[redacted]

73-085A-02B, 02C, 02D #389

MARINER 10

VENUS OCCULTATION REDUCED TELEMETRY SIGNAL DATA

VENUS OCCULTATION INTERMEDIATE DATA FILE

AND

REDUCED MERCURY OCCULTATION DATA

[redacted]

MARINER 10

VENUS OCCULTATION

REDUCED TELEMETRY SIGNAL DATA

73-085A-02B

AND

VENUS OCCULATION INTERMEDIATE DATA FILE

73-085A-02C

THESE DATA SETS HAVE BEEN RESTORED. ORIGINALLY THERE WERE 27 9-TRACK, 800 BPI MARINER 10 REDUCED TELEMETRY SIGNAL DATA TAPES AND ONE 7-TRACK, 800 BPI MARINER 10 VENUS OCCULATION INTERMEDIATE DATA TAPE. THERE ARE NOW 5 RESTORED TAPES AT 9-TRACK, 6250 BPI CONTAINING MULTPLE FILES OF DATA FOR 73-085A-02B AND ONE TAPE AT 9-TRACK, 6250 BPI, CONTAINING 20 FILES, THE FIRST FILE IS AN E.O.F., THE SECOND FILE IS A HEADER AND THE FILES 3 - 20 ARE DATA FILES, FOR 73-085A-02C. THE TAPES WERE CREATED ON AN UNIVAC 1108 COMPUTER. THE VENUS OCCULATION INTERMEDIATE DATA TAPE SHOULD BE SENT WITH THE MARINER 10 DATA TAPES SINCE IT CONTAINS THE PROGRAMS TO RUN AGAINST THOSE TAPES. THE DR AND DS NUMBERS ALONG WITH THE CORRESPONDING D NUMBERS AND THE TIME SPANS ARE AS FOLLOWS:

73-085A-02B

DR#	DS#	D#	FILES	TIME SPAN
DR02698	DS02698	D29598	1	02/05/74
		D29599	2	02/05/74
		D29600	3	02/05/74
		D29601	4	02/05/74
		D29602	5	02/05/74
		D29603	6	02/05/74
DR02699	DS02699	D29604	1	02/05/74
		D29605	2	02/05/74
		D29606	3	02/05/74
		D29607	4	02/05/74
		D29626	5	02/05/74
		D29627	6	02/05/74

73-085A-02B

DR#	DS#	D#	FILES	TIME SPAN
DR02700	DS02700	D29628	1	02/05/74
		D29629	2	02/05/74
		D29630	3	02/05/74
		D29631	4	02/05/74
		D29632	5	02/05/74
		D29633	6	02/05/74
DR02701	DS02701	D29634	1	02/05/74
		D29635	2	02/05/74
		D29651	3	02/05/74
		D29652	4	02/05/74
		D29653	5	02/05/74
		D29654	6	02/05/74
DR02702	DS02702	D29655	1	02/05/74
		D29656	2	02/05/74
		D29657	3	02/05/74

73-085A-02C

DR02786	DS02786	D29359	1-20

REQ. AGENT	RAND NO.	ACQ. AGENT
VJP	RC7556	CDW

MARINER 10

VENUS OCCULTATION

REDUCED TELEMETRY SIGNAL DATA

73-085A-02B

AND

VENUS OCCULTATION INTERMEDIATE DATA FILE

73-085A-02C

This data set catalog consists of 27 Mariner 10 Reduced Telemetry Signal data tapes and 1 Mariner 10 Venus Occultation Intermediate data tapes.

The reduced Telemetry data are 800 BPI Bin, 9 track and contains 1 file each. The Venus Occultation Intermediate data are 800 BPI, Bin, 7 track and contains 20 files, the first file is an E.O.F., the second a header and files 3-20 are the data files. The tapes were created on a UNIVAC 1108 computer.

The Venus Occultation Intermediate data tape should be sent with the Mariner 10 data tapes since it contains programs to run against those tapes.

MARINER 10 73-085A-02C

D#	C#	FILES
D-29359	C-18979	20

MARINER 10 73-085A-02B

D#	C#	DATE	TIMES
D-29598	C-18997	02/05/74	17:11:15 - 17:12:12
D-29599	C-18998	02/05/74	17:08:29 - 17:09:30
D-29600	C-18999	02/05/74	17:20:24 - 17:21:25
D-29601	C-19000	02/05/74	17:14:55 - 17:15:55
D-29602	C-19001	02/05/74	17:17:39 - 17:18:40
D-29603	C-19002	02/05/74	17:16:45 - 17:17:45
D-29604	C-19003	02/05/74	17:13:04 - 17:14:05
D-29605	C-19004	02/05/74	17:13:59 - 17:15:00
D-29606	C-19005	02/05/74	17:12:09 - 17:13:10
D-29607	C-19006	02/05/74	17:34:09 - 17:35:10
D-29626	C-19061	02/05/74	17:24:59 - 17:26:00
D-29627	C-19062	02/05/74	17:10:19 - 17:11:20
D-29628	C-19063	02/05/74	17:09:24 - 17:10:25
D-29629	C-19064	02/05/74	17:19:29 - 17:20:30
D-29630	C-19065	02/05/74	17:18:34 - 17:19:35
D-29631	C-19066	02/05/74	17:24:04 - 17:25:05
D-29632	C-19067	02/05/74	17:33:15 - 17:34:15
D-29633	C-19068	02/05/74	17:32:26 - 17:33:20
D-29634	C-19069	02/05/74	17:31:34 - 17:32:25
D-29635	C-19070	02/05/74	17:26:49 - 17:27:48
D-29651	C-19128	02/05/74	17:23:09 - 17:24:10
D-29652	C-19129	02/05/74	17:28:39 - 17:29:40
D-29653	C-19130	02/05/74	17:27:44 - 17:28:45
D-29654	C-19131	02/05/74	17:30:29 - 17:31:30
D-29655	C-19132	02/05/74	17:29:34 - 17:30:35
D-29656	C-19133	02/05/74	17:25:55 - 17:26:55
D-29657	C-19134	02/05/74	17:22:14 - 17:23:15

MARINER 10

REDUCED MERCURY OCCULTATION DATA

73-085A-02D

This data set have been restored. Originally there were four 9-track, 800 BPI tapes, written in Binary. There is one restored tape. The original tapes were created on a UNIVAC 1108 computer. The restored tape was created on the IBM 9021 computer. The DR tape is 3480 cartridge and the DS tape is 9-track, 6250 BPI. The DR and DS numbers along with their corresponding D numbers and time span is as follows:

DR#	DS#	DD#	FILES	TIME SPAN	
DR-004919	DS-004919	DD-029593	1	20:55:20 - 20:56:20	03/29/74
		DD-029594	2	21:07:15 - 21:08:15	03/29/74
		DD-029595	3	21:08:10 - 21:09:10	03/29/74
		DD-029596	4	21:09:05 - 21:10:05	03/29/74

REQ. AGENT	RAND NO.	ACQ. AGENT
VJP	RC7556	CDW

MARINER 10

REDUCED MERCURY OCCULTATION DATA

73-085A-02D

This data set catalog consists of 4 Mariner 10 data tapes. The tapes are 9 track, 800 BPI, Bin and contains 1 file each. The tapes were created on a UNIVAC 1108 computer.

