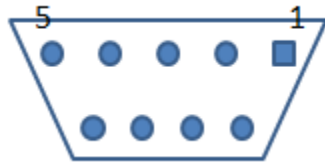


打开超级终端（putty 不支持），设置 9600,8, N,1

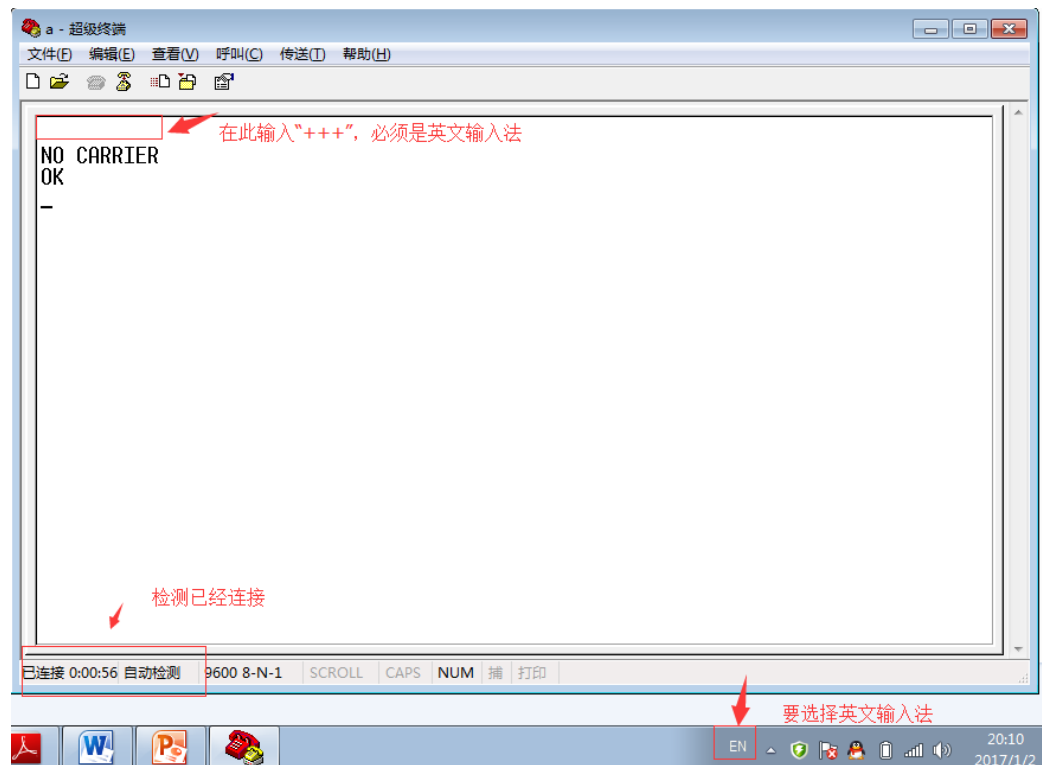
连接 Microhard 到计算机的串口上。针脚顺序，方向的吸盘为第一脚



