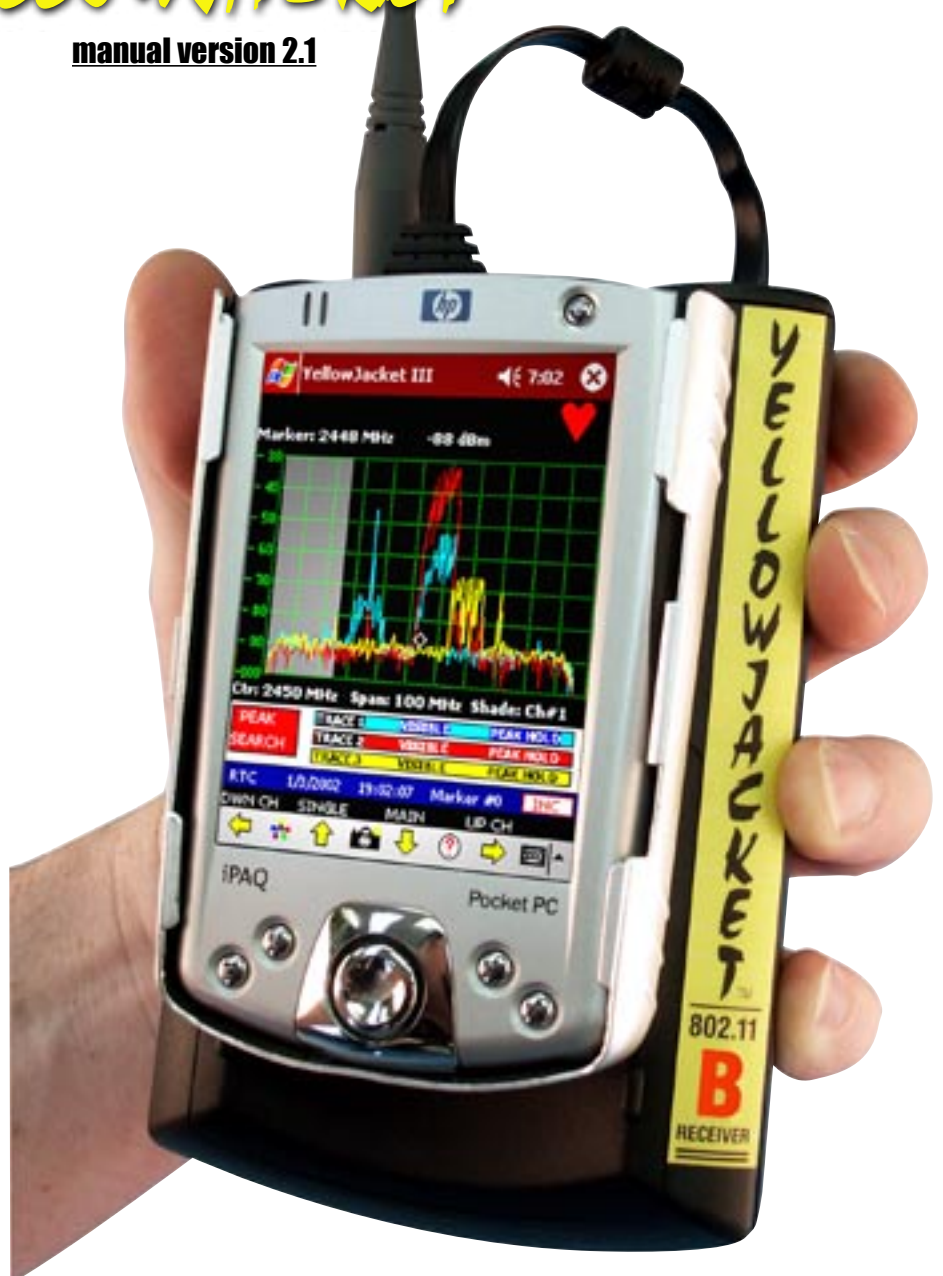




YELLOWJACKET™

manual version 2.1



Contents

INTRODUCTION.....	2
STARTING UP.....	2
YELLOWJACKET ACCESSORIES.....	3
STARTING UP YOUR YELLOWJACKET.....	4
MAIN SCREEN.....	5
OPTIONS SCREEN.....	5
FULL SPECTRUM SCREEN.....	6
SINGLE CHANNEL SPECTRUM SCREEN.....	6
AP/STATION STATION ANALYSIS.....	7
AP/STATION SINGLE CHANNEL MODE.....	7
MULTIPATH / SIGNAL QUALITY INDICATOR (“Q” Factor).....	8
DELAY SPREAD SCREEN.....	8
GEIGER COUNTER SCREEN.....	9
SECURITY SCREEN.....	9
UTILIZATION SCREEN.....	10
USAGE SCREEN.....	10
TYPICAL INTERFERENCE EXAMPLES.....	11
YELLOWJACKET TROUBLESHOOTING SETUP STEPS.....	14
YELLOWJACKET POCKET PC SOFTWARE FLOW CHART.....	15
BATTERY CHARGING SYSTEM.....	16
TROUBLESHOOTING.....	16
TIPS.....	17
BATTERY LIFE.....	17
SOFTWARE INSTALLATION.....	18
DRIVER INSTALLATION.....	18
SURVEYING.....	18
YELLOWJACKET PC VIEWER UTILITY SOFTWARE.....	19
CHAMELEON WLAN SOFTWARE.....	20
NETWORKING BASICS.....	22
DSSS INTERNATIONAL CHANNEL CHART.....	23
YELLOWJACKET ACCESSORIES.....	24
HIVE™ INDOOR MAPPING SOFTWARE	
GLOSSARY OF ACRONYMS	
GENERAL SAFETY	
ANTENNA RADIATION PATTERNS	
YELLOWJACKET DATA SHEET	
YELLOWJACKET CE CERTIFICATION	
YELLOWJACKET FCC APPROVAL	

INTRODUCTION

The Yellowjacket™ is an 802.11b Analysis System. It consists of a an HP iPAQ PocketPC® coupled with custom hardware and software by BVS. This system contains a variety of features to analyze 802.11b networks including spectrum analysis over all 14 channels (2.401 – 2.495 GHz), a list of AP's and/or stations over all 14 channels, multi-path and packet-error rate information for each individual MAC address. The Yellowjacket also contains a “Geiger-counter” feature to locate a single AP/ STATION via audio/visual aids and a security feature to warn the user of possible unauthorized AP/ STATIONS in the area based on a list of authorized MAC addresses. The data from a Yellowjacket may be logged into resident memory for transfer to a desktop PC at a later time and then be converted from binary to ASCII using “Chameleon WLAN”.

Yellowjacket receiver (top view) has an **SMA male connector** for the supplied antenna. This manual contains operational procedures to get the user up-and-going right out of the box. For any details regarding the iPAQ, users should read all materials from Compaq/HP and contact them.

STARTING UP YELLOWJACKET

Power up your Yellowjacket by pushing **power button** in upper right corner of unit. This power will automatically power up the Yellowjacket receiver also. When you power down the iPAQ, (push the power button on the upper right quickly-holding this button will also toggle the backlight on and off) your Yellowjacket receiver will also shut down. Connect the included antenna to the SMA connector and remove the stylus by pushing down on it. Use your stylus to tap onto the **Windows® icon** in the upper left corner. Choose **Yellowjacket** in the pulldown menu. Data may be transferred to a PC via the IrDA window or USB or serial connection. Install Yellowjacket software by connecting your iPAQ to your PC and inserting included BVS software CD-ROM into PC to begin installation. You may also use the provided Compact Flash Installer card. Be sure to turn off any internal WLAN or Bluetooth in your iPAQ before using your Yellowjacket.



Your iPAQ can be reset using 2 different methods. If Yellowjacket software loses communications with Yellowjacket hardware, perform a **soft reset** with your stylus by pressing the reset button on the back left corner just below the battery door. Perform a **hard reset** by holding in the **two outer buttons** for at least 10 seconds while performing a soft reset. **Warning!** Hard reset erases all RAM data from iPAQ so be sure to backup all data and re-install your Yellowjacket application software after a hard reset.

WARNING FOR USERS WITH BUILT-IN WIRELESS **(you must disable your iPAQ's Bluetooth and WLAN)**

1. Press the START button on the upper left hand side of the touch screen.
2. Click on the “iPAQ Wireless” folder.
3. Click on the “Wireless Control” program.
4. Click on “All wireless features OFF”. The icons for Bluetooth and WLAN will have red backgrounds when disabled.

YELLOWJACKET ACCESSORIES

Your Yellowjacket includes the following accessories: antenna, 2 sets of AA (Ni-MH) removable batteries (8 total), Simply insert depleted batteries into charger and plug charger into AC outlet. See top of charger for LED status indicator lights (see end of manual for charger specs). Approximate charging time for 4 Ni-MH batteries is just over one hour. Run time is just over two hours. Yellowjacket uses common AA battery cells found in any convenience store. Ni-Cad, Alkalines, Ni-MH and Li-Ion cells may all be used. Yellowjacket does require 4 AA cells with at least 1500 mAh per cell. BVS supplies 2 battery sets (8 Ni-MH battery cells total) to get users working right out of the box. Ni-MH cells are recommended for best performance from your Yellowjacket. Batteries that are warm or hot to the touch (from constant usage or warm ambient temperatures) will take longer to charge than batteries of a normal temperature. Contact BVS for new Ni-MH battery packs. Expect over 500 cycles from each Ni-MH battery or battery pack.



YELLOWJACKET SD Card Installer

Insert SD card into the SD slot on the top of iPAQ
Tap on the "Start" icon on top left of screen
Tap on "Programs" in menu
Tap on the "File Explorer" folder
Choose "My Device"
Tap on "SD Card" or "Storage Card"
Choose Yellowjacket receiver and iPAQ model for installation and tap on "install"

DATE: _____

If the Yellowjacket CF or SD Backup Installer card has been included, the card may be used to log data files onto. It can also be used on iPAQs that have never been initially set up at the BVS factory, have had files erased or damaged in the ROM or after a hard reset has been performed on an iPAQ. Yellowjacket software that has been erased/lost from RAM may be restored at anytime by accessing the "install" file from the SD Card or Storage Card directory. Always make sure batteries are fully charged when doing any software installs. Yellowjacket software that has been erased from RAM may be restored at anytime by accessing the "reinstyj" file from the \iPAQ File Store\My Device directory.



Recommended iPAQ 4700/4705 model shown with Yellowjacket receiver



Starting Up Your Yellowjacket

Unpack and assemble your Yellowjacket unit as shown. Slide the iPAQ case onto the Yellowjacket and slide your iPAQ computer into the iPAQ case. Remove the Compact Flash cover and install the Compact Flash serial cable. The Compact Flash serial cable is the communication link between the Yellowjacket receiver and the iPAQ. Connect both the Yellowjacket and iPAQ to external power as shown with the "Y" power cable.

