

DATA SET CATALOG # 170

65-042A-05A
EXPLORER 28 (IMP-3)
TOTAL IONIZATION

65-042A-05C
EXPLORER 28 (IMP-3)
SORTED TOTAL IONIZATION

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1. INTRODUCTION:

The documentation for this data set was originally on paper, kept in NSSDC's Data Set Catalogs (DSCs). The paper documentation in the Data Set Catalogs have been made into digital images, and then collected into a single PDF file for each Data Set Catalog. The inventory information in these DSCs is current as of July 1, 2004. This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system. The information existing in the DSCs is now not needed for locating the data files, but we did not remove that inventory information.

The offline tape datasets have now been migrated from the original magnetic tape to Archival Information Packages (AIP's).

A prior restoration may have been done on data sets, if a requestor of this data set has questions; they should send an inquiry to the request office to see if additional information exists.

2. ERRATA/CHANGE LOG:

NOTE: Changes are made in a text box, and will show up that way when displayed on screen with a PDF reader.

When printing, special settings may be required to make the text box appear on the printed output.

Version	Date	Person	Page	Description of Change
01				
02				

3 LINKS TO RELEVANT INFORMATION IN THE ONLINE NSSDC
INFORMATION SYSTEM:

<http://nssdc.gsfc.nasa.gov/nmc/>

[NOTE: This link will take you to the main page of the NSSDC Master Catalog. There you will be able to perform searches to find additional information]

4. CATALOG MATERIALS:

- a. Associated Documents To find associated documents you will need to know the document ID number and then click here.
<http://nssdcftp.gsfc.nasa.gov/miscellaneous/documents/>

- b. Core Catalog Materials

SPHE 00540

IMP C

ORIG. GM & ION CHAMBER COUNTS, TAPE

65-042A-05A

THIS DATA SET HAS BEEN RESTORED. THERE WAS ORIGINALLY SIX 7-TRACK, 800 BPI TAPES, WRITTEN IN BCD. THERE ARE THREE RESTORED TAPES WRITTEN IN EBCDIC. THE DR TAPES ARE 3480 CARTRIDGES AND THE DS TAPES ARE 9-TRACK, 6250 BPI. THE TAPES WERE CREATED ON AN IBM 360 COMPUTER. THE DR AND DS NUMBERS ALONG WITH THE CORRESPONDING D NUMBERS AND TIME SPANS ARE AS FOLLOWS:

DR#	DS#	DD#	FILES	TIME SPAN
-----	-----	-----	-----	-----
DR03279	DS03279	DD01530	1-1525	05/29/65 - 11/08/65
		DD01531	1526-2036	11/08/65 - 01/05/66
DR03280	DS03280	DD05490*	1-1074	01/06/66 - 04/10/66
		DD05491	1075-2240	04/10/66 - 08/15/66
DR03281	DS03281	DD05492	1-1191	08/15/66 - 11/17/66
		DD05493	1192-1647	11/17/66 - 01/03/67

* MISSING FILES 1075-1082

IMP-C

SPHE-00392

RE-ORDERED GM & ION CHAMBER DATA

65-042A-05C

THIS DATA SET HAS BEEN RESTORED. THERE WERE ORIGINALLY SIX, 7-TRACK, 556 BPI TAPES WRITTEN IN BCD. THERE IS ONE RESTORED TAPE, WRITTEN IN ASCII. THE DR TAPE IS A 3480 CARTRIDGE AND THE DS TAPE IS 9-TRACK, 6250 BPI. THE TAPES WERE CREATED ON AN IBM 7094 COMPUTER. THE DR AND DS NUMBERS ALONG WITH THE CORRESPONDING D NUMBERS AND TIME SPANS ARE AS FOLLOWS:

DR#	DS#	D#	FILES	TIME SPAN
DR003498	DS003498	D008114	1	05/29/65 - 09/10/65
		D008115	2	09/11/65 - 12/23/65
		D008116	3	12/24/65 - 03/31/66
		D008117	4	04/01/66 - 07/15/66
		D008118	5	07/16/66 - 10/20/66
		D008119	6	10/21/66 - 01/03/67

