Macromate

MAP-811E

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:

- Install the antenna so that a 6.5cm distance can be kept from the antenna.
- While installing the antenna in the location, please do not turn on the power of the wireless card.
- While the device is working, please do not contact the antenna.

NOTE: MAP-811E CAN BE USED ON TABLE ONLY.

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 MAP-811E

MAP-811E is an intelligent DSSS (Direct Sequence Spread Spectrum) Wireless Micro Access Point that performs as a Bridge between the wired LAN (Local Area Network) to one or more WLAN (Wireless Local Area Network) or acts as a wireless transceiver for any wired LAN segment or equipments.

Placed anywhere onto the wired Ethernet network, MAP-811E 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-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-811E to your Ethernet (10Mbps) network, and you then have all PC and the mobile notebook computers connected; cabling is no longer a problem.
- With multiple MAP-811E together with MAP-811E installed, the originally complicated network configuration can be simplified.
- Easy configuration and management through Windows Based Utility (**APUTIL.EXE**).
- SNMP MIB II supported. With standard SNMP (Simple Network Management Protocol) software package, users can easily manage MAP-811E remotely.
- Diversity Antennas. MAP-811E equips with internal diversity antennas for better RF transmission.

- Automatic RF transmission speed adjustment. According the RF signal quality, MAP-811E can adjust itself to RF speed at 11Mbps, 5.5Mbps, 2Mbps and 1Mbps.
- Dual power source selection. Users can choose to use the power source from external AC adapter or through Macromate WLAN accessory (MWA-CB10) to have power supply through UTP cable.
- Easy network feature upgrade and expansion with other members. MAP-811E can be easily connected to other members such as ADSL/Cable Switch Router, ISDN Hub Router and Switch for much better connectivity.
- Easy operation mode and AP type configuration. The wireless channel selection can be configured either through the DIP switches aside, or through its utility.

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.

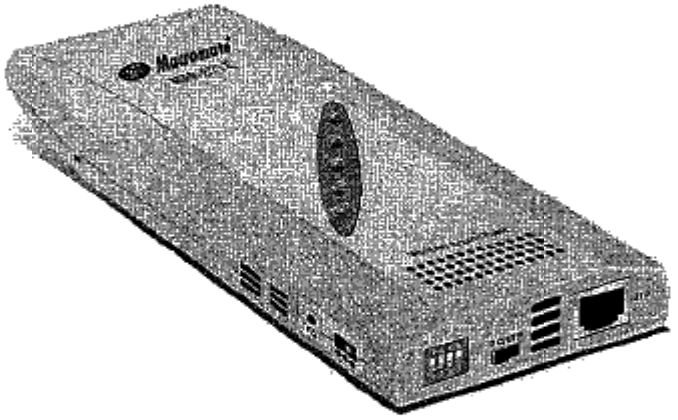
2.3 PACKAGE INCLUDES

Each MAP-811E package includes the following items.

- MAP-811E Wireless Access Point
  The 11Mbps DSSS Wireless Access Point.
- Utility Diskette x 1
  Includes program for MAP-811E firmware upgrade.
- User's Manual
- Magnet x 2
  For attaching MAP-811E to steel made furniture.
- Wall Mount Screw x 2
  For wall mounting MAP-811E to wall.
- Wall Mount Guide x 1
- Rubber Pad * 4

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

2.4 DETAIL DESCRIPTION



- LED Indication

  There are totally 5 LED indications for displaying the status of link, transmission, power and LAN port status.

MAP-811E CONFIGURATION: SIMPLE MODE

LED	STATUS	DESCRIPTION
Power	ON	Power is On
	OFF	Power is off
WLINK	ON	Link With Existing Ad hoc Network Or Build-up a New Ad hoc Network.
	Flash	Seraching For Existing Ad hoc Network
WRX	Flash	Receiving WLAN Data
Link	ON	Wired ConnecIton Is Up
	OFF	No Wired Connection
RX	Flash	Receiving LAN Data

MAP-811E CONFIGURATION: STANDARD MODE

LED	STATUS	DESCRIPTION
Power	ON	Power is On
	OFF	Power is off
WLINK	ON	Connection Established
	Flash	Seraching For Connection
WRX	Flash	Receiving WLAN Data
Link	ON	Wired Conneciton Is Up
	OFF	No Wired Connection
RX	Flash	Receiving LAN Data