Power up the iPAQ by pushing the **power button** in the upper right corner of the iPAQ. Connect the appropriate frequency antenna to the SMA male antenna input. iPAQs shipped by BVS are optimized for the Yellowjacket. If you are using your own iPAQ, see the optimization section to set up your iPAQ.

iPAQs supplied by BVS have the Yellowjacket software pre-installed. If you need to install the Yellowjacket software, see the software installation/re-installation section.

Tap the **windows Start icon** in the upper left corner and then choose Yellowjacket in the pulldown menu. If the Yellowjacket does not appear in the pulldown menu, tap on the "Programs" folder. Tap on the Yellowjacket icon.

Running the Yellowjacket software will power the Yellowjacket receiver.

If the Yellowjacket software loses communication with the Yellowjacket, perform a soft reset by pressing the iPAQ's reset button. If communications problems persist, perform a hard reset by holding down the **two outer buttons** on the front of the iPAQ while holding in the soft reset button. Remember, hard resets erase all data collected and software installed so backup all data and see software installation for details.

Optional iPAQ 2210/2215 model shown

Reset button located on back just below battery



Optional iPAQ 2415/2410 model shown

Reset button located on bottom of iPAQ



Yellowjacket Main Screen

Yellowjacket main screen allows access to all software menus. Use the stylus or the joystick to make a selection. You can back up and access the main screen anytime by pressing the joystick UP, DOWN, LEFT or RIGHT (the direction is indicated at the bottom of the page).

Note that the firmware and serial number in the upper left corner appears indicating serial connection between the iPAQ and the Yellowjacket receiver.

RTC MARKER MODE

YellowJacket uses the internal real-time clock of the iPAQ for timing. In addition, there is a marker that starts at 0. By pressing the button to the right of the marker value, the marker increases by 1. These values are stored in any log files created for later conversion by Chameleon.

RTC 1/3/2002 19:37:41 Marker #0 INC



Note: Users should normally see genuine firmware and serial numbers on this screen when Yellowjacket is functioning properly. If your firmware and serial number appear as 0.00 and XXXXXX, then the iPAQ software is not communicating properly with the Yellowjacket receiver. Try troubleshooting procedures found in this user's manual.

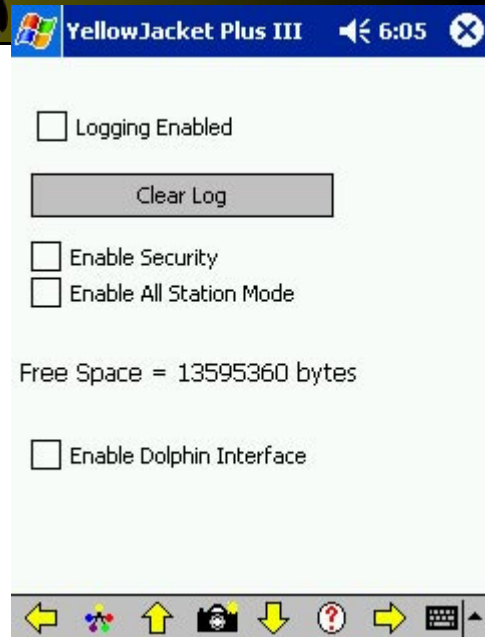
Yellowjacket Options Screen

Press the iPAQ's joystick to the right when in the Main Screen to access this options screen. Here, you may turn on logging and clear it from memory, enable security, enable all STATION mode and enable Dolphin™ Mapping Interface.

Note: Logging mode will only log data from the screen (multipath, spectrum, utilization, etc.) you are currently running. The data file containing all data collected when logging is turned ON is called LOG.YJ3.

Note: Security mode should only be enabled after the user has set the authorized MAC addresses in the security screen. Otherwise, all APs detected will be seen as 'unauthorized' and set off the security alarm until it is disabled.

Note: Dolphin Realtime Mapping software requires YellowjacketPLUS' internal GPS receiver option and a laptop with a USB connection. Do not enable this option unless you have the appropriate software, hardware and want to map your 802.11b study in real-time.





Full Spectrum Mode



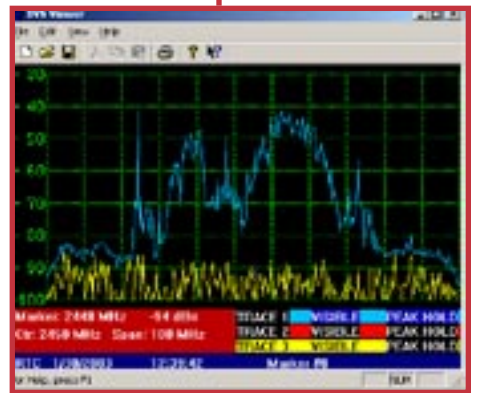
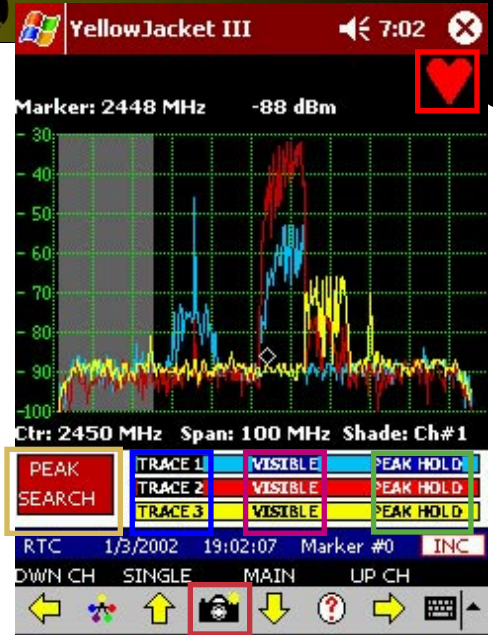
The full spectrum screen has **three available TRACES**. These traces can be **PEAK HOLD** and **VISIBLE/INVISIBLE**. Only one trace can be active at any time. The buttons on the screen below the graph change the settings on the spectrum screen.

There is also a **PEAK SEARCH** button that will put a diamond on the highest point in the spectrum at that time. RSSI and frequency information for that point will then be displayed on top of the graph.

The **BLINKING HEART** on the top right indicates an active 802.11b signal. This icon also applies to the other spectrum and multipath screens.

There is a highlight bar that allows the user to select a particular channel. This is navigated by use of the joystick and/or arrow buttons on the menu. After highlighting a particular channel, the user may enter into single channel spectrum mode by pressing the UP arrow on the joystick or the UP arrow on the menu bar.

You may take a snapshot of the full spectrum screen by pressing the **CAMERA BUTTON** on the menu bar. The data for the screen will then be stored along with RTC or GPS information. The PC Snapshot Viewer Utility will allow you to view these snapshots on the PC and then print them out on a printer.



Single Channel Spectrum



Single channel spectrum mode works exactly like the full spectrum mode with the exception that you are now zoomed in to a single 802.11b channel.

NOTE: 802.11b traffic will be seen in bursts on the spectrum screen. The energy will only rise as packets are transmitted. You will see a constant RSSI level in the AP screens because the RSSI measurement is synchronous with the reception of the packet. The spectrum screen is sweeping the frequency band because it is looking for **ALL** 2.4GHz energy, not just 802.11b packets. In this way, interferers will also appear. It sweeps as fast as it can, but if a packet is transmitted while the sweep is at another frequency, the energy will not be seen.





MAC AP/Station Survey Mode

Choose “AP List” mode from the main screen to get to the AP List screen. The first screen will “survey” all 14 channels for available AP’s. This screen will show AP’s ONLY. The single channel mode can show all stations.

The record number, absolute channel, whether or not it is authorized (if security is enabled), the MAC address, the SSID (for AP’s), the RSSI, and WEP (privacy enabled bit) are shown for each address.

Arrows will appear in the header if more than 5 AP’s are being detected. The user can then scroll up and down to view all of the AP/STA captured data. An address will be removed from the list if it hasn’t been detected the next time that channel is swept.

#	CH#	MAC	RSSI
TYP	AUT	SSID	WEP
1	6	00E003041FB2 Plant_AP	-63
2	10	004033AFF348 Wireless	-48
3	10	004033AFF1C3 Wireless	-58
4	10	004033AFF5D1 Wireless	-51
5	10	004033AFF201 Wireless	-51

RTC 1/3/2002 19:19:31 Marker #0 INC
MAIN PRV PG NXT PG



AP/Station Single Channel Mode

To see the AP’s/stations for a single channel, choose the channel by tapping the “SURVEY ALL CHANNELS” area above the AP list. This will switch the list to APs only from one channel.

#	CH#	MAC	RSSI
TYP	AUT	SSID	WEP
1	6	00E003041FB2 Plant_AP	-63
2	10	004033AFF348 Wireless	-48
3	10	004033AFF1C3 Wireless	-58
4	10	004033AFF5D1 Wireless	-51
5	10	004033AFF201 Wireless	-51

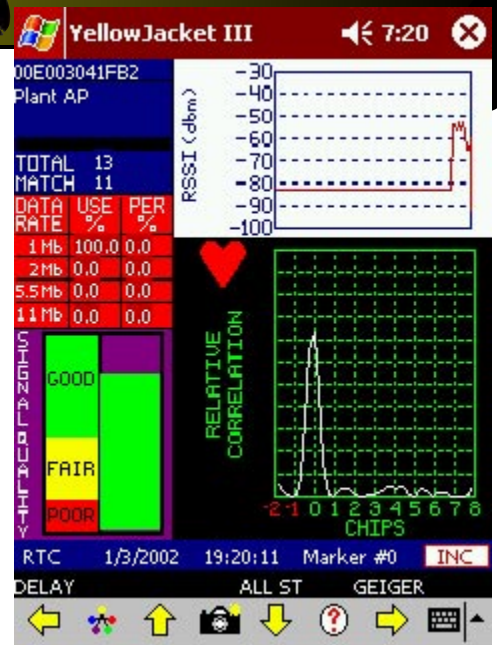
RTC 1/3/2002 19:19:31 Marker #0 INC
MAIN PRV PG NXT PG



Multipath / Signal Quality Indicator ("Q" Factor)

The bar graph on the lower left hand side of the multipath and the delay spread screens is known as the 'Q' factor graph. This graph uses a formula to determine the quality of the direct path and reflections of the signal by determining the 'fatness' of the main peak compared to the height of the direct path component.

