BeeKeeper

Manual Version 1.5

Contents **Page**

BVS Pollenator™: Instructions for Operation

The BVS Pollenator™ 802.11b WLAN Monitoring package contains

1. The Pollenator™ receiver*
2. Pollenator™ WLAN monitoring application software CD*
3. 5V Power Supply.
4. 10/100 Base-T Ethernet Cable.
5. USB 2.0 cable.
6. 50Ω Swivel Antenna.
7. 30dB Attenuator.
8. Pollenator receiver USB port drivers, which get stored in the same folder as the Pollenator Software Application once the CD is installed.

* These items will only be included if you have ordered a BeeKeeper software package for the Pollenator which only interfaces with the Yellowjacket 802.11b receiver.

IMPORTANT: *You will require the **Registration Code** for the Software Application. This can be found inside the BeeKeeper™ CD case. If TCP/IP connection is desired for interfacing the software with the hardware, the **MAC address of the Pollenator™ Ethernet port** may be needed, which can be found on the Pollenator™ receiver next to the Serial No.*

1. Mounting the Pollenator on the Yellow Jacket:

Before starting up the software application, make sure that the **Pollenator™** needs to be properly interfaced to the Yellow Jacket B Receiver as shown on the page above. After having detached the iPAQ from the Yellow Jacket B Receiver, the Pollenator has to be mounted on the same face of the Yellow Jacket Receiver. It can be held in place that way by inserting the screws on the **Pollenator** into the two screw holes on the Yellow Jacket Receiver next to the Swivel Antenna.

2. Connecting the Power Supply and the Quatech Cable to the Pollenator| :

The Pollenator interface has to be powered up using the power supply provided with the Yellow Jacket. To do this, detach the iPAQ charging connector from the power supply port and connect this port to the **Pollenator™** interface power supply port. You will then need to remove the Quatech CF card from the iPAQ and insert it to the Quatech card reader slot on the **Pollenator™.** If the **Pollenator™** is powered up and the Quatech card hasn't been inserted into the CF card reader on the Pollenator, the **Red LED** on the **Pollenator™** will blink. Upon inserting the Quatech card into the card reader will cause the **Red LED** to stop blinking and remain steady.

3. Interfacing the Pollenator-Yellow Jacket Assembly to the BeeKeeper Software:

If the medium of interface to the PC is via the USB cable, the Operating System will prompt you to load the appropriate USB drivers. The USB drivers have been provided along with the application and can be found in the same directory as the **BeeKeeper™** application, once the application has been installed using the **BeeKeeper™** Application Installation CD. Make sure that the driver is correctly installed before using the USB port as the interface to the software.

The **Pollenator™** can be interfaced to the **BeeKeeper™** software application over the Internet or within the local network. If the **Pollenator™** is to be used within the local network connect the provided Ethernet cable to the Ethernet port of the **Pollenator™** and the other end to

either a hub, switch or a router on the subnet to which the PC on which the **Pollenator™** software application is likely to be running. The other end can also be connected to the Ethernet port of the PC itself.

If the **Pollenator™** is to be interfaced to the **BeeKeeper™** application via the internet, make sure you have the Gateway server/router/machine of the Network to which the Pollenator-Yellow Jacket 'B' receiver connected, properly configured to forward IP traffic over to the Pollenator-Yellow Jacket 'B'. You will have to configure the Gateway Router or server to forward any IP traffic on port **10001** to an IP address permissible within that local network so as to enable remote connection to the Pollenator-Yellow Jacket receiver. Once you do that, you will be prompted to enter the IP address of the Gateway router or server of the Network in which the Pollenator-Yellow Jacket 'B' receiver has been connected.

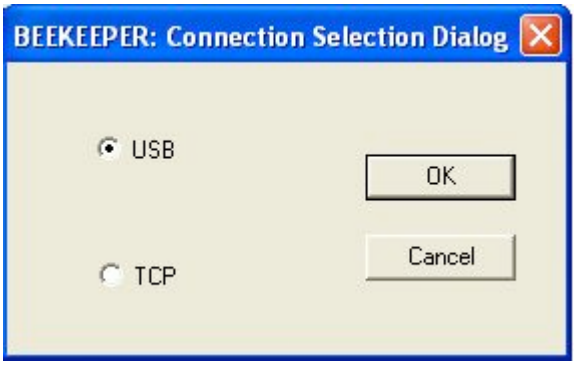
IMPORTANT NOTE:

IP Addresses can change (unless they are static IP Addresses) once or more than once in 24 hours and hence there could be disruption in connection. Also, due to the nature of the way data gets routed over the internet, there could be disruptions/timeouts/malfunctioning of the software. Hence you may not experience the same performance as you get when the Pollenator-Yellow Jacket Receiver has been connected within the local network.

Having installed the **Pollenator™** receiver successfully, the CD can be installed. Go through the CD installation process and store the application in the desired location. A shortcut to the application will be created on the Desktop and Program Files menu of the Windows Start Menu.

Instructions for Software Operation:

The Beekeeper software is designed to operate either via a USB or an Ethernet connection with the Beekeeper 802.11b receiver. Before starting the software, make sure that the Beekeeper receiver is connected to the PC/ laptop, via the desired connection. Upon starting the software, the user will be prompted to select the desired connection:



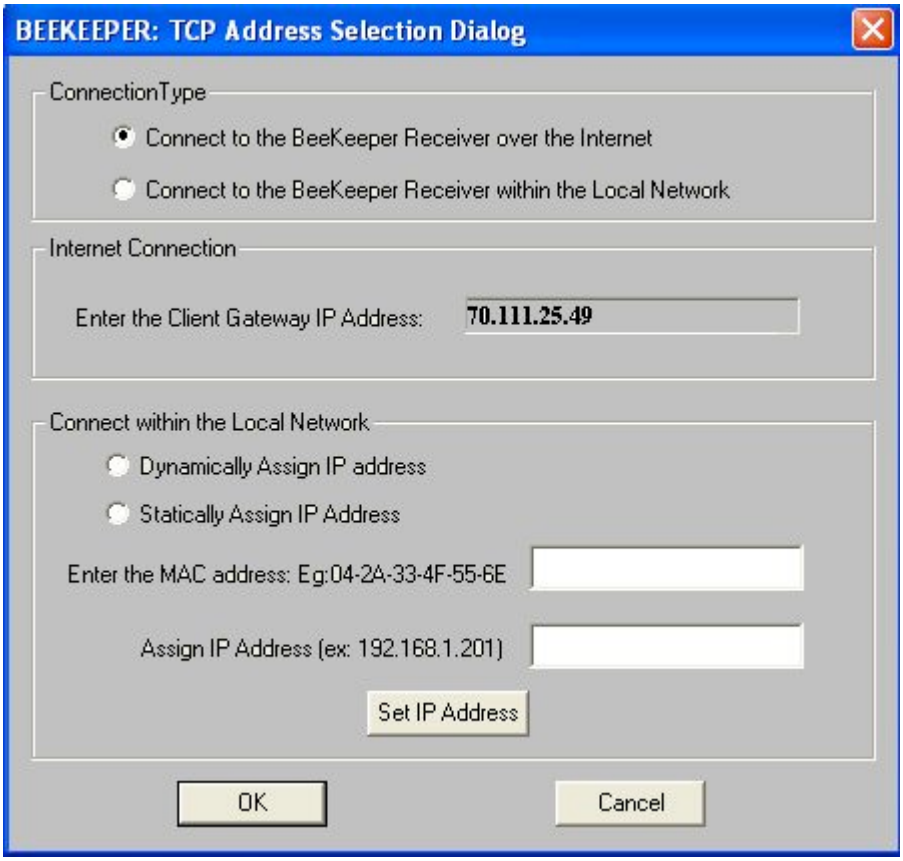
If the USB connection is selected, the appropriate USB device selection dialog Box will pop up:

If the appropriate USB connection has been selected, then upon clicking OK, the user will be directed to the Registration Box, where he will be prompted to Enter the Registration code which has been printed on the inside of the CD case just above the CD hook.

Important Note for Pollenator users:

Upon selecting the Pollenator USB device and clicking OK, the LED on the Pollenator interface will turn **Orange** if the USB connection has been properly established.

If the TCP/IP connection has been selected, an IP address dialog box will prompt the user to further configure his network connection.

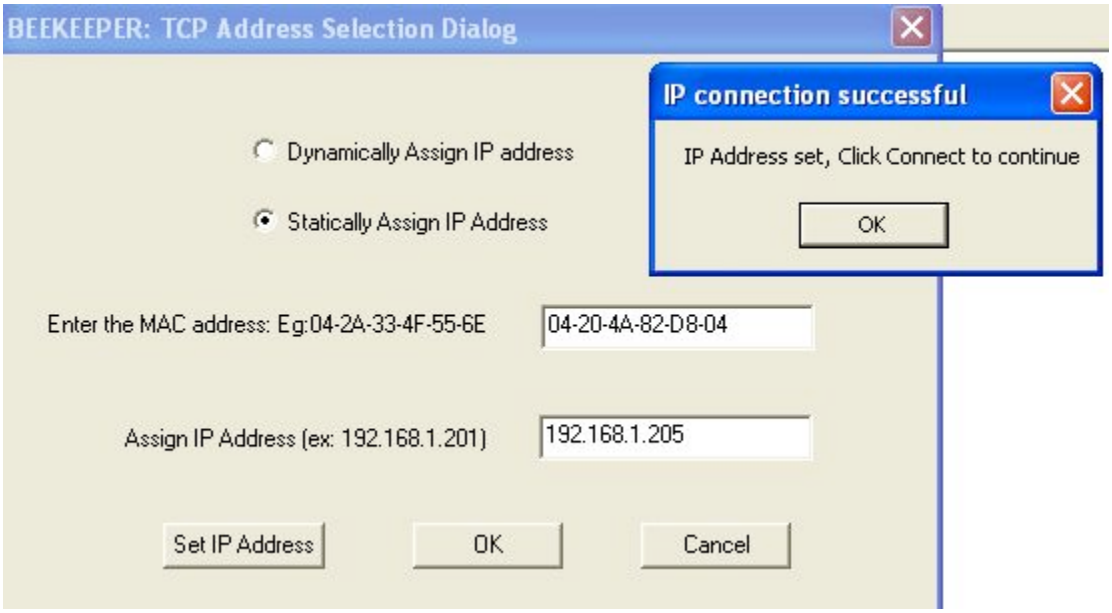


If the user has to connect to the receiver over the Internet, he would need to enter the IP address of the Gateway router or server of the network to which the Pollenator-Yellow Jacket has been connected.

