                              624
202             DUTC   ASSIGN     3,PF10,PF                           624
203                    TRANSFER   ,KUSE6                              624
                *                                                     625
                *      GROUNDLINK AVAILABLE?                          626
                *                                                     627
204             GLAVL  GATE U     49,VAREC                            628
                *                                                     629
                *   F.M. SIGNAL PROCESSOR                             630
                *                                                     631
                *      TRANSMIT ALL DATA TO F.M. SIGNAL PROCESSOR     632
                TMITA  MACRO      FMBIT,10,VREC,R10,BIT10,S10         633
205             FMBIT  GATE SNF   10,VAREC                            633
206                    TEST GE    R10,PF3,BIT10                       633
207                    ENTER      10,PF3                              633
                BUFFER MACRO                                          633
208                    ASSIGN     8,PA,PF                             633
209                    PRIORITY   0,BUFFER                            633
210                    PRIORITY   PF8                                 633
211                    ASSIGN     8,10,PF                             633
212                    ASSIGN     9,S10,PF                            633
213                    SAVEVALUE  V58,PF9                             633
214                    LEAVE      10,PF3                              633
215                    TERMINATE                                      633
                *      TRANSMIT PART DATA TO F.M. SIGNAL PROCESSOR    634
                TMITP  MACRO      BIT10,10,R10,VREC,FMBIT,V30,BIT06   635
216             BIT10  ASSIGN     10,R10,PF                           635
217                    SPLIT      1,BIT06                             635
218                    ASSIGN     3,V30,PF                            635
219                    TRANSFER   ,VREC                               635
220             BIT06  ASSIGN     3,PF10,PF                           635
221                    TRANSFER   ,FMBIT                              635
                *                                                     636
                *   V.R. RECORDER                                     637
                *                                                     638
                *      TRANSMIT ALL DATA TO V.R. RECORDER             639
                RECDA  MACRO      VREC,6,LOSE6,R6,PF3,PART6,DUMP6,5   640
222             VREC   PRIORITY   5                                   640
223                    GATE SNF   6,LOSE6                             640
224                    TEST GE    R6,PF3,PART6                        640
225                    ENTER      6,PF3                               640
226                    TRANSFER   ,DUMP6                              640
                *      TRANSMIT PART DATA TO V.R. RECORDER, LOSE PART DATA  641
                RECDP  MACRO      PART6,10,R6,6,11,PF10,PF11,DUMP6,6+,V26  642
227             PART6  ASSIGN     10,R6,PF                            642
228                    ENTER      6,R6                                042
229                    ASSIGN     11,V26,PF                           642
230                    SAVEVALUE  6+,PF11                             642
231                    ASSIGN     3,PF10,PF                           642
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232             TRANSFER    ,DUMP6                                          642
                *                                                           643
                *       DUMP V.R. RECORDER TO (1) KU-BAND, (2) FM SIGNAL PROCESSOR  644
                *                                                           645
                *       DUMP ALL DATA TO KU-BAND                            646
                DUMPA MACRO       DUMPB,DMP6A,12,DMPBA,R12,PTA12,6,KUSEG,50 647
233             DUMP6 GATE U      50,DMP6A                                    647
234                   GATE SNF    12,DMP6A                                    647
235                   TEST GE     R12,PF3,PTA12                               647
236                   LEAVE       6,PF3                                       647
237                   TRANSFER    ,KUSEG                                      647
                *       DUMP PART DATA TO KU-BAND                           648
                DUMPP MACRO       PTA12,10,R12,9,0,DMP6A,PF10,V32,MOV12,6   649
238             PTA12 ASSIGN      10,R12,PF                                   649
239                   SPLIT       1,MOV12                                     649
240                   PRIORITY    9                                           649
241                   ADVANCE     0                                           649
242                   ASSIGN      3,V32,PF                                    649
243                   TRANSFER    ,DMP6A                                      649
244             MOV12 ADVANCE     0                                           649
245                   ASSIGN      3,PF10,PF                                   649
246                   LEAVE       6,PF3                                       649
                JUMP1 MACRO       KUSEG                                       650
247                   TRANSFER    ,KUSEG                                      650
                *       DUMP ALL DATA TO FM-BAND                            651
                DUMPA MACRO       DMPBA,DLAY6,10,DLA6A,R10,PTA10,6,FMSEG,49 652
248             DMP6A GATE U      49,DLAY6                                    652
249                   GATE SNF    10,DLA6A                                    652
250                   TEST GE     R10,PF3,PTA10                               652
251                   LEAVE       6,PF3                                       652
252                   TRANSFER    ,FMSEG                                      652
                *       DUMP PART DATA TO FM BAND                           653
                DUMPP MACRO       PTA10,10,R10,9,1,DUMP6,PF10,V41,MOV06,6   654
253             PTA10 ASSIGN      10,R10,PF                                   654
254                   SPLIT       1,MOV06                                     654
255                   PRIORITY    9                                           654
256                   ADVANCE     1                                           654
257                   ASSIGN      3,V41,PF                                    654
258                   TRANSFER    ,DUMP6                                      654
259             MOV06 ADVANCE     0                                           654
260                   ASSIGN      3,PF10,PF                                   654
261                   LEAVE       6,PF3                                       654
                JUMP1 MACRO       FMSEG                                       655
262                   TRANSFER    ,FMSEG                                      655
                *       DELAY UNTIL DOWNLINK AVAILABLE                      656
                DLAY3 MACRO       DLAYB,8,V57,V5,FBAND,DUMP6                657
263             DLAY6 PRIORITY    8                                           657
264                   TEST GE     V57,V5,FBAND                                657
265                   ADVANCE     V5                                          657
266                   TRANSFER    ,DUMP6                                      657
267             FBAND ADVANCE     V57                                         657
268                   TRANSFER    ,DUMP6                                      657
                *       DELAY ONE TIME UNIT                                 658
                DLAY2 MACRO       DLA6A,0,DUMP6                             659
269             DLA6A PRIORITY    0                                           659
270                   ADVANCE     1                                           659
271                   TRANSFER    ,DUMP0                                      659
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                *                                                                   660
                *   F.M. SIGNAL PROCESSOR                                           661
                *                                                                   662
                *     TRANSMIT ALL DATA TO F.M. SIGNAL PROCESSOR                    663
                *                                                                   664
                 TMITA MACRO       FMSEG,10,DUMP6,R10,PRT10,S10                    665
272              FMSEG GATE SNF    10,DUMP6                                        665
273                    TEST GE     R10,PF3,PRT10                                   665
274                    ENTER       10,PF3                                          665
                 BUFFR MACRO                                                       665
275                    ASSIGN      8,PK,PF                                         665
276                    PRIORITY    0,BUFFER                                        665
277                    PRIORITY    PF8                                             665
278                    ASSIGN      8,10,PF                                         665
279                    ASSIGN      9,S10,PF                                        665
280                    SAVEVALUE   V58,PF9                                         665
281                    LEAVE       10,PF3                                          665
282                    TERMINATE                                                   665
                *     TRANSMIT PART DATA TO F.M. SIGNAL PROCESSOR                 666
                 TMITP MACRO       PRT10,10,R10,DUMP6,FMSEG,V30,DOT6               667
283              PRT10 ASSIGN      10,R10,PF                                       667
284                    SPLIT       1,DOT6                                          667
285                    ASSIGN      3,V30,PF                                        667
286                    TRANSFER    ,DUMP6                                          667
287              DOT6  ASSIGN      3,PR10,PF                                       667
288                    TRANSFER    ,FMSEG                                          667
                *   RECORDER FILLED, DATA LOST ( IN SAVEVALUE 6)                    668
289              LOSE6 SAVEVALUE   64,PF3                                          669
290                    TERMINATE                                                   670
                *                                                                   671
                * PART 4. EXPERIMENT TO KU-BAND OR H.R. RECORDER                    672
                *                                                                   673
                *                                                                   674
                *     DOWNLINK AVAILABLE?                                           675
                *                                                                   676
291              SECT4 ASSIGN      3,V2,PF                                         677
292                    GATE U      50,HRREC                                        678
                *                                                                   679
                *   KU-BAND SIGNAL PROCESSOR                                        680
                *                                                                   681
                *     TRANSMIT ALL DATA TO KU-BAND                                682
                 TMITA MACRO       KUSIG,12,HRREC,R12,SEC12,S12                    683
293              KUSIG GATE SNF    12,HRREC                                        683
294                    TEST GE     R12,PF3,SEC12                                   683
295                    ENTER       12,PF3                                          683
                 BUFFR MACRO                                                       683
296                    ASSIGN      8,PK,PF                                         683
297                    PRIORITY    0,BUFFER                                        683
298                    PRIORITY    PF8                                             683
299                    ASSIGN      8,12,PF                                         683
300                    ASSIGN      9,S12,PF                                        683
301                    SAVEVALUE   V58,PF9                                         683
302                    LEAVE       12,PF3                                          683
303                    TERMINATE                                                   683
                *     TRANSMIT PART DATA TO KU-BAND                               684
                 TMITP MACRO       SEC12,10,R12,HRREC,KUSIG,V32,DOT12              685
304              SEC12 ASSIGN      10,R12,PF                                       685
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305             SPLIT       1,DOT12
306             ASSIGN      3,V32,PF
307             TRANSFER    ,HRREC
308     DOT12   ASSIGN      3,PF10,PF
309             TRANSFER    ,KUSIG
                *
                *   H.R. RECORDER
                *
                *       TRANSMIT DATA TO H.R. RECORDER
                RECDA MACRO       HRREC,5,LOSE5,R5,PF3,PART5,DUMP5,0
310             HRREC PRIORITY    0
311             GATE SNF    5,LOSE5
312             TEST GE     R5,PF3,PART5
313             ENTER       5,PF3
314             TRANSFER    ,DUMP5
                *       TRANSMIT PART DATA TO HIGH RATE RECORDER
                RECDP MACRO       PART5,10,R5,5,11,PF10,PF11,DUMP5,5+,V41
315             PART5 ASSIGN      10,R5,PF
316             ENTER       5,35
317             ASSIGN      11,V41,PF
318             SAVEVALUE   5+,PF11
319             ASSIGN      3,PF10,PF
320             TRANSFER    ,DUMP5
                *
                *     RECORD DATA LOST
                *
321     LOSE5   SAVEVALUE   5+,PF3
322             TERMINATE
                *
                *       DUMP H.R. RECORDER TO KU-BAND
                *
                *       DUMP ALL DATA TO KU-BAND
                DUMPA MACRO       DUMP5,DLAY5,12,DLA5A,R12,SEA12,5,KUSIG,50
323     DUMP5   GATE U      5C,DLAY5
324             GATE SNF    12,DLA5A
325             TEST GE     R12,PF3,SEA12
326             LEAVE       5,PF3
327             TRANSFER    ,KUSIG
                *       DUMP PART DATA TO KU-BAND
                DUMPP MACRO       SEA12,10,R12,4,0,DLA5A,PF10,V32,MOVE5,5
328     SEA12   ASSIGN      10,R12,PF
329             SPLIT       1,MOVE5
330             PRIORITY    4
331             ADVANCE     0
332             ASSIGN      3,V32,PF
333             TRANSFER    ,DLA5A
334     MOVE5   ADVANCE     0
335             ASSIGN      3,PF10,PF
336             LEAVE       5,PF3
                JUMP1 MACRO       KUSIG
337             TRANSFER    ,KJSIG
                *       DELAY UNTIL DOWNLINK AVAILABLE
                DLAY1 MACRO       DLAY5,3,DUMP5
338     DLAY5   PRIORITY    3
339             ADVANCE     V5
340             TRANSFER    ,DUMP5
                *       DELAY ONE TIME UNIT
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                                                                                709
        DLAY2 MACRO     DLA5A,1,DUMP5                                           709
341     DLA5A PRIORITY  1                                                       709
342           ADVANCE   1                                                       709
343           TRANSFER  ,DUMP5                                                  710
      ********************************************************************      711
      **                                                                **      712
      **  MODULE 3.  EXPERIMENT ENGINEERING DATA                        **      713
      **                                                                **      714
      ********************************************************************      715
      *                                                                         716
      *                                                                         717
      *     INPUT EXPERIMENT DATA                                               718
      *                                                                         719
344           GENERATE  1,,200,14775,10,25PF                                    720
345           ASSIGN    3,4X4(1,20),PF                                          721
      *                                                                         722
      * PART 1. EXPERIMENT TO I/O                                               723
      *                                                                         724
      *     EXPERIMENT RAU                                                      725
      *                                                                         726
      *     TRANSMIT ALL DATA TO EXPERIMENT RAU                                 727
        TRNSA MACRO     RAUPT,2,HOLD2,R2,SOME2,RAUGO,IOPRT,S2                   727
        RAUPT GATE SNF  2,HLLD2                                                 727
346           TEST GE   R2,PF3,SOME2                                            727
347     RAUGO ENTER     2,PF3                                                   727
348     BUFER MACRO                                                             727
349           ASSIGN    8,PR,PF                                                 727
350           PRIORITY  0,BUFFER                                                727
351           PRIORITY  PF8                                                     727
352           ASSIGN    8,2,PF                                                  727
353           ASSIGN    9,S2,PF                                                 727
354           SAVEVALUE V58,PF9                                                 727
355           LEAVE     2,PF5                                                   727
356           TRANSFER  ,IOPRT                                                  728
      *     TRANSMIT PART DATA TO EXPERIMENT RAU                                729
        TRNSP MACRO     SOME2,10,R2,TRVL2,12,RAUPT,PF10,RAUGO,V22               729
357     SOME2 ASSIGN    10,R2,PF                                                729
358           SPLIT     1,TRVL2                                                 729
359           PRIORITY  12                                                      729
360           ASSIGN    3,V22,PF                                                729
361           ADVANCE   1                                                       729
362           TRANSFER  ,RAUPT                                                  729
363     TRVL2 ASSIGN    3,PF10,PF                                               729
364           TRANSFER  ,RAUGO                                                  730
      *     DELAY TRANSMISSION ONE TIME UNIT                                    731
        WAITA MACRO     HLLD2,11,2,RAUGO                                        731
365     HOLD2 PRIORITY  11                                                      731
366           QUEUE     2,PF3                                                   731
367           ADVANCE   1                                                       731
368           DEPART    2,PF3                                                   731
369           TRANSFER  ,RAUGO                                                  732
      *                                                                         733
      *     EXPERIMENT I/O                                                      734
      *                                                                         735
      *     TRANSMIT ALL DATA TO EXPERIMENT I/O                                 736
        TRNSA MACRO     IOPRT,3,HOLD3,R3,SOME3,IOGOS,SPLZ3,S3                   736
370     IOPRT GATE SNF  3,HOLD3
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371             TEST GE     R3,PF3,SOME3                                    736
372       IOGOS ENTER       3,PF3                                           736
          BUFER MACRO                                                       736
373             ASSIGN      8,PR,PF                                         736
374             PRIORITY    0,BUFFER                                        736
375             PRIORITY    PF8                                             736
376             ASSIGN      8,3,PF                                          736
377             ASSIGN      9,S3,PF                                         736
378             SAVEVALUE   V53,PF9                                         736
379             LEAVE       3,PF3                                           736
380             TRANSFER    ,SPLZ3                                          736
          *     TRANSMIT PART DATA TO EXPERIMENT I/O                        737
          TRNSP MACRO       BCHC3,10,R3,TRVL3,16,IOPRT,PF10,IOGOS,V30       738
381       SOME3 ASSIGN      10,R3,PF                                        738
382             SPLIT       1,TRVL3                                         736
383             PRIORITY    16                                              738
384             ASSIGN      3,V30,PF                                        738
385             ADVANCE     1                                               738
386             TRANSFER    ,IOPRT                                          738
387       TRVL3 ASSIGN      3,PF10,PF                                       738
388             TRANSFER    ,IOGOS                                          736
          *     DELAY TRANSMISSION ONE TIME UNIT                            739
          WAITA MACRO       HOLD3,15,3,IOPRT                                740
389       HOLD3 PRIORITY    15                                              740
390             CYCLE       3,PF3                                           740
391             ADVANCE     1                                               740
392             DEPART      3,PF3                                           740
393             TRANSFER    ,IOPRT                                          740
          *  EXTRM COULD BE CHANGED TO AN ASSIGN BEFORE POSEG IF SOME DATA    741
          *   BYPASSES THE COMPUTER.                                         742
394       SPLZ3 SPLIT       1,EXTRM                                         743
395             ASSIGN      3,V15,PF                                        744
396             TEST L      PF3,1,EDCPU                                     745
397             ASSIGN      3,1,PF                                          746
          *                                                                 747
          * PART 2. I/O TO COMPUTER TO I/O TO PAYLOAD DATA INTERLEAVER      748
          *                                                                 749
          *    EXPERIMENT COMPUTER                                          750
          *                                                                 751
          *     TRANSMIT DATA TO EXPERIMENT COMPUTER                        752
          COMPA MACRO       EDCPU,R4,FOREB,4,FOREA                          753
398       EDCPU TEST GE     R4,PF3,FOREB                                    753
399             ENTER       4,PF3                                           753
400       FOREA LINK        4,FIFC                                          753
          COMPB MACRO       FOREB,R4,FOREC,FORED,4,FOREA,V9                 754
401       FOREB TEST G      R4,0,FOREC                                      754
402             ASSIGN      4,R4,PF                                         754
403             SPLIT       1,FORED                                         754
404             ENTER       4,R4                                            754
405             TRANSFER    ,FOREA                                          754
406       FORED ASSIGN      3,V9,PF                                         754
          COMPC MACRO       FOREC,FOREA,4,FOREE,FOREF,BUFE4                 755
407       FOREC SPLIT       1,FOREA                                         755
408             QUEUE       4                                               755
409             SEIZE       4                                               755
410             DEPART      4                                               755
411       FOREE UNLINK      4,FOREF,1                                       755
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412                SPLIT       1,BUFE4                                          755
413                RELEASE     4                                                755
414                TERMINATE                                                    755
           COMPD   MACRO       BUFE4,4,X23,FOREG,FOREH,V4,FOREE,V3,X22,4-       755
415        BUFE4   SEIZE       4                                                756
416                TEST E      PF3,X23,FOREG                                    756
417                RELEASE     4                                                756
418                TERMINATE                                                    756
419        FOREG   TEST L      X23,PF3,FOREH                                    756
420                ASSIGN      3,V4,PF                                          756
421                TRANSFER    ,FOREE                                           756
422        FOREH   ASSIGN      3,V3,PF                                          756
423                ASSIGN      2,X22,PF                                         756
424                RELEASE     4                                                756
425                SAVEVALUE   4-,PF3                                           756
426                LINK        4,LIFO                                           756
           COMPE   MACRO       FOREF,23,22,4+                                   756
427        FOREF   SAVEVALUE   23,PF3                                           757
428                SAVEVALUE   22,PF2                                           757
429                SAVEVALUE   4+,PF3                                           757
430                TERMINATE                                                    757
           *****                                                                757
           *     EXPERIMENT ENGINEERING DATA STOPS HERE SINCE IT IS NOT CALLED  758
           *      FROM THE COMPUTER                                             759
           *****                                                                760
           *     TRANSMIT ALL DATA BACK THRU EXPERIMENT I/O                     761
            TRNSA  MACRO       IOEXP,3,STP3,R3,HAF3,IOETR,SEGPD,S3            762
431         IOEXP  GATE SNF    3,STP3                                         763
432                TEST GE     R3,PF3,HAF3                                    763
433         IOETR  ENTER       3,PF3                                          763
            BUFER  MACRO                                                      763
434                ASSIGN      8,PR,PF                                        763
435                PRIORITY    0,BUFFER                                       763
436                PRIORITY    PF3                                            763
437                ASSIGN      8,3,PF                                         763
438                ASSIGN      9,S3,PF                                        763
439                SAVEVALUE   V59,PF9                                        763
440                LEAVE       3,PF3                                          763
441                TRANSFER    ,SEGPD                                         763
           *     TRANSMIT PART DATA BACK THRU EXPERIMENT I/O                    764
            TRNSP  MACRO       HAF3,10,R3,ZIP3,16,IOEXP,PF10,IOETR,V23        765
442         HAF3   ASSIGN      10,R3,PF                                       765
443                SPLIT       1,ZIP3                                         765
444                PRIORITY    16                                             765
445                ASSIGN      3,V23,PF                                       765
446                ADVANCE     1                                              765
447                TRANSFER    ,IOEXP                                         765
448         ZIP3   ASSIGN      3,PF10,PF                                      765
449                TRANSFER    ,IOETR                                         765
           *WAITA  DELAY TRANSMISSION ONE TIME UNIT                           765
450         STP3   PRIORITY    15,15,3,IOEXP                                  766
451                QUEUE       3,PF3                                          767
452                ADVANCE     1                                              767
453                DEPART      3,PF3                                          767
454                TRANSFER    ,IOEXP                                         767
                                                                              767
                                                                              768
```

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                * PART 3. PAYLOAD DATA INTERLEAVER TO TRANSMIT                                  769
                *                                                                               770
455              SEGPD TRANSFER   ,PDSEG                                                        771
                ********************************************************************************772
                **                                                                            **773
                **  MODULE 4.  SUBSYSTEM ENGINEERING DATA                                     **774
                **                                                                            **775
                ********************************************************************************776
                *                                                                               777
                *                                                                               778
                * PART 1. SUBSYSTEM TO I/O                                                      779
                *                                                                               780
                *   SUBSYSTEM ENGINEERING DATA INPUT                                            781
                *                                                                               782
456                     GENERATE   1,,200,14775,,25PF                                           783
457                     ASSIGN     3,MX4(1,21),PF                                               784
458                     TRANSFER   ,SKIP                                                        785
459              MODL4  ASSIGN     3,FNSFLO#1,PF                                                786
460                     ASSIGN     3,V15,PF                                                     787
461              SKIP   PRIORITY   10                                                           788
462                     TEST E     PF3,0,ERAUS                                                  789
463                     TERMINATE                                                               790
                *                                                                               791
                *   SUBSYSTEM RAU                                                               792
                *                                                                               793
                *     TRANSMIT ALL DATA TO SUBSYSTEM RAU                                        794
                TRNSA MACRO       ERAUS,14,#AT14,R14,PRT14,ERAUN,EIOSG,S14                      795
464             ERAUS GATE SNF    14,#AT14                                                      795
465                   TEST GE     R14,PF3,PRT14                                                 795
466             ERAUN ENTER       14,PF3                                                        795
                BUFER MACRO                                                                     795
467                   ASSIGN      8,P#,PF                                                       795
468                   PRIORITY    0,BUFFER                                                      795
469                   PRIORITY    PF8                                                           795
470                   ASSIGN      8,14,PF                                                       795
471                   ASSIGN      9,S14,PF                                                      795
472                   SAVEVALUE   V58,PF9                                                       795
473                   LEAVE       14,PF3                                                        795
474                   TRANSFER    ,EIOSG                                                        795
                *     TRANSMIT PART DATA TO SUBSYSTEM RAU                                       796
                TRNSP MACRO       PRT14,10,R14,MVP14,12,ERAUS,PF10,ERAUN,V34                    797
475             PRT14 ASSIGN      10,R14,PF                                                     797
476                   SPLIT       1,MVP14                                                       797
477                   PRIORITY    12                                                            797
478                   ASSIGN      3,V34,PF                                                      797
479                   ADVANCE     1                                                             797
480                   TRANSFER    ,ERAUS                                                        797
481             MVP14 ASSIGN      3,PF10,PF                                                     797
482                   TRANSFER    ,ERAUN                                                        797
                *     DELAY TRANSMISSION ONE TIME UNIT                                          798
                WAITA MACRO       #AT14,11,14,ERAUS                                             799
483             WAT14 PRIORITY    11                                                            799
484                   QUEUE       14,PF3                                                        799
485                   ADVANCE     1                                                             799
