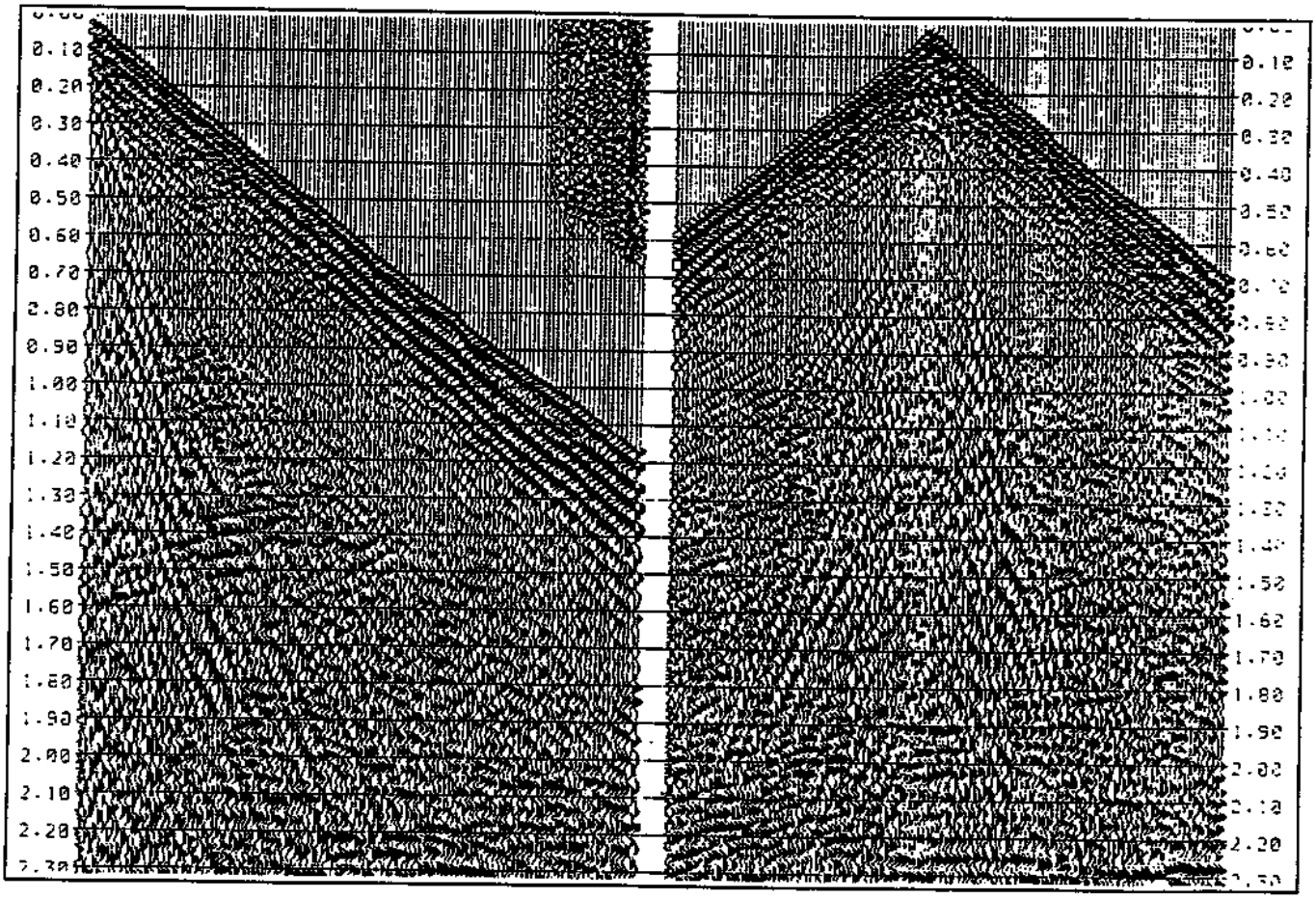
OPSEIS
GEOPHYSICAL SYSTEMS

OPSEIS ® Eagle System

RF/Wireline Digital Seismic Recording System



Recording Tape Format
2009618-002

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OPSEIS ® Eagle System Recording Tape Format

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OPSEIS® EAGLE SYSTEM RECORDING TAPE FORMAT

FOREWORD

This document defines the recording tape formats for the OPSEIS® EAGLE RF/Wireline Digital Seismic Telemetry System manufactured by OPSEIS, INC.

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OPSEIS® EAGLE SYSTEM RECORDING TAPE FORMAT

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RECORDING TAPE FORMAT

Overview

Introduction

This document describes the recording tape format used in the OPSEIS® Eagle System. The tape format used to record the seismic trace data blocks is Standard SEG-Y. The Standard SEG-Y format is a 32-bit floating point (IBM 32 Excess 64) format as defined on page 15.

