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I. INTRODUCTION.

This document contains a useful description of the Pioneer F/G GSFC/CRT Data Reduction Program (PIODRP), Flux Database Generator (FLXDBG) and Flux Plotting Program (FLUXPLOT) and the supplemental programs which comprise the Pioneer F/G GSFC/CRT Data Reduction System.

PIODRP has as its main input the Pioneer Experimenter Data Record (EDR) tapes received from Ames Research Center in Moffett Field, California and its main output the Pulse Height Anlaysis (PHA) tapes and the Events per second (RATES) tapes. The PHA and RATES tapes contain the GSFC/CRT experiment data in a readily accessible format for subsequent analysis programs.

FLUXDBG has as its main input the PHA and Rates tapes generated by PIODRP and its main output is Flux tapes in a readily accessible format for a subsequent analysis program, FLUXPLOT.

FLUXPLOT has as its main input the Flux tapes generated by FLUXDBG and its main output is listings and plot tapes, if requested.

These three major programs make up the Pioneer Data Processing System.

II. EXPERIMENTER DATA RECORD TAPE.

A. Experimenter Data Record (EDR) tapes are received from Ames Research Center (ARC), Moffett Field, California. Each tape usually contains 1 days worth of data for either of 2 satellites (Pioneer 10 or 11). GSFC/CRT EDRs are 9 TRACK, NL, 800 BPI data tapes containing 4 files of fixed length records:

1. Logistics
2. Command data (not processed)
3. Attitude data (not processed)
4. Experiment data
5. In the very near future multi-day EDR tape will be generated due to the reduced amount of data which will be received by tracking stations.

B. With each tape we receive a shipping letter which contains vital statistics such as Day, Pass no, start/stop times, date generated, and volume serial no. Each shipping letter is filed in a notebook for reference and is also used as a logging in function. A sample of a shipping letter is shown on the next page. All EDRs are checked to be sure they are physically undamaged by shipment and are then separated by Satellite ID. Following this procedure each tape should be checked for write-rings (which are plastic rings in the back of each tape) which should be removed and a 'NO RING' sticker placed on the back side of the tape. This is to ensure that the tape will not be written on. After this, the tapes should be put in chronological order for processing.

C. The EDRs are then assigned temporary slots in the computer room in Bldg. 1 near the 360/75, 91 so they will be ready for the first phase of processing (PIODRP). The temporary slots assigned to Pioneer 10 and 11 are E02101 thru E02150 inclusive.

III. PIONEER F/G DATA REDUCTION PROGRAM (PIODRP).

A. Description.

1. The purpose of the Pioneer F/G Data Reduction Program (PIODRP) is to read the Pioneer F/G EDR tapes and create time-ordered PHA, RATES and CATALOG tapes which contain GSFC/CRT experiment data and related spacecraft information.

PIODRP reads parameter cards to determine the processing options requested and the EDR tapes to process. The latest version of the Data Reduction System (DRS) Tape Catalog is then searched, provided Quick-Look processing was not requested, to determine what tapes are currently available for saving the data being processed. If the new data needs to be merged with data previously processed and the data merge option was specified, the tapes (PHA and/or RATES) containing the old data are copies and the new data is merged onto new tapes (PHA and/or RATES). At the end of each run a Processing Messages Report, a Data Quality Summary Report, a FILE/LOGISTICS/HISTORY Catalog Report and a Current Status Report are generated. These reports provide a history of the EDR tapes processed, the abnormal conditions encountered, the quality of the GSFC/CRT experiment data processed and a status report of all tapes available to the system.

2. System Design Specifications and Assumptions:

a. The following assumptions and considerations were included in the system design: After each production run of PIODRP, a new/updated version of the DRS Tape Catalog is created. To facilitate this continual updating of the Tape Catalog and to provide the capability of rerunning a job that ran to completion but was in error, the four latest versions of the Tape Catalog are kept on the disk. Also, a tape backup of the four

latest Tape Catalogs is maintained by PIODRP on the associated primary and backup CATALOG tapes. If a Tape Catalog on disk is destroyed, DRSMNT may be used to restore it from the appropriate backup tape.

b. It is assumed that each EDR tape processed by PIODRP will contain data for only one day and the start and stop times of the data provided in the Logistics data (file 1) is an accurate indication of the experiment data contained in file four of the EDR tape.

c. The processing of subsequent EDR tapes in the same run of PIODRP is based on the restriction that all EDR tapes must be submitted for processing in time-ordered sequence. All tapes not in time-ordered sequence for the current run are rejected by PIODRP and an appropriate message is written in the Processing Messages Report and the run continues.

d. The PHA and RATES tapes are created in a one pass system rather than a two pass system to eliminate duplication of the setup functions inherent to a Data Reduction System, the computer time required to process the same data a second time and the tapes required for the intermediate storage of the experiment data.

e. A Quick-Look option has been provided in PIODRP to allow for the processing of the most recent GSFC/CRT EDR tapes available onto temporary PHA and/or RATES tapes. The temporary data tapes are supplied to PIODRP via the OPTION group of parameter cards and only the blank tapes required for the new PHA and/or RATES tapes can be supplied (the data processed in the Quick-Look mode cannot be merged or added to data previously processed). The DRS Tape Catalogs are not referenced when Quick-Look processing is requested, therefore all EDR tapes processed in this manner must be reprocessed in their proper chronological sequence by PIODRP in the normal (not Quick-Look) mode.

The Quick-Look option provides the capability to process all the Pioneer F/G EDR tapes and create the PHA and RATES tapes in the most efficient manner possible. This is, new data is always added after previously processed data and the unnecessary copying of old PHA and RATES tapes for the purpose of merging new data with previously processed data is eliminated.

3. Definitions and Abbreviations.

Definitions:

Many of the following terms have several meanings; however, only the definition pertinent to this report is given.

Absolute File - All the data (Logistics, Command, Attitude and Experiment) processed from a particular EDR tape in same run of PIODRP.

Absolute File Number - A number assigned to each absolute file (consists of data for an entire day) of data processed by PIODRP. Each file processed is assigned an absolute file number one larger than the previous file; therefore, each file is uniquely identified.

Catalog Pointer - A disk data set which contains the character (1, 2, 3, or 4) indicating which of the four Tape Catalogs is the most recent.

CATALOG Tape - Tape(s) containing all the time-ordered Logistics, Command and Attitude information related to the Pioneer F/G missions.

Events per second (RATES) Tape - Tape(s) containing all the time-ordered events per second information from the GSFC/CRT experiment.

Experiment Data Record (EDR) Tape - Input tape received from Ames Research Center in Moffett Field, California.

Pulse Height Analysis (PHA) Tape - Tape(s) containing all the time-ordered pulse height analysis information from the GSFC/CRT experiment

and the corresponding events per second information.

Relative Modified Julian Day (RMJD) - Date assigned to each day of data referenced from day 0 to launch year, 1972 (Modified Julian Day 41316).

Tape Catalog - A disk data set which contains pointers to all the tapes used by the D.R.S. along with certain control information.

Abbreviations

ARC	Ames Research Center, Moffett Field, California
BPI	Bytes Per Inch
DASD	Direct Access Storage Device
EBCDIC	Extended Binary Coded Decimal Interchange Code
EDR	Experimenter Data Record
GMT	Greenwich Mean Time (UT)
GSFC/CRT	Goddard Space Flight Center/Cosmic Ray Telescope
HET	High Energy Telescope
LET	Low Energy Telescope
MS	Milliseconds
PHA	Pulse Height Analysis
RTLT	Round Trip Light Time
TLM	Telemetry
UT	Universal Time (GMT)

4. Tapes.

There are four types of tapes utilized by PIODRP. The first type is the Pioneer GSFC/CRT EDR tapes which contain the GSFC/CRT experiment data and related spacecraft information. These tapes are 9-track, odd parity and the recording density is 800 BPI. Each tape consists of four

files of data having fixed length records with a different record length for each file. Files one through four contain the logistics, command, attitude and experiment data, respectively. The tape contains undefined records with a maximum blocksize of 5204 bytes.

The second type of tape is the PHA tape that is created and read by PIODRP. These tapes are 9-track with standard OS/360 labels and the data set name (DSNAME) is PIOPHA. The tapes are written in the binary mode and odd parity at a recording density of 1600 BPI. The tapes contain variable length blocked records with a maximum logical record length of 1524 bytes and a maximum physical record length of 7624 bytes.

The third type of tape is the RATES tape that is created and read by PIODRP. These tapes are 9-track with standard OS/360 labels and the data set name (DSNAME) is PIORAT. The tapes are written in the binary mode and odd parity at a recording density of 1600 BPI. The tapes contain variable length blocked records with a maximum logical record length of 1740 bytes and a maximum physical record length of 8704 bytes.

The fourth type of tape is the CATALOG tape that is created and read by PIODRP. These tapes are 9-track with standard OS/360 lables and the data set name (DSNAME) is PIOCAT. The tapes are written in the binary mode and odd parity at a recording density of 1600 BPI. The tapes contain variable length blocked records with a maximum logical record length of 7288 bytes and a maximum physical record length of 7292 bytes.

B. PIODRP JCL.

The program was designed so that the JCL need not be changed from one production run to the next for a particular satellite. However,

the data set names (DSNAME) for all the permanent disk data sets must be unique for each satellite (F/G). Only the parameter cards, which specify the processing options and identify the EDR tapes to be processed must be updated each run. However, to make more efficient use of the computer, it is advisable to remove Data Definition (DD) cards for tapes which will not be used during a particular job. By doing so, unnecessary tape drives are not allocated for the job. DD cards for data sets on disk that will not be used, need not be removed since disk drives are shared by other jobs.