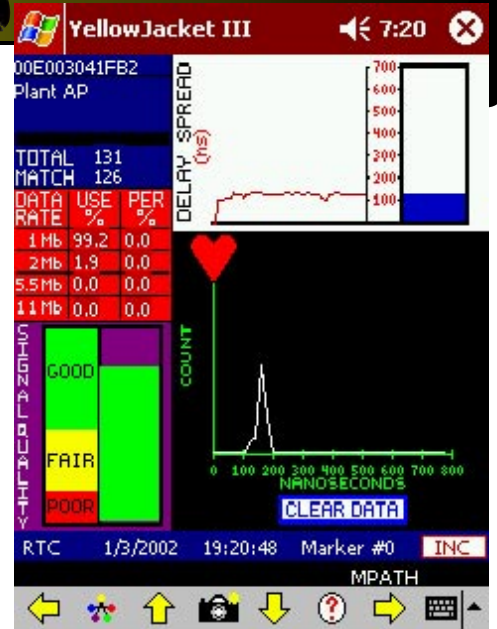
As the direct path gets stronger and sharper, the 'Q' factor goes up. As the path gets weaker and fatter, the 'Q' factor drops, signaling a possible multipath interference concern.



Delay Spread Screen

By moving left from the multipath screen using the joystick and/or menu arrow, the user enters the delay spread screen. The left of this screen shows the same information as the multipath screen. The upper right hand side of the delay spread screen shows a running total and current delay spread in nanoseconds.

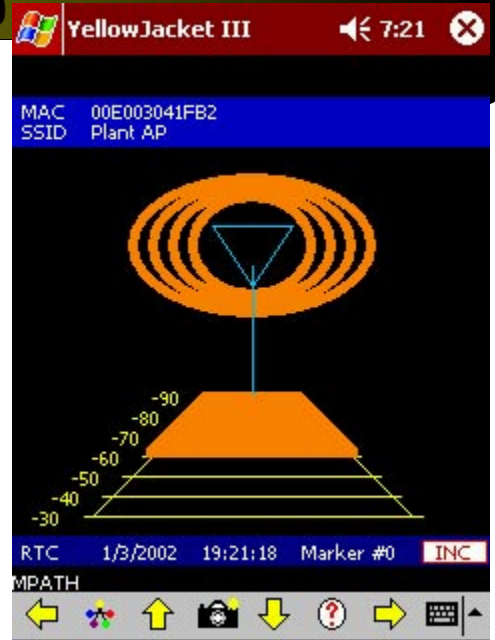
The next graph below the running total graph is the cumulative delay spread graph (count vs. spread). The X axis is also in nanoseconds. The spread is cumulative and can be reset using the provided button.





“Geiger-Counter” Mode

To find an AP/station using audible sounds as a guide, press up on the joystick to enter the “Geiger-counter” screen. The colors will approach white when nearing and/or pointing directly at an AP or station. The Geiger counter sound will also get stronger with more frequency.



Security Screen

To go to the security screen, press the security icon from the main screen. The screen shown will appear. You may enter a list of AP's that are authorized (up to 1000) to be a part of the network by entering them in the top left edit field and then pressing the 'ADD' button. Press 'DEL' to delete an entry from the list after highlighting that entry. Press 'CLR<-->' to clear the authorized list.

An authorized list can be generated from the Yellowjacket by following these steps. First, go into survey mode or single channel mode in the AP List section. Then, once all of the AP's have been located, go back into the security screen. Press the 'GENERATE' button. All of the AP's(stations) will be transferred into the authorized list.

When the security mode is enabled from the menu bar in the AP/STA mode, APs and STATIONS which aren't in the authorized list will be put in the unauthorized list and a warning message will appear.

An AP/station can be moved over to the authorized list by pressing the 'ADD' button. To clear the unauthorized list, press the 'CLR-->' button.

A list of AP's can be saved and retrieved from/to the authorized and unauthorized lists by choosing the save/retrieve options from the menu bar. The files to be saved/retrieved from will be auth.lst and unauth.lst located in the root directory.



Unauthorized Warning

When Yellowjacket detects any AP that is not included in the Authorized list, an ALERT! screen will appear and audible warning beep will be heard. Press OK to close the ALERT! screen. Remember that Yellowjacket will continue to sound off the alarm each time any unauthorized AP is detected until it is placed in the Authorized list by the user. Check your Options Screen (press joystick right in Main Screen) to turn this security alert ON or OFF.



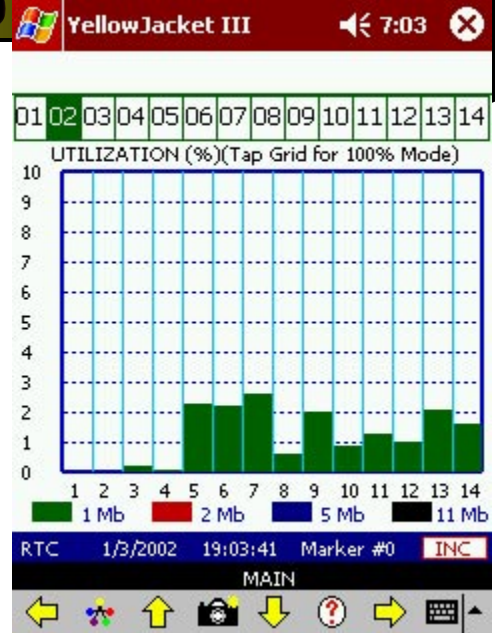
Utilization Screen

The utilization screen shows bandwidth utilization for every 802.11b channel. The top of the screen shows the current channel being scanned (highlighted). The chart below shows the utilization from 0 to 100% for channels 1 thru 14. It is color coded to show the percentages for each data rate, as keyed on the bottom of the screen.

The percentages add up the throughput of data at each data rate. For instance, if there were packets at 1Mb/s containing 500,000 bits, then the corresponding percentage at 1Mb/s would be 50%. This would be the same percentage for receiving 5.5 Mb/s on 11 Mb/s packets.

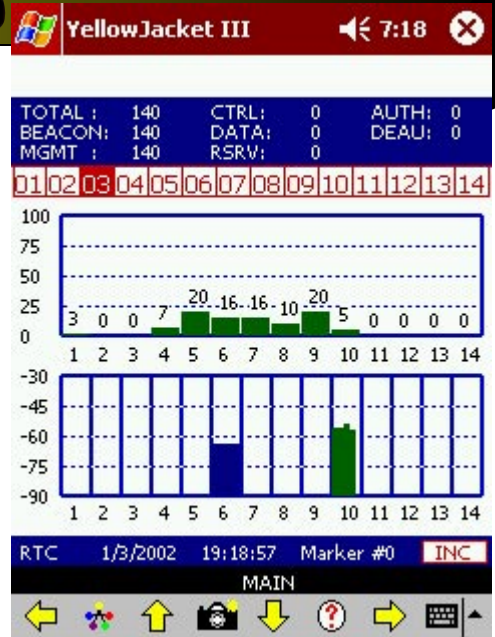
The bars stack on top of each other to reveal no more than 100%.

By tapping the grid, the display toggles between a range of 0-10% and 0-100%. This is for zooming in on low-utilization statistics.

