

Mongoose

manual version 1.3



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TRADEMARK INFORMATION

IBM PC is a trademark (tm) of IBM Corporation

MS-DOS is a trademark (tm) of Microsoft Corporation

Excel is a trademark (tm) of Microsoft Corporation

Overview

The **MONGOOSE** is a hand-held RF Signal Strength meter that can be programmed to measure from 1 to 80 frequencies. Results of the measurements are displayed on a built-in LCD as text or as bar graphs. In addition, time tagged measurement results can be recorded in non-volatile memory for later conversion into ASCII for analysis. RF frequencies to be measured can be selected via the keypad, can be scanned for, or downloaded from a PC. All other operating parameters are selected using the simple seven button keypad via displayed menus. **MONGOOSE** is supplied with MS-DOS software that is used to create frequencies tables, to load the **MONGOOSE** with frequency tables, to retrieve saved measurements and to convert them to ASCII.

Keypad

The **MONGOOSE** keypad consists of eight buttons as follows:

Power ON-OFF

UP Arrow

DOWN Arrow

ENTER

SELECT

1, 2, 3

The function of these keys varies depending on the measurement in progress and the option selected.

LCD Display

The **MONGOOSE** display is a 128 x 128 pixel back lit LCD. It is used to display selection menus, measurements and memory replay. The amount of backlight is adjustable via the DISPLAY SET-UP MENU as is the format of measurement presentation (text or bar graph).

Non-Volatile Memory

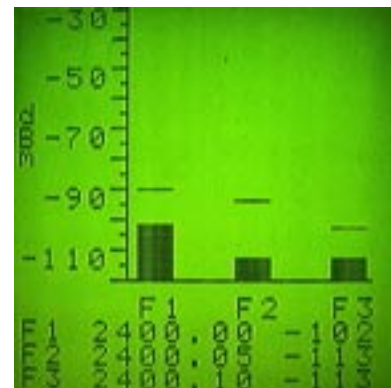
MONGOOSE contains a 512K non-volatile memory for storage of measurement results. Data saved can be replayed on the **MONGOOSE** display and also downloaded into a PC using the **MONGOOSE** serial port and PC software.

Quick Startup

Turn on the **MONGOOSE** using the POWER ON-OFF switch. The LCD will present a start-up screen indicating the unit's



Unpacking first reveals the accessories and documentation boxes followed by the Mongoose unit itself.



POWER



serial number, calibration date and firmware version number. This display information will be held for several seconds while the non-volatile memory is tested. The more data saved in the memory, the longer this screen will be held. The minimum time is 5 seconds. The next screen displayed is the **MONGOOSE** Setup Menu. To resume measurement using all of the same settings as were in effect when the unit was last turned off, exit the Setup Menu by pressing ENTER with the Exit Setup option highlighted.

Shutdown

If not recording to non-volatile memory, it is safe to turn off the **MONGOOSE** at any time. When recording, first suspend measurement by pressing the SELECT button (and enter the Setup Menu). At this time, it is safe to turn off the **MONGOOSE**.

Operation

There are four possible display modes that will be active on the **MONGOOSE** LCD:

- A) Selection Menus
- B) Text display of RF measurements
- C) Bar graph display of RF measurements
- D) Memory replay

Menu Operation

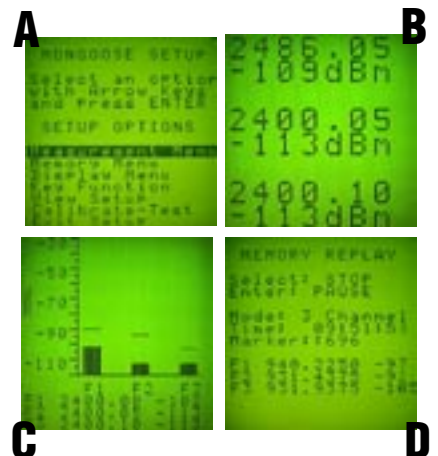
When a menu is presented, options are selected using the UP and DOWN arrow buttons to highlight the desired selection. When the desired option is highlighted, it is activated by pressing the ENTER key. If no further intervention is required, the highlighted option text will blink and the selected item will be put into effect. If more information is required, further prompting will be displayed. To exit a menu, select the Exit or Return to Setup option and then press ENTER. To start an RF Measurement, exit the Setup Menu.

Number Entry

Several menu options and RF frequency inputs require the entry of numbers. In these cases, the current number in effect will be displayed with the left most digit highlighted. To change the highlighted digit, use the UP (increment digit) and DOWN (decrement digit) arrow keys. To use the currently highlighted digit, press the ENTER key. This causes



POWER



the highlight to move right one digit so that the next digit to the right can be modified. If the right most digit is highlighted when the ENTER key is pressed, the entry as displayed is taken. If the entry is out of range, it is ignored. If an operator error is made during entry, use the SELECT button to move the highlight left to correct the digit in error.

Set-Up Menu

Measurement Menu
Memory Menu
Display Menu
Key Function
View Setup
Calibrate - Test
Exit Setup



The first four Setup Menu selections are sub-menus and are described in separate sections. Use View Setup to verify all settings before starting an RF measurement. To start the RF measurement, select Exit Setup and press the ENTER key. To return to the Setup Menu during an RF measurement, press the SELECT button. While in the Setup (or any) Menu, measurement and recording to memory are suspended.

Measurement Menu

1 Channel
3 Channel
Scan Table

Upload Table
Set Time and Date
Return to Setup



1 Channel

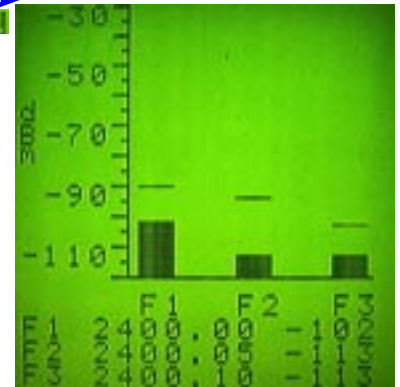


Press ENTER to select one channel RF measurement. One RF frequency will be measured and displayed when measurement begins. This is the best measurement to use when monitoring audio with the MONGOOSE audio output option. The small horizontal line above the signal strength bar (approximately -77 dBm) is the peak hold line. This line represents the maximum (peak) signal strength detected for that frequency and remains there for as long as the user stays in this measurement screen.

3 Channel

Press ENTER to select three channel RF measurement. Three RF frequencies will be measured and displayed when measurement begins. The small horizontal lines above the signal strength bars are the peak hold lines. These lines represent the maximum (peak) signal strength detected for each frequency and remain there for as long as the user stays in this measurement screen.