OTHER

LED	STATUS	DESCRIPTION
Power	Flash Twice	System Initilizaing
Power WLINK WRJ	Flash	Firmware Upgrading

O 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	INIT	ON	System Initializing
		OFF	None
2		Reserve	
3	AP Type	ON	Infrastructure AP
		OFF	Infrastructure Station
4	AP Mode	ON	Infrastructure Mode
		OFF	Ad hoc Mode

When power ON MAP-811E, MAP-811E 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.

O Connectors & Switch

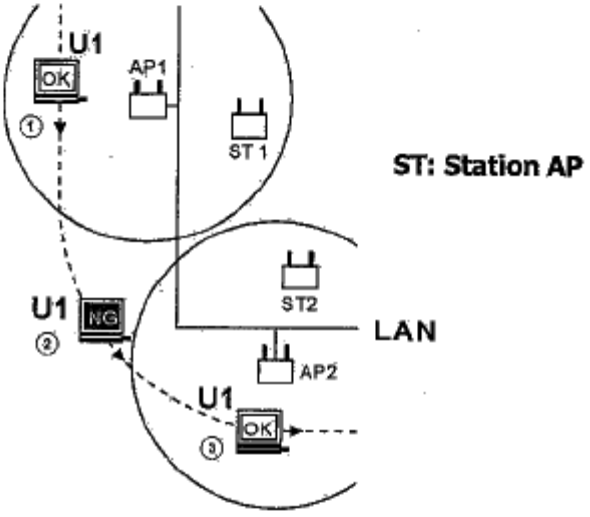
10M RJ-45	for connecting to LAN
Power	for Power Adapeter (Iutput: 6Vdc 2A)
Ground	for connecting with ground cable
DC/UTP Switch	for switch power source DC: Through Power Adapter UTP: Through UTP Cable (MWA-CB10/MWA-SP10 is needed.)

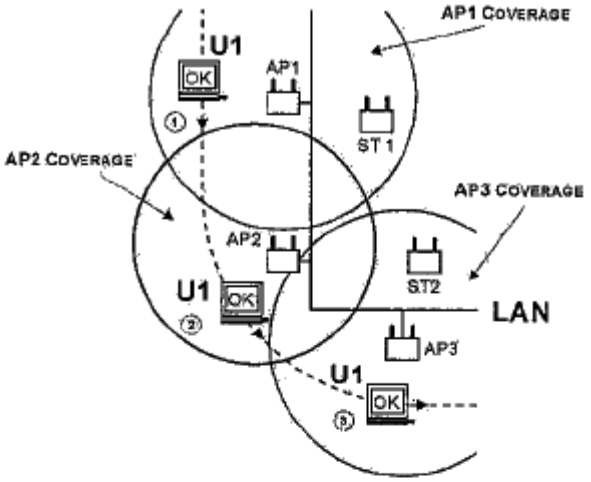
3. MAP-811E's Roaming and Modes

This section explains the concept of wireless roaming, the special IP Tunneling features of MAP-811E, and its three different 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.




AP1 COVERAGE
U1
OK
AP1
ST 1
AP2 COVERAGE
AP3 COVERAGE
AP2
ST2
U1
OK
LAN
AP3
U1
OK

3.2 OPERATION MODES

MAP-811E can be configured into three different modes, which are Ad hoc (Simple), Infrastructure (Standard), Compatible Modes.

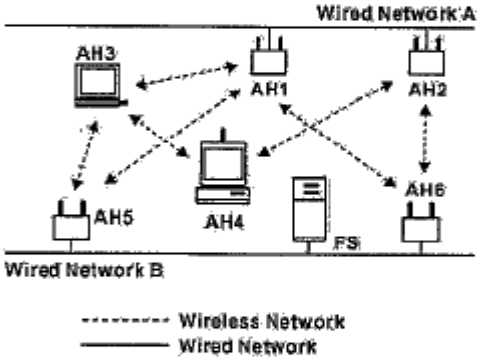
❍ SIMPLE MODE

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
- 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.