65-042A-05A

EXPLORER 28 (IMP-3)

TOTAL IONIOZATION

800 BPI, BCD, 7-track, IBM 7094

D-01530	C-00236	1525 FILES
D-01531	C-00305	511 FILES
D-05490		1082 FILES
D-05491		1166 FILES
D-05492		1191 FILES
D-05493		456 FILES

65-042A-05C

EXPLORER 28 (IMP-3)

SORTED TOTAL IONIOZATION

556 BPI, BCD, 7-track, IBM 7094

D-08114	C-06174	1 FILE
D-08115	C-06175	1 FILE
D-08116	C-06176	1 FILE
D-08117	C-06177	1 FILE
D-08118	C-06178	1 FILE
D-08119	C-06179	1 FILE

We ran the associated D tapes in data set (65-042A-05A) through Clair McWilliams IMP 1 program (A6-03-010) which removes the header + ID records along with removing the EOFs and making the outputs 1 file tapes, these resultant tapes were then run through the Generalized Sort Program and the tapes were sorted by Day of year, hour, minutes and milliseconds, with Day = 000 records deleted. The sorted tapes had no way to distinguish the year, so we ran program (A3.01.002) which inserts either a 5, 6, or 7 in the 60th character of each logical record# to represent years

1965, 1966, or 1967. Data set 65-042A-05A is not sorted,

Data set 65-042A-05C is sorted only by Julian Day not by year.

65-042A-05A

IMP-1 UNIVERSITY OF CALIFORNIA EXPERIMENT DATA TAPES

The enclosed two tapes contain all the data from the University of California experiment aboard the IMP-1 spacecraft. They were generated by stacking of shorter data tapes received from Goddard Space Flight Center onto the two 2400-foot reels. The stacked tapes were written on an IBM 360 system and contain BOD characters written on a 7-track tape in even parity at 800 char/in. density.

The first file on each stacked tape is a one record file which serves as an index to that tape. The physical record (gap to gap) is 1032 characters long and consists of 26 twelve character logical records. There is one index entry for each of the GSFC short reels stacked on the larger tape. The entries are in the following format:

Chars

- 1-6 GSFC reel number.
- 7-9 Number of files contained on the GSFC tape.
- 10-12 Blank.

Tape 1 contains 20 entries and tape 2 contains 17 entries. The remaining index entries are blank. Following the index file is the stacked experiment data copied from the GSFC reels. The data is in the same file by file format as it appeared on the original tapes except that a 12-character field has been prefixed to each record to identify it to U. C. programs using these tapes. The individual records are 1032 characters (including prefix field) and are formatted as follows:

Chars

- 1-6 The GSFC reel number on which this record originally appeared.
- 7-9 The file number within that GSFC reel.
- 10-12 The record number within the above file.

15-1037 The experimental data in its original format (see separate tape format sheet).

