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Digital Side Scan
GCF File Format
DSS-6405/B

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-	-	New document based on 0296-6320/B.

Scope

This document describes the file format used with GeoAcoustics Digital Side Scan: the GeoAcoustics Condensed Format (GCF).

Introduction

GCF is used to transfer data from the Tow Fish to the Deck Unit, from the Deck Unit to the Acquisition System, and for raw storage on the Deck Unit or Acquisition System. It contains only data relevant to the equipment creating it, and is thus said to be *condensed*.

It is intended that files containing raw GCF information can be played back successfully without any external knowledge of the system setup.

Endian

The term endian refers to the order of bytes within multi-byte words (eg 16bit and 32 bit numbers) when the words are **accessed as bytes**. This could be when the bytes in a word are accessed in memory, or when they are transferred serially, one byte at a time.

Different hardware platforms may be either little endian or big endian:

- little endian is when the lowest byte of a multi-byte word is accessed first.
- big endian is when the highest byte of a multi-byte word is accessed first.

GCF uses the **little endian** form. This means that all header and data values are transferred and stored **least significant byte first**. Ie

For an 8bit field, the endian mode doesn't make any difference.

For a 16bit field, the bytes are transferred in the order: byte0, byte1.

For a 32bit field, the bytes are transferred in the order: byte0, byte1, byte2, byte3.

Information Sequence

Information is presented in a sequence of headers and data sections as follows:

header	data	header	data	header	data	header	data	...
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The size of each header and data section is always a multiple of 128 bytes, padding with zeros if necessary. The data section may be absent if it is not needed.

Header Details

Each header consists of 2 parts - common and data-specific:

common	data-specific
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The common part contains general information.

The contents of the data-specific part are determined by the DataType field.

In the following details, *Offset* is the byte count from the start of the header to the field.

Size is the size of the field, in bytes.

Name is how the field is referred to.

Description is what the field does.

Type refers to a standard data type:

Type	Description
intu8	unsigned 8 bit integer
intu16	unsigned 16 bit integer
intu32	unsigned 32 bit integer
ieee32	32 bit IEEE floating point

Numeric values with 0x prefix are in **hexadecimal**, all others are in **decimal**.

Common part of Header

Offset	Size	Type	Name	Description
0x00	4	intu16	HeaderSync[2]	Two synchronisation words, each set to 0x5A5A ('ZZ').
0x04	2	intu16	HeaderMagic	Identification word, set to 0xBABE. Can use this to check for endian 'ness.
0x06	2	intu16	HeaderSize	The size of this header, in 8bit bytes.
0x08	2	intu16	HeaderCheckzero	This makes the sum of the header equal to 0. Summing should be done in units of intu8.
0x0A	2	intu16	SystemType	The type of system sending the data: 100 GeoAcoustics Digital Side Scan. 101 GeoAcoustics Digital Chirp. 200 Attitude: TCM2 Module. 300 Navigation: NMEA/GPS std. 400 Magnetometer: SeaSpy & Explorer. 401 Magnetometer: Geometrics. 500 Event
0x0C	2	intu16	DataType	The type of data: 1 String. 2 Side Scan Sonar. This determines which data-specific part of the header to use.
0x0E	2	intu16	SystemSource	Identifies where the data comes from: 0 Not specified. 1 ADSL Port1. 8 ADSL Port8. 11 Deck Unit Port1. 18 Deck Unit Port8.
0x10	4	intu32	TimestampSeconds	The timestamp, recorded as the number of seconds since 1970-01-01 00:00:00, and ...
0x14	4	intu32	TimestampMicroseconds	... the number of microseconds within that second.
0x18	4	intu32	DataSize	The size of the data section, in units of intu8. This must be a multiple of 128.
0x1C	4	intu32	DataChecksum	The sum of all DataSize items in the data section, with each item regarded as an intu8.

Data Specific part of Header for Strings

This section applies when DataType refers to *String*.

Offset	Size	Type	Name	Description
0x20	2	intu16	StringLength	The length of the string, in units of intu8.
0x22	94	intu8	StringShort[94]	Array containing the string if StringLength is ≤ 94 . Not used if StringLength is > 94 .

If StringLength is ≤ 94 , the entire string is contained within StringShort in the header and there will not be a following data section.

If StringLength > 94 , StringShort is filled with zeros and the string will be at the beginning of the following data section. Zeros may be appended after the string to pad the size to DataSize.

The string may contain non-printable characters, so provision for handling these must be made if they are to be displayed. For example, the <Carriage Return> and <Line Feed> characters will be included if they are used as line terminators.

Data Specific part of Header for Side Scan Sonar

This section applies when DataType refers to *Side Scan Sonar*.

Offset	Size	Type	Name	Description
0x20	4	intu32	TriggerNumber	The transmit sequence number for the ping.
0x24	4	intu32	TxFrequency_Hz	The sonar transmit frequency, in Hz.
0x28	2	intu16	NumberOfSamples	The number of samples in the data section.
0x2A	2	intu16	SampleFormat	The format for the value(s) of each sample: 0x0011 8bit signed integer 0x0021 8bit unsigned integer 0x0012 16 bit signed integer 0x0022 16bit unsigned integer 0x0014 32bit signed integer 0x0024 32bit unsigned integer 0x0044 32bit IEEE floating point Note: the lowest 4 bits give the format size.
0x2C	2	intu16	Channel	The data channel number: 0 Port 1 Starboard.
0x2E	2	intu16	SamplePeriod_us	The time between successive data samples, in microseconds.
0x30	2	intu16	DelayPeriod_ms	The time between the trigger and the first data sample, in milliseconds.
0x32	2	intu16	TxWidth_us	The transmit pulse width, in microseconds.
0x34	16	ieee32	TVGParameters[4]	Parameters defining the digital TVG curve: $Gain_{dB} = 10 * P0 * LOG_{10}(Range_m) + P1 * Range_m + P2$
0x44	4	ieee32	BaseGain	Digital gain applied, in dB.
0x48	2	intu16	SampleType	The mathematical type of each sample: 0x0011 Magnitude: 1 unipolar value per sample 0x0042 Complex: 1 bipolar real value and 1 bipolar imaginary value per sample. Note: the lowest 4 bits give the value count.

The header is followed by a data section containing a single channel of data, ie either Port or Starboard. Zeros may be appended after the data to pad the size to DataSize.