FD-61MN Wireless IP MESH Ethernet & Full Duplex TTL Serial Data Link

Introduction

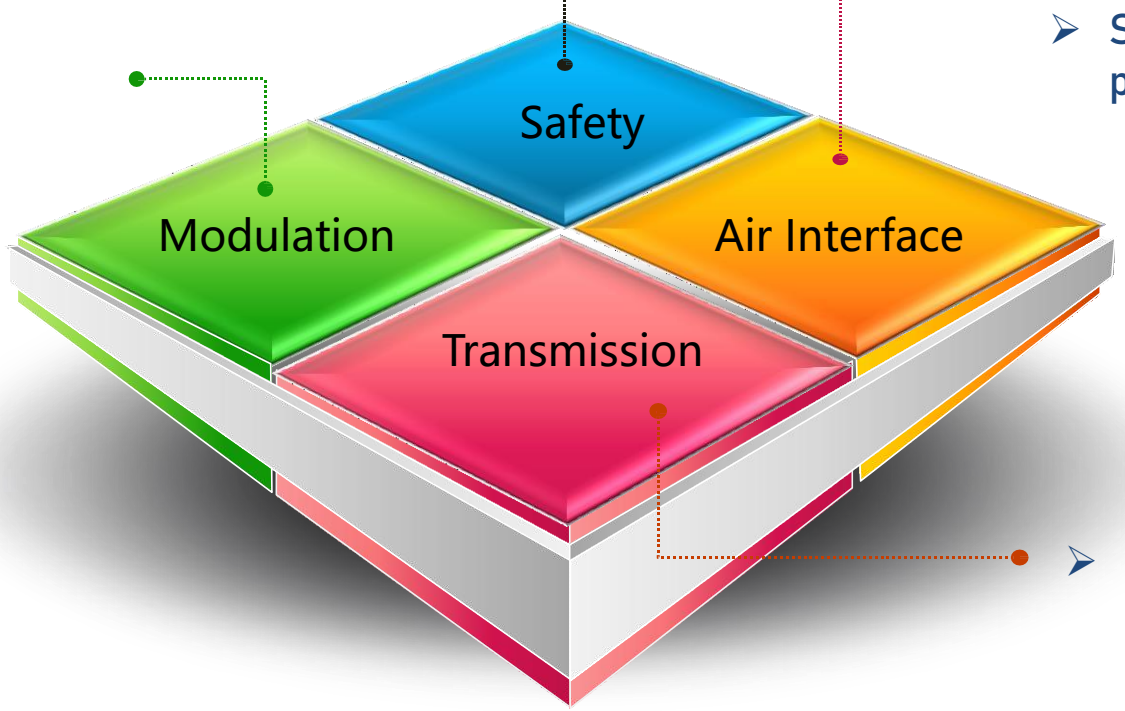
- FD-61MN is a wireless transmission product designed by IWAVE based on mature SOC chipset, which is a IP MESH radio offering full duplex TCPIP/UDP data and control TTL data communication.
- FD-61MN is designed based on TD-LTE wireless communication standard. It doesn't rely on any carrier's base station.
- Supports Ethernet and full duplex TTL data transmission. And the control data transmission is higher priority than the network signal.
- It adopt the automatic frequency hopping technology(FHSS) for anti-interference greatly reduce system power consumption and size of the module.
- Self-forming, self-healing mesh architecture
- Support obtain serial port information via IP
- 3*Ethernet port for accessing various terminals
- Wide voltage input: DV5-32V
- Low latency IP communication
- Support WEBUI/API/management software for network management and parameters configurable.