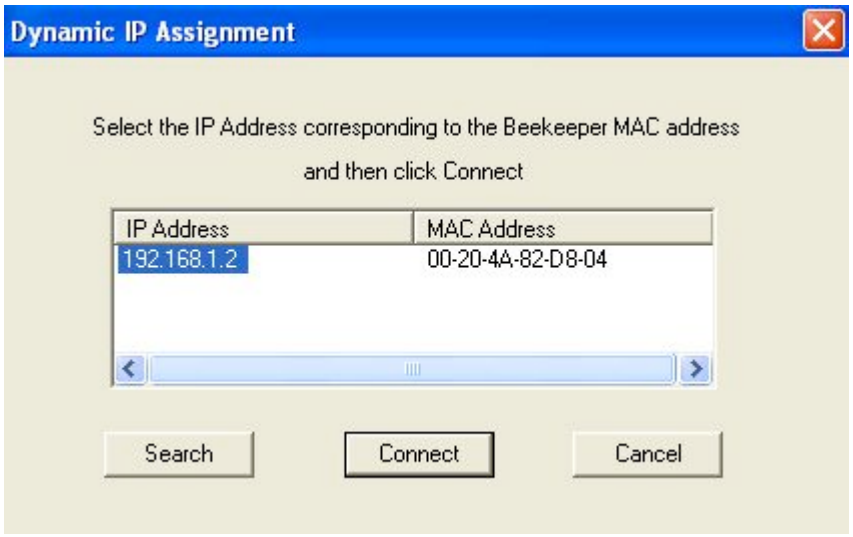
If the Pollenator – Yellow Jacket has been connected within the Local network, the user can choose to Configure the Local Network access for the Pollenator-Yellow Jacket, by either Statically assigning an IP address or allowing the DHCP server on the Local Network to Dynamically assign an IP address to the Pollenator-Yellow Jacket.

IMPORTANT NOTE: ***The IP addressed can be statically assigned only if the device is connected to the same sub-net to which the user's PC has been connected.***

If the user selects a Static IP address assignment, then he will have to enter the MAC address, which has been attached close to the Ethernet port on the Beekeeper Hardware, and then assign an appropriate IP address. Upon doing so, the user has to click "Set IP Address" to set the IP address. If the IP address has been successfully set, then the user will be notified to click "connect" to establish a TCP/IP connection with the Beekeeper device and will be directed towards the registration box.



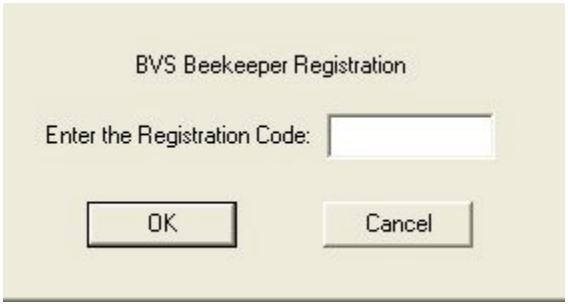
If the user has selected Dynamic IP assignment, upon clicking OK, he will get a dialog box which will display an IP address and the corresponding MAC address to which the IP address belongs to. Upon clicking "Search", an IP address will appear in the list box. Please select that IP address which corresponds to the Beekeeper Ethernet Port MAC address (provided near the Ethernet port on the Beekeeper device). Upon clicking OK, the connection to the device will be established and the registration box will appear.



IMPORTANT NOTE FOR POLLENTOR USERS:

Once the TCP/IP connection has been properly established, the LED on the Pollenator™ interface becomes **Green.**

BeeKeeper Registration Authentication:
Once the desired connection has been selected and established, the user will be prompted to enter the registration code (written inside the CD case), to link the software with its hardware. Incorrect Registration code entered will deny the user access to the software.



Once the appropriate registration code has been entered, the Beekeeper application is now ready for use. A window such as the one below will open up:

BVS Beekeeper: Overview

The BVS BeeKeeper™ 802.11b WLAN Monitoring package contains:

9. The BeeKeeper™ receiver*
10. BeeKeeper™ WLAN monitoring application software CD*
11. 5V Power Supply.
12. 10/100 Base-T Ethernet Cable.
13. USB 2.0 cable.
14. 50Ω Swivel Antenna.
15. 30dB Attenuator.

* These items will only be included if you have ordered a BeeKeeper software package that includes a BeeKeeper 802.11b desktop module receiver.

IMPORTANT: *You will require the **Registration Code** for the Software Application. This can be found inside the BeeKeeper™ CD case. If TCP/IP connection is desired for interfacing the software with the hardware, the **MAC address of the** BeeKeeper™ **Ethernet port** may be needed, which can be found on the BeeKeeper™ receiver next to the Serial No.*

Instructions for BeeKeeper Hardware Installation

Before starting up the software application, make sure that the **BeeKeeper™** is properly installed, powered up using the 5V power supply provided and connected to the desired interface (i.e. Ethernet/USB). The 50Ω Swivel Antenna should be connected to the connector above the power LED and must be positioned perpendicular to the base of the **BeeKeeper™** receiver, such that it is vertically polarized as shown on the previous page.

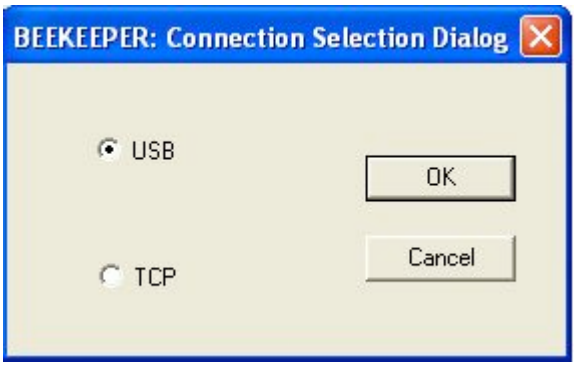
If the medium of interface to the PC is via the USB cable, the Operating System will prompt you to load the appropriate USB drivers. The USB drivers have been provided along with the application and can be found in the same directory as the **BeeKeeper™** application, once the application has been installed using the **BeeKeeper™** Application Installation CD. Make sure that the driver is correctly installed before using the USB port as the interface to the software.

If the **BeeKeeper™** is to be used using the Ethernet port, connect the provided Ethernet cable to the Ethernet port of the **BeeKeeper™** and the other end to either a hub, switch or a router on the subnet to which the PC on which the **BeeKeeper™** software application is likely to be running. The other end can also be connected to the Ethernet port of the PC itself. When this is done, make sure that the USB connection has been removed else, the TCP/IP connection will not work.

Having installed the **BeeKeeper™** receiver successfully, the CD can be installed. Go through the CD installation process and store the application in the desired location. A shortcut to the application will be created on the Desktop and Program Files menu of the Windows Start Menu.

Instructions for BeeKeeper Software Operation:

The Beekeeper software is designed to operate either via a USB or an Ethernet connection with the Beekeeper 802.11b receiver. Before starting the software, make sure that the Beekeeper receiver is connected to the PC/ laptop, via the desired connection. Upon starting the software, the user will be prompted to select the desired connection:



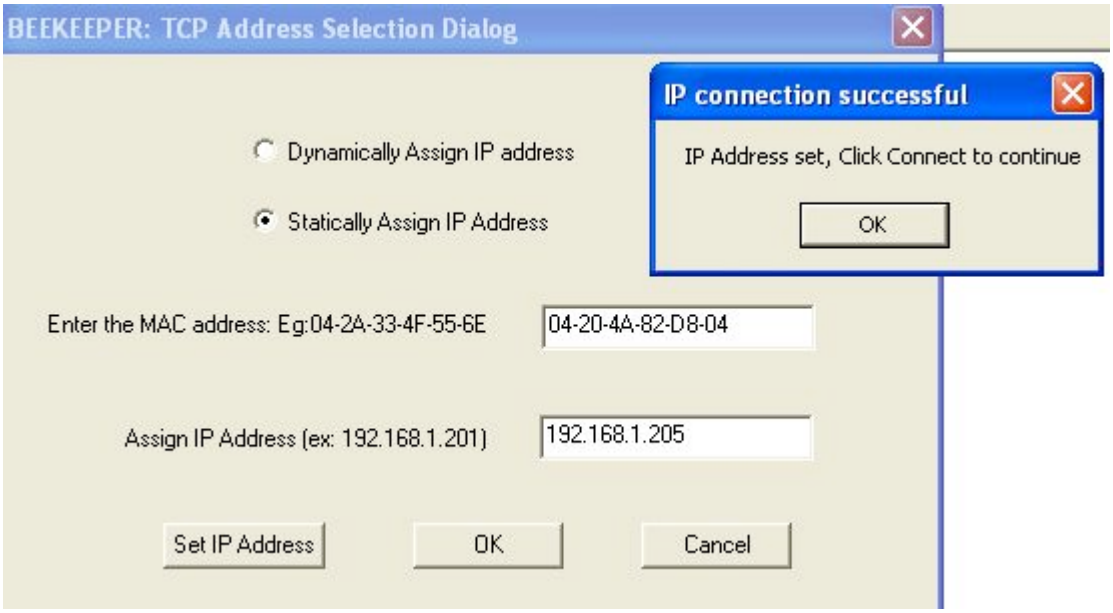
If the USB connection is selected, the appropriate USB device selection dialog Box will pop up:

If the appropriate USB connection has been selected, then upon clicking OK, the user will be directed to the Registration Box, where he will be prompted to Enter the Registration code which has been printed on the inside of the CD case just above the CD hook.

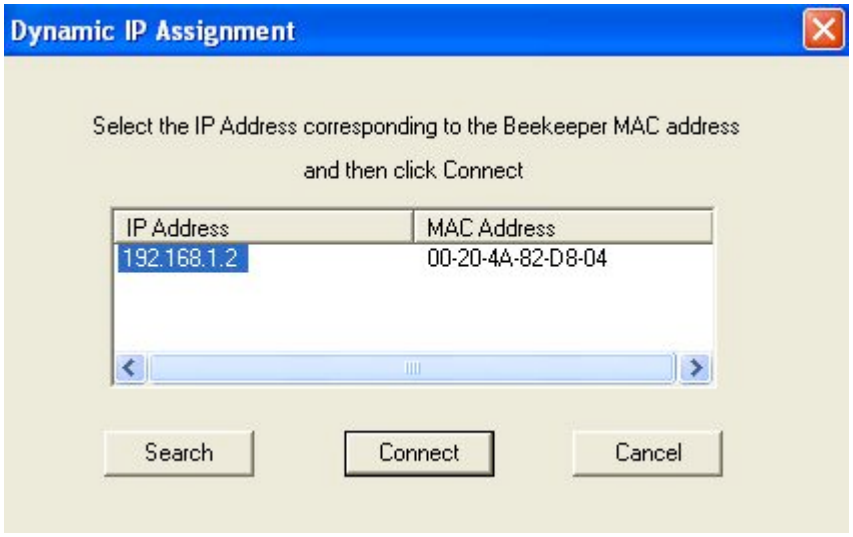
If the TCP/IP connection has been selected, an IP address dialog box will prompt the user to either assign a Static IP Address or let the network dynamically assign an IP address.