D#	C#	DATE	TIME
D-29593	C-18993	3/29/74	20:55:20 - 20:56:20
D-29594	C-18994	3/29/74	21:07:15 - 21:08:15
D-29595	C-18995	3/29/74	21:08:10 - 21:09:10
D-29596	C-18996	3/29/74	21:09:05 - 21:10:05

TO FIND THE TIME SPAN

Write down the first 12 bytes.

ex:

0A3320110E30

Broken down as:

0000 1010 0011 0011 0010 0000 0001 0001 0000 1110 0011 0000

Then cross out the first two bits, and then every two bits after every 6 bits.

00 1010 11 0011 10 0000 01 0001 00 1110 11 0000

6 bits	10 bits	6 bits	7 bits	7 bits
001010	1100111000	000100	0100111	0110000
	3 8	0 4	2 7	3 0

First 6 bits = type of data

next 10 bits = Day Day = 338

next 6 bits = Hour HR = 04

next 7 bits = Minute Mn. = 27

next 7 bits = Seconds Sec = 30

D28954-000A

MARINER VENUS-MERCURY PROJECT

RADIO SCIENCE TEAM
VENUS OCCULTATION EXPERIMENT

REDUCED DATA

Explanatory Document

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Mariner 10 Occultation Data

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1. Introduction

The material submitted contains raw, intermediate, and reduced data from the Occultation portion of the Mariner 10 Radio Science Experiment (H. T. Howard, Team Leader). The following data are included:

a)	Raw Digital Data	DIGITAL TAPES ONLY
b)	Data Files	
	RPP, DIP1, DIP2, ATMOS (input) (Venus Only)	TAPES LISTINGS & MICROFILM
c)	ATMOS (output) (Venus Entry Only)	LISTINGS & MICRO-FILM ONLY

The material is described in greater detail in following sections.

2. Digital Data Tapes

Digital occultation data tapes are prepared by sampling analog spacecraft signal and time from analog recorded tapes. The sample rate time is 160,000 samples/sec for S-band and X-band signals, respectively. These tapes contain a digital representation of recorded signals received from the spacecraft, the time of reception (UTC) and header information. They are 9-track, 800 BPI tapes with odd parity.

2.1 Format

Each record on the magnetic tape contains 4096 six bit binary data words (with S-band and X-band alternating) plus 9 six bit BCD words used to identify the time and one header word. The description of information in each bit in each record is shown in Figure 1.

2.2 List of Digital Data Tapes

Mr 10 digitized tapes are listed as follows. All the tapes are 9-track 800 BPI tapes. The tape number is in the second column and the start and stop

LEGEND

CODE	MEANING
p'	LONGITUDINAL EVEN PARITY BIT
S	STATION CODE 10 - DSS 14 01 - DSS 4X 11 - DSS 6X
DS	DATA SOURCE 0 - ANALOG 1 - DIGITAL
$D_1 - D_{10}$	BCD DAY BITS
$H_1 - H_6$	BCD HOUR BITS
$M_1 - M_7$	BCD MINUTE BITS
$S_1 - S_7$	BCD SECOND BITS
$M_1 - M_{12}$	BCD MILLISECOND BITS
$\mu_1 - \mu_{12}$	BCD MICROSECOND BITS
p	BCD PARITY BIT
$\bar{S}$	S-Band Data Sample Bit
X	X-Band Data Sample Bit

START OF RECORD

p	0	0	0	0	S	S	1	DS	HEADER
p	0	0	D_1	D_2	D_3	D_4	D_5	D_6	TIME OF DAY FOR FIRST DATA WORD IN RECORD
p	0	0	D_7	D_8	D_9	D_{10}	H_1	H_2	
p	0	0	H_3	H_4	H_5	H_6	M_1	M_2	
p	0	0	M_3	M_4	M_5	M_6	M_7	S_1	
p	0	0	S_2	S_3	S_4	S_5	S_6	S_7	
p	0	0	M_1	M_2	M_3	M_4	M_5	M_6	
p	0	0	M_7	M_8	M_9	M_{10}	M_{11}	M_{12}	
p	0	0	μ_1	μ_2	μ_3	μ_4	μ_5	μ_6	
p	0	0	μ_7	μ_8	μ_9	μ_{10}	μ_{11}	μ_{12}	
p	0	0	$\bar{S}$	$\bar{S}$	$\bar{S}$	$\bar{S}$	$\bar{S}$	$\bar{S}$	1ST DATA WORD
p	0	0	X	X	X	X	X	X	2ND DATA WORD
p	0	0	$\bar{S}$	$\bar{S}$	$\bar{S}$	$\bar{S}$	$\bar{S}$	$\bar{S}$	⋮
p	0	0	$\bar{S}$	$\bar{S}$	$\bar{S}$	$\bar{S}$	$\bar{S}$	$\bar{S}$	4095TH DATA WORD
p	0	0	X	X	X	X	X	X	4096TH DATA WORD
p'	p'	p'	p'	p'	p'	p'	p'	p'	
									INTERRECORD GAP

NOTE:

$\mu_1 - \mu_{12}$ NOT USED IN ORA-2 CTA 21

Figure 1: Data Record Format on Digital Magnetic Tape, S-X Band

times for the tape are in the last column. Venus and Mercury tapes are listed seperately.

