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# S/360 TELOR3 PROGRAM DESCRIPTION TEST, EDIT, AND LIST AN ORB3A TAPE

ROBERT K. SCHLESSINGER

JULY 1971



— GODDARD SPACE FLIGHT CENTER —  
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S/360 TELOR3 PROGRAM DESCRIPTION  
TEST, EDIT, AND LIST AN ORB3A TAPE

Robert K. Schlessinger  
Computer Sciences Corporation

July 1971

GODDARD SPACE FLIGHT CENTER  
Greenbelt, Maryland

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S/360 TELOR3 PROGRAM DESCRIPTION  
TEST, EDIT, AND LIST AN ORB3A TAPE

Prepared by

COMPUTER SCIENCES CORPORATION

for

GODDARD SPACE FLIGHT CENTER

Under

Contract No. NAS 5-11790

Task Assignment No. 72 Subtask H

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FOREWORD

The Test, Edit, and List ORB3A Tape program (TELOR3), was prepared by Computer Sciences Corporation under Contract Number NAS 5-11790. It is a completely revised version of the Test, Edit, and List ORB3A Tape program produced by International Business Machines Corporation in March 1969, under Contract Number NAS 5-10022.

The present document supersedes the original.

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Task Assignment No. 72, Subtask H  
Contract Number NAS 5-11790

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#### ABSTRACT

This report documents the S/360 TELOR3 Program which tests, edits, and lists the information on an ORB3A tape. The documentation includes narrative descriptions (including flowcharts) of the main driver routine and the sub-routines of the TELOR3 Program, a User's Guide, cross reference charts pertaining to the source program, and a compiled listing of the source program.

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## SECTION 1

### INTRODUCTION

The purpose of the TELOR3 Program (Test, Edit, and List ORB3A Tape) is to validate and/or edit the single precision floating point data on a 7-track, binary ORB3A tape (see Reference 1). To accomplish this purpose TELOR3 provides the five options which are listed below:

1. Ascending Node Report Option - Processing in this option lists the times of ascending node crossing numbers (pass numbers) present on an input, binary ORB3A tape and computes and lists the time period between successive pass numbers (ascending nodes).
2. Change Pass Numbers and Report Option - Processing in this option creates an output, binary ORB3A tape identical to the input, binary ORB3A tape, except that the output ORB3A tape contains altered pass numbers (altered ascending node crossing numbers). This option also produces an ascending node report based on the output ORB3A tape.
3. Select Time Period Option - Processing in this option selects a user specified period of data present on the input, binary ORB3A tape and writes this period on an output, binary ORB3A tape, together with a revised title record containing the start and end times of the selected period.
4. Sunlight Report Option - Processing in this option lists the times of satellite entrance into and exit from sunlight present on an input, binary ORB3A tape.

5. Check Record Option - This option is used to check binary ORB3A tapes which experienced abnormal run termination when being generated. Certain words in each record of the input ORB3A tape are checked for absolute errors, such as, a percent value exceeding 100 percent. In addition, selected words are checked for errors peculiar to ORB3A data, such as, a word not being equal to a standard ORB3A value. Each record is also checked for a read error and for an end-of-file indicator. The first input ORB3A record to fail any one of the above checks while being processed in this option, causes an output binary ORB3A tape to be generated with the period of data extending through the next-to-the-last record before the check-fail record. In addition, the output ORB3A tape has a revised title record containing the new end time of the satellite data.

Only one option can be executed for any job submittal.

The S/360 TELOR3 Program has been compiled under FORTRAN IV, level H, optimization level of zero on the IBM 360/95 using Release 19.

The following sections of this report present detailed subroutine descriptions for the main driver routine and the processing subroutines which form the TELOR3 Program. Each description includes: (1) the purpose of the subroutine; (2) the method of the subroutine; (3) subroutine usage; (4) subprograms called; (5) a flowchart; and (6) subroutine restrictions.

In addition, this report contains three appendices which are described below:

- |             |   |
|-------------|---|
| Appendix A: | A User's Guide including a sample run printout for each of the five TELOR3 options.   |
| Appendix B: | Source program cross reference charts displaying: (1) subroutine COMMON block usage; (2) input/output units vs internal statement numbers (ISN) for each subroutine; and (3) calls to subroutines vs ISN numbers for each subroutine. |
| Appendix C: | A compiled listing of the source program.   |

## SECTION 2

### SUBROUTINE DESCRIPTION -- MAIN DRIVER

Subroutine Name and Program Number MAIN, Number G00409

Programmer's Name Robert K. Schlessinger

Date May 7, 1971

#### 2.1 PURPOSE

MAIN serves as the executive or supervisory routine for four of the five options in the S/360 TELOR3 Program. The remaining option, specifically, the Change Pass Numbers and Report option, is performed by logic contained within MAIN.

#### 2.2 METHOD

The MAIN routine first reads in the title record of the TELOR3 input tape and verifies whether or not the input is a binary ORB3A tape. If not, an error message is printed out, and execution is terminated. If the input is a binary ORB3A tape, MAIN reads an option card specifying the input ORB3A tape number and which one of the five possible TELOR3 options is to be performed. The five possible TELOR3 options are: the Ascending Node Report Option (subroutine ASCEND); the Change Pass Numbers and Report Option (MAIN routine); the Select Time Period Option (subroutine SELECT); the Sunlight Report Option (subroutine SUNLGT); and the Check Record Option (subroutine CHKREC). A validity check is made on the option selector read from the card. If the selector is invalid, an error message is printed out and execution is terminated. If the option selector is valid, processing continues and MAIN converts the input ORB3A tape start and end times in seconds-of-day (contained

in the title record), to start and end times in hours, minutes, and seconds. A title page is printed out displaying the program title (TELOR3), the option selected, satellite ID, input ORB3A tape number, and input ORB3A tape start and end times in hours, minutes, and seconds. MAIN is then ready to supervise the execution of the specific option chosen. The following paragraphs describe how MAIN controls the program flow for each of the five possible options.

If the Sunlight Report Option, the Select Time Period Option, or the Check Record Option has been specified, MAIN calls the appropriate subroutine. The desired processing is performed by the subroutine. Control is then returned to MAIN, and the program comes to a stop.

If the Ascending Node Report Option has been selected, MAIN prints out the column headings for this report option. MAIN then enters a loop which reads an input ORB3A tape record into an array called READIN, and checks the record to see whether it is a data record or a sentinel record.

When a data record is encountered, MAIN checks for the existence of an ascending node data item by examining the third word in the 12th data item (the special type data item) for the absence or presence of a 999. When 999 is absent, an ascending node data item exists in the data record. In this case, MAIN calls subroutine ASCEND to isolate that item and use it to produce and store one line of information for the BCD output of the Ascending Node Report. Program control is then returned to MAIN which executes instructions to print the ascending node line of information just stored by ASCEND. MAIN then returns to the beginning of the loop and another input record is read into array READIN.

If 999 is present in the 3rd word of the 12th data item, it indicates to MAIN that no ascending node item exists in this data record and MAIN returns to the beginning of the loop to process the next data record.

When a sentinel record is encountered, a message is printed on the Ascending Node Report stating that a normal termination of the Ascending Node Report Option has occurred.

If the Change Pass Numbers and Report Option has been selected, MAIN creates an output, binary ORB3A tape which is a duplicate of the input, binary ORB3A tape, with the exception that the output tape contains altered pass numbers (i. e., altered ascending node crossing numbers). The Pass Number Option also produces an ascending node report, based on the output ORB3A tape. The input option card read by MAIN supplies a number (stored in variable VALUE) which is one less than the desired value for the pass number of the first ascending node data item to be written on the output ORB3A tape. After the option card has been read, column headings for the Ascending Node Report based on the output ORB3A tape are printed out. Next, the TITLE array (containing the title record from the input ORB3A tape) is written out as the title record on the output ORB3A tape. MAIN then enters a loop which performs the following steps:

1. Reads an input ORB3A record into the READIN array.
2. Checks the record (array READIN) to determine whether it is a sentinel, or a data record.
3. If it is a sentinel record, a loop exit occurs, the proper number of sentinel type records are written on the output ORB3A tape, an end-of-file is written on the output ORB3A, and a message is



printed in the Ascending Node Report stating that a normal termination of the Change Pass Numbers and Report Option has occurred.

4. If it is a data record, the pass number of each satellite data item in the record (array READIN ) is changed and the content of READIN is then written out on the output ORB3A tape.
5. If the record just written out contains an ascending node data item, subroutine ASCEND is called to produce and store one line of information for the output of the Ascending Node Report. Control then returns to MAIN which prints the line of information in the Ascending Node Report, and MAIN returns to the beginning of the loop.
6. If the record just written out does not contain an ascending node data item, MAIN returns to the beginning of the loop.

The pass numbers in Step 4 above are changed in the following way. Each data item in array READIN is examined for the presence of an ascending node type indicator and the pass number of every data item is replaced by the content of VALUE until an ascending node data item is encountered. When an ascending node data item is encountered, VALUE is incremented by one and the result replaces the pass number of the ascending node data item, and the pass numbers of all subsequent satellite data items in the READIN array, until another ascending node data item is encountered.

### 2.3

#### USAGE

This section presents information defining the interfaces of the Main Driver Routine (MAIN), of program TELOR3, with referenced external storage areas, and with other subprograms.

2.3.1 Calling Sequence

MAIN is the Main Driver Routine for program TELOR3 and, therefore has no associated calling sequence.

2.3.2 COMMON Areas

A single, unlabeled COMMON area is used in the TELOR3 Program. The statement defining this COMMON area is:

```
COMMON TITLE (256), READIN (256), PERIOD, ISAVE(6),  
      ISET
```

The arguments are defined in the following table:

<u>Argument</u>	<u>Dimension</u>	<u>Description</u>
TITLE	256	Array containing an ORB3A title record.
READIN	256	Array containing an ORB3A data record.
PERIOD	1	Time interval between successive ascending nodes in minutes (set in subroutine ASCEND). The seventh data element in each line of the Ascending Node Report output.
ISAVE	6	Array used to store six of the seven data elements comprising one line of the Ascending Node Report output (set in subroutine ASCEND).
ISAVE(1)		Pass Number
ISAVE(2)		Year-month-day
ISAVE(3)		Day-of-year
ISAVE(4)		Hour-of-day
ISAVE(5)		Minute-of-hour
ISAVE(6)		Second-of-minute

} Pass Number  
time of occurrence

<u>Argument</u>	<u>Dimension</u>	<u>Description</u>
ISET	1	<p>Flag parameter used in subroutine ASCEND to specify the equation to be used in calculating the time interval (PERIOD) between successive ascending nodes (set in MAIN)</p> <p>= 0; PERIOD=0, (for first ascending node encountered only)</p> <p>= 1; PERIOD=time elapsed from preceding ascending node encountered.</p>

### 2.3.3 External Data Sets

Program TELOR3 interfaces with two external data sets:

1. The input, binary ORB3A tape for all options
2. The output, binary ORB3A tape for the following options:
  - Change pass numbers and report option
  - Select time period option
  - Check record option

These tapes are read or written, as appropriate by subroutine RWTAP4. Detailed description of the content and format of these tapes is included in the subroutine description for RWTAP4.

### 2.4 SUBPROGRAMS CALLED

This section identifies the subprograms (subroutines and functions) called from MAIN. The CALL statement for each call to each subprogram is given, followed by a definition of the calling sequence arguments. Where multiple calls to the same program are made from MAIN, the calls are presented in the order in which they appear in the source listing.

#### 2.4.1 Subroutines Called

1. Subroutine ASCEND - This subroutine is called to isolate ascending node data items and store data for the Ascending Node Report. The calling sequence is:

CALL ASCEND

There are no arguments in the calling sequence.

2. Subroutine SUNLGT - This subroutine is called to isolate sunlight entrance or exit data items and report them. The calling sequence is :

CALL SUNLGT

3. Subroutine SELECT - This subroutine is called to execute the Select Time Period Option.  
The calling sequence is:

CALL SELECT

There are no arguments in the calling sequence.

4. Subroutine CHKREC - This subroutine is called to execute the Check Record Option. The calling sequence is:

CALL CHKREC

There are no arguments in the calling sequence.

5. Subroutine RWTAP4 - This subroutine is called to read the input ORB3A tape or write the output ORB3A tape. RWTAP4 has three entry points:

RTAPE4 -- Called to read the input ORB3A tape

WTAPE4 - Called to write title or data records on the output ORB3A tape.

WSNEOF- Called to write sentinel records and an end-of-file on the output ORB3A tape.

The calling sequences used in MAIN are listed below:

```
CALL RTAPE4 (TITLE, IERR)
CALL WTAPE4 (TITLE)
CALL RTAPE4 (READIN, IERR)
CALL WTAPE4 (READIN)
CALL WSNEOF (READIN, TITLE, IWORD)
```

The arguments appearing in these calling sequences are defined below:

**IERR:** An error indicator returned by subroutine RWTAP4 reflecting unusual conditions encountered in reading the input ORB3A tape.

- =0; No unusual conditions
- =1; End-of-file encountered
- =4; Permanent read error encountered. Data are returned to calling program, but their validity is questionable.

**IWORD:** An indicator used to control branching in WSNEOF processing.

- =1; WSNEOF writes one sentinel item record, two sentinel records, and an end-of-file on the output ORB3A tape.
- =2; WSNEOF writes two sentinel records and an end-of-file on output ORB3A tape.

**READIN:** A 256 word array used to store each data record read from the input ORB3A tape; and data or sentinel item records ready to be written on the output ORB3A tape.

**TITLE:** A 256 word array used to store the title record read from the input ORB3A tape; and to store the title record and sentinel records ready to be written on the output ORB3A tape.

#### 2.4.2 Functions Called

The routine MAIN calls the IBM system function FLOAT (IVAR) several times to convert the integer argument variable, represented by IVAR, to a real variable without round off. The calling sequences appearing in MAIN are:

FLOAT (IREAD1)

FLOAT (IREAD2)

FLOAT (IREAD3)

FLOAT (IREAD4)

The arguments appearing in these calling sequences are defined below:

IREAD1:	Start time hour for satellite data on the input ORB3A tape
IREAD2:	End time hour for satellite data on the input ORB3A tape
IREAD3:	Start time minute-of-hour for satellite data on the input ORB3A tape
IREAD4:	End time minute-of-hour for satellite data on the input ORB3A tape.

#### 2.5 FLOWCHART

The flowchart for routine MAIN appears in Figure 1.

#### 2.6 RESTRICTION

The routine MAIN can only process one option per job submittal.

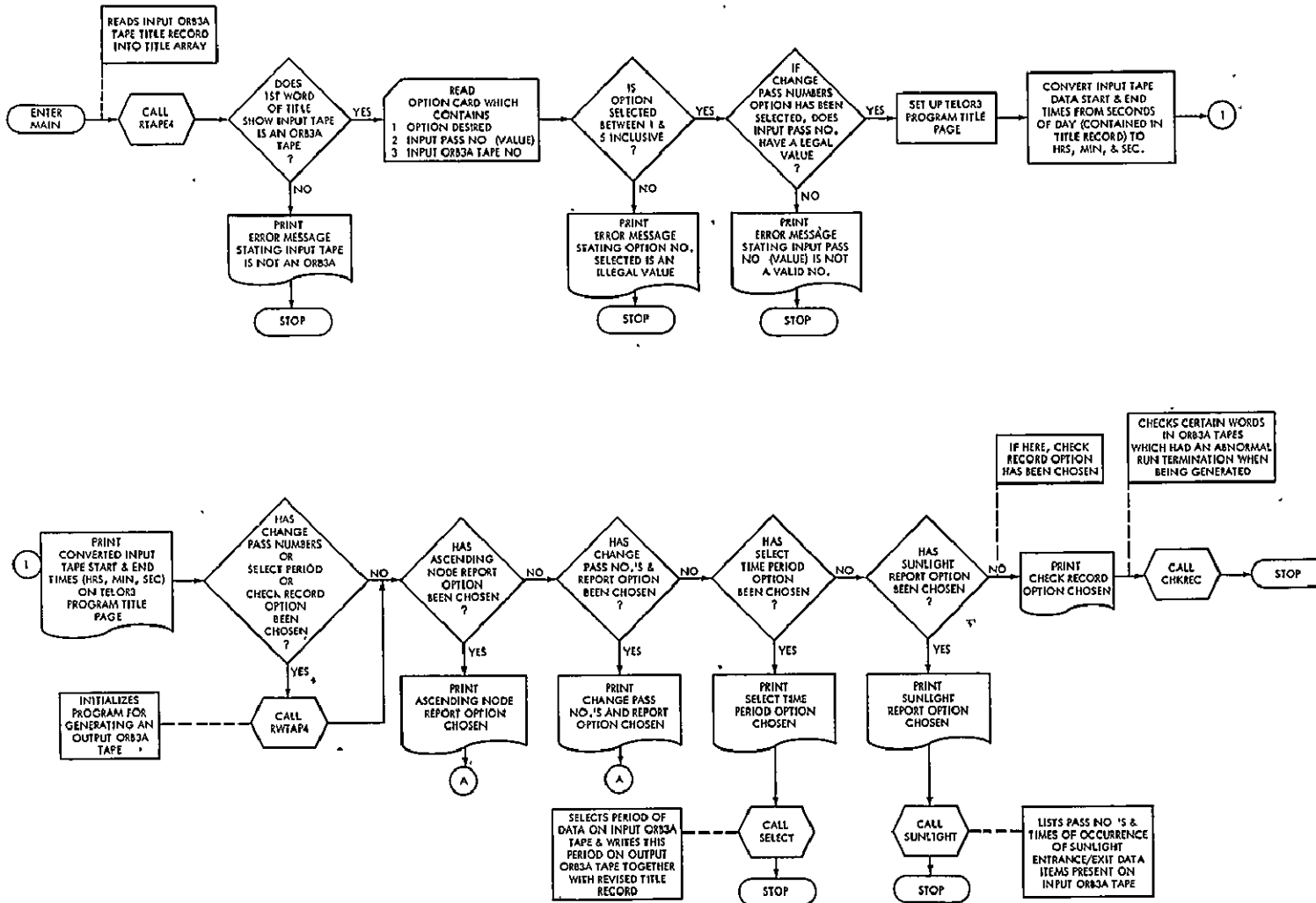


Figure 1 (sheet 1 of 3). Flowchart for MAIN Routine of the S/360 TELOR3 Program

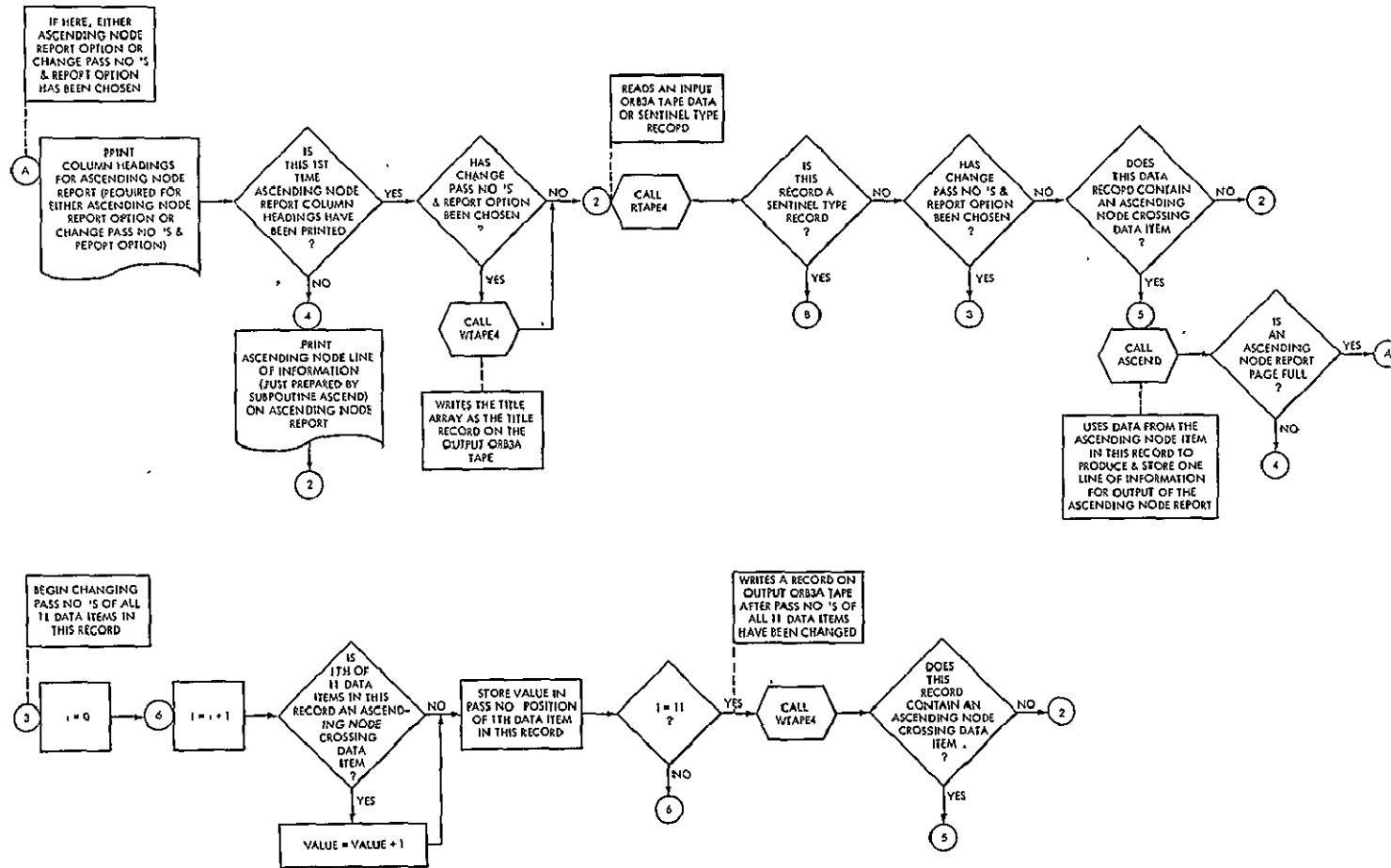


Figure 1 (sheet 2 of 3). Flowchart for MAIN Routine of the S/360 TELOR3 Program



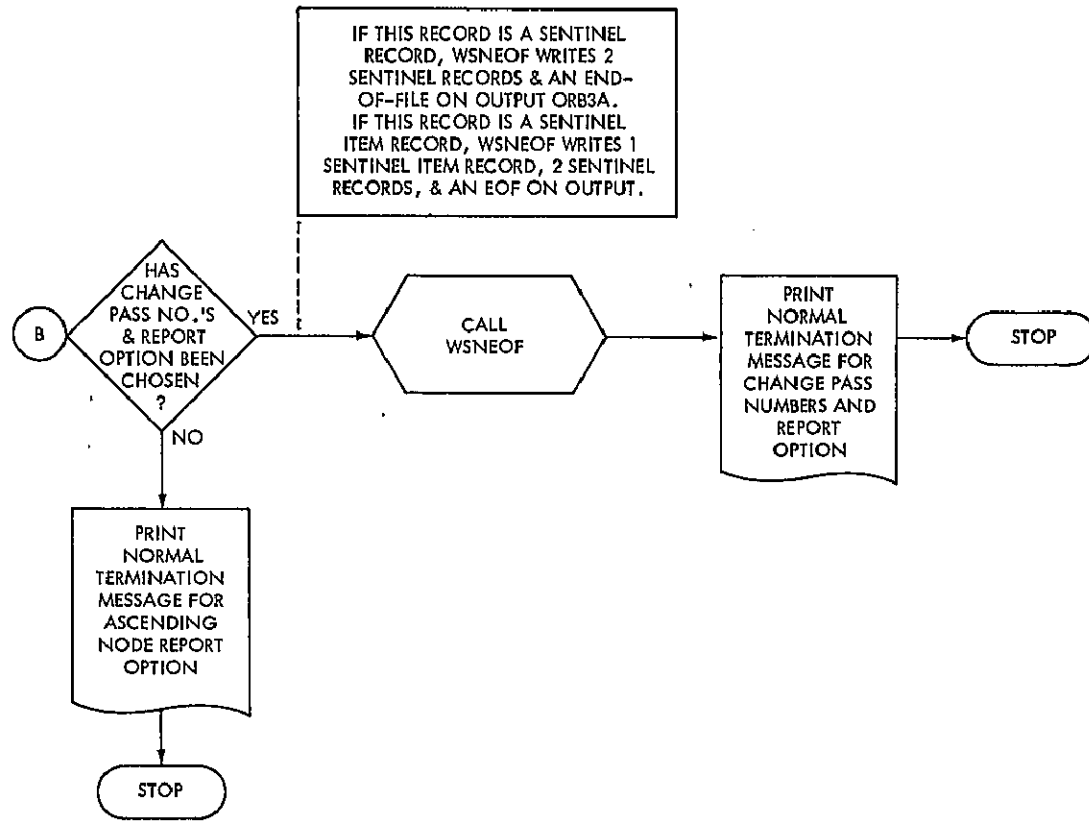


Figure 1 (sheet 3 of 3). Flowchart for MAIN Routine of the S/360 TELOR3 Program

## SECTION 3

### SUBROUTINE DESCRIPTION -- ISOLATE ASCENDING NODE (ASCEND)

Subroutine Name and Program Number ASCEND, Number G00409

Programmer's Name Robert K. Schlessinger

Date May 7, 1971

#### 3.1 PURPOSE

Subroutine ASCEND isolates the satellite data item in an ORB3A data record which is of the ascending node type, and uses data from this ascending node item to produce and store one line of information for the BCD output of the Ascending Node Report.

#### 3.2 METHOD

Subroutine ASCEND isolates the data item in an ORB3A data record which is of the ascending node type. To accomplish this isolation, ASCEND examines the type indicator (first word) of each of the eleven satellite data items in the data record. The record is stored in the READIN array. When the first word of a data item contains a type indicator equal to 2, the ascending node data item has been found. The time of occurrence of this ascending node is converted from seconds-of-day to hours, minutes, and seconds. The pass number, the year-month-day of occurrence, day-of-year, and the converted time of the ascending node are then stored in an array called ISAVE. Finally, the period of time, in minutes, between this ascending node and the last previous ascending node, is calculated and stored in variable PERIOD. If this is the first ascending node to be found, PERIOD is set to zero. ISAVE and PERIOD then contain the necessary data for one line of information for the output Ascending Node Report. Control is returned to MAIN in which instructions are executed to print this line of information.

### 3.3 USAGE

This section presents information defining the interfaces of subroutine ASCEND with referenced external storage areas, and other subprograms.

#### 3.3.1 Calling Sequence

The calling sequence is:

CALL ASCEND

There are no arguments in the calling sequence.

#### 3.3.2 COMMON Areas

Subroutine ASCEND makes use of information stored in the unlabeled COMMON area used in Program TELOR3. This COMMON area is defined in the subroutine description for the routine, MAIN (Section 2.3.2).

#### 3.3.3 External Data Sets

None

### 3.4 SUBPROGRAMS CALLED

This section identifies the subroutines and functions called from ASCEND. Calling sequences used are presented, followed by definitions of the arguments appearing in the calling sequences.

#### 3.4.1 Subroutines Called

None

#### 3.4.2 Functions Called

Subroutine ASCEND make use of two IBM system functions: FLOAT and MOD.

1. Function FLOAT (IVAR) - This function is used to convert the integer argument variable (represented by IVAR) to a real variable without round off. The calling sequences appearing in ASCEND are:

FLOAT (ISAVE(4))

FLOAT (ISAVE(5))

The arguments appearing in these calling sequences are defined below:

ISAVE(4): Hour-of-day in which an ascending node occurs

ISAVE(5): Minute-of-hour in which an ascending node occurs

2. Function MOD (IVAR, N) - The value of this function is the integer remainder after dividing the first argument by the second. The calling sequence appearing in ASCEND is:

MOD (IYEAR, 4)

where IYEAR is the year associated with satellite data on the input ORB3A tape. The MOD function is used in determining whether the year represented by IYEAR is a leap year.

### 3.5 FLOWCHART

The flowchart for subroutine ASCEND appears in Figure 2.

### 3.6 RESTRICTION

The coding of subroutine ASCEND presumes that no more than one ascending node data item will appear in a single data record on the input ORB3A tape.

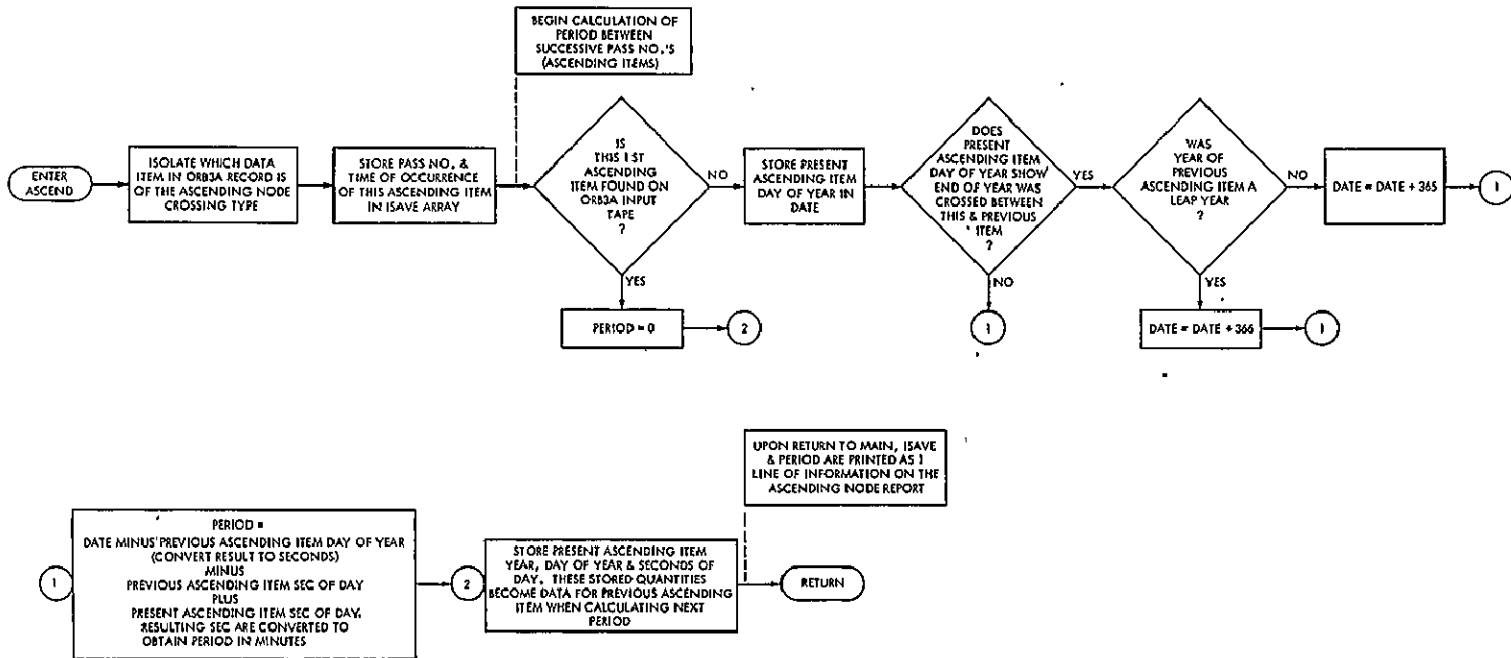


Figure 2 (sheet 1 of 1). Flowchart for Subroutine ASCEND of the S/360 TELOR3 Program

## SECTION 4

### SUBROUTINE DESCRIPTION -- SELECT-TIME PERIOD (SELECT)

Subroutine Name and Program Number: SELECT, Number G00409

Programmer's Name: Robert K. Schlessinger

Date: May 7, 1971

#### 4.1 PURPOSE

Subroutine SELECT is used to select any period of data present on an input, binary ORB3A tape, and write this period on an output, binary ORB3A tape together with a revised title record containing the start and end times of the selected period.

#### 4.2 METHOD

Backspacing and/or rewinding a 7-track, binary, input ORB3A tape is not allowed when using the special purpose FORTRAN library subroutine, DBFOR, which is required for reading this input tape with the S/360 series of computers (see subroutine description for RWTAP4). The capability is desired in subroutine SELECT for backspacing and/or rewinding an input ORB3A tape. To provide this capability, subroutine SELECT copies, onto a disk, the input ORB3A data records up through the first sentinel record or through the sentinel item record whichever the case may be. (The ORB3A title record has been previously read into the TITLE array by MAIN and TITLE is available to SELECT when needed.) The disk is then rewound, variables are initialized, and the requested period start and end times (year-month-day, hours-minutes) are read from the Select Period Input Card. The hours and minutes of the requested period start and end times are converted into requested start and end seconds-of-day. The requested time period is printed out

(year-month-day, seconds of day), and subroutine SELECT enters a search-for-start-time loop which performs the following steps.

1. Reads a record from the disk into the READIN array, increments the record counter (IRECRD) by one, and examines READIN(1) for the presence of 9's (99999999.).
2. If 9's are present, a sentinel record or a sentinel item record has been encountered which indicates the requested start time cannot be found on the input ORB3A tape. An error message stating this condition is printed out. Control is then returned to MAIN, and the program comes to a stop.
3. If 9's are not present, the year-month-day of the first satellite data item in the record (READIN(2)) is compared with the requested start year-month-day (ST).
4. If READIN(2) is equal to ST, a flag (IDATE) is set to one, which indicates that the requested start year-month-day has been found. A comparison is then made between the seconds-of-day of the first satellite data item in the record (READIN(4)) and the requested start seconds-of-day (SSEC).
5. If READIN(4) is less than SSEC, the requested period start time has not been found, SELECT returns to the beginning of the search-for-start-time loop, and another record is read from the disk into the READIN array.
6. If READIN(4) is equal to SSEC, the requested start time has been found, and corresponds to the first satellite data item in the record currently stored in READIN. An exit from the search-for-start-time loop occurs, the present value in the record counter (IRECRD) is saved in variable ISTREC, and the time of occurrence of the

first satellite data item in READIN (READIN(2), READIN(3), READIN(4)) is stored in the satellite data start-time positions in the TITLE array (TITLE(4), TITLE(5), TITLE(6)). Thus the actual satellite data start time contained in TITLE is exactly equal to the requested period start time. A search-for-end-time loop now begins according to step 10.

7. If READIN(4) is greater than SSEC, a test is made to determine whether or not READIN contains the first data record (IRECRD equal one). If IRECRD is equal to one, the requested period start time is earlier than the time of the first satellite data item on the input ORB3A tape and, therefore, can not be found. Execution then proceeds according to step 2 above. If IRECRD is not equal to one, the requested period start time has been found but exists in the record just before the one presently stored in READIN, and processing proceeds to step 8.
8. Since the requested period start time exists in the record just before the one presently stored in READIN (the requested start time could be in any satellite data item other than the first one in the previous record), the disk is backspaced one record, the present value in the record counter (IRECRD) is decremented by one and saved in the variable ISTREC, and the previous record under consideration is read from the disk into READIN. The time of occurrence of the first satellite data item in READIN (READIN(2), READIN(3), READIN(4)) is stored in the satellite data start time positions in the TITLE array (TITLE (4), TITLE (5), TITLE (6)). Thus, the actual satellite data start time contained in TITLE is somewhat earlier than the requested start time. One record is read from the disk for positioning to the beginning of the record which has not yet been read from the disk. A search-for-end-time loop now begins according to step 10.



9. If READIN(2) is not equal to ST (as opposed to step 4 above), the flag IDATE is tested for the presence of a one. If IDATE contains a one, the requested start year-month-day has been found in the record just before the one presently stored in READIN and therefore, the requested period start time also exists in this previous record. Execution then proceeds according to step 8 above. If IDATE does not contain a one, the requested start year-month-day has not as yet been found in the first satellite data item of any record including the one presently stored in READIN. SELECT returns to the beginning of the search-for-start-time loop and another record is read from the disk into the READIN array.
10. A search-for-end-time loop begins after: the requested period start time has been found, the no. of the data record on the disk containing the requested period start-time has been stored in ISTREC, and the TITLE array has been changed to reflect the satellite data start time of the period of data to be written on the output ORB3A tape. A record is read from the disk into the READIN array, the record counter (IRECRD) is incremented by one, and READIN(1), is examined for the presence of 9's.
11. If 9's are not present, the year-month-day of the first satellite data item in the record (READIN(2)) is compared with the requested end year-month-day (EN). If 9's are found, processing branches to step 24.
12. If READIN(2) is equal to EN, a flag (LDATE) is set to one (LDATE has been previously set to zero during SELECT initialization) which indicates the requested end year-month-day has been found, and a comparison is made between the seconds-of-day of the first satellite data item in the record (READIN(4)) and the requested end seconds-of-day (ESECC). For READIN(2) not equal to EN, proceed to step 19.

13. If READIN(4) is less than ESEC, the requested period end time has not been found, SELECT returns to the beginning of the search-for-end-time loop (step 10), and another record is read from the disk into the READIN array.
- If READIN(4) is equal to ESEC, the requested period end time has been found and corresponds to the first satellite data item in the record currently stored in READIN. An exit from the search-for-end-time loop occurs, the present value in the record counter (IRECRD) is saved in a variable named IENREC, and the time of occurrence of the last satellite data item in READIN (READIN(212), READIN(213), READIN(214)) is stored in the satellite data end time positions in the TITLE array (TITLE(7), TITLE(8), TITLE(9)). Thus, the actual satellite data end time contained in TITLE is somewhat later than the requested end time. A read and copy operation now begins according to step 25.
15. If READIN(4) is greater than ESEC, the requested period end time has been found, but falls either within the record just before the one presently stored in READIN or falls between the last satellite data item in the previous record under consideration and the first satellite data item in the record presently stored in READIN. In order to ascertain which of these two possibilities is the case, SELECT proceeds as in step 16 below.
16. Since the requested period end time may be within the record just before the one presently stored in READIN (the requested end time could be in any satellite data item other than the first one in this previous record), the disk is backspaced one record and the previous record is read from the disk into READIN. A comparison is made between the seconds-of-day of the last satellite data item in READIN (READIN(214)) and the requested end seconds-of-day (ESEC).

17. If READIN(214) is greater than or equal to ESEC, the requested end time does exist within this previous record. The present value in the record counter (IRECRD), decremented by one is saved in variable IENREC and the time-of-occurrence of the last satellite data item in READIN (READIN(212), READIN(213), READIN(214)) is stored in the satellite data end time positions in the TITLE array (TITLE (7), TITLE (8), TITLE (9)). Thus, the actual satellite data end time contained in TITLE is either equal to or somewhat larger than the requested period end time. A read and copy operation now begins according to step 25.
18. If READIN(214) is less than ESEC, the requested period end time does not exist within the previous record. Instead, the requested period end time falls between the last satellite data item in this previous record and the first satellite data item in the next record on the disk (the record stored in READIN before backspacing). This next record is read from the disk into READIN, the present value in the record counter (IRECRD) is saved in the variable IENREC, and the time-of-occurrence of the last satellite data item in READIN (READIN(212), READIN(213), READIN(214)) is stored in the satellite data end time positions in the TITLE array (TITLE(7), TITLE(8), TITLE(9)). Thus, the actual satellite data end time contained in TITLE is larger than the requested period end time. A read and copy operation now begins according to step 25.
19. If READIN(2) is not equal to EN (as opposed to step 12 above), the flag LDATE is tested for the presence of a one.

20. If LDATE contains a one, the requested end year-month-day has been found in the record just before the one presently stored in READIN, the disk is backspaced one record, and this previous record is read from the disk into READIN. A comparison is made between the year-month-day of the last satellite data item in READIN (READIN(212)), and the requested end year-month-day (EN).
21. If READIN(212) is not equal to EN, this previous record contains both the requested end year-month-day (at least in the first satellite data item from an earlier check) and a later end year-month-day (at least in the last satellite data item from the current check). Therefore, the requested period end time exists in this previous record. The present value in the record counter (IRECRD), decremented by one, is saved in the variable IENREC, and the time-of-occurrence of the last satellite data item in READIN (READIN(212), READIN(213), READIN(214)) is stored in the satellite data end time positions in the TITLE array (TITLE(7), TITLE(8), TITLE(9)). Thus, the actual satellite data end time contained in TITLE is somewhat larger than the requested period end time. A read and copy operation now begins according to step 25.
22. If READIN(212) is equal to EN, this previous record contains the requested end year-month-day in all eleven satellite data items. A comparison is made between the seconds-of-day of the last satellite data item in the previous record (READIN(214)), and the requested end seconds-of-day (ESEC). If READIN(214) is greater than or equal to ESEC, execution proceeds according to step 17 above. If READIN(214) is less than ESEC, execution proceeds according to step 18 above.

23. If LDATE does not contain a one (as opposed to step 20 above), the requested end year-month-day has not as yet been found in the first satellite data item of any record including the one presently stored in READIN. SELECT returns to the beginning of the search-for-end-time loop, another record is read from the disk into the READIN array, the record counter (IRECRD) is incremented by one, and READIN(1) is examined for the presence of 9's.
24. If 9's are present (as opposed to step 11) a sentinel record, or a sentinel item record, has been encountered. The final data record on the disk (corresponds to the final data record on the input ORB3A tape) is then obtained by backspacing the disk one record and reading a record from the disk into READIN. The present value in the record counter (IRECRD), decremented by one, is saved in the variable IENREC, and the following test is made to determine whether or not this final data record (READIN) contains eleven valid satellite data items. The first word of each of the eleven satellite data items is checked for the presence of 9's. If 9's are not found, this record has eleven valid data items, and the variable named IFILL is left unchanged (IFILL is initialized to eleven). If 9's are found, this record has less than eleven valid data items, IFILL is set to zero, and the location of the last valid data item in the record is saved. If the end time of the last valid satellite data item is greater than or equal to the requested period end time, a read and copy operation now begins according to step 25. If the end time is less than the requested end time, an error message is printed stating that the requested period end time is greater than the last time on the input tape; but an output ORB3A tape will be generated anyway. A read and copy operation begins

according to step 25. Since SELECT has reached the final data record, the original (present) satellite data end time contained in the TITLE array is not changed and therefore, becomes the actual satellite data end time on the output ORB3A tape to be generated.

25. The read and copy operation is as follows. The disk is rewound and the TITLE array is written as the title record on the output ORB3A tape. Data records are then read from the disk and copied onto the output ORB3A tape for those records on the disk having record numbers between ISTREC and IENREC inclusive.

26. Sentinel type records are prepared and written on the output ORB3A tape in the following manner. A sentinel record is prepared by placing 9's in the first word of the TITLE array.

If the last data record written on the output ORB3A has eleven valid data items (IFILL=11), a sentinel item record is prepared (9's are placed in the first 21 words of the last data record stored in the READIN array). A call is made to WSNEOF (an entry point to subroutine RWTAP4) in which instructions are executed to write one sentinel item record, two sentinel records, and an end-of-file on the output ORB3A tape.

If the last data record written on the output ORB3A does not have eleven valid data items (IFILL=0), WSNEOF is called and executes instructions which write two sentinel records and an end-of-file on the output ORB3A tape.

27. Control is returned to SELECT from WSNEOF. If the requested period end time has been found previously, a message is printed stating that the entire requested time period exists on the input ORB3A and has been written on the output ORB3A tape.

28. Finally, the actual start and end times (year-month-day, seconds-of-day) of the period of data written on the output ORB3A tape are printed for reference and a message is printed stating a normal termination of the Select Time Period Option has occurred. Control is then returned to MAIN, and the program comes to a stop.

#### 4.3 USAGE

This section presents information defining the interfaces of subroutine SELECT with referenced external data sets, and other subprograms.

##### 4.3.1 Calling Sequence

The calling sequence is:

```
CALL SELECT.
```

There are no arguments in the calling sequence.

##### 4.3.2 COMMON Areas

Subroutine SELECT makes use of information stored in the unlabeled COMMON area used in program TELOR3. This COMMON area is defined in the subroutine description for the routine MAIN (see Section 2.3.2).

##### 4.3.3 External Data Sets

Subroutine SELECT references a scratch file on disk (FORTRAN logical unit number 14) for temporary storage of data records read from the input ORB3A tape. These data records are written in the scratch file by SELECT and are subsequently read from the scratch file in the process of creating the output ORB3A tape. The format of each data record stored in the temporary disk file is identical to the data record format on the input ORB3A tape. This format is described in detail in the description of subroutine RWTAP4 (see Section 7.3.3).

#### 4.4 SUBPROGRAMS CALLED

This section identifies the subroutines and functions called from SELECT. Calling sequences used are presented, followed by definitions of the arguments appearing in the calling sequences.

##### 4.4.1 Subroutines Called

Subroutine SELECT makes use of subroutine RWTAP4 to read records from the input ORB3A tape, and to write records on the output ORB3A tape. RWTAP4 has three entry points:

RTAPE4 - Called to read the input ORB3A tape.

WTAPE4 - Called to write title or data records on the output ORB3A tape.

WSNEOF - Called to write sentinel type records and an end-of-file on the output ORB3A tape.

The calling sequences used in SELECT are listed below:

CALL RTAPE4 (READIN, IERR)

CALL WTAPE4 (TITLE)

CALL WTAPE4 (READIN)

CALL WSNEOF (READIN, TITLE, IWORD)

The arguments appearing in these calling sequences are defined below:

IERR: An error indicator returned by subroutine RWTAP4 reflecting unusual conditions encountered in reading the input ORB3A tape.

= 0; No unusual conditions

= 1; End-of-file encountered

= 4; Permanent read error encountered.

Data are returned to calling program, but their validity is questionable.



IWORD: Flag used in WSNEOF processing for branching, set by the calling routine.

= 1; WSNEOF writes one sentinel item record, two sentinel records, and an end-of-file on the output ORB3A tape.

= 2; WSNEOF writes two sentinel records and an end-of-file on the output ORB3A tape.

READIN: A 256-word array used to store each data record read from the input ORB3A tape; and to store data records and sentinel item records ready to be written on the output ORB3A tape.

TITLE: A 256-word array used to store the title record read from the input ORB3A tape; and to store the title record and sentinel records ready to be written on the output ORB3A tape.

#### 4.4.2 Functions Called

Subroutine SELECT makes use of the IBM system function FLOAT (IVAR) several times to convert the integer argument variable, represented by IVAR, to a real variable without round off. The calling sequences appearing in SELECT are:

FLOAT (IST)  
FLOAT (IEN)  
FLOAT (ISEC)  
FLOAT (ISEC)

The arguments appearing in these calling sequences are defined below:

IST: Requested period start year-month-day

IEN: Requested period end year-month-day

ISEC: Requested period start seconds-of-day

ISEC: Requested period end seconds-of-day.

4.5 FLOWCHART

The flowchart for subroutine SELECT appears in Figure 3.

