FAIRFIELD INDUSTRIES

Receiver Gather File Format

Specifications

REVISION HISTORY

Rev	Date	Author	Description
1.0	27-Jan-06	JT, MEM, WG, SB	Initial.
1.1	6-Mar-06	JGT	Added epoch shot time in 2nd 32-byte shot block. Moved shot based data from miscellaneous block to new 2nd shot block.
1.2	30 Jun 06	JGT	Added "First break analysis" as a selection regarding the "source of final receiver information" (Trace header block #4). Modified "Shot status flag" (Trace header block #3) to include "Bad – Operator specified" and "Bad – Failed T0 QC test". Added a new Extended Header Block #3. Added a External Header Definition Block in the front of all external headers that define the data contained in the external headers.
1.3	19 Oct 06	JGT	Added Clock Drift entry to Extended header #2.
1.4	09 May 07	SKB	Added new Trace header extensions 7, 8 and 9 that define the instrument test configuration parameters.
1.5	30 May 2008	SKB, MEM	Increase size of all clock drift related fields to 64 bit. Add an option to collection type to signify guard banded collection Split extended trace header 3 into two separate trace header extensions, one with shot time and drift values, the other with guard band information and the remainder of what was previously in trace header extension 3. Added shot preplan and final information to the external header. Added definitions for the field variations when the data is time sliced.
1.5-1	24 Nov 2008	MEM	Document corrections and clarifications. Merged file system hierarchy and naming conventions to this document.
1.6	29 Nov 2011	SKB	Added fields for Trace Count Within File (TH#1, Bytes 22-25), External Shot ID (TH#4, Bytes 13-16). Orientation Matrix Version Number (TH#7, Bytes 25-28), and Gimbaling corrections applied flag (TH#7, Bytes 29).
1.6-1	21June2012	SKB	Document correction. RU Channel number in the channel set descriptor byte 31, Trace Edit code in Trace Header byte 12, and Sensor Type in Trace Header 1, byte 21, were not fully documented.

TABLE OF CONTENTS

1 PURPOSE

The purpose of this document is to describe a custom receiver gather file format for Fairfield.

Fairfield Industries retains the right to change this document at any time and does not guarantee it to be 100% accurate, however every effort will be made to insure that it is both accurate and complete.

2 GLOSSARY

List all terms and abbreviations.

SEG Society of Exploration Geophysicists

Epoch Refers to Unix Epoch Time in micro-seconds (i.e. 00:00:00.000000 UTC on 1 January 1970)