2.2.1 Mariner 10 Venus Digitized Tapes

ORIGINAL DIGITIZED TAPE		DUPLICATE TAPE NO.	TIME UTC, FEB 5, 1974
VEN001	ENTRY	N052	17:08:30 → 17:09:30
VEN002		N053	17:09:25 → 17:10:25
VEN003		N054	17:10:20 → 17:11:20
VEN004		N055	17:11:15 → 17:12:12
VEN005		N125	17:12:10 → 17:13:10
VEN006		N199	17:13:05 → 17:14:05
VEN007		N234	17:14:00 → 17:15:00
VEN008		N245	17:14:55 → 17:15:55
VEN009		N246	
VEN010		N336	17:16:45 → 17:17:45
VEN011		N337	17:17:40 → 17:18:40
VEN012		N370	17:18:35 → 17:19:35
VEN013		N413	17:19:30 → 17:20:30
VEN014		N447	17:20:25 → 17:21:25
VEN016	EXIT	N449	17:22:15 → 17:23:15
VEN017		N453	17:23:10 → 17:24:10
VEN018		N525	17:24:05 → 17:25:05
VEN019		N561	17:25:00 → 17:26:00
VEN020		N584	17:25:55 → 17:26:55
VEN021		N585	17:26:50 → 17:27:48
VEN022		N587	17:27:45 → 17:28:45
VEN023		N758	17:28:40 → 17:29:40
VEN024		N796	17:29:35 → 17:30:35
VEN025		N797	17:30:30 → 17:31:30
VEN026		N884	17:31:25 → 17:32:25
VEN027		N889	17:32:26 → 17:[illegible]20
VEN028		N966	17:33:15 → 17:34:15
VEN029		N986	17:34:10 → 17:35:10

2.2.2 Mariner 10 Mercury Digitized Tapes

DIGITIZED TAPE	DUPLICATE TAPE NO.	TIME, UTC, 29 March, 1974
MERC05	X435	20:55:20 - 20:56:20 (entry)
MERC06	X455	21:07:15 - 21:08:15 (exit)
MERC07	X573	21:08:10 - 21:09:10 (exit)
MERC08	X574	21:09:05 - 21:10:05 (exit)

3. Data Files

Mariner 10 (Venus) data files are created by Processing Mariner 10 radio occultation data using the subset of occultation software. A brief description of software and the files is given below.

The occultation software consists of the Computer Programs RPP, DIP1/PCP, DIP2 and ATMOS. The functions of these programs are:

RPP: removes drift and bias from frequency residuals.

DIP1/PCP: computes bending angle, ray-asymptote distance and power correction.

DIP2: computes refractivity as a function of radius to center of planet

ATMOS: computes atmospheric information (temperature, pressure, etc.) as a function of radius to center of planet

Detail description of these programs are given in section 3.2.

The data files are input/output files obtained by executing programs RPP, DIP1/PCP, DIP2 and ATMOS on the UNIVAC 1108 computer.

The files are written using standard formatted FORTRAN I/O on the UNIVAC 1108 system. The format statement for each record is given in Section 3.3 and corresponds to the label for that record.

The definitions and types of each variable are also given in section 3.2. The type of a variable is either Integer, Real or Double precision.

These files are written on tape H144 (7-track, 600 BPI) using TAPE processor

of the 91*LIB. sub-routine library at JPL.

3.1 List of Data Files

The following is a list of Mariner 10 data files obtained by executing computer programs RPP, DIP1/PCP, DIP2 and ATMOS. These are on tape H144 and are written using tape processor of the 391*LIB computer sub-routine library at JPL. The format is a standard formatted Fortran I/O and the detailed format statements are given in section 3.4.

File Sequence No. on H144	Content
1	OCEP S-X band V.entry old file
2	Traj V.entry old file for above
3	OCEP S-X band V.Exit old file
4	Traj V.exit old
5	OCEP V.entry only S-band (big-8-min)
6	Traj V.entry for big OCEP
7	OCEP V.entry (new) for power 4-min (BW-10) S-band
8	OCEP V.entry X-band (new) for power 2-min (BW-10)
9	V.entry S-band (BW-10) RPP output file (-13SN10)
10	V.entry S-band (BW-10) DIP1/PCP output file (-14)
11	V.entry S-band (BW-10) DIP2 output file (-15)
12	OCEP V.entry X-band (BW-10) (2-min) for power
13	V.entry X-band (BW-10) RPP output
14	V.entry X-band (BW-10) DIP1/PCP output (-14)
15	V.entry X-band (BW-10) DIP2/AVRG AVRG=1 output file
16	OCEP V.exit both S-X band (BW-10) 3-min
17	RPP (-13) V.exit S-band output
18	RPP (-13) V.exit X-band output

3.2 Occultation Software and I/O Data Files

The occultation software consists of the computer programs RPP, DIP1/PCP, DIP2, and ATMOS. These programs and the description of input/output files for them are given in the following secitons.

3.2.1 Residual Processing Program

The function of the Residual Processing Program (RPP) is to remove drift and bias from frequency residuals. The RPP program reads the RADIO DATA file produced by the Occultation Editing Program (OCEP) program which consists of time points and corresponding frequency residuals. RPP then computes a polynomial

drift function for a user specified time interval and subtracts this function from the data. RPP then computes the phase differences in cycles and write an output file consisting of doppler residuals (from which bias and drift has been removed) and amplitude to be used by the DIP1 Program.

3.2.1.1 Input File

The input file to be used by RPP is the Radio data file produced by OCEP Program. It consists of frequency residuals and power for each time points. This file is in standard formatted Fortran I/O and is described as follows. Each line corresponds to one record and the format statement for that record corresponds to the label (e.g. 5*) in section 3.4. The definition and type of each variable in the file is also given.

FLTYPE	SCID	PASS	MODE		(Record 1)	1*
XTR	DSS	IW	FBAND		(Record 2)	1*
F1	F2				(Record 3)	2*
SYNFRQ	SYNLO				(Record 4)	2*
IYR	IDAY	TIME	SFEQ	SRES	(Record 5)	3*
SPWR	XPWR	XFREQ	XRES		(Record 6)	4*
.	.	.	.	.		
.	.	.	.	.		
.	.	.	.	.		
IYR	IDAY	TIME	SFREQ	SRES	(Record(n-1)	3*
SPWR	XPWR	XFREQ	XRES		(Record n)	4*

where,

FLTYPE	type of file. 1 for closed loop, 2 for open loop, and 3 for both	(integer)
SCID	spacecraft identification number	(integer)
PASS	orbit or revolution number	(integer)
MODE	1 for entry, 2 for exit	(integer)
XTR	transmitting station number	(integer)
DSS	receiving station number	(integer)
IW	1-way, 2-way or 3-way data	(integer)
FBAND	always 3	(integer)

F1	uplink frequency in hertz	(d. p.)
F2	downlink frequency in hertz	(d. p.)
SYNFREQ	closed loop synthesizer frequency	(d. p.)
SYNLO	open loop synthesizer frequency	(d. p.)
IYR	year of the sample	(integer)
IDAY	day of the sample	(integer)
TIME	time of sample in seconds past midnight	(real)
SFREQ	S-band frequency in hertz	(d. p.)
SRES	S-band frequency residuals in hertz	(d. p.)
SPWR	S-band power in dbm	(real)
XPWR	X-band power in dbm	(real)
XFREQ	X-band frequency in hertz	(d. p.)
XRES	X-band frequency residuals in hertz	(d. p.)

