Point Cloud File Format

Revision 1.0, 2008/12/03

Topcon Corp.

Point cloud data are described by following files:

(1) Point Cloud File (.cl3) : Stores scanning information and point list.
Simple point stream can be described by this file.

(2) Point Cloud IJ File (.ij) : Stores IJ structure information of point clouds of corresponding CL3 file.
Matrix formed point clouds (e.g. PTX format) can be described with a set of CL3 and IJ files.

(1). POINT CLOUD FILE

This file stores scanning information and point list. Multiple point cloud blocks can be included in a CL3 file. This file supports two types of point format that are (X,Y,Z,I) and (X,Y,Z,I,R,G,B).

File Format : BINARY
File Name : “Scan name”.cl3
File Extension : cl3

File Structure;

< Version >				
	File Version	32Byte	char[32]	[CL3_0.7]
< Hardware Information >				
	Model Name	12Byte	char[12]	[GLS1000]
	Hardware Version	4Byte	char[4]	[1.00]
	Farm ware Version	4Byte	char[4]	[1.00]
	Serial Number	12Byte	char[12]	[000001]
< Scanning Information >				
	Date	8Byte	char[8]	yyyymmdd
	Time	6Byte	char[6]	hhmmss
	Temperature [deg C]	4Byte	float	
	Atmospheric Pressure [hPa]	4Byte	float	
	Left of Horizontal Angle [deg]	4Byte	float	
	Top of Vertical Angle [deg]	4Byte	float	
	Right of Horizontal Angle [deg]	4Byte	float	
	Bottom of Vertical Angle [deg]	4Byte	float	
	Horizontal Interval [deg]	4Byte	float	
	Vertical Interval [deg]	4Byte	float	
< Point Clouds Information >				
	Point Format	1Byte	BYTE	(0: X,Y,Z,I 1: X,Y,Z,I, R,G,B)
	Number of Point Clouds	4Byte	unsigned long	
< Block Header #1 >				
	Number of Points	4Bytes	unsigned long	
	Step Zoom Motor Position	1Byte	BYTE	
		(0: Unknown, 1: 0-200m, 2: 0-50m, 3: 30-50m, 4: 13-30m, 5:0-13m)		
< Point Array #1 >				
	X Coordinate [m]	8Bytes	double	
	Y Coordinate [m]	8Bytes	double	
	Z Coordinate [m]	8Bytes	double	
	Intensity	4Bytes	float	
	Red	1Byte	BYTE (*1)	
	Green	1Byte	BYTE (*1)	
	Blue	1Byte	BYTE (*1)	
	.....			
< Block Header #2 >				
	Number of Points	4Byte	unsigned long	
	Step Zoom Motor Position	1Byte	BYTE	
< Point Array #2 >				
	.....			

*1 : R,G and B values will not be included in point array when the "Point Format" is set as 0 (X,Y,Z,I).

(2). POINT CLOUD IJ FILE

This file defines matrix structure of point clouds of corresponding CL3 file. This file stores simply indexes of corresponding points. And also this file can include multiple point cloud blocks.

File Format : BINARY

File Name : “Scan name”.ij

File Extension : ij

File Structure;

< File Header >			
	File Version	32Bytes	char[32] [CL3_IJ_0.2]
	# of Blocks	4Bytes	unsigned long
	# of Points in Horizontal	4Bytes	unsigned long
	# of Points in Vertical	4Bytes	unsigned long
	Width of a Block	4bytes	unsigned long
< Block Header #1 > (*1)			
	Index of block in horizontal	4Bytes	unsigned long
	Index of block in vertical	4Bytes	unsigned long
	# of Valid Points in Block	4Bytes	unsigned long
< Index Array #1 >			
	Index of Point (0,0)	4Bytes	long (*2)
	Index of Point (0,1)	4Bytes	long
	.....		
	.....		
< Block Header #2 >			
	Index of block in horizontal	4Bytes	unsigned long
	Index of block in vertical	4Bytes	unsigned long
	# of Valid Points in Block	4Bytes	unsigned long
< Index Array #2 >			
	Index of Point (0,0)	4Bytes	long
	Index of Point (0,1)	4Bytes	long
	.....		
	.....		

*1 : Each block of IJ file is corresponding to a point cloud block of CL3 file.

*2 : Valid points are stored as an integer from 1 to the number of points in a cloud block. And invalid points are stored as zero.