The program requires 300 bytes of main storage and approximately one minute of CPU time and 1.5 minutes of I/O time (I/O time includes one minute for tape mount charge) for each EDR tape processed. The DD cards required for PIODRP are shown below in the following table which shows the purpose of each data set and indicates when it is required.

DD Name	Purpose of Data Set	Input/ Output	Device Type	Code
FT06F001	Error Message (No Data Cards)	Output	Printer	A
FT10F001	EDR Tape	Input	Tape	A
FT11F001	PHA Tape	Output	Tape	P/C
FT12F001	PHA Tape	Output	Tape	P/C
FT13F001	PHA Tape	Input	Tape	PM/C
FT14F001	RATES Tape	Output	Tape	R
FT15F001	RATES Tape	Output	Tape	R
FT16F001	RATES Tape	Input	Tape	RM
FT17F001	CATALOG Tape	Input	Tape	C/U

DD Name	Purpose of Data Set	Input Output	Device Type	Code
FT18F001	CATALOG Tape (Primary)	Output	Tape	C
FT19F001	CATALOG Tape (Backup)	Output	Tape	C
FT20F001	Logistics Catalog (Permanent)	Input/ Output	Disk	A
FT21F001	Logistics Catalog (Temporary)	Input/ Output	Disk	M
FT22F001	Command Catalog (Temporary)	Input Output	Disk	N
FT30F001	Processing Messages	Output	Printer	A
FT31F001	Data Quality Summary Report	Output	Printer	A
FT32F001	FILE/LOGISTICS/HISTORY Rpt	Output	Printer	A
FT33F001	Current Status Report	Output	Printer	A
FT40F001	DRS Tape Catalog Pointer	Input/ Output	Disk	A
FT41F001	DRS Tape Catalog 1	Input/ Output	Disk	A
FT42F001	DRS Tape Catalog 2	Input/ Output	Disk	A
FT43F001	DRS Tape Catalog 3	Input/ Output	Disk	A
FT44F001	DRS Tape Catalog 4	Input/ Output	Disk	A
FT60F001	Processing Messages	Output	Printer	A
SYSUDUMP	Abend Dumps	Output	Printer	A
DATA5	Parameter Cards	Input	Card Reader	A

The meaning of code is as follows:

A - Always required.

C - Required if a CATALOG Tape is to be generated.

P - Required if a PHA Tape is to be generated.

PM - Required if a PHA Tape is to be generated and data merge is specified.

R - Required if a RATES Tape is to be generated.

RM - Required if a RATES Tape is to be generated and data merge is specified.

U - Required if the DRS Tape Catalog Pointer is specified on the Namelist Card/OPTION.

M - Required if data merge is specified.

N - Required if Command data is specified to be processed.

```
//*F PIODRP
//*JCL   PHA
//PDRS EXEC LINKGO,REGION.GO=300K,NBLK=120
//LINK.SYSLIB DD DSN=K3.SBCID.SB001.OPIONEER,DISP=SHR
//            DD DSN=K3.SBCID.SB001.OPICTEMP,DISP=SHR
//LINK.SYSLIN DD *
  INCLUDE SYSLIB(PIODRP)
  ENTRY PIODRP
//GO.FT06F001 DD DCB=(BUFNO=1)
//GO.FT10F001 DD DSN=EDRIN,UNIT=(1600,,DEFER),DISP=(OLD,KEEP),
// DCB=(RECFM=U,BLKSIZE=5204,DEN=2,BUFNO=1),LABEL=(,BLP),VOL=SER=DUMI
//GO.FT11F001 DD DSN=PIOPHA,UNIT=(1600,,DEFER),DISP=(MOD,KEEP),
// DCB=(RECFM=VBS,LRECL=1524,BLKSIZE=7624,BUFNO=1,DEN=3),
// LABEL=(,SL,,OUT),VOL=SER=DMYPH1
//GO.FT12F001 DD DSN=PIOPHA,UNIT=AFF=FT11F001,DISP=(NEW,KEEP),
// DCB=(RECFM=VBS,LRECL=1524,BLKSIZE=7624,BUFNO=1,DEN=3),
// LABEL=(,SL,,OUT),VOL=SER=DMYPH2
//GO.FT13F001 DD DSN=PIOPHA,UNIT=(1600,,DEFER),DISP=(OLD,KEEP),
// VOL=SER=DMYPH3,DCB=(BUFNO=1,DEN=3)
//GO.FT17F001 DD DSN=PIOCAT,UNIT=AFF=FT10F001,DISP=(OLD,KEEP),
// VOL=SER=DMYCT1,DCB=(BUFNO=1,DEN=3)
//GO.FT18F001 DD DSN=PIOCAT,UNIT=AFF=FT11F001,DISP=(NEW,KEEP),
// DCB=(RECFM=VB,LRECL=7288,BLKSIZE=7292,BUFNO=1,DEN=3),VOL=SER=DMYCT2
//GO.FT19F001 DD DSN=PIOCAT,UNIT=AFF=FT13F001,DISP=(NEW,KEEP),
// DCB=(RECFM=VB,LRECL=7288,BLKSIZE=7292,BUFNO=1,DEN=3),VOL=SER=DMYCT3
//GO.FT20F001 DD DSN=K3.SBJPH.SB001.FPDRSLOG,DISP=CLD
//GO.FT21F001 DD UNIT=2314,SPACE=(7294,15),DCB=BLKSIZE=7294
//GO.FT22F001 DD UNIT=2314,SPACE=(708,200),DCB=BLKSIZE=708
//GO.FT23F001 DD DSN=&&ATT,UNIT=2314,DISP=(NEW,PASS),
// DCB=(RECFM=F,BLKSIZE=1240),SPACE=(1240,50)
//GO.FT30F001 DD SYSOUT=A,DCB=*.FT06F001
//GO.FT31F001 DD SYSOUT=A,DCB=*.FT06F001
//GO.FT32F001 DD SYSOUT=A,DCB=*.FT06F001
//GO.FT33F001 DD SYSOUT=A,DCB=*.FT06F001
//GO.FT40F001 DD DSN=K3.SBJPH.SB001.PFDRSCTP,DISP=CLD
//GO.FT41F001 DD DSN=K3.SBJPH.SB001.PFDRSCT1,DISP=CLD
//GO.FT42F001 DD DSN=K3.SBJPH.SB001.PFDRSCT2,DISP=CLD
//GO.FT43F001 DD DSN=K3.SBJPH.SB001.PFDRSCT3,DISP=CLD
//GO.FT44F001 DD DSN=K3.SBJPH.SB001.PFDRSCT4,DISP=CLD
//GO.FT60F001 DD SYSOUT=A,DCB=(RECFM=VBA,LRECL=137,BLKSIZE=141)
//GO.SYSUDUMP DD SYSOUT=A
//GO.DATAS DD *
```

Following is an example of the data cards which are required:

```
&OPTION IDRUN='G',HCPUTM=3,HIOTM=4,QMERGE=T,QPRTID=T, &END
&EDRTAP DTSLOT='E02101',  &END
&EDRTAP DTSLOT='E02102',  &END
```

C. Data Cards.

Parameter cards follow the last DD card in the program setup and are of two types:

1. Processing options (OPTION) card.
2. Input EDR tape (EDRTAP) cards.

All cards are read using the NAMELIST convention of FORTRAN IV. The first column in each card must be blank. The second column in the first card of a group of data cards associated with the same NAMELIST name must contain an ampersand (&), immediately followed by the NAMELIST name (OPTION/EDRTAP). The name is followed by a blank and then a series of data items separated by commas. The end of the data group is indicated by the characters "&END".

The first data group for each run must be the option group of cards. This group is used to specify various program variables and options to be used throughout the current run. All program variables and options which may be specified in this group are listed below along with their associated purpose and the standard default value they assume whenever they are not specified. The underlined keywords and equal sign must be written exactly as shown.

IDRUN= 'F' If Pioneer F EDR tapes are to be processed.
'G' If Pioneer G EDR Tapes are to be processed.

(Default - The job is terminated with a user completion code of 47.)

NQLHIG= The high limit for the Data Quality Indicator to be used when accepting data this run. The Data Quality indicator may have the following values:

0 - Data is bad (no sync).
1 - At least two quality indicators are bad (data is suspect).

2 - At least one quality indicator is bad (data is suspect).
3 - All quality indicators are good (data is good).

(Default = 3)

NQLLOW= The low limit for the Data Quality Indicator to be used when accepting data this run (see NQLHIG for possible values).

(Default = 2)

HCPUTM= The CPU time in minutes needed to process one EDR tape and terminate the job normally which includes the generation of the CATALOG tape when specified (see QCTLGT).

(Default = 2 min)

HIOTM= The I/O time in minutes needed to process one EDR tape and terminate the job normally which includes the generation of the CATALOG tape when specified (see QCTLGT).

(Default = 2 min if CATALOG tape not being created and 5 min if CATALOG tape is being created.)

QMERGE= T If data processed this run is to be merged with data processed previously.
F If data processed this run is to be added after all data processed previously.

(Default = F)

QPHATP= T If PHA tapes are to be created this run.
F If PHA tapes are not to be created this run.

(Default = T)

QRATTP= T If RATES tapes are to be created this run.
F If RATES tapes are not to be created this run.

