# **T900-MINIseries User Guide**

Version: 20230410V2.0



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## **1.Product Introduction**

The T900-MINI series is a miniaturized digital radio of the T900 series. The T900-MINI series mainly includes T01 and T02 models. The only difference between the two is the interface. The T01 is mainly used for the UAV end, while the T02 uses the Type C interface for the ground end. Both of them have the characteristics of small size, good integration and high sensitivity. T900-MINI series products work in the frequency band of 902~928MHz. In a good environment, the maximum transmission distance can reach 60KM.



5V GNDTX RX	DC7-26V	

T01 Module and Interface Diagram



TO2 Module and Interface Diagram

## **2.Product Accessories**

#### **2.1.T01** Accessories

T900-MINI-T01 Accessories (one)								
No.	Name	Description	Quantity					
1	T900-MINI-T01	T01 Module	1					
2	Small glue stick antenna	2.5dBi	1					
3	XT30 Semi-bare power cable		1					
4	GH1.25-4pinSerial port semi- bare cable		1					



#### **2.2.T02** Accessories

T900-MINI-T02 Accessories (one)								
No.	Name	Description	Quantity					
1	T900-MINI-T02	T02 Module	1					
2	Small glue stick antenna	2.5dBi	1					
3	Type C to USB cable		2					





T900-MINI-T02 Module

TypeC to USB cable



Small glue stick antenna

## **3.Product Connection**

#### 3.1.T01 Connection Diagram



T900-MINI-T01 Connection steps:

- SMA Connected antenna.
- The power supply to T01 is DC7~26V, typical value is +12V.
- The serial port can be connected in the following ways. The serial port can also be used to configure AT command parameters.

(Notes: Please confirm whether the serial port of the T01 device is TTL level or RS232 level).



#### 3.2.T02 Connection Diagram



T900-MINI-T02 Connection Steps:

SMA Connected antenna.

Two USB cables are connected to the computer. The USB port not only provides 5V power supply, but also supports data transmission and parameter settings. The DC5V port provides power supply only.

## **4.Product Use**

#### 4.1.T01/T02 Power Supply

The T900-MINI-T01 uses DC power supply. The power supply voltage ranges from 7 to 26V, and the typical operating value is +12V. The maximum current required for 100% transmission of T01 data at different voltages is shown in the table below.

Supply Voltage	Peak Current (A)	Average Current (A)
7V	1.03A	0.76A
12V	0.60A	0.44A
24V	0.30A	0.22A
26V	0.28A	0.20A

• The T900-MINI-T02 device is powered by DC5V and USB simultaneously.

#### 4.2.T01 Interface Definition



The T01 device has two interfaces, one serial port and one power supply port.

When connecting the serial port, note whether the device is TTL level or RS232 level.

The power port uses the male head of the XT30 terminal and supports 7 to 26V.

NO.	Interface	Description	Remarks
1	GH1.25-4PINSerial	White line: RX	Note that the serial
	port	Yellow line: TX	port is TTL level or
		Black line: GND	RS232 level
		Red line: 5V@1A Output	
2	XT30 Power male	DC7~26V	
	head inner needle		

#### 4.3.T02 Interface Definition



The T02 interface is two Type C ports, both with standard 5V voltage. The USB identification interface supports both power supply and data transmission. The DC5V port provides power supply only.

No.	Interface	Description	Remarks
1	USB	It can supply power, transmit data and configure parameters	
2	DC5V	Power supply only	

#### 4.4.T01/T02 Indicator Meaning



#### Emission lamp TX (RED)

When the TX lights up, it indicates that the module is sending data.

#### Receiving lamp RX (RED)

When RX lights up, it indicates that the module is receiving data.

Power on to configure the SET button.

Press and hold the SET button and then power on. The release button will enter the AT command is used to set parameters.

#### Receive signal strength light (RSSI green lights)

The greater the number of power lights, the greater the signal receiving strength.

