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GeoSwath Plus

Broadcast Raw Data File Format
9-GS+-6063/B

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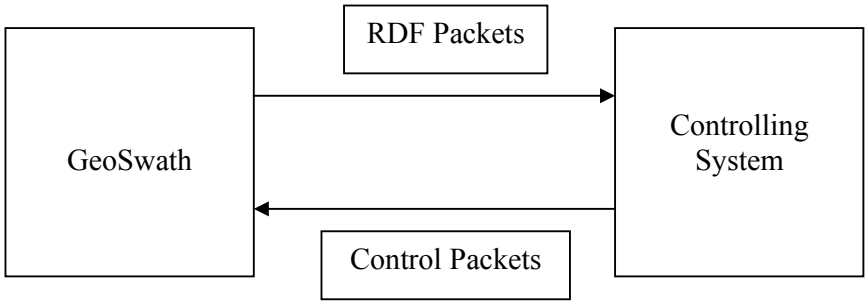
GeoAcoustics GeoSwath TCP/UDP Broadcast Data and Remote Control

Introduction

This document describes the format and protocol for broadcast Raw Data Format (RDF) and remote control of the GeoAcoustics GeoSwath Plus wide swath bathymetry system.

All sample source code files are provided 'as is' and may be used at your own risk. GeoAcoustics Limited will not be held responsible for any consequential damage resulting from the use, misuse, or inability to use the code.



Raw Data Format

The GeoSwath raw data file (extension **rdf**) is used to store the raw information acquired by the GeoAcoustics GeoSwath Plus wide swath bathymetry system.

Methodology

All data is stored within the raw data file on a ping by ping basis, each ping record contains all of the necessary information for that ping. The structure of the raw data file can be seen below:-

File Structure:-

File Header	Ping 1	Ping 2	Ping 3	…….	Ping n

File Header:-

Creation Time	File Header Size	Ping Header Size	Original Filename	System Frequency	Echosounder Type

Ping:-

Ping Header	Ping Data

Ping Header:-

Ping Number	Ping Time	Previous Ping Position	Ping Size	Number of Navigation Samples	Number of Attitude Samples	Number of Heading Samples	Number of Echosounder Samples

Number of miniSVS Samples	Number of Aux1 Samples	Number of Aux2 Samples	Ping Length	Transmit Pulse Length	Transmit Power	Sidescan Gain	Number of Data Samples

Side	Navigation Strings Size	Attitude Strings Size	Heading Strings Size	Echosounder Strings Size	miniSVS Strings Size	Aux1 Strings Size	Aux2 Strings Size

Binary Data Representation

All data written in the raw data file format use the structures shown below:-

Type Name	Bytes	Range Of Values
char	1	–128 to 127
unsigned char	1	0 to 255
wchar_t	2	For UNICODE characters
short	2	–32,768 to 32,767
unsigned short	2	0 to 65,535
int	4	–2,147,483,648 to 2,147,483,647
unsigned int	4	0 to 4,294,967,295
long	4	–2,147,483,648 to 2,147,483,647
unsigned long	4	0 to 4,294,967,295
float	4	3.4E +/- 38 (7 digits)
double	8	1.7E +/- 308 (15 digits)
long double	10	1.2E +/- 4932 (19 digits)

All data is written using the Intel 80x86 byte ordering (LSB to MSB). If a raw data file is to be processed on a non-Intel computer such as one from Sun Microsystems™, Inc., Silicon Graphics®, Inc., or Apple Computer®, Inc., the order of the bytes in all values must be exactly reversed. For example, a float value (4 bytes) would need to be reordered from (1,2,3,4) to (4,3,2,1) in the target machine's memory before treating the number as a floating-point value. This effectively converts the value from little-endian (least significant byte first) to big-endian (most-significant byte first).

File Header Format

Each raw data file begins with a file header record and is followed by one or more ping records. The format of this record is shown below:-

Element Name	Bytes	Type	Description
Creation	4	unsigned int	Creation time of raw data file
Raw_header_size	2	short	Size of file header in bytes
Raw_ping_header_size	2	short	Size of ping header in bytes
File_name	512	wchar_t[256]	Original filename
Frequency	4	int	System frequency
Echo_type	2	short	Echosounder type
Spare	18	char[18]	Reserved

Ping Header Format

Each ping within the raw data file following the file header record starts with a ping header record, the format of this record is shown below:-

Element Name	Bytes	Type	Description
Ping_number	4	int	Ping number
Ping_time	8	double	Start time of ping
Previous_ping_position	4	int	Start position of previous ping
Ping_size	4	int	Size of ping data in bytes
Navigation_number	1	char	Number of navigation samples in ping
Attitude_number	1	char	Number of attitude samples in ping
Heading_number	1	char	Number of heading samples in ping
Echosounder_number	1	char	Number of echosounder samples in ping
MiniSVS_number	1	char	Number of MiniSVS samples in ping
Aux1_number	1	char	Number of aux1 samples in ping
Aux2_number	1	char	Number of aux2 samples in ping
Ping_length	2	short	Ping length in metres
Pulse_length	1	char	Transmit pulse length
Power	1	char	Transmit power
Sidescan_gain	1	char	Sidescan gain channel
Sample_number	4	int	Number of range/angle/amplitude samples