Definitions

BCD	Binary Coded Data
CRC	Cyclic Redundancy Code
CRS	OPSEIS® EAGLE Central Recording Station
DB	Decibels
EBCDIC	Extended Binary Coded Decimal Interchange Code
EOF	End of File
GCR	Group Coded Recording data
HZ	Hertz
IBG	Inter-Block Gap
MS	Milliseconds
NRZI	Non-Return-to-Zero
PE	Phase Encoded data
RFIOC	Remote Frequency Input Output Controller
RMS	Root Mean Square
SAR	Seismic Acquisition Remote unit
SEG-Y	Society of Exploration Geophysicists Y tape standard

Recording Densities

Either phase encoded (PE) data at 1600 bpi density, group coded recording (GCR) data at 6250 bpi density, or double density 18-track NRZI can be used for recording.

Recording Standards

The following standards are applicable:

SEG-Y

"Digital Tape Standards" by the Society of Exploration Geophysicists.

1600 bpi (PE)

IBM Form GA 22-6862 entitled "IBM 2400-Series Magnetic Tape Units Original Equipment Manufacturers' Information."

6250 bpi (GCR)

ANSI standard X3.54-1976, "American National Standard Recorded Magnetic Tape for Information Interchange (6250 bpi, GCR)."

Double density NRZI

IBM 3840 standard.

