LEMI-417M control protocol

Commands and Acknowledgments

#	Command name	Code/data		Data						Comments and descriptions
		Byte 1	**Byte 2**	**Byte 3**	**Byte 4**	**Byte 5**	**Byte 6**	**Byte 7**	**Byte 8**	
1	Read time	3D	31	-	-	-	-	-	-	Host ⇒ LEMI
		3F	31	05	13	11	23	15	59	LEMI ⇒ Host
				Year	Day	Month	Hour	Min	Sec	BCD values
2	Set time	3D	32	05	13	11	23	15	59	Host ⇒ LEMI
				Year	Day	Month	Hour	Min	Sec	BCD values
		3F	32	05	13	11	23	15	59	LEMI ⇒ Host
3	Set coefficients 1	3D	33	"AV"	"Mode"	-	-	-	-	Host ⇒ LEMI
										"AV" – Average (SR): 0x01 1 (4Hz) 0x02 2 (2Hz) 0x04 4 (1Hz) 0x08 8 (1/2Hz) 0x18 24 (1/6Hz) 0x F0 240 (1/60Hz) "Mode": 1 – FLASH 2 – PC 3 – FL + PC
		3F	33	"AV"	"Mode"	-	-	-	-	LEMI ⇒ Host
4	**Read coefficients 1**	3D	34	-	-	-	-	-	-	Host ⇒ LEMI
		3F	34	"AV"	"Mode"	U_{IN}*10	"Mode"	-	-	LEMI ⇒ Host
5	Set coefficients 2	3D	35	XX	XX	Ax1 (4 bytes)				Host ⇒ LEMI L1…L2 = 1…255 m
		Ay1 (4 bytes)				Az1 (4 bytes)				
		Ax2 (4 bytes)				Ay2 (4 bytes)				
		Az2 (4 bytes)				Kxy (4 bytes)				
		Kyz (4 bytes)				Kxz (4 bytes)				
		Ke1 (4 bytes)				Ke2 (4 bytes)				
		Ke3 (4 bytes)				Ke4 (4 bytes)				
		K1x (4 bytes)				K1y (4 bytes)				
		K1z (4 bytes)				K2x (4 bytes)				
		K2y (4 bytes)				K2z (4 bytes)				
		KTF (4 bytes)				KTE (4 bytes)				
		KTF0 (4 bytes)				KTE0 (4 bytes)				
		KVBAT (4 bytes)				L1	L2	L3	L4	
		3F	35	-	-	-	-	-	-	LEMI ⇒ Host
6	Read coefficients 2	3D	36	-	-	-	-	-	-	Host ⇒ LEMI
		3F	36	XX	XX	Ax1 (4 bytes)				LEMI ⇒ Host
		Ay1 (4 bytes)				Az1 (4 bytes)				
		Ax2 (4 bytes)				Ay2 (4 bytes)				
		Az2 (4 bytes)				Kxy (4 bytes)				
		Kyz (4 bytes)				Kxz (4 bytes)				
		Ke1 (4 bytes)				Ke2 (4 bytes)				
		Ke3 (4 bytes)				Ke4 (4 bytes)				
		K1x (4 bytes)				K1y (4 bytes)				
		K1z (4 bytes)				K2x (4 bytes)				
		K2y (4 bytes)				K2z (4 bytes)				
		KTF (4 bytes)				KTE (4 bytes)				
		KTF0 (4 bytes)				KTE0 (4 bytes)				
		KVBAT (4 bytes)				L1	L2	L3	L4	
7	Read GPS data	3D	37	-	-	-	-	-	-	Host ⇒ LEMI
		3F	37	Latitude (5 bytes)					Lon. 1…	LEMI ⇒ Host
		…Longitude 2nd…6th (6 bytes)					Altitude (3 bytes)			

#	Command name	Code/data		Data						Comments and descriptions
		Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	
8	Read configuration	3D	30	-	-	-	-	-	-	Host ⇒ LEMI
		3F	30	34	31	37	56*	“SN”	-	LEMI ⇒ Host
				(‘4’)	(‘1’)	(‘7’)	(‘V’)			“SN” – Station number
9	Stop recording	3D	38	-	-	-	-	-	-	Host ⇒ LEMI
10	Start recording	3D	39	-	-	-	-	-	-	Host ⇒ LEMI
		3F	39	-	-	-	-	-	-	LEMI ⇒ Host
11	Check FLASH	3D	3A	-	-	-	-	-	-	Host ⇒ LEMI
		3F	3A	Fl_size		“Free”	-	-	-	LEMI ⇒ Host
				Flash size, MB		%				“Free” - flash free size

“-“ – Means that there no bytes sending/receiving
* 0x4d (‘M’) is used for the stations S/Ns 0nn, Ann (x – any digit)
  0x56 (‘V’) – for stations S/Ns Bnn, Cnn

Multi-byte values are sent least-significant byte first: (PDP-11, aka ‘‘Intel’’, byte order), so the 32-bit integer 0x01020304 will be sent as 0x04, 0x03, 0x02, 0x01.

Multibyte data coding:

- 4 bytes coefficients – Floating point values by 32-bit numbers according to standard IEEE 754 format
- Latitude [BCD + Char]. Example: 0x 49 47 94 45 4e ⇒ 49° 47.9445’ N
- Longitude [BCD + Char]. Example: 0x 00 24 00 54 96 45 ⇒ 0024° 00.5496’ E
- Altitude [BCD]. Example: 0x 00 03 40 ⇒ 000340 (m)

Note. Any command except “Read coefficients 1” causes stop recording.

Olexander Kuznietsov
kuzn@isr.lviv.ua