DATE June 30, 1977 ICA No. 70

DEEP SPACE NETWORK
INTERFACE CHANGE AUTHORIZATION

820-13 MODULE No. TRK-2-14 TITLE DSN Tracking System Interfaces
Metric Data Assembly HSD Interface

INITIAL RELEASE DATE 8-15-77

REVISION DATE

ABSTRACT:

DESCRIPTION OF CHANGE:

This is a new interface that provides the variable data types and pseudo residuals.

REASON FOR CHANGE:

Pseudo residuals are computed at DSS only, variable data types provide efficient data sampling and additional calibration, configuration and validation data have been added in the data stream.

CONCURRENCES:

DSN MANAGER	FLIGHT PROJECT NAVIGATION	FLIGHT PROJECT RMOC REPRESENTATIVE
R B Miller	Courtney Jones	
Paul S Goodwin	W E Kirkpatrick	
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E.K. for H. Mahoney	E. L. McKinley	

DISPOSITION:

☐ CHANGE REJECTED. REASONS:

☒ CHANGE RELEASED FOR PUBLICATION

DSN SYSTEM ENGINEER W D Cheney DATE 8/9/77

Table TRK-2-14-6. Content of Data Type 41 (DRVID Data)

Parameter	Bits/ Parameter	LSB	Data Units	Comments	Explanatory Note (Appendix)
Data Type ID	6	2^0	-	Binary	
DRVID Frequency Band	1	-	-	0 = X-Band; 1 = S-Band	
DRVID Mode	2	-	-	00 = Coherent 3-Way; 01 = 1 Way; 10 = 2-Way; 11 = 3-Way	64
GMT	17	2^0	Seconds	Binary Seconds Past "0" Hour, Always Positive	
DRVID Type	2	-	-	00 = Discrete; 01 = Continuous; 10 = R&D; 11 = Spare	
DRVID Data	27	2^{-6}	Range Units	Two's Complement, Modulo 2^{20}	
DRVID Validity	1	-	-	0 = Bad; 1 = Good	65
DRVID Sample Interval	10	2^0	Sec	Binary, Always Positive	24
DRVID Noise	14	2^{-6}	Range Units	Always Positive*	66
DRVID Noise Tolerance	1	-	-	0 = Out; 1 = In	67
Pr/No.	11	2^{-4}	dB	Two's Complement*	68
Pr/No. Tolerance	1	-	-	0 = Out; 1 = In	69
Differenced S-X DRVID	27	2^{-6}	Range Units	Two's Complement	70
TOTAL =	120 Bits				

*If computed value exceeds field size, set to maximum value.

Table TRK-2-14-7. Content of Data Type 42 (Programmed Frequency Data)

Parameter	Bits/ Parameter	LSB	Data Units	Comments	Explanatory Note (Appendix)
Data Type ID	6	2^0	-	Binary	
Exciter No.	1	-	-	0 = 1; 1 = 2	
GMT of Start of Ramp	17	2^0	Seconds	Binary Seconds Past "0" Hour, Always Positive	71
Frequency	46	2^{-20}	Hz	Always Positive	72
Frequency Ramp	31	2^{-20}	Hz/Sec	Two's Complement	73
TOTAL =	101 Bits				

Table TRK-2-14-8. Content of Data Type 43 (Radio Metric Validation Data)

Parameter	Bits/ Parameter	LSB	Data Units	Comments	Explanatory Note (Appendix)
Data Type ID	6	2^0	-	Binary	
Frequency Band	1	-	-	0 = X-Band; 1 = S-Band	
GMT	17	2^0	Seconds	Binary Seconds Past "0" Hours, Always Positive	
High Rate Noise	18	2^0	Degrees	Always Positive	74
Medium High Rate Noise	18	2^0	Degrees	Always Positive	75
Medium Low Rate Noise	18	2^0	Degrees	Always Positive	76
New Medium Low Rate Noise	1	-	-	0 = No; 1 = Yes	77
Low Rate Noise	18	2^0	Degrees	Always Positive	78
New Low Rate Noise	1	-	-	0 = No; 1 = Yes	79
Doppler Type	2	-	-	00 = Coherent 3-Way; 01 = 1-Way; 10 = 2-Way; 11 = 3-Way	
Figure of Merit	8	2^{-4}	dB	Two's Complement	80
Predict Set ID	32	-	-	4 ASCII Characters	
Static Phase Error (SPE)	12	2^{-4}	Deg or Volts	Two's Complement	
SPE (Deg or Volts)	1	2^0	-	0 = Volts; 1 = Degrees	
TOTAL =	153 Bits				

(1) Alignment - data will be bit aligned to insure maximum block utility of the HSDL.

(2) Yes-No and On-Off Conventions - all yes-no, on-off or good-bad indicators shall be indicated by a one (1)- zero (0), respectively.

(3) Time of day in the GCF header of the high speed data block shall be the same as that for the first data type in the block

(4) Day of year will be indicated in the GCF header. Blocks will be closed on day of year change.

(5) Data Block Numbering - Data Block serial numbers are not changed for replay data blocks.

(6) Numerical convention: all data are binary; two's complement used for fields with possible negative numbers; otherwise all bits are parameter value bits. Fields will be set to maximum value with appropriate sign if computer value exceeds field stage.

(7) Blocks will be closed out with DT=30 for last block this pass; DT=31 for end of block, but not end of pass.

c. Characteristics.

(1) Data types can be added or deleted

(2) Parameters within data types can be added or deleted

(3) Data can be processed as single flow of 1200 bits given location of 1st bit.

(4) Data types capitalize on fact that programmable computers generate and receive VDBs.

d. Constraints.

(1) Data types are not split between high speed data blocks.

(2) Parameters within a data type apply only to that data type.

(3) Blocks will be closed on day of year change.

e. Operational, Testing, and Calibration Modes. Operational, testing, and calibration data will be distinguished utilizing S/C ID. These IDs are defined in 820-13; OPS-6-6.

f. Tabular Information. Table TRK-2-14-9 presents gross data description code assignments. Table TRK-2-14-10 provides angle modes.

3. GCF Error Detection.

The GCF error detection information is contained in the last 40 bits of the HSD block.

a. 22-Bit Error Polynomial.

(1) Error detection correction (16 bits); byte 2 of Word 73 and byte 1 of Word 74.
(2) Error status code (2 bits); bits 9 & 10 of Word 74. These bits are defined in OPS-6-6 of this document
(3) 22-bit error polynomial; bits 11-16 of Word 74 and Word 75.

b. 33-Bit Error Polynomial.

