



MacroStack

MAP-811

2.4GHz ISM BAND DSSS 11MBPS

WIRELESS ACCESS POINT

USER'S MANUAL

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1. NOTES

1.1 FCC INFORMATION

This equipment has been tested and found to comply with the limits for a **Class B** digital device pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communication.

Operation of this equipment in residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

The user should not modify or change this equipment without written approval of the company. Modification could make invalid any authority to use this equipment.

It is unsafe to work under circumstances in which the RF exposure exceeds recommended amount. To prevent the situation from happening, people who work with the antenna should be aware of the following rules:

- While the device is working, please do not contact the antenna.

1.2 TRADEMARKS

Macromate is the registered trademark of Macromate Corp. and has been recognized under the auspice of the National Bureau of Standards, MOEA (Ministry of Economic Affairs) Taiwan.

1.3 LIMITED WARRANTY

In no event will Macromate be liable for any damage, including loss of data or profits, cost of recover, or other incidental, consequential or indirect damages arising from the installation, maintenance, use, performance, failure or interruption of Macromate's products, whatever caused and on any theory of liability. This limitation will apply even if Macromate has been advised of the possibility of such damage.

2. ABOUT MACROSTACK MAP-811

MacroStack MAP-811 is a full-featured DSSS (Direct Sequence Spread Spectrum) Wireless Access Point that performs as a Bridge Router between the wired LAN (Local Area Network) to one or more WLAN (Wireless Local Area Network). Not only bridging the wired and wireless networks, MAP-811 can also be configured as a Wireless Router.

Placed anywhere onto the wired Ethernet network, MAP-811 allows the wireless stations to transparently accessing the corporate network resources. Together with other Macromate WLAN products such as wireless network adapters (MWN-711, MWN-611) or Access Point (MAP-811, MAP-802E, MAP-811E), it enables you to build a totally mobile and flexible network infrastructure.

2.1 FEATURES

- Easy Plug-N-Play Integration between Ethernet wired and wireless networks. Simply connect the MAP-811 to your Ethernet (10/100Mbps) network, and you then have all PC and the mobile notebook computers connected; cabling is no longer a problem.
- With multiple MAP-811 installed, the originally complicated network configuration can be simplified.
 - a) By enabling the IP Tunneling function, mobile computers can roam not only between different AP (Access Point), but also roaming between the different corporate IP subnet networks.
 - b) In Simple Mode, users can use MAP-811's to configure the redundant wireless links (dual wireless connections, one as the master and the other as backup line; totally 4 units of MAP-811 needed).

- c) In BRouter mode, MAP-811 can be configured to a multi-port Wireless Router (isolating network traffic from wired networks and support with DHCP server).
- Easy configuration and management through Web Browser program. MAP-811 is a full management feature intelligent Access Point that can be configured via browser program such as Netscape™ (version 3.0 or above) or Internet Explorer™ (version 3.0 or above).
- SNMP MIB II supported. With standard SNMP (Simple Network Management Protocol) software package, users can easily configure and manage MAP-811 remotely.
- Console and Telnet management support.
- SmartMedia support for easy firmware upgrade. MAP-811 supports one SmartMedia slot, to upgrade the firmware -- it is simply plug-in the pre-uploaded SmartMedia card and let MAP-811 do the rest by itself.
- Diversity Antennas. MAP-811 equips with two antennas for better RF transmission.
- Automatic RF transmission speed adjustment. According the RF signal quality, MAP-811 can adjust itself to RF speed at 11Mbps, 5.5Mbps, 2Mbps and 1Mbps.
- Dual LED indications design. There is dual LED indications in MAP-811, the front, and the rear LED indications for easy troubleshooting.
- Dual power source selection. Users can choose to use the power source from internal power supply or the external AC adapter.
- Easy network feature upgrade and expansion with other MacroStack members. MAP-811 can be easily connected to other MacroStack members such as ADSL/Cable Switch Router, ISDN Hub Router and Switch for much better

connectivity. All MacroStack members are mechanically stackable. For example, by connecting one MAP-811 to MSHR-8104, all wired or wireless PC connected can go Wireless Internet Access instantly.

- Easy wireless domain and channel configuration. The wireless channel selection can be configured either through the DIP switches in front panel, or through its software configuration.

2.2 APPLICATION

- **Remote access to corporate network information**
E-mail, file transfer and terminal emulation without the need of cable.
- **Difficult-to-wire environments**
Historical or old buildings, asbestos installations, and open area where wiring is difficult to employ.
- **Frequently changing environments**
Retailers, manufacturers and banks who frequently re-arrange the workplace and change location.
- **Temporary LANs for special projects or peak time**
Trade shows, exhibitions and construction sites need temporary setup for a short time period. Retailers, airlines and shipping companies need additional workstations for a peak period. Auditors require workgroups at customer sites.
- **Access to database for mobile workers**
Doctors, nurses, retailers, white-collar workers need access to database while being mobile in the hospital, retail store or office campus.
- **SOHO (Small Office and Home Office) users**
SOHO users need easy and quick installation of a small computer network.

2.3 PACKAGE INCLUDES

Each MAP-811 package includes the following items.



MAP-811



User's Manual



Utility Diskette



Connector Cover



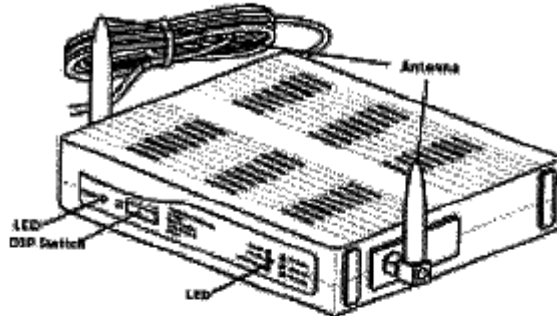
Magnet x 4

- MAP-811 Wireless Access Point
The 11Mbps DSSS Wireless Access Point.
- Utility Diskette x 1
Includes program for MAP-811 firmware upgrade.
- User's Manual
- Connector Cover x 4
Protector for SmartMedia card
- Magnet x 4
For attaching MAP-811 to steel made furniture.

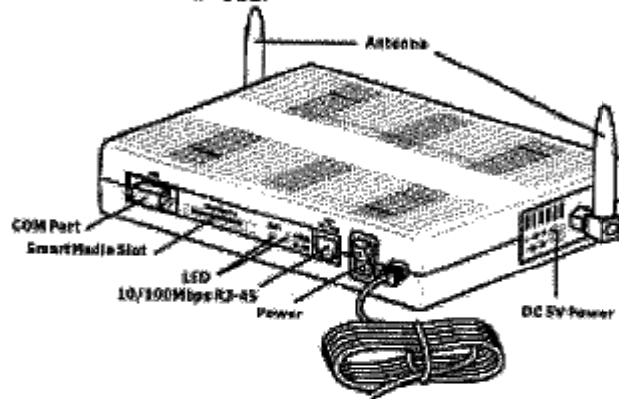
If any of the items listed are not included or found damaged, please contact your local dealer.