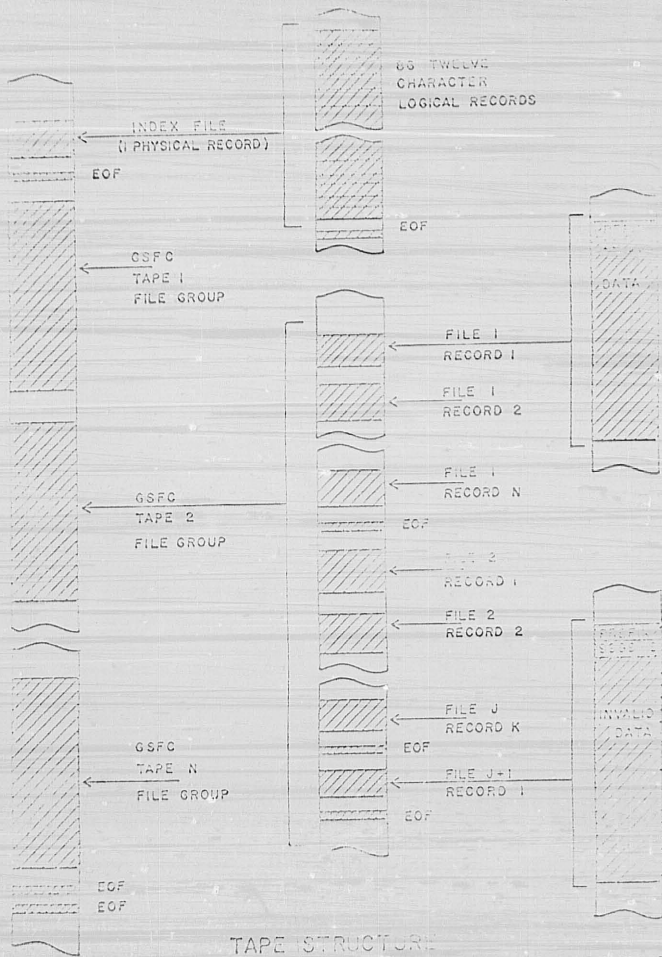
The last file on each of the GSFC tapes is a one record file with the twelve character identification field (i.e. Satellite No., Month, Day, etc.) set to nines. This file has also been copied onto the stacked tape. Thus the first record of the following file on the stacked tape will have a different GSFC reel number and a file number of 1 in the prefix field. Two end of file marks will follow the last valid data file on the stacked tape.

The following is a description of the three non-numeric characters which can occur in the data and their significance.

- (1) "@" represents a system error.
- (2) "=" represents missing data.
- (3) ":" represents loss of synchronization.

The "@" and "=" symbols appear only in the data. The ":" can appear anywhere in the sequence. Once a colon is present, no other character but a colon can follow. As a result the frame length computation may be in error; however, the sequence count is correct and may be used to fill in missing time.

Time gaps appear as a result of the loss of synchronization or in the absence of a signal in which case the "=" symbol is generated.



TAPE STRUCTURE

IM-100 ANALOG TAPE FORMAT

<u>Index</u>	<u>Ch. No.</u>	<u>Description</u>	
1	1-6	Original GSFC reel number.	
2	7-9	File number within GSFC reel.	Prefix field.
3	10-12	Record number within above file.	
4	13-14	Satellite number.	
5	15-16	Month of analog tape generation.	
6	17-18	Day of analog tape generation.	ID field
7	19	Year of analog tape generation.	
8	20-21	Station number.	
9	22-24	Analog tape number.	
10	25-27	Universal time - day.	
11	28-29	Universal time - hours.	
12	30-31	Universal time - minutes.	
13	32-36	Universal time - milliseconds.	
14	37-41	Sequence counter.	
15	42	Frame time in seconds.	
16	43-45	Frame time in milliseconds.	
17	46	Sequence ID.	1..a field
18	47	BT flag 1.	
19	48-52	P1 data - background counter.	
20	53	BT flag 2.	
21	54-58	P4 data - Beta counter.	
22	59	BT flag 3.	
23	60-64	P9 data - background counter if different from 1. If on channel P1 and sequence ID equals 1.	

<u>Page</u>	<u>Tap</u> <u>Chan.</u>	<u>Significance</u>
64	65	ET flag 4.
65	66-70	F12 data - Beta counter.
66	71-74	Azimuthal angle.
67	75-76	Polar solar angle.
68	77-80	Spin period.

Then repeat items 10-28 for 17 more times.

Significance of the ET FLAG

Even ET FLAG means that all program checks were made. Odd ET FLAG means data was processed without some important checks and the satellite clock reading could be in error.

It should be noted that an ET FLAG of 0 means everything is probably good and an ET FLAG of 4 means that NSFUDG was guessed due to noise.