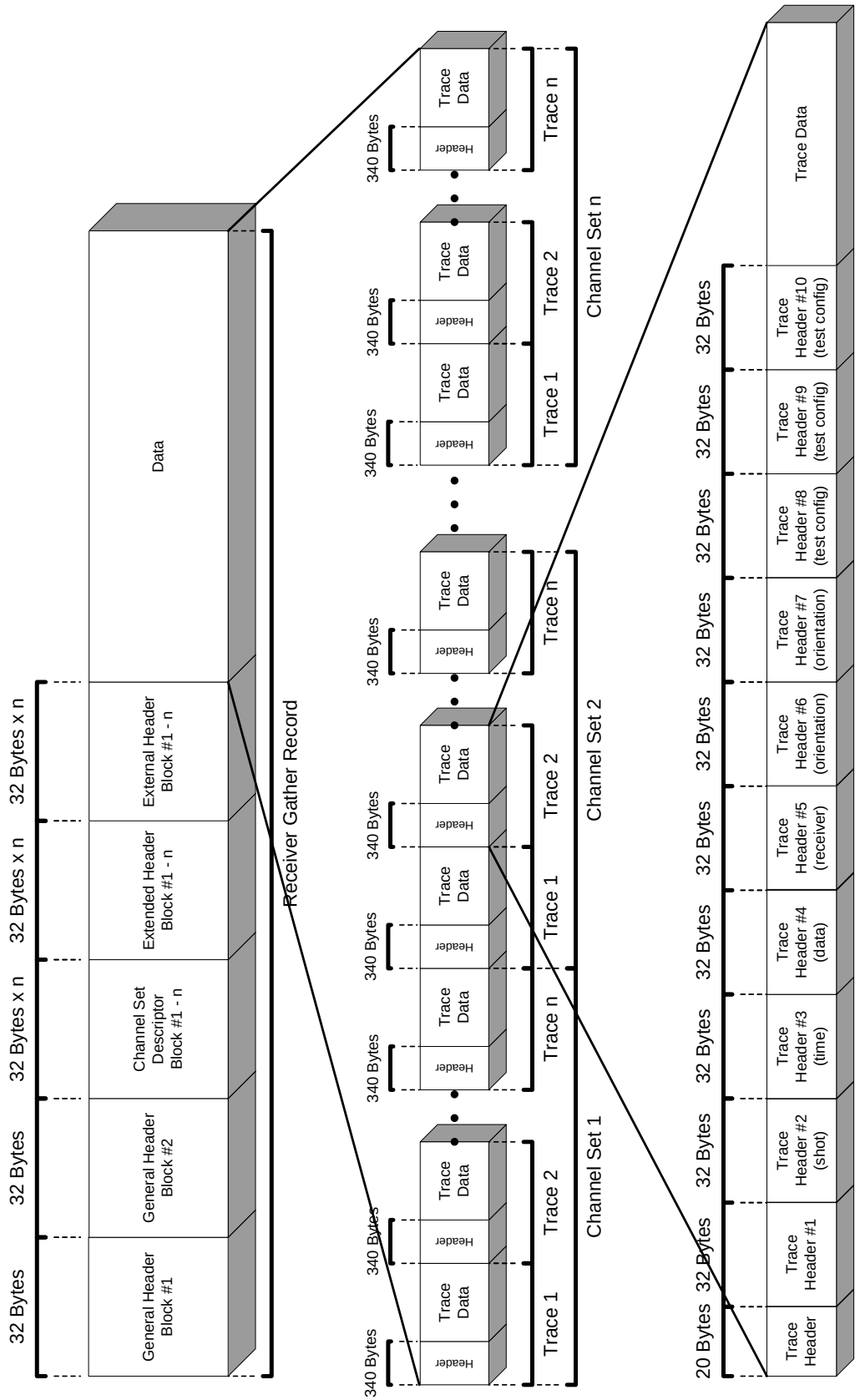
3 CONSTRAINTS

Below is a list of constraints when dealing with these files.

1. A remote unit's data set can be broken into multiple files only on shot line boundaries. This does not apply for continuous data mode.
2. A file will never span tapes.
3. A file may contain multiple shot lines.
4. The system will have the means to limit the size of a file written to tape. This will be a user configurable parameter.
5. The system will have the means to limit the size of a file written to a removable disk. This will be a user configurable parameter.
6. The system can be configured to make sure that all data for a single remote unit is contained within one tape cartridge assuming sufficient media density.
7. All shots or time slices within a file will have the same record length.

4 RECORD FORMAT

A receiver record header is written before each remote unit gather record and will consist of a number of General Header blocks, Channel Set Descriptor blocks, Extended Header blocks and External Header blocks. A receiver record will contain data associated with a single remote unit and all shots associated with a single shot line and may contain multiple shot lines. When the receiver data is written in continuous (fixed time sliced) form, some of the fields in the header blocks will vary or simply be zeroed. These differences will be noted. The following diagram depicts the structure of the Receiver Gather Record. It is intended to show the order of the headers and data fields within the record. The definitions of each field can be found in subsequent sections.


32 Bytes
32 Bytes
32 Bytes x n
32 Bytes x n
32 Bytes x n
General Header Block #1
General Header Block #2
Channel Set Descriptor Block #1 - n
Extended Header Block #1 - n
External Header Block #1 - n
Data
Receiver Gather Record
340 Bytes
Header
Trace Data
Trace 1
Trace 2
Trace n
Channel Set 1
Channel Set 2
Channel Set n
20 Bytes
32 Bytes
Trace Header
Trace Header #1
Trace Header #2 (shot)
Trace Header #3 (time)
Trace Header #4 (data)
Trace Header #5 (receiver)
Trace Header #6 (orientation)
Trace Header #7 (orientation)
Trace Header #8 (test config)
Trace Header #9 (test config)
Trace Header #10 (test config)
Trace Data

5 STORAGE UNIT LABEL

The first 128 bytes of data on a tape consists of ASCII characters and constitutes a storage unit label.