The RSSI lamp represents the strength of the received signal								
Number of RSSI Energy Lights On	Energy Received dBm							
All three RSSI lights on	About -50dBm							
Two RSSI lights on	About -80dBm							
One RSSI light on	About -95dBm							

Module Type	Mode	T900-MINI Series Indicator Status						
		RX	ТХ	RSSI 123				
All	AT Command	Turn off	Turn off	Turn off				
	Configuration Mode							
Master	Normal operation	Flashing when receiving	Turn on (steady light)	Proportional to the received				
		data		signal strength				
Slave	No-sync	Turn off	Turn off	Cycle light every 860ms				
Slave	Synchronization	Turn on (steady light)	Flashing when sending	Proportional to the received				
			data	signal strength				
Repeater	No-sync	Flashing alternately with the	Flashing alternately with	Cycle light every 860ms				
		sanding light	the receiving light					
Repeater	Synchronization	Flashing when receiving	Flashing when sending	Proportional to the received				
		data	data	signal strength				
		Otherwise on	Otherwise on					

When the master and slave devices are successfully paired, the power indicator and TX indicator of the master device are steady on, and the power indicator and RX indicator of the slave device are steady on. If the master/slave pairing fails, the RSSI of the salve device is always in the search state. In this case, you should re-check the configured parameters. When data is being sent or received over the serial port, the RX indicator of the master device and the TX indicator of the slave device blink.

#### 4.5.AT Software Parameter Configuration

You can configure the parameters of the AT command by using the general serial port Assistant or using the AT software of the upper computer.

🚺 (★有新	版本V5.13.1	*)SSC	OM V5	.12.1 串口	]/网络数排	目调试器	],作者:3	小猛(大	虾丁丁)	,26180	)58@qi	q.com. (	QQ群		_		$\times$
通讯端口	串口设置	显示	发送	多字符串	小工具	帮助	回报作	渚 PC	B打样								
Welcome To OK at&v T900 900MHz Hop Zhejiang T www.okseek Hardware V Firmware V Software V Serial Num	Use T900 ping Radio 3 ianze Commu er.com ersion 60130 ersion 0001- ersion 0001- ber 01-20220	System nicati 6B-30-3 -20220 -20220 0708-0	on LTD. IPEX 301-0A 727-0A 307	,													~
Network Ty Wireless L NetWork Ad Synchronou Serial Bau Data Forma Repeater Y Encryption RSSI Form OK	pe ink Rate dress(ID) s Address d Rate t t /N Enable Master(dBm)	S13 S10 S10 S111 S10 S111 S14 S15 S12	3=1 3=2 4=1 3=0 2=1 0=1 1=0 3=-255	Ope Out Uni Dex Ser Rep Rep RSS	erating M put Powe t Addres stination ket Retr ial Chan peater In peaters I SI Form S	ode r(dBm) s Addres ansmiss nel Mod dex Use ndex laver(d	s ions e Gpio Bm)	3101=2 3108=30 3105=0 3140=0 3113=3 3142=0 3142=0 3114=1 3124=-25	5								
清除窗口	打开文件							发送文件	≠ 停止	清	安浜区	□ 最前	🗌 Eng	glish	保存會	る数	扩展 —
端口号 COM	13 USB Seri	al Por	t	▼   HE	X显示 -	保存数据	s  □ i	制物	到文件	⊢ HE)	发送 🗆	定时发	送: 10	0 7	is/次	マ加	回车换行
④ 关闭	第日 🕑	更多	串口设	置口加		分包显示	た 超時	时间: 20	) ms	第1	字节至	末尾加核	验: No	ne		•	
	DTR 波特革	≊: <b>1</b> 15	200	▼ atôrv													^
【PCB打样】 当然就是嘉	哪家强? 立创! [进入]		发送														~
【升级到/5	. 13. 1】 ★合	宙高性	价比4G	糞块值得-	-i式 ★RT-	Thread	中国人的	9开源免	费操作系	🤅 ★	新一代W	iFi芯片	兼容826	6支持	<b>∳</b> RT-Th	read ;	★8км)元距
www.daxia	.com S:20		R:93	6	COM13	已打开	11520	0bps,8,	1,None	,None							

You can use the general serial port terminal, through the data serial port, and use the AT command to configure parameters. For details about how to configure the AT command, see Chapter 6 of the T900 User Manual. Chapter 5 of the T900 User Manual describes how to enter the AT command mode. SSCOM specifies the parameters for configuring the universal serial port tool:

- 1) Correctly connect the serial port to the power supply, set the correct baud rate, and turn on the serial port.
- 2) Enter '+++' to enter the AT command mode.
- 3) Enter AT&V to display the current configuration parameters.
- 4) Use the AT command to configure the required parameters (see AT command/Register instructions in Chapter 6 of the T900 User's Manual).
- 5) After the configuration is complete, enter AT&W to save the parameters.
- 6) Enter ATA to exit the AT command mode and start to work normally.

You can also use the T900 AT configuration platform to configure parameters through the data serial port. AT The upper computer software allows users to quickly configure the T900. All its functions can also be realized by manually inputting AT commands through the above general serial port tool.