IMPORTANT NOTE: ***The IP addressed can be statically assigned only if the device is connected to the same sub-net to which the user's PC has been connected. If the device is connected to a router which has a Dynamic Host Configuration Protocol (DHCP) server on it, then he wont be able to set his own IP address and will have to let the router dynamically assign an IP address to it.***

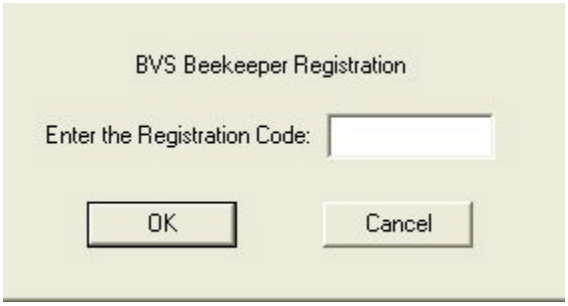
If the user selects a Static IP address assignment, then he will have to enter the MAC address, which has been attached close to the Ethernet port on the Beekeeper Hardware, and then assign an appropriate IP address. Upon doing so, the user has to click "Set IP Address" to set the IP address. If the IP address has been successfully set, then the user will be notified to click "connect" to establish a TCP/IP connection with the Beekeeper device and will be directed towards the registration box.



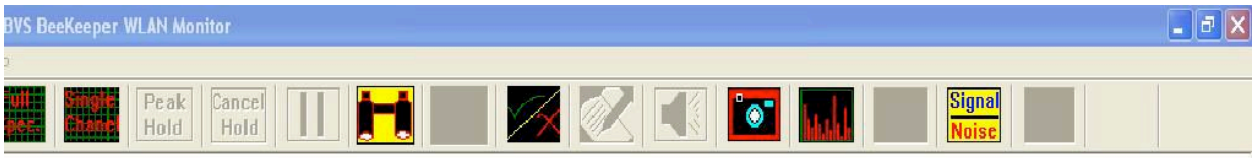
If the user has selected Dynamic IP assignment, upon clicking OK, he will get a dialog box which will display an IP address and the corresponding MAC address to which the IP address belongs to. Upon clicking “Search”, an IP address will appear in the list box. Please select that IP address which corresponds to the Beekeeper Ethernet Port MAC address (provided near the Ethernet port on the Beekeeper device). Upon clicking OK, the connection to the device will be established and the registration box will appear.

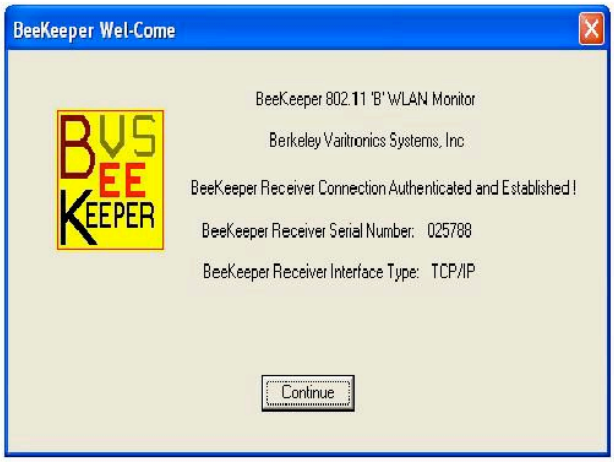


BeeKeeper Registration Authentication:
Once the desired connection has been selected and established, the user will be prompted to enter the registration code (written inside the CD case), to link the software with its hardware. Incorrect Registration code entered will deny the user access to the software.



Once the appropriate registration code has been entered, the Beekeeper application is now ready for use. A window such as the one below will open up:

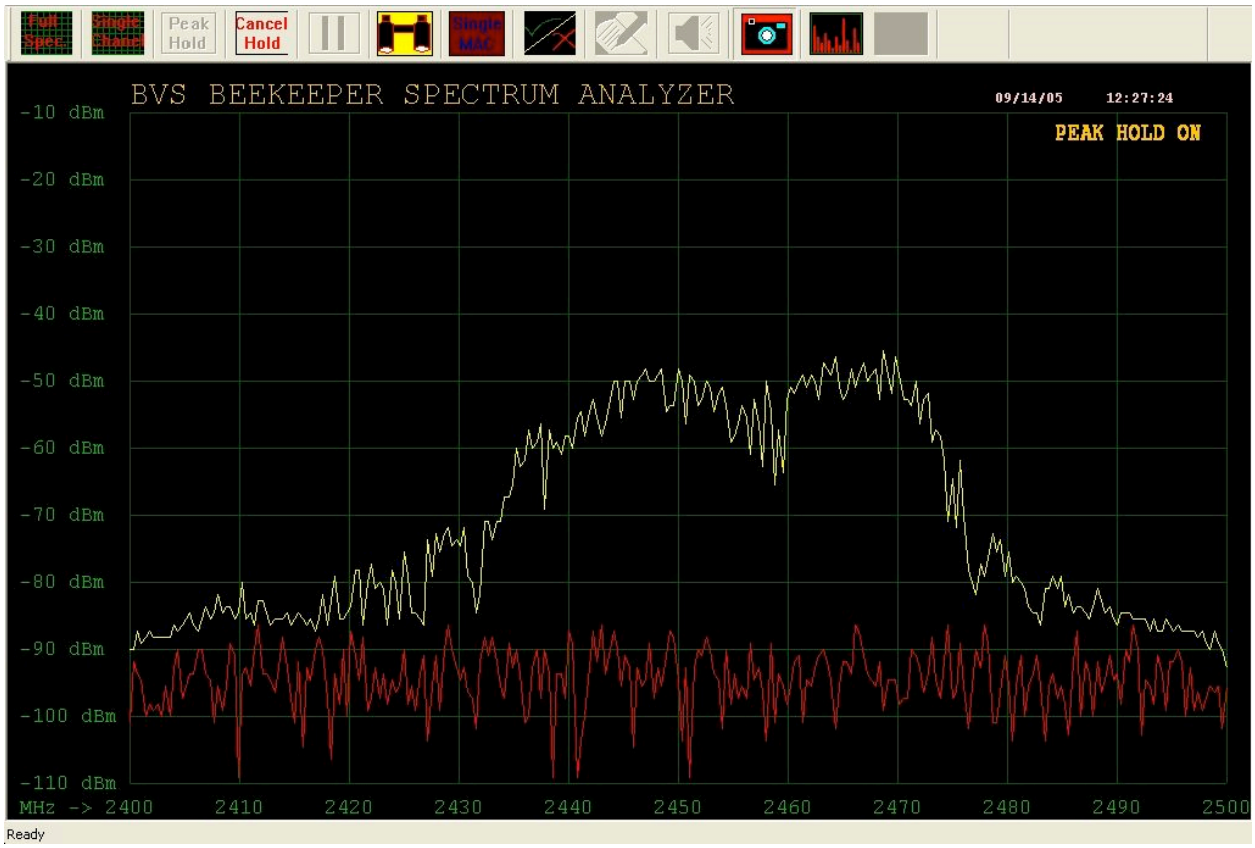




The Beekeeper software can be used in the Full Spectrum Display, Single Channel Spectrum Display, Channel Scan and Data Logging Mode. Each of these modes can be used by clicking the appropriate command buttons on the application window.

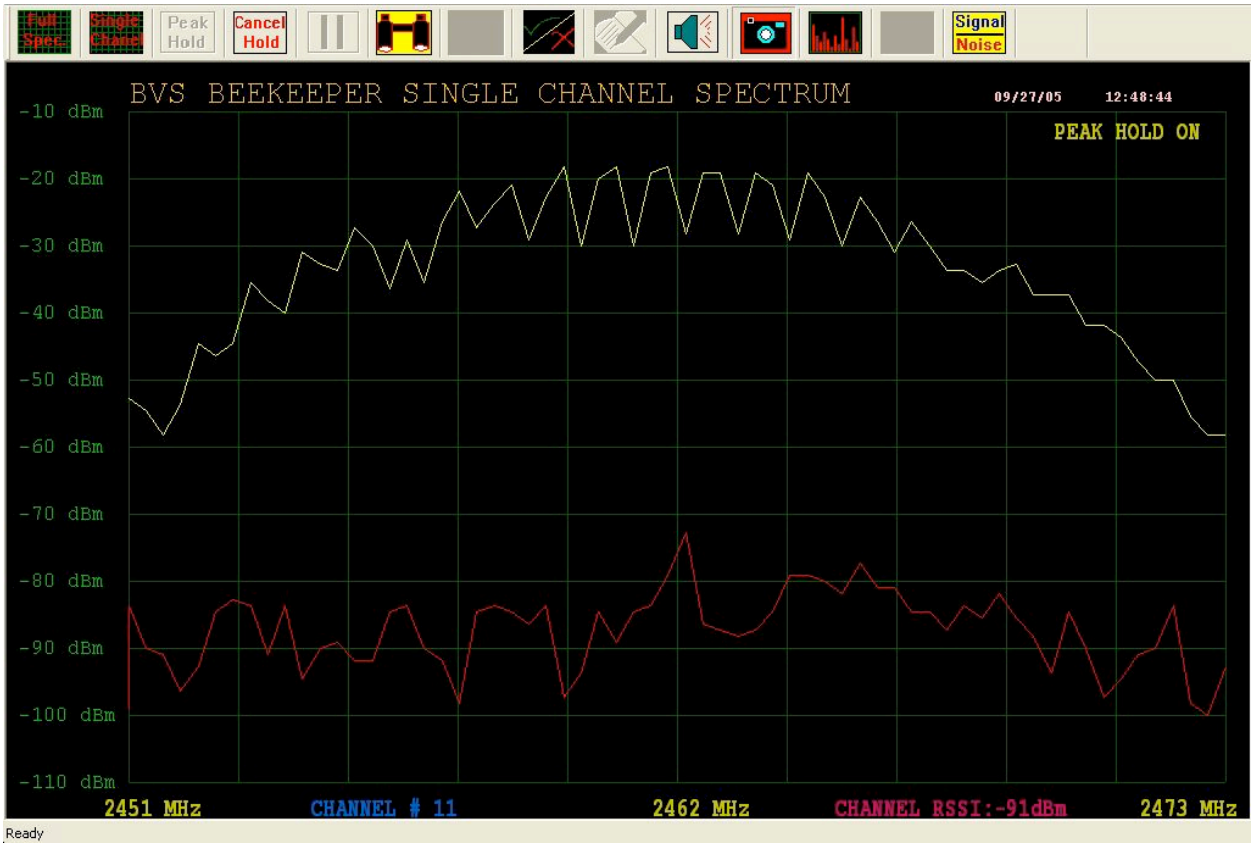
1. 

Full Spectrum Display: This mode displays the entire 802.11b spectrum on the screen. RF energy of 802.11b STAs on all the 14 channels seen by the receiver, is displayed graphically in the form of a Spectrum Analyzer with frequency on the X-Axis and RSSI (in dBm) on the Y- Axis. Each vertical section is 10 dBm and the frequency spacing is spaced 10 MHz apart.



2. Single Channel Display: This mode allows the user to view RSSI data (in dBm) within the channel of his selection.

Once the appropriate channel has been entered, clicking ok, will display the RSSI for that particular channel



4. 

. **Peak Hold:** This feature is enabled only in the Full Spectrum or the Single Channel Spectrum Mode. Clicking this button will enable the peak hold for the current display mode.

5. 

. **Cancel Hold:** This command comes up only when the Peak Hold has already been clicked and is used to disable the Peak Hold Trace.

