lizard

manual version 1.6

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Overview

The Lizard™ is a portable, battery-powered 1 watt CW (Continuous Wave) or modulated (available on certain models) stimulus transmitter used for indoor coverage testing. The Lizard is ideal for WLAN set-up and evaluating network performance. In a typical application, one or more Lizards are placed throughout an area of interest and set on different channels; while measuring and recording field strength using one of BVS's portable signal strength meters such as Champ, Fox, Mongoose or Ultra-Lite.The Lizard is a portable, battery-powered 1 watt CW (Continuous Wave) or modulated (available on certain models) stimulus transmitter used for indoor coverage testing. The Lizard is ideal for WLAN set-up and evaluating network performance. In a typical application, one or more Lizards are placed throughout an area of interest and set on different channels; while measuring and recording field strength using one of BVS's portable signal strength meters such as Champ, Fox, Mongoose or Ultra-Lite.The LIZARD has the following features:

- Backlit 128x128 pixel LCD display that exhibits current, frequency, power level and status.
- 14-button keypad used to enter frequency, power level and setup options.
- Knob used to adjust frequency or power level.
- Infra-red remote control of knob and keypad functions.
- Power output adjustable from 0 to 30 dBm in 0.5 db steps.
- Bright panel mounted LED that indicates transmitt status (lit when ON).
- RS-232 serial port for computer control of the transmitter.

1 128 x 128 LCD display

2 Infrared remote receiver window

3 Rotary optical encoder

4 Power switch

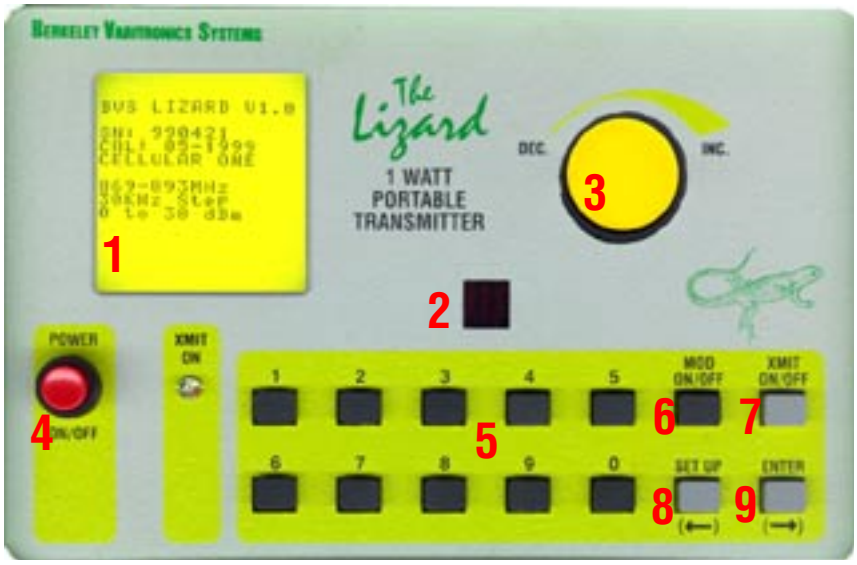
5 Numeric keypad

6 Modulation On/Off button

7 Transmit power On/Off button

8 Setup menu/Left arrow button

9 Enter/Right arrow button



Getting Started

Use the SETUP key to select modulation, entry of channel number or frequency and to select the function of the knob. See sections on USING THE KEYPAD and SETUP MENU for further information. Connect the transmitter TNC output connector to an antenna or other 50 ohm load. When connecting to a spectrum analyzer, be sure there is a suffient pad to protect the analyzer input.Turn on the LIZARD and press the ENTER key to set the frequency and power output. Turn the output on by pressing the XMIT key (when the LIZARD is transmitting, the front panel XMIT LED will be on and status will indicate TX ON). You can turn the backlight on by pressing the MOD ON/OFF button on the keypad or remote for viewing the backlight will go out after 15 seconds. If unit is transmitting, it will not shut transmitter off. The output of the transmitter is monitored. It will automatically adjust (if need be) every 15 seconds. If transmitting at one power level and changing to another level or frequency you should transmit, then wait 15 seconds before measurements are taken.