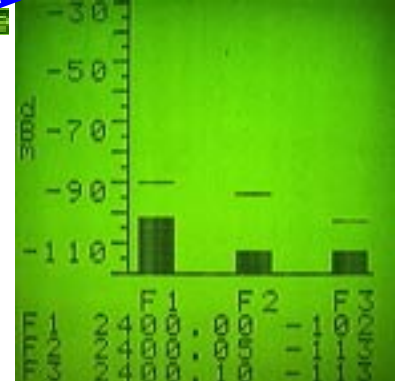
3 Channel



Scan Table

Press ENTER to select the SCAN TABLE RF measurement. Up to 80 frequencies will be measured. The 3 strongest signals that are found during each measurement of the table will be displayed when measurement begins. The Inc-Dec Freq and Seek Up-Down options have no effect in this measurement, as do the 1, 2 and 3 buttons. Frequencies of 0.00 MHz are skipped during the scan measurement. If less than 80 frequencies need to be scanned, fill extra table locations with 0.0 MHz using the Scan Table Editor.

Scan Table



Upload Table

Connect the **MONGOOSE** to the PC while running the **MONGOOSE** PC software. Select the UPLOAD TABLE option. The **MONGOOSE** screen will display:

Upload Table

SCAN TABLE
UPLOAD

Press Any Key to ABORT....

Waiting for PC

SCAN TABLE
UPLOAD
Press Any Key
to ABORT.....
Waiting for PC

At this time, use the PC software FREQUENCY SCAN EDIT MENU option "D" to upload the scan table to the MONGOOSE.



Set Time and Date

Use this option to set the **MONGOOSE** real time clock. Make sure the clock is set properly before recording. Use the View Set-Up option to verify the time and date setting.

Set Time & Date

ENTER DATE
Mon-Day-Year

Change Digits
with Arrow Keys
and Press ENTER
to move right.
Press SELECT to
move left.

01-19-99

After the user finishes entering in the date, they will then be prompted to enter the time of day using the ARROW KEYS, ENTER and SELECT keys.



Exit Measurement Menu

Memory Menu

Download Memory
Replay Memory
Clear Memory
Continuous Rec.
Marker Record
Record OFF
Return to Setup

Memory Menu



Download Memory

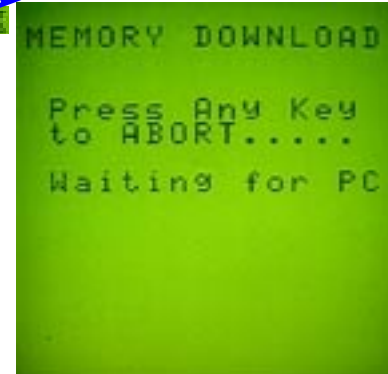
Download Memory

This option is used in conjunction with the PC software to download the contents of the MONGOOSE non-volatile memory to a PC disk file. Connect the MONGOOSE to the PC running the MONGOOSE PC software. Select the Download Memory option. The MONGOOSE screen will display:

MEMORY DOWNLOAD

Press Any Key to ABORT.....

Waiting for PC

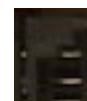


Select the PC software MAIN MENU option "D" to download the memory to the PC disk. When data begins to be transferred from the MONGOOSE to the PC, the MONGOOSE screen will change to:

MEMORY DOWNLOAD

Press Any Key to ABORT.....

Send to PC..



When the download of memory is complete, the **MONGOOSE** will return to the Memory Menu.

Replay Memory

Use this option to view the RF frequency and signal strength data recorded in the non-volatile memory. All data so recorded is displayed and the display may be paused by pressing the ENTER button. The screen will automatically pause whenever the marker value changes.

While the replay display is paused, the UP and DOWN arrow buttons can be used to step the display forward and backward one record at a time. Press the SELECT button to stop the replay.

Replay Memory

ENTER



SELECT



```
MEMORY REPLAY
Select: STOP
Enter: PAUSE

Mode: 1 Channel
Time: 13:29:26
Marker: 696

F1 940.2250 -119
F2 931.4375 -117
F3 931.9375 -117

[PAUSED]
```

```
MEMORY REPLAY
Select: STOP
Enter: PAUSE

Mode: 1 Channel
Time: 13:29:30
Marker: 696

F1 940.2250 -119
F2 931.4375 -117
F3 931.9375 -117

[DONE]
Press Any Key...
```

Clear Memory

Use this option to erase the contents of the **MONGOOSE** non-volatile memory. Do not use this option until the data in the memory has been downloaded to the PC. Once data has been processed on the PC, use the Clear Memory option to initialize the memory for a new data collection recording session.

Clear Memory

ENTER



```
CLEAR MEMORY
Are You SURE ?
ENTER if YES
```

```
CLEAR MEMORY
Are You SURE ?
ENTER if YES
Please Wait....
```


Continuous Rec.

Continuous Rec.

Select this option to save the results of RF frequency and signal strength measurement continuously into the non-volatile memory.

Note: This selection does not prompt any new screen on the **MONGOOSE** so be sure to check that your selection registered in the View Setup menu.



Marker Record

Marker Record

Select this option to save the results of RF measurement whenever the marker is incremented or decremented.

Note: This selection does not prompt any new screen on the **MONGOOSE** so be sure to check that your selection registered in the View Setup menu.



Record Off

Record Off

Select this option if it is not required to save the results of RF measurements.

Note: This selection does not prompt any new screen on the **MONGOOSE** so be sure to check that your selection registered in the View Setup menu.



Exit Memory Menu



Display Menu

Display Menu

Display Text
Display Graph
Set Backlight
Return to Setup



Display Text

Display Text

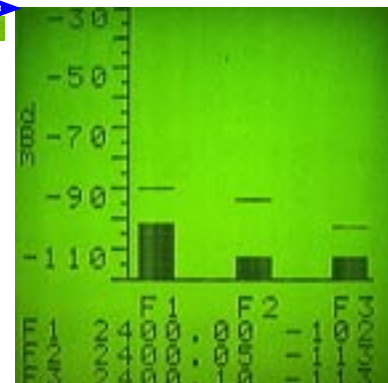
When this option is selected, RF measurements (both frequency and dBm) are displayed in large font text.



Display Graph

Display Graph

When this option is selected, RF measurements are displayed as bar graphs (one dBm bar for each frequency measured). The measured frequency and dBm are also displayed in small font text below the graph.