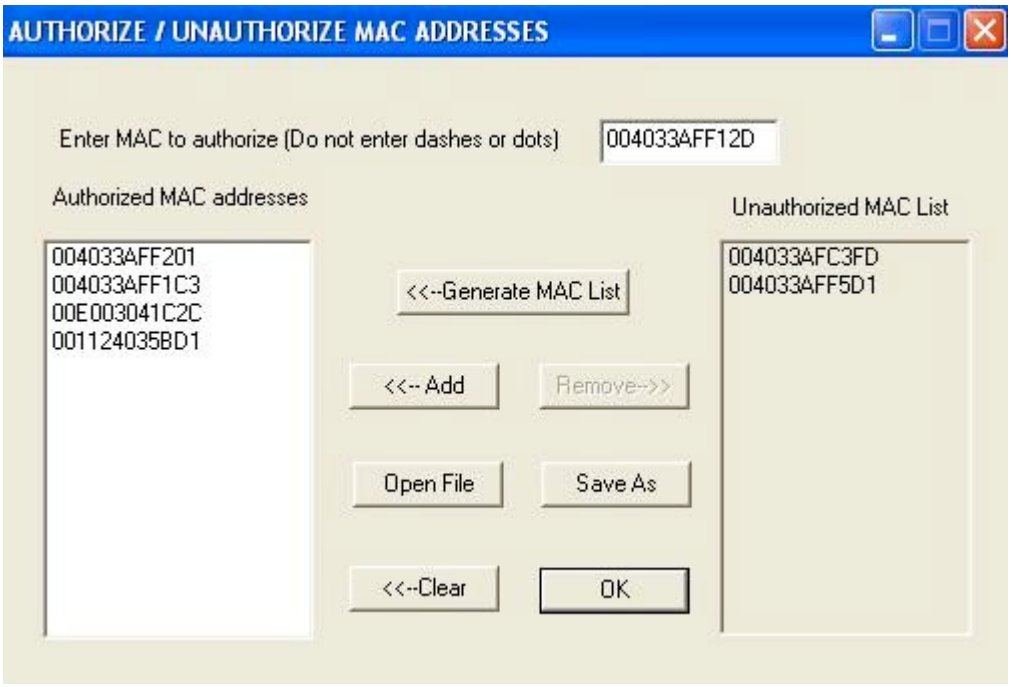
6.  **Pause Display:** Clicking this button will cause the display to freeze. This feature can only be used in the Full Spectrum and Single Channel Spectrum Mode only.

7.  **Channel Survey Mode:** Clicking this button will change the screen display to channel survey mode. The receiver will scan all the 14 WLAN channels @ 1 channel per second and display the corresponding STAs on that channel. The data displayed is the MAC address, the SSID, the channel number, the RSSI (in dBm) and whether the STA is an AP or a NIC, the name of the manufacturer of the STA / organization for which the corresponding MAC address is registered, is also displayed. The display also shows whether the MAC address has been authorized to be within the vicinity of the network or not. Information about how MAC addresses can be authorized/unauthorized for the Beekeeper display is given further.

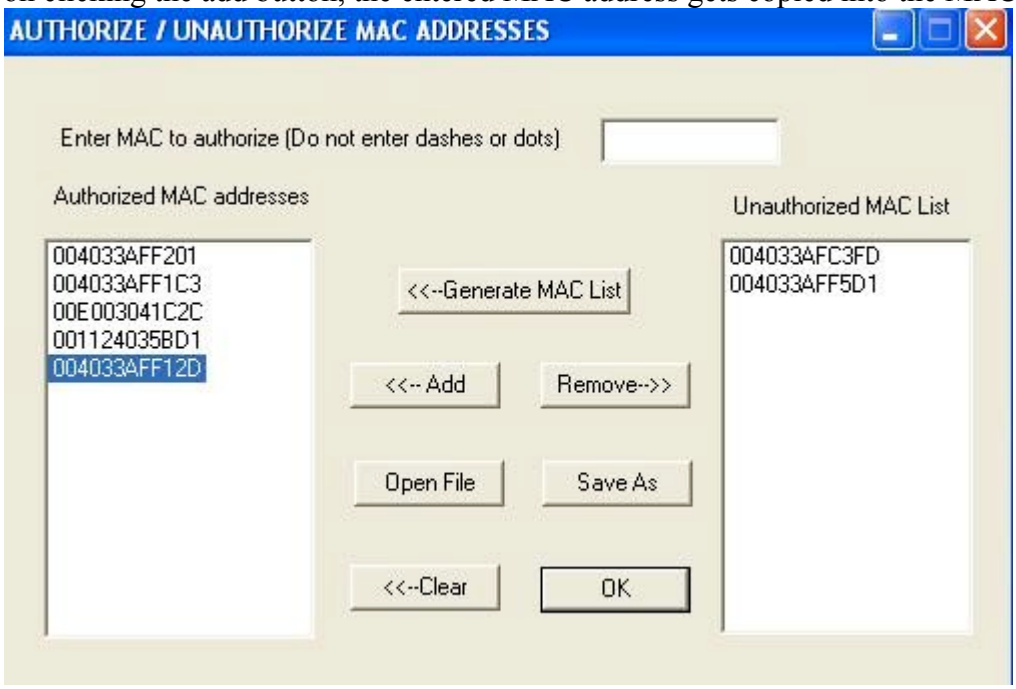
8. **Authorize/Unauthorize MAC addresses:**

This feature allows a Beekeeper application user/network administrator to enter upto **300** MAC addresses, which are to be allowed access to the organization's network resources. There are various ways by which the user can enter the authorized MAC addresses:

1. By simply entering the MAC address in the Text Box: (The user need not bother about the case, it is taken care of by the application)



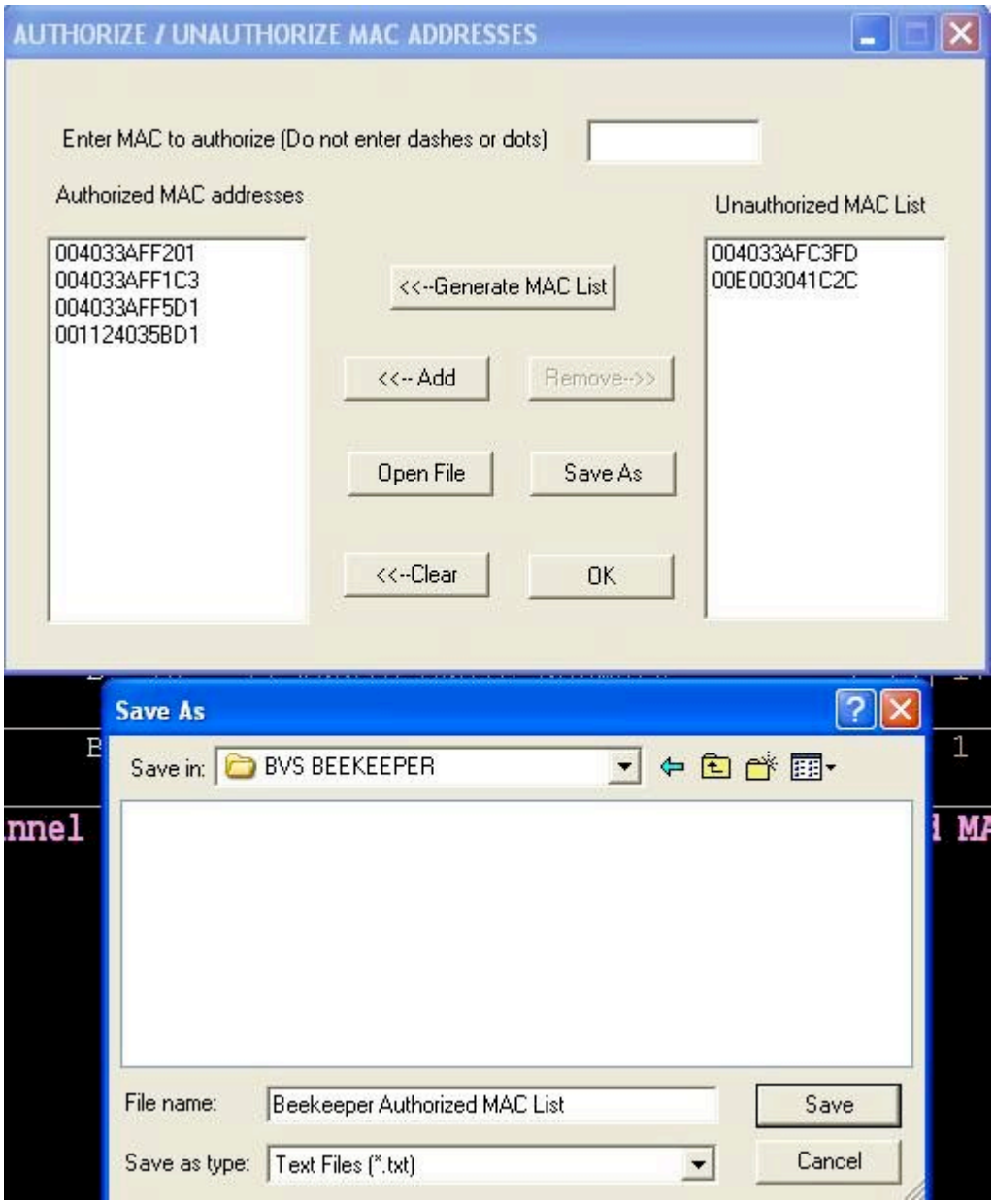
Upon clicking the add button, the entered MAC address gets copied into the MAC List:



2. By creating a text file (using the Notepad in Microsoft Windows).

Creating a text file containing many MAC addresses can be useful so that the user just needs to create a file with authorized MAC addresses once, and then use this file to extract MAC addresses into the software, thus avoiding the pain of physically typing scores of MAC addresses every time the software is restarted, or the user moves from one location with a set of authorized MAC addresses to another location, with a different set.

Enter the MAC addresses into the list as mentioned above. Click “Save As”. This will prompt the user to name the file, which will now be saved with MAC addresses just entered.