AH: Ad-hoc

○ STANDARD MODE

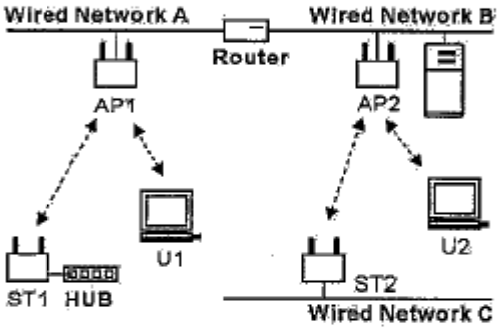
For multiple Access Point application, all wireless devices are communicating through Access Point connected to wired LAN(s). Roaming feature is supported in this mode; all computers can roam within all AP's RF signal coverage. In order for the Roaming and IP Tunneling features to operate properly, one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

Enabled features in this mode are:

- **Roaming**
- **SNMP**
- **Data Scrambling**

Benefit: through the multiple Access Point application, users can easily configure a wider area wireless network.

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



○ COMPATIBLE MODE

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

Enabled features in this mode are:

- Roaming

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

3.4 MODE & COMMUNICATION

The way MAP-811E 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	O	-	-
Simple	ST	Ad-hoc	O	O	O ST⇔ST
Standard	AP or ST	Infrastructure	X	O	O
Compatible	-	Infrastructure	X	O	X

4. HARDWARE INSTALLATION

MAP-811E 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-811E.

4.1 NETWORK ADDRESS CONFIRMATION

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

FACTORY DEFAULT ADDRESS

MAC Address

E: (Ethernet) _____

W: (Wireless) _____

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.

4.2 CONNECTING CABLES

CONNECTING TO DC POWER SOURCE

MAP-811E can also use the optional power source of DC 6vDC maximum 2.0A, that means you can connect MAP-811E to an external adapter. The inner electrode is Positive (+), and Negative (-) for the outer electrode, outer diameter is ø4.0mm and inner diameter is ø1.7mm. **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-811E supports speeds of 10Mbps. By using the UTP/STP straight cable, you can connect it directly to Hub, Switch or Router. For connecting with PC, please use crossover UTP cable.

CONNECTING TO UTP POWER SOURCE

MAP-811E can also use the MWA-CB10 and MWA-SP10 to supply power through UTP cable. You have to adjust Power Suorce Switch to UTP and then connect an UTP cable to MWA-CB10 or MWA-SP10. Please use the standatd UTP cable with the correct pin assignment.

4.3 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-811E.

ABOUT WLAN (WIRELESS LOCAL AREA NETWORK)

MAP-811E 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-811E 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 weakening 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 weakening the RF signal.

Location is important. For moving host, RSSI value would be better above 70. For fixed point, RSSI value would be better above 50. Please try identifying and locating the interference source. Mobility is the benefit of the 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 communicates 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-811E CONFIGURATION & MANAGEMENT

If you're going to manage MAP-811E with wired (with cable) network adapter, you only need to connect to MAP-811E with UTP/STP cable.

Connecting MAP-811E directly to PC, you need to use CROSS UTP/STP cable. Connecting MAP-811E to wired Hub/Switch, you need to use STRAIGHT UTP/STP cable.

If you're going to manage MAP-811E with wireless (with RF) network adapter, you must adjust the CHANNEL, ESSID, MODE, and disable DATA SCRAMBLING functions of your Macromate wireless network adapter to MAP-811E's default settings.

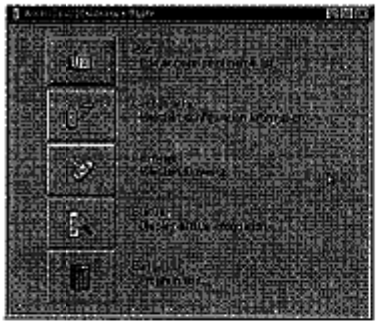
MAP-811E's factory default settings:
CHANNEL: **14**
ESSID: **LocalGroup**
DATA SCARMBLING: **Disable**
Mode: **ADHOC (Simple Mode)**
DC/UTP Switch: **DC**
DIP Switch: all **OFF**

MAP-811E can use the power from DC or from UTP cable. The UTP cable power supply kit will be released soon. DC/UTP switch can be set to UTP only with Macromate's UTP cable power supply kit.

