Contact to buy MH-FC V2.2. mhive1002@naver.com M-HIVE STM32 Drone Programming Online Course on Udemy

Definition of FC ↔ GCS communication message frame (protocol v0.9.1)

3DR Telemetry

Tx messages (FC → GCS)		Sensor and Setpoint (50Hz)	GPS and ETC. (10Hz)	PID Gain ACK (Acknowledgement when receiving PID gain from GCS. PID gain data is very important, so the acknowledgement checks data integrity)					
SYNC1	Byte 0	0x46 ('F')	0x46 ('F')	0x46 ('F')	0x46 ('F')	0x46 ('F')	0x46 ('F')	0x46 ('F')	0x46 ('F')
SYNC2	Byte 1	0x43 ('C')	0x43 ('C')	0x43 ('C')	0x43 ('C')	0x43 ('C')	0x43 ('C')	0x43 ('C')	0x43 ('C')
ID	Byte 2	**0x10 (AHRS)**	**0x11 (GPS and ETC)**	**0x00 (Roll Inner Gain ACK)**	**0x01 (Roll Outer Gain ACK)**	**0x02 (Pitch Inner Gain ACK)**	**0x03 (Pitch Outer Gain ACK)**	**0x04 (Yaw Angle Gain ACK)**	**0x05 (Yaw Rate Gain ACK)**
PAYLOAD	Byte 3	Roll Angle short0 (x10e2)	GPS Lat long0 (x10e7)	Roll Inner P float0	Roll Outer P float0	Pitch Inner P float0	Pitch Outer P float0	Yaw Angle P float0	Yaw Rate P float0
	Byte 4	Roll Angle short1 (x10e2)	GPS Lat long1 (x10e7)	Roll Inner P float1	Roll Outer P float1	Pitch Inner P float1	Pitch Outer P float1	Yaw Angle P float1	Yaw Rate P float1
	Byte 5	Pitch Angle short0 (x10e2)	GPS Lat long2 (x10e7)	Roll Inner P float2	Roll Outer P float2	Pitch Inner P float2	Pitch Outer P float2	Yaw Angle P float2	Yaw Rate P float2
	Byte 6	Pitch Angle short1 (x10e2)	GPS Lat long3 (x10e7)	Roll Inner P float3	Roll Outer P float3	Pitch Inner P float3	Pitch Outer P float3	Yaw Angle P float3	Yaw Rate P float3
	Byte 7	Yaw Angle ushort0 (x10e2)	GPS Lon long0 (x10e7)	Roll Inner I float0	Roll Outer I float0	Pitch Inner I float0	Pitch Outer I float0	Yaw Angle I float0	Yaw Rate I float0
	Byte 8	Yaw Angle ushort1 (x10e2)	GPS Lon long1 (x10e7)	Roll Inner I float1	Roll Outer I float1	Pitch Inner I float1	Pitch Outer I float1	Yaw Angle I float1	Yaw Rate I float1
	Byte 9	Baro Alt short0 (x10e1)	GPS Lon long2 (x10e7)	Roll Inner I float2	Roll Outer I float2	Pitch Inner I float2	Pitch Outer I float2	Yaw Angle I float2	Yaw Rate I float2
	Byte 10	Baro Alt short1 (x10e1)	GPS Lon long3 (x10e7)	Roll Inner I float3	Roll Outer I float3	Pitch Inner I float3	Pitch Outer I float3	Yaw Angle I float3	Yaw Rate I float3
	Byte 11	Roll Setpoint short0 (x10e2)	Bat Volt ushort0 (x10e2)	Roll Inner D float0	Roll Outer D float0	Pitch Inner D float0	Pitch Outer D float0	Yaw Angle D float0	Yaw Rate D float0
	Byte 12	Roll Setpoint short1 (x10e2)	Bat Volt ushort1 (x10e2)	Roll Inner D float1	Roll Outer D float1	Pitch Inner D float1	Pitch Outer D float1	Yaw Angle D float1	Yaw Rate D float1
	Byte 13	Pitch Setpoint short0 (x10e2)	iBus.SwA (0, 1)	Roll Inner D float2	Roll Outer D float2	Pitch Inner D float2	Pitch Outer D float2	Yaw Angle D float2	Yaw Rate D float2
	Byte 14	Pitch Setpoint short1 (x10e2)	iBus.SwC (0, 1, 2)	Roll Inner D float3	Roll Outer D float3	Pitch Inner D float3	Pitch Outer D float3	Yaw Angle D float3	Yaw Rate D float3
	Byte 15	Yaw Setpoint ushort0 (x10e2)	FS-i6 Fail-safe (0, 1, 2)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)
	Byte 16	Yaw Setpoint ushort1 (x10e2)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)
	Byte 17	Alt Setpoint short0 (x10e1)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)
	Byte 18	Alt Setpoint short1 (x10e1)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)
TRAILER	Byte 19	CHKSUM	CHKSUM	CHKSUM	CHKSUM	CHKSUM	CHKSUM	CHKSUM	CHKSUM

