Air@link User manual

SwiftLink series: 1.4GHz
Version: 20240908V2.0

Airlink - I

Airlink-II

Version history

Date	Version	Modification description
20240405	V1.0	Initial release
20240908	V2.0	Serial2&SBUS changed from 6PIN to 8PIN, and the line sequence was modified to add Airlink-II product information

Catalogue

1.Product overview

Airlink is a TDD bidirectional digital remote integrated ground receiver. There are two Airlink configurations, Airlink-I and Airlink-II. Both devices support a variety of interfaces such as Wi-Fi, network port, serial port, SBUS, and asynchronous RS422, and both support independent battery pack power supply and external power supply. Both devices are simple to assemble and easy to disassemble. Airlink-I and Airlink-II are available in 2/5/8/10/20W versions. Support real-time environment noise detection adaptive stream, automatic frequency selection, automatic retransmission mechanism, automatic antenna selection, automatic power control, manual frequency mode, multiple sets of coexistence and a series of functions.

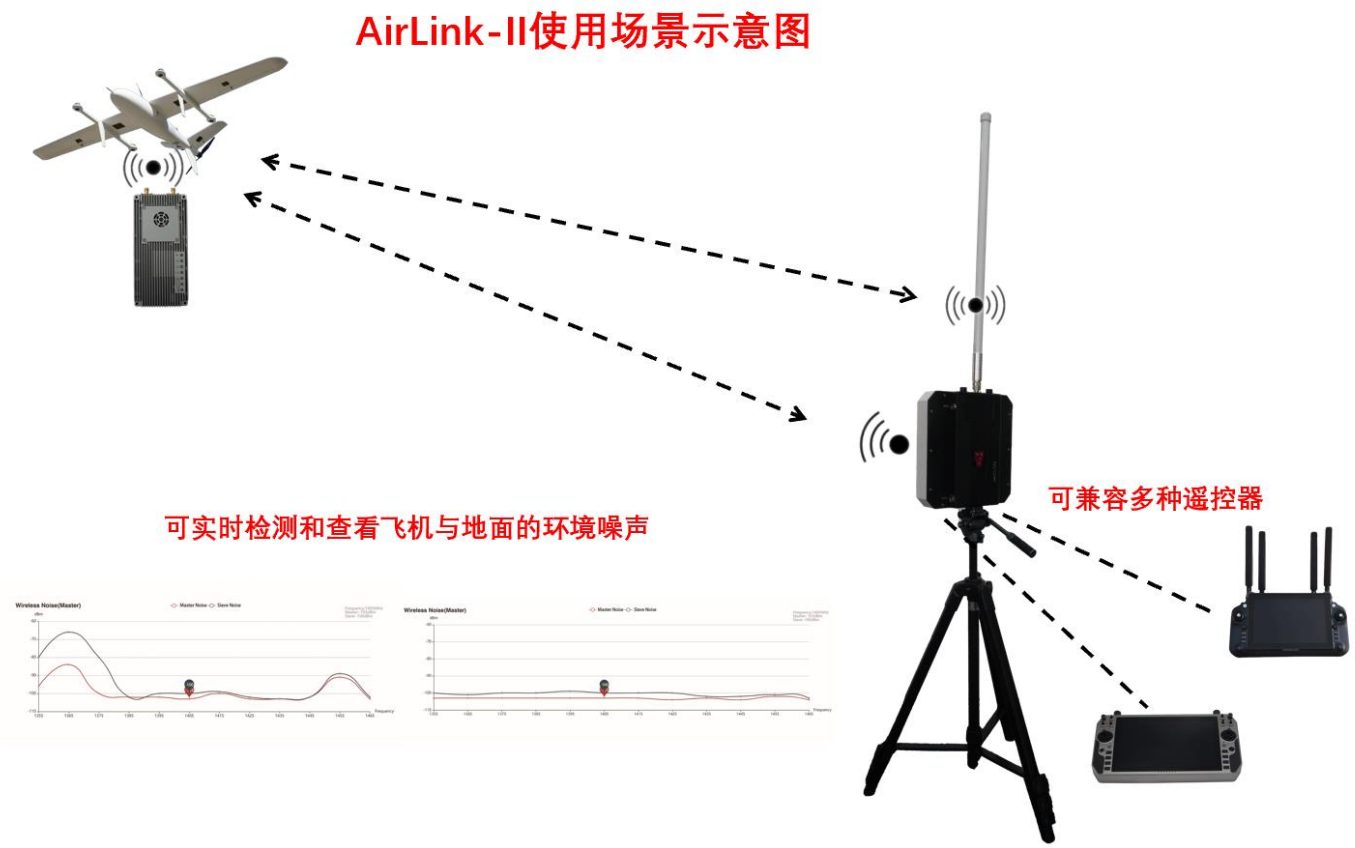
Airlink-I uses two omnidirectional antennas. Airlink-I can support air-to-ground transmission distance of about 30KM with 2W transmission power under clear viewing conditions. 5W air-to-ground can support the transmission distance of about 50KM, 8/10W air-to-ground can support the transmission distance of about 80KM, 20W air-to-ground can support the transmission distance of about 100KM.