4.6 RESTRICTION

None

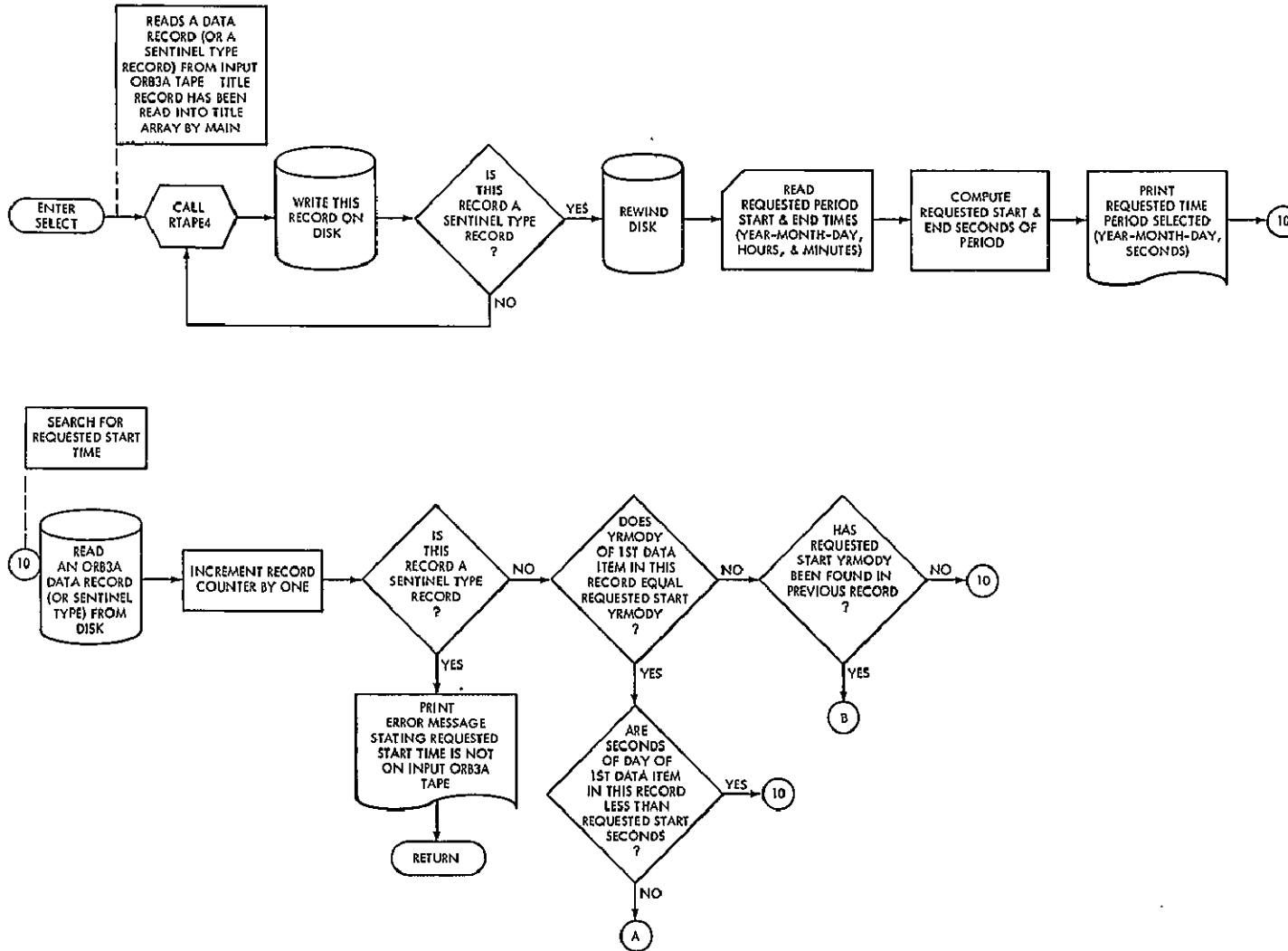


Figure 3 (sheet 1 of 6). Flowchart for Subroutine SELECT of the S/360 TELOR3 Program

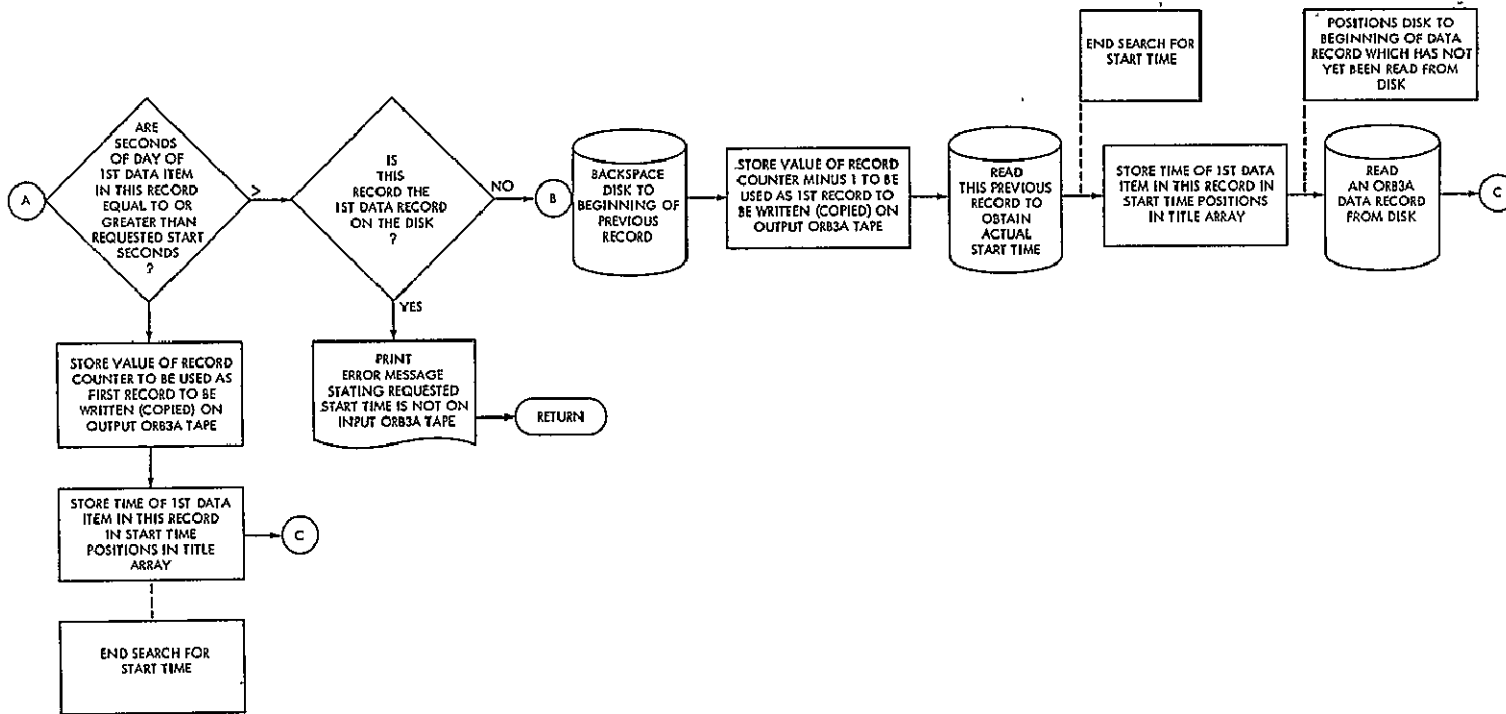


Figure 3 (sheet 2 of 6): Flowchart for Subroutine SELECT of the S/360 TELOR3 Program

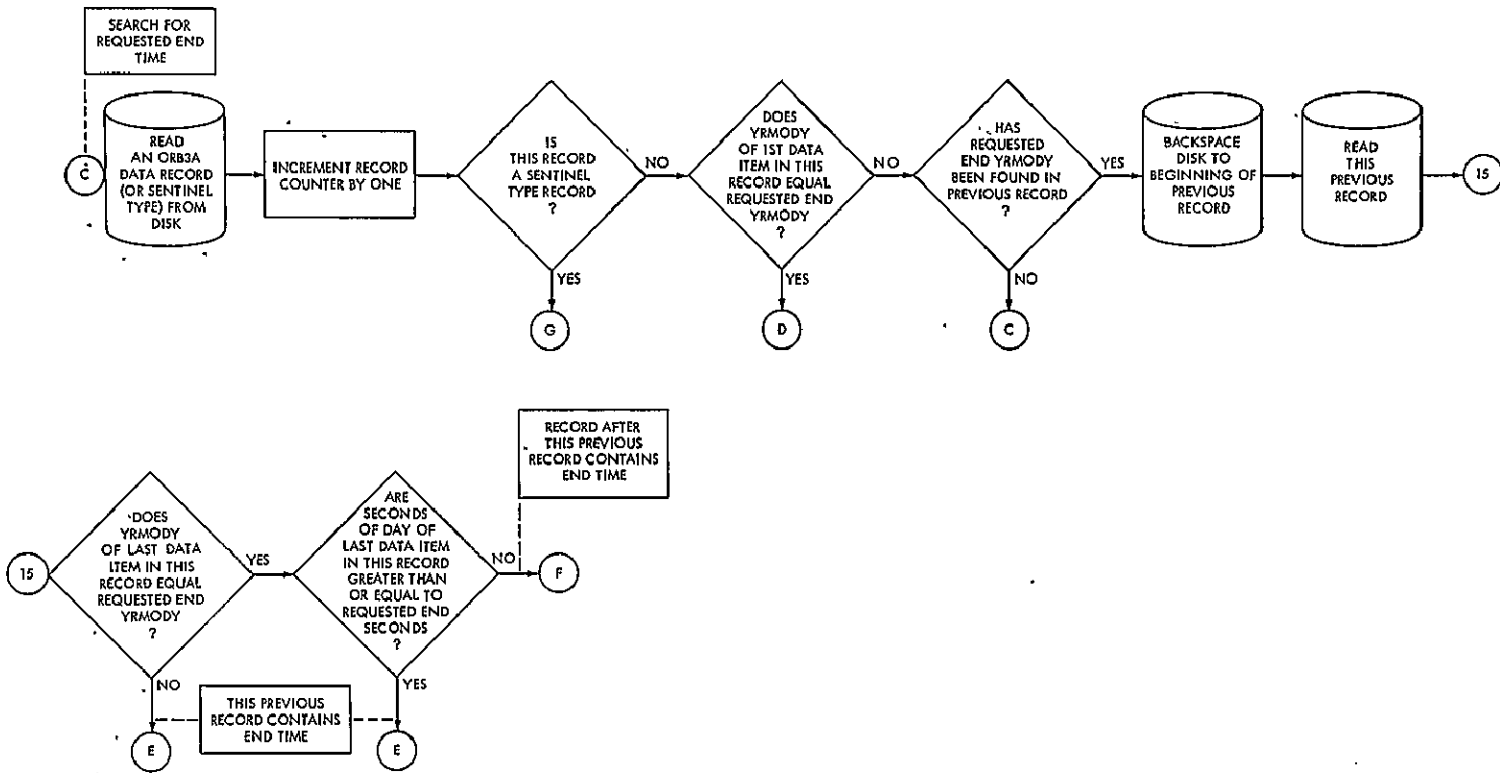


Figure 3 (sheet 3 of 6). Flowchart for Subroutine SELECT of the S/360 TELOR3 Program

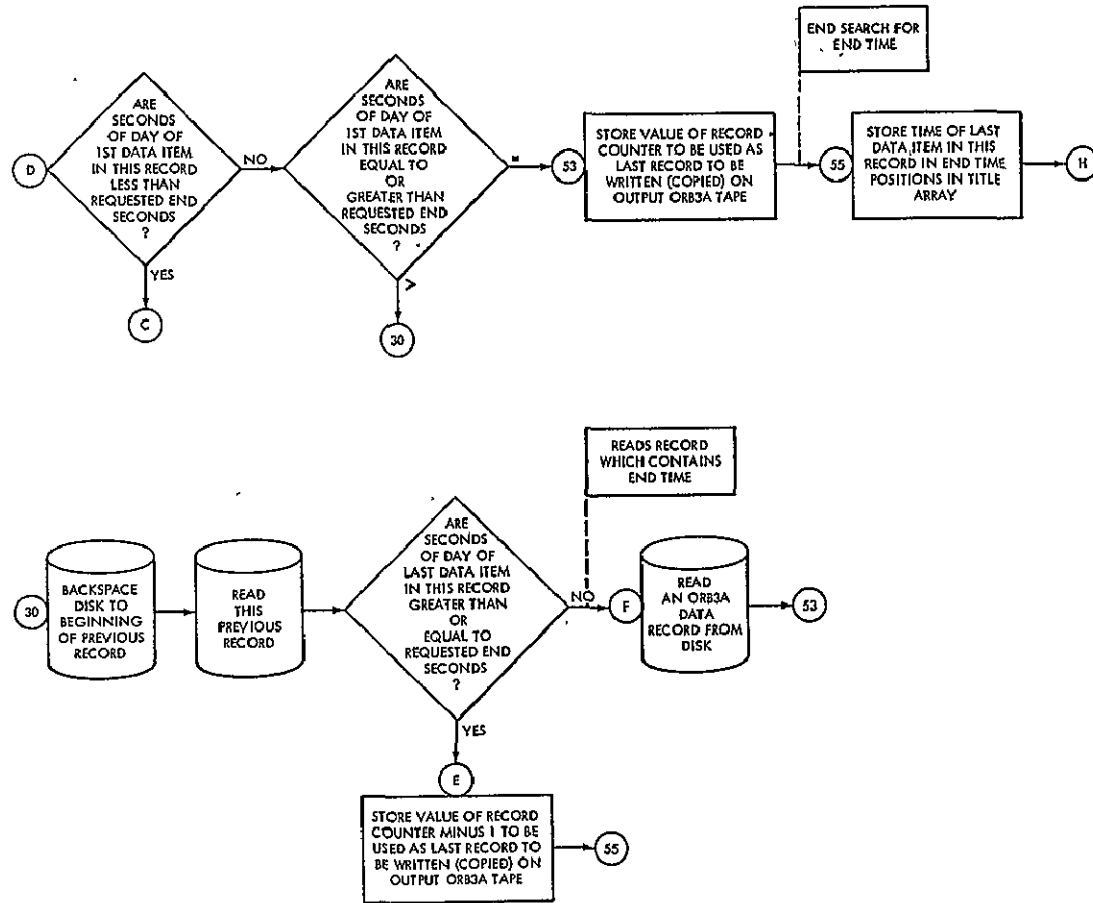


Figure 3 (sheet 4 of 6). Flowchart for Subroutine SELECT of the S/360 TELOR3 Program

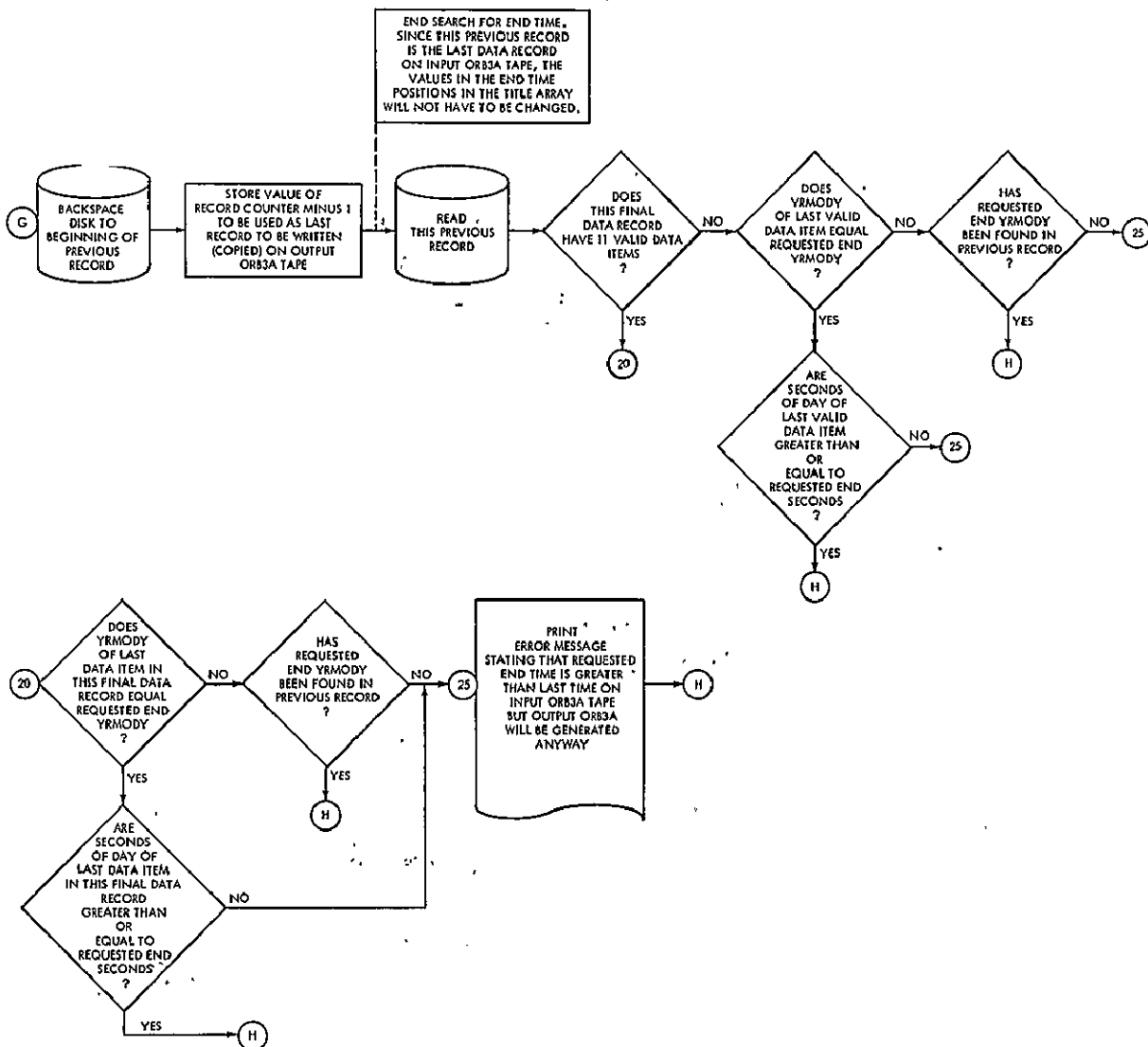


Figure 3 (sheet 5 of 6). Flowchart for Subroutine SELECT of the S/360 TELOR3 Program

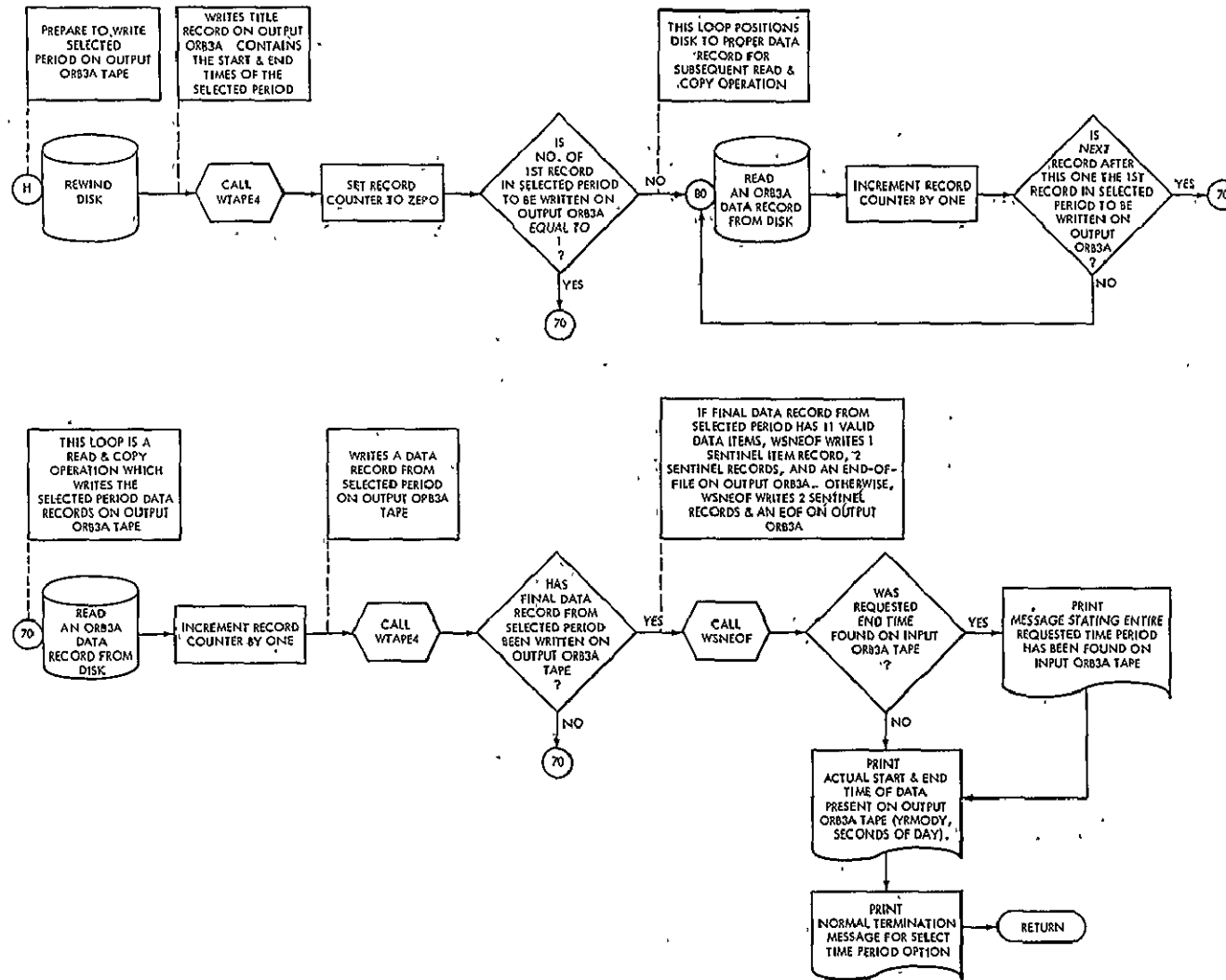


Figure 3 (sheet 6 of 6). Flowchart for Subroutine SELECT of the S/360 TELOR3 Program



## SECTION 5

### SUBROUTINE DESCRIPTION -- SUNLIGHT REPORT (SUNLGT)

Subroutine Name and Program Number SUNLGT, Number G00409

Programmer's Name Robert K. Schlessinger

Date May 7, 1971

#### 5.1 PURPOSE

Subroutine SUNLGT isolates the satellite data items on an input ORB3A tape, which are of the sunlight entrance or exit type, and prints out a BCD sunlight report containing the pass number and time-of-occurrence of each of these sunlight entrance or exit data items.

#### 5.2 METHOD

Subroutine SUNLGT first prints out the column headings for a sunlight report and then enters a loop which performs the following steps:

1. Reads an input ORB3A record into the READIN array.
2. Checks the record to see if it is a data or a sentinel record.
3. If it is a sentinel record, a loop exit occurs (described further in subsequent discussion).
4. If it is a data record, SUNLGT examines the type indicator (first word) of each of the eleven satellite data items in the record to determine whether or not a sunlight entrance or exit data item is present (type indicator equal to 6 or 7).
5. If no sunlight entrance or exit data item is present, SUNLGT returns to the beginning of the loop.

6. If a sunlight entrance data item is present (type indicator equal to 6), the pass number and time-of-occurrence of this entrance are stored and processing returns to the beginning of the loop.
7. If a sunlight exit data item is present (type indicator equal to 7), the pass number and time-of-occurrence of the last stored entrance item and of this exit item are printed as one line of output on the sunlight report. If the exit data item happens to be the first entrance or exit item on the input tape, there is no stored entrance data present, and the exit data are printed as the first line of output on the sunlight report. SUNLGT processing then returns to the beginning of the loop.

When a loop exit occurs (step 3 above), SUNLGT performs the following steps:

1. If the last stored entrance data item has not been printed out, this entrance data item is printed as the last line of output on the sunlight report. This case occurs when an entrance data item is the last entrance or exit item on the input tape.
2. One of two possible types of normal termination messages is printed on the sunlight report.
  - a. Normal termination of the Sunlight Report Option has occurred.
  - b. Normal termination of the Sunlight Report Option has occurred, but there were no sunlight entrances or exits on ORB3A input tape.

### 5.3 USAGE

This section presents information defining the interfaces of subroutine SUNLGT with referenced external storage areas, and other subprograms.

#### 5.3.1 Calling Sequence

The calling sequence is:

```
CALL SUNLGT
```

There are no arguments in the calling sequence.

#### 5.3.2 COMMON Areas

Subroutine SUNLGT does not make use of any COMMON areas.

#### 5.3.3 External Data Sets

None

### 5.4 SUBPROGRAMS CALLED

This section identifies the subroutines and functions called from SUNLGT. Calling sequences used are presented, followed by definitions of the arguments appearing in the calling sequences.

#### 5.4.1 Subroutines Called

Subroutine SUNLGT calls the RTAPE4 entry point of subroutine RWTAP4 to read data and sentinel records from the input ORB3A tape. The calling sequence used is:

```
CALL RTAPE4 (READIN, IERR)
```

The arguments appearing in this calling sequence are defined below:

READIN: A 256 word array used to store the data or sentinel record read from the input ORB3A tape.

IERR: An error indicator returned by subroutine RWTAP4 reflecting unusual conditions encountered in reading the input ORB3A tape.

= 0; No unusual conditions

= 1; End-of-file encountered

= 4; Permanent read error encountered.  
Data are returned to calling program, but their validity is questionable.

#### 5.4.2 Functions Called

Subroutine SUNLGT makes use of the IBM system function FLOAT (IVAR) several times to convert the integer argument variable, represented by IVAR, to a real variable without round off. The calling sequences appearing in SUNLGT are:

FLOAT (INHR)

FLOAT (INMIN)

FLOAT (IOHR)

FLOAT (IOMIN)

The arguments appearing in these calling sequences are defined below:

INHR: Hour-of-day for a sunlight entrance data item

INMIN: Minute-of-hour for a sunlight entrance data item

IOHR: Hour-of-day for a sunlight exit data item

IOMIN: Minute-of-hour for a sunlight exit data item.

5.5 FLOWCHART

The flowchart for subroutine SUNLGT appears in Figure 4.

5.6 RESTRICTION

The coding of subroutine SUNLGT presumes that no more than one sunlight entrance or sunlight exit data item will appear in a single data record on the input ORB3A tape.

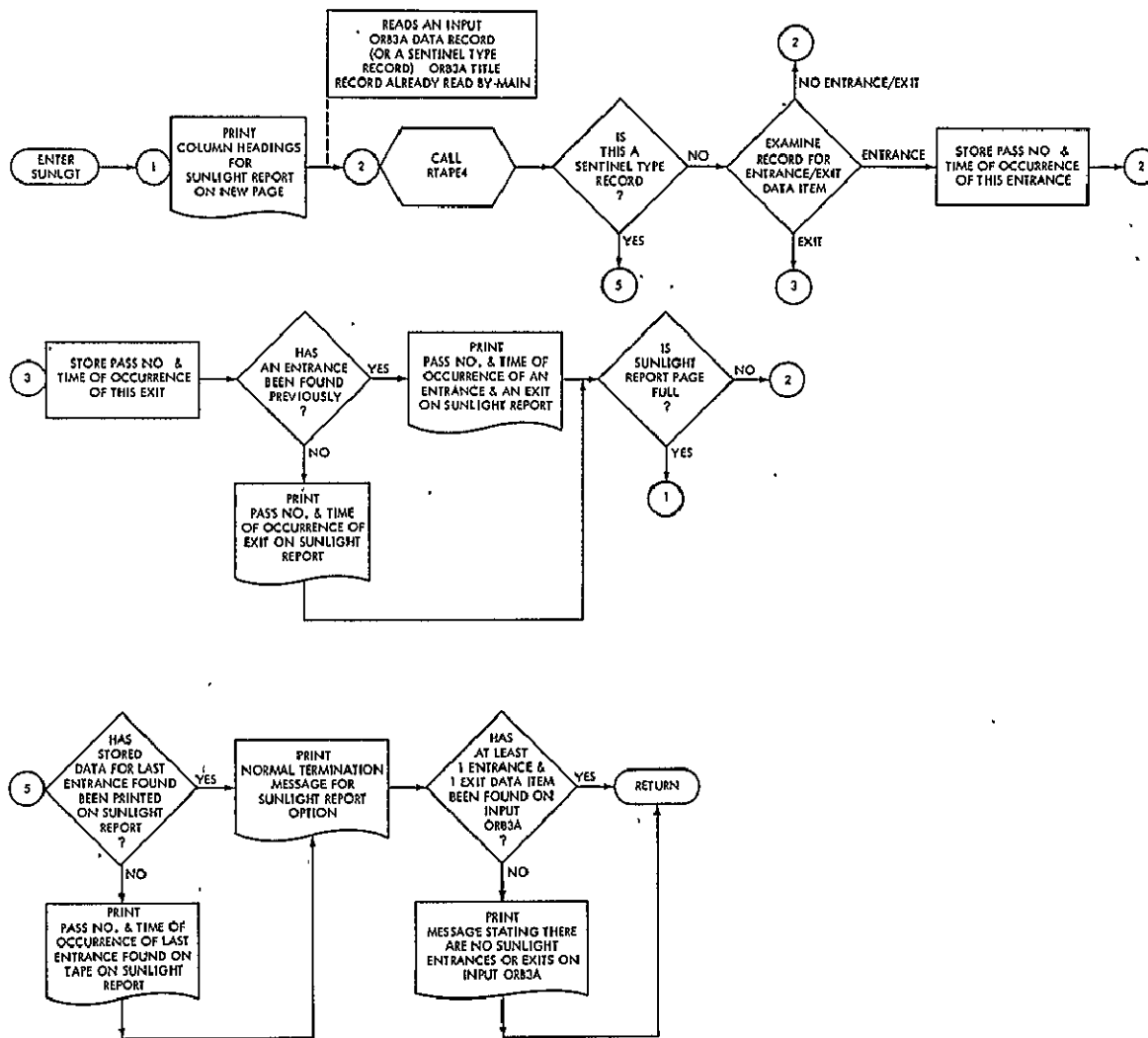


Figure 4 (sheet 1 of 1). Flowchart for Subroutine SUNLGT of the S/360 TELOR3 Program

## SECTION 6

### SUBROUTINE DESCRIPTION -- CHECK ORB3A RECORD (CHKREC)

Subroutine Name and Program Number: CHKREC, Number G00409

Programmer's Name: Robert K. Schlessinger

Date: May 7, 1971

#### 6.1 PURPOSE

Subroutine CHKREC is used to check binary ORB3A tapes which had an abnormal run termination when being generated. Selected words in each record of the input ORB3A tape are checked for data errors, and each record is checked for a read error. The first input ORB3A record to fail any one of these checks causes an output, binary ORB3A tape to be generated, with the period of data extending through the next-to-the-last record preceding the check-fail record. The output tape has a revised title record containing the new end time for the satellite data.

#### 6.2 METHOD

Backspacing and/or rewinding of a 7-track, binary, input ORB3A tape is not permitted when using the special purpose FORTRAN library subroutine, DBFOR, which is required for reading this input tape (see subroutine description for RWTAP4). Since this capability is desired in subroutine CHKREC, for backspacing and/or rewinding an input ORB3A tape, subroutine CHKREC copies, onto a scratch disk, the input ORB3A data records (including any having read errors) up to the end-of-file. (The ORB3A title record has been previously read into the TITLE array by MAIN and TITLE is available to CHKREC when needed.) An end-of-file is then written on the disk, the disk is rewound, and CHKREC enters a loop which performs the following steps.

1. Reads a record from the disk into the READIN array.
2. If a read error or an end-of-file is encountered, an appropriate message is printed out, a loop exit occurs, and execution proceeds according to the logic described in steps 6 through 15 below.
3. If a read error or an end-of-file is not encountered, the data in five key words of the record (READIN) are given the following tests.
  - a. Is the day count of the year of the first satellite data item in this record (READIN(3)) equal to or one greater than the day count of the year of the first satellite data item in the previous record?
  - b. Is the second-of-day of first satellite data item in this record (READIN(4)) less than 86400 seconds, and greater than or equal to zero seconds?
  - c. Is the third word of the special type of data item (READIN(234)) in this record equal to 999. or equal to a value between zero and 100 inclusive?
  - d. Does the type indicator of the first satellite data item in this record (READIN(1)) have a value between one and seven inclusive?
  - e. Is the first word of the special type of data item (READIN (232)) in this record equal to 99. ?
4. If the results of all of the above five tests are affirmative, CHKREC returns to the beginning of the loop and the next record is read from the disk into the READIN array.



5. If the result of any one of the above five tests is negative, an appropriate error message is printed, a loop exit occurs, and the following steps (6 through 15) are executed.
6. The check-fail record is printed out for reference except if coming from step 2 above. If coming from step 2, a read error or an end-of-file has been encountered. Printing out an end-of-file cannot be done and printing out the record causing a read error is not attempted since this record is not always accessible.
7. The disk is positioned to the beginning of the next-to-the-last record immediately preceding the check-fail record and this record is read from the disk into the READIN array.
8. The time of occurrence of the last satellite data item in this record (READIN (212), READIN (213), and READIN (214)) is stored in the satellite data end time positions in the TITLE array (TITLE(7), TITLE(8), TITLE (9), respectively).
9. The TITLE array now corresponds to a revised title record, containing the new end-time of the satellite data, and is written as the title record of the output ORB3A tape. The next-to-the-last record preceding the check-fail record, rather than the last record before the check-fail record, is considered to be the last good data record on the input ORB3A tape for the following reason. Three out of the five key words checked in a data record involve only the first satellite data item. It is conceivable these three words could pass inspection, but one or more of the same words in the ten remaining satellite data items in the record could be in error. Therefore, as a precaution, the next-to-the-last record before the check-fail record is considered to be the last good data record on the input ORB3A tape.

10. The disk is rewound and a read and copy operation is executed as follows: A data record is read from the disk into the READIN array and then written on the output ORB3A tape. A test is made to determine whether or not the time-of-occurrence of the last satellite data item in this record (READIN (212), READIN (213), READIN (214)) is equal to the satellite data end time contained in the TITLE array (TITLE (7), TITLE (8), TITLE (9)). If these items are not equal, the read and copy operation continues. If these times are equal, no more data records are to be written on the output ORB3A, the read and copy operation comes to a halt, and the last data record written on the output ORB3A is printed for reference.
11. The output ORB3A title record is printed for reference.
12. A sentinel item record is prepared (9's are placed in the first 21 words of the last data record stored in the READIN array).
13. A sentinel record is prepared (9's are placed in the first word of the TITLE array).
14. A call is made to WSNEOF (an entry point to subroutine RWTAP4) in which instructions are executed to write one sentinel item record, two sentinel records, and an end-of-file on the output ORB3A tape.
15. A message is printed stating that normal termination of the Check Record Option has occurred, control is returned to MAIN, and the program comes to a stop.

### 6.3 USAGE

This section presents information defining the interfaces of subroutine CHKREC with referenced external data sets, and other subprograms.

#### 6.3.1 Calling Sequence

The calling sequence is:

```
CALL CHKREC
```

There are no arguments in the calling sequence.

#### 6.3.2 COMMON Areas

Subroutine CHKREC makes use of information stored in the unlabeled COMMON area used in program TELOR3. This COMMON area is defined in the subroutine description for the routine MAIN (see Section 2.3.2).

#### 6.3.3 External Data Sets

Subroutine CHKREC references a scratch file on disk (FORTRAN logical unit number 14) for temporary storage of data records read from the input ORB3A tape. These data records are written in the scratch file by CHKREC, and are subsequently read from the scratch file in the process of creating the output ORB3A tape. The format of each data record, as stored in the temporary disk file, is identical to the data record format on the input ORB3A tape. This format is described in detail in the subroutine description for subroutine RWTAP4 (see Section 7.3.3).

### 6.4 SUBPROGRAMS CALLED

This section identifies the subroutines and functions called from CHKREC. Calling sequences used are presented, followed by definitions of the arguments appearing in the calling sequences.

#### 6.4.1 Subroutines Called

Subroutine CHKREC makes use of subroutine RWTAP4 to read records from the input ORB3A tape, and to write records on the output ORB3A tape. RWTAP4 has three entry points:

RTAPE4 - Called to read the input ORB3A tape

WTAPE4 - Called to write title or data records on the output ORB3A tape.

WSNEOF - Called to write sentinel records and an end-of-file on the output ORB3A tape.

The calling sequences used in CHKREC are listed below:

CALL RTAPE 4 (READIN, IERR)

CALL WTAPE 4 (TITLE)

CALL WTAPE 4 (READIN)

CALL WSNEOF (READIN, TITLE, IWORD)

The arguments appearing in these calling sequences are defined below:

IERR: An error indicator returned by subroutine RWTAP4 reflecting unusual conditions encountered in reading the input ORB3A tape.

=0; No unusual conditions

=1; End-of-file encountered

=4; Permanent read error encountered.

Data are returned to calling program, but their validity is questionable.

IWORD: Flag used in WSNEOF processing for branching, set by the calling routine.

=1; WSNEOF writes one sentinel item record, two sentinel records, and an end-of-file on the output ORB3A tape.

=2; WSNEOF writes two sentinel records and an end-of-file on the output ORB3A tape.

READIN: A 256-word array used to store each data record read from the input ORB3A tape; and to store data records, and sentinel item records, ready to be written on the output ORB3A tape.

⊕

TITLE: A 256-word array used to store the title record read from the input ORB3A tape; and a title record or a sentinel record ready to be written on the output ORB3A tape.

6.4.2 Functions Called

None

6.5 FLOWCHART

The flowchart for subroutine CHKREC appears in Figure 5.

6.6 RESTRICTION

If an entirely good input ORB3A tape is processed by subroutine CHKREC, an output ORB3A tape will be generated with the last output ORB3A data record corresponding to the next-to-the-last data record on the input ORB3A tape.

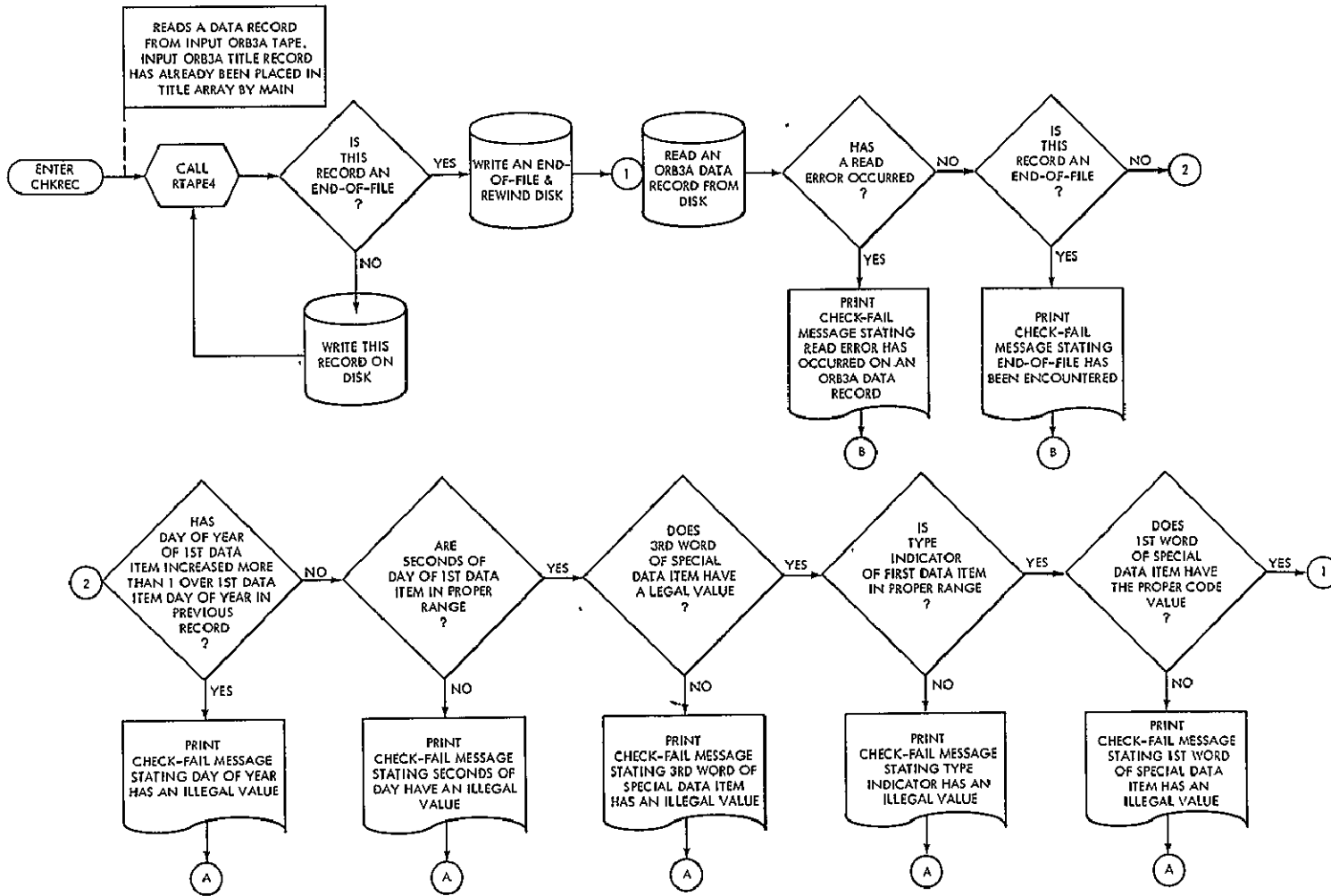
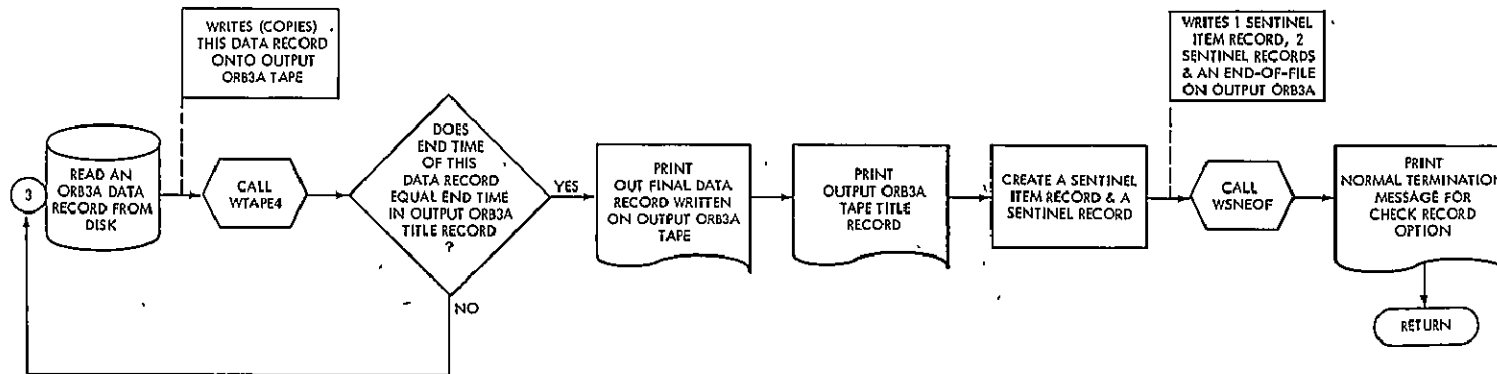
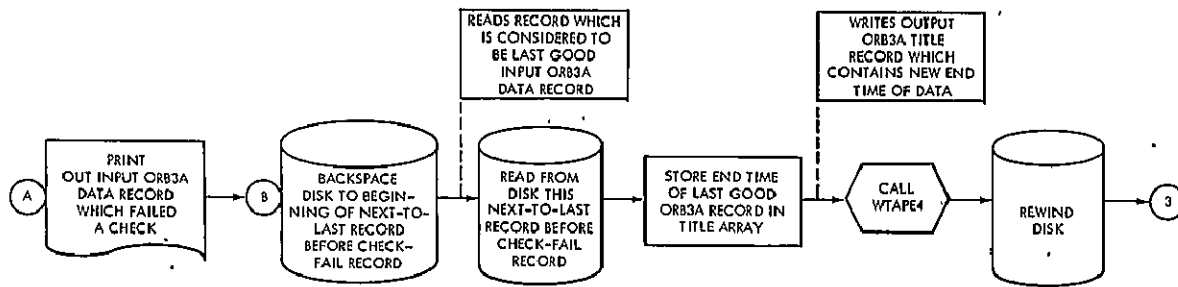


Figure 5 (sheet 1 of 2). Flowchart for Subroutine CHKREC of the S/360 TELOR3 Program



NOTE

1. NEXT-TO-LAST RECORD BEFORE THE CHECK-FAIL RECORD RATHER THAN THE LAST RECORD BEFORE THE CHECK-FAIL RECORD IS CONSIDERED TO BE THE LAST GOOD DATA RECORD FOR THE FOLLOWING REASON. THREE OUT OF THE 5 KEY WORDS CHECKED IN A DATA RECORD INVOLVE ONLY THE 1ST DATA ITEM. IT IS CONCEIVABLE THESE 3 WORDS COULD PASS INSPECTION BUT ONE OR MORE OF THE SAME WORDS IN THE 10 REMAINING DATA ITEMS IN THE RECORD COULD BE IN ERROR THEREFORE, AS A PRECAUTION, THE NEXT-TO-THE-LAST RECORD BEFORE THE CHECK-FAIL RECORD IS CONSIDERED TO BE THE LAST GOOD DATA RECORD ON THE INPUT ORB3A TAPE.

Figure 5 (sheet 2 of 2). Flowchart for Subroutine CHKREC of the S/360 TELOR3 Program

## SECTION 7

### SUBROUTINE DESCRIPTION -- READ-WRITE ORB3A TAPE (RWTAP4)

Subroutine Name and Program Number: RWTAP4, Number G00409

Programmer's Name: Robert K. Schlessinger

Date: May 7, 1971

#### 7.1 PURPOSE

Subroutine RWTAP4 is used to read a 7-track, binary, single precision, ORB3A tape which is the input to the S/360 TELOR3 Program. In addition, RWTAP4 is called to create an output ORB3A tape in the same format as the input ORB3A tape.

#### 7.2 METHOD

For each record to be read from the 7-track, binary, input ORB3A tape, it is necessary to make a call to entry point RTAPE4 of subroutine RWTAP4. After entering at RTAPE4 the following steps are executed.

1. A call is made to the special purpose FORTRAN library subroutine DBFOR (see Reference 2 ). DBFOR allows a 7-track FORTRAN tape to be read on a S/360 series computer and provides one logical record in the proper format for processing according to step 2 below.
2. A call is made to the special purpose FORTRAN library subroutine CNVRT (see Reference 2 ) immediately after the call to DBFOR. The CNVRT subroutine converts the single precision 7094 floating point data in the logical record provided by DBFOR to double word S/360 floating point structured data, and places the results in the 256-word array named RECORD. Control is then returned to the calling subroutine.



Since RECORD is in the argument list of RTAPE4, the data in the RECORD array is available to the subroutine which is called RTAPE4, and can be readily processed without further manipulation.

For each record to be written on the output, 7-track, binary ORB3A tape containing single precision floating point data, it is necessary to make a call to entry point WTAPE4 of subroutine RWTAP4. After entering at WTAPE4 the following steps are executed.

1. A call is made to DATCON (see Reference 3) which consists of an existing set of S/360 Assembler Language subroutines modified for TELOR3 Program purposes to omit the complementing of negative numbers when performing the following manipulation. DATCON converts the double word S/360 floating point data in the array RECORD (in the WTAPE4 argument list) to single precision, 7094-form, floating point data.
2. A second call is made to DATCON immediately after the first call and the converted data (single precision, 7094-form floating point) are written as one logical record on the 7-track, binary, output ORB3A tape. Control is then returned to the calling subroutine.

One call to entry point WSNEOF of subroutine RWTAP4 writes the appropriate number of sentinel item records, sentinel records, and an end-of-file on the output, 7-track ORB3A tape. The method used to write these sentinel records is identical to that employed in entry point WTAPE4 processing described previously. WSNEOF logic is as follows.

1. . . The IWORD flag passed through the argument list of WSNEOF controls branching in the following manner.
  - a. If IWORD equals one, six calls are made to DATCON

(with each two calls writing one record), resulting in one sentinel item record and two sentinel records being written on the output ORB3A tape. Finally, a single call is made to DATCON with a special flag (-2) in the argument list. This call causes an end-of-file to be written on the output ORB3A tape. Control is then returned to the calling subroutine.

- b. If IWORD equals two, four calls are made to DATCON (with each two calls writing one record) resulting in two sentinel records being written on the output ORB3A tape. Finally, a single call is made to DATCON to write an end-of-file on the output ORB3A tape. Control is then returned to the calling subroutine.

It should be noted that when DATCON is used, two initialization calls must be made to this subroutine. These two calls are accomplished as follows. In the initialization section of MAIN a call is made to RWTAP4 (standard entry point). Upon entering RWTAP4 the following steps are executed.

1. A call is made to DATCON with a special flag (97) in the argument list. This flag causes the output ORB3A tape to be generated by DATCON to actually have a UNIVAC 1107 type format.
2. A second call is made to DATCON with the argument list specifying the FORTRAN logical unit number on which the output tape will be written (unit number 15) and specifying the number of 36-bit words in one record on the output tape (253 data words; control words are not to be counted). Control is then returned to MAIN.

### 7.3 USAGE

This section presents information defining the interfaces of subroutine RWTAP4 with referenced external storage areas, and other subprograms.

#### 7.3.1 Calling Sequence

The calling sequences of the standard entry point and the three nonstandard entry points are, respectively:

```
CALL RWTAP4
```

```
CALL RTAPE4 (RECORD, IERR)
```

```
CALL WTAPE4 (RECORD)
```

```
CALL WSNEOF (RECORD, RECRD1, IWORD)
```

The arguments appearing in the RTAPE4 calling sequence are defined below:

**RECORD:** A 256-word array used to store a record read from the input ORB3A tape.

**IERR:** An error indicator returned by subroutine RWTAP4 reflecting unusual conditions encountered in reading the input ORB3A tape.

= 0; No unusual conditions

= 1; End-of-file encountered

= 4; Permanent read error encountered. Data are returned to calling program, but their validity is questionable.

The argument appearing in the WTAPE4 calling sequence is defined below:

**RECORD:** A 256-word array used to store a title record or a data record ready to be written on the output ORB3A tape.

The arguments appearing in the WSNEOF calling sequence are defined below:

- RECORD: A 256-word array used to store a sentinel item record ready to be written on the output ORB3A tape.
- RECRD1: A 256-word array used to store a sentinel record ready to be written on the output ORB3A tape.
- IWORD: Flag used in WSNEOF processing for branching, set by the calling routine.
- = 1; WSNEOF writes one sentinel item record, two sentinel records, and an end-of-file on the output ORB3A tape.
  - = 2; WSNEOF writes two sentinel records and an end-of-file on the output ORB3A tape.

### 7.3.2 COMMON Areas

Subroutine RWTAP4 does not make use of any COMMON areas.

### 7.3.3 External Data Sets

Subroutine RWTAP4 interfaces with two external data sets:

1. The input, binary ORB3A tape.
2. The output, binary ORB3A tape.

These tapes are read or written, as appropriate, by subroutine RWTAP4. A detailed description of the content and format of these input and output tapes (which are identical in format) follows.

The format of a 7-track floating point binary ORB3A tape is defined in Tables 1, 2, and 3. It can be seen there are three kinds of records on an ORB3A tape: (1) the title record (Table 1); (2) data records (Table 2); and (3) sentinel records (Table 3). Each record contains 256 words. A set of notes pertaining to format for all three record types appears at the end of Table 3. Actual floating point dumps of an ORB3A title and data record are shown in Figure A-6.