SEISMIC REEL DESCRIPTION

General

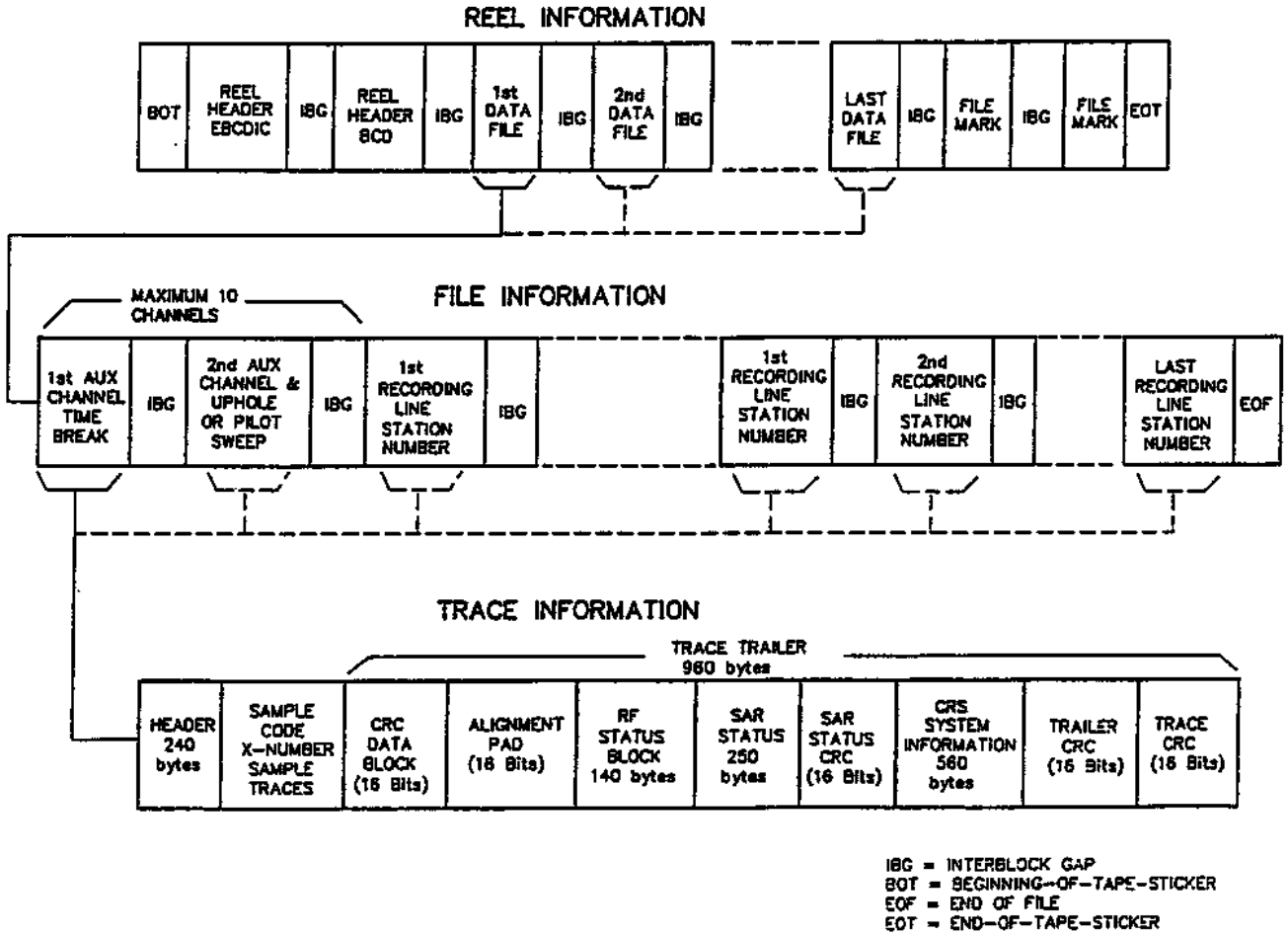
Description

The seismic reel is divided into three parts: a reel identification header, file or records and end-of-file marks (EOF); see Figure 1-1.

Important

Raw data and correlated data are not recorded on the same reel. No more than one logical line of seismic data is permitted on a reel. When shooting 3-D, physical lines are used to make up the logical line. Additional reels are used for long lines and each reel must start with a reel identification header.

Figure 1-1
Seismic Reel Layout



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SEISMIC REEL DESCRIPTION

General, continued

Reel Identification Header	The reel identification header contains information pertaining to the information recorded on the entire reel and is subdivided into two blocks. The first block contains 3200 bytes of EBCDIC card image information (equivalent of 40 cards) including 2 bytes CRC (cyclic redundancy code). The second block consists of 400 bytes of binary coded (BCD) information including 2 CRC bytes (399 & 400). These two blocks are separated by an inter-block gap (IBG); see Figure 1-1.
Trace Data Block	Each trace data block contains a trace identification header, the data values for the seismic station, and a trace trailer. All data within a trace data block is ungapped. The reel identification header and the first trace data block are separated by an IBG. An IBG also separates each trace data block. Data values are written in 8-bit bytes with vertical parity odd.

SEISMIC REEL DESCRIPTION

Reel Identification Header

Description	A format code (bytes 3225-3226) of 1 identifies the reel as being standard SEG-Y.
EBCDIC Part	The EBCDIC part of the reel header (Figure 1-2) describes the data from a line of shotpoints in a fixed specified format consisting of 40 card images with each image containing 80 bytes.
EBCDIC Information	Figure 1-2 shows the record locations for each of the 80 column cards. All unused card image characters are EBCDIC blank. Card image numbers 23 through 39 are unassigned for optional use. Each card image contains the character "C" in the first card column. All EBCDIC entries are left justified.
Comment	Card C40 is only 78 bytes with bytes 79 and 80 being reserved for the cyclic redundancy code (CRC) of the data block.

Figure 1-2
Reel Header EBCDIC Information

```
         1111111111222222222233333333334444444444555555555566666666667777777778
1234567890123456789012345678901234567890123456789012345678901234567890123456789

C 1 CLIENT                        COMPANY                        CREW NO
C 2 LINE            AREA                        MAP ID
C 3 REEL NO           DAY-START OF REEL      YEAR      OBSERVER
C 4 INSTRUMENT: MFG            MODEL             SERIAL NO
C 5 DATA TRACES/RECORD        AUXILIARY TRACES/RECORD          CDP FOLD
C 6 SAMPLE INTERVAL         SAMPLES/TRACE       BITS/IN       BYTES/SAMPLE
C 7 RECORDING FORMAT        FORMAT THIS REEL          MEASUREMENT SYSTEM
C 8 SAMPLE CODE: FLOATING PT     FIXED PT     FIXED PT-GAIN      CORRELATED
C 9 GAIN TYPE: FIXED      BINARY     FLOATING POINT     OTHER
C10 FILTERS: ALIAS     HZ  NOTCH      HZ BAND   -       HZ SLOPE      -   DB/
C11 SOURCE: TYPE            NUMBER/POINT        POINT INTERVAL
C12     PATTERN:                            LENGTH        WIDTH
C13 SWEEP: START         HZ  END    HZ  LENGTH       MS  CHANNEL NO  TYPE
C14 TAPER: START LENGTH       MS  END LENGTH       MS  TYPE
C15 SPREAD: OFFSET        MAX DISTANCE        GROUP INTERVAL
C16 GEOPHONES: PER GROUP     SPACING     FREQUENCY     MFG
C17     PATTERN:                            LENGTH        WIDTH
C18 TRACES SORTED BY: RECORD     CDP     OTHER
C19 AMPLITUDE RECOVERY: NONE      SPHERICAL DIV      AGC    OTHER
C20 MAP PROJECTION                      ZONE ID      COORDINATE UNITS
C21 PROCESSING:
C22 PROCESSING:
C23
.
.
C40 END EBCDIC
```

continued on next page

SEISMIC REEL DESCRIPTION

Reel Identification Header, continued

Binary Coded

The binary coded decimal (BCD) section of the reel header consists of 400 bytes of information common to the seismic data on the related reel.