Set Backlight

Set BackLight

Use this menu to select the duty cycle (brightness) of the LCD backlight. The brighter the backlight, the more power is drawn from the battery. Use the dimmest setting possible for greatest battery run time. The 100% option is brightest (backlight on continuously, use when it's dark), OFF is no backlight (use in bright ambient lighting conditions).



BACKLIGHT MENU OPTIONS

On 100%	On 87.5%
On 75%	On 62.5%
On 50%	On 37.5%
On 25%	Off

Return to Set-Up

Exit Display Menu

Return to Setup

Key Function Menu

Inc-Dec Freq
Seek Up-Down
Inc-Dec Marker
Volume Up-Down
Enter Seek thrsh
Enter Marker
Return to Setup

Key Function



MONGOOSE SETUP
Select an option
with Arrow Keys
and Press ENTER

SETUP OPTIONS
Inc-Dec Freq
Seek Up-Down
Inc-Dec Marker
Volume Up-Down
Enter Seek Thrsh
Enter Marker
Return to Setup

Inc-Dec Frequency

When this option is selected, the currently selected measurement frequency will be stepped-up or stepped-down one channel when the UP or DOWN arrow buttons are pressed. This function may be accessed in either text or graph modes.

Inc-Dec Freq

*Inc-Dec Freq
does not prompt
any new screens*

Seek Up-Down

When this option is selected, the currently selected measurement frequency will seek up or seek down to a frequency greater than or equal to the seek threshold dBm level when either the UP or DOWN arrow buttons are pressed. This function may be accessed in either text or graph modes.

Seek Up-Down



SEEK UP
Thrsh -105dBm

2486.65
-109

Inc-Dec Marker

When this option is selected, the current marker value is incremented or decremented by one when the UP or DOWN arrow buttons are pressed. Use the marker to identify areas of interest. Use this option in conjunction with the "Marker Record" memory option to save a measurement in non-volatile memory whenever the marker is changed.

Inc-Dec Marker

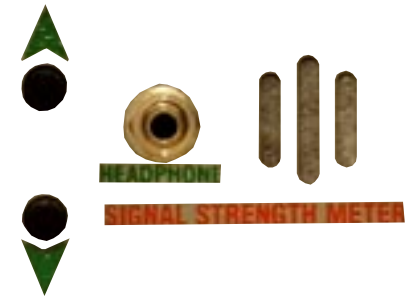


MONGOOSE SETUP
Select an option
with Arrow Keys
and Press ENTER

SETUP OPTIONS
Inc-Dec Freq
Seek Up-Down
Inc-Dec Marker
Volume Up-Down
Enter Seek Thrsh
Enter Marker
Return to Setup

Volume Up-Down

When this option is selected, the audio volume is increased or decreased whenever the UP or DOWN arrow buttons are pressed while a graph or text measurement screen is displayed.



Enter Seek Thrsh

Use this option to enter the dBm value that is used by the Seek Up-Down option. Entry values for the seek threshold can range from 30 to 120 (dBm).



Enter Marker

Use this option to enter the initial marker value (0-9999).



Exit Key Function Menu

Return to Setup

View Set-Up

Use this option to verify MONGOOSE set-up options before starting a measurement. Press any key to exit this screen.



This selection is used by the Berkeley factory only so selecting this entry has no effect.

RF MEASUREMENTS

Common to 1 and 3 Channel Measurements

If either the Inc-Dec Freq or Seek Up-Down options are selected, the 1, 2 and 3 buttons are used to select the frequency affected by the UP-DOWN arrow buttons. Pressing the 1, 2 or 3 key will highlight the frequency ID text in the graph mode (F1, F2 or F3 displayed to the left of the frequency below the graph). When in the text display mode, the selected frequency will display a special up-down arrow character in place of the decimal point in the displayed frequency. When the UP or DOWN arrow button is pressed, the frequency selected (as described above) will be affected. If the ENTER button is pressed, the frequency selected can be modified. When the Inc-Dec Marker or Volume Up-Down options are selected, the 1, 2 or 3 buttons are used to change frequencies 1, 2 or 3.

1 CHANNEL MEASUREMENT

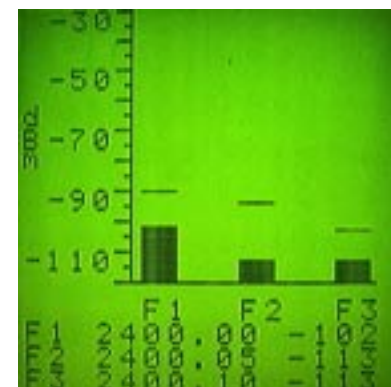
One RF frequency is measured, displayed and recorded. This is the best measurement to use when using the audio output option.

3 CHANNEL MEASUREMENT

Three RF frequencies are measured, displayed and recorded. Use this measurement for adjacent channel studies or to compare three different frequencies in a particular location.

SCAN TABLE MEASUREMENT

Up to eighty channels may be measured from a downloaded table of frequencies. After each measurement of the table, the strongest three are displayed and recorded. The Inc-Dec Freq and Seek Up-Down options have no effect in this measurement, as do the 1, 2 and 3 buttons. Frequencies of 0.00 MHz are skipped during the scan measurement. If less than 80 frequencies need to be scanned, fill extra table locations



with 0.0 MHz using the Scan Table Editor.

BVS MONGOOSE Data Transfer (v1.00) Windows 95'98' Application Software

Introduction

The MONGOOSE Data Transfer application software is the Windows 95, 98, ME interface that enables the BVS MONGOOSE Receiver to upload scan table data and retrieve scanned data.

Also, the MONGOOSE Data Transfer application (MDT) retrieves receiver information from the Mongoose, providing the minimum and maximum frequencies as well as the channel step size.

Application Overview

The MDT application main screen consists of the main menu, system status bars, and a scan table editor area. The scan table edit area includes the scan table grid, receiver information, and associated buttons to retrieve, save, and clear the table editor.

The main menu contains four different submenus. The first submenu is FILE. The user may exit the application from this submenu. There are also options for saving and retrieving scan table files.

The second submenu is MONGOOSE. There are options here to either download scan data from the MONGOOSE, or upload scan table information to the Mongoose.

The third submenu is COMMUNICATION. In this submenu, the user can select the port to which the MDT is connected. This is the same screen that comes up upon launching the MDT application.

The final submenu is HELP. In this submenu, this user manual can be brought up. The About box displaying version information is also available.