LCD Display

The LIZARD LCD displays the current transmitter status using large characters that are easily visible from a distance. In addition, the display is used for entry of frequency, power and setups. The first line of the display indicates the transmitt frequency in MHz. The second line is the output power in dBm. Below the output power is the status of the transmitter (on or off) and the modulation status (on or off). If the channel number display option is selected in setup, the first line would display the channel number (the EAMPS channel number would be 0334). Whenever a key is pressed, the knob moved or the remote control used, the LCD backlight is turned on for one minute. This is the normal running display when the LIZARD is either transmitting or idle. In the event of an RF problem or battery low condition,an error screen will be displayed and the device is prevented from transmitting.

When the transmitter is on, the LIZARD backlight can be turned on for 15 seconds by pressing the MOD key on the top panel keypad or the IR remote. Pressing ENT, SETUP or turning the knob with PWR or FREQ selected will turn off the transmitter and allow changes to be made. All other keys or turning the knob with the knob selected off have no effect on either the backlight or the operation of the unit (the transmitter stays on).

Using the Keypad

The digit keys are used for entering frequency, output power and

setup parameters. Pressing the MOD ON/OFF key toggles modulation on and off. Modulation is selected using the SETUP MENU. Pressing the XMIT ON/OFF key toggles the power output on and off. Whenpower output is on, the LCD display indicates TX ON , frequency or channel number, output power in dBm and the front panel XMIT ON led is lit.

To change frequency and power output, press the ENTER key . The LCD wil display the frequency edit screen…

line 1-indicates the edit menu the user is in
line 2-indicates the entry limits in MHz
line 3-indicates minimum frequency increment (step).
line 4-indicates current frequnecy setting

The rightmost digit of the current frequency is highlighted. To change the highlighted digit, press a digit key, use the remote up-down arrow keysor use the knob. To use the highlighted digit, press the ENTER key to move right one digit. Note that there is no need to enter a decimal point, when moving the highlight, the decimal point is skipped.If an error is made during entry, use the SETUP key to move the highlight left to correct a digit. When the rightmost digit is highlighted and the ENTER key is pressed, the frequency is taken and the output power edit sceen is displayed. If channel number entry and display has been selected, channel number would be displayed instead of frequency. Changing digits and moving the highlight is the same.

line 1-indicates the edit menu the user is in
line 2-indicates the range of valid power settings
line 3-indicates current power setting

On entry, the leftmost digit is highlighted. Entry of digits is the same as in the frequency edit screen.When the rightmost digit is highlighted and the ENTER key is pressed, the entered output power is taken and the display returns to normal.

Using the Knob

The front panel INC/DEC knob can be set to increase or decrease frequency or outputpower. When set for frequency, each

turn adjusts the frequency by 1 channel step. The stepis displayed in the frequency edit screen. When the knob is selected for output power, each turn of the knob adjusts the output power by .5 dDm. In situations where the power and frequency must remain fixed, the knob can be set to off so that turning it has no effect on either-power or frequency. In addition, the knob can be used in the frequency and output power edit screens to increase or decrease the highlighted digit. When in the setup screen, the knob can beused to select setup options.

Using the Remote Control

The infra-red remote is used to control the transmitter in situations where it has been installed in an inconvenient location (such as on top of an eight foot step ladder). Every functionavailable on the front panel (using the keypad or knob) can be controlled using the remote. To use the remote control, aim it at the front panel of the LIZARD and press the TX key to toggle the transmitter output on and off (the same as pressing the front panel keypad XMIT ON/OFF key). Press the MOD key to turn modulation on and off (the same as pressing the front panel MOD ON/OFF key). This applies to EAMPS units only, otherwise this key turn backlight on for 15 seconds for viewing the screen. Press the ENT key to change the frequency and output power. The LCD will enter the frequency edit screen. Use the remote ENT and SETUP keys to move the highlight. Use the UP and DOWN arrow keys to change the curently highlighted digit. To enter the setup screen, press the remote SETUP key. Use the UP and DOWN arrow keys to change the setup selection. When the required setup option is displayed, press the remote ENT key to select the option.

When the LIZARD is in its normal screen the remote UP and DOWN arrow keys have the same function as the front panel knob. If the knob is selected to control output power, pressing the remote UP and DOWN arrow keys has the same effect as turing the front panel knob. The same is true if the knob is selected to control frequency. If the knob is selected OFF, pressing the remote UP or DOWN key has no effect.