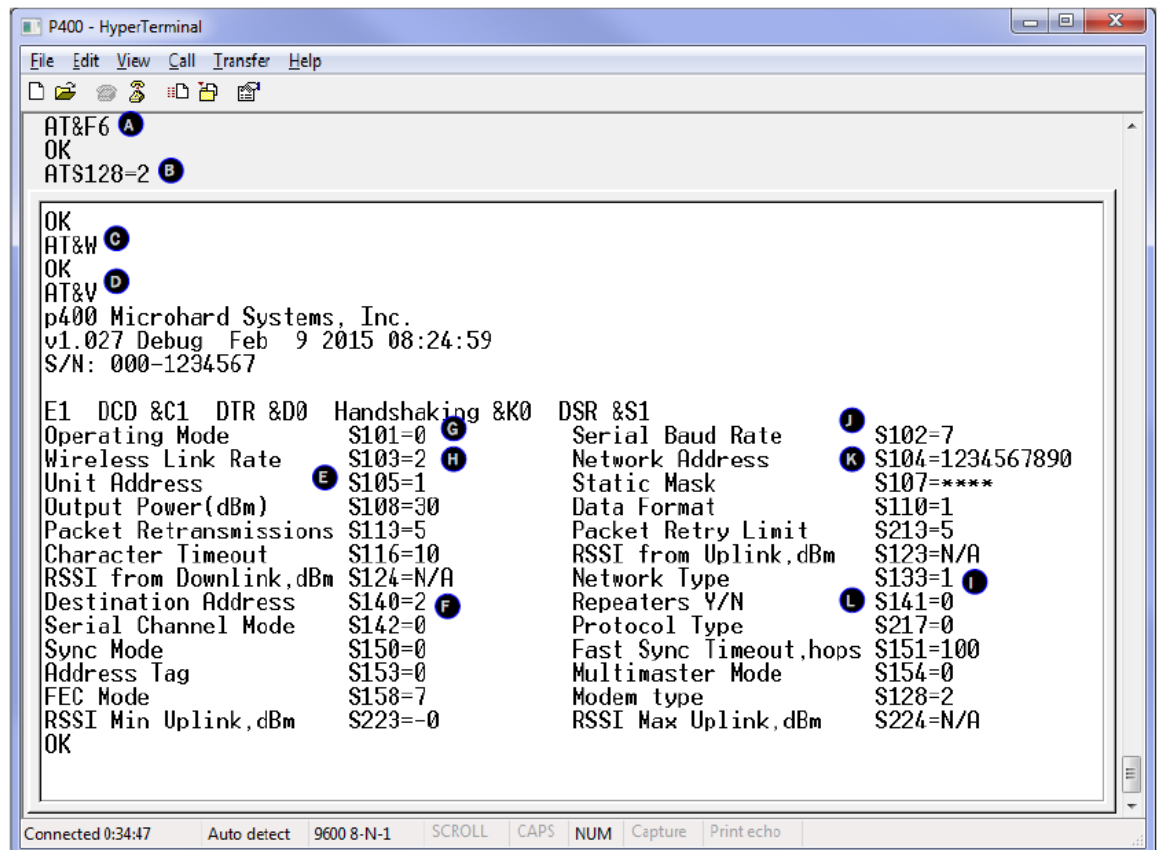
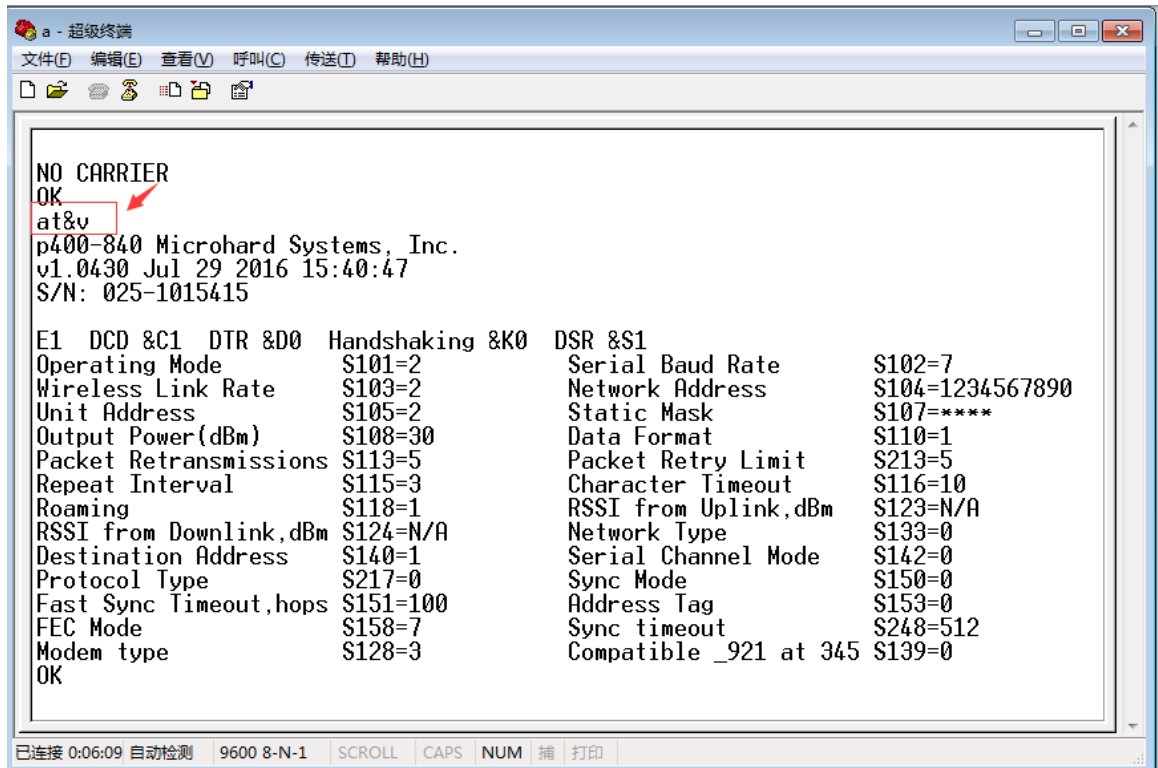
给模块 S/N: 025-1015415 上电，模块 L1 常亮，L2, L3,L4 交替闪动

