Header format of the MU radar

Int.	Position	Name	Contents
1	1–4	LNBLK	Length of a data block
2	5–8	NTBLK	Number of total blocks
			(Header, spectra & parameters)
3	9–12	NDBLK	Number of data blocks (Spectra only)
4	13–16	LNSEG	Length of segment
5	17–20	LNHEAD	Length of record header
6	21–24	NHBLK	Number of header blocks
7	25–32	PRGNAM	Data taking (Signal processing) program name (8 bytes)
9	33–56	LDTIME	Parameter file load time (24 bytes)
15	57–60	NPROG	Data taking program number
			(since control program started) (not use)
16	61–84	RECSTA	Record start time [DD-MMM-YYYY hh:mm:ss.ss]
22	85–96	RECEND	Record end time [hh:mm:ss.ss]
25	97–100	IREC	Record number
			(since observation program started)
26	101–104	ITREC	Total record number
			(since control program started) (not use)
27	105–108	MOBS	Observation mode
			0: Raw data
			1: FFT-spectra only
			11: FFT-parameters only
			21: FFT-spectra & parameters
			2: SAD-CCFs
			12: SAD-parameters
			22: SAD-CCFs & parameters
			3: iono.-ACFs
			13: iono.-ACFs & power
			23: (remove meteor)
			4: power profile
			14: power (remove meteor)
			5: FFT-complex spectra
			6: Coherence
			99: Unknown
28	109–112	MHEAD1	Usage of each header 1 (units of height)
			0 (or 1000): 1 μs
			250: 250 ns
			500: 500 ns
29	113–116	MHEAD2	Usage of each header 2
			0: none

Int.	Position	Name	Contents
			1: FFT type (no DC)
			11: FFT type (DC)
			2: SAD type
30	117–120	NDATA	Maximum number of data points in all combined channels (or ACF lags)
31	121–124	NRDATA	Number of result data
32	125–128	NTSEG	Number of total segments
33	129–132	NHIGH	Number of height points
34	133–136	NBEAM	Number of beam directions
35	137–140	NCHAN	Number of combined channels
36	141–144	NCCF	Number of data in same height
37	145–148	IPP	IPP (μs)
38	149–152	JSTART	Sample start time (μs)
39	153–156	JSINT	Sample interval (μs)
40	157–160	NCOH	Maximum number of coherent integrations in all combined channels
41	161–164	NICOH	Number of incoherent integrations
42	165–168	MTYPE	Data type (FFT-mode)
			0: spectra only
			1: spectra & parameters
			2: 1 & power
			11: parameters only (real-time)
			12: 11 & power
			21: parameters only (off-line)
			22: 21 & power
			Data type (ACF-mode)
			1: ACF & power & DC component
			2: power & DC component
			3: ACF only
43	169–172	MPULSE	Multi-pulse pattern (32 bits)
44	173–256	MACF	Lag number of each ACF point (21 words)
		(NADD)	Number of sum (power profile) (16 words)
65	257–320	IBEAM	Beam directional number in first 16 beams (16 words)
81	321–324	NFIT	Number of fitting points in dopplfit
			Number of blocks for removing meteor echo in pwrdeb and acfmet
82	325–328	LSUBP	Length of a sub-pulse (μs) (-1: 0.5μs)
83	329–332	NSUBP	Number of sub-pulse
84	333–336	MSCAN	Beam scanning mode
			1: every ISPL (unavailable)
			0: every IPP
85	337–344	HPNAM	HP parameter-file name (6 bytes)
87	345–348	NOMODE	
88	349–352	NEHEAD	
89	353–416	NICOHM	Number of sum (ACF method) (16 words)

Int.	Position	Name	Contents
105	417–420	NSAMPL	Number of sample points (ACF method)