486                   DEPART      14,PF3                                                        799
487                   TRANSFER    ,ERAUS                                                        799
                                                                                                800
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*    SUBSYSTEM I/O                                                          601
*                                                                           602
*       TRANSMIT ALL DATA TO SUBSYSTEM I/O                                  603
 TRNSA MACRO       EIOSG,15,WAT15,R15,PRT15,EIOEN,SPL15,S15                 604
488    EIOSG GATE SNF    15,WAT15                                           604
489          TEST GE     R15,PF3,PRT15                                      604
490    EIOEN ENTER       15,PF3                                             604
 BUFER MACRO                                                               604
491          ASSIGN      8,PR,PF                                            604
492          PRIORITY    0,BUFFER                                           604
493          PRIORITY    PF8                                                604
494          ASSIGN      8,15,PF                                            604
495          ASSIGN      9,S15,PF                                           604
496          SAVEVALUE   V58,PF9                                            604
497          LEAVE       15,PF3                                             604
498          TRANSFER    ,SPL15                                             604
*       TRANSMIT PART DATA TO SUBSYSTEM I/O                                 605
 TRNSP MACRO       PRT15,10,R15,MVP15,16,EIOSG,PF10,EIOEN,V35               606
499    PRT15 ASSIGN      10,R15,PF                                          606
500          SPLIT       1,MVP15                                            606
501          PRIORITY    16                                                 606
502          ASSIGN      3,V35,PF                                           606
503          ADVANCE     1                                                  606
504          TRANSFER    ,EIOSG                                             606
505    MVP15 ASSIGN      3,PF10,PF                                          606
506          TRANSFER    ,EIOEN                                             606
*       DELAY TRANSMISSION ONE TIME UNIT                                    607
 WAITA MACRO       WAT15,15,15,EIOSG                                        608
507    WAT15 PRIORITY    15                                                 608
508          QUEUE       15,PF3                                             608
509          ADVANCE     1                                                  608
510          DEPART      15,PF3                                             608
511          TRANSFER    ,EIOSG                                             608
*                                                                           609
*       ENGINEERING SUBSYSTEM DATA IN I/O; 90 PERCENT TERMINATED 10         610
*         PERCENT TO SUBSYSTEN COMPUTER.                                    611
*                                                                           612
*  SBTRM COULD BE CHANGED TO AN ASSIGN BEFORE POSEG IF SOME DATA            613
*    BYPASSES THE COMPUTER.                                                 614
512    SPL15 SPLIT       1,SBTRM                                            615
513          ASSIGN      3,V15,PF                                           616
514          TEST L      PF3,1,SBCPU                                        617
515          ASSIGN      3,1,PF                                             618
*                                                                           619
* PART 2. I/O TO COMPUTER TO I/O TO PAYLOAD DATA INTERLEAVER                820
*                                                                           821
*    SUBSYSTEM COMPUTER                                                     822
*                                                                           823
*       TRANSMIT DATA TO SUBSYSTEM COMPUTER                                 824
 COMPA MACRO       SBCPU,R16,TEENB,16,TEENA                                 825
516    SBCPU TEST GE     R16,PF3,TEENB                                      825
517          ENTER       16,PF3                                             825
518    TEENA LINK        16,FIFO                                            825
 COMPB MACRO       TEENB,R16,TEENC,TEEND,16,TEENA,V9                        826
519    TEENB TEST G      R16,0,TEENC                                        826
520          ASSIGN      4,R16,PF                                           826
521          SPLIT       1,TEEND                                            826
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522                ENTER       16,R16                                          826
523                TRANSFER    ,TEENA                                          826
524          TEEND ASSIGN      3,V6,PF                                         826
             COMPC MACRO       TEENC,TEENA,16,TEENE,TEENF,BUF16                827
525          TEENC SPLIT       1,TEENA                                         827
526                QUEUE       16                                             827
527                SEIZE       16                                             827
528                DEPART      16                                             827
529          TEENE ENTER       16,TEENF,1                                      827
530                SPLIT       1,BUF16                                        827
531                RELEASE     16                                             827
532                TERMINATE                                                  827
             COMPD MACRO       BUF16,16,X25,TEENG,TEENH,V12,TEENE,V11,X24,16-  828
533          BUF16 SEIZE       16                                             828
534                TEST E      PF3,X25,TEENG                                  828
535                RELEASE     16                                             828
536                TERMINATE                                                  828
537          TEENG TEST L      X25,PF3,TEENH                                  828
538                ASSIGN      3,V12,PF                                       828
539                TRANSFER    ,TEENE                                         828
540          TEENH ASSIGN      3,V11,PF                                       828
541                ASSIGN      2,X24,PF                                       828
542                RELEASE     16                                             828
543                SAVEVALUE   16-,PF3                                        828
544                LINK        16,LIFO                                        828
             COMPE MACRO       TEENF,25,24,16+                                829
545          TEENF SAVEVALUE   25,PF3                                         829
546                SAVEVALUE   24,PF2                                         829
547                SAVEVALUE   16+,PF3                                        829
548                TERMINATE                                                  829
                                                                              830
*****                                                                         831
*    SUBSYSTEM ENGINEERING DATA STOPS HERE SINCE IT IS NOT CALLED             832
*    FROM THE COMPUTER                                                        833
*****                                                                         834
*    TRANSMIT ALL DATA BACK THRU SUBSYSTEM I/O                                835
 TRNSA MACRO       IOSUB,15,STP15,R15,HAF15,IOSTR,PDSEG,S15
549    IOSUB GATE SNF    15,STP15                                             835
550          TEST GE     R15,PF3,HAF15                                        835
551    IOSTR ENTER       15,PF3                                               835
       BUFER MACRO                                                            835
552          ASSIGN      8,P6,PF                                              835
553          PRIORITY    0,BUFFER                                             835
554          PRIORITY    PF8                                                  835
555          ASSIGN      8,15,PF                                              835
556          ASSIGN      9,S15,PF                                             835
557          SAVEVALUE   V58,PF9                                              835
558          LEAVE       15,PF3                                               835
559          TRANSFER    ,PDSEG                                               835
             TRANSMIT PART DATA BACK THRU SUBSYSTEM I/O                       836
       TRNSP MACRO       HAF15,10,R15,ZIP15,16,IOSUB,PF10,IOSTR,V35           837
560    HAF15 ASSIGN      10,R15,PF                                            837
561          SPLIT       1,ZIP15                                              837
562          PRIORITY    16                                                   837
563          ASSIGN      3,V35,PF                                             837
564          ADVANCE     1                                                    837
565          TRANSFER    ,IOSUB                                               837
566    ZIP15 ASSIGN      3,PF10,PF                                            837
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567                TRANSFER    ,IJSTR                                          837
                *       DELAY TRANSMISSION ONE TIME UNIT                    838
                 WAITA MACRO       STP15,15,15,IUSU8                        839
568              STP15 PRIORITY    15                                       839
569                    QUEUE       15,PF3                                   839
570                    ADVANCE     1                                        839
571                    DEPART      15,PF3                                   839
572                    TRANSFER    ,IJSU6                                   840
                *       TRANSMIT TO PAYLOAD DATA INTERLEAVER                841
573                    TRANSFER    ,PDSEG                                   842
                *                                                           843
                * PART 3. PAYLOAD DATA INTERLEAVER TO TRANSMIT               844
                *                                                           845
                *   PAYLOAD DATA INTERLEAVER                                846
                *                                                           847
                *       TRANSMIT ALL DATA TO PAYLOAD DATA INTERLEAVER       848
                 TRNSA MACRO       PDSEG,7,WAIT7,R7,PART7,PDENT,DCSEG,S7    848
574              PDSEG GATE SNF    7,WAIT7                                  848
575                    TEST GE     R7,PF3,PART7                             848
576              PDENT ENTER       7,PF3                                    848
                 BUFFER MACRO                                               848
577                    ASSIGN      8,PR,PF                                  848
578                    PRIORITY    0,BUFFER                                 848
579                    PRIORITY    PF3                                      848
580                    ASSIGN      8,7,PF                                   848
581                    ASSIGN      9,S7,PF                                  848
582                    SAVEVALUE   V58,PF9                                  848
583                    LEAVE       7,PF3                                    848
584                    TRANSFER    ,DCSEG                                   849
                *       TRANSMIT PART DATA TO PAYLOAD DATA INTERLEAVER      850
                 TRNSP MACRO       PART7,10,R7,MOVP7,16,PDSEG,PF10,PDENT,V27 850
585              PART7 ASSIGN      10,R7,PF                                 850
586                    SPLIT       1,MOVP7                                  850
587                    PRIORITY    16                                       850
588                    ASSIGN      3,V27,PF                                 850
589                    ADVANCE     1                                        850
590                    TRANSFER    ,PDSEG                                   850
591              MOVP7 ASSIGN      3,PF10,PF                                850
592                    TRANSFER    ,PDENT                                   850
                *       DELAY TRANSMISSION ONE TIME UNIT                    851
                 WAITA MACRO       WAIT7,15,7,PDSEG                         852
593              WAIT7 PRIORITY    15                                       852
594                    QUEUE       7,PF3                                    852
595                    ADVANCE     1                                        852
596                    DEPART      7,PF3                                    852
597                    TRANSFER    ,PDSEG                                   852
                *                                                           853
                *   DATA ACQUISITION CONTROL AND BUFFER UNIT                854
                *                                                           855
                *       TRANSMIT ALL DATA TO DACBU                          856
                 TRNSA MACRO       DCSEG,8,WAIT8,R8,PART8,DCENT,DLSEG,S8    857
598              DCSEG GATE SNF    8,WAIT8                                  857
599                    TEST GE     R8,PF3,PART8                             857
600              DCENT ENTER       8,PF3                                    857
                 BUFFER MACRO                                               857
601                    ASSIGN      8,PR,PF                                  857
602                    PRIORITY    0,BUFFER                                 857
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603             PRIORITY    PF8                                                 857
604             ASSIGN      8,5,PF                                              857
605             ASSIGN      9,S8,PF                                             857
606             SAVEVALUE   V58,PF9                                             857
607             LEAVE       8,PF3                                               857
608             TRANSFER    ,LLSEG                                              857
                *       TRANSMIT PART DATA TO DAC6U                             858
                TRNSP   MACRO       PART8,10,R8,MOVP8,16,DCSEG,PF10,DCENT,V2    859
609             PART8   ASSIGN      10,R8,PF                                    859
610             SPLIT       1,MOVP8                                             859
611             PRIORITY    16                                                  859
612             ASSIGN      3,V28,PF                                            859
613             ADVANCE     1                                                   859
614             TRANSFER    ,DCSEG                                              859
615             MOVP8   ASSIGN      3,PF10,PF                                   859
616             TRANSFER    ,DCENT                                              860
                *       DELAY TRANSMISSION ONE TIME UNIT                        861
                WAITA   MACRO       WAIT8,15,8,DCSEG                            861
617             WAIT8   PRIORITY    15                                          861
618             QUEUE       8,PF3                                               861
619             ADVANCE     1                                                   861
620             DEPART      8,PF3                                               861
621             TRANSFER    ,DCSEG                                              862
                *                                                               863
                *       DOWNLINK AVAILABLE?                                     864
                *                                                               865
622             DLSEG   GATE U      50,NETWO                                    866
                *                                                               867
                *   KU-BAND                                                     868
                *                                                               869
                *       TRANSMIT ALL DATA TO KU-BAND                            870
                TMITA   MACRO       KUPRT,12,NETWO,R12,PTL12,S12                870
623             KUPRT   GATE SNF    12,NETWO                                    870
624             TEST GE     R12,PF5,PTL12                                       870
625             ENTER       12,PF3                                              870
                BUFER   MACRO                                                   870
626             ASSIGN      8,PK,PF                                             870
627             PRIORITY    0,BUFFER                                            870
628             PRIORITY    PF8                                                 870
629             ASSIGN      8,12,PF                                             870
630             ASSIGN      9,S12,PF                                            870
631             SAVEVALUE   V58,PF9                                             870
632             LEAVE       12,PF3                                              870
633             TERMINATE                                                       871
                *       TRANSMIT PART DATA TO KU-BAND                           872
                TMITP   MACRO       PTL12,10,R12,NETWO,KUPRT,V32,DOTD           872
634             PTL12   ASSIGN      10,R12,PF                                   872
635             SPLIT       1,DOTD                                              872
636             ASSIGN      3,V32,PF                                            872
637             TRANSFER    ,NETWC                                              872
638             DOTD    ASSIGN      3,PF10,PF                                   872
639             TRANSFER    ,KUPRT                                              873
640             NETWO   GATE U      49,LNKEC                                    874
                *                                                               875
                *   NETWORK SIGNAL PROCESSOR                                    876
                *                                                               877
                *       TRANSMIT ALL DATA TO NETWORK SIGNAL PROCESSOR
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          XMITA MACRO       NSPRT,11,LMREC,R11,PRT11,S11                    878
641       NSPRT GATE SNF    11,LMREC                                        878
642             TEST GE     R11,PF3,PRT11                                   878
643             ENTER       11,PF3                                          878
          BUFFER MACRO                                                      878
644             ASSIGN      8,PR,PF                                         878
645             PRIORITY    0,BUFFER                                        878
646             PRIORITY    PF8                                             878
647             ASSIGN      8,11,PF                                         878
648             ASSIGN      9,S11,PF                                        878
649             SAVEVALUE   V58,PF9                                         878
650             LEAVE       11,PF3                                          878
651             TERMINATE                                                   878
          *     TRANSMIT PART DATA TO NETWORK SIGNAL PROCESSOR              879
          XMITP MACRO       PRT11,10,R11,LMREC,NSPRT,V31,OUT11              880
652       PRT11 ASSIGN      10,R11,PF                                       880
653             SPLIT       1,OUT11                                         880
654             ASSIGN      3,V31,PF                                        880
655             TRANSFER    ,LMREC                                          880
656       OUT11 ASSIGN      3,PF10,PF                                       880
657             TRANSFER    ,NSPRT                                          880
          *                                                                 881
          *   LOOP MAINTENANCE RECORDER                                     882
          *                                                                 883
          *     TRANSMIT ALL DATA TO L.M. RECORDER                          884
          RECDA MACRO       LMREC,9,LUSE9,R9,PF3,PART9,DUMP9,10             885
658       LMREC PRIORITY    10                                              885
659             GATE SNF    9,LUSE9                                         885
660             TEST GE     R9,PF3,PART9                                    885
661             ENTER       9,PF3                                           885
662             TRANSFER    ,DUMP9                                          886
          *     TRANSMIT PART DATA TO L.M. RECORDER                         887
          RECDP MACRO       PART9,10,R9,9,11,PF10,PF11,DUMP9,9+,V29         887
663       PART9 ASSIGN      10,R9,PF                                        887
664             ENTER       9,R9                                            887
665             ASSIGN      11,V29,PF                                       887
666             SAVEVALUE   9+,PF11                                         887
667             ASSIGN      3,PF10,PF                                       887
668             TRANSFER    ,DUMP9                                          888
          *                                                                 889
          *     DUMP L.M. RECORDER TO F.M. SIGNAL PROCESSOR                 890
          *                                                                 891
          *     DUMP ALL DATA TO F.M. SIGNAL PROCESSOR                      892
          DUMPA MACRO       DUMP9,DLAY9,10,DLA9A,R10,PRA10,9,FMPRT,49       892
669       DUMP9 GATE U      49,DLAY9                                        892
670             GATE SNF    10,DLA9A                                        892
671             TEST GE     R10,PF3,PRA10                                   892
672             LEAVE       9,PF3                                           892
673             TRANSFER    ,FMPRT                                          892
                DUMP PART DATA TO F.M. SIGNAL PROCESSOR                     893
          DUMPP MACRO       PRA10,10,R10,14,1,DUMP9,PF10,V30,MVA10,9        894
674       PRA10 ASSIGN      10,R10,PF                                       894
675             SPLIT       1,MVA10                                         894
676             PRIORITY    14                                              894
677             ADVANCE     1                                               894
678             ASSIGN      3,V30,PF                                        894
679             TRANSFER    ,DUMP9                                          894
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680       *,210 ADVANCE     0
681             ASSIGN      3,PF10,PF
682             LEAVE       9,PF3
          JUMP1 MACRO       FMPRT
683             TRANSFER    ,FMPPT
          *     DELAY UNTIL DOWNLINK AVAILABLE
          DLAY8 MACRO       DLAY9,16,V57,V5,FMBAD,DUMP9
684       DLAY9 PRIORITY    13
685             TEST GE     V57,V5,FMBAD
686             ADVANCE     V5
687             TRANSFER    ,DUMP9
688       FMBAD ADVANCE     V57
689             TRANSFER    ,DUMP9
          *     DELAY ONE TIME UNIT
          DLAY2 MACRO       DLAYA,11,DUMP9
690       DLAYA PRIORITY    11
691             ADVANCE     1
692             TRANSFER    ,DUMP9
          *
          *    F.M. SIGNAL PROCESSOR
          *
          *       TRANSMIT ALL DATA TO F.M. SIGNAL PROCESSOR
          TMITA MACRO       FMPRT,10,DUMP9,R10,SEG10,S10
693       FMPRT GATE SNF    10,DUMP9
694             TEST GE     R10,PF3,SEG10
695             ENTER       10,PF3
          BUFER MACRO
696             ASSIGN      8,PR,PF
697             PRIORITY    0,BUFFER
698             PRIORITY    PF8
699             ASSIGN      8,10,PF
700             ASSIGN      9,S10,PF
701             SAVEVALUE   V58,PF9
702             LEAVE       10,PF3
703             TERMINATE
          *       TRANSMIT PART DATA TO F.M. SIGNAL PROCESSOR
          TMITP MACRO       SEG10,10,R10,DUMP9,FMPRT,V30,DOT10
704       SEG10 ASSIGN      10,R10,PF
705             SPLIT       1,DOT10
706             ASSIGN      3,V30,PF
707             TRANSFER    ,DUMP9
708       DOT10 ASSIGN      3,PF10,PF
709             TRANSFER    ,FMPRT
710       EXTRM TERMINATE
711       SBTRM TERMINATE
712       LOSE9 SAVEVALUE   9+,PF3
713             TERMINATE
          ********************************************************************
          **                                                                **
          **  MODULE 5. DOWNLINK SCHEDULE                                   **
          **                                                                **
          ********************************************************************
           2      MATRIX     X,1,6C
                  INITIAL    MX2(1,1),417/MX2(1,2),422/MX2(1,3),425/MX2(1,4),500
                  INITIAL    MX2(1,5),503/MX2(1,6),561/MX2(1,7),583/MX2(1,8),594
                  INITIAL    MX2(1,9),600/MX2(1,10),726/MX2(1,11),742
                  INITIAL    MX2(1,12),761/MX2(1,13),772/MX2(1,14),900
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                INITIAL    MX2(1,15),906/MX2(1,16),928/MX2(1,17),950                                  921
                INITIAL    MX2(1,18),1106/MX2(1,19),1117/MX2(1,20),1283                               922
                INITIAL    MX2(1,21),1286/MX2(1,22),1339/MX2(1,23),1344                               923
                INITIAL    MX2(1,24),1411/MX2(1,25),1425/MX2(1,26),1439                               924
                INITIAL    MX2(1,27),1444/MX2(1,28),1500/MX2(1,29),1511                               925
                INITIAL    MX2(1,30),1572/MX2(1,31),1592/MX2(1,32),1606                               926
                INITIAL    MX2(1,33),1608/MX2(1,34),1672/MX2(1,35),1675                               927
                INITIAL    MX2(1,36),1731/MX2(1,37),1755/MX2(1,38),1897                               928
                INITIAL    MX2(1,39),1914/MX2(1,40),1928/MX2(1,41),1939                               929
                INITIAL    MX2(1,42),2069/MX2(1,43),2072/MX2(1,44),2094                               930
                INITIAL    MX2(1,45),2117/MX2(1,46),2272/MX2(1,47),2289                               931
                INITIAL    MX2(1,48),2447/MX2(1,49),2453/MX2(1,50),2511                               932
                INITIAL    MX2(1,51),2517/MX2(1,52),2586/MX2(1,53),2594                               933
                INITIAL    MX2(1,54),2611/MX2(1,55),2617/MX2(1,56),2672                               934
                INITIAL    MX2(1,57),2633/MX2(1,58),2726/MX2(1,59),2739                               935
                INITIAL    MX2(1,60),2797                                                             936
714             GENERATE   ,,400,1,50,25PF          CREATE CNTCL TRANS.                               937
715     LOOP2   ASSIGN     1+,1,PF                  SET INDEX                                         938
716             TEST E     PF1,1,MOVE1              FIRST TIME THROUGH?                               939
717             SAVEVALUE  50,V18                                                                     940
718             ASSIGN     2,V19,PF                 SET FIRST CHANGE TIME                             941
719             TRANSFER   ,DLINK                   GO TO DOWN LINK SECTION                           942
720     MOVE1   ASSIGN     2,V20,PF                 FIND NEXT STATUS CHANGE                           943
721     DLINK   ADVANCE    PF2                                                                        944
722             ASSIGN     1+,1,PF                  INCREMENT EVENT COUNT                             945
723             ASSIGN     2,V20,PF                 FIND NEXT CHANGE                                  946
724             SEIZE      50                       TIES UP FACILITY 50                               947
725             ADVANCE    PF2                      DOWN LINK AVAILABLE                               948
726             RELEASE    50                       RELEASES FACILITY 50                              949
727             TEST E     PF1,60,GOHED             DETERMINE TIME NEXT DOWNLNK                       950
728             ASSIGN     1,0,PF                                                                     951
729             ASSIGN     3+,1,PF                                                                    952
730             ASSIGN     4,1,PF                                                                     953
731             SAVEVALUE  50,V6                                                                      954
732             ADVANCE    3                        TO END OF CYCLE                                   955
733             TRANSFER   ,LOOP2                                                                     956
734     GOHED   ASSIGN     4,V17,PF                                                                   957
735     CKDLK   SAVEVALUE  50,V6                                                                      958
736             TRANSFER   ,LOOP2                                                                     959
        ********************************************************************************            960
        **                                                                          **                961
        **  MODULE 6. GROUND LINK SCHEDULE                                          **                962
        **                                                                          **                963
        ********************************************************************************            964
                                                                                                      965
 3      MATRIX     X,3,353                                                                           966
                INITIAL    MX3(1,1),292/MX3(2,1),330/MX3(3,1),13                                      967
                INITIAL    MX3(1,2),299/MX3(2,2),230/MX3(3,2),12                                      968
                INITIAL    MX3(1,3),301/MX3(2,3),340/MX3(3,3),12                                      969
                INITIAL    MX3(1,4),326/MX3(2,4),280/MX3(3,4),13                                      970
                INITIAL    MX3(1,5),362/MX3(2,5),360/MX3(3,5),12                                      971
                INITIAL    MX3(1,6),452/MX3(2,6),330/MX3(3,6),13                                      972
                INITIAL    MX3(1,7),487/MX3(2,7),280/MX3(3,7),12                                      973
                INITIAL    MX3(1,8),522/MX3(2,8),360/MX3(3,8),13                                      974
                INITIAL    MX3(1,9),561/MX3(2,9),300/MX3(3,9),13                                      975
                INITIAL    MX3(1,10),626/MX3(2,10),300/MX3(3,10),13                                   976
                INITIAL    MX3(1,11),678/MX3(2,11),330/MX3(3,11),13                                   977
                INITIAL    MX3(1,12),731/MX3(2,12),7/MX3(3,12),12
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INITIAL    MX3(1,13),769/MX3(2,13),320/MX3(3,13),13                    978
INITIAL    MX3(1,14),709/MX3(2,14),7/MX3(3,14),13                      979
INITIAL    MX3(1,15),794/MX3(2,15),7/MX3(3,15),13                      980
INITIAL    MX3(1,16),794/MX3(2,16),350/MX3(3,16),13                    981
INITIAL    MX3(1,17),801/MX3(2,17),7/MX3(3,17),16                      982
INITIAL    MX3(1,18),861/MX3(2,18),350/MX3(3,18),13                    983
INITIAL    MX3(1,19),804/MX3(2,19),320/MX3(3,19),13                    984
INITIAL    MX3(1,20),805/MX3(2,20),480/MX3(3,20),3                     985
INITIAL    MX3(1,21),899/MX3(2,21),7/MX3(3,21),13                      986
INITIAL    MX3(1,22),949/MX3(2,22),7/MX3(3,22),15                      987
INITIAL    MX3(1,23),949/MX3(2,23),340/MX3(3,23),12                    988
INITIAL    MX3(1,24),952/MX3(2,24),230/MX3(3,24),12                    989
INITIAL    MX3(1,25),967/MX3(2,25),7/MX3(3,25),9                       990
INITIAL    MX3(1,26),1015/MX3(2,26),340/MX3(3,26),12                   991
INITIAL    MX3(1,27),1019/MX3(2,27),230/MX3(3,27),13                   992
INITIAL    MX3(1,28),1086/MX3(2,28),320/MX3(3,28),13                   993
INITIAL    MX3(1,29),1086/MX3(2,29),7/MX3(3,29),13                     994
INITIAL    MX3(1,30),1100/MX3(2,30),330/MX3(3,30),13                   995
INITIAL    MX3(1,31),1100/MX3(2,31),7/MX3(3,31),13                     996
INITIAL    MX3(1,32),1123/MX3(2,32),7/MX3(3,32),13                     997
INITIAL    MX3(1,33),1166/MX3(2,33),330/MX3(3,33),13                   998
INITIAL    MX3(1,34),1181/MX3(2,34),320/MX3(3,34),13                   999
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INITIAL    MX3(1,36),1502/MX3(2,36),360/MX3(3,36),13                   1001
INITIAL    MX3(1,37),1992/MX3(2,37),280/MX3(3,37),13                   1002
INITIAL    MX3(1,38),2153/MX3(2,38),280/MX3(3,38),13                   1003
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INITIAL    MX3(1,42),2449/MX3(2,42),230/MX3(3,42),12                   1007
INITIAL    MX3(1,43),2451/MX3(2,43),340/MX3(3,43),12                   1008
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INITIAL    MX3(1,49),2630/MX3(2,49),280/MX3(3,49),13                   1014
INITIAL    MX3(1,50),2672/MX3(2,50),360/MX3(3,50),13                   1015
INITIAL    MX3(1,51),2762/MX3(2,51),330/MX3(3,51),13                   1016
INITIAL    MX3(1,52),2797/MX3(2,52),280/MX3(3,52),13                   1017
INITIAL    MX3(1,53),2871/MX3(2,53),300/MX3(3,53),13                   1018
INITIAL    MX3(1,54),2871/MX3(2,54),7/MX3(3,54),13                     1019
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INITIAL    MX3(1,62),3067/MX3(2,62),7/MX3(3,62),13                     1027