2.4 DETAIL DESCRIPTION

Front view of MAP-811.



Rear view of MAP-811.



- Antennas
Used for the wireless transmission.
- LED Indication
There are totally 10 LED indications (7 in the front panel, 3 in the rear panel) for displaying the status of link, RF transmission, power and LAN port status.

LED	STATUS	DESCRIPTION
10/100M	ON	Connected in 100Mbps mode
	OFF	Connected in 10Mbps mode
LINK/ACT	ON	Link established
	Flash	Data transmission in process
FDX/COL	FDX ON	Connected in Full-duplex mode
	COL ON	Collision detected
BUSY	Flash	SmartMedia accessing

FDX/COL LED can be re-defined by using the DIP switches.

The LED indications of POWER, MGMT, WLINK, WTX/WRX's meaning are explained below.

MAP-811 CONFIGURATION: STANDARD MODE / AP

LED	STATUS	DESCRIPTION
POWER	ON	Power ON
MGMT	ON	Firmware accessing
WLINK	ON	Connected with user unit
WTX/WRX	Flash	WLAN data transmission

MAP-811 CONFIGURATION: STANDARD MODE, SEGMENT MODE & BRROUTER MODE / STATION AP

LED	STATUS	DESCRIPTION
POWER	ON	Power ON
MGMT	ON	Firmware accessing
WLINK	ON	AP login in process
WTX/WRX	Flash	WLAN data transmission

MAP-811 CONFIGURATION: SIMPLE MODE

SPANNING TREE ON

LED	STATUS	DESCRIPTION
POWER	ON	Power ON
MGMT	ON	Firmware accessing
WLINK	ON	Forwarding
	Flash	Listening/Learning
	OFF	Blocking
WTX/WRX	Flash	WLAN data transmission

MAP-811 CONFIGURATION: SIMPLE MODE
SPANNING TREE OFF

LED	STATUS	DESCRIPTION
POWER	ON	Power ON
MGMT	ON	Firmware loaded
WLINK	ON	Connected
WTX/WRX	Flash	WLAN data transmission

○ DIP Switch

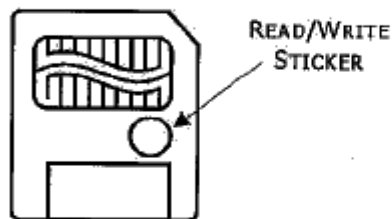
Can be used for COM port mode setting, re-defining LED indication, WLAN channel setting and the AP initiation.

DIP	Item	Action/Function															
1	Modem/ Terminal	To configure the COM port for connecting to Modem or Terminal. Default: Terminal															
2	RSSI	To configure the LED MGMT, WLINK, WTX/WRX to RSSI. <table border="1"> <thead> <tr> <th>POWER</th> <th>WLINK</th> <th>MODE</th> </tr> </thead> <tbody> <tr> <td>OFF</td> <td>OFF</td> <td>Ad-hoc Mode</td> </tr> <tr> <td>ON</td> <td>OFF</td> <td>Infrastructure AP</td> </tr> <tr> <td>OFF</td> <td>ON</td> <td>Infrastructure Station</td> </tr> </tbody> </table>	POWER	WLINK	MODE	OFF	OFF	Ad-hoc Mode	ON	OFF	Infrastructure AP	OFF	ON	Infrastructure Station			
POWER	WLINK	MODE															
OFF	OFF	Ad-hoc Mode															
ON	OFF	Infrastructure AP															
OFF	ON	Infrastructure Station															
3, 4	Channel 1, 2	To configure the channel to channel 1, 6, 11, 14. Via software or Web browser, users can configure channel from 1-14. <table border="1"> <thead> <tr> <th>Channel 1</th> <th>Channel 2</th> <th>Channel</th> </tr> </thead> <tbody> <tr> <td>OFF</td> <td>OFF</td> <td>14</td> </tr> <tr> <td>ON</td> <td>OFF</td> <td>1</td> </tr> <tr> <td>ON</td> <td>OFF</td> <td>6</td> </tr> <tr> <td>OFF</td> <td>ON</td> <td>11</td> </tr> </tbody> </table>	Channel 1	Channel 2	Channel	OFF	OFF	14	ON	OFF	1	ON	OFF	6	OFF	ON	11
Channel 1	Channel 2	Channel															
OFF	OFF	14															
ON	OFF	1															
ON	OFF	6															
OFF	ON	11															
5	INIT	To re-initiate the MAP-811 to factory reset, and restore all settings to default.															
6, 7, 8	(Not defined)																

When power ON MAP-811, MAP-811 will perform the POST (Power On Self Test) first. In this stage the power LED will be in flashing state, when it turns to steady ON state -- it means POST passed and the firmware has been loaded successfully.

- Connectors
 - SmartMedia for SmartMedia card (optional)
 - COM for connecting to Modem or terminal
 - 10/100M RJ-45 for connecting to 10/100Mbps LAN
 - Power for DC 4.85-5.25V max. 2.0A input

SmartMedia card is an optional accessory for storing or upgrading MAP-811's configuration and firmware. In this slot, users can use the 3.3V SmartMedia card from 2MB, 4MB, 8MB, 16MB or 32MB card. If SmartMedia is in Read and Write access status, MAP-811 will automatically saves its settings onto the card. If SmartMedia is in Read Only access status, MAP-811 will automatically loads the settings from the card.



FOR OUT DOOR WIRELESS APPLICATION, OPTIONAL ANTENNA CAN BE USED TO EXPAND THE WIRELESS RF TRANSMISSION COVERAGE.

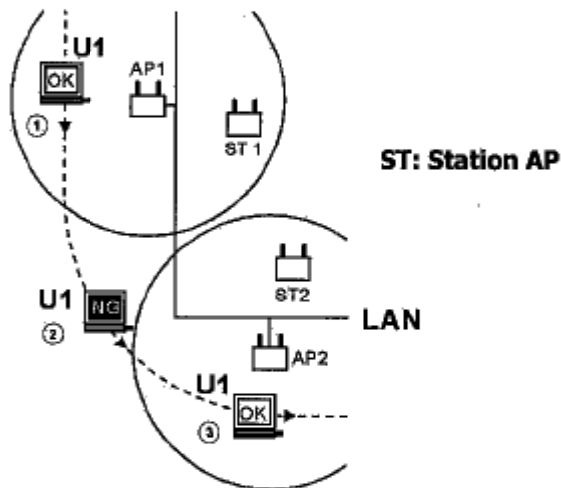
OPTIONAL ANTENNAS MUST BE INSTALLED ONTO THE LEFT SIDE ANTENNA CONNECTOR (FROM FRONT VIEW; THE SIDE CONNECTOR BESIDES THE DC 5V CONNECTOR).