(Default = T)

QCTLGT= T If CATALOG tapes are to be created this run.
F If CATALOG tapes are not to be created this run.

(Default = T)

QCMMND= T If command data is to be processed this run.
F If command data is not to be processed this run.

(Default = T)

QPRTID= T If the entire FILE/LOGISTICS/HISTORY catalog is to be printed at the end of the run.
F If only the updated section of the catalog is to be printed.

(Default = F)

QATT= T If attitude data is to be processed this run.
F If attitude data is not to be processed this run.

(Default = T)

NUMCAT= The sequence number of the DRS Tape Catalog to be read. This number +40 is the FORTRAN logical unit from which the Catalog will be read.

(Default - The DRS Tape Catalog will be read from the last unit on which the latest version of the DRS Tape Catalog was written by PIODRP. This Catalog is pointed to by the DRS Tape Catalog Pointer on disk.)

QLOOK= T If Quick-Look processing is to be performed this run. The DRS Tape Catalogs and the current FILE/LOGISTICS/HISTORY catalog are not referenced for this type of processing. Also, the command data and CATALOG tapes are not processed.
F If normal processing is to be presented this run.

(Default = F)

DTPPHA= Labels of tapes to be used for PHA tapes when Quick-Look processing is specified (see QLOOK). A maximum of 10 tape labels may be supplied. Each tape label must be enclosed in apostrophes and be separated from the previous one by a comma.

(Default - Blank PHA tapes will be used from the latest version of the DRS Tape Catalog.)

DTPRAT= Labels of tapes to be used for RATES tapes when Quick-Look processing is specified (see QLOOK). A maximum of 10 tape labels may be supplied. Each tape label must be enclosed in apostrophes and be separated from the previous one by a comma.

(Default - Blank RATES tapes will be used from the latest version of the DRS Tape Catalog.)

One or more NAMELIST groups with the name EDRTAP must follow the OPTION group of cards. These cards are used to identify the EDR tapes to be processed this run and these tapes must be submitted in time sequence. The form of the data items within this group is given below along with the standard default value they assume whenever they are not specified. The underlined keywords and equal sign must be written exactly as shown.

DTSLOT= The location (tape slot) or symbol identifying the EDR tape to be processed. The tape slot or symbol may contain a maximum of six characters and must be enclosed in apostrophes. This symbol appears on on the operator's console whenever the EDR tape is to be mounted.

(Default - None. The EDR tape must always be identified.)

DTLABL= The label or identifying symbol for the EDR tape being processed. This label may contain a maximum of six characters and must be enclosed in apostrophes. This label appears in all the printed reports generated by PIODRP which are associated with this EDR tape.

(Default - Assumes the value of DTSLOT when not specified.)

QREPLC=

T If the PHA and RATES data processed from this EDR tape is to replace all PHA and RATES data processed previously for the same time period.

F If the PHA and RATES data processed from this EDR tape is not to replace all PHA and Rates data processed previously for the same time period.

(Default = F)

Note: When data replace is specified (QREPLC=T) for a particular EDR tape, the tape must either be the last tape processed in the run or all subsequent EDR tapes to be processed must also have data replace specified. Also, data merge must be specified (QMERGE=T) on the OPTION group of cards.

D. Output.

1. Tapes

There are three types of output tapes generated from a PIODRP run. PHA and Rates tapes with merged or new data are created as well as a catalog tape and its backup.

2. Printed Reports.

PIODRP provides four types of printed reports at the end of each production run: a Processing Messages Report, a Data Quality Summary Report, a FILE/LOGISTICS/HISTORY catalog Report, and the Current Status Report. Each page of a report contains the following standard header information:

a. Type of Report.

b. Name of the spacecraft and experiment.

c. Date of run (MM/DD/YY).

d. Page number.

3. Processing Messages Report.

The Processing Messages Report provides a history of all the EDR tapes processed and the errors (abnormal conditions) encountered. Each message produced has a standard format (reading left to right) as follows:

a. Time the message was generated (HHMMSS).

b. Name of the routine generating the message.

c. Label of the EDR tape being processed.

d. Tape sequence number for current run.

e. Number of file being processed from EDR tape.

f. Number of record being processed.

g. Message content.

All Processing Messages generated by PIODRP are self-explanatory and provide the following information:

a. Indications of all abnormal conditions encountered during processing.

b. Reasons for discarding data either on a record basis or an entire EDR tape.

c. First message generated lists all the pertinent processing options specified for run.

d. The last message generated either provides the total EDR tapes mounted and the total EDR tapes rejected (normal End of Job) or provides the reason the job was abnormally terminated with a user dump.

4. Data Quality Summary Report.

The Data Quality Summary Report provides an indication of the quality and status of the Pioneer GSFC/CRT experiment data processed. A Data Quality Summary Report is generated for each EDR tape processed and contains the following information:

a. EDR tape label (source of data).

b. Absolute File Number assigned to data.

c. Start time of data coverage (MM/DD/YY - HH/MM/SS.SSS).

d. End time of data coverage (MM/DD/YY - HH/MM/SS.SSS).

The following information is provided for each data format (A, A/D, B, B/D) along with an over-all total:

a. Total records processed.

b. Number of good records.

c. Number of records discarded due to pad.

d. Number of records discarded due to sync errors.

e. Number of records discarded due to time errors.

f. Number of records discarded with power off.

g. Number of records when GSFC/CRT experiment was operating in low power mode (no PHA data).

h. Number of records when GSFC/CRT experiment was operating with Sector Sync Inhibited.

i. Number of records when the SPSG (Spin Period Sector Generator) roll reference was 180°.

j. Number of good pages processed (PHA/RATES).

k. Number of pages discarded due to pad (this number does not include item c).

l. Number of pages discarded with power off (this number does not include item f).

m. Number of pages discarded due to time errors (this number does not include item e).

n. Number of pages discarded due to sync errors (this number does not include item d).

o. Number of pages of PHA data discarded due to overlap with data previously processed (not provided as a function of format).

p. Number of pages of RATES data discarded due to overlap with data previously processed (not provided as a function of format).

The following information is provided for each PHA event priority mode (0-3 for HET and 0-1 for LET) along with an over-all total:

a. Number of good PHA events as a function of type (0-3 for HET and 0-1 for LET).

b. Number of Null PHA events.

c. Total number of PHA events (this number does not include Null events).

Finally, the total number of PHA events (HET and LET) discarded as a function of the following data quality criteria is provided along with an over-all total:

a. All Bad - data is bad (no sync).

b. Two Bad - at least two quality indicators are bad (data is suspect).

c. One Bad - at least one quality indicator is bad (data is suspect).

d. Padded - all or part of the data necessary for a PHA event is padded.

5. FILE/LOGISTICS/HISTORY Catalog Report.

The FILE/LOGISTICS/HISTORY Catalog Report provides a permanent history of all the EDR tapes processed by PIORP and provides a permanent record of the data processed from each tape. This report contains the following information for each EDR tape processed:

a. Absolute File Number assigned to data.

b. Start time of data (MM/DD/YY - HH/MM/SS.SSS).

c. End time of data (MM/DD/YY - HH/MM/SS.SSS).

d. EDR sequence number.

e. Date EDR was generated (MM/DD/YY).

f. Date EDR was regenerated (MM/DD/YY).

g. Date EDR was processed by PIODRP (MM/DD/YY).

h. Total records processed.

i. Total good records.

j. High limit of the Data Quality Indicator used for accepting data.

k. Low limit of the Data Quality Indicator used for accepting data.

l. Record of the data processed from this EDR tape (PHA/RATES/ COMMANDS).

6. Current Status of D.R.S. Report.

This report provides the current status of all tapes available to the Pioneer Data Reduction System. This report provides the following information at the end of each production run of PIODRP:

a. Total number of good PHA and RATES tapes currently in the system.

b. Total number of blank PHA and RATES tapes currently available to the system.

c. First and last tapes assigned to the PHA and RATES block of tapes.

d. Current versions of the primary and backup CATALOG tapes and a record of the data sets contained on them.

e. List of all blank PHA and RATES tapes currently available to the system.

f. List of all PHA and RATES tapes created in the current run.

g. List of all PHA and RATES tapes copied in the current run.

h. List of all GOOD PHA and RATES tapes giving the start and end times and the amount of tape (feet) used on each.

i. List absolute File Number assigned to data.

j. Last track and last entry on the track used by the FILE/LOGISTICS/HISTORY catalog.

k. Current value of the D.R.S. Tape Catalog Pointer (1, 2, 3, or 4) indicating which Tape Catalog is the latest.

E. ABENDS.

Abnormal Conditions

1. PIODRP recognizes several abnormal conditions and terminates a run with a user dump when they are encountered. Normally all user dumps with a completion code that is less than 50 will be explained by the last printed message in the Processing Messages Report. For user dumps 001 and 002 when this does not apply, and all user dumps with a completion code that is greater than 50, refer to the User Abends section of the "IBM System/360 General I/O Package".

After the error condition is corrected, the job may be resubmitted without any other changes to the deck. However, when data merge was not specified (QMERGE=F) for the job which abnormally terminated, (i.e., with a user or system completion code) the job must be resubmitted with data merge specified (QMERGE=T). This is necessary to prevent the PHA and RATES tapes from containing any duplicate and/or unwanted data.