Table 1-1

Table 1-1 provides a description of the binary coded section of the reel header.

BYTE NUMBER	DESCRIPTION	BYTES
3201	Job identification number	4
3205	Logical line number	4
3209	Reel number	4
3213	Number data traces per record	2
3215	Auxiliary trace per record	2
3217	Sample interval in microsec. (2000 microsec = 2 ms)	2
3219	Sample interval in microsec. (original field record)	2
3221	Number samples per data trace	2
3223	Number samples per data trace (original field record)	2
3225	Data sample format code 1 = floating point	2
3227	Expected number data trace Data and auxiliary traces	2
3229	Trace sorting code 1 = as recorded (no sorting)	2
3231	Vertical sum code Number of stacks before recording	2
3233	Sweep frequency at start	2
3235	Sweep frequency at end	2
3237	Sweep length (ms)	2
3239	Sweep type code Linear, exponential, parabolic, etc.	2

continued on next page

Table 1-1, continued
BCD Header Information

BYTE NUMBER	DESCRIPTION	BYTES
3241	Trace number of sweep channel	2
3243	Sweep trace taper length start	2
3245	Sweep trace taper length end	2
3247	Taper type	2
3233	Sweep frequency at start	2
3235	Sweep frequency at end	2
3237	Sweep length (ms)	2
3239	Sweep type code	2
3241	Trace number of sweep channel	2
3243	Sweep trace taper length start	2
3245	Sweep trace taper length end	2
3247	Taper type	2
3249	Correlated data traces 1 = not correlated data (raw) 2 = correlated data	2
3251	Binary gain recovered	2
3253	Amplitude recovery method	2
3255	Measurement system 1 = meter 2 = feet	2
3257	Impulse signal polarity	2

continued on next page

SEISMIC REEL DESCRIPTION
Reel Identification Header, continued

Table 1-1, continued
BCD Header Information

BYTE NUMBER	DESCRIPTION	BYTES
3259	Vibratory Lag code (Degrees) 1 = seismic signal lags pilot 337.5°-22.5° 2 = seismic signal lags pilot 22.5°-67.5° 3 = seismic signal lags pilot 67.5°-112.5° 4 = seismic signal lags pilot 112.5°-157.5° 5 = seismic signal lags pilot 157.5°-202.5° 6 = seismic signal lags pilot 202.5°-247.5° 7 = seismic signal lags pilot 247.5°-292.5° 8 = seismic signal lags pilot 292.5°-337.5°	2
3261	System ID code (binary)	4
3265	CRS system number (binary)	4
3269	CRS system software revision number	4
3273	CRS hardware revision number	4
3277	Reel continuation identifier 1 = not a continuation 2 = continuation of a shotpoint file	4
3281	Copy flag 0 = original 1 = copy	4
3285	Spare	314
3299	BCD CRC	2

TRACE DATA BLOCK

Overview

Introduction

The seismic data is written in a demultiplexed form starting with the lowest designated station number to the highest and from the lowest designated physical line number to the highest. All stations on a physical line are grouped together. The auxiliary traces are written ahead of the data traces for that line. Time breaks are recorded as a trace; see Figure 1-1.

Three Data Sub-Blocks

Each trace data block contains three sub-blocks of data. The sub-blocks are ungapped. Each trace data block is separated from the next by an IBG:

1. Trace identification header (240 bytes)
2. Seismic trace data block (omitted for dead and non-permitted stations if zero fill is not selected; see bytes 29-30 of Table 1-2)
3. Trace trailer data block (960 bytes).

Trace Identification Header

Each trace data block consists of a fixed 240-byte trace identification header. The trace header is written in binary code. Table 1-2 describes the trace identification header. Column 1 shows the starting byte number for each of the records. Column 2 gives the record name and Column 3 defines the type as:

S-32 = signed 32-bit integer
U-32 = unsigned 32-bit integer
S-16 = signed 16-bit integer
U-16 = unsigned 16-bit integer
Byte = 8-bit integer
ID = Packed Array (1..4) of upper alphanumeric character

Trace Trailer

The trace trailer is composed of 960 bytes of information. The first 2 bytes contain the CRC of the data block followed by 2 bytes of spare. The next 140 bytes consist of the RFIOC status block. Subsequently, 252 bytes consist of the status data for each remote seismic unit. The remainder of the bytes (564) pertain to the overall system operating status, a CRC for the trailer, and a CRC for the whole trace data block. Further details are provided in the trace trailer description section. A trace trailer is appended to each seismic data block.