TABLE 1: ORB3A Tape Title Record Format

<u>Word Number</u>	<u>Description</u>
0	FORTTRAN data record size indicator= <u>000375010001</u> <sub>8</sub> (Underlined octal number indicates a total data word count of 253 words).
1	Form of data identification = 76799361
2-3	Satellite identification
4	Date
5	Day Count of Year
6	Seconds of Day
	} U. T. Start Time of Satellite Data
7	Date
8	Day Count of Year
9	Seconds of Day
	} U. T. End Time of Satellite Data
10	= $\Delta t$ in seconds, if tape has equal intervals = 0, if tape has unequal intervals
11	No. of data items in data record = 12 (includes a special type of item as item no. 12)
12	No. of words per data item = 21
13	No. of words per data item that are a function of time (these words follow the time words consecutively) = 16
14	No. of words in data record = 256
15	Spare
16-26	Run identification data
27	Date
28	Day Count of Year
29	Apparent Sidereal Time
	} Coordinate System Reference Data Time and Position in radians
30-40	Used for harmonics, etc.

TABLE 1: ORB3A Tape Title Record Format (Continued)

<u>Word Number</u>	<u>Description</u>
41	Date
42	Day Count of Year
43	Seconds of Day
	} Epoch
44	Semi-major axis, a (km.)
45	Eccentricity, e (ratio)
46	Inclination, I (deg.)
47	Right ascension of ascending node, $\Omega$ (deg.)
48	Rate of change of R. A. of ascending node, $\dot{\Omega}$ (deg./day)
49	Argument of perigee, $\omega$ (deg.)
50	Rate of change of argument of perigee, $\dot{\omega}$ (deg./day)
51	Period, P (min.)
52	Rate of change of period, $\dot{P}$ (min./day)
53-253	Used for elements, drags, etc.
254	Check sum of words in word no. 1-253
255	Same as word 0

TABLE 2: ORB3A Tape Data Record Format

<u>Word Number</u>	<u>Description</u>		
0	FORTRAN data record size indicator = <u>000375010001</u> <sub>8</sub> (Underlined octal number indicates a total data word count of 253 words.)		
1	Type of data item indicator 1 = regular satellite data item 2 = ascending node crossing data item 3 = north point data item 4 = descending node data item 5 = south point data item 6 = sunlight entrance data item 7 = sunlight exit data item		
2	Date of data	} Time of Data Item	
3	Day Count of Year		
4	Seconds of Day		
5	X } Y } Z }	Satellite Position	
6		Vector in km.	
7			
8	$\dot{X}$ } $\dot{Y}$ } $\dot{Z}$ }	Satellite Velocity	
9		Vector in km./sec.	
10			
11	Longitude (deg.)	} Geodetic Position	
12	Latitude (deg.)		
13	Height above spheroid (km.)		
14	SX } SY } SZ }	Solar Vector in A.U.	
15			
16			
17	L (earth radii)	McIlwain L Parameter	
18	B (Gauss)	Magnetic Field Strength	

TABLE 2: ORB3A Tape Data Record Format (Continued)

<u>Word Number</u>	<u>Description</u>
19	Right ascension (deg.) } Real Field Inertial Declination (deg.) } Coordinates
20	
21	Ascending node crossing no. (pass no.)
22-231	10 other satellite data items
232	=99 (type of data indicator)
233	Year of Data
234	= 999 if no ascending node item occurred = % of orbit in sunlight if an ascending node item occurred in this record
235-252	Spares in last item
253	Spare in record
254	Check sum of data words in word no. 1-253
255	Same as word 0



TABLE 3: ORB3A Tape Sentinel Record Format

<u>Word Number</u>	<u>Description</u>
0	FORTRAN data record size indicator = <u>000375010001</u> <sub>8</sub> (Underlined octal number indicates a total data word count of 253 words.)
1	99999999
2-253	Irrelevant
254	Check sum of data words in word no. 1-253
255	Same as word 0

NOTES (for Tables 1, 2, and 3)

1. All words are in floating point form except for words 0, 254, and 255, which are in fixed point form.
2. Longitude is positive east of Greenwich; negative west.
3. Northern latitudes are positive; southern latitudes are negative.
4. Date of data = day + 100 (months + year (100)). (Example: Feb. 10, 1962 at 2 hours is recorded as 620210 in date of data, 41 in day count of year and 7200 in seconds of day).
5. The satellite and the solar position vectors are referenced to an equatorial coordinate system with the origin at the center of the earth, the x-axis in the direction of the vernal equinox, the z-axis along the North Pole of the earth, and the y-axis forming a right-handed coordinate system.
6. Reference day data of apparent sidereal time is obtained from "The American Ephemeris and Nautical Almanac" for the given year.

TABLE 3: ORB3A Tape Sentinel Record Format (Continued)

7. The last valid data item in a data record is followed by an item of 9's. If the last valid data item fills a record, a data binary record follows which contains 9's in words 1-21. 9's are equal to 99999999 in floating point.

Information in an ORB3A title record, used by the TELOR3 Program, consists of: the ORB3A tape identification code (word 1); the satellite identification (words 2 and 3); the start time of satellite data on the tape (words 4, 5, and 6); and the end time of satellite data on the tape (words 7, 8, and 9).

A data record (Table 2) contains eleven satellite data items plus one special type of data item. The twelve data items contain 21 words each. Information used by the TELOR3 Program from a satellite data item consists of: the data item type indicator (word 1 in each data item); the data item time-of-occurrence (words 2, 3, and 4 in each data item); and the ascending node crossing number, or pass number (the 21st word in each data item). The pass number in a satellite data item is one larger than the preceding data item pass number, when the present data item is of the ascending node crossing type. If a data item is of the ascending node crossing type, the first word of the data item contains a type indicator equal to 2.

Any particular ORB3A tape can have all regular satellite data items separated by equal intervals of time. Typical intervals are 60 and 120 seconds. Regular satellite data items on a given tape can also be separated by unequal intervals of time. The tenth word in the ORB3A title record contains the time interval in seconds, if equal intervals are involved, or a zero if unequal intervals are involved.

Information stored in the third word of the special type of data item in a data record is used by the TELOR3 Program. The presence of 999 in this word indicates that no ascending node data item exists in the entire record.

A sentinel record (Table 3) results from placing nines (99999999) in the first word of a data record. A sentinel record appears after either of two possible forms of a final data record on an ORB3A tape. When there is not enough data available to fill all eleven satellite data items in the last data record on the tape (which is usually the case), the next data item is filled with nines (all 21 words). This form of a final data record is followed by two sentinel records and an end-of-file. The second form (relatively rare) of final data record exists when there is exactly enough data to fill all eleven satellite data items in the last data record on the tape. This form of a final data record is followed by one sentinel item record (a data record containing nines in the first 21 words), two sentinel records, and an end-of-file.

#### 7.4 SUBPROGRAMS CALLED

This section identifies the subprograms (subroutines and functions) called from RWTAP4. The CALL statement for each call to each subprogram is given, followed by a definition of the calling sequence arguments. Where multiple calls to the same program are made from RWTAP4, the calls are presented in the order in which they appear in the source listing.

##### 7.4.1 Subroutines Called

1. Subroutine DBFOR - This subroutine is called to read the input, 7-track, binary ORB3A tape and provides one logical record in the proper format for processing by subroutine CNVRT.
2. Subroutine CNVRT - This subroutine is called to convert the single precision 7094-form floating point data in the logical record provided by DBFOR to double word, S/360, floating point structured data and place the results in the 256-word array named RECORD.

3. Subroutine DATCON - This subroutine is called to convert the double word, S/360 floating point data in the array RECORD or RECRD1 to single precision, 7094-form floating point data, and to write the converted data as one logical record on the output, 7-track, binary ORB3A tape.

The calling sequences used in RWTAP4 and definitions of the arguments in these calling sequences are listed below.

1. Calls to DBFOR

CALL DBFOR (256, IADD, IERR)

The calling sequence arguments are defined below.

256: The size of an input ORB3A tape logical record in 7094 words (includes control as well as data words).

IADD: The beginning address of the input ORB3A tape logical record read and stored by DBFOR. Returned to the calling program (RWTAP4) from DBFOR.

IERR: An error indicator returned to the calling program (RWTAP4) reflecting unusual conditions encountered in reading the input ORB3A tape.

= 0; No unusual conditions

= 1; End-of-file encountered

= 4; Permanent read error encountered.

Data are returned to calling program, but their validity is questionable.

2. Calls to CNVRT

CALL CNVRT (IADD, RECORD, 256, 2, JERR, 1)

The calling sequence arguments are defined below.

- IADD:        The beginning address of the input ORB3A tape record read and stored by DBFOR.
- RECORD:     A 256-word array containing the data after conversion. Contains a record read from the input ORB3A tape.
- 256:        The number of 7094-form words to be converted.
- 2:          Indicates the type of conversion to be performed (single precision 7094 floating point to double word S/360 floating point).
- JERR:       Contains a code to indicate a certain error condition. This variable is not used in the TELOR3 program.
- 1:          The number of the 7094-form word which is to be the first to be converted.

3.        Calls to DATCON

CALL DATCON (97)

CALL DATCON (JOUTBN, 253)

CALL DATCON (47, RECORD, 253, JOUTBN)

CALL DATCON (JOUTBN, -1)

CALL DATCON (47, RECORD, 253, JOUTBN)

CALL DATCON (JOUTBN, -1)

CALL DATCON (47, RECRD1, 253, JOUTBN)

CALL DATCON (JOUTBN, -1)

CALL DATCON (47, RECRD1, 253, JOUTBN)

CALL DATCON (JOUTBN, -1)

CALL DATCON (JOUTBN, -2)

The arguments appearing in these calling sequences are defined below.

- 97: A flag which causes the output ORB3A tape generated by DATCON to have a UNIVAC 1107 type format.
- JOUTBN: The FORTRAN logical unit number on which the output ORB3A tape is written.
- 253: The number of 36-bit words in one record on the output ORB3A tape (253 data words; control words are not counted).
- 47: Indicates the type of conversion to be performed (double word S/360 floating point to single precision 7094-form floating point).
- RECORD: A 256-word array containing the data to be converted. Contains a title record, a data record, or a sentinel item record ready to be written on the output ORB3A tape.
- A flag which causes DATCON to write a record on the output ORB3A tape.
- RECRD1: A 256-word array containing the data to be converted. Contains a sentinel record ready to be written on the output ORB3A tape.
- 2: A flag which causes DATCON to write an end-of-file on the output ORB3A tape.

7.4.2 Functions Called

There are no function subprograms called by RWTAP4.

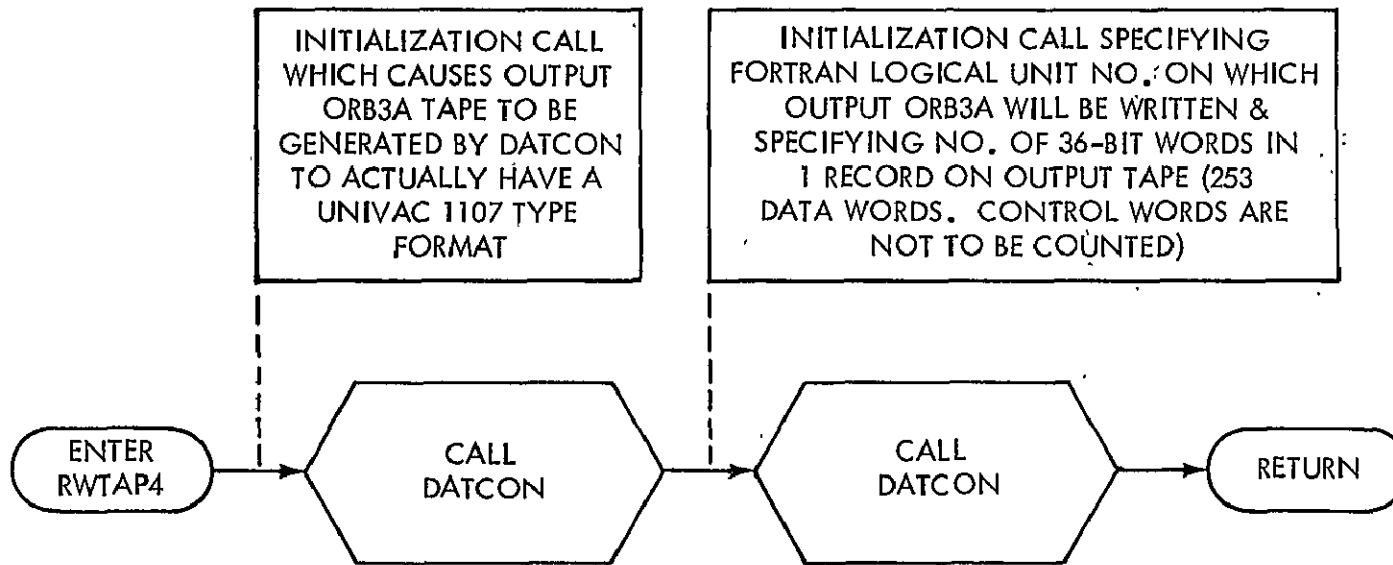
7.5 FLOWCHART

The flowchart for subroutine RWTAP4 appears in Figure 6.

7.6 RESTRICTION

Subroutine RWTAP4 reads and writes only 7-track, binary ORB3A tapes containing single precision floating point data.

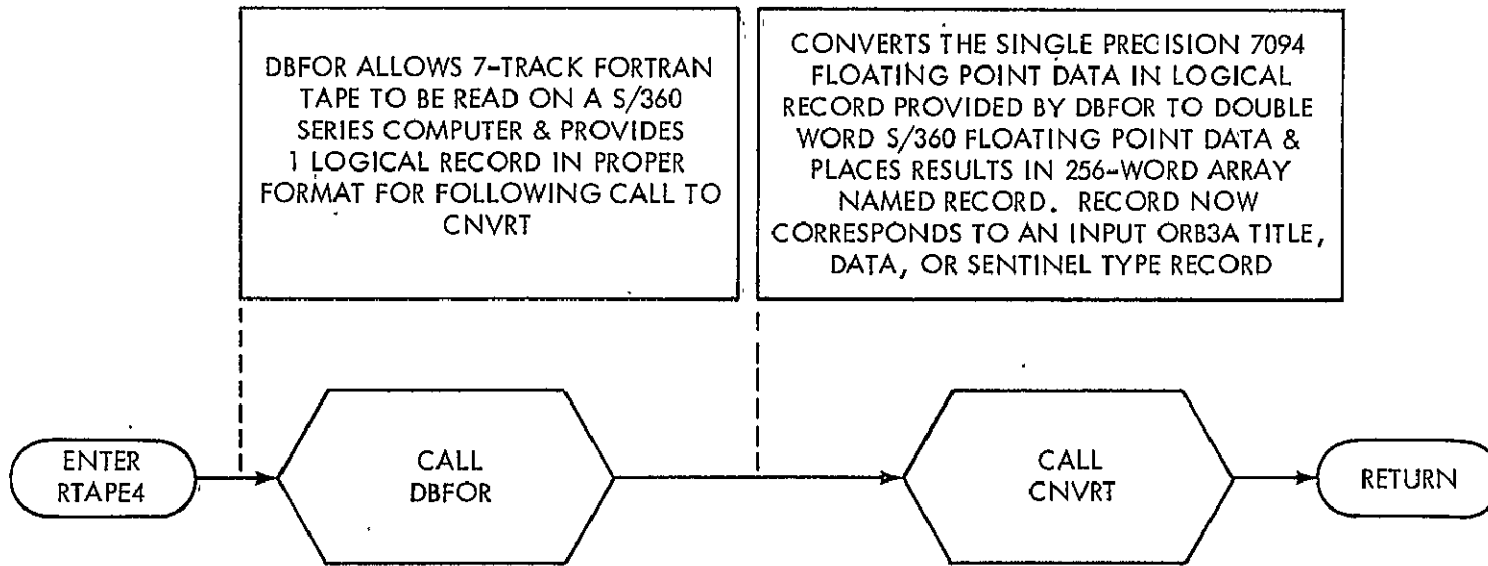




NOTE:

1. DATCON IS A FORTRAN LIBRARY SUBROUTINE MODIFIED FOR TELOR3 PROGRAM PURPOSES TO OMIT THE COMPLEMENTING OF NEGATIVE NUMBERS.

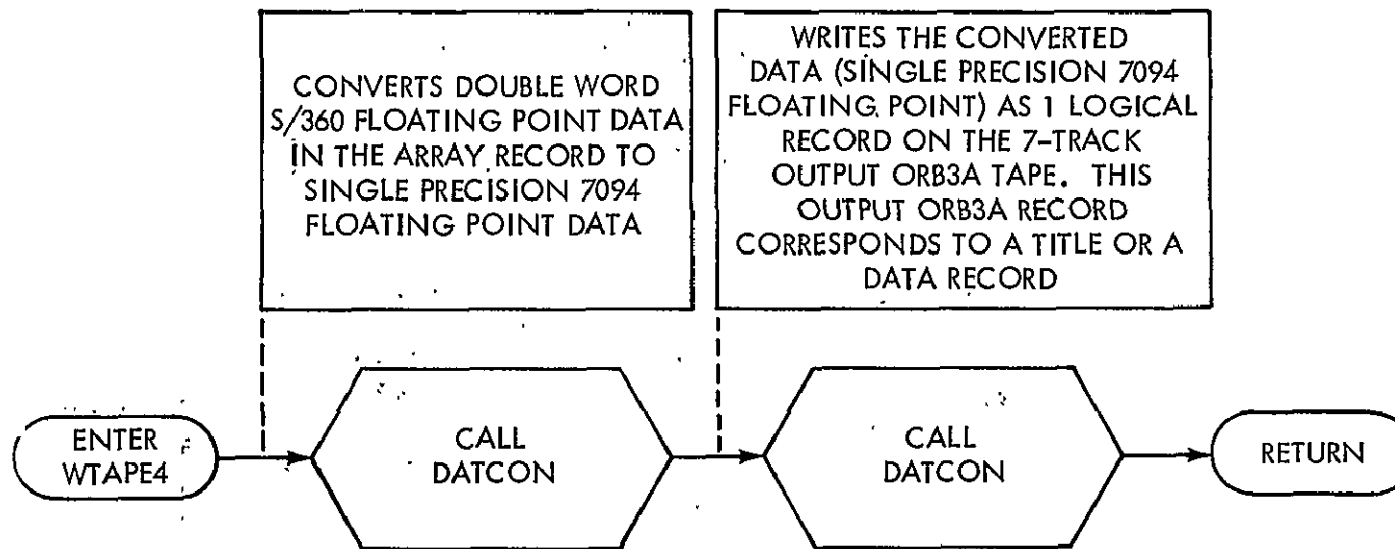
Figure 6 (sheet 1 of 4). Flowchart for Subroutine RWTAP4 (Standard Entry Point) of the S/360 TELOR3 Program



## NOTE:

1. DBFOR & CNVRT ARE FORTRAN LIBRARY SUBROUTINES.

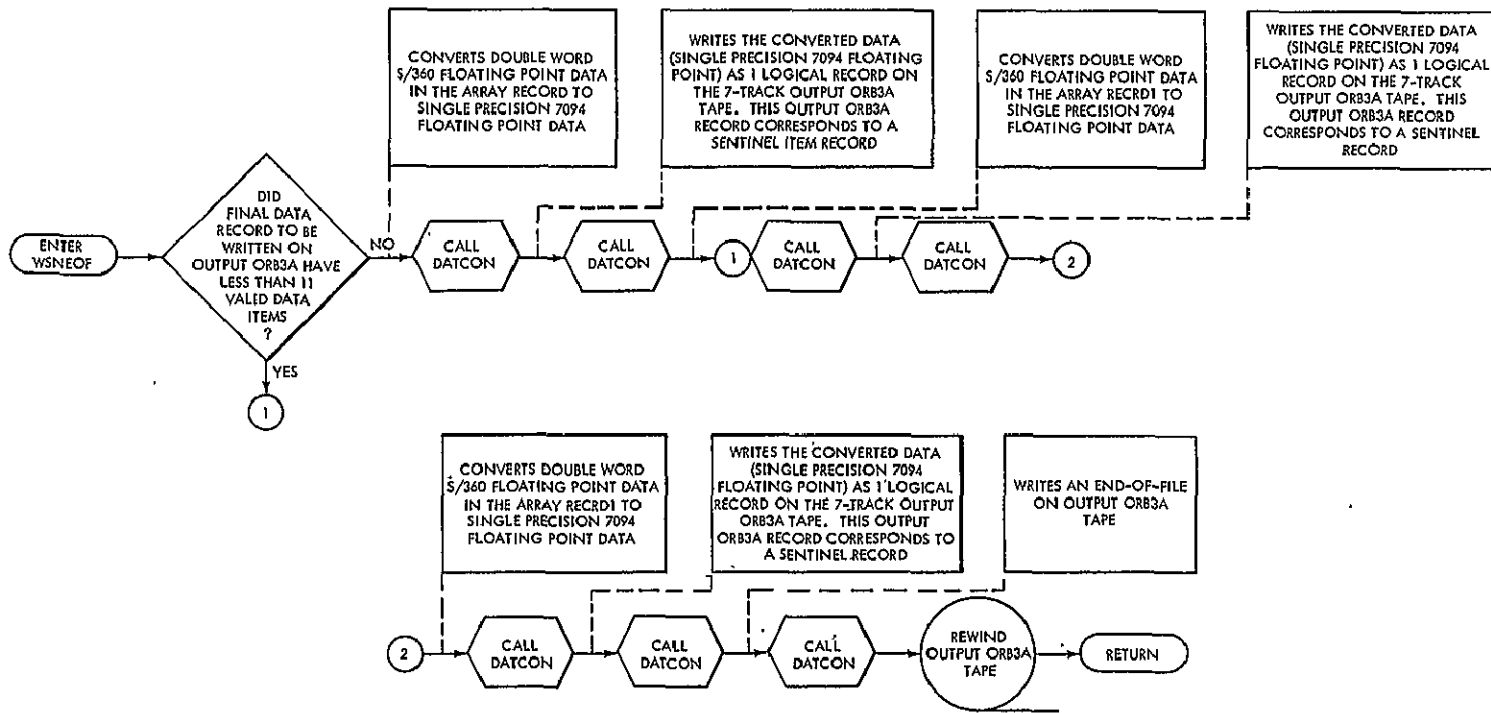
Figure 6 (sheet 2 of 4). Flowchart for Subroutine RWTAP4 (Non-Standard Entry Point RTAPE4) of the S/360 TELOR3 Program



NOTE:

1. DATCON IS A FORTRAN LIBRARY SUBROUTINE MODIFIED FOR TELOR3 PROGRAM PURPOSES TO OMIT THE COMPLEMENTING OF NEGATIVE NUMBERS.

Figure 6 (sheet 3 of 4). Flowchart for Subroutine RWAP4 (Non-Standard Entry Point WTAPE4) of the S/360 TELOR3 Program



NOTE:  
 1. DATCON IS A FORTRAN LIBRARY SUBROUTINE MODIFIED FOR TELOR3 PROGRAM PURPOSES TO OMIT THE COMPLEMENTING OF NEGATIVE NUMBERS.

Figure 6 (sheet 4 of 4). Flowchart for Subroutine RWTAP4 (Non-Standard Entry Point WSNEOF) of the S/360 TELOR3 Program

## REFERENCES

1. Orbital Determination Utility Programs - IBM Federal Systems Division, Gaithersburg, Maryland: Contract NAS 5-10022; March 1970 (TELOR3 Program Section).
2. Space and Earth Sciences Computing Center User's Guide - Wolf Research and Development Corporation, Riverdale, Maryland: Contract NAS 5-11735, Mod. 3, Revised May 1, 1970 (DEBLOCK/CNVRT Package, pp 225-226).
3. Registered Computer Program Number A00042 - DATCON: Computer Program Library, Room 25, Bldg. 16A, Goddard Space Flight Center, Greenbelt, Maryland.

## APPENDIX A

### S/360 TELOR3 PROGRAM USER'S GUIDE

#### A.1 LANGUAGE AND SYSTEM

The S/360 TELOR3 Program has been compiled under FORTRAN IV, level H, optimization level of zero on the IBM 360/95 using Release 19. No changes are necessary to run this program on the 360/75.

#### A.2 PROGRAM INPUT

##### A.2.1 Tape Input

One 7-track, binary ORB3A tape containing single precision floating point data (see Section 7.3.3 for detailed tape format description and Figure A-6 for a numerical example).

##### A.2.2 Data Card Input

##### A.2.2.1 Option Card

<u>Format</u>	<u>Columns</u>	<u>Variable</u>	<u>Description</u>
I1		KASE	Used to select TELOR3 option desired (see below).
8X	2-9		Blank
F6.1	10-15	VALUE	Used with Change Pass Numbers and Report Option. A number which is one less than the desired value for the pass no. of the first ascending node crossing data item to be written on the output ORB3A tape.
4X	16-19		Blank

<u>Format</u>	<u>Columns</u>	<u>Variable</u>	<u>Description</u>
A6	20-25	TAPEIN	Input ORB3A tape no. (left adjusted).

KASE = 1, Ascending Node Report Option

KASE = 2, Change Pass Numbers and Report Option

KASE = 3, Select Time Period Option

KASE = 4, Sunlight Report Option

KASE = 5, Check Record Option

#### A.2.2.2 Select Time Period Card

This card is required when using the Select Time Period Option and contains the requested start and end times of the period of data to be selected from an input, binary ORB3A tape and written on an output, binary ORB3A tape.

<u>Format</u>	<u>Columns</u>	<u>Variable</u>	<u>Description</u>
I6	1-6	IST	Requested START YRMODY of interval of data to be selected, e.g. 710507.
1X	7		Blank
I4	8-11	IHR	Requested START HRMN, e.g. 1758.
1X	12		Blank
I6	13-18	IEN	Requested END YRMODY of interval of data to be selected.
1X	19		Blank
I4	20-23	IEHR	Requested END HRMN

A.3            PROGRAM OUTPUT

A.3.1        Tape Output

Output-tape format is identical to the input tape. See Section 7.3.3 for detailed tape format description and Figure A-6 for a numerical example. Program tape output associated with each of the five TELOR3 options is listed below:

1.    Ascending Node Report Option:  
      None.
2.    Change Pass Numbers and Report Option:  
      A new 7-track, binary ORB3A tape (single precision floating point) which is a duplicate of the input ORB3A tape with the exception that the output tape contains altered pass numbers.
3.    Select Time Period Option:  
      A new 7-track, binary ORB3A tape (single precision floating point) containing period of data selected from input ORB3A tape.
4.    Sunlight Report Option:  
      None
5.    Check Record Option:  
      A new 7-track, binary ORB3A tape (single precision floating point) with the period of data extending through the next-to-the-last record before the check-fail record.



### A.3.2 System Printer Output

1. Ascending Node Report Option:  
Report listing the times of the ascending node crossing numbers (pass numbers) present on the input ORB3A tape and listing the period of time between successive pass numbers.
2. Change Pass Numbers and Report Option:  
An ascending node report based on the output ORB3A tape.
3. Select Time Period Option:  
Summary showing both requested and actual time period selected for output ORB3A tape.
4. Sunlight Report Option:  
Report listing the times of satellite sunlight entrances and exits present on the input ORB3A tape.
5. Check Record Option:  
Summary showing the type of error found in a data record on the input ORB3A tape, a display of the record containing the error, a display of the last data record written on the output ORB3A tape, and a display of the output ORB3A tape title record.

### A.4 PROGRAM SCRATCH FILES

If the Select Time Period Option or the Check Record Option has been chosen, the TELOR3 Program uses a scratch file on disk for temporary storage of data records read from the input ORB3A tape. These data records are subsequently read from the scratch file in the process of creating the output ORB3A tape.

A.5      SAMPLE DECK SETUP

A sample deck set up along with a set of notes is shown in Figure A-1 for the Select Time Period Option since this option (as well as the Check Record Option) requires the maximum device configuration used by the TELOR3 Program. It is assumed in this example that a TELOR3 object deck has been made and placed on tape. The object deck includes the system utility routine DATCON which has been modified for TELOR3 Program purposes to omit the complementing of negative numbers when converting data and subsequently writing this data on an output ORB3A tape.

A.6      SAMPLE SYSTEM PRINTER OUTPUTS

Sample run printouts for the five TELOR3 options are presented in Figures A-2 through A-6. A list of option sample printouts and figure numbers appears below:

1.      Ascending Node Report Option: Figure A-2
2.      Change Pass Numbers and Report Option: Figure A-3
3.      Select Time Period Option: Figure A-4
4.      Sunlight Report Option: Figure A-5
5.      Check Record Option: Figure A-6.

```

//ZBRKS004 JOB (GI0011311F,T,G00409,003003),000,MSGLEVFL=1, TYPRUN=HOLD
// EXEC LTKG0
//TAPELIB DD DSN=TELOR3,VOL=SFR=1067H A
//LINK.SYSLIN DD *
INCLUDE TAPELIB
ENTRY MAIN
//GO.SYSUDUMP DD SYSOUT=A
//GO.FORTAP DD DSN=ORB3A,UNIT=2400-7, B
// LABEL=(,BLP),DISP=(OLD,KEEP),VOLUME=SER=4568H,
// DCB=(LRECL=1542,BLKSIZE=1542,DEN=1)
//GO.FT14F001 DD UNIT=DISK,SPACE=(CYL,(30,6)), C
// DCB=(RECFM=VS,BLKSIZE=2056)
//GO.FT15F001 DD DSN=ORB3OUT,UNIT=2400-7,DISP=(NEW,KEEP), D
// LABEL=(,BLP);VOLUME=SER=1811M,
// DCB=(RECFM=F,DEN=1,BLKSIZE=1536)
//GO.DATA5 DD *
3 4568H E
700718 0700 700724 0700 F
/*

```

Notes

- A. Specifies TELOR3 Object Program tape no. (1067H). Required for all options.
- B. Defines input ORB3A tape (4568H). Required for all options.
- C. Defines scratch disk space necessary for processing an input ORB3A tape containing approximately one month of data. This scratch disk is required only for the Select Time Period Option and the Check Record Option.
- D. Defines output ORB3A tape (1811M). Required for the Change Pass Numbers and Report Option, the Select Time Period Option, and the Check Record Option.
- E. Option card. Required for all options. Specifies option desired, input pass number (only needed for Change Pass Numbers and Report Option), and input ORB3A tape number.
- F. Select time period card. Required only for Select Time Period Option. Specifies the requested start and end times (YRMODY, HRMN) of the data to be written on the output ORB3A tape.

Figure A-1. TELOR3 Program Sample Deck Setup for the  
Select Time Period Option

Figure A-2. Ascending Node Report Option Sample Run Printout

```

*****
//ZBRKS001 JOB (GIC)11-31-77, T, 000409, 001001, 000, MSGLEVEL=1, TYPRUN=HOLD
// EXEC LINKGD
XXDEFAULT PROC NBLK=50 00000100
XXLINK EXEC PGM=IEWL, PARM=(MAP, LIST), COND=(5, LT), REGION=300K 00000200
XXLOADLIB DD DSNNAME=SYS2.LOADLIB, DISP=SHR 00000300
XXNEWLIN DD DUMMY 00000400
XXSYSLIB DD DSNNAME=SYS2.DUMMY, DISP=SHR 00000500
XX DD DSNNAME=SYS2.DUMMY, DISP=SHR 00000600
XX DD DSNNAME=SYS1.FORTLIB, DISP=SHR 00000700
XX DD DSNNAME=SYS2.GSFCLIB, DISP=SHR 00000800
XX DD DSNNAME=SYS1.PLJLIB, DISP=SHR 00000900
XX DD DSNNAME=SYS1.TELCMLIB, DISP=SHR 00001000
XX DD DSNNAME=SYS2.LOADLIB, DISP=SHR 00001100
XX DD DSNNAME=SYS1.SSPAK, DISP=SHR 00001200
XXSYSLMOD DD DSN=88LJ00MJD(GSEC), DISP=(NEW, PASS), UNIT=DISK, 00001300
XX SPACE=(3072, (ENBLK, 40, 1)) 00001400
IEF653I SUBSTITUTION ICL = SPACE=(3072, (50, 40, 1))
XXSYSPRINT DD SYSOUT=A, DLB=(RECFM=F8M, LRECL=121, BLKSIZE=1210), 00001500
XX SPACE=(TRK, (10, 5)) 00001600
XXSYSUT1 DD UNIT=DISK, SPACE=(1024, (100, 20)), DCB=BLKSIZE=1024 00001700
//TAPELIB DD DSN=TELOR3, VOL=SER=1067H
X/TAPELIB DD DUMMY, VOL=SER=TAPEIN, UNIT=(9TRACK, DEFER), LABEL=(, BLP), 00001800
XX DISP=(OLD, KEEP), DCB=(RECFM=F8, LRECL=80, BLKSIZE=3200) 00001900
//LINK.SYSLIN DD *
X/SYSLIN DD DSN=880BJMJD, DISP=(OLD, DELETE), DCB=RECFM=F8 00002000
XX DD DSN=880BJMJD, DISP=(OLD, DELETE), DCB=RECFM=F8 00002100
IEF236I ALLOC FOR Z3RKS001 LINK
IEF237I 547 ALLOCATED TJ LOADLIB
IEF237I 547 ALLOCATED TJ SYSLIB
IEF237I 547 ALLOCATED TJ
IEF237I 547 ALLOCATED TJ
IEF237I 547 ALLOCATED TJ
IEF237I 547 ALLOCATED TJ
IEF237I 547 ALLOCATED TJ
IEF237I 547 ALLOCATED TJ
IEF237I 547 ALLOCATED TJ
IEF237I 337 ALLOCATED TJ
IEF237I 330 ALLOCATED TJ SYSLMOD
IEF237I 330 ALLOCATED TJ SYSPRINT
IEF237I 330 ALLOCATED TJ SYSUT1
IEF237I 0D4 ALLOCATED TJ TAPELIB
IEF237I 232 ALLOCATED TJ SYSLIN

```

FILE-LEVEL LINKAGE EDITOR OPTIONS -Simplified-Map, List-  
 VARIABLE JOPTIONS USED - SIZE=(307200,12288)- DEFAULT OPTION(S) USED  
 IEW0000 INCLUDE LABELS  
 IEW0000 ENTRY MAIN

MODULE MAP

CONTROL SECTION			ENTRY							
NAME	ORIGIN	LENGTH	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION
MAIN	00	EB0								
ASCEND	583	4E2								
SELECT	1370	D62								
SUNLGT	2008	1080								
CHKREC	3190	C00								
RWTAP4	30F8	402								
DATGNE	4238	F00	RTAPE4	40CC	WTAPE4	4148	WSNEDF	41AC		
CNVHT	5233	00	DATCON	4238						
DBFOR	52C0	2A7								
F30F90	5558	200	F30F90	5508						
IHCGBMH*	5828	F41	IBCOM*	5828	FDIOCS*	58E4	INTSWTCH	674E		
IHCGBMH*	0770	000	SEQDASD	6AE8						
DTI	0DD0	20								
FLT	6EC8	230	ESTES	6EC8	FSTED	6EEC	FDTRS	6E10	EDTED	6E34
FIXFLT	7100	151	ITES	7100	ITED	7124				
FIX	7258	110	ITI	7258						
M	7378	00								
TRANS	7450	5A								
IHCFCVTH*	7540	1100	ADCON*	7540	FCVAQUTP	75EA	FCVLQUTP	767A	FCVZQUTP	77CA
IHCENFTH*	8650	510	FCVIUJTP	7878	FCVEQUTP	807A	FCVCQUTP	8294	INT6SWCH	8578
IHCENFUS*	80F8	1300	ARITH*	86E0	ADJSWTCH	8A4C				
IHCUSPT	9F60	350	FIQCS*	88F8	FIQCSBEP	88FE				
CMPRS	A280	170								
IHCERRM	A420	500	ERRMON	A420	IHCERRE	A438				
IHCUATBL*	A9E0	038								
IHCETRCH*	0018	280	IHCETRCH	8018	ERRTRA	8020				
\$BLANKCOM	B2A8	1024								

~~NAME LOCATION~~ ~~NAME LOCATION~~ ~~NAME LOCATION~~ ~~NAME LOCATION~~  
ENTRY ADDRESS  
~~NAME LOCATION~~  
\*\*\*RC\*\*\* ~~Does not exist~~ HAS BEEN ADDED TO DATA SET

```

IEF225I  SYS2,LOADLIB          KEPT
IEF225I  VOL SER NOS= G15YS1.
IEF225I  SYS2,DUMMY          KEPT
IEF225I  VOL SER NOS= G15YS1.
IEF225I  SYS2,DUMMY          KEPT
IEF225I  VOL SER NOS= G15YS1.
IEF225I  SYS1,FORTLIB        KEPT
IEF225I  VOL SER NOS= G15YS1.
IEF225I  SYS2,GSECLIB        KEPT
IEF225I  VOL SER NOS= G15YS1.
IEF225I  SYS1,PLILIB        KEPT
IEF225I  VOL SER NOS= G15YS1.
IEF225I  SYS1,TELCMLIB      KEPT
IEF225I  VOL SER NOS= G15YS1.
IEF225I  SYS2,LOADLIB        KEPT
IEF225I  VOL SER NOS= G15YS1.
IEF225I  SYS1,SSPAK          KEPT
IEF225I  VOL SER NOS= G15YS2.
IEF225I  SYS71153,T15451,RV000,ZBRK5001,LODMOD  PASSED
IEF225I  VOL SER NOS= G15CRA.
IEF225I  SYS71153,T15451,RV000,ZBRK5001,RG000894  SYSOUT
IEF225I  VOL SER NOS= G15CRA.
IEF225I  SYS71153,T15451,RV000,ZBRK5001,R9000895  DELETED
IEF225I  VOL SER NOS= G15CRA.
IEF225I  TELCR3             KEPT
IEF225I  VOL SER NOS= 1057H .
IEF225I  SYS71153,T15451,RV000,ZBRK5001,S0000896  SYSIN
IEF225I  VOL SER NOS= G15CRJ.
IEF225I  SYS71153,T15451,RV000,ZBRK5001,S0000896  DELETED
IEF225I  VOL SER NOS= G15CRJ.
----- JOB NBR 013 STEP NBR 01 ZBRK5001 LINK PGM=IEWL CARDS=00002 INITIATION TIME=20.59.32.15 DATE=06-07-71
----- CPU=000.1 I/O=000.1 CURE=000.1 CHARGE=000.06 STEP-01 LINK TERMINATION TIME=21.01.34.68 DATE=06-07-71
----- I/O TIME BY DEVICE DISK=*****2.36, DRUM=*****.01, TAPE=*****.08, CELL=*****.00, D.THR=*****.00
----- STEP REGION SIZE=0300K MAXIMUM REGION SIZE USED=0300K PERCENT OF REGION USED=99
XXGO EXEC PGM=*,LINK,SYSLMOD,COND=(5,LT),REGION=100K 00002300
XXFT05F001 DD DDNAME=DATAS 00002300
XXFT06F001 DD SYSOUT=A,DCB=(RECFM=VBA,LRECL=137,BLKSIZE=7265), 00002400
XX SPACE=(CYL,(1,1)) 00002500
XXFT07F001 DD DUMMY,DCB=(RECFM=EB,LRECL=80,BLKSIZE=7280), 00002600
XX SPACE=(TRK,(1,20)) 00002700
*** INSERT //GO,FT07F001 DD DSN=LEDECK,SYSOUT=B FOR PUNCHED OUTPUT 00002800
XXSYSPRINT DD SYSOUT=A,DCB=(RECFM=VBA,LRECL=125,BLKSIZE=629), 00002900
XX SPACE=(TRK,(1,20)) 00003000
//GO.SYSUDUMP DD SYSOUT=A
//GO.FORTAP DD DSNNAME=INQ33A,UNIT=2400-7,
// LABEL=(,BLP),DISP=(DL0,KEEP),VOLUME=SFR=4517H,
// DCB=(LRECL=1542,BLKSIZE=1542,DSN=)
//GO.DATAS DD *
//
IEF236I ALLC. FOR ZBRK5001 GO
IEF237I 330 ALLOCATED TJ PGM=*.DD
IEF237I 230 ALLOCATED TJ FT05F001
IEF237I 330 ALLOCATED TJ FT06F001
IEF237I 332 ALLOCATED TJ SYSPRINT
IEF237I 330 ALLOCATED TJ SYSUDUMP
IEF237I 000 ALLOCATED TJ FORTAP

```



~~S/360 TELORB PROSPAM (TEST, EDIT, AND LIST ORB3A TAPE)~~

~~INPUT ORB3A TAPE NO. IS 4517H SATELLITE ID ON INPUT ORB3A TITLE RECORD IS 67731~~

	DATE	HR	MIN	SEC
INPUT ORB3A SATELLITE DATA START TIME	681130	0	4	59
INPUT ORB3A SATELLITE DATA END TIME	681203	2	4	59

~~ASCENDING NODE REPORT OPTION CHOSEN FOR THIS RUN~~

PASS NJ.	ASCENDING NODE						PERIOD
	DATE	DAY	OF YR	HR	MIN	SEC	MINUTES
7245	681130		335	0	28	27	0.0
7246	681130		335	2	5	31	97.08
7247	681130		335	3	42	36	97.07
7248	681130		335	5	19	40	97.07
7249	681130		335	6	56	45	97.07
7250	681130		335	8	33	49	97.07
7251	681130		335	10	10	53	97.07
7252	681130		335	11	47	58	97.07
7253	681130		335	13	25	2	97.08
7254	681130		335	15	2	7	97.08
7255	681130		335	16	39	11	97.07
7256	681130		335	18	16	16	97.07
7257	681130		335	19	53	20	97.07
7258	681130		335	21	30	24	97.07
7259	681130		335	23	7	29	97.07
7260	681201		336	0	44	33	97.08
7261	681201		336	2	21	38	97.08
7262	681201		336	3	58	42	97.07
7263	681201		336	5	35	47	97.07
7264	681201		336	7	12	51	97.07
7265	681201		336	8	49	55	97.07
7266	681201		336	10	27	0	97.07
7267	681201		336	12	4	4	97.07
7268	681201		336	13	41	8	97.07
7269	681201		336	15	18	13	97.07
7270	681201		336	16	55	17	97.07
7271	681201		336	18	32	21	97.07
7272	681201		336	20	9	26	97.07
7273	681201		336	21	46	30	97.07
7274	681201		336	23	23	34	97.07
7275	681202		337	1	0	39	97.07
7276	681202		337	2	37	43	97.07
7277	681202		337	4	14	48	97.07
7278	681202		337	5	51	52	97.07
7279	681202		337	7	28	56	97.07
7280	681202		337	9	6	0	97.07
7281	681202		337	10	43	5	97.07
7282	681202		337	12	20	9	97.07
7283	681202		337	13	57	13	97.07
7284	681202		337	15	34	18	97.07
7285	681202		337	17	11	22	97.07
7286	681202		337	18	48	26	97.07
7287	681202		337	20	25	30	97.07
7288	681202		337	22	2	34	97.07

PASS NO.	ASCENDING NODE					PERIOD	
	DATE	DAY	OF YR.	HR	MIN	SEC	MINUTES
7289	681202	337		23	39	39	97.07
7290	681203	338		1	16	43	97.07

NORMA TERMINATION OF ASCENDING NODE REPORT OPTION.

```

--IEF285I--SY571153.F154554.RV000.ZBRKS001.LDDMOD-----PASSED-----
IEF285I VOL SER NUS= G13CRA.
--IEF285I--SY571153.F154554.RV000.ZBRKS001.S0000900-----SYSIN-----
IEF285I VOL SER NUS= G13CRI.
--IEF285I--SY571153.F154554.RV000.ZBRKS001.S0000900-----DELETED-----
IEF285I VOL SER NUS= G13CRI.
--IEF285I--SY571153.F154554.SV000.ZBRKS001.R0000897-----SYSOUT-----
IEF285I VOL SER NUS= G13CRA.
--IEF285I--SY571153.F154554.SV000.ZBRKS001.R0000898-----DELETED-----
IEF285I VOL SER NUS= G13CR9.
--IEF285I--SY571153.F154554.SV000.ZBRKS001.R0000899-----DELETED-----
IEF285I VOL SER NUS= G13CRA.
--IEF285I--INJR3A-----KEPT-----
IEF285I VOL SER NUS= 4517H.
-----JOB_NBR=013 STEP_NBR=02 ZBRKS001 GO PGM=PGM=*.DD.CARDS=00001 INITIATION TIME=21.01.35.08 DATE=06-07-71
----- CPU=000.1 I/O=000.1 CORE=000.1 CHARGE=000.09 STEP=02 GO TERMINATION TIME=21.02.28.90 DATE=06-07-71
----- I/O TIME BY DEVICE DISK=*****.18 DRUM=*****.01 TAPE=*****2.13 CEL=*****.00 OTHR=*****.00
----- STEP REGION SIZE=0100K MAXIMUM REGION SIZE USED=0084K PERCENT OF REGION USED=84
--IEF285I--SY571153.F154554.RV000.ZBRKS001.LDDMOD-----DELETED-----
IEF285I VOL SER NUS= G13CRA.

----- CPU=000.1 I/O=000.1 CORE=000.1 CHARGE=000.15 JOB_NBR=013 ZBRKS001 360/95 SYSTEM=MVT-19.6 01-16-71 01
----- I/O TIME BY DEVICE DISK=*****2.54 DRUM=*****.01 TAPE=*****2.21 CEL=*****.00 OTHR=*****.00

```

Figure A-3. Change Pass Numbers and Report Option Sample Run Printout

\*\*\*\*\*

```
//Zer<S(03 JOB (G00011311F,T,6,049,)1301),C00,MSGLEVEL=1,TYPRUN=HOLD  
// XACC LINKS  
XACC=ALLT P=CC KBLK=5) 0000190  
XXLINK CACC PCN=LINK,FAN=(MAP,LIS),CJND=(S,LT),REGION=300K 0000200  
XXLALLID CC LSNAME=SYS2,LALLID,DISP=SHR 0000300  
XXHALLIN CC LUMPY 0000400  
XXSYSLID CC LSNAME=SYS2,DUMPY,DISP=SHR 0000500  
XX CC LSNAME=SYS2,DUMPY,DISP=SHR 0000600  
XX CC LSNAME=SYS1,FILEID,DISP=SHR 0000700  
XX CC LSNAME=SYS2,CPFILEID,DISP=SHR 0000800  
XX CC LSNAME=SYS1,FILEID,DISP=SHR 0000900  
XX CC LSNAME=SYS1,FILEID,DISP=SHR 0001000  
XX CC LSNAME=SYS2,LALLID,DISP=SHR 0001100  
XX CC LSNAME=SYS1,SUFAX,DISP=SHR 0001200  
XXSYSLMOD CC LSNAME=SYS2(COPY),DISP=(NEW,PASS),UNIT=DISK, 0001300  
XX SPACE=(3172,1000LK,40,1)) 0001400  
DEFCE01 SUBSTITUTION JUL- SPACE=(3172,(0),40,1))  
XXSYSPRINT CC SYSLT=PRINT,RECFM=FBS,LRECL=121,BLKSIZE=1217), 0001500  
XX SPACE=(TRK,(1),5))  
XXSYSLT CC UNIT=DISK,SPACE=(1124,(10),20)),DCB=BLKSIZE=1124 0001600  
//TAPFILE CC DSN=TELECR3,VOL=SER=1067H  
X/TAPFILE CC DUMPY,VOL=SER=TAPFILE,UNIT=(9TRACK,,DEFER),LABEL=(,HLP), 0001800  
XX DISP=(ULL,KLDF),CCD=(RECFM=FB,LRECL=80,BLKSIZE=3200) 0001900  
//LINK,SYSLIN CC *  
X/SYSLIN CC DSN=SYSMOD,DISP=(OLD,DELETE),DCB=RECFM=FB 0002000  
XX CC LSNAME=LLJECT 0002100  
DEF2361 ALL00 FOR ZBRK603 LINK  
DEF2371 547 ALLOCATED TO LALLID  
DEF2371 547 ALLOCATED TO SYSLID  
DEF2371 547 ALLOCATED TO  
DEF2371 547 ALLOCATED TO  
DEF2371 547 ALLOCATED TO  
DEF2371 547 ALLOCATED TO  
DEF2371 547 ALLOCATED TO  
DEF2371 547 ALLOCATED TO  
DEF2371 331 ALLOCATED TO SYSLMOD  
DEF2371 332 ALLOCATED TO SYSPRINT  
DEF2371 331 ALLOCATED TO SYSLT  
DEF2371 332 ALLOCATED TO TAPFILE  
DEF2371 341 ALLOCATED TO SYSLIN
```



FILE-LEVEL LINKAGE EDITOR OPTIONS SPECIFIED MAP\*LIST  
 VARIABLE OPTIONS USED - SIZE=(3)7200,12288)-  
 IEW0000 INCLUDE TAPE10  
 IEW0000 ENTRY MAIN

DEFAULT OPTION(S) USED

MODULE MAP

CONTROL SECTION			ENTRY							
NAME	CRICIN	LENGTH	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION
MAIN	FE	22C								
ASCEND	22B	4E2								
SELECT	137C	0C2								
SUNLOC	2C0C	1C2B								
CPKREC	215C	CCB								
RTAPE4	2C7C	4C2	RTAPE4	49CC	WTAPE4	4148	WSNEOP	41AC		
DATALEN=	422C	FCU	LATCEN	423B						
CONVRT *	520B	0C								
DBFLH *	52CC	2A7								
F3BF90= *	52CC	2EC	F3BF90	550B						
INCELCMH*	582B	F41	IBCOM=	582B	FDIOCS=	5824	INTSWTCH	674E		
INCLCMP2*	677C	65D	SEQDASD	6A5B						
DT1 *	6C0C	F5								
FLT *	6B0B	23B	F3TFS	6E0B	FSTF0	6EFC	FDTFS	6F1D	FDTFD	6F34
FIXFLT *	710C	151	ITFS	7100	ITFD	7124				
FIX *	725B	11C	ITI	725B						
M *	737B	0B								
TRANS *	745B	5A								
INCFVTF*	754C	115D	ADGUN=	7540	FCVADUTP	752A	FCVL0UTP	767A	FCVZ0UTP	77CA
			FCVIOUTP	757B	FCVE0UTP	807A	FCVCC0UTP	8294	INT6SWCH	857B
INCEFNTH*	802C	512	ARITH=	8020	ADJSWTCH	8A4C				
INCEFIQS*	88FB	136B	FIOCS=	83F8	FIOCSSEP	8BFE				
INCUOPT *	9F6C	25D								
CMFRS *	A2EC	170								
INCEFRM *	A42C	50C	ERHMON	A420	IMCERRE	A438				
INCUATEL*	A95C	62B								
INCETRCH*	EC1C	28C	IHCTRCH	B018	FRPTRA	B020				
%BLANKCM	E2AE	1C24								

NAME	ORIGIN	LENGTH	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION
ENTRY ADDRESS		.04								
TOTAL LENGTH		0200								
***CSFC LLES NOT EXIST BUT HAS BEEN ADDED TO DATA SET										



```

IEF2651 SYSC,LLCALLIB KEPT
IEF2651 VUL SER NLS= G1SYS1.
IEF2651 SYSC,CUMMY KEPT
IEF2651 VUL SER NCS= C1SYS1.
IEF2651 SYSC,CUMMY KEPT
IEF2651 VUL SER NLS= C1SYS1.
IEF2651 SYB1,PORTLIE KEPT
IEF2651 VUL SER NCS= C1SYS1.
IEF2651 SYSC,GSFCLIE KEPT
IEF2651 VUL SER NCS= C1SYS1.
IEF2651 SYB1,PLILIE KEPT
IEF2651 VUL SER NCS= C1SYS1.
IEF2651 SYB1,TELCKLIE KEPT
IEF2651 VUL SER NCS= C1SYS1.
IEF2651 SYB2,LCALLIB KEPT
IEF2651 VUL SER NLS= G1SYS1.
IEF2651 SY,1,SSPAK KEPT
IEF2651 VUL SER NLS= C1SYS2.
IEF2651 SYB71159,1221042,RV000,ZBRK5013,LU0MUD PASS20
IEF2651 VUL SER NLS= C1SCN6.
IEF2651 SYB71159,1221042,RV000,ZBRK5063,R0000188 SYSOUT
IEF2651 VUL SER NLS= G1SCN5.
IEF2651 SYB71159,1221042,RV000,ZBRK5093,R0000109 DELETED
IEF2651 VUL SER NLS= G1SCN6.
IEF2651 TLLLR0 KEPT
IEF2651 VUL SER NLS= 1007H.
IEF2651 SYB71159,1221042,RV000,ZBRK5043,S0000190 SYSIN
IEF2651 VUL SER NLS= C1SCN5.
IEF2651 SYB71159,1221042,RV000,ZBRK5063,S0000195 DELETED
IEF2651 VUL SER NLS= C1SCN5.
*---JOB NAME= 009 STEP NAME= 01 ZBRK5003 LINK FJM=IcWL CARDS=00112 INITIATION TIME=23.59.43.70 DATE=06-19-71
*--- CPU=00.01 I/L=00.01 C/LK=00.01 CHARGE=000.00 STEP=01 LINK TERMINATION TIME=00.03.10.75 DATE=06-19-71
*--- I/O TIME BY DEVICE. LINK=*****2.36,LRUM=*****.0,TAPT=*****.00,CELL=*****.00,OTHR=*****.00
*--- STEP REGION SIZE=00000 MAXIMUM REGION SIZE USED=00000 PERCENT OF REGION USED=99
XAGU LKLC FCP=*.LINK,SYSLMOD,CONC=(S,LT),REGION=100K 00002200
XXFT05F001 00 LKNAME=LATA5 00002300
XXFT05F001 00 SYSLT=A,CC=(RECFM=VBA,LRECL=137,BLKSIZ=7265), 00002400
XX SPACE=(CYL,(1,1)) 00002500
XXFT05F001 00 LCMNY,CC=(RECFM=FB,LRECL=80,BLKSIZ=7280), 00002600
XX SPACE=(TRK,(1,2)) 00002700
*** INSERT //CG,FT(700) LG LSN=06LLECK,SYBOUT=0 FOR PUNCHED OUTPUT 00002800
XXSYSPRINT LL SYSLT=A,CC=(RECFM=VBA,LK=125,BLKSIZ=629), 00002900
XX SPACE=(TRK,(1,2)) 00003000
//GL,SYSLMOD,CC SYSLT=A
//GL,FCRTRP LL CSRABL=INCHSA,UNIT=2400-7,
// LABEL=(,0LP),DISP=(CLD,RLP),VOLUME=SLK=4517H,
// CC=(LRECL=1542,BLKSIZ=1542,OLN=1)
//OU,FT05F001 CL LSNAME=CHLUL1,UNIT=2400-7,DISP=(NL,A,KEEP),
// LABEL=(,0LP),VOLUME=SLK=3223H,
// CC=(RECFM=FB,LK=1,BLKSIZ=1536)
//GL,LATA5 LC *
//
IEF2651 ALLUC, FOR ZBRK5003 CL
IEF2671 001 ALLOCATED TO PGM=*,JD
IEF2671 200 ALLOCATED TO FT05F001
IEF2671 241 ALLOCATED TO FT05F001
IEF2671 243 ALLOCATED TO SYSPRINT
IEF2671 251 ALLOCATED TO SYSLCUMP
IEF2671 001 ALLOCATED TO FLKTRP
IEF2671 001 ALLOCATED TO FT05F001

```

S/SEC TELURS PROGRAM( TEST, EDIT, AND LIST ORB3A TAPE)

INPUT ORB3A TAPE NO. IS 4517H SATELLITE ID ON INPUT ORB3A TITLE RECORD IS 6773I

	DATE	HR	MIN	SEC
INPUT ORB3A SATELLITE DATA START TIME	681130	0	4	59
INPUT ORB3A SATELLITE DATA END TIME	681203	2	4	59

CHANGE PASS NUMBERS AND REPORT OPTION CHOSEN FOR THIS RUN

PASS NO.