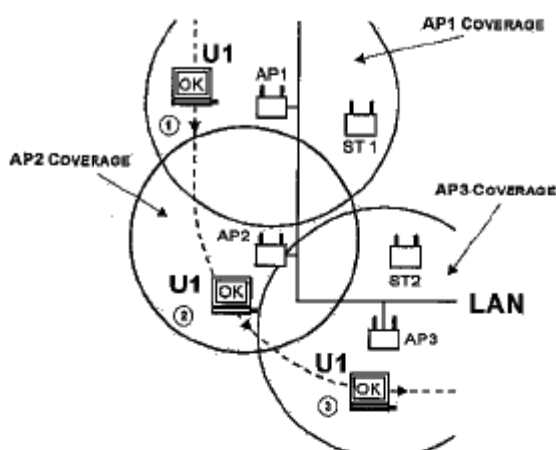
3. MAP-811's ROAMING, IP TUNNELING AND MODES

This section explains the concept of wireless roaming, the special IP Tunneling features of MAP-811, and its five different modes. MAP-811 features not only the standard AP function, furthermore it's a Wireless Bridge Router that can be configured into five operating modes, Simple, Standard, BRouter, Segment and Compatible modes.

3.1 ROAMING

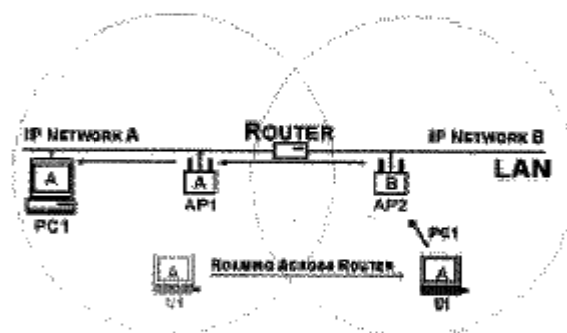
When user unit (PC U1 as in the figure below) moves physically to different location (from ① to ② to ③), it automatically connects itself to other Access Point (AP) within the **AP overlap RF coverage area**. If without the installation of AP 2, U1 cannot roaming from location ① to ③ (disconnected in ②). Within all the AP coverage overlap area, U1 will automatically connect itself with the AP that has strongest RF signal.





3.2 IP TUNNELING

In TCP/IP network, computers can only communicate to each other if all of them are within the same subnet network. To communicate with computers in different subnet networks, usually Router is required, or the computer's IP subnet has to be re-configured. With MAP-811, besides physically roaming between locations, user can also roaming between different TCP/IP subnet networks. This is the wireless roaming across Router, and across different subnet networks.



If without MAP-811's IP Tunneling feature, U1 will need to re-configure its IP address for connecting to IP Network B while roaming. MAP-811 will translate U1 packet's IP address from/to IP Network A or IP Network B.

IP TUNNELING FEATURE IS AVAILABLE ONLY IN MAP-811'S STANDARD MODE.

3.3 MAP-811's MODES

MAP-811 can be configured into five different modes, which are Simple, Standard, BRouter, Segment and Compatible Modes.

○ SIMPLE MODE

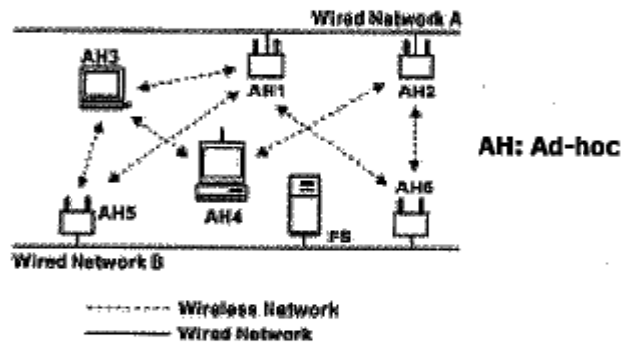
For small and simple network; use Ad-hoc (peer-to-peer; all devices directly communicate to each other) for the WLAN communication.

Enabled features in this mode are:

- Redundant Link
- DHCP Server
- SNMP
- Data Scrambling

Benefit: ease of configuration/setup, can build wireless redundant links (bridges) for wired network.

Note: RF transmission coverage is much shorter, not the ideal application/solution for big scale network.



○ **STANDARD MODE**

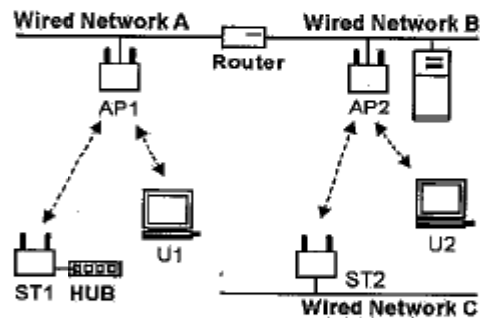
For multiple Access Point application, all wireless devices are communicating through Access Point connected to wired LAN(s). Roaming feature is supported in this mode, all computers can roam within all AP's RF signal coverage. In order for the Roaming and IP Tunneling features to operate properly, one of the AP has to be configured as the Master AP.

Enabled features in this mode are:

- Roaming
- IP Tunneling
- DHCP Server
- SNMP
- Automatic Firmware Upgrade
- Log Recording
- Data Scrambling

Benefit: through the multiple Access Point application, users can easily configure a wider area wireless network. If the IP Tunneling function is enabled, user can also roaming across different IP subnet networks; without re-configuring the mobile computer's (or Notebook Computer) IP address.

Note: more AP to be configured and more management setup steps.