TRACE DATA BLOCK
Trace Identification Header

Table 1-2
Trace Identification Header Description

BYTE NUMBER	VARIABLE NAME	VALUE
1	Trace sequence number within line	S-32
5	Trace sequence number within reel	S-32
9	File number	S-32
13	Recording number	S-32
17	Energy source point number	S-32
21	Shot point number (cdp ensemble number)	S-32
25	Trace number within cdp ensemble	S-32
29	Trace identification code 1 = seismic data 2 = dead trace 3 = dummy 4 = time break 5 = uphole 6 = master sweep 7 = timing 8 = water break 9 = non-permitted station NNN = 100-999 user defined AUX traces 1XXX = any error specified in decimal e.g. 1001 = seismic data trace errors	U-16
31	Number of vertically summed traces	U-16
33	Number of horizontally summed traces	U-16
35	Data use code 1 = production seismic data 2 = noise test 3 = similarity test 4 = levitate test 5 = levitate test analysis 6 = CRS stacked data 7 = spectral analysis data 8 = partial CDP stack results 9 = low velocity layer results 10 = single sweep 11 = RF test pattern 12 = partial stack 13 = single sweep 14 = snoopy monitor 15 = pseudo random data test 16 = direct-coupled signal test 17 = impulse test 18 = sine distortion test 19 = SAR data memory test 20 = synchronization test 21 = blaster test 22 = saw-tooth test	U-16

continued on next page

TRACE DATA BLOCK
Trace Identification Header, continued

Table 1-2
Trace Identification Header Description

BYTE NUMBER	VARIABLE NAME	VALUE
37	Distance from source point to receiver group[1]	S-32
41	Receiver group elevation[2]	S-32
45	Surface elevation at source	S-32
49	Source depth below surface	S-32
53	Data elevation at receiver	S-32
57	Datum elevation at source	S-32
61	Water depth at source	S-32
65	Water depth at group	S-32
69	Scalar applied to all elevations & depths	S-32
71	Scalar applied to coordinates (feet or meters)	S-32
73	Source x coordinate (feet or meters)	S-32
77	Source y coordinate (feet or meters)	S-32
81	Group x coordinate (feet or meters)	S-32
85	Group y coordinate (feet or meters)	S-32
89	Coordinate units (feet or meters)	U-16
91	Weathering velocity[3]	U-16
93	Sub-weathering velocity[3]	U-16

continued on next page

1 All distances (lengths) are in feet or meters depending on the distance measurement system specified in card image 7 and in bytes 255-256 of the reel identification binary header.

2 Elevation is represented by "+" above and "-" below mean sea level.

3 All velocities are in feet per second or meters per second depending on the distance measurement system specified in the reel identification binary header.

TRACE DATA BLOCK
Trace Identification Header, continued

Table 1-2
Trace Identification Header Description

BYTE NUMBER	VARIABLE NAME	VALUE
95	Uphole time at source	U-16
97	Source static correction	U-16
101	Group static correction	U-16
103	Total static applied	U-16
105	Lag time a	U-16
107	Time break difference	U-16
109	Delay recording time	U-16
111	Mute time - start	U-16
113	Mute time - end	U-16
115	Number samples in trace	U-16
117	Sample interval for this trace	U-16
119	Gain type for field instruments 1 = fixed point 2 = floating point	U-16
121	Instrument gain constant	U-16
123	Instrument early or initial gain (db)	U-16
125	Correlated data traces 1 = not correlated data (raw) 2 = correlated data	U-16
127	Sweep frequency (Hz) at start	U-16
129	Sweep frequency (Hz) at end	U-16
131	Sweep length (ms)	U-16

continued on next page

TRACE DATA BLOCK
Trace Identification Header, continued

Table 1-2
Trace Identification Header Description

BYTE NUMBER	VARIABLE NAME	VALUE
133	Sweep type code 1 = linear 2 = parabolic 3 = exponential 4 = other	U-16
135	Sweep trace taper length at start 1 = linear 2 = cosine 3 = other	U-16
137	Sweep trace length at end	U-16
139	Taper type	U-16
141	Alias filter	U-16
143	Alias filter slope 48 db[1]	U-16
145	Notch filter frequency (Hz)	U-16
147	Notch filter slope	U-16
149	Low cut frequency (Hz)	U-16
151	High cut frequency (Hz)	U-16
153	Low cut slope	U-16
155	High cut slope	U-16
157	Year data recorded	U-16
159	Day of year	U-16
161	Hour of day (24 hour clock)	U-16
163	Minute of hour	U-16
165	Second of minute	U-16