ET FLAGS will be even provided the following was done:

- (1) The analog line has been continuously checked through the program and five consecutive bad normal sequences never showed up with line errors. If random buffer errors occurred, data for the suspect frame or frames in the sequence were "at" signal out.
- (2) CNSFUDG was checked by means independent of most of the past history of the satellite. Thus NSFUDG is probably correct. (NSFUDG is the decimal clock reading given the experimenters. CNSFUDG is defined below.
- (3) The insert of Station ID (DAY, MONTH AND YEAR) by the analog line operator was checked and the day, month and year was correct as determined by the program. Thus, one should be wary of ODD ET FLAG and have a high degree of confidence in EVEN ET FLAG.

Some definitions are in order as follows:

NSFUDG = The five character decimal number that the experimenter receives to indicate the sequence count. This number goes from 00000 to 99999 in about 90 days. Thus each normal telemetry sequence will be tagged with a unique number over the 3-month period. The ET FLAG will indicate how good this number is. If the flag is 0 it means we think this number is excellent. If the flag is ODD the number could be fine but there is a good possibility it is not correct.

RMS = The sequence rate in seconds per sequence. (Nominal value 0.0001 sec/seq)
 The program for the MNT obtains the sequence rate for each frame. Both

Values are the integrated value over the entire pass. The time that appears on the experimenter's tape is obtained from the values of RMS and NSPUDG and not from the station time appearing on the analog tape. Thus it is extremely important that the significance of the ET FLAG is understood since it directly implies the quality of recorded data.

The ET FLAG also gives valuable information as to the quality of the line operation, and the data. If the flag is 3 the line and satellite are working well and the signal is probably clean. An ET FLAG of 1 means the same thing but time may be wrong; in fact, it may be very wrong, may even have the wrong year.

DNS = The decimal equivalent of the satellite clock value. No fudge factors are involved in this number; its value covers the range of 00000 to 32767.

CNSNOW = The computed value of NS now. When the program initializes a file using the satellite clock $CNSNOW = DNS$; from this point on CNSNOW is incremented by "1" each sequence. Thus, if there are no "gaps" in the data, CNSNOW should always equal DNS. In the presence of noise when DNS may not be obtained, CNSNOW is used to determine NSPUDG with an ET FLAG of 4. Whenever $CNSNOW \neq DNS$, records are stored by the program for 10 consecutive normal sequences and a decision is made as to what happened (e.g. was there a gap in the data?; did the satellite go into under-voltage, thus starting the satellite clock off in a different place?; did the odometer flip or whatever). When this decision can be made, the program goes back and changes CNSNOW to $= DNS$ and the process continues.

CODE UPDATE: When $CNSNOW = DNS$.

UPDATE: When $CNSNOW \neq DNS$.

STATION FLAG: The value fed into the computer by a card that gives the fudge factor required to make NSPUDG (the 90-day function) from DNS (a 30-day function at best, e.g., if no undervoltages occur in the satellite).

One can really understand that it is most important to check CDNSFUDG independent of most of the satellite past history.

BASIC EQUATION:

$$NSFUDG = DNS \cdot k + CNSNOW (1-k) + CDNSFUDG$$

Where $k = 1$ if the signal is good enough to get DNS and if $DNS = CNSNOW$

(ET FLAG = 0 or 2) or 1 or 3.

$k = 0$ if signal is too noisy to obtain DNS or if signal is clean but DNS

$\neq CNSNOW$ (ET FLAG = 4, 6, or 8) or 5, 7 or 9.