ASCENDING NODE

PERIOD  
MINUTES

	DATE	DAY OF YR	HR	MIN	SEC	
2	681130	335	1	28	27	0.0
3	681130	335	2	5	31	97.08
4	681130	335	3	42	36	97.07
5	681130	335	5	19	40	97.07
6	681130	335	6	50	45	97.07
7	681130	335	8	33	49	97.07
8	681130	335	10	10	53	97.07
9	681130	335	11	47	58	97.07
10	681130	335	13	25	2	97.08
11	681130	335	15	2	7	97.08
12	681130	335	16	39	11	97.07
13	681130	335	18	16	16	97.07
14	681130	335	19	53	20	97.07
15	681130	335	21	30	24	97.07
16	681130	335	23	7	29	97.07
17	681201	336	0	44	33	97.08
18	681201	336	2	21	38	97.08
19	681201	336	3	58	42	97.07
20	681201	336	5	35	47	97.07
21	681201	336	7	12	51	97.07
22	681201	336	8	49	55	97.07
23	681201	336	10	27	0	97.07
24	681201	336	12	4	4	97.07
25	681201	336	13	41	8	97.07
26	681201	336	15	18	13	97.07
27	681201	336	16	55	17	97.07
28	681201	336	18	32	21	97.07
29	681201	336	20	9	26	97.07
30	681201	336	21	46	30	97.07
31	681201	336	23	23	34	97.07
32	681202	337	1	0	39	97.07
33	681202	337	2	37	43	97.07
34	681202	337	4	14	48	97.07
35	681202	337	5	51	52	97.07
36	681202	337	7	28	56	97.07
37	681202	337	9	6	0	97.07
38	681202	337	10	43	5	97.07
39	681202	337	12	20	9	97.07
40	681202	337	13	57	13	97.07
41	681202	337	15	34	18	97.07
42	681202	337	17	11	22	97.07
43	681202	337	18	48	26	97.07
44	681202	337	20	25	30	97.07
45	681202	337	22	2	34	97.07

PASS No.	ASCENDING NOUE						PERIOD	
	DATE	DAY	OF	YR	HR	MIN	SEC	MINUTES
46	061202			337	23	39	39	97.07
47	061203			338	1	10	43	97.07

NORMAL TERMINATION OF CHANGE PASS NUMBERS AND REPORT OPTION.

```

IEF2251  SYS71159.T231642.RV000.ZERKS003.LUDMOD      PASSED
IEF2251  VOL SCR NLS= C1SCR6.
IEF2251  SYS71159.T231642.RV000.ZERKS003.S0000194    SYSIN
IEF2251  VOL SCR NLS= G1SCR1.
IEF2251  SYS71159.T231642.RV000.ZERKS003.S0000194    DELETED
IEF2251  VOL SCR NLS= C1SCR1.
IEF2251  SYS71159.T231642.SV000.ZERKS003.R0000191    SYSJUT
IEF2251  VOL SCR NLS= C1SCR1.
IEF2251  SYS71159.T231642.SV000.ZERKS003.R0000192    DELETED
IEF2251  VOL SCR NLS= G1SCR7.
IEF2251  SYS71159.T231642.SV000.ZERKS003.R0000193    DELETED
IEF2251  VOL SCR NLS= G1SCR6.
IEF2251  INLKDA                                          KEPT
IEF2251  VOL SCR NLS= 4617H.
IEF2251  UNCLT                                          KEPT
IEF2251  VOL SCR NLS= 3239H.
-----JOB NBR= 889 STEP NBR= 02 ZERKS003 60 PGM=PGM=*,CD CARDS=00001 INITIATION TIME=00.03.11.26 DATE=06-09-71
----- CPU=000.2 I/O=000.1 CCR=000.1 CHARGE=000.25 STEP=02 GO TERMINATION TIME=00.10.10.95 DATE=06-09-71
----- I/O TIME BY DEVICE. DISK=*****.21,DRUM=*****.00,TAPE=*****4.30,CELL=*****.00,OTHR=*****.00
----- STCP REGION SIZE=0100K MAXIMUM REGION SIZE USED=0000K PERCENT OF REGION USED=90
IEF2251  SYS71159.T231642.RV000.ZERKS003.LUDMOD      DELETED
IEF2251  VOL SCR NLS= C1SCR6.

----- CPU=000.2 I/O=000.1 CCR=000.1 CHARGE=000.31 JOB NBR=819 ZERKS003 360/95 SYSTEM=MVT-19.6 01-16-71 01
----- I/O TIME BY DEVICE. DISK=*****2.58,DRUM=*****.00,TAPE=*****4.38,CELL=*****.00,OTHR=*****.00

```

Figure A-4. Select Time Period Option Sample Run Printout

```

*****
//ZBRKS004 JOB (G1001131IF,T,G004CS,003003),CCC,MSGLEVEL=1,TPRDN=RCLD
// EXEC LINKGD
XXDEFAULT PREC NBCK=50 00000100
XXLINK EXEC PGM=IEWL,PARM=(MAP,LIST),COND=(5,LT),REGION=300K 00000200
XXLOADLIB DD DSNNAME=SYS2.LOADLIB,DISP=SHR 00000300
XXNEWLIN DD DUMMY 00000400
XXSYSLIB DD DSNNAME=SYS2.DUMMY,DISP=SHR 00000500
XX DD DSNNAME=SYS2.DUMMY,DISP=SHR 00000600
XX DD DSNNAME=SYS1.FORTLIB,DISP=SHR 00000700
XX DD DSNNAME=SYS2.GSFCLIB,DISP=SHR 00000800
XX DD DSNNAME=SYS1.PLIB,DISP=SHR 00000900
XX DD DSNNAME=SYS1.TELCLIB,DISP=SHR 00001000
XX DD DSNNAME=SYS2.LOADLIB,DISP=SHR 00001100
XX DD DSNNAME=SYS1.SSPAK,DISP=SHR 00001200
XXSYSLMOD DD DSN=CCLODMOD(GSFC),DISP=(NEW,PASS),UNIT=DISK, 00001300
XX SPACE=(3072,(ENBLK,40,1)), 00001400
IEF2331 SUBSTITUTION JCL = SPACE=(3072,(50,40,1))
XXSYSPRINT DD SYSOUT=A,DCB=(RECFM=FBM,LRECL=121,BLKSIZE=1210), 00001500
XX SPACE=(TRK,(10,5)) 00001600
XXSYST1 DD UNIT=DISK,SPACE=(1024,(100,20)),DCB=BLKSIZE=1024 00001700
//TAPELIB DD DSN=TELD03,VOL=SER=1067H
X/TAPELIB DD DUMMY,VOL=SER=TAPEIA,UNIT=(9TRACK,,DEFER),LABEL=(,BLP), 00001800
XX DISP=(OLD,KEEP),DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200) 00001900
//LINK.SYSLIN DD *
X/SYSLIN DD DSN=CCO8JMOD,DISP=(OLD,DELETE),DCB=RECFM=FB 00002000
XX DD DDNAME=OBJECT 00002100
IEF2361 ALLOC. FOR ZBRKS004 LINK
IEF2371 547 ALLJCATD TO LOADLIB
IEF2371 547 ALLJCATD TO SYSLIB
IEF2371 547 ALLJCATD TO
IEF2371 547 ALLJCATD TO
IEF2371 547 ALLJCATD TO
IEF2371 547 ALLJCATD TO
IEF2371 547 ALLJCATD TO
IEF2371 547 ALLJCATD TO
IEF2371 337 ALLJCATD TO
IEF2371 332 ALLJCATD TO SYSLMOD
IEF2371 332 ALLJCATD TO SYSPRINT
IEF2371 332 ALLJCATD TO SYST1
IEF2371 002 ALLJCATD TO TAPELIB
IEF2371 231 ALLJCATD TO SYSLIN

```

FILED LEVEL LINKAGE EDITOR OPTIONS SPECIFIED MAP LIST  
 VARIABLE OPTIONS USED - SIZE=(307200,12238)- DEFAULT OPTION(S) USED  
 IEW0000 INCLUDE TAPLES  
 IEW0000 ENTRY MAIN

REDUCE MAP

CONTROL SECTION			ENTRY							
NAME	ORIGIN	LENGTH	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION
MAIN	00	632								
ASGEND	633	422								
SELECT	1370	062								
SUNLGT	2008	106								
CHKREC	3190	066								
WTAP4	3078	432								
DATCON	4238	100	RTAPE4	4000	WTAPE4	4148	#SNLDF	41AC		
ENVST	5208	08	DATCON	4238						
DSFOR	5200	2A7								
F36F90	5308	200	F36F90	5568						
INCCOIN*	5828	141	IUCOM	5828	FDICCS	58E4	INTSWTCH	674E		
INCCOIN2*	5770	250	SE0J450	5AEB						
DTI	6000	15								
FLT	6008	236	FSTFS	6008	FSTFD	6000	FDTFS	6F10	FDYFD	6F34
FIXFLT	7100	151	ITFS	7100	ITFD	7124				
FIX	7253	110	ITF	7256						
M	7378	08								
TRANS	7450	EA								
INCFCVTH*	7540	1190	ADCON	7540	FCVADUTP	75CA	FCVCDUTP	7E7A	FCVZOUTR	77CA
INCEPNT*	8600	012	FCVIDUTP	7878	FCVCDUTP	807A	FCVCOUTP	8294	INT6SACH	857B
INCEFIOS*	88F8	1368	ARITH	80E0	ADJSWTCH	8A40				
INCOOPT*	9F50	350	FIOS	88F0	FIOSZLP	88F0				
CMPS	A2B0	170								
INCERRH*	A420	500	ERRMON	A420	INCERKE	A438				
INCJATL*	A9E0	636								
INCETKCH*	B014	200	INCTPCH	B018	ERRTRA	C020				
BLANKCOM	B2A0	102								

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NAME	ORIGIN	LENGTH	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION
ENTRY ADDRESS		00								
TOTAL LENGTH		02DC								
***CSFC DOES NOT EXIST BUT HAS BEEN ADDED TO DATA SET										

```

IEF265I  SYS2-J3ADL10                                KEPT
IEF285I  VOL SER NOS= GISYS1.
IEF265I  SYS2-D00MY                                  KEPT
IEF285I  VOL SER NOS= GISYS1.
IEF265I  SYS2-D00MY                                  KEPT
IEF285I  VOL SER NOS= GISYS1.
IEF265I  SYS1-F0RTE10                                KEPT
IEF285I  VOL SER NOS= GISYS1.
IEF265I  SYS2-G3PCL10                                KEPT
IEF285I  VOL SER NOS= GISYS1.
IEF265I  SYS1-PL1L10                                 KEPT
IEF285I  VOL SER NOS= GISYS1.
IEF265I  SYS1-FELCML10                               KEPT
IEF285I  VOL SER NOS= GISYS1.
IEF265I  SYS2-J3ADL10                                KEPT
IEF285I  VOL SER NOS= GISYS1.
IEF265I  SYS1-G3PAK                                  KEPT
IEF285I  VOL SER NOS= GISYS2.
IEF285I  SYS71159-T064321-RV000-ZBRK5004-LODM00    PASSED
IEF285I  VOL SER NOS= GISCR9.
IEF265I  SYS71159-T064321-RV000-ZBRK5004-R0000264    SYSOUT
IEF285I  VOL SER NOS= GISCR9.
IEF265I  SYS71159-T064321-RV000-ZBRK5004-R0000265    DELETED
IEF285I  VOL SER NOS= GISCR9.
IEF265I  TELDRS                                       KEPT
IEF285I  VOL SER NOS= IC67H.
IEF265I  SYS71159-T064321-RV000-ZBRK5004-S0000266    SYSIN
IEF285I  VOL SER NOS= GISCR2.
IEF265I  SYS71159-T064321-RV000-ZBRK5004-S0000266    DELETED
IEF285I  VOL SER NOS= GISCR2.
-----JOB-NUM-776-STEP-NBR-01-ZBRK5004-LINK-PGM=TEWL-CARDS=00002-INITIATION TIME=21.58.36.36-DATE=06-08-71
-----CPU=000.1 I/O=000.1 CORE=000.1 CHARGE=000.06-STEP-01-LINK-TERMINATION TIME=22.03.00.30-DATE=06-08-71
-----CPU-TIME-BY-DEVICE-DISK=*****2.36-DRUM=*****00-TAPE=*****JOB-CLL=*****0000THRE=*****200
-----STEP REGION SIZE=0300K MAXIMUM REGION SIZE USED=0300K PERCENT OF REGION USED=96
XX00 EXEC PGM=LINK,SYSDMOD,CCNO=(STRT),REGION=100K 00002200
XXFT05F001 DD DDNAME=DATA5 00002300
XXFT06F001 DD SYSOUT=A,DCB=(RECFM=V3A,LRECL=137,BLKSIZE=7265), 00002400
XX SPACE=(CYL,(1,1)) 00002500
XXFT07F001 DD DDNAME=DCB=(RECFM=PD,LRECL=307,BLKSIZE=72807, 00002600
XX SPACE=(TRK,(1,20)) 00002700
*** INSERT //GD=FT07F001 DD DSN=DDDECK,SYSDUMP=8 FOR PUNCHL OUTPOT 00002800
XXSYSPRINT DD SYSOUT=A,DCB=(RECFM=W3A,LRECL=125,BLKSIZE=629), 00002900
XX SPACE=(TRK,(1,20)) 00003000
//GD=SYSUDUMP DD SYSOUT=A
//GD=PORTAP DD DSNNAME=INDRJA,UNIT=2400-7,
// LABEL=(,BLP),DISP=(OLD,KEEP),VOLUME=SER=4560H,
// DCB=(LRECL=1542,BLKSIZE=1542,DEN=1),
//GD=FT14F001 DD UNIT=DISK,SPACE=(CYL,(30,6)),
// DCB=(RECFM=VS,BLKSIZE=2056)
//GD=FT15F001 DD DSNNAME=DR30UT,UNIT=2400-7,DISP=(NEW,KEEP),
// LABEL=(,BLP),VOLUME=SER=1811H,
// DCB=(RECFM=F,DEN=1,BLKSIZE=1536)
//GD=DAT#5 DD *
//
IEF236I ALLJOB FOR ZBRK5004 GD
IEF237I 332 ALLOCATED TO PGM=*.DD
IEF237I 541 ALLOCATED TO FT05F001
IEF237I 541 ALLOCATED TO FT06F001
IEF237I 332 ALLOCATED TO SYSPRINT
IEF237I 542 ALLOCATED TO SYSUDUMP
IEF237I 000 ALLOCATED TO PORTAP
IEF237I 543 ALLOCATED TO FT14F001
IEF237I 001 ALLOCATED TO FT15F001

```

S7360 TELOR3 PROGRAM (TEST, EDIT, AND LIST ORB3A TAPE)

---

INPUT ORB3A TAPE NO. IS 4368H SATELLITE ID CN INPUT ORB3A TITLE RECORD IS 6953I

---

	DATE	HR	MIN	SEC
INPUT ORB3A SATELLITE DATA START TIME	700718	6	22	0
INPUT ORB3A SATELLITE DATA END TIME	700820	21	49	59

---

SELECT TIME PERIOD OPTION CHOSEN FOR THIS RUN

---

	START TIME		END TIME	
REQUESTED TIME PERIOD SELECTED	DATE	SEC OF DAY	DATE	SEC OF DAY
FOR OUTPUT ORB3A TAPE.	700718	25200.	700724	25200.

---

ENTIRE REQUESTED TIME PERIOD SELECTED EXISTS IN INPUT ORB3A TAPE.  
 OUTPUT ORB3A TAPE HAS BEEN GENERATED.

---

	START TIME		END TIME	
ACTUAL TIME PERIOD SELECTED	DATE	SEC OF DAY	DATE	SEC OF DAY
FOR OUTPUT ORB3A TAPE.	700718.	24900.	700724.	25800.

---

NORMAL TERMINATION OF SELECT TIME PERIOD OPTION.

---

```

IEF285I  SYS71159.T064321.RV000.ZBRKS004.LDDMCD  PASSED
IEF285I  VOL SER NOS= G1SCR9.
IEF285I  SYS71159.T064321.RV000.ZBRKS004.S0000271  SYSIN
IEF285I  VOL SER NOS= G1SCR5.
IEF285I  SYS71159.T064321.RV000.ZBRKS004.S0000271  DELETED
IEF285I  VOL SER NOS= G1SCR5.
IEF285I  SYS71159.T064321.SV000.ZBRKS004.R0000267  SYSOUT
IEF285I  VOL SER NOS= G1SCR5.
IEF285I  SYS71159.T064321.SV000.ZBRKS004.R0000268  DELETED
IEF285I  VOL SER NOS= G1SCR9.
IEF285I  SYS71159.T064321.SV000.ZBRKS004.R0000269  DELETED
IEF285I  VOL SER NOS= G1SCR6.
IEF285I  INDRJA  KEPT
IEF285I  VOL SER NOS= 456EH .
IEF285I  SYS71159.T064321.RV000.ZBRKS004.R0000270  DELETED
IEF285I  VOL SER NOS= G1SCR7.
IEF285I  DR3OUT  KEPT
IEF285I  VOL SER NOS= 1811M .
-----JOB NBR= 776 STEP NBR= 02 ZBRKS004 GO PGM=PGM=*.DL CARDS=00002 INITIATION TIME=22.03.01.05 DATE=06-08-71
----- CPU=000.5 I/O=001.3 CORE=000.2 CHARGE=001.84 STEP=02 GO TERMINATION TIME=22.10.41.18 DATE=06-08-71
----- I/O TIME BY DEVICE. DISK=***54.64,DRUM=***.00,TAPE=***26.08,CELL=***.00,OTHR=***.00
----- STEP REGION SIZE=0100K MAXIMUM REGION SIZE USED=0096K PERCENT OF REGION USED=96
IEF285I  SYS71159.T064321.RV000.ZBRKS004.LDDMCD  DELETED
IEF285I  VOL SER NOS= G1SCR9.

```

```

----- CPU=000.5 I/O=001.4 CORE=000.2 CHARGE=001.90 JOB NBR=776 ZBRKS004 360795 SYSTEM=MVT=1.9.6 01-16-71 GI
----- I/O TIME BY DEVICE. DISK=***37.01,DRUM=***.00,TAPE=***26.16,CELL=***.00,OTHR=***.00

```

Figure A-5. Sunlight Report Option Sample Run Printout

```

*****
//ZBRK002 JOB (C100113115,T,000A09,001001),000,MSGLEVEL=1,TYPRUN=HOLD
// EXEC LINKGC
XXDEFAULT PROC NELK=50 0000100
XXLINK EXEC PGM=IEWL,PARM=(MAP,LIST),CCND=(5,LT),REGION=300K 0000200
XXLOADLIB DD DSN=SYS2,LOADLIB,DISP=SHR 0000300
XXNEWLIN DC DUMMY 0000400
XXSYSLIB DC DSN=SYS2,DUMMY,DISP=SHR 0000500
XX DD DSN=SYS2,DUMMY,DISP=SHR 0000600
XX DD DSN=SYS1,LOADLIB,DISP=SHR 0000700
XX DD DSN=SYS2,GSFCLIB,DISP=SHR 0000800
XX DD DSN=SYS1,PLILIB,DISP=SHR 0000900
XX DD DSN=SYS1,TSLCMLIB,DISP=SHR 0001000
XX DD DSN=SYS2,LOADLIB,DISP=SHR 0001100
XX DD DSN=SYS1,SSPAK,DISP=SHR 0001200
XXSYSLMOD DD DSN=SYS1,SSPAK,DISP=(NEW,PASS),UNIT=DISK, 0001300
XX SPACE=(3072,(8,NBLK,40,1)) 0001400
IEF237I SUBSTITUTION UCL SPACE=(3072,(50,40,1))
XXSYSPRINT DD SYSOUT=A,DCB=(RECFM=FBM,LRECL=121,BLKSIZE=1210), 0001500
XX SPACE=(TRK,(10,5)) 0001600
XXSYST1 DD UNIT=DISK,SPACE=(1024,(100,20)),DCB=BLKSIZE=1024 0001700
//TAPELIB DD DSN=TELE03,VOL=SER=1067H
X/TAPELIB DC DUMMY,VOL=SER=TAPEIN,UNIT=(9TRACK,,DEFER),LABEL=(,BLP), 0001800
XX DISP=(CLC,KEEP),DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200) 0001900
//LINK.SYSLIN DD *
X/SYSLIN DC DSN=SYS2,DISP=(OLD,DELETE),DCB=RECFM=FB 0002000
XX DD DSN=OBJECT 0002100
IEF236I ALLOC FOR ZBRK002 LINK
IEF237I 527 ALLOCATED TO LOADLIB
IEF237I 547 ALLOCATED TO SYSLIB
IEF237I 547 ALLOCATED TO
IEF237I 547 ALLOCATED TO
IEF237I 547 ALLOCATED TO
IEF237I 547 ALLOCATED TO
IEF237I 547 ALLOCATED TO
IEF237I 547 ALLOCATED TO
IEF237I 337 ALLOCATED TO
IEF237I 332 ALLOCATED TO SYSLMOD
IEF237I 332 ALLOCATED TO SYSPRINT
IEF237I 332 ALLOCATED TO SYST1
IEF237I 002 ALLOCATED TO TAPELIB
IEF237I 230 ALLOCATED TO SYSLIN

```

3  
⊕

~~F128-LEVEL LINKAGE EDITOR-OPTIONS-SPECIFIED-MAP-LIST~~  
 VARIABLE OPTIONS USED - SIZE=(307200,12288)- DEFAULT OPTION(S) USED  
 IEW0000 INCLUDE TAPELIB  
 IEW0000 ENTRY MAIN

MODULE MAP

CONTROL SECTION			ENTRY							
NAME	ORIGIN	LENGTH	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION
MAIN	CC	898								
ASCEND	588	452								
SELECT	137C	C52								
SUNLGT	2080	1088								
CHKREC	319C	C66								
PWTAPA	30FE	43F	RTAPE4	40CC	WTAPC4	4148	WSNEOF	41AC		
DATA CON	4238	FC6	DATCON	4238						
CONVRT *	520E	99								
DBFCR *	52C0	2A7								
F36F90 *	556E	28E	F36F90	556E						
IHCCEMI *	58FE	741								
IHCCEMI 2 *	6770	650	IBCUM	5828	FDIOCS	58E4	INTSWTCH	674E		
RTI *	680C	F5	SEODASD	6AE8						
FLT *	6E0B	235	FSTFS	6E0B	FSTFD	6E5C	FDTFS	6F10	FDTFD	6F34
FIXFLT *	710C	151								
FIX	* 728E	11D	ITFS	7108	ITFD	7124				
N *	737E	D8	ITI	7258						
TRANS *	745C	EA								
IHCFCVTF *	7840	119D	ADCON	7540	FCVADUTP	75EA	FCVLOUTP	767A	FCVZOUTP	77CA
			FCVIOUTP	7878	FCVEOUTP	807A	FCVCOUTP	8294	INT6SWCH	8578
IHCFFNT *	86EC	512	ARITH	86E0	ADJSWTCH	8A4C				
IHCFFICS *	88FC	1368	FIOCS	88F8	FIOCS8EP	88FE				
IHCVEPT *	976C	350								
CMPRS *	A28C	170								
IHCERRM *	A420	58C	ERRMCN	A420	IHCERRE	A438				
IHCUTPL *	A5E0	638								
IHCETRC *	B01E	28E	IHCETRC	B018	ERRTRA	B020				
SELANKCCM	B2AE	1024								

A-34

~~NAME ORIGIN LENGTH NAME LOCATION NAME LOCATION NAME LOCATION NAME LOCATION~~  
~~ENTRY ADDRESS 00~~  
~~TOTAL LENGTH 02E0~~  
~~\*\*\*GREG DOES NOT EXIST BUT HAS BEEN ADDED TO DATA SET~~



```

IEF2251 SYS2,LOADLIB KEPT
IEF2251 VOL SER NCS= G1SYS1,
IEF2251 SYS2,DUMMY KEPT
IEF2251 VOL SER NCS= G1SYS1,
IEF2251 SYS2,DUMMY KEPT
IEF2251 VOL SER NCS= G1SYS1,
IEF2251 SYS1,FORTLIB KEPT
IEF2251 VOL SER NCS= G1SYS1,
IEF2251 SYS2,CSECLIB KEPT
IEF2251 VOL SER NCS= G1SYS1,
IEF2251 SYS1,PLILIB KEPT
IEF2251 VOL SER NCS= G1SYS1,
IEF2251 SYS1,TELEMLIB KEPT
IEF2251 VOL SER NCS= G1SYS1,
IEF2251 SYS2,LOADLIB KEPT
IEF2251 VOL SER NCS= G1SYS1,
IEF2251 SYS1,SSFAK KEPT
IEF2251 VOL SER NCS= G1SYS2,
IEF2251 SYS7-1156,T-11454,RV000,ZPRK5002,LBRMBD PASSED
IEF2251 VOL SER NCS= C1SCR9,
IEF2251 SYS7-1156,T-11454,RV000,ZPRK5002,R0000943 SYSOUT
IEF2251 VOL SER NCS= G1SCR9,
IEF2251 SYS7-1156,T-11454,RV000,ZPRK5002,R0000944 DELETED
IEF2251 VOL SER NCS= G1SCR9,
IEF2251 TELCP3 KEPT
IEF2251 VOL SER NCS= 1057H,
IEF2251 SYS7-1156,T-11454,RV000,ZPRK5002,S0000945 SYSIN
IEF2251 VOL SER NCS= G1SCR1,
IEF2251 SYS7-1156,T-11454,RV000,ZPRK5002,S0000946 DELETED
IEF2251 VOL SER NCS= G1SCR1,
JOB-NR 435-STEP-NR 01-ZPRK5002-LINK PGM=IEWL CARDS=0002 INITIATION TIME=21.34.55.73-DATE=06-07-71
----- CPU=000.1 I/C=000.1 CORR=000.1 CHARGE=000.05 STEP-01 LINK TERMINATION TIME=21.37.31.48 DATE=06-07-71
I/O TIME BY SERVICE DISK=*****2,3,C,PRGM=*****00,TAP=*****09,CFL=*****00,OTHR=*****00
----- STEP EXEC SIZE=0300Y MAXIMUM REGION SIZE USED=0300K PERCENT OF REGION USED=99
XXGO EXEC PGM=*,LINK,SYSLMBR,COND=(S,LT),REGION=100K 00002200
XXFTCEP001 DD DDNAME=DATAS 00002300
XXFTCEP001 DD SYSOUT=A,DCB=(RECFM=VB,A,LRECL=137,BLKSIZE=7265), 00002400
XX SPACE=(CYL,(1,1)) 00002500
XXFT07F001 DD DUMMY,DCB=(RECFM=FB,LRECL=90,BLKSIZE=7260), 00002600
XX SPACE=(TRK,(1,20)) 00002700
*** INSERT //GO,FT07F001 DD DSN=06FAEK,SYSOUT=A FOR PUNCHED OUTPUT 00002800
XXSYSPRINT DD SYSOUT=A,DCB=(RECFM=VB,A,LRECL=125,BLKSIZE=620), 00002900
XX SPACE=(TRK,(1,20)) 00003000
//GO.SYSUIMP DD SYSOUT=A
//GO.FORTAP DD GENNAME=INBR3A,UNIT=2A00-7,
// LABEL=(,BLP),DISP=(OLD,KEEP),VOLUME=SER=4568H,
// DCB=(LRECL=1542,BLKSIZE=1542,GEN=1)
//GO.DATAC DD *
//
IEF2361 ALLOC, FOR ZPRK5002 GO
IEF2371 232 ALLCATED TO PGM=*,DD
IEF2371 231 ALLCATED TO FTCS=001
IEF2371 240 ALLCATED TO FT05=001
IEF2371 241 ALLCATED TO SYSPRINT
IEF2371 242 ALLCATED TO SYSUIMP
IEF2371 001 ALLCATED TO FORTAP

```

~~S/360 TELCR3 PROGRAM (TEST, EDIT, AND LIST CRB3A TAPE)~~  
~~INPUT CRB3A TAPE NO. IS 4568H SATELLITE ID ON INPUT CRB3A TITLE RECORD IS 69531~~  
~~DATE HR MIN SEC~~  
~~INPUT CRB3A SATELLITE DATA START TIME 700718 6 22 0~~  
~~INPUT CRB3A SATELLITE DATA END TIME 700820 21 49 59~~  
~~SUNLIGHT REPORT OPTION CHOSEN FOR THIS RUN~~

SUNLIGHT ENTRANCE				SUNLIGHT EXIT			
PASS NO.	DATE	DAY OF YR	HR MIN SEC	PASS NO.	DATE	DAY OF YR	HR MIN SEC
117	700719	200	22 56 30	117	700719	200	22 32 44
118	700723	204	7 01 36	118	700723	204	7 18 30
119	700726	207	16 20 31	119	700726	207	15 58 18
120	700730	211	1 6 30	120	700730	211	0 45 21
121	700802	214	10 3 44	121	700802	214	9 44 0
122	700805	217	18 45 25	122	700805	217	18 27 24
123	700809	221	3 24 6	123	700809	221	3 8 13
124	700812	224	12 6 49	124	700812	224	11 53 45
125	700815	227	20 52 59	125	700815	227	20 44 2

NORMAL TERMINATION OF SUNLIGHT REPORT OPTION.

```

IEF285I  SYS71156, T154554, RV000, ZBRKS002, LODMOD          PASSED
IEF285I  VOL SER NCS= G1SCR9.
IEF285I  SYS71156, T154554, RV000, ZBRKS002, S0000949        SYSIN
IEF285I  VOL SER NCS= G1SCR2.
IEF285I  SYS71156, T154554, RV000, ZBRKS002, S0000949        DELETED
IEF285I  VOL SER NCS= G1SCR2.
IEF285I  SYS71156, T154554, SV000, ZBRKS002, R0000946        SYSOUT
IEF285I  VOL SER NCS= G1SCR4.
IEF285I  SYS71156, T154554, SV000, ZBRKS002, R0000947        DELETED
IEF285I  VOL SER NCS= G1SCR5.
IEF285I  SYS71156, T154554, SV000, ZBRKS002, R0000948        DELETED
IEF285I  VOL SER NCS= G1SCR6.
IEF285I  INQR3A          KERT
IEF285I  VOL SER NCS= 056EH .
----- JOB NBR=635 STEP NBR=02 ZBRKS002 GO          RCN=RCM=X,00 CARDS=00001 INITIATION TIME=21.37.32.45 DATE=06-07-71
----- CPU=000.3 I/O=000.4 CORE=000.1 CHARGE=000.69          STEP=02 GO          TERMINATION TIME=21.40.38.13 DATE=06-07-71
----- I/O TIME BY DEVICE. DISK=*****.18, DRUM=*****.00, TAPE=*****.22.08, CELL=*****.00, OTHR=*****.00
----- STEP PFCIGN SIZE=0100K MAXIMUM REGION SIZE USED=0084K PERCENT OF REGION USED=84
IEF285I  SYS71156, T154554, RV000, ZBRKS002, LODMOD          DELETED
IEF285I  VOL SER NCS= G1SCR9.

```

---

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----- CPU=000.3 I/O=000.4 CORE=000.1 CHARGE=000.74          JOB NBR=635 ZBRKS002 360/95          SYSTEM=MVT-19.6 01-16-71 G1
----- I/O TIME BY DEVICE. DISK=*****2.54, DRUM=*****.00, TAPE=*****.22.16, CELL=*****.00, OTHR=*****.00

```

Figure A-6. Check Record Option Sample Run Printout

```

*****
//ZBRK5005 JOB (G10611311E,T,000409,001001),000,MSGLEVEL=1,TYPE=HOLD
// EXEC LINKGO
XXDEFAULT PROC NOLK=5) 00000100
XXLINK EXEC PGM=IEHL,PARM=(MAP,LIST),COND=(5,LT),REGION=300K 00000200
XXLOADLIB DD DSN=SYS2.LOADLIB,DISP=SHR 00000300
XXNEWLIN DD DUMMY 00000400
XXSYSLIB DD DSN=SYS2.DUMMY,DISP=SHR 00000500
XX DD DSN=SYS2.DUMMY,DISP=SHR 00000600
XX DD DSN=SYS1.FORTLIB,DISP=SHR 00000700
XX DD DSN=SYS2.GSFCLIB,DISP=SHR 00000800
XX DD DSN=SYS1.QLIB,DISP=SHR 00000900
XX DD DSN=SYS1.TELCLIB,DISP=SHR 00001000
XX DD DSN=SYS2.LOADLIB,DISP=SHR 00001100
XX DD DSN=SYS1.SSPAK,DISP=SHR 00001200
XXSYSLMOD DD DSN=ELUDMOD(GSEC),DISP=(NEW,PASS),UNIT=DISK, 00001300
XX SPACE=(3072,(8NBLK,40,1)) 00001400
IEF653I SUBSTITUTION UC1 = SPACE=(3072,(50,40,1))
XXSYSPRINT DD SYSOUT=A,DCB=(RECFM=FBS,LRECL=121,BLKSIZE=1210), 00001500
XX SPACE=(TRK,(10,5)) 00001600
XXSYSUT1 DD UNIT=DISK,SPACE=(1024,(100,20)),DCB=BLKSIZE=1024 00001700
//TAPELIB DD DSN=TEL003,VOL=SER=1057H
X/TAPELIB DD DUMMY,VOL=SER=TAPEIN,UNIT=(9TRACK,,DEFER),LABEL=(,BLP), 00001800
XX DISP=(JLD,KEEP),DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200) 00001900
//LINK.SYSLIN DD *
X/SYSLIN DD DSN=EL003JLD,DISP=(JLD,DELETE),DCB=RECFM=FB 00002000
XX DD DDNAME=OBJECT 00002100
IEF236I ALLUC FOR ZBRK5005 LINK
IEF237I 547 ALLOCATED TJ LOADLIB
IEF237I 547 ALLOCATED TJ SYSLIB
IEF237I 547 ALLOCATED TJ
IEF237I 547 ALLOCATED TJ
IEF237I 547 ALLOCATED TJ
IEF237I 547 ALLOCATED TJ
IEF237I 547 ALLOCATED TJ
IEF237I 547 ALLOCATED TJ
IEF237I 337 ALLOCATED TJ
IEF237I 540 ALLOCATED TJ SYSLMOD
IEF237I 541 ALLOCATED TJ SYSPRINT
IEF237I 542 ALLOCATED TJ SYSUT1
IEF237I 003 ALLOCATED TJ TAPELIB
IEF237I 231 ALLOCATED TJ SYSLIN

```

P128-LEVEL LINKAGE EDITOR-OPTIONS-SPECIFIED-MAP-LIST  
 VARIABLE OPTIONS USED - SIZE=(307200,12288)-  
 IEW0000 INCLUDE TAPELID  
 IEW0000 ENTRY MAIN

DEFAULT OPTION(S) USED

MODULE MAP

CONTROL SECTION			ENTRY							
NAME	ORIGIN	LENGTH	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION
MAIN	00	880								
ASCEND	E00	4E2								
SELECT	1370	062								
SUNLGT	2000	1000								
CHKREC	3190	060								
RWTAP4	30F4	43E								
DATCON	4230	600	RTAPE4	40CC	WTAPE4	4148	WSNEO	41AC		
			DATCUN	4238						
CONVRT *	5200	90								
DBFOR *	5200	247								
F30F90 *	5560	200								
			F30F90	5560						
IHCCEM1*	5020	641								
			IUCOM	5020	FDI0CS	58E4	INTSWTCH	674E		
IHCCEM12*	6770	500								
			SL00ASD	6AEB						
DTI *	6000	60								
FLT *	0EC0	230								
			FSTFS	6EC0	FSTFD	6EE0	FDTFS	6E10	FDTFD	6E3A
FIXFLT *	7100	151								
			ITFS	7100	ITFD	712A				
FIX *	7250	110								
			ITI	7250						
M *	7370	08								
TRANS *	7450	EA								
IHCFCVTH*	7540	1190								
			ADCON	7540	FCV4OUTP	75EA	FCV1OUT2	767A	FCV2OUTP	77CA
			FCV1OUTP	7870	FCV2OUTP	807A	FCV3OUTP	8294	INT6SWCH	857B
IHCENH*	8050	512								
			ARITH	86E0	ADJSWCH	8A4C				
IHCENIOS*	80F0	1360								
			F10CS	8BF0	F10CSREP	8BFE				
IHCJORT *	9E60	350								
CMPRS *	A200	170								
IHCERRM *	A420	600								
			ERRMUN	A420	IHCERRE	A438				
IHCJATBL*	A9E0	630								
IHCETRCH*	B010	280								
			IHCETRCH	B010	ERRTRA	B020				
\$BLANKCOM	B2A0	1024								

~~NAME ORIGIN LENGTH NAME LOCATION NAME LOCATION NAME LOCATION NAME LOCATION~~  
~~ENTRY ADDRESS 00~~  
~~TOTAL LENGTH 6200~~  
~~\*\*\*GSEC DOES NOT EXIST BUT HAS BEEN ADDED TO DATA SET~~