Byte Number	Number of Bytes	Data Type	Description
1-4	4	ASCII	Storage unit sequence number (“ xx”)
5-9	5	ASCII	Fairfield revision (“FF1.6”)
10-15	6	ASCII	Storage unit structure (“RECORD”)
16-19	4	ASCII	Binding edition (“B2 “)
20-29	10	ASCII	Maximum block size (“ 0”)
30-39	10	ASCII	API producer code (set to blanks)
40-50	11	ASCII	Creation date (dd-MMM-yyyy)
51-62	12	ASCII	Serial number (“ xxx”)
63-68	6	ASCII	Reserved (set to blanks)
69-80	12	ASCII	External label name (“ xxx”)
81-104	24	ASCII	Recording entity name (<crew#>,<recID>,<job>)
105-118	14	ASCII	User defined (“Fairfield Z “)
119-128	10	ASCII	Max file size in MBytes (“ xxxx”)

The following notes are included to clarify the use of some of the above fields.

- The Storage unit sequence number (bytes 1-4) is a unique integer that indicated the order in which the current storage unit was written from the source data set.
- The Serial number field (bytes 51-62) contains what is commonly referred to as the reel number.
- Bytes 69-128 collectively make up the Storage set identifier.
- The External label name (bytes 69-80) contains the user specified area string.
- The Recording entity name (bytes 81-104) is made up of three fields; crew number, recording system ID, and job name (i.e. “108,0,DeepWaterJob”).

6 RECEIVER RECORD HEADER DEFINITIONS

Modifications from the standard Fairfield SEG-D Rev. 2 format are depicted in red.

The latest changes to this document are depicted in blue.

6.1 General Header

There are two general header blocks that describe the data that is contained in each receiver record file.

6.1.1 General Header Block #1

Byte Number	Number of Bytes	Data Type	Description
1-2	2	BCD	File number (0-9999). Set to FFFF when the file number is greater than 9999. The expanded file number is contained in bytes 1-3 of General Header Block #2.
3-4	2	BCD	Data sample format code (8058)
5-10	6	BCD	General constants
11	1	BCD	1st shot point or time slice last two digits of year
12	½	Binary	Number of additional General Header blocks (1)
12-13	1-1/2	BCD	1st shot point or time slice Julian day in year
14-16	3	BCD	1st shot point or time slice UTC time (HHMMSS)
17	1	BCD	Manufacturer's code (20)
18-19	2	BCD	Manufacturer's serial number
20-22	3	BCD	No used (0)
23	1	Binary	Base scan interval
24	½	Binary	Polarity code (0)
24-25	1-1/2	Binary	Not used (0)
26	½	Binary	Record type. Moved to trace header (set to 0)
26-27	1-1/2	BCD	Record length in increments of 0.512 seconds (always set to FFF). Use value stored in General Header Block #2 – bytes 15-17.
28	1	BCD	Scan types per record (01)
29	1	BCD	Channel sets per scan type

Byte Number	Number of Bytes	Data Type	Description
30	1	BCD	Number of 32-byte skew blocks (0)
31	1	BCD	Number of 32-byte Extended Header Blocks (00-99 or FF…use value in General Header Block #2)
32	1	BCD	Number of 32-byte External Header Blocks (00-99 or FF…use value in General Header Block #2)

6.1.2 General Header – Block #2

Byte Number	Number of Bytes	Data Type	Description
1-3	3	Binary	Extended file number
4-5	2	Binary	Extended channel sets per scan type
6-7	2	Binary	Extended header blocks
8-10	3	Binary	External header blocks (now 3 bytes instead of 2)
11-12	2	Binary	Fairfield file version number (One byte unsigned binary and one byte binary fraction. This version: 0x0106)
13-14	2	Binary	Number of 32-byte general trailer blocks (0)
15-17	3	Binary	Extended record length in milliseconds
18	1	-	Undefined (0)
19	1	Binary	General header block number (2)
20-32	13	-	Undefined (0)

6.2 Channel Set Descriptor

The channel set descriptor block follows the SEG-D Rev 2 convention. There may be multiple channel set descriptor blocks if auxiliary data is recorded within the same file.