Core Technology of Digital Transmission Scheme

- Access authentication to prevent illegal access
- Support user-defined encryption
- Band scanning to avoid interference
- Cross-band frequency hopping reduces interference effects

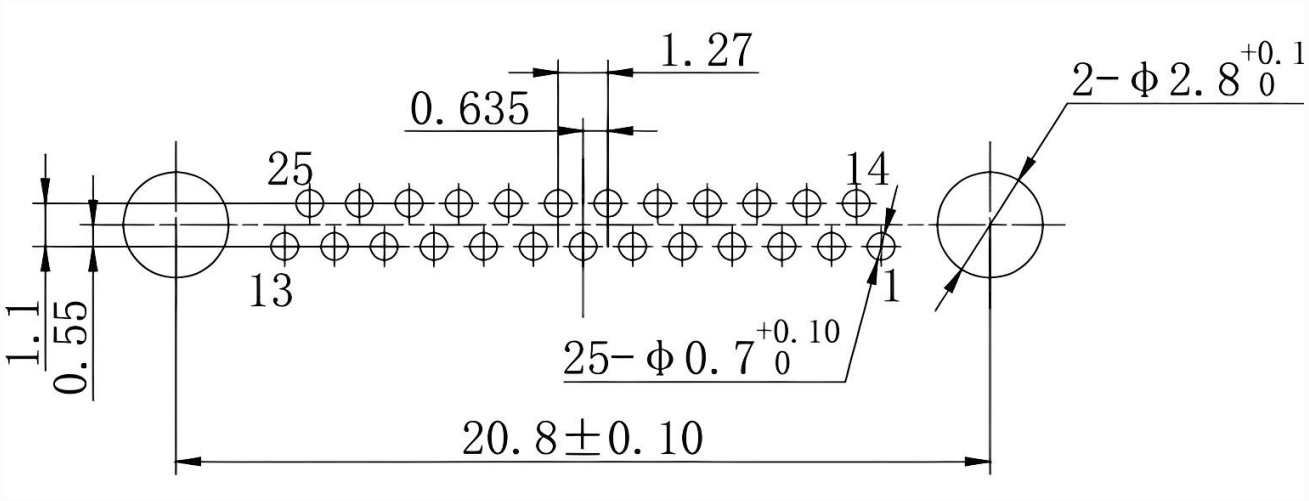
- 800MHz/1.4GHz/2.4GHz for option
- Bandwidth: 5/10/20Mhz
- Support frequency/rf power/appearance customized design