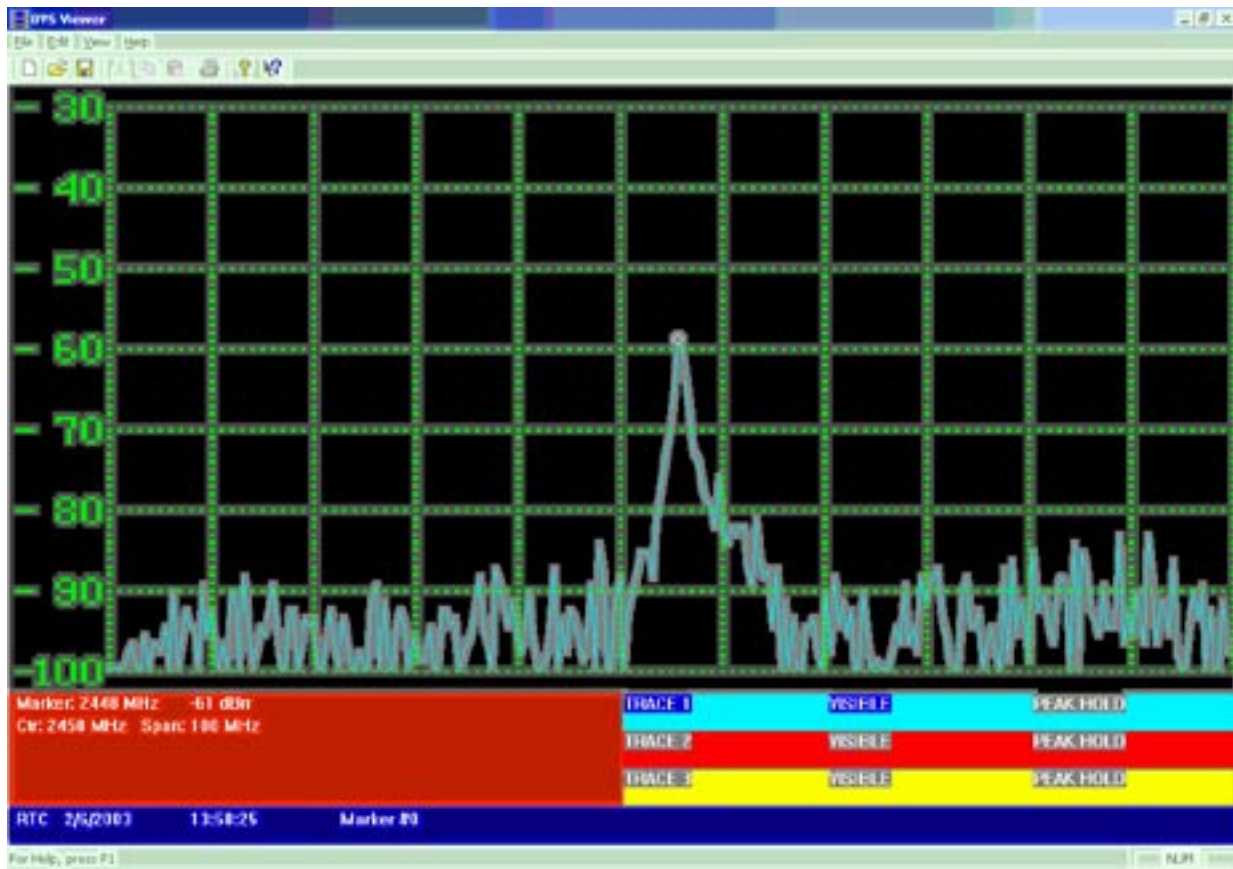


Usage Screen

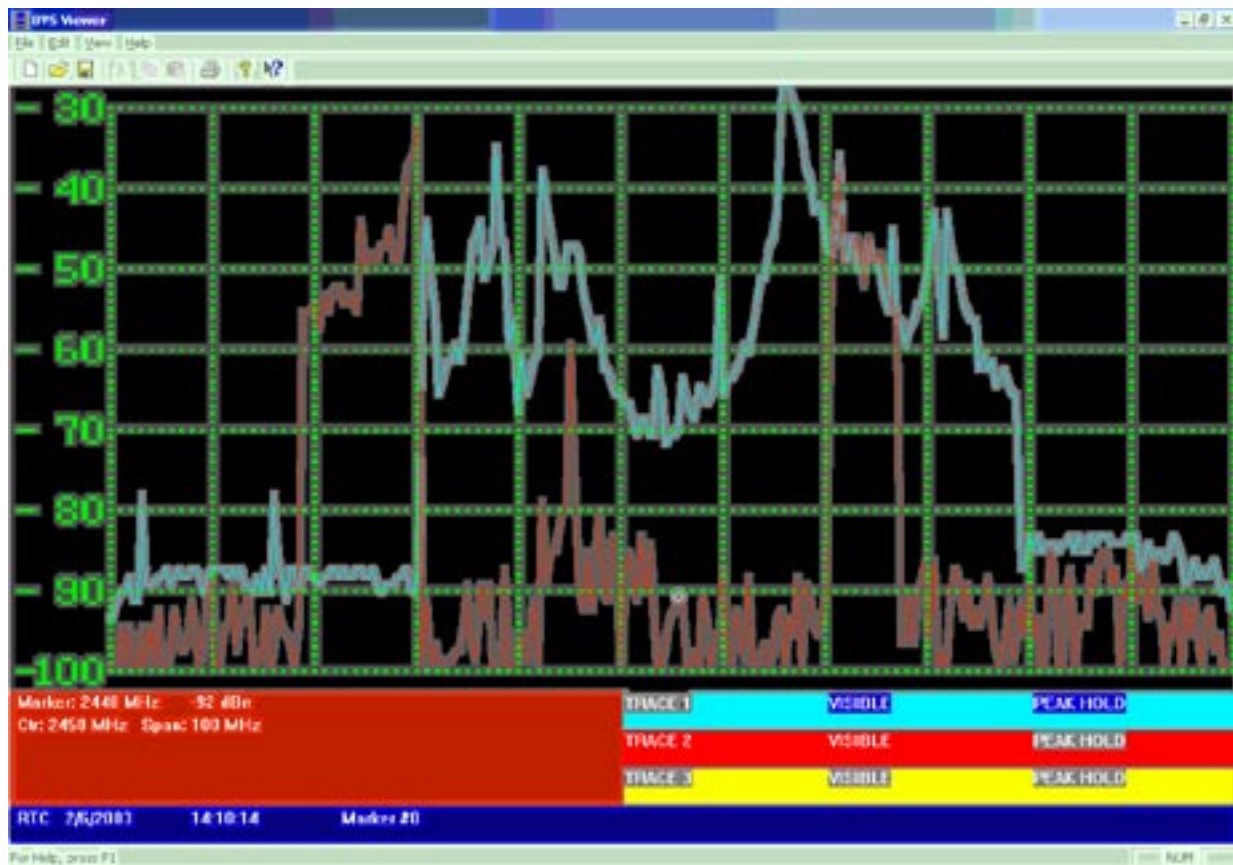
The usage screen displays the percentage of packets being seen by Yellowjacket in channels 1 through 14. The graph at the bottom shows RSSI bars for APs detected and is arranged by channel number. Note that the more APs that occupy each channel, the thinner the vertical RSSI bars will become (each bar represents a single AP). The PER/USAGE calculations are now based on a rolling average over the last number (1024) points.



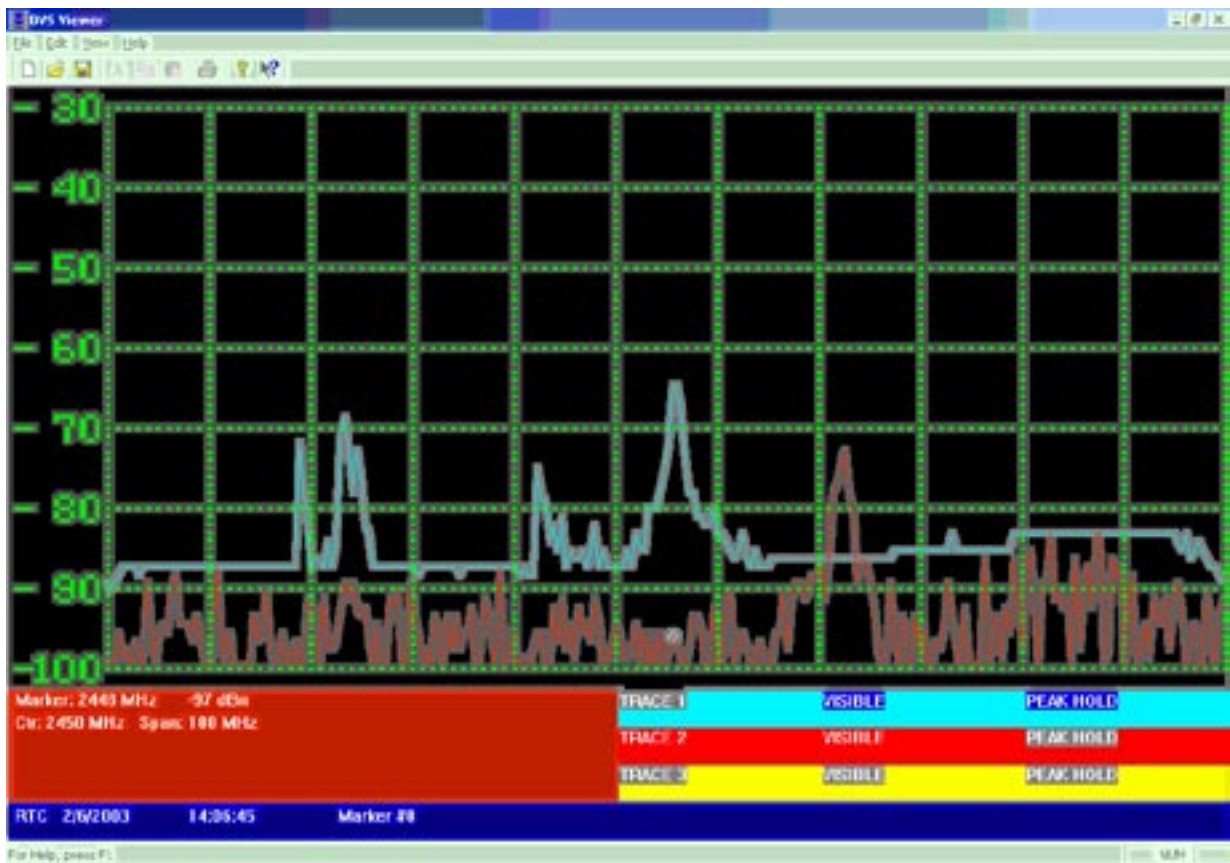
Yellowjacket Typical Spectrum Interference Examples



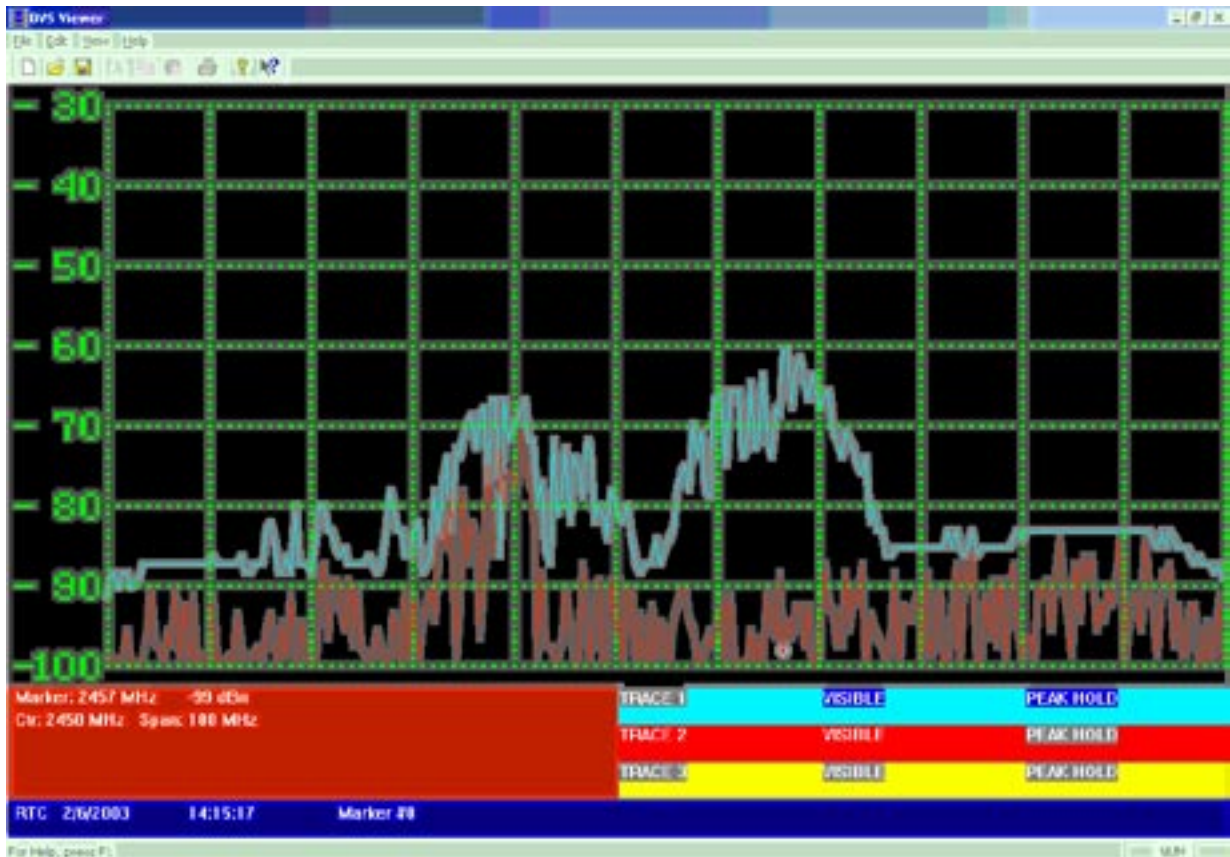
INTERFERENCE Narrow Band - Continuous Wave