Byte Number	Number of Bytes	Data Type	Description
1	1	BCD	Scan type number (1)
2	1	BCD	Channel set number
3-4	2	Binary	Channel set start time in milliseconds / 2

Byte Number	Number of Bytes	Data Type	Description
5-6	2	Binary	Channel set end time in milliseconds / 2
7	1	Binary	Optional MP factor extension byte (0)
8	1	Binary	MP factor descaler multiplier (0…Fairfield data is already descaled to millivolts)
9-10	2	BCD	Number of channels in channel set
11	½	Binary	Channel type code (1…seismic) (high order 4-bits)
11	½	Binary	Unused
12	½	BCD	Number of sub-scans (high order 4-bits)
12	½	Binary	Gain control type (3…low order 4-bits)
13-14	2	BCD	Alias filter frequency in Hertz
15-16	2	BCD	Alias filter slope in dB per octave
17-18	2	BCD	Low cut filter frequency in Hertz
19-20	2	BCD	Low cut filter slope in dB per octave
21-22	2	BCD	Notch filter frequency in Hertz x 10
23-24	2	BCD	2nd notch filter frequency in Hertz x 10
25-26	2	BCD	3rd notch filter frequency in Hertz x 10
27-28	2	Binary	Extended channel set number
29	½	Binary	Extended header flag
29	½	Binary	Number of 32-byte trace header extensions
30	1	Binary	Vertical stack size (1)
31	1	Binary	RU Channel Number
32	1	Binary	Array forming (0)

6.3 Extended Header

The extended header blocks will provide general information.

6.3.1 32-byte Extended Header #1

This block contains information relative to all of the data contained in this file.

Byte Number	Number of Bytes	Data Type	Description
1-8	8	Binary	ID number of remote unit
9-16	8	Binary	Epoch deployment time
17-24	8	Binary	Epoch pickup time
25-32	8	Binary	Remote unit Epoch start time

6.3.2 32-byte Extended Header #2

This block contains information relative to all of the data contained in this file.

Byte Number	Number of Bytes	Data Type	Description
1-4	4	IEEE	Acquisition drift window (us) (only valid if clock stopped normally. Set to 0.0 if it died on its own accord)
5-12	8	Binary	Clock drift (ns) for this acquisition.
13	1	Binary	Clock stop method 0 – normal 1 – storage full (ran out of memory) 2 –power loss (ran out of battery life) 3 – reboot (by command)
14	1	Binary	Frequency drift within specification flag 0 – not within specification 1 – within specification
15	1	Binary	Oscillator type 0 – control board 1 – atomic 2 – ovenized 3 – double ovenized 4 – disciplined
16	1	Binary	Data collection method 0 – normal (as driven by real shots)

Byte Number	Number of Bytes	Data Type	Description
			1 – continuous (fixed time slice of all data contained in remote unit) 2 – Shot sliced with guard band.
17-20	4	Binary	Number of records (shots or time slices) in this file
21-24	4	Binary	Total number of files to be acquired for this remote unit
25-28	4	Binary	File number x (out of total number above)
29	1	Binary	Data decimation flag 0 – not decimated 1 – decimated data
30	1	Binary	Original base scan interval (set to 0 if not decimated)
31-32	2	Binary	Number of decimation filter coefficients (set to 0 if not decimated)

6.3.3 32-byte Extended Header #3

This block contains miscellaneous data related to this file. All binary data contained in this block is unsigned.

Byte Number	Number of Bytes	Data Type	Description
1-4	4	Binary	Receiver line number (this is replicated here to facilitate file naming conventions when making media copies to block devices)
5-8	4	Binary	Receiver point (this is replicated here to facilitate file naming conventions when making media copies to block devices)
9	1	Binary	Receiver point index (this is replicated here to facilitate file naming conventions when making media copies to block devices)
10-13	4	Binary	First shot line written to this file (set to 0 for continuous)
14-17	4	Binary	First shot point written to this file (set to 0 for continuous)
18	1	Binary	First shot point index written to this file (set to 0 for continuous)

Byte Number	Number of Bytes	Data Type	Description
19-22	4	Binary	Last shot line written to this file (set to 0 for continuous)
23-26	4	Binary	Last shot point written to this file (set to 0 for continuous)
27	1	Binary	Last shot point index written to this file (set to 0 for continuous)
28-32	5	-	Reserved (set to 0)

6.3.4 32-byte Extended Header #4 through n (as required)

This block contains decimation filter coefficients. The number of these blocks depends on the total number of filter coefficients required as stated in the Extended Header Block #2 (bytes 23-26) above.

Byte Number	Number of Bytes	Data Type	Description
1-4	4	IEEE	Data decimation filter coefficient
5-8	4	IEEE	Data decimation filter coefficient
9-12	4	IEEE	Data decimation filter coefficient
13-16	4	IEEE	Data decimation filter coefficient
17-20	4	IEEE	Data decimation filter coefficient
21-24	4	IEEE	Data decimation filter coefficient
25-28	4	IEEE	Data decimation filter coefficient
29-32	4	IEEE	Data decimation filter coefficient

6.4 External Header

The first external header 32-byte block will contain information that describes the contents of the remaining external header blocks. Below is a description of that block. All binary data contained in this block is 32-bit unsigned.