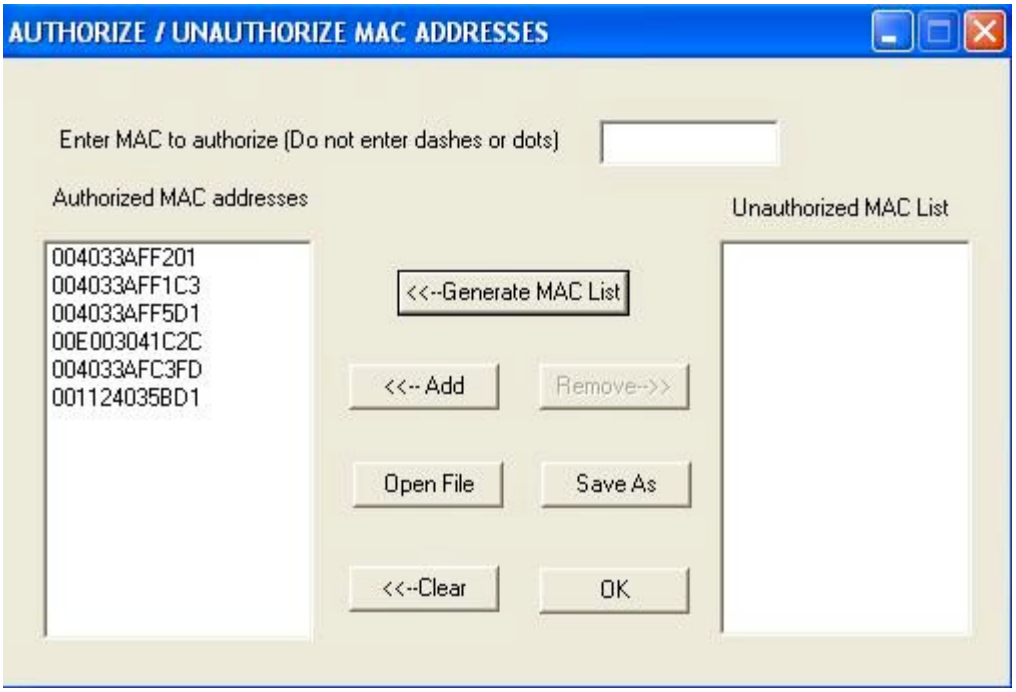
This way, the user can create a number of files containing MAC addresses specific to a given location, which he is monitoring. The next time he starts the application, all he needs to do is open up the file containing the many MAC addresses and begin monitoring the network.

The user can open multiple files, this will cause the MAC List to contain MAC addresses from all the files opened, provided the total number of MAC addresses is less than or equal to 300.

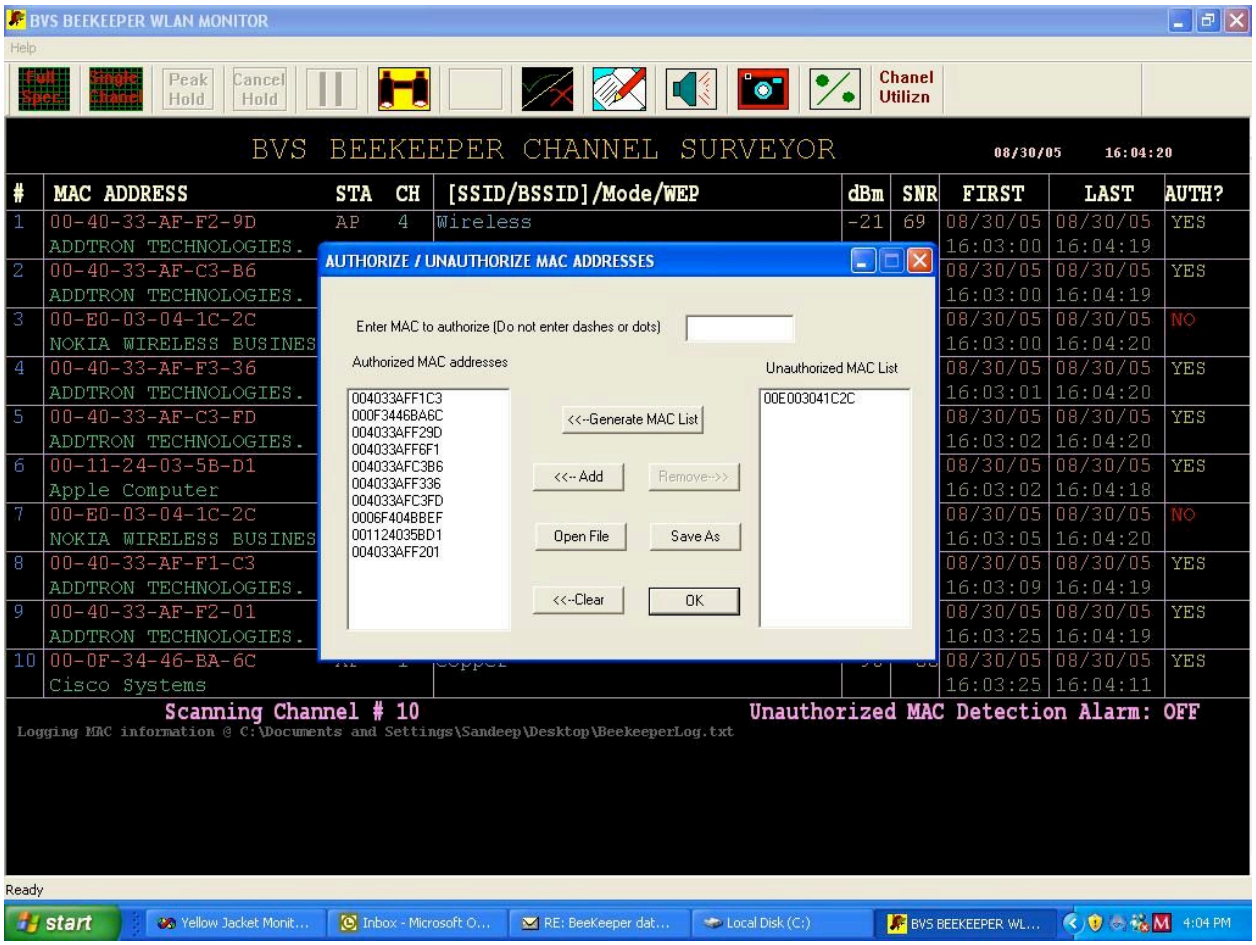
The user can also open up a file/files and then add individual MAC addresses via the text box. The newly entered MAC address will simply add to the existing list. This can now be saved if needed.

3. Auto generation of an Authorized MAC List in the Channel Survey Mode:

Once in the the Channel Survey Mode, upon clicking the "Generate MAC List" button, a List of MAC addresses, as seen by the Beekeeper receiver after a complete scan of all the 14 channels, gets generated.

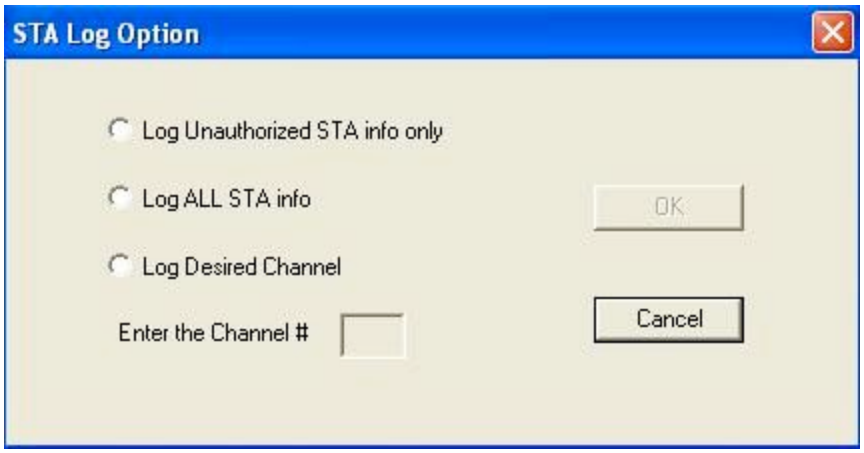


The “Clear” button simply clears the list.
Clicking OK will cause the Display in the Channel Survey Mode to show the Authorized MAC address information in Yellow, while the Unauthorized MAC addresses in Red.



9. Alarm: If the Alarm Button is clicked ON during the Channel Survey Mode, an alarm will be sounded every time an authorized STA is detected. By default, this feature is turned off. Once ON, it can be turned off by simply clicking the same button again. The display will show if the Alarm is ON or OFF.

10. Data Log: Once in the channel survey mode, clicking this button will enable the user to Log Data: either related Unauthorized STAs or all STAs being monitored or log a particular desired channel.



Once the desired logging capability has been selected, the user will be prompted to Create a file to which the data will be logged. The user can log data in MS Notepad (*.txt) format, MS Word (*.doc) format, or directly to MS Excel (*.xls). **Please note that the data is logged directly to the three mentioned formats, in a readable format and requires no conversion.**

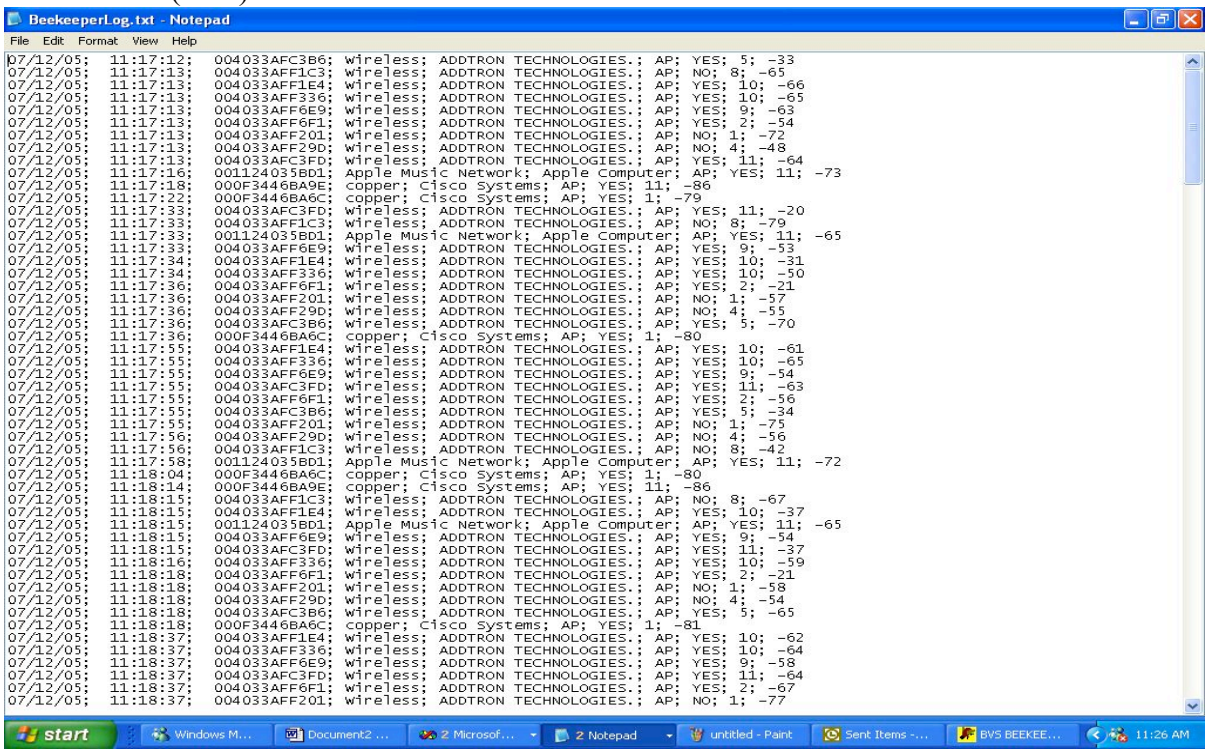
The log file contains the date, the time, the MAC address, the SSID, the MAC manufacturer/registration information, the channel number and the RSSI at that time instant. If the Logging is for all MAC addresses, the Log will also contain information on whether the MAC address is authorized (YES) or not (NO).

