Crocodile

manual version 3.2

Contents

Introduction

The Crocodile™ Transmitter simulates a CDMA and CW Base Station (BS) with its Pilot I and Q modulated output and assign-able PN Offset. The transmitter is housed in a high impact, water resistant case, operates from AC or battery power and is ideal for field use.

CDMA systems, as well as may other PCS formats, typically lock the BS's system time and clocks to the Global Positioning System's (GPS) time. The GPS receiver, located at the BS, determines time and position by measuring the time of arrival of spread spectrum signal from orbital satellites. Of particular interest is the Pulse Per Second (PPS) signal generated by the GPS. This signal is a seconds tick with jitter in the 200 ns range. The PPS is used to control the start of the Pilot code generator at each BS and to phase lock the Pilot code generator to the PPS.

Code division in the forward link is not accomplished by using different spreading codes. Actually, the same code is used at neighboring BS, but the codes are started at different times. A correlator will respond when it's code phase is aligned to the code phase of the received signal. A code, regardless if it is from multipath or from a BS producing the same code offset in time, will not highly correlate when not aligned to the correlator's code phase.

It is evident that the alignment between pilot code generators in a CDMA system is critical. The same alignment is also critical for the Crocodile transmitter set at candidate BS sites.

Crocodile transmitters, each with a different Base Station offset, may be set up at candidate Base Station sites and coverage measured by the Super Eagle or Falcon CDMA receivers. This type of coverage testing yields much more data than traditional CW studies; CDMA signal propagation, multi-path, hand-off thresholds and PN re-use are measured and tested while coverage area is being tested. In addition, a single drive study conducted with a single receiver measures all of the candidate Base Station sites. Multiple CW or scanning receivers are not required.

Power Input

The transmitter will operate from either an AC or DC power source. Both AC and DC power connectors are located on the rear panel. Use the cables provided with the transmitter. A slide switch for selecting AC or DC operation must be set, and is located on the rear panel. AC operation is from 90 to 260 VAC 47-63 Hz. DC power for the PCS Crocodile is 12V @ 10A or Cellular Crocodile is 24V @ 8A. The power source should be as noise free as possible. When a PCS transmitter

is to be used in a vehicular installation, and it is connected after the ignition switch, turning the engine on and off will interrupt transmitter operation.

Transmitting antenna

Following the manufacturer's instructions, keep the transmission line as short and straight as possible. Connect antenna lead to the transmitter rear panel female type N connector labeled "RF Out." The nominal output impedance is 50 ohms. We recommend mobile mark model IMAG-5 for 1800-1900 MHz operation or model IMAG 5-1900 for PCS operation. We recommend Mobile Mark's MAG 5-900 for all Cellular frequencies.

Crocodile Transmitter Operation

Before operating the Crocodile Transmitter, check power source voltage, minimum antenna VSWR, and the proper installation of accessories. See the transmitter front panel diagram and become familiar with the switches, panel lights, controls, keypad and LCD display.

The Crocodile has five display screens:
Greeting Screen
Transmitter Status Screen
Main Menu
Set-up Screen
Resume Screen

Greeting Screen

Displays the BVS logo and unit serial number after power up. Pressing the rocker switch will turn the Transmitter on. A power up screen is

displayed for a few seconds, followed by the main screen. Adjust the contrast control for maximum display legibility. Optimum RF carrier stability is achieved within 10 minutes of operation.

Transmitter Status Screen

The **Crocodile** Transmitter has several hardware and software monitors that can shut-down the power amplifier after the unit has begun to transmit or inhibit the start of transmission. The Transmitter Status Screen displays the status of these monitors. This screen is entered after the Greeting Screen and remains in this screen until all of the monitors are in the "Locked" or "OK" state. This screen will re-appear if any of these monitors enter a "Un-locked" or "Error" state. Transmission will be terminated or not allowed if any monitor is in "Error" or "Unlocked"!

The Monitors are:

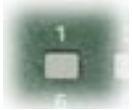
Hardware	(OK / Error)-This monitor reports the status of Power Good, Firmware load OK and Watch-dog timer
Rubidium	(Lock / Unlock / Cold)-Status of the internal Rubidium Clock
Timing	(OK / Error)-OK if the difference between the GPS PPS and PPS derived from the Rubidium clock is less than 10 uS
I-Q	(OK / Error)-Status of the I and Q Pilot Modulators
Synthesizer	(Lock / Unlock)-Status of the RF Synthesizer
GPS	(Unlocked and number of GPS satellites or Latitude and Longitude when locked)

Note: The GPS must be locked before transmission can begin; but once started, transmission continues until the GPS has remained Unlocked for more than 4 hours. See page 16 for complete instructions on GPS lock using a BVS Rhino.