3.2.1.2 Output File:

RPP output file consists of doppler residuals (from which bias and drift has been removed) phase and power for corresponding to time points. The file is written with formatted FORTRAN I/O, and is described as follows:

FLTYPE	SCID	PASS	MODE	(Record 1)	1*
XTR	DSS	IW	FBAND	(Record 2)	1*
F1	F2			(Record 3)	2*
TIME	RESIDUAL	PHASE	PWRPTS	(Record 4)	7*
.	.	.	.	.	
.	.	.	.	.	
.	.	.	.	.	
TIME	RESIDUAL	PHASE	PWRPTS	(Record n)	7*

where,

FLTYPE	type of file. 1 for closed loop, 2 for open loop, and 3 for both	(integer)
SCID	spacecraft identification number	(integer)

PASS	orbit or revolution number	(integer)
MODE	1 for entry, 2 for exit	(integer)
XTR	transmitting station number	(integer)
DSS	receiving station number	(integer)
IW	1-way, 2-way or 3-way data	(integer)
FBAND	always 3	(integer)
F1	uplink frequency in hertz	(d. p.)
F2	downlink frequency in hertz	(d. p.)
TIME	time of sample in seconds past midnight	(d. p.)
RESIDUAL	frequency sample in hertz	(d. p.)
PHASE	phase difference in cycles	(d. p.)
PWRPTS	strength of the signal in DBM	(d. p.)

3.2.2 Data Inversion Program No.1 (DIP1/PCP)

DIP1/PCP computes refractive bending angle, ray asymptote distance, range from S/C to the center of the planet and corrected power for each time point.

The input and output files for DIP1/PCP are described as follows:

3.2.2.1 Input files

The input files to DIP1/PCP are the Trajectory file and the RPP output file. The RPP output file is described in Section 3.2.1.2 on Page 6. The Trajectory file is described as follows:

3.2.2.2 Trajectory file

This file is a Trajectory file produced by the Trajectory link of the OCEP program which is based on the DPTRAJ Save and Plot Tape. The file is dynamically catalogued and assigned to the run. The file is written using formatted FORTRAN I/O, and the format is described as follows:

FLTYPE	SCID	PASS	I			(Record 1)	1*
ETSCA	ETMC	LITTM				(Record 2)	5*
S1	S2	S3				(Record 3)	5*
$TIME_{(1)}$	$YR_{(1)}$	$DAY_{(1)}$	$HR_{(1)}$	$MIN_{(1)}$	$SEC_{(1)}$	(Record 4)	6*
$DPREC_{(1,1)}$	$DPREC_{(1,2)}$	$DPREC_{(1,3)}$				(Record 5)	5*
$DPREC_{(1,4)}$	$DPREC_{(1,5)}$	$DPREC_{(1,5)}$				(Record 6)	5*
$DPREC_{(1,7)}$	$DPREC_{(1,8)}$	$DPREC_{(1,9)}$				(Record 7)	5*
$DPREC_{(1,10)}$	$DPREC_{(1,11)}$	$DPREC_{(1,12)}$				(Record 8)	5*
⋮	⋮	⋮					
$TIME_{(N)}$	$YR_{(N)}$	$DAY_{(N)}$	$HR_{(N)}$	$MIN_{(N)}$	$SEC_{(N)}$	(Record M-4)	6*
$DPREC_{(N,1)}$	$DPREC_{(N,2)}$	$DPREC_{(N,3)}$				(Record M-3)	5*
$DPREC_{(N,4)}$	$DPREC_{(N,5)}$	$DPREC_{(N,6)}$				(Record M-2)	5*
$DPREC_{(N,7)}$	$DPREC_{(N,8)}$	$DPREC_{(N,9)}$				(Record M-1)	5*
$DPREC_{(N,10)}$	$DPREC_{(N,11)}$	$DPREC_{(N,12)}$				(Record M)	5*

Where,

FLTYPE	Type of file, 1 for closed loop, 2 for open loop and 3 for both (INTEGER)
SCID	Spacecraft Identification Number (INTEGER)
PASS	Orbit or Revolution Number (INTEGER)
I	1 for Entry, 2 for Exit (INTEGER)
ETSCA	Time of closest approach - ET (sec/past Midnite 1950.0) (D.P.)
ETMC	Difference between Ephermis time and Universal time/sec. (D.P.)
TIME (N)	Time in Seconds (ET) from Jan. 1, 1950.0 for N^{th} Point (D.P.)
YR (N)	Year for the Nth Point (Real)
DAY (N)	Day number for N^{th} Point (Real)
MIN (N)	Time at MIN minutes for N^{th} Point (Real)
LITTM	1-Way light time (D.P.)

S1, S2, S3	X, Y, Z Coordinates of Sun Position vector, relative to Venus (D.P.)
DPREC (N,I)	I = 1, 2, 3
	X, Y, Z Coordinates of S/C Position vector relative to Venus for N^{th} point (D.P.)
DPREC (N,I)	I = 4, 5, 6
	X, Y, Z Components of S/C Velocity vector relative to Venus (D.P.) for N^{th} Point
DPREC (N,I)	I = 7, 8, 9
	X, Y, Z Coordinates of Earth Position vector for N^{th} Point (D.P.)
DPREC (N,I)	I = 10, 11, 12
	X, Y, Z Coordinates of Earth Velocity vector for N^{th} Point (D.P.)
NOTE:	All above vectors are space centered and in the Earth Equator of 1950.0 coordinate system.

3.2.2.3 Output File

DIPI/PCP output file consists of ray-distance, bending angle, corrected power and range from S/C to center of the planet. The file is written with formatted FORTRAN I/O, and is described as follows:

FLTYPE	SCID	PASS	MODE	(Record 1)	1*
XTR	DSS	IW	FBAND	(Record 2)	1*
F1	F2			(Record 3)	2*
TIME	RD	CORPWR		(Record 4)	5*
BA	R			(Record 5)	2*
.	.			.	
.	.			.	
.	.			.	
TIME	RD	CORPWR		(Record n-1)	5*
BA	R			(Record n)	2*

Where,

FLTYPE	type of file. 1 for closed loop, 2 for open loop and 3 for both

SCID	spacecraft identification number	(integer)
PASS	orbit or revolution number	(integer)
MODE	1 for entry, 2 for exit	(integer)
XTR	transmitting station number	(integer)
DSS	receiving station number	(integer)
IW	1-way, 2-way or 3-way data	(integer)
FBAND	always 3	(integer)
F1	uplink frequency in hertz	(d. p.)
F2	downlink frequency in hertz	(d. p.)
TIME	time of sample in seconds past midnight	(d. p.)
RD	asymptotic ray distance in km	(d. p.)
CORPWR	corrected power in DBM	(d. p.)
BA	refractive bending angle in radians	(d. p.)
R	range from spacecraft to the center of planet	(d. p.)