(1) Error status code; bits 13, 14, and 15 of Word 73. These bits are defined in Section OPS-6-6 of this document.
(2) 33-bit error polynomial; bit 16 of Word 73 and Words 79 and 75.

Table TRK-2-14-9. Gross Data Description Code Assignments

Code				Data Types*
Binary Bits (Word 4)			Octal Representation	
1	2	3		
0	0	0	0	Real Time Transmission, All Systems
0	0	1	1	Non Telemetry Data Replay by DSS
0	1	0	2	All Systems Data Replay from Network Data Log (NDL)
0	1	1	3	TRK HRDR Replay
1	0	0	4	Telemetry Data (Digital) Replay by DSS
1	0	1	5	Telemetry Data (Analog) Replay by DSS

*Reference: 820-13; Rev. A, OPS-6-6

Table TRK-2-14-10. Angle Modes

Code	Condition
0	Auto-Track
1	Manual Aided
2	Computer RA/Dec
3	Drive Tape
4	Sidereal
5	Spare
6	Spare
7	Spare

900-769

DSN INTERMEDIATE DATA RECORD (IDR) STRIPPER PROGRAM

SYSTEM REQUIREMENTS DOCUMENT

January 20, 1977

Prepared by: G. L. Sievers
Navigation Systems Section

Prepared by: G. L. Goltz
Navigation Systems Section

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Navigation Systems Section

Jet Propulsion Laboratory
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Pasadena, California

IDR-STRIPPER

SYSTEM REQUIREMENTS DOCUMENT

TABLE OF CONTENTS

IDR-STRIPPER SYSTEM REQUIREMENTS DOCUMENT

1. INTRODUCTION

In October 1975, the ECT Tracking Subteam embarked on the implementation of a new tracking system to replace the current Mission Control and Computing Center (MCCC) IBM 360/75 real-time processor with a non-real-time processor to be used on the General Purpose Computing Facility (GPCF) Univac 1108 (U1108) Navigation System computer. The programs comprising this new system have been designated as the IDR-STRIPPER Program Set (IDRSPS). The basic function of the IDRSPS is to provide radio metric, pseudo-residual, and meteorological data to the Navigation System users.

1.1 Scope

This System Requirements Document gives a detailed description of the IDRSPS input/output functional, software, and interface requirements, and proposed software plans and implementation schedule.

1.2 Purpose

The purpose of this document is to provide all Phase 1 Tracking System requirements for the development of a new Navigation System data acquisition and storage program set.

1.3 Problem Statement

In order to expedite the Phase 1 Tracking System, the IBM 360/75 will be eliminated from the process. This means that radio metric data will be received directly by the U1108 via Deep Space Network (DSN) Intermediate Data Record (IDR) tapes. The IDRSPS program will read the IDR input tapes, strip the radio metric, pseudo-residual, and/or meteorological data from the IDR's, convert the data to U1108 formats, time order the data types, build appropriate accountability records, and produce output tapes for use with other Navigation System software.

2. APPLICABLE DOCUMENTS

The latest issues of the following documents are applicable to and furnish source requirements for this specification document:

1)	820-13	DSN System Requirements Detailed Interface Design, September 1, 1976. —
2)	900-771	IDR-STRIPPER Programmer's Manual, November 1, 1976.
3)	900-772	IDR-STRIPPER User's Manual, November 1, 1976.
4)	900-770	Multi-Mission Tracking Software Subsystem, Intermediate Data Record Processor/Orbit Data Editor Interface, January 20, 1977.
5)	1839-1, TRK-1-4	Multi-Mission Tracking System Meteorology File Interface/Weather Transmission Data Tape, November 11, 1974.
6)		Phase 1 Multi-Mission Tracking System Management Plan, August 13, 1976.
7)	900-950	Programmer's Guide to SDR/Archive Tape, December 29, 1972.
8)	TM-285	Special Feature Subprogram Library, February 8, 1972.
9)	620-406	Viking 75 User's Guide for the Orbit Data Editor, August 25, 1974.

3. INPUT

Input to the IDRSPS consists of user-input control statements and name-list data, and IDR tapes. The IDR tapes are 9-track, 800 bpi, unlabeled magnetic tapes.

3.1 Software Requirements

The IDRSPS must provide the capability to read DSN IDR tapes formatted as defined in 820-13, TRK-2-15 (see Reference 1). Each IDR data record consists of five High Speed Data Blocks (HSDB). Format specifications for the several different types of HSDB's are given in 820-13, TRK-2-11, and TRK-2-12, and TRK-2-14 (see Reference 1). Radio metric, pseudo-residual, and/or meteorological data must be stripped off of the IDR HSDB's as requested by the user. The selected data must then be decoded to U1108 format (see Reference 2).

Additionally, a temporary capability for accepting MCCC System Data Record (SDR) tapes as input (see Reference 7) must be provided in the IDRSPS to convert existing IBM 360/75 archive radio metric data to the new format described in Section 4.

3.2 Software Plan

The IDRSPS uses a system library I/O processor called IOW to facilitate reading of the non-U1108-compatible IDR (and SDR) tapes. Input tapes (up to three per request) are assigned internally by the program (not by the user) for 9-track drives. As each IDR record is read the five HSDB's are individually extracted and processed. The Block Format Code, User Data Type (UDT), and Data Dependent Type (DDT) for each HSDB are checked for agreement with the user's request. If an HSDB is to be processed, the IDRSPS unpacks the bit strings to U1108 data words as determined by the DDT (see Reference 2 for a detailed description of bit unpacking); otherwise the HSDB is ignored. This process is performed for each of the five HSDB's for each record of each user-specified IDR input. The unpacked data is written to a file for subsequent processing.

4. OUTPUT

The IDRSPS generates an Archive Tracking Data File (ATDF) tape and/or a Weather Transmission Data (WET) tape as its only output files. Output of either or both of these tapes is contingent on the user request data.