2. If an error is detected by the user after one or more production runs has executed successfully, (job was not abnormally terminated with a dump) the error may be corrected and the job may usually be resubmitted

by setting NUMCAT (on OPTION group cards) to a Tape Catalog prior to the error. However, this may not be done if more than two production runs have been run since the error.

Once the error has been defined most likely all the data which was processed after the error occurred will have to be run. The programmer responsible for maintenance of the programs should be consulted before any action is taken.

3. A program in executible load module form, VBSCOPY, has been written to duplicate and correct PHA and RATES tape which have developed I/O errors. This was done to keep the logical integrity of the data because of Variable Block Spanning (VBS) Records. See the Utilities Section for VBSCOPY.

IV. PIONEER F/G DATA REDUCTION SYSTEM CATALOG MAINTENANCE PROGRAM (DRSMNT).

A. Description.

DRSMNT is used to perform the following nine basic functions on the DRS Tape Catalog:

1. Initialize and list all four Tape Catalogs and the Tape Catalog Pointer.
2. Add blank tapes (PHA and/or RATES) to the latest version of the Tape Catalog indicated by the Tape Catalog Pointer and provide a listing of the Tape Catalog before and after update.
3. Modify the Tape Catalog Pointer and provide a listing of the Tape Catalog to which it points before and after update.
4. List the contents of a specified Tape Catalog.
5. Restore and list a specified Tape Catalog from the appropriate backup tape.
6. Eliminate one PHA and/or one Rate tape from the catalog.
7. Replace one or more PHA and/or one more RATE tape with backup tapes.
8. Create a backup tape of a specified catalog.
9. Read and print catalog from backup tape.

DRSMNT reads parameter cards to determine what function is requested. The DRS Tape Catalogs or the DRS Tape Catalog Pointer is updated as requested and a listing of all the Tape Catalogs affected by the update is generated.

The program was designed so that the JCL need not be changed from one production run to the next for a particular satellite. However, the data set names (DSNAMES) for all the permanent disk data sets must be unique for each satellite (F/G). Only the parameter cards, which specify the function to be performed, identify the appropriate satellite (F/G) and provide the necessary input data, must be updated each run. However, to make more efficient use of the computer, it is advisable to remove the Data Definition (DD) cards for the CATALOG tape which will not be used during a particular job. By doing so, an unnecessary tape drive is not allocated for the job. DD cards for data sets on disk that will not be used, however, need not be removed since disk drives are shared by other jobs.

B. JCL for DRSMNT.

The program requires 100K bytes of main storage and approximately .5 minutes of CPU time and .5 minutes of I/O time to perform any function requested. The DD cards required for DRSMNT are shown in the following table, explaining the purpose of each data set and when it is required:

DD Name	Purpose of Data Set	Input/ Output	Device Type	Code*
FT06F001	Processing Messages	Output	Printer	A
FT10F001	CATALOG Tape	Input	Tape	U/R
FT20F001	Logistics Catalog (Permanent)	Output	Disk	U
FT40F001	DRS Tape Catalog 1	Input/ Output	Disk	A
FT41F001	DRS Tape Catalog 2	Input/ Output	Disk	A
FT43F001	DRS Tape Catalog 3	Input/ Output	Disk	A
FT44F001	DRS Tape Catalog 4	Input/ Output	Disk	A
SYSUDUMP	Abend Dumps	Output	Printer	A
Data5	Parameter Cards	Input	Card Reader	A

* A = Always required.
U = Required if the DRS Tape Catalog Pointer is being updated.
R = Required if a DRS Tape Catalog (1-4) is being restored from the CATALOG tape.

```
//*F PIODRP
//*CAT MAIN
//* H00/H00
//PDRS EXEC LINKGO,REGION.GO=100K
//LINK.SYSLIB DD DSN=K3.SBCID.SB001.OPICNEER,DISP=SHR
//LINK.SYSLIN DD *
  INCLUDE SYSLIB(DRSMNT)
  ENTRY DRSMNT
//GO.FT06F001 DD SYSOUT=A,DCB=BLKSIZE=3564
//GO.FT10F001 DD DSN=PIOCAT,UNIT=(1600,,DEFER),DISP=SHR,
//  VOL=SER=DMYCAT
//GO.FT20F001 DD DSN=K3.SBJPH.SB001.PFDRSLOG,DISP=CLD
//GO.FT40F001 DD DSN=K3.SBJPH.SB001.PFDRSCTP,DISP=CLD
//GO.FT41F001 DD DSN=K3.SBJPH.SB001.PFDRSCT1,DISP=CLD
//GO.FT42F001 DD DSN=K3.SBJPH.SB001.PFDRSCT2,DISP=CLD
//GO.FT43F001 DD DSN=K3.SBJPH.SB001.PFDRSCT3,DISP=CLD
//GO.FT44F001 DD DSN=K3.SBJPH.SB001.PFDRSCT4,DISP=CLD
//GO.SYSUDUMP DD SYSOUT=A
//GO.DATA5 DD *
```

C. Data Cards.

The parameter cards follow the last DD card in the program setup and must be supplied to the program as shown in the following table:

Number	Columns	Format	Variable Name	Field Description
1	1	I1	MODE	Maintenance function requested. MODE = 1: Initialize and list all four DRS Tape Catalogs and the DRS Tape Catalog Pointer. MODE = 2: Add blank tapes (PHA and/or RATES) to the latest Tape Catalog indicated by the Tape Catalog Pointer.
1	1	A1	MODE	MODE=3: Modify the Catalog Pointer and generate a listing of the Catalog to which it points before and after update. MODE=4: List the contents of a specified tape catalog. MODE=5: Restore a specified Tape Catalog from a specified backup tape.
				MODE=6: Eliminate one PHA and/or one rate tape from the catalog. MODE=7: Replace one or more PHA and/or RATE tape with backup tapes. MODE=8: Create a backup tape of a specified catalog. MODE=9: Read and print catalog from backup tape.
	2	A1	IDCAT	Pioneer (F/G) identification. F: Perform maintenance function for Pioneer F Tape Catalogs. G. Perform maintenance function for Pioneer G Tape Catalogs.

Card Number	Columns	Format	Variable Name	Field Description
(Cards '2 to N1+4' must have the following format when MODE=1 is specified on Card 1.)				
2	1-2	I2	NUMPHA	Number of blank PHA tapes to be placed in the DRS Tape Catalogs (must be greater than zero and less than 51).
	5-6	I2	NUMRAT	Number of blank RATES tapes to be placed in the DRS Tape Catalogs (must be greater than zero and less than 51).
	11-16	A6	DPHAST	First tape assigned to PHA block of tapes.

Card Number	Columns	Format	Variable Name	Field Description
2	21-26	A6	DPHAEN	Last tape assigned to PHA block of tapes
	31-36	A6	DRATST	First tape assigned to RATES block of tapes.
	41-46	A6	DRATEN	Last tape assigned to RATES block of tapes.
3	1-6	A6	DTAP(1)	Blank PHA tape number 1.
	9-14	A6	DTAP(2)	Blank PHA tape number 2.
	17-22	A6	DTAP(3)	Blank PHA tape number 3.
	25-30	A6	DTAP(4)	Blank PHA tape number 4.
	33-38	A6	DTAP(5)	Blank PHA tape number 5.
	41-46	A6	DTAP(6)	Blank PHA tape number 6.
	49-54	A6	DTAP(7)	Blank PHA tape number 7.
	57-62	A6	DTAP(8)	Blank PHA tape number 8.
	65-70	A6	DTAP(9)	Blank PHA tape number 9.
	73-78	A6	DTAP(10)	Blank PHA tape number 10.
4-N	(same as card 3)			Repeat card 3 for Blank PHA tapes 11-50 if necessary.
N+1	(same as card 3)			Blank RATES tapes 1-10.
N+2 to N1	(same as card 3)			Blank RATES 11-50 if necessary.
N1+1	1-6	A6	DCATLG (1,1)	Primary CATALOG tape for backup Tape Catalog 1 and the FILE/ LOGISTICS/HISTORY catalog associated with Tape Catalog 1.
	9-14	A6	DCATLG (1,2)	Primary CATALOG tape for backup Tape Catalog 1 and the FILE/LOGISTICS/HISTORY catalog associated with Tape Catalog 1.
	17-22	A6	DCATLG (2,1)	Backup CATALOG tape for the Command and Attitude catalogs associated with Tape Catalog 1.

Card Number	Columns	Format	Variable Name	Field Description
N1+1	25-30	A6	DCATLG (2,2)	Backup CATALOG tape for the Command and Attitude catalogs associated with Tape Catalog 1.
N1+2	(same as card N1+1)			Primary and backup CATALOG tapes associated with Tape Catalog 3.
N1+4	(same as card N1+1)			Primary and backup CATALOG tapes associated with Tape Cagalot 4.

(Cards '2 to N' must have the following format with MODE=2 is specified on Card 1.)

2	1-2	I1	NUMPHA	Number of blank PHA tapes to be added to the latest DRS Tape Catalog (this number can be zero).
	5-6	I2	NUMRAT	Number of blank RATES tapes to be added to the latest DRS Tape Catalog (this number can be zero).
3-N	(same as card 3 when MODE=1)			Blank PHA and/or RATES tapes to be added to the latest DRS Tape Catalog (when both PHA and RATES tapes are added, the RATES tapes must follow the PHA tapes and they must begin on a new parameter card).

(Card '2' must have the following format when MODE=3 is specified on Card 1.)

2	1	I1	NCAT	Value to be assigned to the DRS Tape Catalog Pointer indicating the latest version to the Tape Catalog (must be a value from 1 to 4).