```

IEF285I  SYS2.LJADL10          KEPT
IEF285I  VOL SER NOS= G1>YSI.
IEF285I  SYS2.DUMMY          KEPT
IEF285I  VOL SER NOS= G1>YSI.
IEF285I  SYS2.DUMMY          KEPT
IEF285I  VOL SER NOS= G1>YSI.
IEF285I  SYS1.FORTL10       KEPT
IEF285I  VOL SER NOS= G1>YSI.
IEF285I  SYS2.GSFL10       KEPT
IEF285I  VOL SER NOS= G1>YSI.
IEF285I  SYS1.PL1L10       KEPT
IEF285I  VOL SER NOS= G1>YSI.
IEF285I  SYS1.TELEM110     KEPT
IEF285I  VOL SER NOS= G1>YSI.
IEF285I  SYS2.LOADL10      KEPT
IEF285I  VOL SER NOS= G1>YSI.
IEF285I  SYS1.SSMK        KEPT
IEF285I  VOL SER NOS= G1>YSI.
IEF285I  SYS71158.T15455.RV000.ZBRK5005.LDDMOD PASSED
IEF285I  VOL SER NOS= G1>CR4.
IEF285I  SYS71158.T15454.RV000.ZBRK5005.R000957 SYSDUT
IEF285I  VOL SER NOS= G1>CR5.
IEF285I  SYS71158.T15455.RV000.ZBRK5005.R000958 DELETED
IEF285I  VOL SER NOS= G1>CR0.
IEF285I  TELGRJ          KEPT
IEF285I  VOL SER NOS= 10>7H.
IEF285I  SYS71158.T15454.RV000.ZBRK5005.5000959 SYSIN
IEF285I  VOL SER NOS= G1>CR2.
IEF285I  SYS71158.T15454.RV000.ZBRK5005.5000959 DELETED
IEF285I  VOL SER NOS= G1>CR2.
-----
JOB-NBR 058 STEP-NBR 01 ZBRK5005 LINK PGM=IEWL CARDS=00002 INITIATION TIME=01.38.14.56 DATE=06-08-71
-----
CPU=000.1 I/O=000.1 C/P=000.1 CHARGE=000.06 STLP-01 LINK TERMINATION TIME=01.38.00.20 DATE=06-08-71
-----
I/O TIME BY DEVICE  DISK=*****2.36 DRUM=*****.00 TAPE=*****.00 GCL=*****.00 QTR=*****.00
-----
STEP REGION SIZE=0320K MAXIMUM REGION SIZE USED=0300K PERCENT OF REGION USED=99
-----
EXEC RGN=*,LINK,SYSLNDD,COND=(5,LT),REGION=1,LOCK 00002200
XXFT05F001 DD DDNAME=DATA5 00002300
XXFT06F001 DD SYSOUT=A,D,B=(RECFM=VBA,LRECL=137,DLKSIZ=7265), 00002400
XX SPACE=(CYL,(1,1)) 00002500
XXFT07F001 DD DUMMY,DCB=(RECFM=FB,LRECL=83,BLKSIZE=7280), 00002600
XX SPACE=(TRK,(1,20)) 00002700
** INSERT //GO.FT07F001 DD DSN=CDDECK,SYSOUT=B FOR PUNCHED OUTPUT 00002800
XXSYSPRINT DD SYSOUT=A,D,B=(RECFM=VBA,LRECL=125,BLKSIZE=629), 00002900
XX SPACE=(TRK,(1,20)) 00003000
//GO.SYSUDUMP DD SYSOUT=A
//GO.FORTAP DD DSN=INJ1JA,UNIT=2400-7,
// LABEL=(,BLP),DISP=(OLD,KEEP),VOLUME=SER=4405C,
// DCB=(LRECL=1542,DLKSIZE=1542,DEN=1)
//GO.FT14F001 DD UNIT=DISK,SPACE=(CYL,(9,1)),
// DCB=(RECFM=VS,BLKSIZE=2056)
//GO.FT15F001 DD DSN=OR3OUT,UNIT=2400-7,DISP=(NEW,KEEP),
// LABEL=(,BLP),VOLUME=SER=4920H,
// DCB=(RECFM=F,DEN=1,BLKSIZE=1536)
//GO.DATAS DD *
//
IEF236I ALLOC FOR ZBRK5005 GO
IEF237I 540 ALLOCATED TJ PGM=*,DD
IEF237I 232 ALLOCATED TJ FT05F001
IEF237I 540 ALLOCATED TJ FT06F001
IEF237I 540 ALLOCATED TJ SYSPRINT
IEF237I 540 ALLOCATED TJ SYSUDUMP
IEF237I 000 ALLOCATED TJ FORTAP
IEF237I 540 ALLOCATED TJ FT14F001
IEF237I 000 ALLOCATED TJ FT15F001

```

~~S/360 TELOR3 PROGRAM (TEST, EDIT, AND LIST ORB3A TAPE)~~

~~INPUT ORB3A TAPE NO. IS 4405C SATELLITE ID ON INPUT ORB3A TITLE RECORD IS 67731~~

	DATE	HR	MIN	SEC
INPUT ORB3A SATELLITE DATA START TIME	681130	0	48	0
INPUT ORB3A SATELLITE DATA END TIME	681130	2	0	50

~~CHECK RECORD OPTION CHOSEN FOR THIS RUN~~

~~SECONDS OF DAY OF 1ST DATA ITEM IN A RECORD ARE NOT WITHIN LEGAL LIMITS.  
SECONDS SHOULD BE LESS THAN 86400 AND GREATER THAN OR EQUAL TO ZERO.~~

INPUT ORBSA CHECK FAIL DATA RECORD											
0.10000000	01	0.68113000	06	0.33500000	03	0.87000000	05	0.36706537	04	0.17664763	04
0.66657783	04	0.60189950	01	0.13719485	01	0.43289945	01	0.12245143	03	0.63960418	02
0.53286698	03	0.47061149	00	0.83337023	00	0.30355967	00	0.22758531	01	0.40431033	00
0.34997079	03	0.39168415	02	0.72450000	04	0.10000000	01	0.68113000	06	0.33500000	03
0.67200000	04	0.40234917	04	0.18760676	04	0.52940851	04	0.57391273	01	0.17598740	01
0.47238638	01	0.12200138	03	0.50193528	02	0.54332982	03	0.37060222	00	0.83837471	00
0.36355244	00	0.20130020	01	0.33643759	00	0.34874449	03	0.23857249	02	0.72450000	04
0.10000000	01	0.68113000	06	0.33500000	03	0.67900000	04	0.43588787	04	0.19775214	04
0.49933623	04	0.54366432	01	0.15208116	01	0.50963577	01	0.12165663	03	0.46423786	02
0.55411894	03	0.32938900	00	0.83837838	00	0.36355421	00	0.18164368	01	0.36822875	00
0.34856472	03	0.17044559	02	0.72450000	04	0.10000000	01	0.68113000	06	0.33500000	03
0.68400000	04	0.16754570	04	0.20704390	04	0.46829970	04	0.51133319	01	0.14754482	01
0.54450279	01	0.12138992	03	0.42661371	02	0.50519295	03	0.37057769	00	0.83838246	00
0.34355998	00	0.16554814	01	0.34991040	00	0.34851942	03	0.99897090	01	0.72450000	04
0.10000000	01	0.68113000	06	0.33500000	03	0.69000000	04	0.49719407	04	0.21544633	04
0.47464622	04	0.47075231	01	0.13244883	01	0.57585628	01	0.12118357	03	0.38907190	02
0.57652723	03	0.37050042	00	0.83838654	00	0.36355774	00	0.15261980	01	0.33202656	03
0.34861145	03	0.26539928	01	0.72450000	04	0.10000000	01	0.68113000	06	0.33500000	03
0.69600000	04	0.52471825	04	0.22292799	04	0.39912974	04	0.44042491	01	0.11686488	01
0.60657943	01	0.12162434	03	0.35161972	02	0.52869436	03	0.37055516	00	0.83839062	00
0.36355951	00	0.14218030	01	0.31464214	00	0.34885763	03	0.50130861	01	0.72450000	04
0.10000000	01	0.68113000	06	0.33500000	03	0.70200000	04	0.55001144	04	0.22946180	04
0.36191136	04	0.40241629	01	0.10085565	01	0.63350974	01	0.12090231	03	0.31426313	02
0.59902332	03	0.37054339	00	0.83837469	00	0.36355128	00	0.13372975	01	0.29815463	00
0.34929173	03	0.13042004	02	0.72450000	04	0.10000000	01	0.68113000	06	0.33500000	03
0.70800000	04	0.67297820	04	0.23502503	04	0.32315780	04	0.36290770	01	0.84524198	00
0.65773893	01	0.12080939	03	0.27700720	02	0.61172204	03	0.37053263	00	0.83839877	00
0.76356304	00	0.12692225	01	0.28288004	00	0.34997343	03	0.21473675	02	0.72450000	04
0.10000000	01	0.68113000	06	0.33500000	03	0.71400000	04	0.59353405	04	0.23959933	04
0.28404359	04	0.32238319	01	0.67913732	00	0.67901328	01	0.12074112	03	0.23985620	02
0.62372710	03	0.37052136	00	0.83840284	00	0.36356481	00	0.12150366	01	0.26917960	00
0.35100843	03	0.30332760	02	0.72450000	04	0.10000000	01	0.68113000	06	0.33500000	03
0.72000000	04	0.61100539	04	0.24317076	04	0.24173531	04	0.28012893	01	0.51107203	00
0.69733295	01	0.12069121	03	0.20281581	02	0.63380386	03	0.37051009	00	0.83840692	00
0.36356658	00	0.11724407	01	0.25735228	00	0.35259457	03	0.39625155	02	0.72450000	04
0.10000000	01	0.68113000	06	0.33500000	03	0.72500000	04	0.62713066	04	0.24572972	04
0.19942060	04	0.23723207	01	0.34176879	00	0.71265230	01	0.12065624	03	0.16588315	02
0.64791122	03	0.37049833	00	0.83841100	00	0.36356834	00	0.11403582	01	0.24772329	00
0.35513749	03	0.49314464	02	0.72450000	04	0.99000000	02	0.68000000	02	0.99900000	03
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

LAST DATA RECORD WRITTEN ON OUTPUT 0083A TAPE

0.10000000D	01	0.68113000D	06	0.33500000D	03	0.54000000D	04	-0.46940585D	04	0.13733415D	04
-0.47339606D	04	-0.49969542D	01	-0.22454982D	01	-0.54902017D	01	0.72203202D	02	-0.44246938D	02
0.43868613D	03	-0.37084806D	00	-0.83828460D	00	-0.36351354D	00	0.30884130D	01	0.39986132D	00
0.14761818D	03	0.26404855D	02	0.72450000D	04	0.10000000D	01	0.68113000D	06	0.33500000D	03
0.54600000D	04	0.43841680D	04	0.12355951D	04	-0.50523839D	04	0.53348854D	01	-0.23443301D	01
-0.51190926D	01	0.72621629D	02	-0.48143714D	02	0.43592843D	03	-0.37083679D	00	-0.83828857D	00
-0.36351531D	00	0.37064467D	01	0.41052220D	00	0.14578319D	03	-0.31885667D	02	0.72450000D	04
0.10000000D	01	0.68113000D	06	0.33500000D	03	0.55200000D	04	-0.40543497D	04	0.10922328D	04
-0.53477760D	04	0.56549420D	01	-0.2+326147D	01	-0.47235046D	01	0.72933024D	02	-0.52037774D	02
0.43414407D	03	-0.37032553D	00	-0.83822276D	00	-0.36351708D	00	0.45443025D	01	0.42141183D	00
0.14588640D	03	-0.37260188D	02	0.72450000D	04	0.10000000D	01	0.68113000D	06	0.33500000D	03
-0.55809900D	04	-0.37060819D	04	0.94330146D	03	-0.50187670D	04	0.59495111D	01	-0.25098964D	01
-0.43060451D	01	0.73470896D	02	-0.55927061D	02	0.43311511D	03	-0.37081426D	00	-0.83829683D	00
-0.36351885D	00	0.57153645D	01	0.47230527D	00	0.14487890D	03	-0.42574895D	02	0.72450000D	04
0.10000000D	01	0.68113000D	06	0.33500000D	03	0.56400000D	04	-0.33499479D	04	0.79127325D	03
-0.58641046D	04	0.62171119D	01	-0.25757813D	01	-0.38687465D	01	0.74184597D	02	-0.58808988D	02
0.43289991D	03	-0.37080299D	00	-0.83830091D	00	-0.36352062D	00	0.73995597D	01	0.44296718D	00
0.14363424D	03	-0.47857734D	02	0.72450000D	04	0.10000000D	01	0.68113000D	06	0.33500000D	03
0.57090000D	04	-0.29605974D	04	0.63504224D	03	-0.60826627D	04	0.64564172D	01	-0.26299407D	01
-0.34137522D	01	0.76151935D	02	-0.65580009D	02	0.43348396D	03	-0.37079173D	00	-0.83830499D	00
-0.36352239D	00	0.99187491D	01	0.45318098D	00	0.14218505D	03	-0.53122111D	02	0.72450000D	04
0.10000000D	01	0.68113000D	06	0.33500000D	03	0.57600000D	04	-0.25667672D	04	0.47592021D	03
-0.62734467D	04	0.56662565D	01	-0.25721106D	01	-0.29433262D	01	0.76503423D	02	-0.67534763D	02
0.43484395D	03	-0.37078047D	00	-0.83830007D	00	-0.36352416D	00	0.13795952D	02	0.46275805D	00
0.14019160D	03	-0.58370165D	02	0.72450000D	04	0.10000000D	01	0.68113000D	06	0.33500000D	03
0.58200000D	04	-0.21612560D	04	0.51463269D	03	-0.64355994D	04	0.68456311D	01	-0.27020964D	01
-0.24597774D	01	0.78474157D	02	-0.71364179D	02	0.43697825D	03	-0.37076920D	00	-0.83831315D	00
-0.36352592D	00	0.19776707D	02	0.47152635D	00	0.14736958D	03	-0.63591640D	02	0.72450000D	04
0.10000000D	01	0.68113000D	06	0.33500000D	03	0.58800000D	04	-0.17459174D	04	0.15191488D	03
-0.65634055D	04	0.69937143D	01	-0.27197719D	01	-0.19655084D	01	0.81533461D	02	-0.75150706D	02
0.43984744D	03	-0.37075794D	00	-0.83831722D	00	-0.36352769D	00	0.28213967D	02	0.47930919D	00
0.13306604D	03	-0.68752073D	02	0.72450000D	04	0.10000000D	01	0.68113000D	06	0.33500000D	03
0.59400000D	04	-0.13226493D	04	-0.11492509D	02	-0.66712948D	04	0.71098565D	01	-0.27250793D	01
-0.14629600D	01	0.86753474D	02	-0.73850257D	02	0.44443429D	03	-0.37074667D	00	-0.83832131D	00
-0.36352946D	00	0.36400327D	02	0.48589580D	00	0.22698312D	03	-0.71659163D	02	0.72450000D	04
0.10000000D	01	0.68113000D	06	0.33500000D	03	0.60000000D	04	-0.89338290D	03	-0.17484747D	03
-0.67438448D	04	0.71935922D	01	-0.27180314D	01	-0.95461002D	00	0.97078568D	02	-0.82359987D	02
0.44771444D	03	-0.47073541D	00	-0.83832538D	00	-0.36353125D	00	0.37060918D	02	0.49103277D	00
0.23297837D	03	-0.72666491D	02	0.72450000D	04	0.99000000D	02	0.68000000D	02	0.99900000D	03
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0



```

IEF285I  SYS71158.T15455+.RV000.ZBRKS005.LDDMOD  PASSED
IEF285I  VOL SER NOS= G15CR4.
IEF285I  SYS71158.T15455+.RV000.ZBRKS005.S0000964  SYSIN
IEF285I  VOL SER NOS= G15CR3.
IEF285I  SYS71158.T15455+.RV000.ZBRKS005.S0000964  DELETED
IEF285I  VOL SER NOS= G15CR3.
IEF285I  SYS71158.T15455+.SV000.ZBRKS005.R0000960  SYSOUT
IEF285I  VOL SER NOS= G15CR4.
IEF285I  SYS71158.T15455+.SV000.ZBRKS005.R0000961  DELETED
IEF285I  VOL SER NOS= G15CR4.
IEF285I  SYS71158.T15455+.SV000.ZBRKS005.R0000962  DELETED
IEF285I  VOL SER NOS= G15CR4.
IEF285I  INJ3A  KEPT
IEF285I  VOL SER NOS= 44J5C .
IEF285I  SYS71158.T15455+.RV000.ZBRKS005.R0000963  DELETED
IEF285I  VOL SER NOS= G15CR4.
IEF285I  URJOUT  KEPT
IEF285I  VOL SER NOS= 4920H .
IEF280E-K 000.4405C.ZBRKS005.G0
-----JOB NBR- 058 STEP NBR- 02 ZBRKS005 G0 PGM=PGM=*.DD CARDS=00001 INITIATION TIME=01.38.00.61 DATE=06-08-71
-----CPU=000.1 I/O=000.1 CORE=000.1 CHARGE=000.03 STEP=02.G0 TERMINATION TIME=01.39.38.23 DATE=06-08-71
-----I/O TIME BY DEVICE. DISK=*****.73,DRUM=*****.00,TAPE=*****.16,CELL=*****.00,OTHR=*****.00
STEP REGION SIZE=0100K MAXIMUM REGION SIZE USED=0096K PERCENT OF REGION USED=96
IEF285I  SYS71158.T15455+.RV000.ZBRKS005.LDDMOD  DELETED
IEF285I  VOL SER NOS= G15CR4.

----- CPU=000.1 I/O=000.1 CORE=000.1 CHARGE=000.09 JOB NBR=058 ZBRKS005 360/95 SYSTEM=MVT-19.6 01-16-71 G1
----- I/O TIME BY DEVICE. DISK=*****.10,DRUM=*****.00,TAPE=*****.24,CELL=*****.00,OTHR=*****.00

```

## APPENDIX B

### S/360 TELOR3 SOURCE PROGRAM CROSS REFERENCE CHARTS

This appendix presents three types of cross reference charts pertaining to the S/360 TELOR3 Source Program. The chart types and corresponding figure numbers are listed below:

1. A chart displaying subroutine COMMON block usage:  
Figure B-1
2. Charts displaying input/output units vs internal statement numbers (ISN) for each subroutine:  
Figures B-2 through B-7
3. Charts displaying calls to subroutines vs ISN numbers for each subroutine:  
Figures B-8 through B-13

SUBROUTINE COMMON BLOCK	MAIN	ASCEND	SELECT	SUNLGT	CHKREC	RWTAP4
COMMON (UNLABELED)	X	X	X		X	

Figure B-1. Subroutine COMMON Block Usage Cross Reference Chart



ISN INPUT/OUTPUT	12	17	19	42	46	48	50	53	56	80	81	82	90	99	102	104	106	108
READ DATA CARD	X																	
WRITE ON SYSTEM PRINTER		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Figure B-2. Cross Reference Chart of Input/Output Units VS ISN Numbers for the MAIN Routine

ISN INPUT/OUTPUT																	
	NO INPUT/OUTPUT ACTIVITY FOR THIS SUBROUTINE																

Figure B-3. Cross Reference Chart of Input/Output Units VS ISN Numbers for Subroutine ASCEND

ISN INPUT/OUTPUT	8	22	13	33	35	44	60	61	63	67	69	76	77	79	89	109	110	111	123	124	125	139	142	148	155	172	174	175	
READ DATA CARD		X																											
READ FROM SCRATCH DISK					X				X	X	X			X				X			X	X			X	X			
WRITE ON SYSTEM PRINTER				X		X									X	X											X	X	X
WRITE ON SCRATCH DISK	X																												
BACKSPACE SCRATCH DISK							X	X				X	X			X	X		X	X									
REWIND SCRATCH DISK			X																					X					

Figure B-4. Cross Reference Chart of Input/Output Units VS ISN Numbers  
for Subroutine SELECT

ISN INPUT/OUTPUT	10	12	52	55	59	61	62
WRITE ON SYSTEM PRINTER	X	X	X	X	X	X	X

Figure B-5. Cross Reference Chart of Input/Output Units VS ISN Numbers for Subroutine SUNLGT

ISN	10	13	14	15	22	26	30	34	38	42	44	46	48	51	53	54	55	56	61	62	67	70	72	75	83
INPUT/OUTPUT																									
READ FROM SCRATCH DISK				X														X		X					
WRITE ON SYSTEM PRINTER					X	X	X	X	X	X	X	X	X	X							X	X	X	X	X
WRITE ON SCRATCH DISK	X																								
WRITE END-OF-FILE ON SCRATCH DISK		X																							
BACKSPACE SCRATCH DISK																X	X	X							
REWIND SCRATCH DISK			X																	X					

Figure B-6. Cross Reference Chart of Input/Output Units VS ISN Numbers for Subroutine CHKREC

INPUT/OUTPUT	ISN						
	10	15	21	24	26	27	28
READ <sup>1</sup> FROM INPUT ORB3A TAPE	X						
WRITE <sup>2</sup> ON OUTPUT ORB3A TAPE		X	X	X	X		
WRITE <sup>2</sup> END-OF-FILE ON OUTPUT ORB3A TAPE						X	
REWIND OUTPUT ORB3A TAPE							X

<sup>1</sup>THE SYSTEM UTILITY ROUTINE DBFOR ACTUALLY DOES THE READING.

<sup>2</sup>THE SYSTEM UTILITY ROUTINE DATCON (MODIFIED FOR TELOR3 PROGRAM PURPOSES TO OMIT THE COMPLEMENTING OF NEGATIVE NUMBERS) ACTUALLY DOES THE WRITING.

Figure B-7. Cross Reference Chart of Input/Output Units VS ISN Numbers for Subroutine RWTAP4

ISN SUBROUTINES CALLED	9	43	51	54	57	60	62	75	86	98
ASCEND									X	
SELECT			X							
SUNLGT				X						
.CHKREC					X					
RWTAP4 (STANDARD ENTRY)		X								
RWTAP4 (ENTRY RTAPE4)	X						X			
RWTAP4 (ENTRY WTAPE4)						X		X		
RWTAP4 (ENTRY WSNEOF)										X

Figure B-8. Cross Reference Chart of Calls to Subroutines VS ISN Numbers for the MAIN Routine

ISN SUBROUTINES CALLED											
	NO SUBROUTINES ARE CALLED BY ASCEND										

Figure B-9. Cross Reference Chart of Calls to Subroutines VS ISN Numbers for Subroutine ASCEND



ISN	7	143	150	171
SUBROUTINES CALLED				
RWTAP4 (ENTRY RTAPE4)	X			
RWTAP4 (ENTRY WTAPE4)		X	X	
RWTAP4 (ENTRY WSNEOF)				X

Figure B-10. Cross Reference Chart of Calls to Subroutines VS ISN Numbers for Subroutine SELECT

ISN	
SUBROUTINES CALLED	13
RWTAP4 (ENTRY RTAPE4)	X

Figure B-11. Cross Reference Chart of Calls to Subroutines VS ISN Numbers for Subroutine SUNLGT

ISN SUBROUTINES CALLED	7	60	63	82
RWTAP4 (ENTRY RTAPE4)	X			
RWTAP4 (ENTRY WTAPE4)		X	- X	
RWTAP4 (ENTRY WSNEOF)				X

Figure B-12. Cross Reference Chart of Calls to Subroutines VS ISN Numbers for Subroutine CHKREC

ISN SUBROUTINES CALLED	6	7	10	11	14	15	20	21	23	24	25	26	27
DBFOR			X										
CNVRT				X									
DATCON	X	X			X	X	X	X	X	X	X	X	X

Figure B-13. Cross Reference Chart of Calls to Subroutines VS ISN Numbers for Subroutine RWTAP4

## APPENDIX C

### S/360 TELOR3 SOURCE PROGRAM COMPILED LISTING

This appendix presents a compiled listing of the S/360 TELOR3 Source Program. For ready reference the page number on which each subroutine begins in the listing appears below:

1. MAIN routine: Page C-4
2. Subroutine ASCEND: Page C-18
3. Subroutine SELECT: Page C-26
4. Subroutine SUNLGT: Page C-40
5. Subroutine CHKREC: Page C-48
6. Subroutine RWTAP4: Page C-58

Figure C-1. Compiled Listing of the S/360 TELOR3 Source Program

```

.....
//ZBRKS000 JEE (G10011311F,T,C00409,001001),660,MSCLEVEL=1
// EXEC FORTRANH
XXDEFAULT-PRGC-NBLK=20
XXSOURCE EXEC PGM=IEKAA00,REGION=300K 00000100
XXSYSLIN DD DSN=6600JMCD,UNIT=DISK,SPACE=(3200,(6NBLK,10),,ROUND), 00000300
IEF653I SUBSTITUTION JCL - CSN=6600JMCD,UNIT=DISK,SPACE=(3200,(20,10),,ROUND),
XX DISP=(MOD,PASS),DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200) 00000400
XXSYSPRINT DD SYSOUT=A,DCB=(RECFM=VBA,LRECL=137,BLKSIZE=7265), 00000500
XX SPACE=(CYL,(2,1)) 00000600
XXSYSPUNCH DD DUMMY,DCB=(RECFM=FB,LRECL=80,BLKSIZE=7280), 00000700
XX SPACE=(TRK,(10,5)) 00000800
XXSYSUT1 DD UNIT=DISK,DCB=(RECFM=FE,LRECL=105,BLKSIZE=3465), 00000900
XX SPACE=(3465,(15,15)) 00001000
XXSYSUT2 DD UNIT=DISK,SPACE=(4096,(2,1)),DCB=BLKSIZE=4096 00001100
//SOURCE,SYSIN CD *
//
IEF236I ALLOC. FOR ZBRKS000 SOURCE
IEF237I 330 ALLCCATED TO SYSLIN
IEF237I 330 ALLEGATED TO SYSPRINT
IEF237I 331 ALLCCATED TO SYSUT1
IEF237I 330 ALLEGATED TO SYSUT2
IEF237I 230 ALLCCATED TO SYSIN

```