Setup Menu Screen

The setup menu screen is entered if the LCD is in the normal running screen and the front panel or remote SETUP key is pressed. The setup menu is used to select the operation mode of the knob (power, frequency or off), the entry and display of frequency (either as frequency or channel number), and to select modulation options.

line 1-indicates that SETUP screen is active
line 2-indicates the current setup selection
line 3-indicates current power setting

Below the current selection are brief instructions for using the setup screen. To change the selection on line 2, press the SETUP key on the front panel keypad, turn the front panel knob, or use the remote UP and DOWN keys. When the required selection is displayed on line 2, press the ENTER key on the fron panel keypad or the remote's ENT key.

Setup Options

The following setup selections are available on all standard model LIZARD transmitters:

CW

When CW is selected, no modulation is applied to the transmitter (continuous wave) when the output is turned on (the MOD ON/OFF key will turn backlight on for 15 seconds.)

Display Freq

When this option is selected, entry and display of frequency is in MHz.

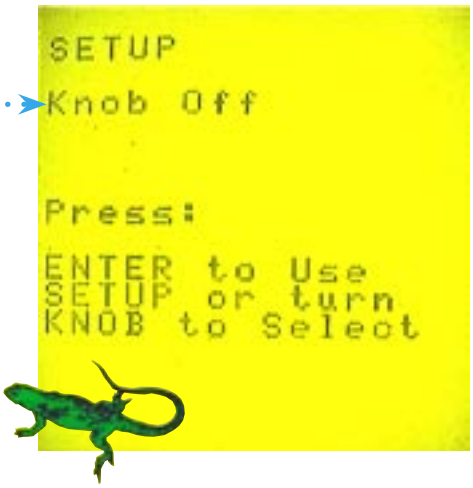
Display Chan

When this option is selected, entry and display of frequency is in channel number. For non-EAMPS units, the relation between frequency and channel number is:

Frequency = ((Channel # - 1) * frequency step) + base frequency.

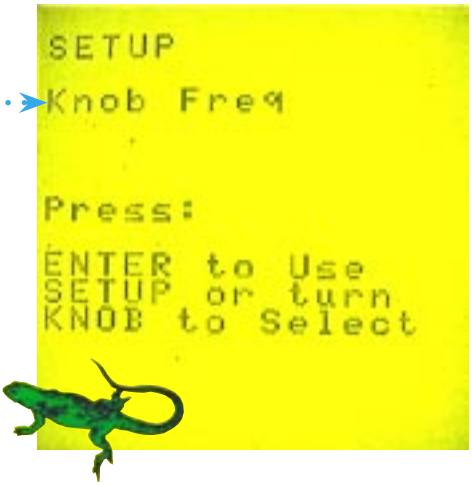
Knob Off

When this option is selected, the front panel knob does not effect either frequency, output power and does not turn backlight on. MOD ON/OFF will turn the backlight ON. The knob can still be used to change digits in the frequency/power edit screens and to change the selection in the setup screen.



Knob Pwr

When this option is selected, the front panel knob changes output power and turns the backlight ON.



Knob Freq

When this option is selected, the front panel knob changes frequency and turns the backlight ON.

Note that the function of the remote UP/DOWN arrow keys follows the setting of the knob.

9.6V battery (Makita) run times Avg. AH=1.45

Power Output	runtime	mA.dc	amp-hours
+10 dBm/10 mW	6:00	238	1.428
+20 dBm/100 mW	5:01	291	1.458
+27 dBm/500 mW	3:45	400	1.500
+30 dBm/1 W	2:46	514	1.410

BVS Lizard Controller (v1.00) Application Software

Introduction

The Lizard Controller® application software is the Windows 95/98/2000/NT interface that enables a user of the Lizard Transmitter to control the unit for desired performance.

Certain operations such as modification of frequency and transmit power can be accomplished from a remote location by using the Lizard Controller software. The following sections outline the operation of the Lizard Controller in greater detail.

Application Overview

The Lizard Controller application mimics the display panel for the Lizard. The status is reported once a second from the Lizard and updated on the PC display. Different commands can be sent to the Lizard from the software to control certain parameters of the transmitter.

The main menu contains three different submenus. The first submenu is FILE. The user may exit the application from this submenu.