Airlink-II adopts a directional + omnidirectional antenna combination scheme. Therefore, Airlink-II usually has better transmission performance than Airlink-I. Airlink-II can support a maximum transmission distance of 60KM with 2W transmission power, 100KM with 5W/8W transmission power, 150KM with 10W transmission power, and 200KM with 20W transmission power.

2.Product characteristics

- Support long-distance transmission: Air to ground 200km(LOS).
- Supports large bandwidth transmission: Up to 17Mbps@10MHz
- Supports automatic relay transmission: Supports automatic repeater addition.
- Supports multi-interface design: Ethernet;WI-FI;RS232;TTL;RS422;SBUS.
- Supports automatic frequency selection: Automatic detection of interference signals, real-time selection of the optimal frequency point.
- Supports automatic retransmission: Automatic retransmission of sudden error data to improve data reliability.
- Supports adaptive stream: The channel modulation mode is automatically adjusted according to the signal quality in real time.
- Supports automatic power control: Close range automatic adjustment of transmission power, reduce power consumption.
- Supports automatic antenna selection: According to the occlusion situation, the optimal antenna transmission is selected in real time.
- Supports upstream and downstream dynamic allocation: The upstream and downstream bandwidth ratio can be automatically allocated based on the data volume in real time.
- Supports the coexistence of multiple sets: Supports simultaneous operation of multiple devices.
- Supports the frequency matching function : It can be used by software and hardware for frequency pairing.
- Supports IP53 level protection: Rainwater and dust proof design.

