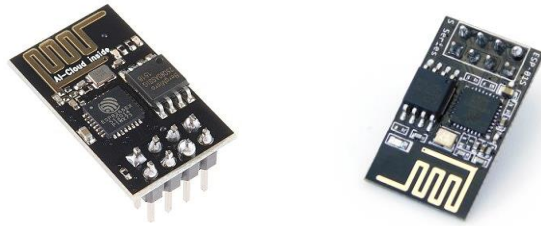


Tx ID :

- UAV identification and location
- WiFi broadcast
- ESP8266 based



### UAV WiFi Identification and Location Set

**UILS** (UAV Identification and Location Set) is two module (Tx – transmit module and Rx – receive module) set designed for autonomous UAV identification and location. It contains two ESP8266 WiFi modules that communicate with onboard UAV navigation computer via serial interface.

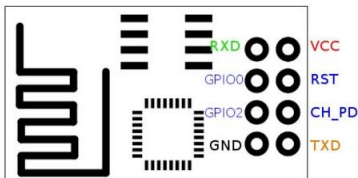
**UILS Tx** module receives navigation data from UAV computer and broadcasts them via WiFi protocol.

**UILS Rx** module receives all UAV WiFi broadcasts in range and transmits them to serial connected device (UAV navigation computer).

#### Disclaimer

**UILS** is distributed as the prototype of UTM (U-space) support device. It has not been airborne (real unmanned traffic) tested yet. You use it for your own risk and for development environments only. No responsibility is taken in case of any damage or malfunction. Copyright © paten law, 2018.

#### Hardware ESP8266



**Power** ESP8266 with **3.3V** (VCC, CH\_PD, RST and also Tx, Rx, GPIOs pins). Provide min. 1.5A current.

#### Regular operation connection

ESP8266	Serial device / Power
VCC, RST, CH_PD	3.3V
TX	RX
RX	TX
GND	GND

#### Firmware update connection

ESP8266	Serial device / Power
VCC, RST, CH_PD	3.3V
TX	RX
RX	TX
GPIO0, GND	GND

**Serial connection** baud rate: 115200

**UILS Tx module** serial protocol (transmit below frames to ESP8266 Rx line)

Example: \$M,25,54.00123,N,024.09856,E,5,360,254,254,D,985,125\*32

Field	Header	AC Type	MTOM	Lat	Lat Sign	Lon	Lon Sign	Alt	Course	Speed	Vario	Vario Sign	Pressure	Radius	CRC Sep	CRC	CR LF
Length (max)	1	1	3	8	1	9	1	5	3	3	3	1	4	3	1	2	2
Values	\$	A M H	1 - 254	DD.ddddd	N S	DDD.ddddd	E W	0 - 64769	1 - 360	0 - 254	0 - 254	C D	797 - 1050	50-250	*	00 - FF	x0Dx0A
Example	\$	M	25	54.00123	N	024.09856	E	5	360	254	254	D	985	125	*	32	x0Dx0A
Unit			Kg * 10	Deg.Decimal		Deg.Decimal		m	Deg	kt	m/s		hPa	m*10			
Remarks												Climb/Descent		12.5m		HEX	

Field separator: “,” (comma). Minimum serial data feed frequency: 2Hz.

**UILS Tx module** serial replies (listen to ESP8266 Tx line): “broadcast ID only : <Tx ID>”, “broadcast : <received serial data>”, “CRC OK”, “error CRC mismatch”

**UILS Rx module** serial protocol (listen to ESP8266 Tx line)

Example: \$-58,eeee,M,25,54.00123,N,24.09856,E,5,360,254,254,D,985,125,74\*0d

Field	Header	RSSI	ID	AC Type	MTOM	Lat	Lat Sign	Lon	Lon Sign	Alt	Course	Speed	Vario	Vario Sign	Pressure	Radius	Frame nb	CRC Sep	CRC	CR LF
Length (max)	1	3	4	1	3	8	1	9	1	5	3	3	3	1	4	3	3	1	2	2
Values	\$		01-FF01-FF	A M H	1 - 254	DD.ddddd	N S	DDD.ddddd	E W	0 - 64769	1 - 360	0 - 254	0 - 254	C D	797 - 1050	50-250	1-254	*	00 - FF	x0Dx0A
Example	\$	-58	eeee	M	25	54.00123	N	024.09856	E	55	360	254	254	D	985	125	74	*	0d	x0Dx0A
Unit					kg * 10	Deg.Decimal		Deg.Decimal		m	Deg	kt	m/s		hPa	m * 10				
Remarks			2 x HEX		1.1kg									Climb/Descent		12.5m			HEX	

Field separator: “,” (comma). UILS Rx module provides multi frame Tx serial output at refresh rate ~0.75Hz.

**CRC calculation**

CRC is calculated as frame bytes XOR from frame string between (excluding) \$ ... \*

CRC checker: <http://www.hhhh.org/wiml/proj/nmeaxor.html>

```
uint8_t calculateCRC(char *string)
{ int XOR = 0; for (int i = 0; i < strlen(string); i++)
  { XOR = XOR ^ string[i]; }
  return XOR; }
```