If there is Router connected on your network, please check and write down the IP addresses of your Subnet Mask and Gateway. This information will be used later.

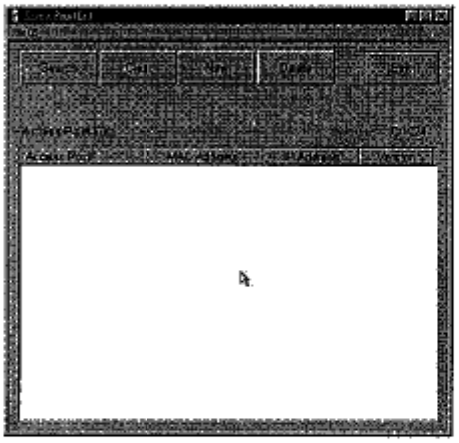
5.1 EXECUTE THE APUTIL PROGRAM

Please copy the APUTIL program from the floppy diskette to your local hard disk. Once copied, execute APUTIL program and the following window will appear. Please click on **Edit** to search for your MAP-811E.



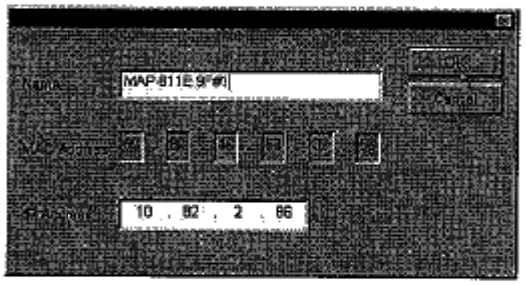
[SEARCH FOR YOUR MAP-811E]

In the following window, click on **Search** to start searching MAP-811E from your network.

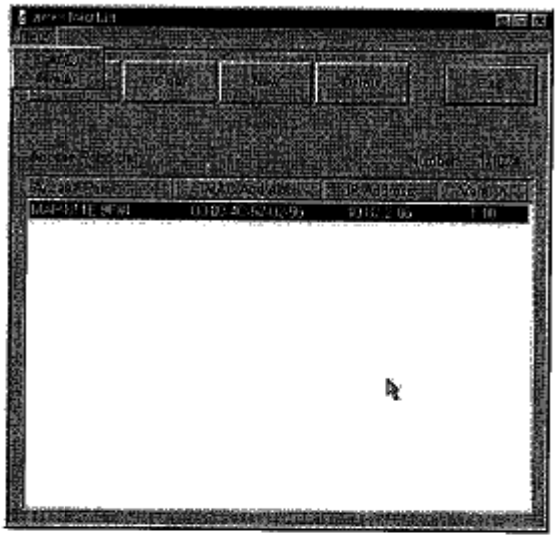


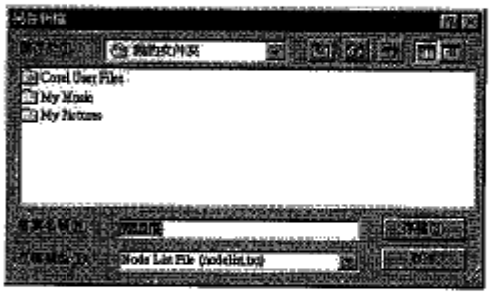
If MAP-811E is found, MAP-811E will be listed in the window with its MAC Address, IP Address and the current firmware Version.

Double on the MAP-811E found, you can then edit the Name (for example the #1 MAP-811E on the 9F) and the IP Address of MAP-811E. Once finished, please click on **OK**. Then you will be back to the Access Point List window.



In the Access Point List window, click on the File, choose Save and you can save the AP node list for future usage.