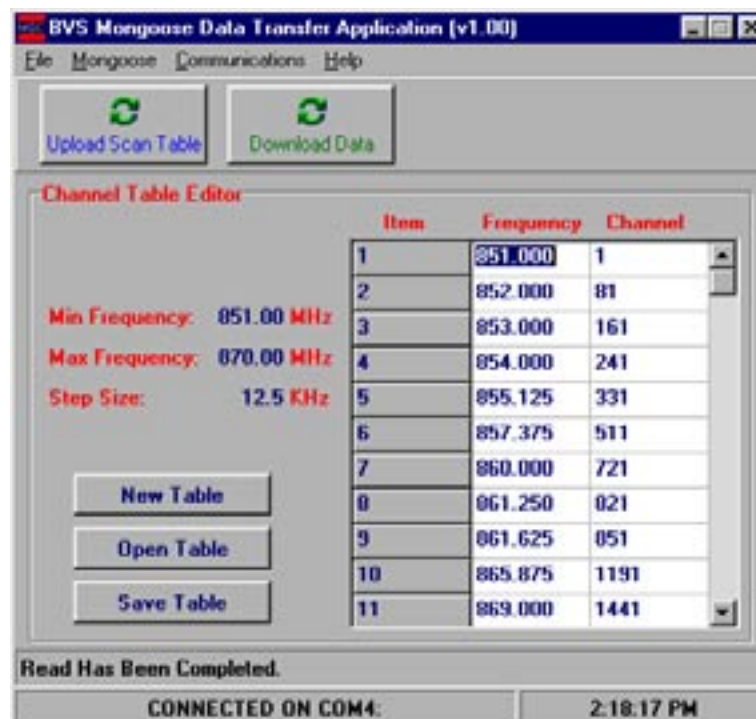


FIGURE 1 – BVS MONGOOSE Data Transferrer

The individual features of the application software are discussed in the following sections.

Installing the Application

The application is installed by placing the supplied CD-ROM into the drive. Run the SETUP.EXE application and InstallShield will prompt for further installation questions. After the installation is completed, an icon will be created in the folder specified during the installation process.

Starting the Application

Make sure that the **MONGOOSE** is running and connected to a serial port on a PC using the cable packed with the unit. Clicking on the MDT icon starts the **MONGOOSE** Data Transfer application. When the PORT screen appears, choose the port to which the **MONGOOSE** is connected.

When the main screen appears, check the status bar for verification that the connection was made to the Mongoose. You are now ready to transfer data.

Clearing the Scan Table Editor

To remove all existing data from the scan table editor, press the NEW TABLE button, or choose NEW from the FILE menu. The 80 channel table editor will now read all 0's for frequencies, and -1 for all channels.

Editing the Scan Table

Enter desired channels into the table. If a frequency is entered, the channel entry for the same row will change to correspond the frequency just entered. If a channel is entered, the corresponding frequency will be adjusted. If an illegal frequency or channel is entered, the defaults of 0.000 and -1 will be used.

Saving the Scan Table Editor

To save information from the scan table editor, choose either the SAVE TABLE button, or the SAVE option in the FILE menu. Choose a filename. The information will now be saved for later retrieval.

Retrieving Data into the Scan Table Editor

To retrieve information stored in a scan table file, choose either the OPEN TABLE button, or the OPEN option in the FILE menu. Choose a filename. The information will be retrieved just as it was stored.

Uploading the Scan Table to the Mongoose

Choose the MEASUREMENT MENU from the SETUP menu on the Mongoose. Then select UPLOAD TABLE. The **MONGOOSE** is now ready for upload. Now go to the **MONGOOSE** Data Transfer application. Choose either the UPLOAD SCAN TABLE button or the UPLOAD option from the **MONGOOSE** menu. Select GO! and the table should be uploaded within a few seconds.

Downloading Mongoose Scan Data

Choose the MEMORY MENU from the SETUP menu on the **MONGOOSE**. Then select DOWNLOAD MEMORY. The **MONGOOSE** is now ready for download. Now go to the **MONGOOSE** Data Transfer application. Choose either the DOWNLOAD DATA button or the DOWNLOAD DATA option from the **MONGOOSE** menu. Select a filename and then choose GO! to begin download. Up to 512K data may be stored on the unit. A rolling total of bytes retrieved is displayed during download.

After the transfer of the data into the binary file, convert the necessary information using BVS's Chameleon CW software.

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 MSI Planet. In addition to the ability of this application to convert data into custom formats, different filtering capabilities are available to facilitate the extraction of useful data needed for network analysis.

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



Installation

Installation of Chameleon is straightforward. Insert the CD provided with the product purchased into the computer. Wait a few seconds for the auto-run program on the CD to boot up. Choose Chameleon CW from the list of applications to install. This will load the installation program. Next, follow the steps outlined by this application. After the installation has been completed, an icon will be placed in the chosen folder (default is “BVS”).

Running the Application

After starting the application, the main screen will appear. There are four steps to conversion which are outlined in the following sections.

Main Menu

The main menu contains options to save and retrieve configurations. The “Save Configuration” option under the APPLICATION menu will save information stored in all fields on all notebook pages. This allows the user to save custom configurations for use on a number of different files. Any saved configuration can be restored using the “Open Configuration” option in the APPLICATION menu. The configuration files are stored in ASCII form. DO NOT modify these configurations manually! Any manual change to the configuration files may result in the loss of configuration information.

Step 1 – Select Input / Output

Choose the data file that is to be converted. Chameleon will automatically determine which product created the file. Chameleon will display the product type next to the filename. A default output filename will be chosen with the .OUT extension. This may be modified to suit the users needs.

Step 2 – Choose Formatting Options

This step enables the user to specify which data is to be converted. This section also contains vari-

ous filters that can be used to reduce the amount of information being converted into the output file.

Choose which receivers are to be converted. Different CW products have a different amount of receivers. Chameleon will only convert data from the receivers which are selected here.

Choose the Data Reduction Type. Either all of the data will be converted or just the data for the strongest server (RSSI), depending on the choice chosen here.

Choose the Average Type. Depending on the product, different options will be available here. Certain products will have the choice of 40 lambda averaging (Panther for example).

One of the powerful features of Chameleon is its ability to convert data into a large number of formats. By selecting the appropriate post-processing application, the correct fields will be selected and placed in the selected field box in the appropriate order. If the format selected requires information that is not ASCII-delimited, no fields will show as selected in the selected field box. The data for these non-ASCII formats is fixed thus the user will not be able to adjust the order or the number of fields to be converted.