Byte Number	Number of Bytes	Data Type	Description
1-4	4	Binary	Size (number of 32-byte external header blocks that contain information associated with a single shot. The size of each shot will be set to the maximum size of any shot in this record. This implies a fixed blocking to provide a means to

Byte Number	Number of Bytes	Data Type	Description
			index quickly into a desired area.)
5-8	4	Binary	Receiver line number (this is replicated here to facilitate file naming conventions when making media copies to block devices)
9-12	4	Binary	Receiver point (this is replicated here to facilitate file naming conventions when making media copies to block devices)
13	1	Binary	Receiver point index (this is replicated here to facilitate file naming conventions when making media copies to block devices)
14-32	19	-	Reserved (set to 0)

The remaining external header blocks contain preplan location, final location, navigation, and energy source information relative to each shot point.

The first block for each shot will be as follows:

Byte Number	Number of Bytes	Data Type	Description
1-8	8	Binary	Shot epoch time
9-12	4	Binary	Shot line number
13-16	4	Binary	Shot point
17	1	Binary	Shot point index
18-21	4	Binary	Shot point final X coordinate x 10
22-25	4	Binary	Shot point final Y coordinate x 10
26-29	4	Binary	Shot point final depth in meters x 10
30	1	Binary	Source of final shot information 0 – Undefined 1 – preplan 2 – as shot 3 – post processed
31	1	Binary	Shot status flag 0 – normal 1 – Bad – Operator specified

Byte Number	Number of Bytes	Data Type	Description
			2 – Bad – Failed T0 QC test
32	1	-	Reserved (set to 0)

The remaining blocks for each shot will contain the external header data written in a raw manner as it was received by the recording system. The following example depicts a typical Concept Systems navigation and Syntron GCS90 energy source setup.

The Concept User Header 7 header description consumes the first 16 bytes, the Concept User Header 7 Hydronav data tag consumes next 176 bytes and the Concept User Header 7 GCS90 data tag consumes next 832 bytes or more depending on how many guns are used. A typical header is 2416 bytes which rounds up to 76 32-byte headers (2432 bytes) needed to store the raw navigation headers for each shot. Please refer to the Concept System's User Header 7 document, which describes the format of this data.

Thus for the example headers described above, the total size of the external header data that will be required to store all of the data associated with the shots contained in this receiver oriented file can be calculated as follows:

Assume that we have 400 shots per line and 10 shot lines.

400 shots per line x 77 32-byte blocks per shot = 30,800 blocks per line x 10 lines = 308,000 blocks

Plus one block for the external header block descriptor = 308,001 blocks x 32 bytes = 9,856,032 bytes

6.5 Trace Header

A 20-byte trace header and a number of 32-byte trace header extension blocks are attached to the beginning of each trace record.

6.5.1 20-byte Trace Header

This block adheres to the SEG-D rev 2 standard.

Byte Number	Number of Bytes	Data Type	Description
1-2	2	BCD	Tape file number (two byte, four digit, BCD). These bytes must be set to FFFF when the Extended File Number (bytes 18, 19 and 20) is used.
3-4	2	BCD	Scan type and channel set number
5-6	2	BCD	Trace number (1 – 9999)
7-9	3	BCD	First timing word
10	1	Binary	Number of 32-byte trace extension blocks
11	1	Binary	SEG-D sample skew value (0)

Byte Number	Number of Bytes	Data Type	Description
12	1	Binary	Trace edit code 00 – No edit 01 – Not Used 02 – Trace zeroed intentionally. 03 – Trace has been edited. Acquisition system has modified one or more of the samples on this trace . 04 – 06 – Not used in this format. Reserved for SEG-D 2.1 output format
13-15	3	Binary	Time break window (0)
16-17	2	Binary	Extended channel set number (0)
18-20	3	Binary	Extended file number

6.5.2 32-byte Trace Header #1

This block adheres to the SEG-D rev 2 standard.