(Card '2' must have the following format when MODE=4 is specified on Card 1.)

2	1	I1	NCAT	Number specifying the DRS Tape Catalog to list. A value of zero defaults to the latest version of Tape Catalog indicated by the Tape Catalog Pointer (must be value from 0 to 4).

Card Number	Columns	Format	Variable Name	Field Description
(Card '2' must have the following format when MODE=5 is specified on Card 1.)				
2	1	I1	NCAT	Number specifying the DRS Tape Catalog to restore (must be a value from 1 to 4).
	6-11	A6	DCLGTP	CATALOG tape containing the appropriate backup Tape Catalog (must always be specified on data card).
(Card '2' must have the following format when MODE=6 is specified on Card 1.)				
2	1-8	A8	DPOUT	PHA tape that is to be eliminated.
	11-18	A8	DROUT	RATE tape that is to be eliminated.
NOTE: When there is no PHA or RATES tape to be eliminated, the appropriate field is left blank.				
(Cards '2 to N' must have the following format when MODE=7 is specified on Card 1.)				
2	1-4	A4	NAME	Tape identification for either PHA or RATE. This must have the value 'PHAb' or 'RATE.' (b=blank)
2	6-13	A8	DOLDTP	PHA or RATES tape that is to be replaced.
	15-22	A8	DNEWTP	Backup PHA or RATES tape.
	24-31	I8	ITIMES	Start time of backup tape (milliseconds).
	33-40	I8	ITIMEE	End time of backup tape (milliseconds).
	42-45	I4	HDAYS	Start date of backup tape (relative modified Julian date).
	47-50	I4	HDAYE	End date of backup tape (relative modified Julian date).
	52-55	I4	HFEET	Amount of space (feet) used on backup tape.
3-N	(same as card 2)			Repeat card 2 for each PHA and/or RATES tape that is to be replaced.

NOTE: If it is desired to continue to use the same PHA and/or RATES tape parameters as found on the DRS Tape Catalogs, leave the following field blank: ITIMES. Otherwise, the program will replace the appropriate PHA and/or RATES tape parameters of the backup tape.

(Card '2' must have the following format when MODE=8 or MODE=9 is specified on Card 1.)

Card Number	Columns	Format	Variable Name	Field Description
2	1	I1	NCAT	Number specifying the DRS Tape Catalog (must be a value from 1 to 4).
	4-11	A8	DTAPBK	Backup tape number.

Added to the JCL are the following cards for the execution of MODE=8 and MODE=9:

For MODE=8:

```
//GO.FT11F001 DD DSN=PIOTAP,UNIT=(1600,DEFER),
//      DISP=(NEW,KEEP),DCB=(RECFM=U,BLKSIZE=5540),
//      VOL=SER=DMYTAP
```

For MODE=9:

```
//GO.FT11F001 DD DSN=PIOTAP,UNIT=(1600,,DEFER),
//      DISP=(OLD,KEEP),DCB=(RECFM=U,BLKSIZE=5540),
//      VOL=SER=DMYTAP
```

Following is an example of a data card to add tapes to the catalog:

```
2F
 5
E00405  E00407  E00415  E00418  E00419
```

D. Output.

DRSMNT provides one printed report at the end of each production run. This report is divided into two sections; the first section contains the processing messages which indicate all abnormal conditions encountered and the action taken by the program,and the second section is the Current Status Report. Each page of the report contains the following standard header information:

1. Type of report.
2. Name of the spacecraft.
3. Date of run (MM/DD/YY).
4. Page number.

There are three categories of messages generated by DRSMNT and all are self-explanatory. The first category is the group of messages which list all PHA and RATES tapes rejected by the program. These messages should be investigated for possible errors with the parameter cards. The second category is the group of messages which begin with "JOB TERMINATED" and provide an explicit reason for the abnormal termination of the job. All messages in this group must be investigated and the abnormal condition corrected before the job is resubmitted. The third category is the group of messages which signify the normal "end of job," and these always follow the Current Status report.

The contents of the Current Status report generated by DRSMNT is identical to the Current Status report generated by PIODRP. However, all the DRS Tape Catalogs affected by the current maintenance run are listed by DRSMNT.

E. ABENDS.

DRSMNT recognizes several abnormal conditions and terminates a run without a dump whenever they occur. The last message printed by the job will always indicate the abnormal condition encountered. This condition must be corrected before the job is resubmitted. When a job is terminated abnormally with a user completion code, refer to the User Abends section of the "IBM System/360 General I/O Package," written by Alan R. Thompson included in this procedures document.

V. PIONEER F/G EDR TAPE LIST PROGRAM (EDRLST).

A. Description.

The purpose of the Pioneer F/G EDR Tape List Program is to provide a formatted listing of selected data.

There is only one tape utilized by EDRLST. This tape is the Pioneer F/G EDR tape which contains the GSFC/CRT experiment data and related spacecraft information. This tape is 9-track, odd parity with a recording density of 800 BPI. Each tape consists of four files of data having fixed length records with a different record length for each file. Files one through four contain the logistics, command, attitude and experiment data, respectively. The tape contains undefined records with a maximum block size of 5204 bytes. EDRLST reads parameter cards to determine the EDR tapes and the amounts of data to list. One or more tapes may be listed in each run and each tape must be specified on a separate parameter card.

B. EDRLST JCL.

The program requires 100K bytes of main storage and approximately .5 minutes of CPU time and .5 minutes of I/O time to list 100 records from a particular EDR tape. A description of the DD cards required by EDRLST, the purpose of each data set, and when it is required follows:

DD Name	Purpose of Data Set	Input/ Output	Device Type	Code*
FT06F001	Formatted Data Listing	Output	Printer	A
FT10F001	EDR Tape	Input	Tape	A
SYSDUMP	Abend Dumps	Output	Printer	A
DATA5	Parameter Cards	Input	Card Reader	A

* A = Always Required.

```
//*LIST EDR
//*.TAPES..
//PEDR EXEC LINKGO,REGION.GO=100K
//LINK.SYSLIB DD DSN=K3.SBCID.SB001.OPIONEER,DISP=SHR
//LINK.SYSLIN DD *
  INCLUDE SYSLIB(EDRLST)
  ENTRY EDRLST
//GO.FT06F001 DD DCB=(BLFNO=4)
//GO.FT10F001 DD DSN=EDRIN,UNIT=(2400-9,,DEFER),DISP=SHR,
//  DCB=(RECFM=U,BLKSIZE=5204,DEN=2),LABEL=(,BLP,,IN),VOL=SER=DUMI
//GO.SYSUDUMP DD SYSOUT=A
//GO.DATA5 DD *
```

C. Data Cards.

The data cards follow the last DD card in the program setup and are read using the NAMELIST convention of FORTRAN IV. The first column in each card must be blank. The next six columns of the first card of a group of cards must contain the characters "&INPUT", followed by a blank. The blank is followed by data items separated by commas. The end of a group of cards is signaled by the characters "&END". One or more groups of cards, each identifying a unique EDR tape, may be submitted each run.

Each group of cards, with the NAMELIST name INPUT, identifies an EDR tape to list and specifies the amount of data to list. The form of the data items within this group follows, along with the standard default value they assume whenever they are not specified. The underlined keywords and equal sign must be written

as follows. Below is a sample of a data card:

```
&INPUT DTAPE='E02131',QATT=T,LIMITS=1,1                    &END
```

DTAPE= The location (tape slot) or symbol identifying the EDR tape to be listed. The tape slot or symbol may contain a maximum of six characters and must be enclosed in apostrophes. This symbol appears on the operator's console whenever the EDR tape is to be mounted.

(Default - None. The EDR tape must always be identified.)

DALIAS= The label or identifying symbol for the EDR tape being processed. This label may contain a maximum of six characters and must be enclosed in apostrophes. This label appears in all the listings generated by EDRLST which all associated with this EDR tape.

(Default - Assumes the value of DTAPE when not specified.)

LSTRCN= 0 If the records on the EDR tape are to be listed by record number.
1 If the records on the EDR tape are to be listed by time period (MS of day).

(Default = 0)

LIMITS= Pairs of start and end record sequence numbers or time periods (MS of day) that are to be listed from the EDR tape specified via the "DTAPE" keyword. A maximum of 20 pairs (2 entries) may be supplied and each entry must be separated from the previous one by a comma. Both entries of a pair must be supplied even if only one record is desired. The pairs must be supplied in sequence and the end entry of a pair must always be larger than or equal to the start entry. Only the data contained in the first three files of the EDR tape is listed when only one pair is supplied with both entries set equal to zero.

(Default - Only the data contained in the first three files of the EDR tape is listed.)

QATT= T If the Attitude information contained in file 3 of the EDR tape is to be listed.
F if the Attitude information is not to be listed.

(Default = T)

D. Output.

The primary output from EDRLST is the listing of the first three files of data contained on the EDR tape, followed by the listing of the specified records contained in file four. The first three files of data (logistics, commands and attitude) are printed on one page followed by four pages for each full data record from file four. When a data record does not contain all good data, the following message will be printed after the last good frame of data:

***** REMAINDER OF RECORD ALL PAD *****

The listing generated by EDRLST for all four files of data on an all-EDR tape is self-explanatory. Also, all messages generated by EDRLST are self-explanatory except for the following message:

ERROR ENCOUNTERED:FILE-XX REC-XXX STATUS INFORMATION FOLLOWS:

This message indicates that an error occurred during a read operation and the pertinent information describing the error is provided in the following line of printout. A detailed description of the status information is provided in the I/O Errors section of the "IBM System/360 General I/O Package," written by Alan R. Thompson.