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INITIAL    MX3(1,64),3104/MX3(2,64),350/MX3(3,64),13                   1029
INITIAL    MX3(1,65),3118/MX3(2,65),7/MX3(3,65),14                     1030
INITIAL    MX3(1,66),3118/MX3(2,66),280/MX3(3,66),13                   1031
INITIAL    MX3(1,67),3133/MX3(2,67),7/MX3(3,67),12                     1032
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INITIAL    MX3(1,73),3259/MX3(2,73),340/MX3(3,73),13                        1038
INITIAL    MX3(1,74),3262/MX3(2,74),230/MX3(3,74),13                        1039
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INITIAL    MX3(1,76),3273/MX3(2,76),7/MX3(3,76),15                          1041
INITIAL    MX3(1,77),3325/MX3(2,77),340/MX3(3,77),13                        1042
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INITIAL    MX3(1,225),10425/MX3(2,225),320/MX3(3,225),13                   1190
INITIAL    MX3(1,226),10488/MX3(2,226),7/MX3(3,226),13                     1191
INITIAL    MX3(1,227),10488/MX3(2,227),320/MX3(3,227),13                   1192
INITIAL    MX3(1,228),10502/MX3(2,228),330/MX3(3,228),12                   1193
INITIAL    MX3(1,229),10502/MX3(2,229),7/MX3(3,229),16                     1194
INITIAL    MX3(1,230),10525/MX3(2,230),7/MX3(3,230),13                     1195
INITIAL    MX3(1,231),10662/MX3(2,231),330/MX3(3,231),13                   1196
INITIAL    MX3(1,232),10904/MX3(2,232),360/MX3(3,232),13                   1197
INITIAL    MX3(1,233),11394/MX3(2,233),280/MX3(3,233),13                   1198
INITIAL    MX3(1,234),11555/MX3(2,234),260/MX3(3,234),12                   1199
INITIAL    MX3(1,235),11626/MX3(2,235),300/MX3(3,235),13                   1200
INITIAL    MX3(1,236),11796/MX3(2,236),300/MX3(3,236),13                   1201
INITIAL    MX3(1,237),11850/MX3(2,237),230/MX3(3,237),13                   1202
INITIAL    MX3(1,238),11956/MX3(2,238),350/MX3(3,238),13                   1203
INITIAL    MX3(1,239),12011/MX3(2,239),230/MX3(3,239),12                   1204
INITIAL    MX3(1,240),12013/MX3(2,240),340/MX3(3,240),12                   1205
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INITIAL    MX3(1,241),12016/MX3(2,241),350/MX3(3,241),13                    1206
INITIAL    MX3(1,242),12019/MX3(2,242),480/MX3(3,242),3                     1207
INITIAL    MX3(1,243),12038/MX3(2,243),280/MX3(3,243),13                    1208
INITIAL    MX3(1,244),12164/MX3(2,244),330/MX3(3,244),13                    1209
INITIAL    MX3(1,245),12175/MX3(2,245),340/MX3(3,245),13                    1210
INITIAL    MX3(1,246),12198/MX3(2,246),280/MX3(3,246),13                    1211
INITIAL    MX3(1,247),12234/MX3(2,247),360/MX3(3,247),13                    1212
INITIAL    MX3(1,248),12273/MX3(2,248),300/MX3(3,248),13                    1213
INITIAL    MX3(1,249),12324/MX3(2,249),330/MX3(3,249),13                    1214
INITIAL    MX3(1,250),12394/MX3(2,250),360/MX3(3,250),13                    1215
INITIAL    MX3(1,251),12433/MX3(2,251),300/MX3(3,251),13                    1216
INITIAL    MX3(1,252),12468/MX3(2,252),7/MX3(3,252),13                      1217
INITIAL    MX3(1,253),12520/MX3(2,253),280/MX3(3,253),14                    1218
INITIAL    MX3(1,254),12520/MX3(2,254),7/MX3(3,254),13                      1219
INITIAL    MX3(1,255),12534/MX3(2,255),7/MX3(3,255),8                       1220
INITIAL    MX3(1,256),12603/MX3(2,256),7/MX3(3,256),13                      1221
INITIAL    MX3(1,257),12641/MX3(2,257),320/MX3(3,257),13                    1222
INITIAL    MX3(1,258),12641/MX3(2,258),7/MX3(3,258),13                      1223
INITIAL    MX3(1,259),12661/MX3(2,259),340/MX3(3,259),12                    1224
INITIAL    MX3(1,260),12661/MX3(2,260),7/MX3(3,260),18.                     1225
INITIAL    MX3(1,261),12666/MX3(2,261),350/MX3(3,261),13                    1226
INITIAL    MX3(1,262),12679/MX3(2,262),7/MX3(3,262),16                      1227
INITIAL    MX3(1,263),12733/MX3(2,263),350/MX3(3,263),13                    1228
INITIAL    MX3(1,264),12733/MX3(2,264),7/MX3(3,264),16                      1229
INITIAL    MX3(1,265),12736/MX3(2,265),320/MX3(3,265),13                    1230
INITIAL    MX3(1,266),12821/MX3(2,266),340/MX3(3,266),13                    1231
INITIAL    MX3(1,267),12821/MX3(2,267),7/MX3(3,267),16                      1232
INITIAL    MX3(1,268),12824/MX3(2,268),230/MX3(3,268),13                    1233
INITIAL    MX3(1,269),12891/MX3(2,269),7/MX3(3,269),13                      1234
INITIAL    MX3(1,270),12891/MX3(2,270),230/MX3(3,270),13                    1235
INITIAL    MX3(1,271),12907/MX3(2,271),7/MX3(3,271),13                      1236
INITIAL    MX3(1,272),12958/MX3(2,272),320/MX3(3,272),13                    1237
INITIAL    MX3(1,273),12972/MX3(2,273),330/MX3(3,273),13                    1238
INITIAL    MX3(1,274),13038/MX3(2,274),330/MX3(3,274),13                    1239
INITIAL    MX3(1,275),13047/MX3(2,275),340/MX3(3,275),13                    1240
INITIAL    MX3(1,276),13053/MX3(2,276),320/MX3(3,276),12                    1241
INITIAL    MX3(1,277),13215/MX3(2,277),360/MX3(3,277),12                    1242
INITIAL    MX3(1,278),13375/MX3(2,278),360/MX3(3,278),12                    1243
INITIAL    MX3(1,279),13865/MX3(2,279),280/MX3(3,279),13                    1244
INITIAL    MX3(1,280),13930/MX3(2,280),300/MX3(3,280),13                    1245
INITIAL    MX3(1,281),14025/MX3(2,281),280/MX3(3,281),13                    1246
INITIAL    MX3(1,282),14097/MX3(2,282),300/MX3(3,282),12                    1247
INITIAL    MX3(1,283),14166/MX3(2,283),350/MX3(3,283),13                    1248
INITIAL    MX3(1,284),14321/MX3(2,284),230/MX3(3,284),13                    1249
INITIAL    MX3(1,285),14323/MX3(2,285),340/MX3(3,285),13                    1250
INITIAL    MX3(1,286),14327/MX3(2,286),350/MX3(3,286),12                    1251
INITIAL    MX3(1,287),14347/MX3(2,287),280/MX3(3,287),12                    1252
INITIAL    MX3(1,288),14348/MX3(2,288),280/MX3(3,288),13                    1253
INITIAL    MX3(1,289),14417/MX3(2,289),300/MX3(3,289),13                    1254
INITIAL    MX3(1,290),14474/MX3(2,290),330/MX3(3,290),13                    1255
INITIAL    MX3(1,291),14475/MX3(2,291),7/MX3(3,291),21                      1256
INITIAL    MX3(1,292),14481/MX3(2,292),230/MX3(3,292),13                    1257
INITIAL    MX3(1,293),14483/MX3(2,293),340/MX3(3,293),13                    1258
INITIAL    MX3(1,294),14509/MX3(2,294),7/MX3(3,294),22                      1259
INITIAL    MX3(1,295),14509/MX3(2,295),280/MX3(3,295),12                    1260
INITIAL    MX3(1,296),14544/MX3(2,296),360/MX3(3,296),13                    1261
INITIAL    MX3(1,297),14544/MX3(2,297),7/MX3(3,297),13                      1262
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INITIAL    MX3(1,298),14635/MX3(2,298),330/MX3(3,298),13                    1263
INITIAL    MX3(1,299),14705/MX3(2,299),360/MX3(3,299),12                    1264
INITIAL    MX3(1,300),14744/MX3(2,300),7/MX3(3,300),12                      1265
INITIAL    MX3(1,301),14744/MX3(2,301),300/MX3(3,301),12                    1266
INITIAL    MX3(1,302),14779/MX3(2,302),7/MX3(3,302),13                      1267
INITIAL    MX3(1,303),14809/MX3(2,303),7/MX3(3,303),13                      1268
INITIAL    MX3(1,304),14809/MX3(2,304),300/MX3(3,304),13                    1269
INITIAL    MX3(1,305),14841/MX3(2,305),7/MX3(3,305),13                      1270
INITIAL    MX3(1,306),14847/MX3(2,306),7/MX3(3,306),13                      1271
INITIAL    MX3(1,307),14861/MX3(2,307),7/MX3(3,307),13                      1272
INITIAL    MX3(1,308),14881/MX3(2,308),330/MX3(3,308),13                    1273
INITIAL    MX3(1,309),14952/MX3(2,309),320/MX3(3,309),13                    1274
INITIAL    MX3(1,310),14977/MX3(2,310),350/MX3(3,310),13                    1275
INITIAL    MX3(1,311),15044/MX3(2,311),350/MX3(3,311),12                    1276
INITIAL    MX3(1,312),15047/MX3(2,312),320/MX3(3,312),13                    1277
INITIAL    MX3(1,313),15048/MX3(2,313),480/MX3(3,313),2                     1278
INITIAL    MX3(1,314),15134/MX3(2,314),230/MX3(3,314),13                    1279
INITIAL    MX3(1,315),15197/MX3(2,315),340/MX3(3,315),13                    1280
INITIAL    MX3(1,316),15202/MX3(2,316),230/MX3(3,316),12                    1281
INITIAL    MX3(1,317),15269/MX3(2,317),320/MX3(3,317),13                    1282
INITIAL    MX3(1,318),15283/MX3(2,318),330/MX3(3,318),12                    1283
INITIAL    MX3(1,319),15349/MX3(2,319),330/MX3(3,319),12                    1284
INITIAL    MX3(1,320),15364/MX3(2,320),320/MX3(3,320),12                    1285
INITIAL    MX3(1,321),15525/MX3(2,321),360/MX3(3,321),13                    1286
INITIAL    MX3(1,322),15685/MX3(2,322),360/MX3(3,322),13                    1287
INITIAL    MX3(1,323),16175/MX3(2,323),280/MX3(3,323),13                    1288
INITIAL    MX3(1,324),16336/MX3(2,324),280/MX3(3,324),12                    1289
INITIAL    MX3(1,325),16407/MX3(2,325),300/MX3(3,325),13                    1290
INITIAL    MX3(1,326),16477/MX3(2,326),350/MX3(3,326),13                    1291
INITIAL    MX3(1,327),16567/MX3(2,327),300/MX3(3,327),13                    1292
INITIAL    MX3(1,328),16633/MX3(2,328),340/MX3(3,328),13                    1293
INITIAL    MX3(1,329),16637/MX3(2,329),350/MX3(3,329),13                    1294
INITIAL    MX3(1,330),16657/MX3(2,330),280/MX3(3,330),13                    1295
INITIAL    MX3(1,331),16792/MX3(2,331),230/MX3(3,331),12                    1296
INITIAL    MX3(1,332),16794/MX3(2,332),340/MX3(3,332),12                    1297
INITIAL    MX3(1,333),16819/MX3(2,333),280/MX3(3,333),13                    1298
INITIAL    MX3(1,334),16855/MX3(2,334),360/MX3(3,334),13                    1299
INITIAL    MX3(1,335),16945/MX3(2,335),330/MX3(3,335),13                    1300
INITIAL    MX3(1,336),16980/MX3(2,336),280/MX3(3,336),12                    1301
INITIAL    MX3(1,337),17105/MX3(2,337),350/MX3(3,337),13                    1302
INITIAL    MX3(1,338),17114/MX3(2,338),340/MX3(3,338),13                    1303
INITIAL    MX3(1,339),17249/MX3(2,339),310/MX3(3,339),13                    1304
INITIAL    MX3(1,340),17287/MX3(2,340),350/MX3(3,340),13                    1305
INITIAL    MX3(1,341),17301/MX3(2,341),280/MX3(3,341),12                    1306
INITIAL    MX3(1,342),17421/MX3(2,342),320/MX3(3,342),13                    1307
INITIAL    MX3(1,343),17442/MX3(2,343),340/MX3(3,343),12                    1308
INITIAL    MX3(1,344),17445/MX3(2,344),230/MX3(3,344),12                    1309
INITIAL    MX3(1,345),17447/MX3(2,345),350/MX3(3,345),13                    1310
INITIAL    MX3(1,346),17508/MX3(2,346),340/MX3(3,346),12                    1311
INITIAL    MX3(1,347),17512/MX3(2,347),230/MX3(3,347),13                    1312
INITIAL    MX3(1,348),17515/MX3(2,348),460/MX3(3,348),4                     1313
INITIAL    MX3(1,349),17516/MX3(2,349),320/MX3(3,349),13                    1314
INITIAL    MX3(1,350),17580/MX3(2,350),320/MX3(3,350),13                    1315
INITIAL    MX3(1,351),17593/MX3(2,351),330/MX3(3,351),13                    1316
INITIAL    MX3(1,352),17753/MX3(2,352),330/MX3(3,352),13                    1317
INITIAL    MX3(1,353),18068/MX3(2,353),310/MX3(3,353),12                    1318
                                                                            1319
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737             GENERATE    0,,,1,,25PF
738             PRIORITY    50
739             ASSIGN      1,1,PF
740             ASSIGN      2,2,PF
741             SAVEVALUE   49,MX3(1,PF1)
742     ADV     ADVANCE     V33
743             SEIZE       49
744     AGN     TEST G      V10,MX3(1,PF2),SAVEX
745             TEST G      V10,V40,CHAG
746             ASSIGN      2+,1,PF
747             TEST LE     PF2,353,STOPB
748             TRANSFER    ,AGN
749     CHAG    ASSIGN      1,PF2,PF
750             ASSIGN      2+,1,PF
751             TEST LE     PF2,353,STOPB
752             TRANSFER    ,AGN
753     SAVEX   SAVEVALUE   49,MX3(1,PF2)
754             ADVANCE     V39
755             RELEASE     49
756             ASSIGN      1,PF2,PF
757             ASSIGN      2,V17,PF
758             TEST LE     PF2,353,STOPA
759             TRANSFER    ,ADV
760     STOPA   SAVEVALUE   49,MX3(1,PF1)
761             ADVANCE     V38
762             SEIZE       49
763     STOPB   SAVEVALUE   49,16801
764             ADVANCE     V39
765             RELEASE     49
766             TERMINATE
        ********************************************************************************
        **
        **  MODULE 7:  COMMAND DATA
        **
        ********************************************************************************
        *
        * PART 1. GROUND COMMAND DATA THRU NETWORK SIGNAL PROCESSOR
        *
        *   COMMAND DATA INPUT
        *
767             GENERATE    1,,200,,25,25PF
768             ASSIGN      3,MX4(1,14),PF
        *
        *   NETWORK SIGNAL PROCESSOR
        *
        *     TRANSMIT DATA THRU NETWORK SIGNAL PROCESSOR
        RECEV   MACRO       NWCOM,11,NWLUZ
769     NWCOM   GATE SNF    11,NWLUZ
770             ENTER       11,PF3
771             BUFFER
772             LEAVE       11,PF3
773             TRANSFER    ,MDISG
774     NWLUZ   SAVEVALUE   61+,PF3
775             TERMINATE
        *
        *   MDM
        *
```

```
*     TRANSMIT COMMAND DATA TO MDM                                    1373
 TMIT  MACRO       MDISG,17,MDLOZ,R17,MDLOZ,S17                        1374
776    MDISG GATE SNF   17,MDLOZ                                      1374
777          TEST GE    R17,PF3,MDLOZ                                 1374
778          ENTER      17,PF3                                        1374
779          BUFFER                                                   1374
780          ASSIGN     8,17,PF                                       1374
781          ASSIGN     9,S17,PF                                      1374
782          SAVEVALUE  V58,PF9                                       1374
783          LEAVE      17,PF3                                        1374
784          TRANSFER   ,GPISG                                        1375
785    MDLOZ SAVEVALUE  67+,PF3                                       1376
786          TERMINATE                                                1377
*                                                                     1378
*    GPC I/O BUSS                                                     1379
*                                                                     1380
*     TRANSMIT COMMAND DATA TO GPC I/O BUSS                           1381
 TMIT  MACRO       GPISG,18,GPLOZ,R18,GPLOZ,S18                        1382
787    GPISG GATE SNF   18,GPLOZ                                      1382
788          TEST GE    R18,PF3,GPLOZ                                 1382
789          ENTER      18,PF3                                        1382
790          BUFFER                                                   1382
791          ASSIGN     8,18,PF                                       1382
792          ASSIGN     9,S18,PF                                      1382
793          SAVEVALUE  V58,PF9                                       1382
794          LEAVE      18,PF3                                        1382.
795          TRANSFER   ,GPCSG                                        1383
796    GPLOZ SAVEVALUE  68+,PF3                                       1384
797          TERMINATE                                                1385
*    GPC                                                              1386
*                                                                     1387
*     TRANSMIT COMMAND DATA TO GPC                                    1388
 TMIT  MACRO       GPCSG,19,GPLOZ,R19,GPLOZ,S19                        1389
798    GPCSG GATE SNF   19,GPLOZ                                      1389
799          TEST GE    R19,PF3,GPLOZ                                 1389
800          ENTER      19,PF3                                        1389
801          BUFFER                                                   1389
802          ASSIGN     8,19,PF                                       1389
803          ASSIGN     9,S19,PF                                      1389
804          SAVEVALUE  V59,PF9                                       1389
805          LEAVE      19,PF3                                        1389
806          TRANSFER   ,GPUSG                                        1390.
807    GPLOZ SAVEVALUE  69+,PF3                                       1391
808          TERMINATE                                                1392
*                                                                     1393
*    GPC I/O BUSS                                                     1394
*                                                                     1395
*     TRANSMIT COMMAND DATA TO GPC I/O BUSS                           1396
 TMIT  MACRO       GPUSG,18,GPLOZ,R18,GPLOZ,S18                        1397
809    GPUSG GATE SNF   18,GPLOZ                                      1397
810          TEST GE    R18,PF3,GPLOZ                                 1397
811          ENTER      18,PF3                                        1397
812          BUFFER                                                   1397
813          ASSIGN     8,18,PF                                       1397
814          ASSIGN     9,S18,PF                                      1397
815          SAVEVALUE  V58,PF9                                       1397
816          LEAVE      18,PF3                                        1397
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```
*
*   MDM
*
*      TRANSMIT COMMAND DATA TO MDM
 TMIT  MACRO       MDUSG,17,MDLUZ,R17,MDLUZ,S17
817    MDUSG GATE SNF   17,MDLUZ
818          TEST GE    R17,PF3,MDLUZ
819          ENTER      17,PF3
820          BUFFER
821          ASSIGN     8,17,PF
822          ASSIGN     9,S17,PF
823          SAVEVALUE  V58,PF9
824          LEAVE      17,PF3
*
*     ATT. PAYLOAD SEA
*
825          TRANSFER   .MX4(1,5),SUBSY,PSPRT
*
*     PSP ROUTING
*
826    PSPRT TRANSFER   .MX4(1,6),COMSYS,PSP
       TMIT  MACRO      PSP,17,PLOST,R17,PLOST,S17
827    PSP   GATE SNF   17,PLOST
828          TEST GE    R17,PF3,PLOST
829          ENTER      17,PF3
830          BUFFER
831          ASSIGN     8,17,PF
832          ASSIGN     9,S17,PF
833          SAVEVALUE  V58,PF9
834          LEAVE      17,PF3
835          TRANSFER   ,COMSYS
836    PLOST SAVEVALUE  67+,PF3
837          TERMINATE
*
* PART 2. GROUND COMMAND DATA THROUGH KU-BAND
*
*   COMMAND DATA INPUT
*
838          GENERATE   1,,200,,25,25PF
839          ASSIGN     3,MX4(1,15),PF
*
*   KU BAND SIGNAL PROCESSOR
*
*      TRANSMIT DATA THRU KU BAND SIGNAL PROCESSOR
 RECEV MACRO      CKUBP,12,KULOS
840    CKUBP GATE SNF   12,KULOS
841          ENTER      12,PF3
842          BUFFER
843          LEAVE      12,PF3
844          TRANSFER   ,TRANS
845    KULOS SAVEVALUE  12+,PF3
846          TERMINATE
847    TRANS TRANSFER   .MX4(1,7),COMSYS,COMNO
848    COMNO TRANSFER   ,EXCOM
*      TEST TO SEE IF DATA IS FROM CONTROL PANEL
849    COMSYS TEST NE   PF7,1,EXCOM
850          TEST NE    PF7,2,SUCOM
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                *       SUBSYSTEM OR EXPERIMENT COMMAND?                                    1435
851                     TRANSFER    .MX4(1,8),EXCOM,SUCOM                                   1436
                *                                                                           1437
                *    SUBSYSTEM I/O                                                          1438
                *                                                                           1439
                *       TRANSMIT COMMAND DATA TO SUBSYSTEM I/O                              1440
                TMIT    MACRO       SUCOM,15,SULUZ,R15,SULUZ,S15                            1441
852             SUCOM   GATE SNF    15,SULUZ                                                1441
853                     TEST GE     R15,PF3,SULUZ                                           1441
854                     ENTER       15,PF3                                                  1441
855                     BUFFER                                                              1441
856                     ASSIGN      8,15,PF                                                 1441
857                     ASSIGN      9,S15,PF                                                1441
858                     SAVEVALUE   V58,PF9                                                 1441
859                     LEAVE       15,PF3                                                  1441
860                     TRANSFER    .MX4(1,9),SUBCM,SUBSY                                   1442
861             SULUZ   SAVEVALUE   65+,PF3                                                 1443
862                     TERMINATE                                                           1444
                *                                                                           1445
                *    SUBSYSTEM COMPUTER                                                     1446
                *                                                                           1447
                COMPZ   MACRO       SUBCM,R16,SUBB,16,SUBA,SICOM                            1448
863             SUBCM   TEST GE     R16,PF3,SUBB                                            1448
864             SUBA    ENTER       16,PF3                                                  1448
865                     LEAVE       16,PF3                                                  1448
866                     TRANSFER    ,SICOM                                                  1448
                COMPY   MACRO       SUBB,R16,SUBC,SUBD.16.SICOM.V9                          1449
867             SUBB    TEST G      R16,0,SUBC                                              1449
868                     ASSIGN      4,R16,PF                                                1449
869                     SPLIT       1,SUBD                                                  1449
870                     ENTER       16,R16                                                  1449
871                     LEAVE       16,R16                                                  1449
872                     TRANSFER    ,SICOM                                                  1449
873             SUBD    ASSIGN      3,V9,PF                                                 1449
                COMPX   MACRO       SUBC,SUBZ,16,SUBE,SUBF,BUFFS,CH1                        1450
874             SUBC    QUEUE       16                                                      1450
875                     SEIZE       16                                                      1450
876                     DEPART      16                                                      1450
877             SUBE    TEST NE     CH16,0,SUBZ                                             1450
878                     UNLINK      16,SUBF,1                                               1450
879                     SPLIT       1,BUFFS                                                 1450
880             SUBZ    RELEASE     16                                                      1450
881                     TERMINATE                                                           1450
                COMPD   MACRO       BUFFS,16,X25,SUBG,SUB4,V12,SUBE,V11,X24,16-             1451
882             BUFFS   SEIZE       16                                                      1451
883                     TEST E      PF3,X25,SUBG                                            1451
884                     RELEASE     16                                                      1451
885                     TERMINATE                                                           1451
886             SUBG    TEST L      X25,PF3,SUB4                                            1451
887                     ASSIGN      3,V12,PF                                                1451
888                     TRANSFER    ,SUBE                                                   1451
889             SUB4    ASSIGN      3,V11,PF                                                1451
890                     ASSIGN      2,X24,PF                                                1451
891                     RELEASE     16                                                      1451
892                     SAVEVALUE   16-,PF3                                                 1451
893                     LINK        16,LIFO                                                 1451
                COMPE   MACRO       SUBF,25,24,16+                                          1452
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894       SUBF  SAVEVALUE  25,PF3                                                1452
895             SAVEVALUE  24,PF2                                                1452
896             SAVEVALUE  164,PF3                                               1452
897             TERMINATE                                                        1452
                *                                                                1453
                *    SUBSYSTEM I/O                                               1454
                *                                                                1455
                *       TRANSMIT COMMAND DATA TO SUBSYSTEM I/O                   1456
                TMIT  MACRO     SICOM,15,SULUZ,R15,SULUZ,S15                     1457
898             SICOM GATE SNF  15,SULUZ                                         1457
899             TEST GE   R15,PF3,SULUZ                                          1457
900             ENTER     15,PF3                                                 1457
901             BUFFER                                                           1457
902             ASSIGN    8,15,PF                                                1457
903             ASSIGN    9,S15,PF                                               1457
904             SAVEVALUE V53,PF9                                                1457
905             LEAVE     15,P                                                   1457
                *                                                                1458
                *     SUBSYSTEM RAU                                              1459
                *                                                                1460
                TRANSA MACRO      RAUS,14,TRM15,R14,TRM15,GUSU,SUBSY,R14         1461
906             RAUS  GATE SNF    14,TRM15                                       1461
907             TEST GE   R14,PF3,TRM15                                          1461
908             GUSU  ENTER       14,PF3                                         1461
                BUFFR MACRO                                                      1461
909             ASSIGN    8,PR,PF                                                1461
910             PRIORITY  0,BUFFER                                               1461
911             PRIORITY  PF8                                                    1461
912             ASSIGN    8,14,PF                                                1461
913             ASSIGN    9,R14,PF                                               1461
914             SAVEVALUE V53,PF9                                                1461
915             LEAVE     14,PF3                                                 1461
916             TRANSFER  ,SUBSY                                                 1461
                *                                                                1462
                *    SUBSYSTEM                                                   1463
                *                                                                1464
917             SUBSY SAVEVALUE  134,PF3                                         1465
918             TERMINATE                                                        1466
                *                                                                1467
                *    EXPERIMENT I/O                                              1468
                *                                                                1469
                *       TRANSMIT COMMAND DATA TO EXPERIMENT I/O                  1470
                TMIT  MACRO       EXCOM,3,EXLUZ,R3,EXLUZ,S3                      1471
919             EXCOM GATE SNF    3,EXLUZ                                        1471
920             TEST GE   R3,PF3,EXLUZ                                           1471
921             ENTER     3,PF3                                                  1471
922             BUFFER                                                           1471
923             ASSIGN    8,3,PF                                                 1471
924             ASSIGN    9,S3,PF                                                1471
925             SAVEVALUE V53,PF9                                                1471
926             LEAVE     3,PF3                                                  1471
927             TRANSFER  .NX4(1,10),EXPCM,RAUE                                  1472
928             EXLUZ SAVEVALUE  63+,PF3                                         1473
929             TERMINATE                                                        1474
                *                                                                1475
                *     EXPERIMENT COMPUTER                                        1476
                *                                                                1477
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                CUMPZ MACRO     EXPCM,X4,EXPB,4,EXPA,EICOM                      1478
                                                                                1478
930             EXPCM TEST GE   X4,PF3,EXPB                                     1478
931             EXPA  ENTER     4,PF3                                           1478
932                   LEAVE     4,PF3                                           1478
933                   TRANSFER  ,EICOM                                          1478
                CUMPY MACRO     EXPB,X4,EXPC,EXPD,4,EICOM,V9                    1479
                                                                                1479
934             EXPB  TEST G    X4,C,EXPC                                       1479
935                   ASSIGN    4,X4,PF                                         1479
936                   SPLIT     1,EXPD                                          1479
937                   ENTER     4,X4                                            1479
938                   LEAVE     4,X-                                            1479
939                   TRANSFER  ,EICOM                                          1479
940             EXPD  ASSIGN    3,V9,PF                                         1479
                CUMPX MACRO     EXPC,EXPZ,4,EXPE,EXPF,EBUF,CH4                  1480
                                                                                1480
941             EXPC  QUEUE     4                                               1480
942                   SEIZE     4                                               1480
943                   DEPART    4                                               1480
944             EXPE  TEST NE   CH4,0,EXPZ                                      1480
945                   UNLINK    4,EXPF,1                                        1480
946                   SPLIT     1,EBUF                                          1480
947             EXPZ  RELEASE   4                                               1480
948                   TERMINATE                                                 1480
                CUMPD MACRO     EBUF,4,X23,EXPG,EXPH,V4,EXPE,V3,X22,4-          1481
                                                                                1481
949             EBUF  SEIZE     4                                               1481
950                   TEST E    PF3,X23,EXPG                                    1481
951                   RELEASE                                                   1481
952                   TERMINATE                                                 1481
953             EXPG  TEST L    X23,PF3,EXPH                                    1481
954                   ASSIGN    3,V4,PF                                         1481
955                   TRANSFER  ,EXPE                                           1481
956             EXPH  ASSIGN    3,V3,PF                                         1481
957                   ASSIGN    4,X22,PF                                        1481
958                   RELEASE   4                                               1481
959                   SAVEVALUE 4-,PF3                                          1481
960                   LINK      4,LIFO                                          1481
                CUMPE MACRO     EXPF,23,22,4+                                   1482
                                                                                1482
961             EXPF  SAVEVALUE 23,PF3                                          1482
962                   SAVEVALUE 22,PF4                                          1482
963                   SAVEVALUE 4+,PF3                                          1482
964                   TERMINATE                                                 1482
                *                                                               1483
                *   EXPERIMENT I/O                                              1484
                *                                                               1485
                *     TRANSMIT COMMAND DATA TO EXPERIMENT I/O                   1486
                 TMIT  MACRO     EICOM,3,EXLOZ,R3,EXLOZ,S3                      1487
                                                                                1487
965              EICOM GATE SNF  3,EXLOZ                                        1487
966                   TEST GE   R3,PF3,EXLOZ                                    1487
967                   ENTER     3,PF3                                           1487
968                   BUFFER                                                    1487
969                   ASSIGN    8,3,PF                                          1487
970                   ASSIGN    9,S3,PF                                         1487
971                   SAVEVALUE V58,PF9                                         1487
972                   LEAVE     3,PF3                                           1487
                *                                                               1488
                *     EXPERIMENT RAU                                            1489
                *                                                               1490
                 TRNSA MACRO    RAUE,2,TERM3,R2,TERM3,GUEX,EXPSY,S2             1491
```