SETUP MENU

Press ESC when in the Main Screen and you will access the Setup Menu. Use the numbers on the keypad to choose between the 4 items or press ESC to return back to the Main Menu Screen. The Setup Menu Screen has the following selections:

BASE STATION OFFSET

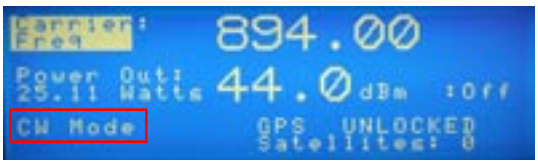


Press the 1 key while in the Setup Menu to access this screen. A number between 0 and 511 is entered to determine the start of the pilot code relative to the GPS PPS.

IS-95 Pilot Code - Forward Channel

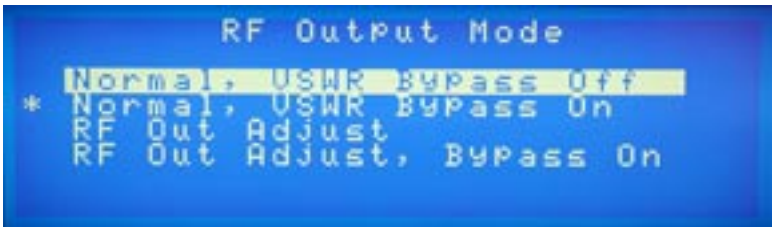
Unmodulated PN codes (I code transmitted on the I channel and Q code transmitted on the Q channel) transmitted for phase recovery and timing at the subscriber.

CW / CDMA



Press the 2 key while in the Setup Menu to access this screen.Use the UP/DOWN ARROW keys to toggle between CW and CDMA mode in this screen. While in CDMA mode, Crocodile transmits a CDMA signal using the current base station offset.

RF OUTPUT MODE



All BVS' transmitters are protected from being turned on under conditions that could cause damage to the transmitter output.

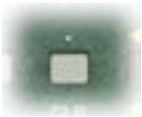
Normal, VSWR Bypass Off:
VSWR is measured and the transmitter is turned off if a bad match is detected. The output RF power is the dB value displayed on the main screen.

Normal, VSWR Bypass On:
VSWR is not measured and RF output power is the dB value displayed on the main screen.

RF Out Adjust:
VSWR is measured and the transmitter is turned off if a bad match is detected. The output RF power is controlled by using the Power/Freq knob.

RF out Adjust, Bypass On:
VSWR is not measured and RF output power is controlled by using the Power/Freq knob on the panel.

TRACKING



When using the adjustable output mode, adjust the external wattmeter to the desired output level, then press the "." key on the keypad. This will put the Crocodile into tracking mode. In this mode, the output level selected using the knob is tracked and held. In addition, in this mode, the knob is disabled to prevent accidental changes to the output level. The VSWR Bypass modes are used in situations where there is a problem matching the antenna to the Crocodile 50 ohm output. The adjustable output modes are used when an external wattmeter is connected to the Crocodile RF output.

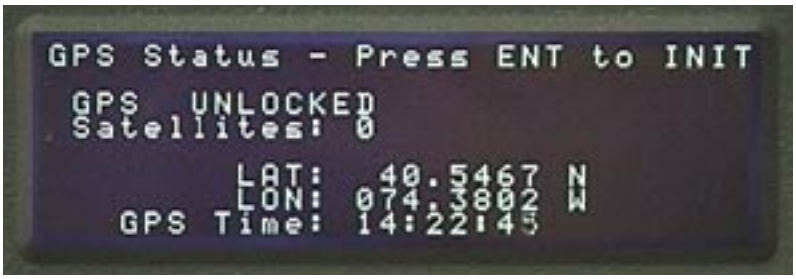
POWER UP

Press the 4 key while in the Setup Menu to access this screen.This feature, when enabled will allow the Crocodile transmitter to automatically begin transmitting after a 10 second delay if the Crocodile was transmitting when the power was turned off. When the Crocodile resumes, it returns the output RF power to what it was transmitting when the power was turned off. This is true for both the normal and adjustable output modes. This is useful when the system is powered from gas powered generators or unstable power sources. While the BVS PowerStation is not required, it is recommended power source for the **Crocodile** transmitter because of rigorous testing trials both have undergone together at Berkeley labs. The transmitter will "beep" loudly when powered-up in this mode.