3.2.3 Data Inversion Program No. 2 (DIP2)

The function of the DIP2 program is to compute refractivity as a function of the radial distance to the center of the planet.

DIP2 reads a file of ray distance and corresponding bending angle (among other parameters) produced by the DIP1/PCP program and inverts this data using the Abel Integral Transform to obtain refractivity versus radius.

3.2.3.1 Input File

The input file to the DIP2 Program is the same as the output file of DIP1/PCP and is described on Page 9 of Section 3.2.2.3.

3.2.3.2 Output File

The DIP2 output file consists of radius, refractivity, bending angle and corrected power. The file is written with formatted FORTRAN I/O and described

as follows:

FLTYPE	SCID	PASS	MODE	(Record 1)	1*
XTR	DSS	IW	FBAND	(Record 2)	1*
F1	F2			(Record 3)	2*
RD	CORPWR	BA	BA	(Record 4)	5*
RAD	REF	R	R	(Record 5)	5*
.	.			.	
.	.			.	
RD	CORPWR	BA	BA	(Record N-1))	5*
RAD	REF	R	R	(Record N)	5*

Where,

FLTYPE	type of file. 1 for closed loop, 2 for open loop 3 for both	(integer)
SCID	spacecraft identification number	(integer)
PASS	orbit or revolution number	(integer)
MODE	1 for entry, 2 for exit	(integer)
XTR	transmitting station number	(integer)
DSS	receiving station number	(integer)
IW	1-way, 2-way or 3-way data	(integer)
FBAND	always 3	(integer)
F1	uplink frequency in hertz	(d. p.)
F2	downlink frequency in hertz	(d. p.)
RD	asymptote ray distance in Km	(d. p.)
CORPWR	corrected Power in DBM	(d. p.)
BA	refractive bending in radians	(d. p.)
REF	refractivity in N-units	(d. p.)
RAD	radial distance to the center of the planet in Km	(d. p.)
R	range from spacecraft to the center of the planet	(d. p.)

3.2.4 Atmospheric Parameter Program (ATMOS)

The function of the ATMOS program is to compute atmospheric information

from the refractivity data produced by the DIP2 program.

A detailed description of ATMOS can be found in the Mariner Mars 1971 occultation Atmospheric Parameter Program - Program document.

3.2.4.1 Input File

The ATMOS input file is the same as the DIP2 output file. This file is in formatted FORTRAN I/O and is described on Page 10, Section 3.2.3.2.

3.2.4.2 Output

The output of the ATMOS Program consists of hard-copy computer listings and plots containing the following information:

For all points:

RADIUS (km) REFRACTIVITY (n-units)
with bias removed

For negative refractivity points

RADIUS (km) REFRACTIVITY (n-units) ELECTRON DENSITY (cm^{-3})

For all positive refractivty points:

RADIUS (km) REFRACTIVITY (n-units) TEMPERATURE (^{o}K) PRESSURE (mb)

RADIUS (km) SCALE HEIGHT (km) LAPSE RATE ($^{o}K/km$) NUMBER DENSITY (cm^{-3})

MASS DENSITY (gcm^{-3})

3.3 Formats

The following formats are referred to in the preceding sections:

1* FORMAT (4I10)

2* FORMAT (2D26.18)

3* FORMAT (I2,I5,F12.4,2D26.18)

4* FORMAT (F9.4,F10.4,2D26.18)

5* FORMAT (3D26.18)

6* FORMAT (D26.14,4X,4F7.1,F14.8)

7* FORMAT (4D26.18)