Byte Number	Number of Bytes	Data Type	Description
1-3	3	Binary	Receiver line number – two's complement, signed
4-6	3	Binary	Receiver point – two's complement, signed
7	1	Binary	Receiver point index – two's complement, unsigned
8-10	3	Binary	Number of samples per trace
11-15	5	Binary	Extended receiver line number
16-20	5	Binary	Extended receiver point number
21	1	Binary	Sensor type on this trace 00 – Not defined 01 – Hydrophone 02 – Vertical geophone 03 – Inline geophone 04 – Cross-line geophone 05 – Other horizontal geophone 06 – Vertical accelerometer 07 – Inline accelerometer 08 – Cross-line accelerometer 09 – Other horizontal accelerometer

Byte Number	Number of Bytes	Data Type	Description
			10 - Geophone, X 11 - Geophone, Y 12 - Geophone, Z 13 - Geophone, Horizontal, North 14 - Geophone, Horizontal, East 21 - AUX, Ground Force 22 - AUX, True Reference 23 - AUX, Mass Accelerometer 24 - AUX, Baseplate Accelerometer
22-25	4	Binary	Trace count within file
26-32	7	-	Reserved (set to 0)

6.5.3 32-byte Trace Header #2 (shot block)

This block defines shot location parameters. All binary data contained in this block is unsigned.

Byte Number	Number of Bytes	Data Type	Description	
			Shot Mode	Continuous Mode
1-4	4	Binary	Shot line number	Remote Unit Serial Number
5-8	4	Binary	Shot point	Time slice index for this Remote Unit
9	1	Binary	Shot point index	Set to 0
10-13	4	Binary	Shot point pre-plan X coordinate x 10	Set to 0
14-17	4	Binary	Shot point pre-plan Y coordinate x 10	Set to 0
18-21	4	Binary	Shot point final X coordinate x 10	Set to 0
22-25	4	Binary	Shot point final Y coordinate x 10	Set to 0
26-29	4	Binary	Shot point final depth x 10	Set to 0

Byte Number	Number of Bytes	Data Type	Description	
			Shot Mode	Continuous Mode
30	1	Binary	Source of final shot information 0 – Undefined 1 – preplan 2 – as shot 3 – post processed	Set to 0
31	1	Binary	Energy source type 0 – Undefined 1 – Vibroseis 2 – Dynamite 3- Air gun	Set to 0
32	1	-	Reserved (set to 0)	

6.5.4 32-byte Trace Header #3 (time block)

This block defines timing information associated with this shot/time slice. All binary data contained in this block is 32-bit unsigned.

Byte Number	Number of Bytes	Data Type	Description
1-8	8	Binary	Shot or time slice epoch time
9-16	8	Binary	Shot skew time from sample boundary (us)
17-24	8	Binary	+/- Applied clock correction time shift (ns)
25-32	8	Binary	+/- Remaining (not applied) clock correction time shift (ns)

6.5.5 32-byte Trace Header #4 (data block)

This block defines additional information associated with the data contained in this trace. All binary data contained in this block is 32-bit unsigned.

Byte Number	Number of Bytes	Data Type	Description
1-4	4	Binary	Pre Shot Guard Band (ms) (set to 0 for continuous)
5-8	4	Binary	Post Shot Guard Band (ms) (set to 0 for

Byte Number	Number of Bytes	Data Type	Description
			continuous)
9	1	Binary	Preamp gain in dB
10	1	Binary	Trace clipped flag 0 – not clipped 1 – digital clip detected 2 – analog clip detected
11	1	Binary	Record type code 0x8 = normal seismic data record 0x2 = test data record
12	1	Binary	Shot status flag (set to 0 for continuous) 0 – normal 1 – Bad – Operator specified 2 – Bad – Failed T0 QC test
13-16	4	Binary	External Shot ID
17-24	8	-	Reserved (set to 0)
25-28	4	IEEE	Post Processed First Break Pick Time
29-32	4	IEEE	Post Processed RMS Noise

6.5.6 32-byte Trace Header #5 (receiver block)

This block defines receiver location parameters. All binary data contained in this block is 32-bit unsigned.