4.1 Software Requirements

The IDRSPS must provide the capability to construct and output an ATDF tape consisting of a radio metric data file and/or a pseudo-residual data file, and/or a WET tape consisting of meteorological data. Each output file consists of bit-oriented, constant-word-length records as described in References 4 (radio metric data and pseudo-residual data), and 5 (meteorological data). To meet this requirement, the IDRSPS must perform the following functions:

1) Separately time order radio metric and pseudo-residual data, and order meteorological data by station, received time.
2) Create and add Pass and Split Pass identification numbers to radio metric and meteorological data records such that:

   Pass Id = YDDD* where Y = last digit of pass start year
   DDD = day-of-year of pass start day

   Split Pass ID = n where n = 0 for the first pass of a given Pass ID
   n = 1,2...for subsequent, separate recognizable passes with the same Pass and Station ID

3) Determine and add sample times to the radio metric and pseudo-residual data records (if not already present),
4) Compute and add corrected doppler count to radiometric data records,
5) Create and add WET accountability records (see Reference 5),
6) Create and add radio metric Range-At-T_o (Range data record for time = T_o), Transmitter, and Pass Summary records (see Reference 2),**
7) Stack and write records to appropriate 7-track, 800 bpi, unlabeled output tapes.

---

*For meteorological data the Pass ID will consist of the last two digits of the pass start year plus the day-of-year; YYDDD.

**Recommendaton Records will not be required.

4.2 Software Plan

The IDRSPS uses a system library, Random Sequential List Processor called RSLP (see Reference 8) to facilitate efficient handling, editing, and sorting of the intermediate data. Using the IOW library I/O routine, the program writes the intermediate data to appropriate output tapes (assigned internally by the program). To meet the specific functional requirements, the IDRSPS does the following:

1) Since nothing is known about the sequence of the input data, it is assumed to be unsorted (random). Hence, as the user-selected IDR HSDB's (see Reference 3) are extracted and deocded, a sort key is added to the front of the record before writing it to the intermediate file. The sort key is comprised of the data type, station number, receiver type (for radio metric and pseudo-residual data), and the record date and time (see Reference 2). The RSLP automatically keeps the intermediate data file in sorted sequence and overwrites duplicate-key records with the latest input.

2) After all IDR input data has been moved to the RSLP file, the IDRSPS goes through the different data types editing existing records (adding sample times, correcting doppler count, etc.) as necessary, adding required accountability records (Pass Summary, Transmitter, etc.) and revising the sort key to consist only of the data type identifier and date/time tag.* Again, the RSLP automatically keeps the data, with the new sort key, in sorted sequence.

3) When all file changes have been completed, the data is in strict time sequence within each of the data types present (see Reference 4). The IDRSPS then goes through the RSLP file, accumulates records as required (see References 4 and 5), and writes the stacked record to the appropriate output tape file.

*For meteorological data, the station number is also retained as part of the new sort key.

5. ARCHIVAL FILES

Archival tracking data files consisting of large time blocks of radio metric or pseudo-residual data are required to save tape storage space and to simplify dissemination of data to Navigation Teams.

5.1 Software Requirements

The IDRSPS must provide the capability to merge TDF radio metric or pseudo-residual data to produce single tape files covering relatively large periods of time. To meet this requirement the program must perform the following functions:

1) Access two ATDF tapes (a primary and a secondary tape),
2) Merge records of a selected data type by adding secondary file records to primary file data (secondary records which duplicate primary data are ignored),
3) Output a merge tape file,
4) Print summary information for primary and secondary input files, and for the output file.

5.2 Software Plan

The IDRSPS uses the IOW library I/O routine for reading input tapes and for writing output tapes. Both input and output tapes are dynamically assigned by the program and are 7-track, 800 bpi, unlabeled magnetic tapes. Primary and secondary records are compared for date, time, and data type identifier. The record with the earlier date/time tag is written to the output tape. If duplicates occur, only the record from the primary file is written to the output tape. This procedure continues until all primary and secondary records have been processed. The output merge tape is comprised of only one type of data (radio metric or pseudo-residual, depending on the user's request). Merge tapes may be merged with other data or merge tapes of the same type to facilitate as large a tape storage savings as possible. At the end of the program the numbers of primary input records, secondary input records, duplicate input records, and output records are displayed.

6. REQUIRED MODIFICATIONS TO EXISTING SOFTWARE

To accommodate the new ATDF formats described in Reference 4, some existing Navigation System software must be modified. These programs and their revision requirements are described below.

6.1 ODE Program

6.1.1 Software Requirements

The Orbit Data Editor (ODE) program must provide the capability to read and process the ATDF tape radio metric data file. The current ODE capability for using MCCC IBM 360/75 Project Tracking Tapes (PTT) will be retained as an interim until implementation of the IDRSPS. Output in both versions is the same as that now produced by the ODE TDFDEC program (see Reference 9 for a description of the decoded TD file). The user shall specify the type of input file via the control statement processor (CSP) cards as follows:

```
TD-FILE (DECODE, PROCESS)...        for PTT input
or  TD-FILE (CONVERT, PROCESS)...   for ATDF input
```

6.1.2 Software Plan

(Revised ATDF formats are understood by the cognizant ODE engineer and programmer and the software plan will be published in the form of an IOM at a later date).

6.2 RPPP and IODE Programs

6.2.1 Software Requirements

The Interactive Orbit Data Editor (IODE) and Residual Plot and Processing Program (RPPP) must provide the capability to read and process the ATDF pseudo-residual data file. The current capability for using MCCC IBM 360/75 PTT's will be retained as an interim until implementation of the IDRSPS. Output in both versions is the same as that presently produced: a Type-66 format Pseudo-Regres file for IODE and an LGFIO format Pseudo-Regres file for RPPP. Reference 4 describes the format of the IODE and RPPP input data file.

6.2.2 Software Plan

(Revised ATDF formats are understood by the cognizant IODE/RPPP engineer and programmers and the software plan will be published in the form of an IOM at a later date).

7. OPERATING ENVIRONMENT

7.1 Requirements

The IDRSPS must be a stand-alone system designed for operation on the GPCF Navigation System U1108 computers. The program may be accessed in either batch or demand mode, with additional security measures available for batch usage. It is also required that the user be able to make multiple requests for a single program run.

The primary design constraints are that core occupancy for any executable program element must be less than 64K and that system thruput ("wall clock") time be minimized. Core-time product and execution costs are secondary considerations.

7.2 Plan

The programs comprising the IDRSPS are coded in U1108 SFTRAN II and are designed to permit the user to execute from either batch or demand mode, and to simulate one mode while operating in the other. Also, input and output tapes are dynamically assigned by the programs based on user-input tape reel numbers, thereby permitting processing of multiple requests and correction/verification of input data (demand mode only) in a single execution (i.e., without exiting from the program).

To decrease core occupancy, the IDRSPS is split into several separate and independent programs: IDR-STRIPPER/DIS, IDR-STRIPPER/MDA, SDR-STRIPPER, and MERGE. Additionally, each program is segmented along functional lines so that only part of the program is in core at any given time. Thruput time, core-time product, and execution costs are minimized by extensive use of U1108 assembler-coded, library routines for manipulating data.

