ImmersionRC LapRF Interface Protocol

Version 1.2, Aug 2017

Packet types shaded in green are considered 'essentials' for any implementation

Message ID	Field ID	Name	sent/received by timing system	Length (bytes)	Format	Usage
Common		**Common *TO ALL MESSAGES BELOW***				*elements which are common for most packet types*
	0x01	PILOT_ID	sent/received	1	byte	*the slot for which to set the values (slot 1 to MAX_PILOTS)*
	0x02	RTC_TIME	sent	8	long long	*timestamp, microseconds since startup*
	0x03	STATUS_FLAGS	sent	2	short	*status of puck*
0xDA02		**RF SETTINGS**				*settings for each detection slot*
	0x01	PILOT_ID	sent/received	1	byte	*the slot for which to set the values (slot 1 to MAX_PILOTS)*
	0x20	RF_SETTINGS_ENABLE	sent/received	2	short	*enable/disable slot, 1 = enable, 0 = disable*
	0x21	RF_SETTINGS_CHANNEL	sent/received	2	short	*the channels to set (only informational, value not used, client decides how to interpret))*
	0x22	RF_SETTINGS_BAND	sent/received	2	short	*the band to set (only informational, value not used, client decides how to interpret)*
	0x23	RF_SETTINGS_THRESHOLD	sent/received	4	float	*the detection peak height, ADC codes, typical value 1000 codes, max approx. 3000 codes*
	0x24	RF_SETTINGS_GAIN	sent/received	2	short	*the gain to set - 0: min gain, 31.5dB attenuation , 63: max gain, 0dB attenuation)*
	0x25	RF_SETTINGS_FREQUENCY	sent/received	2	short	*the frequency to set in MHz*
0xDA09		**DETECTIONS**				*(Passing records)*
	0x01	PILOT_ID	sent	1	byte	*the slot for which to set the values (slot 1 to MAX_PILOTS)*
	0x02	RTC_TIME	sent	8	long long	*timestamp, microseconds since startup*
	0x20	DECODER_ID	sent	4	int	*Note: This is not the Slot ID*
	0x21	DETECTION_NUMBER	sent	4	int	*passing number (increments with each passings over the timing system)*
	0x22	DETECTION_PEAK_HEIGHT	sent	2	short	*Level of the peak detected*
	0x23	DETECTION_FLAGS	sent	2	short	*0 or resent flag*
0xDA0A		**STATUS**				
	0x01	PILOT_ID	sent	1	byte	*the slot for which to set the values (slot 1 to MAX_PILOTS)*
	0x21	STATUS_INPUT_VOLTAGE	sent	2	short	*battery voltage, scaled in mV*
	0x02	RTC_TIME	sent	8	long long	*timestamp, microseconds since startup*
	0x22	STATUS_RSSI	sent	4	float	*instantaneous RSSI, in ADC codes, approx. 950 for no signal, ~3500 for max. signal*
	0x23	STATUS_GATE_STATE	sent	1	byte	*state of gate*
	0x24	STATUS_COUNT	sent	4	int	*number of detections (use to detect a communications lapse)*
0xDA07		**SETTINGS**				
	0x20	SETTINGS_NAME	sent	10	bytes	*8 first bits are char names*
	0x22	SETTINGS_STATUS_UPDATE_PERIOD_MS	sent	2	short	*milliseconds between status update messages*
	0x25	SETTINGS_SAVE_SETTINGS	sent	1	bytes	*save settings in EEPROM*
	0x26	SETTINGS_MIN_LAP	sent	4	int	*minimum lap time, in ms, new in post Aug 2017 firmware*
	0x27	SETTINGS_MODULE_ENABLED	sent	1	bytes	*turn modules on/off, in dev for TimingPuckV2*
0xDA08		**DECRIPTOR**				*packet sent out on empty message*
	0x20	PUCK_VERSION	sent	4	int	*puck version (four bytes, version byte1.byte2.byte3.byte4)*
	0x21	PROTOCOL_VERSION	sent	1	byte	*protocol version*

0xDA04		**STATE_CONTROL**				*clean this up, start/stop race currently does nothing, handle on client side*	
	0x20	STATE_CTRL_RACE	sent	1	byte	*start/stop race, 0xff = shutdown, 0xfe = reset, 1 = start race, 0 = stop race*	
	0x21	STATE_CTRL_CALIBRATION	sent	1	byte	*start/stop dynamic calibration*	
	0x22	STATE_CTRL_DATA_DUMP	sent	1	byte	*data dump*	
	0x23	STATE_CTRL_STATIC_CALIBRATION	receive	1	byte	*start static calibration*	
0xDA05		**data dump**					
	0x20	DATA DUMP				*currently unused*	
0xDA06		**CALIBRATION_LOGS**					
		PILOT_ID					
		RTC_TIME					
	0x20	PEAK_HEIGHT	sent	4	float	*detected peak height*	
	0x21	NUM_PEAK	sent	2	short	*detected peak number*	
	0x22	BASE	sent	2	short	*baseline level*	
0xDA0B		**DETECTION_COUNT**					
	0x20	COUNT	sent/receive	4	int	*Request current count*	
	0x21	FROM	sent	4	int	*Request packets from this number*	
	0x22	UNTIL	sent	4	int	*Request packets to this number*	
0xDA0C		**Get/Set time**					
	0x02	RTC_TIME	received	8	long long	*set time since 1 jan 1970 in us.*	
	0x02	RTC_TIME	sent	8	long long	*time value since 1 jan 1970 in us.*	
	0x02	RTC_TIME	received	0	none	*get time value since 1 jan 1970 in us*	
0xDA01		**RSSI/CURRENTLY UNUSED**				*RSSI packet sendout for debug/not used*	
	0x24	RSSI_ENABLE	received	0	none	*enable/disable RSSI statistics packet sendout, returns RSSI sendout state*	
	0x24	RSSI_ENABLE	sent	1	byte (1 true 0 false)	*send out RSSI statistics sendout state*	
	0x25	RSSI_INTERVAL	received	0	none	*get RSSI statistics send out time interval in milliseconds*	
	0x25	RSSI_INTERVAL	sent	4	int	*set RSSI statistics send out interval in milliseconds*	
	0x20	RSSI_MIN	sent	4	float	*minimum RSSI value over sampling period*	
	0x21	RSSI_MAX	sent	4	float	*maximum RSSI value over sampling period*	
	0x22	RSSI_MEAN	sent	4	float	*mean RSSI value over sampling period*	
	0x23	RSSI_COUNT	sent	4	int	*number of RSSI samples over sampling period used for statistics*	
	0x26	RSSI_SDEV	sent	4	float	*standard deviation of RSSI*	
0xDA0D		**Network**					
	0x20	Ping	sent/received	4	int	*send a ping request, returns a ping with the numerical value received*	
Examples							
		5a 0b 00 19 5c 9a 02 da 01 01 01 5b	Query RF Setup for slot 1			Note: 5c is the escape character, with the 9a being inserted	