```

C-----
C  COMPILER OPTIONS  NAME= MAIN,OPT=00,LINENR=58,SIZE=0000K,
C  SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF
C-----
C  MAIN ROUTINE FOR TELOR3 PROGRAM(TEST,EDIT,AND LIST ORB3A TAPE)
C-----
C  PURPOSE
C-----
C  MAIN SERVES AS THE EXECUTIVE OR SUPERVISORY ROUTINE FOR FOUR OF
C  THE FIVE OPTIONS IN THE S/360 TELOR3 PROGRAM,THE REMAINING
C  OPTION(CHANGE PASS NUMBERS AND REPORT OPTION) IS PERFORMED
C  BY LOGIC CONTAINED WITHIN MAIN.
C-----
C  CALLING SEQUENCE
C-----
C  MAIN IS THE EXECUTIVE ROUTINE FOR THE TELOR3 PROGRAM AND,
C  THEREFORE,HAS NO ASSOCIATED CALLING SEQUENCE.
C-----
C  CCMCN AREA(DESCRIPTION SERVES FOR ALL SUBROUTINES USING COMMON)
C-----
C  INPUT TO MAIN
C-----
C  ISAVE = A SIX-WORD ARRAY FILLED BY SUBROUTINE ASCEND,CONTAINS
C-----
C  SIX OF THE SEVEN VARIABLES NEEDED FOR ONE LINE OF
C-----
C  INFORMATION IN AN ASCENDING NODE REPORT.
C-----
C  ISAVE(1) = PASS NUMBER
C-----
C  ISAVE(2) = PASS NUMBER YEAR-MONTH-DAY
C-----
C  ISAVE(3) = PASS NUMBER DAY OF YEAR
C-----
C  ISAVE(4) = PASS NUMBER HOUR OF DAY
C-----
C  ISAVE(5) = PASS NUMBER MINUTE OF HOUR
C-----
C  ISAVE(6) = PASS NUMBER SECOND OF MINUTE
C-----
C  PERIOD = CALCULATED BY SUBROUTINE ASCEND AND IS THE PERIOD OF
C-----
C  TIME(MINUTES) BETWEEN SUCCESSIVE PASS NUMBERS.THIS IS
C-----
C  THE SEVENTH AND LAST VARIABLE NEEDED FOR ONE LINE OF
C-----
C  INFORMATION IN AN ASCENDING NODE REPORT.
C-----
C  OUTPUT FROM MAIN
C-----
C  READIN = A 256-WORD ARRAY CONTAINING AN ORB3A DATA RECORD,
C-----
C  SENTINEL ITEM RECORD,OR A SENTINEL RECORD.
C-----
C  ISET = FLAG USED BY SUBROUTINE ASCEND TO DETERMINE PROPER
C-----
C  EQUATION FOR CALCULATING PERIOD BETWEEN SUCCESSIVE
C-----
C  PASS NUMBERS.
C-----
C  =0,PERIOD=0.(FOR FIRST PASS NUMBER ONLY)
C-----
C  =1,PERIOD=GENERAL CALCULATION(FOR ALL PASS NUMBERS
C-----
C  AFTER THE FIRST)
C-----
C  TITLE = A 256-WORD ARRAY CONTAINING AN ORB3A TITLE RECORD.
C-----
C  MAJOR VARIABLES (IN ADDITION TO ABOVE)
C-----
C  IERR = ERROR INDICATOR RETURNED TO CALLING PROGRAM
C-----
C  REFLECTING UNUSUAL CONDITIONS ENCOUNTERED IN
C-----
C  READING AN INPUT ORB3A RECORD.
C-----
C  =0,NO UNUSUAL CONDITIONS.
C-----
C  =1,END-OF-FILE.
C-----
C  =4,PERMANENT READ ERROR,DATA RETURNED BUT ITS
C-----
C  VALIDITY IS QUESTIONABLE.
C-----
C  INCRD = FORTRAN LOGICAL UNIT NO. FOR CARD READER(5).
C-----
C  IREAD1 = INPUT ORB3A TAPE SATELLITE DATA START TIME,
C-----
C  HOUR OF DAY.
C-----
C  IREAD2 = INPUT ORB3A TAPE SATELLITE DATA END TIME,
C-----
C  HOUR OF DAY.
C-----
C  IREAD3 = INPUT ORB3A TAPE SATELLITE DATA START TIME,
C-----
C  MINUTE OF HOUR.
C-----
C  IREAD4 = INPUT ORB3A TAPE SATELLITE DATA END TIME,
C-----
C  MINUTE OF HOUR.
C-----
C  IREAD5 = INPUT ORB3A TAPE SATELLITE DATA START TIME,
C-----
C  SECOND OF MINUTE.
C-----
C  IREAD6 = INPUT ORB3A TAPE SATELLITE DATA END TIME,
C-----
C  SECOND OF MINUTE.
C-----

```



~~C IREAD7 = INPUT ORB3A TAPE SATELLITE DATA START TIME,~~  
~~C YEAR-MONTH-DAY.~~  
~~C IREAD8 = INPUT ORB3A TAPE SATELLITE DATA END TIME,~~  
~~C YEAR-MONTH-DAY.~~  
~~C IWGRD = FLAG USED IN WSNEOF (ENTRY POINT TO SUBROUTINE~~  
~~C 'RWTAPA). PROCESSING FOR BRANCHING.~~  
~~C SET BY CALLING ROUTINE.~~  
~~C =1, WSNEOF WRITES ONE SENTINEL ITEM RECORD, TWO~~  
~~C SENTINEL RECORDS, AND AN END OF FILE ON OUTPUT~~  
~~C ORB3A TAPE.~~  
~~C =2, WSNEOF WRITES TWO SENTINEL RECORDS AND AN~~  
~~C END-OF-FILE ON OUTPUT ORB3A TAPE.~~  
~~C JSYCUT = FORTRAN LOGICAL UNIT NO. FOR SYSTEM PRINTER(6).~~  
~~C KASE = OPTION TO BE PERFORMED FOR THIS RUN (READ FROM~~  
~~C OPTION CARD).~~  
~~C =1, ASCENDING NODE REPORT OPTION.~~  
~~C =2, CHANGE PASS NUMBERS AND REPORT OPTION.~~  
~~C =3, SELECT TIME PERIOD OPTION.~~  
~~C =4, SUNLIGHT REPORT OPTION.~~  
~~C =5, CHECK RECORD OPTION.~~  
~~C READIN(1) = USED IN MAIN TO CHECK FOR PRESENCE OF SENTINEL~~  
~~C ITEM RECORD OR SENTINEL RECORD.~~  
~~C EQ 99999999, SENTINEL ITEM RECORD OR SENTINEL~~  
~~C RECORD IS PRESENT.~~  
~~C NE 99999999, NEITHER SENTINEL TYPE RECORD IS~~  
~~C PRESENT.~~  
~~C READIN(234) = FLAG WHICH INDICATES PRESENCE OR ABSENCE OF AN~~  
~~C ASCENDING NODE CROSSING DATA ITEM IN ORB3A RECORD~~  
~~C STORED IN READIN.~~  
~~C EQ 999, NO ASCENDING NODE ITEM IN RECORD.~~  
~~C NE 999, ASCENDING NODE ITEM EXISTS IN RECORD.~~  
~~C READIN(N-20) = DATA ITEM TYPE INDICATOR OF KTH OF ELEVEN~~  
~~C SATELLITE DATA ITEMS IN ORB3A RECORD.~~  
~~C =1, REGULAR SATELLITE DATA ITEM.~~  
~~C =2, ASCENDING NODE CROSSING DATA ITEM.~~  
~~C =3, NORTH POINT DATA ITEM.~~  
~~C =4, DESCENDING NODE DATA ITEM.~~  
~~C =5, SOUTH POINT DATA ITEM.~~  
~~C =6, SUNLIGHT ENTRANCE DATA ITEM.~~  
~~C =7, SUNLIGHT EXIT DATA ITEM.~~  
~~C READIN(N) = PASS NO. (ASCENDING NODE CROSSING NO.) OF KTH OF~~  
~~C ELEVEN SATELLITE DATA ITEMS IN ORB3A RECORD.~~  
~~C TAPEIN = INPUT ORB3A TAPE NO. (READ FROM OPTION CARD).~~  
~~C TITLE(1) = TAPE IDENTIFICATION CODE PRESENT ON INPUT ORB3A~~  
~~C TAPE TITLE RECORD.~~  
~~C =76799361, THIS IS AN ORB3A TAPE.~~  
~~C TITLE(2) = SATELLITE IDENTIFICATION NO. PRESENT ON INPUT~~  
~~C ORB3A TAPE TITLE RECORD.~~  
~~C TITLE(4) = ORB3A TAPE SATELLITE DATA START TIME,~~  
~~C YEAR-MONTH-DAY.~~  
~~C TITLE(6) = ORB3A TAPE SATELLITE DATA START TIME,~~  
~~C SECONDS OF DAY.~~  
~~C TITLE(7) = ORB3A TAPE SATELLITE DATA END TIME,~~  
~~C YEAR-MONTH-DAY.~~  
~~C TITLE(9) = ORB3A TAPE SATELLITE DATA END TIME,~~  
~~C SECONDS OF DAY.~~

~~C VALUE = A NUMBER WHICH IS ONE LESS THAN THE DESIRED VALUE~~  
~~C FOR THE PASS NO. OF THE FIRST ASCENDING NODE~~  
~~C CROSSING DATA ITEM TO BE WRITTEN ON THE OUTPUT~~  
~~C ORB3A TAPE(READ FROM OPTION CARD).~~  
~~C REFERENCE~~  
~~C IBM FEDERAL SYSTEMS DIVISION, GAITHERSBURG, MARYLAND, \*\*ORBITAL~~  
~~C DETERMINATION UTILITY PROGRAMS, \*\*CONTRACT NAS 5-10022, MARCH 1970~~  
~~C (TELOR3 PROGRAM SECTION)~~  
~~C METHOD~~  
~~C MAIN PERFORMS THE FOLLOWING STEPS~~  
~~C~~  
~~C 1. READS TITLE RECORD OF TELOR3 INPUT TAPE AND DETERMINES~~  
~~C WHETHER THE INPUT IS A BINARY ORB3A TAPE (IF TITLE(1).NE.~~  
~~C 76799361., AN ERROR MESSAGE IS PRINTED AND EXECUTION IS~~  
~~C TERMINATED).~~  
~~C 2. READS OPTION CARD SPECIFYING INPUT ORB3A TAPE NO. AND ONE OF~~  
~~C FIVE POSSIBLE TELOR3 OPTIONS TO BE PERFORMED.~~  
~~C 3. CONVERTS INPUT ORB3A TAPE START AND END TIMES IN SECONDS OF~~  
~~C DAY (CONTAINED IN TITLE RECORD) TO START AND END TIMES IN~~  
~~C HOURS, MINUTES, AND SECONDS.~~  
~~C 4. PRINTS OUT TITLE PAGE DISPLAYING~~  
~~C A. THE PROGRAM TITLE (TELOR3)~~  
~~C B. OPTION SELECTED~~  
~~C C. SATELLITE ID~~  
~~C D. INPUT ORB3A TAPE NO.~~  
~~C E. INPUT ORB3A START AND END TIMES (HOURS, MINUTES, SECONDS)~~  
~~C~~  
~~C THE FOLLOWING DESCRIBES HOW MAIN CONTROLS THE TELOR3 PROGRAM~~  
~~C FLOW FOR EACH SPECIFIC OPTION CHOSEN.~~  
~~C~~  
~~C IF THE SUNLIGHT REPORT OPTION, THE SELECT TIME PERIOD OPTION, OR~~  
~~C THE CHECK RECORD OPTION IS SELECTED FOR A PARTICULAR JOB~~  
~~C SUBMITTAL, MAIN CALLS THE APPROPRIATE SUBROUTINE, THE OPTION IS~~  
~~C EXECUTED, CONTROL IS RETURNED TO MAIN, AND THE PROGRAM COMES TO~~  
~~C A STOP.~~  
~~C~~  
~~C IF THE ASCENDING NODE REPORT OPTION IS SELECTED, MAIN PRINTS OUT~~  
~~C COLUMN HEADINGS FOR THIS REPORT OPTION AND ENTERS A LOOP WHICH~~  
~~C PERFORMS THE FOLLOWING STEPS~~  
~~C~~  
~~C 1. READS AN INPUT RECORD INTO THE READIN ARRAY.~~  
~~C 2. CHECKS RECORD TO SEE IF IT IS A DATA OR A SENTINEL TYPE~~  
~~C RECORD.~~  
~~C 3. CHECKS A DATA RECORD FOR PRESENCE OF AN ASCENDING NODE~~  
~~C CROSSING DATA ITEM.~~  
~~C 4. IF AN ASCENDING NODE DATA ITEM IS PRESENT (READIN(234).NE.~~  
~~C 999.), SUBROUTINE ASCEND IS CALLED, CONTROL RETURNS TO MAIN, AN~~  
~~C ASCENDING NODE LINE OF INFORMATION JUST PREPARED BY ASCEND~~  
~~C IS PRINTED, AND MAIN RETURNS TO THE BEGINNING OF THE LOOP.~~  
~~C 5. IF AN ASCENDING NODE DATA ITEM IS NOT PRESENT IN THE DATA~~  
~~C RECORD (READIN(234).EQ.999.), MAIN RETURNS TO BEGINNING OF~~  
~~C THE LOOP.~~  
~~C 6. WHEN A SENTINEL RECORD OR A SENTINEL ITEM RECORD IS FOUND~~  
~~C (READIN(1).EQ.99999999.), A MESSAGE IS PRINTED STATING A~~  
~~C NORMAL TERMINATION OF THE ASCENDING NODE REPORT OPTION~~  
~~C HAS OCCURRED.~~

C IF THE CHANGE PASS NUMBERS AND REPORT OPTION (PERFORMED BY LOGIC  
 C CONTAINED MOSTLY WITHIN MAIN) IS SELECTED, MAIN CREATES AN OUTPUT  
 C ORB3A TAPE WHICH IS A DUPLICATE OF THE TELOR3 INPUT ORB3A TAPE  
 C WITH THE EXCEPTION THAT THE OUTPUT TAPE CONTAINS ALTERED PASS  
 C NUMBERS (ALTERED ASCENDING NODE CROSSING NUMBERS). FURTHERMORE, THE  
 C PASS NO. OPTION ALSO PRODUCES AN ASCENDING NODE REPORT BASED ON  
 C THE OUTPUT ORB3A TAPE. THE FOLLOWING STEPS ARE PERFORMED IN  
 C EXECUTING THE CHANGE PASS NUMBERS AND REPORT OPTION  
 C  
 C 1. COLUMN HEADINGS FOR THE ASCENDING NODE REPORT BASED ON THE  
 C OUTPUT ORB3A TAPE ARE PRINTED OUT BY MAIN.  
 C 2. THE TITLE ARRAY (CONTAINS INPUT ORB3A TITLE RECORD) IS  
 C WRITTEN OUT BY MAIN AS THE TITLE RECORD ON THE OUTPUT ORB3A  
 C TAPE.  
 C 3. MAIN ENTERS A LOOP WHICH PERFORMS THE FOLLOWING  
 C A. READS AN INPUT ORB3A RECORD INTO READIN ARRAY.  
 C B. CHECKS RECORD (READIN) TO SEE IF IT IS A DATA OR A  
 C SENTINEL TYPE RECORD.  
 C C. IF IT IS A DATA RECORD, THE PASS NO. OF EACH SATELLITE  
 C DATA ITEM IN THE RECORD (READIN(N), N=21, 231, 21) IS  
 C CHANGED AND READIN IS WRITTEN ON THE OUTPUT ORB3A TAPE.  
 C D. IF THE RECORD JUST WRITTEN OUT CONTAINS AN ASCENDING  
 C NODE CROSSING DATA ITEM (READIN(234), NE, 999.), SUBROUTINE  
 C ASCEND IS CALLED, CONTROL RETURNS TO MAIN, AN ASCENDING  
 C NODE LINE OF INFORMATION JUST PREPARED BY ASCEND IS  
 C PRINTED, AND MAIN RETURNS TO THE BEGINNING OF THE LOOP.  
 C E. IF THE RECORD JUST WRITTEN OUT DOES NOT CONTAIN AN  
 C ASCENDING NODE CROSSING DATA ITEM (READIN(234), EQ, 999.),  
 C MAIN RETURNS TO THE BEGINNING OF THE LOOP.  
 C 4. THE PASS NUMBERS IN 3C ABOVE ARE CHANGED IN THE FOLLOWING  
 C WAY. VALUE (READ FROM OPTION CARD) REPLACES THE PASS NUMBERS  
 C OF ALL SATELLITE DATA ITEMS PRESENTLY AND HENCEFORTH IN THE  
 C READIN ARRAY UNTIL AN ASCENDING NODE CROSSING DATA ITEM IS  
 C ENCOUNTERED. WHEN ENCOUNTERED VALUE IS INCREMENTED BY ONE AND  
 C THE RESULT REPLACES THE PASS NUMBER OF THIS ASCENDING NODE  
 C CROSSING DATA ITEM AND THE PASS NUMBERS OF ALL SUBSEQUENT  
 C SATELLITE DATA ITEMS PRESENTLY AND HENCEFORTH IN READIN. WHEN  
 C ANOTHER ASCENDING NODE ITEM IS FOUND, VALUE IS INCREMENTED BY  
 C ONE AND THE ABOVE PROCEDURE IS REPEATED.

C REQUIRED SUBPROGRAMS  
 C SUBROUTINE SUBPROGRAMS  
 C ASCEND, SUNLGT, SELECT, CHKREC, RWTAP4 (ALSO ENTRY POINTS RTAPE4,  
 C WTAPE4, WSNECF).  
 C FUNCTION SUBPROGRAMS  
 C THE FORTRAN BASIC SUPPLIED MATHEMATICAL FUNCTION, FLOAT  
 C LANGUAGE AND SYSTEM  
 C MAIN HAS BEEN COMPILED UNDER FORTRAN IV, LEVEL H, OPTIMIZATION  
 C LEVEL OF ZERO ON THE IBM 360/95 USING RELEASE 19.  
 C PROGRAMMER  
 C ROBERT K. SCHLESSINGER  
 C COMPUTER SCIENCES CORPORATION  
 C SILVER SPRING, MARYLAND  
 C PREPARED FOR  
 C GODDARD SPACE FLIGHT CENTER

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C NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
C GREENBELT, MARYLAND
C CONTRACT NUMBER AND COMPLETION DATE
C NAS 5-11790, TASK 72, SUBTASK H
C COMPLETED ON 7, MAY, 1971
C
C *** START PROGRAM *****
C
ISN 0002 IMPLICIT REAL*8 (A-I, G-U, W-Z)
ISN 0003 CCMCN TITLE(256), READIN(256) , PERIOD , ISAVE(6) ,
C I ISET
ISN 0004 DATA XCRB3A , XNINES / 76799361.D0, 99999999.D0
ISN 0005 DATA INCRD , JSYOUT / 5, 6 /
C TC FACILITATE THE USE OF DEBUGGING TOOLS, ALL *GC TO* AND *CALL*
C STATEMENTS WHICH WERE NOT REFERENCED INITIALLY HAVE BEEN ASSIGNED
C STATEMENT LABELS FROM 700-899 INCLUSIVE.
C
ISN 0006 ISET=0
ISN 0007 IND=1
ISN 0008 IWORD=2
C READ INPUT TAPE TITLE RECORD.
ISN 0009 700 CALL RTAPE4(TITLE, IERR)
C IF INPUT TAPE IS NOT AN ORB3A TAPE, PRINT APPROPRIATE ERROR MESSAGE
C (GO TO 11) AND STOP PROGRAM.
ISN 0010 702 IF(TITLE(1).NE.XCRB3A) GO TO 11
C READ S/360 TELOR3 PROGRAM OPTION CARD.
ISN 0012 READ(INCRD, 1000) KASE, VALUE, TAPEIN
C IF THE OPTION SELECTOR(KASE) IS NOT BETWEEN ONE AND FIVE
C INCLUSIVE, PRINT APPROPRIATE ERROR MESSAGE AND STOP PROGRAM.
ISN 0013 704 IF(KASE.LT.1 .OR. KASE.GT. 5) GO TO 8
C IF THE CHANGE PASS NUMBERS AND REPORT OPTION HAS BEEN CHOSEN FOR
C THIS RUN AND THE INPUT PASS NO. IS LESS THAN ONE, PRINT APPROPRIATE
C ERROR MESSAGE AND STOP PROGRAM.
ISN 0015 706 IF(KASE.EQ.2 .AND. VALUE.LT.1.) GO TO 9
C START TITLE PAGE FOR S/360 TELOR3 PROGRAM.
ISN 0017 WRITE(JSYOUT, 2000)
ISN 0018 ISATT=TITLE(2)
ISN 0019 WRITE(JSYOUT, 2010) TAPEIN, ISATT
C CONVERT INPUT ORB3A TAPE SATELLITE DATA START AND END TIMES FROM
C SECONDS OF DAY (CONTAINED IN TITLE RECORD) TO HOURS, MINUTES,
C AND SECONDS.
C
C CONVERT START TIME (SEC) TO HOURS AND FRACTION OF HOURS.
ISN 0020 READ1=TITLE(6)/3600.
C CONVERT END TIME (SEC) TO HOURS AND FRACTION OF HOURS.
ISN 0021 READ2=TITLE(9)/3600.
C *** TRUNCATE START TIME TO HOUR OF DAY ***
ISN 0022 IREAD1=READ1
C *** TRUNCATE END TIME TO HOUR OF DAY ***
ISN 0023 IREAD2=READ2
C CONVERT START HOUR OF DAY TO REAL FORMAT WITHOUT ROUND OFF.
ISN 0024 READ3=FLOAT(IREAD1)
C CONVERT END HOUR OF DAY TO REAL FORMAT WITHOUT ROUND OFF.
ISN 0025 READ4=FLOAT(IREAD2)
C FIND START TIME FRACTION OF HOURS.
ISN 0026 READ1=READ1-READ3

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----- C ----- FINE-END-TIME-FRACTION-OF-HOURS.
ISN 0027      READ2=READ2-READ4
----- C ----- COMPUTE-START-TIME-MINUTES-AND-FRACTION-OF-MINUTES.
ISN 0028      READ1=READ1*60.
----- C ----- COMPUTE-END-TIME-MINUTES-AND-FRACTION-OF-MINUTES.
ISN 0029      READ2=READ2*60.
----- C ----- ***-TRUNCATE-START-TIME-TO-MINUTE-OF-HOUR-***
ISN 0030      IREAD3=READ1
----- C ----- ***-TRUNCATE-END-TIME-TO-MINUTE-OF-HOUR-***
ISN 0031      IREAD4=READ2
----- C ----- CONVERT-START-MINUTE-OF-HOUR-TO-REAL-FORMAT-WITHOUT-ROUND-OFF.
ISN 0032      READ3=FLOAT(IREAD3)
----- C ----- CONVERT-END-MINUTE-OF-HOUR-TO-REAL-FORMAT-WITHOUT-ROUND-OFF.
ISN 0033      READ4=FLOAT(IREAD4)
----- C ----- FIND-START-TIME-FRACTION-OF-MINUTES.
ISN 0034      READ1=READ1-READ3.
----- C ----- FIND-END-TIME-FRACTION-OF-MINUTES.
ISN 0035      READ2=READ2-READ4
----- C ----- COMPUTE-REMAINDER-OF-START-TIME-SECONDS-AND-FRACTION-OF-SECONDS.
ISN 0036      READ1=READ1*60.
----- C ----- COMPUTE-REMAINDER-OF-END-TIME-SECONDS-AND-FRACTION-OF-SECONDS.
ISN 0037      READ2=READ2*60.
----- C ----- ***-TRUNCATE-START-TIME-TO-SECOND-OF-MINUTE-***
ISN 0038      IREAD5=READ1
----- C ----- ***-TRUNCATE-END-TIME-TO-SECOND-OF-MINUTE-***
ISN 0039      IREAD6=READ2
----- C ----- ***-CONVERT-START-TIME-YEAR-MONTH-DAY-FROM-REAL-TO-INTEGGER-FORMAT.
ISN 0040      IREAD7=TITLE(4)
----- C ----- ***-CONVERT-END-TIME-YEAR-MONTH-DAY-FROM-REAL-TO-INTEGGER-FORMAT.
ISN 0041      IREAD8=TITLE(7)
----- C -----
----- C ----- PRINT-ON-TITLE-PAGE-INPUT-ORB3A-TAPE-SATELLITE-DATA-START-AND-END
----- C ----- TIMES-IN-HOURS,MINUTES,AND-SECONDS.
ISN 0042      WRITE(JSYOUT,2020) IREAD1,IREAD1,IREAD3,IREAD5,IREAD8,IREAD2,
----- C ----- IREAD4,IREAD6
----- C ----- CALL-RWTAP4-TO-INITIALIZE-PROGRAM-TO-GENERATE-AN-ORB3A-TAPE-IF-ANY
----- C ----- ONE-OF-THE-THREE-OUTPUT-TAPE-OPTIONS-HAS-BEEN-CHOSEN-FOR-THIS-RUN.
ISN 0043      708 IF(KASE.EQ.2 .OR. KASE.EQ.3 .OR. KASE.EQ.5) CALL RWTAP4
ISN 0045      710 GC TC (21,22,23,24,25),KASE
----- C ----- KASE=1(ASCENDING-NODE-REPORT-OPTION)
ISN 0046      21 WRITE(JSYOUT,2030)
ISN 0047      720 GC TC 304
----- C ----- KASE=2(CHANGE-PASS-NUMBERS-AND-REPORT-OPTION)
ISN 0048      22 WRITE(JSYOUT,2040)
ISN 0049      730 GC TC 304
----- C ----- KASE=3(SELECT-TIME-PERIOD-OPTION)
ISN 0050      23 WRITE(JSYOUT,2050)
ISN 0051      740 CALL SELECT
ISN 0052      750 GC TC 999
----- C ----- KASE=4(SUNLIGHT-REPORT-OPTION)
ISN 0053      24 WRITE(JSYOUT,2060)
ISN 0054      760 CALL SUNLGT
ISN 0055      770 GC TC 999
----- C ----- KASE=5(CHECK-RECORD-OPTION)
ISN 0056      25 WRITE(JSYOUT,2070)
ISN 0057      780 CALL CHKREC

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ISN 0058 790 GO TC 999
ISN 0059 14 IND=2
C IF CHANGE PASS NUMBERS AND REPORT OPTION HAS BEEN CHOSEN, WRITE THE
C TITLE ARRAY AS THE TITLE RECORD ON THE OUTPUT ORB3A TAPE.
ISN 0060 752 IF (KASE.EQ.2) CALL WTAPE4(TITLE)
C READ AN INPUT ORB3A DATA OR SENTINEL TYPE RECORD INTO READIN.
ISN 0062 3 CALL RTAPE4(READIN, IERR)
C IF RECORD IN READIN IS A SENTINEL TYPE, ALL INPUT ORB3A DATA
C RECORDS HAVE BEEN PROCESSED, EXIT READ LOOP (GO TC 10).
ISN 0063 794 IF (READIN(1).EQ.XNINES) GO TC 10
ISN 0065 796 IF (KASE.EQ.2) GO TO 90
C IF USING ASCENDING NODE REPORT OPTION AND READIN DOES NOT CONTAIN
C AN ASCENDING NODE CROSSING DATA ITEM, READ ANOTHER INPUT RECORD
C (GO TC 3).
ISN 0067 798 IF (READIN(234).EQ.999.D0) GO TO 3
C IF USING ASCENDING NODE REPORT OPTION AND READIN CONTAINS AN
C ASCENDING NODE CROSSING DATA ITEM, CALL SUBROUTINE ASCEND
C (GO TC 400).
ISN 0069 800 GO TO 400
C IF HERE, CHANGE PASS NUMBERS AND REPORT OPTION HAS BEEN CHOSEN.
C
C CHANGE PASS NUMBERS OF RECORD IN READIN WITH FOLLOWING DO LOOP.
ISN 0070 90 DO 100 N=21, 231, 21
ISN 0071 IF (READIN(N).EQ.2.D0) VALUE=VALUE+1.
ISN 0073 READIN(N)=VALUE
ISN 0074 100 CCNTINUE
C WRITE ON OUTPUT ORB3A THE READIN ARRAY CONTAINING CHANGED PASS
C NUMBERS.
ISN 0075 810 CALL WTAPE4(READIN)
C IF THE RECORD JUST WRITTEN ON OUTPUT ORB3A CONTAINS AN ASCENDING
C NODE CROSSING DATA ITEM, CALL SUBROUTINE ASCEND (GO TO 400).
ISN 0076 812 IF (READIN(234).NE.999.D0) GO TO 400
C GO TO BEGINNING OF READ LOOP AND READ ANOTHER INPUT RECORD
C INTO READIN.
ISN 0078 820 GO TO 3
C PRINT COLUMN HEADINGS FOR ASCENDING NODE REPORT (REQUIRED
C FOR EITHER ASCENDING NODE OPTION OR CHANGE PASS NUMBERS AND
C REPORT OPTION).
ISN 0079 304 ICOUNT=4
ISN 0080 WRITE (JSYOUT, 2080)
ISN 0081 WRITE (JSYOUT, 2090)
ISN 0082 WRITE (JSYOUT, 2100)
C IF THIS IS NOT THE FIRST TIME ASCENDING NODE REPORT COLUMN
C HEADINGS HAVE BEEN PRINTED, PRINT ASCENDING NODE LINE OF
C INFORMATION JUST PREPARED BY SUBROUTINE ASCEND (GO TO 501).
ISN 0083 822 IF (IND.NE.1) GO TO 501
C GO TO BEGINNING OF READ LOOP FOR ASCENDING NODE REPORT OPTION OR
C PASS NO. OPTION.
ISN 0085 830 GO TO 14
C CALL SUBROUTINE ASCEND TO PREPARE AN ASCENDING NODE LINE OF
C INFORMATION.
ISN 0086 400 CALL ASCEND
ISN 0087 ICOUNT=ICOUNT+1
C IF LINE COUNTER .GT. 48 PRINT ASCENDING NODE COLUMN HEADINGS ON A
C NEW PAGE (GO TO 304).
ISN 0088 832 IF (ICOUNT.GT.48) GO TC 304

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C PRINT OUT ASCENDING NODE LINE OF INFORMATION PREPARED BY ASCEND.
ISN 0090 501 WRITE(JSYOUT,2110) ISAVE(1),ISAVE(2),ISAVE(3),ISAVE(4),ISAVE(5),
1 ISAVE(6),PERIOD
C GO TO BEGINNING OF READ LOOP AND READ ANOTHER INPUT RECORD.
ISN 0091 840 GO TO 3
ISN 0092 10 CCNTINUE
C IF ASCENDING NODE REPORT OPTION,PRINT NORMAL TERMINATION MESSAGE
C (GO TO 200).
ISN 0093 842 IF(KASE.EQ.1) GO TO 200
C IF HERE,USING PASS NO. OPTION.
C CREATE SENTINEL RECORD.
ISN 0095 TITLE(1)=XNINES
C IF READIN CONTAINS A SENTINEL ITEM RECORD,SET IWORD=1.
ISN 0096 IF(READIN(2).EQ.XNINES) IWORD=1
C CALL WSNECF TO WRITE SENTINEL TYPE RECORDS AND AN END OF FILE(EOF)
C ON OUTPUT ORB3A TAPE.
C IF IWORD=2,WSNECF WRITES 2 SENTINEL RECORDS AND AN EOF.
C IF IWORD=1,WSNECF WRITES 1 SENTINEL ITEM RECORD,2 SENTINEL
C RECORDS,AND AN EOF.
ISN 0098 850 CALL WSNECF(READIN,TITLE,IWORD)
ISN 0099 WRITE(JSYOUT,2130)
ISN 0100 860 GO TO 999
ISN 0101 200 CCNTINUE
ISN 0102 WRITE(JSYOUT,2120)
ISN 0103 870 GO TO 999
ISN 0104 8 WRITE(JSYOUT,2150)
ISN 0105 880 GO TO 999
ISN 0106 9 WRITE(JSYOUT,2160)
ISN 0107 890 GO TO 999
ISN 0108 11 WRITE(JSYOUT,2140)
ISN 0109 1000 FORMAT(I1,8X,F6.1,4X,A6)
ISN 0110 2000 FORMAT(1H1,////////////////////)
ISN 0111 2010 FORMAT(1H,20X,51H5/360 TELCR3 PROGRAM(TEST,EDIT,AND LIST ORB3A TA
1 PE)/1H0,20X,24HINPUT ORB3A TAPE NO. IS ,A6,2X,44HSATELLITE ID GN I
2 INPUT ORB3A TITLE RECORD IS ,I7)
ISN 0112 2020 FORMAT(1H0,60X, 4HDATE,3X,2HHR,2X,3HMIN,2X,3HSEC/
1 1H,20X,37HINPUT ORB3A SATELLITE DATA START TIME,2X,I6,2X,I2,2X,
2 I2,3X,I2/
3 1H,20X,35HINPUT ORB3A SATELLITE DATA END TIME,4X,I6,2X,I2,2X,I2,
4 3X,I2)
ISN 0113 2030 FORMAT(1H0,20X, 48HASCENDING NODE REPORT OPTION CHOSEN FOR THIS RU
1 N)
ISN 0114 2040 FORMAT(1H0,20X, 57HCHANGE PASS NUMBERS AND REPORT OPTION CHOSEN FO
1 R THIS RUN)
ISN 0115 2050 FORMAT(1H0,20X, 45HSELECT TIME PERIOD OPTION CHOSEN FOR THIS RUN)
ISN 0116 2060 FORMAT(1H0,20X, 42HSUNLIGHT REPORT OPTION CHOSEN FOR THIS RUN)
ISN 0117 2070 FORMAT(1H0,20X, 39HCHECK REGRD OPTION CHOSEN FOR THIS RUN)
ISN 0118 2080 FORMAT(1H1,//)
ISN 0119 2090 FORMAT(1H,19X,8HPASS NO.,26X,14HASCENDING NODE,26X,6HPERIOD)
ISN 0120 2100 FORMAT(1H,46X,5HDATE ,1X,9FDAY OF YR,2X,2HHR,1X,3HMIN,1X,3HSEC,
1 20X,7HMINUTES)
ISN 0121 2110 FORMAT(1H,20X,I5,20X,I6,4X,I3,5X,I2,2X,I2,2X,I2,18X,F8.2)
ISN 0122 2120 FORMAT(1H0,19X, 61HNORMAL TERMINATION OF ASCENDING NODE REPORT OPT
1 ICN.)
ISN 0123 2130 FORMAT(1H0,19X, 60HNORMAL TERMINATION OF CHANGE PASS NUMBERS AND R
1 EPORT OPTION.)

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~~ISN 0124 2140 FORMAT(1H0,78H\*\*DATA IDENTIFICATION ON TAPE IS NOT DRB3A\*\* \*\*CHEC  
IK TAPE NO. AND TRY AGAIN\*\*)~~  
~~ISN 0125 2150 FORMAT(1H0,70HOPTION SELECTOR IS NOT BETWEEN 1 AND 5 INCLUSIVE,EXE  
CUTION TERMINATED.)~~  
~~ISN 0126 2160 FORMAT(1H0,112HINPUT PASS NO. CAN NOT BE LESS THAN 1 WHEN USING TH  
IE CHANGE PASS NUMBERS AND REPORT OPTION. EXECUTION TERMINATED.)~~  
~~ISN 0127 599 STOP~~  
ISN 0128 END

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SYMBOL	INTERNAL STATEMENT NUMBERS
N	0070 0071 0072
IND	0007 0059 0063
IERR	0009 0062
ISET	0003 0066
KASE	0012 0013 0013 0015 0043 0043 0043 0045 0060 0065 0093
FLOAT	0024 0025 0032 0033
INCRD	0006 0012
ISATT	0018 0019
ISAVE	0003 0090 0090 0090 0090 0090
INCRD	0009 0056 0058
READ1	0020 0022 0026 0026 0028 0028 0030 0034 0034 0036 0036 0038
READ2	0021 0023 0027 0027 0029 0029 0031 0035 0035 0037 0037 0039
READ3	0024 0024 0032 0034
READ4	0025 0027 0033 0035
TITLF	0003 0005 0010 0018 0020 0021 0040 0041 0060 0095 0098
VALUF	0012 0015 0071 0071 0073
ASCEND	0066
CHKREC	0057
ICCOUNT	0079 0087 0087 0088
IREAD1	0022 0022 0042
IREAD2	0023 0025 0042
IREAD3	0030 0032 0042
IREAD4	0031 0033 0042
IREAD5	0038 0042
IREAD6	0039 0042
IREAD7	0040 0042
IREAD8	0041 0042
JSYOUT	0006 0017 0019 0042 0046 0048 0050 0053 0056 0080 0081 0082 0090 0099 0102 0104 0106 0108
PERICD	0003 0050
READIN	0003 0062 0063 0067 0071 0073 0075 0076 0096 0099
RTAPE4	0009 0062
RWTAPA	0043
SELECT	0051
SUNLGT	0054
TAFEIN	0012 0016
WSNEQF	0098
WTAPE4	0060 0075
XNINES	0004 0062 0095 0096
XCRB3A	0004 0010

~~\*\*\*\*\*FORTRAN CROSS REFERENCE LISTING\*\*\*\*\*~~

<del>LABEL</del>	<del>DEFINED</del>	<del>REFERENCES</del>
<del>3</del>	<del>0062</del>	<del>0067 0C78 0091</del>
<del>8</del>	<del>0104</del>	<del>0013</del>
<del>9</del>	<del>0106</del>	<del>0015</del>
<del>10</del>	<del>0092</del>	<del>0063</del>
<del>11</del>	<del>0108</del>	<del>0010</del>
<del>14</del>	<del>0059</del>	<del>0085</del>
<del>21</del>	<del>0046</del>	<del>0045</del>
<del>22</del>	<del>0048</del>	<del>0045</del>
<del>23</del>	<del>0050</del>	<del>0045</del>
<del>24</del>	<del>0053</del>	<del>0045</del>
<del>25</del>	<del>0056</del>	<del>0045</del>
<del>90</del>	<del>0070</del>	<del>0065</del>
<del>100</del>	<del>0074</del>	<del>0070</del>
<del>200</del>	<del>0101</del>	<del>0053</del>
<del>304</del>	<del>0C79</del>	<del>0047 0C49 0088</del>
<del>400</del>	<del>0086</del>	<del>0069 0C76</del>
<del>501</del>	<del>0090</del>	<del>0023</del>
<del>700</del>	<del>0009</del>	
<del>702</del>	<del>0010</del>	
<del>704</del>	<del>0013</del>	
<del>706</del>	<del>0015</del>	
<del>708</del>	<del>0043</del>	
<del>710</del>	<del>0045</del>	
<del>720</del>	<del>0047</del>	
<del>730</del>	<del>0049</del>	
<del>740</del>	<del>0051</del>	
<del>750</del>	<del>0052</del>	
<del>760</del>	<del>0054</del>	
<del>770</del>	<del>0055</del>	
<del>780</del>	<del>0057</del>	
<del>790</del>	<del>0058</del>	
<del>792</del>	<del>0060</del>	
<del>794</del>	<del>0063</del>	
<del>796</del>	<del>0065</del>	
<del>798</del>	<del>0067</del>	
<del>800</del>	<del>0069</del>	
<del>810</del>	<del>0075</del>	
<del>812</del>	<del>0076</del>	
<del>820</del>	<del>0078</del>	
<del>822</del>	<del>0083</del>	
<del>830</del>	<del>0085</del>	
<del>832</del>	<del>0088</del>	
<del>840</del>	<del>0091</del>	
<del>842</del>	<del>0093</del>	
<del>850</del>	<del>0098</del>	
<del>860</del>	<del>0100</del>	
<del>870</del>	<del>0103</del>	
<del>880</del>	<del>0105</del>	
<del>890</del>	<del>0107</del>	
<del>999</del>	<del>0127</del>	<del>0052 0055 0058 0100 0103 0105 0107</del>
<del>1000</del>	<del>0109</del>	<del>0012</del>
<del>2000</del>	<del>0110</del>	<del>0017</del>
<del>2010</del>	<del>0111</del>	<del>0019</del>
<del>2020</del>	<del>0112</del>	<del>0042</del>

~~\*\*\*\*\*FORTRAN CROSS REFERENCE LISTING\*\*\*\*\*~~

<del>LABEL</del>	<del>DEFINED</del>	<del>REFERENCES</del>
<del>2030</del>	<del>0113</del>	<del>0046</del>
<del>2040</del>	<del>0114</del>	<del>0048</del>
<del>2050</del>	<del>0115</del>	<del>0050</del>
<del>2060</del>	<del>0116</del>	<del>0053</del>
<del>2070</del>	<del>0117</del>	<del>0056</del>
<del>2080</del>	<del>0118</del>	<del>0060</del>
<del>2090</del>	<del>0119</del>	<del>0061</del>
<del>2100</del>	<del>0120</del>	<del>0062</del>
<del>2110</del>	<del>0121</del>	<del>0050</del>
<del>2120</del>	<del>0122</del>	<del>0102</del>
<del>2130</del>	<del>0123</del>	<del>0059</del>
<del>2140</del>	<del>0124</del>	<del>0108</del>
<del>2150</del>	<del>0125</del>	<del>0104</del>
<del>2160</del>	<del>0126</del>	<del>0106</del>

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.				
N	SF	I*4	0005B4	IND	S	I*4	0005B8	IBRR	SFA	I*4	0005BC	ISET	S	C	I*4	001020			
KASE	SF	I*4	0005C0	INCRD	F	I*4	0005C4	ISATT	SF	I*4	0005C8	ISAVE	F	C	I*4	001008			
IWORD	SFA	I*4	0005CC	READ1	SF	R*8	000600	READ2	SF	R*8	000608	RFAD3	SF	R*8	000610				
READ4	SF	R*8	000618	TITLE	SFA	C	R*8	000000	VALUE	SF	R*4	0005D0	ASCEND	SF	XF	R*8	000000		
CHKREG	SF	XF	R*8	0C0000	IRGCM	F	XF	I*4	000000	IGOUNT	SF	I*4	0005D4	IREAD1	SFA	I*4	0005D8		
IREAD2	SFA	I*4	0005DC	IREAD3	SFA	I*4	0005E0	IREAD4	SFA	I*4	0005E4	IREAD5	SF	I*4	0005E8				
IREAD6	SF	I*4	0005EC	IREAD7	SF	I*4	0005F0	IREAD8	SF	I*4	0005F4	JSYOUT	F	I*4	0005F8				
PERIOD	F	C	R*8	0C1000	READIN	SFA	C	R*8	000800	RTAPE4	SF	XF	R*8	000000	RWTAP4	SF	XF	R*8	000000
SELECT	SF	XF	R*8	0C0000	SUNLGT	SF	XF	R*8	000000	TAPEIN	SF	R*8	000620	WSNEOF	SF	XF	R*8	000000	
WTAPE4	SF	XF	R*8	0C0000	XNINES	F	R*8	000628	XDRB3A	R*8	000630								

\*\*\*\*\* COMMON INFORMATION \*\*\*\*\*

NAME OF COMMON BLOCK	SIZE OF BLOCK	HEXADECIMAL BYTES
	001024	

VAR. NAME	TYPE	REL.	ADDR.	VAR. NAME	TYPE	REL.	ADDR.	VAR. NAME	TYPE	REL.	ADDR.	VAR. NAME	TYPE	REL.	ADDR.
TITLE	R*8		000000	READIN	R*8		000800	PERIOD	R*8		001000	ISAVE	I*4		001008
ISET	I*4		001020												

LABEL	ADDR	LABEL	ADDR	LABEL	ADDR	LABEL	ADDR
700	00C73C-NR	702	00074A-NR	704	000798-NR	706	0007A4-
708	00C8D0 NR	710	000806	21	00C820	720	000834 NR
22	00083A	730	000850-NR	23	000856	740	00086C-NR
750	00C878 NR	24	00087E	750	00C894 NR	770	0008A0 NR
25	0008AC	760	0008BC-NR	790	00C8C8-NR	14	0008CE.
792	00C8D6 NR	3	0008F2	79A	00CC00 NR	796	000C12
798	00CC20	800	000C32	90	00CC38	100	000C8A
810	00CC9A	812	00CCAB NR	820	00CC9A	304	00CC0
822	00CD04-NR	830	000D12	400	006D18	832	000D30-NR
501	00CD3E	840	000D90 NR	10	00CD96	842	000D96 NR
850	00CDCE	860	000DE8-NR	200	00CDEE	870	000ED4-NR
8	00CE0A	880	000E20 NR	9	000E26	890	000E3C NR
11	00CE42	999	000E5E-				

~~OPTICNS IN-EFFECT~~ NAME=MAIN,OPT=00,LINECNT=38, SIZE=0000K  
~~\*OPTICNS IN EFFECT\*~~ SOURCE,EBCCIC,NOLIST,NOCHK,LOAD,MAP,NOEDIT,ID,XREF  
~~\*STATISTICS\*~~ SOURCE-STATEMENTS=127, PROGRAM-SIZE=3718  
~~\*STATISTICS\*~~ NO-DIAGNOSTICS-GENERATED  
~~\*\*\*\*\*END-OF-COMPIATION\*\*\*\*\*~~ 105K-BYTES-OF-CORE-NOT-USED

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-----COMPILER OPTIONS-----NAME=MAIN,OPT=00,LINECNT=58,SIZE=0000K,
-----SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF
-----ISN 0002-----SUBROUTINE ASCEND
C      PURPOSE
C      SUBROUTINE ASCEND ISOLATES WHICH SATELLITE DATA ITEM IN AN ORB3A
C      DATA RECORD IS OF THE ASCENDING NODE CROSSING TYPE AND USES DATA
C      FROM THIS ASCENDING ITEM TO PRODUCE AND STORE ONE LINE OF
C      INFORMATION FOR THE BCD OUTPUT OF AN ASCENDING NODE REPORT.
C      CALLING SEQUENCE
C      CALL ASCEND
C      THERE ARE NO ARGUMENTS IN THE CALLING SEQUENCE.
C      INPUT(THROUGH COMMON)
C      ISET = FLAG (INITIALLY SET BY MAIN) USED TO DETERMINE PROPER
C      EQUATION FOR CALCULATING PERIOD BETWEEN SUCCESSIVE
C      PASS NUMBERS (ASCENDING NODE CROSSING DATA ITEMS).
C      =0, PERIOD=0. (FOR FIRST PASS NO. ONLY)
C      =1, PERIOD=GENERAL CALCULATION (FOR ALL PASS NUMBERS
C      AFTER THE FIRST)
C      READIN = A 256 WORD ARRAY (INPUT FROM MAIN) CORRESPONDING TO AN
C      ORB3A DATA RECORD WITH AN ASCENDING NODE CROSSING DATA
C      ITEM.
C      OUTPUT(THROUGH COMMON)
C      ISAVE = A SIX WORD ARRAY (USED BY MAIN) CONTAINING SIX OF THE
C      SEVEN VARIABLES NEEDED FOR ONE LINE OF INFORMATION IN
C      AN ASCENDING NODE REPORT.
C      ISAVE(1) = PASS NUMBER (OF PRESENT ASCENDING NODE
C      CROSSING DATA ITEM)
C      ISAVE(2) = PASS NUMBER YEAR-MONTH-DAY
C      ISAVE(3) = PASS NUMBER DAY OF YEAR
C      ISAVE(4) = PASS NUMBER HOUR OF DAY
C      ISAVE(5) = PASS NUMBER MINUTE OF HOUR
C      ISAVE(6) = PASS NUMBER SECOND OF MINUTE
C      PERIOD = PERIOD OF TIME (MINUTES) BETWEEN SUCCESSIVE PASS NUMBERS
C      (USED BY MAIN). SEVENTH AND LAST VARIABLE NEEDED FOR ONE
C      LINE OF INFORMATION IN AN ASCENDING NODE REPORT.
C      MAJOR VARIABLES (IN ADDITION TO ABOVE)
C      C1 = USED TO SAVE DAY OF YEAR OF PRESENT ASCENDING
C      NODE CROSSING DATA ITEM. BECOMES DAY OF YEAR OF
C      PREVIOUS CROSSING ITEM WHEN CALCULATING PERIOD.
C      C2 = USED TO SAVE SECONDS OF DAY OF PRESENT ASCENDING
C      NODE CROSSING DATA ITEM. BECOMES SECONDS OF DAY OF
C      PREVIOUS CROSSING ITEM WHEN CALCULATING PERIOD.
C      IYEAR = USED TO SAVE YEAR OF PRESENT ASCENDING NODE
C      CROSSING DATA ITEM. BECOMES YEAR OF PREVIOUS
C      CROSSING ITEM WHEN CALCULATING PERIOD.
C      READIN(N=20) = DATA ITEM TYPE INDICATOR OF KTH OF ELEVEN
C      SATELLITE DATA ITEMS IN ORB3A RECORD.
C      =1, REGULAR SATELLITE DATA ITEM.
C      =2, ASCENDING NODE CROSSING DATA ITEM.
C      =3, NORTH POINT DATA ITEM.
C      =4, DESCENDING NODE DATA ITEM.
C      =5, SOUTH POINT DATA ITEM.
C      =6, SUNLIGHT ENTRANCE DATA ITEM.
C      =7, SUNLIGHT EXIT DATA ITEM.
C      READIN(N=19) = YEAR-MONTH-DAY OF PRESENT ASCENDING NODE CROSSING

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C          DATA ITEM.
C      READIN(N-18) = DAY OF YEAR OF PRESENT ASCENDING NCDE CROSSING
C          DATA ITEM.
C      READIN(N-17) = SECONDS OF DAY OF PRESENT ASCENDING NODE CROSSING
C          DATA ITEM.
C      REFERENCE
C      IBM FEDERAL SYSTEMS DIVISION, CAITHERSBURG, MARYLAND, "ORBITAL
C      DETERMINATION UTILITY PROGRAMS," CONTRACT NAS 5-10022, MARCH 1970
C      (TELETYPE PROGRAM SECTION)
C      METKCD
C      SUBROUTINE ASCEND ISOLATES WHICH DATA ITEM IN AN ORB3A DATA
C      RECORD IS OF THE ASCENDING NODE TYPE BY EXAMINING THE TYPE
C      INDICATOR(FIRST WORD) OF EACH OF THE ELEVEN SATELLITE DATA ITEMS
C      IN THE RECORD(READIN(N-20),N=21,231,21). WHEN THE FIRST WORD OF A
C      SATELLITE DATA ITEM CONTAINS A TYPE INDICATOR EQUAL TO 2, THE
C      ASCENDING NODE CROSSING DATA ITEM HAS BEEN FOUND. THE PASS NO.,
C      YEAR-MONTH-DAY, DAY OF YEAR, AND TIME(HRS, MIN, SEC) OF THIS
C      ASCENDING NODE ARE STORED IN ISAVE. THE TIME IN MINUTES BETWEEN
C      THIS ASCENDING NODE AND THE LAST PREVIOUS ASCENDING NODE IS
C      CALCULATED AND STORED IN PERIOD. ISAVE AND PERIOD NOW CONTAIN
C      DATA FOR ONE LINE OF INFORMATION FOR PCC OUTPUT OF THE ASCENDING
C      NCDE REPORT.
C      REQUIRED SUBPROGRAMS
C      SUBROUTINE SUBPROGRAMS
C      NO SUBROUTINES ARE CALLED BY ASCEND.
C      FUNCTION SUBPROGRAMS
C      THE FORTRAN BASIC SUPPLIED MATHEMATICAL FUNCTIONS FLOAT, MOD
C      LANGUAGE AND SYSTEM
C      ASCEND HAS BEEN COMPILED UNDER FORTRAN IV, LEVEL H, OPTIMIZATION
C      LEVEL OF ZERO, ON THE IBM 360/95 USING RELEASE 19.
C      PROGRAMMER
C      ROBERT K. SCHLESSINGER
C      COMPUTER SCIENCES CORPORATION
C      SILVER SPRING, MARYLAND
C      PREPARED FOR
C      GODDARD SPACE FLIGHT CENTER
C      NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
C      GREENBELT, MARYLAND
C      CONTRACT NUMBER AND COMPLETION DATE
C      NAS 5-11790, TASK 72, SUBTASK H
C      COMPLETED ON 7 MAY 1971
C      *** START PROGRAM *****
C
ISN 0003      IMPLICIT REAL*8 (A-H,O-U,W-Z)
ISN 0004      COMMON      TITLE(256), READIN(256)      , PERIOD      , ISAVE(6)      ,
              1          ISET
C      TO FACILITATE THE USE OF DEEUGGING TOOLS, ALL *GO TO* AND *CALL*
C      STATEMENTS WHICH WERE NOT REFERENCED INITIALLY HAVE BEEN ASSIGNED
C      STATEMENT LABELS FROM 700-899 INCLUSIVE.
C      THE *RETURN* STATEMENT (NOT REFERENCED INITIALLY) HAS BEEN ASSIGNED
C      THE LABEL 999 .
C
C      ISOLATE WHICH SATELLITE DATA ITEM IN READIN IS OF THE ASCENDING
C      NODE CROSSING TYPE.
ISN 0005      DC 100 N=21,231,21

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C IF TYRE INDICATOR OF KTH OF ELEVEN DATA ITEMS IN READIN EQUALS 2.,
C THE ASCENDING NODE CROSSING ITEM HAS BEEN FOUND. STORE DATA
C PERTAINING TO THIS ASCENDING ITEM(GO TO 110).
ISN 0006 700 IF(READIN(N-20),EQ.2,C0) GO TO 110
ISN 0008 100 CONTINUE
C STORE PASS NO. OF THIS ASCENDING ITEM.
ISN 0009 110 ISAVE(1)=READIN(N)
C STORE YEAR-MONTH-DAY OF THIS ASCENDING ITEM.
ISN 0010 ISAVE(2)=READIN(N-19)
C STORE DAY OF YEAR OF THIS ASCENDING ITEM.
ISN 0011 ISAVE(3)=READIN(N-16)
C CCNVERT ASCENDING ITEM TIME(SEC OF DAY) TO HOUR OF DAY(INCLUDES
C ANY FRACTION).
ISN 0012 READ1=READIN(N-17)/3600.
C *** TRUNCATE ASCENDING ITEM TIME TO HOUR OF DAY(DROPS FRACTION).
ISN 0013 ISAVE(4)=READ1
C GENVERT ASCENDING ITEM HOUR OF DAY TO REAL FORMAT WITHOUT ROUND
C OFF.
ISN 0014 READ2=FLGAT(ISAVE(4))
C FIND ASCENDING ITEM FRACTIONAL HOUR OF DAY.
ISN 0015 READ1=READ1-READ2
C CCNVERT ASCENDING ITEM FRACTIONAL HOUR OF DAY TO MINUTE OF HOUR.
C (INCLUDES ANY FRACTION).
ISN 0016 READ1=READ1*60.
C *** TRUNCATE ASCENDING ITEM TIME TO MINUTE OF HOUR(DROPS FRACTION)
ISN 0017 ISAVE(5)=READ1
C GENVERT ASCENDING ITEM MINUTE OF HOUR TO REAL FORMAT WITHOUT
C ROUND OFF.
ISN 0018 READ2=FLGAT(ISAVE(5))
C FIND ASCENDING ITEM FRACTIONAL MINUTE OF HOUR.
ISN 0019 READ1=READ1-READ2
C CCNVERT ASCENDING ITEM FRACTIONAL MINUTE OF HOUR TO SECCND OF
C MINUTE(INCLUDES ANY FRACTION).
ISN 0020 READ1=READ1*60.
C *** TRUNCATE ASCENDING ITEM TIME TO SECOND OF MINUTE
C (DRGPS FRACTION).
ISN 0021 ISAVE(6)=READ1
C IF THIS IS FIRST ASCENDING ITEM FOUND ON ORB3A TAPE,SET PERIOD
C TO ZERO(GO TO 199).
ISN 0022 710. IF (ISET,EQ.0) GO TO 199
C STORE DAY OF YEAR OF PRESENT ASCENDING ITEM.
ISN 0024 DATE=READIN(N-18)
C IF END OF YEAR WAS CROSSED BETWEEN PRESENT AND PREVIOUS ASCENDING
C ITEM AND YEAR OF PREVIOUS ASCENDING ITEM WAS A LEAP YEAR,ADD 366
C TO DAY OF YEAR OF PRESENT ASCENDING ITEM(DATE).
ISN 0025 IF(READIN(N-18).LT.C1.AND.MOD(IYEAR,4).EQ.0) DATE=DATE+366.
C IF END OF YEAR WAS CROSSED BETWEEN PRESENT AND PREVIOUS ASCENDING
C ITEM AND YEAR OF PREVIOUS ASCENDING ITEM WAS NOT A LEAP YEAR,
C ADD 365 TO DAY OF YEAR OF PRESENT ASCENDING ITEM(DATE).
ISN 0027 IF(READIN(N-18).LT.C1.AND.MOD(IYEAR,4).NE.0) DATE=DATE+365.
C CALCULATE TIME BETWEEN SUCCESSIVE PASS NUMBERS(ASCENDING ITEMS).
C PERIOD=PRESENT MINUS PREVIOUS ASCENDING ITEM DAY OF YEAR(CONVERT
C RESULT TO SEC) LESS PREVIOUS ASCENDING ITEM SEC OF DAY PLUS
C PRESENT ASCENDING ITEM SEC OF DAY.RESULTING SEC ARE DIVIDED
C BY 60 TO OBTAIN PERIOD IN MINUTES.
ISN 0029 PERIOD=((DATE-C1)*86400.)-C2+READIN(N-17))/60.

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	C	<del>IF HERE, PERIOD SHOULD NOT BE ZEROED (GO TO 200).</del>
ISN 0030	720	GO TO 200
ISN 0031	199	PERIOD=0.
	C	STORE PRESENT ASCENDING ITEM DAY OF YEAR, SECONDS OF DAY, AND YEAR.
	C	BECOME DATA FOR PREVIOUS ASCENDING ITEM WHEN CALCULATING PERIOD.
ISN 0032	200	C1=READIN(N-18)
ISN 0033		C2=READIN(N-17)
ISN 0034		IYEAR=READIN(N-19)/10000.
	C	<del>THIS IS SET TO 1 AFTER FIRST ASCENDING ITEM IS FOUND AND PERIOD</del>
	C	<del>ZERCED. FUTURE PERIODS WILL BE CALCULATED WITH GENERAL EQUATION.</del>
ISN 0035		ISET=1
ISN 0036	999	RETURN
ISN 0037		END

\*\*\*\*\*FORTRAN CROSS-REFERENCE LISTING\*\*\*\*\*

SYMBOL	INTERNAL STATEMENT NUMBERS												
N	0005	0006	0009	0010	0011	0012	0024	0025	0027	0029	0032	0033	0034
C1	0025	0027	0029	0032									
C2	0029	0033											
MOD	0025	0027											
DATE	0024	0025	0025	0027	0027	0029							
ISCT	0004	0025	0032										
FLQAT	0014	0018											
ISAVE	0004	0005	0010	0011	0013	0014	0017	0018	0021				
IYEAR	0025	0027	0034										
READ1	0012	0013	0015	0015	0016	0016	0017	0019	0019	0020	0020	0021	
READ2	0014	0015	0018	0019									
TITLE	0004												
ASCEND	0002												
PERIOD	0004	0025	0031										
READIN	0004	0006	0009	0010	0011	0012	0024	0025	0027	0029	0032	0033	0034

\*\*\*\*\*FORTRAN CROSS REFERENCE LISTING\*\*\*\*\*

LABEL	DEFINED	REFERENCES
100	0008	0005
110	0009	0005
199	0031	0022
200	0032	0030
700	0006	
710	0022	
720	0030	
999	0036	

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.
N SF		I*4	000114	C1 SF		R*8	000120	C2 SF		R*8	000128	DATE SF		R*8	000130
ISET S	C	I*4	001020	ISAVE SFA	C	I*4	001008	IYEAR S A		I*4	000118	READ1 SF		R*8	000138
READ2 SF		H*8	000140	TITLE		C	R*8	N.R.		ASCEND		R*8		R*8	001000
REACIN	F	C	R*8	000800											

\*\*\*\*\* COMMON INFORMATION \*\*\*\*\*

NAME OF COMMON BLOCK		SIZE OF BLOCK	HEXADECIMAL BYTES												
VAR. NAME	TYPE	REL.	ADDR.	VAR. NAME	TYPE	REL.	ADDR.	VAR. NAME	TYPE	REL.	ADDR.	VAR. NAME	TYPE	REL.	ADDR.
TITLE	R*8		N.R.	READIN	R*8		000800	PERIOD	R*8		001000	ISAVE	I*4		001008
ISET	I*4		001020												

LABEL	ADDR	LABEL	ADDR	LABEL	ADDR	LABEL	ADDR
700	0001A4	100	0001BE	110	0001D4	710	000380 NR
720	000448 NR	199	00044E	200	00045A	999	0004BC NR
*OPTIONS IN EFFECT* NAME= MAIN,OPT=00,LINECNT=58,SIZE=0000K,							
*OPTIONS IN EFFECT* SCURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF							
*STATISTICS* SOURCE STATEMENTS = 36,PROGRAM SIZE = 1250							
*STATISTICS* NO DIAGNOSTICS GENERATED							
***** END OF COMPILATION *****						113K BYTES OF CORE NOT USED	

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-----
COMPILER OPTIONS - NAME= MAIN,OPT=00,LINEGT=58,SIZE=0000K,
SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF
-----
ISN 0002      SUBROUTINE SELECT
C      PURPOSE
C      SUBROUTINE SELECT IS USED TO SELECT ANY PERIOD OF DATA PRESENT
C      ON AN INPUT BINARY ORB3A TAPE AND WRITE THIS PERIOD ON AN OUTPUT
C      BINARY ORB3A TAPE TOGETHER WITH A REVISED TITLE RECORD
C      CONTAINING THE START AND END TIMES OF THE SELECTED PERIOD.
C      CALLING SEQUENCE
C      CALL SELECT
C      THERE ARE NO ARGUMENTS IN THE CALLING SEQUENCE.
C      INPUT(THROUGH COMMON)
C      TITLE = A 256-WORD ARRAY CONTAINING AN ORB3A TITLE RECORD.
C      OUTPUT(THROUGH COMMON)
C      NONE.
C      MAJOR VARIABLES(IN ADDITION TO ABOVE)
C      EN      = REQUESTED END YEAR-MONTH-DAY(YRMODY),FLOAT,PT.
C      ESEC    = REQUESTED END SECONDS OF DAY.
C      IDATE   = INDICATES IF REQUESTED START YRMODY HAS BEEN
C              FOUND.
C              =0,NOT FOUND YET.
C              =1,FOUND AT LEAST ONCE.
C      IDISK   = FORTRAN LOGICAL UNIT NO. FOR SCRATCH DISK(14).
C      IEHR    = REQUESTED END HRS AND MIN(READ FROM PERIOD
C              SELECT CARD).
C      IEN     = REQUESTED END YRMODY(READ FROM PERIOD SELECT
C              CARD).
C      IENREC  = LAST ORB3A DATA RECORD ON DISK TO BE COPIED
C              ONTO OUTPUT ORB3A TAPE.
C      IERR    = ERROR INDICATOR REFLECTING UNUSUAL CONDITIONS
C              ENCOUNTERED IN READING AN INPUT ORB3A RECORD.
C              =0,NO UNUSUAL CONDITIONS.
C              =1,END OF FILE.
C              =4,PERMANENT READ ERROR,DATA RETURNED BUT ITS
C              VALIDITY IS QUESTIONABLE.
C      IFILL   = INDICATES IF LAST DATA RECORD ON INPUT ORB3A
C              TAPE HAS 11 VALID SATELLITE DATA ITEMS.
C              =0,RECORD NOT FILLED WITH 11 VALID DATA ITEMS.
C              =11,RECORD FILLED WITH 11 VALID DATA ITEMS.
C      IHR     = REQUESTED START HRS AND MIN(READ FROM PERIOD
C              SELECT CARD).
C      INCRD   = FORTRAN LOGICAL UNIT NO. FOR CARD READER(5).
C      IRECRD  = COUNTS ORB3A DATA RECORDS READ FROM DISK.
C      IST     = REQUESTED START YRMODY(READ FROM PERIOD
C              SELECT CARD).
C      ISTREC  = 1ST ORB3A DATA RECORD ON DISK TO BE COPIED
C              ONTO OUTPUT ORB3A TAPE.
C      IWORD   = FLAG USED IN WSNEOF(AN ENTRY PT. TO SUBROUTINE
C              RWTAPA) FOR BRANCHING.
C              =1,WSNEOF WRITES ONE SENTINEL ITEM RECORD,
C              2 SENTINEL RECORDS,AND AN END-OF-FILE ON
C              OUTPUT ORB3A TAPE.
C              =2,WSNEOF WRITES 2 SENTINEL RECORDS AND AN
C              END-OF-FILE ON OUTPUT ORB3A TAPE.
C      JSYOUT  = FORTRAN LOGICAL UNIT NO. FOR SYSTEM PRINTER(6).
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~~C~~ LDATE ~~=~~ INDICATES IF REQUESTED END YRMODY HAS BEEN  
~~C~~ FOUND.  
~~C~~ ~~=~~ 0, NOT FOUND YET.  
~~C~~ ~~=~~ 1, FOUND AT LEAST ONCE.  
~~C~~ NCEND ~~=~~ INDICATES IF REQUESTED END TIME(YRMOBY AND SEC)  
~~C~~ HAS BEEN FOUND.  
~~C~~ ~~=~~ 0, FOUND.  
~~C~~ ~~=~~ 1, NOT FOUND.  
~~C~~ READIN ~~=~~ A 256 WORD ARRAY CONTAINING AN ORB3A DATA  
~~C~~ RECORD, SENTINEL ITEM RECORD, CR SENTINEL RECORD.  
~~C~~ READIN(2) ~~=~~ YRMODY OF 1ST SATELLITE DATA ITEM IN ORB3A  
~~C~~ DATA RECORD.  
~~C~~ READIN(3) ~~=~~ DAY OF YR OF 1ST SATELLITE DATA ITEM IN ORB3A  
~~C~~ DATA RECORD.  
~~C~~ READIN(4) ~~=~~ SECONDS OF DAY OF 1ST SATELLITE DATA ITEM IN  
~~C~~ ORB3A DATA RECORD.  
~~C~~ READIN(212) ~~=~~ YRMODY OF LAST SATELLITE DATA ITEM IN ORB3A  
~~C~~ DATA RECORD.  
~~C~~ READIN(214) ~~=~~ SECONDS OF DAY OF LAST SATELLITE DATA ITEM IN  
~~C~~ ORB3A DATA RECORD.  
~~C~~ READIN(I) ~~=~~ TYPE INDICATOR OF NTH OF 11 SATELLITE DATA  
~~C~~ ITEMS IN ORB3A DATA RECORD. CHECKED FOR 99999999  
~~C~~ TO SEE IF LAST DATA RECORD ON INPUT ORB3A TAPE  
~~C~~ HAS 11 VALID DATA ITEMS.  
~~C~~ READIN(LSOD) ~~=~~ SECONDS OF DAY OF LAST VALID DATA ITEM IN LAST  
~~C~~ DATA RECORD ON INPUT ORB3A TAPE.  
~~C~~ READIN(LYRMOBY) ~~=~~ YRMODY OF LAST VALID DATA ITEM IN LAST DATA  
~~C~~ RECCRD ON INPUT ORB3A TAPE.  
~~C~~ SSEC ~~=~~ REQUESTED START SECONDS OF DAY.  