If the user chooses Resume Off, Crocodile will not resume transmitting the next time it is turned on. With resume off, Crocodile can only start transmitting after power up by pressing the ENT key or via the PC serial port or via modem port.

NOTE: The **Crocodile** will resume transmission only if it was transmitting before power interruption.

GPS STATUS



Pressing the 5 key while in the Setup Menu will cause the Crocodile to display the GPS STATUS Screen. This screen presents the operator with the current GPS status as shown in the following example:

This screen displays the GPS status (LOCKED or NOT LOCKED), the number of satellites being tracked (at least 3 are required for LOCK), the GPS position (only valid if locked) and the GPS time.

Note: Do not press the ENTER key, as this is used only at the factory to initialize the GPS receiver. Pressing ENTER will cause the GPS to

re-acquire satellites which can take as long as 20 minutes. Press any other key to return to the SETUP MENU. Please note that whenever the Crocodile is moved a great distance with the GPS OFF, the GPS can take as long as 20 minutes to re-acquire satellite information in its new location.

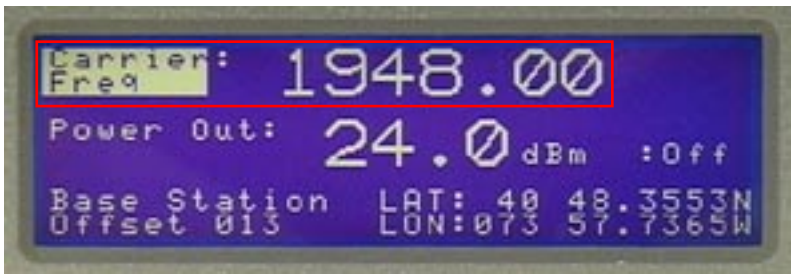
When a GPS receiver is first installed, initialization of the receiver is necessary because the old latitude and longitude were stored. This process can take as long as 30 minutes when the unit has been transported a large distance. While in the SETUP MENU, press the 3 key to change to the GPS INIT screen. [The initial process of the GPS receiver locking to signals received from satellites and computing and displaying GPS data and can take several minutes.] If the GPS receiver has already been initialized, the GPS receiver will display latitude and longitude. If the GPS has not been initialized, press ENT to initialize. Press the ESC key to return to the SETUP MENU. The next time the GPS receiver is used, acquisition will be completed in less than 1 minute. Latitude and longitude are displayed on the lower right corner of the main screen.

Note: The initial process of the GPS receiver locking to signals received from satellites and computing and displaying GPS data and can take several minutes.

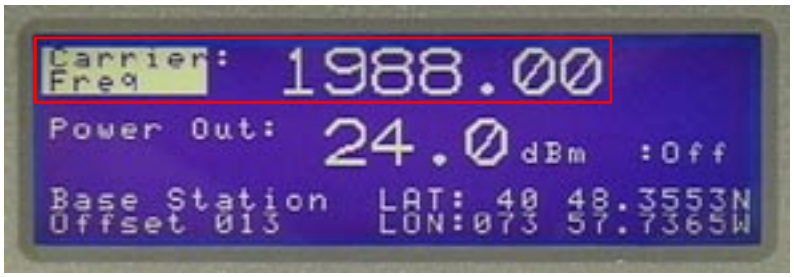
Unit Data

Press the number 6 key while in the Setup Menu to access the Crocodile unit's version and latest calibration date.

Setting the Transmitter Frequency



Press ESC at any time in the Setup Menu to exit and enter the Main Menu. Rotate the SELECTION control or use the UP and DOWN ARROW keys to move the display highlight to Carrier Frequency.



Rotating the POWER / FREQUENCY control dial increases or decreases the frequency in 1 MHz steps. The transmitter carrier frequency is displayed as it is changed. The carrier frequency can also be changed by using the number keys. The frequency must be between 1930.00 and 1990.00 MHz (PCS **Crocodile**) or 869.04 MHz and 893.97 MHz (Cellular **Crocodile**).