E. ABENDS.

When a job is terminated abnormally with a user completion code, refer to the User Abends section of the "IBM System/360 General I/O Package," written by Alan R. Thompson (see Section FTIO).

VI. PIONEER RATES TAPE LIST PROGRAM USER'S GUIDE.

A. Description.

The Pioneer Rates Tape List Program is designed to create formatted listings of all RATES tapes, or part of a specified tape.

The user may request listings of specific contiguous records from a specified tape (record option), or of all Rates records spanning a given time interval (time option). Several Rate tapes may be mounted to satisfy a time option request. As many requests as desired may be processed in a run, with one input card required for each request. Time and record option requests may be mixed. Request for listings from Pioneer-F/G spacecraft may also be mixed. If the spacecraft ID is not specified, and this is the first request of a run, the assumed ID is F. After the first request, the ID of the previous request is assumed when none is specified.

When the time option is used, and the start time is not specified, then a tape label must be specified. Listing will then begin with the first record of this tape, and will continue until the specified end time, which may be on the same or some other tape. Failure to specify a tape label when no start time is specified will result in the list request being ignored. Any time option request not specifying an end time will cause the listing to end with the last record of the first tape mounted.

When the record option is specified, and no stapt record is specified, the listing will begin with the first record of the tape. If no stop record is specified, the listing will end with the last record on the tape.

Thus, it is possible to list all of a Rate tape using either the time or record option merely by specifying the tape label in the Time/Record data card.

B. JCL FOR RATES.

The program requires 150K bytes of main storage and .5 minutes of CPU time and 1.0 minutes of I/O time to list approximately 100 records.

The program references the following data sets (by DDNAME):

DATA SET	DESCRIPTION
FT06F001	Defines output data set for listing of Rate tapes. This is usually directed to a line printer (SYSOUT=A).
FT08F001	Defines output data set to receive program messages and error messages. This is normally directed to a line printer (SYSOUT=A) with following DCB specification: RECFM=VBA, LRECL=137, BLKSIZE=7265.
FT09F001	Defines input data set for Rate tape. A 9-track tape drive (UNIT=1600) should be specified with defer mounting. A dummy volume serial number should be specified. User must also specify DISP=SHR, and a dummy parameter for DSNAME.
FT20F001	Defines Pioneer-F DRS catalog pointer data set. If cataloged, only DSNAME and DISP parameters must be specified. Otherwise UNIT and VOL parameters must also be specified.

DATA SET	DESCRIPTION
FT21F001 FT22F001 FT23F001 FT24F001	Define Pioneer-F DRS Catalogs 1,2,3 and 4, respectively. If cataloged, only DSNAME and DISP parameters must be specified. Otherwise, UNIT and VOL parameters must also be specified.
FT30F001 FT31F001 FT32F001 FT33F001 FT34F001	Define Pioneer-G DRS catalog pointer data set, and Pioneer-G DRS catalog numbers 1, 2, 3, and 4, respectively. If cataloged, only DSNAME and DISP parameters must be specified. Otherwise, UNIT and VOL parameters must also be specified.
FT05F001	Defines card input data set to contain request for listing of Rate tapes by time and record option.

RATE TAPE LIST JCL:

```
//*F&G LIST
//*RATETAPE
//LINKGO  EXEC  LINKGC,REGION.GO=150K
//LINK.SYSLIB  DD  DSN=K3.Z82NL.S8001.OPIOFRAT,DISP=SHR
//  DD DSN=K3.S8CID.S8001.OPIONEER,DISP=SHR
//LINK.SYSLIN  DD  *
 INCLUDE SYSLIB(PFRTPL)
 ENTRY PFRTPL
//GO.FT08F001  DD  SYSOUT=A,DCB=(RECFM=VBA,LRECL=137,BLKSIZE=7265)
//GO.FT09F001  DD  DSN=FIORAT,UNIT=(6250,,DEFER),DISP=SHR,
//  VOL=SER=DUMRAT,DCB=DEN=3
//GO.FT20F001  DD  DSN=K3.S8CID.S8001.PFREDOR0,DISP=SHR
//GO.FT21F001  DD  DSN=K3.S8CID.S8001.PFREDOR1,DISP=SHR
//GO.FT22F001  DD  DSN=K3.S8CID.S8001.PFREDOR2,DISP=SHR
//GO.FT23F001  DD  DSN=K3.S8CID.S8001.PFREDOR3,DISP=SHR
//GO.FT24F001  DD  DSN=K3.S8CID.S8001.PFREDOR4,DISP=SHR
//GO.FT30F001  DD  DSN=K3.S8JPH.S8001.PGDRSCT0,DISP=SHR
//GO.FT31F001  DD  DSN=K3.S8JPH.S8001.PGDRSCT1,DISP=SHR
//GO.FT32F001  DD  DSN=K3.S8JPH.S8001.PGDRSCT2,DISP=SHR
//GO.FT33F001  DD  DSN=K3.S8JPH.S8001.PGDRSCT3,DISP=SHR
//GO.FT34F001  DD  DSN=K3.S8JPH.S8001.PGDRSCT4,DISP=SHR
//* DATA CARD: COL. 1-8 (TYPE), 9 (ID), 13 (TAPE), 26-49 (START & END)
//GO.SYSUDUMP DD SYSOUT=A
//GO.DATA5 DD *
```

C. Data Cards.

An example of a data card follows:

```
TIME     G                    77C127053000770127063000
```

INPUT CARD FORMAT (RECORD OPTION):

Card Columns	Description
1-6	Must contain word RECORD starting in Column 1.
7-12	Blank
13-20	Label of tape to be read
21-25	Blank
26-29	Integer specifying first record of tape to be listed (Default: 1)
30-37	Blank
38-41	Integer specifying last record to be listed (Default: last record on tape)

INPUT CARD FORMAT (TIME OPTION):

Card Columns	Description
1-4	Must contain word TIME starting in Column 1
5-8	Blank
9	Spacecraft ID (F or G). If not specified on first request of run, F is assumed. If not specified on other than first request, ID of previous request is assumed.
10-12	Blank
13-20	Optional--label of tape for start of processing for this request, or label of tape known to contain requested start time. Must be specified if start time is not specified.
21-25	Blank
26-27	Two-digit year for start of processing:
28-29	Start month
30-31	Start day

Card Columns	Description
32-33	Start hour
34-35	Start minute
36-37	Start second
38-39	Two-digit year of last time to be listed:
40-41	End month
42-43	End day
44-45	End hour
46-47	End minute
48-49	End second

D. Output.

The primary output from the Rates Tape List Program is a formatted listing of the Rates Data by time or record, whichever was specified.

E. Abends.

Following is a list of program error and information messages with appropriate user responses:

1. LISTING WAS TO BEGIN WITH RECORD XXXXXX BUT END OF VOLUME WAS REACHED AT RECORD XXXXXX.

   Cause: The user on a record option request specified a start record index larger than the number of records on the tape.

   User Response: Either decrease the start record specified or make sure the correct tape label is specified.

2. *** ERROR TAPE NOT SPECIFIED IN RECORD MODE - REQUEST IGNORED.

   Cause: As stated.

   User Response: If the tape label is not known, use the time option to obtain desired listing. Otherwise, specify the tape label on the record option card.

3. *** ERROR MODE COULD NOT BE IDENTIFIED. MODE FIELD CONTAINED XXXXXXX. REQUEST IGNORED.

   Cause: The first characters of a user request card were neither TIME nor RECORD.

   User Response: Obvious.

4. *** ERROR BEGIN TIME WAS NOT SPECIFIED THUS IMPLYING THE START OF THE TAPE. BUT NO LABEL WAS SPECIFIED. REQUEST IGNORED.

   Cause: A time option request specified neither start time nor tape label.

   User Response: A time option request must specify either the tape label or start time.

5. *** ERROR S/C ID READ FROM THE CATALOG POINTER DATASET (X), DOES NOT MATCH ID READ DROM CATALOG # X, (UNIT XX)--X. RUN TERMINATED.

   Cause: A unit designated as defining an "F" DRS catalog (FT21-FT24 contains the DSNAME of a "G" DRS catalog. Conversely, a unit designated as "G" (FT31-FT34) contains the DSNAME of an "F" DRS catalog.

User Response: FORTRAN units 21 through 24 should define only "F" DRS catalogs, FORTRAN units 31 through 34 should define only "G" DRS catalogs.

6. *** ERROR EITHER AN END-OF-FILE OR AN I/O ERROR WAS DETECTED WHILE READING DRS CATALOG # X ON UNIT XX. RUN TERMINATED.

   Cause: As stated

   User Response: Check the DD card of the indicated unit. Make sure the data set with this DSNAME has been written on and in fact is a DRS catalog; if so, try resubmitting run as before since this may be an intermittant I/O error.

7. TIME PERIOD REQUESTED IS NOT ENTIRELY CONTAINED ON TAPES CURRENTLY IN THE DRS CATALOG.

   Cause: Not an error. The user-requested listing of data is not currently available.

   User Response: N/A.

8. *** I/O ERROR DETECTED ON TAPE XXXXXX AT RECORD XXXXXX. PROCESSING FOR THIS REQUEST TERMINATED. (Message from FTIO is printed.)