continued on next page

1 All frequency (Hz) slopes are in db/octave.

TRACE DATA BLOCK
Trace Identification Header, continued

Table 1-2
Trace Identification Header Description

BYTE NUMBER	VARIABLE NAME	VALUE
167	Time basis code 1 = local 2 = GMT	U-16
169	Trace weighting factor 1 = pass 2 = failed trace analysis 3 = not being done	U-16
171	unused	ID
177	Gap size (number of groups dropped)	U-16
179	Overtravel of taper	U-16
181	Station number of this trace	S-32
185	Station number of first trace of this file	S-32
189	Station number of last trace of this file	S-32
193	SAR number	U-16
195	Total traces in this line	U-16
197	Total traces in this file	U-16
199	Trace sequence number in line	U-16
201	SAR channel number	Byte
202	Trace analysis results	Byte
203	Stacking type 0 = none 1 = 4x4 stack performed 2 = vertical	Byte

continued on next page

TRACE DATA BLOCK
Trace Identification Header, continued

Table 1-2
Trace Identification Header Description

BYTE NUMBER	VARIABLE NAME	VALUE
204	Header status 0 = 0 fixed 1 = 0 fixed 2 = Blaster connected 3 = Inactive 4 = Batter Vdc low (out of range) 5 = 0 fixed 6 = 0 fixed 7 = SAR failure	Byte
205	Number of lines in file	Byte
206	Number of transmit requests to receive data	Byte
207	Excitation source 1 = dynamite 2 = impulse source 3 = vibrator source 4 = weight drop	Byte
208	Floating shooter flag 0 = not floating shooter 1 = floating shooter	Byte
209	Identifier of shot point line (3-D)	ID
213	Station number start of spread shot point line	U-32
217	Station number end of spread shot point line	U-32
221	Current line ID (3-D)	ID
225	Station number start of spread current line	U-32
229	Station number end of spread current line	U-32
233	Index of current line in plot parameters	U-16
235	Spare	U-32
239	Header CRC	U-16

TRACE DATA BLOCK

Trace Data Block Format

Tape Format

The seismic trace data block for the standard SEG-Y format is in a 32-bit floating point format (IBM-32 Excess 64 Standard) as defined below. It has a length of 4*N bytes; where N equals the number of samples (see Trace Identification Header bytes 115-116). The value of the data sample can be converted to volts by multiplying the trace value by the trace weighting factor (bytes 169-170 in the Identification Header) and dividing by 1,000,000.

Description

The 4 bytes form a 32-bit word consisting of the sign bit S, a 7-bit characteristic Qc and a 24-bit fraction Qf. S indicates signal polarity and is a "1" for a negative value. Qc signifies a power of 16 expressed in excess 64 binary notation allowing both negative and positive powers of 16 to be represented by a true number. Qf is a 6 hexadecimal digit number with a radix point to the left of the most significant digit.

MSB Bit	0	1	2	3	4	5	6	7
MSB byte 1	S	Qc	Qc	Qc	Qc	Qc	Qc	Qc
Byte 2	Qf	Qf	Qf	Qf	Qf	Qf	Qf	Qf
Byte 3	Qf	Qf	Qf	Qf	Qf	Qf	Qf	Qf
LSB byte 4	Qf	Qf	Qf	Qf	Qf	Qf	Qf	Qf

where: S = sign bit (one=negative number)
Qc = characteristic
Qf = fraction

Data Sample

The data value represented by a floating point number is S*16**(Qc-64)*Qf.

Input Signal = [S*16**(Qc-64)*Qf]*M/1,000,000 volts

where: M = binary value of the trace weighting factor for bytes 169-170 in the Identification Header.

TRACE DATA BLOCK
Trace Trailer

Description

The trace trailer is composed of 960 bytes and consists of the data fields outlined in Table 1-3 Trace Trailer Overview. The first field is a CRC of the data block (bytes 1-2). Other fields are grouped together in subblocks, such as the RFIOC transmit and receive status block (table 1-4), the seismic acquisition unit status block (table 1-5), miscellaneous blocks (table 1-6), and the recording plot parameters (table 1-7). The trace trailer is completed by a trailer block CRC (bytes 957-958), and end of trace CRC (bytes (959-960). A trace trailer data block is appended to each seismic data block.

The 140 bytes of RFIOC transmit and receive status block contain information from the RFIOC concerning status communication with the Seismic Acquisition Remote (SAR) unit. The 252 bytes of the seismic acquisition unit status block contains status data and CRC for each SAR communicated with during a shot. The recording plot parameters are those plot parameters used for this trace. Other blocks contain miscellaneous CRS information.