The user may also choose a custom ASCII format of a type that is not represented by any of the supported post-processing applications. This is accomplished by choosing "Custom Configuration". As stated above, these configurations can be saved in configuration files by using the "Save Configuration" option found in the APPLICATION menu.

Step 3 – Select Data and Fields Which Are To Be In The Output File

Select the fields that are to be placed in the output file. The delimiting character may also be chosen. Field titles may be placed in the output file by checking the appropriate box. To include data fields as specified by the "Output Filter" page, be sure to have the "<<DATA>>" field in the selected box.

When a particular post-processing format type has been chosen, fields will be displayed in the selected box. If the format chosen is a non-ASCII delimited custom format, the selection boxes will be inactive.

Step 4 – Convert The Input File

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 data filter chosen. After the message appears stating that the conversion has been completed, the converted file will be ready for import into the specific post-processing application that you have chosen.

ASCII DATA FORMAT

Note: the following conversion information refers to users who wish to use MS-DOS for all data upload and download for the **MONGOOSE**.

Channel numbers start at 1 (the base frequency) and continue to the high channel. Each consecutive channel is separated by the Channel Step in frequency. To convert channel numbers to frequency, use the following formula (assuming channel number is 1041):

$$F \text{ (MHz)} = (\text{channel \#} - 1) * \text{step} + \text{base frequency}$$

$$F \text{ (MHz)} = ([\text{channel \#} - 1] * 0.0125) + 928$$

F (MHz) = 941

The format of measurement results, when converted to ASCII, is such that they will import directly into Microsoft Excel®. The data is separated into individual fields, each separated by a TAB character. The measurement type is indicated by an ASCII string. Both three channel and scan measurements include three frequencies and dBm values. One channel measurements include the one measurement frequency and dBm value.

Example of SCAN Data ASCII

Row	Time	Marker	Measurement type	Strongest Frequency	Strongest dBm	Second Strongest Frequency	Second Strongest dBm	Third Strongest Frequency	Third Strongest dBm
1	09:46:22	1	SCAN	929.1125	-080	929.2125	-091	929.0125	-09

Example of 3 Channel Data ASCII

Row	Time	Marker	Measurement type	Frequency 1	dBm	Frequency 2	dBm	Frequency 3	dBm
2	09:46:467	1	3CH	929.1125	-098	929.0125	-098	929.2125	-088

Example of 1 Channel Data ASCII

Row	Time	Marker	Measurement type	Frequency	dBm
2	09:46:	467	1CH	929.1125	-094

Note: These ASCII data samples are not converted using the **Mongoose** Data Transfer application. However, ASCII data can be converted directly in MS Excel®. The user may also use ChameleonCW® software available from BVS to convert any ASCII data for use with popular post-processing packages.

MONGOOSE MEASUREMENT NOTES

For V1.0 firmware and greater

Latest firmware: V1.11

The following is a technical description of the Mongoose measurement. Each measurement saved in flash requires 15 bytes for 3 channels. At 15 bytes per second, the flash will last for about:

$$512k / (15 * 3600) = 9 \text{ hours}$$

Scan mode measurement:

- 1) Measure all frequencies in the table (2.8 sec max)
- 2) Display the strongest 3 (.348 sec)
- 3) Save the strongest 3 in flash if record is on
- 4) Repeat from step 1 till stopped or flash full.

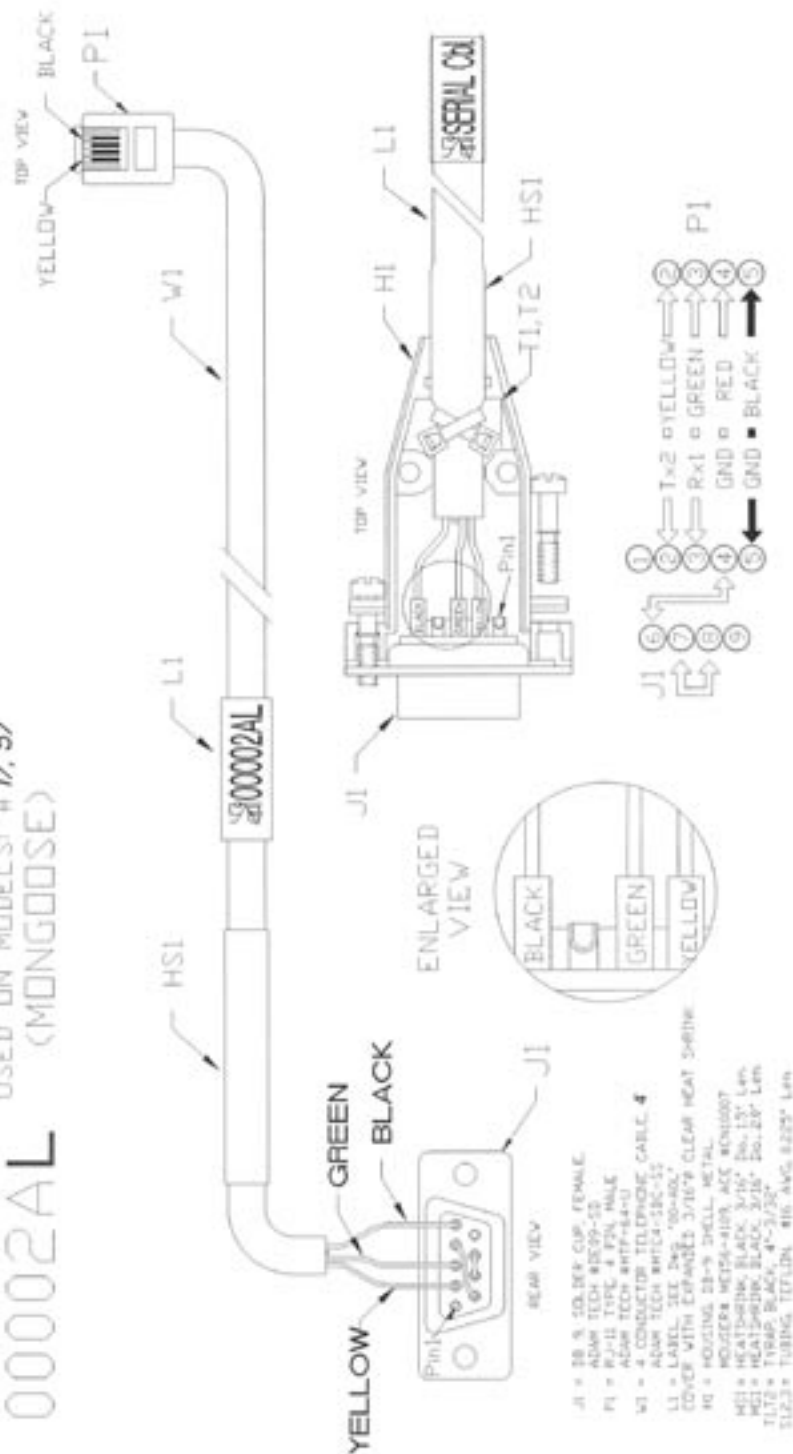
Each dBm sample saved or displayed is the average of 128 a to d readings. This average is used to find the nearest 'best' fit to the calibration data saved (to within 1 db). The time between measurements is as follows:

Measurement	Time between measurements saved in onboard FLASH
1 chan	1 second
3 chan	1 second
Scan Table	28 channels per second, 2.8 seconds (worst case, all 80 channels measured).