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

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

The main screen of the Lizard Controller can be seen in Figure 1. In addition to the status being updated in the display, the Xmit simulated LED will light up during a transmit condition.

The status bar of the Lizard Controller displays unit information such as the calibration date, the serial number, the owner, and the frequency range. The PC system clock is also displayed.

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

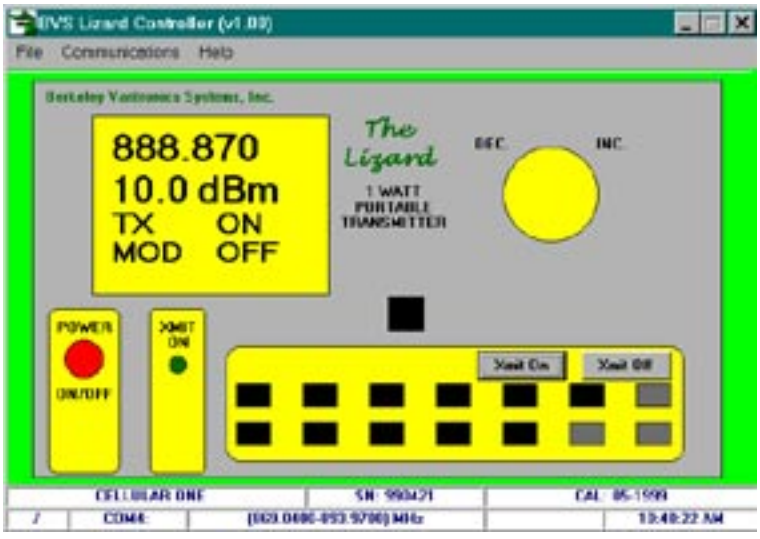


Figure 1 – BVS Lizard Controller

Installing the Application

Insert the supplied CD-ROM. 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 Lizard is running and connected to a serial port on a PC using the cable packed with the unit. The Lizard Controller application is started by clicking on the Lizard Controller icon. When the PORT screen appears, choose the port to which the Lizard is connected. Leaving the choice as AUTOMATIC will put the Lizard Controller into search mode, and it will poll COM1 thru COM4 in an attempt to find an operating Lizard.

When the main screen appears, check the status bar for verification that the connection was made to the Lizard. The status bar should report unit information and the communications window should read the com port to which the application is connected to the Lizard. You are now ready to control the Lizard.

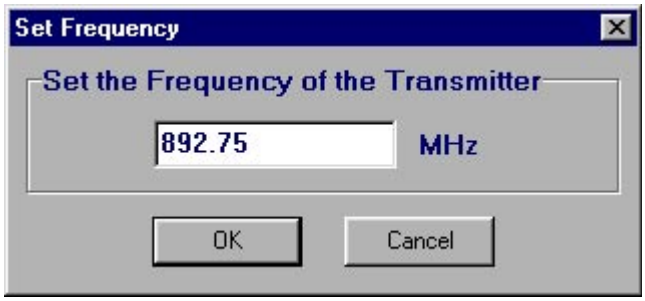


Figure 2 – Update Frequency Dialog

Setting the Frequency

The frequency of the Lizard may be set by clicking once on the frequency in the display box. The dialog box shown in Figure 2 then appears. Enter a frequency in the range of the Lizard and click OK. Within a couple of seconds the status will reflect the new frequency. If the frequency selected is between channels, the Lizard will correct to the nearest channel. NOTE: If the Lizard is transmitting, transmission will cease when a request to change this parameter is received. This is normal and intended to prevent accidental interference with other licensed users.

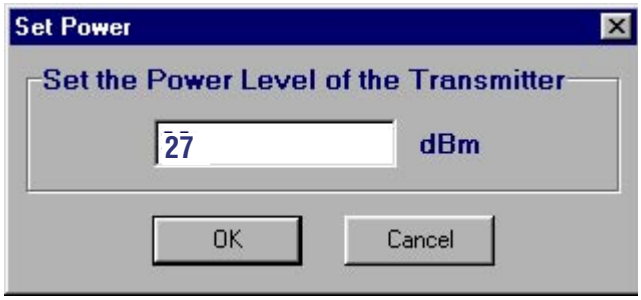


Figure 3 – Update Power Dialog

Setting the Power

The power of the Lizard may be set by clicking once on the power in the display box. The dialog box shown in Figure 3 appears. Enter in a power in the range of the Lizard and click on OK. Within a couple of seconds the status will reflect the new power output setting. If the power selected is out of range, the Lizard will correct to the nearest valid power value.