○ BRouter Mode

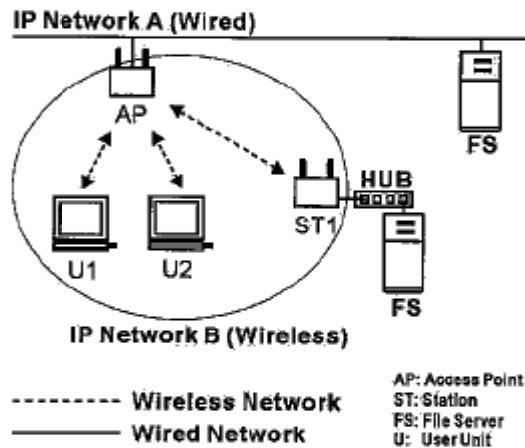
Typically for the application of one AP plus many wireless user units (including Station AP and wireless adapter), wireless network can be isolated from the wired network and yet communicate via AP. In this mode, MAP-811 can be used as the trunk of wireless network.

Enabled features in this mode are:

- IP Bridge Router
- Spanning Tree
- DHCP Server
- SNMP
- Data Scrambling

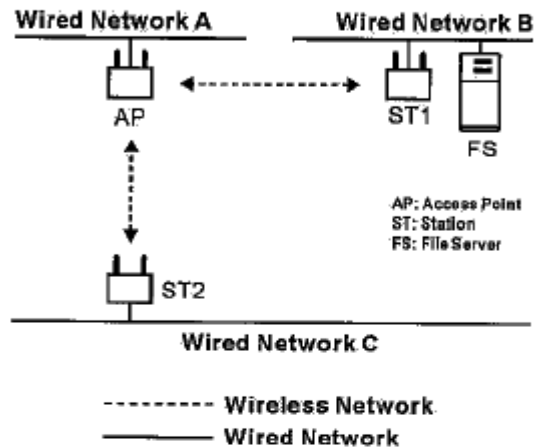
Benefit: MAP-811 performs as the IP Router that can isolate traffic from IP Network A to/from B; wired and wireless networks can also be isolated.

Note: can not use the Roaming and IP Tunneling functions.



○ **SEGMENT MODE**

For multiple Access Point application, all wireless devices are communicating through one central Access Point. In this application MAP-811 performs as the segmenting Bridge Router. All users units (U) cannot communicate with AP. This mode is designed for segmenting wired networks with wireless Access Point.



In the diagram above, AP in wired network A performs as the multi-port Router that routes packets between the wired network A, B and C. While in different subnet networks, or where cabling is impossible - Segment mode becomes an easy way for the integration. RIP (Routing Information Protocol) is supported in Segment Mode.

Enabled features in this mode are:

- IP Bridge Router
- Spanning Tree
- SNMP
- Data Scrambling

Benefit: wireless routing between the wired different subnet networks. Routing for IP packets, and Bridging for other packets. Broadcast packets will not be transmitted to other networks.

Note: redundant wireless networking is not supported.

○ **COMPATIBLE MODE**

For MAP-811 to communicate with standard WLAN DSSS products from other vendors, you need to configure MAP-811 to this mode.

Enabled features in this mode are:

- Roaming

Note: advanced features of MAP-811 will be disabled.

3.4 MODE & COMMUNICATION

The way MAP-811 communicates varies depending on its mode setting. Please see below the summarized table.

UU(U): User Unit
 AP: Access Point
 ST(S): Station AP, same as UU, communicate via AP
 UU↔UU: Communication between UU and UU
 AP↔UU: Communication between AP and UU
 AP↔ST: Communication between AP and Station AP
 ** Station AP (ST) will login and associate itself with AP.

AP		UU	COMMUNICATION COMPATIBILITY		
MODE	UNIT TYPE	MODE	UU↔UU	AP↔UU	AP↔ST
Not used	-	Ad-hoc	0	-	-
Simple	ST	Ad-hoc	0	0	0 ST↔ST
Standard	AP or ST	Infrastructure	X	0	0
Segment	AP or ST	None above	X	X	0
BRouter	AP or ST	Infrastructure	X	0	0
Compatible	-	Infrastructure	X	0	X

MAP-811 is a full-featured Wireless Access Point that can be used for constructing a highly complicated wireless network. When in multiple MAP-811 application, the mix use of different modes and unit types will become powerful for solving configuration problems.

The complicated MAP-811 application needs to be properly planned in advance, and requires networking technical know-how for its configuration and management.

3.5 MODE COMPARISON

MAP-811 supports five different operation modes, and each mode operates differently. Please see below the MAP-811 mode comparison table.

	SIMPLE	STANDARD	SEGMENT	BROUTER	COMPATIBLE
EASE OF CONFIGURATION	O	Δ	Δ	Δ	O
WIRELESS SCALE	Small	Medium to Large	-	Small	Small
ROAMING	X	O	X	X	O
IP TUNNELING	X	O	X	X	X
IP BRIDGE ROUTER	X	X	O	O	X
BRIDGE OFF	X	X	O	O	X
REDUNDANT LINK	O	X	X	X	X
DHCP SERVER	O	O	X	O	X
SNMP	O	O	O	O	X
AUTO FIRMWARE UPGRADE	X	O	X	X	X
LOG RECORDING	X	O	X	X	X
DATA SCRAMBLING	O	O	O	O	X

○ **EASE OF CONFIGURATION**

How easily MAP-811 can be configured. In Simple Mode (Ad-hoc), there is no need for MAP-811's configuration; simply Plug-N-Play. But under other modes such as Standard, Segment and BRouter modes, configuration is required. O means easy to configure, and Δ means difficult to configure (require technical know-how).

○ **WIRELESS SCALE**

In Simple Mode (Ad-hoc) the Roaming feature is not supported, all wireless devices communicate to each other - this greatly reduces the wireless RF signal coverage (physically shorter distance). For middle to large wireless network (physically longer distance), Standard Mode is a better choice.

○ **ROAMING**

User Unit (mobile computer with wireless adapter installed) can roam across multiple Access Point.

- **IP TUNNELING**
User Unit (mobile computer with wireless adapter installed) can roam across Access Point, and across different subnet networks.
- **IP BRIDGE ROUTER**
Routing for IP packets, and Bridging for other packets (such as NetBIOS, IPX). MAP-811 performs as a Bridge Router.
- **REDUNDANT LINK**
In Simple Mode, MAP-811 can support the wireless redundant link feature by assigning the first AP as the Master, and the second AP as Backup. MAP-811 support Spanning Tree Algorithm that will automatically enable the backup line once primary link fails.
- **DHCP SERVER**
DHCP (Dynamic Host Control Protocol) server will automatically assign IP address to DHCP client (the user units).
- **SNMP**
MAP-811 can be managed through Console port, Web browser, and the standard SNMP network management programs. Network manager can remotely manage MAP-811.
- **AUTO FIRMWARE UPGRADE**
In Standard mode, the master AP will automatically upgrade the firmware of Station AP -- once the master AP has been upgraded.
- **LOG RECORDING**
Record all the events into one log file; useful for troubleshooting.
- **DATA SCRAMBLING**
To scramble the data for security concern; scramble key must be matched in order to communicate.