APPENDIX I

GLOSSARY OF TERMS AND ABBREVIATIONS

ATDF	-	Archive Tracking Data File
CSP	-	Control Statement Processor
DDT	-	Data Dependent Type
DSN	-	Deep Space Network
ECT	-	Engineering Coordination Team
GPCF	-	General Purpose Computing Facility
HSDB	-	High Speed Data Block
IDR	-	Intermediate Data Record
IDRSPS	-	IDR-STRIPPER Program Set
I/O	-	Input/Output
IODE	-	Interactive Orbit Data Editor
LGFIO	-	Lawson's Generalized Format Input/Output
MCCC	-	Mission Control and Computing Center
ODE	-	Orbit Data Editor Program
PTT	-	Project Tracking Tape
RPPP	-	Residual Plot and Processing Program
RSLP	-	Random Sequential List Package
SDR	-	System Data Record
UDT	-	User Data Type
U1108	-	Univac 1108 Computer
WET	-	Weather Transmission Tape

APPENDIX II
IMPLEMENTATION SCHEDULE

MULTIMISSION TRACKING SYSTEM

Phase 1 Implementation Schedule

MILESTONES		DATE
START DATE		JULY 5, 1976
DEFINE FUNCTIONAL REQUIREMENTS		SEPT. 15, 1976
FUNCTIONAL DESIGN		OCT. 15, 1976
SOFTWARE REQUIREMENTS/SOFTWARE PLANNING DOCUMENT		DEC. 15, 1976
FIRST DEMONSTRATION (TRK 2-11, TRK 2-12)		APR. 1, 1977
*SECOND DEMONSTRATION (TRK 2-14, TRK 2-12)		SEPT-OCT 1977
CERTIFICATION TEST		NOV. 15, 1977
DELIVERY FOR MJS'77	(TENTATIVE)	JAN. 1978
	(MANAGEMENT PLAN)	MAY 15, 1978

SIGNIFICANT DATES	
MJS'77 LAUNCH	AUG. 1977
MJS'77 ENCOUNTER	APR. 1979(J) MAR. 1981(S)
PV LAUNCH	MAY 1978
PSEUDO RESIDUALS @DSS (ALL)	MARCH 1978

*Dependent on DSN delivery of TRK 2-14 for testing.

900-770

TITLE: MULTI-MISSION TRACKING SOFTWARE SUBSYSTEM, TRACKING INTERMEDIATE DATA RECORD PROCESSOR/ORBIT DATA EDITOR INTERFACE

Original Issue Date: January 20, 1977

APPROVAL

*C. J. Vegos
Navigation Systems Section

*Interface Custodian

ABSTRACT

MEDIUM: Magnetic Tape

SPECIFICATIONS: 7-Track, 800 BPI, unlabeled, fieldata and binary

GENERATING PROGRAM: Intermediate Data Record Selection, Translation, Revision, Intercalation, and Processing Program for Engineering Radio Metric Data (IDR-STRIPPER)

USING PROGRAM: Orbit Data Editor (ODE)

PURPOSE: Define the interface for passing Archive Tracking Data Files (ATDF's) to the ODE program for multi-project use or other users/user programs.

INTERFACE DESCRIPTION CHANGE HISTORY

Original Issue Date: January 20, 1977 Latest Revision Date: May 19, 1977

TITLE: MULTI-MISSION TRACKING SOFTWARE SUBSYSTEM, TRACKING INTERMEDIATE DATA RECORD PROCESSOR/ORBIT DATA EDITOR INTERFACE

Issue/Revision	Date	Pages Changed
Original	January 20, 1977	Original issue of pages 1-17
Revision 1	May 19, 1977	All

APPROVALS

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ODE Cognizant Programmer

Prepared by: _____
Gene L. Goltz
IDR-STRIPPER
Cognizant Programmer

A. APPLICABLE DOCUMENTS

900-771 IDR-STRIPPER Programmer's Manual

B. APPLICABLE INTERFACE DESCRIPTIONS

None

C. FUNCTIONAL DESCRIPTION

1. Purpose

The purpose of this interface is to provide users with tracking data received by the Deep Space Network (DSN).

2. Description

The DSN transfers tracking data to the Univac 1108 via IDR tapes. The IDR tapes are processed to generate ATDF tapes. All data on any one ATDF tape pertains to only one spacecraft. The ATDF tape is comprised of a single data file consisting of both S and X band doppler, range, DRVID, angles, pseudo-residuals, programmed frequency, and radio metric validation data. The IDR-STRIPPER program will provide ATDF tapes to the ODE arranged as follows:

a) File Identification Logical Record (1 record only)

b) Pass Summary Logical Records (time ordered)

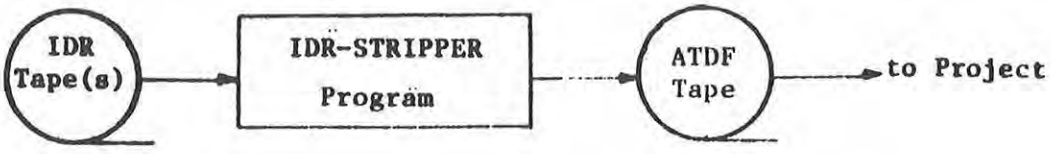
c) Transmitter Logical Records (time ordered)

d) Tracking Data Logical Records (time ordered)

e) Hardware End-of-File Mark

D. FUNCTIONAL BLOCK DIAGRAM

A functional block diagram showing the generation of the ATDF tape is given below.



E. DATA FORMAT

1. ATDF Tape Description

Each ATDF tape block (physical record) is 1792 36-bit words in length. Each block consists of 28 64-word (2304-bit) logical records. Tables 1 through 4 give detailed, bit-oriented descriptions of the ATDF logical records.

Note that several items of data are shown to be two's complement and may be positive, zero, or negative. The leftmost bit of these data items indicates the sign (0 means positive, 1 means negative). The sign bit for most items has been left-extended to fill another item of information (for always positive items these bits are shown to be all zeroes, otherwise they may be all zeroes or all ones). The user may extract the data item alone and sign-extend manually, or may use any portion of the Sign Bits field combined with the data field to get a signed integer which fills his computer's word size. For example, a 22 Sign Bits/14-bit Data Item pair can be taken as a 20-bit item to be ignored plus a 16-bit Data Item, or as a 4-bit item to be ignored plus a 32-bit Data Item, or as a 36-bit Data Item, etc. This is always true whether the Sign Bits field is all zeroes or all ones.