4. Bibliography

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MARINER 10
Feb 5. 1974
17:11:15 - 17:12:12
N-29598

```
$JOB    9:27:07
$ASS IN MS3
$NOP ******************* HEX DUMP OF J20UT-1B *******************
$EXEC DPHEX BS
 INPUT TAPE ON MS3
 DATA INPUT     1 1 1
  FILE  1       RECORD    1        LENGTH    4106 BYTES
  (     0)  0A031910  22141917  00000202  00030108  00083F3F  3C053D01  2E3A3F06  013C0400  053E0405  03010237
  (    40)  37060206  04000630  3D3C0931  083B063C  033C0001  3F3F3F3F  00000200  04050603  073C0609  050E0301
  (    80)  01040000  000C0003  00000002  3F3E3E3D  3D343D32  3D3A3E00  3E353E3E  000C0000  000F0009  3E3C3E3F
  (   120)  3E023E02  3F3A003F  3F010136  0202020F  03080406  053E3E2E  05380400  02000039  39393D3D  1C0B3B0A
  (   160)  3C043C38  2E3E3F01  000C0207  040B0508  06080504  05000506  04020405  03313333  023F0203  02000339
  (   200)  393F3F08  0101003D  3D013F3F  3F01003F  003E3E3C  003D0039  3E0F3C07  3B093A05  2B3E3D38  3F050200
  (   240)  0330043B  333E0102  3F093F00  0003023F  3F3E0700  0831073D  3D09013E  3E3C3D35  3E3D3F3F  003F003F
  (   280)  00003F3F  3F163F04  3F013F3E  003F3F00  3F3D3F3F  3F013F3B  3F063F3A  3F023F38  2E3C3F3E  0000013A
  (   320)  0339043F  053B043B  0208003B  3F3F3E13  3E0C3E00  2E3F3E3B  3E003D3E  3D023E03  3E063E05  2F3C3F07
  (   360)  3F0B3E06  3E083E06  2E3F3E02  3E003F3B  00070000  00010035  35353D03  3B09393C  3A3C3D09  003F0300
  (   400)  0605070C  07060607  050C0405  0408053B  3B370701  08040806  07000705  08353539  08370805  0601043C
  (   440)  3C353D09  3B0C3A09  3B0B3E05  023D063F  06040703  0505023E  3E023C00  2C393D39  3F030038  01000000
  (   480)  00020203  3C3C393F  3902370A  273D3701  39003C39  3F000208  0500060C  05040337  3F063E01  2E383E07
  (   520)  003E0203  04010639  3900063D  043F3F3D  3F343D35  3B023A3C  3A013C03  2E3F003F  04000502  05010400
  (   560)  023F3F3F  3F3C003B  003E0008  0005003D  3D3D3F38  3E043D00  2D3F3D2B  3D343E3F  3E3E3F37  3F3A3E08
  (   600)  3F3D3F01  000B0001  023D3D3D  0301030A  033B0100  013C003E  3E3F3E03  3E083E02  2E3E3F34  0039013D
  (   640)  0237023E  01080037  00070007  0004010E  0309033E  030F0209  003D3E09  3E083E01  000A0137  3739043E
  (   680)  0400030D  013F3F3E  3F3A3F3B  3F033E38  3E383C3C  3B023A02  2A3A3B08  3C083E04  00020137  37350107
  (   720)  00103F3F  3E323E37  3E063F38  01310335  043F0400  043C0202  00040005  3F3F0109  020D0408  05000608
  (   760)  0606060A  05010402  03040208  00093F3F  3D063F00  3F010136  2636053C  063D0402  0201003D  3D3D0008
  (   800)  02080509  07030900  0A04090C  0803070Z  06390602  05010302  01080005  3F3F3F3F  023D043E  0536053A
  (   840)  0408033E  003C3E3F  3C003B3A  2B3A3B0E  3D083F3F  023F0439  063D0501  03030037  37003E3D  3F000008
  (   880)  023C3C3C  0339023A  00393E05  3E023F0C  01100406  053E3E01  04000103  3F3F3F02  3E113F0B  02360437
  (   920)  053C063F  040A013D  3F3D3C2F  3B303B3D  3B3B3C3F  3D3D3D3B  3E023D3F  3D053C07  3B003916  380C3716
  (   960)  3B0B3A10  2B3C3E3C  00010200  04070536  36380737  07380601  05360339  01003F3F  3D043C3E  3C3C3E3D
  (  1000)  3F00003B  003D3D3D  010D0209  03080506  083D0903  0C3C0B00  083A053C  3C053F06  3E013E3E  3E083F02
  (  1040)  00000002  3F3E3F3D  3D383C38  3C013C3C  3D013D3B  2E3F3F0F  00050109  0208043C  3C3E0500  053D053F
  (  1080)  3F3E0508  063D073C  073D0802  08000707  04373701  3F053D00  3C063D3F  3D000006  0001000A  000E0E05
  (  1120)  3F3D3F06  0034003C  3C050402  053C0634  063E0604  043C0306  003B3F3C  3E383F03  0000033E  3F3D053C
  (  1160)  0301003E  3D3A393F  3709381D  3A0A3E3B  010D0403  0406040C  023D3F3F  013C0308  04080600  063F3F3A
  (  1200)  00393E3C  3B3B3A32  3B363C39  3D003E3E  3D0A3C00  2A3D3700  3808393E  2A353E02  01040500  08000B0B
  (  1240)  0A0D0B04  080D0606  04350337  043D0531  063E0703  063E043F  00350000  3E3E3E3F  1E0E3F06  00000101
  (  1280)  01020100  0139383B  010C0204  030E0302  0306040C  0300023D  3D020001  3E003E3E  2C3E3D3C  3E010006
  (  1320)  010C0239  3905010F  00013E3E  3C043B03  3C023E04  003C3E36  06000705  07060606  04380225  013E0135
  (  1360)  023D033D  0438053E  05040505  0437013D  02040009  00113F3F  3F003F39  01060302  063C073B  063E060E
  (  1400)  0534033A  00003F3D  3F01003F  00340201  02030204  0200003F  3F3F3E3C  3E053E0B  3E073E0A  3E053E39
  (  1440)  00020100  0301043C  3C0A0405  03040300  033D0338  033E043B  032C0239  01300000  3F3F3E07  3D0C3C02
  (  1480)  3B3E3C3C  3D003F06  030C0700  0B020D0B  0B040902  063F0203  0000003F  3F3F013D  043C043D  02070000
  (  1520)  3F3D3E3E  3E383E08  00190100  013E0111  3F053D05  3B003A00  2B3B3C3B  3E043E04  00070007  00010000
  (  1560)  003E3E3E  0001013E  00060038  3F3D3E08  3E0C3F0D  01130304  05050601  0501043F  3F393F02  3D063D03
  (  1600)  3D053E35  00350333  0535063E  0509043A  01020038  3F3D3E3C  3F3D3F0C  3F0A3E04  3D013C06  3B0A3B06
  (  1640)  3C043D02  3F050105  0307043F  3F390502  053B043F  3F390238  013C0036  3F393F39  3E303E38  3E013E3F
  (  1680)  3E00000A  0109030E  0308030A  03040402  06020739  08010A04  09010605  04040100  3F3F3F37  0038023E
  (  1720)  043E043E  04000237  3F3E3D03  3C003D35  3E023F3E  0001010D  0108000A  3F3F3D01  3E053E00  3D373D01
  (  1760)  3C093C05  3D0A3E00  3E380105  022E0332  0302023E  0034363A  3E033C09  3C003D36  3E060006  01010136
  (  1800)  3F3F3E3F  3B033906  283C3A01  3E000438  08343400  0A02063B  3B393B3A  383E383E  2B083F05  030D0700
  (  1840)  0A060A12  090C0717  0408013F  3F073E01  3D053D35  3D3E3E01  3E013E00  2E3E3D3D  3E383E33  3E013F01
  (  1880)  3F383F08  3F003F37  0000000C  023E3E3E  04040503  063A0400  0439023C  3C0E3F06  3E043D03  3D063E00
  (  1920)  2E3C3F00  00373F3D  3D393D09  3C063C3E  2C393E37  00320232  043C0403  03030204  0108010D  02040201
  (  1960)  023E3E07  003C3F3A  3F0A3F07  00000006  02090303  0431042F  03040306  03060337  023C023D  0105000E
  (  2000)  3F3E3E03  3E033E17  3E0C3F09  3F0D0009  000F0004  00353737  3F0B3F01  003D0101  04030501  0508043F
  (  2040)  3F3E0002  3E043E09  3E033F00  0000013E  3E36030E  033A040D  053D0609  060B0705  07050505  04030109
  (  2080)  00393F3F  3F38003B  03020600  09000803  0C340A39  07060406  01083F3F  3D3E3B07  3A09380C  380A3902
  (  2120)  3C0C3F05  023F060E  08080833  06020506  03393B34  0028003F  3F3F0036  0038003E  00030000  3F3D3F3F
  (  2160)  3C063901  3701363F  36003806  3B073E05  00040100  02030201  013C000C  00060104  023D0304  03090300
  (  2200)  02000037  37393E36  3D3A3C03  3C043B2D  2B3E3B3F  1C0C3D12  3F050100  04080636  363E080F  0804083F
  (  2240)  07030702  080D0808  08050707  03380001  3D3D3A3C  393B3909  3A3D3B3E  3A003904  273E3500  353C3605
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(  2280)  39033E0E  0104053E  06060605  04040207  00373E3F  003D013E  033D0402  053D050D  0401033E  02000402