4. HARDWARE INSTALLATION

MAP-811 is a solution member of MacroStack Family, it can be installed onto your desktop, wall mounted or attaching to steel made furniture by using magnets. This chapter introduces the ways you need to know for installing MAP-811.

4.1 NETWORK ADDRESS CONFIRMATION

At the bottom of MAP-811, there is a label indicates the MAC address and IP address of your MAP-811. Please take notes of those addresses for your future management usage.

FACTORY DEFAULT ADDRESS

MAC Address: _____

IP Address: _____

NEW IP ADDRESS

IP Address: _____

MAC address is a fixed address that cannot be change. IP address can be changed according to your network's subnet configuration.

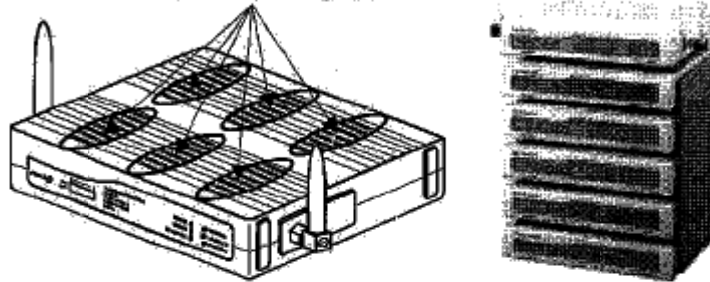
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4.3 MAP-811 INSTALLATION

DESKTOP INSTALLATION

Please avoid installing MAP-811 to a location where the ventilation holes and top cover may be blocked. Blocking the ventilation holes may cause the temperature of MAP-811 to arise, and causing failure. If MAP-811 is stacked with other MacroStack products, please always put MAP-811 on top of the stack.

Ventilation Holes



When you install MAP-811 on desktop using its rubber foot, please always install MAP-811 to a horizontally flat and higher surface (better field of vision). Due to wireless RF signal transmission, the higher you install MAP-811, the better the signal quality and coverage will be (less interference).

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4.4 CONNECTING CABLES

CONNECTING TO POWER OUTLET

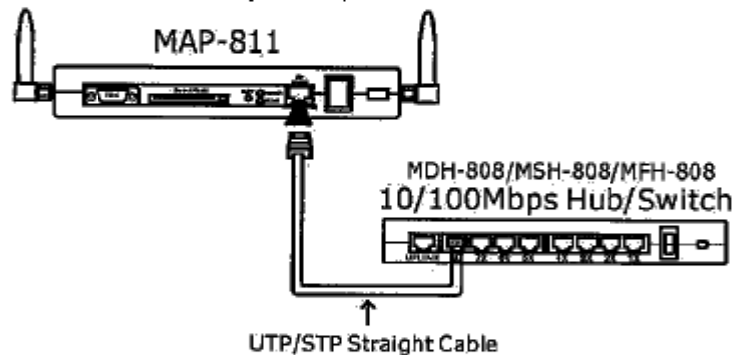
MAP-811 has built-in universal (110V-240V) internal power supply, you can connect the power connector directly to the power outlet. **Please make sure the power switch is turned OFF before you connect it to the power outlet.**

CONNECTING TO OPTIONAL DC POWER SOURCE

MAP-811 can also use the optional power source of DC 4.95-5.25V maximum 2.0A, that means you can connect MAP-811 to an external adapter. The inner electrode is Positive (+), and Negative (-) for the outer electrode, outer diameter is $\varnothing 4.0\text{mm}$ and inner diameter is $\varnothing 1.7\text{mm}$. **Please make sure the power switch is turned OFF before you connect it to the power outlet.**

CONNECTING TO 10/100Mbps HUB/SWITCH

The LAN port of MAP-811 supports both speeds of 10Mbps and 100Mbps. By using the Category 5 UTP/STP straight cable, you can connect it directly to Hub, Switch or Router.



CONNECTING RS-232 CABLE FOR CONSOLE MANAGEMENT

The RS-232 port of MAP-811 is designed for the out-of-band management. You can connect MAP-811 to a Modem through RS-232 cable and to the telephone line, and then MAP-811 can be remotely managed from the dial-in computer (remote computer manages MAP-811 using Modem and telephone line).

If you want to manage MAP-811 locally by using the RS-232 port, you need to connect your PC through the RS-232 cable with one Null Modem.

4.5 WIRELESS BASIC

If you are the first time wireless network product user, it is to be suggested that you shall read this section first before you install the MAP-811.

ABOUT WLAN (WIRELESS LOCAL AREA NETWORK)

MAP-811 is a 2.4GHz ISM band DSSS WLAN product complaint to IEEE 802.11 (2Mbps) and IEEE 802.11b (11Mbps). The ISM stands for Industrial, Science and Medical, it is a RF band (open frequency at 2.4GHz) that can be used for Industrial, Science and Medical environments.

There are two different RF technologies used in WLAN, the Frequency Hopping Spread Spectrum (FHSS) and the Direct Sequence Spread Spectrum (DSSS). Please notice that DSSS and FHSS products cannot communicate with each other.

DIFFERENCE BETWEEN WLAN & LAN

WLAN sometimes are called as the Wireless Ethernet. The difference between WLAN and LAN is only on the media; LAN

uses cables (Twisted-Pair, Coaxial or Fiber-Optical) for the transmission, and WLAN uses wireless RF for the transmission. From user's aspect, operation is exactly the same except with the benefit gain on mobility and cable free implementation. WLAN eliminates the costs for network cabling.

STANDARD	CABLE/MEDIA	DISTANCE
ETHERNET (10Mbps), FAST ETHERNET (100Mbps); CSMA/CD		
IEEE 802.3/802.3u	Twisted-Pair	100 meters
IEEE 802.3/802.3u	Coaxial (Thin-Thick)	185/500 meters
IEEE 802.3/802.3u	Fiber-Optical	2+ kilometers
WIRELESS ETHERNET (2Mbps & 11Mbps); CSMA/CA		
IEEE 802.11 2Mbps	Standard Antenna - open space - with obstacle	300 meters 100 meters
IEEE 802.11	Optional Antenna	20+ kilometers
IEEE 802.11b 11Mbps	Standard Antenna - open space - with obstacle	150 meters 50 meters
IEEE 802.11b	Optional Antenna	20+ kilometers

- * CSMA/CD: Carrier Sense Media Access / Collision Detection
- * CSMA/CA: Carrier Sense Media Access / Collision Avoidance
- * The actual working distance can be shorter due to environmental interference.