ESTO: This is essentially a "filter" and is the heart of the program. As soon as a bad update occurs, (e.g., on ET FLAG of 6 (or 7) or 8 (or 9)) information is stored in the program while the MDT is produced. If a good update does not occur in 10 consecutive normal sequences (noise is not counted as a good update of course) we say we have had 10 ESTOS and the program stops putting out the MDT and analyses what happened during the 10 ESTOS. The most likely event to occur is a "noise gap" in which the analog line found 6 noisy sequences and stopped processing until it could again obtain telemetry data synchronization. The program determines that this has happened by a process of elimination. First it checks that the 10 ESTOS make sense (are in order) if not, it reinitializes. Then it determines that the mode didn't change (if it is too noisy, it reinitializes.) Then it determines that the odometer didn't flip (if it did, it computes a new CDNSFUDG and continues). If none of the above occurred, it determines that the satellite didn't go into undervoltage. (If it did go into undervoltage an elaborate process occurs in which new cards are punched. This will not be finished until after launch.) During any of the reinitializations it becomes necessary to check for a mode change. Now if the 10 ESTOS are fairly clean, no odometer flip, undervoltage, etc. If undervoltage, the program commences to close the noise . . . If it is

it correctly (e.g., the gap station time is equal to the gap by the satellite clock). It rewinds the tape back to the first ESTO and computes a new CNSNOW and starts to process again.

The experiment will have the ET FLAG of 6 or 8 changed to a ϕ .

The above gives a qualitative indication of what the ET FLAG means: to sum up an ODD ET FLAG means that the time may be wrong (incorrect CMCSEFLAG) and/or the MDT was made at the request of the analog line, without checking for line errors.

An ET FLAG of ϕ (or 1) means the satellite is probably working correctly and that the signal is clean since both clock readings were clean and equal to each other. In addition, there was a good update (DNS = CNSNOW) and we used DNS to compute NSFUDG.

An ET FLAG of 2 (or 3) means the satellite is probably working well but noise or line errors have perturbed one of the clock readings. The clock reading that was clean however caused a good update (DNS = CNSNOW) and we used DNS to compute NSFUDG.

An ET FLAG of 4 (or 5) means both clock readings were perturbed by noise or line errors so the update couldn't be checked. It was necessary to use CNSNOW to compute NSFUDG.

IMPORTANT NOTE: Any time an ET FLAG of 4 occurs and the first non 4 following it is a ϕ or 2, the guess for NSFUDG was probably correct for the 4. If the first non 4 following it is a 6 or 8 or 9 something drastic happened that the program couldn't analyze, so time for the sequences with a 4 was probably incorrect. It is hoped that 4's will be followed by ϕ or 2 most of the time for this means that the program successfully closed a "noise gap." If the 4's are followed by a 9, it means the program completely gave up and re-initialized at the record with the ET FLAG of 9. If the 4's are followed by a 6 or 8, the two most likely events are 1) we are near the end of the tape

And couldn't get 10 consecutive sequences with bad updates and gave up or
some mysterious event occurred that gave a bad update for a few sequences
and then straightened itself out again.

An ET FLAG of 6 (or 7) means one of the clock readings are clean but it
caused a bad update (DNSNOW $\neq$ DNS). This will start ESTO. NSFUDG was computed
from CNSNOW.

An ET FLAG of 8 (or 9) means both the clock readings were clean and equal
to each other; however, there was a bad update since CNSNOW $\neq$ DNS. This event
will start ESTO. After 10 ESTO's the program can usually determine what
happened (ODOMETER FLIP OR NOISE GAP) and update CNSNOW such that the experi-
menter will receive an ET FLAG of 0 because the program had backspaced and
closed the gap correctly. The ST FLAG will signify that this occurred.

65-042A-05C

NSSDC IMP 3 DATA FORMAT
ENERGETIC PARTICLE EXPERIMENT
BCD TAPE FORMAT

Symbol	Description
*Logical Record	
1-6	Sequence counter
7-8	Station number
9-11	Universal time - day
12-13	Universal time - hours
14-15	Universal time - minutes
16-20	Universal time - milliseconds
21	Frame time in seconds
22-24	Frame time in milliseconds
25	Sequence ID
26	ET1
27-31	F1 data - background counter
32	ET2
33-37	F4 data - Beta counter
38	ET3
39-43	F9 data - background counter if Sequence ID is $\neq 1$, Ion chamber readout if Sequence ID = 1,
44	ET4
45-49	F12 data - Beta counter
50-53	Azimuthal angle
54-55	Polar solar angle
56-59	Spin period
60	Year, either 5, 6, or 7

*There are 18 Logical Records per Physical Record.