👯 T900	)AT配置平	台)	/2.6	5			- + ×
网络类型 输出功率 网络ID 串口波特率 RS232/RS485	点对点 30 1234567890 9600 RS232			运行模式 空口速率 串口格式 本机地址 同步地址	从模式 172800 8N1 0 0		申口: COM50 9600 火間 进入AT模式
是否有中继 中继序号 信道接入方式 加密开关 硒44654	无中继 1 RTS/CTS OFF			目标地址 数据重传次数 TDMA最大地址 加密密钥	0 3 6 0020-20221017-01		查询 保存 退出AT模式
生产序号	01-20221110-0370			固件版本	0001-20221121-0A	]	恢复出厂设置 升级
Welcome To Us OK send: AT&V	e T900						清除

AT software configuration parameters:

- After setting the correct baud rate, open the serial port. (The general baud rate is 9600/115200bps).
- Click to enter AT mode (send '+++'), the data frame will return Welcome to Use T900 OK, indicating that the AT mode was successfully entered.
- Click Query (send AT&V), and the queried parameters will be displayed one by one in the parameter list on the left.
- 4) After modifying the corresponding parameter as required, click the yellow button on the right of the parameter box (send AT command to set).
- 5) After all parameters to be modified are configured, click Save button (send AT&W).
- 6) Click the Exit AT mode button (send ATA) to return to the normal working state.

🔍 T900 AT配	置平台V2.6	- + ×
网络类型       输出功率       网络ID       串口波特率	· 运行模式       · 空口速率       · 申口格式       · 本机地址	●       ●       □
RS232/RS485       是否有中继       中继序号       信道接入方式       加密开关	<ul> <li>◆ 升级</li> <li>◆ 版本发布文件/FPGA版本发布/T900_60136B-30-IPEX_6</li> <li>5%</li> <li>Ⅰ 伊加载中</li> </ul>	<ul> <li>         → 単入AT模式         → 進入AT模式         <ul> <li>         → 重询         <ul> <li></li></ul></li></ul></li></ul>
硬件版本 生产序号	软件版本       固件版本	恢复出厂设置       升级

#### 4.6. AT Software Upgrade

网络类型       /       运行模式       ////////////////////////////////////	🔍 T900 AT配置	置平台V2.6	- + ×
	网络类型 输出功率 网络ID 串口波特率 RS232/RS485	·     ·     运行模式       ·     ·     空口速率       ·     ·     申口格式       ·     ·     ·	□ (A) □ (A)
硬件版本     软件版本     恢复出厂设置       生产序号     固件版本     升级	是否有中继	<ul> <li>♀,升级     ご版本发布文件/FPGA版本发布/T900_60136B-30-IPEX_     5%     ₩ ₩     </li> <li>固件加载中</li> </ul>	<ul> <li>★ 进入AT模式</li> <li>● 登询</li> <li>● 登询</li> <li>● 保存</li> <li>● 退出AT模式</li> </ul>
清除	硬件版本 生产序号	软件版本       固件版本	恢复出厂设置       升级

AT Software Upgrade Steps:

- After setting the correct baud rate, open the serial port. (The average baud rate is 9600/115200bps)
- 2) Click the Upgrade button and select the Upgrade File.
- 3) During the firmware loading process, you can click the Cancel button to cancel the upgrade.
- 4) Firmware update phase. In this phase, the upgrade cannot be canceled and the power cannot be disconnected. An unexpected power failure may damage the device.
- 5) When the upgrade is completed, please power off and restart the equipment.

## 5. Point-to-point Mode Configuration

#### T900 AT配置平台V3.0 网络类型 运行模式 主模式 COM5 输出功率 30 空口速率 172800 1 1 115200 网络ID 1234567890 8N1 串口波特率 115200 1 / RS232/RS485 RS232 同步地址 / 进入AT模式 是否有中继 无中继 L. 查询 中继序号 🔅 设备恢复出厂设置 $\times$ 保存 信道接入方式 RTS/CTS 退出AT模式 恢复出厂设置 点对点主站 **OFF** /\_\_\_\_ 60136B-30-II 20230301-0A OK Cancel 恢复出厂设置 生产序号 01-20220708-20230403-0A 升级 0 OK

#### 5.1 Master Configuration (AT Software)

- 1) Power on the data transmission station and then connect the data serial port firstly. Secondly, click to enter the AT mode, and then click query.
- Click Restore factory Settings firstly, select point-to-point master mode secondly, and then click OK.
- 3) Click Query to configure network ID, serial port baud rate, port rate, etc. (Other parameters can be default).
- 4) Click the yellow write flag after the parameters, and click Save.
- 5) Click to exit the AT mode.