Press the ENT key to change to the new frequency. If an invalid frequency is entered, the frequency will return to the last valid entry made. The main screen shows the current carrier frequency in MHz, RF power out in dBm Base Station Offset, transmitter RF power ON - OFF status and GPS latitude and longitude in degrees and decimal minutes.

Note: When the transmitter is "ON", all controls are locked out except the transmitter "OFF" control.

Setting the Transmitter RF Output Power Level

Select RF Output Power from the main menu. Rotate the SELECTION control to move the display highlight to Power Out. Then rotate the POWER/FREQUENCY control dial to adjust the RF power output level, shown on the display. The RF power out can be adjusted over the range in .5 dB from 24 dBm to 40 dBm.

Turning the Transmitter RF Output Power On and Off

Rotate the SELECTION control to move the highlight to the ON or OFF label. Pressing the ENT key will toggle the transmitter RF output on or off. When the transmitter is "ON", only the transmitter "OFF" selection is allowed. The green front panel XMIT light will light when the transmitter output power is on. The red front panel UNLOCK light should not light. If it does light, it is because the transmitter's synthesizer is unlocked and the transmitter's power amplifier will not be activated, to prevent spurious transmission. The unit needs to be serviced.

Remote DTMF Control of the Crocodile Transmitter

The Crocodile Transmitter may be controlled by a remote touch tone telephone. The transmitter must be connected to a telephone line at the rear panel as shown in the rear panel diagram, the transmitter installation diagram. The transmitter's main power switch must be on. Carrier frequency, PN length, and chip clock rate must also be set.

To change the Crocodile transmitter's RF power output level and RF output on-off status using a remote telephone:

1.) Dial the number that the transmitter is connected to.

2.) Wait for the transmitter to answer. The transmitter answers with two beeps.

3.) Within five seconds, press the # key to access the transmitter's DTMF answer mode.

If the # key is not pressed within five seconds, the transmitter's modem will be activated, and an answer tone will begin and DTMF operation will then be disabled. If this occurs, hang up and repeat steps 1, 2 and 3 before proceeding with step 4.

4.) After successfully accessing the transmitter's DTMF answer mode, use the following telephone keys to control the transmitter functions shown:

Key:	Function:
1	turns transmitter RF output on
0	turns transmitter RF output off
3	increases transmitter's RF output power level by +1 dB
9	decreases transmitter's RF output power level by - 1 dB

The transmitter will respond with three beeps after successfully receiving and executing a command. The transmitter will not respond to an invalid command such as pressing the 2 key on the telephone keypad.

Note: All the controls are "locked" during transmit on, to prevent erroneous frequency, output power or modulation from being transmitted. To change any parameter, first turn off the transmitter, then make any adjustments required.

Remote Control via a Modem

The Crocodile transmitter has a built in standard Bell 212A Modem. The baud rate is 1200. The format uses 1 start bit, 1 stop bit and no parity bit.

Use the following command set to get the attention of the internal modem. The ampersand (&) is used in concert with two characters followed by an enter key according to the following examples:

To set the transmitter carrier frequency, type &FS,XXXX.XX <ENT> where, "&" is attention, "FS" means frequency set, and XXXX.XX is the frequency in MHz. and <ENT> is the Enter key.

To set the transmitter power level, type &PS,XX <ENT> where, "&" is attention, "PS" means power set, and XX is the power level in dB, and <ENT> is the Enter key.

To turn the transmitter on, type &TG <ENT>, where "&" is attention, and "TG" is transmitter go, and <ENT> is the Enter key.

To turn the transmitter off, type &TS <ENT>, where "&" is attention, and "TS" is transmitter stop, and <ENT> is the Enter key.

These commands can also be used via the transmitter's serial port, but run at 9600 bps with the same ASCII convention.

Connecting the Crocodile to a Rhino (optional)

If a Crocodile transmitter is to be located in an area where GPS reception is not available, a Rhino may provide Pulse Per Second (PPS) timing to the Crocodile transmitter. Follow these steps to transmit CDMA Pilot signals with the Crocodile where GPS coverage is not available.