Byte Number	Number of Bytes	Data Type	Description
1-4	4	Binary	Receiver line number
5-8	4	Binary	Receiver point
9	1	Binary	Receiver point index
10-13	4	Binary	Receiver point pre-plan X coordinate x 10
14-17	4	Binary	Receiver point pre-plan Y coordinate x 10
18-21	4	Binary	Receiver point final X coordinate x 10
22-25	4	Binary	Receiver point final Y coordinate x 10

Byte Number	Number of Bytes	Data Type	Description
26-29	4	Binary	Receiver point final depth x 10
30	1	Binary	Source of final receiver information 1 – preplan 2 – as laid (no navigation sensor) 3 – as laid (HiPAP only) 4 – as laid (HiPAP and INS) 5 – as laid (HiPAP and DVL) 6 – as laid (HiPAP, DVL and INS) 7 – post processed (HiPAP only) 8 – post processed (HiPAP and INS) 9 – post processed (HiPAP and DVL) 10 – post processed (HiPAP, DVL and INS) 11 – first break analysis
31-32	2	-	Reserved (set to 0)

6.5.7 32-byte Trace Header #6 (orientation block)

This block defines remote unit orientation parameters.

Byte Number	Number of Bytes	Data Type	Description
1-4	4	IEEE Float	Tilt matrix element 0 (H1X)
5-8	4	IEEE Float	Tilt matrix element 1 (H2X)
9-12	4	IEEE Float	Tilt matrix element 2 (VX)
13-16	4	IEEE Float	Tilt matrix element 3 (H1Y)
17-20	4	IEEE Float	Tilt matrix element 4 (H2Y)
21-24	4	IEEE Float	Tilt matrix element 5 (VY)
25-28	4	IEEE Float	Tilt matrix element 6 (H1Z)
29-32	4	IEEE Float	Tilt matrix element 7 (H2Z)

6.5.8 32-byte Trace Header #7 (orientation block)

This block continues to define remote unit orientation parameters.

Byte Number	Number of Bytes	Data Type	Description
1-4	4	IEEE Float	Tilt matrix element 8 (VZ)
5-8	4	IEEE Float	Azimuth in degrees
9-12	4	IEEE Float	Pitch in degrees
13-16	4	IEEE Float	Roll in degrees
17-20	4	IEEE Float	Remote Unit Temperature
21-24	4	IEEE Float	Remote Unit Humidity
25-28	4	Binary	Orientation Matrix Version Number
29	1	Binary	Gimbal Corrections applied using above orientation matrix.
30-32	3	-	Reserved (set to 0)

6.5.9 32-byte Trace Header #8 (Instrument Test Configuration)

This block begins the remote unit instrument test configuration parameters

Byte Number	Number of Bytes	Data Type	Description
1-4	4	Binary	Fairfield Test Analysis code.
5-8	4	Binary	First Test Oscillator Attenuation
9-12	4	Binary	Second Test Oscillator Attenuation
13-16	4	Binary	Start Delay (in uSec)
17-20	4	Binary	DC Filter Flag 0 = No Filter 1 = Apply Filter
21-24	4	Float	DC Filter frequency
25-28	4	Binary	Preamp Path 0 = external input selected (default) 1 = simulated data selected 2 = pre-amp input shorted to ground 3 = test oscillator with sensors

Byte Number	Number of Bytes	Data Type	Description
			4 = test oscillator without sensors 5 = common mode test oscillator with sensors 6 = common mode test oscillator without sensors 7 = test oscillator on positive sensors with neg sensor grounded 8 = test oscillator on negative sensors with pos sensor grounded 9 = test oscillator on positive PA input, with neg PA input ground 10 = test oscillator on negative PA input, with pos PA input ground 11 = test oscillator on positive PA input, with neg PA input ground, no sensors 12 = test oscillator on negative PA input, with pos PA input ground, no sensors
29-32	4	Binary	Test Oscillator Signal Type 0 = test oscillator path open 1 = test signal selected 2 = DC reference selected 3 = test oscillator path grounded 4 = DC reference toggle selected

6.5.10 32-byte Trace Header #9 (Instrument Test Configuration)

This block continues to define remote unit instrument test configuration parameters

Byte Number	Number of Bytes	Data Type	Description
1-4	4	Binary	Test Signal Generator Signal Type 0 = pattern is address ramp 1 = pattern is RU address ramp 2 = pattern is built from provided values 3 = pattern is random numbers 4 = pattern is a walking 1s 5 = pattern is a walking 0s 6 = test signal is a specified DC value 7 = test signal is a pulse train with specified duty cycle