For computers such as the Univac 1108 which use one's complement for negative numbers, the ATDF two's complement numbers can be converted by subtracting one if the first bit of the data item is one (do not check for number less than 0 since a -0 (all one bits) is not recognized as negative, but must be converted).

Table 1. ATDF FILE IDENTIFICATION LOGICAL RECORD FORMAT

Item Number	Bit Number	Length (Bits)	U1108 Word	Description	
1	1-31	31	1	Sign Bits (all zeroes)	
2	32-36	5		Word Count for ODE = 8	
3	37-65	29	2	Sign Bits (all zeroes)	
4	66-72	7		Record Type = 10	
5	73-78	6	3	'T' = 031_8	
6	79-84	6		'R' = 027_8	
7	85-90	6		'A' = 006_8	
8	91-96	6		'C' = 010_8	
9	97-102	6		'K' = 020_8	
10	103-108	6		'I' = 016_8	
11	109-114	6	4	'N' = 023_8	
12	115-120	6		'G' = 014_8	
13	121-126	6		' ' = 005_8	
14	127-132	6		'D' = 011_8	
15	133-138	6		'A' = 006_8	
16	139-144	6		'T' = 031_8	
17	145-150	6	5	'A' = 006_8	
18	151-156	6		' ' = 005_8	
19	157-162	6		'F' = 013_8	
20	163-168	6		'I' = 016_8	
21	169-174	6		'L' = 021_8	
22	175-180	6		'E' = 012_8	
23	181-186	6	6	' ' = 005_8	
24	187-192	6		'I' = 016_8	
25	193-198	6		'D' = 011_8	
26	199-204	6		'R' = 027_8	
27	205-210	6		' ' = 005_8	
28	211-216	6		' ' = 005_8	
29	217-245	29	7	Sign Bits (all zeroes)	
30	246-252	7		Spacecraft ID Number	
31	253-256	4	8	Sign Bits (all zeroes)	Time File Was Created
32	257-264	8		Last 2 Digits of Year	
33	265-280	16		Day-of-Year	
34	281-288	8		Hour	
35	289-292	4	9	Sign Bits (all zeroes)	
36	293-300	8		Minute	
37	301-308	8		Second	
38	309-324	16		0	
39-83	325-2304	1980	10-64	Not Used (all zeroes)	

Table 2. ATDF PASS SUMMARY LOGICAL RECORDS FORMAT

Item Number	Bit Number	Length (Bits)	U1108 Word	Description	
1	1-31	31	1	Sign Bits (all zeroes)	
2	32-36	5		Word Count for ODE = 26	
3	37-65	29	2	Sign Bits (all zeroes)	
4	66-72	7		Record Type = 20	
5	73-76	4	3	Sign Bits (all zeroes)	Time of First Data Point
6	77-84	8		Last 2 Digits of Year	
7	85-100	16		Day-of-Year	
8	101-108	8		Hour	
9	109-112	4	4	Sign Bits (all zeroes)	
10	113-120	8		Minute	
11	121-128	8		Second	
12	129-144	16		0	
13	145-148	4	5	Sign Bits (all zeroes)	
14	149-156	8		Spacecraft ID Number	
15	157-164	8		Network ID 2 = DSN 3 = MSFN 4 = ETR 5 = GTS	
16	165-172	8		Station Number	
17	173-180	8		Receiver Type 1 = S-Band 2 = X-Band	
18	181-184	4	6	Sign Bits (all zeroes)	Time of Last Data Point
19	185-192	8		Last 2 Digits of Year	
20	193-208	16		Day-of-Year	
21	209-216	8		Hour	
22	217-220	4	7	Sign Bits (all zeroes)	
23	221-228	8		Minute	
24	229-236	8		Second	
25	237-252	16		0	
26	253-256	4	8	Sign Bits (all zeroes)	
27	257-272	16		Pass ID Number	
28	273-288	16		1-Way Total Doppler Points	
29	289-292	4	9	Sign Bits (all zeroes)	
30	293-308	16		1-Way Good Doppler Points	
31	309-324	16		1-Way Doppler Normalized Percentage	
32	325-328	4	10	Sign Bits (all zeroes)	
33	329-344	16		2-Way Total Doppler Points	
34	345-360	16		2-Way Good Doppler Points	
35	361-364	4	11	Sign Bits (all zeroes)	
36	365-380	16		2-Way Doppler Normalized Percentage	
37	381-396	16		3-Way Total Doppler Points	
38	397-400	4	12	Sign Bits (all zeroes)	
39	401-416	16		3-Way Good Doppler Points	
40	417-432	16		3-Way Doppler Normalized Percentage	
41	433-436	4	13	Sign Bits (all zeroes)	
42	437-452	16		3-Way Coherent Total Doppler Points	
43	453-468	16		3-Way Coherent Good Doppler Points	

Table 2. ATDF PASS SUMMARY LOGICAL RECORDS FORMAT (cont'd)

Item Number	Bit Number	Length (Bits)	U1108 Word	Description	
44	469-472	4	14	Sign Bits (all zeroes)	
45	473-488	16		3-Way Coherent Doppler Normalized Percentage	
46	489-504	16		Range/DRVID Type (see Table 4)	
47	505-508	4	15	Sign Bits (all zeroes)	
48	509-524	16		Total Range Points Received	
49	525-540	16		0	
50	541-560	20	16	Sign Bits (all zeroes)	
51	561-576	16		Total Records Received	
52	577-580	4	17	Sign Bits (all zeroes)	
53	581-596	16		Total DRVID Points Received	
54	597-612	16		0	
55	613-632	20	18	Sign Bits (all zeroes)	
56	633-648	16		Type of Angles (see Table 4)	
57	649-652	4	19	Sign Bits (all zeroes)	
58	653-668	16		Total Angle Pairs	
59	669-684	16		Total Good Angle Pairs	
60	685-688	4	20	Sign Bits (all zeroes)	
61	689-704	16		Angle Pairs Normalized Percentage	
62	705-712	8		Sign Bits (all zeroes)	
63	713-720	8		Split Pass ID Number	
64	721-732	12	21	Sign Bits (all zeroes)	AOS Time
65	733-740	8		Last 2 Digits of Year	
66	741-756	16		Day-of-Year	
67	757-760	4	22	Sign Bits (all zeroes)	
68	761-768	8		Hour	
69	769-776	8		Minute	
70	777-784	8		Sign Bits (all zeroes)	
71	785-792	8		Second	
72	793-820	28	23	Sign Bits (all zeroes)	LOS Time
73	821-828	8		Last 2 Digits of Year	
74	829-832	4	24	Sign Bits (all zeroes)	
75	833-848	16		Day-of-Year	
76	849-856	8		Hour	
77	857-864	8		Minute	
78	865-876	12	25	Sign Bits (all zeroes)	
79	877-884	8		Second	
80	885-900	16		0	
81	901-904	4	26	Sign Bits (all zeroes)	
82	905-920	16		Total Doppler Points Received	
83	921-936	16		Total Doppler Points Expected	
84	937-940	4	27	Sign Bits (all zeroes)	
85	941-956	16		Percentage of Doppler Points Received	
86	957-972	16		Normalized Percentage of Doppler Points Received	
87-123	973-2304	1332	28-64	Not Used (all zeroes)	