NOTE: it takes about 116msec per freq in 3 chan mode to display
(2.8 freq per sec - includes display and synth time)

"A" SERIES CABLES SERIAL TYPE

00002AL USED ON MODELS: # 17, 57
(MONGOOSE)



Instructions For DW9071 12.0 Volt XR

The batteries in your new battery pack are not fully charged! First read the safety instructions, then follow charging notes and procedures.

IMPORTANT SAFETY INSTRUCTIONS

WARNING: When using electric tools, basic safety precautions should always be followed to reduce risk of fire, electric shock, and personal injury, including the following:

READ ALL INSTRUCTIONS

- Do not incinerate the battery pack even if it is severely damaged or is completely worn out. The battery pack can explode in a fire
- A small leakage of liquid from the battery pack cells may occur under extreme usage or temperature conditions. This does not indicate a failure. However, if the outer seal is broken and this leakage gets on your skin:
 - a. Wash quickly with soap and water.
 - b. Neutralize with a mild acid such as lemon juice or vinegar.
 - c. If battery liquid gets into your eyes, flush them with clean water for a minimum of 10 minutes and seek immediate medical attention.

(MEDICAL NOTE: The liquid is 25%-35% solution of potassium hydroxide.)

- Never attempt to open the battery pack for any reason. If the plastic housing of the battery pack breaks or cracks, immediately discontinue use and do not recharge.
- Do not carry extra “charged battery packs” in aprons, pockets, or tool boxes along with other metal objects. Battery pack could be short-circuited causing damage to the battery pack and possibly causing severe burn or fire.
- Charge the battery packs listed above only in DEWALT chargers.
- **NOTE:** Review and observe all of the “Important Charging Notes” in the DEWALT charger instruction manual.

Charging Procedure

Your charger is designed to use standard household 120 volt AC 60 Hz power. Do not use DC. The use of other power sources like, but not limited to, those that convert DC to AC is not recommended and may cause serious damage to the internal circuitry of your charger.

1. Insert the battery pack into the charger as shown in the figure. The red charging light will begin to blink indicating that the charging process has started.

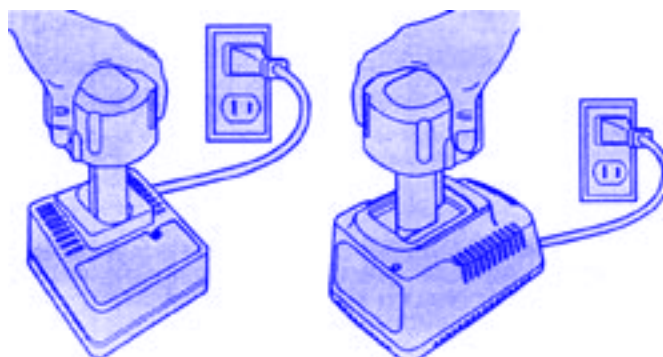
2. The battery pack will be fully charged in about 60 minutes. Full charge will be indicated by the red charging light remaining on (not blinking). At this point the charger has switched into its “equalize charge” mode which lasts about 4 hours. After 4 hours the charger switches into its continuous “maintenance charge”

mode keeping the battery fresh indefinitely. The battery pack can be removed at any time during any of the charge modes but will only be fully charged if the red light is glowing steadily when the pack is removed. The charger and the battery pack can be left connected indefinitely.

3. The charger is designed to detect certain problems that can arise with battery packs. Such a problem would be signaled by a rapidly flashing red charging light. If such a situation occurs, try a different battery pack. If the new pack charges properly, the original is defective and should be returned to a Dewalt certified authorized service center if

under warranty or otherwise disposed of properly.

NOTE: A battery pack will slowly lose its charge when kept out of the charger. If the battery pack has not been kept on maintenance charge, it may need to be recharged before use.



Removing and Installing

the Battery Pack

NOTE: THE BATTERIES IN YOUR BATTERY PACK ARE NOT FULLY CHARGED AT THE FACTORY.

(DW9073) State of Charge Battery Packs

Your battery pack is equipped with a “state of charge” fuel gauge that indicates the charge remaining in the battery. The fuel gauge is activated whenever the tool is in use.

If both LEDs are on (• •), the battery pack has 50% to 100% of its charge remaining.

If the left LED is on, and the right LED is off (• o), the battery pack has 10% to 50% of its charge remaining.

If the left LED is blinking, and the right LED is off (* o), the battery pack has 0% to 10% of its charge remaining.

For optimum performance, fully charge and fully discharge your battery pack on its first use. (Charge for 1 hour or longer, then run the battery until it will no longer power your tool before re-charging.) This calibrates your battery pack to its maximum capacity and ensures the LED readout is accurate.

The RBRC Seal

The RBRC (Rechargeable Battery Recycling Corporation) Seal on the nickel-cadmium battery (or battery pack) indicates that the costs to recycle the battery (or battery pack) at the end of its useful life have already been paid by Black & Decker. In some areas, it is illegal to place spent nickel-cadmium batteries in the trash or municipal solid waste stream and the RBRC program provides an environmentally conscious alternative.

RBRC in cooperation with Black & Decker and other battery users, has established programs in the United States to facilitate the collection of spent nickel-cadmium batteries. Help protect our environment and conserve natural resources by returning the spent nickel-cadmium battery to an authorized Black & Decker service center or to your local retailer for recycling. You may also contact your local recycling center for information on where to drop off the spent battery.

Section I - Product Identification

Product Name: Nickel Cadmium Battery

Trade Name: Cadnica

Chemical System: Nickel/Cadmium

Nominal Voltage: 1.2V

Designated for Recharge: Yes

Section II - Hazardous Ingredients

IMPORTANT NOTE: The battery cell should not be opened or exposed to heat because exposure to the following ingredients contained within could be harmful under some circumstances.