106	421–600		Reserved for the future (180 bytes)
151	601–616	OPARAM	Observation parameter name (16 bytes)
155	617–620	IPRVER	Program Version
156	621–624	ISTA	Record start time (s) (since epoch)
157	625–628	ISTAUS	Record start time shorter than 1 sec (micro s)
158	629–632	IEND	Record end time (s) (since epoch)
159	633–636	IENDUS	Record end time shorter than 1 sec (micro s)
160	637–640	NPSEQ	Number of pulse sequences (1–64)
161	641–896	ITXCOD	Transmit pulse pattern (32 bits×64)
225	897–900	LDCDAL	Decoding code length for all channels
226	901–904	NPSQAL	Number of pulse decoding sequences for all channels
227	905–1160	IDCDAL	Pulse decoding pattern for all channels (32 bits×64)
291	1161–1164	ISTEER	Beam steering interval (0: one beam, 1: IPP, 2: 2 IPP, 3: FFT)
292	1165–1676	IBEAM2	Beam direction (2 bytes×256)
420	1677–1680	IBSHAP	Beam shape
421	1681–1684	IAZOFF	Beam azimuth offset (0.01 degree unit)
422	1685–1688	IZEOFF	Beam zenith offset (0.01 degree unit)
423	1689–1692	IPOLAR	Polarization (1: right circular fixed)
424	1693–1696	NTXFRQ	Number of TX frequencies
425	1697–1716	TXFREQ	TX frequency offset (5 words)
430	1717–1720	IGAIN	Gain correction of TX source signal
431	1721–1724	ITXATT	TX attenuator
432	1725–1740	IRXATT	RX attenuator (4 words)
436	1741–1744	ITXON	TX on(1)/off(0) (1-25 bits) and TX module No. (26-30 bits; 0: all)
437	1745–1760	IRXON	RX on(1)/off(0) (4 words) RX No. 1-4 means Channel No. 26-29
441	1761–1812	IRXSEL	RX module selection (2 bytes×(25 + 1), 0: all modules)
454	1813–1816	IFILTR	Selection of filter (same as PIO)
455	1817–1820	IRNGZR	Range zero correction (ns)
456	1821–2844	ISTART	Sample start time (256 words: unit of sub-pulse/4)
712	2845–2848	IRXSEQ	Reception sequence (Dummy)
713	2849–2964	ICHAN	Channel number in digital combine (32 bits×29)
742	2965–3080	NCOH2	Number of coherent integrations for each combined channel (29 words)
771	3081–3196	NFFT	Number of FFT points for each combined channel (29 words)
800	3197–3312	NDATA2	Number of data points for each combined channel (29 words)
829	3313–3428	IFFT1	Lower and upper boundary of FFT number in each combined channel (2 bytes×2×29)
858	3429–3544	IFFT2	Same as above
887	3545–3660	IFFT3	Same as above
916	3661–3776	RXFREQ	RX frequency offset for each combined channel (29 words)
945	3777–3808	ITXFIR	FIR coefficient in TX (2 bytes×16)
953	3809–3924	IGAFIR	Gain adjustment of FIR filter in RX for each combined channel (2 bytes×2

Int.	Position	Name	Contents
982	3925–3928	INTPTN	CIC interpolation pattern in TX (0–15)
983	3929–3932	INTRAT	CIC interpolation rate in TX (1–640)
984	3933–3936	NTXCIC	Number of CIC filter in TX (1–10)
985	3937–3940	IGACIC	Gain adjustment of CIC filter in TX ($\log_2 G$)
986	3941–4056	NRXCIC	Number of CIC filter in RX for each combined channel (29 words)
1015	4057–4172	ICRRAT	CIC cropping rate in RX for each combined channel (29 words)
1044	4173–4176	SEALVL	Above sea level (m) ... Memo.
1045	4177–4180	IHEADF	Header flag
			0x1: RX FIR coefficient and TX module selection
			0x2: Pulse decoding pattern etc.