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973       RAUE  GATE SNF    2,TERM3                                          1491
97-             TEST GE     R2,PF3,TERM3                                     1491
975       GOEX  ENTER       2,PF3                                            1491
          BUFER MACRO                                                        1491
97:             ASSIGN      8,PR,PF                                          1491
977             PRIORITY    0,BUFFER                                         1491
978             PRIORITY    PF8                                              1491
97=             ASSIGN      8,2,PF                                           1491
98:             ASSIGN      9,S2,PF                                          1491
981             SAVEVALUE   V58,PF9                                          1491
982             LEAVE       2,PF3                                            1491
983             TRANSFER    ,EXPSY                                           1491
          *                                                                  1492
          *   EXPERIMENT                                                     1493
          *                                                                  1494
984       EXPSY SAVEVALUE   14,PF3                                           1495
985             TERMINATE                                                    1496
          *                                                                  1497
          * PART 3 CONS CONTROL PANEL                                        1498
          *                                                                  1499
          *    DATA INPUT FROM CONTROL                                       1500
986             GENERATE    1,,200,,25,25PF                                  1501
987             ASSIGN      3,MX4(1,16),PF                                   1502
988             TRANSFER    .MX4(1,11),SUBIO,EXPIO                           1503
          *                                                                  1504
          *     SUBSYSTEM I/O                                                1505
          *                                                                  1506
          *       TRANSMIT ALL DATA TO SUBSYSTEM I/O                         1507
          TRNSA MACRO       SUBIO,15,TRM15,R15,TRM15,GOESU;CPUSU,S15         1508
989       SUBIO GATE SNF    15,TRM15                                         1508
990             TEST GE     R15,PF3,TRM15                                    1508
991       GOESU ENTER       15,PF3                                           1508
          BUFER MACRO                                                        1508
992             ASSIGN      8,PR,PF                                          1508
993             PRIORITY    0,BUFFER                                         1508
994             PRIORITY    PF8                                              1508
995             ASSIGN      8,15,PF                                          1508
996             ASSIGN      9,S15,PF                                         1508
997             SAVEVALUE   V58,PF9                                          1508
998             LEAVE       15,PF3                                           1508
999             TRANSFER    ,CPUSU                                           1508
1000      TRM15 TERMINATE                                                    1509
          *                                                                  1510
          *     SUBSYSTEM COMPUTER                                           1511
          *                                                                  1512
          *       TRANSMIT ALL DATA TO SUBSYSTEM COMPUTER                    1513
          COMPZ MACRO       CPUSU,R16,SIXTB,16,SIXTA,SUBOI                   1514
1001      CPUSU TEST GE     R16,PF3,SIXTB                                    1514
1002      SIXTA ENTER       16,PF3                                           1514
1003            LEAVE       16,PF3                                           1514
1004            TRANSFER    ,SUBOI                                           1514
          COMPY MACRO       SIXTB,R16,SIXTC,SIXTD,16,SUBOI,V9                1515
1005      SIXTB TEST G      R16,0,SIXTC                                      1515
1006            ASSIGN      4,R16,PF                                         1515
1007            SPLIT       1,SIXTD                                          1515
1008            ENTER       16,R16                                           1515
1009            LEAVE       16,R16                                           1515
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1010            TRANSFER    ,SUBOI
1011      SIXTC ASSIGN      3,V9,PF
          COPY  MACRO       SIXTC,SIXTZ,16,SIXTE,SIXTF,BOF16,CH16
1012      SIXTC QUEUE       16
1013            SEIZE       16
1014            DEPART      16
1015      SIXTE TEST NE     CH16,0,SIXTZ
1016            UNLINK      16,SIXTF,1
1017            SPLIT       1,BOF16
1018      SIXTZ RELEASE     16
1019            TERMINATE
          COMPB MACRO       BOF16,16,X25,SIXTG,SIXTH,V12,SIXTE,V11,X24,16-
1020      BOF16 SEIZE       16
1021            TEST E      PF3,X25,SIXTG
1022            RELEASE     16
1023            TERMINATE
1024      SIXTG TEST L      X25,PF3,SIXTH
1025            ASSIGN      3,V12,PF
1026            TRANSFER    ,SIXTE
1027      SIXTH ASSIGN      3,V11,PF
1028            ASSIGN      2,X24,PF
1029            RELEASE     16
1030            SAVEVALUE   16-,PF3
1031            LINK        16,LIFO
          COMPB MACRO       SIXTF,25,24,16+
1032      SIXTF SAVEVALUE   25,PF3
1033            SAVEVALUE   24,PF2
1034            SAVEVALUE   16+,PF3
1035            TERMINATE
*
*     SUBSYSTEM I/O
*
*       TRANSMIT ALL DATA BACK THRU SUBSYSTEM I/O
          TRNSA MACRO       SUBOI,15,TRM15,R15,TRM15,SOIO,GCRQD,S15
1036      SUBOI GATE SNF    15,TRM15
1037            TEST GE     R15,PF3,TRM15
1038      SOIO  ENTER       15,PF3
          BUFER MACRO
1039            ASSIGN      8,PR,PF
1040            PRIORITY    0,BUFFER
1041            PRIORITY    PF8
1042            ASSIGN      8,15,PF
1043            ASSIGN      9,S15,PF
1044            SAVEVALUE   V53,PF9
1045            LEAVE       15,PF3
1046            TRANSFER    ,GCRQD
1047      GCRQD ASSIGN      7,2,PF
1048            TRANSFER    .MX4(1,12),RAUS,MDISG
*
*     EXPERIMENT I/O
*
*       TRANSMIT ALL DATA TO EXPERIMENT I/O
          TRNSA MACRO       EXPIO,3,TERM3,R3,TERM3,GOEIO,CPUEX,S3
1049      EXPIO GATE SNF    3,TERM3
1050            TEST GE     R3,PF3,TERM3
1051      GOEIO ENTER       3,PF3
          BUFER MACRO
```

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1052            ASSIGN      8,PR,PF                                          1530
1053            PRIORITY    0,BUFFER                                         1530
1054            PRIORITY    PF3                                              1530
1055            ASSIGN      8,3,PF                                           1530
1056            ASSIGN      9,S3,PF                                          1530
1057            SAVEVALUE   V53,PF9                                          1530
1058            LEAVE       3,PF3                                            1530
1059            TRANSFER    ,CPUEX                                           1530
1060      TERM3 TERMINATE                                                    1531
                *                                                          1532
                *     EXPERIMENT COMPUTER                                  1533
                *                                                          1534
                *      TRANSMIT DATA TO EXPERIMENT COMPUTER                1535
                COMPZ MACRO       CPUEX,R4,FOARB,4,FOARA,EXPOI             1536
1061      CPUEX TEST GE     R4,PF3,FOARB                                     1536
1062      FOARA ENTER       4,PF3                                            1536
1063            LEAVE       4,PF3                                            1536
1064            TRANSFER    ,EXPOI                                           1536
                COMPY MACRO       FOARB,R4,FOARC,FOARD,4,EXPOI,V9          1537
1065      FOARB TEST G      R4,0,FOARC                                       1537
1066            ASSIGN      4,R4,PF                                          1537
1067            SPLIT       1,FOARD                                          1537
1068            ENTER       4,R4                                             1537
1069            LEAVE       4,R4                                             1537
1070            TRANSFER    ,EXPOI                                           1537
1071      FOARD ASSIGN      3,V9,PF                                          1537
                COMPX MACRO       FOARC,FOARZ,4,FOARE,FOARF,BUUF4,CH4      1538
1072      FOARC QUEUE       4                                                1538
1073            SEIZE       4                                                1538
1074            DEPART      4                                                1538
1075      FOARE TEST NE     CH4,0,FOARZ                                      1538
1076            UNLINK      4,FOARF,1                                        1538
1077            SPLIT       1,BUUF4                                          1538
1078      FOARZ RELEASE     4                                                1538
1079            TERMINATE                                                    1538
                COMPD MACRO       BUUF4,4,X23,FOARG,FOARH,V4,FOARE,V3,X22,4- 1539
1080      BUUF4 SEIZE       4                                                1539
1081            TEST E      PF3,X23,FOARG                                    1539
1082            RELEASE     4                                                1539
1083            TERMINATE                                                    1539
1084      FOARG TEST L      X23,PF3,FOARH                                    1539
1085            ASSIGN      3,V4,PF                                          1539
1086            TRANSFER    ,FOARE                                           1539
1087      FOARH ASSIGN      3,V3,PF                                          1539
1088            ASSIGN      2,X22,PF                                         1539
1089            RELEASE     4                                                1539
1090            SAVEVALUE   4-,PF3                                           1539
1091            LINK        4,LIFO                                           1539
                COMPE MACRO       FOARF,23,22,4+                           1540
1092      FOARF SAVEVALUE   23,PF3                                           1540
1093            SAVEVALUE   22,PF2                                           1540
1094            SAVEVALUE   4+,PF3                                           1540
1095            TERMINATE                                                    1540
                *                                                          1541
                *     EXPERIMENT I/O                                       1542
                *                                                          1543
                *      TRANSMIT ALL DATA BACK THRU EXPERIMENT I/O           1544
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        TRNSA MACRO     EXPOI,3,TERM3,R3,TERM3,GOOIO,COMND,S3                    1545
1096    EXPOI GATE SNF  3,TERM3                                                  1545
1097          TEST GE   R3,PF3,TERM3                                             1545
1098    GOOIO ENTER     3,PF3                                                    1545
        BUFER MACRO                                                              1545
1099          ASSIGN    8,PR,PF                                                  1545
1100          PRIORITY  0,BUFFER                                                 1545
1101          PRIORITY  PF8                                                      1545
1102          ASSIGN    8,3,PF                                                   1545
1103          ASSIGN    9,S3,PF                                                  1545
1104          SAVEVALUE V58,PF9                                                  1545
1105          LEAVE     3,PF3                                                    1545
1106          TRANSFER  ,COMND                                                   1545
1107    COMND ASSIGN    7,1,PF                                                   1546
1108          TRANSFER  .MX4(1,15),RAUG,MDISG                                    1547
      ********************************************************************       1548
      **                                                                **       1549
      **  MODULE 8: GUIDANCE, NAVIGATION AND CONTROL DATA               **       1550
      **                                                                **       1551
      ********************************************************************       1552
      *                                                                          1553
      * PART 1. GPC TO EXPERIMENT COMPUTER AND SUBSYSTEM                         1554
      *                                                                          1555
      *                                                                          1556
      *    INPUT GN&C DATA                                                       1557
      *                                                                          1558
1109          GENERATE  1,,200,,20,25PF                                          1559
1110          ASSIGN    3,MX4(1,17),PF                                           1560
      *                                                                          1561
      *   GPC I/O BUSS                                                           1562
      *                                                                          1563
      *     TRANSMIT GN&C DATA TO GPC I/O BUSS                                   1564
        TRNSA MACRO     GPCPT,18,GPLOZ,R18,GPLOP,GPCR,MDMPT,S18                  1565
1111    GPCPT GATE SNF  16,GPLOZ                                                 1565
1112          TEST GE   R18,PF3,GPLOP                                            1565
1113    GPCR  ENTER     18,PF3                                                   1565
        BUFER MACRO                                                              1565
1114          ASSIGN    8,PR,PF                                                  1565
1115          PRIORITY  0,BUFFER                                                 1565
1116          PRIORITY  PF8                                                      1565
1117          ASSIGN    8,18,PF                                                  1565
1118          ASSIGN    9,S18,PF                                                 1565
1119          SAVEVALUE V58,PF9                                                  1565
1120          LEAVE     18,PF3                                                   1565
1121          TRANSFER  ,MDMPT                                                   1565
        TRNSP MACRO     GPLOP,10,R18,GPCA,12,GPCPT,PF10,GPCR,V53                 1566
1122    GPLOP ASSIGN    10,R18,PF                                                1566
1123          SPLIT     1,GPCA                                                   1566
1124          PRIORITY  12                                                       1566
1125          ASSIGN    3,V53,PF                                                 1566
1126          ADVANCE   1                                                        1566
1127          TRANSFER  ,GPCPT                                                   1566
1128    GPCA  ASSIGN    3,PF10,PF                                                1566
1129          TRANSFER  ,GPCR                                                    1566
      *                                                                          1567
      *   MDM                                                                    1568
      *                                                                          1569
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                *     TRANSMIT GNEC DATA TO MDM                                                    1570
                 TRNSA MACRO       MDMPT,17,MDLOZ,R17,MDLOP,MDMR,SUIOS,S17                       1571
                 MDMPT GATE SNF    17,MDLOZ                                                      1571
1130             TEST GE           R17,PF3,MDLOP                                                 1571
1131             ENTER             17,PF3                                                        1571
1132             BUFFER MACRO                                                                    1571
                       ASSIGN      8,PR,PF                                                       1571
1133                   PRIORITY    0,BUFFER                                                      1571
1134                   PRIORITY    PF3                                                           1571
1135                   ASSIGN      8,17,PF                                                       1571
1136                   ASSIGN      9,S17,PF                                                      1571
1137                   SAVEVALUE   V53,PF9                                                       1571
1138                   LEAVE       17,PF3                                                        1571
1139                   TRANSFER    ,SUIOS                                                        1571
1140             TRNSP MACRO       MDLOP,10,R17,MDM17,12,MDMPT,PF10,MDMR,V52                     1572
                 MDLOP ASSIGN      10,R17,PF                                                     1572
1141                   SPLIT       1,MDM17                                                       1572
1142                   PRIORITY    12                                                            1572
1143                   ASSIGN      3,V52,PF                                                      1572
1144                   ADVANCE     1                                                             1572
1145                   TRANSFER    ,MDMPT                                                        1572
1146             MDM17 ASSIGN      3,PF10,PF                                                     1572
1147                   TRANSFER    ,MDMR                                                         1572
1148             *                                                                               1573
                 *     GNEC DATA SPLITS; PART TO EXPERIMENT I/O, PART TO SUBSYSTEM I/O           1574
                 *       SPLIT     1,EXOIS                                                       1575
                 *                                                                               1576
                 *   SUBSYSTEM I/O                                                               1577
                 *                                                                               1578
                 *     TRANSMIT GNEC DATA TO SUBSYSTEM I/O                                       1579
                 TRNSA MACRO       SUIOS,15,SULOZ,R15,SULOP,SIOR,SUCPU,S15                       1580
                 SUIOS GATE SNF    15,SULOZ                                                      1580
1149             TEST GE           R15,PF3,SULOP                                                 1580
1150             ENTER             15,PF3                                                        1580
1151             BUFFER MACRO                                                                    1580
                       ASSIGN      8,PR,PF                                                       1580
1152                   PRIORITY    0,BUFFER                                                      1580
1153                   PRIORITY    PF3                                                           1580
1154                   ASSIGN      8,15,PF                                                       1580
1155                   ASSIGN      9,S15,PF                                                      1580
1156                   SAVEVALUE   V53,PF9                                                       1580
1157                   LEAVE       15,PF3                                                        1580
1158                   TRANSFER    ,SUCPU                                                        1580
1159             TRNSP MACRO       SULOP,10,R15,SUB15,12,SUIOS,PF10,SIOR,V35                     1581
                 SULOP ASSIGN      10,R15,PF                                                     1581
1160                   SPLIT       1,SUB15                                                       1581
1161                   PRIORITY    12                                                            1581
1162                   ASSIGN      3,V35,PF                                                      1581
1163                   ADVANCE     1                                                             1581
1164                   TRANSFER    ,SUIOS                                                        1581
1165             SUB15 ASSIGN      3,PF10,PF                                                     1581
1166                   TRANSFER    ,SIOR                                                         1581
1167             *                                                                               1582
                 *   SUBSYSTEM COMPUTER                                                          1583
                 *                                                                               1584
                 COMPZ MACRO       SUCPU,R16,SAXTB,16,SAXTA,SUBUI                                1585
1168             SUCPU TEST GE     R16,PF3,SAXTB                                                 1585
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1169     SAXTA ENTER       16,PF3                                                  1585
1170           LEAVE       16,PF3                                                  1585
1171           TRANSFER    ,SUBOI                                                  1585
       COMPY MACRO         SAXTB,R16,SAXTC,SAXTD,16,SUBOI,V9                       1586
1172   SAXTB TEST G        R15,,,SAXTC                                             1586
1173         ASSIGN        4,R16,PF                                                1586
1174         SPLIT         1,SAXTD                                                 1586
1175         ENTER         16,R16                                                  1586
1176         LEAVE         16,R16                                                  1586
1177         TRANSFER      ,SUBOI                                                  1586
1178   SAXTD ASSIGN        3,V9,PF                                                 1586
       COMPX MACRO         SAXTC,SAXTZ,16,SAXTE,SAXTF,BAF16,CH16                   1587
1179   SAXTC SEIZE         16                                                      1587
1180         SEIZE         16                                                      1587
1181         DEPART        16                                                      1587
1182   SAXTE TEST NE       CH16,C,SAXTZ                                            1587
1183         UNLINK        16,SAXTF,1                                              1587
1184         SPLIT         1,BAF16                                                 1587
1185   SAXTZ RELEASE       16                                                      1587
1186         TERMINATE                                                           1587
       COMPD MACRO         BAF16,16,X25,SAXTG,SAXTH,V12,SAXTE,V11,X24,16-          1588
1187   BAF16 SEIZE         16                                                      1588
1188         TEST E        PF3,X25,SAXTG                                           1588
1189         RELEASE       16                                                      1588
1190         TERMINATE                                                           1588
1191   SAXTG TEST L        X25,PF3,SAXTH                                           1588
1192         ASSIGN        3,V12,PF                                                1588
1193         TRANSFER      ,SAXTE                                                  1588
1194   SAXTH ASSIGN        3,V11,PF                                                1588
1195         ASSIGN        2,X24,PF                                                1588
1196         RELEASE       16                                                      1588
1197         SAVEVALUE     16-,PF3                                                 1588
1198         LINK          16,LIFO                                                 1588
       COMPE MACRO         SAXTF,25,24,16+                                         1589
1199   SAXTF SAVEVALUE     25,PF3                                                  1589
1200         SAVEVALUE     24,PF2                                                  1589
1201         SAVEVALUE     16+,PF3                                                 1589
1202         TERMINATE                                                           1589
       *                                                                         1590
       *   SUBSYSTEM I/O                                                         1591
       *                                                                         1592
       *     TRANSMIT GNEC DATA TO SUBSYSTEM I/O                                 1593
       TRNSA MACRO         IOSUS,15,LUZSU,R15,LUZSP,SUIR,SSRAU,S15               1594
1203   IOSUS GATE SNF      15,LUZSU                                                1594
1204         TEST GE       R15,PF3,LUZSP                                           1594
1205   SUIR  ENTER         15,PF3                                                  1594
       BUFER MACRO                                                               1594
1206         ASSIGN        8,PR,PF                                                 1594
1207         PRIORITY      0,BUFFER                                                1594
1208         PRIORITY      PF9                                                     1594
1209         ASSIGN        8,15,PF                                                 1594
1210         ASSIGN        9,S15,PF                                                1594
1211         SAVEVALUE     VF8,PF9                                                 1594
1212         LEAVE         15,PF3                                                  1594
1213         TRANSFER      ,SSRAU                                                  1594
       TRNSP MACRO         LUZSP,10,R15,IOS15,12,IOSUS,PF10,SUIR,V35               1595
1214   LUZSP ASSIGN        10,R15,PF                                               1595
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1215            SPLIT       1,IOS15                                                 1595
1216            PRIORITY    12                                                      1595
1217            ASSIGN      3,V35,PF                                                1595
1218            ADVANCE     1                                                       1595
1219            TRANSFER    ,IOSUS                                                  1595
1220     IOS15  ASSIGN      3,PF10,PF                                               1595
1221            TRANSFER    ,SUIR                                                   1595
                *                                                                   1596
                *   SUBSYSTEM RAU                                                   1597
                *                                                                   1598
                *       TRANSMIT GN&C DATA TO SUBSYSTEM RAU                         1599
      TRNSA MACRO           SSRAU,14,SSLOZ,R14,SSLOP,SRUR,SUBTR,S14                 1600
1222  SSRAU GATE SNF        14,SSLOZ                                                1600
1223            TEST GE     R14,PF3,SSLOP                                           1600
1224  SRUR  ENTER           14,PF3                                                  1600
      BUFER MACRO                                                                   1600
1225            ASSIGN      8,PR,PF                                                 1600
1226            PRIORITY    0,BUFFER                                                1600
1227            PRIORITY    PF3                                                     1600
1228            ASSIGN      8,14,PF                                                 1600
1229            ASSIGN      9,S14,PF                                                1600
1230            SAVEVALUE   V58,PF9                                                 1600
1231            LEAVE       14,PF3                                                  1600
1232            TRANSFER    ,SUBTR                                                  1600
      TRNSP MACRO           SSLOP,10,R14,SSR14,12,SSRAU,PF10,SRUR,V34               1601
1233  SSLOP ASSIGN          10,R14,PF                                               1601
1234            SPLIT       1,SSR14                                                 1601
1235            PRIORITY    12                                                      1601
1236            ASSIGN      3,V34,PF                                                1601
1237            ADVANCE     1                                                       1601
1238            TRANSFER    ,SSRAU                                                  1601
1239  SSR14 ASSIGN          3,PF10,PF                                               1601
1240            TRANSFER    ,SRUR                                                   1601
1241  SUBTR TERMINATE                                                               1602
                *                                                                   1603
                *   EXPERIMENT I/O                                                  1604
                *                                                                   1605
                *       TRANSMIT GN&C DATA TO EXPERIMENT I/O                        1606
      TRNSA MACRO           EXOIS,3,EELOZ,R3,EELOP,EIOR,EPCPU,S3                    1607
1242  EXOIS GATE SNF        3,EELOZ                                                 1607
1243            TEST GE     R3,PF3,EELOP                                            1607
1244  EIOR  ENTER           3,PF3                                                   1607
      BUFER MACRO                                                                   1607
1245            ASSIGN      8,PR,PF                                                 1607
1246            PRIORITY    0,BUFFER                                                1607
1247            PRIORITY    PF3                                                     1607
1248            ASSIGN      8,3,PF                                                  1607
1249            ASSIGN      9,S3,PF                                                 1607
1250            SAVEVALUE   V58,PF9                                                 1607
1251            LEAVE       3,PF3                                                   1607
1252            TRANSFER    ,EPCPU                                                  1607
      TRNSP MACRO           EELOP,10,R3,EXO3,12,EXOIS,PF10,EIOR,V23                 1608
1253  EELOP ASSIGN          10,R3,PF                                                1608
1254            SPLIT       1,EXO3                                                  1608
1255            PRIORITY    12                                                      1608
1256            ASSIGN      3,V23,PF                                                1608
1257            ADVANCE     1                                                       1608
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1258                TRANSFER    ,EXOIS                                    1e08
1259      EXO3      ASSIGN      3,PF10,PF                                 1e08
1260                TRANSFER    ,EILK                                     1e08
                  *                                                       1e09
                  *    EXPERIMENT CPU                                     1e10
                  *                                                       1e11
                  *       TRANSMIT GN&C DATA TO EXPERIMENT COMPUTER        1e12
                  COMPZ MACRO       EPCPU,R4,FORT0,4,FORTA,EPPIO          1e13
1261              EPCPU TEST GE     R4,PF3,FORT3                          1e13
1262              FORTA ENTER       4,PF3                                 1e13
1263                    LEAVE       4,PF3                                 1613
1264                    TRANSFER    ,EPPIC                                1e13
                  COMPY MACRO       FORT0,R4,FORTC,FORTD,4,EPPIO,V9       1e14
1265              FORTD TEST G      R4,0,FORTC                            1614
1266                    ASSIGN      4,R4,PF                               1e14
1267                    SPLIT       1,FORTD                               1e14
1268                    ENTER       4,R4                                  1614
1269                    LEAVE       4,R4                                  1e14
1270                    TRANSFER    ,EPPIC                                1e14
1271              FORTD ASSIGN      3,V9,PF                               1614