Data Interpretation

The trace trailer provides information on the status of each recording station and channel used for each trace. In addition it provides programming and deployment information. The SAR status block can be used as a quality check when interpreting the traces for each seismic data record. Also the trailer record can be used to pinpoint a SAR failure as indicated in the SAR status block Failure definition flag mask by bit 16 Fatal Error being set (see table 1-4, bytes 145-146).

Example

If bit 16 of the Failure definition flag mask is set, then the failure can be interpreted from the rest of the bits in this field.

Further analysis of the record in question can be made by reviewing other bytes of the RFIOC and SAR status blocks.

Table 1-3
Trace Trailer Overview

Field	Bytes	Description
1	1-2	CRC16 over sample data
2	3-4	unused, 32-bit alignment
3-40	5-144	RFIOC transmit and receive status block
41-130	145-396	Seismic acquisition unit status block
131-134	397-408	Auxiliary trace record information
	409-538	CRS option block
135-150	539-794	Input Output Controller (IOC) status blocks
151-170	795-956	Recording plot parameters
171	957-958	CRC16 over trailer block
172	959-960	Always 65535 ($FFFF) end of trace

TRACE DATA BLOCK
Trace Trailer, continued

Table 1-4
RFIOC Transmit and Receive Status Block

Field	Bytes	Description
3	5-6	Bad Block Tolerance
4	7	Total Number of tries to retrieve
5	8	Number of SAR channels to be retrieved
6	9-10	Channel 1 number of good blocks
7	11-12	Channel 1 number of bad CRC blocks
8	13-14	Channel 1 number of missed blocks
9	15-16	Channel 1 over all rtve status ($8000 = all ok)
10-13	17-24	Channel 2 status record same as channel 1
14-17	25-32	Channel 3
18-21	33-40	Channel 4
22-25	41-48	Channel 5
26-29	49-56	Channel 6
30	57-60	Trace Retrieve status bit mask

Bit Set	Descriptor	Bit Set	Descriptor
20	Unexpected no data	19	Memory CRC error
18	Signal interference	17	Signal weak
16	Receiver busy	15	Wrong SAR responded
14	Channel unexpected	13	End code error
12	Header block checksum	11	Block size error
10	Channel number error	9	Block number error
8	Bytesync between blocks	7	Time-out
6	Missing data blocks	5	Bad CRC on data
4	First block missing	3	Bad CRC on 1st block
2	No word sync	1	No preamble

31	61	Receiver Noise Level
32	62	Receiver Signal Strength
33	63-64	Transmit driver status
34	65	Transmit Receiver signal strength at start
35	66	Transmit Receiver signal strength at end
36	67-68	Expected SAR address
37	69-132	Transmit Command used to Retrieve
38	133	DRP wirelined to SEIU
	134-136	Reserved1
39	137-140	Reserved2
40	141-144	Reserved3

TRACE DATA BLOCK
Trace Trailer, continued

Table 1-5
Seismic Acquisition Unit Status Block

Field	Bytes	Description		
41	145-146	Failure Definition Flag mask		
Bit Set	Descriptor		Bit Set	Descriptor
16	Fatal Error		15	Battery Low
14	Continuity		13	Leakage
12	Communication		11	Memory
10	Analog Cal.		9	Regulated Volts
8	Wet		7	Reserved
6	Reserved		5	Reserved
4	Reserved		3	Active
2	Ready		1	Status Only
42	147	Blaster Definition Flag mask		
Bit Set	Descriptor		Bit Set	Descriptor
8	Blaster Data		7	Blaster Ready
6	Bad Cap		5	Bad Phone
4	Reserved		3	Reserved
2	Reserved		1	Reserved
43	148	Communication Format definition		
44	149-150	SAR identity address		
45	151-154	Lowest Recording Channel station Assignment		
46	155-158	Highest Recording Channel station Assignment		
47	159	Logical Line number Assignment		
48	160	Record Channel Mask		
Bit Set	Recording Channel		Bit Set	Recording Channel
8	reserved		7	reserved
6	6		5	5
4	4		3	3
2	2		1	1
49	161-162	Low continuity limit 1ohm / count		
50	163-164	High continuity limit 1ohm / count		
51	165-166	Low Leakage limit 1Kohm / count		
52	167-168	Low Battery Limit 0.00125 volts / count		
53	169-170	Holding Buffer Keep Flags lsb = oldest		
54	171	Logical Line Grouping assignment		
55	172	Reserved		
56	173-174	Reserved		
57	175-176	Logical shot collection number assignment		
58	177-180	Lowest Recording Station		
59	181-184	Highest Recording Station		