			0x4: TX pulse pattern including on/off
1046	4181–4260	COMENT	Comment by user (80 bytes)
1066	4261–4264	NFFTC	Number of FFT points to calculate coherence
1067	4265–4268	NBLS	Number of baselines
1068	4269–4272	ICHANC	Channel number in coherence calculation (32 bits)
1069	4273–4480	USRHDR	User header
1	1–3712	IRXFIR	FIR coefficient in RX for each combined channel ($2\times16\times29$ words)
929	3713–3812	ITXSEL	TX module selection (32 bits$\times$25)
954	3813–4480		Reserved for future
1	1–4	LDCD01	Decoding code length in combined channel 1
2	5–8	NPSQ01	Number of pulse decoding sequences in combined channel 1
3	9–264	IDCD01	Pulse decoding pattern in combined channel 1 (32 bits$\times$64)
67	265–268	LDCD02	Decoding code length in combined channel 2
68	269–272	NPSQ02	Number of pulse decoding sequences in combined channel 2
69	273–528	IDCD02	Pulse decoding pattern in combined channel 2 (32 bits$\times$64)
133	529–532	LDCD03	Decoding code length in combined channel 3
134	533–536	NPSQ03	Number of pulse decoding sequences in combined channel 3
135	537–792	IDCD03	Pulse decoding pattern in combined channel 3 (32 bits$\times$64)
199	793–796	LDCD04	Decoding code length in combined channel 4
200	797–800	NPSQ04	Number of pulse decoding sequences in combined channel 4
201	801–1056	IDCD04	Pulse decoding pattern in combined channel 4 (32 bits$\times$64)
265	1057–1060	LDCD05	Decoding code length in combined channel 5
266	1061–1064	NPSQ05	Number of pulse decoding sequences in combined channel 5
267	1065–1320	IDCD05	Pulse decoding pattern in combined channel 5 (32 bits$\times$64)
331	1321–1324	LDCD06	Decoding code length in combined channel 6
332	1325–1328	NPSQ06	Number of pulse decoding sequences in combined channel 6
333	1329–1584	IDCD06	Pulse decoding pattern in combined channel 6 (32 bits$\times$64)
397	1585–1588	LDCD07	Decoding code length in combined channel 7
398	1589–1592	NPSQ07	Number of pulse decoding sequences in combined channel 7
399	1593–1848	IDCD07	Pulse decoding pattern in combined channel 7 (32 bits$\times$64)
463	1849–1852	LDCD08	Decoding code length in combined channel 8
464	1853–1856	NPSQ08	Number of pulse decoding sequences in combined channel 8

Int.	Position	Name	Contents
465	1857–2112	IDCD08	Pulse decoding pattern in combined channel 8 (32 bits×64)
529	2113–2116	LDCD09	Decoding code length in combined channel 9
530	2117–2120	NPSQ09	Number of pulse decoding sequences in combined channel 9
531	2121–2376	IDCD09	Pulse decoding pattern in combined channel 9 (32 bits×64)
595	2377–2380	LDCD10	Decoding code length in combined channel 10
596	2381–2384	NPSQ10	Number of pulse decoding sequences in combined channel 10
597	2385–2640	IDCD10	Pulse decoding pattern in combined channel 10 (32 bits×64)
661	2641–2644	LDCD11	Decoding code length in combined channel 11
662	2645–2648	NPSQ11	Number of pulse decoding sequences in combined channel 11
663	2649–2904	IDCD11	Pulse decoding pattern in combined channel 11 (32 bits×64)
727	2905–2908	LDCD12	Decoding code length in combined channel 12
728	2909–2912	NPSQ12	Number of pulse decoding sequences in combined channel 12
729	2913–3168	IDCD12	Pulse decoding pattern in combined channel 12 (32 bits×64)
793	3169–3172	LDCD13	Decoding code length in combined channel 13
794	3173–3176	NPSQ13	Number of pulse decoding sequences in combined channel 13
795	3177–3432	IDCD13	Pulse decoding pattern in combined channel 13 (32 bits×64)
859	3433–3436	LDCD14	Decoding code length in combined channel 14
860	3437–3440	NPSQ14	Number of pulse decoding sequences in combined channel 14
861	3441–3696	IDCD14	Pulse decoding pattern in combined channel 14 (32 bits×64)