3.Application scenario



4.Product specifications

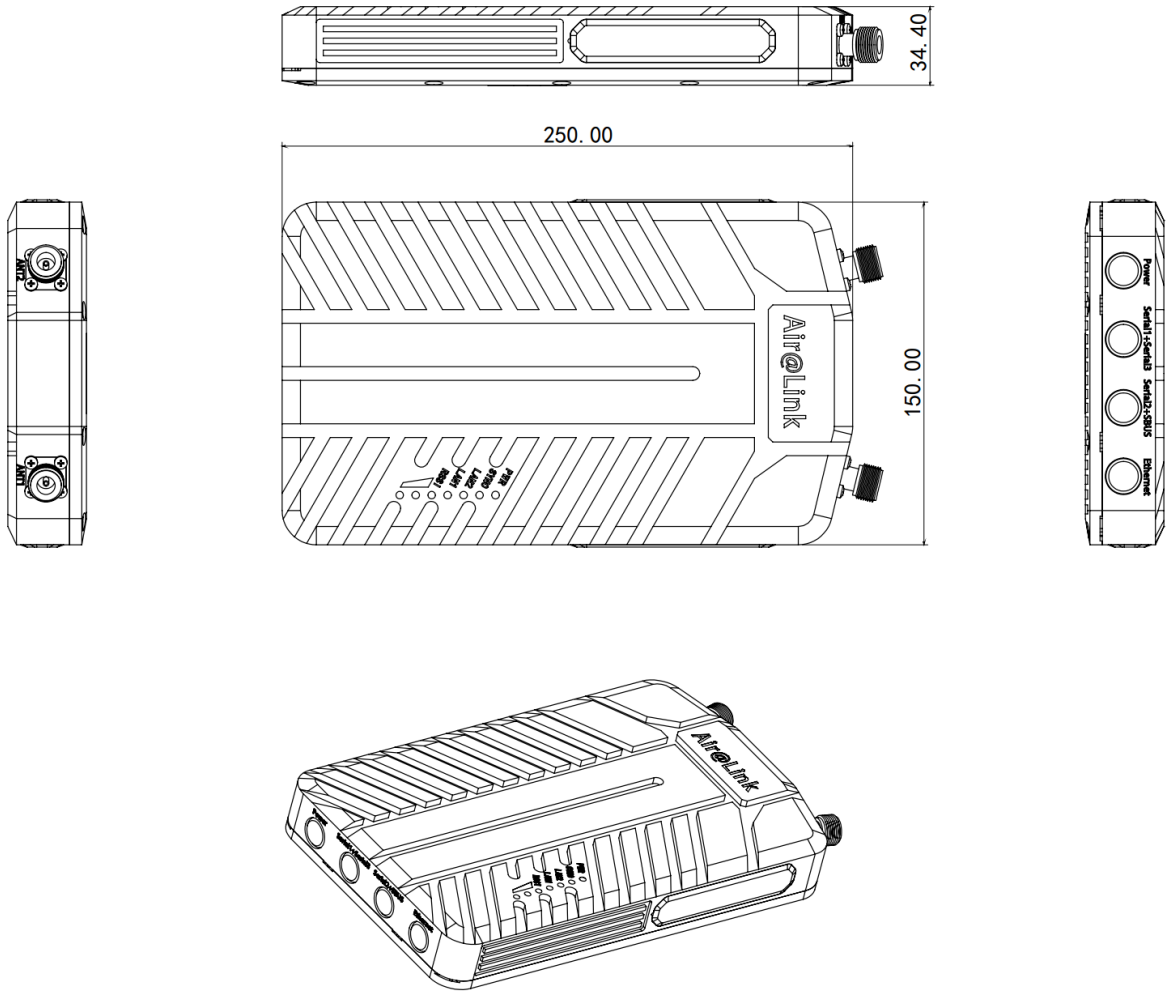
System parameter	Airlink-I Technical index	Airlink-II Technical index
Equipment type	Airlink-I	Airlink-II
Working frequency	1350~1470MHz	1350~1470MHz
RF Channel	2T2R	2T2R
Transmission power	33/37/39/40/43dBm (2W/5W/8W/10W/20W)	33/37/39/40/43dBm (2W/5W/8W/10W/20W)
Transmission distance	Air to ground (LOS): 30KM@2W; Air to ground (LOS): 50KM@5W; Air to ground (LOS):80KM@8/10W; Air to ground (LOS):100KM@20W;	Air to ground (LOS): max: 60KM@2W; Air to ground (LOS): max: 100KM@5W/8W; Air to ground (LOS): max: 150KM@10W; Air to ground (LOS): max: 200KM@20W;
Channel bandwidth	10MHz	10MHz
Modulation mode	QPSK/16QAM	QPSK/16QAM
Receiving sensitivity	See Table 2	See Table 2
Maximum speed	16.8Mbps@16QAM3/4	16.8Mbps@16QAM3/4
Encryption	AES256	AES256
Transmission delay	≤10ms	≤10ms
RF Interface	N*2	N*1
Data interface	Ethernet*1; WIFI *1	Ethernet *1; WIFI *1
	TTL/RS232*2; RS422*1; SBUS*1	TTL/RS232*2; RS422*1; SBUS*1
Consumption	≤15W	≤15W
Protection	IP20(air unit), IP53(ground unit)	IP20(air unit), IP53(ground unit)
Dimension	250mm*150mm*34.4mm	259mm*259mm*76mm
Weight	1.5KG	1.5KG
Working voltage	DC9~36V	DC9~36V
Working temperature	-40~+65℃	-40~+65℃