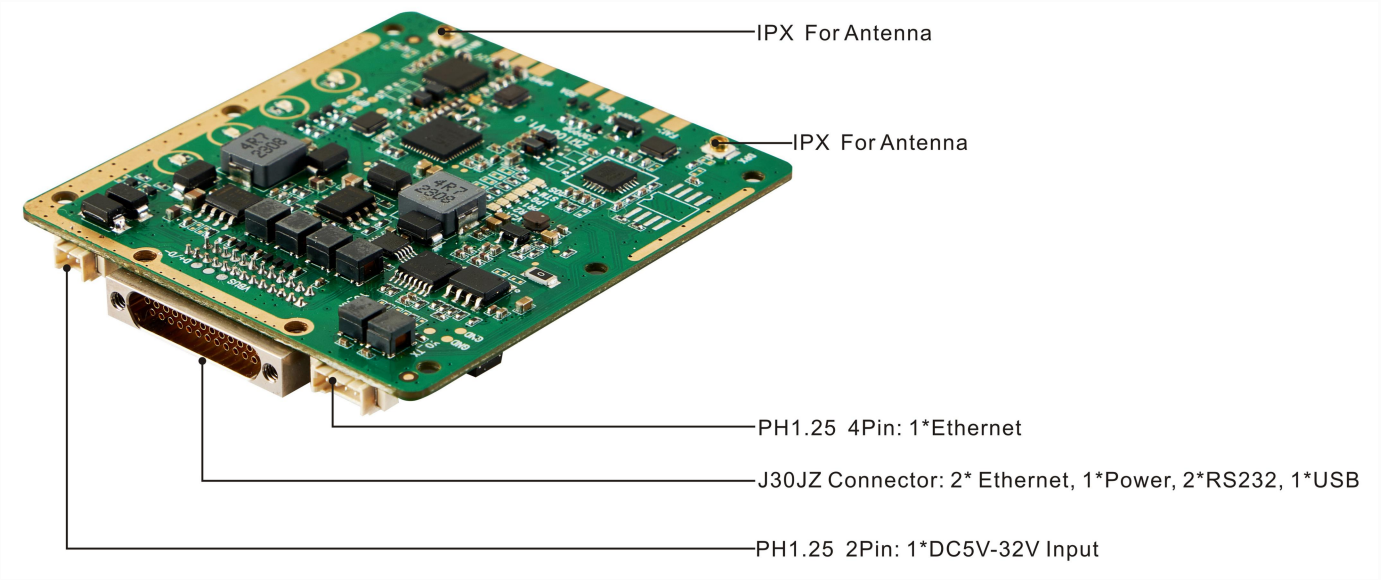
- OFDMA
- TDD
- 64QAM、16QAM、QPSK



- 30Mbps data rate

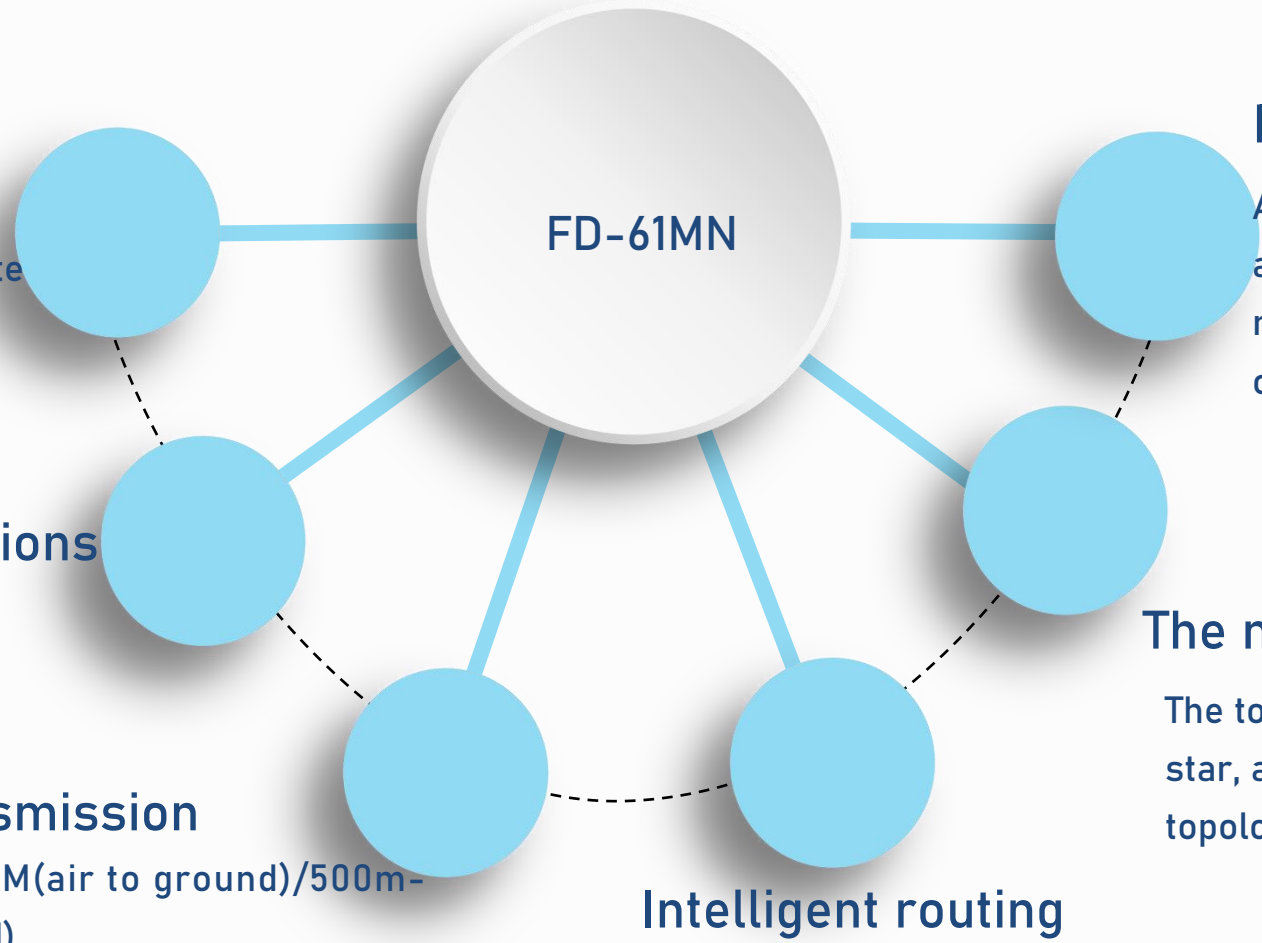
Interface Definition





Pin	Name	Pin	Name
1	TX0+	14	RX0+
2	TX0-	15	RX0-
3	GND	16	RS232_TX
4	TX4-	17	RS232_RX
5	TX4+	18	COM_TX
6	RX-	19	COM_RX
7	RX+	20	UART0_TX
8	GND	21	UART0_RX
9	VBUS	22	BOOT
10	D+	23	VBAT
11	D-	24	GND
12	GND	25	DC VIN
13	DC VIN		

Advantages



Support 16 nodes

Any node can freely communicate

Power Adaptive

According to the channel conditions, adaptively adjust the transmitting and receiving power to reduce power consumption and network interference

Diverse bandwidth options

1.4M/3M/5M/10M/20Mhz

The network topology is variable

The topology can be switched between linear, star, and mesh topologies or multiple topologies coexisting

Long Distance Transmission

One hop distance up to 17KM(air to ground)/500m-3KM(NLOS ground to ground)

Intelligent routing

The network automatically switches routes based on factors such as the number of transceiving and channel environment.

Technical Specification

General	
Technology	MESH base on TD-LTE Wireless technology standard
Encryption	ZUC/SNOW3G/AES128
Date Rate	30Mbps(Uplink and Downlink, all nodes share this data rate)
	Adaptive average distribution of system rate
	Support users to set speed limit
Communication Range	10km-15km(Air to ground) 500m-3km(NLOS Ground to ground)