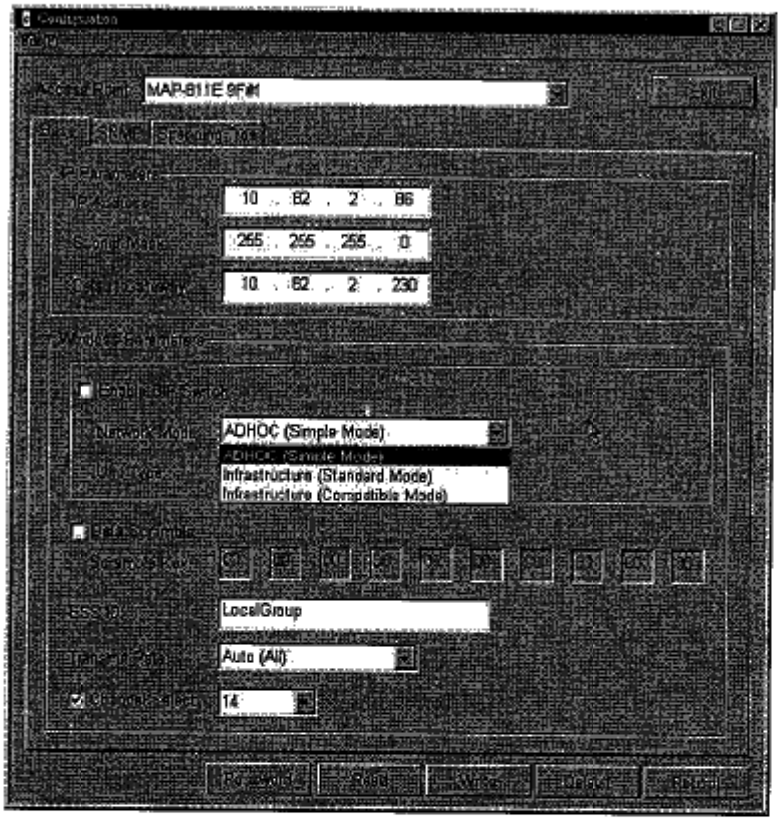




Now please click on the **Exit** to return to the Access Point Maintenance Utility.

5.2 CONFIGURATION & MANAGEMENT

From the Access Point Maintenance Utility window, click on **Configuration** and the following configuration window will appear. Click on the **Read** button first to get the current configuration data of MAP-811E.



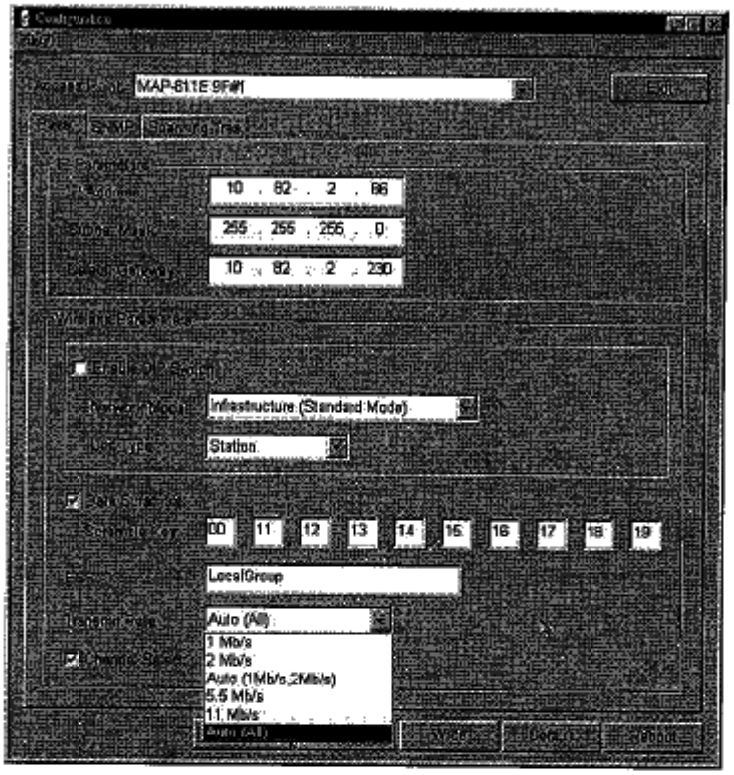
In the IP Parameters fields, you can modify the IP Address, Subnet Mask and the Default Gateway setting of MAP-811E.

In the Wireless Parameters, Enable DIP Switch means the hardware DIP Switches setting function is enabled, you need to disable it in order to adjust setting through software configuration. If DIP Switch option is enabled, you can only adjust the Network Mode and Unit Type through DIP switches.