NOTE: If the Lizard is transmitting, transmission will cease when a request to change this parameter is received. Transmission may be started or stopped by using the buttons on the application main screen.

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 facil4 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.

The Lizard

1 WATT PORTABLE TRANSMITTER

The Lizard is a portable, battery-powered 1 watt CW (Continuous Wave) or modulated (available on certain models) stimulus transmitter used for indoor coverage testing. The Lizard is ideal for WLAN set-up and evaluating network performance. In a typical application, one or more Lizards are placed throughout an area of interest and set on different channels; while measuring and recording field strength using one of BVS's portable signal strength meters such as Champ, Fox, Mongoose or Ultra-Lite.

FEATURES:

- Completely self-contained module design
- Dynamically adjustable power control from 1 milliwatt to 1 watt output
- Infrared Remote control adjusts power output, frequency and on-off >25 feet
- Super bright 128 x 128 graphic LCD with backlight for viewing in all light conditions
- Removable rechargeable 7.2 volt battery (Makita Ni-Cad available at Home Depot)
- Light-weight design is ideal for "stick-up" applications
- Includes rudimentary modulation (on certain models)
- Precision output held to within ±0.5 dB

13 STANDARD FREQUENCIES IMMEDIATELY AVAILABLE:

- LMR . . . . . 450-470 MHZ
- SMR . . . . . 850-870 MHz
- Cellular EAMPs reverse . . . 824-848 MHz
- Cellular EAMPs forward . . . 868-894 MHz (optional modulation available)
- Cellular ETACs forward . . . . 915-947 MHz (optional modulation available)
- Cellular ETACs reverse . . . . 872-905 MHz
- Cellular GSM forward . . . . . 935-960 MHz
- ISM . . . . . 900-928 MHz
- Paging . . . . . 928-941 MHz (optional POCSAG modulation)
- PCS reverse . . . . . 1850-1910 MHz
- PCS forward . . . . . 1930-1990 MHz
- PCS Korean . . . . . 1805-1865 MHz
- ISM . . . . . 2400-2485 MHz

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

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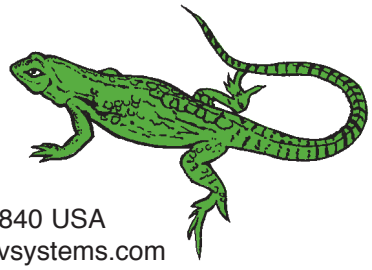
BERKELEY VARITRONICS SYSTEMS

The Lizard

1 WATT PORTABLE TRANSMITTER

SPECIFICATIONS

FREQUENCY RANGE	13 models covering all popular telecom bands
FREQUENCY STEP SIZE	12.5, 25, 30, 50 kHz or 1.25 MHz
FREQUENCY STABILITY	±2.0 ppm (short term) 30° to125° F
FREQUENCY STABILITY	±0.5 ppm (aging maximum for 1 year)
MODULATION (optional)	FSK Manchester modulation or A1 (CW)
MODULATION MODES	Holding tone 1004 Hz SAT tones 5970, 6000, 6030 Hz End tone 10 kHz
OUTPUT POWER	0.0 dBm to 30.0 dBm ±0.5 dB
PASSBAND FLATNESS	±0.5 dB maximum
POWER STEPS	±0.5 dB
OUTPUT	50Ω with TNC Female
OUTPUT VSWR	<2:1
OUTPUT LOAD VSWR	>100:1
DISPLAY	128 x 128 Graphic STN LCD
BACKLIGHT	LED
CONTROLS	Direct enter via 14 button keypad Rotary optical encoder (push to choose) Infrared remote keypad (25' operational range)
DC POWER	Internal (removable) Ni-Cad rechargeable cells External DC power supply via 2.5mm slip jack
CHARGER	2 hour external recharge time. 110 VAC
WEIGHT	5 pounds with battery
SIZE	6-1/2" wide x 8-1/2" long x 3-1/4" deep
ENVIRONMENTAL	Wet suit recommended



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