CHEMICAL NAME	CAS No:	% by wt	PEL mg/m	TLV mg/m
Cadmium	7440-43-9	11-26	0.005 TWA	0.05 TWA
Cadmium hydroxide	21041-95-2	11-26	0.005 TWA	0.05 TWA
Nickel (powder)	7440-02-0	8-17	1 TWA	1 TWA
Nickel hydroxide	12054-48-7	5-12	1 TWA	1 TWA
Potassium hydroxide	1310-58-3	<3	2 Ceiling	2 Ceiling

Notes: Concentrations vary depending on the state of charge or discharge.
TWA is the time weighted average concentration over an 8-hour period

Section III - Physical Data

The product is a manufactured article as described in 29 CFR 1910.1200. The battery cell is contained in a hermetically-sealed case, designed to withstand temperatures and pressures encountered during normal use. As a result, during normal use, hazardous materials are fully contained inside the battery cell. However, if exposed to a fire, explosion, extreme abuse, misuse, or improper disposal that results in breaching of the battery cell case, hazardous materials may be released. The following physical data relating to the hazardous materials contained within the battery cell are provided for the user's information. (Also see Section IV - Fire and Explosion Hazards, and Section VIII - Precautions for Safe Handling and Use.)

Cadmium: Melting point (°F): 610 Boiling point (°F): 1,407
 % Volatile by Volume: Vapor Pressure (mm Hg):
 Evaporation Rate: Vapor Density (Air=1):
 Specific Gravity (H₂O): 8.65 @ 77°F
 Solubility in Water: Insoluble
 Appearance and Odor: Silver-white, blue-tinged, lustrous metal

Cadmium: Melting point (°F): Boiling point (°F):
 Hydroxide % Volatile by Volume: Vapor Pressure (mm Hg):
 Evaporation Rate: Vapor Density (Air=1):
 Specific Gravity (H₂O): 4.79
 Solubility in Water: Practically insoluble
 Appearance and Odor: Powder

Nickel: Melting point (°F): 2,831 Boiling point (°F): 5,134
 Powder % Volatile by Volume: Vapor Pressure (mm Hg):
 Evaporation Rate: Vapor Density (Air=1):
 Specific Gravity (H₂O): 8.90
 Solubility in Water: Insoluble
 Appearance and Odor: Powder

Nickel: Melting point (°F): * Boiling point (°F):
 Hydroxide % Volatile by Volume: Vapor Pressure (mm Hg):
 Evaporation Rate: Vapor Density (Air=1):
 Specific Gravity (H₂O):
 Solubility in Water: Insoluble
 Appearance and Odor: Apple green powder

*Note: decomposes above 392°F into NiO and H₂O

Potassium: Melting point (°F): * Boiling point (°F):
 Hydroxide % Volatile by Volume: Vapor Pressure (mm Hg):
 Evaporation Rate: Vapor Density (Air=1):
 Specific Gravity (H₂O):
 Solubility in Water: Soluble in 0.9 part water, 0.6 part in boiling water
 Appearance and Odor: White or slightly yellow

*Note: Potassium hydroxide is present as a liquor or paste and acts as the electrolyte in the battery cell.

Section IV - Fire and Explosion Hazard Data

Flash point: NA Lower Explosive Limit: NA Upper Explosive Limit: NA

Extinguishing Media: Any class of extinguishing medium may be used on the batteries or their packing material.

Special Fire Fighting Procedures: Exposure to temperatures of above 212°F can cause evaporation of the liquid content of the potassium hydroxide electrolyte resulting in the rupture of the cell. Potential for exposure to cadmium fumes during fire; use self-contained breathing apparatus.

Section V - Health Hazard Data

Threshold Limit Values: See Section II

Effects of a Single (Acute) Overexposure

Inhalation: During normal use inhalation is an unlikely route of exposure due to containment of hazardous materials within the battery case. However, should the batteries be exposed to extreme heat or pressures causing a breach in the battery cell case, cadmium dusts and fumes may be emitted. Inhalation of cadmium dusts or fumes may cause throat dryness, respiratory irritation, headache, nausea, vomiting, chest pain, extreme restlessness and irritability, pneumonitis and bronchopneumonia. In the case of high concentration exposures (e.g., above 1 to 5 mg/m during an eight hour period) death may occur within several days after the exposure.

Ingestion: If the battery case is breached in the digestive tract, the electrolyte may cause localized burns. Ingestion of cadmium compounds may result in increased salivation, choking, nausea, persistent vomiting, diarrhea, abdominal pain, anemia, tenesmus, and kidney disfunction.

Skin Absorption: No evidence of adverse effects from available data.

Skin Contact: Exposure to the electrolyte contained inside the battery may result in severe irritation and chemical burns.

Carcinogenicity:

Cadmium and nickel have been identified by the National Toxicology Program (NTP) as reasonably anticipated to be carcinogens. U.S. EPA classified cadmium as a "B1" probable human carcinogen. The International Agency for Research on Cancer (IARC) recommended that cadmium be listed as a "2A" probable human carcinogen and the American Conference of Governmental Industrial Hygienists (ACGIH) has proposed listing cadmium as an A2 carcinogen.

Other Effects of Repeated (Chronic) Exposure:

Repeated overexposures to cadmium may result in lung cancer; lung, kidney, and liver disfunction; skeletal disease (e.g., osteoporosis) and reproductive toxicity. Chronic overexposure to nickel may result in cancer; dermal contact may result in dermatitis in sensitive individuals.

Medical Conditions Aggravated by Overexposure:

A knowledge of the available toxicology information and of the physical and chemical properties of the material suggests that overexposure is unlikely to aggravate existing medical conditions.

Emergency and First Aid Procedures:

Swallowing: Do not induce vomiting. Seek medical attention immediately.

Skin: If the internal cell materials of an opened battery cell comes into contact with the skin, immediately flush with water for at least 15 minutes.

Inhalation: If potential for exposure to cadmium or nickel fumes or dusts occurs, remove immediately to fresh air and seek medical attention.

Eyes: If the contents from an opened battery comes into contact with the eyes, immediately flush eyes with water continuously for at least 15 minutes. Seek medical attention.

Section VI - Reactivity Data

The batteries are stable under normal operating conditions.

Hazardous polymerization will not occur.

Hazardous decomposition products: oxides of cadmium and nickel.

Conditions to avoid: heat, open flames, sparks and moisture.

Potential incompatibilities (i.e., materials to avoid contact with): The battery cells are encased in a non-reactive container; however, if the container is breached, avoid contact of internal battery components with acids, aldehydes and carbonate compounds.