   Cause: As stated.

   User Response: Check FTIO manual for an interpretation of the message. Try copying tape using the utility VBSCOPY and replace the tape in the catalog with the new copy.

9. ---- BEGIN TIME NOT FOUND ON GIVEN TAPE.

Cause: A time option request contained both a tape label and a start time; however, the tape ended prior to the requested start time.

User Response: If the desired tape must be listed, eliminate the start time from request or change to the record option. If data from the time interval is desired, do not specify a tape label and let the program find the correct tape.

VII. PIONEER PHA TAPE LIST PROGRAM USER'S GUIDE.

A. Description.

The Pioneer PHA Tape List Program is designed to create formatted listings of all PHA tapes, or part of a specified tape.

The user may request listings of specific contiguous records from a specified tape (record option), or of all PHA records spanning a given time interval (time option). Several PHA tapes may be mounted to satisfy a time option request. As many requests as desired may be processed in a run, with one input card required for each request. Time and record option requests may be mixed. Request for listings from Pioneer-F/G spacecraft may also be mixed. If the spacecraft ID is not specified, and this is the first request of a run, the assumed ID is F. After the first request, the ID of the previous request is assumed when none is specified.

When the time option is used, and the start time is not specified, then a tape label must be specified. Listing will then begin with the first record of this tape, and will continue until the specified end time, which may be on the same or some other tape. Failure to specify a tape label when no start time is specified will result in the list request being ignored. Any time option request not specifying an end time will cause the listing to end with the last record of the first tape mounted.

When the record option is specified, and no stapt record is specified, the listing will begin with the first record of the tape. If no stop record is specified, the listing will end with the last record on the tape.

Thus, it is possible to list all of a PHA tape using either the time or record option merely by specifying the tape label in the Time/Record data card.

B. JCL FOR RATES.

The program requires 150K bytes of main storage and .5 minutes of CPU time and 1.0 minutes of I/O time to list approximately 100 records.

The program references the following data sets (by DDNAME):

DATA SET	DESCRIPTION
FT06F001	Defines output data set for listing of PHA tapes. This is usually directed to a line printer (SYSOUT=A).
FT08F001	Defines output data set to receive program messages and error messages. This is normally directed to a line printer (SYSOUT=A) with following DCB specification: RECFM=VBA, LRECL=137, BLKSIZE=7265.
FT10F001	Defines input data set for PHA tape. A 9-track tape drive (UNIT=1600) should be specified with defer mounting. A dummy volume serial number should be specified. User must also specify DISP=SHR, and a dummy parameter for DSNAME.
FT20F001	Defines Pioneer-F DRS catalog pointer data set. If cataloged, only DSNAME and DISP parameters must be specified. Otherwise UNIT and VOL parameters must also be specified.

DATA SET	DESCRIPTION
FT21F001 FT22F001 FT23F001 FT24F001	Define Pioneer-F DRS Catalogs 1,2,3 and 4, respectively. If cataloged, only DSNAME and DISP parameters must be specified. Otherwise, UNIT and VOL parameters must also be specified.
FT30F001 FT31F001 FT32F001 FT33F001 FT34F001	Define Pioneer-G DRS catalog pointer data set, and Pioneer-G DRS catalog numbers 1, 2, 3, and 4, respectively. If cataloged, only DSNAME and DISP parameters must be specified. Otherwise, UNIT and VOL parameters must also be specified.
FT05F001	Defines card input data set to contain request for listing of PHA tapes by time and record option.

PHA TAPE LIST JCL:

```
//*F&G LIST
//*PHA TAPE
//LINKGO  EXEC  LINKGO,REGION.GO=150K
//LINK.SYSLIB  DD  DSN=K3.Z82NL.SB001.OPIOFRAT,DISP=SHR
//LINK.SYSLIN DD *
 INCLUDE SYSLIB(PRNPHA)
 ENTRY PRNPHA
//GO.FT08F001  DD  SYSOUT=A,DCB=(RECFM=VBA,LRECL=137,BLKSIZE=7265)
//GO.FT10F001  DD  DSN=PIOPHA,UNIT=(1600,,DEFER),DISP=SHR,
//  VOL=SER=DUM1,DCB=DEN=3
//GO.FT20F001  DD  DSN=K3.SBJPH.SB001.PFDRSCTP,DISP=SHR
//GO.FT21F001  DD  DSN=K3.SBJPH.SB001.PFDRSCT1,DISP=SHR
//GO.FT22F001  DD  DSN=K3.SBJPH.SB001.PFDRSCT2,DISP=SHR
//GO.FT23F001  DD  DSN=K3.SBJPH.SB001.PFDRSCT3,DISP=SHR
//GO.FT24F001  DD  DSN=K3.SBJPH.SB001.PFDRSCT4,DISP=SHR
//GO.FT30F001  DD  DSN=K3.SBJPH.SB001.PGDRSCTP,DISP=SHR
//GO.FT31F001  DD  DSN=K3.SBJPH.SB001.PGDRSCT1,DISP=SHR
//GO.FT32F001  DD  DSN=K3.SBJPH.SB001.PGDRSCT2,DISP=SHR
//GO.FT33F001  DD  DSN=K3.SBJPH.SB001.PGDRSCT3,DISP=SHR
//GO.FT34F001  DD  DSN=K3.SBJPH.SB001.PGDRSCT4,DISP=SHR
//GO.SYSUDUMP DD SYSOUT=A
//* DATA CARD: COL. 1-8 (TYPE), 9 (ID), 13 (TAPE), 26-49 (START & END)
12345678901234567890123456789012345678901234567890123456789012345678901234567890
//GO.DATA5 DD *
```

C. Data Cards.

An example of a data card follows:

```
TIME     G                    770127053000770127063000
```

C. Data Cards.

INPUT CARD FORMAT (RECORD OPTION):

Card Columns	Description
1-6	Must contain word RECORD starting in Column 1.
7-12	Blank
13-20	Label of tape to be read
21-25	Blank
26-29	Integer specifying first record of tape to be listed (Default: 1)
30-37	Blank
38-41	Integer specifying last record to be listed (Default: last record on tape)

INPUT CARD FORMAT (TIME OPTION):

Card Columns	Description
1-4	Must contain word TIME starting in Column 1
5-8	Blank
9	Spacecraft ID (F or G). If not specified on first request of run, F is assumed. If not specified on other than first request, ID of previous request is assumed.
10-12	Blank
13-20	Optional--label of tape for start of processing for this request, or label of tape known to contain requested start time. Must be specified if start time is not specified.
21-25	Blank
26-27	Two-digit year for start of processing:
28-29	Start month
30-31	Start day

Card Columns	Description
32-33	Start hour
34-35	Start minute
36-37	Start second
38-39	Two-digit year of last time to be listed:
40-41	End month
42-43	End day
44-45	End hour
46-47	End minute
48-49	End second

D. Output.

The primary output from the PHA Tape List Program is a formatted listing of the PHA Data by time or record, whichever was specified.

E. Abends.

Following is a list of program error and information messages with appropriate user responses:

1. LISTING WAS TO BEGIN WITH RECORD XXXXXX BUT END OF VOLUME WAS REACHED AT RECORD XXXXXX.

   Cause: The user on a record option request specified a start record index larger than the number of records on the tape.

   User Response: Either decrease the start record specified or make sure the correct tape label is specified.

2. *** ERROR TAPE NOT SPECIFIED IN RECORD MODE - REQUEST IGNORED.

   Cause: As stated.

   User Response: If the tape label is not known, use the time option to obtain desired listing. Otherwise, specify the tape label on the record option card.

3. *** ERROR MODE COULD NOT BE IDENTIFIED. MODE FIELD CONTAINED XXXXXX. REQUEST IGNORED.

   Cause: The first characters of a user request card were neither TIME nor RECORD.

   User Response: Obvious.

4. *** ERROR BEGIN TIME WAS NOT SPECIFIED THUS IMPLYING THE START OF THE TAPE. BUT NO LABEL WAS SPECIFIED. REQUEST IGNORED.

   Cause: A time option request specified neither start time nor tape label.

   User Response: A time option request must specify either the tape label or start time.

5. *** ERROR S/C ID READ FROM THE CATALOG POINTER DATASET (X), DOES NOT MATCH ID READ DROM CATALOG # X, (UNIT XX)--X. RUN TERMINATED.

   Cause: A unit designated as defining an "F" DRS catalog (FT21-FT24 contains the DSNAME of a "G" DRS catalog. Conversely, a unit designated as "G" (FT31-FT34) contains the DSNAME of an "F" DRS catalog.

User Response: FORTRAN units 21 through 24 should define only "F" DRS catalogs, FORTRAN units 31 through 34 should define only "G" DRS catalogs.

6. *** ERROR EITHER AN END-OF-FILE OR AN I/O ERROR WAS DETECTED WHILE READING DRS CATALOG # X ON UNIT XX. RUN TERMINATED.

   Cause: As stated

   User Response: Check the DD card of the indicated unit. Make sure the data set with this DSNAME has been written on and in fact is a DRS catalog; if so, try resubmitting run as before since this may be an intermittant I/O error.

7. TIME PERIOD REQUESTED IS NOT ENTIRELY CONTAINED ON TAPES CURRENTLY IN THE DRS CATALOG.

   Cause: Not an error. The user-requested listing of data is not currently available.

   User Response: N/A.

8. *** I/O ERROR DETECTED ON TAPE XXXXXX AT RECORD XXXXXX. PROCESSING FOR THIS REQUEST TERMINATED. (Message from FTIO is printed.)

