IMAGENEX TECHNOLOGY CORP.

DeltaT - 83P PROFILE POINT OUTPUT

(83P UDP/IP Ethernet Datagram, .83P File Format)

For each ping, the following bytes are output during the 83P UDP datagram. If recording to a .83P file, the following bytes are appended and saved to the file for each ping. The total number of bytes '**N**' for each ping will vary depending on the number of beams selected.

Byte #	Byte Description
0-255	**File Header** (256 bytes)
256-**nnn**	**Profile Ranges for current ping** (2 range bytes / beam) **nnn** = 256 + (2*number_of_beams) – 1 If **Intensity Bytes** are included (Byte 117 = 1), **nnn** = 256 + (4*number_of_beams) – 1

FILE HEADER

Bytes 0 through 255 contain the following **File Header** information:

0 **ASCII '8'**
1 **ASCII '3'**
2 **ASCII 'P'**

3 **.83P File Version**
10 = v1.10

4-5 **Total Bytes 'N' -** number of bytes that are written to the disk for this ping

Byte 4								**Byte 5**							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
N = 256 + (2*number_of_beams) → Byte 117 = 0 (No Intensity) **N = 256 + (4*number_of_beams) → Byte 117 = 1 (Intensity)**															

6 **Reserved** - always 0

7 **Reserved** - always 0

DeltaT - 83P PROFILE POINT OUTPUT (con't)

8-19 **Sonar Ping Interrogation Timestamp**
Date – system date, null terminated string (12 bytes)
"**DD-MMM-YYYY**"

20-28 **Sonar Ping Interrogation Timestamp**
Time – system time, null terminated string (9 bytes)
"**HH:MM:SS**"

29-32 **Sonar Ping Interrogation Timestamp**
Hundredths of Seconds – system time, null terminated string (4 bytes)
"**.hh**"

Note: see Bytes 112-116 for Milliseconds.

33-46 **GNSS Ships Position Latitude** – text string (14 bytes)
"**_dd.mm.xxxxx_N**"
dd = Degrees
mm = Minutes
xxxxx = Decimal Minutes
_ = Space
N = North or S = South

47-60 **GNSS Ships Position Longitude** – text string (14 bytes)
"**ddd.mm.xxxxx_E**"
ddd = Degrees
mm = Minutes
xxxxx = Decimal Minutes
_ = Space
E = East or W = West

61 **GNSS Ships Speed**
Speed = (Byte 61)/10 in knots

62-63 **GNSS Ships Course**

Byte 62								**Byte 63**							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Course * 10 (in degrees)															

DeltaT - 83P PROFILE POINT OUTPUT (con't)

64-65 **Pitch Angle (from Internal Sensor)**

Byte 64								Byte 65							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
P	**(Pitch Angle*10) + 900**														

If '**P**' = 0, Pitch Angle = 0 degrees
If '**P**' = 1, Pitch Angle = [[((Byte 64 & 0x7F)<<8) | (Byte 65)]-900]/10

66-67 **Roll Angle (from Internal Sensor)**

Byte 66								Byte 67							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
R	**(Roll Angle*10) + 900**														

If '**R**' = 0, Roll Angle = 0 degrees
If '**R**' = 1, Roll Angle = [[((Byte 66 & 0x7F)<<8) | (Byte 67)]-900]/10

68-69 **Heading Angle (from Internal Sensor)**

Byte 68								Byte 69							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
H	**Heading Angle*10**														

If '**H**' = 0, Heading Angle = 0 degrees
If '**H**' = 1, Heading Angle = [((Byte 68 & 0x7F)<<8) | (Byte 69)]/10

70-71 **Beams**

Byte 70								Byte 71							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Number of Beams															

72-73 **Samples Per Beam**

Byte 72								Byte 73							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Number of Samples Per Beam															

DeltaT - 83P PROFILE POINT OUTPUT (con't)

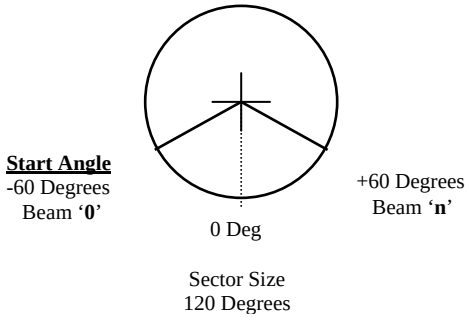
74-75 **Sector Size**

Byte 74								Byte 75							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Sector Size (in degrees)															