※ Scale factor of Roll and Pitch angle is 100 (signed short) ※ Scale factor of Yaw angle is 100 (unsigned short) ※ Scale factor of Baro Alt is 10 (signed short) ※ Scale factor of GPS Lat and Lon is 10^7 (long)

※ Scale factor of Bat Volt is 100 (unsigned short) ※ Alt Setpoint is not used. Padding 0 ※ Reserved byte is not used. Padding 0

※ SWA: Up=0, Down=1 ※ SWC: UP=0, Mid=1, Down=2 ※ Fail-safe: Not triggered=0, Triggered=1, No iBus data=2 ※ CHKSUM = 0xFF - (BYTE0~BYTE18). Underflow ignored

Rx messages (FC ← GCS)		PID Gain Set						Data Request	
SYNC1	Byte 0	0x47 ('G')	0x47 ('G')	0x47 ('G')	0x47 ('G')	0x47 ('G')	0x47 ('G')	0x47 ('G')	
SYNC2	Byte 1	0x53 ('S')	0x53 ('S')	0x53 ('S')	0x53 ('S')	0x53 ('S')	0x53 ('S')	0x53 ('S')	
ID	Byte 2	**0x00 (Roll Inner Gain Set)**	**0x01 (Roll Outer Gain Set)**	**0x02 (Pitch Inner Gain Set)**	**0x03 (Pitch Outer Gain Set)**	**0x04 (Yaw Angle Gain Set)**	**0x05 (Yaw Rate Gain Set)**	**0x10 (PID Gain Request)**	
PAYLOAD	Byte 3	Roll Inner P float0	Roll Outer P float0	Pitch Inner P float0	Pitch Outer P float0	Yaw Angle P float0	Yaw Rate P float0	Requested PID Gain Type →	**0: Roll Inner PID Gain**
	Byte 4	Roll Inner P float1	Roll Outer P float1	Pitch Inner P float1	Pitch Outer P float1	Yaw Angle P float1	Yaw Rate P float1	Reserved (0x00)	**1: Roll Outer PID Gain**
	Byte 5	Roll Inner P float2	Roll Outer P float2	Pitch Inner P float2	Pitch Outer P float2	Yaw Angle P float2	Yaw Rate P float2	Reserved (0x00)	**2: Pitch Inner PID Gain**
	Byte 6	Roll Inner P float3	Roll Outer P float3	Pitch Inner P float3	Pitch Outer P float3	Yaw Angle P float3	Yaw Rate P float3	Reserved (0x00)	**3: Pitch Outer PID Gain**
	Byte 7	Roll Inner I float0	Roll Outer I float0	Pitch Inner I float0	Pitch Outer I float0	Yaw Angle I float0	Yaw Rate I float0	Reserved (0x00)	**4: Yaw Angle PID Gain**
	Byte 8	Roll Inner I float1	Roll Outer I float1	Pitch Inner I float1	Pitch Outer I float1	Yaw Angle I float1	Yaw Rate I float1	Reserved (0x00)	**5: Yaw Rate PID Gain**
	Byte 9	Roll Inner I float2	Roll Outer I float2	Pitch Inner I float2	Pitch Outer I float2	Yaw Angle I float2	Yaw Rate I float2	Reserved (0x00)	**6: All PID Gain**
	Byte 10	Roll Inner I float3	Roll Outer I float3	Pitch Inner I float3	Pitch Outer I float3	Yaw Angle I float3	Yaw Rate I float3	Reserved (0x00)	
	Byte 11	Roll Inner D float0	Roll Outer D float0	Pitch Inner D float0	Pitch Outer D float0	Yaw Angle D float0	Yaw Rate D float0	Reserved (0x00)	
	Byte 12	Roll Inner D float1	Roll Outer D float1	Pitch Inner D float1	Pitch Outer D float1	Yaw Angle D float1	Yaw Rate D float1	Reserved (0x00)	
	Byte 13	Roll Inner D float2	Roll Outer D float2	Pitch Inner D float2	Pitch Outer D float2	Yaw Angle D float2	Yaw Rate D float2	Reserved (0x00)	
	Byte 14	Roll Inner D float3	Roll Outer D float3	Pitch Inner D float3	Pitch Outer D float3	Yaw Angle D float3	Yaw Rate D float3	Reserved (0x00)	
	Byte 15	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	
	Byte 16	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	
	Byte 17	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	
	Byte 18	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	Reserved (0x00)	
TRAILER	Byte 19	CHKSUM	CHKSUM	CHKSUM	CHKSUM	CHKSUM	CHKSUM	CHKSUM	