continued on next page

TRACE DATA BLOCK
Trace Trailer, continued

Table 1-5 continued
Seismic Acquisition Unit Status Block

Field	Bytes	Description
60	185	Logical Line Grouping
61	186	Number of times to stack in this collect seq.
62	187	Mode Flags
63	188	Data Edit Clip Level above RMS 2^N
64	189	Preamplifier gain selection 2^N
65	190	Recording seconds
66	191	Noise analysis time 0.1 sec / count
67	192	Sampling interval 0.00025 sec / count
68	193	Low cut frequency select 1Hz / count
69	194	Notch frequency select 1hz / count
70	195-196	Alias frequency select 1hz / count
71	197-200	Reserved
72	201-202	SAR Receiver signal strength
73	203-204	Measured Battery voltage 0.000125 v/count
74-81	205-220	Measured Continuity Values for max of 8 recording chan.
82-89	221-236	Measured Leakage Values for max of 8 recording chan.
90-97	237-252	Measured Noise Values for max of 8 recording chan.
98-113	253-284	Holding stack for data not retrieved.
114	285	Analog off to warm-up time 0.1 sec / count
115	286	Analog on re-zero time 0.1 sec / count
116	287	Processing time for Fire command 0.1 sec / count
117	288	Processing time after collection complete 0.1s/count
118	289	Processing time for stack on command option 0.1s/count
119	290	Processing time for ending stack 0.1s/count
120	291-294	Largest block of free memory
121	295-298	Number of bytes needed for shot buffer
122	299-302	Starting Memory Address holding this shot data
123	303-306	Ending Memory Address holding this shot data
124	307	Hardware Version number
125	308	Firmware Version number
126	309	Communication configuration
127	310-330	Reserved
128	331-394	Bad Command Received data
129	395-396	CRC16 over status block

TRACE DATA BLOCK
Trace Trailer, continued

Table 1-6
Miscellaneous Trace Trailer Information

Field	Bytes	Description
	397-408	**AUXILIARY TRACE RECORD INFORMATION**
131	397	Auxiliary channel flag
132	398	Correlation flag
133	399-400	Trace identification
134	401-408	Auxiliary trace ASCII descriptor
	409-538	**CRS OPTION BLOCK**
		Not used
	539-794	**INPUT OUTPUT CONTROLLER (IOC) STATUS BLOCKS**
135	539-554	RFIOC Status Block (0)
136	555-570	Spare (1)
137	571-586	MT1IOC Status Block (2)
	571-572	# CRC errors g.m. to RAM
	573-574	# CRC errors read after write
	575-576	# CRC errors from DRP
	577-578	# read errors other than CRC
	579-580	# read timeouts
	581-582	# write errors other than CRC
	583-584	# write timeouts
	585-586	# of tape commands this buffer
138	587-602	MT2IOC Status Block (3)
	587-588	# CRC errors g.m. to RAM
	589-590	# CRC errors read after write
	591-592	# CRC errors from DRP
	593-594	# read errors other than CRC
	595-596	# read timeouts
	597-598	# write errors other than CRC
	599-600	# write timeouts
	601-602	# of tape commands this buffer
139	603-618	Spare (4)
140	619-634	Spare (5)
141	635-650	DDIOC Status Block (6)
142	651-666	Spare (7)
143	667-682	Spare (8)
144	683-698	Spare (9)
145	699-714	Spare (10)
146	715-730	Spare (11)
147	731-746	Spare (12)
148	747-762	Spare (13)
149	763-778	ODSIOC Status Block (14)
150	779-794	Spare (15)

TRACE DATA BLOCK
Trace Trailer, continued

Table 1-7
Recording Plot Parameters

Field	Bytes	Description
151	795	Peak Fill 0-None 1-Negative 2-Positive
152	796	Sort Flag 0-No Sort 1-Odd Stations 2-Even Stations 3-Block Stations 4-None
153	797	Record Identification 0-Station Number 1-Trace in File 2-Trace in Line 3-SAR,Channel
154	798	Auto gain control 0-Auto 1-Manual 2-Fixed
155	799-800	Width of AGC window size (0.001 sec/count)
156	801-802	Offset time 0 of trace (0.001 sec/count)
157	803-804	Seconds of data for page (0.001 sec/count)
158	805-806	Gain for agc other than auto (1 db/count)
159	807-808	Number of traces per inch
160	809-810	Overlap traces (0.5/count)
161	811-812	Trip at source point (0.001 sec/count)
162	813-814	Trace to trace move out (0.001 sec/count)
163	815-816	Low cut filter frequency (0.01 Hz/count)
164	817-818	Roll off slope of low cut filter (1db/count)
165	819-820	High cut filter frequency (0.01 Hz/count)
166	821-822	Roll off slop of high cut filter (1db/count)
167	823-824	Trace number in line to start plotting (plot block option)
168	825-826	Ending trace number in line (plot block option)
169	827-956	Line index numbers for this plot table