~~C~~ ST ~~=~~ REQUESTED START YRMODY, FLOAT. PT.  
~~C~~ TITLE(4) ~~=~~ SATELLITE DATA START TIME YRMODY.  
~~C~~ TITLE(5) ~~=~~ SATELLITE DATA START TIME DAY OF YR.  
~~C~~ TITLE(6) ~~=~~ SATELLITE DATA START TIME SECONDS OF DAY.  
~~C~~ TITLE(7) ~~=~~ SATELLITE DATA END TIME YRMODY.  
~~C~~ TITLE(8) ~~=~~ SATELLITE DATA END TIME DAY OF YR.  
~~C~~ TITLE(9) ~~=~~ SATELLITE DATA END TIME SECONDS OF DAY.  
~~C~~ REFERENCE  
~~C~~ IBM FEDERAL SYSTEMS DIVISION, GAITHERSBURG, MARYLAND, "ORBITAL  
~~C~~ DETERMINATION UTILITY PROGRAMS, " CONTRACT NAS 5-10022, MARCH 1970  
~~C~~ (TELOR3 PROGRAM SECTION)  
~~C~~ METHOD  
~~C~~ BACKSPACING AND/OR REWINDING A 7-TRACK BINARY INPUT ORB3A TAPE  
~~C~~ IS NOT ALLOWED WHEN USING THE SPECIAL PURPOSE FORTRAN LIBRARY  
~~C~~ SUBROUTINE, DBFOR, WHICH IS REQUIRED FOR READING THIS INPUT TAPE  
~~C~~ WITH THE S/360 SERIES OF COMPUTERS (SEE SUBROUTINE RWTAP4). SINCE  
~~C~~ THE CAPABILITY IS DESIRED IN SUBROUTINE SELECT FOR BACKSPACING  
~~C~~ AND/OR REWINDING THE INFORMATION CONTAINED IN THE DATA RECORDS  
~~C~~ ON AN INPUT ORB3A TAPE, SUBROUTINE SELECT COPIES ONTO A SCRATCH  
~~C~~ DISK THE INPUT ORB3A DATA RECCRDS UP THROUGH THE 1ST SENTINEL  
~~C~~ RECORD OR THROUGH THE SENTINEL ITEM RECORD WHICHEVER THE CASE  
~~C~~ MAY BE (THE ORB3A TITLE RECORD HAS BEEN PREVIOUSLY READ INTO THE  
~~C~~ TITLE ARRAY BY MAIN AND TITLE IS AVAILABLE TO SELECT WHEN  
~~C~~ NEEDED). THE DISK IS REWOUND AND THE REQUESTED PERIOD START AND  
~~C~~ END TIMES ARE READ FROM THE SELECT PERIOD INPUT CARD. DATA  
~~C~~ RECORDS ARE READ FROM THE DISK, COUNTED, EXAMINED, AND WHEN THE  
~~C~~ REQUESTED START TIME IS FOUND THE NO. OF THE RECORD CONTAINING

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C THIS TIME IS STORED IN ISTREC. THE TIME OF OCCURRENCE OF THE 1ST
C SATELLITE DATA ITEM ON THIS RECORD IS STORED IN THE SATELLITE
C DATA START TIME POSITIONS IN THE TITLE ARRAY. READING FROM THE
C DISK RESUMES AND, UPON FINDING THE REQUESTED END TIME, THE NO. OF
C THE RECORD IS STORED IN IENREC. THE TIME OF OCCURRENCE OF THE
C LAST SATELLITE DATA ITEM ON THIS RECORD IS STORED IN THE
C SATELLITE DATA END TIME POSITIONS IN THE TITLE ARRAY. THE DISK IS
C REWOUND AND THE TITLE ARRAY (CORRESPONDS TO A REVISED TITLE
G RECORD CONTAINING THE NEW START AND END TIMES OF THE SATELLITE
C DATA) IS WRITTEN AS THE TITLE RECORD ON THE OUTPUT ORB3A TAPE.
C DATA RECORDS ARE NOW READ FROM THE DISK AND COPIED ONTO THE
C OUTPUT ORB3A TAPE FOR THOSE RECORDS ON THE DISK HAVING THE
C NUMBERS BETWEEN ISTREC AND IENREC INCLUSIVE. FINALLY, SENTINEL
C TYPE RECORDS ARE PREPARED AND THESE RECORDS ALONG WITH AN
C ENC-OF-FILE ARE WRITTEN ON THE OUTPUT ORB3A TAPE.
C REQUIRED SUBPROGRAMS
C SUBROUTINE SUBPROGRAMS
C RTAPE4, WSNECF, WTAPE4 (ALL 3 ARE ENTRY POINTS TO RWTAP4).
C FUNCTION SUBPROGRAMS
C THE FORTRAN BASIC SUPPLIED MATHEMATICAL FUNCTION, FLOAT
C LANGUAGE AND SYSTEM
C SELECT HAS BEEN COMPILED UNDER FORTRAN IV, LEVEL H, OPTIMIZATION
C LEVEL OF ZERO ON THE IBM 360/95 USING RELEASE 19.
C PROGRAMMER
C ROBERT K. SCHLESSINGER
C COMPUTER SCIENCES CORPORATION
C SILVER SPRING, MARYLAND
C PREPARED FOR
C GODDARD SPACE FLIGHT CENTER
C NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
C GREENBELT, MARYLAND
C CONTRACT NUMBER AND COMPLETION DATE
C NAS 5-11790, TASK 72, SUBTASK H
C COMPLETED ON 7 MAY 1971
C
C *** START PROGRAM *****
C
ISN 0003      IMPLICIT REAL*8*(A-T,O-U,W-Z)
ISN 0004      COMMON TITLE(256), READIN(256) , PERIOD , ISAVE(6) ,
C            1      ISET
ISN 0005      DATA XNINES / 99999999.00 /
ISN 0006      DATA INCRD , JSYOUT , IDISK / 5, 6, 14 /
C TO FACILITATE THE USE OF DEBUGGING TOOLS, ALL *GE TO* AND *CALL*
C STATEMENTS WHICH WERE NOT REFERENCED INITIALLY HAVE BEEN ASSIGNED
C STATEMENT LABELS FROM 700-899 INCLUSIVE.
C
C INPUT ORB3A TAPE IS ALREADY POSITIONED TO FIRST DATA RECORD FROM
C MAIN PROGRAM.
C
C COPY INPUT ORB3A DATA RECORDS (NOT TITLE RECORD) ON SCRATCH DISK
C THROUGH FIRST SENTINEL RECORD.
ISN 0007      5 CALL RTAPE4 (READIN, IERR)
ISN 0008      WRITE (IDISK) READIN
ISN 0009      700 IF (READIN(1).EQ.XNINES) GO TO 6
ISN 0011      702 GO TO 5
ISN 0012      6 CONTINUE

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ISN 0013      REWIND IDISK
ISN 0014      ISTREC=0
ISN 0015      IENREC=0
ISN 0016      IARECD=0
ISN 0017      IFILL=11
ISN 0018      IDATE=0
ISN 0019      LDATE=0
ISN 0020      IWORD=1
ISN 0021      NGEND=0
ISN 0022      C   READ REQUESTED PERIOD START AND END TIME.
ISN 0023      C   READ(INCRD,1000) IST,IHR,IEN,IEHR
ISN 0024      C   COMPUTE REQUESTED START AND END SECONDS.
ISN 0025      ST=FLOAT(IST)
ISN 0026      EN=FLCAT(IEN)
ISN 0027      JHR=IHR/100
ISN 0028      JMIN=IHR-(JHR*100)
ISN 0029      LHR=IEHR/100
ISN 0030      LMIN=IEHR-(LHR*100)
ISN 0031      ISEC=(JHR*3600)+(JMIN*60)
ISN 0032      SSEC=FLOAT(ISEC)
ISN 0033      ESEC=(LHR*3600)+(LMIN*60)
ISN 0034      ESEC=FLCAT(ISEC)
ISN 0035      C   PRINT REQUESTED TIME PERIOD SELECTED.
ISN 0036      WRITE(JSYOUT,2000) IST,SSEC,IEN,ESEC
ISN 0037      10 CONTINUE
ISN 0038      C   SEARCH FOR ACTUAL START TIME.
ISN 0039      C   READ A DATA REGRD FROM SCRATCH DISK.
ISN 0040      READ(IDISK) REACIN
ISN 0041      IARECD=IARECD+1
ISN 0042      C   IF THIS RECORD IS A SENTINEL TYPE RECORD,PRINT ERROR MESSAGE
ISN 0043      C   STATING REQUESTED START TIME IS NOT ON INPUT ORB3A(GO TO 15).
ISN 0044      704 IF(READIN(1).EQ.XNINES) GO TO 15
ISN 0045      C   IF YRMOBY OF 1ST DATA ITEM IN THIS RECORD EQUALS REQUESTED START
ISN 0046      C   YRMOBY,GO TO 20.
ISN 0047      706 IF(READIN(2) .EQ. ST) GO TO 20
ISN 0048      C   IF REQUESTED START YRMOBY HAS BEEN FOUND IN PREVIOUS RECORD,
ISN 0049      C   BACKSPACE TO BEGINNING OF PREVIOUS RECORD(GO TO 25).
ISN 0050      708 IF(IDATE.EQ.1) GO TO 25
ISN 0051      710 GO TO 10
ISN 0052      15 WRITE(JSYOUT,2010)
ISN 0053      720 GO TO 999
ISN 0054      20 CONTINUE
ISN 0055      C   SET IDATE=1 TO INDICATE REQUESTED START YRMOBY HAS BEEN FOUND.
ISN 0056      IDATE=1
ISN 0057      C   IF SEC OF DAY OF 1ST DATA ITEM IN THIS RECORD ARE LESS THAN
ISN 0058      C   REQUESTED START SECONDS,READ ANOTHER RECORD(GO TO 10).
ISN 0059      722 IF(READIN(4) .LT. SSEC) GO TO 10
ISN 0060      C   IF SEC OF DAY OF 1ST DATA ITEM IN THIS RECORD ARE GREATER THAN
ISN 0061      C   REQUESTED START,CHECK IF THIS RECORD IS THE 1ST INPUT DATA
ISN 0062      C   RECORD(GO TO 24).
ISN 0063      724 IF(READIN(4) .GT. SSEC) GO TO 24
ISN 0064      C   IF HERE,READIN(4) = SSEC.
ISN 0065      C   STORE VALUE OF RECORD COUNTER TO BE USED AS 1ST RECORD TO BE
ISN 0066      C   WRITTEN(COPIED) ON OUTPUT ORB3A.
ISN 0067      ISTREC=IARECD
ISN 0068      C   END SEARCH FOR ACTUAL START TIME.

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C STORE ACTUAL START TIME IN TITLE ARRAY.
ISN 0053 TITLE(4)=READIN(2)
ISN 0054 TITLE(5)=READIN(3)
ISN 0055 TITLE(6)=READIN(4)
ISN 0056 730 GC TC 30
C IF THIS RECORD IS THE 1ST INPUT DATA RECORD, PRINT ERROR MESSAGE
C STATING REQUESTED START TIME IS NOT ON INPUT CRB3A(GO TO 15).
ISN 0057 24 IF(IRECRD.EQ.1) GO TO 15
ISN 0058 25 CONTINUE
C BACKSPACE TO BEGINNING OF PREVIOUS RECORD.
ISN 0060 BACKSPACE IDISK
ISN 0061 BACKSPACE IDISK
C STORE VALUE OF RECORD COUNTER MINUS 1 TO BE USED AS 1ST RECORD TO
C BE WRITTEN(COPIED) ON OUTPUT CRB3A.
ISN 0062 ISTORE=IRECRD-1
C NOW RE-READ PREVIOUS RECORD TO OBTAIN ACTUAL START TIME.
ISN 0063 READ(IDISK) READIN
C END SEARCH FOR ACTUAL START TIME.
C STORE ACTUAL START TIME IN TITLE ARRAY.
ISN 0064 TITLE(4)=READIN(2)
ISN 0065 TITLE(5)=READIN(3)
ISN 0066 TITLE(6)=READIN(4)
C READ 1 RECORD TO PROPERLY POSITION DISK TO BEGINNING OF RECORD
C WHICH HAS NOT YET BEEN READ FROM DISK.
ISN 0067 READ(IDISK) READIN
ISN 0068 30 CONTINUE
C SEARCH FOR ACTUAL END TIME.
C READ A DATA RECORD FROM SCRATCH DISK.
ISN 0069 READ(IDISK) READIN
ISN 0070 IRECRD=IRECRD+1
C IF THIS RECORD IS A SENTINEL TYPE RECORD, BACKSPACE TO BEGINNING
C OF PREVIOUS RECORD(GO TO 35).
ISN 0071 732 IF(READIN(1).EQ.XNINES) GO TO 35
C IF YRMOBY OF 1ST DATA ITEM IN THIS RECORD EQUALS REQUESTED END
C YRMOBY, GO TO 49.
ISN 0073 734 IF(READIN(2).EQ.EN) GO TO 49
ISN 0075 740 GC TC 48
C IF HERE, READIN(1)=XNINES
C BACKSPACE TO BEGINNING OF PREVIOUS RECORD.
ISN 0076 35 BACKSPACE IDISK
ISN 0077 BACKSPACE IDISK
C STORE VALUE OF RECORD COUNTER MINUS 1 TO BE USED AS LAST RECORD TO
C BE WRITTEN(COPIED) ON OUTPUT CRB3A.
ISN 0078 IENREC=IRECRD-1
C END SEARCH FOR ACTUAL END TIME.
C NOW, RE-READ PREVIOUS RECORD. SINCE THIS PREVIOUS RECORD IS THE LAST
C RECORD ON THE TAPE, THE END TIME OF SATELLITE DATA IN TITLE RECORD
C WILL NOT HAVE TO BE CHANGED.
ISN 0079 READ(IDISK) READIN
C CHECK TO SEE IF THIS FINAL DATA RECORD HAS 11 VALID DATA ITEMS.
ISN 0080 DC 43 I=1,211,21
ISN 0081 742 IF(READIN(I).EQ.XNINES) GO TO 44
ISN 0083 43 CONTINUE
C IF HERE, THIS RECORD HAS ELEVEN VALID DATA ITEMS.
C IF YRMOBY OF LAST DATA ITEM IN THIS FINAL DATA RECORD IS NOT EQUAL
C TO REQUESTED END YRMOBY, GO TO 42.

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ISN 0084 744 IF(READIN(212) .NE. EN) GO TO 42
C IF SEC OF DAY OF LAST DATA ITEM IN THIS FINAL DATA RECORD ARE
C GREATER THAN OR EQUAL TO REQUESTED END SECONDS,REWIND DISK AND
C PREPARE TO GENERATE OUTPUT CRB3A(GO TO 60).
ISN 0086 746 IF(READIN(214) .GE. ESEC) GO TO 60
ISN 0088 45 CONTINUE
C IF HERE,REQUESTED END TIME IS GREATER THAN LAST TIME ON INPUT
C CRB3A TAPE BUT OUTPUT CRB3A WILL BE GENERATED ANYWAY.
ISN 0089 WRITE(JSYOUT,2020)
ISN 0090 NCEND=1
C REWIND DISK AND PREPARE TO GENERATE OUTPUT CRB3A.
ISN 0091 750 GC TO 60
C IF REQUESTED END YRMOBY HAS BEEN FOUND IN PREVIOUS RECORD,REWIND
C DISK AND PREPARE TO GENERATE OUTPUT CRB3A(GO TO 60).
ISN 0092 42 IF(LDATE .EQ. 1) GO TO 60
ISN 0094 760 GO TO 45
ISN 0095 44 CONTINUE
C IF HERE,THIS RECORD DOES NOT HAVE ELEVEN VALID DATA ITEMS.
ISN 0096 IFILL=0
C FIND LOCATION OF YRMOBY OF LAST VALID DATA ITEM.
ISN 0097 LYRMOBY=I-21+1
C FIND LOCATION OF SECONDS OF DAY OF LAST VALID DATA ITEM.
ISN 0098 LSOO=I-21+3
C IF YRMOBY OF LAST VALID DATA ITEM IN THIS FINAL DATA RECORD IS NOT
C EQUAL TO REQUESTED END YRMOBY,GO TO 42
ISN 0099 762 IF(READIN(LYRMOBY) .NE. EN) GO TO 42
C IF HERE,YRMOBY OF LAST VALID DATA ITEM = REQUESTED END YRMOBY.
C IF SEC OF DAY OF LAST VALID DATA ITEM IN THIS FINAL DATA RECORD
C ARE GREATER THAN OR EQUAL TO REQUESTED END SECONDS,REWIND DISK AND
C PREPARE TO GENERATE OUTPUT CRB3A(GO TO 60).
ISN 0101 764 IF(READIN(LSOO) .GE. ESEC) GO TO 60
C IF HERE,SECONDS OF DAY OF LAST VALID DATA ITEM .LT. REQUESTED
C END SECONDS.
ISN 0103 770 GO TO 45
ISN 0104 48 CONTINUE
C IF REQUESTED END YRMOBY HAS BEEN FOUND IN PREVIOUS RECORD.
C BACKSPACE TO BEGINNING OF PREVIOUS RECORD(GO TO 51).
ISN 0105 772 IF(LDATE .EQ. 1) GO TO 51
C IF HERE, LDATE .NE. 1 .THIS MEANS THE REQUESTED END YRMOBY HAS NOT
C YET BEEN FOUND.
C THEREFORE,READ ANOTHER RECORD FROM SCRATCH DISK.
ISN 0107 780 GC TO 30
ISN 0108 51 CONTINUE
C BACKSPACE TO BEGINNING OF PREVIOUS RECORD.
ISN 0109 BACKSPACE IDISK
ISN 0110 BACKSPACE IDISK
C NEW RE-READ PREVIOUS RECORD.
ISN 0111 READ(IDISK) READIN
C IF YRMOBY OF LAST DATA ITEM IN THIS RECORD IS NOT EQUAL TO
C REQUESTED END YRMOBY,THIS PREVIOUS RECORD CONTAINS ACTUAL
C END TIME(GO TO 52).
ISN 0112 782 IF(READIN(212) .NE. EN) GO TO 52
C IF SEC OF DAY OF LAST DATA ITEM IN THIS RECORD ARE GREATER THAN OR
C EQUAL TO REQUESTED END SECONDS,THIS PREVIOUS RECORD CONTAINS
C ACTUAL END TIME(GO TO 52).
ISN 0114 784 IF(READIN(214) .GE. ESEC) GO TO 52

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C IF HERE, NEXT RECORD AFTER THIS PREVIOUS RECORD IS THE END RECORD.
ISN 0116 790 GO TO 54
ISN 0117 45 CONTINUE
C SET LDATE=1 TO INDICATE REQUESTED END YRMODY HAS BEEN FOUND.
ISN 0118 LDATE=1
C IF SEC OF DAY OF 1ST DATA ITEM IN THIS RECORD ARE LESS THAN
REQUESTED END SECONDS, READ ANOTHER RECORD(GO TO 30).
ISN 0119 792 IF(READIN(4) .LT. ESEC) GO TO 30
C IF HERE, READIN(4) .GE. REQUESTED END SECONDS OF DAY.
C IF SEC OF DAY OF 1ST DATA ITEM IN THIS RECORD ARE EQUAL TO
REQUESTED END SECONDS, THIS RECORD CONTAINS ACTUAL END
C TIME(GO TO 53).
ISN 0121 794 IF(READIN(4) .EQ. ESEC) GO TO 52
C IF HERE, READIN(4) .GT. REQUESTED END SECONDS OF DAY.
C BACKSPACE TO BEGINNING OF PREVIOUS RECORD.
ISN 0123 BACKSPACE IDISK
ISN 0124 BACKSPACE IDISK
C NOW, RE-READ PREVIOUS RECORD.
ISN 0125 READ(IDISK) READIN
C IF SEC OF DAY OF LAST DATA ITEM IN THIS RECORD ARE LESS THAN
REQUESTED END SECONDS, NEXT RECORD CONTAINS ACTUAL END
C TIME(GO TO 54).
ISN 0126 796 IF(READIN(214) .LT. ESEC) GO TO 54
ISN 0128 52 CONTINUE
C IF HERE, THIS PREVIOUS RECORD CONTAINS ACTUAL END TIME.
C STORE VALUE OF RECORD COUNTER MINUS 1 TO BE USED AS LAST RECORD TO
BE WRITTEN(COPIED) ON OUTPUT ORB3A.
ISN 0129 IENREC=IRECRD-1
ISN 0130 800 GO TO 55
ISN 0131 53 CCNTINUE
C IF HERE, PRESENT RECORD CONTAINS ACTUAL END TIME.
C STORE VALUE OF RECORD COUNTER TO BE USED AS LAST RECORD TO BE
WRITTEN(COPIED) ON OUTPUT ORB3A.
ISN 0132 IENREC=IRECRD
ISN 0133 55 CCNTINUE
C END SEARCH FOR ACTUAL END TIME.
C STORE ACTUAL END TIME IN TITLE ARRAY.
ISN 0134 TITLE(7)=READIN(212)
ISN 0135 TITLE(8)=READIN(213)
ISN 0136 TITLE(9)=READIN(214)
C REWIND DISK AND PREPARE TO GENERATE OUTPUT ORB3A.
ISN 0137 810 GO TO 60
ISN 0138 54 CCNTINUE
C READ 1 RECORD TO OBTAIN ACTUAL END TIME.
ISN 0139 READ(IDISK) READIN
ISN 0140 820 GO TO 53
ISN 0141 60 CONTINUE
C REWIND DISK AND PREPARE TO GENERATE OUTPUT ORB3A.
ISN 0142 REWIND IDISK
C WRITE TITLE RECORD ON OUTPUT ORB3A.
ISN 0143 830 CALL WTAPR4(TITLE)
C SET SCRATCH DISK RECORD COUNTER TO ZERO.
ISN 0144 IRECRD=0
ISN 0145 832 IF(ISTREC .NE. 1) GO TO 80
C IF HERE, COPYING PROCEDURE FROM SCRATCH DISK TO OUTPUT ORB3A BEGINS
C WITH RECORD 1 ON SCRATCH DISK.

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- ISN-0147 70 CONTINUE
C READ A RECORD FROM SCRATCH DISK.
- ISN-0148 READ(IDISK) READIN
C INCREMENT RECORD READ FROM SCRATCH DISK BY ONE.
- ISN-0149 IREGFD=IRECRD+1
C WRITE(COPY) THIS RECORD ON OUTPUT ORB3A.
- ISN-0150 840 CALL WTAP4(READIN)
ISN 0151 842 IF(IRECRD .EQ. IENREC) GO TO 100
C IF HERE, THERE ARE MORE RECORDS TO BE COPIED.
ISN 0153 850 GC TO 70
- ISN-0154 80 CONTINUE
C READ A RECORD FROM SCRATCH DISK WITHOUT COPYING TO OUPUT ORB3A.
C THIS IS TO EVENTUALLY POSITION SCRATCH DISK SO THAT COPYING CAN
C BEGIN LATER.
- ISN-0155 READ(IDISK) READIN
C INCREMENT RECORD READ FROM SCRATCH DISK BY ONE.
- ISN-0156 IREGRD=IRECRD+1
ISN 0157 852 IF(IRECRD+1 .EQ. ISTREC) GO TO 70
C IF HERE, THERE ARE MORE SCRATCH DISK RECORDS TO BE READ WITHOUT
C COPYING TO OUTPUT ORB3A.
- ISN-0159 860 GC TO 80
ISN 0160 100 CONTINUE
C PREPARE TO WRITE END SENTINELS ON OUTPUT ORB3A.
C
C CREATE A RECORD HAVING 99999999.DC IN THE FIRST WORD ONLY.
ISN 0161 TITLE(1)=XNINES
- ISN-0162 862 IF(IFILL .EQ. 1) GC TO 105
C IF HERE, LAST DATA RECORD WRITTEN ON ORB3A DOES NOT HAVE ELEVEN
C VALID DATA ITEMS.
ISN 0164 IWORD=2
C IWORD=2 WILL CAUSE WSNEOF TO WRITE 2 SENTINEL RECORDS ON
C OUTPUT ORB3A.
- ISN-0165 870 GC TO 110
ISN 0166 105 CCNTINUE
C IF HERE, LAST DATA RECORD WRITTEN ON ORB3A HAS ELEVEN VALID DATA
C ITEMS.
C
C CREATE A RECORD HAVING 99999999.DC IN EACH OF THE FIRST 21 WORDS.
- ISN-0167 880 L=1,21
ISN 0168 READIN(L)=XNINES
- ISN-0169 100 CCNTINUE
ISN 0170 110 CCNTINUE
C NEW WRITE END SENTINELS ON OUTPUT ORB3A.
ISN 0171 880 CALL WSNEOF(READIN, TITLE, IWORD)
- ISN-0172 IF(INCEND .EQ. 0) WRITE(JSYCUT, 2030)
C WRITE ACTUAL START AND END TIME OF PERIOD OF DATA WRITTEN ON
C OUTPUT ORB3A.
ISN 0174 WRITE(JSYOUT, 2040) TITLE(4), TITLE(6), TITLE(7), TITLE(9)
- ISN-0175 WRITE(JSYOUT, 2050)
ISN 0176 1000 FORMAT(I6, 1X, I4, 1X, I6, 1X, I4)
- ISN-0177 2000 FORMAT(1H0, 59X, 10HSTART TIME, 9X, 8HEND TIME/
1 1H ,20X, 30HREQUESTED TIME PERIOD SELECTED, 6X, 4HDATE, 2X,
2 10HSEC OF DAY, 2X, 4HDATE, 2X, 10HSEC OF DAY/
3 1H ,20X, 22HFOR OUTPUT ORB3A TAPE., 13X, I6, 1X, F7.0, 4X,
4 I6, 1X, F7.0)
ISN 0178 2010 FERMAT(1H0, 20X, 69HREQUESTED START TIME IS NOT ON INPUT ORB3A TAPE

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1, EXECUTION TERMINATED.)
ISN 0179      2020 FORMAT(1H0,20X, 64HREQUESTED END TIME IS GREATER THAN LAST TIME ON
1 INPUT ORB3A TAPE/
2           1H ,20X, 47H BUT OUTPUT ORB3A TAPE WILL BE GENERATED ANYWAY.
3)
ISN 0180      2030 FORMAT(1H0,20X, 65HENTIRE REQUESTED TIME PERIOD SELECTED EXISTS ON
1 INPUT ORB3A TAPE./
2           1H ,20X, 37H OUTPUT ORB3A TAPE HAS BEEN GENERATED.)
ISN 0181 2040 FORMAT(1H0,59X, 10HSTART TIME,9X,8HEND TIME/
1           1H ,20X, 27HACTUAL TIME PERIOD SELECTED,9X,4HDATE,2X,
2           10HSEC OF DAY,2X,4HDATE,2X,10HSEC OF DAY/
3           1H ,20X, 22HFOR OUTPUT ORB3A TAPE,,12X,F8.0,F7.0,3X,
4           F8.0,F7.0)
ISN 0182      2050 FORMAT(1H0,20X, 48HNORMAL TERMINATION OF SELECT TIME PERIOD OPTION
1.)
ISN 0183      999 RETURN
ISN 0184      END

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SYMBOL	INTERNAL	STATEMENT	NUMBERS																				
I	0080	0081	0097	0098																			
L	0167	0168																					
EN	0024	0073	0084	0099	0112																		
ST	0023	0039																					
IFN	0022	0024	0033																				
IHR	0022	0026	0026																				
IST	0022	0023	0033																				
JHR	0025	0026	0029																				
LHR	0027	0026	0031																				
ESEC	0032	0033	0086	0101	0114	0119	0121	0126															
IEFR	0022	0027	0028																				
IERR	0007																						
ISEC	0029	0030	0031	0032																			
ISET	0004																						
JMIN	0026	0029																					
LMIN	0028	0031																					
LSOD	0098	0101																					
SSEC	0030	0033	0048	0050																			
FLOAT	0023	0024	0030	0032																			
IOATE	0018	0041	0047																				
IDISK	0006	0008	0013	0035	0060	0061	0063	0067	0069	0076	0077	0079	0109	0110	0111	0123	0124	0125	0139				
		0142	0148	0155																			
IFILL	0017	0096	0162																				
INCRD	0006	0022																					
ISAVE	0004																						
IWORD	0020	0164	0171																				
LDATE	0019	0092	0105	0118																			
NGEND	0021	0090	0172																				
TITLE	0004	0053	0054	0055	0064	0065	0066	0134	0135	0136	0143	0161	0171	0174	0174	0174	0174						
IENREC	0015	0076	0129	0132	0151																		
IREFC	0016	0036	0036	0052	0057	0062	0070	0070	0078	0129	0132	0144	0149	0149	0151	0156	0156	0157					
ISTREC	0014	0052	0062	0145	0157																		
JSDUT	0006	0033	0044	0089	0172	0174	0175																
LVRMDY	0097	0099																					
PERIOD	0004																						
READ IN	0004	0007	0008	0009	0035	0037	0039	0048	0060	0053	0054	0055	0063	0064	0065	0066	0067	0069	0071				
		0073	0075	0081	0084	0086	0099	0101	0111	0112	0114	0119	0121	0125	0126	0134	0135	0136	0139	0148			
		0150	0155	0168	0171																		
RTAPE4	0007																						
SELECT	0002																						
WSNEOF	0171																						
WTAPE4	0143	0150																					
XNINES	0005	0005	0037	0071	0081	0161	0168																

\*\*\*\*\*FORTRAN CROSS REFERENCE LISTING\*\*\*\*\*

LABEL	DEFINED	REFERENCES
E	0007	C011
<del>C</del>	<del>0012</del>	<del>0009</del>
10	0034	0043 0048
<del>1E</del>	<del>0044</del>	<del>0037 0057</del>
20	0046	0039
<del>24</del>	<del>0057</del>	<del>0050</del>
2E	0059	0041
<del>30</del>	<del>0068</del>	<del>0056 0107 0119</del>
3E	0076	C071
<del>42</del>	<del>0092</del>	<del>0084 0099</del>
43	0083	0080
<del>44</del>	<del>0095</del>	<del>0081</del>
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49	0117	0073
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52	0128	C112 C114
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772	0105	
<del>780</del>	<del>0107</del>	
782	C112	
<del>784</del>	<del>0114</del>	
790	0116	
<del>792</del>	<del>0119</del>	



\*\*\*\*\*F C-R-T-R-A-N C-R-D-S-S R-E-F-E-R-E-N-C-E L-I-S-T-I-N-G\*\*\*\*\*

LABEL	OFFINED	REFERENCES
794	C121	
796	0126	
800	0130	
810	0137	
820	0140	
830	0143	
832	0145	
840	0150	
842	0151	
850	0153	
852	0157	
860	0159	
862	0162	
870	0165	
880	0171	
898	0183	C045
1000	0176	C022
2000	0177	C033
2010	0178	C044
2020	0179	C069
2030	0180	C172
2040	0181	C174
2050	0182	C175

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<del>I</del>	<del>SF</del>	<del>I*4</del>	<del>00038C</del>	<del>L</del>	<del>SF</del>	<del>I*4</del>	<del>0003C0</del>	<del>EN</del>	<del>S</del>	<del>R*8</del>	<del>000420</del>	<del>ST</del>	<del>S</del>	<del>R*8</del>	<del>000428</del>
<del>IEN</del>	<del>SFA</del>	<del>I*4</del>	<del>0003C4</del>	<del>IHR</del>	<del>SF</del>	<del>I*4</del>	<del>0003C8</del>	<del>IST</del>	<del>SFA</del>	<del>I*4</del>	<del>0003CC</del>	<del>JHR</del>	<del>SF</del>	<del>I*4</del>	<del>0003D0</del>
<del>LHR</del>	<del>SF</del>	<del>I*4</del>	<del>0003D4</del>	<del>ESEC</del>	<del>SF</del>	<del>R*8</del>	<del>000430</del>	<del>IEHR</del>	<del>SF</del>	<del>I*4</del>	<del>0003D8</del>	<del>IERR</del>	<del>SFA</del>	<del>I*4</del>	<del>0003DC</del>
<del>ISEC</del>	<del>SFA</del>	<del>I*4</del>	<del>0003E0</del>	<del>ISET</del>	<del>C</del>	<del>I*4</del>	<del>N.R.</del>	<del>JMIN</del>	<del>SF</del>	<del>I*4</del>	<del>0003E4</del>	<del>LMIN</del>	<del>SF</del>	<del>I*4</del>	<del>0003E8</del>
<del>LSCD</del>	<del>S</del>	<del>I*4</del>	<del>0003EC</del>	<del>SSEC</del>	<del>SF</del>	<del>R*8</del>	<del>000438</del>	<del>IDATE</del>	<del>S</del>	<del>I*4</del>	<del>0003F0</del>	<del>IDISK</del>	<del>F</del>	<del>I*4</del>	<del>0003F4</del>
<del>IFILL</del>	<del>S</del>	<del>I*4</del>	<del>0003F8</del>	<del>INCRD</del>	<del>F</del>	<del>I*4</del>	<del>0003FC</del>	<del>ISAVE</del>	<del>C</del>	<del>I*4</del>	<del>N.R.</del>	<del>IWORD</del>	<del>SFA</del>	<del>I*4</del>	<del>000400</del>
<del>LDATE</del>	<del>S</del>	<del>I*4</del>	<del>000404</del>	<del>NOEND</del>	<del>S</del>	<del>I*4</del>	<del>000408</del>	<del>TITLE</del>	<del>SFA</del>	<del>C</del>	<del>R*8</del>	<del>000000</del>	<del>IBCOM</del>	<del>F</del>	<del>XF</del>
<del>IENREC</del>	<del>S</del>	<del>I*4</del>	<del>00040C</del>	<del>IRECRD</del>	<del>SF</del>	<del>I*4</del>	<del>000410</del>	<del>ISTREC</del>	<del>S</del>	<del>I*4</del>	<del>000414</del>	<del>JSYOUT</del>	<del>F</del>	<del>I*4</del>	<del>000418</del>
<del>LYRMDY</del>	<del>S</del>	<del>I*4</del>	<del>00041C</del>	<del>PERIOD</del>	<del>C</del>	<del>R*8</del>	<del>N.R.</del>	<del>READIN</del>	<del>SFA</del>	<del>C</del>	<del>R*8</del>	<del>000800</del>	<del>RTAPE4</del>	<del>SF</del>	<del>XF</del>
<del>SELECT</del>	<del>R*8</del>	<del>000440</del>		<del>WSNEOF</del>	<del>SF</del>	<del>XF</del>	<del>R*8</del>	<del>000000</del>	<del>WTAPE4</del>	<del>SF</del>	<del>XF</del>	<del>R*8</del>	<del>000000</del>	<del>XNINES</del>	<del>F</del>

\*\*\*\*\* COMMON INFORMATION \*\*\*\*\*

NAME OF COMMON BLOCK * * SIZE OF BLOCK 001024 HEXADECIMAL BYTES															
VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME
<del>TITLE</del>	<del>R*8</del>	<del>000000</del>	<del>READIN</del>	<del>R*8</del>	<del>000800</del>	<del>PERIOD</del>	<del>R*8</del>	<del>N.R.</del>	<del>ISAVE</del>	<del>I*4</del>	<del>N.R.</del>				
<del>ISET</del>	<del>I*4</del>	<del>N.R.</del>													

LABEL	ADDR	LABEL	ADDR	LABEL	ADDR	LABEL	ADDR
5	00054C	700	000578 NR	702	00058A	6	000590
10	000784	704	0007AC NR	706	0007BE	708	0007D0
710	0007DE	715	0007E4	720	0007F8 NR	20	0007FE
722	000806 NR	724	000818	730	00084E NR	24	000854
25	000862	30	00088C	732	000904 NR	734	000916
740	000928	35	00092E	742	000978	43	000992
744	0009A8	746	0009BA	45	0009CG	750	0009E8 NR
42	0009EE	760	0009FC	44	000A02	762	000A2A NR
764	000A44	770	000A5E	48	000A64	772	000A64 NR
780	000A72	51	000A78	782	000AAC NR	784	000ABE
790	000AD0	49	000AD6	792	000ADE NR	794	000AF0
796	000B38 NR	52	000B4A	800	000B56 NR	53	000B5C
55	000B64	810	000B80 NR	54	000B86	820	000BA4 NR
60	000BAA	830	000BB8 NR	832	000BCE NR	70	000BDC
840	000C04 NR	842	000C12 NR	850	000C20	80	000C26
852	000C50 NR	860	000C62	100	000C68	862	000C74 NR
870	000C8A NR	105	000C90	108	000CAC	110	000CC2
880	000CC2 NR	999	000D3C				

\*OPTIONS IN EFFECT\* NAME= MAIN,OPT=00,LINECNT=58,SIZE=0000K,

\*OPTIONS IN EFFECT\* SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT, ID,XREF

\*STATISTICS\* SOURCE STATEMENTS = 183 ,PROGRAM SIZE = 3426

\*STATISTICS\* NO DIAGNOSTICS GENERATED

\*\*\*\*\* END OF COMFILATION \*\*\*\*\*

97K BYTES OF CORE NOT USED

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COMPILER OPTIONS NAME= MAIN,OPT=00,LINECNT=58,SIZE=0000K,
SOURCE,EBDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,LD,XREF
ISN 0002 SUBROUTINE SUNLGT
C PURPOSE
C SUBROUTINE SUNLGT ISOLATES WHICH SATELLITE DATA ITEMS ON AN
C INPUT ORB3A TAPE ARE OF THE SUNLIGHT ENTRANCE/EXIT TYPE AND
C PRINTS OUT A BCD SUNLIGHT REPORT CONTAINING THE PASS NUMBERS AND
C TIMES OF OCCURRENCE OF THESE SUNLIGHT ENTRANCE/EXIT DATA ITEMS.
C CALLING SEQUENCE
C CALL SUNLGT
C THERE ARE NO ARGUMENTS IN THE CALLING SEQUENCE.
C INPUT(THROUGH CCOMMON)
C NCNE.
C OUTPUT(THROUGH CCMGN)
C NCNE.
C MAJOR VARIABLES
C INHR = SUNLIGHT ENTRANCE HOUR OF DAY
C INMIN = SUNLIGHT ENTRANCE MINUTE OF HOUR
C INGRD = SUNLIGHT ENTRANCE PASS NO.
C INSEC = SUNLIGHT ENTRANCE SECOND OF MINUTE
C INT = SUNLIGHT ENTRANCE YEAR-MONTH-DAY
C INT1 = SUNLIGHT ENTRANCE DAY OF YEAR
C IOHR = SUNLIGHT EXIT HOUR OF DAY
C IOMIN = SUNLIGHT EXIT MINUTE OF HOUR
C IOGRD = SUNLIGHT EXIT PASS NO.
C IOSEC = SUNLIGHT EXIT SECOND OF MINUTE
C IOUT = SUNLIGHT EXIT YEAR-MONTH-DAY
C IOUT1 = SUNLIGHT EXIT DAY OF YEAR
C JSYOUT = FORTRAN LOGICAL UNIT NO. FOR SYSTEM PRINTER(6).
C READIN(1) = USED TO CHECK FOR PRESENCE OF SENTINEL ITEM
C RECORD OR SENTINEL RECORD.
C READIN(I-20) = DATA ITEM TYPE INDICATOR OF KTH OF ELEVEN
C SATELLITE DATA ITEMS IN ORB3A RECORD.
C =1,REGULAR SATELLITE DATA ITEM.
C =2,ASCENDING NODE CROSSING DATA ITEM.
C =3,NORTH POINT DATA ITEM.
C =4,DESCENDING NODE DATA ITEM.
C =5,SOUTH POINT DATA ITEM.
C =6,SUNLIGHT ENTRANCE DATA ITEM.
C =7,SUNLIGHT EXIT DATA ITEM.
C READIN(I-17) = SECONDS OF DAY OF SUNLIGHT ENTRANCE OR EXIT
C REFERENCE
C IBM FEDERAL SYSTEMS DIVISION,GAITHERSBURG,MARYLAND,"ORBITAL
C DETERMINATION UTILITY PROGRAMS,"CONTRACT NAS 5-10022,MARCH 1970
C (TELOR3 PROGRAM SECTION)
C METHOD
C SUBROUTINE SUNLGT DETERMINES IF AN ORB3A DATA RECORD CONTAINS A
C SUNLIGHT ENTRANCE OR EXIT DATA ITEM BY EXAMINING THE TYPE
C INDICATOR(FIRST WORD) OF EACH OF THE ELEVEN SATELLITE DATA ITEMS
C IN THE RECORD(READIN(I-20),I=21,231,21).WHEN THE FIRST WORD OF A
C DATA ITEM CONTAINS A TYPE INDICATOR EQUAL TO 6,(OR 7),AN
C ENTRANCE(OR EXIT) ITEM HAS BEEN FOUND.THE PASS NO.,YEAR-MONTH-
C DAY,DAY-OF-YEAR AND TIME(SUNLGT CONVERTS TO HRS,MIN,SEC) OF THE
C ENTRANCE AND/OR EXIT ARE PRINTED AS THE BCD OUTPUT OF THE
C SUNLIGHT REPORT.

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C   REQUIRED SUBPROGRAMS
C   SUBROUTINE SUBPROGRAMS
C   RTAPE4(ENTRY POINT TO RTAPE4),
C   FUNCTION SUBPROGRAMS
C   THE FORTRAN BASIC SUPPLIED MATHEMATICAL FUNCTION, FLOAT
C   LANGUAGE AND SYSTEM
C   SUNLGT HAS BEEN COMPILED UNDER FORTRAN IV, LEVEL H, OPTIMIZATION
C   LEVEL OF ZERO ON THE IBM 360/95 USING RELEASE 19.
C   PROGRAMMER
C   ROBERT K. SCHLESSINGER
C   COMPUTER SCIENCES CORPORATION
C   SILVER SPRING, MARYLAND
C   PREPARED FOR
C   GODDARD SPACE FLIGHT CENTER
C   NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
C   GREENBELT, MARYLAND
C   CONTRACT NUMBER AND COMPLETION DATE
C   NAS 5-11790, TASK 72, SUBTASK H
C   COMPLETED ON 7 MAY 1971
C
C *** START PROGRAM *****
C
ISN 0003   IMPLICIT REAL*8 (A-H,O-U,W-Z)
ISN 0004   DIMENSION READIN(256)
ISN 0005   DATA XNINES / 99999999.D0 /
ISN 0006   DATA JSYOUT / 6 /
C   TO FACILITATE THE USE OF DEBUGGING TOOLS, ALL *GC TO* AND *CALL*
C   STATEMENTS WHICH WERE NOT REFERENCED INITIALLY HAVE BEEN ASSIGNED
C   STATEMENT LABELS FROM 700-899 INCLUSIVE.
C   THE *RETURN* STATEMENT (NOT REFERENCED INITIALLY) HAS BEEN ASSIGNED
C   THE LABEL 999.
C
C   INDICATES WHETHER OR NOT LATEST ENTRANCE FOUND HAS BEEN PRINTED.
ISN 0007   IGO=0
C   INDICATES WHETHER OR NOT ANY ENTRANCES HAVE BEEN FOUND.
ISN 0008   IFST=0
C   INDICATES WHETHER OR NOT ANY EXITS HAVE BEEN FOUND.
ISN 0009   IEXIT=0
C   SET UP HEADINGS FOR SUNLIGHT REPORT.
ISN 0010   8 WRITE(JSYOUT,2000)
ISN 0011   ICGOUNT=3
ISN 0012   WRITE(JSYOUT,2010)
C   READ AN INPUT ORB3A DATA RECORD OR SENTINEL TYPE RECORD.
ISN 0013   10 CALL RTAPE4(REACIN,IERR)
C   IF THIS RECORD IS A SENTINEL TYPE, EXIT READ LOOP(GO TO 600).
ISN 0014   700 IF(READIN(1).EQ.XNINES) GO TO 600
C   SEE IF DATA RECORD CONTAINS ANY ENTRANCE OR EXIT ITEMS.
ISN 0016   DC 100, I=21,231,21
C   IF TYPE INDICATOR OF KTH OF 11 DATA ITEMS IN READIN EQUALS 6.(OR
C   7.), AN ENTRANCE(OR EXIT) HAS BEEN FOUND. PROCESS DATA PERTAINING
C   TO ENTRANCE(OR EXIT) ITEM. GC TO 200(OR 300).
ISN 0017   702 IF(READIN(I-20).EQ. 6.D0) GC TO 200
ISN 0019   704 IF(READIN(I-20).EQ. 7.D0) GC TO 300
ISN 0021   100 CONTINUE
C   NO ENTRANCE/EXIT ITEM FOUND IN RECORD. READ NEXT INPUT RECORD.
ISN 0022   706 GC TO 10

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C IF HERE, AN ENTRANCE HAS BEEN FOUND.
C SET IFST=1 TO INDICATE AT LEAST 1 ENTRANCE HAS BEEN FOUND ON TAPE.
ISN 0023 200 IFST=1
C INDICATES LATEST ENTRANCE FOUND HAS NOT BEEN PRINTED YET.
ISN 0024 100=1
C *** STORE ENTRANCE YEAR-MONTH-DAY.
ISN 0025 INT=READIN(I-19)
C *** STORE ENTRANCE DAY OF YEAR.
ISN 0026 INT1=READIN(I-18)
C CONVERT ENTRANCE TIME(SEC OF DAY) TO HR OF DAY(INCLUDES ANY
C FRACTION).
ISN 0027 DIFF=READIN(I-17)/3600.
C *** TRUNCATE ENTRANCE TIME TO HR OF DAY(DROPS FRACTION).
ISN 0028 INHR=DIFF
C CONVERT ENTRANCE HR OF DAY TO REAL FORMAT WITHOUT ROUND OFF.
ISN 0029 DIFF1=FLOAT(INHR)
C COMPUTE ENTRANCE MINUTE OF HOUR(INCLUDES ANY FRACTION).
ISN 0030 DIFF2=(DIFF-DIFF1)*60.
C *** TRUNCATE ENTRANCE TIME TO MINUTE OF HR(DROPS FRACTION).
ISN 0031 INMIN=DIFF2
C CONVERT ENTRANCE MINUTE OF HR TO REAL FORMAT WITHOUT ROUND OFF.
ISN 0032 DIFF1=FLOAT(INMIN)
C COMPUTE ENTRANCE SECOND OF MINUTE(INCLUDES ANY FRACTION).
ISN 0033 DIFF2=(DIFF2-DIFF1)*60.
C *** TRUNCATE ENTRANCE TIME TO SEC OF MINUTE(DROPS FRACTION).
ISN 0034 INSEC=DIFF2
C *** STORE ENTRANCE PASS NO.
ISN 0035 INORB=READIN(I)
C DO NOT PRINT ENTRANCE DATA YET, READ NEXT INPUT RECORD(LOOK
C FOR AN EXIT ITEM).
ISN 0036 710 GC TC 10
C IF HERE, AN EXIT HAS BEEN FOUND.
C SET EXIT=1 TO INDICATE AT LEAST 1 EXIT HAS BEEN FOUND ON TAPE.
ISN 0037 300 IEXIT=1
C *** STORE EXIT YEAR-MONTH-DAY.
ISN 0038 ICUT=READIN(I-19)
C *** STORE EXIT DAY OF YEAR.
ISN 0039 ICUT1=READIN(I-18)
C CONVERT EXIT TIME(SEC OF DAY) TO HR OF DAY(INCLUDES ANY FRACTION).
ISN 0040 DIFF=READIN(I-17)/3600.
C *** TRUNCATE EXIT TIME TO HR OF DAY(DROPS FRACTION).
ISN 0041 IOHR=DIFF
C CONVERT EXIT HR OF DAY TO REAL FORMAT WITHOUT ROUND OFF.
ISN 0042 DIFF1=FLOAT(IOHR)
C COMPUTE EXIT MINUTE OF HOUR(INCLUDES ANY FRACTION).
ISN 0043 DIFF=(DIFF-DIFF1)*60.
C *** TRUNCATE EXIT TIME TO MINUTE OF HR(DROPS FRACTION).
ISN 0044 IOMIN=DIFF
C CONVERT EXIT MINUTE OF HR TO REAL FORMAT WITHOUT ROUND OFF.
ISN 0045 DIFF1=FLOAT(IOMIN)
C COMPUTE EXIT SECOND OF MINUTE(INCLUDES ANY FRACTION).
ISN 0046 DIFF=(DIFF-DIFF1)*60.
C *** TRUNCATE EXIT TIME TO SEC OF MINUTE(DROPS FRACTION).
ISN 0047 IOSEC=DIFF
C *** STORE EXIT PASS NO.
ISN 0048 ICORB=READIN(I)

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ISN 0049      ICOUNT=ICOUNT+1
C      IF 1ST ENTRANCE/EXIT FOUND ON TAPE IS AN EXIT,PRINT THIS EXIT DATA
C      WITH PRINT EXIT ONLY STATEMENT(GO TO 400).
ISN 0050      712 IF (IFST.EQ.0) GO TO 400
C      IF HERE,PRINT ENTRANCE DATA(WHICH HAS BEEN STORED) ALONG WITH
C      PRESENT EXIT DATA.
ISN 0052      WRITE(JSYOUT,2030) INORB,INT,INT1,INHR,INMIN,INSEC,ICORB,IOUT,
1      IOUT1,IOHR,IOMIN,IOSEC
C      SET IGO=0 TO INDICATE LATEST ENTRANCE FOUND HAS BEEN PRINTED.
ISN 0053      IGO=0
C      TEST LINE COUNTER TO SEE IF SUNLIGHT REPORT PAGE IS FILLED.
ISN 0054      720 GO TO 502
C      IF HERE,1ST ENTRANCE/EXIT FOUND ON TAPE IS AN EXIT,PRINT THIS EXIT
C      DATA NOW.
ISN 0055      400 WRITE(JSYOUT,2020) IORPB,IOUT,IOUT1,IOHR,IOMIN,IOSEC
C      IF SUNLIGHT REPORT PAGE IS FILLED,PRINT COLUMN HEADINGS
C      ON NEW PAGE(GO TO 8).
ISN 0056      502 IF (ICOUNT.GT.49) GO TO 8
C      READ NEXT INPUT RECCRD.
ISN 0058      730 GC TC 10
C      IF HERE,A SENTINEL TYPE RECORD HAS BEEN ENCOUNTERED.
C      IF LATEST ENTRANCE FOUND HAS NOT BEEN PRINTED YET,PRINT ENTRANCE
C      DATA NOW.
ISN 0059      600 IF(IGO.EQ.1) WRITE(JSYOUT,2040) INORB,INT,INT1,INHR,INMIN,INSEC
ISN 0061      WRITE(JSYOUT,2050)
C      IF NO ENTRANCES AND NO EXITS HAVE BEEN FOUND ON INPUT TAPE,PRINT
C      APPROPRIATE SIGN OFF MESSAGE.
ISN 0062      IF(IFST.EQ.0 .AND. IEXIT.EQ.0) WRITE(JSYOUT,2060)
ISN 0064      2000 FORMAT(1H1,24X,17HSUNLIGHT ENTRANCE,30X,13HSUNLIGHT EXIT)
ISN 0065      2010 FORMAT(1H ,10X,8HPASS NO.,4X,6H DATE ,5X,9HDAY (F YR,6X,2HHR,1X,
1      3HMIN,1X,3HSEC,6X,8HPASS NO.,4X,6H DATE ,5X,9HDAY OF YR,6X,
2      2HHR,1X,3HMIN,1X,3HSEC)
ISN 0066      2020 FORMAT(1H ,64X,15,7X,16,8X,13,9X,12,2X,12,2X,12)
ISN 0067      2030 FORMAT(1H ,10X,15,7X,16,8X,13,9X,12,2X,12,2X,12,6X,15,7X,16,8X,13,
1      9X,12,2X,12,2X,12)
ISN 0068      2040 FORMAT(1H ,10X,15,7X,16,8X,13,9X,12,2X,12,2X,12)
ISN 0069      2050 FORMAT(1H0,10X, 4EHNORMAL TERMINATION OF SUNLIGHT REPORT OPTION.)
ISN 0070      2060 FCRMAT(1H ,10X, 66HHOWEVER,THERE ARE NO SUNLIGHT ENTRANCES/EXITS 0
IN INPUT ORB3A TAPE.)
ISN 0071      999 RETURN
ISN 0072      END

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\*\*\*\*\*FORTRAN CROSS REFERENCE LISTING\*\*\*\*\*

SYMBOL	INTERNAL STATEMENT NUMBERS												
I	0016	0017	0019	0025	0026	0027	0035	0038	0039	0040	0048		
IG0	0007	0024	0053	0059									
INT	0025	0052	0059										
DIFF	0027	0028	0030	0040	0041	0043	0043	0044	0046	0046	0047		
IERR	0013												
IFST	0008	0023	0050	0062									
INFR	0028	0029	0052	0059									
INT1	0026	0052	0055										
ICHR	0041	0042	0052	0055									
ICLT	0038	0052	0055										
DIFF1	0029	0030	0032	0033	0042	0043	0045	0046					
DIFF2	0030	0031	0033	0033	0034								
FLCAT	0029	0032	0042	0045									
EXIT	0009	0037	0062										
INNIN	0031	0032	0052	0059									
INCR8	0035	0052	0055										
INSEC	0034	0052	0059										
ICMIN	0044	0048	0052	0055									
IDCR8	0048	0052	0055										
IGSEC	0047	0052	0055										
ICUT1	0039	0052	0055										
ICGUNT	0011	0045	0045	0056									
JSYOLT	0006	0010	0012	0052	0055	0059	0061	0062					
READ IN	0004	0013	0014	0017	0019	0025	0026	0027	0035	0038	0039	0040	0048
RTAPE4	0013												
SUNLCT	0002												
XNINES	0005	0014											



\*\*\*\*\*FORTRAN CROSS REFERENCE LISTING\*\*\*\*\*

LABEL	DEFINED	REFERENCES
8	0010	0056
10	0013	0022 0036 0038
100	0021	0016
200	0023	0017
300	0037	0019
400	0055	0050
502	0056	0054
600	0059	0014
700	0014	
702	0017	
704	0019	
706	0022	
710	0036	
712	0050	
720	0054	
730	0056	
999	0071	
2000	0064	0010
2010	0065	0012
2020	0066	0055
2030	0067	0052
2040	0068	0059
2050	0069	0061
2060	0070	0062

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.
<del>I SF</del>	<del>I*4</del>	<del>I*4</del>	<del>000270</del>	<del>IGO S</del>	<del>I*4</del>	<del>000274</del>	<del>INT SF</del>	<del>I*4</del>	<del>000278</del>	<del>DIFF SF</del>	<del>R*8</del>	<del>0002C0</del>			
<del>IERR SFA</del>	<del>I*4</del>	<del>I*4</del>	<del>00027C</del>	<del>IFST S</del>	<del>I*4</del>	<del>000280</del>	<del>INHR SFA</del>	<del>I*4</del>	<del>000284</del>	<del>INT1 SF</del>	<del>I*4</del>	<del>000288</del>			
<del>IGHR SFA</del>	<del>I*4</del>	<del>I*4</del>	<del>00028C</del>	<del>IOUT SF</del>	<del>I*4</del>	<del>000290</del>	<del>DIFE1 SF</del>	<del>R*8</del>	<del>0002C8</del>	<del>DIFE2 SF</del>	<del>R*8</del>	<del>0002D0</del>			
<del>IEXIT S</del>	<del>I*4</del>	<del>I*4</del>	<del>000294</del>	<del>INMIN SFA</del>	<del>I*4</del>	<del>000298</del>	<del>INORB SF</del>	<del>I*4</del>	<del>00029C</del>	<del>INSEC SF</del>	<del>I*4</del>	<del>0002A0</del>			
<del>IGNIN SFA</del>	<del>I*4</del>	<del>I*4</del>	<del>0002A4</del>	<del>IGORB SF</del>	<del>I*4</del>	<del>0002A8</del>	<del>IGSEC SF</del>	<del>I*4</del>	<del>0002AC</del>	<del>IOUT1 SF</del>	<del>I*4</del>	<del>0002B0</del>			
<del>IBCOM= F XF</del>	<del>I*4</del>	<del>I*4</del>	<del>000000</del>	<del>ICOUNT SF</del>	<del>I*4</del>	<del>0002B4</del>	<del>JSYOUT F</del>	<del>I*4</del>	<del>0002B8</del>	<del>READIN SFA</del>	<del>R*8</del>	<del>0002E8</del>			
<del>RTAPE4 SF XF</del>	<del>R*8</del>	<del>R*8</del>	<del>000000</del>	<del>SUNLGT</del>	<del>R*8</del>	<del>0002D8</del>	<del>XNINES</del>	<del>R*8</del>	<del>0002E0</del>						

LABEL	ADDR	LABEL	ADDR	LABEL	ADDR	LABEL	ADDR
8	006B58	10	000B88	700	000B96 NR	702	000BAC
7CA	00CBC2	100	000BD8	706	000BEE	200	000BF4
710	006D7C NR	300	006D82	712	000F12 NR	720	000F9C NR
400	00CFA2	502	000FE8	730	000FF6	600	000FFC
999	001050						

~~\*OPTIONS IN EFFECT\*~~ NAME= MAIN,OPT=00,LINENGT=58,SIZE=000K,  
~~\*OPTIONS IN EFFECT\*~~ SCURGE,EBGDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,LD,XREF  
~~\*STATISTICS\*~~ SOURCE STATEMENTS = 71, PROGRAM SIZE = 4278  
~~\*STATISTICS\*~~ NO DIAGNOSTICS GENERATED  
~~\*\*\*\*\* END OF COMPILE \*\*\*\*\*~~ 113K BYTES OF CORE NOT USED

CCMPILER-OPTIONS NAME= MAIN,OPT=00,LINECNT=58,SIZE=0000K,  
SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,IC,XREF

ISN 0002

SUBROUTINE CHKREC

C PURPOSE

C SUBROUTINE CHKREC IS USED TO CHECK BINARY ORB3A TAPES WHICH HAD  
C AN ABNORMAL RUN TERMINATION WHEN BEING GENERATED. CERTAIN WORDS  
C IN EACH RECORD OF THIS TYPE OF ORB3A TAPE ARE CHECKED FOR DATA  
C ERRORS AND EACH RECORD IS CHECKED FOR A READ ERROR. THE FIRST  
C INPUT ORB3A RECORD TO FAIL ANY ONE OF THESE CHECKS CAUSES AN  
C OUTPUT BINARY ORB3A TAPE TO BE GENERATED WITH THE PERIOD OF DATA  
C EXTENDING THROUGH THE NEXT TO THE LAST RECORD BEFORE THE  
C CHECK-FAIL RECCRD. THE OUTPUT TAPE HAS A REVISED TITLE RECORD  
C CONTAINING THE NEW END TIME OF THE SATELLITE DATA.

C CALLING SEQUENCE

C CALL CHKREC

C THERE ARE NO ARGUMENTS IN THE CALLING SEQUENCE.

C INPUT(THROUGH COMMON)

C TITLE = A 256-WORD ARRAY CONTAINING AN ORB3A TITLE RECORD.

C OUTPUT(THROUGH COMMON)

C NONE.

C MAJOR VARIABLES(IN ADDITION TO ABOVE)

C IDISK = FORTRAN LOGICAL UNIT NO. FOR DISK(14).

C IERR = ERROR INDICATOR REFLECTING UNUSUAL CONDITIONS  
C ENCOUNTERED IN READING AN INPUT ORB3A RECORD.

C =0, NO UNUSUAL CONDITIONS.

C =1, END-OF-FILE.

C =4, PERMANENT READ ERROR. DATA RETURNED BUT ITS  
C VALIDITY IS QUESTIONABLE.

C IWORD = FLAG USED IN WSNEOF(ENTRY POINT TO SUBROUTINE  
C RWTAP4) PROCESSING FOR BRANCHING,  
C SET BY CALLING ROUTINE.

C =1, WSNEOF WRITES ONE SENTINEL ITEM RECORD, TWO  
C SENTINEL RECCRDS, AND AN END-OF-FILE ON OUTPUT  
C ORB3A TAPE.

C =2, WSNEOF WRITES TWO SENTINEL RECORDS AND AN  
C END-OF-FILE ON OUTPUT ORB3A TAPE.

C JSYGUT = FORTRAN LOGICAL UNIT NO. FOR SYSTEM PRINTER(6).

C READIN = A 256-WORD ARRAY CONTAINING AN ORB3A DATA RECORD  
C (OR SENTINEL ITEM RECORD AT END OF CHKREC).

C READIN(1) = DATA ITEM TYPE INDICATOR OF 1ST SATELLITE DATA  
C ITEM IN ORB3A RECORD. SHOULD HAVE 1 OF THE  
C FOLLOWING VALUES

C =1, REGULAR SATELLITE DATA ITEM.

C =2, ASCENDING NODE CROSSING DATA ITEM.

C =3, NORTH POINT DATA ITEM.

C =4, DESCENDING NODE DATA ITEM.

C =5, SOUTH POINT DATA ITEM.

C =6, SUNLIGHT ENTRANCE DATA ITEM.

C =7, SUNLIGHT EXIT DATA ITEM.

C READIN(3) = DAY OF YEAR OF 1ST SATELLITE DATA ITEM IN ORB3A  
C RECORD.

C READIN(4) = SECONDS OF DAY OF 1ST SATELLITE DATA ITEM IN ORB3A  
C RECORD.

C READIN(212) = YEAR-MONTH-DAY OF LAST SATELLITE DATA ITEM IN  
C ORB3A RECORD.

~~C READIN(213) = DAY OF YEAR OF LAST SATELLITE DATA ITEM IN ORB3A~~  
~~C RECORD.~~  
~~C READIN(214) = SECONDS OF DAY OF LAST SATELLITE DATA ITEM IN~~  
~~C ORB3A RECORD.~~  
~~C READIN(232) = 1ST WORD OF SPECIAL DATA ITEM IN ORB3A RECORD~~  
~~C WHICH IS THE TYPE INDICATOR FOR THIS SPECIAL DATA~~  
~~C ITEM. SHOULD HAVE THE VALUE OF 99.~~  
~~C READIN(234) = 3RD WORD OF SPECIAL DATA ITEM IN ORB3A RECORD~~  
~~C WHICH INDICATES WHETHER OR NOT AN ASCENDING NODE~~  
~~C CROSSING DATA ITEM EXISTS IN THE RECORD. SHOULD~~  
~~C HAVE THE VALUE OF 999, OR BE EQUAL TO A VALUE~~  
~~C BETWEEN 0 AND 100 PERCENT INCLUSIVE.~~  
~~C TITLE(5) = SATELLITE DATA START TIME DAY OF YEAR.~~  
~~C TITLE(7) = SATELLITE DATA END TIME YEAR-MONTH-DAY.~~  
~~C TITLE(8) = SATELLITE DATA END TIME DAY OF YEAR.~~  
~~C TITLE(9) = SATELLITE DATA END TIME SECONDS OF DAY.~~  
~~C XDATE = LOCATION FOR KEEPING A RUNNING COUNT OF DAY OF~~  
~~C YEAR OF 1ST SATELLITE DATA ITEM IN ORB3A RECORDS.~~

~~C REFERENCE~~  
~~C IBM FEDERAL SYSTEMS DIVISION, GAITHERSBURG, MARYLAND, "ORBITAL~~  
~~C DETERMINATION UTILITY PROGRAMS, "CONTRACT NAS 5-10022, MARCH 1970~~  
~~C (TELOR3 PROGRAM SECTION)~~

~~C METHOD~~  
~~C BACKSPACING AND/OR REWINDING A 7-TRACK BINARY INPUT ORB3A TAPE~~  
~~C IS NOT ALLOWED WHEN USING THE SPECIAL PURPOSE FORTRAN LIBRARY~~  
~~C SUBROUTINE, DBFOR, WHICH IS REQUIRED FOR READING THIS INPUT TAPE~~  
~~C (SEE SUBROUTINE RWTAP4). SINCE THE CAPABILITY IS DESIRED IN~~  
~~C CHKREC FOR BACKSPACING AND/OR REWINDING THE INFORMATION~~  
~~C CONTAINED IN THE DATA RECORDS ON AN INPUT ORB3A TAPE, CHKREC~~  
~~C COPIES ONTO A DISK THE INPUT ORB3A DATA RECRD(S) (INCLUDING ANY~~  
~~C HAVING READ ERRORS) UP TO THE END OF FILE. AN EOF IS WRITTEN ON~~  
~~C THE DISK, THE DISK IS REWOUND, AND CHKREC ENTERS A LOOP WHICH DOES~~  
~~C THE FOLLOWING~~

- ~~C 1. READS A RECORD FROM THE DISK INTO THE READIN ARRAY AND TESTS~~  
~~C FOR A READ ERROR, AN END-OF-FILE, AND PROPER DATA IN 5 KEY~~  
~~C WORDS IN READIN.~~
- ~~C 2. IF ALL OF THE TESTS ARE PASSED, CHKREC RETURNS TO THE~~  
~~C BEGINNING OF THE LOOP AND ANOTHER RECORD IS READ FROM THE~~  
~~C DISK INTO THE READIN ARRAY.~~
- ~~C 3. IF ANY 1 OF THE TESTS IS FAILED, AN APPROPRIATE ERROR MESSAGE~~  
~~C IS PRINTED, A LOOP EXIT OCCURS, AND THE FOLLOWING STEPS ARE~~  
~~C PERFORMED~~
  - ~~C A. THE NEXT TO THE LAST RECORD BEFORE THE CHECK-FAIL RECORD~~  
~~C IS READ FROM THE DISK INTO READIN.~~
  - ~~C B. THE TIME OF OCCURRENCE OF THE LAST SATELLITE DATA ITEM~~  
~~C IN READIN IS STORED IN THE SATELLITE DATA END TIME~~  
~~C POSITIONS IN THE TITLE ARRAY.~~
  - ~~C C. THE TITLE ARRAY NOW CORRESPONDS TO A REVISED TITLE~~  
~~C RECORD CONTAINING THE NEW END TIME OF THE SATELLITE DATA~~  
~~C AND IS WRITTEN AS THE TITLE RECORD OF THE OUTPUT ORB3A~~  
~~C TAPE.~~
  - ~~C D. THE DISK IS REWOUND AND A READ AND COPY OPERATION (FROM~~  
~~C DISK TO OUTPUT ORB3A) IS EXECUTED UNTIL THE TIME OF~~  
~~C OCCURRENCE OF THE LAST SATELLITE DATA ITEM IN A RECORD~~  
~~C COPIED ONTO THE OUTPUT ORB3A MATCHES THE SATELLITE DATA~~