Section VII - Spill and Leak Procedures

Spill and leaks are unlikely because cells are contained in an hermetically sealed case. If the battery case is breached, don protective clothing that is impervious to caustic materials and absorb or pack spill residues in inert material. Dispose of as a hazardous waste in accordance with applicable state and federal regulations. Resultant spill residues may be characterized as D002 (caustic) and D006 (cadmium) pursuant to the federal Resource Conservation and Recovery Act (RCRA). See Section IV for response to fires or explosions.

Section VIII - Safe Handling and Use (Personal Protective Equipment)

Ventilation Requirements:	Not required under normal use.
Respiratory Protection:	Not required under normal use.
Eye Protection:	Not required under normal use.
Gloves:	Not required under normal use.

Section IX - Precautions for Safe Handling and Use

Storage: Store in a cool place, but prevent condensation on cell or battery terminals. Elevated temperatures may result in reduced battery life. Optimum storage temperatures are between -31 deg F and 95 deg F.

Mechanical Containment: If there are special encapsulation or sealing requirements, consult your Sanyo Energy Corp. representative about possible cell hazard precautions or limitations.

Handling: Accidental short circuit will bring high temperature elevation to the battery as well as shorten the battery life. Be sure to avoid prolonged short circuit since the heat can burn attendant skin and even rupture of the battery cell case. Batteries packaged in bulk containers should not be shaken. Metal covered tables or belts used for assembly of batteries into devices can be the source of short circuits; apply insulating material to assembly work surface.

If soldering or welding to the case of the battery is required, consult your Sanyo Energy Corp. representative for proper precautions to prevent seal damage or external short circuit.

Charging: This battery is designed for recharging. A loss of voltage and capacity of batteries due to self-discharge during prolonged storage is unavoidable. Charge battery before use. Observe the specified charge rate since higher rates can cause a rise in internal gas pressure which may result in damaging heat generation or cell rupture and or venting.

Labeling: If normal label warnings are not visible, it is important to provide a device label stating:

CAUTION: Do not dispose in fire, mix with other battery types, charge above specified rate, connect improperly, or short circuit, which may result in overheating, explosion or leakage of cell contents.

Disposal: Return to Sanyo Energy Corp. for recycle. Contact your Sanyo representative for more information on the EarthSaver 2001 recycling program. Batteries must be handled in accordance with all applicable state and federal laws and regulations.

DO NOT INCINERATE or subject battery cells to temperatures in excess of 212 deg F. Such treatment can vaporize the liquid electrolyte causing cell rupture. Incineration may result in cadmium emissions.

Glossary of Acronyms

AC	Alternating Current
A/D or ADC	Analog to Digital Converter
AGC	Automatic Gain Control
BER	Bit Error Rate
BPSK	Binary Phase Shift Keying
BW	Band Width
CDMA	Code Division Multiple Access - a 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
FIR	Finite Impulse Response
GHZ	GigaHertz
GPS	Global Positioning System (satellite based)
GPS diff.	GPS error correction signal which enhances GPS accuracy
IF	Intermediate Frequency
I and Q	In phase and Quadrature
kHz	kiloHertz
LCD	Liquid Crystal Display
LO	Local Oscillator
Mbits	Megabits
MHz	MegaHertz
modem	acronym for modulator/demodulator
PCMCIA	Personal Computer Memory Card International Association
PC	Personal Computer
PCS	Personal Communications Service (1.8 to 2.1 GHz)
PN	Pseudo Noise
QPSK	Quaternary Phase Shift Keying, 4-level PSK
RF	Radio Frequency
RSSI	Receiver Signal Strength Indicator
UTC	Universal Time Code
VAC	Volts Alternating Current
VGA	Video Graphics Array
VSWR	Voltage Standing Wave Ratio
X	horizontal axis
Y	vertical axis

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.

Mongoose

SIGNAL STRENGTH METER

The Mongoose is a lightweight, hand held receiver that's ideal for quick indoor sweeps by propagators.

FEATURES:

- Internal memory stores signal strength
- Scans up to 21 channels
- Displays best 3 channels simultaneously
- Data can be output to a PC with a serial cable
- Audio can be heard through the headphones or internal speaker
- Includes rechargeable Ni-Cad battery/charger
- Weighs under 5 pounds

Frequencies Available:

- PCS
- CELLULAR
- FIXED WIRELESS
- PAGING
- LMR
- IVDS
- SMR



The Mongoose is just one of many exceptional design solutions from Berkeley Varitronics. Call us today for more information:
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**BERKELEY
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SYSTEMS**

Mongoose SIGNAL STRENGTH METER

SPECIFICATIONS

DISPLAY	128 x 128 LED backlit display
TUNING RANGE	20-40 MHz tuning range of band
AUDIO	Via internal speaker or headphones
BANDS SUPPORTED	ISM: 2.400-2.485 GHz 900-930 MHz PCS: Uplink (Blocks A through F) 1850-1910 MHz Downlink (Blocks A through F) 1930-1995 MHz LMR: 805-825 MHz IDEN/SMR: 850-870 MHz Cellular: 824-848 MHz 868-896 MHz ETACS: 872-905 MHz 915-950 MHz Paging: 145-165 MHz 450-465 MHz 928-941 MHz IVDS: 218-219 MHz WCS: 2.30-2.36 GHz
SENSITIVITY	-115 to -35 dB ± 1.5 dB (10 kHz IF bandwidth, for 12 dB SINAD)
ADJ. CHAN. REJECTION	> 50 dB @ 30 kHz bandwidth
MEASUREMENT ACCURACY	± 1.5 dB
MEASUREMENT SPEED	Adjustable
CHANNEL SCAN RATE	20 channels/second (typical)
GENERAL SPECIFICATIONS	Dual Conversion: 83 MHz first IF, 455 kHz second IF IF Bandwidth: 12.5 kHz (standard) Stability: ± 2.5 PPM from freezing to 120°F Phase Noise: > 80 dBc @ 1 kHz offset Antenna: TNC 50 Ω whip straight Warmup Time: < 1 minute Power: 12 Volt battery Weight: < 5 pounds Dimensions: 11.25" x 4" x 3.6" including battery
INCLUDES	Antenna: Right angle TNC 50 Ω whip antenna Case: Yellow ABS plastic case Battery: Rechargeable Ni-Cad battery/charger
OPTIONS	IF Bandwidth: 4kHz, 10 kHz, 25 kHz, 30 kHz



Other custom frequencies are available upon request.