Step 1: Connect the Crocodile and Rhino to their appropriate AC or DC power sources:

Rhino 110 VAC or 12 VAC
Cellular Crocodile 110/220 VAC or 24 VDC
PCS Crocodile 110/220 VAC or 12 VDC

Connect the GPS antenna to the Rhino even if GPS coverage is not available. If practical and if maximum stability is required, the rubidium oscillators should be warmed up for a minimum of 48 hours especially if they have not been operated on the previous day. You may want to warm-up the Rhino in the lab overnight, turn it off and take it out to the field to acquire the GPS lock. A short warm-up time may be required in the field if the Rhino is not taken immediately from the lab. A 20 minute warm-up will provide stability for several hours of testing.

Step 2: Remove the Rhino from its power supply (it has an internal battery) and locate the unit's GPS antenna where GPS coverage is present. Allow the Rhino to lock to GPS (the GPS lock light should illuminate). Note that the Rhino may take up to 30 minutes to lock if the unit has moved a large distance since it has last had GPS lock. You may want to lock the unit when connected to a supply in the general area before beginning this procedure.

Step 3: Move Rhino to the Crocodile and reconnect the Rhino to its power source.

Step 4: Connect the Rhino to the Crocodile with the BVS supplied cable. It connects from the Rhino's BVS Interface connector to the Crocodile's BVS Interface connector.

Note: This connector is only present on Crocodiles ordered specifically with this option requested.

Step 5: Both the Crocodile transmitter status screen and main screen should indicate **Ext PPS: Locked**.

Step 6: Set the power level, base station offset and transmit frequency.

Step 7: Set the Crocodile to transmit as described in the manual.

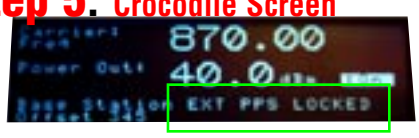
Step 1: Warm-up

Step 2: Lock the Rhino

Step 3: Crocodile & Rhino

Step 4: Connect Rhino & Crocodile

Step 5: Crocodile Screen



Step 6: Settings

Step 7: Begin Transmitting

BVS Crocodile Controller (v1.00) Application Software

System Requirements
Pentium II
500 MHz
64MB RAM
100MB free on Hard Drive
Operating System: Windows 98, ME, 2000 or XP
Coyote interface: 1 free serial port or USB port:

Introduction

The Crocodile Controller™ application software is the Windows 98, ME, 2000 or XP interface that enables a user of the Crocodile Transmitter to control the unit for desired performance. Certain operations such as modification of frequency,transmit power, and base station offset can be accomplished from a remote location by using the Crocodile Controller software. The following sections outline the operation of the Crocodile Controller in greater detail.

Application Overview

The Crocodile Controller application mimics the display panel for the Crocodile. The status is reported once a second from the Crocodile and updated on the PC display. Different commands can be sent to the Crocodile from the software to control certain parameters of the transmitter. The main menu contains four different submenus. The first submenu is FILE. The user may exit the application from this submenu. The second submenu is OPTIONS. This allows the user to switch between the main screen and the GPS screen. The third submenu is COMMUNICATION. In this submenu, the user can select the port to which the Crocodile is connected. This is the same screen that comes up upon launching the Crocodile Controller 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.

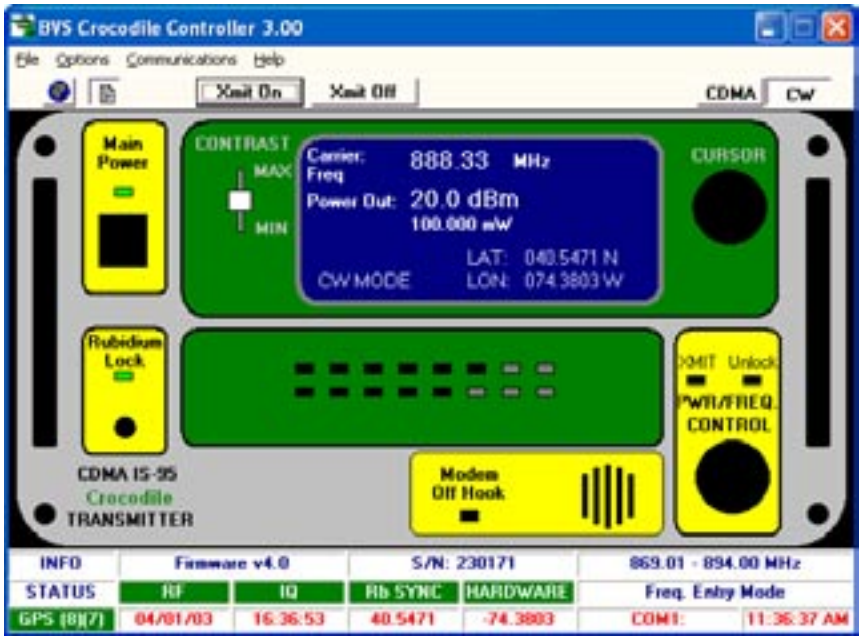


FIGURE 1 – BVS Crocodile Controller

The main screen of the Crocodile Controller can be seen in **Figure 1**. In addition to the status being updated in the display, the Xmit simulated LED will light up for the appropriate condition.