快速用英文输入法输入“+++”//此模块不会出现“CONNECT 9600”

成功后会出现“NO CARRIER”和 OK，模块的 L2, L3, L4 停止闪动，只有 L1 量。



输入“at&v”会显示产品参数：



相关解释:

- A) AT&F6 - Sets the factory defaults for a Point to Point Master.
- B) S128 - Must be set to 2 (ATS128=2) for 400 MHz Frequency Hopping Operation.
- C) AT&W - Writes the changes to NVRAM.
- D) AT&V - Displays the configuration as seen above.
- E) S105 - Every unit in a Point to Point Network must have a unique unit address. The Master is automatically set to 1, and should not be changed.
- F) S140 - The destination address is unit address of the final destination, which all data is to be sent. The address entered would generally be the unit address of the Slave.
- G) S101 - The operating mode defines the unit type and is set to 0, which is a Master.
- H) S103 - Wireless Link Rate must be set to the same value of each unit in the system. Higher link rates may result in higher throughput, but lower link rates usually provide better sensitivity and overall robustness.
- I) S133 - The network type must be set to 1 for Point to Point operation. The content displayed by the AT&V command will vary with the network type.
- J) S102 - The serial baud rate (and data format S110) must match that of the connected device.
- K) S104 - Each unit in a Network must have the same Network Address. It is strongly recommended to never use the default setting of 1234567890. To change the Network Address, the ATS104=XXXXXXX command can be used.
- L) S141 - This register informs the master if 1 or more repeaters are present in the system. This applies only to the master radio.

Remember, anytime registers are changed the values must be written to NVRAM using the AT&W command. To switch from command mode to data mode (online mode), the ATA command can be issued.

