IMAGENEX TECHNOLOGY CORP.

ΔT PROFILE POINT FILE FORMAT (.83P)

When recording the profile point data 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 used.

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**
3 = v1.03

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

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

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

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29-32 **Hundreths of Seconds** – system time, null terminated string (4 bytes)
"**.hh**"

33-46 **GPS 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 **GPS 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 **GPS Ships Speed**
Speed = (Byte 61)/10 in knots

62-63 **GPS Ships Heading**

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

64-65 **Pitch Angle (from Orientation Module)**

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

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66-67 **Roll Angle (from Orientation Module)**

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 Orientation Module)**

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															

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)															

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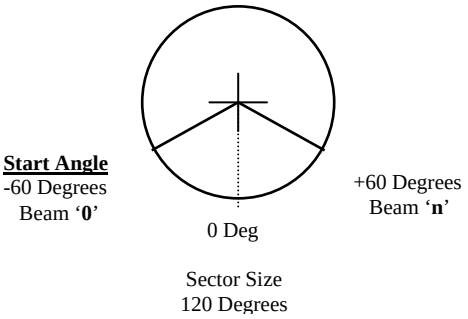
76-77 **Start Angle** (Beam 0 angle)

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)															

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

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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

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)			

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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 **Milliseconds** – system time, null terminated string (5 bytes)
"**.mmm**"

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

118-119 **Ping Latency** – Time between sonar head interrogation and 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 between sonar head interrogation and 83P UDP output 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

122-255 **Reserved** - always 0

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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)															

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

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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)															