The Display will show the path where the Data is getting logged. As follows:

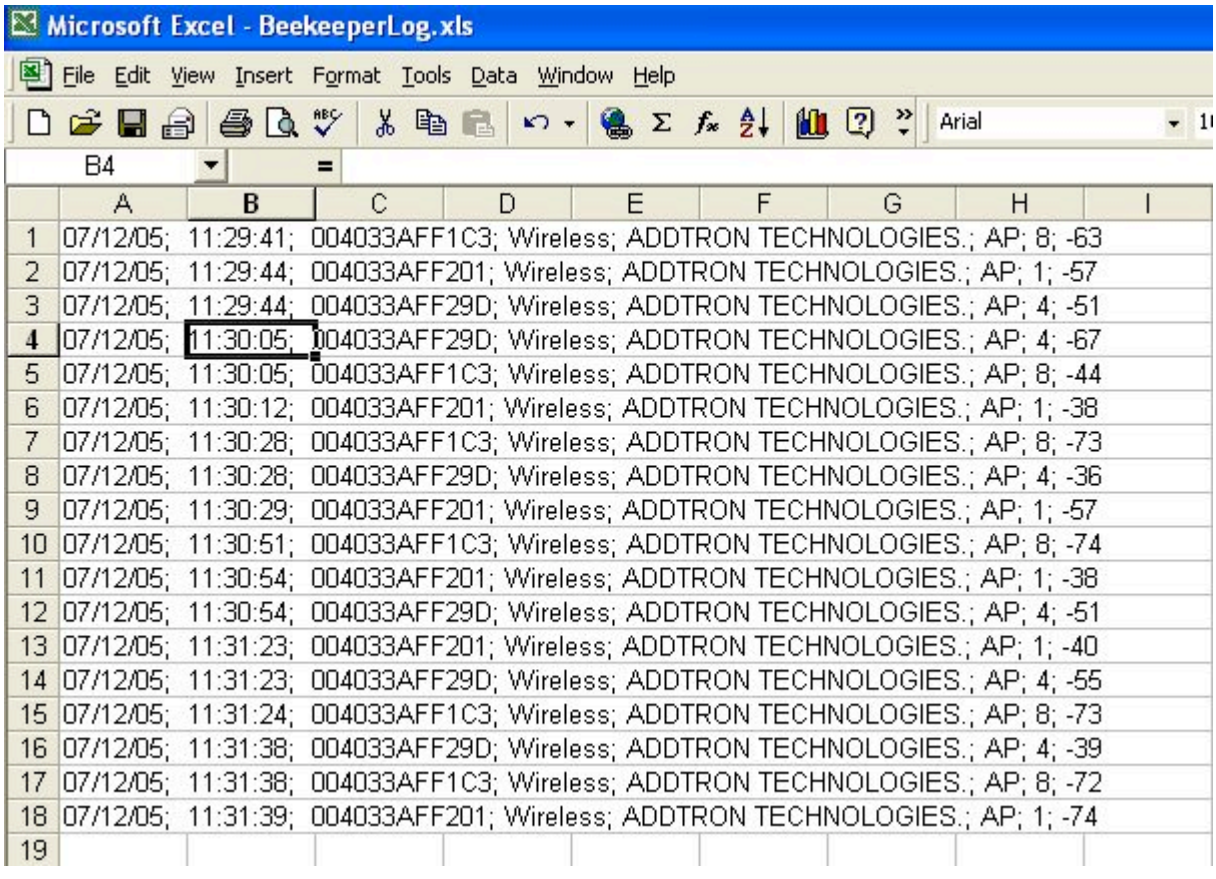
IMPORTANT: Data can only be logged in the Channel Survey Mode. Once this mode has been exited, by clicking the Full Spectrum Mode or the Single Channel Spectrum Mode, the Channel Utilization or Signal-Noise Display, data will no longer get logged.

Examples of Data log in the various formats as mentioned above are shown:

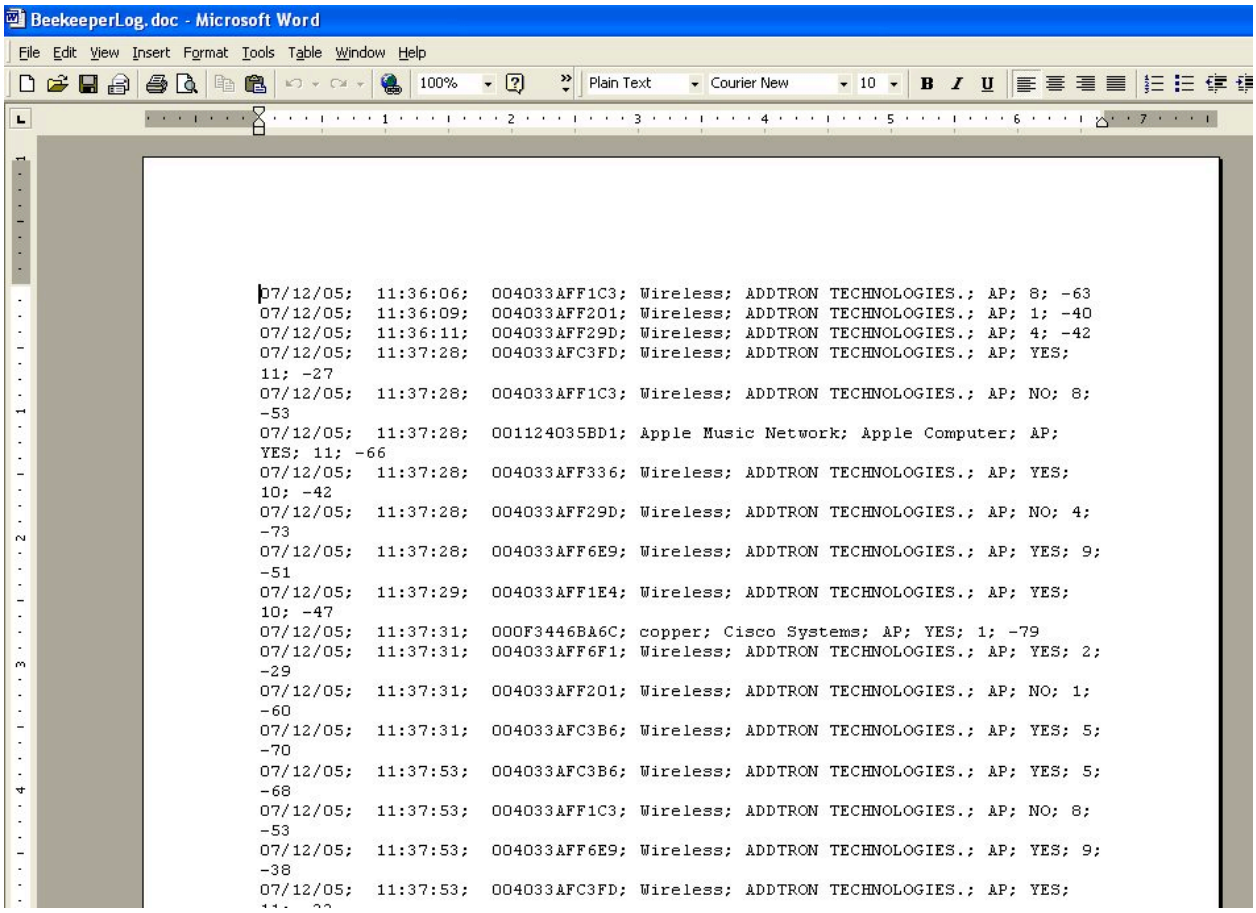
1. Notebook (*.txt)