U1425 05E000B1682 05D000C12944 05B000C6045 05A000C7055 05A000C5707 021000B1687 04G000C85701 05C000A715
2 06A000A9542 05G000B167A 05B000C81489 05C000C9286 05H000C9295 05F000B8679 04H000D0869 04F000B8534 05
B000D1400 05 C00C6449 051000C3377 05A000D4352 055000D3333 05A000B3314 05B000D1390 04G000C1497 05A000
A9551 05E000D3308 051000A9189 05B000D8000 02 00007898 05A000

1, LENGTH 1032

D-1530

[illegible]

D-01530

81425 0A090C750525511C01169132849590051715119711 142911075911123411037201955035161491141130760172511
8143104351103261103211062800112005114191332559400617431191102821019117317691089103345605811614917541
7251061751192101835110411051076510304274095035617401319497130417551191317830186171017610177561012651
05171491343007061785119110601810735013276510720849355801741911339449240161791514300743194511103751
106913007452051714313410840801805119310427061057151042410485202205149511714300743194511103751
106913023676105597706250517145134512590608183511031031671049341029910555401835132761049250142205171491
451193102561105952910216130552303432507149134041895111031031671049341029910555401835132761049250142205171491
35040257051797511910005210473213225104010301502517149132901740610851193131613540111306010471091
1520515114354660076149155119129404103726137661035940655205171491356074240619151110313540111306010471091
81701033940425205171451357658403619281163127645103280127555131433070320517249143013774061954119112
572102856152767102761038520517

D7998 05 00A76116050111831218052240C722085119392101893107691493690958700351005603121A081623372710511
 01291252001120032767601039032511055501218093414972211511924133564-----334-----11216100
 006672212511914-----4-----4-----31218134389972214511914-----4-----4-----4-----4-----
 -----31218150581572215511924-----4-----4-----4-----3121816277317221611934-----4-----4-----4-----
 4-----31218191154572215511912-----4-----4-----4-----222-----200314-----312182037447221951192011053
 00606701502700806050010055913218215597722205119701694000053280170780C098503941055931218247221876226
 25119100154100004492327670063690C721105583121826011467222051192063319000155605481000224067411156003405
 8272306737224511930015010002480C740062700031413560331218360849872225519101150004583757670724205
 5110056031218318348172227511920115920003480059870001906391100550121838360724722265119200419560066700
 1745000400230110560312183534561722305119101218000038303760001460467110559312183656477722315119206
 873600052501392760003700306110559

[illegible][illegible]

0284361600101324376751193900195000590002090000401863104795023438160010135276025119100001500000032 REC 1, LENGTH 1080
7670000060496310478602846316010133649520511920001600000300014000002003931047860284461601013811437
51193000018000003000180000050148310478602844616010140552725119100002100000443276700000073683104786
0284361600101421719051192000150000060001800000402393104786028446160101433918511930019000000000
1900000040101301478602844616010104622943511910001500000403276600007503301047860284471602101474860
5119200001500000300002000004026131047860284461601014905785193300200000403002100000000713104786
02845016001015150613511910001700000503276700004032913104786028451160101531253151192000047000000000
0140000050161304786028452160101543448511930001900000300011000004032310478602845416016115718284
511910000170000060327670000050281310478602845516010158422015119200016000005000170000021213104786
028455160010120000217511930014400004000137600037469310478602845816010120245054511910000150000004032
766000004021031047860284591600102047787251192000150000060000140000600813104786