```

C          END TIME CONTAINED IN THE OUTPUT ORB3A TITLE RECORD.
C          E.WSNEOF IS CALLED(ENTRY POINT TO SUBROUTINE RWTAP4) TO
C          WRITE 1 SENTINEL ITEM RECORD,2 SENTINEL RECORDS,AND AN
C          END-OF-FILE CN THE OUTPUT ORB3A TAPE.
C          F.CONTROL IS RETURNED TO CHKREC AND A MESSAGE IS PRINTED
C          OUT STATING A NCRMAL TERMINATION OF THE CHECK RECORD
C          OPTICK HAS OCCURRED.
C
C          REQUIRED SUBPROGRAMS
C          SUBROUTINE SUBPROGRAMS
C          RTAPE4,WSNEOF,WTAP54(ALL 3 ARE ENTRY POINTS TO RWTAP4).
C          FUNCTION SUBPRCGRAMS
C          NC FUNCTIONS ARE CALLED BY CHKREC.
C          LANGUAGE AND SYSTEM
C          CHKREC HAS BEEN COMPILED UNDER FORTRAN IV,LEVEL H,OPTIMIZATION
C          LEVEL OF ZERO ON THE IBM 360/95 USING RELEASE 19.
C          PROGRAMMER
C          ROBERT K.SCHLESSINGER
C          COMPUTER SCIENCES CORPORATION
C          SILVER SPRING,MARYLAND
C          PREPARED FOR
C          GODDARD SPACE FLIGHT CENTER
C          NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
C          GREENBELT,MARYLAND
C          CONTRACT NUMBER AND COMPLETION DATE
C          NAS 5-11790,TASK 72,SUBTASK H
C          COMPLETED ON 7 MAY 1971
C
C *** START PROGRAM *****
C
ISN 0003      IMPLICIT REAL*8 (A-H,O-U,W-Z)
ISN 0004      COMMGN          TITLE(256),READIN(256)          ,PERIOD          ,ISAVE(6) ,
C          1          ISET
ISN 0005      DATA          IDISK          ,JSYCUT / 14, 6 /
C          TC FACILITATE THE USE OF DEBUGGING TOOLS,ALL *GC TO* AND *CALL*
C          STATEMENTS WHICH WERE NOT REFERENCED INITIALLY HAVE BEEN ASSIGNED
C          STATEMENT LABELS FROM 700-899 INCLUSIVE.
C          THE *RETURN* STATEMENT(NOT REFERENCED INITIALLY.) HAS BEEN ASSIGNED
C          THE LABEL 999.
C
C          STORE SATELLITE DATA START TIME DAY OF YEAR IN LOCATION FOR
C          KEEPING A RUNNING COUNT OF DAY OF YEAR OF 1ST SATELLITE DATA ITEM
C          IN ORB3A RECCRDS.
ISN 0006      XDATE=TITLE(5)
C          INPUT ORB3A TITLE RECORD HAS BEEN PLACED IN TITLE ARRAY BY MAIN.
C
C          BEGIN COPYING ORB3A DATA RECORDS FROM INPUT TAPE TO SCRATCH DISK.
ISN 0007      5 CALL RTAPE4(READIN,IERR)
C          IF END-OF-FILE(ECE) HAS BEEN READ,STOP COPYING(GO TO 6).
ISN 0008      7C0 IF(IERR.EQ.1) GC TO 6
ISN 0010      WRITE(IDISK) READIN
ISN 0011      7C2 GC TO 5
C          END COPYING FROM INPUT TAPE TO DISK.
ISN 0012      6 CONTINUE
ISN 0013      END FILE IDISK
ISN 0014      REWIND IDISK

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```

C READ AN ORB3A DATA RECORD FROM DISK INTO READIN ARRAY.
ISN 0015 READ(IDISK,ERR=530,END=540) READIN
C IF DAY OF YR OF 1ST DATA ITEM IN THIS RECORD HAS BECOME 1 GREATER
C THAN RUNNING COUNT DAY OF YR, INCREMENT RUNNING COUNT BY 1
ISN 0016 IF((READIN(3) XDATE) .EQ. 1.00) XDATE=XDATE+1
C IF DAY OF YR OF 1ST DATA ITEM IN THIS RECORD EQUALS 1ST DAY OF NEW
C YR AND RUNNING COUNT EQUALS 365 OR 366, SET RUNNING COUNT TO 1
ISN 0018 IF(READIN(3) .EQ. 1.00 .AND. XDATE .EQ. 365.00 .OR. READIN(3)
1 .EQ. 1.00 .AND. XDATE .EQ. 366.00) XDATE=1
C IF DAY OF YR OF 1ST DATA ITEM IN THIS RECORD EQUALS RUNNING COUNT,
C DAY OF YR OF 1ST ITEM HAS NOT INCREASED MORE THAN 1 OVER PREVIOUS
C VALUE AND CHECK NO.1 HAS BEEN PASSED(GO TO 20).
ISN 0020 704 IF((READIN(3) .EQ. XDATE) GO TO 20
C PRINT APPROPRIATE CHECK-FAIL MESSAGE.
ISN 0022 WRITE(JSYOUT,2000)
C PRINT OUT INPUT ORB3A DATA RECORD WHICH FAILED A CHECK.
ISN 0023 710 GO TO 555
C IF SECONDS OF DAY OF 1ST SATELLITE DATA ITEM IN THIS RECORD ARE LT
C 86400 AND GE ZERO, CHECK NO.2 HAS BEEN PASSED(GO TO 21).
ISN 0024 20 IF(READIN(4) .LT. 86400.00 .AND. READIN(4) .GE. 0.00) GO TO 21
C PRINT APPROPRIATE CHECK-FAIL MESSAGE.
ISN 0026 WRITE(JSYOUT,2010)
C PRINT OUT INPUT ORB3A DATA RECORD WHICH FAILED A CHECK.
ISN 0027 720 GO TO 555
C IF 3RD WORD OF SPECIAL DATA ITEM IN THIS RECORD EQUALS 999 OR HAS
C A VALUE LE 100 PERCENT, CHECK NO.3A HAS BEEN PASSED(GO TO 22).
ISN 0028 21 IF(READIN(234) .EQ. 999.00 .OR. READIN(234) .LE. 100.00) GO TO 22
C PRINT APPROPRIATE CHECK-FAIL MESSAGE.
ISN 0030 WRITE(JSYOUT,2020)
C PRINT OUT INPUT ORB3A DATA RECORD WHICH FAILED A CHECK.
ISN 0031 730 GO TO 555
C IF 3RD WORD OF SPECIAL DATA ITEM IN THIS RECORD GE ZERO, THIS 3RD
C WORD MUST BE EQUAL TO 999 OR HAVE A VALUE BETWEEN ZERO AND 100
C PERCENT INCLUSIVE AND, THEREFORE, CHECK NO.3B HAS BEEN PASSED
C (GO TO 23).
ISN 0032 22 IF(READIN(234) .GE. 0.00) GO TO 23
C PRINT APPROPRIATE CHECK-FAIL MESSAGE.
ISN 0034 WRITE(JSYOUT,2020)
C PRINT OUT INPUT ORB3A DATA RECORD WHICH FAILED A CHECK.
ISN 0035 740 GO TO 555
C IF TYPE INDICATOR OF 1ST SATELLITE DATA ITEM IN THIS RECORD HAS A
C VALUE BETWEEN 1 AND 7 INCLUSIVE, CHECK NO.4 HAS BEEN PASSED
C (GO TO 24).
ISN 0036 23 IF(READIN(1) .LE. 7.00 .AND. READIN(1) .GT. 0.00) GO TO 24
C PRINT APPROPRIATE CHECK-FAIL MESSAGE.
ISN 0038 WRITE(JSYOUT,2030)
C PRINT OUT INPUT ORB3A DATA RECORD WHICH FAILED A CHECK.
ISN 0039 750 GO TO 555
C IF 1ST WORD OF SPECIAL DATA ITEM IN THIS RECORD EQUALS 99, CHECK
C NO.5 HAS BEEN PASSED AND NEXT INPUT ORB3A DATA RECORD SHOULD BE
C EXAMINED(GO TO 1).
ISN 0040 24 IF(READIN(232) .EQ. 99.00) GO TO 1
C PRINT APPROPRIATE CHECK-FAIL MESSAGE.
ISN 0042 WRITE(JSYOUT,2040)
C PRINT OUT INPUT ORB3A DATA RECORD WHICH FAILED A CHECK.
ISN 0043 760 GO TO 555

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ISN 0044 C IF HERE, A READ ERROR HAS OCCURRED.
ISN 0044 530 WRITE(JSYOUT,2050)
ISN 0045 C POSITION DISK TO BEGINNING OF NEXT TO LAST RECORD BEFORE READ
ISN 0045 C ERROR RECORD.
ISN 0045 770 GO TO 565
ISN 0046 C IF HERE, AN END OF FILE HAS BEEN READ ON DISK.
ISN 0046 540 WRITE(JSYOUT,2060)
ISN 0047 C POSITION DISK TO BEGINNING OF NEXT TO LAST RECORD BEFORE EOF.
ISN 0047 780 GO TO 560
ISN 0048 C INPUT ORB3A DATA RECORD WHICH FAILED A CHECK IS NOW PRINTED:
ISN 0048 555 WRITE(JSYOUT,2070)
ISN 0049 DC 400 K=1,247,6
ISN 0050 M=K+5
ISN 0051 WRITE(JSYOUT,2080) (READIN(I), I=K,M)
ISN 0052 400 CONTINUE
ISN 0053 C POSITION DISK TO BEGINNING OF NEXT TO LAST RECORD BEFORE THE
ISN 0053 C CHECK-FAIL RECORD.
ISN 0053 560 BACKSPACE IDISK
ISN 0054 565 BACKSPACE IDISK
ISN 0055 BACKSPACE IDISK
ISN 0056 C READ LAST GOOD INPUT ORB3A DATA RECORD INTO READIN(NEXT TO LAST
ISN 0056 C RECORD BEFORE CHECK-FAIL RECORD).
ISN 0056 READ(IDISK) READIN
ISN 0057 C STORE END TIME OF LAST GOOD ORB3A RECORD IN TITLE ARRAY.
ISN 0057 TITLE(7)=READIN(212)
ISN 0058 TITLE(8)=READIN(213)
ISN 0059 TITLE(9)=READIN(214)
ISN 0060 C WRITE OUTPUT ORB3A TITLE RECORD WHICH NOW CONTAINS NEW END TIME
ISN 0060 C OF SATELLITE DATA.
ISN 0060 750 CALL WTape4(TITLE)
ISN 0061 REWIND IDISK
ISN 0062 C READ AN ORB3A DATA RECORD FROM DISK.
ISN 0062 10 READ(IDISK) READIN
ISN 0063 C COPY THIS DATA RECORD ONTO OUTPUT ORB3A TAPE.
ISN 0063 500 CALL WTape4(READIN)
ISN 0064 C IF END TIME OF THIS DATA RECORD EQUALS DATA END TIME IN OUTPUT
ISN 0064 C ORB3A TITLE RECORD, NO MORE INPUT ORB3A RECORDS ARE TO BE COPIED
ISN 0064 C ONTO OUTPUT ORB3A TAPE(GO TO 100)
ISN 0064 802 IF(READIN(212).EQ.TITLE(7).AND.READIN(213).EQ.TITLE(8).AND.READIN(
ISN 0064 214).EQ.TITLE(9)) GO TO 100
ISN 0065 C LAST GOOD INPUT ORB3A RECORD HAS NOT BEEN COPIED ONTO OUTPUT ORB3A
ISN 0065 C TAPE. READ ANOTHER ORB3A DATA RECORD FROM DISK.
ISN 0066 810 GO TO 10
ISN 0066 C LAST GOOD INPUT ORB3A DATA RECORD HAS BEEN COPIED ONTO OUTPUT
ISN 0066 C ORB3A TAPE. NOW PRINT THIS RECORD OUT.
ISN 0067 100 WRITE(JSYOUT,2090)
ISN 0068 DC 150 K=1,247,6
ISN 0069 M=K+5
ISN 0070 WRITE(JSYOUT,2080) (READIN(I), I=K,M)
ISN 0071 150 CONTINUE
ISN 0072 C PRINT OUTPUT ORB3A TAPE TITLE RECORD.
ISN 0072 WRITE(JSYOUT,2100)
ISN 0073 DC 500 K=1,247,6
ISN 0074 M=K+5
ISN 0075 WRITE(JSYOUT,2080) (TITLE(I), I=K,M)
ISN 0076 500 CONTINUE

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-----C-----CREATE SENTINEL ITEM RECORD.
ISN 0077      DC 200 I=1,21
ISN 0078      READIN(I)=99999999,00
ISN 0079      200 CCNTINUE
-----C-----CREATE SENTINEL RECORD.
ISN 0080      TITLE(1)=99999999.DO
-----C-----SET IWORD=1 SO THAT %SNEOF(ENTRY POINT TO SUBROUTINE RWTAP4) WILL
C-----WRITE 1 SENTINEL ITEM RECORD,2 SENTINEL RECORDS,AND AN EOF
C-----ON OUTPUT ORB3A TAPE.
ISN 0081      IWORD=1
-----C-----CALL %SNEOF TO WRITE THESE RECORDS.
ISN 0082      820 CALL %SNEOF(READIN,TITLE,IWORD)
C-----PRINT NORMAL TERMINATION MESSAGE.
ISN 0083      WRITE(JSYOUT,2110)
ISN 0084      2000 FERMAT(1H0,20X, 69HDAY OF YEAR OF 1ST DATA ITEM IN A RECORD DOES N
NOT HAVE A LEGAL VALUE./
2-----1H,20X, 66HDAY OF YEAR OF THIS DATA ITEM SHOULD NOT INCREA
SE MORE THAN 1 OVER/
4-----1H,20X, 50H1ST DATA ITEM DAY OF YEAR IN LAST PREVIOUS RECO
RD.)
ISN 0085      2010 FERMAT(1H0,20X, 72HSECONDS OF DAY OF 1ST DATA ITEM IN A RECORD ARE
1 NOT WITHIN LEGAL LIMITS./
2-----1H,20X, 68HSECONDS SHOULD BE LESS THAN 66400 AND GREATER T
HAN OR EQUAL TO ZERO.)
ISN 0086      2020 FERMAT(1H0,20X, 70H3RD WORD OF SPECIAL DATA ITEM IN A RECORD DOES
INCT HAVE A LEGAL VALUE./
2-----1H,20X, 79H3RD WORD SHOULD EQUAL 999, OR HAVE A VALUE BETW
3EEN 0 AND 100 PERCENT INCLUSIVE.)
ISN 0087      2030 FERMAT(1H0,20X, 71HTYPE INDICATOR OF 1ST DATA ITEM IN A RECORD IS
INCT WITHIN LEGAL LIMITS./
2-----1H,20X, 61HTYPE INDICATOR SHOULD HAVE A VALUE BETWEEN 1 AN
3D 7 INCLUSIVE.)
ISN 0088      2040 FERMAT(1H0,20X, 70H1ST WORD OF SPECIAL DATA ITEM IN A RECORD DOES
INCT HAVE A LEGAL VALUE./
2-----1H,20X, 25H1ST WORD SHOULD EQUAL 99.)
ISN 0089      2050 FERMAT(1H0,20X, 46HA READ ERRGR HAS OCCURRED CN INPUT ORB3A TAPE.)
ISN 0090      2060 FERMAT(1H0,20X, 78HSENTINEL TYPE RECORDS ARE MISSING CN INPUT ORB3
1A TAPE.END-OF-FILE ENCCUNTEREC.)
ISN 0091      2070 FERMAT(1H1,30X, 34HINPUT ORB3A CHECK FAIL DATA RECORD)
ISN 0092      2080 FERMAT(1H,10X,6D15.8)
ISN 0093      2090 FERMAT(1H1,32X, 45HLAST DATA RECORD WRITTEN CN OUTPUT ORB3A TAPE)
ISN 0094      2100 FERMAT(1H1,40X, 30HOUTPUT ORB3A TAPE TITLE RECCRD)
ISN 0095      2110 FERMAT(1H0,11X, 42HNORMAL TERMINATION OF CHECK RECORD OPTION.)
ISN 0096      999 RETURN
ISN 0097      END

```

SYMBOL	INTERNAL STATEMENT NUMBERS																		
I	0051	0051	0051	0070	0070	0070	0075	0075	0075	0077	0078								
K	0049	0050	0051	0068	0069	0070	0073	0074	0075										
M	0050	0051	0069	0070	0074	0075													
IERR	0007	0008																	
ISET	0004																		
IDISK	0005	0010	0013	0014	0015	0053	0054	0055	0056	0061	0062								
ISAVE	0004																		
IWORD	0001	0002																	
TITLE	0004	0006	0057	0058	0059	0060	0064	0064	0064	0075	0080	0082							
XDATE	0006	0016	0016	0016	0018	0018	0018	0020											
CHKREC	0002																		
JSYOUT	0005	0022	0026	0030	0034	0038	0042	0044	0046	0048	0051	0057	0070	0072	0075	0083			
PERIOD	0004																		
READIN	0004	0007	0010	0015	0016	0018	0018	0020	0024	0024	0028	0028	0032	0036	0036	0040	0051	0056	0057
	0058	0059	0062	0063	0064	0064	0064	0070	0078	0082									
RTAPE4	0007																		
WSNEOF	0002																		
WTAPE4	0060	0063																	

\*\*\*\*\*FORTRAN CROSS REFERENCE LISTING\*\*\*\*\*

LABEL	DEFINED	REFERENCES
1	0015	0040
5	0007	0011
6	0012	0008
10	0062	0066
20	0024	0020
21	0028	0024
22	0032	0028
23	0036	0032
24	0040	0036
100	0067	0064
150	0071	0068
200	0079	0077
400	0052	0049
500	0076	0073
530	0044	0015
540	0046	0015
555	0048	0023 0027 0031 0035 0039 0043
560	0053	0047
565	0054	0045
700	0006	
702	0011	
704	0020	
710	0023	
720	0027	
730	0031	
740	0035	
750	0039	
760	0043	
770	0045	
780	0047	
790	0060	
800	0062	
802	0064	
810	0066	
820	0082	
999	0096	
2000	0084	0022
2010	0085	0026
2020	0086	0030 0034
2030	0087	0038
2040	0088	0042
2050	0089	0044
2060	0090	0046
2070	0091	0048
2080	0092	0051 0070 0075
2090	0093	0067
2100	0094	0072
2110	0095	0063

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.		
<del>I</del>	<del>SF</del>	<del>I*4</del>	<del>000590</del>	<del>K</del>	<del>SF</del>	<del>I*4</del>	<del>000594</del>	<del>M</del>	<del>SF</del>	<del>I*4</del>	<del>000598</del>	<del>IERR</del>	<del>SFA</del>	<del>I*4</del>	<del>00059C</del>		
ISFT	C	I*4	N.R.	IDISK	F	I*4	0005A0	ISAVE	C	I*4	N.R.	IWORD	SFA	I*4	0005A4		
<del>TITLE</del>	<del>SFA</del>	<del>G</del>	<del>R*8</del>	<del>000000</del>	<del>XDATE</del>	<del>SF</del>	<del>R*8</del>	<del>0005B0</del>	<del>CHKREC</del>	<del>R*8</del>	<del>0005B8</del>	<del>IBCOM</del>	<del>F</del>	<del>XF</del>	<del>I*4</del>	<del>000000</del>	
JSVOLT	F	I*4	0005A8	PERIOD	C	R*8	N.R.	READIN	SFA	C	R*8	000800	RTAPE4	SF	XF	R*8	000000
<del>MSNECF</del>	<del>SF</del>	<del>XF</del>	<del>R*8</del>	<del>000000</del>	<del>RTAPE4</del>	<del>SF</del>	<del>XF</del>	<del>R*8</del>	<del>000000</del>								

~~\*\*\*\*\* COMMON INFORMATION \*\*\*\*\*~~

<del>NAME OF COMMON BLOCK * * SIZE OF BLOCK 001024 HEXADECIMAL BYTES</del>															
VAR. NAME	TYPE	REL.	ADDR.	VAR. NAME	TYPE	REL.	ADDR.	VAR. NAME	TYPE	REL.	ADDR.	VAR. NAME	TYPE	REL.	ADDR.
<del>TITLE</del>	<del>R*8</del>	<del>000000</del>		<del>READIN</del>	<del>R*8</del>	<del>000800</del>		<del>PERIOD</del>	<del>R*8</del>	<del>N.R.</del>		<del>ISAVE</del>	<del>I*4</del>	<del>N.R.</del>	
ISFT	I*4		N.R.												

LABEL	ADDR	LABEL	ADDR	LABEL	ADDR	LABEL	ADDR
5	0066C0	700	0006CE NR	702	0006F8 NR	6	0006FE
1	00C718	704	0007DC	710	000804 NR	20	00080A
720	000840 NR	21	00084C	730	000880 NR	22	000886
740	0008AC NR	23	0008B2	750	0008E8 NR	24	0008EE
760	000914 NR	530	00091A	770	000930 NR	540	000936
780	00094C NR	555	000952	400	0009C2	550	0009DB
565	0009E4	790	000A34 NR	10	000A50	800	000A6C NR
802	00CA7A NR	810	000AC8	100	000ACE	150	000B3E
500	000BC2	200	000BF4	820	000C1E NR	999	000C40 NR

~~\*OPT-ICNS IN EFFECT\*~~      ~~NAME= MAIN,OPT=00,LINECNT=58,SIZE=000K.~~

~~\*OPT-IGNS IN EFFECT\*~~      ~~SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,IC,XREF~~

~~\*STATISTICS\*~~      ~~SOURCE STATEMENTS = 96, PROGRAM SIZE = 3174~~

~~\*STATISTICS\* NO DIAGNOSTICS GENERATED~~

~~\*\*\*\*\* END OF COMPILEATION \*\*\*\*\*~~      ~~105K BYTES OF CORE NOT USED~~

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COMPILER OPTIONS NAME=MAIN,OPT=00,LINECNT=58,SIZE=0000K,
SOURCE,RECDIC,NOLIST,NODECK,LOAD,MAP,NCEDIT,IC,XREF
ISN 0002 SUBROUTINE RWTAP4
C      PURPOSE
C      SUBROUTINE RWTAP4 IS USED TO READ A 7 TRACK BINARY CRB3A SINGLE
C      PRECISION FLOATING POINT TAPE WHICH IS THE INPUT TO THE S/360
C      TELCP3 PROGRAM. IN ADDITION, RWTAP4 IS CALLED TO CREATE AN OUTPUT
C      ORB3A TAPE IN THE SAME FORMAT AS THE INPUT CRB3A TAPE.
C      CALLING SEQUENCE (STANDARD ENTRY POINT)
C      CALL RWTAP4
C      THERE ARE NO ARGUMENTS IN THE CALLING SEQUENCE.
C      CALLING SEQUENCE (NON-STANDARD ENTRY POINT NO. 1)
C      CALL RTAPE4 (RECORD, IERR)
C      INPUT
C      NONE.
C      OUTPUT
C      RECORD = A 256-WORD ARRAY USED TO STORE A RECORD READ FROM THE
C      INPUT CRB3A TAPE.
C      IERR = ERROR INDICATOR REFLECTING UNUSUAL CONDITIONS
C      ENCOUNTERED IN READING AN INPUT CRB3A RECORD.
C      = 0, NO UNUSUAL CONDITIONS.
C      = 1, END-OF-FILE.
C      = 4, PERMANENT READ ERROR, DATA RETURNED BUT ITS
C      VALIDITY IS QUESTIONABLE.
C      CALLING SEQUENCE (NON-STANDARD ENTRY POINT NO. 2)
C      CALL WTAPE4 (RECORD)
C      INPUT
C      RECCRD = A 256-WORD ARRAY USED TO STORE A TITLE RECORD OR A DATA
C      RECORD READY TO BE WRITTEN ON THE OUTPUT ORB3A TAPE.
C      OUTPUT
C      NONE.
C      CALLING SEQUENCE (NON-STANDARD ENTRY POINT NO. 3)
C      CALL WSNECF (RECORD, RECRD1, IWORD)
C      INPUT
C      RECORD = A 256-WORD ARRAY USED TO STORE A SENTINEL ITEM RECORD
C      READY TO BE WRITTEN ON THE OUTPUT ORB3A TAPE.
C      RECRD1 = A 256-WORD ARRAY USED TO STORE A SENTINEL RECORD READY
C      TO BE WRITTEN ON THE OUTPUT ORB3A TAPE.
C      IWORD = FLAG FOR BRANCHING.
C      = 1, WSNECF WRITES 1 SENTINEL ITEM RECORD, 2 SENTINEL
C      RECORDS, AND AN END-OF-FILE ON THE OUTPUT ORB3A TAPE.
C      = 2, WSNECF WRITES 2 SENTINEL RECORDS AND AN END-OF-FILE
C      ON THE OUTPUT ORB3A TAPE.
C      OUTPUT
C      NONE.
C      INPUT (THROUGH COMMON)
C      NONE.
C      OUTPUT (THROUGH COMMON)
C      NONE.
C      MAJOR VARIABLES (IN ADDITION TO ABOVE)
C      JOUTBN = FORTRAN LOGICAL UNIT NO. FOR OUTPUT CRB3A TAPE (15).
C      REFERENCES
C      WOLF RESEARCH AND DEVELOPMENT CORPORATION, RIVERCALE, MARYLAND.

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~~..G~~ ~~SPACE AND EARTH SCIENCES COMPUTING CENTER USER'S GUIDE,~~  
~~C~~ ~~CONTRACT NAS 5-11735, MOD 3, REVISED 1 MAY 1970~~  
~~C~~ ~~(DBLOCK/CNVRT PACKAGE, SECTION II, PAGES 225, 226)~~  
~~C~~  
~~C~~ ~~COMPUTER PROGRAM LIBRARY, GODDARD SPACE FLIGHT CENTER, BLDG. 16A,~~  
~~C~~ ~~ROOM 25, GREENBELT, MARYLAND, REGISTERED COMPUTER PROGRAM~~  
~~C~~ ~~NUMBER A00042-DATCON.~~  
~~C~~ ~~METHOD~~  
~~C~~ ~~FOR EACH RECORD TO BE READ FROM THE 7-TRACK BINARY INPUT ORB3A~~  
~~C~~ ~~TAPE CONTAINING SINGLE PRECISION FLOATING POINT DATA, IT IS~~  
~~C~~ ~~NECESSARY TO MAKE A CALL TO ENTRY POINT RTAPE4 OF SUBROUTINE~~  
~~C~~ ~~RWTAP4. AFTER ENTERING AT RTAPE4, THE FOLLOWING STEPS ARE EXECUTED~~  
~~C~~  
~~C~~ ~~1. A CALL IS MADE TO THE SPECIAL PURPOSE FORTRAN LIBRARY~~  
~~C~~ ~~SUBROUTINE DBFOR (SEE 1ST REFERENCE ABOVE). DBFOR ALLOWS A~~  
~~C~~ ~~7-TRACK FORTRAN TAPE TO BE READ ON A S/360 SERIES COMPUTER~~  
~~C~~ ~~AND PROVIDES ONE LOGICAL RECORD IN PROPER FORMAT FOR~~  
~~C~~ ~~PROCESSING ACCORDING TO STEP 2 BELOW.~~  
~~C~~ ~~2. A CALL IS MADE TO THE SPECIAL PURPOSE FORTRAN LIBRARY~~  
~~C~~ ~~SUBROUTINE CNVRT (SEE 1ST REFERENCE ABOVE) IMMEDIATELY AFTER~~  
~~C~~ ~~THE CALL TO DBFOR. THE CNVRT SUBROUTINE CONVERTS THE SINGLE~~  
~~C~~ ~~PRECISION 7094 FLOATING POINT DATA IN THE LOGICAL RECORD~~  
~~C~~ ~~PROVIDED BY DBFOR TO DOUBLE WORD S/360 FLOATING POINT~~  
~~C~~ ~~STRUCTURED DATA AND PLACES THE RESULTS IN THE 256-WORD ARRAY~~  
~~C~~ ~~NAMED RECCRD.~~  
~~C~~  
~~C~~ ~~FOR EACH RECORD TO BE WRITTEN ON THE 7-TRACK BINARY OUTPUT ORB3A~~  
~~C~~ ~~TAPE CONTAINING SINGLE PRECISION FLOATING POINT DATA, IT IS~~  
~~C~~ ~~NECESSARY TO MAKE A CALL TO ENTRY POINT WTAPE4 OF SUBROUTINE~~  
~~C~~ ~~RWTAP4. AFTER ENTERING AT WTAPE4 THE FOLLOWING STEPS ARE EXECUTED~~  
~~C~~  
~~C~~ ~~1. A CALL IS MADE TO DATCON (SEE 2ND REFERENCE ABOVE) WHICH~~  
~~C~~ ~~CONSISTS OF AN EXISTING SET OF S/360 ASSEMBLER LANGUAGE~~  
~~C~~ ~~SUBROUTINES MODIFIED FOR TELOR3 PROGRAM PURPOSES TO OMIT THE~~  
~~C~~ ~~COMPLEMENTING OF NEGATIVE NUMBERS WHEN PERFORMING THE~~  
~~C~~ ~~FOLLOWING MANIPULATION. DATCON CONVERTS THE DOUBLE WORD S/360~~  
~~C~~ ~~FLOATING POINT DATA IN THE ARRAY RECCRD TO SINGLE PRECISION~~  
~~C~~ ~~7094 FLOATING POINT DATA.~~  
~~C~~ ~~2. A SECOND CALL IS MADE TO DATCON WHICH WRITES THE CONVERTED~~  
~~C~~ ~~DATA (SINGLE PRECISION 7094 FLOATING POINT) AS 1 LOGICAL~~  
~~C~~ ~~RECORD ON THE 7-TRACK BINARY OUTPUT ORB3A TAPE.~~  
~~C~~  
~~C~~ ~~IN ORDER TO WRITE THE APPROPRIATE NO. OF SENTINEL ITEM AND/OR~~  
~~C~~ ~~SENTINEL RECORDS AND AN END-OF-FILE ON THE 7-TRACK OUTPUT ORB3A~~  
~~C~~ ~~TAPE, IT IS NECESSARY TO MAKE ONE CALL TO ENTRY POINT WSNEOF OF~~  
~~C~~ ~~SUBROUTINE RWTAP4. THE PRINCIPLE OF WRITING THESE SENTINEL TYPE~~  
~~C~~ ~~RECORDS IS IDENTICAL TO THAT EMPLOYED IN WTAPE4 ABOVE.~~  
~~C~~ ~~REQUIRED SUBPROGRAMS~~  
~~C~~ ~~SUBROUTINE SUBPROGRAMS~~  
~~C~~ ~~CNVRT, DATCON, DBFOR~~  
~~C~~ ~~FUNCTION SUBPROGRAMS~~  
~~C~~ ~~NO FUNCTIONS ARE CALLED BY RWTAP4.~~  
~~C~~ ~~LANGUAGE AND SYSTEM~~  
~~C~~ ~~RWTAP4 HAS BEEN COMPILED UNDER FORTRAN IV, LEVEL H, OPTIMIZATION~~  
~~C~~ ~~LEVEL OF ZERO ON THE IBM 360/95 USING RELEASE 19.~~  
~~C~~ ~~PROGRAMMER~~

```

C      ROBERT K. SCHLESSINGER
C      - COMPUTER SCIENCES CORPORATION
C      SILVER SPRING, MARYLAND
C      PREPARED FOR
C      GODDARD SPACE FLIGHT CENTER
C      NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
C      GREENBELT, MARYLAND
C      CONTRACT NUMBER AND COMPLETION DATE
C      NAS-5-11790, TASK 72, SUBTASK H
C      COMPLETED ON 7 MAY 1971
C
C *** START PROGRAM *****
C
ISN 0003      IMPLICIT REAL*8 (A-H,O-U,W-Z)
ISN 0004      DIMENSION      RECORD(256)      ,RECORD1(256)
ISN 0005      DATA          JOUTBN / 15 /
C      TO FACILITATE THE USE OF DEBUGGING TOOLS, ALL *GC TO* AND *CALL*
C      STATEMENTS WHICH WERE NOT REFERENCED INITIALLY HAVE BEEN ASSIGNED
C      STATEMENT LABELS FROM 700-999 INCLUSIVE.
C
C      INITIALIZATION CALL WHICH CAUSES THE OUTPUT ORB3A TAPE TO BE
C      GENERATED BY DATCON TO ACTUALLY HAVE A UNIVAC 1107
C      TYPE FORMAT.
ISN 0006      700 CALL DATCON(97)
C      INITIALIZATION CALL SPECIFYING FORTRAN LOGICAL UNIT NO. (JOUTBN) ON
C      WHICH OUTPUT ORB3A WILL BE WRITTEN AND SPECIFYING NO. OF 36-BIT
C      WORDS IN 1 RECORD ON OUTPUT TAPE(253 DATA WORDS, CONTROL WORDS ARE
C      NOT TO BE COUNTED).
ISN 0007      710 CALL DATCON(JOUTBN,253)
ISN 0008      720 GC TC 999
ISN 0009      ENTRY RTAPE4(RECORD,IERR)
C      THE FOLLOWING 2 CALLS TAKEN TOGETHER READ 1 RECORD FROM INPUT
C      ORB3A TAPE AND PLACE RESULTS IN ARRAY RECORD.
ISN 0010      730 CALL DBFOR(256,IADD,IERR)
ISN 0011      740 CALL CNVRT(IADD,RECORD,256,2,IERR,1)
ISN 0012      750 GO TO 999
ISN 0013      ENTRY WTAPE4(RECORD)
C      THE FOLLOWING 2 CALLS TAKEN TOGETHER WRITE 1 TITLE OR DATA RECORD
C      ON OUTPUT ORB3A TAPE USING DATA IN ARRAY RECORD.
ISN 0014      760 CALL DATCON(47,RECORD,253,JGUTBN)
ISN 0015      770 CALL DATCON(JOUTBN,-1)
ISN 0016      780 GC TC 999
ISN 0017      ENTRY WSNEOF(RECORD,RECORD1,IWORD)
C      IF LAST DATA RECORD TO BE WRITTEN ON OUTPUT ORB3A HAD LESS THAN 11
C      VALID DATA ITEMS, WRITE 2 SENTINEL RECORDS AND AN END-OF-FILE ON
C      OUTPUT ORB3A (IWORD=2). OTHERWISE, WRITE 1 SENTINEL ITEM RECORD, 2
C      SENTINEL RECORDS, AND AN END-OF-FILE (IWORD=1).
ISN 0018      782 IF(IWORD.NE.1) GO TO 10
C      IF HERE, WRITE 3 SENTINEL TYPE RECORDS AND AN END-OF-FILE ON OUTPUT
C      ORB3A.
C
C      THE FOLLOWING 2 CALLS TAKEN TOGETHER WRITE 1 SENTINEL ITEM RECORD
C      ON OUTPUT ORB3A TAPE USING DATA IN ARRAY RECORD.
ISN 0020      790 CALL DATCON(47,RECORD,253,JCUTBN)
ISN 0021      800 CALL DATCON(JOUTBN,-1)
ISN 0022      10 CONTINUE

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C IF HERE, WRITE 2 SENTINEL RECORDS AND AN END-OF-FILE ON OUTPUT
C ORB3A.
C
C THE FOLLOWING 2 CALLS TAKEN TOGETHER WRITE 1 SENTINEL RECORD ON
C OUTPUT ORB3A TAPE USING DATA IN ARRAY RECRD1.
ISN 0023 810 CALL DATCON(47, RECRD1, 253, JOUTBN)
ISN 0024 820 CALL DATCON(JOUTBN, 1)
C THE FOLLOWING 2 CALLS TAKEN TOGETHER WRITE 1 SENTINEL RECORD ON
C OUTPUT ORB3A TAPE USING DATA IN ARRAY RECRD1.
ISN 0025 830 CALL DATCON(47, RECRD1, 253, JOUTBN)
ISN 0026 840 CALL DATCON(JOUTBN, 1)
C THE FOLLOWING CALL WRITES AN END-OF-FILE ON OUTPUT ORB3A TAPE.
ISN 0027 850 CALL DATCON(JOUTBN, 2)
C REWIND OUTPUT ORB3A TAPE.
ISN 0028 REWIND JOUTBN
ISN 0029 999 RETURN
ISN 0030 END

```

~~\*\*\*\*\*F E R T R A N C R O S S R E F E R E N C E L I S T I N G\*\*\*\*\*~~

<del>SYMBOL</del>	<del>INTERNAL STATEMENT NUMBERS</del>											
<del>IADD</del>	<del>0010</del>	<del>0011</del>										
<del>JERR</del>	<del>0009</del>	<del>0010</del>										
<del>JERR</del>	<del>0011</del>											
<del>CNVRT</del>	<del>0011</del>											
<del>DEFOR</del>	<del>0010</del>											
<del>INCRD</del>	<del>0017</del>	<del>0018</del>										
<del>DATCON</del>	<del>0006</del>	<del>0007</del>	<del>0014</del>	<del>0015</del>	<del>0020</del>	<del>0021</del>	<del>0023</del>	<del>0024</del>	<del>0025</del>	<del>0026</del>	<del>0027</del>	
<del>JGUTBN</del>	<del>0005</del>	<del>0007</del>	<del>0014</del>	<del>0015</del>	<del>0020</del>	<del>0021</del>	<del>0023</del>	<del>0024</del>	<del>0025</del>	<del>0026</del>	<del>0027</del>	<del>0028</del>
<del>RECRD</del>	<del>0004</del>	<del>0005</del>	<del>0011</del>	<del>0013</del>	<del>0014</del>	<del>0017</del>	<del>0020</del>					
<del>RECRD1</del>	<del>0004</del>	<del>0017</del>	<del>0022</del>	<del>0025</del>								
<del>RTAPE4</del>	<del>0009</del>											
<del>RWTAP4</del>	<del>0002</del>											
<del>WSNECF</del>	<del>0017</del>											
<del>WTAPE4</del>	<del>0013</del>											

\*\*\*\*FORTRAN CROSS REFERENCE LISTING\*\*\*\*

LABEL	DEFINED	REFERENCES
10	0022	0018
700	0006	
710	0007	
720	0008	
730	0010	
740	0011	
750	0012	
760	0014	
770	0015	
780	0016	
782	0018	
790	0020	
800	0021	
810	0023	
820	0024	
830	0025	
840	0026	
850	0027	
999	0029	CCC8 0012 0016

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	
<del>IADD</del>	<del>SFA</del>	<del>I*4</del>	<del>000110</del>	<del>ISRR</del>	<del>SFA</del>	<del>I*4</del>	<del>000114</del>	<del>JERR</del>	<del>SFA</del>	<del>I*4</del>	<del>000118</del>	<del>CONVRT</del>	<del>SF</del>	<del>XF</del>	<del>R*8</del>	<del>000000</del>
<del>DBFDR</del>	<del>SF</del>	<del>XF</del>	<del>R*8</del>	<del>IWORD</del>		<del>I*4</del>	<del>00011C</del>	<del>DATCON</del>	<del>SF</del>	<del>XF</del>	<del>R*8</del>	<del>IBCON=</del>	<del>F</del>	<del>XF</del>	<del>I*4</del>	<del>000000</del>
<del>JGUTBN</del>	<del>SFA</del>	<del>I*4</del>	<del>000120</del>	<del>RECORD</del>	<del>SFA</del>	<del>XR</del>	<del>R*8</del>	<del>REGRD1</del>	<del>SFA</del>	<del>XR</del>	<del>R*8</del>	<del>RTAPE4</del>			<del>R*8</del>	<del>000128</del>
<del>RWTAP4</del>		<del>R*8</del>	<del>000130</del>	<del>WSNEOF</del>		<del>R*8</del>	<del>000138</del>	<del>WTAPE4</del>		<del>R*8</del>	<del>000140</del>					

<del>LABEL</del>	<del>ADDR</del>	<del>LABEL</del>	<del>ADDR</del>	<del>LABEL</del>	<del>ADDR</del>	<del>LABEL</del>	<del>ADDR</del>
<del>700</del>	<del>000198</del>	<del>710</del>	<del>0001A6 NR</del>	<del>720</del>	<del>0001B4 NR</del>	<del>730</del>	<del>0001BA</del>
<del>740</del>	<del>0001C8 NR</del>	<del>750</del>	<del>0001D6 NR</del>	<del>760</del>	<del>0001DC</del>	<del>770</del>	<del>0001EA NR</del>
<del>780</del>	<del>000202 NR</del>	<del>782</del>	<del>000208</del>	<del>790</del>	<del>000216</del>	<del>800</del>	<del>000224 NR</del>
<del>10</del>	<del>00023C</del>	<del>810</del>	<del>00023C NR</del>	<del>820</del>	<del>00024A NR</del>	<del>830</del>	<del>000262 NR</del>
<del>840</del>	<del>000270 NR</del>	<del>850</del>	<del>000288 NR</del>	<del>999</del>	<del>0002AC</del>		

~~\*OPTIONS IN EFFECT\* NAME= MAIN,OPT=00,LINECNT=58,SIZE=0000K,~~

~~\*OPTIONS IN EFFECT\* SOURCE,EBODIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,LD,XREF~~

~~\*STATISTICS\* SOURCE STATEMENTS = 29, PROGRAM SIZE = 1086~~

~~\*STATISTICS\* NO DIAGNOSTICS GENERATED~~

~~\*\*\*\*\* END OF COMPIATION \*\*\*\*\* 113K BYTES OF CORE NOT USED~~

~~\*STATISTICS\* NO DIAGNOSTICS THIS STEP~~

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IEF285I SYS7115E,T103436,RV000,ZBRKS000,08JMGD PASSED
IEF285I VOL SER NCS= G1SCRA.
IEF285I SYS7115E,T103436,SV000,ZBRKS000,R0000433 SYSOUT
IEF285I VOL SER NCS= G1SCRA.
IEF285I SYS7115E,T103436,RV000,ZBRKS000,R0000434 DELETED
IEF285I VOL SER NCS= G1SCR2.
IEF285I SYS7115E,T103436,RV000,ZBRKS000,R0000435 DELETED
IEF285I VOL SER NCS= G1SCRA.
IEF285I SYS7115E,T103436,RV000,ZBRKS000,S0000436 SYSIN
IEF285I VOL SER NCS= G1SCR1.
IEF285I SYS7115E,T103436,RV000,ZBRKS000,S0000436 DELETED
IEF285I VOL SER NCS= G1SCR1.
-----JOB-NBR-----219-STEP-NBR--01--ZBRKS000-SCURCE-----PGM=IEKAA00-CARDS=01805-----INITIATION-TIME=11.41.27.06-DATE=06-07-71
-----CPU=000.1 I/O=000.1 CORE=000.1 CHARGE=000.10-----STEP-01-SCURCE-----TERMINATION-TIME=11.44.14.75-DATE=06-07-71
-----I/O-TIME-EY-DEVICE-----DISK=*****1.71,DRUM=*****1.95,TAPE=*****.00,CELL=*****.00,OTHR=*****.00
-----STEP-REGION-SIZE=0300K-MAXIMUM-REGION-SIZE-USED=0300K-PERCENT-OF-REGION-USED=99
IEF285I SYS7115E,T103436,RV000,ZBRKS000,08JMGD DELETED
IEF285I VOL SER NCS= G1SCRA.

-----CPU=000.1 I/O=000.1 CORE=000.1 CHARGE=000.10-----JOB-NBR-219-ZBRKS000-360/95-----SYSTEM=MVT-1.9.6-----01-16-71-G1
----- I/O TIME EY DEVICE. DISK=*****1.71,DRUM=*****1.95,TAPE=*****.00,CELL=*****.00,OTHR=*****.00

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