The status bar of the Crocodile Controller displays any system messages and the PC system clock. A green box indicates that this part of the Crocodile is ready for transmission. The numbers next to the acronym "GPS" represent the number of visible and tracked satellites, respectively.

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

Installing the Application

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

If a modem is being used, select the appropriate radio button. Make sure that the correct phone number is entered. A few system messages will appear during the connection phase. Also make sure that the correct COM port is selected (the one which the modem is using).

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

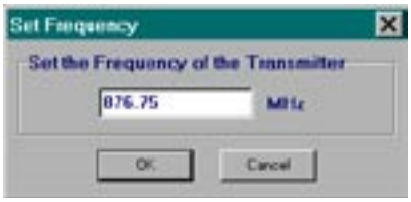


FIGURE 2 – Update Frequency Dialog

Setting the Frequency

The frequency of the Crocodile 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 Crocodile and click OK. Within a couple of seconds the status will reflect the new frequency. If the frequency selected is between channels, the Crocodile will correct to the nearest channel. NOTE: If the Crocodile 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 Crocodile may be set by clicking once on the power in the display box. The value range is typically 26 dBm to 46 dBm in .5 dBm steps. The dialog box shown in **Figure 3** appears. Enter in a power in the range of the Crocodile 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 Crocodile will correct to the nearest valid power value.

NOTE: If the Crocodile is transmitting, transmission will cease when a request to change this parameter is received.

Setting the Base Station (PN Offset)

The base station (PN offset) of the Crocodile may be set by clicking once on the base station in the display box. The value range is between 0 and 511. The dialog box shown in **Figure 4** appears. Enter in a base station in the range of the Crocodile and click on OK. Within a couple of seconds the status will reflect the new base station setting. If the base station selected is out of range, the Crocodile will correct to the nearest valid value. NOTE: If the Crocodile is transmitting, transmission will cease when a request to change this parameter is received.

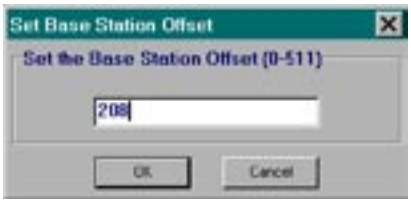


FIGURE 4 – Set Base Station Dialog

Viewing GPS Information

In order to see the complete list of GPS information for the Crocodile, press F10 or click on the given button under the main menu. Various information and status flags are now visible, as shown in **Figure 5**.