                  COMPX MACRO       FORTC,FORTZ,4,FORTE,FORTF,BAFF4,CH4   1e15
1272              FORTC QUEUE       4                                     1615
1273                    SEIZE       4                                     1615
1274                    DEPART      4                                     1e15
1275              FORTE TEST NE     CH4,0,FORTZ                           1e15
1276                    UNLINK      4,FORTF,1                             1615
1277                    SPLIT       1,BAFF4                               1615
1278              FORTZ RELEASE     4                                     1e15
1279                    TERMINATE                                         1615
                  COMPD MACRO       BAFF4,4,X23,FORTG,FORTH,V4,FORTE,V3,X22,4-  1e16
1280              BAFF4 SEIZE       4                                     1e16
1281                    TEST E      PF3,X23,FORTG                         1616
1282                    RELEASE     4                                     1e16
1283                    TERMINATE                                         1616
1284              FORTG TEST L      X23,PF3,FORTH                         1e16
1285                    ASSIGN      3,V4,PF                               1e16
1286                    TRANSFER    ,FORTE                                1e16
1287              FORTH ASSIGN      3,V3,PF                               1e16
1288                    ASSIGN      2,X22,PF                              1616
1289                    RELEASE     4                                     1e16
1290                    SAVEVALUE   4-,PF3                                1616
1291                    LINK        4,LIFO                                1617
                  COMPE MACRO       FORTF,23,22,4+                        1617
1292              FORTF SAVEVALUE   23,PF3                                1e17
1293                    SAVEVALUE   22,PF2                                1617
1294                    SAVEVALUE   4+,PF3                                1617
1295                    TERMINATE                                         1618
1296              EPPIO TERMINATE                                         1619
                  *                                                       1620
                  * PART 2. EXPERIMENT/SUBSYSTEM TO GPC                   1621
                  *                                                       1622
                  *                                                       1623
                  *    INPUT SUBSYSTEM GN&C DATA                          1624
1297                    GENERATE    1,,,,30,25PF                          1625
1298                    ASSIGN      3,MX4(1,18),PF                        1e26
                  *                                                       1627
                  *    SUBSYSTEM RAU
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                                                                                1628
          TRANSMIT GN&C DATA TO SUBSYSTEM RAU                                   1629
     TRNSA MACRO      SYRAU,14,SYLOZ,R14,SYLUP,SRAR,SYIND,S14                   1630
1299 SYRAU GATE SNF   14,SYLOZ                                                  1630
1300       TEST GE    R14,PF3,SYLUP                                             1630
1301 SRAR  ENTER      14,PF3                                                    1630
     BUFER MACRO                                                                1630
1302       ASSIGN     8,PR,PF                                                   1630
1303       PRIORITY   0,BUFFER                                                  1630
1304       PRIORITY   PF8                                                       1630
1305       ASSIGN     8,14,PF                                                   1630
1306       ASSIGN     9,S14,PF                                                  1630
1307       SAVEVALUE  V58,PF9                                                   1630
1308       LEAVE      14,PF3                                                    1630
1309       TRANSFER   ,SYIND                                                    1630
     TRNSP MACRO      SYLUP,10,R14,SYR14,12,SYRAU,PF10,SRAR,V34                 1631
1310 SYLUP ASSIGN     10,R14,PF                                                 1631
1311       SPLIT      1,SYR14                                                   1631
1312       PRIORITY   12                                                        1631
1313       ASSIGN     3,V34,PF                                                  1631
1314       ADVANCE    1                                                         1631
1315       TRANSFER   ,SYRAU                                                    1631
1316 SYR14 ASSIGN     3,PF10,PF                                                 1631
1317       TRANSFER   ,SRAR                                                     1631
     *                                                                          1632
     *    SUBSYSTEM I/O                                                         1633
     *                                                                          1634
     *      TRANSMIT GN&C DATA TO SUBSYSTEM I/O                                 1635
     TRNSA MACRO      SYIND,15,SYLOZ,R14,SYLUP,SUER,SYCPU,S15                   1636
1318 SYIND GATE SNF   15,SYLOZ                                                  1636
1319       TEST GE    R14,PF3,SYLUP                                             1636
1320 SUER  ENTER      15,PF3                                                    1636
     BUFER MACRO                                                                1636
1321       ASSIGN     8,PR,PF                                                   1636
1322       PRIORITY   0,BUFFER                                                  1636
1323       PRIORITY   PF8                                                       1636
1324       ASSIGN     8,15,PF                                                   1636
1325       ASSIGN     9,S15,PF                                                  1636
1326       SAVEVALUE  V58,PF9                                                   1636
1327       LEAVE      15,PF3                                                    1636
1328       TRANSFER   ,SYCPU                                                    1636
     TRNSP MACRO      SYLUP,10,R14,SY114,12,SYIND,PF10,SUER,V35                 1637
1329 SYLUP ASSIGN     10,R14,PF                                                 1637
1330       SPLIT      1,SY114                                                   1637
1331       PRIORITY   12                                                        1637
1332       ASSIGN     3,V35,PF                                                  1637
1333       ADVANCE    1                                                         1637
1334       TRANSFER   ,SYIND                                                    1637
1335 SY114 ASSIGN     3,PF10,PF                                                 1637
1336       TRANSFER   ,SUER                                                     1637
     *                                                                          1638
     *    SUBSYSTEM COMPUTER                                                    1639
     *                                                                          1640
     *      TRANSMIT GN&C DATA TO SUBSYSTEM COMPUTER                            1641
     COMPZ MACRO      SYCPU,R16,SYXTB,16,SYXTA,SYSUB                            1642
1337 SYCPU TEST GE    R15,PF3,SYXTB                                             1642
1338 SYXTA ENTER      16,PF3                                                    1642
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1339            LEAVE       16,PF3                                                  1642
1340            TRANSFER    ,SYSUB                                                  1642
                COMPY MACRO         SYXTB,R16,SYXTC,SYXTD,16,SYSUB,V9               1643
1341            SYXTB TEST G        R16,0,SYXTC                                     1643
1342                  ASSIGN        4,R16,PF                                        1643
1343                  SPLIT         1,SYXTD                                         1643
1344                  ENTER         16,R16                                          1643
1345                  LEAVE         16,R16                                          1643
1346                  TRANSFER      ,SYSUB                                          1643
1347            SYXTD ASSIGN        3,V9,PF                                         1643
                COMPX MACRO         SYXTC,SYXTZ,16,SYXTE,SYXTF,BYF16,CH16           1644
1348            SYXTC QUEUE         16                                              1644
1349                  SEIZE         16                                              1644
1350                  DEPART        16                                              1644
1351            SYXTE TEST NE       CH16,0,SYXTZ                                    1644
1352                  UNLINK        16,SYXTF,1                                      1644
1353                  SPLIT         1,BYF16                                         1644
1354            SYXTZ RELEASE       16                                              1644
1355                  TERMINATE                                                     1644
                COMPD MACRO         BYF16,16,X25,SYXTG,SYXTH,V12,SYXTE,V11,X24,16-  1645
1356            BYF16 SEIZE         16                                              1645
1357                  TEST E        PF3,X25,SYXTG                                   1645
1358                  ADVANCE       16                                              1645
1359                  TERMINATE                                                     1645
1360            SYXTG TEST L        X25,PF3,SYXTH                                   1645
1361                  ASSIGN        3,V12,PF                                        1645
1362                  TRANSFER      ,SYXTE                                          1645
1363            SYXTH ASSIGN        3,V11,PF                                        1645
1364                  ASSIGN        2,X24,PF                                        1645
1365                  RELEASE       16                                              1645
1366                  SAVEVALUE     16-,PF3                                         1645
1367                  LINK          16,LIFO                                         1645
                COMPE MACRO         SYXTF,25,24,16+                                 1646
1368            SYXTF SAVEVALUE     25,PF3                                          1646
1369                  SAVEVALUE     24,PF2                                          1646
1370                  SAVEVALUE     16+,PF3                                         1646
1371                  TERMINATE                                                     1646
                *                                                                   1647
                *     GN&C DATA SPLITS; PART TO SUBSYSTEM TRAU, PART TO MDM         1648
                *                                                                   1649
1372            SYSUB SPLIT         1,IOSUS                                         1650
                *                                                                   1651
                *   SUBSYSTEM I/O                                                   1652
                *                                                                   1653
                *     TRANSMIT DATA TO SUBSYSTEM I/O                                1654
                TRNSA MACRO         SYIOU,15,SYLAZ,R15,SYLAP,SINR,MDPRT,S15         1655
1373            SYIOU GATE SNF      15,SYLAZ                                        1655
1374                  TEST GE       R15,PF3,SYLAP                                   1655
1375            SINR  ENTER         15,PF3                                          1655
                BUFER MACRO                                                         1655
1376                  ASSIGN        8,PR,PF                                         1655
1377                  PRIORITY      0,BUFFER                                        1655
1378                  PRIORITY      PF3                                             1655
1379                  ASSIGN        8,15,PF                                         1655
1380                  ASSIGN        9,S15,PF                                        1655
1381                  SAVEVALUE     V58,PF9                                         1655
1382                  LEAVE         15,PF3                                          1655
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1383            TRANSFER    ,MDPRT                                                  1655
        TRNSP   MACRO       SYLAP,10,R15,SYI15,12,SYIOU,PF10,SINK,V35               1656
1384    SYLAP   ASSIGN      10,R15,PF                                               1656
1385            SPLIT       1,SYI15                                                 1656
1386            PRIORITY    12                                                      1656
1387            ASSIGN      3,V35,PF                                                1656
1388            ADVANCE     1                                                       1656
1389            TRANSFER    ,SYIOU                                                  1656
1390    SYI15   ASSIGN      3,PF1C,PF                                               1656
1391            TRANSFER    ,SINK                                                   1656
                *                                                                   1657
                *   MDM                                                             1658
                *                                                                   1659
                *       TRANSMIT DATA TO MDM                                        1660
        TRNSA   MACRO       MDPRT,17,MDLST,R17,MDLSP,MDER,GPPRT,S17                 1661
1392    MDPRT   GATE SNF    17,MDLST                                                1661
1393            TEST GE     R17,PF3,MDLSP                                           1661
1394    MDER    ENTER       17,PF3                                                  1661
        BUFER   MACRO                                                               1661
1395            ASSIGN      8,PP,PF                                                 1661
1396            PRIORITY    0,BUFFER                                                1661
1397            PRIORITY    PF8                                                     1661
1398            ASSIGN      8,17,PF                                                 1661
1399            ASSIGN      9,S17,PF                                                1661
1400            SAVEVALUE   V58,PF9                                                 1661
1401            LEAVE       17,PF3                                                  1661
1402            TRANSFER    ,GPPRT                                                  1661
        TRNSP   MACRO       MDLSP,10,R17,MDP17,12,MDPRT,PF10,MDER,V52               1662
1403    MDLSP   ASSIGN      10,R17,PF                                               1662
1404            SPLIT       1,MDP17                                                 1662
1405            PRIORITY    12                                                      1662
1406            ASSIGN      3,V52,PF                                                1662
1407            ADVANCE     1                                                       1662
1408            TRANSFER    ,MDPRT                                                  1662
1409    MDP17   ASSIGN      3,PF10,PF                                               1662
1410            TRANSFER    ,MDER                                                   1662
                *                                                                   1663
                *   GPC I/O BUS                                                     1664
                *                                                                   1665
                *                                                                   1666
        TRNSA   MACRO       GPPRT,18,GPLST,R18,GPLSP,GIOR,GPCAT,S18                 1667
1411    GPPRT   GATE SNF    18,GPLST                                                1667
1412            TEST GE     R18,PF3,GPLSP                                           1667
1413    GIOR    ENTER       18,PF3                                                  1667
        BUFER   MACRO                                                               1667
1414            ASSIGN      8,PP,PF                                                 1667
1415            PRIORITY    0,BUFFER                                                1667
1416            PRIORITY    PF8                                                     1667
1417            ASSIGN      8,18,PF                                                 1667
1418            ASSIGN      9,S18,PF                                                1667
1419            SAVEVALUE   V58,PF9                                                 1667
1420            LEAVE       18,PF3                                                  1667
1421            TRANSFER    ,GPCAT                                                  1667
        TRNSP   MACRO       GPLSP,10,R18,GPP18,12,GPPRT,PF10,GIOR,V53               1668
1422    GPLSP   ASSIGN      10,R18,PF                                               1668
1423            SPLIT       1,GPP18                                                 1668
1424            PRIORITY    12                                                      1668
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1425            ASSIGN      3,V53,PF                                    1668
1426            ADVANCE     1                                           1668
1427            TRANSFER    ,GPPRT                                      1668
1428     GPP18  ASSIGN      3,PF10,PF                                   1668
1429            TRANSFER    ,GICR                                       1669
                *                                                       1670
                *   GPC                                                 1671
                *                                                       1672
                *                                                       1673
                TRNSA  MACRO       GPCAT,19,GPCLT,R19,GPCLP,GPER,GPCTR,S19  1673
1430            GPCAT  GATE SNF    19,GPCLT                             1673
1431            TEST GE            R19,PF3,GPCLP                        1673
1432            GPER   ENTER       19,PF3                               1673
                BUFER  MACRO                                            1673
1433            ASSIGN             8,PR,PF                              1673
1434            PRIORITY           0,BUFFER                             1673
1435            PRIORITY           PF3                                  1673
1436            ASSIGN             8,19,PF                              1673
1437            ASSIGN             9,S19,PF                             1673
1438            SAVEVALUE          V53,PF9                              1673
1439            LEAVE              19,PF3                               1673
1440            TRANSFER           ,GPCTR                               1674
                TRNSP  MACRO       GPCLP,10,R19,GPC19,12,GPCAT,PF10,GPER,V55  1674
1441            GPCLP  ASSIGN      10,R19,PF                            1674
1442            SPLIT              1,GPC19                              1674
1443            PRIORITY           12                                   1674
1444            ASSIGN             3,V55,P                              1674
1445            ADVANCE            1                                    1674
1446            TRANSFER           ,GPCAT                               1674
1447            GPC19  ASSIGN      3,PF10,PF                            1674
1448            TRANSFER           ,GPER                                1675
1449            GPCTR  TERMINATE                                        1676
                *                                                       1677
                *   INPUT ENGINEERING GNEC DATA                         1678
                *                                                       1679
1450            GENERATE           1,,,,30,25PF                         1680
1451            ASSIGN             3,MX4(1,19),PF                       1681
                *                                                       1682
                *   EXPERIMENT RAU                                      1683
                *                                                       1684
                *      TRANSMIT GNEC DATA TO EXPERIMENT RAU             1685
                TRNSA  MACRO       XPRAU,2,XPLUZ,R2,XPLUP,XRAU,XPIND,S2  1685
1452            XPRAU  GATE SNF    2,XPLUZ                              1685
1453            TEST GE            R2,PF3,XPLUP                         1685
1454            XRAU   ENTER       2,PF3                                1685
                BUFER  MACRO                                            1685
1455            ASSIGN             8,PR,PF                              1685
1456            PRIORITY           0,BUFFER                             1685
1457            PRIORITY           PF8                                  1685
1458            ASSIGN             8,2,PF                               1685
1459            ASSIGN             9,S2,PF                              1685
1460            SAVEVALUE          V58,PF9                              1685
1461            LEAVE              2,PF3                                1685
1462            TRANSFER           ,XPIND                               1685
                TRNSP  MACRO       XPLUP,10,R2,XPR2,12,XPRAU,PF10,XRAU,V22  1686
1463            XPLUP  ASSIGN      10,R2,PF                             1686
1464            SPLIT              1,XPR2                               1686
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1465            PRIORITY    12                                              1686
1466            ASSIGN      3,V22,PF                                        1686
1467            ADVANCE     1                                               1686
1468            TRANSFER    ,XPRAU                                          1686
1469     XPR2   ASSIGN      3,PF1C,PF                                       1686
1470            TRANSFER    ,XRAU                                           1687
                *                                                           1688
                *   EXPERIMENT I/O                                          1689
                *                                                           1690
                *       TRANSMIT ONEC DATA TO EXPERIMENT I/O                1691
                TRNSA MACRO         XPINO,3,XPLOZ,R3,XPLOP,EXIR,XPCPU,S3    1691
1471            XPINO GATE SNF      3,XPLCZ                                 1691
1472            TEST GE             R3,PF3,XPL..P                           1691
1473            EXIR  ENTER         3,PF3                                   1691
                BUFER MACRO                                                 1691
1474            ASSIGN      8,PR,PF                                         1691
1475            PRIORITY    0,BUFFER                                        1691
1476            PRIORIT     PF3                                             1691
1477            ASSIGN      8,3,PF...                                       1691
1478            ASSIGN      9,S3,PF                                         1691
1479            SAVEVALUE   V53,PF9                                         1691
1480            LEAVE       3,PF3                                           1691
1481            TRANSFER    ,XPCPL                                          1691
                TRNSP MACRO         XPLOP,10,R3,XPI3,12,XPINO,PF10,EXIR,V23 1692
1482            XPLOP ASSIGN        10,R3,PF                                1692
1483            SPLIT       1,XPI3                                          1692
1484            PRIORITY    12                                              1692
1485            ASSIGN      3,V23,PF                                        1692
1486            ADVANCE     1                                               1692
1487            TRANSFER    ,XPINC                                          1692
1488     XPI3   ASSIGN      3,PF1C,PF                                       1692
1489            TRANSFER    ,EXIR                                           1693
                *   EXPERIMENT COMPUTER                                     1694
                *                                                           1695
                *       TRANSMIT ONEC DATA TO EXPERIMENT COMPUTER           1696
                COMPZ MACRO         XPCPU,R4,FOXTB,4,FOXTA,XPCOM            1696
1490            XPCPU TEST GE       R4,PF3,FOXTB                            1696
1491            FOXTA ENTER         4,PF3                                   1696
1492            LEAVE       4,PF3                                           1696
1493            TRANSFER    ,XPCOM                                          1697
                COMPY MACRO         FOXTB,R4,FOXTC,FOXTD,4,XPCOM,V9         1697
1494            FOXTB TEST G        R4,0,FOXTC                              1697
1495            ASSIGN      4,R4,PF                                         1697
1496            SPLIT       1,FOXTD                                         1697
1497            ENTER       4,R4                                            1697
1498            LEAVE       4,R4                                            1697
1499            TRANSFER    ,XPCOM                                          1697
1500            FOXTD ASSIGN        3,V9,PF                                 1698
                COMPX MACRO         FOXTC,FOXTZ,4,FOXTE,FOXTF,FXBUF,CH4     1698
1501            FOXTC QUEUE         4                                       1698
1502            SEIZE       4                                               1698
1503            DEPART      4                                               1698
1504            FOXTE TEST NE       CH4,0,FOXTZ                             1698
1505            UNLINK      4,FOXTF,1                                       1698
1506            SPLIT       1,FXBUF                                         1698
1507            FOXTZ RELEASE       4                                       1698
1508            TERMINATE
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                COMPD   MACRO       FX8UF,4,X23,FOXTG,FOXTH,V4,FOXTE,V3,X22,4-
1509            FX8UF   SEIZE       4
1510                    TEST E      PF3,X23,FOXTG
1511                    RELEASE     4
1512                    TERMINATE
1513            FOXTG   TEST L      X23,PF3,FOXTH
1514                    ASSIGN      3,V4,PF
1515                    TRANSFER    ,FOXTE
1516            FOXTH   ASSIGN      3,V3,PF
1517                    ASSIGN      2,X22,PF
1518                    RELEASE     4
1519                    SAVEVALUE   4-,PF3
1520                    LINK        4,LIFO
                COMPE   MACRO       FOXTF,23,22,4+
1521            FOXTF   SAVEVALUE   23,PF3
1522                    SAVEVALUE   22,PF2
1523                    SAVEVALUE   4+,PF3
1524                    TERMINATE
                *
                *    EXPERIMENT I/O
                *
                *       TRANSMIT GN&C DATA TO EXPERIMENT I/O
                TRNSA   MACRO       XPCOM,3,XPLST,R3,XPLSP,EXOK,TRAFR,S3
1525            XPCOM   GATE SNF    3,XPLST
1526                    TEST GE     R3,PF3,XPLSP
1527            EXOK    ENTER       3,PF3
                BUFFER  MACRO
1528                    ASSIGN      8,PR,PF
1529                    PRIORITY    0,BUFFER
1530                    PRIORITY    PF8
1531                    ASSIGN      8,3,PF
1532                    ASSIGN      9,S3,PF
1533                    SAVEVALUE   V59,PF9
1534                    LEAVE       3,PF3
1535                    TRANSFER    ,TRAFR
                TRNSP   MACRO       XPLSP,10,R3,XPC3,12,XPCOM,PF10,EXOK,V23
1536            XPLSP   ASSIGN      10,R3,PF
1537                    SPLIT       1,XPC3
1538                    PRIORITY    12
1539                    ASSIGN      3,V23,PF
1540                    ADVANCE     1
1541                    TRANSFER    ,XPCOM
1542            XPC3    ASSIGN      3,PF10,PF
1543                    TRANSFER    ,EXOK
1544            TRAFR   TRANSFER    ,MOPRT
1545            MDLOZ   SAVEVALUE   17+,PF3
1546                    TERMINATE
1547            SULOZ   SAVEVALUE   15+,PF3
1548                    TERMINATE
1549            LUZSU   SAVEVALUE   15+,PF3
1550                    TERMINATE
1551            SSLOZ   SAVEVALUE   14+,PF3
1552                    TERMINATE
1553            EELOZ   SAVEVALUE   3+,PF3
1554                    TERMINATE
1555            SYLUZ   SAVEVALUE   14+,PF3
1556                    TERMINATE
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1557            TERMINATE
1558      SYLOZ SAVEVALUE  15+,PF3
1559            TERMINATE
1560      SYLAZ SAVEVALUE  15+,PF3
1561            TERMINATE
1562      MULST SAVEVALUE  17+,PF3
1563            TERMINATE
1564      GPLST SAVEVALUE  18+,PF3
1565            TERMINATE
1566      GPCLT SAVEVALUE  19+,PF3
1567            TERMINATE
1568      XPLUZ SAVEVALUE  2+,PF3
1569            TERMINATE
1570      XPLOZ SAVEVALUE  3+,PF3
1571            TERMINATE
1572      XPLST SAVEVALUE  3+,PF3
1573            TERMINATE
          ********************************************************************
          **                                                                **
          **  MODULE 9: OUTPUT REPORT GENERATOR                             **
          **                                                                **
          ********************************************************************
1574      PLOTA GENERATE   600,,,,0,25PF
1575            SAVEVALUE  V42,X402
1576            SAVEVALUE  V43,X403
1577            SAVEVALUE  V44,S4
1578            SAVEVALUE  V45,S5
1579            SAVEVALUE  V46,S6
1580            SAVEVALUE  V47,X412
1581            SAVEVALUE  V48,X414
1582            SAVEVALUE  V49,X415
1583            SAVEVALUE  V50,S16
1584            SAVEVALUE  V59,X41(
1585            SAVEVALUE  V60,X41)
1586            SAVEVALUE  V61,X41*
1587            SAVEVALUE  V62,X41+
1588            SAVEVALUE  V63,X41'
1589            TERMINATE
1590            GENERATE   16800
1591            TERMINATE  1
                START      1
                REPORT
                OUTPUT
                GRAPH      X,101,127
                ORIGIN     50,22
                X          ,1,5,,,,MO
                Y          0,50,24,2
 5              STATEMENT  22,10,EXPERIMENT
 8              STATEMENT  24,3,RAU
 6              STATEMENT  26,5,CONTENTS
 6              STATEMENT  28,5,(X BITS)
 26             STATEMENT  5c,106,5  12  18  24  30  36  42  48  54  60  66  72 1
 78  84  90  96  102 108 114 120 126 132 138 144 150 156 162
 60             STATEMENT  54,12,TIME (HOURS)
 8              STATEMENT  56,59,FIGURE 7: CONTENTS OF EXPERIMENT RAU AS A FUNCTI
ION OF TIME.
                ENDGRAPH
```

```
         EJECT
         GRAPH        X,131,157
         ORIGIN       50,22
         X            ,1,3,,,,NO
         Y            0,50,24,2
 5       STATEMENT    22,10,EXPERIMENT
 3       STATEMENT    24,3,I/O
 6       STATEMENT    26,8,CONTENTS
 6       STATEMENT    28,8,(K BITS)
 26      STATEMENT    52,106,6  12  18  24  30  36  42  48  54  60  66  72 1
 78   84  90  96   102 108 114 120 126 132 138 144 150 156 162
 60      STATEMENT    54,12,TIME (HOURS)
 3       STATEMENT    58,59,FIGURE 8: CONTENTS OF EXPERIMENT I/O AS A FUNCTI
ION OF TIME.
         ENDGRAPH
         EJECT
         GRAPH        X,161,187
         ORIGIN       50,22
         X            ,1,3,,,,NO
         Y            0,50,6,8
 5       STATEMENT    22,10,EXPERIMENT
 3       STATEMENT    24,3,CPU
 6       STATEMENT    26,8,CONTENTS
 6       STATEMENT    28,8,(K BITS)
 26      STATEMENT    52,106,6  12  18  24  30  36  42  48  54  60  66  72 1
 78   84  90  96   102 108 114 120 126 132 138 144 150 156 162
 60      STATEMENT    54,12,TIME (HOURS)
 3       STATEMENT    58,59,FIGURE 9: CONTENTS OF EXPERIMENT CPU AS A FUNCTI
ION OF TIME.
         ENDGRAPH
         EJECT
         GRAPH        X,191,217
         ORIGIN       50,22
         X            ,1,3,,,,NO
         Y            0,50,24,2
 5       STATEMENT    22,9,HIGH RATE
 6       STATEMENT    24,8,RECORDER
 6       STATEMENT    26,8,CONTENTS
 6       STATEMENT    28,8,(K BITS)
 26      STATEMENT    52,106,6  12  18  24  30  36  42  48  54  60  66  72 1
 78   84  90  96   102 108 114 120 126 132 138 144 150 156 162
 60      STATEMENT    54,12,TIME (HOURS)
 3       STATEMENT    58,64,FIGURE 10: CONTENTS OF HIGH RATE RECORDER AS A 1
FUNCTION OF TIME.
         ENDGRAPH
         EJECT
         GRAPH        X,221,247
         ORIGIN       50,22
         X            ,1,3,,,,NO
         Y            0,50,24,2
 6       STATEMENT    22,8,VARIABLE
 6       STATEMENT    24,8,RECORDER
 6       STATEMENT    26,8,CONTENTS
 6       STATEMENT    28,8,(K BITS)
 26      STATEMENT    52,106,6  12  18  24  30  36  42  48  54  60  66  72 1
 78   84  90  96   102 108 114 120 126 132 138 144 150 156 162
 60      STATEMENT    54,12,TIME (HOURS)
```