2. MS Excel:

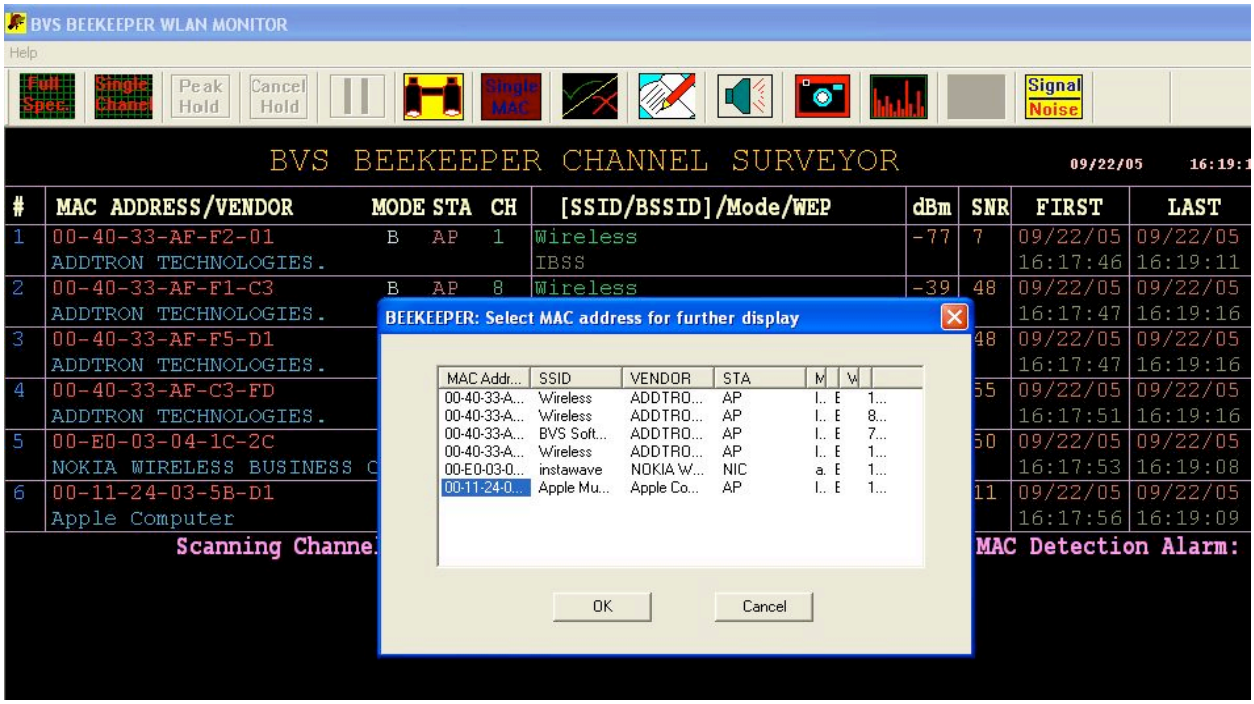


4. MS Word:



11.  Single MAC Address Profile

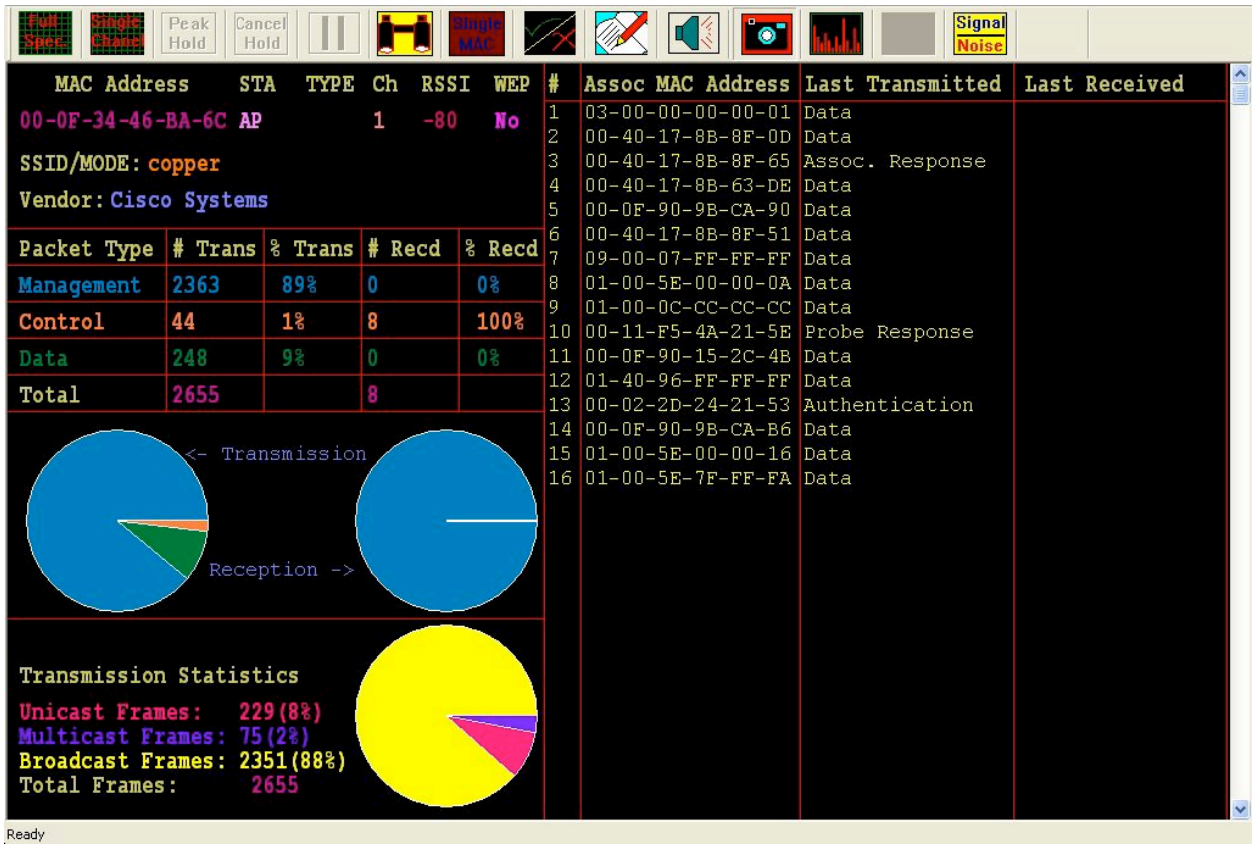
In the Single MAC mode, a user can select a particular MAC address, which has been listed in the Channel Survey List, and analyze Traffic experienced by that particular MAC address.



This Mode only gets activated in the Channel Survey Mode. Once in the Channel Survey Mode, upon clicking this button, the user will be prompted to select a particular MAC address from a list of those found during the Channel Survey.

Upon selecting the desired MAC address, the Software application displays the traffic experienced by the selected MAC address via Transmitted and Received Management Packets (Beacons, Authentications etc), Control Packets (Acknowledgements, RTS/CTS etc) and Data packets. The transmission type in terms of Unicast/Multicast/Broadcast Packets is also displayed numerically and graphically.

This mode also displays the other MAC addresses associated with the selected Single MAC address and what packets are being exchanged between the two.



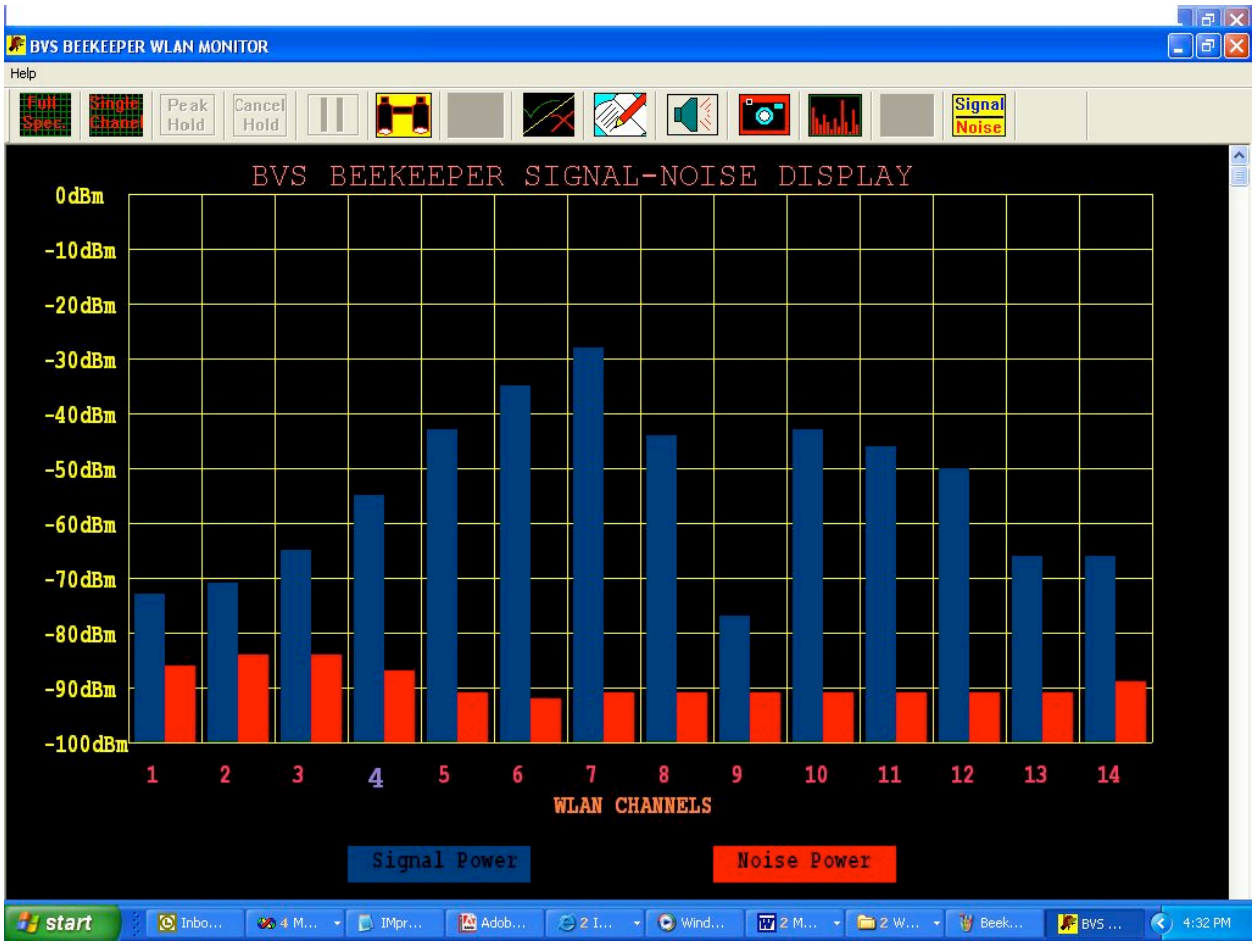
In the snapshot as shown above, the left area shows the details of the Selected MAC address and the traffic being experienced by it.

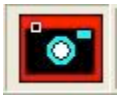
The area on the right side shows the 802.11 MAC addresses associated with the selected MAC address. The column “Last Transmitted” displays the last packet sent by the Selected MAC address to the corresponding Associated MAC address, while the column titled “Last Received” shows the last packet, which the Selected MAC address received from the Associated MAC address. If there hasn’t been any transmission/reception to the associated MAC address, that particular entry will be blank.

12. 

Signal – Noise Display:

In this mode, the receiver scans the 14 channels and displays the Signal and Noise measurements of every channel in the form of a histogram:

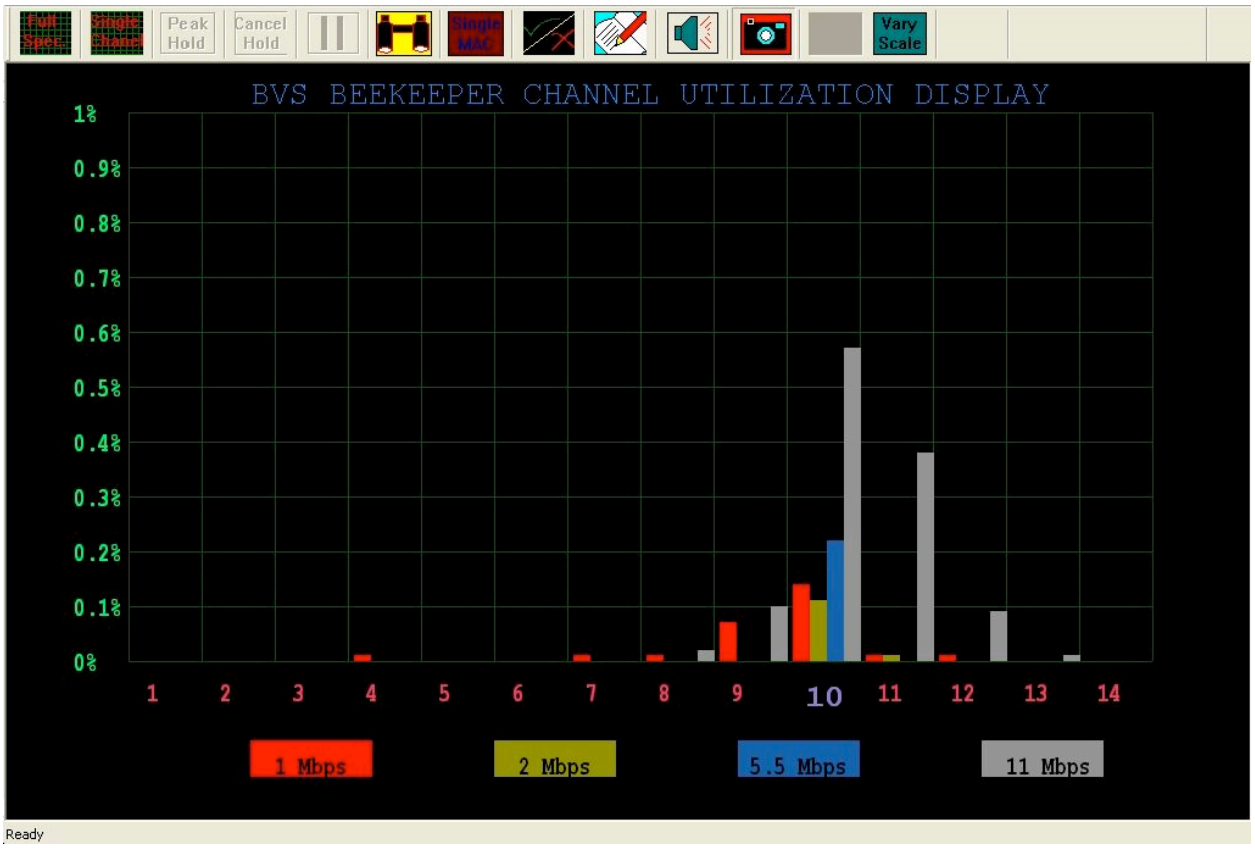


13.  **JPEG Snapshot**

A snapshot of the current display is clicked and stored in the directory of the application. The user would then have to rename the saved file or re-locate it to another directory manually.

