

SPS File Format Description

Typinski, 2015

Radio Sky Spectrograph (RSS) produces data files with an ".sps" extension. This document describes how the file is arranged.

Example from LGM_150127042000.sps

File size: 69,569,170 bytes

Position	Data	Type	Bytes		Notes
START OF HEADER					
Fixed-length portion of header					
1	Version	String	10	0000202020	The software version number of the RSS software that wrote the file. Example here indicates RSS version 2.2.20
11	Start	Real64	8	42031.18055630854	Chart start date & time in Microsoft Date data type. 0 = 0000 UTC on Jan 01, 0001 AD. Example here indicates 27 Jan 2015 04:20:00 UTC
19	End	Real64	8	42031.37682568586	Chart start date & time in Microsoft Date data type. 0 = 0000 UTC on Jan 01, 0001 AD. Example here indicates 27 Jan 2015 09:02:38 UTC
27	Latitude	Real64	8	29.80111122131348	Observatory latitude in degrees.
35	Longitude	Real64	8	-82.45944213867190	Observatory longitude in degrees.
43	ChartMax	Real64	8	N/A	Not used in SPS files.
51	ChartMin	Real64	8	N/A	Not used in SPS files.
59	TimeZone	Int16	2	0	Time zone of the observatory clock, UTC offset in hours.
61	Source	String	10	N/A	Not used in SPS files.
71	Author	String	20	Wes Greenman	Observer name.
91	Name	String	20	LGM Radio Alachua	Observatory name.
111	Location	String	40	Alachua FL 32615	Observatory location.
151	Channels	Int16	2	300	Number of frequency channels in the data.
153	NoteLength	Int32	4	88	Provides the length in bytes of the variable-length portion of the SPS file header.

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Variable-length portion of header				
157	Note	String	[NoteLength]	see example below
	EXAMPLE header note:	*[[*SWEEPS115563ÿLOWF17000000ÿHIF26000000ÿSTEPS300ÿDUALSPECFILEFalseÿRCVRÿCOLORRES4ÿ]]*		
			[[Start of note marker.
			SWEEPS115563	Number of frequency sweeps in the data.
			ÿ	Delimiter, 0xFF byte.
			LOWF17000000	Sweep low frequency bound, value in Hz.
			ÿ	Delimiter, 0xFF byte.
			HIF26000000	Sweep high frequency bound, value in Hz.
			ÿ	Delimiter, 0xFF byte.
			STEPS300	Number of frequency channels in the data.
			ÿ	Delimiter, 0xFF byte.
			DUALSPECFILEFalse	Is this a DPS file? True or False.
			ÿ	Delimiter, 0xFF byte.
			RCVR	NOT USED.
			ÿ	Delimiter, 0xFF byte.
			COLORRES4	Data range indicator, value "4" indicates 12-bit data. This tag not present in 10-bit data files.
				10-bit data: RSS color offset control max is 500 12-bit data: RSS color offset control max is 2500
			ÿ	Delimiter, 0xFF byte.
]]	End of note marker.

END OF HEADER

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START OF DATA				
NOTE: SPS file ADC data values are unsigned 16-bit integers. They are also big-endian -- i.e., the byte order is reversed (low byte is the MSB).				
NOTE: Data starts at byte number 157 + NoteLength. Here we use an example NoteLength of 88, but this varies from file to file.				
NOTE: Data value range is 0 to 1023 for 10-bit ADC's (FSX-1, FSX-2, FSX-3, FS-200B spectrographs).				
NOTE: Data value range is 0 to 4095 for 12-bit ADC's (FSX-4, FSX-5, FSX-6, DPS spectrographs).				
NOTE: DPS data files have RCP and LCP data interleaved channel by channel, NOT sweep by sweep. The LCP word is stored first, then the RCP word.				
245	Data	UInt16	2	Sweep 1, highest frequency channel ADC output (channel 001).
247	Data	UInt16	2	Sweep 1, next highest frequency channel ADC output (channel 002).
:	:	:	:	:
843	Data	UInt16	2	Sweep 1, lowest frequency channel ADC output (channel 300).
845	Delimiter	UInt16	2	65278 (two consecutive 0xFE bytes) End-of-Sweep delimiter.
847	Data	UInt16	2	Sweep 2, highest frequency channel ADC output (channel 001).
849	Data	UInt16	2	Sweep 2, next highest frequency channel ADC output (channel 002).
:	:	:	:	:
1,445	Data	UInt16	2	Sweep 2, lowest frequency channel ADC output (channel 300).
1,447	Delimiter	UInt16	2	65278 (two consecutive 0xFE bytes) End-of-Sweep delimiter.
:	:	:	:	:
69,568,569	Data	UInt16	2	Sweep 115,563, highest frequency channel ADC output (channel 001).
69,568,571	Data	UInt16	2	Sweep 115,563, next highest frequency channel ADC output (channel 002).
:	:	:	:	:
69,569,167	Data	UInt16	2	Sweep 115,563, lowest frequency channel ADC output (channel 300).
69,569,169	Delimiter	UInt16	2	65278 (two consecutive 0xFE bytes) End-of-Sweep delimiter.

END OF DATA