(  2320)  05010638  383F033F  01003F3B  3C3E3B09  3B013D3E  003F0308  07000A00  0B3A3A07  06090104  3E353C30
(  2360)  3C003E03  3F010000  013F3F3F  3D3D3D00  3C393C37  3C033E38  3E003E0E  2D3E3C01  3B093B03  3D013F38
(  2400)  0006020E  033D0307  033C0434  043B053D  06000637  053D033B  0132003D  3F00003D  0039023A  0206023E
(  2440)  00013F3F  3E043D3C  3D0D3E09  003F0235  03010702  08000806  07080609  04010301  02080207  01030333
(  2480)  0239023C  023D023F  0101013E  002E3E36  3D303C2F  3C3E3D3E  3F3D000A  00070005  00003F3F  3E053F0A
(  2520)  02020508  09080B08  0C050A3F  3F06013F  3E053B36  39393936  3B363E36  00340337  0407030E  02040007
(  2560)  003B3B3B  0009020F  04000508  05020404  03383A3A  02030204  013D3D3D  0104003C  003B3E3C  3E353F3A
(  2600)  00370037  010C0005  00040000  3F3F3F3F  01040305  05030607  060E0607  060D073A  07350737  07000603
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(  2680)  0304020C  00093E3E  3B0A3906  3A083C03  3E00003F  3F000236  003F3F3F  3F3E3E04  3F3C023A  043B053A
(  2720)  043C020D  3F0C3D0D  3A003A00  3C083F07  023E053C  06000536  023F3F01  3D003C00  3C003D01  2F3D0039
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(  2840)  0601070E  082E0702  09380801  0806073A  3A030502  04390301  023F003E  3E053E01  3E003D34  2D343D39
(  2880)  3E3A3D3C  3C053B3E  3A0A3B08  2C3D3E09  00040008  01010000  00000008  0B03033F  0302053F  05350400
(  2920)  04060437  37080406  04060439  3938033F  023E0204  02000200  01080102  00030000  3F3D3F3F  1E0A3E03
(  2960)  3F340005  0206040E  0405053F  043A0338  0209013E  013E003E  00013F3F  3E043B37  2A3D390F  3A0B3C11
(  3000)  3F110112  03020439  01000006  3E3E3E03  3D013E03  0000013C  3C38023B  0139003D  003E3F3F  3E363D02
(  3040)  3C3C3C3D  3C003D39  2F3E0039  013C0201  0203020F  0F010201  03020401  053C3E3F  040E0305  0200010D
(  3080)  0104013F  003C013D  01080000  01333333  0400063E  073F063C  0638053B  03020106  00393B3B  03060506
(  3120)  073C0705  0600063A  3A07040A  03050300  033B0202  03000301  023D3D3D  03360336  03370339  0230013D
(  3160)  3F003E0E  3D073D37  3D013D3E  3E123E06  3F070003  0135023B  03030400  04050309  013E3F3B  3E0B3C3D
(  3200)  2B3D3A39  3B3E3C00  3D2D3D30  3C393B33  3A363905  380C3814  39113B0A  3C113E0B  00070208  05050606
(  3240)  0602053F  3F09003F  3F3C3F3D  3F3C0106  03010405  05050406  0434033E  033A0204  00083F3F  3B003905
(  3280)  273B3603  36063808  3B013E33  3F370100  0309043C  3C080604  0600043B  3B020002  2F393D3D  3E3E3F39
(  3320)  0030013C  02170106  00203E3E  3D013D04  3E073E02  3F013F3B  2F3E3F35  0000003E  013E3E05  043C0531
(  3360)  05080402  033A0137  37000301  030604DE  0E0B0300  01343639  3E0A3E0C  3F053F3D  00390206  030A033C
(  3400)  0201033B  023F013B  00000000  00383F3F  3F000007  0005003A  3A013E3F  3E013C0A  2C3C3B01  3C063C05
(  3440)  3E0C3E05  3F020006  00390030  3C000339  033B003A  01040038  00313F3F  3F3B3F3E  3F020000  00010006
(  3480)  060E010E  02090307  04040508  06030601  07040603  04060009  3E3C3C08  3B3D3B00  3C003D02  2D3A3D05
(  3520)  3E003E00  3E0C3E00  3F0A003E  3E0C0004  00060039  393C0005  003E003D  0000013B  00040005  003F3F3F
(  3560)  00010100  01000138  38030007  003D3D3D  3F04000A  003C0000  013E0102  000D003F  3F3E0002  00000106
(  3600)  023D3D05  053E060A  0700073D  3D040300  00003D3D  3D073A04  2B3C3C3E  3E063E06  3E093E0C  2D3F3D06
(  3640)  3E053F06  000D023F  3F000306  02020103  0001013A  3A000401  0539033E  3E360037  3E353E3C  3E3C003D
(  3680)  01370201  02080000  3E3E3E08  3B013B06  3C093E0F  3F0A003F  02010237  0200023E  02373706  01000002
(  3720)  00003F3F  3F003E05  2F3E3F02  00340037  373D0009  000C010A  03050403  053E0435  05040307  01073F38
(  3760)  3D043D13  3D313E3B  3E033E00  3E053D0F  3B043A01  3A043A02  3C033D07  2E353F05  00070200  04050500
(  3800)  063D0605  053F043B  013C0003  3E3E3D3F  3D143400  2C3D3C3B  3C043C3A  2C3E3C0A  3C043D39  3E033F00
(  3840)  003D020E  030B060E  060C073F  08060802  0935083A  07050605  040A0207  00043F3D  3F3D3F39  003E0201
(  3880)  04000500  063C3C02  05390301  0138003F  3F3E3E3A  3E3B3F04  0005010E  0305063F  07370802  08000707
(  3920)  05000406  020A0204  0205023A  3A3F003D  3F343E36  3C073B06  3A023A3D  3A103A05  2A0D3A0D  3C3A3E3E
(  3960)  010C053F  09000B3F  0A3A063D  02393E05  3A033801  283C3804  3C3F3E37  3F043F3F  3F3B3E3E  3E013D04
(  4000)  3D0C3C2F  3C3E3D0D  3E153F0A  0000010A  02080304  03070406  043C040E  0504053B  053D0502  04010402
(  4040)  033E3E34  023C013E  00083F3F  3F363F3C  00340102  03100404  053B0537  05000609  050F040C  03000107
(  4080)  003E3E3E  3C393B01  3B053B08  3B033C3D  2B383B3E  3B393B32  3C02
FILE  1      RECORD   4497   LENGTH   4106 BYTES
(     0)  0A03191C  24120805  00000000  3F3F3F3F  3F000008  00070707  0034003C  0000013C  033C040E  06030707
(    40)  07000637  0336003F  3F003E3C  3E013F3C  003D0000  013E0202  0205033D  3D3E0400  04040506  04040504
(    80)  043F0304  043D0336  003D3F00  3C393B38  3A033B00  3E000002  023A3A3A  043D0435  02053F3F  3E043D0E
(   120)  3D0D3E07  3F3F0035  023C0308  0302040C  040D0311  0404043E  3E3A0306  01393F36  3D003A00  2939393D
(   160)  3A003C39  3E01003C  02040206  023E003E  0008000C  3F3F3E0B  3F003E3E  3E0D3E3D  3E063E3C  3E003E02
(   200)  3D023D3D  2C343C38  3C013C3F  3D283E38  3F363E08  3E053D04  3C063D06  3E010000  0205043F  3F3E043F
(   240)  0234003B  3E013C05  3B073B3F  3D013F3D  0105033F  043A043E  0438020C  0104003B  3B380103  02060200
(   280)  023D3F3F  02000306  040A040F  04050305  030F020C  0200033F  02350401  05000506  0508033E  003D0033
(   320)  3F363E02  3E043F00  00000104  0208023F  3F3E0103  0035003F  3F070108  0401063A  063F0703  06030439
(   360)  39040039  003C3F3F  003F003F  003D0002  010A013F  3F0D050C  0704093F  090C0A00  0900073E  3E000100
(   400)  2F3E3E02  3E0B3E00  3F05003F  3F353E36  3B3E3802  363D3507  36023804  2B3C3D03  C0010204  02060105
(   440)  003C3F3F  3E3E3D02  3D003D15  3E073F02  00000030  3005020D  023C0302  0304033C  3C3E003E  3E393C08
(   480)  3B073A3F  3A0F3B04  3C013C00  2E3C3F0A  00370206  0408070E  090C0902  093E0737  04000404  0306020A
(   520)  023C0236  003A0134  00303F3F  2F2E3E32  3D393D0B  3C3D3C3A  3E060010  0304053D  0405060B  0500043B
(   560)  043E3E03  07060A00  0C3C0B3C  07020407  3F093C00  2B343B3C  3D3B3F3F  00390004  3F3F3E02  3E0B3E3D
(   600)  3E003F05  000B0006  003D003E  3F030007  01090100  003C3E3E  3D0E3D04  3C343C37  3C003C3F  2D363D3E
(   640)  3E3C3E01  3E12000C  0005B100  020A0117  17040104  0105020F  010B0200  02040100  013F3F3F  00380100
(   680)  000B003D  3D3C3D04  3C023D3B  2E3D003E  03DE0503  060C060B  053B0411  04080400  04040433  333C040C
(   720)  0302013F  3F393E00  3E3A3E00  000C0204  033D043D  023F0337  013C0031  003F0007  0200033C  3C00063C
```