Table 3. ATDF TRANSMITTER LOGICAL RECORDS FORMAT

Item Number	Bit Number	Length (Bits)	UT108 Word	Description	
1	1-31	31	1	Sign Bits (all zeroes)	
2	32-36	5		Word Count for ODE = 8	
3	37-65	29	2	Sign Bits (all zeroes)	
4	66-72	7		Record Type 30 = Spacecraft Transponder Record 31 = Station Transmitter Record	
5	73-76	4	3	Sign Bits (all zeroes)	Transmitter On Time
6	77-84	8		Last 2 Digits of Year	
7	85-100	16		Day-of-Year	
8	101-108	8		Hour	
9	109-112	4	4	Sign Bits (all zeroes)	
10	113-120	8		Minute	
11	121-128	8		Second	
12	129-144	16		0	
13	145-148	4	5	Sign Bits (all zeroes)	
14	149-156	8		Spacecraft ID Number	
15	157-164	8		Network ID 2 = DSN 3 = MSFN 4 = ETR 5 = GTS	
16	165-172	8		Station Number	
17	173-180	8		Transmitter Type 1 = S-Band 2 = X-Band	
18	181-184	4	6	Sign Bits (all zeroes)	Transmitter Off Time
19	185-192	8		Last 2 Digits of Year	
20	193-208	16		Day-of-Year	
21	209-216	8		Hour	
22	217-220	4	7	Sign Bits (all zeroes)	
23	221-228	8		Minute	
24	229-236	8		Second	
25	237-252	16		0	
26	253-268	16	8	Sign Bits (all zeroes)	
27	269-288	20		Transmitter Frequency - H/P*	
28	289-304	16	9	Sign Bits (all zeroes)	
29	305-324	20		Transmitter Frequency - L/P*	
30-84	325-2304	1980	10-64	Not Used (all zeroes)	

* H/P = high part = variable / 10^4

L/P = low part = (variable modulo 10^4) x 10^3

double precision variable = (H/P) x 10^4 + (L/P) / 10^3

Table 4. ATDF TRACKING DATA LOGICAL RECORDS FORMAT

Item Number	Bit Number	Length (Bits)	U1108 Word	Description
1	1-31	31	1	Sign Bits (all zeroes)
2	32-36	5		Word Count for ODE = 18
3	37-65	29	2	Sign Bits (all zeroes)
4	66-72	7		Record Type 90 = Low Rate Data 91 = High Rate Data
5	73-76	4	3	Sign Bits (all zeroes)
6	77-84	8		Last 2 Digits of Year
7	85-100	16		Day-of-Year
8	101-108	8		Hour
9	109-112	4	4	Sign Bits (all zeroes)
10	113-120	8		Minute
11	121-128	8		Second
12	129-144	16		0
13	145-148	4	5	Sign Bits (all zeroes)
14	149-156	8		Spacecraft ID Number
15	157-164	8		Network ID 2 = DSN 3 = MSFN 4 = ETR 5 = GTS
16	165-172	8		Station Number
17	173-180	8		Receiver Type 1 = S-Band 2 = X-Band
18	181-184	4	6	Sign Bits (zeroes or ones)
19	185-192	8		Ground Mode (two's complement) -4 = Three-Way Coherent, No Doppler -3 = Three-Way, No Doppler -2 = Two-Way, No Doppler -1 = One-Way, No Doppler 0 = No Doppler, No Range, No DRVID 1 = One-Way Doppler 2 = Two-Way Doppler 3 = Three-Way Doppler 4 = Three-Way Coherent Doppler
20	193-200	8		Range Type 0 = No Ranging Data 6 = PLOP (Planetary Operational Discrete Spectrum) 7 = PLOP2 (Planetary Operational Continuous Spectrum) 8 = MU2 (Planetary R&D Discrete Spectrum)
21	201-208	8		Angle Type 0 = No Angles 1 = Azimuth/Elevation 2 = Hour Angle/Declination 3 = X30/Y30 4 = X85/Y85

Table 4. ATDF TRACKING DATA LOGICAL RECORDS FORMAT (cont'd)

Item Number	Bit Number	Length (Bits)	U1108 Word	Description
22	209-216	8		DRVID Type 0 = No DRVID Data 6 = PLOP 7 = PLOP2 8 = MU2
23	217-220	4	7	Sign Bits (all zeroes)
24	221	1		Doppler Good/Bad Indicator 0 = Good 1 = Bad
25	222	1		Doppler Data Tolerance 0 = In Tolerance 1 = Out of Tolerance
26	223	1		0
27	224-227	4		Bias (two's complement)
28	228	1		Range Acquisition Toggle
29	229	1		Angle Good/Bad Indicator 0 = Good 1 = Bad
30	230-232	3		Range Data Field Identifier (RDFI) 0 = No Ranging Data Present if Item 20 $\leq$ 0 0 = Range-at-T_0 if Item 20 > 0 1 = Round Trip Light Time, T_1 2 = T_2, T_3 3 = Correlation Voltages 4 = T_0, Carrier Suppression 5 = Range (Not at T_0)
31	233	1		Transmitter Frequency Tolerance 0 = In Tolerance 1 = Out of Tolerance
32	234	1		FTS Standard Indicator 0 = In Lock 1 = Out of Lock
33	235	1		Synthesizer Indicator 0 = In Lock 1 = Out of Lock
34	236	1		Receiver Loop Lock Indicator 0 = In Lock 1 = Out of Lock
35	237	1		Transmitter/Exciter No. 1 On/Off 0 = On 1 = Off
36	238	1		Transmitter/Exciter No. 2 On/Off 0 = On 1 = Off
37	239	1		Receiver Block Identifier 0 = Block III 1 = Block IV