ADHOC (Simple Mode):	used for peer to peer communication
Infrastructure (Standard Mode):	used for wireless infrastructure communication
Infrastructure (Compatible Mode):	when MAP-811 is used with AP or adapter from other vendors
Unit Type (Station):	Station AP that logins to Access Point
Unit Type (Access Point):	Root Access Point

In the same wireless domain (same ESSID and CHANNEL), there can be only one MAP-811E set to "Infrastructure/Access Point", other MAP-811E has be configured as the "Infrastructure/Station".

In the Data Scramble, enable data scramble means enabling the security function of MAP-811E. If Data Scramble is enabled, both wireless network adapter and other access point can only communicate to MAP-811E when the **Scramble Key** is correct.

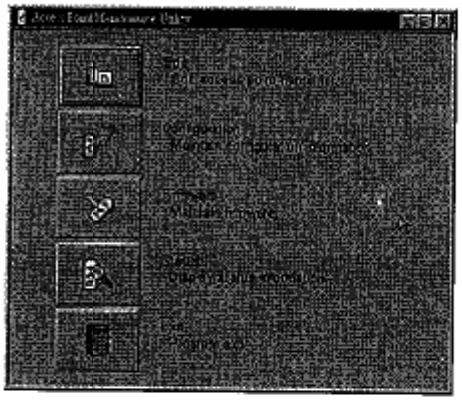


ESS ID. For the wireless communication within same wireless domain, the ESSID and CHANNEL must be configured to the same settings.

Transmit Rate. MAP-811E supports speeds at 1/2/5.5/11/Auto modes, it is recommended that you use the default setting **"Auto (All)"**.

Once all settings are finished, you can now click on the **Write** button to save and write all changed to MAP-811E. Click on the **Default** button will adjust all setting to its factory default settings, but you need to click on the Write button again to save it. Reboot will reboot the MAP-811E, and you will see the LED status change of MAP-811E.

You can now **Exit** APUTIL and start using MAP-811E.



Firmware (maintain firmware) is for further MAP-811E's firmware upgrade.

Status (display status information) is for monitoring the status of MAP-811E.

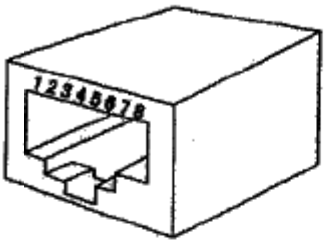
6 APPENDIX

6.1 HARDWARE SPECIFICATION

MAP-811E

STANDARDS COMPLIANCE **WIRELESS** **LAN**	 IEEE 802.11, 802.11b IEEE 802.3
PORTS	1 RJ-45 (UTP/STP)
DATA TRANSFER RATE **WIRELESS** **LAN**	 11/5.5/2/1Mbps 10Mbps
MEDIA ACCESS METHOD **WIRELESS** **LAN**	 CSMA/CA + ACK (RTS/CTS) CSMA/CD
OPERATING FREQUENCY	2.4GHz ISM Band (2400~2497MHz)
RF TECHNOLOGY	DSSS
OUTPUT POWER	13dB (20mW) + 0dB Dipole Antenna
MANAGEMENT	Windows Based Utility, SNMP
ANTENNA	Internal Diversity Antennas
SENSITIVITY	11Mbps -80dBm, 5.5Mbps -83dBm 2Mbps -89dBm, 1Mbps -92dBm
SECURITY	WEP (40 Bit), Data Scramble (20 Bit)
LED INDICATORS	POWER, WLINK, WRX, LINK, RX
EMISSION	CE, FCC Class A
DIMENSION (MM)	81(W) x 26.5(D) X 175(H)
WEIGHT	0.2Kg
OPERATING ENVIRONMENT	0° - 50°C, 0% - 95% Humidity (non-condensing)
STORAGE ENVIRONMENT	-20° - 80°C, 10% - 90% Humidity (non-condensing)
POWER INPUT	DC5.5~7.0V,2A
WARRANTY	5 Years

6.2 RJ-45 CONNECTOR PIN ASSIGNMENT



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

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