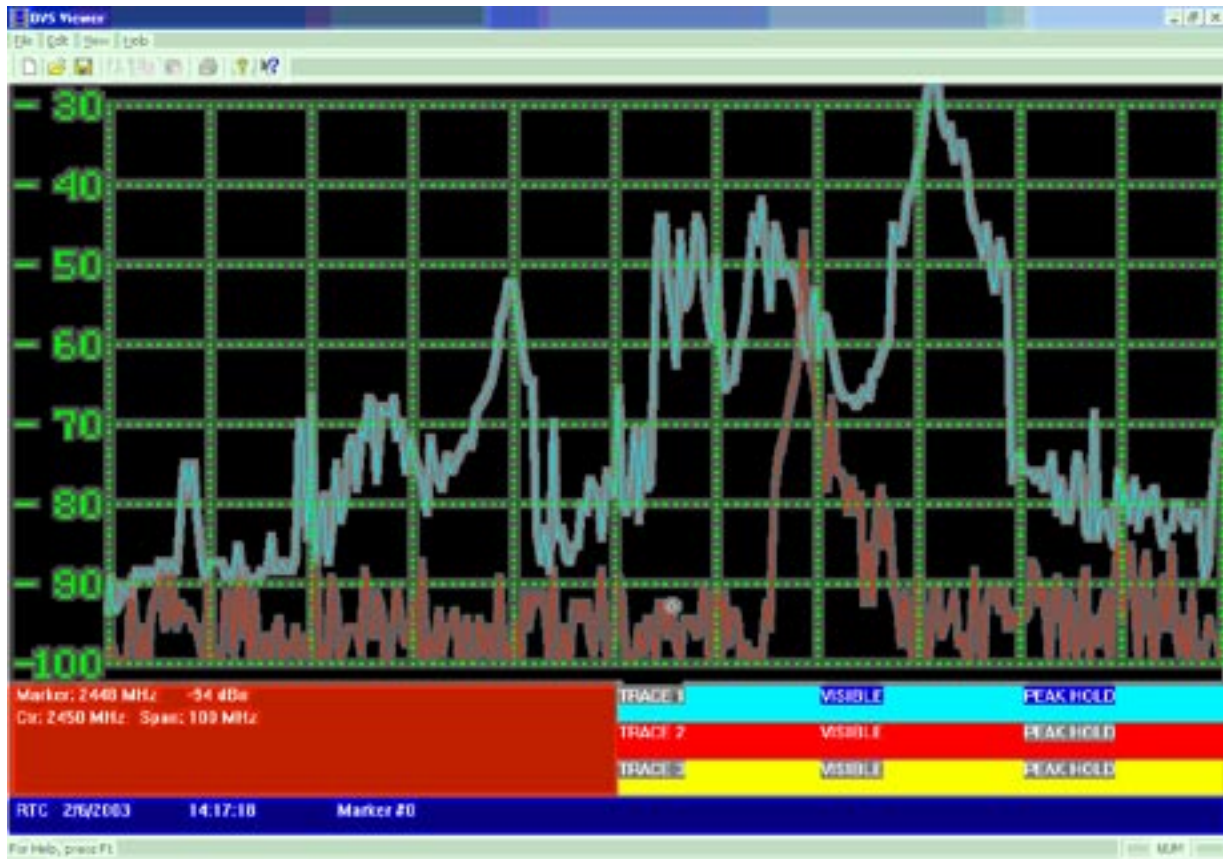
INTERFERENCE Microwave Oven - Blue Trace - Peak Hold Red Trace - Realtime



INTERFERENCE - Frequency Hopper (802.11) Blue Trace - Peak Hold Red Trace - Realtime



802.11b DSSS Signal - Blue Trace - Peak Hold Red Trace - Realtime



INTERFERENCE-Bluetooth frequency Hopper (strong signal strength) **Blue Trace - Peak Hold** **Red Trace - Realtime**

Yellowjacket Troubleshooting Setup Steps

STEP 1

When you start the software and tap past the startup screen, what do you see for the firmware and serial number?

XXXXXX and 0.00 Proceed to **STEP 2**

Valid SN and FW Proceed to **STEP 10**

STEP 2

Do you have the AC adapter Y cable attached to the iPAQ and YJ base unit?

YES Proceed to **STEP 4**

NO Proceed to **STEP 3**

STEP 3

Plug in the Y power adapter to the iPAQ and base unit and power from an AC source. Does the software see a firmware number and serial number now?

YES The batteries on the iPAQ or base unit are not fully charged.

NO Proceed to **STEP 4**

STEP 4

Reset iPAQ by pushing the button on the bottom of iPAQ using stylus. Run the YJ software again. Does the unit respond with a valid serial number and firmware version?

NO Proceed to **STEP 5**

STEP 5

How does the flash card serial cable attach to the base unit?

RJ-11 connector Call BVS at 732-548-3737 for a cable upgrade

Grommet (fixed) Proceed to **STEP 6**

STEP 6

Re-seat the flash card and reset the iPAQ again. Does the unit respond with a valid serial number and firmware version when running the software again?

NO Proceed to **STEP 7**

STEP 7

Verify that the AC Y cable is firmly attached to the base unit. You should hear a click while feeling a little resistance. Was the cable firmly attached?

YES Proceed to **STEP 8**

NO Proceed to **STEP 3**

STEP 8

Verify that the iPAQ is firmly seated in its expansion pack through the large connector at the bottom of the iPAQ. When you remove the iPAQ and then re-seat it, do you hear and see a confirmation (on the iPAQ screen) that the expansion pack was recognized?

YES Proceed to **STEP 9**

NO Connection is not made with expansion pack. Reset iPAQ and proceed to **STEP 9** when a connection is made. If no connection is ever made, proceed to **STEP 10**.

STEP 9

Reset iPAQ and try the software again. Do you see a valid serial number and firmware version?

NO Proceed to **STEP 10**

STEP 10

Call BVS at 732-548-3737 for further technical support and/or an RMA.

Charging System

The Yellowjacket has 2 different battery sources that need charging power. There is an internal battery for the Pocket PC and removable batteries for the receiver module. The 4 AA Ni-MH receiver batteries may only be charged using the supplied fast charger or another comparable Ni-MH charger. The Compaq iPAQ internal battery may be charged by either plugging in the supplied power transformer or by inserting the iPAQ PDA into the supplied charging / data transfer cradle. The BVS supplied charger will **power the Yellowjacket receiver AND power and charge the iPAQ PDA**. Batteries for the Yellowjacket receiver (4 AA cells) must be charged in the provided charger. See Compaq's documentation for complete charging instructions.

Troubleshooting

Replacing Batteries

If your Yellowjacket or Hive has difficulty connecting or collecting data and you have verified the iPAQ is fully charged, then you may need to change your AA Ni-MH batteries out for fresh ones. To access batteries under iPAQ:

1. Slide iPAQ back and away from antenna end of receiver. Be sure not to pull too hard on the cable in any way. **NEVER** remove the Compact Flash connector from the iPAQ sled unless troubleshooting for connectivity issues.

2. Flip over iPAQ exposing the battery compartment on the top of the BumbleBee receiver.

3. Change 4 Ni-MH AA batteries for fresh Ni-MH batteries and repeat steps above in reverse order.

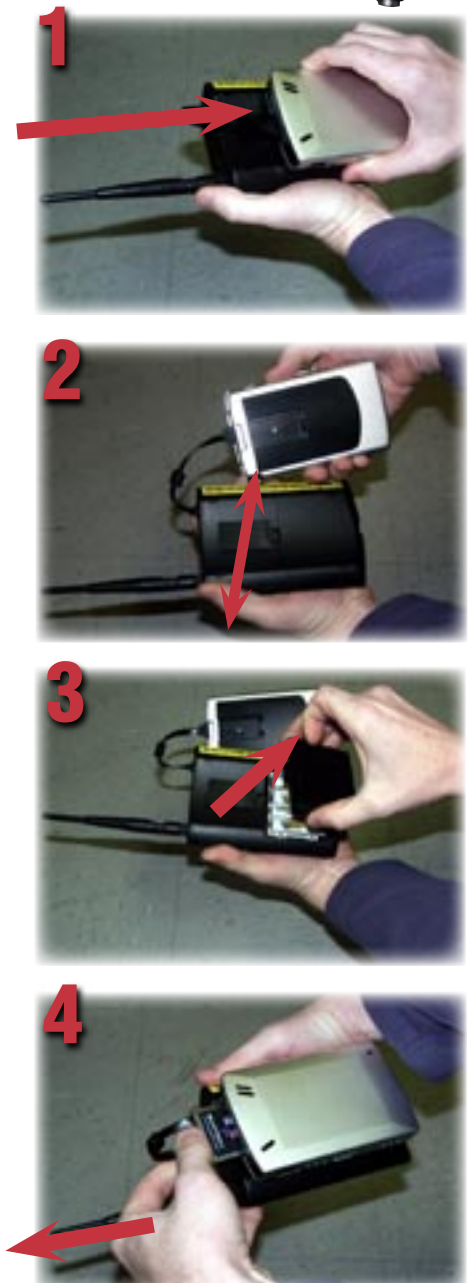
4. When troubleshooting connectivity issues, be sure to **GENTLY** remove the Compact Flash serial adapter card from the iPAQ. Slowly slide the card out holding it by the very top of the card and **NOT** the cable. Be sure it is seated properly and slowly slide it back into the iPAQ's CF housing.

- Cannot Open Com Port or System Not Responding – Try restarting the application. If the system locks up completely, **press the small reset button** located at the back of your iPAQ. See HP's usage instructions for more info on performing a hard reset.

- Yellowjacket software is missing or corrupted - Re-install your Yellowjacket software.



Use this included power adapter for iPAQs with no separate power input.



- Cannot Open Com Port or System Not Responding – Try restarting the application. If the system locks up completely, **press the small reset button** located at the back of your iPAQ. See HP’s usage instructions for more info on performing a hard reset.
- Yellowjacket software is missing or corrupted -
Re-install your Yellowjacket software. You can find the latest software at www.bvsystems.com

TIPS

BATTERY LIFE

Yellow Jacket™ and Yellow Jacket Plus (formerly called Scorpion), receivers use 4 or 5 Ni-MH long-lasting “AA Cells”.

1. Ni-MH batteries do not charge to full capacity the first time they are charged.
2. Ni-MH batteries do not charge to full capacity the first time they are charged after a long period of inactivity. or after a long period of non-use.

Cause:

When charging Ni-MH batteries for the first time after long-term storage, deactivation of reactants may lead to increased battery voltage and decreased capacity, (which causes premature termination of charging). Because batteries are chemical products involving internal chemical reactions, performance deteriorates with prolonged storage. This is normal in Ni-MH batteries.

Resolution:

Ni-MH batteries may not charge to full capacity the first time they are charged, or after a long period of inactivity.