925	3697–3700	LDCD15	Decoding code length in combined channel 15
926	3701–3704	NPSQ15	Number of pulse decoding sequences in combined channel 15
927	3705–3960	IDCD15	Pulse decoding pattern in combined channel 15 (32 bits×64)
991	3961–3964	LDCD16	Decoding code length in combined channel 16
992	3965–3968	NPSQ16	Number of pulse decoding sequences in combined channel 16
993	3969–4224	IDCD16	Pulse decoding pattern in combined channel 16 (32 bits×64)
1057	4225–4480		Reserved for future
1	1–4	LDCD17	Decoding code length in combined channel 17
2	5–8	NPSQ17	Number of pulse decoding sequences in combined channel 17
3	9–264	IDCD17	Pulse decoding pattern in combined channel 17 (32 bits×64)
67	265–268	LDCD18	Decoding code length in combined channel 18
68	269–272	NPSQ18	Number of pulse decoding sequences in combined channel 18
69	273–528	IDCD18	Pulse decoding pattern in combined channel 18 (32 bits×64)
133	529–532	LDCD19	Decoding code length in combined channel 19
134	533–536	NPSQ19	Number of pulse decoding sequences in combined channel 19
135	537–792	IDCD19	Pulse decoding pattern in combined channel 19 (32 bits×64)
199	793–796	LDCD20	Decoding code length in combined channel 20
200	797–800	NPSQ20	Number of pulse decoding sequences in combined channel 20
201	801–1056	IDCD20	Pulse decoding pattern in combined channel 20 (32 bits×64)
265	1057–1060	LDCD21	Decoding code length in combined channel 21
266	1061–1064	NPSQ21	Number of pulse decoding sequences in combined channel 21
267	1065–1320	IDCD21	Pulse decoding pattern in combined channel 21 (32 bits×64)
331	1321–1324	LDCD22	Decoding code length in combined channel 22

Int.	Position	Name	Contents
332	1325–1328	NPSQ22	Number of pulse decoding sequencies in combined channel 22
333	1329–1584	IDCD22	Pulse decoding pattern in combined channel 22 (32 bits×64)
397	1585–1588	LDCD23	Decoding code length in combined channel 23
398	1589–1592	NPSQ23	Number of pulse decoding sequencies in combined channel 23
399	1593–1848	IDCD23	Pulse decoding pattern in combined channel 23 (32 bits×64)
463	1849–1852	LDCD24	Decoding code length in combined channel 24
464	1853–1856	NPSQ24	Number of pulse decoding sequencies in combined channel 24
465	1857–2112	IDCD24	Pulse decoding pattern in combined channel 24 (32 bits×64)
529	2113–2116	LDCD25	Decoding code length in combined channel 25
530	2117–2120	NPSQ25	Number of pulse decoding sequencies in combined channel 25
531	2121–2376	IDCD25	Pulse decoding pattern in combined channel 25 (32 bits×64)
595	2377–2380	LDCD26	Decoding code length in combined channel 26
596	2381–2384	NPSQ26	Number of pulse decoding sequencies in combined channel 26
597	2385–2640	IDCD26	Pulse decoding pattern in combined channel 26 (32 bits×64)
661	2641–2644	LDCD27	Decoding code length in combined channel 27
662	2645–2648	NPSQ27	Number of pulse decoding sequencies in combined channel 27
663	2649–2904	IDCD27	Pulse decoding pattern in combined channel 27 (32 bits×64)
727	2905–2908	LDCD28	Decoding code length in combined channel 28
728	2909–2912	NPSQ28	Number of pulse decoding sequencies in combined channel 28
729	2913–3168	IDCD28	Pulse decoding pattern in combined channel 28 (32 bits×64)
793	3169–3172	LDCD29	Decoding code length in combined channel 29
794	3173–3176	NPSQ29	Number of pulse decoding sequencies in combined channel 29
795	3177–3432	IDCD29	Pulse decoding pattern in combined channel 29 (32 bits×64)
859	3433–4480		Reserved for future
1	1–4096	ITXPTN	TX pulse on/off pattern (512 bits×64)
1025	4097–4480		Reserved for future (1)
1	1–4096	ITXPHS	TX pulse phase pattern (512 bits×64)
1025	4097–4480		Reserved for future (2)