#### 5.2 Slave Configuration (AT Software)

🤽 T90	0 AT配置平台	//∃¥3.0				- + ×
网络类型	点对点	-	运行模式	从模式	•	串口:
输出功率	30		空口速率	172800	-	COM5
网络ID	1234567890		串口格式	8N1	- 🟒	115200
串口波特率	115200	•	本机地址	0		
RS232/RS485	RS232	-	同步地址	0		进入лт档式
是否有中继	无中继	-	目标地址	0		查询
中继序号	1					但在
信道接入方式	RTS/CTS		~	`		退出AT模式
加密开关	OFF 恢复出厂设置	点对点从站	i ~			
硬件版本	60136B-		ar (a. 1	)030-20230301-0A		恢复出厂设置
生产序号	01-2022		OK Cancel	3001-20230403-0A		升级
send: ATS221? ATS221? O OK						清除

- 1) Power on the data transmission station, then connect the data serial port, and enter the AT configuration platform.
- 2) Click Restore factory Settings firstly, select point-to-point slave mode secondly, and then click OK.
- Click Query to set the same network ID, port rate, and serial port baud rate as the master port.
- 4) Click the yellow write flag after the parameters, and click Save.
- 5) Click to exit the AT mode.

## 6.Point-to-point with relay Mode Configuration

#### 6.1 Master-slave Configuration (AT Software)

The configurations on the master and slave ends are the same as those in 5.1 and 5.2.

#### 6.2 Relay Configuration (AT Software)

🤽 T900	O AT配置平台	<del>]</del> V3.0			- + ×
<ul> <li>网络类型</li> <li>输出功率</li> <li>网络ID</li> <li>串口波特率</li> <li>RS232/RS485</li> <li>是否有中继</li> </ul>	点对点 30 1234567890 115200 RS232 无中继		运行模式 空口速率 串口格式 本机地址 同步地址 目标地址	中维模式 172800 8N1 0 0 0	串口: COM5 115200 文件 进入AT模式
中继序号 信道接入方式 加密开关 硬件版本 生产序号	1 RTS/CTS OFF 60136B- 01-2022	厂设置 点对点中继	0K Cancel	) )030-20230301-0A 3001-20230403-0A	
on send: ATS221? ATS221? O OK					清除

- 1) Power on the data transmission station, then connect the data serial port, and enter the AT configuration platform.
- Click Restore factory Settings firstly, select point-to-point relay mode secondly, and then click OK.
- 3) Click Query to set the same network ID, serial port baud rate, and port rate as the master port.
- 4) Set the trunk number to 1. If there are several relays, set the relay number from 1 to N.

(The master, slave, and relay do not need to configure whether there is a relay.

The master will automatically identify the relay)

- 5) Click the yellow write flag after the parameters, and click Save.
- 6) Click to exit the AT mode.

## 7. Point-to-multipoint Mode Configuration

67890		空口速率 串口格式 本机地址	172800		115200 关闭
67890		串口格式 本机地址	8N1		115200 关闭
)		本机地址	1		
	<u>L</u> m.	同步地址	0		ін дата
<u> </u>	<u>/</u>	目标地址	0		查询
		数据重传次数	0		
rs		TDMA最大地址	0		退出和横
		加密密钥			
B-30-IPEX		软件版本	0030-20230301-0A		恢复出厂i
220708-0025		固件版本	3001-20230403-0A		升级
	FS B-30-IPEX 220708-0025	IS / / / / / / / / / / / / / / / / / / /	/     数据重传次数       FS     /       /     加密密钥       B-30-IPEX     软件版本       220708-0025     固件版本	ダ据重传次数     0       FS     TDMA最大地址     0       加密密钥     加密密钥     1       B-30-IPEX     0030-20230301-0A     1       220708-0025     固件版本     3001-20230403-0A	メガロを次数0         IS         TDMA最大地址0         加密密钥         加密密钥         ションの1PEX         牧件版本0030-20230301-0A         220708-0025         固件版本3001-20230403-0A

### 7.1 Master Configuration (AT Software)

- 1) Power on the data transmission station, then connect the data serial port, and enter the AT configuration platform.
- 2) Click Restore factory Settings firstly, select point-to-multipoint master mode secondly, and then click OK.
- 3) Click query, and the user can configure the required network ID, serial port baud rate, and empty port rate.
- 4) Local address =1, synchronous address =0, destination address =0, channel access

mode select RTS/CTS.