The first-time charge of the Ni-MH Rechargeable Battery Pack should take approximately 2 hours. If the charger indicates a full charge, in less than 2 hours, repeat the charge cycle as follows:

First-time Charge:

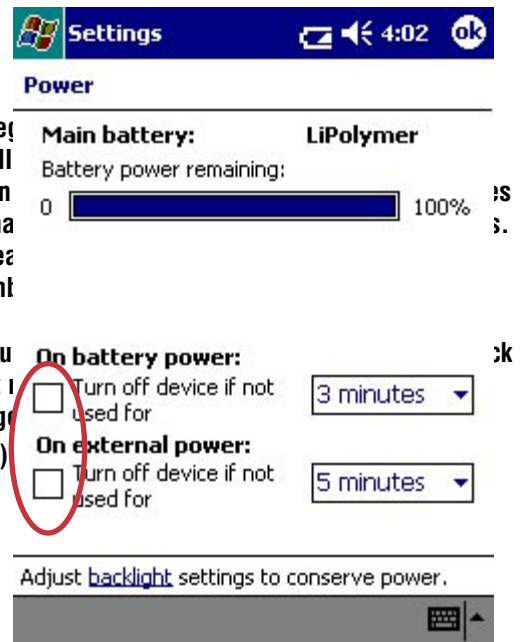
NOTE: In order to prevent the Ipaq from freezing when running YellowJacket software (therefore rendering the power button useless), 1. To be insert NI
2. When make sure to:

1. ALWAYS leave the checkboxes in the **SETTINGS/SYSTEM/POWER** from cha screen unchecked. Power-save mode will lock up the application due 3. Repea to the fact that the application is stopped while communicating with the com the hardware..

2. Make sure that the battery level on the Ipaq remains above 40%. will not i
The serial card interface may cease to operate when the battery level uncharg is under 40%. months)

To resolve the freeze, simply press the soft reset button on the bottom of the Ipaq with the stylus.

NEVER LEAVE THE IPAQ ON FOR EXTENDED TIMES (10 HOURS OR GREATER) WITHOUT EXTERNAL POWER. ALWAYS SAVE ANY DATA AND THEN TURN OFF IPAQ (TOP RIGHT POWER BUTTON) WHEN NOT IN USE. NOT DOING SO WILL RESULT IN DAMAGE TO THE IPAQ’S INTERNAL BATTERY.



In the PocketPC’s OS, choose Settings and then choose System settings at the bottom. Select the battery icon for Power Settings to access this screen. These power settings come unchecked from the BVS factory to ensure Yellowjacket software runs optimally. **Power must remain on during logging or else data might be corrupted.**

SOFTWARE INSTALLATION

YELLOWJACKET SOFTWARE INSTALLATION FROM A SECURE DIGITAL (SD) CARD

Yellowjacket software comes pre-installed on your iPAQ, but as a courtesy, BVS includes a 128MB SD card containing a Yellowjacket software installer should you provide your own iPAQ or lose the factory installed files. This SD card may be used to store Yellowjacket data or other data.

Remember you must switch “lock” tab on side of SD card to “unlock” before storing or erasing any data.

To install the YellowJacket application from the SD card provided in the YellowJacket package, complete the following steps:

1. Insert SD card into the SD slot on the top of the iPAQ.
2. Using the stylus, tap on the “Start” button on the top of the screen.
3. Tap on “Programs” near the bottom of the menu.
4. Tap on the “File Explorer” folder.
5. Make sure that the shaded area on the top of the File Explorer says “My Device”. If not, use the upside-down triangle next to the text to choose “My Device”.
6. Tap on “SD Card”.
7. Make sure that the shaded area on the top of the File Explorer says “SD Card”. If not, use the upside-down triangle next to the text to choose “SD Card”.
8. Choose your Yellowjacket receiver and iPAQ model for installation and tap on “install”.
9. When the message “Installation is Complete” appears, you have successfully installed the application.

The YellowJacket application will be accessible by tapping on “Start” and then “Programs”. Scroll down to the bottom and the YellowJacket application icon will appear.

DRIVER INSTALLATION

The 24xx model iPAQ needs an updated driver for the Quatech serial card which interfaces to your BVS product. The driver installation program can be found in the “driver” directory of your product CD. Run this executable from your PC while the iPAQ is connected via ActiveSync. After installation, soft boot the iPAQ. Your product should be ready to go. Symptoms of an iPAQ needing this driver include loss of communication in a high-speed data transfer mode (such as spectrum on YellowJackets and Bumble Bee).

SURVEYING

While surveying, Yellowjacket achieves the most accuracy when the supplied omni-directional antenna is at a vertical 90 degree angle and completely perpendicular to the ground or floor as shown below.



BVS Viewer Utility

The BVS Viewer Utility allows users of the YellowJacket series of products to display and print snapshots of full spectrum outputs. The following steps are taken to display and print a snapshot.

STEP 1: PRODUCE A SNAPSHOT

While running the YellowJacket or YellowJacket Plus, enter into the fullband spectrum screen. This is the spectrum screen which sweeps the entire band of the receiver.

When the desired output is seen on the display, press the camera icon in the menu on the bottom of the screen. Note the filename of the snapshot that is saved. (For example, a message box would appear that would state that the file was saved as YJ#####.YJS.

This file contains data that will be used to recreate the screen in the Viewer.

STEP 2: COPY FILE TO HOST PC

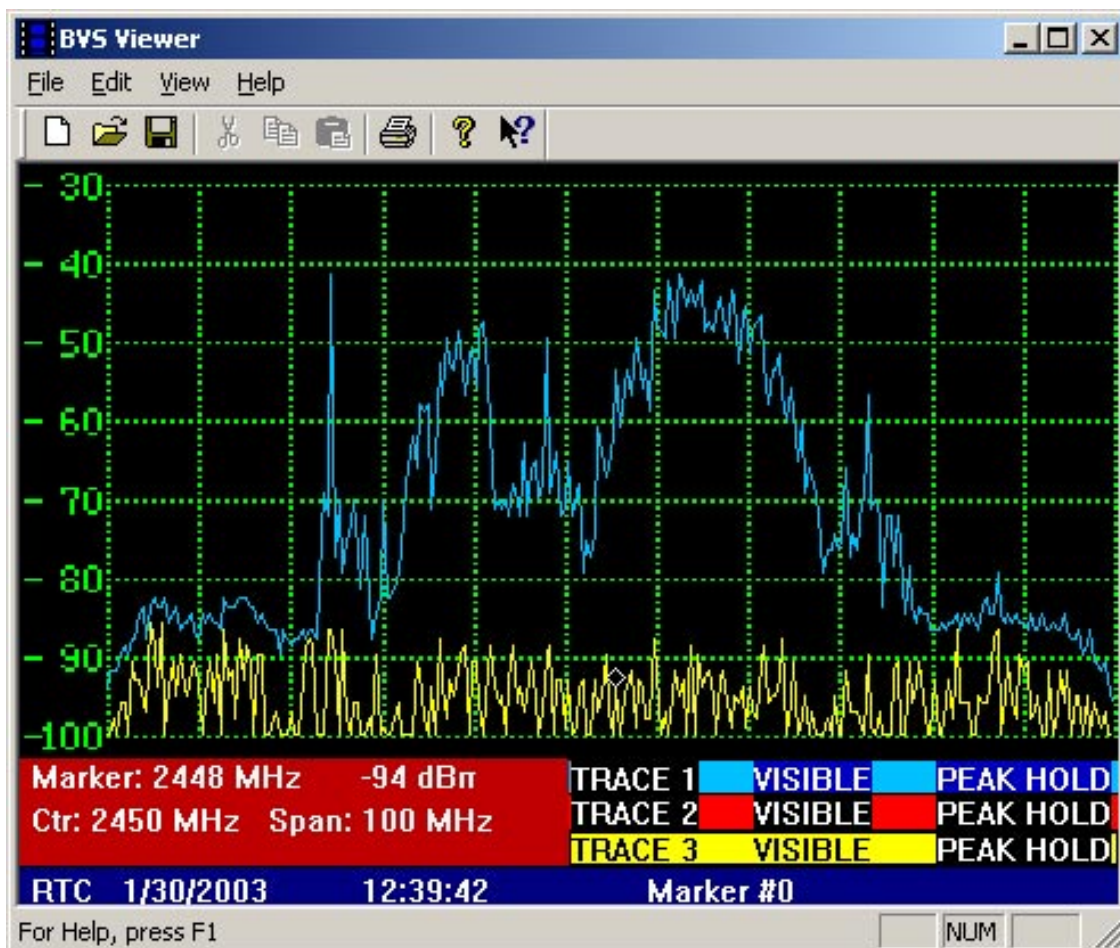
Using ActiveSync, copy the saved data file over to the PC. The file will be in the root directory of the Ipaq.

STEP 3: RUN VIEWER UTILITY

Run the BVS Viewer Utility on the PC. Open the file that was copied from the Ipaq by using FILE/OPEN. You will now view the recreated snapshot.

STEP 4: PRINT OUT THE PICTURE

Use FILE/PRINT to print out a black and white copy of the screenshot on your printer.



BVS CHAMELEON DATA CONVERSION UTILITY

Introduction

The Chameleon application software is the universal data conversion and filtering tool for BVS Receivers.

The Chameleon was designed to greatly simplify the transfer of receiver data to many popular post-processing applications such as MapInfo and MS Excel.

The following sections of this document outline the various features of the Chameleon WLAN software.

Installation

Installation of Chameleon is straightforward. Use the enclosed CD and follow the instructions.

Starting the Application

Start Chameleon by clicking on the icon created by the installation utility. The main screen will show up. All steps for the conversion of data are taken from this screen.



Chameleon WLAN Main Screen

Input File

The first step is the choosing of files for input and output. Choose the data file that is to be converted. The Chameleon will automatically determine which product created the file. Chameleon will display the product on the top of the screen. Then choose the name of the file to store the conversion results. By default, the filename for input will be chosen with a “.out” extension.

Output Format

By selecting the appropriate post-processing application, the correct fields will be selected and placed in the field selection screen in the appropriate order. The user may also choose “none”. Whether or not the field titles are in the output can be selected.

Also, the delimiting character of the fields in the output file is chosen in this section.

Output Field Selection

This section enables the selection of those fields that are to be placed in the output file. The individual fields for the data types will appear in the far right box when the data type is selected in the “selected” box.

Conversion

The final step in the step-by-step process is the “conversion” section. Press the CONVERT button. The progress bar will be updated as the file is being processed. The speed of conversion will vary based on the size of the data file.

Networking Basics

Packets and traffic

Information travels across a network in chunks called “packets.” Each packet has a header that tells where the packet is from and where it’s going, similar to what you write on the envelope when you send a letter. The flow of all these packets on the network is called “traffic.”

Hardware addresses

Your PC “listens” to all of the traffic on its local network and selects the packets that belong to it by checking for its hardware address in the packet header or MAC (Media Access Control). Every hardware product used for networking is required to have a unique hardware address permanently embedded in it.