例如：想查看当前的频率是否为 840Mhz

```

E1 DCD &C1 DTR &D0 Handshaking &K0 DSR &S1
Operating Mode          S101=2          Serial Baud Rate      S102=7
Wireless Link Rate      S103=2          Network Address      S104=1234567890
Unit Address            S105=2          Static Mask           S107=*****
Output Power(dBm)       S108=30         Data Format            S110=1
Packet Retransmissions S113=5          Packet Retry Limit    S213=5
Repeat Interval         S115=3          Character Timeout     S116=10
Roaming                 S118=1          RSSI from Uplink,dBm  S123=N/A
RSSI from Downlink,dBm S124=N/A        Network Type          S133=0
Destination Address     S140=1          Serial Channel Mode   S142=0
Protocol Type           S217=0          Sync Mode              S150=0
Fast Sync Timeout,hops S151=100        Address Tag            S153=0
FEC Mode                S158=7          Sync timeout           S248=512
Modem type              S128=3          Compatible _921 at 345 S139=0
OK
ats128 /?
Modem type.
0 - 400MHz Narrow Band (NB) Modem
1 - 900MHz Frequency Hopping (FH) Modem
2 - 400MHz FH Modem
3 - 840MHz FH Modem
4 - 869MHz FH Modem
OK

```

查看模块是 master 还是 slave,由此判定该模块 S/N: 025-1015415 是 slave.因为查看到的 101 寄存器值是 2

```

ats101 /?
Operating Mode
  For FH modems
0 - Master
1 - Repeater
2 - Remote
  For NB modems (depends on selected protocol)
0 - Master (Base) for Trimtalk
1 - Repeater
2 - Slave (Remote)
3 - Repeater 2 for Trimtalk
OK

```

如果想修改模块的串口参数如下：

```

ats102 /? 查看参数
Serial Baud Rate, baud
0 - 230400
1 - 115200
2 - 57600
3 - 38400
4 - 28800
5 - 19200
6 - 14400
7 - 9600
8 - 7200
9 - 4800
10 - 3600
11 - 2400
12 - 1200
13 - 600
14 - 300
OK
ats102=1 修改串口波特率伟
OK 115.2kbps
at&w 保存参数
OK

```

修改空中速率：

```

OK
ats103 /? 查看空中速率
Wireless Link Rate, bps (when enabled by fact
Frequency Hopping modems:
0 - 19200
1 - 115200
2 - 172800 *

```

```

3 - 230000 *
4 - 276000 *
5 - 340000 *
6 - 24700
8 - 57600

```

Notes:

* - link rates are not supported by all model

Narrow Band modems:

```

0 - 1200
1 - 2400
2 - 3600
3 - 4800
4 - 7200
5 - 9600 (9600 bps for 4FSK)
6 - 14400
7 - 19200 (19200 bps for 4FSK)
8 - 16000
9 - 8000

```

OK

ats103=1 修改空中速率为115.2kbps, 如果传输的速率不高,

OK 可以修改参数到更小, 接收灵敏度会提高, 传的会

at&w 更远

OK

从模块最终参数如下:

```

v1.0430 Jul 29 2016 15:40:47
S/N: 025-1015415

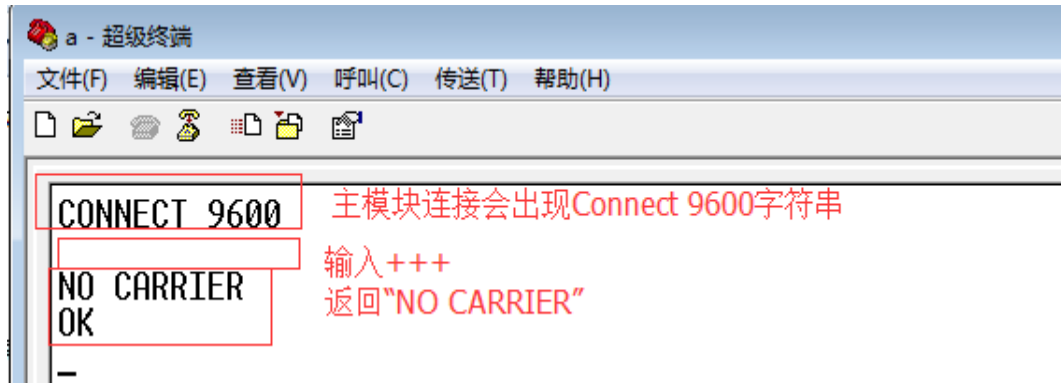
```