ORIGINAL PAGE IS OF POOR QUALITY

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 8      STATEMENT  58,68,FIGURE 11: CONTENTS OF VARIABLE RATE RECORDER AS A FUNCTION OF TIME.
        ENDGRAPH
        EJECT
        GRAPH      X,251,277
        ORIGIN     50,22
        X          ,1,8,,,,NO
        Y          0,50,24,2
 7      STATEMENT  22,7,KU-BAND
 5      STATEMENT  24,9,PROCESSOR
 6      STATEMENT  26,8,CONTENTS
 6      STATEMENT  28,8,(K BITS)
 26     STATEMENT  52,106,6  12  18  24  30  36  42  48  54  60  66  72 1
 78  84  90  96  102 108 114 120 126 132 138 144 150 156 162
 60     STATEMENT  54,12,TIME (HOURS)
 8      STATEMENT  58,63,FIGURE 12: CONTENTS OF KU-BAND PROCESSOR AS A FUNCTION OF TIME.
        ENDGRAPH
        EJECT
        GRAPH      X,281,307
        ORIGIN     50,22
        X          ,1,8,,,,NO
        Y          0,50,24,2
 5      STATEMENT  22,9,SUBSYSTEM
 8      STATEMENT  24,3,RAU
 6      STATEMENT  26,8,CONTENTS
 6      STATEMENT  28,8,(K BITS)
 26     STATEMENT  52,106,6  12  18  24  30  36  42  48  54  60  66  72 1
 78  84  90  96  102 108 114 120 126 132 138 144 150 156 162
 60     STATEMENT  54,12,TIME (HOURS)
 8      STATEMENT  58,58,FIGURE 13:CONTENTS OF SUBSYSTEM RAU AS A FUNCTION OF TIME.
        ENDGRAPH
        EJECT
        GRAPH      X,311,337
        ORIGIN     50,22
        X          ,1,8,,,,NO
        Y          0,50,24,2
 5      STATEMENT  22,9,SUBSYSTEM
 8      STATEMENT  24,3,I/O
 6      STATEMENT  26,8,CONTENTS
 6      STATEMENT  28,8,(K BITS)
 26     STATEMENT  52,106,6  12  18  24  30  36  42  48  54  60  66  72 1
 78  84  90  96  102 108 114 120 126 132 138 144 150 156 162
 60     STATEMENT  54,12,TIME (HOURS)
 8      STATEMENT  58,58,FIGURE 14:CONTENTS OF SUBSYSTEM I/O AS A FUNCTION OF TIME.
        ENDGRAPH
        EJECT
        GRAPH      X,341,367
        ORIGIN     50,22
        X          ,1,8,,,,NO
        Y          0,50,6,8
 5      STATEMENT  22,9,SUBSYSTEM
 8      STATEMENT  24,3,CPU
 6      STATEMENT  26,8,CONTENTS
 6      STATEMENT  28,8,(K BITS)
```

```
 26     STATEMENT  52,106,6  12  18  24  30  36  42  48  54  60  66  72 1
 78  84  90  96  102 108 114 120 126 132 138 144 150 156 162
 60     STATEMENT  54,12,TIME (HOURS)
  8     STATEMENT  56,56,FIGURE 15:CONTENTS OF SUBSYSTEM CPU AS A FUNCTI1
ON OF TIME.
        ENDGRAPH
        EJECT
        GRAPH      X,371,397
        ORIGIN     50,42
        X          ,1,5,,,,NO
        Y          0,50,24,2
  7     STATEMENT  24,7,FM-BAND
  5     STATEMENT  26,9,PROCESSOR
  6     STATEMENT  28,8,CONTENTS
  6     STATEMENT  30,8,(K-BITS)
 26     STATEMENT  52,106,6  12  18  24  30  36  42  48  54  60  66  72 1
 78  84  90  96  102 108 114 120 126 132 138 144 150 156 162
 60     STATEMENT  54,12,TIME (HOURS)
  8     STATEMENT  56,57,FIGURE 16: CONTENTS OF FM PROESSOR AS A FUNCTIO1
N OF TIME.
        ENDGRAPH
        EJECT
        GRAPH      X,451,457
        ORIGIN     50,22
        X          ,1,5,,,,NO
        Y          0,50,24,2
  7     STATEMENT  22,7,NETWORK
  8     STATEMENT  24,6,SIGNAL.
  5     STATEMENT  26,9,PROCESSOR
  6     STATEMENT  28,8,CONTENTS
  6     STATEMENT  30,8,(K-BITS)
 26     STATEMENT  52,106,6  12  18  24  30  36  42  48  54  60  66  72 1
 78  84  90  96  102 108 114 120 126 132 138 144 150 156 162
 60     STATEMENT  54,12,TIME (HOURS)
  8     STATEMENT  56,70,FIGURE 17: CONTENTS OF NETWORK SIGNAL PROCESSOR1
AS A FUNCTION OF TIME.
        ENDGRAPH
        EJECT
        GRAPH      X,461,487
        ORIGIN     50,22
        X          ,1,5,,,,NO
        Y          0,50,24,2
  8     STATEMENT  26,3,MDM
  6     STATEMENT  28,8,CONTENTS
  6     STATEMENT  30,8,(K-BITS)
 26     STATEMENT  52,106,6  12  18  24  30  36  42  48  54  60  66  72 1
 78  84  90  96  102 108 114 120 126 132 138 144 150 156 162
  8     STATEMENT  58,50,FIGURE 18: CONTENTS OF MDM AS A FUNCTION OF TIM1
E.
        ENDGRAPH
        EJECT
        GRAPH      X,491,517
        ORIGIN     50,22
        X          ,1,5,,,,NO
        Y          0,50,24,2
  8     STATEMENT  24,3,GPC
  6     STATEMENT  26,8,I/O BUSS
```

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0      STATEMENT  20,8,CONTENTS                                                  1948
6      STATEMENT  30,8,(K-BITS)                                                 1949
26     STATEMENT  52,106,6  12  18  24  30  36  42  48  54  60  66  72 1        1950
78  84  90  96  102 108 114 120 126 132 138 144 150 156 162                     1951
5      STATEMENT  58,79,FIGURE 19: CONTENTS OF GENERAL PURPOSE COMPUTER1        1952
I/O BUSS AS A FUNCTION OF TIME.                                                 1953
       ENDGRAPH                                                                 1954
       EJECT                                                                    1955
       GRAPH      X,521,547                                                     1956
       ORIGIN     50,22                                                         1957
       X          ,1,3,,,,ND                                                    1958
       Y          ,50,24,2                                                      1959
3      STATEMENT  26,3,GPC                                                      1960
0      STATEMENT  20,8,CONTENTS                                                 1961
6      STATEMENT  30,8,(K-BITS)                                                 1962
26     STATEMENT  52,106,6  12  18  24  30  36  42  48  54  60  66  72 1        1963
78  84  90  96  102 108 114 120 126 132 138 144 150 156 162                     1964
60     STATEMENT  54,12,TIME (HOURS)                                            1965
5      STATEMENT  58,70,FIGURE 20: CONTENTS OF GENERAL PURPOSE COMPUTER1        1966
AS A FUNCTION OF TIME.                                                          1967
       ENDGRAPH                                                                 1968
       END                                                                      1969
```

APPENDIX D

PROGRAM OUTPUT

RELATIVE CLOCK 16300 ABSOLUTE CLOCK 16800

BLOCK COUNTS

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
1	0	929	11	0	51476	21	0	25738	31	0	0	41	0	25738
2	0	929	12	0	25738	22	0	25738	32	0	0	42	0	25738
3	0	3	13	0	25738	23	0	25738	33	0	0	43	0	25738
4	0	926	14	0	25738	24	0	0	34	0	0	44	0	25738
5	0	926	15	0	25738	25	0	0	35	0	0	45	0	25738
6	0	24812	16	0	25738	26	0	0	36	0	0	46	0	25738
7	0	51476	17	0	25738	27	0	0	37	0	25738	47	0	25738
8	0	25738	18	0	25738	28	0	0	38	0	25738	48	0	0
9	0	926	19	0	25738	29	0	0	39	0	25738	49	0	0
10	0	51476	20	0	25738	30	0	0	40	0	25738	50	0	0

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
51	0	0	61	0	51476	71	0	0	81	0	84652	91	0	17190
52	0	0	62	0	25738	72	0	0	82	0	42326	92	0	17190
53	0	0	63	0	25738	73	0	0	83	0	42326	93	0	17190
54	0	0	64	0	25738	74	0	0	84	0	42326	94	0	17190
55	0	0	65	0	25738	75	0	0	85	0	42326	95	0	17190
56	0	0	66	0	0	76	0	51476	86	0	8548	96	0	29195
57	0	0	67	0	25738	77	0	25738	87	0	8548	97	0	29196
58	0	0	68	0	0	78	0	25738	88	0	33778	98	0	29195
59	0	0	69	0	25738	79	0	25738	89	0	16568	99	0	29195
60	0	0	70	0	25738	80	0	42326	90	0	16568	100	0	0

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
101	0	0	111	0	0	121	0	0	131	0	0	141	0	0
102	0	0	112	0	0	122	0	0	132	0	0	142	0	0
103	0	0	113	0	0	123	0	0	133	0	0	143	0	0
104	0	0	114	0	0	124	0	0	134	0	0	144	0	0
105	0	0	115	0	0	125	0	0	135	0	0	145	0	0
106	0	0	116	0	0	126	0	0	136	0	0	146	0	0
107	0	0	117	0	0	127	0	0	137	0	0	147	0	0
108	0	0	118	0	0	128	0	0	138	0	0	148	0	0
109	0	0	119	0	0	129	0	0	139	0	0	149	0	0
110	0	0	120	0	0	130	0	0	140	0	0	150	0	0

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
151	0	0	161	0	0	171	0	0	181	0	0	191	0	24304
152	0	0	162	0	0	172	0	0	182	0	0	192	0	24304
153	0	0	163	0	0	173	0	0	183	0	0	193	0	24304
154	0	0	164	0	0	174	0	0	184	0	0	194	0	24304
155	0	0	165	0	0	175	0	0	185	0	0	195	0	24304
156	0	0	166	0	0	176	0	0	186	0	25738	196	0	24304
157	0	0	167	0	0	177	0	0	187	0	24304	197	0	24304
158	0	0	168	0	0	178	0	0	188	0	24304	198	0	0
159	0	0	169	0	0	179	0	0	189	0	24304	199	0	0
160	0	0	170	0	0	180	0	0	190	0	24304	200	0	0

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
201	0	0	211	0	1093	221	0	0	231	0	0	241	0	0
202	0	0	212	0	1093	222	0	2401	232	0	0	242	0	0
203	0	0	213	0	1093	223	0	2401	233	0	4802	243	0	0
204	0	3494	214	0	1093	224	0	2401	234	0	2060	244	0	0
205	0	1093	215	0	1093	225	0	2401	235	0	2060	245	0	0
206	0	1093	216	0	0	226	0	2401	236	0	2060	246	0	0
207	0	1093	217	0	0	227	0	0	237	0	2060	247	0	0
208	0	1093	218	0	0	228	0	0	238	0	0	248	0	2742
209	0	1093	219	0	0	229	0	0	239	0	0	249	0	341

210	0	2659	220	0	0	230	0	0	240	0	0	250	0	341

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
251	0	341	261	0	0	271	0	0	281	0	341	291	0	25738
252	0	341	262	0	0	272	0	341	282	0	341	292	0	25738
253	0	0	263	0	2401	273	0	341	283	0	0	293	0	25738
254	0	0	264	0	2401	274	0	341	284	0	0	294	0	25738
255	0	0	265	0	2060	275	0	341	285	0	0	295	0	25738
256	0	0	266	0	2060	276	0	341	286	0	0	296	0	25738
257	0	0	267	0	341	277	0	341	287	0	0	297	0	25738
258	0	0	268	0	341	278	0	341	288	0	0	298	0	25738
259	0	0	269	0	0	279	0	341	289	0	0	299	0	25738
260	0	0	270	0	0	280	0	341	290	0	0	300	0	25738

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
301	0	25738	311	0	3494	321	0	0	331	0	0	341	0	0
302	0	25738	312	0	3494	322	0	0	332	0	0	342	0	0
303	0	25738	313	0	3494	323	0	6988	333	0	0	343	0	0
304	0	0	314	0	3494	324	0	3494	334	0	0	344	0	14775
305	0	0	315	0	0	325	0	3494	335	0	0	345	0	14775
306	0	0	316	0	0	326	0	3494	336	0	0	346	0	14775
307	0	0	317	0	0	327	0	3494	337	0	0	347	0	14775
308	0	0	318	0	0	328	0	0	338	0	3494	348	0	14775
309	0	0	319	0	0	329	0	0	339	0	3494	349	0	14775
310	0	3494	320	0	0	330	0	0	340	0	3494	350	0	14775