Node	16nodes
Bandwidth	1.4MHz/3MHz/5MHz/10MHz/20MHz
RF Power	25dBm±2
Adaptive Modulation	QPSK, 16QAM, 64QAM
Anti-Jam	FHSS, frequency hopping cross-band or within band
Frequency Band	
1.4Ghz	1428-1448MHz
800Mhz	806-826 MHz
2.4Ghz	2402-2481 MHz

Wireless		
Communication Mode	Any two nodes can communicate with each other(unicast, multicast, broadcast)	
Transmission Mode	Full duplex communication between nodes	
Networking Mode	Mesh networking	
Access mode	Multiple logical slave nodes are powered on and access the network at the same time	
Network Control	State Monitoring	Connection status /rsrp/ snr/distance/ uplink and downlink throughput rates
System Management	WATCHDOG: all system-level exceptions can be identified, automatic reset	
Re-transmission	HARQ retransmission	
Data Link	Dynamically adjust the rate based on wireless data	
Time Synchronization	Self-synchronizing, independent of external clock	
Latency	Air Interface	Single hop transmission delay<=30ms
	Transmission delay	8 nodes, serial 7 hops, one-way<500ms(depends on working environment)
	Boot delay	<15s
	Shutdown delay	<10s
Systems Control	Parameter Configuration	Transmit power/frequency/bandwidth (real-time change), frequency band (non-real-time change)
	Status/Parameter Reporting	Connection status/rsrp/snr/distance/uplink and downlink throughput rates, etc.
Configuration & Management	WebUI/ Management software /API/ Serial Port	