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( 3400)  05330434  043C043A  03000306  04060611  093D0B0D  0F3C103C  0F080C08  08000500  0306030A  06080836
( 3440)  073B0808  0500003C  3C343B00  3C003D3C  3F030005  00043F3D  3D3B3B04  3A3C3B3D  3E03010D  053C3E39
( 3480)  08040610  00073B3C  36353405  350C3703  39043A05  3A03373E  363A343C  34383439  06003906  3A073902
( 3520)  3601330A  2F022D3A  2C012E06  310B3403  37083A06  2B363B38  3B093B01  3B3D3B3D  3C383D01  3E053F00
( 3560)  3F033F34  2F3D3E33  2E2D3D35  3C3A3C07  1C083C04  3D063D04  3E040000  020C040A  06040709  08030802
( 3600)  0738043B  0234023A  033C0635  08390B3D  0C360C39  093C0637  04280337  0502083E  0B390D3E  0E370C05
( 3640)  08050439  0003013C  030D060C  0A0C0D06  0E130C07  0A01083E  06070808  0C010F3B  123A133F  02060E39
( 3680)  0A3D0500  01043F3F  3E07003C  03000502  07070B0D  0801083F  070C0803  083E0900  08010704  043D0004
( 3720)  3D003A05  270D3736  38373A3D  3C003D39  2E373E38  3D3D3D06  3C053C00  3C073B08  3A393833  373C363C
( 3760)  36313600  36313638  363E3504  353C353C  26083834  3B3D3D38  3E353E38  3D3B3B34  3A343934  1B163E0C
( 3800)  3F180016  00093E3C  3B053904  3805390E  3B0B3E05  0105043B  3B020404  023D3F3D  3D3F3C3D  3B303C2A
( 3840)  3E3F3F02  0038003B  3B363E39  3C013B37  2B3E3C00  3E3D000Q  000A0008  00103E3E  00050212  04130706
( 3880)  093D0A04  0A060039  053D0637  073D093B  0B3E0D3C  0E3D0D31  0B250734  0503033D  00010006  003E3E3C
( 3920)  0101030A  040F0604  063C0702  09010A3B  0A020E0C  0F353700  10030A07  0C3C3E01  0A0F0A09  0A000A3A
( 3960)  0705063F  0336013C  00390005  00060239  02010405  023F3F3E  3E363C3D  1C013E3D  013C043B  063B060D
( 4000)  0504013D  3F3A3C00  3901383E  3802393F  39053913  3936383D  17013607  3600353A  263F3705  3814390B
( 4040)  39053800  273D3609  370A3A39  3D3C3E08  3E043C0E  38063400  3200323D  34003936  3C003C3C  2B3C3737
( 4080)  353B3436  35043908  3E07000B  02050200  00053F3D  1C0A3C04  3C00
FILE    1        # OF DATA RECORDS    4774     # SUCCESSFUL READS   4775
        # PERMANENT READ ERRORS    0        # ZERO BYTE ERRORS   0        # SHORT RECORDS    0        # UNDEFINED ERRORS   0
          # OF RECORDS RETRIED    0        TOTAL # OF RETRIES   0
```

```
$$
$REW LO
```