Table 2　MCS and sensitivity (10MHz bandwidth)

No.	MCS	Total throughput (Mbps)@2W/5W/10W/20W				Sensitivity (dBm)
1	QPSK1/3	4.1	4.0	3.8	3.7	-99
2	QPSK1/2	6.0	5.8	5.6	5.3	-98
3	QPSK2/3	7.3	7.1	6.8	6.5	-97
4	QPSK3/4	8.4	8.2	7.8	7.5	-96
5	16QAM1/3	8.2	8.0	7.6	7.3	-96
6	16QAM1/2	12.0	11.6	11.1	10.7	-95
7	16QAM2/3	14.6	14.3	13.7	13.1	-93
8	16QAM3/4	16.8	16.4	15.7	15.1	-91

5.Product dimension and weight

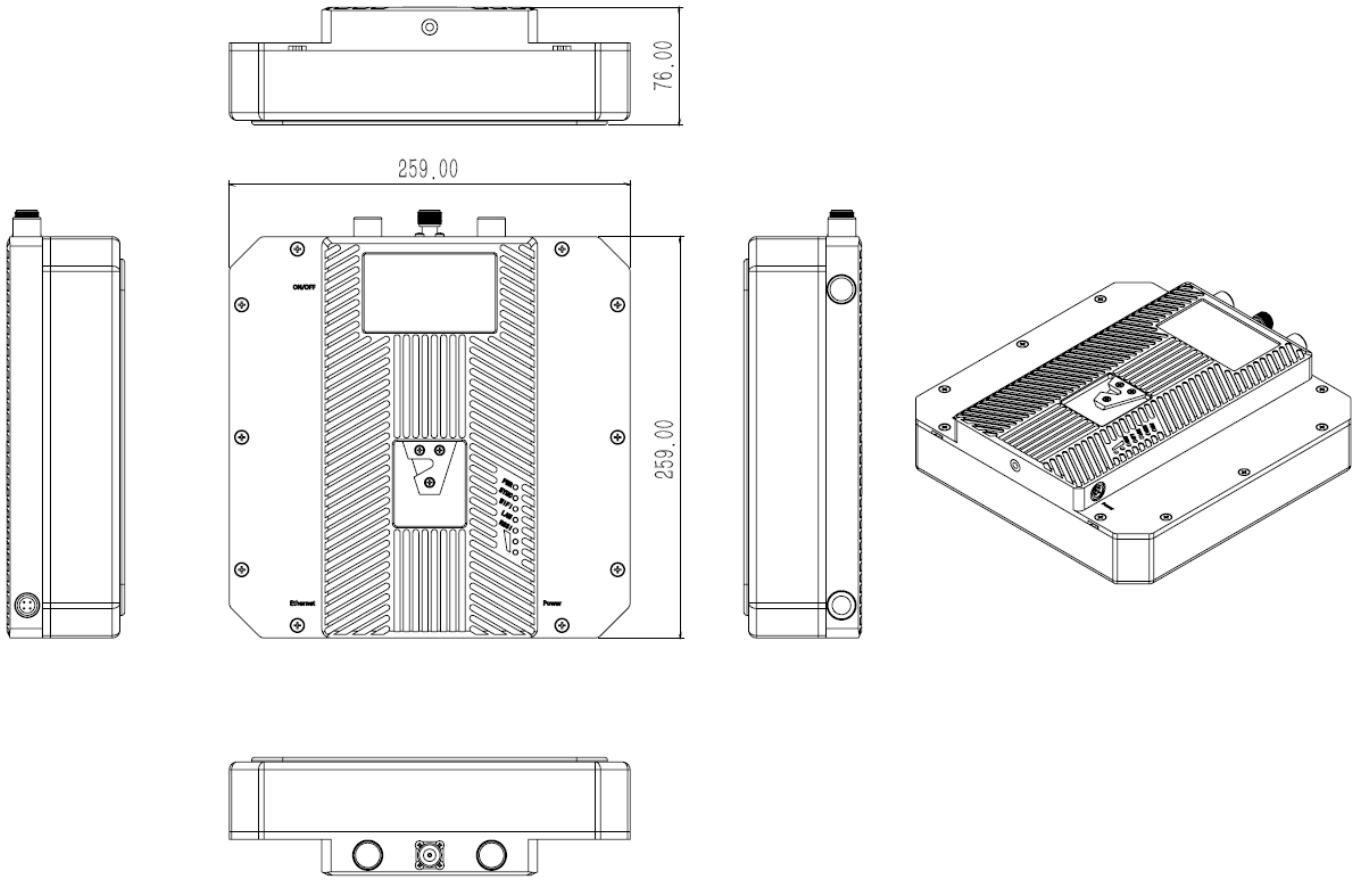
5.1 Airlink-I Dimensional diagram



5.2 Airlink-I Dimension and weight

- Dimension: 250mm*150mm*34.4mm（N headers are not included）
- Weight: 1.5KG

5.3 Airlink-II Dimensional diagram

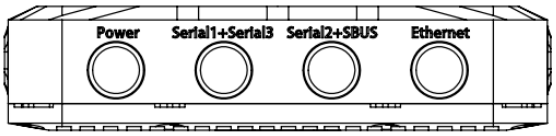


5.4 Airlink-II Dimension and weight

- Dimension: 259mm*259mm*76mm (N headers are not included)
- Weight: 1.5KG

6.Product interface definition

6.1 Airlink-I Interface diagram



The Airlink-I device has four data ports, including power ports from left to right, serial ports 1 and 3, serial ports 2 and SBUS, and one 100 Mbit/s network port. Airlink also supports Wi-Fi connectivity. You can configure parameters or view parameters instead of using network ports.