   Cause: As stated.

   User Response: Check FTIO manual for an interpretation of the message. Try copying tape using the utility VBSCOPY and replace the tape in the catalog with the new copy.

9. ---- BEGIN TIME NOT FOUND ON GIVEN TAPE.

Cause: A time option request contained both a tape label and a start time; however, the tape ended prior to the requested start time.

User Response: If the desired tape must be listed, eliminate the start time from request or change to the record option. If data from the time interval is desired, do not specify a tape label and let the program find the correct tape.

VIII. LOGISTICS.

A. Description.

The purpose of the Pioneer F&G Logistic Compress program is to compress the Logistic data set on disk associated with either satellite as determined by the JCL. The program can modify any or all entries via data cards in "NAMELIST" form.

Normally, this program is run to delete the oldest exact duplicate entries in the logistic dataset specified, but it can be run to delete specific absolute file numbers if desired.

B. JCL for Logistics.

The program requires 150 bytes of main storage and approximately .5 minutes of CPU time and 1.0 minutes of I/O time to do any operation desired. The DD cards required by LOGISTIC, and the purpose of each data set, are shown below:

DD NAME	PURPOSE OF DATA SET	INPUT/ OUTPUT	DEVICE TYPE	CODE
FT06F001	Processing Messages	Output	Printer	A
FT10F001	DRS Tape Catalog Pointer	Input	Disk	A
FT11F001	DRS Tape Catalog 1	Input	Disk	A
FT12F001	DRS Tape Catalog 2	Input	Disk	A
FT13F001	DRS Tape Catalog 3	Input	Disk	A
FT14F001	DRS Tape Catalog 4	Input	Disk	A
FT15F001	DRS Logistic Catalog	Input	Disk	A
FT16F001	Temp. Logistic Work Catalog	Output	Disk	A

DD NAME	PURPOSE OF DATA SET	INPUT/ OUTPUT	DEVICE TYPE	CODE
FT17F001	Temp. Logistic Work Catalog	Output	Disk	A
SYSUDUMP	ABEND DUMPS	Output	Printer	A
DATA5	Parameter cards	Input	Card/ Reader	B

CODE: A = Always Required.
B = Required only if normal compress is not requested. See Data Cards.

```
//* LOGISTIC
//* THISDATE
// EXEC LINKGO,REGION.GO=150K
//LINK.SYSLIB DD DSN=K3.SBCID.SB001.QPIONEER,DISP=SHR
// DD DSN=K3.SBCID.SB001.QPICTEMP,DISP=SHR
//LINK.SYSLIN DD *
 INCLUDE SYSLIB(LOGIST)
//GO.FT10F001 DD DSN=K3.SBCID.SB001.PFREDORP,DISP=SHR
//GO.FT11F001 DD DSN=K3.SBCID.SB001.PFREDOR1,DISP=(OLD,KEEP,KEEP)
//GO.FT12F001 DD DSN=K3.SBCID.SB001.PFREDOR2,DISP=(OLD,KEEP,KEEP)
//GO.FT13F001 DD DSN=K3.SBCID.SB001.PFREDOR3,DISP=(OLD,KEEP,KEEP)
//GO.FT14F001 DD DSN=K3.SBCID.SB001.PFREDOR4,DISP=(OLD,KEEP,KEEP)
//GO.FT15F001 DD DSN=K3.SBCID.SB001.PFREDOLG,DISP=(OLD,KEEP,KEEP)
//GO.FT16F001 DD UNIT=2314,DISP=(NEW,DELETE,DELETE),SPACE=(TRK,20),
// DCB=(RECFM=F,LRECL=7294,BLKSIZE=7294)
//GO.FT17F001 DD UNIT=2314,DISP=(NEW,DELETE,DELETE),SPACE=(TRK,20),
// DCB=(RECFM=F,LRECL=7294,BLKSIZE=7294)
//GO.SYSUDUMP DD SYSOUT=A
//GO.DATA5 DD *
```

C. Data Cards.

The data cards follow the last DD card in the job setup and are read using the NAMELIST convention of FORTRAN IV. If no data cards are specified* only those entries in the Logistics Catalog which have exact duplicate entries except for absolute file number (QABSF) will be analyzed. If duplicate entries are found, the most recent entry is kept and all other entries are deleted. If a particular type of entry is to be

*Under normal conditions no data cards are specified--this is a simple compression run.

deleted, options to key on must be specified. When an option is specified, any duplicate entry for that particular option specified will be deleted. The options to be keyed on must be set to true, all options default to false. The first column of each card must be blank. The second column in the first card of a group of data cards associated with the same NAMELIST must contain an ampersand (@) immediately followed by the NAMELIST Name CNTROL. If the data card CNTROL is defined the first absolute file number (QABSF) and the number of files (NABSF) must be spedified. This second parameter (NABSF) number of files must not exceed 20. The following are the options which may be keyed on for deletion of duplicate entries.

QSMDY	Start month/day/year.
QSHMS	Start hour/min/sec.
QEMDY	END month/day/year.
QEHMS	END hour/min/sec.
QEDRG	EDR generated.
QEDRRG	EDR re-generated.
QTLREC	Total records read.
QGDREC	Total good records processed.
QUALLW	Data Quality Low.
QUALHG	Data Quality High.
QPROCP	PHA generated.
QPROCR	Rates Generated.
QPROCC	Commands Processed.

D. Output.

The output from the Logistics Compress programs is (1) a formatted list of the logistics data set from disk before the requested operation was performed, (2) the absolute file numbers a requested operation was asked to perform, and (3) the Logistic data set as it appears after the requested operation was performed.

E. Abends.

When a job is terminated abnormally with a user completion code, refer to the User Abends section of the "IBM System/360 General I/O Package," Section FTIO.

IX. VBSCOPY.

A. Description.

The purpose of the Pioneer F&G VBSCOPY program is to create backup tapes of the Rates and PHA tape data base. It is also used to correct the PHA and Rate tapes with I/O Errors, Wrong Length Records, and Data Checks. The program basically keeps the logical integrity of VBS Records.

B. JCL for VBSCOPY.

The program VBSCOPY is in executable load module form on SYS2. LOADLIB named SEHGDVBS. The program requires .5 minutes of CPU time and 2. minutes of I/O for a full 2200-ft. tape. This program may be used for both PHA and Rates tapes with slight changes to the JCL. The changes are data set name, LRECL and BLKSIZE. The DD cards required by VBSCOPY are shown below and the purpose of each data set is defined.

DD NAME	PURPOSE OF DATA SET	INPUT/ OUTPUT	DEVICE TYPE	CODE
STEPLIB	User Program	Input	Disk	A
SYSPRINT	Formatted Listing	Output	Printer	A
ORIGINAL	PHA or RATE Tape	Input	Tape	A
COPY	Corrected PHA or Rate Tape	Output	Tape	A
SYSUDUMP	ABEND LISTING	Output	Printer	A

CODE: A = Always required

JCL FOR RATES TAPES:

```
//COPYVBS  PROC  INVOL=,OUTVOL=
//BACKITUP  EXEC  PGM=SEHGDVBS,REGION=150K
//STEPLIB  DD  DSN=SYS2.LOADLIB,UNIT=3330,DISP=SHR
//SYSPRINT  DD  SYSOUT=A
//ORIGINAL  DD  DSN=PIORAT,UNIT=6250,VOL=SER=&INVOL.,
//  DISP=SHR,DCB=(RECFM=U,BLKSIZE=8704,LRECL=8704,OPTCD=BZ,DEN=3)
//COPY  DD  DSN=PIORAT,UNIT=6250,VOL=SER=&OUTVOL.,
//  DISP=(SHR,KEEP),DCB=(RECFM=VBS,LRECL=1740,BLKSIZE=8704,DEN=3)
//SYSUDUMP  DD  SYSOUT=A
//  PEND
```

JCL FOR PHA TAPES:

```
//COPYVBS  PROC  INVOL=,OUTVOL=
//BACKITUP  EXEC  PGM=SEHGDVBS,REGION=150K
//STEPLIB  DD  DSN=SYS2.LOADLIB,UNIT=3330,DISP=SHR
//SYSPRINT  DD  SYSOUT=A,DCB=BLKSIZE=3564
//ORIGINAL  DD  DSN=PIOPHA,UNIT=6250,VOL=SER=&INVOL.,
//  DISP=SHR,DCB=(RECFM=U,LRECL=1524,BLKSIZE=7624,OPTCD=Z,EROPT=ACC,
// DEN=3)
//COPY  DD  DSN=PIOPHA,UNIT=6250,VOL=SER=&OUTVOL.,
//  DISP=(SHR,KEEP),DCB=(RECFM=VBS,LRECL=1524,BLKSIZE=7624,DEN=3)
//SYSUDUMP  DD  SYSOUT=A
//  PEND
```

C. Data Cards.

Only one card is used for this program. It merely envokes the procedure and defines the input and output tape:

```
// EXEC COPYVBS,INVOL=E02644,OUTVOL=E02687
```

D. Output.

The output from this program is a corrected or backup PHA or RATES tape and a listing. The listing has the number of blocks read, copied, not copied and why.

E. Abends.

This program does not abend except due to bad Output tapes or tape drives. If a bad output tape is encountered, have the tape Librarian in the Building 1 Computer Facility clean it and rerun the job. If the drive is bad, resubmit the job, specifying a different drive.