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
351	0	14775	361	0	0	371	0	14775	381	0	0	391	0	0
352	0	14775	362	0	0	372	0	14775	382	0	0	392	0	0
353	0	14775	363	0	0	373	0	14775	383	0	0	393	0	0
354	0	14775	364	0	0	374	0	14775	384	0	0	394	0	29550
355	0	14775	365	0	0	375	0	14775	385	0	0	395	0	14775
356	0	14775	366	0	0	376	0	14775	386	0	0	396	0	14775
357	0	0	367	0	0	377	0	14775	387	0	0	397	0	0
358	0	0	368	0	0	378	0	14775	388	0	0	398	0	14775
359	0	0	369	0	0	379	0	14775	389	0	0	399	0	21
360	0	0	370	0	14775	380	0	14775	390	0	0	400	0	14775

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
401	0	14794	411	0	25057	421	0	10303	431	0	0	441	0	0
402	0	0	412	0	50114	422	0	11039	432	0	0	442	0	0
403	0	0	413	0	25057	423	0	11039	433	0	0	443	0	0
404	0	0	414	0	25057	424	0	11039	434	0	0	444	0	0
405	0	0	415	0	25057	425	0	11039	435	0	0	445	0	0
406	0	0	416	0	25057	426	0	11039	436	0	0	446	0	0
407	0	29508	417	0	3715	427	0	10507	437	0	0	447	0	0
408	0	14794	418	0	3715	428	0	10507	438	0	0	448	0	0
409	0	14794	419	0	21342	429	0	10507	439	0	0	449	0	0
410	0	14794	420	0	10303	430	0	10507	440	0	0	450	0	0

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
451	0	0	461	0	40513	471	0	26365	481	0	0	491	0	26365
452	0	0	462	0	40513	472	0	26365	482	0	0	492	0	26365
453	0	0	463	0	14148	473	0	26365	483	0	0	493	0	26365
454	0	0	464	0	26365	474	0	26365	484	0	0	494	0	26365
455	0	0	465	0	26365	475	0	0	485	0	0	495	0	26365
456	0	14775	466	0	26365	476	0	0	486	0	0	496	0	26365
457	0	14775	467	0	26365	477	0	0	487	0	0	497	0	26365
458	0	14775	468	0	26365	478	0	0	488	0	26365	498	0	26365
459	0	25738	469	0	26365	479	0	0	489	0	26365	499	0	0
460	0	25738	470	0	26365	480	0	0	490	0	26365	500	0	0

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
501	0	0	511	0	0	521	0	0	531	0	38636	541	0	20835
502	0	0	512	0	52730	522	0	0	532	0	38636	542	0	20835
503	0	0	513	0	26365	523	0	0	533	0	38636	543	0	20835
504	0	0	514	0	26365	524	0	0	534	0	38636	544	0	20835
505	0	0	515	0	0	525	0	52690	535	0	5510	545	0	16713
506	0	0	516	0	26365	526	0	26345	536	0	5510	546	0	16713
507	0	0	517	0	20	527	0	26345	537	0	33176	547	0	16713
508	0	0	518	0	26365	528	0	26345	538	0	12341	548	0	16713
509	0	0	519	0	26345	529	0	38686	539	0	12341	549	0	0
510	0	0	520	0	0	530	0	77372	540	0	20835	550	0	0

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
551	0	0	561	0	0	571	0	0	581	0	0	591	0	0
552	0	0	562	0	0	572	0	0	582	0	0	592	0	0
553	0	0	563	0	0	573	0	0	583	0	0	593	0	0
554	0	0	564	0	0	574	0	0	584	0	0	594	0	0
555	0	0	565	0	0	575	0	0	585	0	0	595	0	0
556	0	0	566	0	0	576	0	0	586	0	0	596	0	0
557	0	0	567	0	0	577	0	0	587	0	0	597	0	0
558	0	0	568	0	0	578	0	0	588	0	0	598	0	0
559	0	0	569	0	0	579	0	0	589	0	0	599	0	0
560	0	0	570	0	0	580	0	0	590	0	0	600	0	0

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
601	0	0	611	0	0	621	0	0	631	0	0	641	0	0
602	0	0	612	0	0	622	0	0	632	0	0	642	0	0
603	0	0	613	0	0	623	0	0	633	0	0	643	0	0
604	0	0	614	0	0	624	0	0	634	0	0	644	0	0
605	0	0	615	0	0	625	0	0	635	0	0	645	0	0
606	0	0	616	0	0	626	0	0	636	0	0	646	0	0
607	0	0	617	0	0	627	0	0	637	0	0	647	0	0
608	0	0	618	0	0	628	0	0	638	0	0	648	0	0
609	0	0	619	0	0	629	0	0	639	0	0	649	0	0
610	0	0	620	0	0	630	0	0	640	0	0	650	0	0

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
651	0	0	661	0	0	671	0	0	681	0	0	691	0	0
652	0	0	662	0	0	672	0	0	682	0	0	692	0	0
653	0	0	663	0	0	673	0	0	683	0	0	693	0	0
654	0	0	664	0	0	674	0	0	684	0	0	694	0	0
655	0	0	665	0	0	675	0	0	685	0	0	695	0	0
656	0	0	666	0	0	676	0	0	686	0	0	696	0	0
657	0	0	667	0	0	677	0	0	687	0	0	697	0	0
658	0	0	668	0	0	678	0	0	688	0	0	698	0	0
659	0	0	669	0	0	679	0	0	689	0	0	699	0	0
660	0	0	670	0	0	680	0	0	690	0	0	700	0	0

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
701	0	0	711	0	26365	721	0	204	731	0	6	741	0	1
702	0	0	712	0	0	722	0	204	732	0	6	742	0	213
703	0	0	713	0	0	723	0	204	733	0	6	743	0	213
704	0	0	714	0	1	724	0	204	734	0	197	744	0	332
705	0	0	715	0	204	725	1	204	735	0	197	745	0	119
706	0	0	716	0	204	726	0	203	736	0	197	746	0	29
707	0	0	717	0	7	727	0	203	737	0	1	747	0	29
708	0	0	718	0	7	728	0	6	738	0	1	748	0	29
709	0	0	719	0	7	729	0	6	739	0	1	749	0	90
710	0	14775	720	0	197	730	0	6	740	0	1	750	0	90

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
751	0	90	761	0	0	771	0	18228	781	0	18231	791	0	18231
752	0	90	762	0	0	772	0	18228	782	0	18231	792	0	18231
753	0	213	763	0	0	773	0	18228	783	0	18231	793	0	18231
754	0	213	764	0	0	774	0	0	784	0	18231	794	0	18231
755	0	212	765	0	0	775	0	0	785	0	0	795	0	18231
756	0	212	766	0	0	776	0	18231	786	0	0	796	0	20870
757	0	212	767	0	16601	777	0	18231	787	0	18231	797	0	20870
758	0	212	768	0	16601	778	0	18231	788	0	18231	798	0	18231
759	0	212	769	0	18228	779	0	18231	789	0	18231	799	0	18231
760	0	0	770	0	18228	780	0	18231	790	0	18231	800	0	18231
														16713

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
801	0	18231	811	0	18231	821	0	18231	831	0	7	841	0	16601
802	0	18231	812	0	18231	822	0	18231	832	0	7	842	0	16601
803	0	18231	813	0	18231	823	0	18231	833	0	7	843	0	16601
804	0	18231	814	0	18231	824	0	18231	834	0	7	844	0	16601
805	0	18231	815	0	18231	825	0	18231	835	0	7	845	0	0
806	0	18231	816	0	18231	826	0	1704	836	0	0	846	0	0
807	0	0	817	0	18231	827	0	7	837	0	0	847	0	16600
808	0	0	818	0	18231	828	0	7	838	0	16601	848	0	1627
809	0	18231	819	0	18231	829	0	7	839	0	16601	849	0	16678
810	0	18231	820	0	18231	830	0	7	840	0	16601	850	0	16678
														0

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
851	0	16676	861	0	0	871	0	0	881	0	799	891	0	486
852	0	870	862	0	0	872	0	0	882	0	468	892	0	486
853	0	870	863	0	795	873	0	0	883	0	488	893	0	484
854	0	870	864	0	0	874	0	795	884	0	0	894	0	1488
855	0	870	865	0	0	875	0	795	885	0	0	895	0	488
856	0	870	866	0	0	876	0	795	886	0	468	896	0	488
857	0	870	867	0	795	877	0	799	887	0	4	897	0	488
858	0	870	868	0	0	878	0	488	888	0	4	898	0	0
859	0	870	869	0	0	879	0	978	889	0	434	899	0	0
860	0	870	870	0	0	880	0	799	890	0	464	900	0	0
											0			0

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
901	0	0	911	0	36	921	0	15808	931	0	19	941	0	14394
902	0	0	912	0	36	922	0	15808	932	0	19	942	0	14394
903	0	0	913	0	36	923	0	15808	933	0	19	943	0	14394
904	0	0	914	0	36	924	0	15808	934	0	14394	944	0	37772
905	0	0	915	0	36	925	0	15808	935	0	1	945	0	23458
906	0	36	916	0	36	926	0	15808	936	0	2	946	0	46916
907	0	36	917	0	16638	927	0	15808	937	0	1	947	0	37772
908	0	36	918	0	16638	928	0	0	938	0	1	948	0	37772
909	0	36	919	0	15808	929	0	0	939	0	1	949	0	23458
910	0	36	920	0	15808	930	0	14413	940	0	1	950	0	23458
											0			0

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
951	0	1	961	0	23458	971	0	20	981	0	1416	991	0	15813
952	0	1	962	0	23458	972	0	20	982	0	1416	992	0	15813
953	0	23457	963	0	23458	973	0	1416	983	0	1416	993	1	15813
954	0	23378	964	0	23458	974	0	1416	984	0	1416	994	0	15814
955	0	23378	965	0	20	975	0	1416	985	0	1416	995	0	15814
956	0	79	966	0	20	976	0	1416	986	0	16601	996	0	15813
957	0	79	967	0	20	977	0	1416	987	0	16601	997	0	15813
958	0	79	968	0	20	978	0	1416	988	0	16601	998	0	15802
959	0	79	969	0	20	979	0	1416	989	0	15813	999	0	15812
960	0	79	970	0	20	980	0	1416	990	0	15813	1000	0	20
					7						1			20

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL

1001	0	15812	1011	0	0	1021	0	9443	1031	0	8958	1041	0	39
1002	0	19	1012	0	15793	1022	0	1	1032	0	9443	1042	0	39
1003	0	19	1013	0	15793	1023	0	1	1033	0	9443	1043	0	39
1004	0	19	1014	0	15793	1024	0	9442	1034	0	9443	1044	0	39
1005	0	15793	1015	0	16277	1025	0	484	1035	0	9443	1045	0	39
1006	0	0	1016	0	9443	1026	0	484	1036	0	39	1046	0	39
1007	0	0	1017	0	18886	1027	0	8958	1037	0	39	1047	0	39
1008	0	0	1018	0	16277	1028	0	8958	1038	0	39	1048	0	39
1009	0	0	1019	0	16277	1029	0	8958	1039	0	39	1049	0	788
1010	0	0	1020	0	9443	1030	0	8958	1040	0	39	1050	0	788

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
1051	0	788	1061	0	788	1071	0	0	1081	0	271	1091	0	0
1052	0	788	1062	0	1	1072	0	787	1082	0	0	1092	0	271
1053	0	788	1063	0	1	1073	0	787	1083	0	0	1093	0	271
1054	0	788	1064	0	1	1074	0	787	1084	0	271	1094	0	271
1055	0	788	1065	0	787	1075	0	1058	1085	0	271	1095	0	271
1056	0	788	1066	0	0	1076	0	271	1086	0	271	1096	0	1
1057	0	788	1067	0	0	1077	0	542	1087	0	0	1097	0	1
1058	0	788	1068	0	0	1078	0	1058	1088	0	0	1098	0	1
1059	0	788	1069	0	0	1079	0	1058	1089	0	0	1099	0	1
1060	0	0	1070	0	0	1080	0	271	1090	0	0	1100	0	1

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
1101	0	1	1111	0	16601	1121	0	16600	1131	0	16600	1141	0	0
1102	0	1	1112	0	16601	1122	0	0	1132	0	16600	1142	0	0
1103	0	1	1113	0	16601	1123	0	0	1133	0	16600	1143	0	0
1104	0	1	1114	0	16601	1124	0	0	1134	0	16600	1144	0	0
1105	0	1	1115	1	16601	1125	0	0	1135	0	16600	1145	0	0
1106	0	1	1116	0	16600	1126	0	0	1136	0	16600	1146	0	0
1107	0	1	1117	0	16600	1127	0	0	1137	0	16600	1147	0	0
1108	0	1	1118	0	16600	1128	0	0	1138	0	16600	1148	0	0
1109	0	16601	1119	0	16600	1129	0	0	1139	0	16600	1149	0	16600
1110	0	16601	1120	0	16600	1130	0	16600	1140	0	16600	1150	0	16600

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
1151	0	16600	1161	0	0	1171	0	19	1181	0	16581	1191	0	23122
1152	0	16600	1162	0	0	1172	0	16581	1182	0	38346	1192	0	21765
1153	0	16600	1163	0	0	1173	0	1	1183	0	23172	1193	0	21765
1154	0	16600	1164	0	0	1174	0	2	1184	0	46344	1194	0	1357
1155	0	16600	1165	0	0	1175	0	1	1185	0	38346	1195	0	1357
1156	0	16600	1166	0	0	1176	0	1	1186	0	38346	1196	0	1357
1157	0	16600	1167	0	0	1177	0	1	1187	0	23172	1197	0	1357
1158	0	16600	1168	0	16600	1178	0	1	1188	0	23172	1198	0	1357
1159	0	16600	1169	0	19	1179	0	16581	1189	0	50	1199	0	23172
1160	0	0	1170	0	19	1180	0	16581	1190	0	50	1200	0	23172

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
1201	0	23172	1211	0	219	1221	0	0	1231	0	219	1241	0	219
1202	0	23172	1212	0	219	1222	0	219	1232	0	219	1242	0	0
1203	0	219	1213	0	219	1223	0	219	1233	0	0	1243	0	0
1204	0	219	1214	0	0	1224	0	219	1234	0	0	1244	0	0
1205	0	219	1215	0	0	1225	0	219	1235	0	0	1245	0	0
1206	0	219	1216	0	0	1226	0	219	1236	0	0	1246	0	0
1207	0	219	1217	0	0	1227	0	219	1237	0	0	1247	0	0
1208	0	219	1218	0	0	1228	0	219	1238	0	0	1248	0	0
1209	0	219	1219	0	0	1229	0	219	1239	0	0	1249	0	0
1210	0	219	1220	0	0	1230	0	219	1240	0	0	1250	0	0

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
				0	0	1271	0	0	1281	0	0	1291	0	0

1252	0	0	1262	0	0	1272	0	0	1282	0	0	1292	0	0
1253	0	0	1263	0	0	1273	0	0	1283	0	0	1293	0	0
1254	0	0	1264	0	0	1274	0	0	1284	0	0	1294	0	0
1255	0	0	1265	0	0	1275	0	0	1285	0	0	1295	0	0
1256	0	0	1266	0	0	1276	0	0	1286	0	0	1296	0	0
1257	0	0	1267	0	0	1277	0	0	1287	0	0	1297	0	16800
1258	0	0	1268	0	0	1278	0	0	1288	0	0	1298	0	16800
1259	0	0	1269	0	0	1279	0	0	1289	0	0	1299	0	16800
1260	0	0	1270	0	0	1280	0	0	1290	0	0	1300	0	16800

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
1301	0	16800	1311	0	0	1321	0	16799	1331	0	0	1341	0	16580
1302	0	16800	1312	0	0	1322	0	16799	1332	0	0	1342	0	0
1303	1	16800	1313	0	0	1323	0	16799	1333	0	0	1343	0	0
1304	0	16799	1314	0	0	1324	0	16799	1334	0	0	1344	0	0
1305	0	16799	1315	0	0	1325	0	16799	1335	0	0	1345	0	0
1306	0	16799	1316	0	0	1326	0	16799	1336	0	0	1346	0	0
1307	0	16799	1317	0	0	1327	0	16799	1337	0	16799	1347	0	0
1308	0	16799	1318	0	16799	1328	0	16799	1338	0	219	1348	0	16580
1309	0	16799	1319	0	16799	1329	0	0	1339	0	219	1349	0	16580
1310	0	0	1320	0	16799	1330	0	0	1340	0	219	1350	0	16580

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
1351	0	24737	1361	0	8157	1371	0	9453	1381	0	219	1391	0	0
1352	0	9453	1362	0	8157	1372	0	438	1382	0	219	1392	0	439
1353	0	18906	1363	0	1270	1373	0	219	1383	0	219	1393	0	439
1354	0	24737	1364	0	1270	1374	0	219	1384	0	0	1394	0	439
1355	0	24737	1365	0	1270	1375	0	219	1385	0	0	1395	0	439
1356	0	9453	1366	0	1270	1376	0	219	1386	0	0	1396	0	439
1357	0	9453	1367	0	1270	1377	0	219	1387	0	0	1397	0	439
1358	0	26	1368	0	9453	1378	0	219	1388	0	0	1398	0	439
1359	0	26	1369	0	9453	1379	0	219	1389	0	0	1399	0	439
1360	0	9427	1370	0	9453	1380	0	219	1390	0	0	1400	0	439

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
1401	0	439	1411	0	439	1421	0	439	1431	0	439	1441	0	0
1402	0	439	1412	0	439	1422	0	0	1432	0	439	1442	0	0
1403	0	0	1413	0	439	1423	0	0	1433	0	439	1443	0	0
1404	0	0	1414	0	439	1424	0	0	1434	0	439	1444	0	0
1405	0	0	1415	0	439	1425	0	0	1435	0	439	1445	0	0
1406	0	0	1416	0	439	1426	0	0	1436	0	439	1446	0	0
1407	0	0	1417	0	439	1427	0	0	1437	0	439	1447	0	0
1408	0	0	1418	0	439	1428	0	0	1438	0	439	1448	0	0
1409	0	0	1419	0	439	1429	0	0	1439	0	439	1449	0	439
1410	0	0	1420	0	439	1430	0	439	1440	0	439	1450	0	16800

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
1451	0	16800	1461	0	16799	1471	0	16799	1481	0	16799	1491	0	220
1452	0	16800	1462	0	16799	1472	0	16799	1482	0	0	1492	0	220
1453	0	16800	1463	0	0	1473	0	16799	1483	0	0	1493	0	220
1454	0	16800	1464	0	0	1474	0	16799	1484	0	0	1494	0	16579
1455	0	16800	1465	0	0	1475	0	16799	1485	0	0	1495	0	0
1456	1	16800	1466	0	0	1476	0	16799	1486	0	0	1496	0	0
1457	0	16799	1467	0	0	1477	0	16799	1487	0	0	1497	0	0
1458	0	16799	1468	0	0	1478	0	16799	1488	0	0	1498	0	0
1459	0	16799	1469	0	0	1479	0	16799	1489	0	0	1499	0	0
1460	0	16799	1470	0	0	1480	0	16799	1490	0	16799	1500	0	0

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
1501	0	16579	1511	0	1	1521	0	5593	1531	0	220	1541	0	0
1502	0	16579	1512	0	1	1522	0	5593	1532	0	220	1542	0	0

1503	0	16579	1513	0	5592	1523	0	5593	1533	0	220	1543	0	0
1504	0	21967	1514	0	5388	1524	0	5593	1534	0	220	1544	0	220
1505	0	5593	1515	0	5388	1525	0	220	1535	0	220	1545	0	0
1506	0	11186	1516	0	204	1526	0	220	1536	0	0	1546	0	0
1507	0	21967	1517	0	204	1527	0	220	1537	0	0	1547	0	0
1508	0	21967	1518	0	204	1528	0	220	1538	0	0	1548	0	0
1509	0	5593	1519	0	204	1529	0	220	1539	0	0	1549	0	0
1510	0	5593	152C	0	204	1530	0	220	1540	0	0	1550	0	0

BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL	BLOCK	CURRENT	TOTAL
1551	0	0	1561	0	0	1571	0	0	1581	0	27	1591		
1552	0	0	1562	0	0	1572	0	0	1582	0	27			
1553	0	0	1563	0	0	1573	0	0	1583	0	27			
1554	0	0	1564	0	0	1574	0	27	1584	0	27			
1555	0	0	1565	0	0	1575	0	27	1585	0	27			
1556	0	0	1566	0	0	1576	0	27	1586	0	27			
1557	0	0	1567	0	0	1577	0	27	1587	0	27			
1558	0	0	1568	0	0	1578	0	27	1588	0	27			
1559	0	0	1569	0	0	1579	0	27	1589	0	27			
1560	0	0	157C	0	0	1580	0	27	1590	0	1			

FACILITIES

FACILITY	NUMBER ENTRIES	AVERAGE TIME/TRAN	AVERAGE TOTAL TIME	UTILIZATION DURING AVAIL. TIME	UTILIZATION DURING UNAVAIL. TIME	CURRENT STATUS	PERCENT AVAILABILITY	TRANSACTION NUMBER SEIZING	TRANSACTION NUMBER PREEMPTING
4	168957	.000	.000				100.0		
16	157336	.000	.000				100.0		
49	213	14.103	.178				100.0	7	
50	204	69.422	.842				100.0	6	

STORAGES

STORAGE	CAPACITY	AVERAGE CONTENTS	ENTRIES	AVERAGE TIME/UNIT	AVERAGE TOTAL TIME	UTILIZATION AVAIL. TIME	DURING- UNAVAIL. TIME	CURRENT STATUS	PERCENT AVAILABILITY	CURRENT CONTENTS	MAXIMUM CONTENTS
RAUEX	36000	.000	9361450	.000	.000				100.0	36	4986
IOEXP	36000	.000	10483800	.000	.000				100.0		4966
CPUEX	288	284.363	9648	495.159	.987				100.0	288	288
HARREC	360000000	5877.769	20397390	8.156	.000				100.0		772206
VARREC	360000000	209.396	520578	6.758	.000				100.0		10811
FMSIG	36000	.000	501345	.000	.000				100.0		10811
NASIG	6912	.000	1312416	.000	.000				100.0		72
KUSIG	1080000	.000	141594499	.000	.000				100.0		772905
RAUSU	36000	.000	15602400	.000	.000				100.0	36	9864
IOSUB	36000	.000	16006340	.000	.000				100.0	72	9864
CPUSU	288	284.370	10908	437.974	.987				100.0	288	288
MDMUL	36000	.000	3836772	.000	.000				100.0		144
GPGIO	36000	.000	3836340	.000	.000				100.0	72	144
GPCOM	1152	.000	1328436	.000	.000				100.0		72

```
****************************************
*                                      *
*               QUEUES                 *
*                                      *
****************************************
```

QUEUE	MAXIMUM CONTENTS	AVERAGE CONTENTS	TOTAL ENTRIES	ZERO ENTRIES	PERCENT ZEROS	AVERAGE TIME/TRANS	$AVERAGE TIME/TRANS	TABLE NUMBER	CURRENT CONTENTS
4	1	.000	72252	72252	100.0	.000	.000		
16	1	.000	76094	76094	100.0	.000	.000		

$AVERAGE TIME/TRANS = AVERAGE TIME/TRANS EXCLUDING ZERO ENTRIES

USER CHAINS

USER CHAIN	TOTAL ENTRIES	AVERAGE TIME/TRANS	CURRENT CONTENTS	AVERAGE CONTENTS	MAXIMUM CONTENTS
4	69025	.428		1.758	21
16	59269	.172		.606	20