The standard Access Point provides one RJ-45 LAN port for integrating AP with wired LAN. One of its basic features is to Bridge between the wired and the wireless networks.

WLAN APPLICATION

The application of WLAN can be divided into two parts, indoor and the outdoor applications. Indoor application usually means the AP is used within building, and with its Included standard antenna for the RF transmission. In outdoor application, usually the AP is used for inter-building connection, and uses optional antenna (such as directional antennas for longer distance).

WLAN MUST-KNOW

MAP-811 uses RF signal for the transmission, the two important characteristics of RF signal are:

a) The weakening of RF signal.

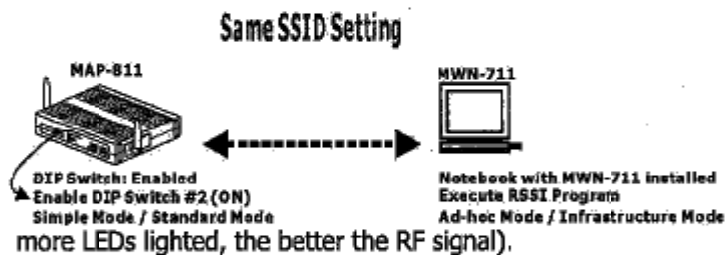
The longer the distance, the weaker the signal (both in signal strength and quality). RF signal gets weaker against distance. Repeater AP needs to be used in repeating the RF signal and the WLAN coverage. Passing through obstacle will also weaken the RF signal.

b) The interference.

Interference is the other key factor affecting RF signal. There are two interference sources, which are the active interference source and the passive interference source. Active interference is from the electricity consuming product and/or equipment that generate electromagnetic signal. Passive interference is the objects within installation environment that will absorb/reflect and weaken the RF signal.

On the MAP-811's front panel, the DIP switch #2 RSSI (Receive Signal Strength Indication) can be used for testing the RF signal strength. To do the RSSI test, you will need at least one MAP-811 Wireless Access Point and one MWN-702/MWN-711.

During the test, you will find the signal quality level from the RSSI program, and LEDs on MAP-811 will also be lit (the



Location is important. If the test result of your RSSI is below 70%, please try identifying and locating the interference source. Mobility is the benefit of wireless network, you can always change the location of your wireless user units.

WLAN GLOSSARY

ACCESS POINT: The networking device that seamlessly connects wired and wireless networks. It is as a Hub without cables.

AD-HOC: An Ad-hoc wireless network is a group of wireless devices that communicate directly with each other (without through the Access Point). Ad-hoc operates based on the peer-to-peer communication. In Ad-hoc operation, the RF overall cover area will be much smaller -- as all devices must be within the cover area in order to communicate. All wireless devices (AP or wireless adapter) can be configured to either Ad-hoc or Infrastructure mode.

BASE STATION: In wireless mobile telecommunication, a base station is the central radio transmitter/receiver that maintains communication with the mobile radiotelephone sets within its range. In cellular and personal communications applications, each cell or micro cell has its own base station; each base station in turn is interconnected with other cells' base stations.

BSS (Basic Service Set): An Access Point associated with several wireless stations (such as wireless adapter or AP in station mode).

ESS (Extended Service Set): The application of more than one BSS configuration is called Extended Service Set. An ESS is basically a roaming domain. **For devices to communicate with each in the same roaming domain, the devices must use the same ESSID.**

INFRASTRUCTURE: The infrastructure's definition in AP is that the AP is connected to both wired and wireless LAN; used as the backbone of wireless LAN. The infrastructure's definition in wireless adapter means the wireless adapter will communicate with others through AP.

ROAMING: A function that enables one to travel with his mobile end system (wireless LAN mobile station, for example) throughout a domain (an ESS, for example) while being continuously connected to the infrastructure.

RTS THRESHOLD: Transmitters contending for the medium may not hear each other. RTS/CTS mechanism can solve this "Hidden Node Problem". If the packet size is smaller than the preset RTS Threshold size, the RTS/CTS mechanism will NOT be enabled.

5. MAP-811 CONFIGURATION & MANAGEMENT

MAP-811 can be configured and managed via various ways, including through Telnet/Console, Web-based browser or SNMP based management software.

5.1 SETTING FOR TELNET/CONSOLE MANAGEMENT

Telnet/Console management can be used locally or remotely.

MANAGING MAP-811 USING TELNET/CONSOLE LOCALLY

To manage MAP-811 using Telnet/Console locally, you need to connect your PC to MAP-811 locally through RS-232 cable WITH NULL MODEM. HyperTerminal program (tool program within Windows 95/98) can be used for the terminal emulation.

Baud Rate: 9600
Parity: None
Data Bit: 8
Stop Bit: 1
Password: <Enter>



MANAGING MAP-811 USING TELNET/CONSOLE REMOTELY

To manage MAP-811 using Telnet/Console locally, please refer to the following procedure:

MAP-811 Site:

1. Enable the front panel "DIP Switch" option through Web browser program, or local Telnet/Console management. Please refer to the "Web Browser Management" section.
2. Adjust the DIP Switch #1 to ON position (Modem Mode).
3. Connect PSTN Modem to MAP-811 (DB9 female) with RS-232 cable, and connect telephone line to the modem.
4. Check MAP-811's IP address (see bottom for factory default IP address).

Remote Manager Site:

1. Re-configure the manager's computer IP address to the same class as MAP-811. For example, if MAP-811's IP address is 10.1.1.2, then you can set your computer's IP address to 10.1.1.3.
2. Create a "New Connection" profile from Windows "Dial-Up Networking" to remotely dial-in MAP-811; just like creating connection profile for dial-in ISP. When using manage from remote site, use the setting of 38400, N, 8, 1.
3. Double click on the icon of newly created connection profile.
4. When password is prompted, press <Enter>.

To remotely manage MAP-811, you must use the "Dial-Up Network" from Windows. Using HyperTerminal cannot remotely manage MAP-811.

NOTE: TO CHECK YOUR CONNECTION WITH MAP-811, YOU CAN USE THE PING COMMAND, AND TO PING THE MAP-811'S IP ADDRESS.

5.2 SETTING FOR WEB BROWSER MANAGEMENT

Web Browser management can be used locally or remotely. MAP-811 built-in the HTML based Web server. When managing MAP-811 through Browser, it is as simple as connecting to a web site by entering URL (in this case MAP-811's IP address).

MANAGING MAP-811 USING WEB BROWSER LOCALLY

Using Web Browser through LAN; from wired or the wireless connection. Please make sure you have properly installed and configured the network adapter.