6.2 Airlink-I Interface definition

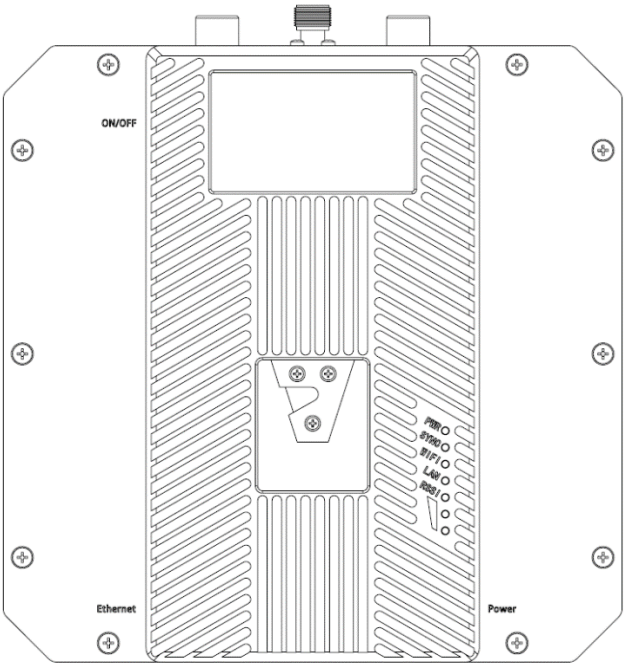
Power supply:DC9-36V. Typical value Input voltage: +24V.

Interface definition	Name	Lemo-Line colour	Interface description	Signal direction
POWER (4PIN)	Power+	Red&white,red	Power positive	I
	Power+	Blue&black,blue	Power positive	I
	Power-	Black&white,black	Power Negative	I
	Power-	Green&black,green	Power Negative	I
Serial1 & Serial3 (7PIN)	422A	red	422 RX+	I
	422B	Red&white	422 RX-	I
	422Z	black	422 TX-	O
	422Y	Black&white	422 TX+	O
	TXD_A	green	Serial port 1 TX	O
	RXD_A	Green&black	Serial port 1 RX	I
	GND	blue	Serial port 1 ground	I
Serial2 & SBUS (8PIN)	TXD_B	Red&white	Serial port 2 TX	O
	RXD_B	red	Serial port 2 RX	I
	GND	Green&black	Serial port 2 ground	O
	SBUS1_R	blue	SBUS1 receive	I
	+5V	Blue&black	SBUS 5V@1A Output	O
	GND	green	SBUS ground	O
	SBUS2_R	Black&white	SBUS2 receive	I
	GND	black	SBUS ground	O
Ethernet (8PIN)	RJ45		Ethernet * 1	IO