14.  **Channel Utilization Display:**

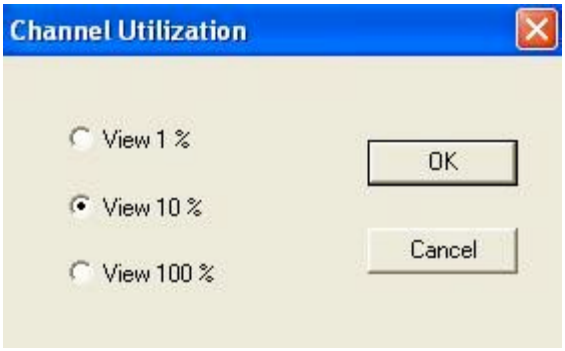
This mode is used to Display the Percentage Bandwidth Utilization of the 14 802.11 WLAN channels. The Utilization Percentage for every Data Rate is shown using a different color for every channel.



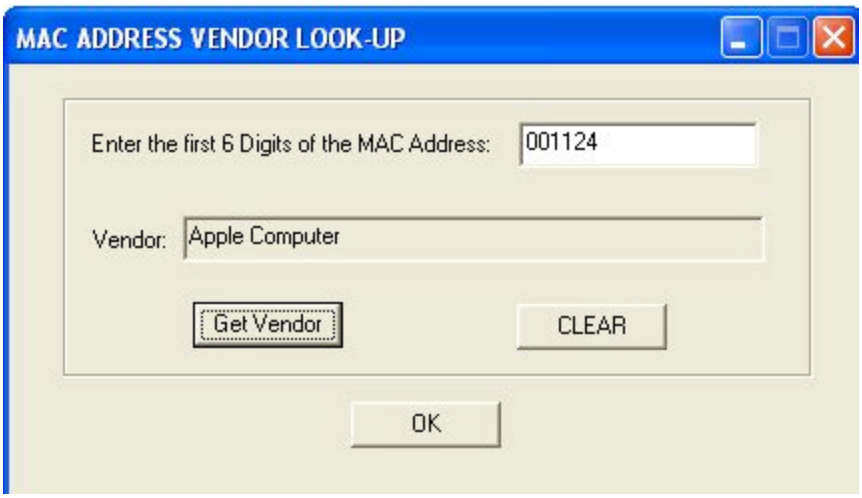
15. 

Vary Scale

This Button is activated only in the Channel Utilization Mode (discussed in 13 above). This button is used to vary the Vertical Axis to display higher Percentages

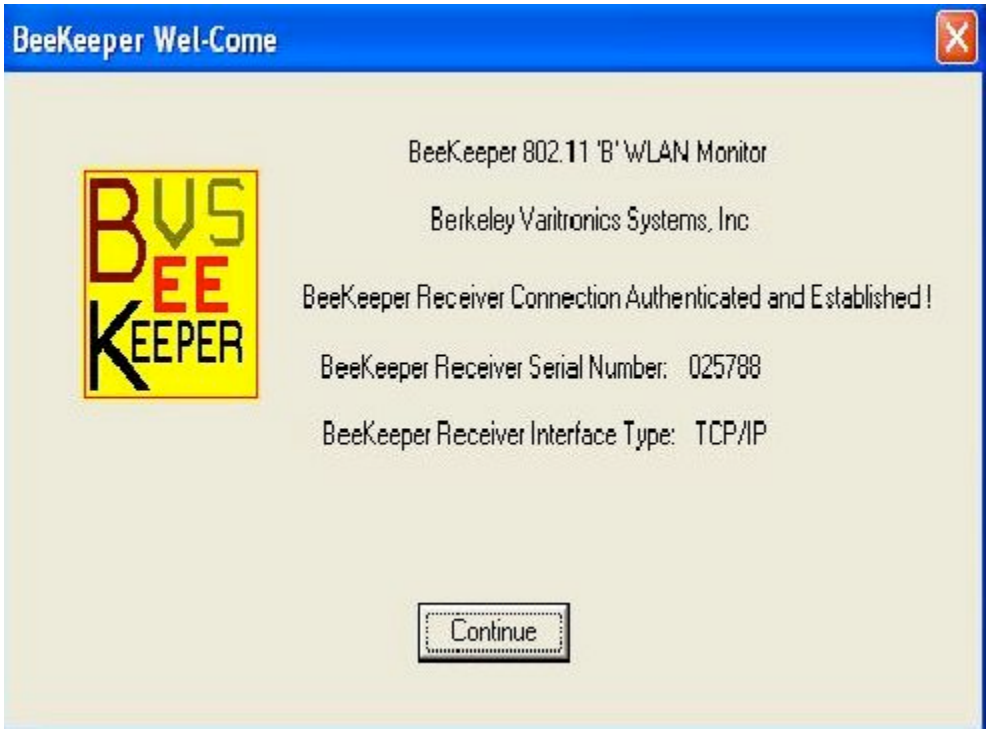


MAC Vendor Look-Up:



The Software application provides users with the ability to look-up a certain MAC address and pull up the vendor to whom that particular MAC address has been registered. In the dialog box which pops up, upon entering the 6 digits of the MAC address, and clicking "Get Vendor", the Vendor of that MAC address will be displayed in the text box. To find out the Vendor of another MAC address, simply click 'Clear' and continue as before.

Established Connection:



This menu will display the Serial Number of the BeeKeeper receiver and the Type of interface to the receiver.

BEEKEEPER™

802.11 Wi-Fi Analysis PC Software

BeeKeeper™ is Windows® 2000 / NT / XP software application that graphically & textually scans, monitors and logs all 2.4 GHz 802.11b Wi-Fi networks. ***BeeKeeper***™ utilizes the ***BeeKeeper***™ ***Receiver Module*** monitoring all 14 DSSS network channels as well as MAC, SSID, AP manufacturer, SNR, data rate and RSSI signal levels of any access point or NIC. **Yellowjacket®** users may use their 802.11b receivers with the **Pollenator**™ PC interface with ***BeeKeeper***™ software. User selectable scanning and log settings ensure that ***BeeKeeper***™ will identify any unauthorized MAC and alerts the user instantly with audible buzzing and time-stamped log file onto any desktop or laptop PC. Vital information such as RSSI, Signal-to-Noise, SSID and channel utilization are captured and may be used to identify neighboring 2.4 GHz interference, WLAN interference and even nearby client cards trying to wirelessly "hack" into the network. In addition, APs can be traced from the local NICs they are connected to allowing users to view the network transparently. Unlike NIC based analyzers, ***BeeKeeper***™ is a passive, network independent hardware & software package with the ability to see the "whole picture" wirelessly without being seen or detected by anyone on or off the network. ***BeeKeeper***™ software is controllable via any PC's serial or ethernet port allowing RF surveys to be performed all from your desk.

BeeKeeper™ monitors and logs continuously on any Windows® PC for both realtime and time-stamped RSSI analysis.

BeeKeeper™ utilizes an 802.11b calibrated receiver for dBm accurate analysis. Yellowjacket® users may use their receivers with Pollenator™ to interface with ***BeeKeeper***™.

SECURITY

- Identify any 802.11b/g AP or NIC
- Log all network access attempts 24-7
- Detects WEP encryption & client ad-hoc mode
- Selectable/auto-generation of MAC authorization lists
- Export data into spreadsheets like Excel®
- Passive "invisible" network RF survey sweep
- Detects any AP to which NIC is connected

SURVEYS

- Identify 2.4 GHz RF interference
- Measures RSSI with a calibrated receiver
- Measures 802.11b (all 14 channels or single channel)
- Spectrum analysis, waveform traces, peak hold
- Scan, monitor and log DSSS studies on any PC
- Channel utilization, SSID, RSSI, SNR and more
- JPEG snapshots of any waveform screen

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info@bvsystems.com

wireless products
BERKELEY VARITRONICS SYSTEMS

BEEKEEPER®

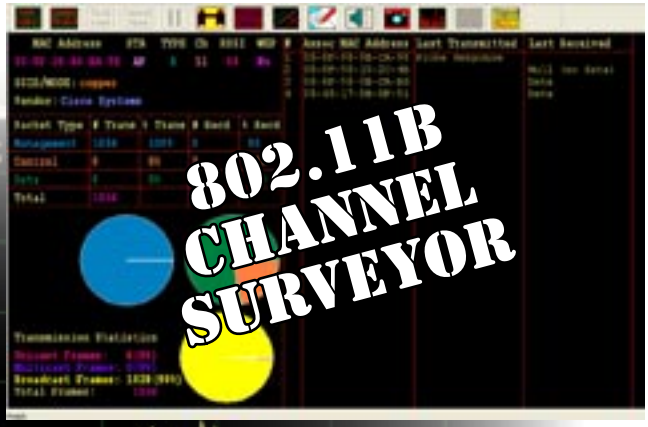
802.11 Wi-Fi Analysis PC Hardware

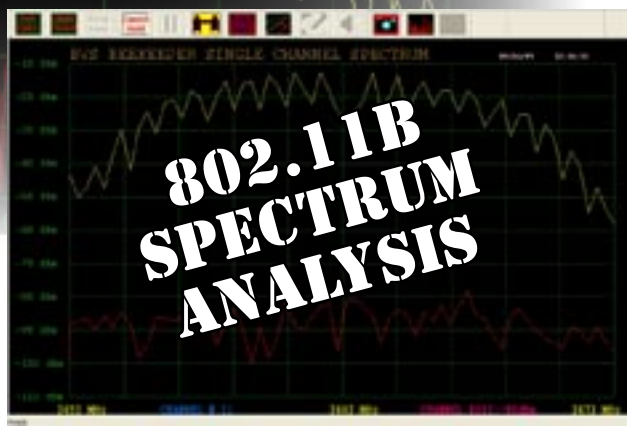
BANDS SUPPORTED	ISM: 2.400-2.495 GHz
RF SENSITIVITY (Wide Band)	-20 to -90 dBm
RSSI MEASUREMENT (Narrow Band)	-30 to -90 dBm @ 343.75 kHz resolution bandwidth
TUNING INCREMENTS	Tunes 11 USA channels & 3 international channels

CORRELATED POWER MEASUREMENTS:	**RATIO**
Correlated Power (dBm)	-30 dBm : -100 dBm
Correlated Power to Total Power Ec/Io (dB)	0 dB : -10 dB
Total Channel Power Measurement	-20 dBm : -90 dBm

RECEIVER GENERAL SPECIFICATIONS

IF Bandwidth:	Wideband 22 MHz
Stability:	± 2.5 PPM Temp range 32° to 120 F°
Antenna:	SMA Female 50 ohm
Controls:	Windows® software
Warm Up Time:	< 3 minutes
Weight:	3 lbs.
Dimensions:	2” H x 4” W x 6” L (water resistant, high impact aluminum case)





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