E1 DCD &C1 DTR &D0 Handshaking &K0 DSR &S1	
Operating Mode	S101=2
Wireless Link Rate	S103=1
Unit Address	S105=2
Output Power(dBm)	S108=30
Packet Retransmissions	S113=5
Repeat Interval	S115=3
Roaming	S118=1
RSSI from Downlink,dBm	S124=N/A
Destination Address	S140=1
Protocol Type	S217=0
Fast Sync Timeout,hops	S151=100
FEC Mode	S158=7
Modem type	S128=3
Serial Baud Rate	S102=1
Network Address	S104=1234567890
Static Mask	S107=*****
Data Format	S110=1
Packet Retry Limit	S213=5
Character Timeout	S116=10
RSSI from Uplink,dBm	S123=N/A
Network Type	S133=0
Serial Channel Mode	S142=0
Sync Mode	S150=0
Address Tag	S153=0
Sync timeout	S248=512
Compatible _921 at 345	S139=0

主的参与及配置:

加载电源，从没有开的情况下，是 L1&L6 常亮

打开超级终端，设置 9600,8,N,1，进入配置后只有 L1 常亮



查看参数：

```
at&v
p400-840 Microhard Systems, Inc.
v1.0430 Jul 29 2016 15:40:47
S/N: 025-1015638
```

E1	DCD	&C1	DTR	&D0	Handshaking	&K0	DSR	&S1
Operating Mode					S101=0		Serial Baud Rate	S102=7
Wireless Link Rate					S103=2		Network Address	S104=1234567890
Unit Address					S105=1		Static Mask	S107=****
Output Power(dBm)					S108=30		Data Format	S110=1
Packet Retransmissions					S113=5		Packet Retry Limit	S213=5
Character Timeout					S116=10		RSSI from Uplink,dBm	S123=N/A
RSSI from Downlink,dBm					S124=N/A		Network Type	S133=0
Destination Address					S140=65535		Repeaters Y/N	S141=0
Serial Channel Mode					S142=0		Protocol Type	S217=0
Sync Mode					S150=0		Fast Sync Timeout,hops	S151=100
Address Tag					S153=0		Multimaster Mode	S154=0
FEC Mode					S158=7		Modem type	S128=3
Compatible _921 at 345					S139=0			
OK								

修改空中速率：为 115.2kbps

```
ats103 /?
```

```
Wireless Link Rate, bps (when enabled by factory), 2FSK
```

```
Frequency Hopping modems:
```

```
0 - 19200
```

```
1 - 115200
```

```
2 - 172800 *
```

```
3 - 230000 *
```

```
4 - 276000 *
```

```
5 - 340000 *
```

```
6 - 24700
```

```
8 - 57600
```

```
Notes:
```

```
* - link rates are not supported by all models
```

```
Narrow Band modems:
```

```
0 - 1200
```

```
1 - 2400
```

```
2 - 3600
```

```
3 - 4800
```

```
4 - 7200
```

```
5 - 9600 (9600 bps for 4FSK)
```

```
6 - 14400
```

```
7 - 19200 (19200 bps for 4FSK)
```

```
8 - 16000
```

```
9 - 8000
```

```
OK
```

```
ats103=1
```

```
OK
```

修改串口参数:

```

ats102=?
Serial Baud Rate, baud
0 - 230400
1 - 115200
2 - 57600
3 - 38400
4 - 28800
5 - 19200
6 - 14400
7 - 9600
8 - 7200
9 - 4800
10 - 3600
11 - 2400
12 - 1200
13 - 600
14 - 300
OK
ats102=1
OK
at&w
OK