- 5) Click the yellow write flag after the parameters, and click Save.
- 6) Click to exit the AT mode.

#### 7.2 Slave Configuration (AT Software)

🤽 T900	) AT配置平台	₹V3.	0			- + ×
网络类型	点对多点	• 🟒	运行模式	从模式 -		串口: COM5
输出功率 网络ID	30 1234567890		空口速率 串口格式	172800 8N1	] 🚄	115200 - ※同
串口波特率 RS232/RS485	115200 RS232	· 🦾	本机地址 同步地址	2		
是否有中继	 无中继		目标地址	0		进入AT模式 查询
<sup>平继厅 5</sup> 信道接入方式	RTS/CTS		双语重传代数 TDMA最大地址	0		保存 退出AT模式
加密开关 硬件版本	OFF 60136B-30-IPEX	- 🤇	加密密钥 软件版本	0030-20230301-0A	] 🚄	恢复出厂设置
生产序号	01-20220708-0025		固件版本	3001-20230403-0A	]	升级
send: ATS221? ATS221? O OK						清除

- 1) Power on the data transmission station, then connect the data serial port, and enter the AT configuration platform.
- 2) Click Restore factory Settings firstly, select point-to-multipoint slave mode secondly, and then click OK.
- 3) Click Query to set the same network ID, port rate, and serial port baud rate as the master port.
- 4) The local address is 2 to N+1, where N is the total number of slave ends.Synchronization address =1.

synchronization address = local address of the master end.

The destination address is 0.

The channel access mode is RTS/CTS.

- 5) Click the yellow write flag after the parameters, and click Save.
- 6) Click to exit the AT mode.

## 8. Have A Central MESH Model Configuration

#### 8.1 Master Configuration (AT Software)

🔍 T900	)AT配置平台	/3.0				- + ×
网络类型 输出功率 网络ID	有中心MESH	) 🛴	运行模式 空口速率 串口格式	主模式 172800 8N1		串口: COM5 115200
串口波特率 RS232/RS485	115200	]	本机地址 同步地址	0		
是否有中继 中继序号	无中继 1		目标地址 数据重传次数	0		进入AT模式 查询
信道接入方式 加密开关	TDMA -	]	TDMA最大地址 加密密钥	6		保存 退出AT模式
硬件版本 生产序号	60136B-30-IPEX 01-20220708-0025	]	软件版本 固件版本	0030-20230301-0A 3001-20230403-0A	]	恢复出厂设置 升级
send: ATS221? ATS221? 6 OK						清除

- 1) Power on the data transmission station, then connect the data serial port, and enter the AT configuration platform.
- 2) Click Restore factory Settings firstly, select Have A Central MESH mode secondly, and then click OK.

- 3) Click query, and the user can configure the required network ID, serial port baud rate, and empty port rate.
- 4) Local address =1, synchronization address =0, destination address =0.

The channel access mode is TDMA\_AUTO.

TDMA slot allocation =15.

- 5) Click the yellow write flag after the parameters, and click Save.
- 6) Click to exit the AT mode.

网络类型	有中心MESH		运行模式	从模式	· 🔝	串口:
俞出功率	30		空口速率	172800	-	
网络ID	1234567890		串口格式	8N1	•	115200
串口波特率	115200		本机地址	2		
S232/RS485	RS232		同步地址	1		进入AT模
是否有中继	无中继		目标地址	0	<u></u>	~
中继序号	1		数据重传次数	0		保存
言道接入方式	TDMA		TDMA最大地址	6		退出AT模:
叩密开关	0FF -		加密密钥			And the local sectors in the l
更件版本	60136B-30-IPEX	]	软件版本	0030-20230301-0A		恢复出厂设
<b>上产序号</b>	01-20220708-0025	]	固件版本	3001-20230403-0A		升级
end: ATS221?						
[S221?						

#### 8.2 Slave Configuration (AT Software)

- 1) Power on the data transmission station, then connect the data serial port, and enter the AT configuration platform.
- 2) Click Restore factory Settings firstly, select Have a Central MESH mode secondly,

and then click OK.

- Click Query to set the same network ID, port rate, and serial port baud rate as the master port.
- The local address is 2 to N+1, where N is the total number of slave ends. Synchronization address =1.

Synchronization address = local address of the master end.

Destination address =0.

Channel access mode TDMA\_AUTO.

Slave TDMA time slot allocation without configuration.

- 5) Click the yellow write flag after the parameters, and click Save.
- 6) Click to exit the AT mode.