1. Check the MAP-811's IP address, and make sure that your computer's IP address is in the same IP address class with MAP-811.
2. Start your Web Browser program; such as IE or Netscape.
3. Within the Browser program, entering the URL in MAP-811's IP address.
For example, MAP-811's IP is 192.128.20.35
<http://192.128.20.35>
4. Within the Browser program, entering the URL with MAP-811's IP address, following window will appears.



5.3 CONFIGURATION & MANAGEMENT

This section divides the configuration and management in three parts, through Telnet/Console, Web Browser or SNMP based network management software. Management contents will be different according to AP's modes; each mode has its special setting options.

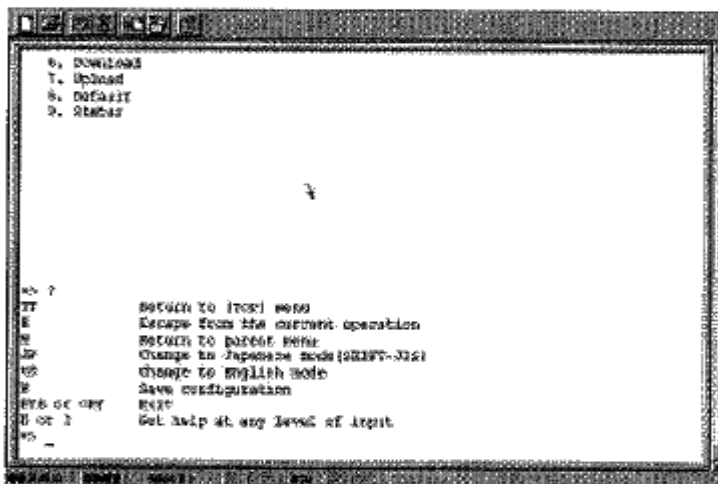
MANAGING MAP-811 USING TELNET/CONSOLE

```
[TOP]
  1.  Exit
  2.  Configure
  3.  Write Configuration
  4.  Reboot
  5.  Update System Parameters
  6.  Download
  7.  Upload
  8.  Default
  9.  Status
=> _
```

- Exit. Exit from MAP-811 management.
- Configure. To configure MAP-811's: 1) AP, 2) LAN, 3) Wireless, 4) IP, 5) Security, 6) SNMP, 7) DHCP Server, 8) Spanning Tree, 9) Terminal, 10) Remote Maintenance and 11) Log Information.
- Write Configuration. Save configuration to MAP-811.
- Reboot. Reboot MAP-811 from either 1) Cold Boot or 2) Warm Boot.

- Update System Parameters. To configure MAP-811's: 1) Manager Password, 2) User Password, 3) Date/Time and 4) Language.
- Download. To download MAP-811's: 1) Configuration File and 2) Firmware.
- Upload. To upload MAP-811's: 1) Configuration File and 2) Log Information.
- Default. Reset all configuration data to factory defaults.
- Status. To display MAP-811's status of: 1) Environment Information, 2) MIB Information, 3) Wireless Information, 4) AP, 5) Spanning Tree, 6) MAC Address Table Information, 7) DHCP Lease Information, 8) Segment BRouter Information and 9) Log Information.

Help information is available by entering "?" or "H" in each different window.

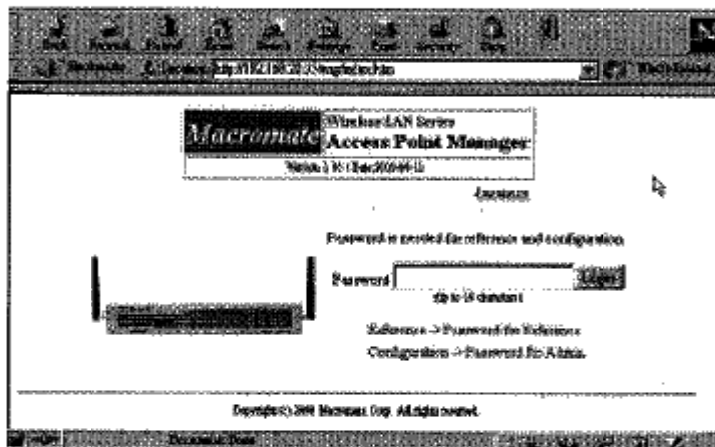


Below are the shortcut commands available in all windows.

TT	Return to [TOP] menu
E	Escape from the current operation
M	Return to parent menu
JP	Change to Japanese mode (SHIFT-JIS)
US	Change to English mode
W	Save configuration
BYE or OFF	Exit
H or ?	Get help at any level of input

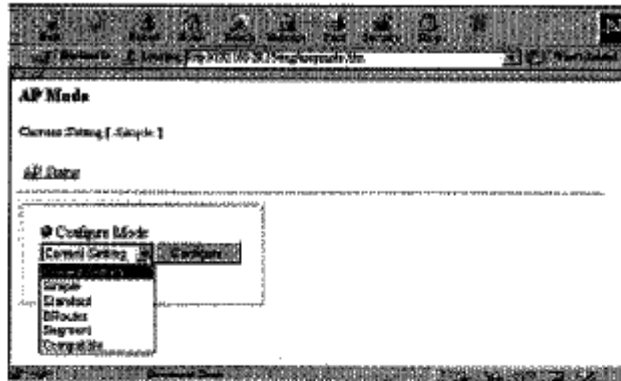
MANAGING MAP-811 USING WEB BROWSER

Within the Browser program, entering the URL with MAP-811's IP address. The first HTML page INDEX.HTM will be loaded, and you can then enter the password for logging MAP-811.

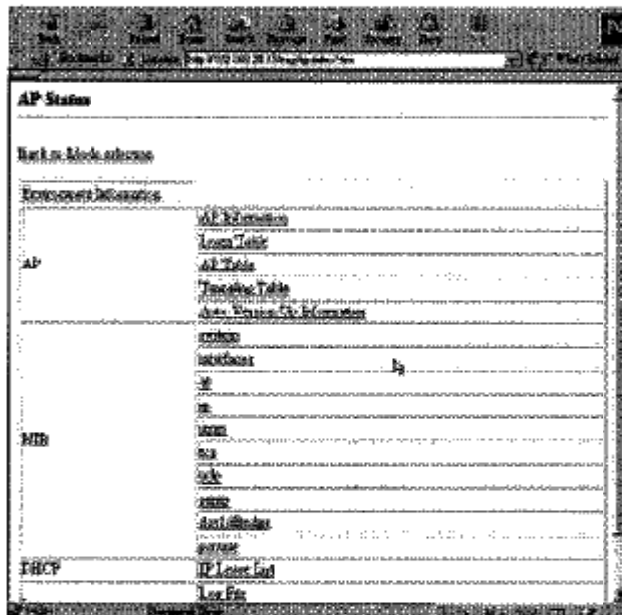


For the first time MAP-811 login, click on the "Login" button and you can login onto MAP-811 (default password is none, simply press Enter). Once you login, please change the User Password and Manager Password. This can prevent the unauthorized or unwanted configuration from other users.