76-77 **Start Angle** (Beam 0 angle)

Byte 76								Byte 77							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
[Start Angle (in degrees) + 180] * 100															

Example:



78 **Angle Increment**
Angle spacing per beam = (Byte 78)/100 in degrees

79-80 **Acoustic Range**

Byte 79								Byte 80							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Acoustic Range (in meters)															

81-82 **Acoustic Frequency**

Byte 81								Byte 82							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Acoustic Frequency (in kHz)															

DeltaT - 83P PROFILE POINT OUTPUT (con't)

83-84 **Sound Velocity**

Byte 83								Byte 84							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
V	**Sound Velocity (in meters/second) * 10**														

If '**V**' = 0, Sound Velocity = 1500.0 m/s
If '**V**' = 1, Sound Velocity = [((Byte 83 & 0x7F)<<8) | (Byte 84)]/10.0

85-86 **Range Resolution**

Byte 85								Byte 86							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Range Resolution (in millimeters)															

87-88 **Reserved** – always 0

89-90 **Profile Tilt Angle** (mounting offset)

Byte 89								Byte 90							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Profile Tilt Angle (in degrees) + 180															

91-92 **Repetition Rate** – Time between pings

Byte 91								Byte 92							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Repetition Rate (in milliseconds)															

93-96 **Ping Number** – increment for every ping

Byte 93	Byte 94	Byte 95	Byte 96
7 – 0	7 – 0	7 - 0	7 - 0
Ping Number			

97-99 **Reserved** - always 0

DeltaT - 83P PROFILE POINT OUTPUT (con't)

100-103 **Sonar X-Offset** – 4-byte single precision floating point number

Byte 100	Byte 101	Byte 102	Byte 103
7 – 0	7 – 0	7 - 0	7 - 0
Sonar X-Offset (in meters)			

104-107 **Sonar Y-Offset** – 4-byte single precision floating point number

Byte 104	Byte 105	Byte 106	Byte 107
7 – 0	7 – 0	7 - 0	7 - 0
Sonar Y-Offset (in meters)			

108-111 **Sonar Z-Offset** – 4-byte single precision floating point number

Byte 108	Byte 109	Byte 110	Byte 111
7 – 0	7 – 0	7 - 0	7 - 0
Sonar Z-Offset (in meters)			

112-116 **Sonar Ping Interrogation Timestamp**
Milliseconds – system time, null terminated string (5 bytes)
"**.mmm**"

117 **Intensity Bytes Included**
0 = No
1 = Yes

118-119 **Ping Latency** – Time from sonar ping interrogation to actual ping

Byte 118								Byte 119							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Ping Latency (in units of 100 microseconds)															

120-121 **Data Latency** – Time from sonar ping interrogation to 83P UDP datagram

Byte 120								Byte 121							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Data Latency (in units of 100 microseconds)															

Time Since Ping = Data Latency – Ping Latency

Note: Data Latency is not available during file playback.

122 **Sample Rate**
0 = Standard Resolution (1 in 500)
1 = High Resolution (1 in 5000)

DeltaT - 83P PROFILE POINT OUTPUT (con't)

123 **Option Flags**
Bit 0 – 1 = data is corrected for roll
Bit 1 – 1 = data is corrected for ray bending
Bit 2 – 1 = sonar is operating in overlapped mode
Bit 3 – 0
Bit 4 – 0
Bit 5 – 0
Bit 6 – 0
Bit 7 – 0

124 **Reserved** - always 0

125 **Number of Pings Averaged**
0 to 25

126-127 **Center Ping Time Offset** – The Sonar Ping Interrogation Timestamp (Bytes 8-19, 20-28 and 112-116) is the timestamp for the current ping. But due to ping averaging, the ping time of the center ping (of a group of averaged pings) may be required (i.e. for roll stabilization). The Center Ping Time Offset is the time difference between the center ping interrogation and the current ping interrogation.