IP addresses

Since the Internet is a network of networks (connecting millions of computers), hardware addresses alone are not enough to deliver information on the Internet. It would be impossible for your computer to find its packets in all the world’s network traffic, and impossible for the Internet to move all traffic to every network, your PC also has an IP (Internet Protocol) address that defines exactly where and in what network it’s located. IP addresses ensure that your local Ethernet network only receives the traffic intended for it. Like the hierarchical system used to define zip codes, street names, and street numbers, IP addresses are created according to a set of rules, and their assignment is carefully administered.

Put another way, the hardware address is like your name; it uniquely and permanently identifies you. But it doesn’t offer any clues about your location, so it’s only helpful in a local setting. An IP address is like your street address, which contains the information that helps letters and packages find your house.

Rules for Sending Information (Protocols)

A protocol is a set of rules that define how communication takes place. For instance, a networking protocol may define how information is formatted and addressed, just as there’s a standard way to address an envelope when you send a letter.

Networking Devices:

Bridges

A bridge joins two networks at the hardware level. This means that as far as other protocols are concerned, the two networks are the same.

Routers

A router connects two IP networks. In contrast to a bridge, which joins networks at the hardware level, a router directs network IP traffic based on information stored in its routing tables. A routing table matches IP addresses with hardware addresses. The router stamps each incoming IP packet with the hardware address that corresponds to that IP address. As a result, the packet can be picked up by the right computer on the hardware network.

DNS (Domain Name Server)

Networks (domains) on the Internet have names that correspond to their IP addresses. A Domain Name Server maintains a list of domain names and their corresponding addresses. This is why you can go to Berkeley’s Web site by entering www.bvsystems.com, instead of the IP address.

Networking Terms:

TCP/IP (Transport Control Protocol/Internet Protocol)

TCP/IP is a collection of protocols that underlies almost every form of communication on the Internet.

DHCP (Dynamic Host Control Protocol)

DHCP is a method of automatically assigning IP addresses. Instead of assigning addresses to individual users, addresses are assigned by the DHCP server when clients need them. This means that instead of entering several fields of long addresses, users need only to select DHCP as their configuration method for IP networking.

PPP (Point-to-Point Protocol)

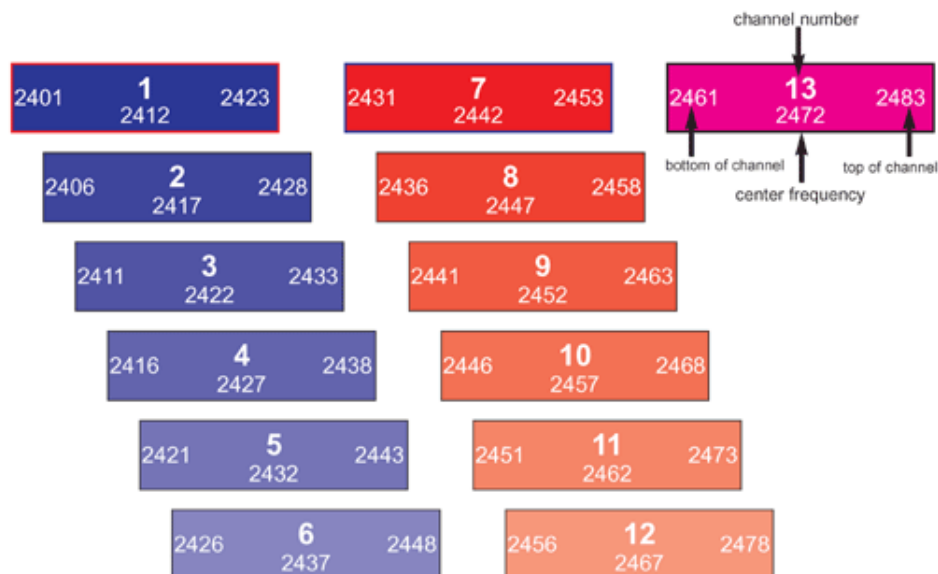
PPP is the most common protocol for providing IP services over a modem.

NAT (Network Address Translation)


NAT is used to share one IP address among several computers. A device set up as a NAT router uses a collection of "private" IP addresses (in the range 10.0.1.2 to 10.0.1.254 for example) to allow several computers to access the Internet using one "public" IP address. When a computer using a private IP address requests information from the Internet, the NAT router keeps a record of the computer making the request, and sends the information to the Internet using its own IP address. When the response comes back from the Internet, the NAT router forwards the packet to the appropriate computer.

Channel Number	Frequency GHz	North America	Europe	Spain	France	Japan MKK
1	2.412	X	X			
2	2.417	X	X			
3	2.422	X	X			
4	2.427	X	X			
5	2.432	X	X			
6	2.437	X	X			
7	2.442	X	X			
8	2.447	X	X			
9	2.452	X	X			
10	2.457	X	X	X	X	
11	2.462	X	X	X	X	
12	2.467		X		X	
13	2.472		X		X	
14	2.483					X

DSSS INTERNATIONAL CHANNEL CHART



Accessories for your **YELLOWJACKET™**




2.4 GHz Antenna
adjustable angle
SMA connector
\$ 25.00



Rugged Carrying Case
ABS Plastic
P/N P-CASE
\$ 100.00




Hive Indoor Mapping Software
P/N 0075-BEA
\$ Call for Pricing



2.4 GHz Direction Finding Antenna with mounting bracket, cable & type N SMA male
9 dBi gain
P/N DFA-001
\$ 250.00



IrDA USB Interface
wireless data transfer Adaptor
P/N IRDA-000
\$ 125.00



Ni-MH Fast-Charger
4 AA 6 V
P/N NIMH-001
\$ 55.00

Hive™



Yellowjacket Indoor 802.11 Wi-Fi Mapping Software

1 Create your floorplan:

Site Initiator

Create floorplan layouts from scratch or from any bitmaps

Add rooms, floors, walls, doors, windows and more

Import existing floorplans for modification and surveys

Survey floorplans on a PocketPC. Create and organize survey maps on a PC.



Hive™ is powerful mapping software that works with Berkeley's Yellowjacket 802.11 (B, A or B/G) Wi-Fi receiver system. *Hive™* runs on an iPAQ® Pocket PC® allowing site surveys to be handheld and performed completely **INDOORS** or outdoors using real-time mapping coverage technology. No GPS reception needed. First, import AutoCAD files into *Hive™* Site Initiator and scale your rooms and walls for measurement overlays. Walk through an office space, warehouse or multi-floor building - any interior space that needs to be surveyed - and take Access Point measurements with Site Supervisor. Then place those measurements on top of any structural floorplan to get a comprehensive, bird's eye view of any WLAN based upon MAC addresses, RSSI, SSID and more. Finally, view your Wi-Fi coverage results in table and graphical views using Site Investigator running under Windows 98, 2000, ME or XP OS.

3 Organize and plot your coverage:

Site Investigator:

Plot and view surveys in multiple data table or graphical windows

Plot coverage by AP or AP groups

Print and export plots or table data into ASCII format for spreadsheets

802.11B
802.11A
802.11G



2 Take your AP measurements:

Site Supervisor

Touch-screen measurement points using PocketPC®

Customizable surveys based on MAC, RSSI, SSID

Export floorplans from AutoCAD® or any bitmap

Take floorplan survey snapshots anytime

Visible survey path throughout floorplan

Call us today for more information on Hive software:
(732) 548-3737 / Fax: (732) 548-3404
Internet: www.bvsystems.com
E-mail: info@bvsystems.com

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Glossary of Acronyms

AC	Alternating Current
A/D	Analog to Digital converter
AGC	Automatic Gain Control
AP	Access Point
Applet	a small Application
BER	Bit Error Rate
BPSK	Binary Phase Shift Keying
BSS	Basic Service Set
BW	Band Width
CDMA	Code Division Multiple Access (spread spectrum modulation)
DC	Direct Current
D/A	Digital to Analog
dB	decibel
dBm	decibels referenced to 1 milliwatt
DOS	Digital Operating System
DSP	Digital Signal Processing
DSSS	Direct Sequence Spread Spectrum
ESS	Extended Service Set
FHSS	Frequency-Hopping Spread Spectrum
FIR	Finite Impulse Response
GHz	GigaHertz
IF	Intermediate Frequency
I and Q	In phase and Quadrature
IBBS	Independent Basic Service Set
IrDA	Infrared Data Association
kHz	kiloHertz
LCD	Liquid Crystal Display
LO	Local Oscillator
MAC	Medium Access Control
Mbits	Megabits
MHz	MegaHertz
NIC	Network Interface Card
OFDM	Orthogonal Frequency Domain Multiplexing (802.11a)
PC	Personal Computer
PCS	Personal Communications Service (1.8 to 2.1 GHz frequency band)
PER	Packet Error Rate
PN	Pseudo Noise
QPSK	Quaternary Phase Shift Keying, 4-level PSK
RF	Radio Frequency
RSSI	Receiver Signal Strength Indicator
SSID	Service Set IDentification
STA	STAtion (generally a laptop WLAN card)
UCT	Universal Coordinated Time
VAC	Volts Alternating Current
VGA	Video graphic
WEP	Wired Equivalent Protocol
WLAN	Wireless Local Area Network

IMPORTANT SAFETY INSTRUCTIONS

When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to persons, including the following:

- 1) Read and understand all instructions.
- 2) Follow all warnings and instructions marked on the product.
- 3) Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
- 4) Do not use this product near water, for example, near a bath tub, wash bowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool.
- 5) Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.
- 6) Slots and openings in the cabinet and the back or bottom are provided for ventilation, to protect it from overheating these openings must not be blocked or covered. The openings should never be blocked by placing the product on the bed, sofa, rug or other similar surface. This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation unless proper ventilation is provided.
- 7) This product should be operated only from the type of power source indicated on the appliance. If you are not sure of the type of power supply to your home, consult your dealer or local power company.
- 8) Do not allow anything to rest on the power cord. Do not locate this product where the cord will be abused by persons walking on it.
- 9) Do not overload wall outlets and extension cords as this can result in the risk of fire or electric shock.
- 10) Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock. Never spill liquid of any kind on the product.
- 11) To reduce the risk of electric shock, do not disassemble this product, but take it to a qualified service facility when some service or repair work is required. Opening or removing covers may expose you to dangerous voltages or other risks. Incorrect reassembly can cause electric shock when the appliance is subsequently used.
- 12) Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
 - A) When the power supply cord or plug is damaged or frayed.
 - B) If liquid has been spilled into the product.
 - C) If the product has been exposed to rain or water.
 - D) If the product does not operate normally by following the operating instructions. Adjust only those controls, that are covered by the operating instructions because improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.
 - E) If the product has been dropped or the cabinet has been damaged.
 - F) If the product exhibits a distinct change in performance.
- 13) Avoid using the product during an electrical storm. There may be a remote risk of electric shock from lightning.
- 14) Do not use the telephone to report a gas leak in the vicinity of the leak.