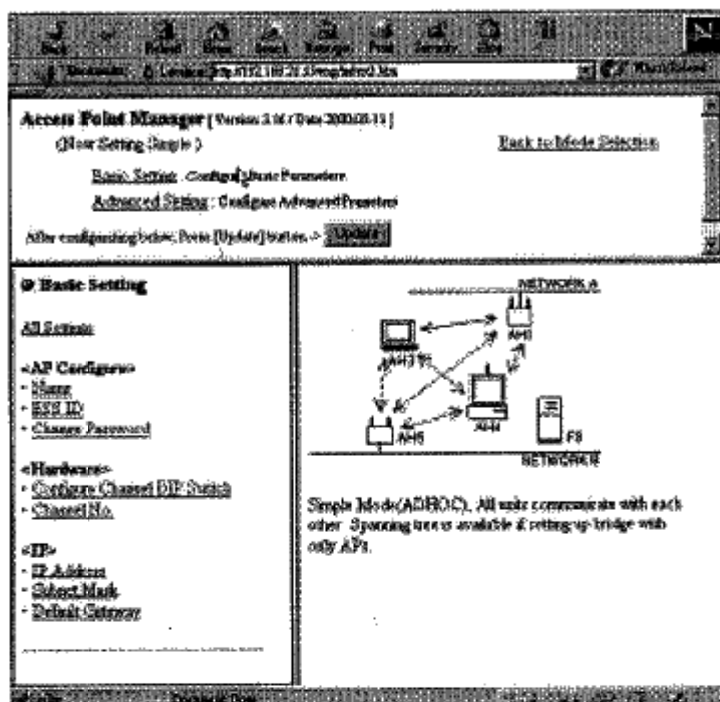
MAP-811's first window after the login.



MAP-811's AP Status window.



MAP-811's Configure window (Access Point Manager Program).



Under MAP-811's Web Browser management, more configuration details and options are available. Basic Setting option is an easy way to configure MAP-811. Advanced Setting option is for those users/managers with advanced networking technical background.

MANAGING MAP-811 USING SNMP MANAGEMENT PROGRAM

Managing MAP-811 using SNMP network management program (such as SNMPc, HP OpenView, etc.) is recommended for advanced users.

5.4 AUTOMATICALLY UPGRADE ALL MAP-811'S FIRMWARE

For Multiple MAP-811 Site

If you have multiple MAP-811 installed, MAP-811's automatic firmware upgrade feature will greatly reduce your Access Point management workload. You only need to upgrade the Master MAP-811's firmware, and the Master MAP-811 will upload the firmware to other station AP (MAP-811).

To perform automatic firmware upgrade, please refer to the following procedure.

1. Within all the MAP-811s, one of the MAP-811 has to be configured as the "Master AP". For redundancy consideration, you may also assign another AP as the "Backup Master AP". In case of failure from the Master AP, the Backup Master AP will become the Master AP.
2. All the other MAP-811 must be configured and assigned the IP address of its "Master AP" and "Backup Master AP" if required.
3. Upgrade the "Master AP" firmware via TFTP or SmartMedia card and then reboot the "Master AP".
4. After the reboot of "Master AP", it will automatically start to upgrade the firmware of all other MAP-811s associated to it.

6. APPENDIX

6.1 HARDWARE SPECIFICATION

MacroStack MAP-811

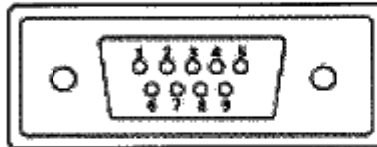
STANDARDS COMPLIANCE WIRELESS	IEEE 802.11, 802.11b
LAN	IEEE 802.3, 802.3u
PORTS	1 RJ-45 (UTP/STP), 1 DB-9, 1 SmartMedia
DATA TRANSFER RATE WIRELESS	11/5.5/2/1Mbps
LAN	10/100Mbps
MEDIA ACCESS METHOD WIRELESS	CSMA/CA + ACK, RTS/CTS
LAN	CSMA/CD
OPERATING FREQUENCY	2.4GHz ISM Band
RF TECHNOLOGY	DSSS
OUTPUT POWER	12.026mW
MANAGEMENT	Telnet, Web, SNMP Mgt.
ANTENNA	Two Diversity Antennas
SENSITIVITY	100Mbps -80dBm, 5.5Mbps -83dBm 2Mbps -89dBm, 1Mbps -92dBm
SECURITY	WEP (40 Bit), Data Scramble (20 Bit)
SMARTMEDIA	3.3V, 2/4/8/16/32M
LED INDICATORS	Front and Rear: POWER, MGMT, WLINK, WTX/WRX, 10/100M, LINK/ACT, FDX/COL
EMISSION	CE, FCC Class B
DIMENSION	205mm x 158mm x 33.5mm
WEIGHT	700g
OPERATING ENVIRONMENT	0° - 55°C, 5% - 95% Humidity (non- condensing)
STORAGE ENVIRONMENT	-20° - 80°C, 10% - 90% Humidity (non- condensing)
POWER INPUT	85 - 240 VAC or DC 5V 2A, 50/60Hz
POWER CONSUMPTION	4.5W Maximum
WARRANTY	5 Years

6.2 DB-9 CONNECTOR PIN ASSIGNMENT

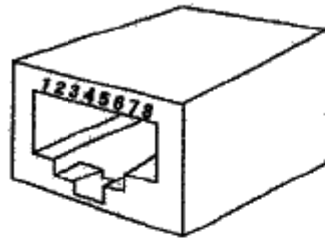
a) Pin Assignment

SIGNAL	9-PIN D-SUB
DCD	1
RXD	2
TXD	3
DTR	4
GND	5
DSR	6
RTS	7
CTS	8
RI	9

b) Connector Pin Assignment



6.3 RJ-45 CONNECTOR PIN ASSIGNMENT



PIN NUMBER	SIGNAL	FUNCTION
1	RD+	Receive (+)
2	RD-	Receive (-)
3	TD+	Transmit (+)
4	(Not Used)	-
5	(Not Used)	-
6	TD-	Transmit (-)
7	(Not Used)	-
8	(Not Used)	-

NOTE:MAP-811 Can be used on table only.