Table 4. ATDF TRACKING DATA LOGICAL RECORDS FORMAT (cont'd)

Item Number	Bit Number	Length (Bits)	U1108 Word	Description
38	240-242	3		Source Designation 1 = DSIF HS 5 = MSFN HS 6 = ETR 7 = GTS
39	243-244	2		0
40	245	1		Doppler Extractor 0 = On Counter 1 1 = On Counter 2
41	246-247	2		Antenna Pointing Status 0 = Auto 1 = Non Auto
42	248	1		0
43	249	1		Mutual Station Data Type 0 = Real Data 1 = Test Data
44	250	1		Doppler Bias Indicator 0 = Biased 1 = Unbiased
45	251	1		SDR Recall Flag for PS-RD 0 = Not SDR Recall Data 1 = SDR Recall Data
46	252	1		No Process Flag 0 = Process Record and Pass 1 = Do Not Process Record but Pass
47	253-257	5	8	Sign Bits (all zeroes)
48	258-288	31		Sample Time (hundredths of seconds)
49	289-304	16	9	Sign Bits (all zeroes)
50	305-324	20		Doppler Count - H/P
51	325-340	16	10	Sign Bits (all zeroes)
52	341-360	20		Doppler Count - L/P
53	361-376	16	11	Sign Bits (zeroes or ones)
54	377-396	20		Range Data Field - Part 1 0 if Item 20 ≤ 0; Otherwise Item 30 = 0. Range-at-T_0 - H/P 1. Round Trip Light Time 2. T_2 Integration Time Constant 3. Ref. Voltage (two's complement) 4. T_0 Time Tag 5. Range (not at T_0) - H/P
55	397-412	16	12	Sign Bits (all zeroes)
56	413-432	20		Range Data Field - Part 2 0 if Item 20 ≤ 0; Otherwise Item 30 = 0. Range-at-T_0 - L/P 1. T_1 Integration Time Constant 2. T_3 Integration Time Constant 3. Quad. Voltage (two's complement) 4. Carrier Suppression (two's comp.) 5. Range (not at T_0) - L/P

Table 4. ATDF TRACKING DATA LOGICAL RECORDS FORMAT (cont'd)

Item Number	Bit Number	Length (Bits)	U1108 Word	Description
57	433-436	4	13	Sign Bits (all zeroes)
58	437-452	16		Number of Ranging Components
59	453-460	8		Split Pass ID Number
60	461-468	8		Line Number
61	469-472	4	14	Sign Bits (all zeroes)
62	473-480	8		Doppler Weight Factor
63	481-488	8		Range Weight Factor
64	489-504	16		Pass ID Number
65	505-508	4	15	Sign Bits (all zeroes)
66	509-524	16		Doppler Multiplier
67	525-540	16		DRVID Power/Noise Ratio (two's complement)
68	541-559	19	16	Sign Bits (all zeroes)
69	560-576	17		Azimuth/Hour Angle/X30/X85
70	577-595	19	17	Sign Bits (all zeroes)
71	596-612	17		Elevation/Declination/Y30/Y85
72	613-617	5	18	Sign Bits (all zeroes)
73	618-648	31		VCO Reference Frequency (tenths of Hz)
74	649-664	16	19	Sign Bits (zeroes or ones)
75	665-684	20		DRVID (two's complement)
76	685-700	16	20	Sign Bits (all zeroes)
77	700-720	20		No. 2 H/R Doppler Count - H/P
78	721-736	16	21	Sign Bits (all zeroes)
79	737-756	20		No. 2 H/R Doppler Count - L/P
80	757-772	16	22	Sign Bits (all zeroes)
81	773-792	20		No. 3 H/R Doppler Count - H/P
82	793-808	16	23	Sign Bits (all zeroes)
83	809-828	20		No. 3 H/R Doppler Count - L/P
84	829-844	16	24	Sign Bits (all zeroes)
85	845-864	20		No. 4 H/R Doppler Count - H/P
86	865-880	16	25	Sign Bits (all zeroes)
87	881-900	20		No. 4 H/R Doppler Count - L/P
88	901-916	16	26	Sign Bits (all zeroes)
89	917-936	20		No. 5 H/R Doppler Count - H/P
90	937-952	16	27	Sign Bits (all zeroes)
91	953-972	20		No. 5 H/R Doppler Count - L/P
92	973-988	16	28	Sign Bits (all zeroes)
93	989-1008	20		No. 6 H/R Doppler Count - H/P
94	1009-1024	16	29	Sign Bits (all zeroes)
95	1025-1044	20		No. 6 H/R Doppler Count - L/P
96	1045-1060	16	30	Sign Bits (all zeroes)
97	1061-1080	20		No. 7 H/R Doppler Count - H/P
98	1081-1096	16	31	Sign Bits (all zeroes)
99	1097-1116	20		No. 7 H/R Doppler Count - L/P
100	1117-1132	16	32	Sign Bits (all zeroes)
101	1133-1152	20		No. 8 H/R Doppler Count - H/P
102	1153-1168	16	33	Sign Bits (all zeroes)
103	1169-1188	20		No. 8 H/R Doppler Count - L/P
104	1189-1204	16	34	Sign Bits (all zeroes)
105	1205-1224	20		No. 9 H/R Doppler Count - H/P

Table 4. ATDF TRACKING DATA LOGICAL RECORDS FORMAT (cont'd)

Item Number	Bit Number	Length (Bits)	U1108 Word	Description
106	1225-1240	16	35	Sign Bits (all zeroes)
107	1241-1260	20		No. 9 H/R Doppler Count - L/P
108	1261-1276	16	36	Sign Bits (all zeroes)
109	1277-1296	20		No. 10 H/R Doppler Count - H/P
110	1297-1312	16	37	Sign Bits (all zeroes)
111	1313-1332	20		No. 10 H/R Doppler Count - L/P
112	1333-1337	5	38	Sign Bits (zeroes or ones)
113	1338-1368	31		Doppler Residual (two's complement)
114	1369-1376	8	39	Sign Bits (zeroes or ones)
115	1377-1404	28		Range Residual (two's complement)
116	1405-1422	18	40	Azimuth/Hour Angle/X30/X85 Residual (two's complement)
117	1423-1440	18		Elevation/Declination/Y30/Y85 Residual (two's complement)
118	1441-1443	3	41	TRK-2-14 Data Flag 0 = TRK-2-14 Data Present -1 = No TRK-2-14 Data Present
119	1444-1446	3		Angles Mode 0 = Auto Track 1 = Manual Aided 2 = Computer Right Ascension/Declination 3 = Drive Tape 4 = Sidereal
120	1447-1448	2		Angles Conscan Mode 0 = Conscan Off 1 = Conscan Auto 2 = Conscan Manual
121	1449	1		Azimuth/Hour Angle/X30/X85 Residual Tolerance 0 = In Tolerance 1 = Out of Tolerance
122	1450	1		Elevation/Declination/Y30/Y85 Residual Tolerance 0 = In Tolerance 1 = Out of Tolerance
123	1451-1453	3		Doppler Channel Number
124	1454	1		Frequency Standard Reference 0 = Backup 1 = Prime
125	1455-1458	4		Doppler Receiver Reference
126	1459-1460	2		Exciter VCO Reference 0 = Short 1 = Synthesizer 2 = Not Available
127	1461	1		DTK Software Configuration 0 = Good 1 = Bad
128	1462	1		DTK Hardware 0 = No Fail 1 = Fail

