

WiFi Multipoint Guide

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Introduction

Amp'ed RF WiFi modules can support several simultaneous connections: MP mode. With UDP protocol, the WiFi module works as an Access Point, AP when configured for MP operation. With TCP protocol, the WiFi module works as a TCP server when configured for MP operation, in either STA or AP mode.

1. Protocol Summary

Since multiple devices may be communicating at the same time, a simple serial protocol was added in order to direct the data to the desired node; a protocol on top of the pass-through usage case.

This protocol consists of a destination/source field and a length field:

| Dest/Source Node | Length | Data |
|------------------|---------|-----------|
| 1 byte | 4 bytes | 1-N bytes |

Destination/Source Node: Node Id from 0 to 4, 1 byte ASCII decimal digit.

Length: 4 ASCII decimal digits from 0001 to N. The maximal value is the configuration "OutMtuSize" value.

Data: Up to N bytes.

2. AT Commands

The following AT commands are typically needed with MP operation:

```
AT+WF Join [optional SSID] [option pass phrase]
```

This command is used when the module in STA mode in order to join a network with a valid IP address. If an SSID is given, then it is used instead of the default configuration SSID. Also, if a pass phrase is given, then it is used instead of the default configuration pass phrase.

```
AT+WF Socketopen
```

This command opens a UDP link or starts a TCP server. Bypass mode is automatically changed when a UDP link is opened or a TCP client joins.

```
AT+WF showdev
```

Output:

```
[n] IP=-.-.-.-
```

This command is valid when the module is in AP mode. Its function is to show the devices joined on its network. In the device list, the Node IDs, n, are displayed with the corresponding IP addresses. The MP protocol will direct data transfers using this Node ID.

```
AT+WF showconnection
```

Output:

```
[n] IP=-.-.-.-
```

This command is valid when the module is in TCP server mode. Its function is to show the clients joined on its network. In the client list, the Node IDs, n, are displayed with the corresponding IP addresses. The MP protocol will direct data transfers using this Node ID.

3. Usage Example

3.1. Multipoint for UDP

UDP data transfers require the IP address and listen port. The AP, uses the config “LocalPort” as its listen port, and the config “HostPort” for the remote device listen port.

- i. Module A must be in AP mode. Configuration setting example:

```
AT+WF Config IPProtocol = UDP
```

```
AT+WF Config MPMode = 1
```

```
AT+WF Config DeviceMode = AP
```

Then reset module A:

```
AT+WF Reset
```

- ii. Device B and C use the `join` command join the AP (module A), both are assigned a valid IP address.
- iii. On module A, use `showdev` to obtain the Node ID of device B (Node 0) and C (Node 1).
- iv. All the modules use `socketopen` to enter into bypass mode
- v. Data transfer, AP module to remotes:

A sends data to B as follows: (from bypass mode)

```
00004abcd
```

Device B displays:

```
abcd
```

Device A sends data to C as follows: (from bypass mode)

```
10003efg
```

C displays:

efg

- vi. Data transfer from device B:

Device B sends data to A as follows:

xyz

Device A displays:

00003xyz

- vii. Data transfer from device C:

Device C sends data to A as follows:

rst

Device A displays:

10003rst

Note: CR and LF are NOT necessary

3.2. Multipoint for TCP

TCP data transfers require the IP address and listen port. The server, uses the config "LocalPort" as its listen port.

- i. Device A must be the TCP server. Configuration setting example:

```
AT+WF Config IPProtocol = TCP
```

```
AT+WF Config MPMMode = 1
```

Then reset module A:

```
AT+WF Reset
```

- ii. Device A and remote WiFi devices join or make a network, then each receives an IP address.
- iii. Device A uses the `socketopen` command start TCP server, device B and C connect to A, then A enters into bypass mode
- iv. On Device A, use the `showconnection` command to obtain the Node ID of device B (Node 0) and C (Node 1).
- v. Device A sends data to B as follows: (from bypass mode)

```
00004abcd
```

Device B displays:

```
abcd
```

Device A sends data to C as follows: (from bypass mode)

```
10003efg
```

Device C displays:

efg

vi. Device B sends data to A:

xyz

Device A displays:

00003xyz

vii. Device C sends data to A:

rst

Device A displays:

10003rst

Note: CR and LF are NOT necessary