Technical Specification

Envrionment		
Storage Temperature	-40℃~+85℃	
Working Temperature	-20℃~+70℃	
Humidity	5%~95%	
Power		
Power Input	DC5V-32V	Power Input
Average Power Consumption	5W	Average Power Consumption
Max Power Consumption	8W	Max Power Consumption
Max Transmitting Power	25±2dBm	

Physical		
Interface	J30JZ Connector	2*Ethernet port
		2*RS232
		1*Power Input
	PH1.25 4Pin	1*Ethernet
	RF Connector	2*IPX
	PH1.25 2Pin	2*Power Input
Dimension	60*55*5.7mm	
Weight	26g	

Heat Dissipation

- Continuous working of the FD-61MN requires a heat dissipation treatment
- Adding a cooling aluminum sheet or fan for heat dissipation
- The heat dissipation design can be evaluated according to 5Watts

Sensitivity

Receiver Sensitivity(Access state)			Sensitivity(BLER≤3%)(Data transmission state)					
1.4GHZ	20Mhz	-100dBm	1.4Ghz	10MHz	-91dBm(10Mbps)	2.4Ghz	20Mhz	-94dBm(10Mbps)
	10MHZ	-103dBm		10MHz	-96dBm(5Mbps)		20Mhz	-97dBm(5Mbps)
	5MHZ	-104dBm		5MHz	-82dBm(10Mbps)		10Mhz	-91dBm(10Mbps)
	3MHZ	-106dBm		5MHz	-91dBm(5Mbps)		10Mhz	-96dBm(5Mbps)
800MHZ	20Mhz	-100dBm		3MHz	-86dBm(5Mbps)		5Mhz	-84dBm(10Mbps)
	10MHZ	-103dBm		3MHz	-97dBm(2Mbps)		5Mhz	-93dBm(5Mbps)
	5MHZ	-104dBm		2MHz	-84dBm(2Mbps)		3Mhz	-87dBm(5Mbps)
	3MHZ	-106dBm	800Mhz	10MHz	-91dBm(10Mbps)		3Mhz	-98dBm(2Mbps)
2.4GHZ	20Mhz	-99dBm		10MHz	-97dBm(5Mbps)		1.4Ghz	-84dBm(2Mbps)
	10MHZ	-103dBm		5MHz	-84dBm(10Mbps)			
	5MHZ	-104dBm		5MHz	-94dBm(5Mbps)			
	3MHZ	-106dBm		3MHz	-87dBm(5Mbps)			
				3MHz	-98dBm(2Mbps)			
				2MHz	-84dBm(2Mbps)			

Control Data Transmission

Command Interface	AT command configuration	API/HTTP/UART for AT command configuration
Configuration Management	Support configuration via WEBUI, API, and management software	
Working Mode	TCP server mode TCP client mode UDP mode UDP multicast MQTT Modbus	● When set as a TCP server, the serial port server waits for computer connection. ● When set as a TCP client, the serial port server actively initiates a connection to the network server specified by the destination IP. ● TCP server, TCP client, UDP, UDP multicast, TCP server/client coexistence, MQTT
Baud rate	1200, 2400, 4800, 7200, 9600, 14400, 19200, 28800, 38400, 57600, 76800, 115200, 230400, 460800	
Protocol	ETHERNET, IP, TCP, UDP, HTTP, ARP, ICMP, DHCP, DNS, MQTT, Modbus TCP, DLT/645,Pass-through mode	
System Management	Supports WATCHDOG function, all system-level exceptions can be identified and automatically reset	

Robot Mobile Communication

- Drone/robot collaborative networking
- Stable/real-time/long-distance communication
- MESH networking
- hd video transmission for NLOS/LOS

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