D-THH
D-8114
From DC 467

02846016001012052978951193000130000040006170000053429311047860284621601012081362451191000015000004032 REC 2, LENGTH 1080
76700000401693104786028463160101293355425119200016000003000140000020039310478602846416010121757460
51193000014000003000015000004038731047860284661601012134295519100019000005327670000051273104786
02846716001012150271501192000190000050001700000300004756128468160101216251305119300019000000000
51190000043453104786028467160101291896551191000190000053276700004008410478602847116001022136883
51192000014000003000190000050432310478602847216010122152805119300018000003001400000050322104786
028474160010122436636511910001600000303276500004004413104786028475160101225585535119200001500000500
0170000040388310478602847516010122207471511930001700000200012100005625831047860284781602123904306
51191000016000004032767000004000364756028479153010231262245119200014000004001500000363443104786
028480160010123248141511930001300000300005187000056213310478602848216010123531976511910000170000004032
7670000040430310478602848316010123653894511920000140000504000190000402993104786

028484160010123815812511930001600000500015000004016831047860284861601012475946751191000014000004032 REC 3, LENGTH 1080
7670000040385310478602848716010129355425119200015000003000150000030025431047860284881601012434382
51193000015000005000130000040123310478602849016010120462731751191000014000004032766000004383104786
028491160010124749235511920001600000600004000240273134786028492160101249111525119200014000000000
0140000020076010478602849416010125015987551191000000053276700002262310478602849516010125316095
51192000017000005000160000601603104786028496160101254384235119300015000003001400000040293104786
028498160010125722659511910001400000503276700005029433104786028499160101258445755119200001500000300
0180000010113310478602850160101260064935119300015000003000015000013045931047860285021601012625328
51191000014000004032767000060166310478602850316010120412246511920001200000300014000000643104786
02850416001013053416351193000130000300000300027650264131047860285051601013028170995511910000150000004032
766000003014710478602850716010130939916511920001600000500001400000500151304786

0285081600101311013451193000150000040001700000400036131047860285116010131345669511910000150000000732 REC 4, LENGTH 1080
767000006019731047860285116010135785751192000150000040000130000044433104786028512160010131269574
51193000018000003000130000040313104786028511601013191339511910000150000040327670000040743104786
028515160010132035297511920001400000200010400005039331047860285160101321571755119300015000003000
014000005026131047860285181601013244011511910001500000403276700004000030747450285191600103262927
51192000016000005000015000005034203104786028520151013272484551193000140000050015000000402104786
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7670000050317310478602853116010134225939511920001400000600001100000301843104786

028532160010134347896511930001500000400014000004005231047760285316010134631691511910000140000000732 REC 5, LENGTH 1080
7670000030264310478602853516010134756309511920000100000500001600000313104776028536160010134915527
511930000120000060000150000060000310475628538160101305159362511910000120000303276600000502993104786
028539160010135321279511920001500000400001500000300763104786028542160101354431975119300016000005000
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511910000130000040327670000500423104786028551601014094429151192000130000030001300000033863104786
02855216001014162085119300013000005000100000302533104786028554160101435704351191000015000004032
766000006046331047860285551601014615119615119200010000002000110220403293345786

028556160010141633879511930000140000020000130000070195310478602855816010149191771451191000014000000302 REC 6, LENGTH 1080
767000003046531047860285591601040233663151192000140000050000140000030271310478602856160101402210549

REC 7, LENGTH 1080

BEC 8. LENGTH 1282

REC 9. LENGTH 1080

250 10. LENGTH 1080

BTC	11.	LENGTH	1080
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51191000016000005327670000404013104786028907050011215458975119200018000005000019000002025231174786
028908050011217083145115300001900000600001900004010331047860289100500112195264851191000018000006032
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028912050011222364825119300001700000500016000004046331047760289140500112252031751191200017200005232
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0289260500112414332351191000017000004032767000002028231047760289270500112430524051192000014000003000
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028932050011249548255119300002000000300001600000503383104786028934050011252386651191000013000003032
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REC 22, LENGTH 1380

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7670000030393310478602893905001125928246511520000150000030000110000060243310477602894005001130051163
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5119100001800000403276700000303733104776028955050011321189205119200001700000300001800000402223104776

REC 23, LENGTH 1380