Note 1: Signal direction I indicates radio input and direction O indicates radio output

Note 2: When using the serial port 1/2 of the device, please check whether it is TTL level or RS232 level

6.3 Airlink-II Interface diagram



The Airlink-II device has one SMA interface and two WIFI antennas at the top, and SMA is used for the installation of omnidirectional antennas. There are two LEMO interfaces below. One is a 4-pin POWER interface, the other is a 26-pin data interface Ethernet, which supports one network port, two serial ports, one asynchronous 422 and two SBUS.

6.4 Airlink-II Interface definition

Power supply:DC9-36V. Typical value Input voltage: +24V.

Airlink-II Power interface 4PIN Definition specification				
Linear order	Pin name	Interface definition	Interface description	Signal direction
1	PWR	Power supply: 4PIN DC 9~36V	Power positive	I
2	PWR		Power positive	I
3	GND		Power negative	I
4	GND		Power negative	I

Airlink-II Data interface 26PIN Definition specification				
No.	Pin name	Interface definition	Interface description	Signal direction
1,2	NC	reserve	reserve	
3,4	GND	ground	ground	
5	422A	Serial port 3 RS-422	RX+	I
6	422B		RX-	I
7	422Z		TX-	O
8	422Y		TX+	O
9	TXD_A	Serial port 1 RS232/TTL	TX	O
10	RXD_A		RX	I
11	TXD_B	Serial port 2 RS232/TTL	TX	O
12	RXD_B		RX	I
13	GND		Serial port 2 ground	O
14	SBUS /TTL TX	Serial port 4 SBUS*2/TTL*1 (see notes 2,3)	SBUS output(air)	O
15	SBUS /TTL RX		SBUS input(ground)	I
16	GND		TTL ground	O
17	TX1P+	Ethernet 1	TX+	O
18	TX1M-		TX-	O
19	RX1P+		RX+	I
20	RX1M-		RX-	I
21	GND	ground	Serial port 1ground	O
22-25	NC	reserve	reserve	
26	5V	SBUS 5V output	SBUS 5V@1A output	O

Note 1: Signal direction I indicates radio input and direction O indicates radio output

Note 2: SBUS14 and 15pin at the ground end are in, and SBUS14 and 15pin at the sky end are out.

Note 3: If two Subs are required, set the sky SBUS mapping to 14pin->14pin. 15pin->15pin.

7.Product status light meaning

PWR（green）

When the PWR indicator is on, the device is powered on.

SYNC（green）

The indicator is blinking. After synchronization, the light is steady on.

WIFI light（green）

When the device is turned on, the WIFI light blinks.

LAN1（green）

When the network port has data receiving and sending, the network port light flashes.

Receiving signal energy light（3 RSSI green lights)

The greater the number of energy lights, the greater the signal reception strength.

The RSSI lamp represents the strength of the received signal	
RSSI Number of energy lights	Received energy dBm
3 RSSI lights are on	-50dBm
2 RSSI lights are on	-80dBm
1 RSSI light is on	-95dBm

The status indicators of Airlink-I and Airlink-II are the same.

When the Airlink device is powered on, the PWR indicator is steady on. When the SYNC indicator is not synchronized, the RSSI indicator of the Airlink device is blinking. Airlink's SYNC light is on when it is synchronized with the sky terminal. The RSSI lamp shows the energy intensity of the received signal. When the network port is wired and data is being sent or received, the LAN indicator of the Airlink blinks. Otherwise, no connection is available, or the network connection is abnormal.