Byte Number	Number of Bytes	Data Type	Description
			8 = test signal is a sine wave 9 = test signal is a dual tone sine 10 = test signal is an impulse 11 = test signal is a step function
5-8	4	Binary	Test Signal Generator Frequency 1 (in mili-hertz)
9-12	4	Binary	Test Signal Generator Frequency 2 (in mili-hertz)
13-16	4	Binary	Test Signal Generator Amplitude 1 (in dB down from full scale, -120 to +120, where the sign is used to indicate the polarity)
17-20	4	Binary	Test Signal Generator Amplitude 2 (in dB down from full scale, -120 to +120, where the sign is used to indicate the polarity)
21-24	4	Float	Test Signal Generator Duty Cycle in %
25-28	4	Binary	Test Signal Generator Active Duration (in uSec)
29-32	4	Binary	Test Signal Generator Activation Time (in uSec)

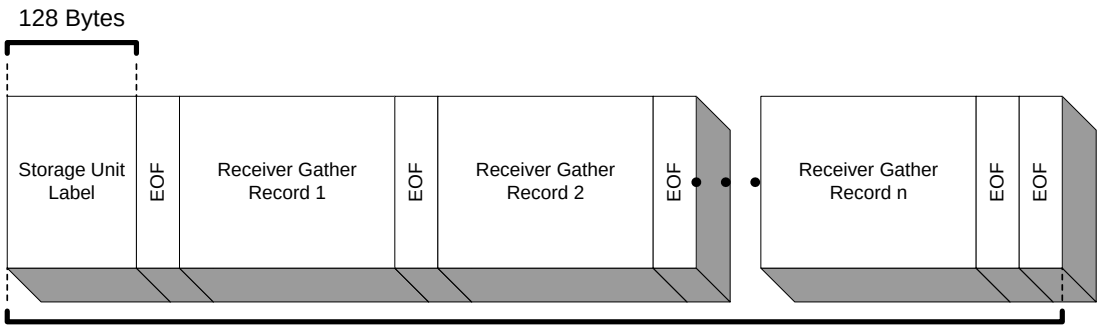
6.5.11 32-byte Trace Header #10 (Instrument Test Configuration)

This block continues to define remote unit instrument test configuration parameters

Byte Number	Number of Bytes	Data Type	Description
1-4	4	Binary	Test Signal Generator Idle Level (% full scale)
5-8	4	Binary	Test Signal Generator Active Level (%full scale)
9-12	4	Binary	Test Signal Generator Pattern 1 (lower level 24 bits_
13-16	4	Binary	Test Signal Generator Pattern 2 (lower level 24 bits)
17-32	4	Binary	Reserved (set to 0)

7 RECORD ORGANIZATION FOR TAPE MEDIA

The following diagram depicts the organization of the Storage Unit Label and Receiver Gather Records on Tape media.



Tape Organization

8 FILE SYSTEM FORMAT CONVENTIONS

This section defines the directory structures and file naming conventions used when the destination media contains a file system.

8.1 Directory and File Organization

The following depicts what is written to the destination file system.

File System Root

|- StorageLabel_xxx.0 aux file

|- ReceiverLineName directory

|- ReceiverPoint data file

Each receiver line name will be a directory on the file system (i.e. 1080, 1240, etc.). Each receiver point will be from 1 to N files written under its respective receiver line name directory.

8.1.1 Receiver Point File Naming

Data acquired from a single receiver point can become quite large. The data output generation supports writing the data to multiple files where each file will contain a portion of the acquired data. Entries are made in the headers (see 32-byte Extended Header #2) that depict this (i.e. file 1 out of 2). This concept is carried further when a file system is involved. For example, the data for receiver point 5056.0 was split into N portions due to the total size of the data set. The file names used on the file system would be 5056.0.0 for the first portion of the data, 5056.0.1 for the second, 5056.0.2 for the third, and so on until 5056.0.N is reached.

8.1.2 Receiver Point File Format

Each receiver point file will be organized as a Fairfield Receiver Gather file format as defined in the FORMAT DEFINITION section of this document.

8.2 Auxiliary Files

8.2.1 Storage Label File Naming

A storage label file will be created for each tape that is written to the file system. The name of these files will be “StorageLabel_<serial#>.<index>” where the <serial#> is the Serial number field as defined in the Storage Unit Label section and <index> is an incrementing number starting at 0 that increments for each repeated instance of the same file name should one occur.

For example, if the Serial Number field of the Storage Label is 163, the first file for this serial number would be “StorageUnit_163.0”, the second would be “StorageUnit_163.1”, and so on.

8.2.2 Storage Label File Format

The data in this file will be formatted as described in the Storage Unit Label section of this document.