```

修改目标地址:

```

ats140=2
OK
at&w
OK

```

主模块修改后的参数:

```

p400-840 Microhard Systems, Inc.
v1.0430 Jul 29 2016 15:40:47
S/N: 025-1015638

E1 DCD &C1 DTR &D0 Handshaking &K0 DSR &S1
Operating Mode S101=0 Serial Baud Rate S102=1
Wireless Link Rate S103=1 Network Address S104=1234567890
Unit Address S105=1 Static Mask S107=*****
Output Power(dBm) S108=30 Data Format S110=1
Packet Retransmissions S113=5 Packet Retry Limit S213=5
Character Timeout S116=10 RSSI from Uplink,dBm S123=N/A
RSSI from Downlink,dBm S124=N/A Network Type S133=0
Destination Address S140=2 Repeaters Y/N S141=0
Serial Channel Mode S142=0 Protocol Type S217=0
Sync Mode S150=0 Fast Sync Timeout,hops S151=100
Address Tag S153=0 Multimaster Mode S154=0
FEC Mode S158=7 Modem type S128=3
Compatible _921 at 345 S139=0
OK

```

退出命令行 ata

进入数据收发模式，（注意必须用 **ata** 退出，否则即使断电重启也只有 **L1** 亮），如果 2 个模块连接上后，主模块 **L1, L2,L3, L4, L6** 常亮，发送数据时候 **L6** 闪动，接收数据 **L5** 闪动。从模块 **L1, L2, L3, L4** 常亮，发送数据时候 **L6** 闪动。

特别注意：此模块底板未设置 cfg 针脚，所以要修改模块参数，必须要记住 S102 的值

```
at&v
p400-840 Microhard Systems, Inc.
v1.0430 Jul 29 2016 15:40:47
S/N: 025-1015638

E1 DCD &C1 DTR &D0 Handshaking &K0 DSR &S1
Operating Mode          S101=0      Serial Baud Rate      S102=1
Wireless Link Rate      S103=1      Network Address       S104=1234567890
Unit Address            S105=1      Static Mask           S107=*****
Output Power(dBm)        S108=30     Data Format            S110=1
Packet Retransmissions  S113=5      Packet Retry Limit    S213=5
Character Timeout        S116=10     RSSI from Uplink,dBm  S123=N/A
RSSI from Downlink,dBm  S124=N/A    Network Type          S133=0
Destination Address     S140=2      Repeaters Y/N         S141=0
Serial Channel Mode     S142=0      Protocol Type         S217=0
Sync Mode               S150=0      Fast Sync Timeout,hops S151=100
Address Tag              S153=0      Multimaster Mode      S154=0
FEC Mode                S158=7      Modem type            S128=3
Compatible _921 at 345  S139=0
OK
-
```

已连接 0:20:33 自动检测 115200 8-N-1 SCROLL CAPS NUM 捕 打印

- 第 1 个灯终不亮;
- 第 2,3 是发和收指示灯;
- 第 4,5,6 是信号强度指示灯;
- 第 7 个灯是电源灯;

\

深圳开发板 LED 状态：

1.各自单独上电：

- master 第二个和第七个灯常亮，其他等不亮；
- slave 第 4、5、6 三个灯循环亮 第七个灯常亮 其他灯不亮；

2.两个同时上电：

- master 第二个和第七个灯常亮，其他等不亮；
- slave 第三个等常亮 第 4、5、6 三个灯常亮（取决于信号强度） 第 7 个灯常亮；

3.进入配置模式：

master 仅第 7 个灯常亮，其他灯不亮；

Slave 仅第七个灯常亮 其他灯不亮;

4.slave 先上电 Master 后上电:

master 第二个和第七个灯常亮,其他等不亮

slave 第三个等常亮 第 4、5、6 三个灯常亮 (取决于信号强度),第 7 个灯常亮;

5.slave 后上电:

Master 先上电:

master 第二个和第七个灯常亮,其他等不亮

slave 第三个等常亮 第 4、5、6 三个灯常亮 (取决于信号强度),第 7 个灯常亮;

两个同时上电,联网失败:

master 第二个和第七个灯常亮,其他等不亮;

slave 第 4、5、6 三个灯循环亮 第七个灯常亮 其他灯不亮;