Side	1	char	Port (0), Starboard(1)
Navigation_strings_size	2	short	Size of raw navigation strings
Attitude_strings_size	2	short	Size of raw attitude strings
Heading_strings_size	2	short	Size of raw heading strings
Echosounder_strings_size	2	short	Size of raw echosounder strings
MiniSVS_strings_size	2	short	Size of raw miniSVS strings
Aux1_strings_size	2	short	Size of raw aux 1 strings
Aux2_strings_size	2	short	Size of raw aux 2 strings
Spare	27	char[13]	Reserved

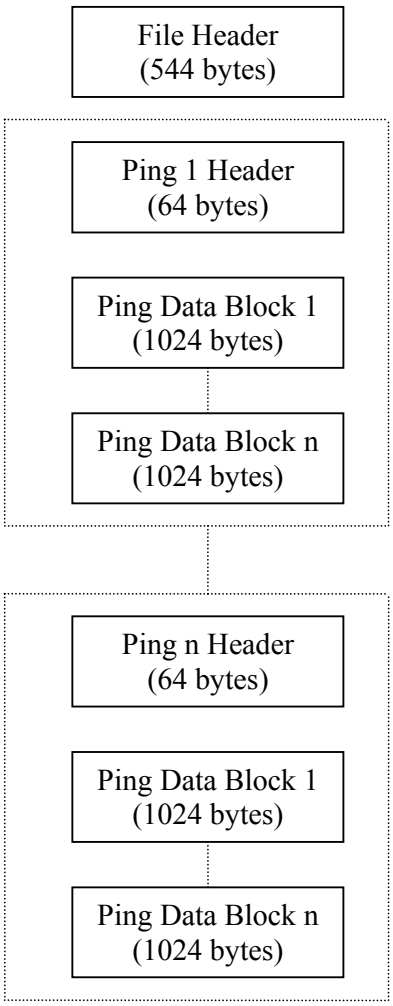
Ping Data Format

Following the ping header each ping record contains the ping data record, the format of the ping data record is shown below:-

Element Name	Bytes	Type	Description
Raa		RAA[]	Range/angle/amplitude samples
Navigation		NAV[]	Navigation samples
Attitude		MRU[]	Attitude samples
Heading		GYRO[]	Heading samples
Echosounder		ECHO[]	Echosounder samples
MiniSVS		MINISVS[]	MiniSVS samples
Aux1_times		double[]	Aux1 time stamps
Aux2_times		double[]	Aux2 time stamps
Navigation_strings		char[][256]	Navigation strings
Attitude_strings		char[][256]	Attitude strings
Heading_strings		char[][256]	Heading strings
Echosounder_strings		char[][256]	Echosounder strings
MiniSVS_strings		char[][256]	MiniSVS strings
Aux1_strings		char[][256]	Aux1 strings
Aux2_strings		char[][256]	Aux2 strings

Broadcast RDF

RDF data is broadcast over an unconnected socket on port 5001. When the GeoSwath starts or when relevant information changes it sends an RDF file header packet. Each ping is then broadcast starting with a ping header packet followed by the ping data in 1024 byte blocks.



Broadcast Control Packet

GeoSwath can be controlled remotely by a remote control packet, this is broadcast on an un-connected socket on port 5002. The remote control packet size is 600 bytes and contains the following information:-

Element Name	Description
remote_control.pinging	Toggles pinging.
remote_control.strings	GeoAcoustics use only.
remote_control.transmit	Toggles transmit.
remote_control.test	Toggles internal test signal.
remote_control.side	Transducer select (port/stbd or both).
remote_control.group_on	Toggles group filter
remote_control.bottom_track_on	Toggles bottom tracking filter.
remote_control.water_column_on	Toggles water column filter.
remote_control.water_column_auto	Toggles water column filter auto mode.
remote_control.water_column_height	Manual setting for water column filter, in metres below transducers.
remote_control.ping_length	Ping length in metres.
remote_control.pulse_length	Transmit pulse length.
remote_control.power	Transmit power.
remote_control.sidescan_gain	Selects sidescan gain.
remote_control.update_comms	GeoAcoustics use only.

Broadcast Messages

Broadcast log messages, as appear in the GeoSwath log window, are broadcast on an un-connected socket on port 5001. Message packet length is 256 bytes.

Sample Source Code and Example Application

Accompanying this document is a sample application for controlling GeoSwath remotely and logging received RDF data, GeoSwath Remote Control.exe, including full source code.

Also included is GeoSwath Remote Simulator which will simulate a GeoSwath system.