Byte 126								Byte 127							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Center Ping Time Offset (in units of 100 microseconds)															

Center Ping Time = Sonar Ping Interrogation Timestamp – Center Ping Time Offset + Ping Latency

Note: Profile data from the current ping should be used when subtracting the Center Ping Time Offset.

128-131 **Heave (from External Sensor)**
4-byte single precision floating point number

Byte 128	Byte 129	Byte 130	Byte 131
7 – 0	7 – 0	7 - 0	7 - 0
Heave (in meters)			

132 **User Defined Byte** – this is a copy of the 837 User Defined Byte (Byte 45 from the .837 File Header)

DeltaT - 83P PROFILE POINT OUTPUT (con't)

133-136 **Altitude** – 4-byte single precision floating point number

Byte 133	Byte 134	Byte 135	Byte 136
7 – 0	7 – 0	7 - 0	7 - 0
Altitude (in meters)			

137 **External Sensor Flags**

Bit 0 – 1 = external heading angle available
Bit 1 – 1 = external roll angle available
Bit 2 – 1 = external pitch angle available
Bit 3 – 1 = external heave available
Bit 4 – 0
Bit 5 – 0
Bit 6 – 0
Bit 7 – 0

138-141 **Pitch Angle (from External Sensor)**

4-byte single precision floating point number

Byte 138	Byte 139	Byte 140	Byte 141
7 – 0	7 – 0	7 - 0	7 - 0
Pitch (in degrees)			

142-145 **Roll Angle (from External Sensor)**

4-byte single precision floating point number

Byte 142	Byte 143	Byte 144	Byte 145
7 – 0	7 – 0	7 - 0	7 - 0
Roll (in degrees)			

146-149 **Heading Angle (from External Sensor)**

4-byte single precision floating point number

Byte 146	Byte 147	Byte 148	Byte 149
7 – 0	7 – 0	7 - 0	7 - 0
Heading (in degrees)			

DeltaT - 83P PROFILE POINT OUTPUT (con't)

150 **Transmit Scan Flag**
0 = manual scan
1 = auto-scan

151-154 **Transmit Scan Angle**
4-byte single precision floating point number

Byte 151	Byte 152	Byte 153	Byte 154
7 – 0	7 – 0	7 - 0	7 - 0
Transmit Scan Angle (in degrees)			

155-255 **Reserved** - always 0

DeltaT - 83P PROFILE POINT OUTPUT (con't)

START OF PROFILE RANGE POINTS (2 bytes/point)

256-257 **Profile Range : Beam 0**

Byte 256								Byte 257							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Profile Range (in samples)															

Standard Resolution samples: 0 – 499
High Resolution samples: 0 – 4999

Profile Range for Beam 0 (starting angle):
range = (Byte 256<<8 | Byte 257) * Range Resolution / 1000 (meters)
corrected range = range * Sound Velocity / 1500

***note: all ranges assume a sound velocity of 1500m/s**

258-259 **Profile Range : Beam 1**

Byte 258								Byte 259							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Profile Range (in samples)															

Profile Range for Beam 1 (starting angle + angle increment):
range = (Byte 258<<8 | Byte 259) * Range Resolution / 1000 (meters)
corrected range = range * Sound Velocity / 1500

nnn-1 to nnn **Profile Range : Beam N**

nnn = 256 + (2 * number_of_beams) – 1

Byte (nnn-1)								Byte nnn							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Profile Range (in samples)															

Profile Range for Beam N (starting angle + N*angle increment):
range = (Byte (nnn-1)<<8 | Byte nnn) * Range Resolution / 1000 (meters)
corrected range = range * Sound Velocity / 1500

DeltaT - 83P PROFILE POINT OUTPUT (con't)

If Byte 117 = 1 (Intensity Bytes Included), the following Intensity Bytes are added on after the Profile Range Bytes:

xxx = 256 + (2 * number_of_beams)
yyy = 256 + (4 * number_of_beams) – 1

xxx to xxx+1 **Intensity : Beam 0**

Byte xxx								Byte (xxx+1)							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Intensity (normalized amplitude)															

xxx+2 to xxx+3 **Intensity : Beam 1**

Byte (xxx+2)								Byte (xxx+3)							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Intensity (normalized amplitude)															

yyy-1 to yyy **Intensity : Beam N**

Byte (yyy-1)								Byte yyy							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Intensity (normalized amplitude)															