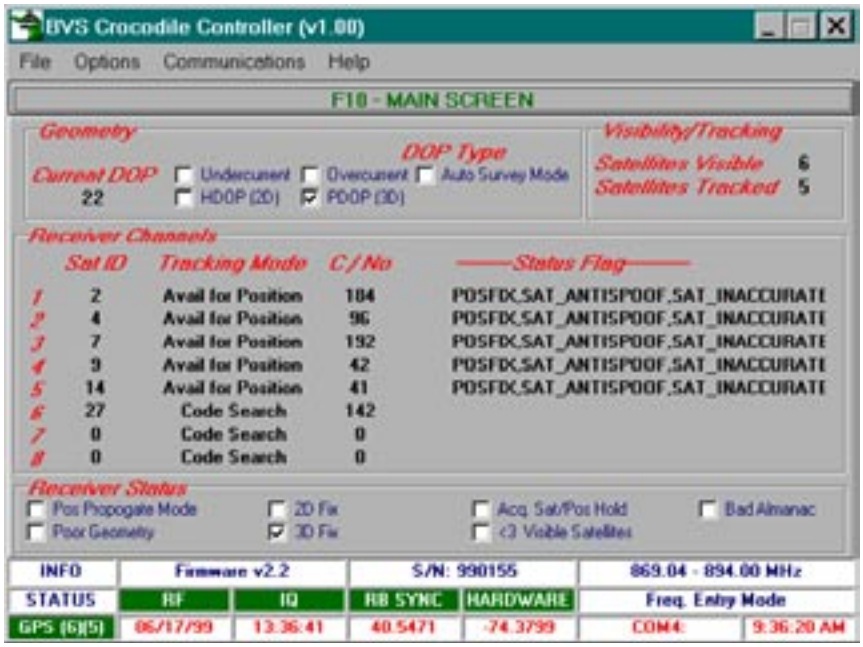
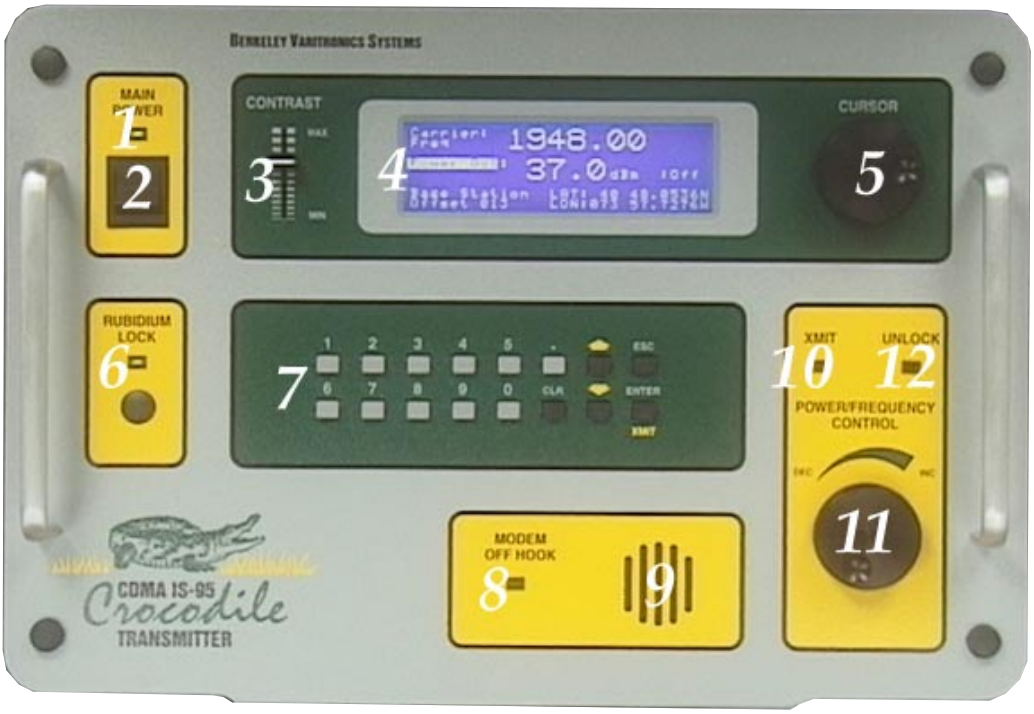


FIGURE 5 – GPS Information Panel

Transmission

Transmission may be started or stopped by using the two buttons provided on the main screen.



Crocodile Transmitter Front Panel

1 main power on light (green)

2 main power on-off switch (for both AC or DC operation)

3 display contrast control lever

4 LCD with vacuum fluorescent back lighting

5 control dial for positioning cursor on display

6 Rubidium Lock “on” light (green) indicates internal Rubidium Lock is locked

7 transmitter keypad for entering transmitter control settings

8 modem “off-hook” light (yellow) indicates connection of modem to line

9 speaker for audio monitoring telephone line

10 transmit light (green) indicates transmitter RF output

11 RF power output level and frequency adjust rotary control dial

12 unlock light (red) indicates synthesizer PLL is not locked

Crocodile Transmitter Rear Panel

1 Phone Hand Set (RJ-11) In

2 Phone Jack (RJ-11) In

3 GPS Antenna In

4 110 VAC In (use supplied cable)