INSTALLATION INSTRUCTIONS

1. Never install telephone wiring during a lightning storm.

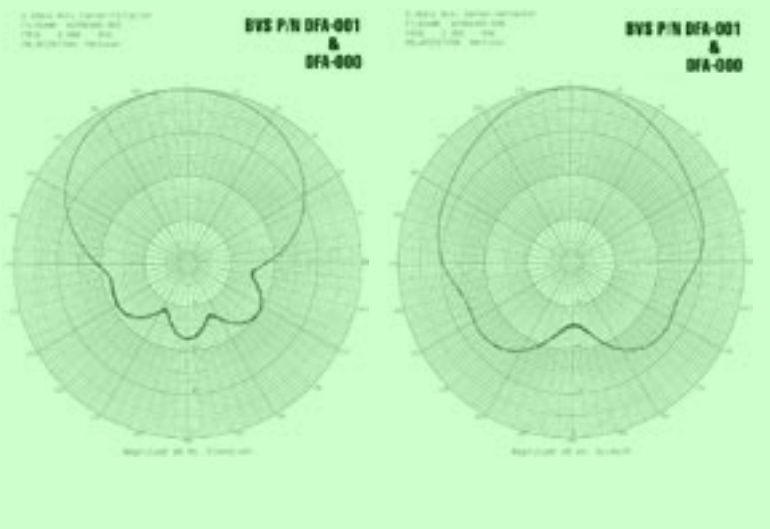
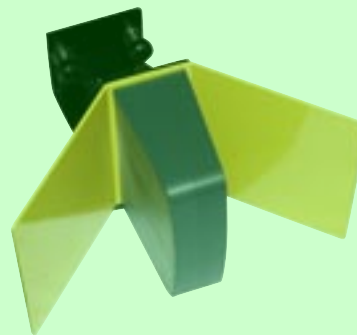
2. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
3. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
4. Use caution when installing or modifying telephone lines.

INSTRUCTION FOR BATTERIES

CAUTION: To Reduce the Risk of Fire or Injury to Persons, Read and Follow these Instructions:

1. Use only the type and size of batteries mentioned in owner's manual.
2. Do not dispose of the batteries in a fire. The cells may explode. Check with local codes for possible special disposal instructions.
3. Do not open or mutilate the batteries. Released electrolyte is corrosive and may cause damage to the eyes or skin. It may be toxic if swallowed.
4. Exercise care in handling batteries in order not to short the battery with conducting materials such as rings, bracelets, and keys. The battery or conductor may overheat and cause burns.
5. Do not attempt to recharge the batteries provided with or identified for use with this product. The batteries may leak corrosive electrolyte or explode.
6. Do not attempt to rejuvenate the batteries provided with or identified for use with this product by heating them. Sudden release of the battery electrolyte may occur causing burns or irritation to eyes or skin.
7. When replacing batteries, all batteries should be replaced at the same time. Mixing fresh and discharged batteries could increase internal cell pressure and rupture the discharged batteries. (Applies to products employing more than one separately replaceable primary battery.)
8. When inserting batteries into this product, the proper polarity or direction must be observed. Reverse insertion of batteries can cause charging, and that may result in leakage or explosion. (Applies to product employing more than one separately replaceable primary battery.)
9. Remove the batteries from this product if the product will not be used for a long period of time (several months or more) since during this time the battery could leak in the product.
10. Discard "dead" batteries as soon as possible since "dead" batteries are more likely to leak in a product.
11. Do not store this product, or the batteries provided with or identified for use with this product, in high-temperature areas. Batteries that are stored in a freezer or refrigerator for the purpose of extending shelf life should be protected from condensation during storage and defrosting. Batteries should be stabilized at room temperature prior to use after cold storage.

2.4 GHz Direction Finding Corner Reflector



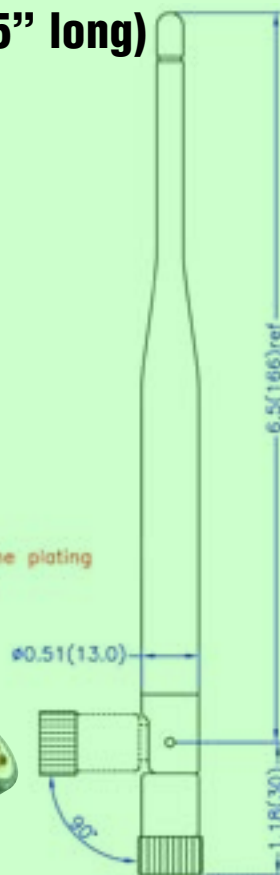
2.4 GHz Omni-Directional (7.5" long)

Electrical Properties:

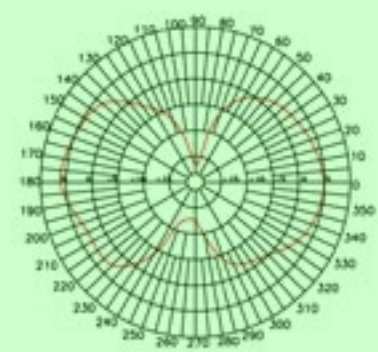
Frequency Range: 2.4~2.5 GHz
 Impedance: 50Ω nominal
 VSWR: <2.0:1
 Gain: 5 dBi
 Radiation: Omni
 Polarization: Vertical

Mechanical Properties:

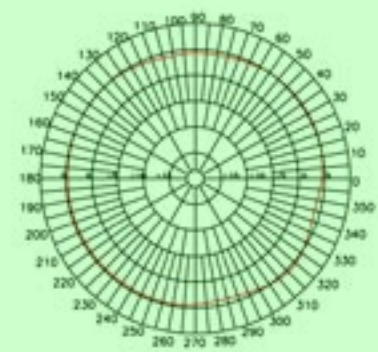
Connector: SMA Plug(male)
 Material:
 Whip: Polyurethane(Black)
 Swivel Mechanism: Polyurethane(Black)
 Connector: Brass with black chrome plating
 Operation Temp.: -20°C to +65°C
 Storage Temp.: -30°C to +75°C



E-Plane Pattern @ 2.45GHz



H-Plane Pattern @ 2.45GHz



YELLOWJACKET™-B

802.11b Wi-Fi Analysis System

with removable
HP iPAQ



Yellowjacket™ is a wireless receiver module designed to work with HP's iPAQ® PocketPC® in sweeping, analyzing and optimizing 2.4 GHz Wireless Local Area Networks. The receiver measures all 14 DSSS network channels which operate on the **IEEE 802.11b** standard allowing the user to determine the AP (Access Point), PER (Packet Error Rate), Multipath (Ec/Io), SSID and RSSI signal levels aiding in locating the hub and access points of neighboring WLANs. **Yellowjacket™** allows those familiar with the iPAQ's PocketPC®

interface a unique advantage over "software only" products currently available because **Yellowjacket™** functions as a complete WLAN analysis system combining the ubiquitous PocketPC® environment along with Berkeley's precision receiver technology.



Berkeley's custom receiver demodulates and displays all 14 DSSS channels like a pocket-sized spectrum analyzer.

FEATURES:

- Measure 2.4 GHz coverage for direct sequence (DSSS) WLANs (IF wideband 22 MHz) within the **IEEE 802.11b** standard
- Receive, filter and process DSSS studies all in Pocket PC®
- 64K color backlit display for real-time color-coded signal analysis
- Measures RSSI in true dBm with a calibrated receiver
- Removable HP iPAQ® PocketPC® PDA
- Measures Packet Error Rate; data rate percentage breakdowns Multipath and RSSI; narrow band & total channel power
- Complex Access Point / Station list analysis including WEP, Multipath, PER, Absolute Channel, Survey Sweep and SSID
- Connection (Hot Sync) to a PC via IRDA or USB
- Removable battery power (4 AA Ni-MH cells)
- UL and FCC approved and certified

Yellowjacket Measurements:

- ✓ MAC
- ✓ SSID
- ✓ PER
- ✓ Total Channel Power
- ✓ Multipath
- ✓ Narrowband RSSI
- ✓ WEP Detection
- ✓ Survey Sweep
- ✓ AP Manufacturer's ID



Yellowjacket includes a carrying case, stylus, AC adaptor, 8 AA Ni-MH batteries, fast-charger, USB cradle and iPAQ PDA with expansion pack sled.

Call us today for more information:
(732) 548-3737 / Fax: (732) 548-3404
Internet: www.bvsystems.com
E-mail: info@bvsystems.com

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wireless products **BERKELEY
VARITRONICS
SYSTEMS**

YELLOWJACKET™-B



802.11b Wi-Fi Analysis System

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

PACKET PREAMBLE DEMODULATOR and ANALYZER:

Multipath Measurement and Graphical Display

CORRELATED POWER MEASUREMENTS:

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

RATIO

RECEIVER GENERAL SPECIFICATIONS

IF Bandwidth:

Wideband 22 MHz

Stability:

± 2.5 PPM Temp range 32° to 120 F°

Antenna:

SMA Female 50 ohm

Controls:

iPAQ PocketPC PDA

Warm Up Time:

< 3 minutes

Power:

Internal battery power (4 AA Ni-MH batteries in receiver)

Weight:

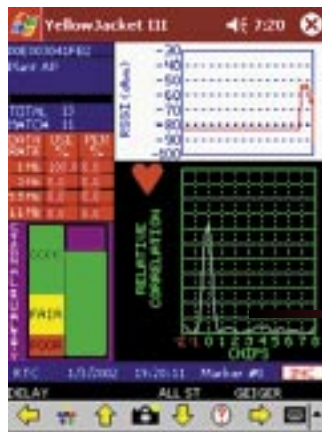
3 lbs.

Dimensions:

2" H x 4" W x 6" L (water resistant, high impact ABS plastic case)



Yellowjacket™ output data supports Microsoft Excel spreadsheets as well as Berkeley's own Hive™ Real-time Indoor/Outdoor Mapping solution on iPAQ PocketPC®. No GPS required.



Yellowjacket's optional Direction Finding Antenna pinpoints WLAN hackers and specific sources of interference.



YELLOWJACKET FEATURES:

SPECTRUM MODE:

- Full spectrum (14 channel) sweep
- Single channel zoom
- Peak Search and Hold
- 3 distinct waveform signal traces

AP ANALYSIS:

- Survey sweep of channels for all APs
- "Q" Factor signal strength quality meter
- Individual channel analysis of APs or STAs
- Absolute channel SSID
- AP manufacturer's ID
- WEP detection
- RSSI for each AP/STA in true dBm
- Multipath in chips and nanoseconds
- PER breakdown/usage for 1, 2, 5.5 and 11 Mbit/Sec.
- "Geiger Mode" for direction finding individual AP/STA

NETWORK SECURITY:

- Authorize or Unauthorize up to 1000 MAC addresses
- Generate valid AP list automatically
- Upload AP list from PC
- Flag invalid APs as "suspect"