Table 4. ATDF TRACKING DATA LOGICAL RECORDS FORMAT (cont'd)

Item Number	Bit Number	Length (Bits)	U1108 Word	Description
129	1463	1		Doppler Residual Tolerance 0 = In Tolerance 1 = Out of Tolerance
130	1464	1		Doppler Noise Tolerance 0 = In Tolerance 1 = Out of Tolerance
131	1465	1		Total Doppler Slipped Cycles Tolerance 0 = In Tolerance 1 = Out of Tolerance
132	1466-1468	3		Reference Channel for Differential Doppler Phase
133	1469-1476	8		Doppler Figure of Merit (two's complement)
134	1477-1494	18	42	Slipped Cycles During Count (two's comp.)
135	1495-1512	18		Total Slipped Cycles During Count
136	1513-1530	18	43	Doppler Noise
137	1531-1548	18		Received Signal Strength (two's comp.)
138	1549-1553	5	44	Sign Bits (zeroes or ones)
139	1554-1584	31		Differential Doppler Phase (two's comp.)
140	1585	1	45	Range Modulation On/Off 0 = On 1 = Off
141	1586	1		Prime Range Channel 0 = S-Band 1 = X-Band
142	1587	1		Pipelining On/Off 0 = On 1 = Off
143	1588	1		Chopper Frequency On/Off 0 = On 1 = Off
144	1589	1		Carrier Suppression Units 0 = Volts 1 = dB
145	1590	1		Range Validity 0 = Good 1 = Bad
146	1591	1		Range Calibration Tolerance 0 = In Tolerance 1 = Out of Tolerance
147	1592	1		Range Configuration Indicator 0 = Same 1 = Different
148	1593	1		Range Power/Noise Ratio Tolerance 0 = In Tolerance 1 = Out of Tolerance
149	1594	1		Range Residual Tolerance 0 = In Tolerance 1 = Out of Tolerance

Table 4. ATDF TRACKING DATA LOGICAL RECORDS FORMAT (cont'd)

Item Number	Bit Number	Length (Bits)	U1108 Word	Description
150	1595	1		Pseudo DRVID Tolerance 0 = In Tolerance 1 = Out of Tolerance
151	1596	1		Differenced S-X Range Tolerance 0 = In Tolerance 1 = Out of Tolerance
152	1597-1600	4		Receiver Number
153	1601	1		Exciter Number 0 = Block III 1 = Block IV
154	1602-1603	2		Maser Number
155	1604-1605	2		Maser Type 0 = SPD 1 = XRO 2 = Non Standard 3 = Not Available
156	1606	1		Transmitter Power Indicator 0 = Low Power 1 = High Power
157	1607	1		Transmitter Power Units 0 = Volts 1 = KW
158	1608-1620	13		Transmitter Power Level
159	1621-1640	20	46	Range Calibration
160	1641-1656	16		Range Power/Noise Ratio (two's complement)
161	1657-1671	15	47	Sign Bits (zeroes or ones)
162	1672-1692	21		Average Doppler Residual (two's comp.)
163	1693-1700	8	48	Sign Bits (zeroes or ones)
164	1701-1728	28		Pseudo DRVID (two's complement)
165	1729-1742	14	49	Sign Bits (zeroes or ones)
166	1743-1764	22		Differenced S-X Range (two's complement)
167	1765-1786	22	50	Z Correction (two's complement)
168	1787-1800	14		Wave Form Distortion (two's complement)
169	1801-1814	14	51	Sign Bits (all zeroes)
170	1815-1833	19		DRVID Noise
171	1834	1		DRVID Validity 0 = Good 1 = Bad
172	1835	1		DRVID Noise Tolerance 0 = In Tolerance 1 = Out of Tolerance
173	1836	1		DRVID Power/Noise Ratio Tolerance 0 = In Tolerance 1 = Out of Tolerance
174	1837-1844	8	52	Sign Bits (zeroes or ones)
175	1845-1872	28		Differenced S-X DRVID (two's complement)
176	1873-1876	4	53	Sign Bits (all zeroes)
177	1877	1		Exciter Number
178	1878-1908	31		Programmed Frequency Ramp (two's comp.)

Table 4. ATDF TRACKING DATA LOGICAL RECORDS FORMAT (cont'd)

Item Number	Bit Number	Length (Bits)	U1108 Word	Description
179	1909-1924	16	54	Sign Bits (all zeroes)
180	1925-1944	20		Programmed Frequency - H/P
181	1945-1960	16	55	Sign Bits (all zeroes)
182	1961-1980	20		Programmed Frequency - L/P
183	1981-1998	18	56	High Rate Noise
184	1999-2016	18		Medium High Rate Noise
185	2017-2034	18	57	Medium Low Rate Noise
186	2035-2052	18		Low Rate Noise
187	2053-2065	13	58	Sign Bits (all zeroes)
188	2066	1		New Medium Low Rate Noise 0 = Yes 1 = No
189	2067	1		New Low Rate Noise 0 = Yes 1 = No
190	2068	1		Static Phase Error Units 0 = Volts 1 = Degrees
191	2069-2076	8		Figure of Merit (two's complement)
192	2077-2088	12		Static Phase Error (two's complement)
193	2089-2092	4	59	0
194	2093-2100	8		Prediction Set ID, 1st ASCII Character
195	2101-2108	8		Prediction Set ID, 2nd ASCII Character
196	2109-2116	8		Prediction Set ID, 3rd ASCII Character
197	2117-2124	8		Prediction Set ID, 4th ASCII Character
198-202	2125-2304	180	60-64	Not Used (all zeroes)