5 RF Out

6 AC and DC Fuses

7 Serial Port DB-9 Male To/From PC (use supplied cable)

8 Options Port

9 PCS 12VDC In / Cellular 24 VDC In

10 DC/AC Power Source Switch

Crocodile Watts and VSWR Conversion Scale

Power Conversion dBm to Watts

dBm	milli Watts
26.0	398
26.5	447
27.0	501
27.5	562
28.0	631
28.5	708
29.0	794
29.5	891
30.0	1000
dBm	Watts
30.5	1.12
31.0	1.26
31.5	1.41
32.0	1.58
32.5	1.78
33.0	2.00
33.5	2.24
34.0	2.51
34.5	2.82
35.0	3.16
35.5	3.55
36.0	3.98
36.5	4.47
37.0	5.01
37.5	5.62
38.0	6.31
38.5	7.08
39.0	7.94
39.5	8.91
40.0	10.00
40.5	11.22
41.0	12.59
41.5	14.13
42.0	15.85
42.5	17.78
43.0	19.95
43.5	22.39
44.0	25.11
44.5	28.18
45.0	31.62
45.5	35.48
46.0	39.81
46.5	44.67
47.0	50.12
47.5	56.23
48.0	63.10
48.5	70.79
49.0	79.43
49.5	89.13
50.0	100.00

Return Loss v.s. VSWR

Return Loss(dB)	VSWR
32.256	1.05
26.444	1.10
23.127	1.15
20.828	1.20
19.085	1.25
17.690	1.30
16.540	1.35
15.563	1.40
14.719	1.45
13.979	1.50
13.324	1.55
12.736	1.60
12.207	1.65
11.725	1.70
11.285	1.75
10.881	1.80
10.509	1.85
10.163	1.90
9.842	1.95
9.542	2.00
8.999	2.10
8.519	2.20
8.091	2.30
7.707	2.40
7.360	2.50
7.044	2.60
6.755	2.70
6.490	2.80
6.246	2.90
6.021	3.00
5.811	3.10
5.617	3.20
5.435	3.30
5.265	3.40
5.105	3.50

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

Crocodile

CDMA TRANSMITTER

The Crocodile Transmitter simulates a CDMA Base Station with its Pilot I and Q modulated output and assignable PN Offset. The transmitter is housed in a high impact, water resistant case, operates from AC or battery power and ideal for field use.

FEATURES:

- CDMA (IS-95) Pilot I and Q modulation signals
- Assignable PN Offset
- Power amplifier with continuously adjustable power output ±1.0 dB
- Supervisory circuits that monitor the Transmitter and shuts-down the PA under error conditions
- Rubidium time base
- GPS receiver
- Models for the PCS or Cellular band
- Compatible with the Super Eagle Pilot Scanner or Falcon
- VSWR antenna protection and internal forward and reverse power measurement
- Powered from 110-240 AC or battery
- Built-in thermal overheat protection for the PA
- Adjustable remotely via RS-232, internal modem or signaling tones
- Weighs only 24 pounds

The Crocodile is just one of many exceptional design solutions from Berkeley Varitronics. Call us today for more information:
(732) 548-3737 / Fax: (732) 548-3404
Internet: http://www.bvsystems.com
E-mail: info@bvsystems.com

BERKELEY VARITRONICS SYSTEMS

Crocodile CDMA TRANSMITTER

SPECIFICATIONS

FREQUENCY RANGES (either)	PCS PCS Cellular	1.930-1.990 GHz 30 kHz steps 1.930-1.990 GHz 50 kHz steps 869.04-893.97 MHz 30 kHz steps
OUTPUT POWER	10 Watt - Class A Power Amp for PCS model, 10 Watt - Class A Power Amp for Cellular model	
MODULATION	I and Q Pilot codes (IS-95) @ 1.2288 MHz	
PN OFFSET	Definable in 64 chip increments (Base Stations 0-511)	
CLOCK STABILITY	.1 part per billion	
OUTPUT FILTERING	Digital FIR	
MONITORS	Clock Stability, Power Good and Modulation Detect	
VSWR MONITORING	Internal power meter for monitoring reflected power	
OUTPUT PROTECTION	Power Amplifier can withstand infinite VSWR and is temperature protected	
GPS	Motorola Encore 8-channel	
REMOTE MODEM CONTROL	Internal Bell 212A modem for full remote control	
REMOTE TEL CO CONTROL	On/Off and power level with DTMF tones	
DISPLAY	64 X 240 back-lighted, CCF LCD	
WARM UP TIME	Less than 5 minutes	
POWER	90-250 VAC or	PCS 12VDC @ 10 Amps Cellular 24VDC @ 8 Amps
WEIGHT	24 pounds	
DIMENSIONS	18" X 15½" X 7"	

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