FULLWORD SAVEVALUES

NUMBER	CONTENTS	NUMBER	CONTENTS	NUMBER	CONTENTS	NUMBER	CONTENTS	NUMBER	CONTENTS	NUMBER	CONTENTS
1	161952	4	861945	13	1197936	16	1498159	20	44	21	11
22	5	23	5	25	11	49	16819	50	16689	101	108
102	900	103	15	104	15	105	15	106	15	107	15
108	54	109	15	110	54	111	15	112	15	113	432
114	15	115	15	116	54	117	15	118	15	119	54
120	15	121	108	122	15	123	15	124	15	125	36
126	36	127	36	131	72	132	72	133	72	134	72
135	72	136	72	137	72	138	72	139	15	140	72
141	72	142	72	143	72	144	15	145	72	146	54
147	72	148	72	149	72	150	72	151	72	152	72
153	72	154	72	155	72	156	72	157	72	161	288
162	288	163	288	164	288	165	288	166	288	167	288
168	288	169	288	170	288	171	288	172	288	173	288
174	288	175	288	176	288	177	288	178	288	179	288
180	288	181	288	182	288	183	288	184	288	185	288
186	288	187	288	252	810	253	13	254	13	255	13
256	13	257	13	258	49	259	13	260	49	261	13
262	13	263	389	264	13	265	13	266	49	267	49
268	13	269	49	270	13	271	13	272	13	273	13
274	13	275	49	276	49	277	49	281	108	282	1800
283	864	284	864	285	864	286	864	287	864	288	108
289	108	290	108	291	864	292	864	293	864	294	108
295	864	296	108	297	1800	298	864	299	108	300	864
301	108	302	864	303	864	304	864	305	36	306	36
307	36	311	72	312	1800	313	864	314	864	315	864
316	864	317	864	318	72	319	72	320	72	321	864
322	864	323	864	324	72	325	864	326	72	327	1800
328	864	329	72	330	864	331	72	332	864	333	864
334	864	335	72	336	72	337	72	341	288	342	288
343	288	344	288	345	288	346	288	347	288	348	288
349	288	350	288	351	288	352	288	353	288	354	288
355	288	356	288	357	288	358	288	359	288	360	288
361	288	362	288	363	288	364	288	365	288	366	288
367	288	372	810	373	810	374	810	375	13	376	13
377	13	378	49	379	49	380	13	381	13	382	13
383	389	384	13	385	13	386	13	387	13	388	13
389	13	390	13	391	13	392	13	393	13	394	13
395	49	396	49	397	49	402	36	409	72	410	49
412	49	414	36	415	72	417	72	418	72	419	72
461	72	462	72	463	72	464	72	465	72	466	72
467	72	468	72	469	72	470	72	471	72	472	72
473	72	474	72	475	72	476	72	477	72	478	72
479	72	480	72	481	72	482	72	483	72	484	72
485	72	486	72	487	72	491	72	492	72	493	72
494	72	495	72	496	72	497	72	498	72	499	72
500	72	501	72	502	72	503	72	504	72	505	72
506	72	507	72	508	72	509	72	510	72	511	72
512	72	513	72	514	72	515	72	516	72	517	72
521	72	522	72	523	72	524	72	525	72	526	72
527	72	528	72	529	72	530	72	531	72	532	72

533	72	534	72	535	72	536	72	537	72	538	72
539	72	540	72	541	72	542	72	543	72	544	72
545	72	546	72	547	72						

FULLWORD MATRICES

FULLWORD MATRIX 2

#COL/COLUMN	1	2	3	4	5	6	7	8	9	10
I	417	422	425	500	503	561	583	594	600	728
#COL/COLUMN	11	12	13	14	15	16	17	18	19	20
I	742	761	772	900	906	928	950	1106	1117	1283
#COL/COLUMN	21	22	23	24	25	26	27	28	29	30
I	1266	1339	1344	1411	1425	1439	1444	1500	1511	1572
#COL/COLUMN	31	32	33	34	35	36	37	38	39	40
I	1592	1606	1608	1672	1675	1731	1756	1897	1914	1928
#COL/COLUMN	41	42	43	44	45	46	47	48	49	50
I	1939	2069	2072	2094	2117	2272	2289	2447	2453	2511
#COL/COLUMN	51	52	53	54	55	56	57	58	59	60
I	2517	2586	2594	2611	2617	2672	2683	2728	2739	2797

FULLWORD MATRIX 3

ROW/COLUMN	1	2	3	4	5	6	7	8	9	10
1	292	299	301	326	362	452	487	522	561	626
2	330	230	340	230	300	330	280	360	300	300
3	13	12	12	13	12	13	16	13	13	13

ROW/COLUMN	11	12	13	14	15	16	17	18	19	20
1	678	731	769	769	794	794	861	861	864	865
2	330	7	320	7	7	350	7	350	320	480
3	13	12	13	13	13	13	16	13	13	3

ROW/COLUMN	21	22	23	24	25	26	27	28	29	30
1	899	949	949	952	967	1015	1019	1080	1086	1100
2	7	7	340	230	7	340	230	320	7	330
3	13	15	12	12	9	12	13	13	13	13

ROW/COLUMN	31	32	33	34	35	36	37	38	39	40
1	1100	1123	1166	1181	1342	1502	1992	2150	2224	2294
2	7	7	330	320	360	360	280	280	300	350
3	13	13	13	13	13	13	13	13	13	13

ROW/COLUMN	41	42	43	44	45	46	47	48	49	50
1	2385	2449	2451	2454	2474	2475	2602	2609	2636	2672
2	300	230	340	350	280	7	340	280	280	360
3	12	12	12	13	13	12	22	13	13	13

ROW/COLUMN	51	52	53	54	55	56	57	58	59	60
1	2762	2797	2871	2871	2907	2923	2923	2932	2959	3032
2	330	230	300	7	7	7	330	340	7	300
3	13	13	13	13	12	21	12	12	12	12

ROW/COLUMN	61	62	63	64	65	66	67	68	69	70
1	3032	3067	3104	3104	3118	3118	3133	3209	3239	3239
2	7	7	7	350	7	280	7	7	320	7
3	12	13	13	13	14	13	16	13	13	12

ROW/COLUMN	71	72	73	74	75	76	77	78	79	80
1	3257	3257	3259	3262	3265	3278	3325	3325	3329	3334
2	300	7	340	230	350	7	340	7	230	320
3	13	20	13	13	13	15	13	21	13	12

ROW/COLUMN	81	82	83	84	85	86	87	88	89	90

1	3397	3401	3571	3813	4303	4463	4535	4695	4759	4765
2	320	330	330	360	280	280	300	300	230	350
3	13	22	12	13	12	13	12	13	13	12
ROW/COLUMN	91	92	93	94	95	96	97	98	99	100
1	4919	4919	4921	4925	4928	4946	4947	5073	5082	5107
2	7	230	340	350	480	7	480	330	340	280
3	19	13	13	13	3	13	12	13	12	13
ROW/COLUMN	101	102	103	104	105	106	107	108	109	110
1	5143	5182	5233	5269	5303	5303	5342	5342	5377	5428
2	360	300	330	7	7	360	7	300	7	7
3	12	12	13	13	13	13	13	13	13	14
ROW/COLUMN	111	112	113	114	115	116	117	118	119	120
1	5428	5443	5512	5550	5550	5569	5569	5575	5588	5642
2	280	7	7	320	7	7	340	350	7	7
3	13	13	12	13	13	19	13	13	16	15
ROW/COLUMN	121	122	123	124	125	126	127	128	129	130
1	5642	5645	5730	5730	5733	5800	5866	5881	5947	5956
2	350	320	7	340	230	230	320	330	330	340
3	13	12	15	12	12	13	13	13	13	13
ROW/COLUMN	131	132	133	134	135	136	137	138	139	140
1	5961	6125	6283	6774	6845	6934	7006	7075	7230	7232
2	320	360	360	280	300	280	300	350	230	340
3	13	13	13	12	13	13	13	13	12	12
ROW/COLUMN	141	142	143	144	145	146	147	148	149	150
1	7235	7255	7257	7326	7326	7383	7390	7392	7417	7453
2	350	280	280	7	300	330	230	340	280	360
3	13	13	13	13	13	13	13	13	13	13
ROW/COLUMN	151	152	153	154	155	156	157	158	159	160
1	7543	7613	7652	7652	7688	7718	7718	7740	7755	7770
2	330	300	300	7	7	300	7	7	7	330
3	13	13	13	13	12	13	12	12	13	12
ROW/COLUMN	161	162	163	164	165	166	167	168	169	170
1	7770	7822	7861	7861	7885	7885	7952	7952	7956	7956
2	7	7	7	320	350	7	350	7	320	480
3	12	13	13	13	13	13	13	16	12	3

ROW/COLUMN	171	172	173	174	175	176	177	178	179	180
1	7990	8040	8040	8043	8059	8106	8106	8110	8177	8191
2	7	340	7	230	7	340	7	230	320	330
3	13	13	16	13	17	13	17	13	13	13

ROW/COLUMN	181	182	183	184	185	186	187	188	189	190
1	8257	8434	8594	9084	9244	9316	9385	9476	9540	9542
2	330	360	360	280	280	300	350	300	230	340
3	13	12	13	13	13	12	13	13	13	13

ROW/COLUMN	191	192	193	194	195	196	197	198	199	200
1	9546	9565	9700	9700	9702	9728	9768	9765	9854	9886
2	350	280	230	7	340	7	280	360	330	280
3	12	13	13	15	13	22	12	13	13	13

ROW/COLUMN	201	202	203	204	205	206	207	208	209	210
1	9963	10014	10023	10048	10123	10123	10158	10196	10196	10209
2	300	330	340	7	7	300	7	7	350	280
3	12	13	13	15	13	13	13	13	13	13

ROW/COLUMN	211	212	213	214	215	216	217	218	219	220
1	10209	10224	10301	10330	10330	10349	10349	10350	10353	10356
2	7	7	7	7	320	7	300	340	230	350
3	14	13	12	13	13	20	13	13	13	13

ROW/COLUMN	221	222	223	224	225	226	227	228	229	230
1	10369	10416	10416	10421	10425	10488	10488	10502	10502	10525
2	7	7	340	230	320	7	320	330	7	7
3	16	22	13	12	13	13	13	12	16	13

ROW/COLUMN	231	232	233	234	235	236	237	238	239	240
1	10662	10904	11394	11555	11626	11780	11850	11856	12011	12013
2	330	360	280	280	300	300	280	350	280	340
3	13	13	13	12	13	13	13	13	12	12

ROW/COLUMN	241	242	243	244	245	246	247	248	249	250
1	12016	12019	12038	12104	12173	12198	12234	12273	12324	12394
2	350	480	280	330	340	280	360	300	330	360
3	13	3	13	13	13	13	13	13	13	13

ROW/COLUMN	251	252	253	254	255	256	257	258	259	260
1	12433	12463	12520	12520	12534	12603	12641	12641	12661	12661
2	300	7	280	7	7	7	320	7	340	7
3	13	13	12	13	8	13	13	13	12	13

ROW/COLUMN	261	262	263	264	265	266	267	268	269	270
1	12666	12679	12733	12733	12736	12821	12821	12824	12891	12891
2	350	7	350	7	340	340	7	230	7	230
3	13	16	13	16	13	13	16	13	13	13

ROW/COLUMN	271	272	273	274	275	276	277	278	279	280
1	12907	12958	12972	13038	13047	13053	13215	13375	13865	13936
2	7	320	330	330	340	320	360	360	280	300
3	13	13	13	13	13	12	16	12	13	13

ROW/COLUMN	281	282	283	284	285	286	287	288	289	290
1	14025	14097	14166	14321	14323	14327	14347	14348	14417	14474
2	280	300	350	230	340	350	260	280	300	330
3	13	12	13	13	13	12	12	13	13	13

ROW/COLUMN	291	292	293	294	295	296	297	298	299	300
1	14475	14481	14483	14509	14509	14544	14544	14635	14705	14744
2	7	230	340	7	280	360	7	330	360	7
3	21	13	13	22	12	13	13	13	12	12

ROW/COLUMN	301	302	303	304	305	306	307	308	309	310
1	14744	14779	14809	14809	14631	14847	14861	14861	14952	14977
2	300	7	7	300	7	7	7	330	320	350
3	12	13	13	13	13	13	13	13	13	13

ROW/COLUMN	311	312	313	314	315	316	317	318	319	320
1	15044	15047	15048	15134	15197	15202	15269	15283	15349	15364
2	350	320	480	230	340	230	320	330	330	320
3	12	13	2	13	13	12	13	12	12	12

ROW/COLUMN	321	322	323	324	325	326	327	328	329	330
1	15525	15685	16175	16336	16407	16477	16567	16633	16637	16657
2	360	360	280	280	300	350	300	340	350	280
3	13	13	13	12	13	13	13	13	13	13

ROW/COLUMN	331	332	333	334	335	336	337	338	339	340
1	16792	16794	16819	16855	16945	16980	17105	17114	17249	17287
2	230	340	280	360	330	280	330	340	310	350
3	12	12	13	13	13	12	13	13	13	13

ROW/COLUMN	341	342	343	344	345	346	347	348	349	350
1	17301	17421	17442	17445	17447	17508	17512	17515	17516	17580

2	280	320	340	230	350	340	230	460	320	320
3	12	13	12	12	13	12	13	4	13	13

ROW/COLUMN	351	352	353
1	17595	7753	16068
2	330	330	310
3	13	13	12

FULLWORD MATRIX 4

ROW/COLUMN	1	2	3	4	5	6	7	8	9	10
1	95	5	90	10	98	10	95	90	90	90

ROW/COLUMN	11	12	13	14	15	16	17	18	19	20
1	50	75	50	72	72	72	72	36	36	108

ROW/COLUMN	21	22	23
1	108	10	50

APPENDIX E

INPUT TAPE CREATION PROGRAM LISTING

```
BLOCK
NUMBER  *LOC   OPERATION  A,B,C,D,E,F,G,H,I        COMMENTS                                                    STATEMENT NUMBER
        ********************************************************************************                    1
        **                                                                            **                    2
        **      D. P. ASSOCIATES, INC.                                                **                    3
        **                                                                            **                    4
        **          SHUTTLE MISSION 18 DATA SYSTEM                                    **                    5
        **                                                                            **                    6
        **          MODULE 1: CREATION OF DATA ENTRIES                                **                    7
        **                                                                            **                    8
        ********************************************************************************                    9
        *                                                                                                   10
              SIMULATE                                                                                      11
        *  AN INITIAL CARD IS REQUIRED FOR EACH DATA ENTRY.  MATRIX MX1 WILL                                12
        *     CONTAIN THE FOLLOWING DATA ELEMENTS:                                                          13
        *       MX1(1,J)  THE TIME FROM LAUNCH OF DATA ENTRY J.                                             14
        *       MX1(2,J)  EXPERIMENT NUMBER I.D. OF DATA ENTRY J.                                           15
         I    MATRIX      X,3,929                                                                         16
        *       MX1(3,J)  DURATION OF DATA ENTRY J.                                                       17
              INITIAL     MX1(1,1),731/MX1(2,1),1C7/MX1(3,1),12                                           18
              INITIAL     MX1(1,2),769/MX1(2,2),1C7/MX1(3,2),14                                           19
              INITIAL     MX1(1,3),786/MX1(2,3),44/MX1(3,3),14                                            20
              INITIAL     MX1(1,4),80G/MX1(2,4),1C7/MX1(3,4),7                                            21
              INITIAL     MX1(1,5),861/MX1(2,5),1C7/MX1(3,5),10                                           22
              INITIAL     MX1(1,6),899/MX1(2,6),107/MX1(3,6),13                                           23
              INITIAL     MX1(1,7),94C/MX1(2,7),44/MX1(3,7),20                                            24
              INITIAL     MX1(1,8),960/MX1(2,8),107/MX1(3,8),4                                            25
              INITIAL     MX1(1,9),967/MX1(2,9),107/MX1(3,9),13                                           26
              INITIAL     MX1(1,10),1015/MX1(2,10),107/MX1(3,10),17                                       27
              INITIAL     MX1(1,11),1100/MX1(2,11),107/MX1(3,11),12                                       28
              INITIAL     MX1(1,12),1101/MX1(2,12),44/MX1(3,12),11                                        29
              INITIAL     MX1(1,13),1166/MX1(2,13),107/MX1(3,13),13                                       30
              INITIAL     MX1(1,14),1181/MX1(2,14),107/MX1(3,14),13                                       31
              INITIAL     MX1(1,15),1195/MX1(2,15),107/MX1(3,15),13                                       32
              INITIAL     MX1(1,16),1298/MX1(2,16),107/MX1(3,16),13                                       33
              INITIAL     MX1(1,17),1342/MX1(2,17),107/MX1(3,17),8                                        34
              INITIAL     MX1(1,18),1800/MX1(2,18),7/MX1(3,18),22                                         35
              INITIAL     MX1(1,19),1800/MX1(2,19),12/MX1(3,19),27                                        36
              INITIAL     MX1(1,20),1873/MX1(2,20),5/MX1(3,20),13                                         37
              INITIAL     MX1(1,21),1877/MX1(2,21),12/MX1(3,21),88                                        38
              INITIAL     MX1(1,22),1879/MX1(2,22),7/MX1(3,22),84                                         39
              INITIAL     MX1(1,23),1956/MX1(2,23),5/MX1(3,23),12                                         40
              INITIAL     MX1(1,24),1970/MX1(2,24),12/MX1(3,24),30                                        41
              INITIAL     MX1(1,25),1972/MX1(2,25),7/MX1(3,25),16                                         42
              INITIAL     MX1(1,26),1990/MX1(2,26),7/MX1(3,26),7                                          43
              INITIAL     MX1(1,27),1993/MX1(2,27),5/MX1(3,27),20                                         44
              INITIAL     MX1(1,28),2034/MX1(2,28),5/MX1(3,28),12                                         45
              INITIAL     MX1(1,29),2039/MX1(2,29),4/MX1(3,29),3                                          46
              INITIAL     MX1(1,30),2047/MX1(2,30),12/MX1(3,30),7                                         47
              INITIAL     MX1(1,31),2056/MX1(2,31),12/MX1(3,31),105                                       48
              INITIAL     MX1(1,32),2056/MX1(2,32),5/MX1(3,32),13                                         49
              INITIAL     MX1(1,33),2059/MX1(2,33),7/MX1(3,33),57                                         50
              INITIAL     MX1(1,34),2116/MX1(2,34),5/MX1(3,34),13                                         51
              INITIAL     MX1(1,35),2120/MX1(2,35),7/MX1(3,35),9                                          52
              INITIAL     MX1(1,36),2134/MX1(2,36),7/MX1(3,36),9                                          53
              INITIAL     MX1(1,37),2145/MX1(2,37),7/MX1(3,37),14                                         54
              INITIAL     MX1(1,38),2153/MX1(2,38),5/MX1(3,38),19                                         55
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                INITIAL     MX1(1,894),14667/MX1(2,894),5/MX1(3,894),13                                  911
                INITIAL     MX1(1,895),14671/MX1(2,895),107/MX1(3,895),12                                912
                INITIAL     MX1(1,896),14675/MX1(2,896),4/MX1(3,896),2                                   913
                INITIAL     MX1(1,897),14677/MX1(2,897),7/MX1(3,897),2                                   914
                INITIAL     MX1(1,898),14690/MX1(2,898),7/MX1(3,898),11                                  915
                INITIAL     MX1(1,899),14702/MX1(2,899),7/MX1(3,899),1                                   916
                INITIAL     MX1(1,900),14705/MX1(2,900),107/MX1(3,900),12                                917
                INITIAL     MX1(1,901),14711/MX1(2,901),7/MX1(3,901),39                                  918
                INITIAL     MX1(1,902),14744/MX1(2,902),107/MX1(3,902),12                                919
                INITIAL     MX1(1,903),14744/MX1(2,903),5/MX1(3,903),13                                  920
                INITIAL     MX1(1,904),14756/MX1(2,904),7/MX1(3,904),45                                  921
                INITIAL     MX1(1,905),14779/MX1(2,905),107/MX1(3,905),13                                922
                INITIAL     MX1(1,906),14779/MX1(2,906),5/MX1(3,906),13                                  923
                INITIAL     MX1(1,907),14800/MX1(2,907),5/MX1(3,907),23                                  924
                INITIAL     MX1(1,908),14809/MX1(2,908),107/MX1(3,908),13                                925
                INITIAL     MX1(1,909),14816/MX1(2,909),44/MX1(3,909),5                                  926
                INITIAL     MX1(1,910),14830/MX1(2,910),5/MX1(3,910),13                                  927
                INITIAL     MX1(1,911),14831/MX1(2,911),107/MX1(3,911),13                                928
                INITIAL     MX1(1,912),14847/MX1(2,912),107/MX1(3,912),13                                929
                INITIAL     MX1(1,913),14847/MX1(2,913),5/MX1(3,913),13                                  930
                INITIAL     MX1(1,914),14861/MX1(2,914),107/MX1(3,914),13                                931
                INITIAL     MX1(1,915),14890/MX1(2,915),5/MX1(3,915),13                                  932
                INITIAL     MX1(1,916),14911/MX1(2,916),5/MX1(3,916),13                                  933
                INITIAL     MX1(1,917),14911/MX1(2,917),107/MX1(3,917),15                                934
                INITIAL     MX1(1,918),14952/MX1(2,918),107/MX1(3,918),13                                935
                INITIAL     MX1(1,919),14952/MX1(2,919),5/MX1(3,919),13                                  936
                INITIAL     MX1(1,920),14968/MX1(2,920),44/MX1(3,920),7                                  937
                INITIAL     MX1(1,921),14971/MX1(2,921),5/MX1(3,921),21                                  938
                INITIAL     MX1(1,922),15047/MX1(2,922),5/MX1(3,922),13                                  939
                INITIAL     MX1(1,923),15117/MX1(2,923),5/MX1(3,923),13                                  940
                INITIAL     MX1(1,924),15132/MX1(2,924),5/MX1(3,924),12                                  941
                INITIAL     MX1(1,925),15194/MX1(2,925),5/MX1(3,925),13                                  942
                INITIAL     MX1(1,926),15207/MX1(2,926),5/MX1(3,926),16                                  943
                INITIAL     MX1(1,927),15229/MX1(2,927),5/MX1(3,927),12                                  944
                INITIAL     MX1(1,928),15245/MX1(2,928),5/MX1(3,928),13                                  945
                INITIAL     MX1(1,929),15269/MX1(2,929),5/MX1(3,929),13                                  946
*                                                                                                        947
1               GENERATE    0,,,1,,25PF             CREATE WORKER TRANSACTION                        948
2               ASSIGN      12,1,PF                 NUMBER FIRST DATA ENTRY                          949
3               TRANSFER    ,EXP1                                                                    950
4       EXP     ASSIGN      12+,1,PF                NUMBER DATA ENTRIES                              951
5               ADVANCE     V1                      DELAY INTERARRIVAL TIME                          952
6       EXP1    ASSIGN      1,MX1(1,P12),PF         RECORD TIME FROM LAUNCH                          953
7               ASSIGN      2,MX1(2,P12),PF         RECORD EXPERIMENT NUMBER                         954
8               ASSIGN      3,MX1(3,P12),PF         RECORD DATA ENTRY DURATION                       955
9               WRITE       JOBTAI                  CREATE JOBTAPE RECORD                            956
10              TEST E      P12,929,EXP                                                              957
11              TERMINATE   1                                                                        958
                CLEAR       MX1                                                                      959
        1       VARIABLE    MX1(1,P12)-MX1(1,V2)    COMPUTE INTERARRIVAL TIME                        960
        2       VARIABLE    P12-1                                                                    961
                START       1                                                                        962
                END                                                                                  963
```

APPENDIX F

DEFINITIONS OF OUTPUT FOR STORAGES

APPENDIX F

Definitions of Output for STORAGES

STORAGE: Storage block name or number.

CAPACITY: Original capacity of STORAGE block; this value is found in the STORAGE definition statement.

AVERAGE CONTENTS: Computed by accumulating the number of time units spent in the storage for each entry made into it and dividing by the length of the simulation.

ENTRIES: Total number of units which was placed into the storage during the simulation.

AVERAGE TIME/UNIT: Calculated by accumulating the number of time units spent in the storage for all entries made into it and dividing by the total entries.

TOTAL TIME: Computed by accumulating the number of time units spent in the storage for all entries made into it and dividing by (length of the simulation X CAPACITY).

PERCENT AVAILABILITY:

$$\frac{\text{(Length of the simulation) - (Total time storage was unavailable during simulation)}}{\text{(Length of the simulation)}}$$

CURRENT CONTENTS: Number of units in the storage when the printout occurred.

MAXIMUM CONTENTS: Maximum number of units which were in the storage at any point during the simulation.